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2 of 3

SUPPORTING DOCUMENT

1. Total Pages 979

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1991 Borehole Completion Data Package for the Low-Level Burial Grounds	WHC-SD-EN-DP-044 Volume 2 of 3	0

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

APPROVED FOR PUBLIC RELEASE

1-26-93 D. Sole

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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9. Impact Level 3Q

10. RELEASE STAMP

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DATE FEB 09 1993
Station # 12

9313018.1

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

9.0 WELL 299-W7-11

9.1 DRILLING

Construction of this well began on 10 April 1991 and total depth of 234.5 feet was reached on 25 May 1991. The well was drilled using a cable tool rig. Approximately 313 gallons of water were added during drilling activities. Specific well construction information is located in Table 9.1. 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 9.1 299-W7-11 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.8	ALS
	10"	165.2	ALS
	8"	234.5	ALS
Gross Gamma Logging	1 May	164.6	0
	24 May	235.0	130.0
Permanent Casing	4"	211.5	ALS
Screen	4" 10-Slot	232.0	211.5
Filter Pack	20-40 Silica Sand	235.3	207.9
Annular Seal	Bentonite Pellets	207.9	203.9
	Bentonite Crumbles	203.9	20.0
	Cement Grout	20.0	1.9
Concrete Pad	4'x4'x6"	1.9	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 45 feet BLS and were primarily sandy gravel with some silt. Approximately 15 feet (45-60 feet BLS) of silt, sandy gravel with some caliche, and gravelly sand represent the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (60-234.5 feet BLS).

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 9.1. Reproductions of these logs are also located at the end of this section.

9.2 WELL COMPLETION

Well completion began on 7 June 1991 and was completed on 13 June 1991. Static water level at the time of completion was 220.9 feet below land surface (BLS). Completion details are presented in Table 9.1. 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.

9.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 29 July 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 1683 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 29 July with the intake located 232.1 feet below the top of the protective casing.

9.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 26 July 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the recovery data was insufficient for analysis. Results from these tests are presented in Table 9.2. The values for transmissivity calculated from the constant discharge test may not be representative of the actual formation because of variable pumping rates, borehole storage effects, and partial well penetration. Drawdown, slug injection, and slug withdrawal data plots are shown in Figures 9.1 through 9.3 respectively. Raw data from the aquifer testing at 299-W7-11 are located at the end of this section.

Table 9.2 Hydrologic Testing Results from 299-W7-11				
Formation: Ringold		Lithology: Sandy Gravel	Interval Tested*: 221.7 - 236.2	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	26 Jul 91	Cooper-Jacob (1946)	----	650†
Recovery	26 Jul 91	Not Interpretable	----	----
Slug Injection	29 Jul 91	Bouwer-Rice (1989)	42	----
Slug Withdrawal	29 Jul 91	Bouwer-Rice (1989)	25	----

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

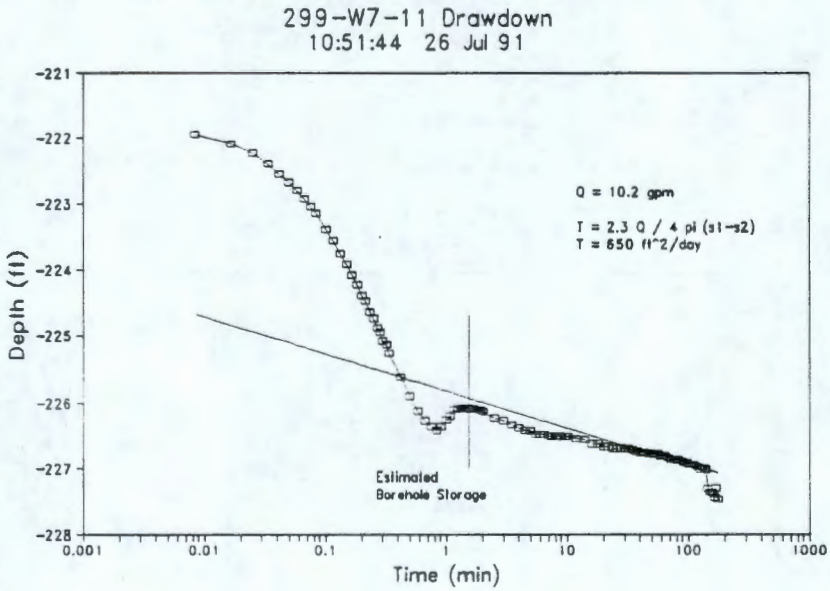

Figure 9.1 299-W7-11 Drawdown Plot.

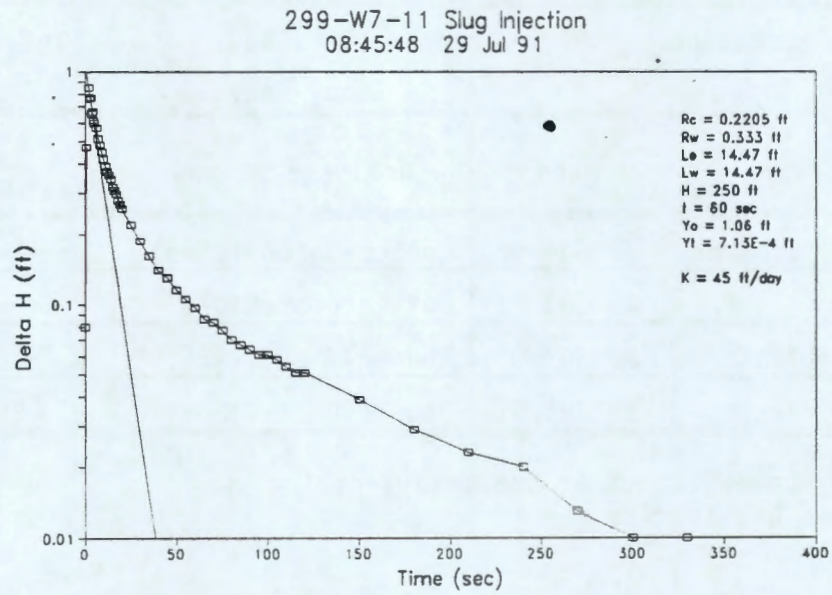

Figure 9.2 299-W7-11 Slug Injection Plot.

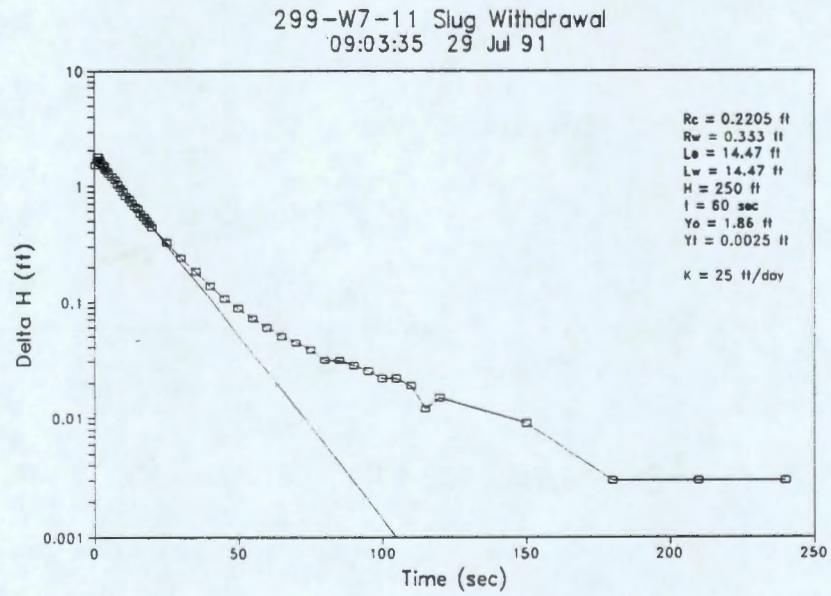

Figure 9.3 299-W7-11 Slug Withdrawal Plot.

LLBG FACILITY 1991

WELL 299-W7-11

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4/10/91	5/24/91	33	—	234.5	221.6	313.0

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
6/7/91	6/13/91	5	220.9	235.3	211.5-232.0	30 - ADDED 35 - REMOVED

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	7/26/91	7/26/91	7/29/91	1683

COMMENTS:

9313018.1?

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

1 of 5

WELL CONSTRUCTION REPORT

Specification No. WHC-S-014 Rev No. 5

ECNs 144240, 144241, 127437

Project W-017 RCRA

Location 200W Dayton & 27th Street

Drilling Company Kaiser Engineers Hanford

Driller Gene Thomas (0867)

Other (Companies)

Geologist(s) Ken Hoffmann, George Lightner, Stacey Callison (EBASCO), R. Weingart, Bryan Walz, J.A. Coates

Well No. 299-W7-11 Temp. Well No. MW-1

Coordinates N: 137,636.0; E: 566,186.2 (LAMBERT)

Casing Elev. 681.45' Ground Elev. 678.03' BRASS CAP

Drilling Method

Verification Method Visual observation.

Criteria WHC-S-014 5.2, 5.3, 7.5, ET 6.7 sec. 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	NA	NA
Cable Tool	D 0'-152'	H 152'-234.5'	SWC	5/24/91
Drilling Fluid	raw water	~313 GAL	[illegible]	5/24/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gamma	0 - 164.63	5/1/91
Gross Gamma	1300'-2350'	5-24-91
	-	
	-	
	-	

Completion Data

Drilled Depth 234.5

Completed Depth 234.5

Date Started 4/10/91

Date Completed 5/24/91

Static Water Level/Date 215.1' 5/24/91

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 7-29-91

Completion Results

Cleaning

Verification Method Visual Inspection

Criteria WHC-S-014 7.6, 4.2.2, 7.7
WHC-CN-7-7 sec. 5.4

	Initials	Date
Drilling Tools/Rig	SWC	4-8-91
Temporary Materials	SWC	4-8-91
Permanent Materials	SWC	6/10/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014 7.3, 4.2.2

	Initials	Date
Mtl. Handling/Storage	SWC	6/10/91
Material Packing	SWC	6/10/91

Screen

Type	Length	Slot Size
Stainless steel 10 slot wire wrap	21.04	10 slot

Depth(s) 211.5' ~~208.3'~~ - 232.0' ~~229.0'~~ bls
BW 6/13/91

Verification Method verify using steel tape

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

Initials RAN BGW Date 5-24-91 6/13/91

Lubricants/Additives

Verification Method Visual observation

Criteria WHC-S-014 7.2

	Identify	Initials	Date
Additives	Raw Water	SWC	4/15/91
Lubricants	Well Guard	[illegible]	5/23/91

Straightness Test

Verification Method Visual observation

Criteria WHC-S-014 8.2

Initials [illegible] Date 5/24/91

9313018.1351

A-6000-436 (09/90)

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W7-11

Casing (permanent)

Type	Size	Placement
4" OD stainless steel	4"	+3.0 - 232.3'
		-
		-
		-

Verification Method: Verify using steel tape

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

Initials: BGW Date: 6/13/91

Well Protection

Verification Method: Visual, measure w/ 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 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~~ 4/16/91 SWC

Type	Interval	Volume	Initials	Date
20-40 silica sand	235.3 - 207.9	19-100# bags (21.3 ft³)	SWC	6/12/91
1/4" bentonite pellets	207.9 - 203.9	5-50# buckets (3.1 ft³)	SWC	6/12/91
20 mesh bentonite crumbles	20.0' - 203.9	~~85~~ .143 5-50# bags (~~58.9 ft³~~ 101.53) BWG 6/13/91	BGW	6/13/91
cement grout	1.9' - 20.0'	37-94# bags + H_2O (47.5 ft³) 6 gal/bag	BGW	6/13/91

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 4.2.11, 4.2.7

	Initials	Date
Pump Decon/Prep	JAC	7-29-91
Installed	JAC	7-29-91
Pump Tested	JAC	7-29-91

Other (initial if performed)

NA Well Abandonment NA Downhole TV Inspection SWC Complete As-Built Diagram, Driller's/Geologist's Logs

JAC 7-26-91 Well Development

Comments/Remarks

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

A-6000-436 (09/90)

9313018.1255

LLBG FACILITY 1991

WELL 299-W7-11

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4/10/91	5/24/91	33	—	234.5	221.6	313.0

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
6/7/91	6/13/91	5	220.9	235.3	211.5-232.0	30 - ADDED 35 - REMOVED

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	7/26/91	7/26/91	7/29/91	1683

COMMENTS:

9313018.1353

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

WELL SUMMARY SHEET

Boring or Well No. 299-W7-11

Sheet 1 of 2

Location 200 West 27th Dayton

Elevation 678.03' Brass Cap

Driller Gene Thomas

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison Date 4/17/91

Project W-017 LLBG

Drilling Contractor Kaiser Engineers Hanford

Drilling Method and Equipment Cable Tool / Walker Neer

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

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12" ØD temporary carbon steel casing from +0.62' to 19.84' bls		1.9		sandy GRAVEL
		10'		" "
				" "
		19.84' 20'		" "
10" OD temporary carbon steel casing to 165.17'			H	slightly silty sandy GRAVEL
		30'		sandy GRAVEL
				" "
		40'		" "
8" OD temporary carbon steel casing to 234.5' bls				SILT EP?
		50'	PP	gravelly silty SAND (caliche)
				gravelly SAND
and I & II Grout From 1.9'-20.0' bls		60'		SAND
				gravelly silty SAND
8-20 mesh bentonite crumbles from 20.00' to 203.9' BLS		70'		slightly gravelly silty SAND
				silty fine SAND
		80'		slightly silty SAND
			UR	very coarse SAND
		90'		coarse SAND
				coarse SAND
		100'		medium SAND
				medium SAND
		110'		medium SAND
				fine SAND
		120'		sandy GRAVEL
				sandy GRAVEL
		130		sandy GRAVEL
				sandy GRAVEL
		140		silty sandy GRAVEL
				silty sandy GRAVEL
		150		silty sandy GRAVEL
				sandy GRAVEL
		160'		silty gravelly SAND
		165'		silty gravelly SAND

165.17' 9-9

9212010 12:11

495

WELL SUMMARY SHEET

Boring or Well No. 299-W7-11

Sheet 2 of 2

Location 200 west, 27TH & Dayton

Elevation 678.03' BRASS CAP

Driller Gene Thomas

Prepared By George Lightner (Sign/Print Name) Date 5/6/91

Project W-017 HLBG

Drilling Contractor Kaiser Engineers Hanford

Drilling Method and Equipment Cable Tool Walker Neer

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

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
8" O.D. temporary carbon steel casing to 234.5'		170'		silty GRAVEL
				silty sandy GRAVEL
		180'		silty sandy GRAVEL
				sandy GRAVEL
8-20 mesh crumbles from 20.0' to 203.9' bls		190'		sandy GRAVEL
				sandy GRAVEL
		200'		sandy GRAVEL
volclay Pellets ¼"-3/8" from 203.9' to 207.9' bls		203.9'		sandy GRAVEL
		202.5'		sandy GRAVEL
20-40 sand CO silica from 207.9' to TD.		210' 211.5		sandy GRAVEL
		216.1' 224.1'		sandy GRAVEL
		220'		sandy GRAVEL
				sandy GRAVEL
0.010 slot screen from 211.5' to 232.0' bls		229.0 230' 232.0		silty sandy GRAVEL
		234.5'		silty sandy GRAVEL
		240'	234.5' T.D.	
		250'		
		260'		
		270'		
		280'		
		290'		
		300'		
		310'		
		320'		
		9-10		

9313018.1355

BOREHOLE LOG

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Boring or Well No. 299-W7-11

Sheet 1 of 12

Location 200 West 27th + Dayton

Project ~~W-049~~ / LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment Cable Tool / ~~WM~~ WN/WSSI

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison

Date 4/15/91

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

Date 4/20/91

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
0'					
					Note: 5' + 10' samples were taken by Ken Hoffman
				(5') sandy GRAVEL (60% gravel, 40% sand)	sample taken w/8" CB
	2 mason 1 moist 1 rad	DB		Vy Dk. grayish brown (10 YR 3/2) wet	
5'				grayish brown (10 YR 5/2) dry	
				slightly moist, poorly sorted, subrounded-subangular, mod. rxn to 10% HCL, 65% mafic 35% felsic. Gravels 10% SC, 10% VCP, 10% CP, 20% MP 5% FP, 5% VFP; Sand 10% VCS 10% CS, 5% MS, 10% FS, 5% VFS	Add 4 gallons water @ 7' bls
	2 mason ~~1 moist~~ 1 rad	4/10/91 SWC DB		(10') sandy GRAVEL (60% gravel, 40% sand) same as above	No moisture sample taken due to water added
10'					6 gallons H_2O added END 4/10/91
					3 gallons water added
	2 mason 1 moist 1 rad	DB		(15') sandy GRAVEL (70% gravel 30% sand) H olive brown (2.5Y 5/3) natural	4/15/91 cd @ 14' bls 12" CS casing
15'				H brownish gray (2.5Y 4/2) dry	
				VCP-10% CP-20% MP-15% FP-15% VFP-10% VCS-15% CS-10% MS-5% dry	
				poorly sorted, 75% mafic 25% felsic	
				moderate rxn to 10% HCL, subangular	
20'					

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 2 of 12

Location 200 West 27th + Dayton

Project W-017/LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment Cable Tool / WM

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison Date 4/15/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/20/91

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
20'	2 mason 1 moist 1 rad	DB		(20') sandy GRAVEL (70% gravel, 30% sand) lt. olive brown (2.5Y 5/3) natural lt. brownish gray (2.5Y 6/2) dry VCP-10% CP-20% MP-15% FP-15% VFP-10% VCS-15% CS-10% MS-5%, damp poorly sorted, 75% mafic 25% felsic moderate rxn to 10% HCL	4/15/91 cd 3 19' b/s 12" cs casing
25'	2 mason 1 moist 1 rad	DB		(25') slightly silty sandy GRAVEL (60% gravel 30% sand 10% silt) olive brown (2.5Y 4/3) natural pale yellow (2.5Y 7/3) dry VCP-10% CP-15% MP-15% FP-10% VFP-10% VCS-10% CS-10% MS-10%, damp poorly sorted, 70% mafic 30% felsic strong rxn to 10% HCL	4/15/91 cd: 19' b/s silt grades in @ ~ 24' b/s silt grades out @ ~ 27' b'
30'	2 mason 1 moist 1 rad	DB		(30') sandy GRAVEL (70% gravel, 30% sand) lt. olive brown (2.5Y 5/3) natural lt. brownish gray (2.5Y 6/2) dry VCP-10% CP-20% MP-15% FP-15% VFP-10% VCS-15% CS-10% MS-5%, damp to dry poorly sorted, 75% mafic 25% felsic moderate rxn to 10% HCL	4/16/91 cd: 19' b/s less silt than previous
35'	2 mason 1 moist 1 rad	DB		(35') sandy GRAVEL (60% gravel 35% sand 5% silt) lt. olive brown (2.5Y 5/3) natural lt. brownish gray (2.5Y 6/2) dry VCP-5% CP-15% MP-20% FP-10% VFP-10% VCS-10% CS-10% MS-10% FS-5% damp poorly sorted, subangular, 75% mafic 25% felsic, strong rxn to 10% HCL	4/16/91 cd: 28' b/s 10" cs casing sample less coarse than previous
40'					

9-12

A-6000-382 (04/90)

9313018.1357

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

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 3 of 12

Location 200 West 27th + Dayton

Project W-017 LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment Cable Tool / WN

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison Date 4/10/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91

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
40'	2 mason 1 moist 1 rad	DB		(40') sandy GRAVEL (70% gravel 30% sand) pale yellow (2.5Y 7/4) natural pale yellow (2.5Y 7/3) dry MP-15% FP-30% VFP-25% VCS-15% CS-10% MS-5%, dry to damp well sorted, subangular, 75% mafic 25% felsic, strong rxn to 10% HCL	4/17/91 cd ≈ 38' bls 10" CS casing sample less coarse than previous silt starts @ ~42' bls
45'	2 mason 1 moist 1 rad	DB		(45') SILT (100% silt) lt. olive brown (2.5Y 5/3) natural pale yellow (2.5Y 7/3) dry very well sorted, damp, mica present strong rxn to 10% HCL	4/17/91 cd ≈ 39' bls 10" CS casing
50'	2 mason 1 moist 1 rad	DB		(50') silty sandy GRAVEL (caliche) (40% gravel, 40% sand, 20% silt) very pale brown (10YR 8/3) natural white (10YR 8/1) dry, MP-10% FP-15% VFP-15% VCS-15% CS-10% MS-10% FS-5% damp, moderately sorted, subangular, 60% mafic 40% felsic very strong rxn to 10% HCL	4/17/91 cd ≈ 34' bls 10" CS casing caliche @ 50' bls sharp contact gradational contact @ 53' bls
55'	2 mason 1 moist 1 rad	DB		(55') gravelly SAND (75% sand 25% gravel) lt. yellowish brown (2.5Y 4/4) natural pale yellow (2.5Y 7/3) dry MP-5% FP-10% VFP-10% VCS-10% CS-15% MS-20% FS-15% VFS-15% dry to damp, well sorted, subangular to subrounded, 60% mafic 40% felsic very strong rxn to 10% HCL	4/17/91 cd ≈ 48' bls 10" CS casing 2 gallons H_2O added @ 54' bls

A-6000-382 (04/90)

1008

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

BOREHOLE LOG

Boring or Well No 299-W7-11

Sheet 4 of 12

Location 200 West 27th + Dayton

Project W-017 LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison Date 4/16/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91

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
60'	2 mason 1 moist 1 rad	DB		(60') SAND (100% sand) lt. yellowish brown (2.5Y 6/3) natural lt. gray (2.5Y 7/2) dry CS-25% MS-40% FS-20% VFS-15% dry to damp, very well sorted, angular. 50 mafic 50% felsic, No rxn to 10% HCL mica present	4/17/91 cd = 48' bls 10" CS casing
65'	2 mason 1 moist 1 rad	DB		(65') gravelly silty SAND (70% sand, 15% silt 15% gravel) lt. yellowish brown (2.5Y 6/4) natural pale yellow (2.5Y 7/4) dry FP-5% VFP-10% VCS-10% CS-15% MS-25% FS-10% VFS-10% damp moderately sorted, subangular 50% mafic 50% felsic, strong rxn to 10% HCL mica present	4/18/91 cd = 57' bls 10" CS casing add 5 gallons water @ 66' bls add 2 gal water @ 68' bls
70'	2 mason 1 moist 1 rad	DB		(70') slightly gravelly silty SAND (70% SAND, 25% silt, 5% gravel) lt olive brown (2.5Y 5/4) natural, olive brown (2.5Y 4/4) dry. FP-20%, VFP-5%, VCS-5%, CS-5% MS-5%, FS-55%, VFS 5% damp, moderately sorted, 75% mafic, 20% feldspathic 5% felsic. Trace mica. Strong reaction to HCL, Non Plastic	
75'	2 mason 1 moist 1 rad	DB		(75') Silty fine SAND (2% gravel, 23% silt, 75% fine sand. FP 1%, VFP 1%, MS 25%, FS 50%. Moderately sorted. olive brown, 2.5Y 4/2 natural, light brownish gray 2.5Y 6/2 dry. Strong HCL reaction. 75% mafic 20% feldspathic, 5% felsic	
80'					

9-14

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 5 of 12

Location 200 West 27th + Dayton

Project W-017 / LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor Kaiser Engineers Hanford

Driller ~~Gene Thomas~~

Drilling Method and Equipment Cable Tool / Walker Neer

Prepared By ~~Stacey W. Collison~~ George Abtner (Sign/Print Name) Stacey W. Collison

Date 4/18/91

Reviewed By R A Munn / RB Meier (Sign/Print Name)

Date 24 Apr 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 MASON 1 MOIST 1 RAD	DB		(80') slightly silty MED SAND (10% silt, 90% sand). (olive brown 2.5Y 4/4 natural, light brown-ish gray 2.5Y 6/2 dry. VCS 20% CS 30% MS 50% strong reaction to HCL. 60% mafic, 40% felsic	4/19/91 10" CS casing
	2 MASON 1 MOIST 1 RAD	DB			
85'				(85') Very Course SAND (90% VCS 5% CS, 4% FS, 1% OTHER) Olive brown 2.5Y 4/2 natural, Dark olive 5Y 3/2 dry Moist well sorted, Subrounded, 50% mafic ~~40~~ 50% felsic, No reaction to HCL Trace gravel, fine to very fine pebbles, 1%	4/22/91 10" CS casing
	2 MASON 1 MOIST 1 RAD	DB			
90'				(90') Course SAND (80% CS, 5% MS, 5% FS 5% VFS, 5% other) Olive brown 2.5Y 4/4 natural, light brownish gray 2.5Y 6/2 dry, Moist, Moderately sorted, Subrounded, 40% mafic 60% felsic, No reaction to HCL Trace gravel 2% MP 1% FP 2% VFP	
	2 MASON 1 MOIST 1 RAD	DB			
95'				(95') Course SAND (80% CS, 5% MS, 10% FS, 4% VFS, 1% other) Olive brown 2.5Y 4/4 natural, light brownish gray 2.5Y 6/2 dry, Moist, Moderately sorted Subrounded 40% mafic, 60% felsic, Weak reaction to HCL Trace gravel, (1% VFP) Trace mica	
100'					

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 6 of 12

Location 200 West 27TH Dayton

Project W-017/LTBG

Elevation 678.03' Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment Cable Tool/Walker Near

Prepared By George Lightner (Sign/Print Name) Date 4/22/91

Reviewed By R B Munn/R D Merrill (Sign/Print Name) Date 29 Apr 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 Mason 1 Moisture 1 RAD	DB		(100') Medium SAND (75% MS 20% FS, 5% VFS) Dark grayish brown 2.5Y 4/2 natural 2.5Y 6/2 light brownish gray dry moist. Very well sorted, Rounded. 75% felsic 25% mafic, No reaction to HCl Trace mica	Dept of Casing 100' 10" CS 10" DB WATER LEVEL - NONE
	2 Mason 1 Moisture 1 RAD	DB			
105'				(105') Medium SAND (80% MS, 15% FS, 5% VFS) ~~Light~~ Grayish Brown 2.5Y 5/2 Natural, Light brownish gray 2.5Y 6/2 Dry, Moist, (Well Sorted) Subrounded 25% mafic, 75% felsic Weak reaction to HCl Trace mica	4/23/91 - Casing start depth 100', Drilling rate moderate. Casing size is 10 Type casing is carbon steel (CS). Bit size is a 10" drive barrel (DB) water level has not been reached
	2 Mason 1 Moisture 1 RAD	DB			
110'				(110') Medium SAND (80% MS 10% FS, 10% VFS) Grayish brown 2.5Y 5/2 natural, light brownish gray 2.5Y 6/2 Dry. Moisture content "dry" Well sorted, Subrounded, 25% mafic 75% felsic, Weak reaction to HCl. Trace gravel (one small cobble, FP, NEP < 1%. Trace mica.	
	2 Mason 1 Moisture 1 RAD	DB			
115'				(115') Fine SAND (80% FS, 10% MS, 5% CS, 5% Gravel Grayish brown 2.5Y 5/2 natural light gray 2.5Y 7/2 dry Moisture content "dry" Well Sorted Rounded 25% mafic 75% felsic, Weak reaction to HCl	Changing (DB) drive barrel - crack in hammer
120'					

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No 299-W7-1

Sheet 7 of 12

Location 200 WEST 27TH DATON

Project W-017/ILBG

Elevation 678.03' BRASS CAP

Drilling Contractor KAISER ENGINEERS, HANFORD

Driller GENE THOMAS

Drilling Method and Equipment CABLE tool/WATER NEED

Prepared By George Lightner (Sign/Print Name) Date 4/24/91

Reviewed By R.B. Mercer/R.B. Mercer (Sign/Print Name) Date ~~4/24/91~~ 4/29/91

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
120'	2 MASON 1 MOIST 1 RAD			(120') SANDY GRAVEL (15% VFS 10% FS, 10% MS, 10% CS, 5% VCS, 10% SC, 20% VCP, 10% CP, 5% MP, 10% FP, 5% VFP) Grayish brown 2.5Y 5/2 natural light brownish gray 2.5Y 6/2 Dry, Dry no moisture, Very poorly sorted, Subrounded, Sand is 20% mafic + 80% felsic, Gravel is 90% mafic + 10% felsic. None-reaction to HCl	4/24/91 Depth of casing 119.63'. Casing size - 10", CS, 13.1 size 10" DB - No water
125'	2 MASON 1 MOIST 1 RAD			(125') Sandy GRAVEL (~~[illegible]~~ 3% VCP, 5% CP, 5% MP, 2% FP, 9% VFP, 30% VCS, 10% CS, 5% MS, 2% FS, 3% VFS) Grayish brown 2.5Y 5/2 natural light brownish gray 2.5Y 6/2 Dry, Dry No moisture, Very poorly sorted, Subrounded, sand is 30% mafic + 70% felsic, Gravel is 90% mafic + 10% felsic, No reaction w/ 10% HCL	4/25/91 Two gal water added
130'	2 MASON 1 MOIST 1 RAD			(130') Sandy GRAVEL (10% MS 15% FS, 15% VFS, 30% SC, 10% VCP, 5% CP, 5% MP, 5% FP, 5% VFP. Grayish brown 2.5Y 5/2 natural, light brownish gray 2.5Y 6/2 dry, Dry no moisture Very poorly sorted Subrounded Sand 20% mafic, 80% felsic, Gravel 40% mafic 60% felsic, HCL reaction none	Dirt not staying in DB One gal water added One gal water added
135'	2 MASON 1 MOIST 1 RAD			(135') Sandy gravel (10% MS 15% FS, 15% VFS, 30% SC 10% VCP, 5% CP, 5% MP, 5% FP 5% VFP Grayish brown 2.5Y 5/2 natural, light brownish gray 2.5Y 6/2 Dry, No moisture Dry, Very poorly sorted Subrounded Sand 20% mafic 80% felsic, Gravel 40% mafic 60% felsic, HCL rex none	Depth of casing 132' 10" casing No water

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 8 of 12

Location 200 WEST, 27TH & DATON

Project (2)-017 / LLBG

Elevation 678.03' BRASS CAP

Drilling Contractor KAISER ENGINEERS, HANFORD

Driller GENE THOMAS

Drilling Method and Equipment Cable Tool / Walker Neer

Prepared By George Lightner (Sign/Print Name) Date 4/26/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91

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
140'	2 MASON 1 MOIST 1 RAD	DB		(140') silty sandy GRAVEL (15% silty, 25% sand, 60% Gravel) (5% ms, 15% fs, 5% vfs, 20% sc, 20% vcp, 5% cp, 5% mp, 5% fp, 5% vfp. Grayish brown (2.5Y 5/2) natural, light gray (2.5Y 7/2) dry. No moisture: dry, very poorly sorted, subrounded, 60% felsic, 40% mafic, Weak 10% HCL rx.	4/26/91: Depth of casing 132', 10" CS Bit size 0.93' No water level @ 136' Dry - Not staying in the 144.73' casing 1 gal water added 1 gal water added
145'	2 MASON 1 MOIST 1 RAD	DB		(145') silty sandy GRAVEL (15% silt, 30% sand, 55% Gravel) (ms 10%, fs 10%, vfs 10%) (LC 25% sc 10%, cp 5%, mp 5% fp 5%, vfp 5%) Grayish brown (2.5Y 5/2 natural, light gray 2.5Y 7/2 dry, No moisture: dry, very poorly sorted, subrounded, 35% mafic 65% felsic weak rx 10% HCL	1 gal water added @ 144' 155' - 29' casing
150'	2 MASON 1 MOIST 1 RAD	DB		(150') silty sandy GRAVEL (10% silt, 15% sand, 75% gravel) 5% vcs to ms, 10% fs to vfs, 50% cp, 25% mp to vfp, Grayish brown (2.5Y 5/2) natural light gray (2.5Y 7/2) dry. No moisture: dry. Poorly sorted, subrounded, 40% mafic, 60% felsic, very weak rx to 10% HCL	Depth of casing 150' 10" CS. Bit 0.93 No water @ 150' Drilling rate 1.87'/hr.
155'	2 MASON 1 MOIST 1 RAD	HT		(155') Sandy Gravel - crushed rock. Grayish brown (2.5Y 5/2) natural, light gray (2.5Y 7/2 dry. No moisture, dry. 60% mafic 40% felsic	4/29/91 one gal water added @ 51' one gal water added @ 53' six gal water added using 10" HT, four gal added using HT

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 9 of 12

Location 200 WEST, 27TH & DATON
Project W-017/LLBG
Elevation 678.03' BRASS CAP
Drilling Contractor KAISER ENGINEERS HANFORD
Driller GENE THOMAS
Drilling Method and Equipment CABLE TOOL
Prepared By George Lightner (Sign/Print Name) Date 5/1/91
Reviewed By R.D. Miller (Sign/Print Name) Date 5/7/91

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'	2 MASON 1 MOIST 1 RAD	HT		(160') Silty Gravely SAND. (60% mafic, 40% felsic) crushed rock from hard tool (HT), Grayish brown (2.5Y 5/2) natural, light gray (2.5Y 7/2 dry	25 gal water added 4/30/91 @ 155' to 159' CASING @ 160' 10" CS No water level Easier drilling @ 160' 5/1/91 @ 160' 10 gal water added
165'	2 MASON 1 MOIST 1 RAD	HT		(165') silty sandy GRAVEL (60% mafic, 40% felsic) crushed rock from HT Grayish brown (2.5Y 5/2) natural, light gray (2.5Y 7/2) dry	changing to 8" casing
					5/6/91
170'	2 MASON 1 MOIST 1 RAD	DB		(170') ~~SANDY~~ silty GRAVEL (20% SAND, 35% silt, 45% gravel) 10% FS, 10% VFS, 35% silt, 20% VCP, 20% CP, 5% FP to VFP, Grayish brown (2.5Y 5/2) natural, Light brownish gray (2.5Y 6/2) dry, No moisture dry, Poorly sorted, Subrounded, Sandy silt is 10% mafic 90% felsic, Gravel is 50% mafic 50% felsic	Depth of casing 165.17' 8" CS, Bit size 0.27' No water dry-Hard drilling 1 gal water added NO 10% HCL rex.
175'	2 MASON 1 MOIST 1 RAD	DB		(175') SANDY GRAVEL (15% silt 30% SAND, 55% Gravel) 5% CS-MS, 25% FS-VFS, 15% SC, 15% VCP, 10% MP, 10% FP, 5% VFP, Grayish brown (2.5Y 5/2) natural, Light brownish gray (2.5Y 6/2) dry-Dry, Poorly sorted, Subrounded silty sand 10% mafic, 90% felsic, Gravel 60% mafic, 40% felsic. No HCL rex	2 gal water added

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 10 of 12

Location 200 West, 27TH & Dayton

Project W-012/LLBG

Elevation 678.03 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller Gene Thomas

Drilling Method and Equipment Cable Tool

Prepared By George Lightner (Sign/Print Name) Date 5/6/91

Reviewed By K Reynolds (Sign/Print Name) Date 9/16/92

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
180'	2 MASON 1 MOIST 1 RAD	D13		(180') Silty Sandy GRAVEL, (15% silt, 25% sand, 60% gravel) 5% vcs to cs, 10% ms-fs, 10% vfs, 15% sc, 15% vcp-cp 15% mp-mfp, 15% fp-vfp Grayish brown (2.5Y 5/2) natural, light brownish gray (2.5Y 6/2) dry. Dry. Poorly sorted, Subrounded Sand 10% mafic 90% felsic, Gravel 60% mafic, 40% felsic No rex to 10% HCl	added 2 gal water
185'	2 MASON 1 MOIST 1 RAD	HT		(185') Sandy GRAVEL (Est. 40% sand 60% gravel, Grayish brown (2.5Y 5/2) natural, light brownish gray (2.5Y 6/2) dry. 70% mafic 30% felsic.	5/13/91, Depth of casing 178.28' cs 8", 0.77' bit No water 6 gal water added
190'	2 MASON 1 MOIST 1 RAD	HT		(190') Sandy GRAVEL (Est. 40% sand, 60% gravel) Grayish brown (2.5Y 5/2) natural, light brownish gray (2.5Y 6/2) dry 70% mafic, 30 felsic.	
					5/14/91 Depth of casing
195'	2 MASON 1 MOIST 1 RAD	200 blows for 6" recovery SS 3"		(195') silty sandy GRAVEL (15% silt 20% sand, 65% GRAVEL) fs to vfs 20% cp 10%, mp to vfp 35%, Grayish brown (2.5Y 5/2) natural, light brownish gray (2.5Y 6/2) dry. No moisture dry. Moderatly to poorly sorted. Subrounded to rounded. Sand 60% mafic 40% felsic, GRAVEL 75% felsic 25% mafic. No 10% HCl reaction.	185.48', 10" cs casing HT - 13.1 + 0.77' 5/14/91 Depth of casing 195.02' 10" cs 0.77' bit no water level. 195' S filled with mud + 6" very dense dry gravel in the mouth of SS 20 gal water added to boring

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 11 of 12

Location 200 WEST AREA, 27TH & DAVIS

Project W-017/HHBG

Elevation 678.03' BRASS CAP

Drilling Contractor KAISER ENGINEERS HANFORD

Driller GENE THOMAS

Drilling Method and Equipment CABLE TOOL

Prepared By GEORGE LIGHTNER (Sign/Print Name) Date 5/15/91

Reviewed By R.D.M. (Sign/Print Name) Date 5/22/91

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 MASON 1 MOIST 1 RAD	HT		(200') SANDY GRAVEL (est.) 30% SAND, 70% GRAVEL. GRAYISH BROWN (2.5Y 5/2) NATURAL, LIGHT BROWNISH GRAY (2.5Y 6/2) DRY, 60% MAFIC 40% FELSIC. NO HCL REACTION	HARD DRILLING 15 GAL WATER USED
205'	2 MASON 1 MOIST 1 RAD	HT		(205') SANDY GRAVEL (est) 30% SAND 70% GRAVEL, GRAYISH BROWN (2.5Y (5/2) NATURAL, LIGHT BROWNISH GRAY (2.5Y 6/2) DRY, 60% MAFIC 40% FELSIC. NO HCL REACTION	5/16/91 DEPTH OF CASING 202.55' 8" CS - NO WATER LEVEL.
210	2 MASON 1 MOIST 1 RAD	HT		(210') SANDY GRAVEL (est) 30% SAND 70% GRAVEL. GRAYISH BROWN (2.5Y 5/2) NATURAL, LIGHT BROWNISH GRAY (2.5 6/2) DRY, 70% MAFIC 30% FELSIC. NO HCL REACTION	HARD DRILLING 35 GAL WATER USED 206.0' CASING IN GROUND. 5/17/91 HARD DRILLING CABLE TOOL REEL MOVEMENT IS ALMOST UNVISABLE DURING HT.
215	2 MASON 1 MOIST 1 RAD	HT		(215') SANDY GRAVEL (est) 30% SAND, 70% GRAVEL. GRAYISH BROWN (2.5Y 5/2) NATURAL, LIGHT BROWNISH GRAY (2.5Y 6/2) DRY, 65% MAFIC 35% FELSIC. NO 10% HCL REACTION	CASING DEPTH 213.40 0.77' BIT 10" CS NO WATER LEVEL 35 GAL WATER USED

A-6000-382 (04/90)

9313018.1355

BOREHOLE LOG

Boring or Well No. 299-W7-11

Sheet 12 of 12

Location 200 West Area, 27th & Dayton
Project W-017 / 241BG
Elevation 678.03' BRASS CAP
Drilling Contractor Kaiser Engineers, Hanford
Driller Ken Blackman
Drilling Method and Equipment Cable Tool
Prepared By George Lightner (Sign/Print Name) Date 5/20/91
Reviewed By Kent Reynolds (Sign/Print Name) Date 9/16/92

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
220'	2 MASON 1 MOIST 1 RAD	HT		(220') SANDY GRAVEL (est 40% sand 60% gravel) Grayish brown (2.5Y 5/2) natural, Light brownish gray (2.5Y 6/2) dry 55% mafic, 45% felsic, No reaction to 10% HCL	Hard drilling 216.50 casing CS 8" - No water level used 20 gal water to 220.00'
					5/22/91 casing @ 216.50 - Drilling rate very slow water is starting to come into hole
225'	2 MASON 1 MOIST 1 RAD	SS		(225') SANDY GRAVEL (est 40% sand 60% gravel) Grayish brown (2.5Y 5/2) natural, Light brownish gray (2.5Y 6/2) dry 65% mafic, 35% felsic	water level 212.14'
					5 gal water added
230	2 MASON 1 MOIST 1 RAD	DB		(230) silty SANDY GRAVEL (11% silt, 19% sand, 70% GRAVEL) 19% MS to VFS, 10% SC, 20% VCP to CP, 40% MP to VFP, Grayish brown (2.5Y 5/2) natural Light brownish (2.5Y 6/2) dry Wet, Very poorly sorted, rounded 65% mafic, 35% felsic, 10% HCl rex None	Only sample out of DB material would not stay in DB because of the water.
					5/23/91 Depth of hole As/ind 228.49' CS 0.77' bit
					water level ▽ 214.1 @ 10:25
235				(234.5) silty Sandy GRAVEL same as previous except slight (wk) rx to 10% HCl	casing depth 234.07'
				TD = 234.5'	9-22

TD 234 F.D. 2/14/92

A-6000-382 (04/90)

9313018.1367

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

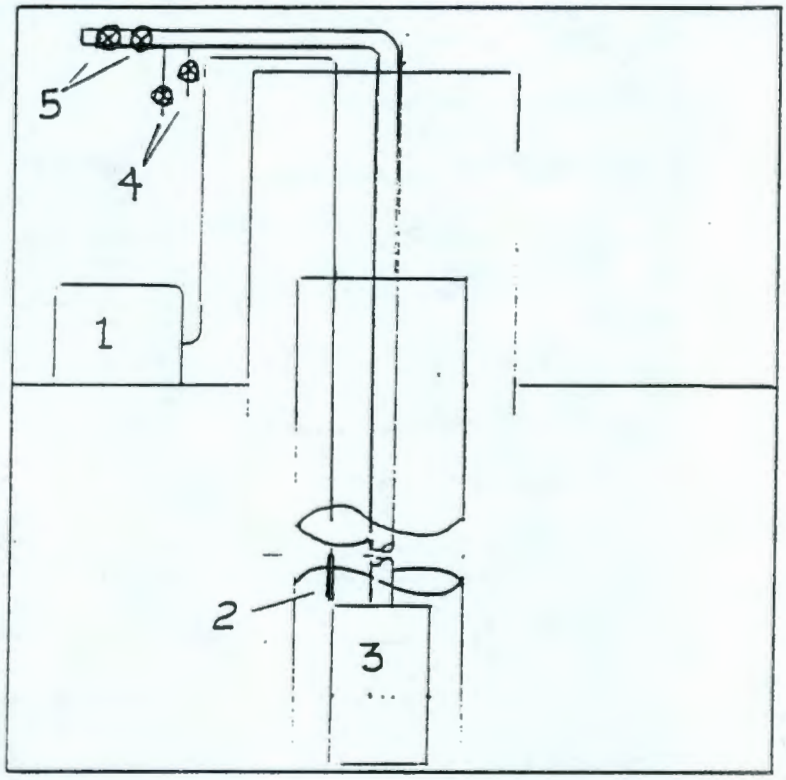
Well Designation 299-W7-11 Depth 236.2' BTOC. 6"

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-350976
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

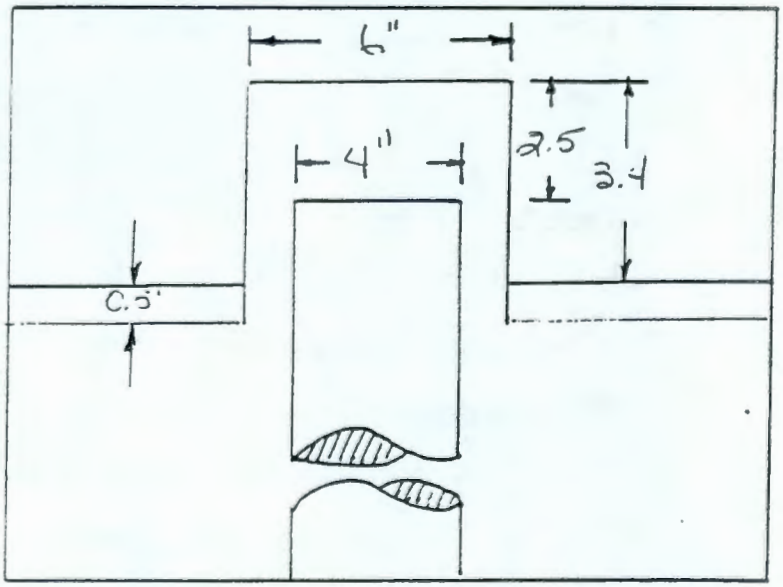
Diagram



Well Head

Comments

Diagram



Signature of Recorder JAMES A. COATES JAMES A. COATES Date 8-2-91

A-6000-417 (08/89)

9313018.1355

WELL DEVELOPMENT FORM

Well Designation 299-W7-11 Well Depth 236.2' BTOC 6"

Screened Interval 236.2 - 215.7' Date Well Development is Performed 7-26-91

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 233.5' Pump Start Time 1050

Flow Rate 10.2 GPM Accumulated Flow 1820 GALS Pump Stop Time 1348

Turbidity 7100 NTU, 85 NTU, 41 NTU, 24 NTU, 20 NTU, 8 NTU, 7.8 NTU, 6.3 NTU

44.0 NTU, 7.1 NTU, 7.5 NTU, 4.2 NTU, —, —, —, —

Comments _____

Signature of Recorder James H. Coates (JAMES H. COATES) Date 8-2-91

Sign and Print Name

A-6000-393 (03/90)

9313018.1369

DRAWDOWN/RECOVERY

Well Designation 299-W7-11 Date 7-26-91

Well Depth 236.2 BTOC 6" Screened Interval 236.2'-215.7'

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E-TAKE / TRANSDUCER S.N. ET-5 / 350916 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" (TOC. 0") Pump Start Time 1050 Pump Stop Time 1348.

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				5 GALS / 29.4 SEC = 10.2 GPM
				5 GALS / 29.4 SEC = 10.2 GPM
		SEE ATTACHED DATA		

Signature of Recorder Anne A. Cortes — Anne A Cortes Date 8-2-91

Sign and Print Name

A-6000-402 (03/90)

9313018.133

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#99

WELL 2-W17-11 BASELINE

SE2000
Environmental Logger
07/30 08:10

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/26 10:33:03

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0	0.00000	221.733	-221.733
1	0.01667	221.733	-221.733
2	0.03333	221.733	-221.733
3	0.05000	221.733	-221.733
4	0.06667	221.736	-221.736
5	0.08333	221.739	-221.739
6	0.10000	221.742	-221.742
7	0.11667	221.739	-221.739
8	0.13333	221.736	-221.736
9	0.15000	221.739	-221.739
10	0.16667	221.742	-221.742
11	0.18333	221.742	-221.742
12	0.20000	221.742	-221.742
13	0.21667	221.742	-221.742
14	0.23333	221.742	-221.742
15	0.25000	221.742	-221.742

9313018.1371

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WELL 2-W17-11 DRAWDOWN

SE2000
Environmental Logger
07/30 08:07

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/26 10:51:44

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	222.882	-222.882
0.0083	0.00014	221.948	-221.948
0.0166	0.00028	222.091	-222.091
0.0250	0.00042	222.236	-222.236
0.0333	0.00056	222.392	-222.392
0.0416	0.00069	222.540	-222.540
0.0500	0.00083	222.673	-222.673
0.0583	0.00097	222.787	-222.787
0.0666	0.00111	222.927	-222.927
0.0750	0.00125	223.041	-223.041
0.0833	0.00139	223.139	-223.139
0.1000	0.00167	223.386	-223.386
0.1166	0.00194	223.560	-223.560
0.1333	0.00222	223.757	-223.757
0.1500	0.00250	223.915	-223.915
0.1666	0.00278	224.089	-224.089
0.1833	0.00306	224.222	-224.222
0.2000	0.00333	224.397	-224.397
0.2166	0.00361	224.476	-224.476
0.2333	0.00389	224.647	-224.647
0.2500	0.00417	224.732	-224.732
0.2666	0.00444	224.878	-224.878
0.2833	0.00472	224.941	-224.941
0.3000	0.00500	225.074	-225.074
0.3166	0.00528	225.128	-225.128
0.3333	0.00556	225.255	-225.255
0.4166	0.00694	225.610	-225.610
0.5000	0.00833	225.901	-225.901
0.5833	0.00972	226.116	-226.116
0.6666	0.01111	226.256	-226.256

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WELL 2-W17-11 DRAWDOWN

0.7500	0.01250	226.351	-226.351
0.8333	0.01389	226.402	-226.402
0.9166	0.01528	226.354	-226.354
1.0000	0.01667	226.250	-226.250
1.0833	0.01805	226.192	-226.192
1.1666	0.01944	226.094	-226.094
1.2500	0.02083	226.066	-226.066
1.3333	0.02222	226.082	-226.082
1.4166	0.02361	226.069	-226.069
1.5000	0.02500	226.059	-226.059
1.5833	0.02639	226.072	-226.072
1.6666	0.02778	226.078	-226.078
1.7500	0.02917	226.088	-226.088
1.8333	0.03056	226.091	-226.091
1.9166	0.03194	226.101	-226.101
2.0000	0.03333	226.132	-226.132
2.5000	0.04167	226.215	-226.215
3.0000	0.05000	226.259	-226.259
3.5000	0.05833	226.322	-226.322
4.0000	0.06667	226.367	-226.367
4.5000	0.07500	226.398	-226.398
5.0000	0.08333	226.421	-226.421
5.5000	0.09167	226.471	-226.471
6.0000	0.10000	226.465	-226.465
6.5000	0.10833	226.468	-226.468
7.0000	0.11667	226.490	-226.490
7.5000	0.12500	226.509	-226.509
8.0000	0.13333	226.509	-226.509
8.5000	0.14167	226.500	-226.500
9.0000	0.15000	226.503	-226.503
9.5000	0.15833	226.506	-226.506
10.0000	0.16667	226.506	-226.506
12.0000	0.20000	226.538	-226.538
14.0000	0.23333	226.550	-226.550
16.0000	0.26667	226.607	-226.607
18.0000	0.30000	226.617	-226.617
20.0000	0.33333	226.645	-226.645
22.0000	0.36667	226.649	-226.649
24.0000	0.40000	226.683	-226.683
26.0000	0.43333	226.674	-226.674
28.0000	0.46667	226.664	-226.664
30.0000	0.50000	226.683	-226.683
32.0000	0.53333	226.677	-226.677
34.0000	0.56667	226.696	-226.696
36.0000	0.60000	226.712	-226.712
38.0000	0.63333	226.718	-226.718
40.0000	0.66667	226.737	-226.737
42.0000	0.70000	226.731	-226.731
44.0000	0.73333	226.725	-226.725
46.0000	0.76667	226.737	-226.737

9313018.1373

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WELL 2-W17-11 DRAWDOWN

48.0000	0.80000	226.753	-226.753
50.0000	0.83333	226.740	-226.740
52.0000	0.86667	226.769	-226.769
54.0000	0.90000	226.763	-226.763
56.0000	0.93333	226.759	-226.759
58.0000	0.96667	226.807	-226.807
60.0000	1.00000	226.791	-226.791
62.0000	1.03333	226.810	-226.810
64.0000	1.06667	226.778	-226.778
66.0000	1.10000	226.810	-226.810
68.0000	1.13333	226.820	-226.820
70.0000	1.16667	226.829	-226.829
72.0000	1.20000	226.858	-226.858
74.0000	1.23333	226.858	-226.858
76.0000	1.26667	226.848	-226.848
78.0000	1.30000	226.858	-226.858
80.0000	1.33333	226.845	-226.845
82.0000	1.36667	226.835	-226.835
84.0000	1.40000	226.873	-226.873
86.0000	1.43333	226.873	-226.873
88.0000	1.46667	226.867	-226.867
90.0000	1.50000	226.896	-226.896
92.0000	1.53333	226.905	-226.905
94.0000	1.56667	226.912	-226.912
96.0000	1.60000	226.927	-226.927
98.0000	1.63333	226.905	-226.905
100.0000	1.66667	226.943	-226.943
105.0000	1.75000	226.937	-226.937
110.0000	1.83333	226.943	-226.943
115.0000	1.91667	226.959	-226.959
120.0000	2.00000	226.981	-226.981
125.0000	2.08333	227.013	-227.013
130.0000	2.16667	226.991	-226.991
135.0000	2.25000	226.988	-226.988
140.0000	2.33333	227.019	-227.019
145.0000	2.41667	227.301	-227.301
150.0000	2.50000	227.355	-227.355
155.0000	2.58333	227.374	-227.374
160.0000	2.66667	227.380	-227.380
165.0000	2.75000	227.444	-227.444
170.0000	2.83333	227.295	-227.295
175.0000	2.91667	227.469	-227.469

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WELL 2-W17-11 RECOVERY

SE2000
Environmental Logger
07/30 08:04

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/26 13:50:36

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	220.998	-220.998
0.0083	0.00014	221.131	-220.998
0.0166	0.00028	220.985	-220.998
0.0250	0.00042	220.767	-220.998
0.0333	0.00056	220.624	-220.998
0.0416	0.00069	220.472	-220.998
0.0500	0.00083	220.342	-220.998
0.0583	0.00097	220.212	-220.998
0.0666	0.00111	220.06	-220.998
0.0750	0.00125	219.908	-220.998
0.0833	0.00139	219.826	-220.998
0.1000	0.00167	219.601	-220.998
0.1166	0.00194	219.427	-220.998
0.1333	0.00222	219.215	-220.998
0.1500	0.00250	219.097	-220.998
0.1666	0.00278	218.933	-220.998
0.1833	0.00306	218.819	-220.998
0.2000	0.00333	218.724	-220.998
0.2166	0.00361	218.587	-220.998
0.2333	0.00389	218.508	-220.998
0.2500	0.00417	218.454	-220.998
0.2666	0.00444	218.362	-220.998
0.2833	0.00472	218.343	-220.998
0.3000	0.00500	218.242	-220.998
0.3166	0.00528	218.185	-220.998
0.3333	0.00556	218.131	-220.998
0.4166	0.00694	217.856	-220.998
0.5000	0.00833	217.605	-220.998
0.5833	0.00972	217.4	-220.998
0.6666	0.01111	217.238	-220.998

9313018.1375

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WELL 2-W17-11 RECOVERY

0.7500	0.01250	217.118	-220.998
0.8333	0.01389	217.048	-220.998
0.9166	0.01528	216.981	-220.998
1.0000	0.01667	216.918	-220.998
1.0833	0.01805	216.867	-220.998
1.1666	0.01944	216.829	-220.998
1.2500	0.02083	216.801	-220.998
1.3333	0.02222	216.776	-220.998
1.4166	0.02361	216.757	-220.998
1.5000	0.02500	216.747	-220.998
1.5833	0.02639	216.747	-220.998
1.6666	0.02778	216.757	-220.998
1.7500	0.02917	216.779	-220.998
1.8333	0.03056	216.817	-220.998
1.9166	0.03194	216.855	-220.998
2.0000	0.03333	216.896	-220.998
2.5000	0.04167	217.232	-220.998
3.0000	0.05000	217.387	-220.998
3.5000	0.05833	217.419	-220.998
4.0000	0.06667	217.438	-220.998
4.5000	0.07500	217.453	-220.998
5.0000	0.08333	217.463	-220.998
5.5000	0.09167	217.466	-220.998
6.0000	0.10000	217.469	-220.998
6.5000	0.10833	217.472	-220.998
7.0000	0.11667	217.472	-220.998
7.5000	0.12500	217.469	-220.998
8.0000	0.13333	217.472	-220.998
8.5000	0.14167	217.472	-220.998
9.0000	0.15000	217.469	-220.998
9.5000	0.15833	217.469	-220.998
10.0000	0.16667	217.466	-220.998
12.0000	0.20000	217.46	-220.998

9213018.1227

SAMPLING PUMP INSTALLATION FORM

17

VALIDATED
KDR 3/2
SIGNATURE

Project: LLBG

Well Number 299-W7-11

Pump Type HYDROSTAR

Pump Model HS 8001

Date Installed: 7/29/91

Installed by: J.A. COATES / B. STRODE

Depth to water: 221.7' BTOC 6"

Depth to Bottom 236.2 BTOC 6"

Reported Depth to water: 215.1 BLS

Screened Interval: ~~211.5'~~ 232.0 - 211.5' BGS

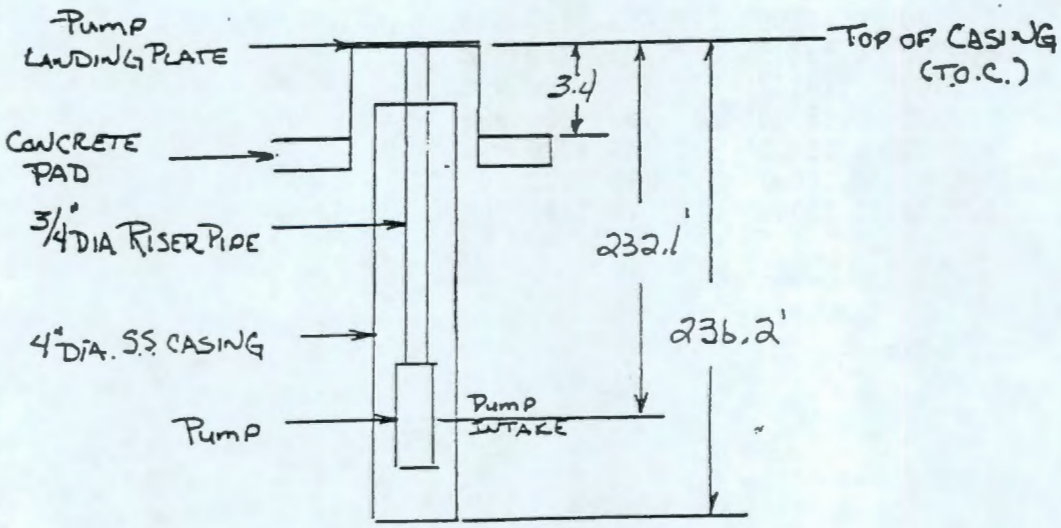
Pump/Riser Pipe Description:
pipe: 3/4" S.S.
pump length: 4.3'
pump screen length 1.9'
material cleaning: FACTORY

Comments: PER WHC-5-014 4.2.1 & 4.2.2.
WHC-CM-7-7.6.4 APP B.

232.0

PUMP INSTALLATION SKETCH

Total material length 234.3'
Loc. of pump intake: 232.1



Completed By: J.A. COATES

Date: 7-29-91

PUMP TEST - MM

5 GAL - 56 STROKES IN 1 MIN 3/4 SEC

9313018.1377

BOREHOLE TEST INFORMATION

KDR 7/18/92
SIGNATURE/DATE

Borehole 299-W7-11 Borehole Diameter 4" Hanford Coordinates — NA —

Interval Tested 236.2'-215.7' BTOC 6 Depth Interval 236.2'-215.7'

Test Type INSTANTANEOUS SLUG Borehole Depth 236.2'

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

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN- ET-5
DATA LOGGER.	IN-SITU INC. SN.- 21192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.- 350976.
SLUGGING ROD	6.1' x 2.0" = .137 ft³
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

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

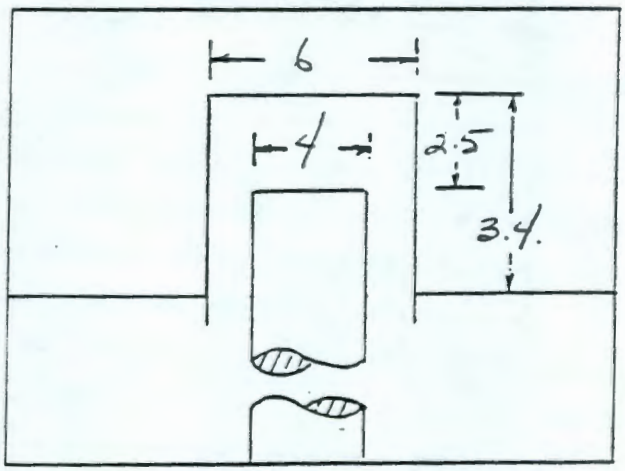
Elevation NA

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 7-31-91
Sign and Print Name Date

BD-6000-295 (05/89)

9313018.1372

INSTANTANEOUS SLUG TEST DATA SHEET
-WITHDRAWAL-

Borehole 299-W7-11
Interval Tested 236.2-255.7 BTOC
Depth to Water 221.73'
Date 7-29-91
Measured by JAMES A. COATES
Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time START WITHDRAWAL 0923
Transducer Measurement Units FEET
Depth to Transducer 9.497' BWL
Initial Pressure (P_i) 221.73
Slug Level or Pressure (P_{max}) 233.525
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 (Sign and Print Name) JAMES A. COATES 9-34 8-2-91 (Date)

9313018.1379

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WELL 2-W17-11 WITHDRAWAL

SE2000
Environmental Logger
07/30 07:55

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/29 09:03:35

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	221.587	-221.587
0.0083	0.00014	223.266	-223.266
0.0166	0.00028	223.525	-223.525
0.0250	0.00042	223.506	-223.506
0.0333	0.00056	223.389	-223.389
0.0416	0.00069	223.335	-223.335
0.0500	0.00083	223.272	-223.272
0.0583	0.00097	223.225	-223.225
0.0666	0.00111	223.142	-223.142
0.0750	0.00125	223.092	-223.092
0.0833	0.00139	223.028	-223.028
0.1000	0.00167	222.930	-222.930
0.1166	0.00194	222.848	-222.848
0.1333	0.00222	222.759	-222.759
0.1500	0.00250	222.696	-222.696
0.1666	0.00278	222.632	-222.632
0.1833	0.00306	222.566	-222.566
0.2000	0.00333	222.506	-222.506
0.2166	0.00361	222.458	-222.458
0.2333	0.00389	222.395	-222.395
0.2500	0.00417	222.357	-222.357
0.2666	0.00444	222.315	-222.315
0.2833	0.00472	222.274	-222.274
0.3000	0.00500	222.236	-222.236
0.3166	0.00528	222.201	-222.201
0.3333	0.00556	222.173	-222.173
0.4166	0.00694	222.056	-222.056
0.5000	0.00833	221.970	-221.970
0.5833	0.00972	221.913	-221.913
0.6666	0.01111	221.866	-221.866

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WELL 2-W17-11 WITHDRAWAL

0.7500	0.01250	221.837	-221.837
0.8333	0.01389	221.818	-221.818
0.9166	0.01528	221.802	-221.802
1.0000	0.01667	221.790	-221.790
1.0833	0.01805	221.780	-221.780
1.1666	0.01944	221.774	-221.774
1.2500	0.02083	221.768	-221.768
1.3333	0.02222	221.761	-221.761
1.4166	0.02361	221.761	-221.761
1.5000	0.02500	221.758	-221.758
1.5833	0.02639	221.755	-221.755
1.6666	0.02778	221.752	-221.752
1.7500	0.02917	221.752	-221.752
1.8333	0.03056	221.749	-221.749
1.9166	0.03194	221.742	-221.742
2.0000	0.03333	221.745	-221.745
2.5000	0.04167	221.739	-221.739
3.0000	0.05000	221.733	-221.733
3.5000	0.05833	221.733	-221.733
4.0000	0.06667	221.733	-221.733
4.5000	0.07500	221.730	-221.730
5.0000	0.08333	221.733	-221.733
5.5000	0.09167	221.726	-221.726
6.0000	0.10000	221.726	-221.726
6.5000	0.10833	221.726	-221.726
7.0000	0.11667	221.726	-221.726
7.5000	0.12500	221.723	-221.723
8.0000	0.13333	221.726	-221.726
8.5000	0.14167	221.723	-221.723
9.0000	0.15000	221.730	-221.730
9.5000	0.15833	221.726	-221.726
10.0000	0.16667	221.723	-221.723
12.0000	0.20000	221.723	-221.723
14.0000	0.23333	221.720	-221.720
16.0000	0.26667	221.717	-221.717
18.0000	0.30000	221.714	-221.714

9313018.1381

INSTANTANEOUS SLUG TEST DATA SHEET -INJECTION-

orehole 299-W7-11

Interval Tested 236.2' - 215.7' BTOC. 6"

Depth to Water 221.73'

Date 7.29.91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time BASELINE START 0819 INJECTION START 0845

Transducer Measurement Units FEET.

Depth to Transducer 9.497' BWL.

Initial Pressure (P_i) 221.73'

Slug Level or Pressure (P_{max}) 220.6584.

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 — JAMES A. COATES (Sign and Print Name) — 8.2.91 (Date)

9313018.1202

Page ~~2 of 4~~ 6 of 8

WELL 2-W17-11 BASELINE INJECTION

SE2000
Environmental Logger
07/30 08:02

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/29 08:19:39

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0	0.00000	221.733	-221.733
1	0.01667	221.730	-221.730
2	0.03333	221.726	-221.726
3	0.05000	221.730	-221.730
4	0.06667	221.726	-221.726
5	0.08333	221.720	-221.720
6	0.10000	221.723	-221.723
7	0.11667	221.723	-221.723
8	0.13333	221.726	-221.726
9	0.15000	221.730	-221.730
10	0.16667	221.726	-221.726
11	0.18333	221.730	-221.730
12	0.20000	221.733	-221.733
13	0.21667	221.730	-221.730
14	0.23333	221.733	-221.733
15	0.25000	221.733	-221.733
16	0.26667	221.736	-221.736
17	0.28333	221.733	-221.733
18	0.30000	221.736	-221.736
19	0.31667	221.730	-221.730
20	0.33333	221.733	-221.733
21	0.35000	221.733	-221.733
22	0.36667	221.733	-221.733
23	0.38333	221.736	-221.736
24	0.40000	221.733	-221.733
25	0.41667	221.733	-221.733

9313018.1383

WELL 2-W17-11 INJECTION

SE2000
Environmental Logger
07/30 08:00

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	221.730
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/29 08:45:48

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	221.650	-221.650
0.0083	0.00014	221.258	-221.258
0.0166	0.00028	222.740	-222.740
0.0250	0.00042	221.736	-221.736
0.0333	0.00056	220.884	-220.884
0.0416	0.00069	220.969	-220.969
0.0500	0.00083	220.963	-220.963
0.0583	0.00097	221.071	-221.071
0.0666	0.00111	221.061	-221.061
0.0750	0.00125	221.115	-221.115
0.0833	0.00139	221.131	-221.131
0.1000	0.00167	221.163	-221.163
0.1166	0.00194	221.216	-221.216
0.1333	0.00222	221.248	-221.248
0.1500	0.00250	221.283	-221.283
0.1666	0.00278	221.311	-221.311
0.1833	0.00306	221.340	-221.340
0.2000	0.00333	221.359	-221.359
0.2166	0.00361	221.372	-221.372
0.2333	0.00389	221.387	-221.387
0.2500	0.00417	221.410	-221.410
0.2666	0.00444	221.422	-221.422
0.2833	0.00472	221.432	-221.432
0.3000	0.00500	221.451	-221.451
0.3166	0.00528	221.460	-221.460
0.3333	0.00556	221.473	-221.473
0.4166	0.00694	221.511	-221.511
0.5000	0.00833	221.543	-221.543
0.5833	0.00972	221.568	-221.568
0.6666	0.01111	221.590	-221.590

~~Page 4 of 4~~ 8 of 8

WELL 2-W17-11 INJECTION

0.7500	0.01250	221.600	-221.600
0.8333	0.01389	221.615	-221.615
0.9166	0.01528	221.625	-221.625
1.0000	0.01667	221.634	-221.634
1.0833	0.01805	221.644	-221.644
1.1666	0.01944	221.647	-221.647
1.2500	0.02083	221.653	-221.653
1.3333	0.02222	221.660	-221.660
1.4166	0.02361	221.663	-221.663
1.5000	0.02500	221.666	-221.666
1.5833	0.02639	221.669	-221.669
1.6666	0.02778	221.669	-221.669
1.7500	0.02917	221.672	-221.672
1.8333	0.03056	221.676	-221.676
1.9166	0.03194	221.679	-221.679
2.0000	0.03333	221.679	-221.679
2.5000	0.04167	221.691	-221.691
3.0000	0.05000	221.701	-221.701
3.5000	0.05833	221.707	-221.707
4.0000	0.06667	221.710	-221.710
4.5000	0.07500	221.717	-221.717
5.0000	0.08333	221.720	-221.720
5.5000	0.09167	221.720	-221.720
6.0000	0.10000	221.723	-221.723
6.5000	0.10833	221.726	-221.726
7.0000	0.11667	221.723	-221.723
7.5000	0.12500	221.723	-221.723
8.0000	0.13333	221.723	-221.723
8.5000	0.14167	221.723	-221.723
9.0000	0.15000	221.723	-221.723
9.5000	0.15833	221.723	-221.723
10.0000	0.16667	221.726	-221.726
12.0000	0.20000	221.730	-221.730
14.0000	0.23333	221.730	-221.730
16.0000	0.26667	221.726	-221.726

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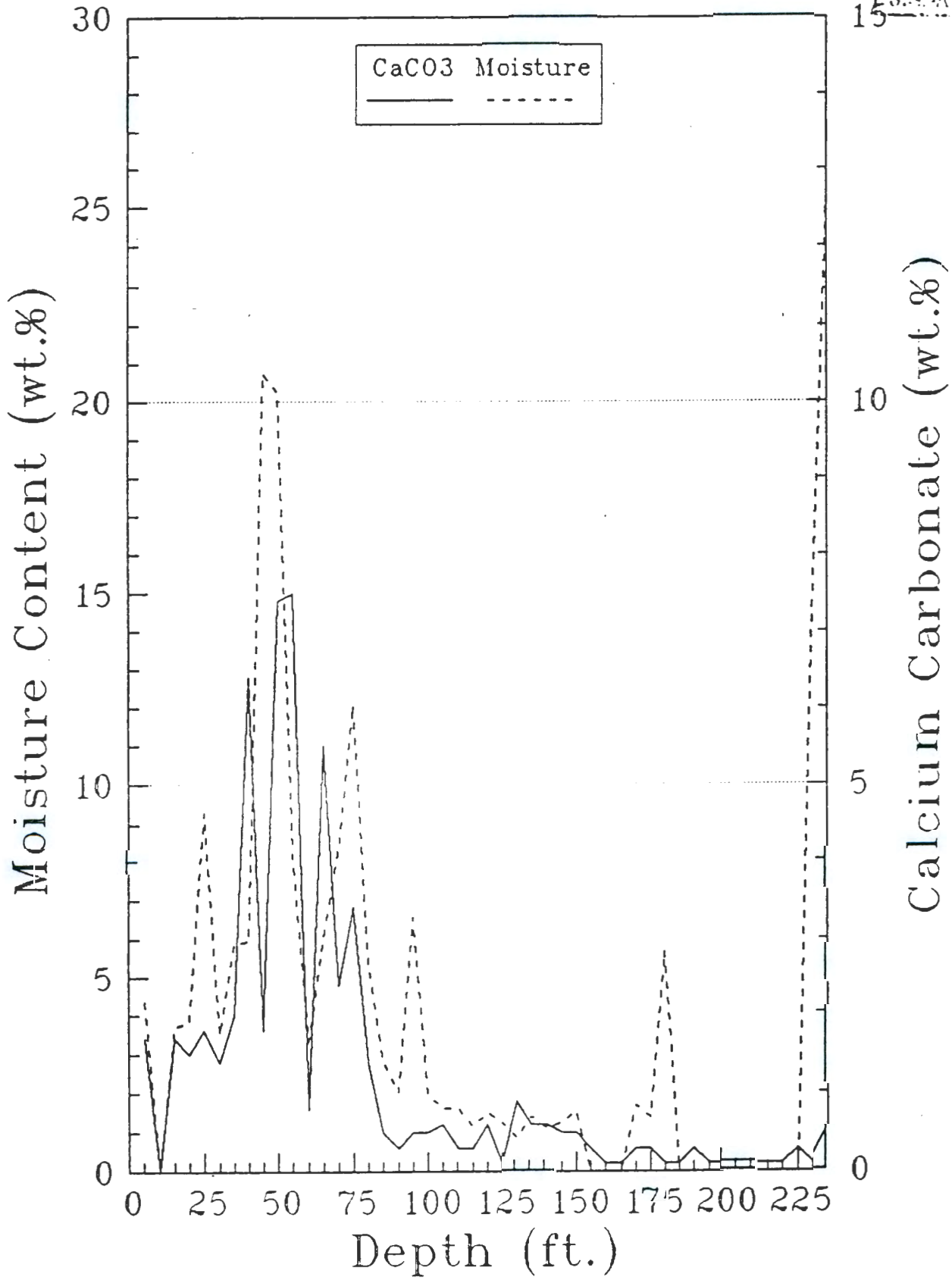
VALIDATED
KDR 3/19/92
SIGNATURE/DATE

WELL 299-W7-11



	A	B	C
1	WELL 299-W7-11		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1.7	4.36
7	10		
8	15	1.7	3.68
9	20	1.5	3.85
10	25	1.8	9.29
11	30	1.4	3.52
12	35	2	5.9
13	40	6.4	5.93
14	45	1.8	20.73
15	50	7.4	20.25
16	55	7.5	8.2
17	60	0.8	3.33
18	65	5.5	6.03
19	70	2.4	8.34
20	75	3.4	12.08
21	80	1.4	5.35
22	85	0.5	2.83
23	90	0.3	2.02
24	95	0.5	6.56
25	100	0.5	1.97
26	105	0.6	1.62
27	110	0.3	1.61
28	115	0.3	1.16
29	120	0.6	1.51
30	125	0.1	1.26
31	130	0.9	0.87
32	135	0.6	1.42
33	140	0.6	1.09
34	145	0.5	1.25
35	150	0.5	1.54
36	155	0.3	
37	160	0.1	
38	165	0.1	
39	170	0.3	1.7
40	175	0.3	1.38
41	180	0.1	5.67
42	185	0.1	
43	190	0.3	
44	195	0.1	
45	200	0.1	
46	205	0.1	
47	210	0.1	
48	215	0.1	
49	220	0.1	
50	225	0.3	
51	230	0.1	14.55
52	235	0.5	25.44
53			
54			
55			
56			

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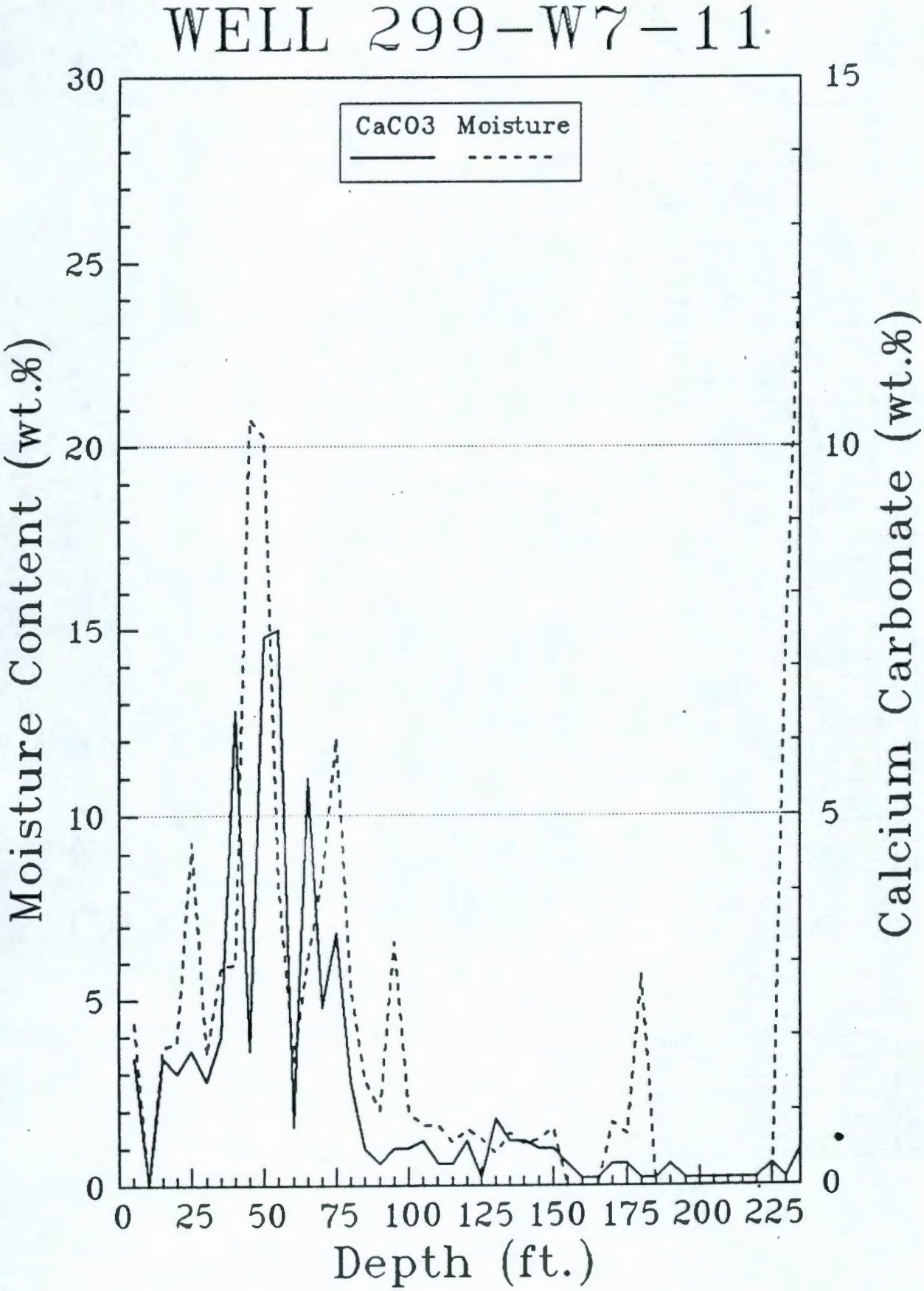
WELL 299-W7-11
CaCO3
Moisture
Moisture Content (wt.%)
Calcium Carbonate (wt.%)
Depth (ft.)
0
5
10
15
20
25
30
0
5
10
15
0
25
50
75
100
125
150
175
200
225

	A	B	C
1	WELL 299-W7-11		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1.7	4.36
7	10		
8	15	1.7	3.68
9	20	1.5	3.85
10	25	1.8	9.29
11	30	1.4	3.52
12	35	2	5.9
13	40	6.4	5.93
14	45	1.8	20.73
15	50	7.4	20.25
16	55	7.5	8.2
17	60	0.8	3.33
18	65	5.5	6.03
19	70	2.4	8.34
20	75	3.4	12.08
21	80	1.4	5.35
22	85	0.5	2.83
23	90	0.3	2.02
24	95	0.5	6.56
25	100	0.5	1.97
26	105	0.6	1.62
27	110	0.3	1.61
28	115	0.3	1.16
29	120	0.6	1.51
30	125	0.1	1.26
31	130	0.9	0.87
32	135	0.6	1.42
33	140	0.6	1.09
34	145	0.5	1.25
35	150	0.5	1.54
36	155	0.3	
37	160	0.1	
38	165	0.1	
39	170	0.3	1.7
40	175	0.3	1.38
41	180	0.1	5.67
42	185	0.1	
43	190	0.3	
44	195	0.1	
45	200	0.1	
46	205	0.1	
47	210	0.1	
48	215	0.1	
49	220	0.1	
50	225	0.3	
51	230	0.1	14.55
52	235	0.5	25.44
53			
54			
55			
56			

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B. Williams
FAX 6-6476
PH. 6-3416

REQUEST

COST CODE/WORK ORDER NO. WJ3V1

I ERSON B. WILLIAMS DATE 5-20-91

TE	ES	TEST LAB INFORMATION (PROCEDURE USED)
	1	ETAL-07

REMARKS 299-W7-11
230'

RECEIVED BY: R.G. ALEXANDER DATE 5-20-91

APPROVED BY: R.G. ALEXANDER DATE 5-20-91

9313018.1300

ARCHIVE

RADIATION RELEASE

Bldg. 299-W7-11 Expiration Date 5-24-91
Released By K. E. LaBrambose
Health Physics
Remarks 230' soil sample

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299-W7-11 Expiration Date 5-24-91
Released By K. E. LaBrambose
Health Physics
Remarks 230' soil sample

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0959 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-28-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 6-1-91
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	1545.4	0	0	100
1½	↓	133.8	8.7	91.3
1	↓	468.3	30.3	69.7
3/4	↓	586.5	38.0	62.0
½	↓	749.4	48.5	51.5
3/8	↓	839.5	54.3	45.7
4	↓	941.8	60.9	39.1
10	155.4	11.0	7.1	36.3
40	↓	33.0	21.2	30.8
60	↓	114.0	73.4	10.2
100	↓	128.7	82.8	6.7
200	↓	135.9	87.5	4.9

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: R.G. ALEXANDER Date 5-29-91

A-6400-204(2-87)

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9313018.13

GRAIN SIZE ANALYSIS PLOT

Sample No. 1.0959

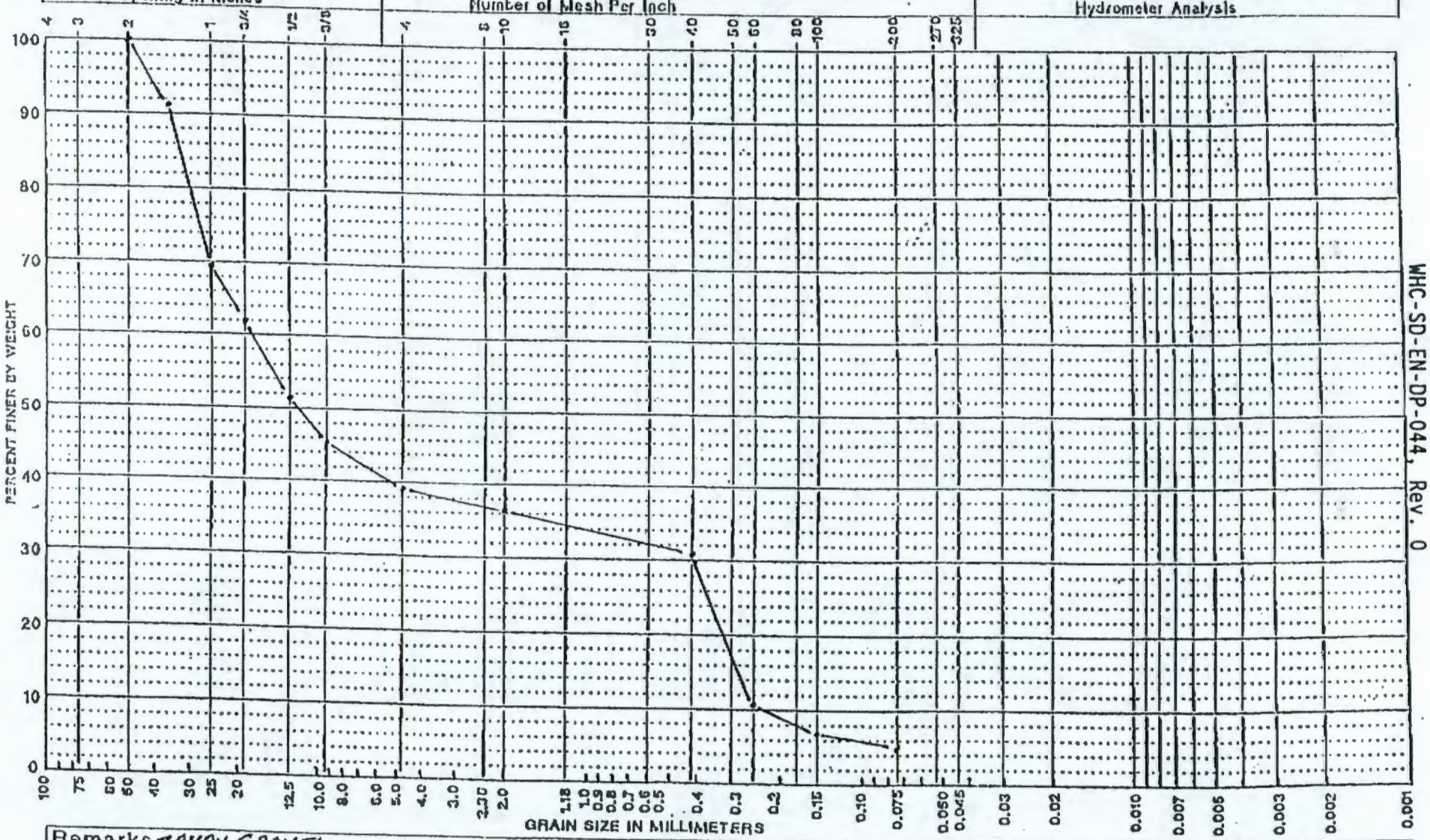
Page 1 of 1

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 5-28-91



Remarks SANDY GRAVEL

299-W7-11 230'

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

Checked By: R.G. ALEXANDER Date 5-29-91

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

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0959 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-28-91
Procedure No: ETAL-07 Rev. 1 Date Issued 12-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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	155.4	0	0	100
10		11.0	7.1	92.9
40		33.0	21.2	78.8
60		114.0	73.4	26.6
100		128.7	82.8	17.2
200		135.9	87.5	12.5
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: R.G. ALEXANDER Date 5-29-91

A-6400-204(2-87)

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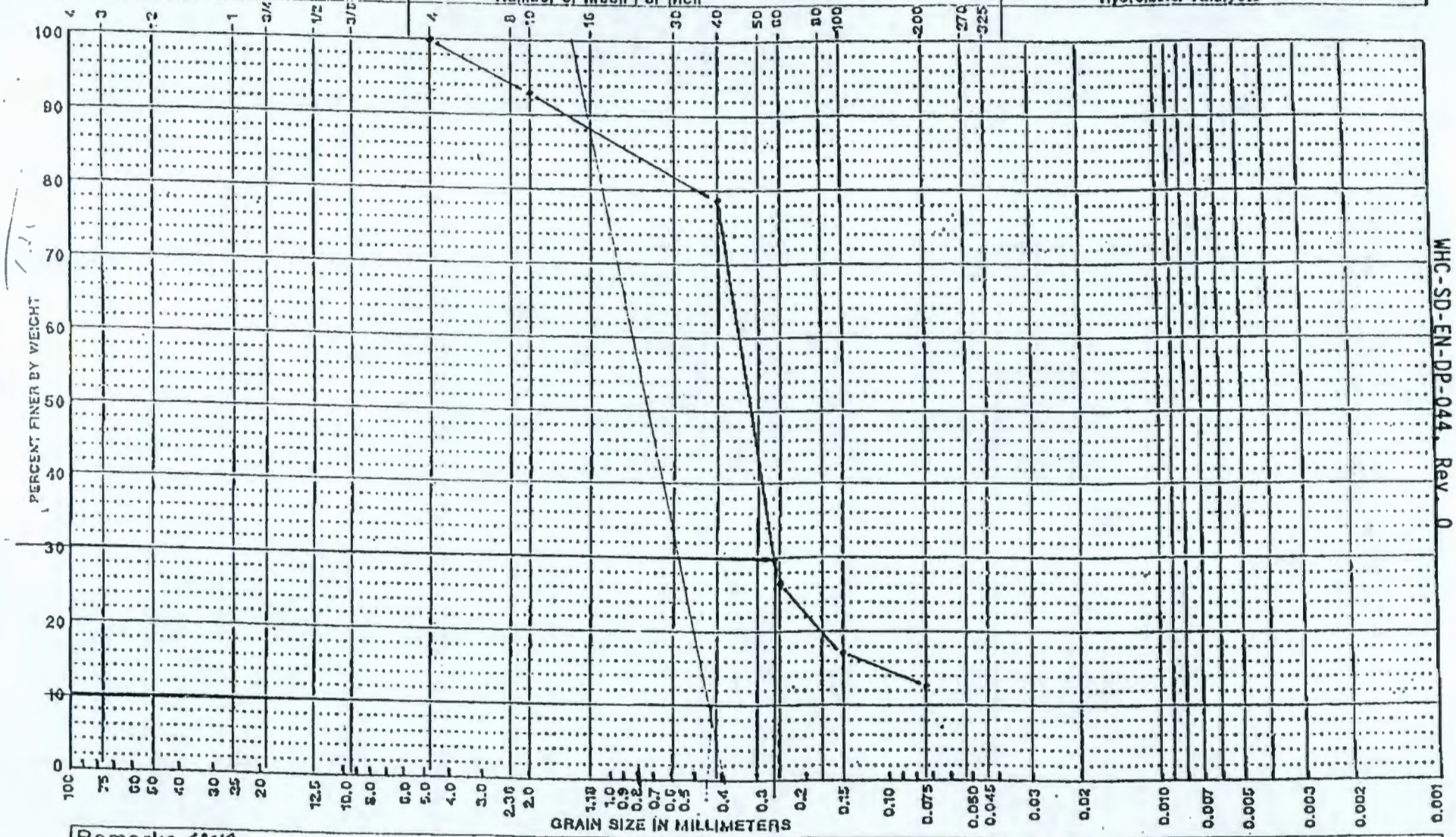
GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0959 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 5-28-91



Remarks SAND

299-W7-11 230'

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

Checked By: R.G. ALEXANDER Date 5-29-91

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg. 1 of 2

Requested by:	Phone No.	Well No.	Date:
		W7-11	

VALIDATED
KDR 7/19/92
SIGNATURE/DATE

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamme (pCi/gr)	Results Alpha (pCi/gr)
5'	4.11.91		4.11.91	0754.91	9.6	1.0
10'				0755.91	12.0	0.4
15'	4.17.91		4.23.91	0773.91	15.5	0.3
20'				0774.91	11.7	0.7
25'				0775.91	11.0	0.6
30'				0776.91	15.0	0.4
35'	4.17.91		4.23.91	0799-91	16.7	0.4
40'	4.18.91		4.24.91	0800.91	11.4	1.3
45				0801.91	24.6	1.1
50'				0802.91	21.7	0.5
55'	4.22.91		4.24.91	0813.91	9.5	1.5
60'				0814.91	24.5	<0
65'			4.24.91	0815.91	22.6	1.0
70'	4.23.91			0825.91	12.8	
75				0826.91	15.0	
80'				0827.91	20.5	0.6
85'			4.26.91	0829.91	14.3	0.7
90			4.29.91	0831.91	17.1	0.5
95				0832.91	16.6	<0
100'				0833.91	14.8	0.5
105'	4.24.91			0834.91	15.0	<0
110'				0835.91	12.[illegible]	0.6
115				0837.91	14.5	<0
120'	4.26.91			0848.91	17.1	1.3
125				0849.91	11.9	0.[illegible]
130'				0850.91	16.5	<0
135				0851.91	21.3	1.0
140'	4.29.91		4.30.91	0859.91	12.9	<0
145				0860.91	16.5	1.2
150				0861.91	14.6	0.7
155'	4.30.91		4.30.91	0873.91	9.5	
160'	5.2.91		5.2.91	0892.91	16.4	

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1395

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 2

uested by:	Phone No.	Well No.	Date:
		LW7-11	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamme (pCi/gr)	Results Alpha (pCi/gr)
165'	5.2.91			0893.91	14.4	0.3
170'	5.6.91		5.8.91	0923.91	11.7	1.0
175	5.7.91		5.7.91	0927.91	16.2	0.7
180'	5.8.91		5.8.91	0938.91	12.8	<0
185'	5.14.91		5.14.91	0980.91	13.0	0.2
190'				0981.91	12.4	0.2
195'	5.16.91		5.16.91	0990.91	22.7	<0
200'				0991.91	13.5	0.2
205'	5.20.91		5.20.91	0999.91	10.4	0.1
210'				1000.91	13.0	0.3
215'				1005.91	16.5	<0
220'	5.21.91		5.21.91	1010.91	15.1	<0
225'	5.23.91		5.23.91	1016.91	13.0	0.3
230'				1014.91	14.4	<0
234.6'	5.30.91		5.31.91	1024.91	11.5	<0

Performed By: _____ 9-51

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

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

Well No. 299-W7-11 Area 200 West Date 5-1-91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 678.03' Brass Cap

Survey Coordinates 137636.0 N 566186.2 E

Log Measured From Ground Surface

Location Description NE Corner of 200 West Area

Ground Surface Elevation 678.03' Brass Cap

Surface Temperature 21.3°C Weather Clear - Warm

BOREHOLE INFORMATION

Driller Gene Thomas

Drill Rig Type Cable Tool	Bit Type/Diameter Hard Tool / 10"
Borehole Diameter(s)/Depth 12"/19.8'	10"/165'
Depth Driller 163.9'	Depth Logger 163.5'
Liquid Level NA	Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.3' - 19.84'
Type 10" Carbon Steel Sch. 40	Interval +0.67' - 165.17'
Type	Interval
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.3' high

Centralizer used

* Survey data from Kaiser 12/15/92 RAM

A-6000-520 (05

9313018.1397

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: 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 usec. | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 163.5' | To: 4.4'

Rerun(s): 163.5' to 125.0' 60.0' to 35.0'

Pre Survey Verification: Position 1: 275.5 eU | Position 2: 48.4 eU | Background: 50 c/s

Base Calibration Difference: Position 1: ~~275.5 eU~~ 15.9 eU | Position 2: 0.1 eU

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

Start Time: 1145 | Completion Time: 1300

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: 275.5 eU | Position 2: 48.0 eU | Background: 50 c/s

Percent Change: Position 1: 0.0% | Position 2: 0.8%

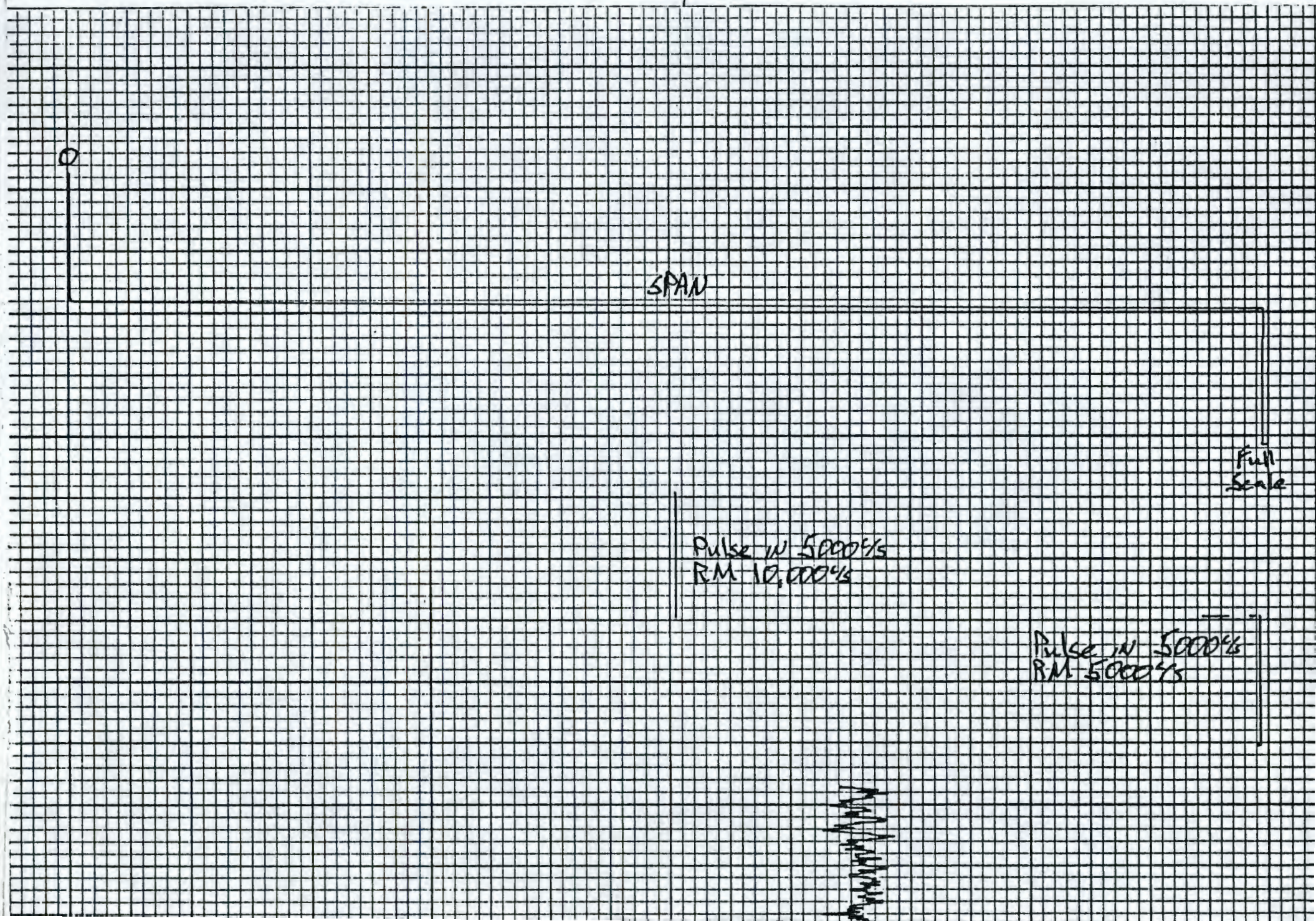
Comments: Return Error = +0.3' high

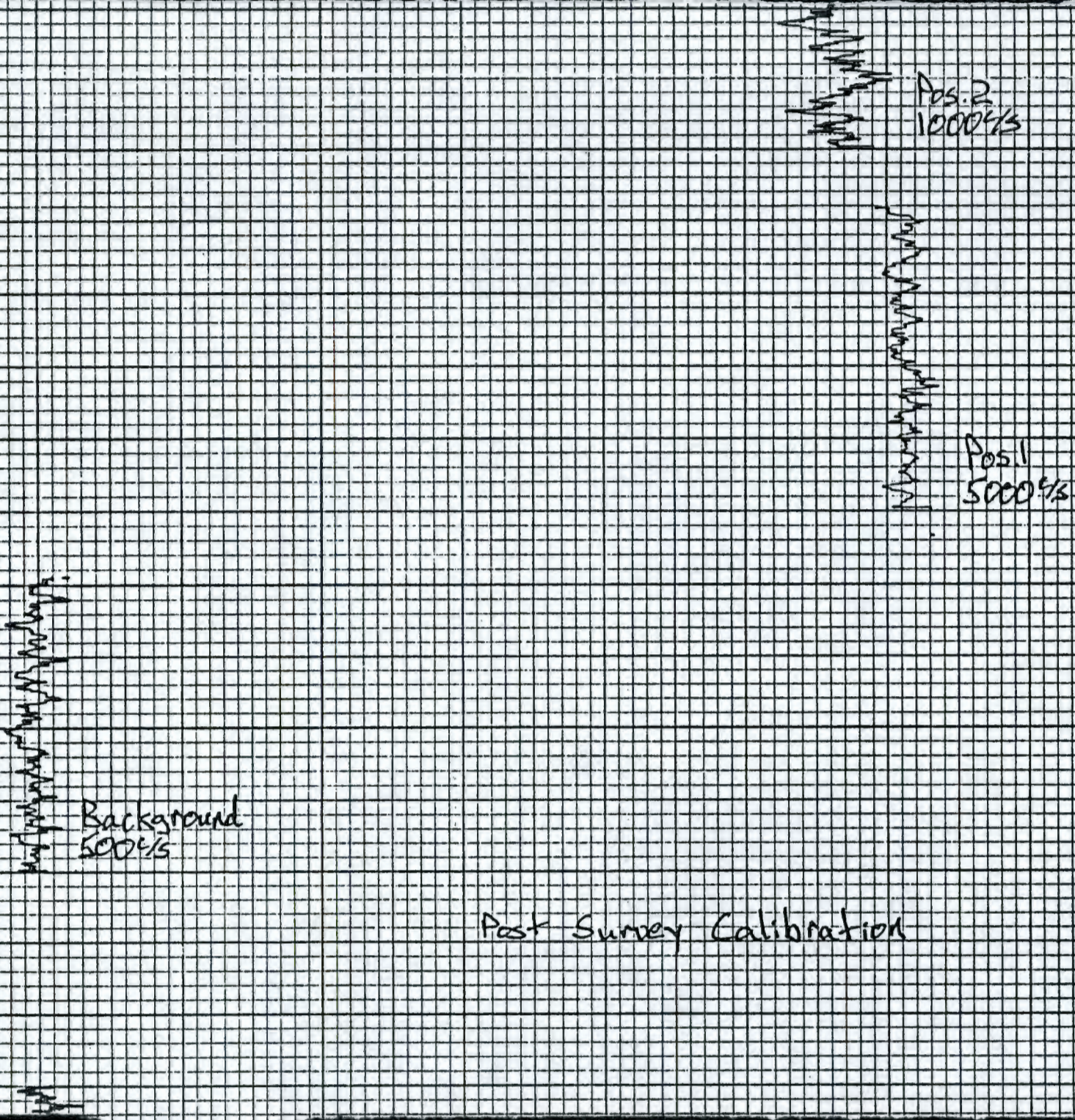
Centralizer used.

Date:

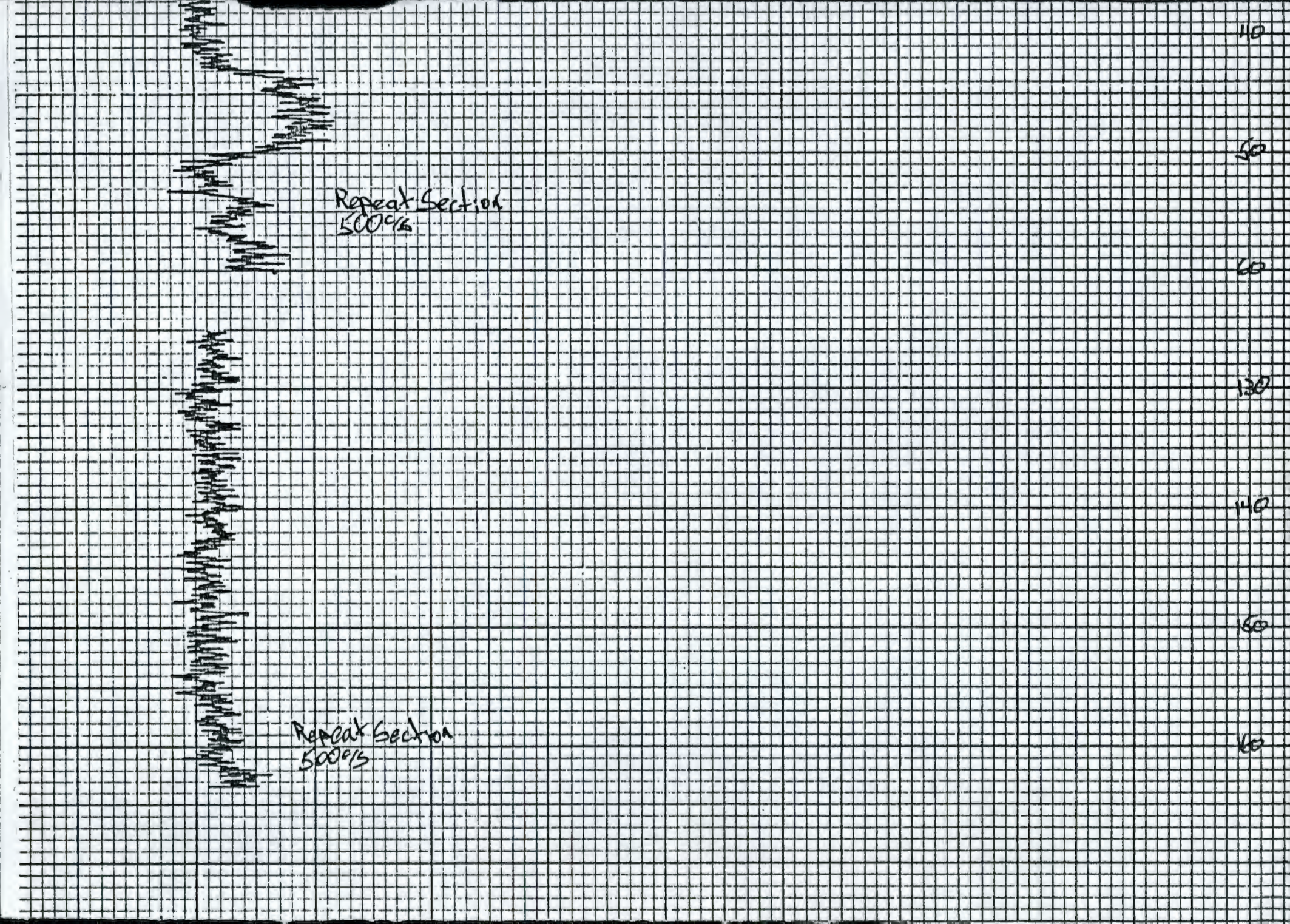
Witnessed and Verified by: (sign and print name) [illegible] / KENT REYNOLDS

A-6000-520 (05/90)





Post Survey Calibration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Repeat Section
500°/s
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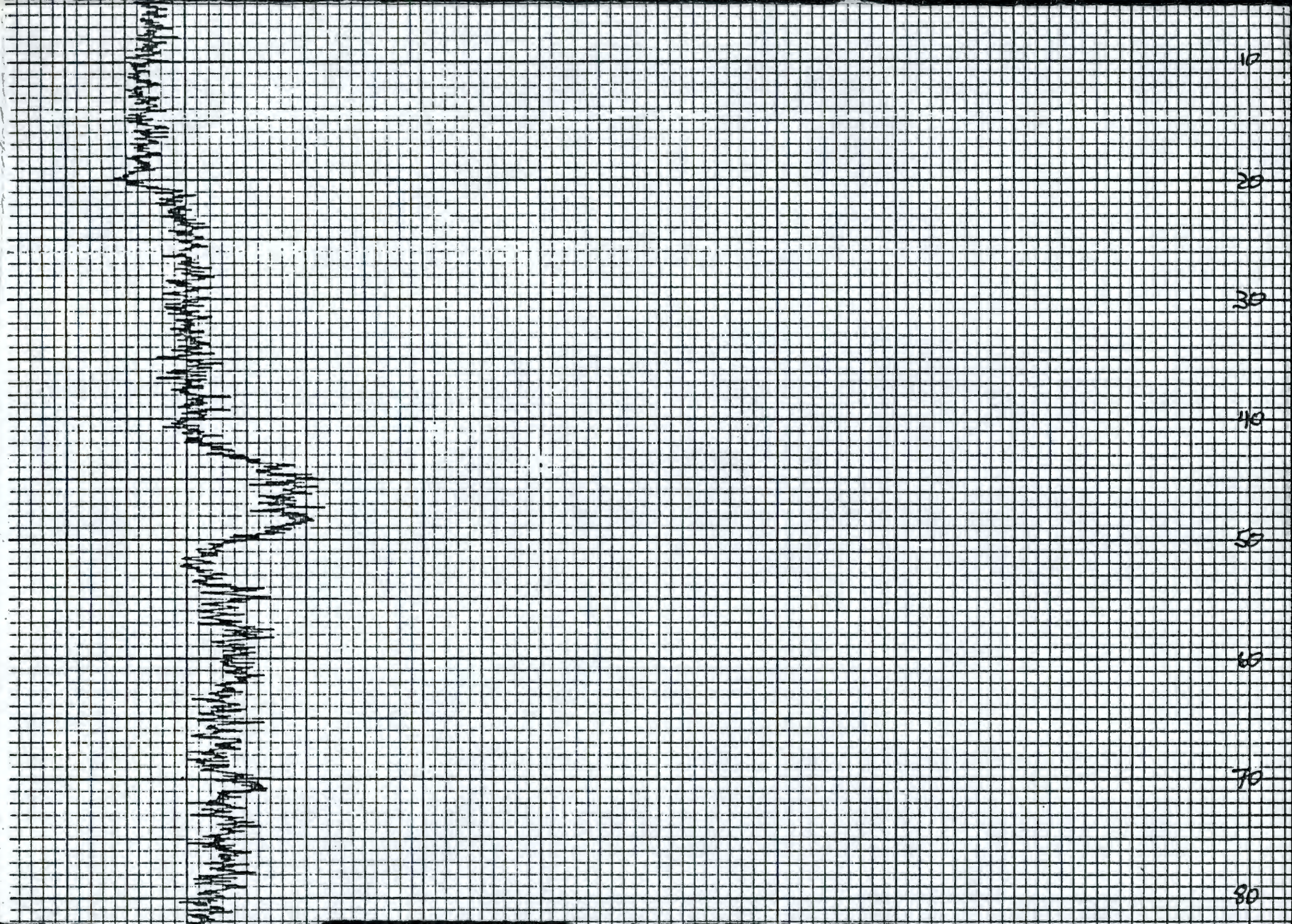
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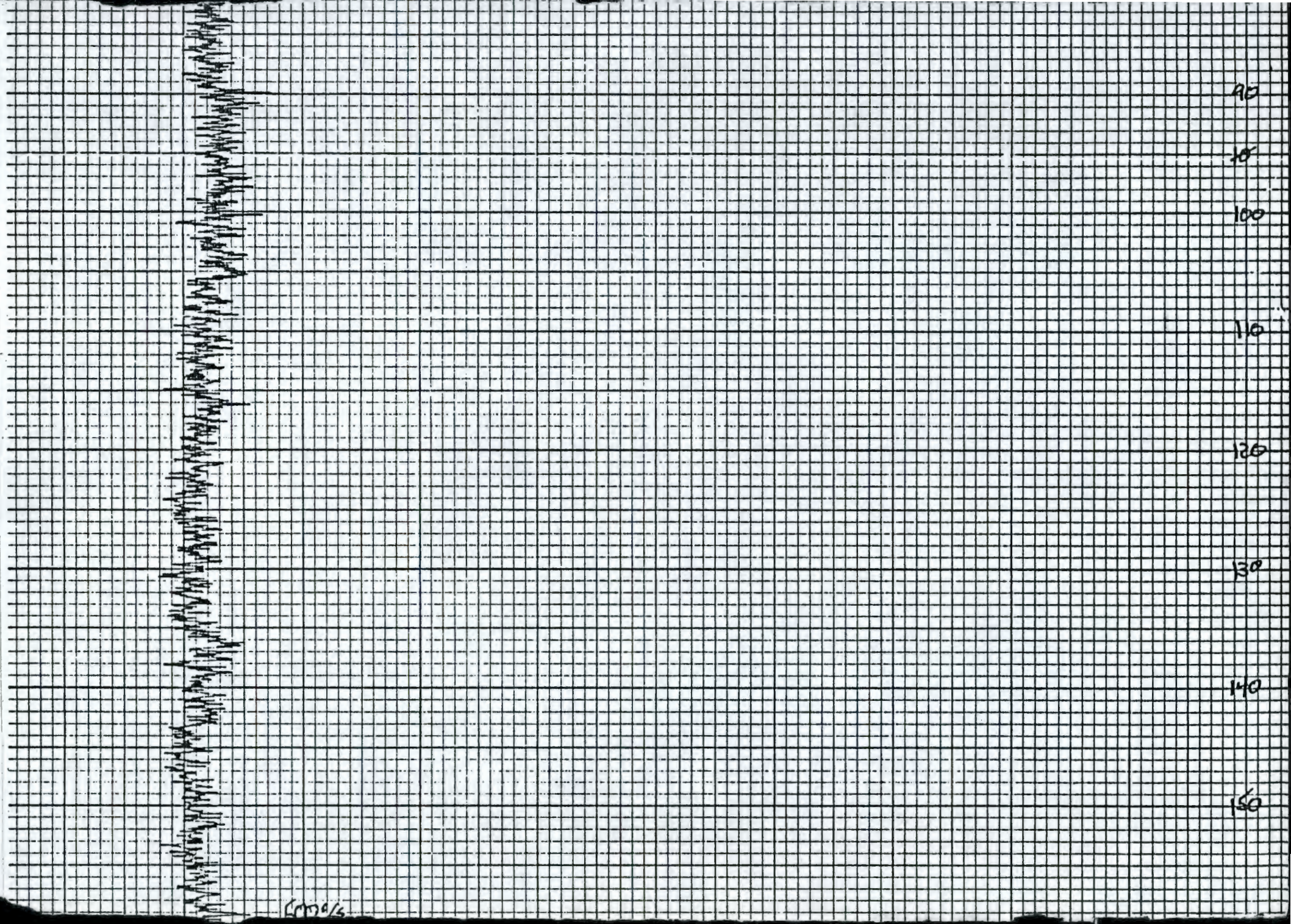
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100
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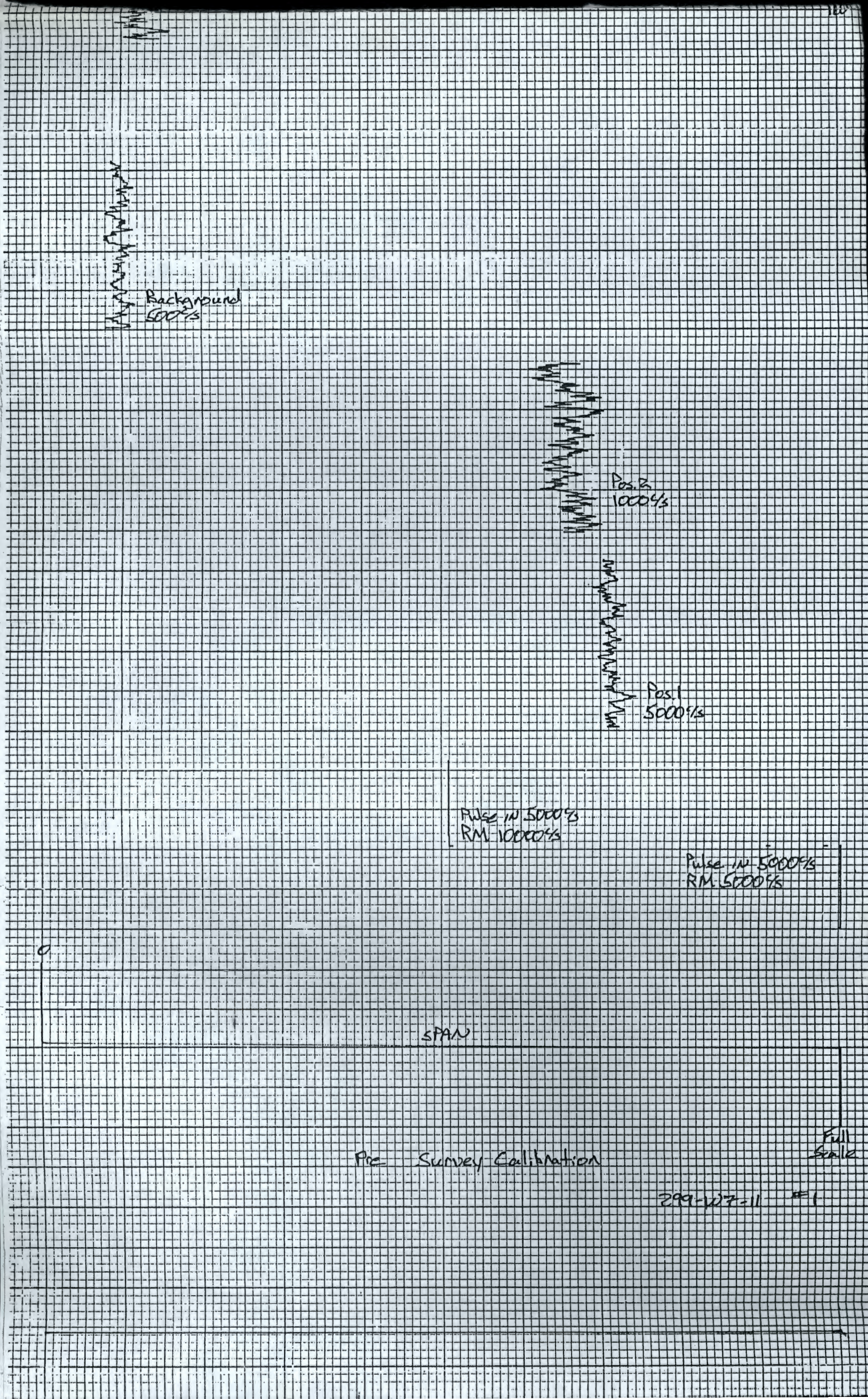
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500°/s
Pos. 2
1000°/s
Pos. 1
5000°/s
Pulse IN 5000°/s
RM 10000°/s
Pulse IN 5000°/s
RM 5000°/s
0
SPAN
Full
Scale
Pre Survey Calibration
299-107-11 #1

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

Well No. 299-W7-11 Area 200 West Date 5/24/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29 Elevation 678.03' Brass Cap

Survey Coordinates 137636.0 N 566186.2 E

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West

Ground Surface Elevation 678.03' Brass Cap

Surface Temperature 19.9°C Weather Cloudy - Cool

BOREHOLE INFORMATION

Driller Gene Thomas

Drill Rig Type Cable Tool	Bit Type/Diameter Hard Tool / 8"
Borehole Diameter(s)/Depth 12"/19.8' 10"/165.2' 8"/234.5'	
Depth Driller 234.5'	Depth Logger 235.0'
Liquid Level 221.3'	Liquid ~~Density~~ Appearance Muddy
Temperature 17.6°C	

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.1' - 19.84'
Type 10" Carbon Steel Sch. 40	Interval +0.5' - 165.17'
Type 8" Carbon Steel Sch. 40	Interval +3.1' - 235.14'
Type	Interval

Well Screen Interval NA

Comments: Return Error = -0.05' Low

Centralizer was used

* Survey data from Kaiser 12/15/92 RAM

9313018.1398

5-55/56

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: 8/90 | Calibration Reference: PNL-7460 UC-606

Calibration/Probe Factor: 7.87×10^{-2} eU P/M/C/2 | 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: 235.0' | To: 130.0'

Rerun(s): 235.0' to ~~220.'~~ AWP 5/24/91 200.0'

Pre Survey Verification: Position 1: 279.4 eU | Position 2: 48.8 eU | Background: 50 c/s

Base Calibration Difference: Position 1: 12.0 eU | Position 2: 0.3 eU

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

Start Time: 0930 | Completion Time: 1115

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: 279.4 eU | Position 2: 48.4 eU | Background: 50 c/s

Percent Change: Position 1: 0.0% | Position 2: 0.8%

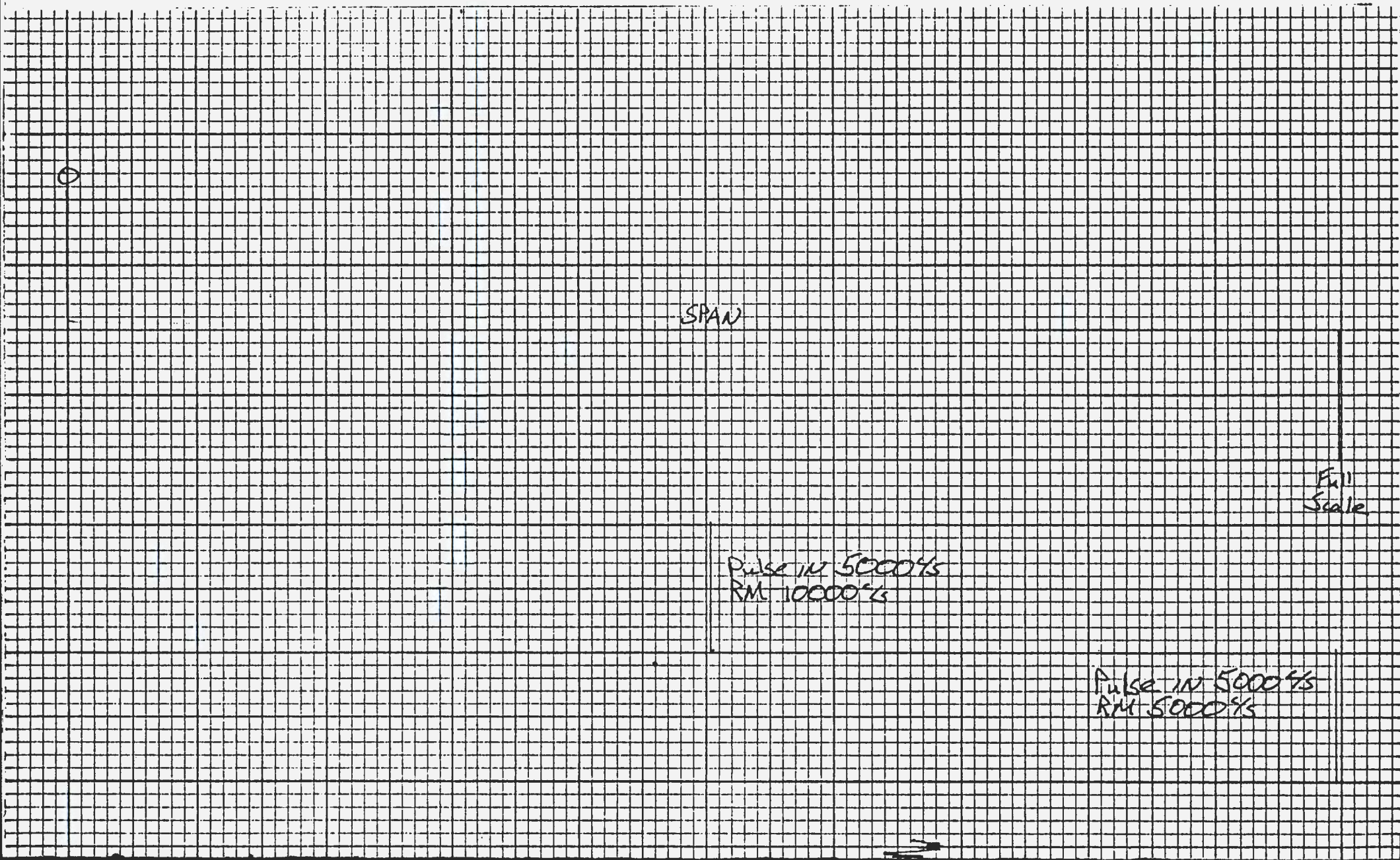
Comments: [illegible]

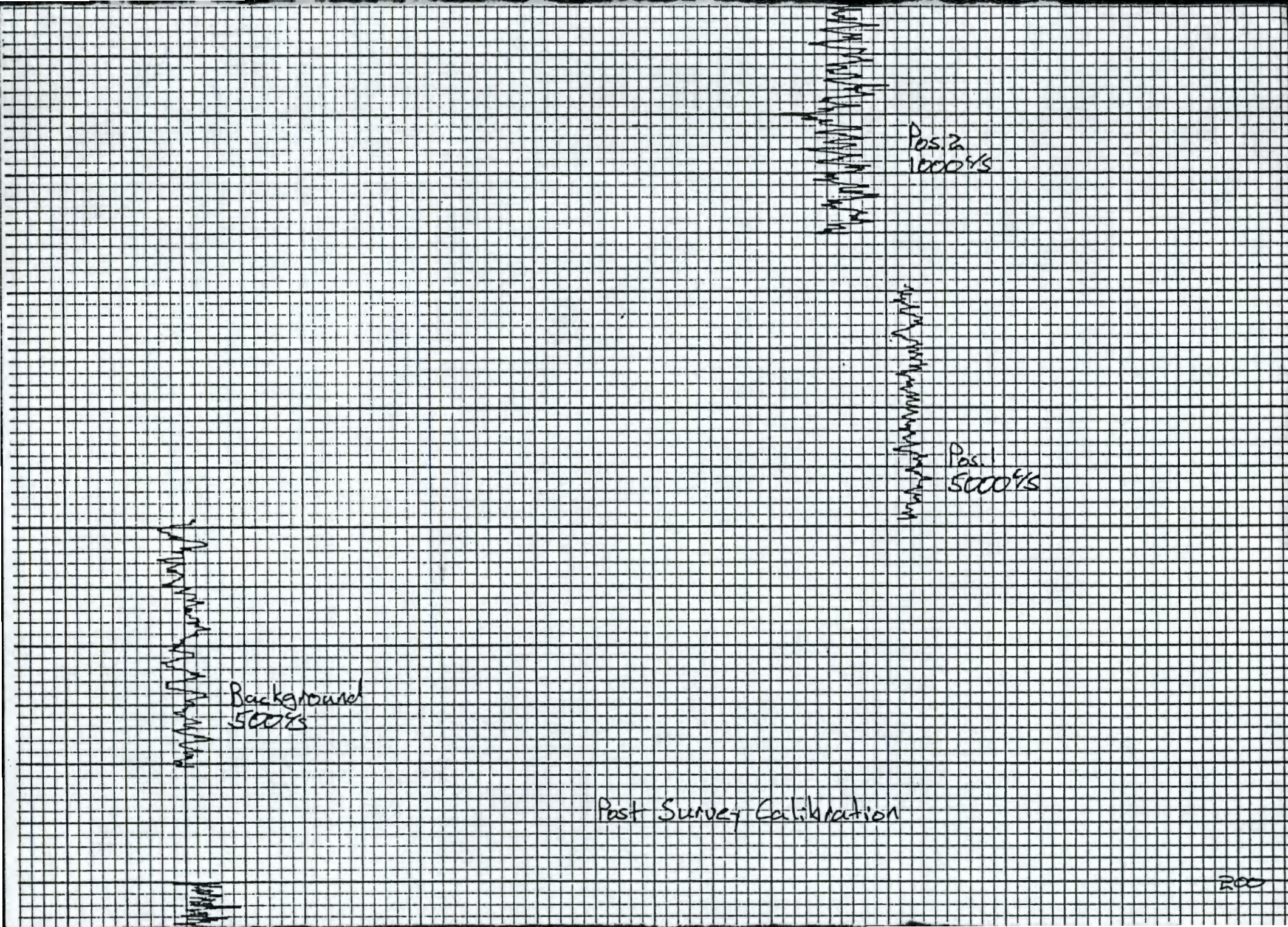
Comments Return Error = 0.05 low

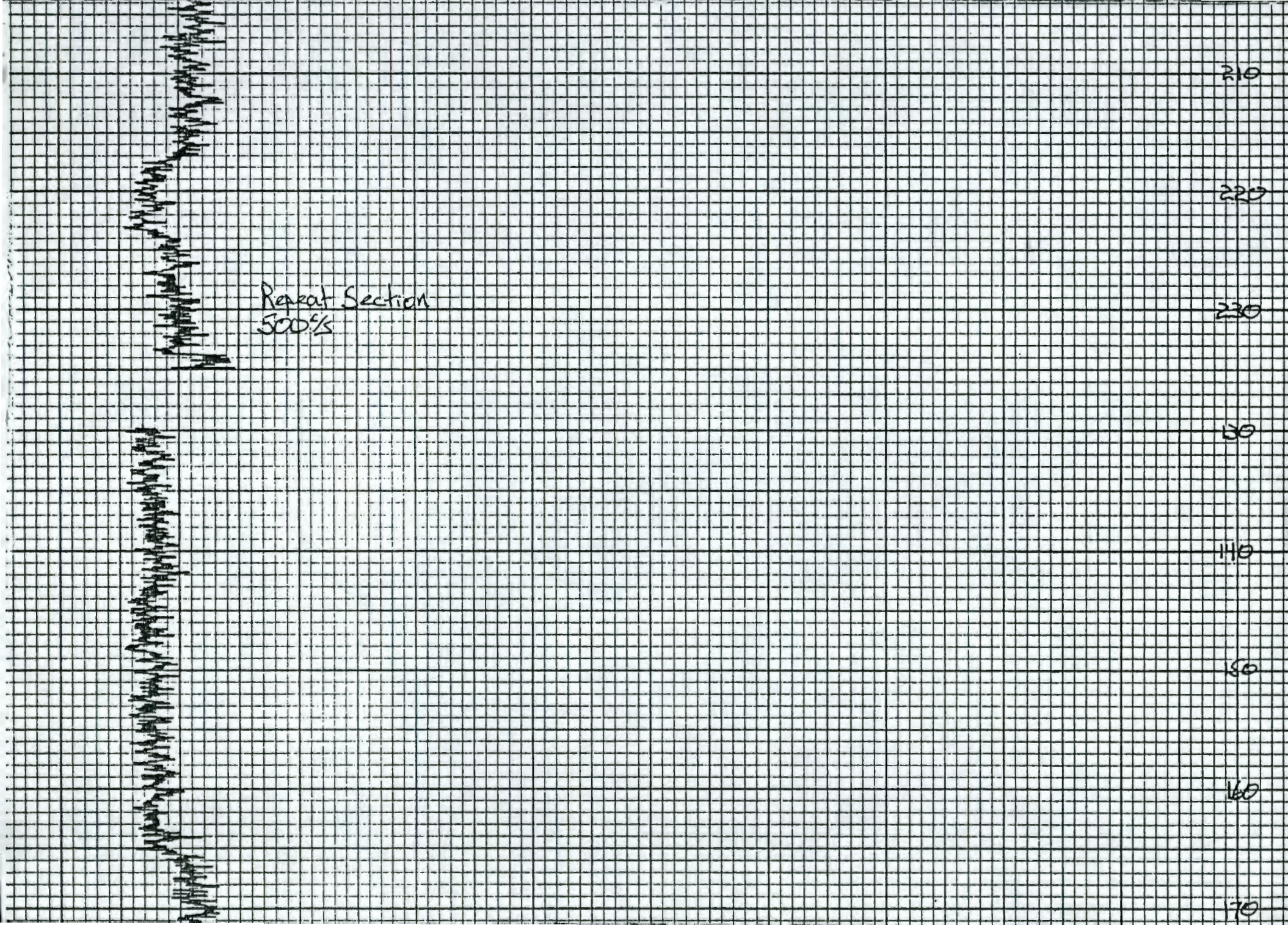
Centralizer used.

Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 5/24/91

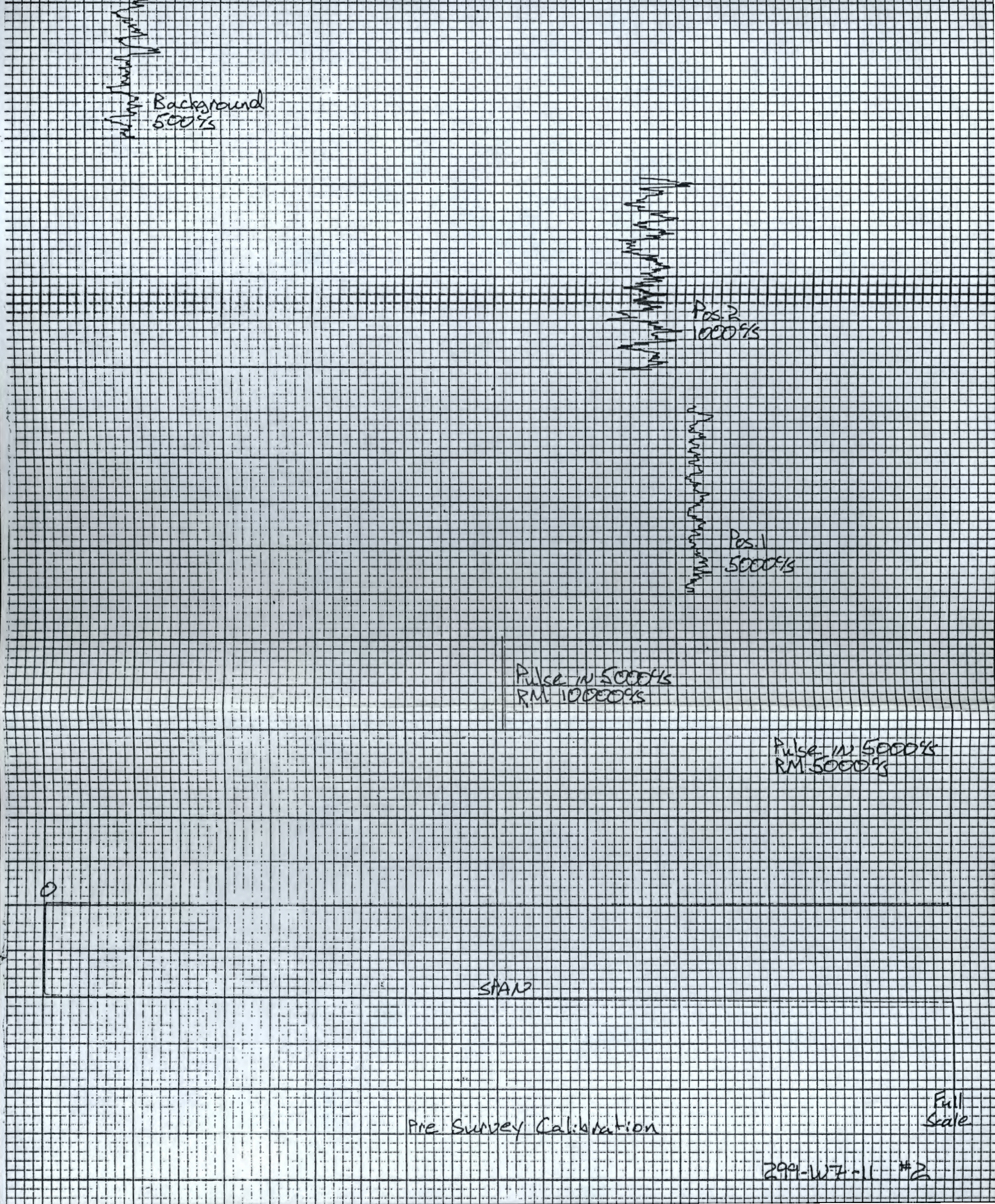
A-6000-520 (05/90)




Pos. 2
1000 c/s
Pos. 1
5000 c/s
Background
500 c/s
Post Survey Calibration
200


Repeat Section
500°/s
210
220
230
130
140
150
160
170

180
190
200
210
220
230
500ms


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
STAND
Pre Survey Calibration
Full
Scale
299-W7-11 #2

10.0 WELL 299-W7-12

10.1 DRILLING

Construction of this well began on 10 April 1991 and total depth of 245.0 feet was reached on 29 May 1991. The well was drilled using a cable tool rig. Approximately 395 gallons of water were added during drilling activities. Specific well construction information is located in Table 10.1. 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 10.1 299-W7-12 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	21.4	ALS
	10"	164.5	ALS
	8"	241.2	ALS
Gross Gamma Logging	3 May	166.0	2.8
	29 May	238	135
Permanent Casing	4"	219.3	ALS
Screen	4" 20-Slot	240.0	219.3
Filter Pack	10-20 Silica Sand	240.5	214.6
Annular Seal	Bentonite Pellets	214.6	207.8
	Bentonite Crumbles	207.8	22.1
	Cement Grout	22.1	1.9
Concrete Pad	4'x4'x6"	1.9	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 56 feet BLS and were primarily silty sandy gravel and gravelly sand. Approximately 10.5 feet (56-66.5 feet BLS) of sandy silt and silty sand represent the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (56-245 feet BLS).

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.

9313018.1355

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 10.1. Reproductions of these logs are also located at the end of this section.

10.2 WELL COMPLETION

Well completion began on 14 June 1991 and was completed on 25 June 1991. Static water level at the time of completion was 224.0 feet below land surface (BLS). Completion details are presented in Table 10.1. Approximately 510 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.

10.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 9 August 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 650 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 9 August with the intake located 240.0 feet below the top of the protective casing.

10.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 9 August 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 10.2. Slug injection and slug withdrawal data plots are shown in Figures 10.1 and 10.2. Raw data from the aquifer testing at 299-W7-12 are located at the end of this section.

Table 10.2 Hydrologic Testing Results from 299-W7-12				
Formation: Ringold		Lithology: Gravelly Sand/ Sandy Gravel	Interval Tested*: 227.8-243.8	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	09 Aug 91	Not Interpretable	----	----
Recovery	09 Aug 91	Not Interpretable	----	----
Slug Injection	09 Aug 91	Bouwer-Rice (1989)	32	----
Slug Withdrawal	09 Aug 91	Bouwer-Rice (1989)	55	----

* Depth below top of 6" protective casing

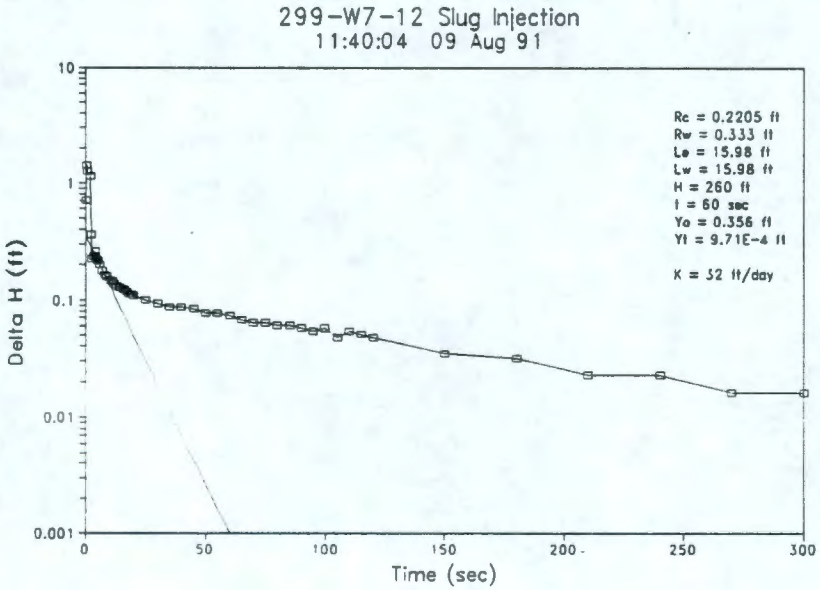


Figure 10.1 299-W7-12 Slug Injection Plot.

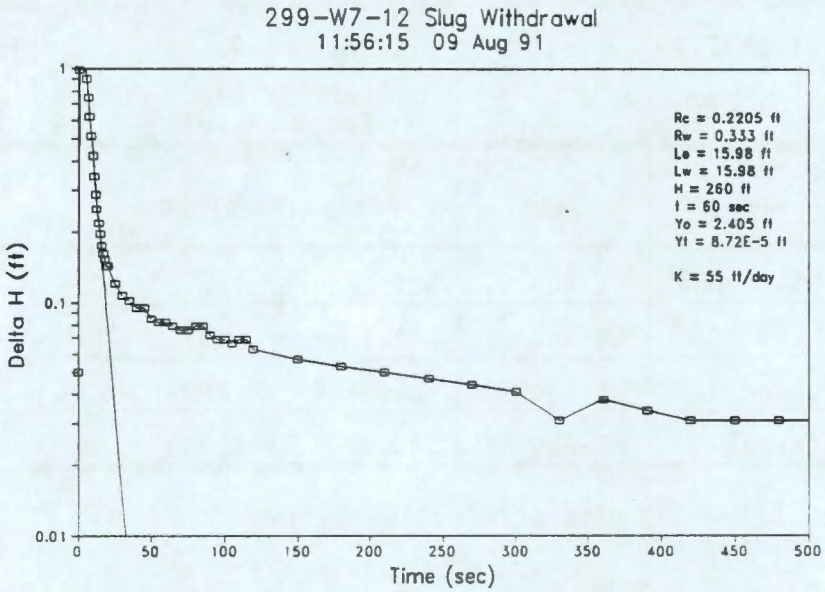


Figure 10.2 299-W7-12 Slug Withdrawal Plot.

9313018.1402

LLBG FACILITY 1991

WELL 299-W7-12

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4/10/91	5/29/91	~~49~~ 35	—	245.0'	222.55'	395.0

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
6/14/91	6/25/91	8	224.0	237.9	219.3-241.2	~~750.0~~ 510.0 - ADDED 240.0 - CEMENT

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	8/5/91	8/5/91	8/9/91	650.0

COMMENTS:

9313018.1422

 175

VALIDATED KDR 3/19/92 SIGNATURE/DATE

WELL CONSTRUCTION REPORT

Specification No. WHC-S-014 Rev No. 5

ECNs 144240, 144241

Project W017 / LLBG

Location 200 WEST

Drilling Company Kaiser Engineering, Hanford

Driller T. Giffoad, Jody Carpenter (completion)

Other (Companies)

Geologist(s) D.B. Jones J.A. Coates
R. Weingartz
B. Walz completion
S.W. Callison (completion)

Well No. 299-W7-12 Temp. Well No. N/A

Coordinates N: 137,636.3; E: 556,040.8 LAMBERT

Casing Elev. 687.93' Ground Elev. 684.64' BRASS CAP

Drilling Method

Verification Method VISUAL OBSERVATION

Criteria WHC-S-014; 5.2, 5.3, 7.5 EII 6.7 Section 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	D 0-175	H 175-245	RW	6/18/91
Drilling Fluid	Raw H_2O	395. GAL ~~N/A~~	RW	4-17-91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	166.0 - 2.8	3-3-91
Gross Gamma	238.0 - 135.0	5-24-91
	-	
	-	
	-	

Completion Data

Drilled Depth 245.0' bls

Completed Depth ~~242.93'~~ 240.5' bls RW 6/20/91

Date Started 4/10/91

Date Completed 5/28/91

Static Water Level/Date 224.0' bls 6/14/91

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 8-9-91

Completion Results

Cleaning

Verification Method Visual observation (direct observation of drill rig cleaning WHC-CM-7-7)

Criteria WHC-S-014 7.7, 7.6, 4.2.2, EII Sect 5.4

	Initials	Date
Drilling Tools/Rig	DBG	4-10-91
Temporary Materials	DBG	4-10-91
Permanent Materials	BGW	6-17-91

Material Storage/Packing

Verification Method Visual observation

Criteria WHC-S-014 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	BGW	6-17-91
Material Packing	BGW	6-17-91

Screen

Type	Length	Slot Size
4"ϕ T304 S.S. wire wrap	20.74'	0.020

Depth(s) ~~224.2~~ 6/25/91 SWC - ~~245.1~~ 6/25/91 SWC ~~244.9~~ 6/25/91 SWC

219.3' - 240.0

Verification Method Steel tape Measurement.

Criteria WHC-S-014 4.2.3, 4.2.5, 12.2d, 4.2.1

Initials BGW Date 6-20-91

Lubricants/Additives

Verification Method Visual observation

Criteria WHC-S-014, 7.2

	Identify	Initials	Date
Additives	Raw Water	RW	4-17-91
Lubricants	WELL GUARD	DBG	4/10/91

Straightness Test

Verification Method VISUAL OBSERVATION

Criteria WHC-S-014 8.2

Initials RW Date 5-29-91

9313018.1404

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W7-12

Casing (permanent)

Type	Size	Placement
~~T-304 stainless steel~~	~~4" OD~~	~~+1.4 - 245.1 - 240.5~~ 6/25/91 SWC
T-304 stainless steel	4" OD	+1.4 - ~~240.0~~ 219.5' KDR 9/19/91

Verification Method verify using steel tape

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

Initials BGW Date 6-20-91

Well Protection

Verification Method Visual, Measure w/ tape

Criteria WHC-S-014, 4.2.10

	Initials	Date
Protective Posts	KDR	3/19/92
Protective Casing	KDR	3/19/92
Site Restored	KDR	3/19/92
Cap, Hasp and Lock	KDR	3/19/92
Surface Pad	KDR	3/19/92

Annular Seal/Filter Pack

Verification Method measure w/ steel tape Criteria WHC-S-014 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1

Type	Interval	Volume	Initials	Date
10-20 sand	≈240.5 - ~~243.7~~ 214.6' BGW 6/20/91	15 sks 16.05 ft³	BGW	6/20/91
1/4"-3/8" Volclay pellets	214.6' - 207.8'	3 bkts 1.86 ft³	BGW	6/20/91
8-20 mesh bentonite crumbles	207.8 - 22.1	163 bags (115.7 ft³)	SWC	6/25/91
cement grout (>14 lb/gal)	22.1 - 1.9	240 gal H2O 36-94 lb bags cement (46.3 ft³)	SWC	6/25/91

Well Survey/Labeling

Verification Method Review of Survey Report

Criteria WHC-S-014 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/19/92
Protective Casing/Brass Cap Surveyed	KDR	3/19/92
Well Number Stenciled	KDR	3/19/92
Brass Cap Labeled	KDR	3/19/92

Pump Installation

Verification Method visual observation

Criteria WHC-S-014, 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	8-9-91
Installed	JAC	8-9-91
Pump Tested	JAC	8.9.91

Other (initial if performed)

NA Well Abandonment NA Downhole TV Inspection SWC Complete As-Built Diagram, Driller's/Geologist's Logs

8-9-91 JAC Well Development

Comments/Remarks

Reviewed By (Sign/Print Name) KD Reynolds Date 3/19/92

A-6000-436 (09/90)

3 of 5

WELL SUMMARY SHEET

Boring or Well No. 299-W7-12

Sheet 1 of 2

Location 200W 27th + Dayton 28-W-5

Project W-017 LLBG

Elevation 685' ground elevation

Drilling Contractor Kaiser Engineers Hanford

Driller Jody Carpenter (Completion) T.G. Gifford

Drilling Method and Equipment Cable Tool, WS-31

Prepared By Stacey W. Callison (Sign/Print Name) S.W. Callison DB Jones

Date 6/26/91

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

Date 7/1/91

CONSTRUCTION DATA: Description	Diagram	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Graphic Log	Lithologic Description
temporary carbon steel				GRAVELLY SAND
bottom 12" OD cs casing		10		SILTY SANDY GRAVEL
@ 21.4' b/s				" " "
		20		SL SILTY SANDY GRAVEL
bottom of cement grout		21.4'		SANDY SILTY GRAVEL
@ 22.1' b/s		22.1'		SL SILTY SANDY GRAVEL
		30		SILTY SANDY GRAVEL
				SILTY SANDY GRAVEL
		40		" " "
				SL SILTY SANDY GRAVEL
		50		" " " "
8-20 mesh bentonite crumbles		60		SANDY SILT
		70		SILTY SAND
4" I.D. stainless steel casing				SL SILTY SANDY GRAVEL
		80		SL GRAVELLY SILTY SAND
				" " " "
		90		" " " "
				" " " "
		100		" " " "
				" " " "
		110		SL SILTY SL GRAVELLY SAND
				SL GRAVELLY SAND
		120		SL SILTY GRAVELLY SAND
				SILTY GRAVELLY SAND
		130		" " "
				SL SILTY GRAVELLY SAND
		140		SL SANDY SILTY GRAVEL
				" " " "
		150		" " " "
temporary carbon steel				" " " "
bottom 10" OD cs casing		160		SILTY GRAVEL
@ 164.5' b/s		164.5'		

A-6000-384 (04/90)

9313018.1406

425

WELL SUMMARY SHEET

Boring or Well No. 299-W7-12

Sheet 2 of 2

Location 200W 27th + Dayton 218-W-5

Project W-017 LLBG

Elevation 685' ground elevation

Drilling Contractor Kaiser Engineers Hanford

Driller Jody Carpenter (Completion)

Drilling Method and Equipment Cable Tool WS-31

Prepared By S.W. Callison (Sign/Print Name) Date 6/24/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
bottom of 8-20 mesh		170		SILTY GRAVEL
bentonite crumbles @ 207.8'				" "
		180		" "
bottom of 1/4" bentonite				" "
pellets @ 214.6' bls		190		" "
				SANDY GRAVEL
20 slot wire wrap screen		200		" "
from 219.3 - 240.0 (stainless)				" "
	207.8	210		" "
bottom of 10-20 sand	214.6			" "
pack @ 240.5' bls	219.3	220		" "
	224.0			" "
water level @ 224.0' bls (6/14/91)		230		GRAVELLY SAND
				SANDY GRAVEL
bottom 8" ΔΔ cs casing	240.5	240		" "
@ 241.2' bls	241.2			" "
	245.0		245.0' bls	
		250		
TD of hole @ 245.0' bls				

A-6000-384 (04/90)

9313018.1443

BOREHOLE LOG

KDR 3/19/92

Boring or Well No. 299-W7-12

Sheet 1 of 13

Location: 200 West: 218-W-5 LLBG

Project: W-017

Elevation: 684.64' BRASS CAP

Drilling Contractor: KAISER Engineering, Hanford

Driller: Tim Gifford

Drilling Method and Equipment: WS-31 : Cable tool

Prepared By: D.B. Jones (Sign/Print Name) Date 4/10/91

Reviewed By: R.D. Miller (Sign/Print Name) Date 4/13/91

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'				SANDY GRAVEL. Bare of vegetation	Start 4/10/91 1345
	(2) Lithology (1) Moisture	100% DB			
5.0				(5') Gravelly SAND (85% SAND 15% gravel) Light yellowish brown (10YR 6/4) Dry to to yellowish brown (10YR 5/4) wet. Sands composed of 5% CS, 25% MS, 40% FS 15% VFS) Gravels composed of coarse to fine pebbles, SA-VR. Most basalt Trace magnetics, small (FS) flakes of Muscovite Dry, loose, uncemented very strong Rx to 10% HCl. well sorted, Clean.	OPEN HOLE. No casing installed.
					End of Shift 4/10/91
	(2) Lithology (1) Moisture	60% Retained DB		COARSENING down word.	
10.0				(10') Silty, Sandy GRAVEL. (20% silt, 25% SAND, 55% gravel). Light brownish gray (10YR 6/2) Dry to grayish brown (2.5YR 5/2) wet. Gravels composed of (10% small Cble 20% CP, 10% MP, 15% FP) VA-SR, highly basaltic (70% basaltic 20% otzic, 10% other. Sands are (5% MS, 10% FS, 10% VFS), 55% basaltic 45% otzic Poorly Sorted, Dry, slight Cementation Strong Rx to 10% HCl. Moderately dense.	Casing to 9' difficult drive Barrel. Some cementation to gravels
	(2) Lithology (1) Moisture	65% Retained DB			
15.0				(15') Silty, Sandy, GRAVEL. (10% silt, 25% Sand, 65% gravel). Light brownish grey (2.5YR 6/2) dry to grayish brown (2.5YR 5/2) wet. Gravels composed of 10% CP 20% MP 30% FP, 5% VFP) A-R, 65% basaltic, 30% otzic, 10% other. Sands composed of 5% CS, 10% MS 10% FS 10% Fines Poorly Sorted, Moderate dense, Dry, Strong Rx to 10% HCl. Gravel content increasing w/ depth	Casing driven to 14.7' difficult drive barrel End of Shift 4/11/91
20.0					

A-6000-382 (04/90)

9313018.1408

BOREHOLE LOG

Boring or Well No 299-C07-12

Sheet 2 of 13

Location 200 West 218-W-5 LLBG

Project W017 / LLBG

Elevation 684.64' BRASS CAP

Drilling Contractor KAISER Engineering, Hanford

Driller T. Gifford

Drilling Method and Equipment

Prepared By D.B. Jones (Sign/Print Name) Date 4/15/91

Reviewed By E.D. Miller (Sign/Print Name) Date 4/20/91

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
20.0	(1) Moisture (2) Lithology	100%		(20') Silty, Sandy GRAVEL. (10% Silt, 25% Sand, 65% gravel). Light yellowish brown (2.5Y 6/4) Dry to light yellowish brown (2.5Y 6/4) wet. Gravels composed of 10% MP, 40% FP, 15% VFP, 55% basaltic, 10% quartzic, 5% other, A-R, Sands composed of 5% CS, 5% MS, 10% FS, 10% VFS. Poorly Sorted, Dry, loose, unconsolidated. Strg Rx to 10% HCl. Trace magnetics	Casing advanced to 20'
	(1) Moisture (2) Lithology	50% Retained DB			BEGIN Shift 4/15/91 Casing to 22.0.
25.0				(25') Sandy, Silty, GRAVEL. (20% Sand, 30% Silt, 45% gravel). Light brownish gray (10YR 6/2) Dry to grayish brown (10YR 5/2) wet. Gravels Range from 5% SC, 5% CP, 15% MP, 15% FP, 5% VFP, well Rounded to Angular. 70% Basaltic, 20% Qtzic, 10% other. Sands composed of 5% VCS, 10% CS, 5% CS, 5% MS. Mostly Basaltic. SR to R. Poorly Sorted, Dry, loose, very Strg Rx to 10% HCl. Seems to be trimodal w/ MP, FP and silt fraction most dominant. Very slight trace magnetics.	Casing advanced to 25'. Poor retention
	(1) Moisture (2) Lithology	100% Retained DB			
30.0				(30') Slightly Silty, Sandy, GRAVEL (5% Silt, 35% Sand, 60% Gravel). Light brownish gray (10YR 6/2) dry to grayish brown (10YR 5/2) wet. Gravels Composed of 10% VFP, 15% CP, 10% MP, 15% FP-VFP, A-R, 60% basaltic, 35% qtzic, 5% other. Sands composed of 5% VCS, 10% CS, 20% M-FS 5% VFS <5% fines. Poorly Sorted, Dry, loose, unconsolidated, very strg Rx to 10% HCl.	Casing advanced to 29.5'
	(1) Moisture (2) Lithology	100% Retained DB		(34') (.5' thick $CaCO_3$ Cemented gravel)	
35.0				(35') Silty, Sandy GRAVEL. (<10% silt/fines, 30% Sand, 60% gravel). Brown (10YR 5/3) dry to Dark brown (10YR 4/3) wet. Gravels composed of 30% fine Pebble to medium pebble 30% VFP, 60% Basalt, 20% Qtzic, 20% $CaCO_3$ cemented fragments. Dry, cemented, Strong Rx to 10% HCl.	Casing driven to 33'
	(1) Moisture (2) Lithology			10-11	
40.0				(40') See Next page	

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BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 3 of 13

Location 200W 218-W-5

Elevation 684.64 BRASS CAP

Driller T. Giffood

Prepared By D.B. Jones / D B Jones (Sign/Print Name) Date 4/16/91

Project W017/ LLBG

Drilling Contractor Kaiser Engineering, Hanford

Drilling Method and Equipment WS-31 Cable

Reviewed By RB Meacle / RB Meacle (Sign/Print Name) Date 4/24/91

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')				(40') Silty, Sandy, GRAVEL (<10% Silt, 25% SAND, 65% Gravel). Brown (10YR 4/3) Dry to Dark brown (10YR 4/3) wet. Gravels composed of 15% MP, 35% FP, 20% VFP) 65% mafic 30% qtzic, 5% Other Sands more qtzic 5% CS, 5% MS, 10% FS 5% VFS Poorly Sorted, slightly Moist, cemented Strong Rx to 10% HCl.	Casing advanced to 32'.
	(1) Moisture (2) Lithology	100% DB			
45.0				(45') Silty, Sandy, GRAVEL. (<10% Silt, 40% Sand, 50% gravel). grayish brown (10YR 5/2) Dry to grayish brown (2.5YR 5/2) wet. Gravels composed of 5% MP, 30% FP, 15% FP. 65% basaltic, 25% felsic, 10% other Sands composed of 5% CS, 15% MS 10% FS, 10% VFS all SR to SA. Dry, loose, Poorly Sorted, moderate Rx to 10% HCl. Seems to be fining downward. Decrease in $CaCO_3$ Percent.	Casing advanced to 43'
	(1) Moisture (2) Lithology	100% DB			
50.0				(50') Slightly Silty, Sandy, GRAVEL (70% gravel 25% Sand, <5% Silt). Light yellowish brown (2.5Y 6/3) dry to Light olive brown (2.5Y 5/3) wet. Gravels composed of 10% MP, 60% FP/VFP. 90% mafic, 10% felsic, R-SA. Sands composed of 10% MS, 15% fine to VFS. Poorly Sorted, loose, Slight cemented, Strong Rx to 10% HCl. Trace magnetics, Muscovite.	Casing driven to 48.5'
	(1) Moisture (2) Lithology	100% DB			
55.0				(55') Same as Above Increase in sand, less silt.	Casing driven to 53'.
				(56') Silty, SAND (15% silt, 82% Sand, 3% fine pebbles) light yellowish brown (2.5Y 6/3) Dry to olive brown (2.5Y 5/3) wet. Sands composed of fine to very fine Sands. Dry, medium dense, slightly cemented, cohesive, well sorted, trace Muscovite. Contact sharp	
60.0				(60') See other page for description	

10-12

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BOREHOLE LOG

Boring or Well No 299-W7-12

Sheet 4 of 13

Location 200 West 218-W-5 LLBG

Project W017 / LLBG

Elevation 684.64' BRACS CAP

Drilling Contractor KAISER Engineering, Hanford

Driller T. G. Ffoed

Drilling Method and Equipment W.S-51 : Cable tool

Prepared By D. B. Jones (Sign/Print Name) Date 4/17/91

Reviewed By RAMunn / R.B. Mercer (Sign/Print Name) Date 4/29/91

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
60.0	(2) Lithology (1) Moisture (3) NP	DB		(60) Sandy SILT (50% silt, 50% sand) Pale brown (10YR 6/3) Dry to very pale brown (10YR 7/3) wet Sands large ab. 2% MS, 20% FS, 28% VFS 50% fines. Dry, slightly cohesive, medium stiff, Mod Rx to 10% HCL. fining downward Horizontal laminations (2p to 3cm thick)	Casing advanced to 58.5' No difficulties in drilling
				(63) cemented silty, sandy gravel.	difficult to retain sample in core barrel set-up Hard Rx.
65.0					
	(1) Moisture (2) Lithology	100% DB			Always hard to drive barrel
70.0				(70) silty SAND (25% silt 75% sand) light gray (2.5Y 7/2) Dry, light brownish gray (2.5Y 6/2) wet 50% VFS 20% FS 5% MS 50% fines, Dry, Cemented, Strong Rx To 10% HCL, Horizontal laminations (.3-.5cm) Trace Mica Flakes	Casing advanced to 72' End of shift 4/17/91 0
	1 moisture 2 Lith	100% DB			
75.0				(75) slightly silty sandy GRAVEL (15% silt 40% sand 45% gravel) Dry (2.5Y 6/3) light yellowish Brown - wet (2.5Y 5/3) light olive Brown 4% MP 41% FP 10 VCS 5% CS 5 MS 20% FS to VFS 15% fines Slightly cemented mod Rx TO 10% HCL coarsen downward, Trace mica flakes	Casing advanced To 71'
				10-13	
80.0				(80) next Page for Discription	

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BOREHOLE LOG

Boring or Well No 219-W7-12

Sheet 5 of 13

Location 200 West 218-W-5 LLBG

Project W017/LLBG

Elevation 684.64' BRASS CAP

Drilling Contractor Kaiser Engineering Hanford

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable Tool

Prepared By L. Wenger (Sign/Print Name) Date 4-18-91

Reviewed By RB Mercer/RB Mercer (Sign/Print Name) Date 4/24/91

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
80.0	214th moisture	DB		(80') Slightly gravelly silty SAND (5% gravel 15% silt 80% sand) light olive gray (5Y 5/2) Dry, Olive gray (5Y 5/2) wet. gravels - 5% FP sand - 5% VCS 15% CS 20% MS 35% FS and 5% VFS gravels 95% basaltic 5% felsic loosely cemented with lenses of CS to FP $CaCO_3$ cemented mod ~~ex~~ to 10% HCl Trace Biotite mica ~~flakes~~ flakes	Casing at 79'
85.0	214th moisture	DB		(85') Slightly gravelly silty SAND (3% gravel 20% silt 77% sand) Pale olive (5Y 6/3) Dry olive (5Y 5/3) wet, 3% FP 40% MS 30% FS 7% VFS 20% Finer 45% basaltic Pebbles 5% felsic. Dry loose mod ex to 10% HCL Trace Mica Fining downward	
90.0	214th moisture	DB		(90') Slighty silty gravelly SAND (10% gravel 85% sand 5% silt) pale yellow (2.5Y 7/3) Dry light yellowish brown (2.5Y 6/3) wet gravels - 2% CP 3% FP Sands 5% VCS 16% CS 20% MS 25% VFS 20% FS 5% finer loosely cemented Dry ~~ex~~ mod. sorted mod ~~ex~~ to 10% HCl Gravels SA to SR Sands A Gravels have $CaCO_3$ find	
95.0	214th moisture	DB		(95) slighty silty gravelly SAND (3% gravel 95% sand 2% silt) light gray (5Y 7/2) Dry light olive gray (5Y 6/2) wet. gravel 3% FP to VP Sand 30% CS 20% MS 15% FS 30% VFS 2% finer no cementation Dry well sorted 80% basaltic pebbles 20% felsic No ex to 10% HCl grains Angular to Subangular	Casing Driven To 93'
				10-14	
100.0				Log on next page	

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BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 2 of 13

Location 200 West 218-W-5 LLBG

Project W017/LLBG

Elevation 684.64' BRASS CAP

Drilling Contractor Kaiser Engineering Hanford

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable Tool

Prepared By R. Weingartz / [illegible] (Sign/Print Name) Date 4-19-91

Reviewed By R.B. Mercer / R.B. Mercer (Sign/Print Name) Date 29 Apr 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
100.0'	21in 1 moist			(100') slighty gravelly silty SAND 3% gravel 7% silty 90% sand, light olive gray (5Y 6/2) dry olive gray (5Y 5/2) wet 3% UFP 60% VCS to CS 20% MS 10% FS 7% fines no Rx to 10% HCL uncemented well sorted clean sand	Plug in pipe ≈99.5' added 4gal water to try and loosen up the plug Jars Broken Down Hole - 100.5 Jars removed
105.0'	21in 1 moist	DB		(105') slighty gravelly silty SAND 3% gravel 5% silt 92% sand - Dry light yellow Brown (2.5Y 6/3) wet - light olive Brown (2.5Y 5/3) 3% UFP 60% VCS to CS 15% MS 10% FS 7% VFS 5% fines. no Rx To 10% HCL loose Dry uncemented well sorted sand. Trace mica flakes, Pebbles - 95% basaltic 5% felsic	Casing at 104' Sample recovery problem - wouldn't stay in DB - 4gal water added
110.0'	21in 1 moist	DB		(110') slighty silty, slightly gravelly SAND 2% silt, 96% sand 2% gravel. - pale olive Dry (5Y 6/2) olive wet (5Y 4/3) gravels - 2% UFP sands 30% VCS to CS 40% MS 20% FS 6% VFS 2% fines. Dry loose well sorted sand no Rx To 10% HCl again angular To subangular 95% pebbles basalt 5% felsic	Casing at 109.5' 112' Transition from sand to gravel layer 113' Back To Sand
115.0'	21in 1 moist	DB		(115') slighty gravelly SAND 2% gravel 98% sand <1% silt dry color pale olive (5Y 6/3) wet color olive (5Y 4/3) 2% FP 40% VCS to CS 25% MS 20 FS 13% VFS <1% silts or fines Dry uncemented well sorted sand angular to Subangular Pebbles - No Rx To 10% HCl except for a few 1% $CaCO_3$ concretions ≈ 1cm	Casing at 114
120.0'					

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BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 7 of 13

Location 200 West 218-W-5 LLBG

Project W017/LLBG

Elevation 684.64 BRASS CAP

Drilling Contractor KEH

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable Tool

Prepared By Rick Weiner (Sign/Print Name) Date 4-25-91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/30/91

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
120.0'	21in h 1 moist	DB		(120') slightly silty gravelly SAND 5% gravel 92% sand 3% silt - color dry pale olive (5Y 6/3) wet olive (5Y 5/3) gravel 1% MP 4% VFP 40% VCS 30% CS 10% MS 12% FS 3% fines. Dry unsemented well sorted sand no rx to 10% HCl pebbles rounded to subrounded Trace misc.	
125.0'	21in h 1 moist	DB		(125') silty gravelly SAND 15% gravel 80% sand 15% silt, color dry pale olive (5Y 6/3) wet olive (5Y 5/3) gravels 3% modP 2% FP 10% VFP sands 30% VCS 10% CS 15% MS 10% FS 5% VFS 15% fines Dry unsemented no Rx to 10% HCl pebbles subrounded 10% Felsic? 90% Basaltic	Casing at 123.5'
UR					
130.0'	21in h 1 moist	DB		(130') silty gravelly SAND 20% 60% 20% gravel, sand, silt respectively. color pale yellow dry (5Y 5/3) pale olive wet (5Y 6/3) 3% MP 17% FTo VFP 30% CS 20 MS 10% FS 20% fines Dry uncemented mod. sorted sand mod rx to 10% HCl pebbles subrounded to angular	
135.0'	21in h 1 moist	DB		(135') slightly silty gravelly SAND 10% gravel 85% sand 5% silt - pale olive (5Y 6/3) dry olive (5Y 5/3) wet 7% CP 3% VFP 70% CS 10% VCS 20% MS 15% FS 5% fines no rx to 10% HCl. Dry unsemented to mod. sorted sand. rounded pebbles	casing driven to 137.5'
					138 - water added due to lack of sample adhesion
140.0'					

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 2041-W7-12

Sheet 8 of 13

Location 200 West 218-W-5 LLBG

Project W017 / LLBG

Elevation 684.64' BRASS CAP

Drilling Contractor KEH

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable Tool

Prepared By R. Weiner / [illegible] (Sign/Print Name) Date 4-21-91

Reviewed By R.D. Miller [illegible] (Sign/Print Name) Date 5/2/91

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
140.0'	21.4h 1 moist	DB		(140') slightly sandy Silty GRAVEL 40% gravel 50% silt 10% sand colors dry very pale yellow Brown (10YR 7/4) wet pale brown (10YR 6/3) 10% SC 10% C to MP 20% FP 5% CS 3% MS 2% FS 50% fines Mod rx to 10% HCl uncemented Dry cobbles rounded	Casing at 139' sample recovery difficulty
146.0'	21.4h 1 moist	DB		(145') slightly sandy silty GRAVEL 60% gravel 30% silt 10% sand lt. olive gray (5Y 6/2) dry olive gray (5Y 4/2) wet 10% SC 10% MP 20% FP 5% MS 5% FS 80% fines mod rx to 10% HCl gravels 80% basalt 20% caliche sands some u. gravels angular to sub rounded $CaCO_3$ cemented "clods" caliche lens.	Casing at 144.6' 4 gal water added to hole to help sample recovery
150.0'	21.4h 1 moist	DB		(150') slightly sandy silty GRAVEL 40% gravel, 40% silt, 20% sands lt. gray (5Y 7/2) dry lt olive gray (5Y 6/2) wet. 10% UCP 5% CP 15% FP 15% CS 5% FS 40% fines strong rx to 10% HCl - dry slightly cemented gravels angular to sub round sands angular to subangular - caliche lenses	
155.0'	21.4h 1 moist	DB		(155') sandy silty GRAVEL 30% gravel, 25% silt 15% sand 10% SC 10% CP 15% MP 5% FP 7% CS 8% MS 3% FS 25% fines lt gray (5Y 7/2) dry lt olive gray (5Y 6/2) wet weak rx to 10% HCl dry uncemented cobbles rounded, sand angular to sub rounded	WS-31 Switch To ~~bent~~ Tools
				10-17	
160.0'				(160') next page	

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BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 9 of 13

Location 200 West WMAS 218-W-5 LLBG
Project W017/LLBG
Elevation 684.64' BRASS CAP
Drilling Contractor KEH
Driller T. Gifford
Drilling Method and Equipment WS-31 cable Tool
Prepared By R. Watson (Sign/Print Name) Date 5-1-91
Reviewed By R.D. Miller (Sign/Print Name) Date 5/11/91

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
160'	21th 1 moist	DB		(160') Silty GRAVEL 50% gravel 15% sand 35% silt lt. olgray (5Y 4/2) Dry olgray (5Y 4/2) wet 3% SMC 20% CP 15% MP 12% FP 5% CS 7% MS 3% FS 35% fines Dry unconsolidated gravel angular to subrounded sands angular, no rx to 10% HCl	Sample recovery difficult
165'	21th 1 moist	DB		(165) Silty GRAVEL 50% gravel 20% sand 30% silt lt gray (5Y 7/2) dry olgray (5Y 4/2) wet 20% UCP 10% CP 2% MP 18% FP 12% CS 4% MS 4% FS 30% fines dry unconsolidated no rx to 10% HCl pebbles angular to subrounded sand angular to subangular. pebbles 30% felsic 70% mafic sands same. layers of cobbles SC between 160' 165'	difficult sample return 4 gal water added
170'	21th 1 moist	DB		(170') silty GRAVEL same as above increase of gravel to 60% and less sand	
175'	21th 1 moist	DB		175' equal (~~170'~~) silty GRAVEL 50% gravel 20% sand 30% silt. pale yellow (5Y 7/3) dry olive (5Y 5/3) wet 5% UCP 2% SC 23% MP 10% FP 10% UFP 5% UCS 8% MS 7% FS 30% fines dry unconsolidated pebbles rounded to subrounded, sands angular to subangular, no rx to 10% HCl	Easy drilling Large boulder - Hard tool - 177'
180'				10-18	

9313018.1416

BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 10 of 13

Location 200 West WMAS 218-W-5

Project W017 / LL136

Elevation 684.64' BRASS CAP

Drilling Contractor KEH

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable Tool

Prepared By R. Weingart / [signature] (Sign/Print Name) Date 5-7-91

Reviewed By R.D. Wilson [signature] (Sign/Print Name) Date 5/22/91

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
180.0'	21th 1 mist	HT		(180') Silty GRAVEL 60% gravel 10% sand 30% silt · color: dry 1Tgray (5Y 7/2) wet, (5Y 4/2) ol gray no rx to 10% HCl clasts · 40% felsic 60% basaltic	
185.0'	21th 1CaCO3	HT		(185') Silty GRAVEL · same as above clst 55% felsic 45% mafic no rx to 10% HCl 3 to 5% rounded sands	
190.0'	21th 1CaCO3 1Rad	ST		(190') Sandy GRAVEL 50% gravel 30% sand 20% silts · 1T ol gray (5Y 6/2) dry ol gray (5Y 4/2) wet. 1% SC 3% VCP 21% CP 10% MP 7% FP 8% VF 5% VCS 10% CS 8% MS 4% FS 3% VFS 30% fines, dry moderate CaCO3 rinds on pebbles mod rx to 10% HCl pebbles 80% mafic 20% felsic sands 50% mafic 50% felsic clast. angular to subrounded some w/sands	
195.0'	21th 1CaCO3 1Rad	HT		(195') Sandy GRAVEL - same as above clasts 65% felsic · 35% mafic sands: 80% felsic 20% mafic - 30% of sand round to subrounded.	
200.0'					

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BOREHOLE LOG

Boring or Well No 299-W7-12

Sheet 11 of 13

Location 200 West WMAS 218-W-5 | Project W017-LLBG

Elevation 684.64' BRASS CAP | Drilling Contractor KEH

Driller T. Gifford | Drilling Method and Equipment WS-31 Cable Tool

Prepared By R. Weingart (Sign/Print Name) Date 5-20-91 | Reviewed By (Sign/Print Name) Date

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
200.0	21ith 1 moist 1 rnd	HT		(200') Sandy GRAVEL same as previous, except. no rx to 10% HCl, 5% increase in round sand	
					Drilling becomes easier
	21ith 1 moist	HT		(205) sandy GRAVEL same as previous	
205.0	1 rnd.			except. weak rx to 10% HCl, 10% less mafics and less rounded grains	205.5 end of day 5/20/91. casing to 203.5'
210.0	21ith 1 moist 1 rnd	HT		(210') Sandy GRAVEL same as previous no rx to 10% HCl. Increase in sands and decrease in gravels	210.1' end of day 5/21/91 Some zones of easy Drilling
215.0	21ith 1 moist 1 rnd	ST 1'-20.86 50% recovery		(215') Sandy GRAVEL 60% gravel 30% sand 10% silt 5% SC, 20% VCP 10% CP 10% MP 15% FP 5% VCS 10% CS 12% MS 3% FS 10% fines when dry lt gray (5Y 7/2) wet lt olive gray (5Y 5/2), dry slight cemented, no rx to 10% HCl, gravels 80% quartzite 20% basalt, sands - qtz - 70% 30% mafics gravels - round to sub angular sands round to angular	
220.0					

10-20

A-6000-382 (04/90)

9313018.1418

BOREHOLE LOG

Boring or Well No 299-W7-12

Sheet 12 of 13

Location 200 West WMAS-218-W-5 Project W017-LLBG

Elevation 684.64' BRASS CAP Drilling Contractor KEH

Driller T. Gifford Drilling Method and Equipment WS-31; cable Tool

Prepared By R. Weingart (Sign/Print Name) Date 5-23-91 Reviewed By R.D. Miller (Sign/Print Name) Date 5/20/91

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
220.0	21 in 1 rad 1 mus	HT		(220') Sandy GRAVEL. same as previous except. decrease gravel 70% increase Sands 20% and 80% rounded qrtz, no cobbles	Drilling becomes easy
			wr		
225.0	21 in 1 rad 1 $CaCO_3$	HT		(225') gravelly SAND - 15% gravels 60% sands 25% silts? lt gray (5Y 7/2) dry lt olive gray (5Y 6/2) wet % approx. 8% m P 5% FP 2% VFP 20% VCS 10% CS 15% MS 15% FS silts and fines 25% no rx to 10% HCl sand is rounded and 80% quartz.	
230.0	21 in 1 $CaCO_3$ 1 rad	HT		(230') sandy GRAVEL, same as 220' sample no rx to 10% HCl	
235.0	21 in 1 $CaCO_3$ 1 rad	ST 9/12/12/25 35%		(235-237) Sandy GRAVEL 50% gravel 40% sand 10% silt, wet lt olive gray (5Y 6/2) dry lt gr. (5Y 7/2) 3% SC 20% CP 10% MP 10% FP 7% VFS 10% VCS 17% CS 20% MS 10% fines no rx to 10% HCl sands 80% felsic 20% mafic, Gravels 60% felsic 40% mafic and round to sub rounded	

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W7-12

Sheet 13 of 13

Location 200 west WMAS-218-W-5

Project W017 - LLBG

Elevation 684.64' BRASS CAP

Drilling Contractor KEH

Driller T. Gifford

Drilling Method and Equipment WS-31 Cable tool

Prepared By R. Weingart (Sign/Print Name) Date 5-28-91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/31/91

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'	21.7 h 1 rad 1 CaCO3	HT		(240') Sandy GRAVEL, same as previous, well sorted round sand 70% felsic 30% mafics	
		TD			
			slurry		
	21.7 h 1 rad 1 CaCO3	HT			Casing at 241.
245'			TD= 242.93'	(245) Sand GRAVEL, same as previous	
250'					

10-22

A-6000-382 (04/90)

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EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

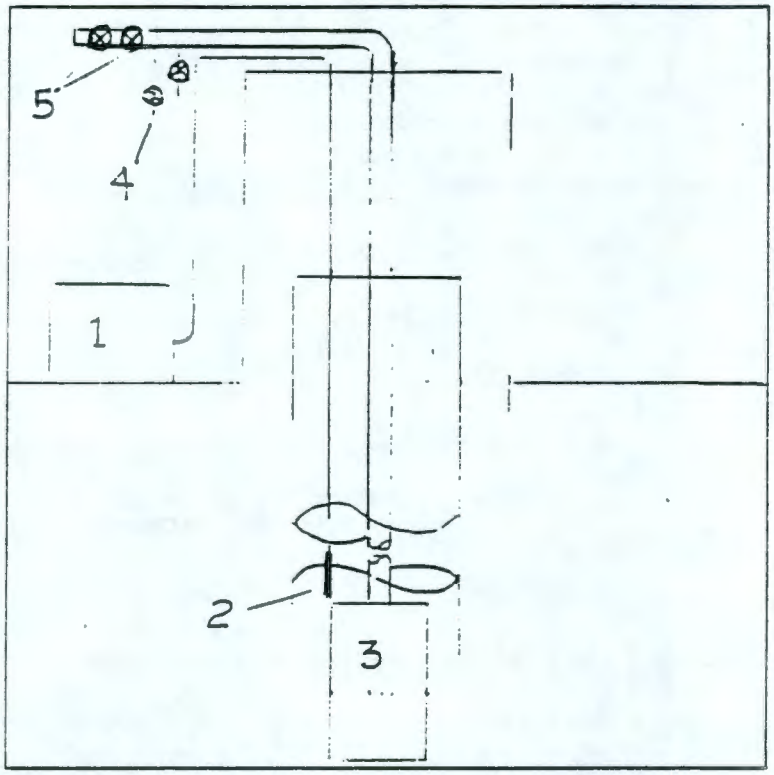
Well Designation 299-W7-12 Depth 243.8 BTOC 6'

VALIDATED
KDR 3/19/92
SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-350976
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

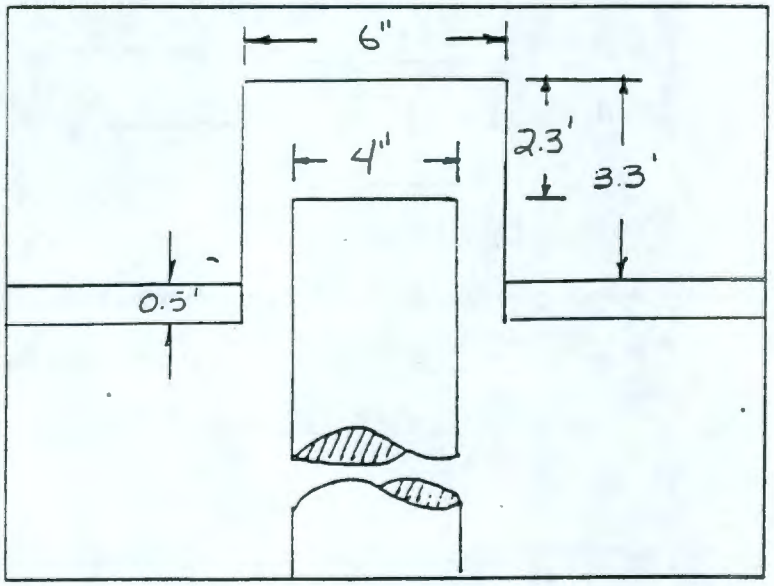
Diagram



Comments

Well Head

Diagram



Signature of Recorder JAMES A. COATES Date 8-9-91

9313018.1421

WELL DEVELOPMENT FORM

Well Designation 299-W7-12 Well Depth 243.8' BTOC 6"

Screened Interval 243.8'-223.1' Date Well Development is Performed 8-9-91

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 242.2' Pump Start Time 0815

Flow Rate 5.9 GPM. Accumulated Flow 640 GALS. Pump Stop Time 1010

Turbidity >100 NTU, 80 NTU, >100 NTU, 20 NTU, 4.1 NTU, 4.9 NTU, —, —

—, —, —, —, —, —, —, —

Comments _____

Signature of Recorder James A Coates, James A Coates Date 8-13-91

Sign and Print Name 10-24

9313018.1422

DRAWDOWN/RECOVERY

Well Designation 299-W7-12 Date 8-9-91

Well Depth 243.8' BTOC Screened Interval 243.8 - 223.1.

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E-TAPE/TRANSDUCER S N ET-5/350976. Calibation Due 1-24-92/5-9-92

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

Measuring Point TOP OF CASING 6" (TOC. 6") Pump Start Time 0815 Pump Stop Time 0825

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				5GALS/31.9SEC. 9.4GPM.
		SEE ATTACHED DATA.		

Signature of Recorder JAMES A COATES JAMES A COATES Date 8-13-91

Sign and Print Name

A-6000-402 (03/90)

9313018.1432

~~Page 2 of 6~~
4 of 8

299-W7-12 BASELINE

SE2000
Environmental Logger
08/12 08:30

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 07:53:35

Elapsed Time	INPUT 1
0.0000	227.823
1.0000	227.826
2.0000	227.829
3.0000	227.832
4.0000	227.832
5.0000	227.839
6.0000	227.842
7.0000	227.845
8.0000	227.845
9.0000	227.851
10.0000	227.854
11.0000	227.851
12.0000	227.858
13.0000	227.858
14.0000	227.861
15.0000	227.861
16.0000	227.861
17.0000	227.864
18.0000	227.864
19.0000	227.867
20.0000	227.867
21.0000	227.870

END

9313018.1424

DRAWDOWN
299-W7-12

~~Fig E30 ft~~
5 of 8

SE2000
Environmental Logger
08/12 08:28

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 08:16:24

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	228.250	-228.250
0.0083	0.00014	227.965	-227.965
0.0166	0.00028	228.105	-228.105
0.0250	0.00042	228.196	-228.196
0.0333	0.00056	228.288	-228.288
0.0416	0.00069	228.399	-228.399
0.0500	0.00083	228.466	-228.466
0.0583	0.00097	228.551	-228.551
0.0666	0.00111	228.621	-228.621
0.0750	0.00125	228.687	-228.687
0.0833	0.00139	228.760	-228.760
0.1000	0.00167	228.884	-228.884
0.1166	0.00194	229.014	-229.014
0.1333	0.00222	229.125	-229.125
0.1500	0.00250	229.251	-229.251
0.1666	0.00278	229.362	-229.362
0.1833	0.00306	229.470	-229.470
0.2000	0.00333	229.571	-229.571
0.2166	0.00361	229.676	-229.676
0.2333	0.00389	229.771	-229.771
0.2500	0.00417	229.866	-229.866
0.2666	0.00444	229.958	-229.958
0.2833	0.00472	230.046	-230.046
0.3000	0.00500	230.135	-230.135
0.3166	0.00528	230.217	-230.217
0.3333	0.00556	230.300	-230.300
0.4166	0.00694	230.642	-230.642
0.5000	0.00833	230.984	-230.984
0.5833	0.00972	231.285	-231.285
0.6666	0.01111	231.551	-231.551
0.7500	0.01250	231.779	-231.779
0.8333	0.01389	232.001	-232.001
0.9166	0.01528	232.181	-232.181
1.0000	0.01667	232.289	-232.289
1.0833	0.01805	232.393	-232.393
1.1666	0.01944	232.501	-232.501
1.2500	0.02083	232.628	-232.628
1.3333	0.02222	232.764	-232.764
1.4166	0.02361	232.900	-232.900
1.5000	0.02500	233.059	-233.059

9313018.1425

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1.5833	0.02639	233.214	-233.214
1.6666	0.02778	233.378	-233.378
1.7500	0.02917	233.515	-233.515
1.8333	0.03056	233.638	-233.638
1.9166	0.03194	233.752	-233.752
2.0000	0.03333	233.885	-233.885
2.5000	0.04167	234.563	-234.563
3.0000	0.05000	235.152	-235.152
3.5000	0.05833	235.681	-235.681
4.0000	0.06667	236.159	-236.159
4.5000	0.07500	236.581	-236.581
5.0000	0.08333	236.974	-236.974
5.5000	0.09167	237.309	-237.309
6.0000	0.10000	237.585	-237.585
6.5000	0.10833	237.838	-237.838
7.0000	0.11667	238.073	-238.073
7.5000	0.12500	238.253	-238.253
8.0000	0.13333	238.446	-238.446
8.5000	0.14167	238.608	-238.608
9.0000	0.15000	238.750	-238.750
9.5000	0.15833	238.865	-238.865
10.0000	0.16667	239.001	-239.001

9313018.1426

(RECOVERY)

~~Page 5 of 6~~

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SE2000
Environmental Logger
08/12 08:26

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 08:26:57

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	238.966	-238.966
0.0083	0.00014	238.769	-238.769
0.0166	0.00028	238.551	-238.551
0.0250	0.00042	238.361	-238.361
0.0333	0.00056	238.171	-238.171
0.0416	0.00069	237.971	-237.971
0.0500	0.00083	237.794	-237.794
0.0583	0.00097	237.607	-237.607
0.0666	0.00111	237.426	-237.426
0.0750	0.00125	237.230	-237.230
0.0833	0.00139	237.062	-237.062
0.1000	0.00167	236.704	-236.704
0.1166	0.00194	236.353	-236.353
0.1333	0.00222	236.007	-236.007
0.1500	0.00250	235.669	-235.669
0.1666	0.00278	235.342	-235.342
0.1833	0.00306	235.026	-235.026
0.2000	0.00333	234.728	-234.728
0.2166	0.00361	234.436	-234.436
0.2333	0.00389	234.167	-234.167
0.2500	0.00417	233.904	-233.904
0.2666	0.00444	233.664	-233.664
0.2833	0.00472	233.416	-233.416
0.3000	0.00500	233.157	-233.157
0.3166	0.00528	232.929	-232.929
0.3333	0.00556	232.739	-232.739
0.4166	0.00694	231.956	-231.956
0.5000	0.00833	231.161	-231.161
0.5833	0.00972	230.471	-230.471
0.6666	0.01111	229.872	-229.872
0.7500	0.01250	229.349	-229.349
0.8333	0.01389	228.906	-228.906
0.9166	0.01528	228.592	-228.592
1.0000	0.01667	228.421	-228.421
1.0833	0.01805	228.320	-228.320
1.1666	0.01944	228.247	-228.247
1.2500	0.02083	228.193	-228.193
1.3333	0.02222	228.146	-228.146
1.4166	0.02361	228.127	-228.127
1.5000	0.02500	228.101	-228.101

9313018.1427

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1.5833	0.02639	228.092	-228.092
1.6666	0.02778	228.079	-228.079
1.7500	0.02917	228.067	-228.067
1.8333	0.03056	228.063	-228.063
1.9166	0.03194	228.057	-228.057
2.0000	0.03333	228.054	-228.054
2.5000	0.04167	228.089	-228.089
3.0000	0.05000	228.092	-228.092
3.5000	0.05833	228.079	-228.079
4.0000	0.06667	228.076	-228.076
4.5000	0.07500	228.067	-228.067
5.0000	0.08333	228.054	-228.054
5.5000	0.09167	228.041	-228.041
6.0000	0.10000	228.041	-228.041
6.5000	0.10833	228.035	-228.035
7.0000	0.11667	228.025	-228.025
7.5000	0.12500	228.013	-228.013
8.0000	0.13333	228.006	-228.006
8.5000	0.14167	228.000	-228.000
9.0000	0.15000	227.994	-227.994
9.5000	0.15833	227.987	-227.987
10.0000	0.16667	227.981	-227.981
12.0000	0.20000	227.959	-227.959
14.0000	0.23333	227.937	-227.937
16.0000	0.26667	227.924	-227.924
18.0000	0.30000	227.908	-227.908
20.0000	0.33333	227.896	-227.896
22.0000	0.36667	227.889	-227.889
24.0000	0.40000	227.886	-227.886

9313018.1428

SAMPLING PUMP INSTALLATION FORM

181

VALIDATED
KDR 3/19/92
SIGNATURE/DATE

Project: W-017-LLBG

Well Number 299-W7-12

Pump Type HYDROSTAR.

Pump Model HS-8000

Date Installed: ~~227.8~~ 8/9/91

Installed by: J.A. COATES / B. STROBE / M. ATKINSON

Depth to water: 227.8 BTOC

Depth to Bottom 243.8 BTOC

Reported Depth to water: 224.0 b/s.

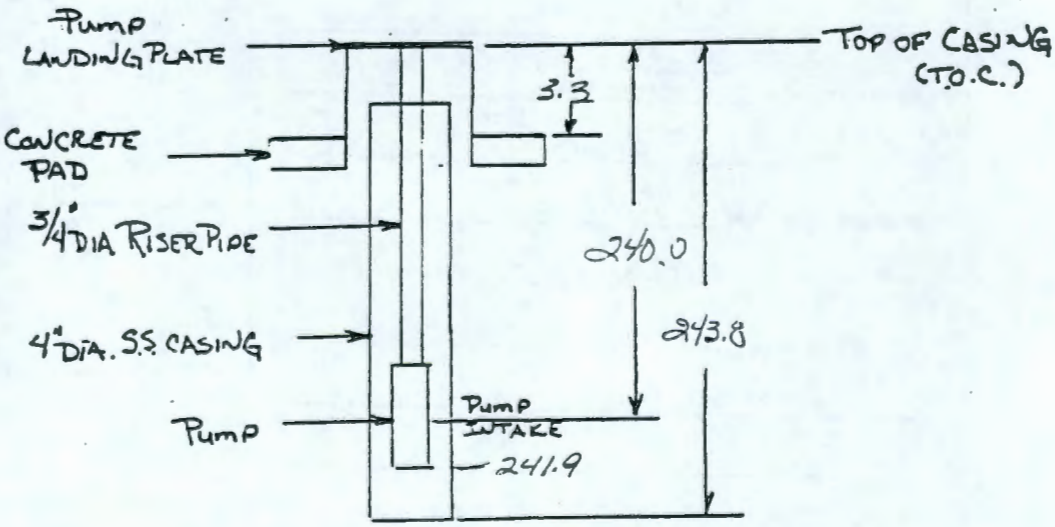
Screened Interval: 240-243 BLS

Pump/Riser Pipe Description:
- pipe: 3/4" S.S. RISER
- pump length: 4.35
- pump screen length 1.90
- material cleaning: FACTORY

Comments: REFERENCE POINT. TOP OF 6" CASING (TOC. 6") OR BELOW LAND SURFACE BLS

PUMP INSTALLATION SKETCH

Total material length 241.9'
Loc. of pump intake: 240.0'



Completed By: JAMES A. COATES

Date: 8-9-91

243.8
1.1
241.9

9313018.1422

BOREHOLE TEST INFORMATION

VALIDATED KDR 2/19/92 SIGNATURE/DA

Borehole 299-W7-12 Borehole Diameter 4" Hanford Coordinates — NA —

Interval Tested 243.8'-223.1' BTOC Depth Interval 243.8'-223.1'

Test Type INSTANTANEOUS SLUG INJECTION - WITHDRAWAL Borehole Depth 243.8'

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

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOLINST SN-ET-5
DATA LOGGER.	IN-SITU INC. SN.- 2K192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.- 350976.
SLUGGING ROD	~~6'x2"~~ 6.1'x2.0"
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

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

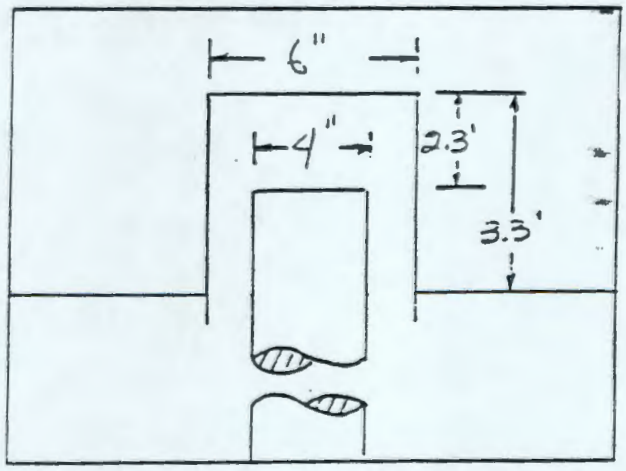
Elevation NA

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 (signature) JAMES A. COATES Sign and Print Name 8-13-91 Date

BD-6000-295 (05/89)

9313018.1430

INSTANTANEOUS SLUG TEST DATA SHEET -INJECTION-

Borehole 299-W7-12

Interval Tested 243.8'-223.1' BTOC 6"

Depth to Water 227.8'

Date 8-9-91.

Measured by JAMES A. COATES

Slug Volume 137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time BASELINE 1120-1138, INJECTION 1140-1155

Transducer Measurement Units FEET.

Depth to Transducer 15.107' BWL

Initial Pressure (P_i) 227.82

Slug Level or Pressure (P_{max}) 226.388

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 8-13-91 (Date)

9313018.1121

INJECTION BASELINE

~~Page 20 of 4~~ 3 of 8

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 11:21:27

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0	0.0000	227.820	-227.820
1	0.0167	227.823	-227.823
2	0.0333	227.820	-227.820
3	0.0500	227.826	-227.826
4	0.0667	227.820	-227.820
5	0.0833	227.820	-227.820
6	0.1000	227.823	-227.823
7	0.1167	227.823	-227.823
8	0.1333	227.823	-227.823
9	0.1500	227.826	-227.826
10	0.1667	227.826	-227.826
11	0.1833	227.829	-227.829
12	0.2000	227.826	-227.826
13	0.2167	227.829	-227.829
14	0.2333	227.826	-227.826
15	0.2500	227.829	-227.829
16	0.2667	227.832	-227.832

9313018.1432

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299-W7-12 INJECTION

SE2000
Environmental Logger
08/12 08:09

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 11:40:04

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	227.110	-227.110
0.0083	0.00014	226.388	-226.388
0.0166	0.00028	226.556	-226.556
0.0250	0.00042	231.918	-231.918
0.0333	0.00056	226.667	-226.667
0.0416	0.00069	227.458	-227.458
0.0500	0.00083	227.595	-227.595
0.0583	0.00097	227.585	-227.585
0.0666	0.00111	227.557	-227.557
0.0750	0.00125	227.591	-227.591
0.0833	0.00139	227.604	-227.604
0.1000	0.00167	227.620	-227.620
0.1166	0.00194	227.642	-227.642
0.1333	0.00222	227.658	-227.658
0.1500	0.00250	227.664	-227.664
0.1666	0.00278	227.674	-227.674
0.1833	0.00306	227.677	-227.677
0.2000	0.00333	227.683	-227.683
0.2166	0.00361	227.690	-227.690
0.2333	0.00389	227.693	-227.693
0.2500	0.00417	227.696	-227.696
0.2666	0.00444	227.699	-227.699
0.2833	0.00472	227.702	-227.702
0.3000	0.00500	227.709	-227.709
0.3166	0.00528	227.709	-227.709
0.3333	0.00556	227.712	-227.712
0.4166	0.00694	227.721	-227.721
0.5000	0.00833	227.728	-227.728
0.5833	0.00972	227.734	-227.734
0.6666	0.01111	227.734	-227.734
0.7500	0.01250	227.737	-227.737
0.8333	0.01389	227.743	-227.743
0.9166	0.01528	227.743	-227.743
1.0000	0.01667	227.747	-227.747
1.0833	0.01805	227.753	-227.753

9313018.1422

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1.1666	0.01944	227.756	-227.756

299-W7-12 INJECTION

1.2500	0.02083	227.756	-227.756
1.3333	0.02222	227.759	-227.759
1.4166	0.02361	227.759	-227.759
1.5000	0.02500	227.762	-227.762
1.5833	0.02639	227.766	-227.766
1.6666	0.02778	227.762	-227.762
1.7500	0.02917	227.772	-227.772
1.8333	0.03056	227.766	-227.766
1.9166	0.03194	227.769	-227.769
2.0000	0.03333	227.772	-227.772
2.5000	0.04167	227.785	-227.785
3.0000	0.05000	227.788	-227.788
3.5000	0.05833	227.797	-227.797
4.0000	0.06667	227.797	-227.797
4.5000	0.07500	227.804	-227.804
5.0000	0.08333	227.804	-227.804
5.5000	0.09167	227.810	-227.810
6.0000	0.10000	227.810	-227.810
6.5000	0.10833	227.810	-227.810
7.0000	0.11667	227.813	-227.813
7.5000	0.12500	227.813	-227.813
8.0000	0.13333	227.816	-227.816
8.5000	0.14167	227.820	-227.820
9.0000	0.15000	227.823	-227.823
9.5000	0.15833	227.823	-227.823
10.0000	0.16667	227.823	-227.823
12.0000	0.20000	227.820	-227.820
14.0000	0.23333	227.823	-227.823

9313018.1434

INSTANTANEOUS SLUG TEST DATA SHEET

-WITHDRAWAL-

Borehole 299-W7-12

Interval Tested 243.8'-223.1' BTOC 6"

Depth to Water 227.8'

Date 8-9-91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1156 - 1207

Transducer Measurement Units FEET

Depth to Transducer 15.107' BWL.

Initial Pressure (P_i) 227.82'

Slug Level or Pressure (P_{max}) 229.517'

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 (Sign and Print Name) JAMES A. COATES 8-9-91 (Date)

9313018.1427

WITHDRAWAL
299-W7-12

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SE2000
Environmental Logger
08/12 08:07

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	227.820
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 08/09 11:56:15

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.00000	229.020	-229.020
0.0083	0.00014	227.870	-227.870
0.0166	0.00028	228.801	-228.801
0.0250	0.00042	228.900	-228.900
0.0333	0.00056	229.517	-229.517
0.0416	0.00069	229.368	-229.368
0.0500	0.00083	229.264	-229.264
0.0583	0.00097	229.140	-229.140
0.0666	0.00111	229.064	-229.064
0.0750	0.00125	228.960	-228.960
0.0833	0.00139	228.881	-228.881
0.1000	0.00167	228.716	-228.716
0.1166	0.00194	228.567	-228.567
0.1333	0.00222	228.437	-228.437
0.1500	0.00250	228.333	-228.333
0.1666	0.00278	228.241	-228.241
0.1833	0.00306	228.165	-228.165
0.2000	0.00333	228.108	-228.108
0.2166	0.00361	228.070	-228.070
0.2333	0.00389	228.038	-228.038
0.2500	0.00417	228.016	-228.016
0.2666	0.00444	227.994	-227.994
0.2833	0.00472	227.981	-227.981
0.3000	0.00500	227.972	-227.972
0.3166	0.00528	227.962	-227.962
0.3333	0.00556	227.962	-227.962
0.4166	0.00694	227.940	-227.940
0.5000	0.00833	227.927	-227.927
0.5833	0.00972	227.921	-227.921
0.6666	0.01111	227.915	-227.915
0.7500	0.01250	227.915	-227.915
0.8333	0.01389	227.905	-227.905
0.9166	0.01528	227.902	-227.902
1.0000	0.01667	227.902	-227.902
1.0833	0.01805	227.899	-227.899
1.1666	0.01944	227.896	-227.896
1.2500	0.02083	227.896	-227.896
1.3333	0.02222	227.899	-227.899
1.4166	0.02361	227.899	-227.899
1.5000	0.02500	227.892	-227.892

9313018.1436

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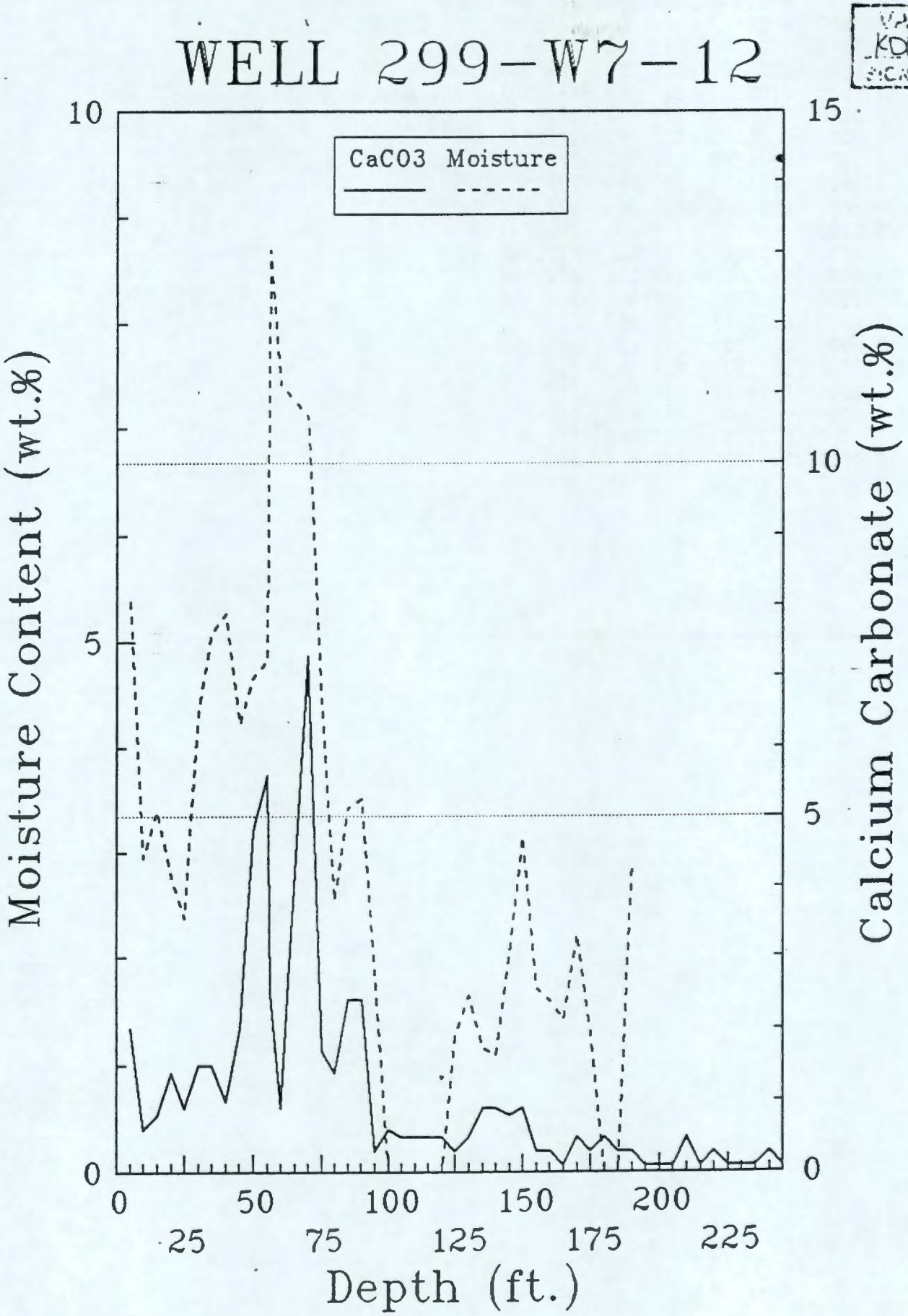
1.5833	0.02639	227.889	-227.889
1.6666	0.02778	227.889	-227.889
1.7500	0.02917	227.886	-227.886
1.8333	0.03056	227.889	-227.889
1.9166	0.03194	227.889	-227.889
2.0000	0.03333	227.883	-227.883
2.5000	0.04167	227.877	-227.877
3.0000	0.05000	227.873	-227.873
3.5000	0.05833	227.870	-227.870
4.0000	0.06667	227.867	-227.867
4.5000	0.07500	227.864	-227.864
5.0000	0.08333	227.861	-227.861
5.5000	0.09167	227.851	-227.851
6.0000	0.10000	227.858	-227.858
6.5000	0.10833	227.854	-227.854
7.0000	0.11667	227.851	-227.851
7.5000	0.12500	227.851	-227.851
8.0000	0.13333	227.851	-227.851
8.5000	0.14167	227.851	-227.851
9.0000	0.15000	227.854	-227.854
9.5000	0.15833	227.848	-227.848
10.0000	0.16667	227.848	-227.848
12.0000	0.20000	227.845	-227.845

9313018.1471


WELL 299-W7-12
CaCO3 Moisture
Moisture Content (wt.%)
Calcium Carbonate (wt.%)
Depth (ft.)
0
5
10
15
0
50
100
150
200
25
75
125
175
225

292

	A	B	C
1	WELL 299-W7-12		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	2	5.38
7	10	0.6	2.95
8	15	0.8	3.4
9	20	1.4	2.77
10	25	0.9	2.37
11	30	1.5	4.35
12	35	1.5	5.08
13	40	1	5.26
14	45	2	4.23
15	50	4.8	4.67
16	55	5.6	4.82
17	56	2.5	8.69
18	60	0.9	7.42
19	70	7.3	7.12
20	75	1.7	4.47
21	80	1.4	2.54
22	85	2.4	3.42
23	90	2.4	3.51
24	95	0.3	1.86
25	100	0.6	0
26	105	0.5	0
27	110	0.5	0
28	115	0.5	0
29	120	0.5	0
30	125	0.3	1.27
31	130	0.5	1.64
32	135	0.9	1.16
33	140	0.9	1.09
34	145	0.8	2.04
35	150	0.9	3.14
36	155	0.3	1.71
37	160	0.3	1.59
38	165	0.1	1.42
39	170	0.5	2.2
40	175	0.3	1.29
41	180	0.5	0
42	185	0.3	0
43	190	0.3	2.89
44	195	0.1	
45	200	0.1	
46	205	0.1	
47	210	0.5	
48	215	0.1	
49	220	0.3	
50	225	0.1	
51	230	0.1	
52	235	0.1	
53	240	0.3	
54	245	0.1	
55			
56			

9313018.1432

TEST REQUEST

SEURT 10-20 SD
- 20SWT
SCREEN

SAMPLE/SPECIMEN NO. 1-1091 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81232 PERSON B. WILLIAMS DATE 6-5-91

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

REMARKS 299-W7-12
235'

RECEIVED BY: R.G. ALEXANDER DATE 6-5-91

APPROVED BY: R.G. ALEXANDER DATE 6-5-91

9313018.1440

RADIATION RELEASE

Bldg. 299-W7-12 Expiration Date 6-5-91

Released By K. E. LaBrambois
Health Physics

Remarks 235'

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299-W7-12 Expiration Date 6-5-91

Released By K. E. LaBrambois
Health Physics

Remarks 235'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-10936 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 6-5-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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	1598.2	0	0	100
1½	↓	0	0	100
1	↓	156.9	9.8	90.2
3/4	↓	457.4	28.2	71.8
½	↓	709.0	44.4	55.6
3/8	↓	823.9	51.6	48.4
4	↓	949.0	59.4	40.6
10	151.2	156	10.3	36.4
40	↓	37.5	24.8	30.5
60	↓	101.8	67.3	13.3
100	↓	121.5	80.4	8.0
200	↓	131.3	86.8	5.4

Finess 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 FINE GRADING

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: R.G. ALEXANDER Date 6-11-91

A-6400-204(2-87)

9313018.1411

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-100356 Page 1 of 1

Procedure No. ETAL-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 6-5-91

Remarks #4 MINUS

299-W7-12 235'

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

Checked By: R.G. ALEXANDER Date 6-11-91

9313018.1411

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-10835E

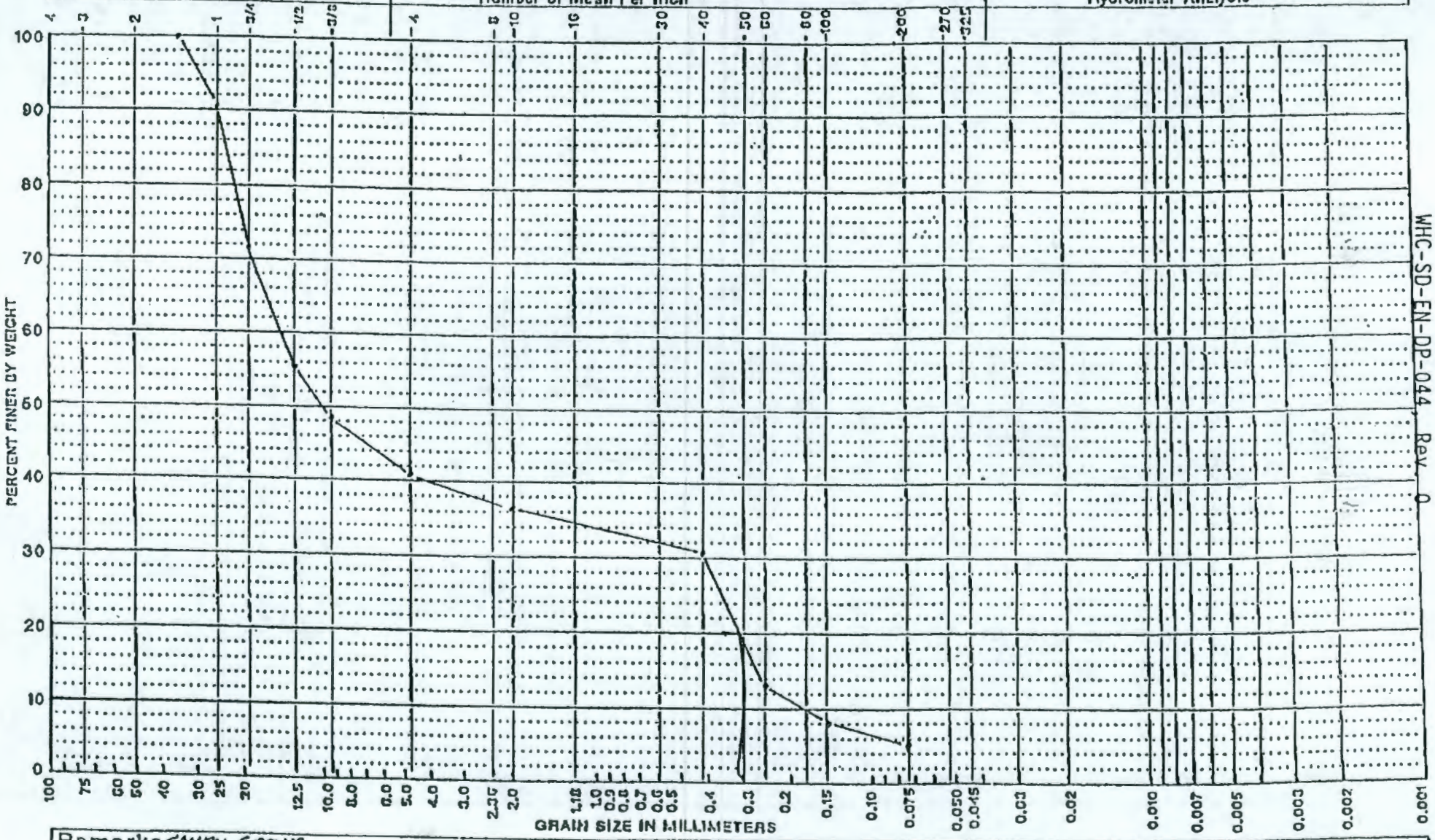
Page 1 of 1

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 6-5-91



Remarks SANDY GRAVEL

299-W7-12 235'

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

Checked By: R.G. ALEXANDER Date 6-11-91

SIEVE ANALYSIS DATA SHEET

Sample No. 1-1091 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 6-5-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-16-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: GEL- 3310 Calibration Due Date 6-21-91
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
N/A : GEL- 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	151.2	0	0	100
10		15.6	10.3	89.7
40		37.5	24.8	75.2
60		101.8	67.3	32.7
100		121.5	80.4	19.6
200		131.3	86.8	13.2
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: R.G. ALEXANDER Date 6-11-91

A-6400-204(2-87)

9313018.1444

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:	Phone No.	Well No.	Date:
		299-W7-12	3-19-92

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5	4-12-91	SOIL	4-17-91	0744-91	13.7	1.8
10				0745-91	14.0	0.4
15	4-15-91		4-22-91	0758-91	14.7	0.4
20				0759-91	17.5	0.6
25	4-17-91			0767-91	22.4	<D
30			4-23-91	0771-91	15.8	<D
35				0772-91	13.8	0.7
40				0777-91	13.3	0.8
45				0778-91	13.8	1.4
50	4-17-91			0794-91	13.4	0.3
55				0795-91	16.7	0.6
56				0796-91	17.9	0.8
60	4-18-91		4-24-91	0803-91	28.0	2.1
65		hard TOOL NO SAMPLE			—	—
70	4-22-91		4-24-91	0811-91	27.1	3.5
75				0812-91	17.5	0.9
80			4-26-91	0819-91	23.0	<D
85	4-23-91			0820-91	19.9	1.3
90				0821-91	16.7	0.9
95				0822-91	22.5	0.5
100				0830-91	11.0	<D
105	4-24-91		4-29-91	0835-91	15.5	0.7
110	4-26-91			0852-91	14.2	<D
115				0853-91	13.5	0.3
120	4-29-91			0856-91	17.2	<D
125				0857-91	14.2	0.5
130				0858-91	12.2	0.3
135				0874-91	17.8	0.5
140				0875-91	22.8	<D
145	5-1-91		5-6-91	0880-91	24.8	0.6
150	5-2-91		5-2-91	0894-91	25.9	0.6
155				0895-91	17.4	1.1

Performed By: [signature]

Date: 3-19-93

Page: 1 of 1

A-6000-829 (10/9

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:	Phone No.	Well No.	Date:
		299-W7-12	3-1[illegible]

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
160	5-2-91	SOIL	5-2-91	0896-91	17.3	0.4
165	5-3-91		5-3-91	0903-91	28.9	3.1
170	5-6-91		5-6-91	0914-91	16.5	0.5
175	5-8-91		5-8-91	0937-91	25.4	3.0
180	5-10-91		5-15-91	0969-91	16.7	<D
185	5-15-91		5-15-91	0986-91	7.3	0.1
190	5-17-91		5-17-91	0998-91	19.8	<D
195	5-20-91		5-20-91	1004-91	18.8	0.2
200	5-21-91		5-21-91	1006-91	14.6	0.2
205	5-23-91		5-23-91	1015-91	3.6	0.2
210	5-23-91		5-23-91	1019-91	13.9	<D
215	5-24-91		5-31-91	1026-91	6.3	<D
220				1031-91	5.9	0.4
225	5-28-91			1048-91	12.9	0.[illegible]
230				1047-91	10.4	0.3
235			5-30-91	1044-91	10.9	0.4
240	5-30-91			1104-91	11.4	0.1
245			6-4-91	1105-91	9.4	0.3

Performed By: Lina Bruno

10-48

Date: 3-19-92

Page: 2 of 1

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W7-12 Area 200 West Date 5-3-91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 684.64' Brass Cap

Survey Coordinates 137636.3 N 566040.8 E

Log Measured From Ground Surface

Location Description NW Corner of 200 West Area

Ground Surface Elevation 684.64' Brass Cap

Surface Temperature 9.5°C Weather Clear - Cool

BOREHOLE INFORMATION

Driller Tim Gifford

Drill Rig Type Cable Tool	Bit Type/Diameter Drive Barrel / 10"
Borehole Diameter(s)/Depth 12"/~~168~~ 21.3' 10"/ 167.0'	
Depth Driller ~~277.8'~~ 167.8'	Depth Logger 166.0'
Liquid Level NA	Liquid Density NA
Temperature NA	

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.4' - 21.34'
Type 10" Carbon Steel Sch. 40	Interval +2.3' - 168.4'
Type	Interval
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.1' high
Centralizer was used.
*Survey data from Kaiser 12/15/92 KAM

10-7-1-1

A-6000-520 (05/90)

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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/MC/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 166.0' | To 2.8'

Rerun(s) 90.0' to 50.0'

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 0930

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 1 275.1 eU | Position 2 48.4 eU | Background 55 c/s

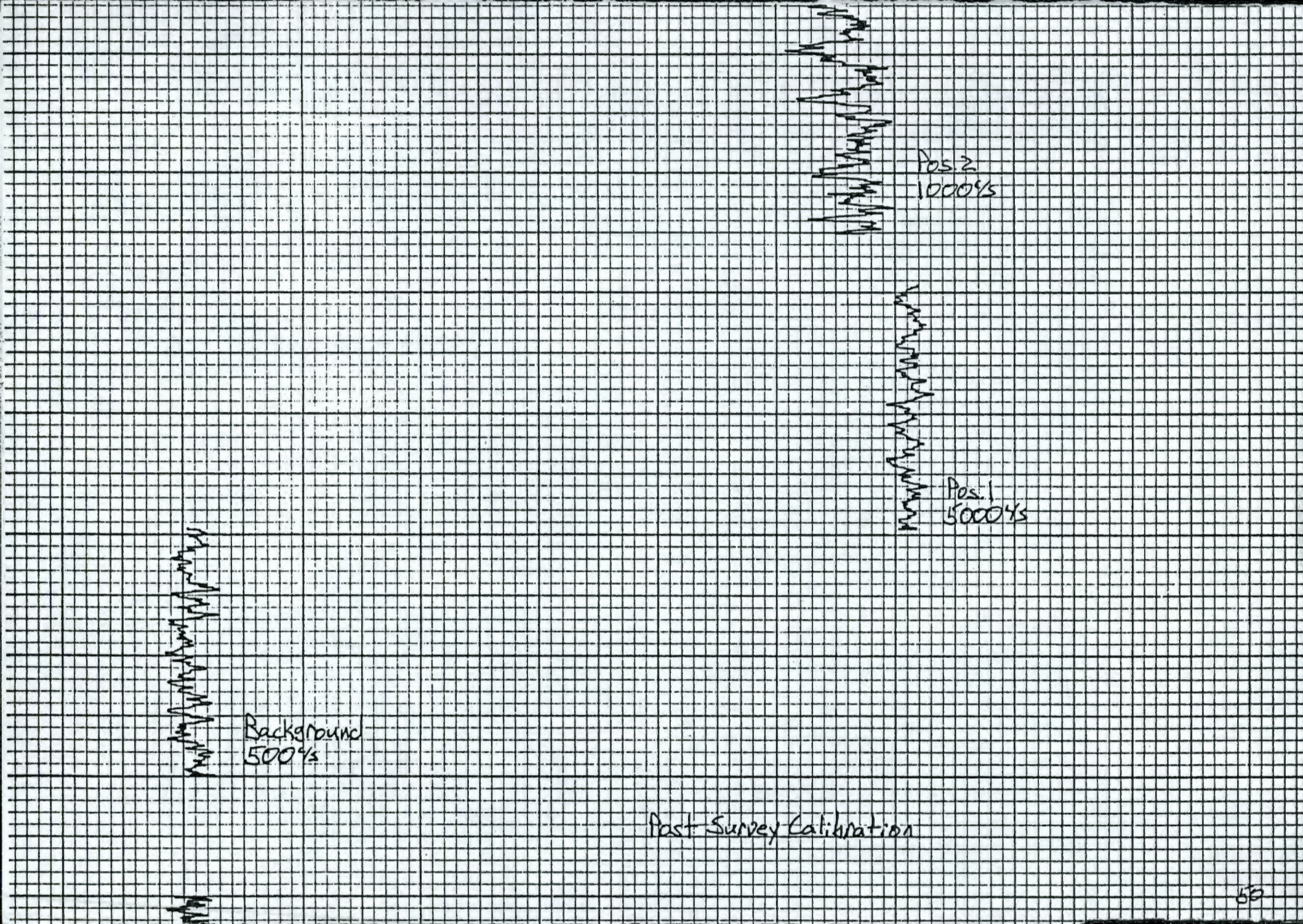
Percent Change: Position 1 1.4% | Position 2 0.8%

Comments Return Error = +0.1' high

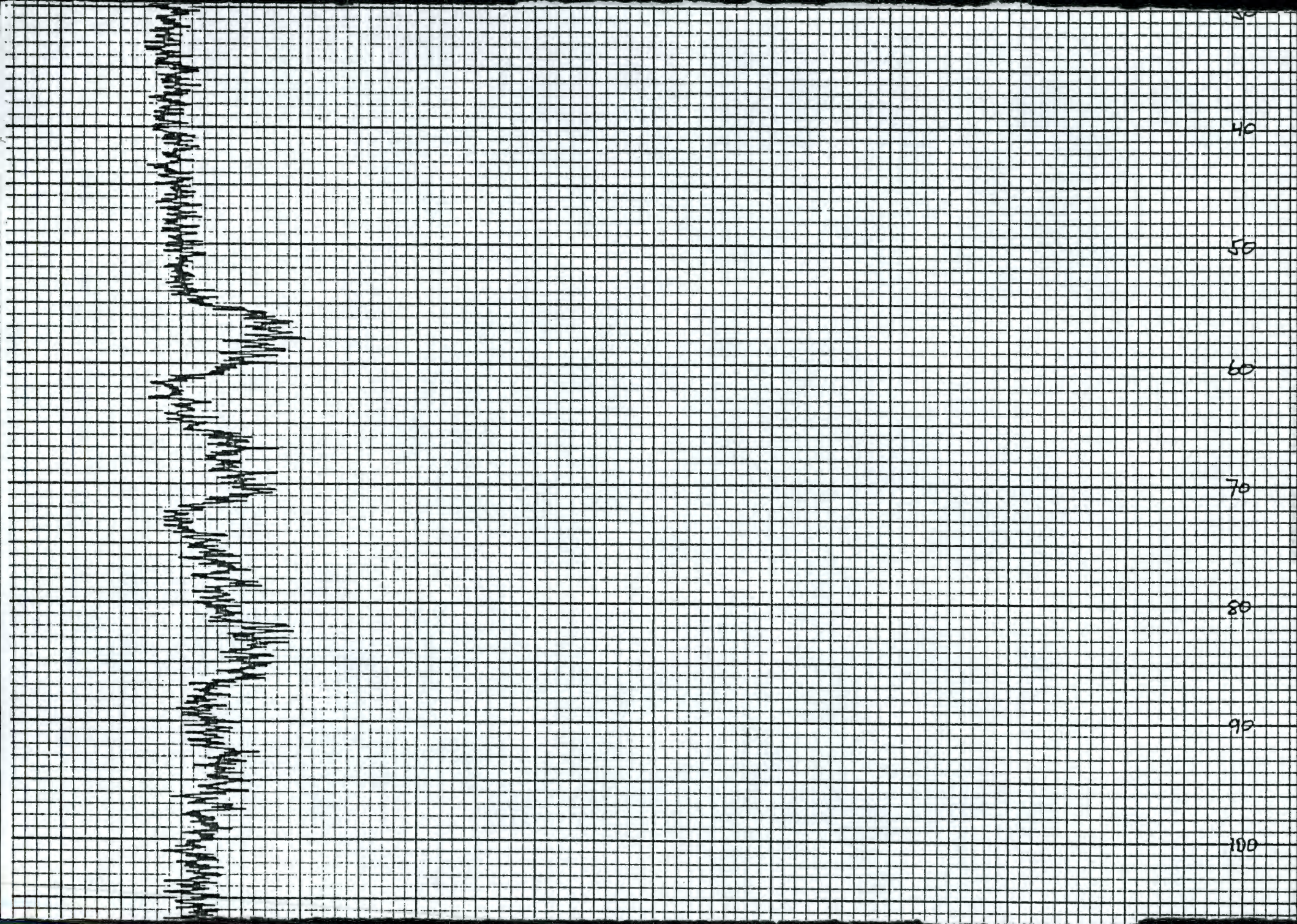
Centralizer used.

Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 5/3/91

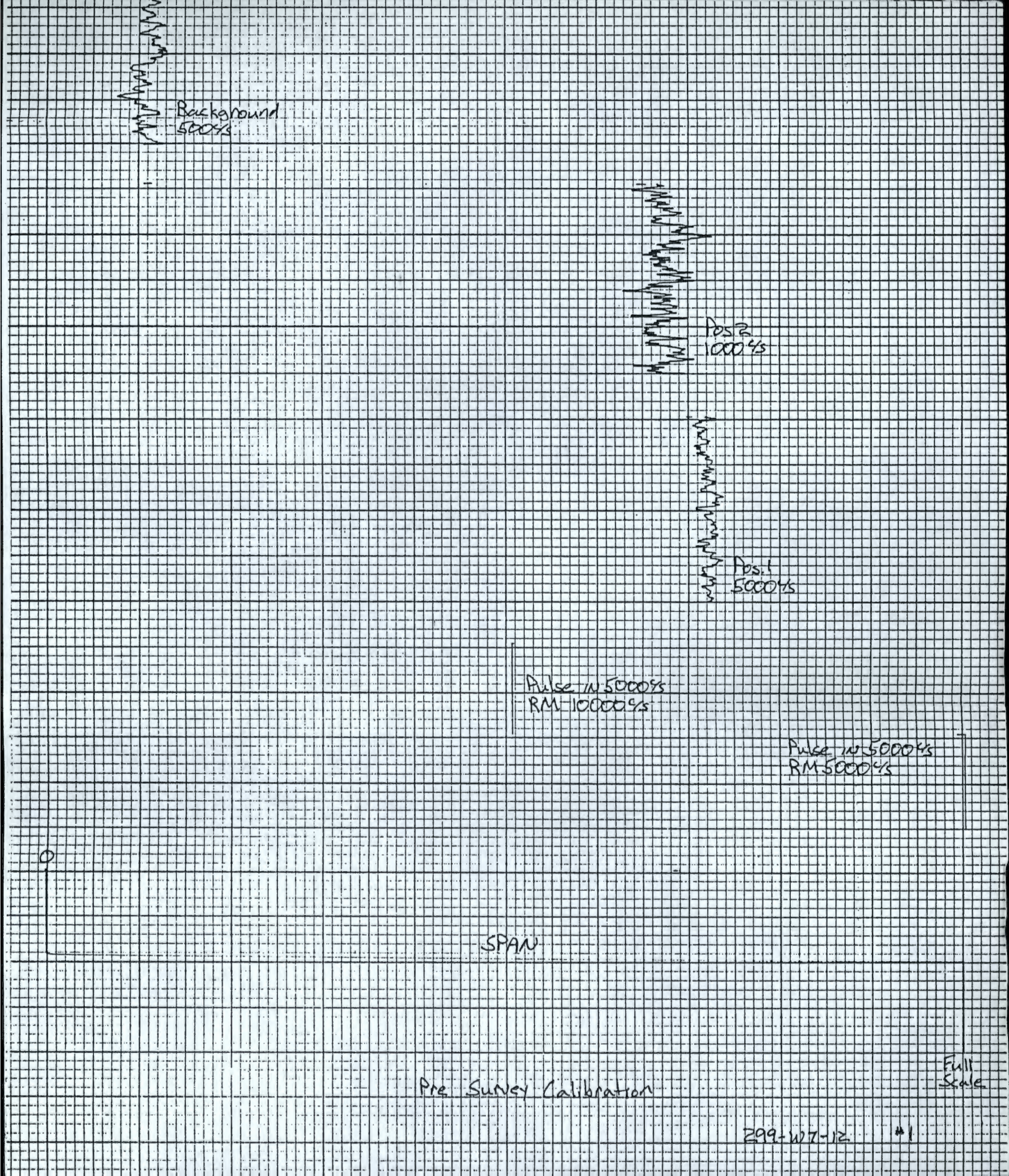
A-6000-520 (05/90)


Pos 2
1000 c/s
Pos. 1
5000 c/s
Background
500 c/s
Post Survey Calibration

Repeat Section
500%s
60
70
80
90
10
20


40
50
60
70
80
90
100

110
120
130
140
150
160
500°/s


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
0
SPAN
Full
Scale
Pre Survey Calibration
299-W7-12
#1

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W7-12 Area 200 West Date 5/29/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 684.64' Brass Cap

Survey Coordinates 137636.3 N 566040.8 E

Log Measured From Ground Surface

Location Description NW Corner of 200 West Area

Ground Surface Elevation 684.64' Brass Cap

Surface Temperature 17.9°C Weather Overcast-Warm

BOREHOLE INFORMATION

Driller Tim Gifford

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

Borehole Diameter(s)/Depth 12" / 21.4' 10" / 164.6' 8" / 241.2'

Depth Driller 242.95' | Depth Logger 238.0'

Liquid Level 222.55' | Liquid ~~Density~~ Appearance Silty

Temperature 20.0°C

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.1' -21.39'
Type 10" Carbon Steel Sch. 40	Interval +0.5' -164.59'
Type 8" Carbon Steel Sch. 40	Interval +1.1' -241.16'
Type	Interval

Well Screen Interval NA

Comments: Return Error = 0.0'
Centralizer was used
Sand may have settled in bottom of borehole ⇒ Difference between D/B (Driller) & D/B (Logger).
Driller also believes 10" casing may be ≈3.0' lower than stated above.
*Survey data from Kaiser 12/15/92 RDM

A-6000-520 (05/90)

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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: 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: 238.0' | To: 135.0'

Rerun(s): 190.0' to 160.0'

Pre Survey Verification: Position 1: 275.5 eU | Position 2: 48.0 eU | Background: 75 c/s

Base Calibration Difference: Position 1: 15.9 eU | Position 2: 0.5 eU

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

Start Time: 0830 | 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: 275.5 eU | Position 2: 48.4 eU | Background: 75 c/s

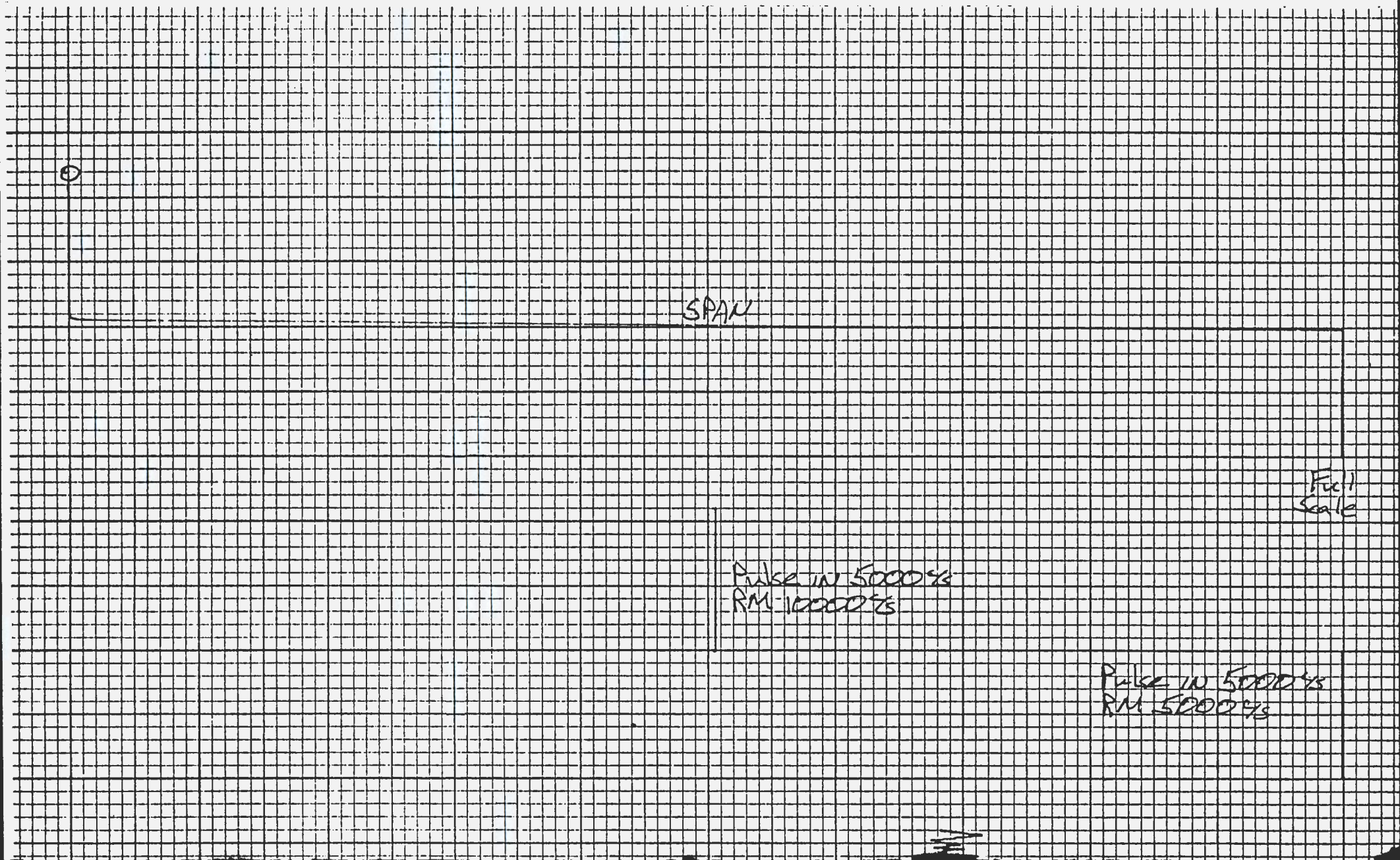
Percent Change: Position 1: 0.0' | Position 2: 0.8%

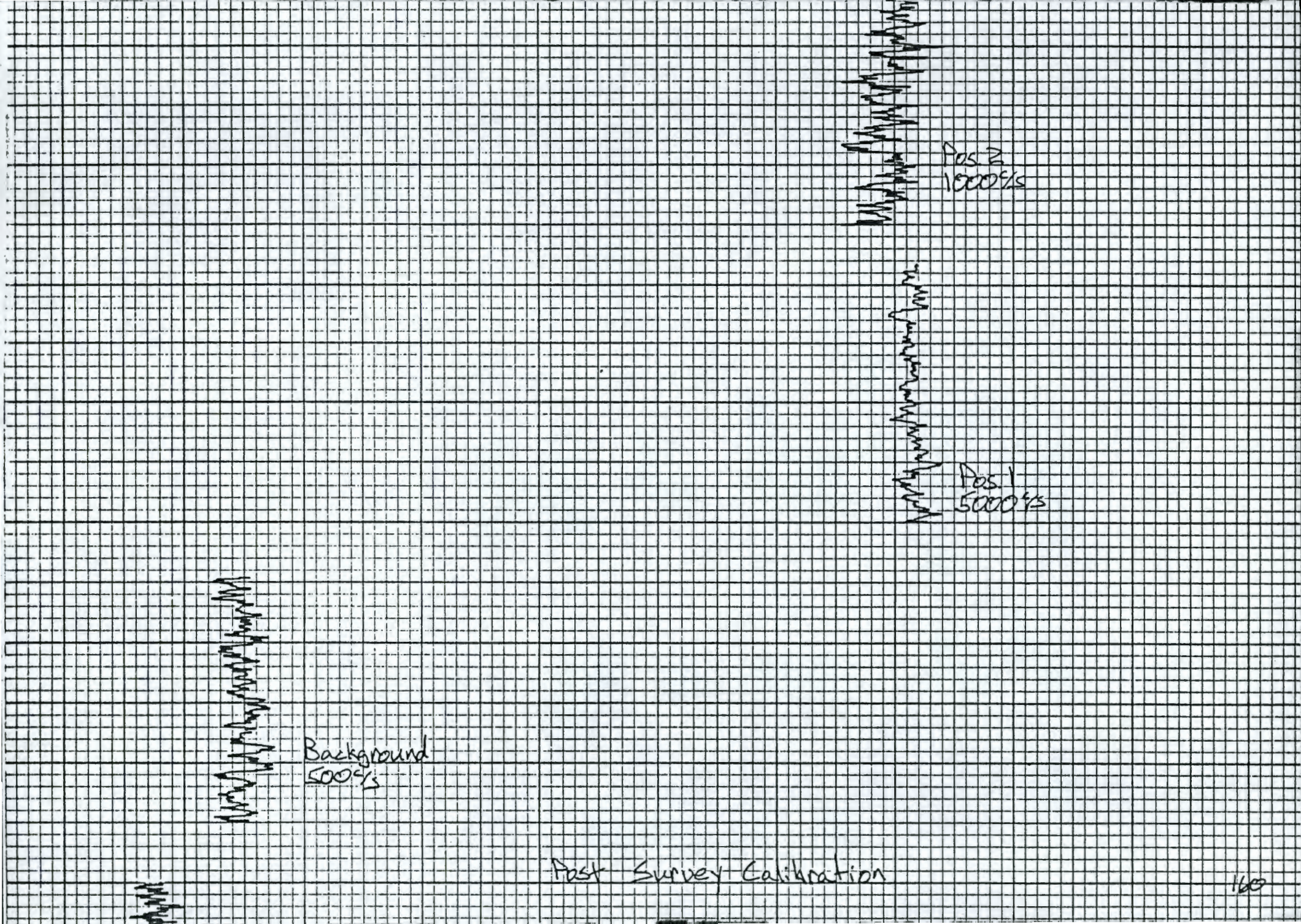
Comments: Return Error = 0.0'

Centralizer used.

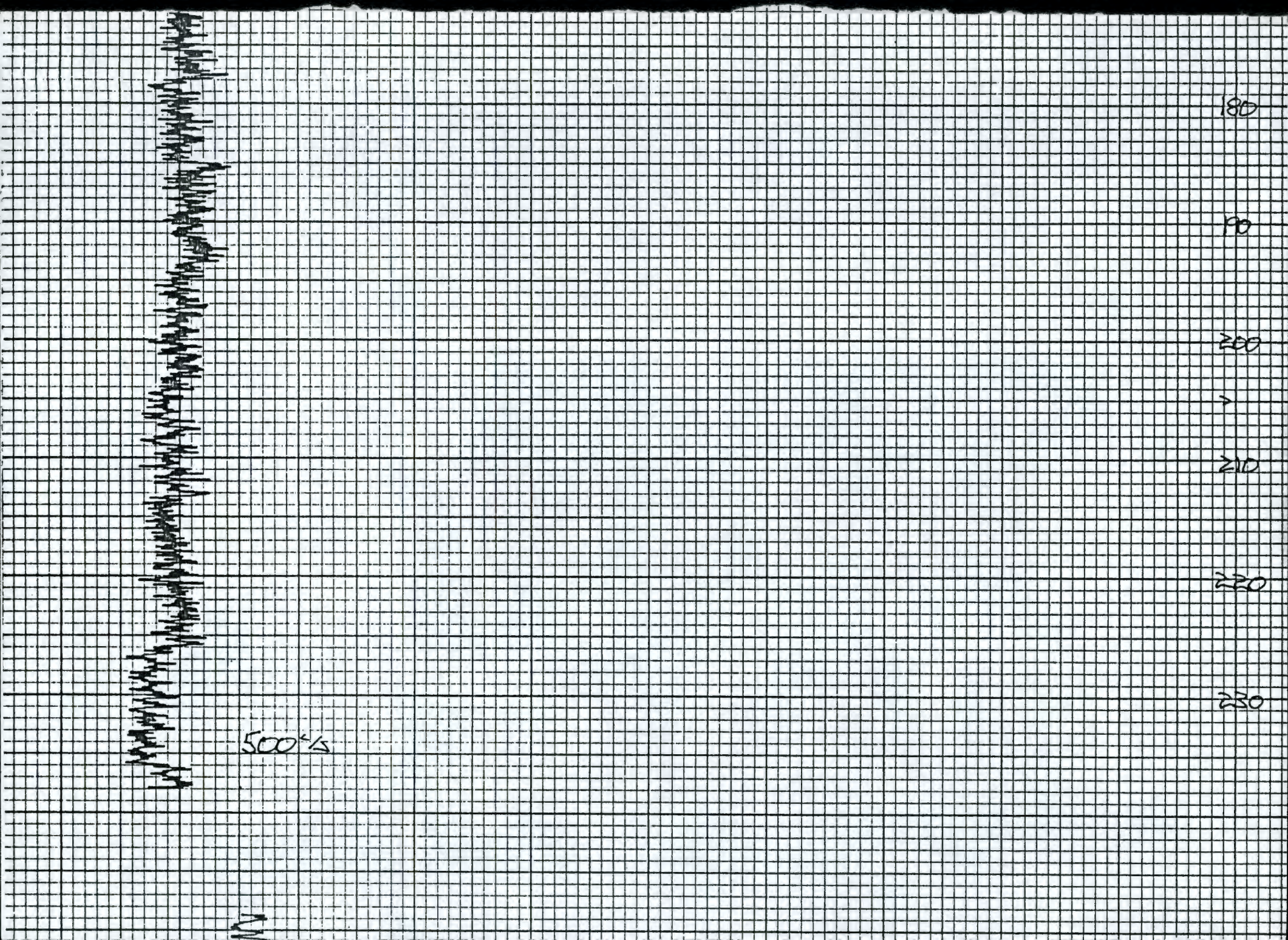
Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 5/29/91

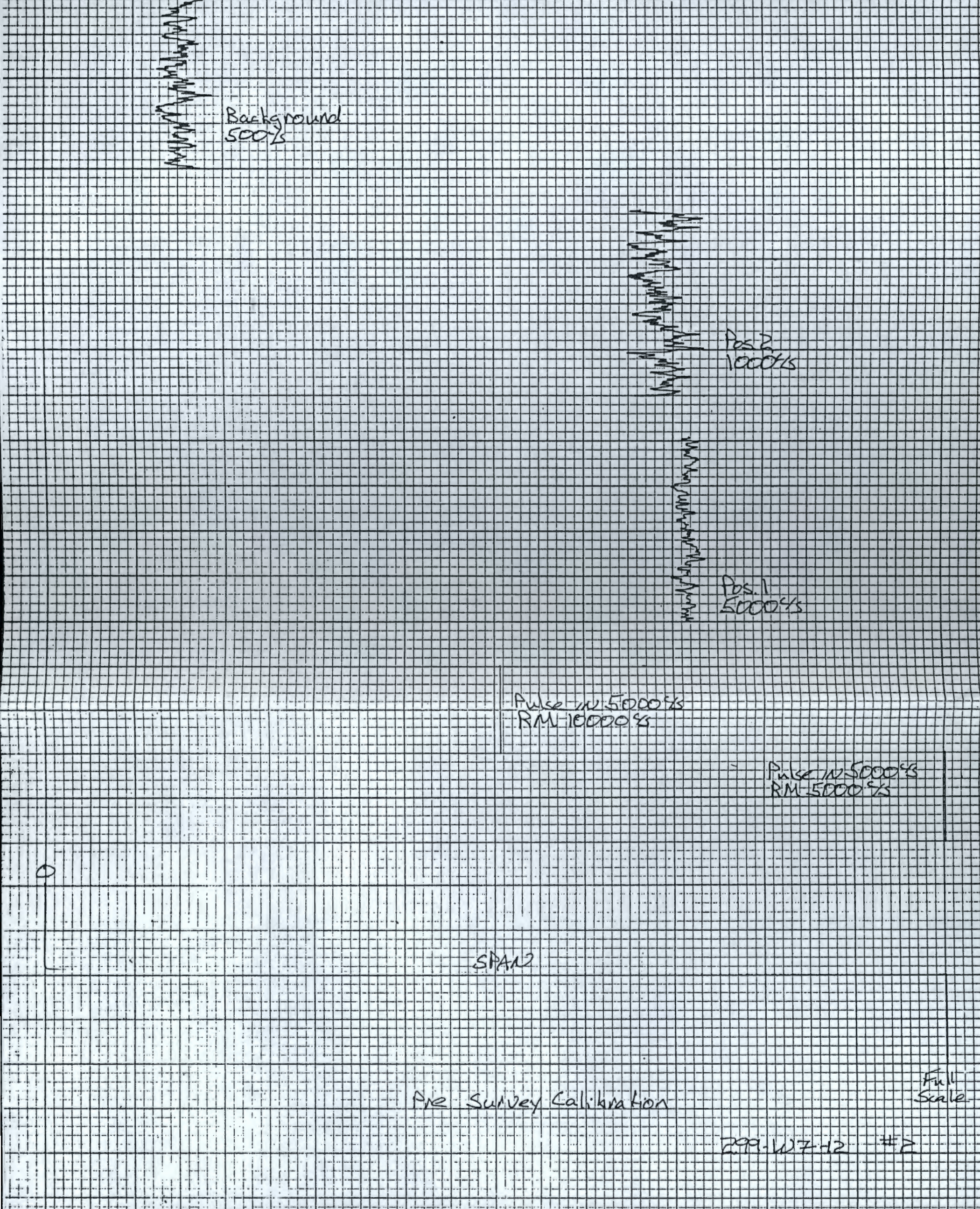
A-6000-520 (05/90)




Pos 2
1000c/s
Pos. 1
5000c/s
Background
500c/s
Post Survey Calibration

Repeat Section
500%
170
180
190
140
150
160
170


180
190
200
210
220
230
500°/s


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
0
SPAN 2
Pre Survey Calibration
Full Scale
299-W7-12 #2

11.0 WELL 299-W18-27

11.1 DRILLING

Construction of this well began on 4 April 1991 and total depth of 238.5 feet was reached on 6 June 1991. The well was drilled using a cable tool rig. Approximately 411 gallons of water were added during drilling activities. Specific well construction information is located in Table 11.1. 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 11.1 299-W18-27 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	20.0	ALS
	10"	160.5	ALS
	8"	237.4	ALS
Gross Gamma Logging	18 April	160.5	0
	7 May	237.5	130
Permanent Casing	4"	216.6	ALS
Screen	4" 10-Slot	237.7	216.6
Filter Pack	20-40 Silica Sand	237.7	213.0
Annular Seal	Bentonite Pellets	213.0	210.0
	Bentonite Crumbles	210.0	19.0
	Cement Grout	19.0	3.2
Concrete Pad	4'x4'x6"	3.2	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 141 feet BLS and were primarily sand and sandy gravel with some silt and clay. Approximately 15 feet (141-156 feet BLS) of clayey silt with some silty sand represent the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (156-238.5 feet BLS).

The borehole was advanced by the drive barrel and hard tool drilling. Hard tool drilling was done when cuttings could not be removed form the hole and in more resistant zones. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological

9313018.1411

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 11.1. Reproductions of these logs are also located at the end of this section.

11.2 WELL COMPLETION

Well completion began on 14 May 1991 and was completed on 29 May 1991. Static water level at the time of completion was 219.5 feet below land surface (BLS). Completion details are presented in Table 11.1. 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.

11.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 18 July 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 1010 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 18 July with the intake located 239.0 feet below the top of the protective casing.

11.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 18 July 1991. The data from the well development pumping was also collected for analysis as drawdown and recovery tests however the recovery data was insufficient for analysis. Results from these tests are presented in Table 11.2. The values for transmissivity calculated from the constant discharge test may not be representative of the actual formation because of variable pumping rates, borehole storage effects, and partial well penetration. Drawdown, slug injection, and slug withdrawal data plots are shown in Figures 11.1 through 11.3 respectively. Raw data from the aquifer testing at 299-W18-27 are located at the end of this section.

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Table 11.2 Hydrologic Testing Results from 299-W18-27				
Formation: Ringold		Lithology: Sandy Gravel	Interval Tested*: 223.6-241.5	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	18 Jul 91	Cooper-Jacob (1946)	----	265†
Recovery	18 Jul 91	Not Interpretable	----	----
Slug Injection	18 Jul 91	Bouwer-Rice (1989)	7	----
Slug Withdrawal	18 Jul 91	Bouwer-Rice (1989)	14	----

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

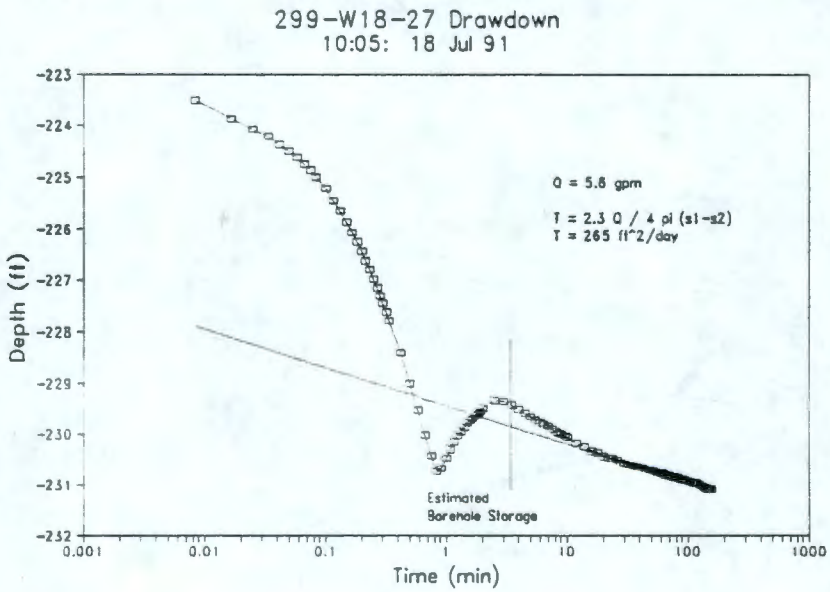

Figure 11.1 299-W18-27 Drawdown Plot.

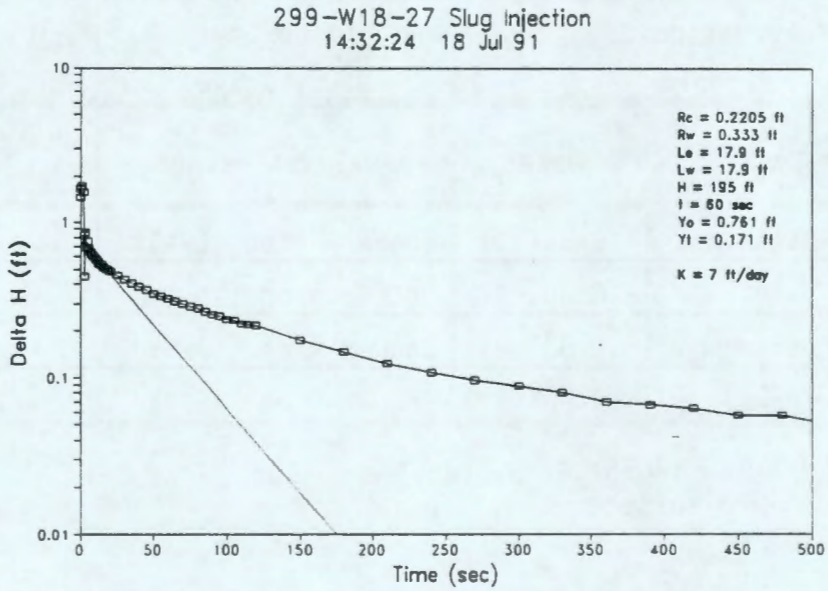

Figure 11.2 299-W18-27 Slug Injection Plot.

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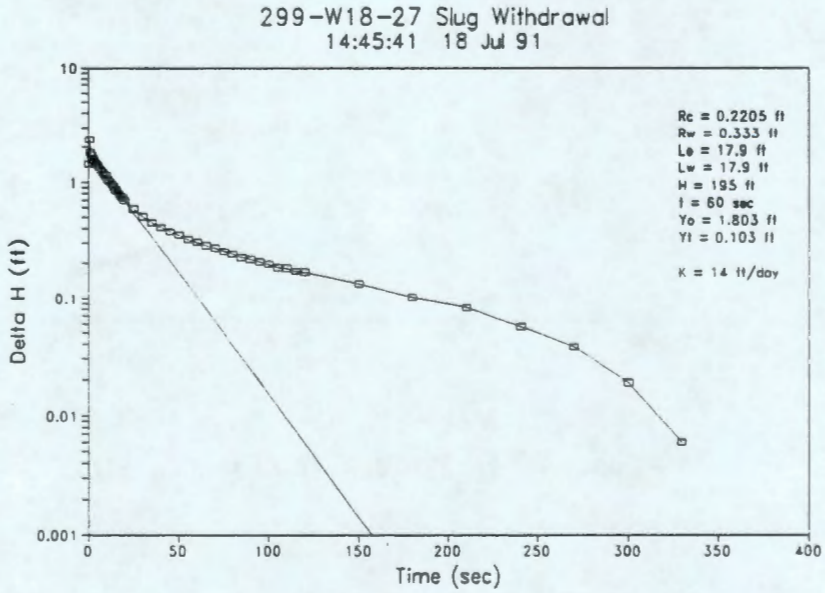

Figure 11.3 299-W18-27 Slug Withdrawal Plot.

LLBG

WELL 299-W18-27

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4-4-91	5-8-91	25	N/A	238.5	5-3-91 219.2 5-6-91 216.9 5-7-91 224 219.6 5-8-91 219.2	411 GALLONS

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
5-14-91	5-29-91	11	5-14-91 219.5 5-15-91 219.5	237.7	216.6 - 237.7	40 GALLONS REMOVE TO DEVELOP FILTER PACK

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	7-15-91	7-18-91	7-18-91	

COMMENTS:

5-17-91 Downhole Camera Survey

VALIDATED KDR 3/19/92 SIGNATURE/DATE

1 of 5

WELL CONSTRUCTION REPORT

Specification No. WHC-S-014 Rev No. 5

ECNs 144240, 144241, 127437

Project RCRA W-017 LLBG

Location 200W / WM-4

Drilling Company Kaiser Engineers Hanford

Driller Kelly Olson, Jody Carpenter, B.F. Strode

Other (Companies) WHC, EST

Geologist(s) Robert F. Raidl
Bryan Walz EST
DC Weekes, Stacey W. Callison
JA. Coates

Well No. 299-W18-27 Temp. Well No. NA

Coordinates N: 135,226.8; E: 566,090.5 (LAMBERT)

Casing Elev. 690.25' Ground Elev. 686.78' (BRASS CAP)

Drilling Method

Verification Method Visual Observation

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

			Initials	Date
Rotary	Air NA	Mud NA	NA	NA
Cable Tool	D 0'-160.5'	H 160.5'-238.5'	BGW	5/7/91
Drilling Fluid	Raw Water	411 Gal	BGW	4/25/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	0 - 160.5	4/18/91
Gross Gamma	130 - 237.5	5/7/91
	-	
	-	
	-	

Completion Data

Drilled Depth 238.5'

Completed Depth 237.7'

Date Started 4/4/91

Date Completed 5/7/91

Static Water Level/Date 219.2' BLS 5/8/91

Aquifer Testing

Type Slug Test - WSTP/Hydrolab

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test 1HR

Volume Pumped -NA-

Drawdown -NA-

Date of Test 7-18-91.

Completion Results

Cleaning

Verification Method Visual Inspection and direct observation of drilling equip. clean

Criteria WHC-S-014 7.6, 7.7, 4.2.2, WHC CM-7.1 sec 5.4

	Initials	Date
Drilling Tools/Rig	BGW	4/5/91
Temporary Materials	BGW	4/5/91
Permanent Materials	BGW	5/7/91

Screen

Type	Length	Slot Size
4" T304 Wesco cont. wrap (wire)	20.78'	0.010

Depth(s) 237.7' - 216.61'

Verification Method Steel Tape Measurement

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

Initials SWC Date 5/29/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	BGW	5/7/91
Material Packing	BGW	5/7/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014, 7.2

	Identify	Initials	Date
Additives	Raw Water	BGW	4/22/91
Lubricants	Jet Lube (Well Guard)	BGW	4/16/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014 8.2

Initials BGW Date 5/7/91

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WELL CONSTRUCTION REPORT
(continuation sheet)

Casing (permanent)

Type	Size	Placement
stainless steel	4" ID	+3.4 - ~~237.7~~ 216.61'
		-
		-
		-

Verification Method: Measure using steel tape

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

Initials: SWC Date: 5/29/91

Well Protection

Verification Method: Visual, Measure w/tape

Criteria: WHC-S-014 4.2.10

	Initials	Date
Protective Posts	KDR	2/26/92
Protective Casing	KDR	2/26/92
Site Restored	KDR	2/26/92
Cap, Hasp and Lock	KDR	2/26/92
Surface Pad	KDR	2/26/92

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, 5.3.1

Type	Interval	Volume	Initials	Date
20-40 mesh Colorado Silica Sand	237.7' - 213.0'	15-100# sacks (16.8 ft³)	ACW	5/20/91
1/4" dia Bentonite Pellets	213.0' - 210.0'	2-50# buckets (1.24 ft³)	ACW	5/20/91
8-20 mesh Bentonite Crumbles	210.0' - 19.0'	175-50# sacks (124.3 ft³)	SWC	5/29/91
Portland Cement Grout	19.0' - 3.2'	15-94# sacks (19.5 ft³)	SWC	5/29/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	2/26/92
Protective Casing/Brass Cap Surveyed	KDR	2/26/92
Well Number Stenciled	KDR	2/26/92
Brass Cap Labeled	KDR	2/26/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	7-18-91
Installed	JAC	7-18-91
Pump Tested	JAC	7-18-91

Other (initial if performed)

NA Well Abandonment NA Downhole TV Inspection SWC Complete As-Built Diagram, Driller's/Geologist's Logs

7-18-91 JAC Well Development

Comments/Remarks

Reviewed By (Sign/Print Name): KD Reynolds KD Reynolds Date: 2/26/92

A-6000-436 (09/90)

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WELL SUMMARY SHEET

Boring or Well No. 299-W18-27

Sheet 1 of 2

Location 200 W / WM-4

Project W-017 / LLBG

Elevation 686.78 BRASS CAP

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment B.E.-22W Cable Tool

Prepared By B. Walz / Bryan Walz ESI (Sign/Print Name) Date 4/5/91

Reviewed By L.D. Hilton (Sign/Print Name) Date 9/10/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12" ID Temporary C.S.				gravelly SAND-Sl.grav. SAND
				6" - Gravelly Lense
casing to 20.00' BLS		10		Slightly Gravelly SAND
				12" - Slightly silty sand Lense
				slightly Gravelly SAND
Cement grout from 19.0'-3.0'		19.0		" " "
		20.00		
				SAND
		30		slightly Gravelly SAND
				" " "
				37' SAND Lense
4" ID Permanent S.S. casing		40		Gravelly SAND
to BLS				SAND
				sandy SILT Lense
		50		SAND
				"
10" ID Temporary C.S.				
casing to 160.5 BLS		60		slightly Gravelly SAND
				sandy GRAVEL
		70		clayey/silty sandy GRAVEL
				" " " "
				" " " "
		80		" " " "
8" ID Temporary C.S.			H	
casing to 237.43' BLS		90		SAND
				sandy GRAVEL
8-20 Mesh Bentonite				" "
Crumbles 210.0'-19.0'		100		SAND
				"
		110		"
				"
		120		"
				"
		130		"
				"
		140		clayey SILT
		EP? PP		
		150		" "
				Silty SAND
		160 E		Sandy GRAVEL
		160.50	11-8	" "

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WELL SUMMARY SHEET

Boring or Well No. 299-W18-27

Sheet 2 of 2

Location 200W / WM-4

Project W-017 / LL86

Elevation 686.78 BRASS CAP

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. - 22W

Prepared By Bryan Walz / Bryan Walz ESI (Sign/Print Name) Date 4/5/91

Reviewed By R.A. Miller (Sign/Print Name) Date 9/18/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
8" ID Temporary C.S. casing to 237.43' BLS		170		Sandy GRAVEL
				" "
		180		" "
4" ID Perm. S.S. casing to BLS				" "
		190		" "
1/4" bentonite from 213.0'-210.0'				" "
		200		Gravelly SAND
20-40 sand from 237.7'-213.0'				Sandy GRAVEL
	210.0	210		Gravelly SAND
	213.0			" "
W/L = ~~219.2'~~ 219.5' BLS (BW 5/14/91) 216.61'		220		Sandy GRAVEL
				" "
		~~240~~ 230		" "
		BW 5/13/91		" "
TD = 238.5' BLS 237.7'		~~260~~ 240		238.5' BLS T.D.
		250		
		260		
		11-9		

BOREHOLE LOG

VALIDATED KDR 2/26/92 SIGNATURE/DATE

Boring or Well No. 299-W18-27

Sheet 1 of 12

Location 200W LLBG WM-4

Project W017/LLBG

Elevation GPS-76 = Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool BE 22W

Prepared By R.F. Raidl (Sign/Print Name) Date 4/4/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/8/91 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
		7.5 in DB		0.0 - 5.0 ft. gravelly SAND	Start 0900 4/4/81
					Drive barrel, open hole
	2 lith 1 moist 1 rad				
5				5.0 ft Slightly Gravelly Sand	PID = < det, 0910
		7.5 in DB		5% Gravel (F-VFP); 95% Sand (tr VCS, 50 ms, 45% fs) dk yellow brn 10YR 4/4, 80% felsic, 20% mafic, well sorted, angular, NO HCl reaction; moist;	
H				6-6.25 ft Gravelly lense	
	2 lith 1 moist 1 rad				
10				10 ft Slightly Gravelly SAND	PID = < det, 0930
		7.5 in DB		5% Gravel (F-VFP) 95% Sand (25% cs, 50% ms, 20% fs) v.dk grayish brn 10YR 3/2 moist, well sorted, angular, 50% mafic, 50% felsic, NO HCl reaction	PID = < det, 1045
				12-12.25 Slightly silty sand lense	
	2 lith 1 moist 1 rad				
15				15 ft Slightly Gravelly Sand	PID = < det, 1105
		7.5 in DB		5% Gravel (F-VFP) 95% Sand (40% cs, 50% ms, 5% fs); v.dk grayish brn 10YR 3/2 moist, well sorted, angular 60% mafic, 40% felsic, NO HCl reaction	
				11-10	
20	2 lith 1 moist 1 rad				1120 set 20 ft 12 in casing

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BOREHOLE LOG

Boring or Well No 299-W18-27

Sheet 2 of 12

Location 200W LLBG WM-4

Project W-017/LLBG/WM-4

Elevation 686.78 = Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool BE 22W

Prepared By RF Raidl / RF Raidl (Sign/Print Name) Date 4/4/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/8/91 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
		7.5 in DB		20.0 ft Slightly Gravelly SAND; 5% gravel (F-VFP); 95% Sand, (10% cs, 75% ms, 10% fs); dk yellow brn 10YR 4/4, moist, well sorted, ang., 70% felsic, 30% mafic, No HCl reaction	casing depth: 12" = 20ft
	2 lith 1 moist 1 rad				
25		7.5 in DB		25 ft SAND tr gravel (F-VFP) ≈ 100% SAND (5% cs, 5% ms, 90% fs); v. dk grayish brn 10YR 3/2, moist, well sorted, angular, 75% mafic, 25% felsic, No HCl reaction	PID = <det 1145
	2 lith 1 moist 1 rad				
30		7.5 in DB		30 ft Slightly Gravelly SAND 5% Gravel (1% cp, 2% mp, 2% fp) 95% SAND (15% vcs, 20% cs, 50% ms, 10% fs); v. dk grayish brn 10YR 3/2, moist, well sorted, angular, 75% mafic, 25% felsic, NO HCl reaction	PID = <det 1245
	2 lith 1 moist 1 rad	DB		35 ft Slightly Gravelly SAND tr-5% Gravel (f-vfp); 95% SAND (10% vcs, 15% cs, 60% ms, 10% fs); v dk grayish brn 10YR 3/2, moist, well sorted, angular, 75% mafic, 25% felsic, No HCl reaction.	PID = <det 1305 Set ft 10 inch casing.
35		7.5 in DB.			
	2 lith 1 moist 1 Rad			37 ft. sand, BWAL HCL 90% SAND 10% Silt (50% fs, 40% vfs, 10% silt) (10YR 3/1 wet, Dk. Br.) (10YR 4/1 Dry, Lt. Br.) Moist Subrd., R.W/10% HCL NONE Very well Sorted. 75% Mafic, 25% Felsic Low Pl, Fe stain, Laminated.	PID = <det 0750 4/5/91 B(GW)
40					

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BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 3 of 12

Location 200 W LLBG WM-4

Project W017/LLBG

Elevation 686.78 = Bluff Corp

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool BE 22W

Prepared By B. G. Walz ESI (Sign/Print Name) Date 4/4/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/8/91

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
40	2Lith 1Moist 1Rad	DB		40.0 ft - Gravelly SAND (25% Gravel, 75% SAND) 10% FP, 15% VFP, 20% VCS 25% CS, 20% MS 10% FS (~~10YR~~ 2.5Y 3/0 bl wet) (2.5Y 4/0 Dry Gr.) Dry, subrd.-ang., Rx w/10% HCL NONE, nonpl, wellsorted 75% mafic 25% Felsic, some mag grs. floraapatite	0810 Pull sample PID = <det.
45	2Lith 1Moist 1Rad	DB		45.0' SAND (tr. Gravel, 95% SAND tr. silt) 2% VFP, 15% VCS, 20% CS, 20% MS, 20% FS, 20% VFS 3% silt, (10YR 3/2 Br. wet) (10YR 7/1 Lt. Gr., Dry) Moist, subrd.-subang., Rx w/10% HCL NONE, wellsorted, 70% mafic, 30% Felsic, nonpl, some mg. grs.	Pull 45.0' sample 0825 4/8/91 PID = <det
50	2Lith 1Moist 1Rad	DB		45.5'-46.0' Sandy SILT Lense 40% VFS 60% SILT Low Pl. ~~45~~ 50.0' - SAND (tr. Gravel 98% SAND) 2% VFP, 10% VCS, 10% CS, 35% MS, 25% FS 18% VFS, (10YR 5/4, tan, wet), (10YR 6/2, cr.gr., Dry) Moist subrd.-subang., Rx w/10% HCL Strong, very well sorted, 60% Felsic, 40% Mafic nonpl.	Pull 50.0' sample 0925 PID = <det.
55	2Lith 1Moist 1Rad	DB		Same as above	Pull 55.0' sample 0950 PID = <det
60					

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BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 4 of 12

Location 200W / LLBG - WM-4

Project W-017 / LLBG

Elevation 686.78 = Brass Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E.-22W

Prepared By Bryan Walz / Bryan Walz (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 4/11/91

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 1Moist 1Rad	DB		60.0'-St. Gravelly SAND (9% Gravel, 91% SAND) tr. mp, 3% fP, 5% vfP, 10% vcs, 15% cs, 25% ms, 25% fs 16% vfs (10YR 5/4, tan wet) (10YR, 4/2 cr gray, Dry) moist, subrd-subang, R= w/10% HCL strong well sorted, 60% Felsic, 40% mafic, nonpl.	Pull 60.0' sample 1020 PID = <det.
65	2Lith 1Moist 1Rad	DB		63.0-65.0' sandy GRAVEL (70% GRAVEL, 30% Sand) 10% SW LC, 10% SC, 10% vcP, 10% cP, 10% mP, 10% fP, 10% vfP 5% vcs, 5% cs, 10% ms, 5% fs, 5% vfs (cobbles 10YR 5/1) (10YR 5/4, tan wet) (10YR 4/2, cr. gray, Dry) Moist, subrd.-subang. R= w/10% HCL weak, very poorly sorted, 90% Mafic, 20% Felsic non pl., some mags.	Pull 65.0' sample 1415 PID = <det
70	2Lith 1Moist 1Rad	DB		70.0' - Clayey/silty sandy GRAVEL (75% Gravel, 10% sand, 15% clay/silt) 15% SC, 15% vcP, 15% cP, 10% mP, 10% fP, 10% vfP, 5% fs, 5% vfs, 15% clay/silt, (cobbles, 10YR 5/1 dk. gr.) (10YR 4/1, br., wet) (10YR 6/2, tan gr., Dry) Moist, subrd, R= w/10% HCL strong on cobble surf, very poorly sorted, 75% mafic 25% Felsic, med. plastic	Pull 70.0' sample 1345 PID = <det.
75				75.0' - Same as above with Fe stains	Pull 75.0' sample 1440 PID = <det
80					

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BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 5 of 12

Location 200 W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 - Brass Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. -22W

Prepared By Bryan Walz / Bryan Walz (Sign/Print Name) Date 4/10/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/12/91

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
80	1 Moist 1 Rad 2 Lith	DB		80.0' - clayey/silty sandy GRAVEL (70% GRAVEL, 15% sand, 15% clay/silt) 10% sc, 15% vcp, 15% cp, 10% mp, 10% fp, 10% vfp, 5% ms, 5% fs, 5% vfs, 15% clay/silt, (cobbles, 10YR 5/1, dk.gr.) (10YR 4/1, br, wet) (10YR 6/2, tan gr., Dry) moist, subrd., Rx w/10% HCL strong on cob sur, very poorly sorted, 70% mafic, 30% Felsic, med.-low plastic	Pull 80.0' sample, 1015 PID = < det.
85	1 Moist 1 Rad 2 Lith	DB		85.0' - same as above	Pull 85.0' sample, 1335
	1 Moist 1 Rad 2 Lith	DB		86.0' - SAND (100% SAND) (5% VCS, 30% ms, 35% fs, 30% vfs) (10YR 6/2, ol. br, wet) (10YR 7/2, tan, Dry) moist, rd., Rx w/10% HCL strong, very well sorted, 20% Mafic, 50% Felsic, 30% quartz, nonplastic cross bedding	PID = < det Pull 86.0' PID = < det 4/11/91 0800 Lith. ck
H 90	1 Moist 1 Rad 2 Lith	DB		90.0' - SAND (3% gravel, 97% SAND) 3% VFP, 5% VCS, 5% CS, 30% ms 32% fs, 25% vfs (10YR 6/3, ol. br. wet) (10YR 7/2 gr tan, Dry) Moist, subrd - subang., Rx w/10% HCL weak, very well sorted, 30% mafic, 60% Felsic 10% quartz, nonplastic, some mag grs.	Pull 90.0' sample 1005 PID = < det.
95	1 Moist 1 Rad 2 Lith	DB		95.0' sandy GRAVEL (60% GRAVEL 40% Sand) (10% CP, 15% mp, 15% fp, 20% vfp, 15% VCS, 10% CS, 5% ms, 5% fs, 5% vfs) (10YR 3/3, bl.br, wet) (10YR 7/1, lt.Gr., Dry) Moist, subrd.-subang., Rx w/10% HCL weak, mod. sorted, 60% Mafic, 40% Felsic, non plastic, some mag. grs.	Pull 95.0' sample 1110 PID = < det
100					

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BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 6 of 12

Location 200W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 = Brass Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. - 22W

Prepared By Bryan Walz / Bryan Walz ESI (Sign/Print Name) Date 4/11/91

Reviewed By R.D.N. (Sign/Print Name) Date 4/13/91

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 1Moist 1Rad	DB		100.0' - Sandy GRAVEL (65% GRAVEL 35% sand) <5% vcp, 10% cp, 15% mp, 15% fp, 10% vfp, 15% vcs, 10% cs, 5% ms, 5% fs, tr. vfs (10YR 3/3 bl. br., wet) (10YR 7/1, Gr. Dry) Moist, subrd., Rx w/10% HCL weak, Poorly sorted, 60% Mafic 40% Felsic, nonplastic, some mag. grs.	Pull 100.0' sample 1415 PID = <det.
	ST	46 / 51 / 49 / 54 / 46/51/49/54 / 100%			split tube 100-102' 4/12/91 0740
	2Lith 1Moist 1Rad	DB			
105				105.0' - SAND (<5% Gravel, 795% SAND) <5% vfp, 15% vcs, 15% cs, 30% ms, 20% fs, 15% vfs, (10YR 6/4, Dl. br., Wet) (10YR 7/2 Gr. tan, Dry) Moist, subrd.-subang, Rx w/10% HCL weak, very well sorted, 70% Felsic 25% Mafic, 5% qtz, nonplastic some mag. grs	105.0' sample 0810 PID = <det
	2Lith 1Moist 1Rad	DB			
110				110.0' - Same as Above	Pull 110.0' sample 0840 PID = <det
	1Moist 2Lith 1Rad	DB			
115				115.0' - SAND (100% SAND) 50% ms, 25% fs, 25% vfs (10YR 6/4 Dl. br. Wet) (10YR 7/2, Gr. tan, Dry) Dry subrd., Rx w/10% HCL NONE, 75% Felsic, 20% Mafic, 5% Qtz, nonpl. some mag grs	Pull 115.0' sample 1115 PID = <det
120					

A-6000-382 (04/90)

9313018.1155

BOREHOLE LOG

Boring or Well No. 299-W15-27

Sheet 7 of 12

Location 200W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 = Blows Gnd

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. - 22W

Prepared By Bryan Wolf / B Walz ESI (Sign/Print Name) Date 4/12/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/16/91

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	~~DB~~ BW 4/12/91 2 Lith 1 Mo:st 1 Rad	DB		120.0' - SAND (100% SAND) (50% ms, 25% fS, 25% vfS, (10YR, 5/4 ol. br., wet) (10YR, 7/2, Gr. tan, Dry) Dry subrd., Rx w/10% HCL NONE, 75% Felsic, 20% Mafic, 5% Qtz, nonpl. some mag. grs.	Pull 120.0' sample 1145 PID = < det.
		10/14/17/16 ST 100%		119.0'-121.0' - same as 120.0' Int.	Pull ST 119.0'-121.0' 1300 PID = <det
125	2 Lith 1 Mo:st 1 Rad	DB		125.0' - same as above w/a slight increase in fines (35% ms, 35% fS, 30% vfS)	Pull 125.0' sample 0720 4/15/91 PID = <det.
130	2 Lith 1 Mo:st 1 Rad	DB		130.0' - same as above w/a decrease in fines & an increase in coarse. (~~10~~ 20% cs, ~~40~~ 35% ms, ~~30~~ 20% fS 20% vfS) BW 4/15/91	Pull 130.0' sample 0750 4/15/91 PID = <det.
135	2 Lith 1 Mo:st 1 Rad	DB		135.0' - same as above w/a sl. change in grain size 10% cS, 40% ms, 30% fS, 20% vfS	Pull 135.0' sample 1010 PID = <det
140					

A-6000-382 (04/90)

9313018.1464

BOREHOLE LOG

Boring or Well No 299-W18-27

Sheet 8 of 12

Location 200 W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 = Bess Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment cable Tool - B.E. - 22W

Prepared By Bryan Walz / Bryan Walz (Sign/Print Name) Date 4/16/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/20/91

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
140	2Lith 1Rad 1Mo.st	DB		140.0' - SAND (100% SAND) 10% cs, 35% ms 30% fs 25% vfs (10YR 4/4 ol. br., wet) (10YR 7/2 Gr. tan, Dry) Dry subrd., Rx w/10% HCL strong, 75% Felsic, 20% Mafic, 5% Qtz, non pl. some mag. grs, very well sorted	Pull 140.0' sample 1050 PID = <det
	2Rad 1Moist 2Lith 2Lith	15/13/22/50 ST			
		100%			
				141.0' - clayey SILT (30% Clay, 70% SILT) (10YR 4/3 Wet, ol br.) (10YR 4/3 Dry, cream) Dry, no grs, Rx w/10% HCL strong, med. plastic	Pull ST 140.0'-142.0' 1335 PID = <det. 140.0'-141.0' same as above 141.0'-142.0' clayey silt
	2Lith 1Moist 1Rad	DB			
145		4/25/34/40 ST			
	1Rad	100%		145.0' - same as above	Pull 145.0' sample 0950 PID = <det
EP?	2Lith			BW 4/16/91 ~~146~~ 145.3'-147.3' - same as above	4/16/91
PP					Pull ST 1020 PID = <det.
	1Rad 1Moist 2Lith	DB			
150				150.0' - same as above w/ less clay	Pull 150.0' sample 1100 PID = <det
	2Lith 1Moist 1Rad	DB			
155	2Lith 1Moist 1Rad	DB		155.0' Silty SAND (35% silt, 65% SAND) 15% fs 50% vfs 35% silt (10YR 4/3 ol. br., wet) (10YR 7/2 4/3 BW 4/16/91 Dry Lt. tan), Dry, very well sorted rd., Rx w/10% HCL strong, 80% Felsic 20% mafic non pl.	Pull 155.0' sample 1355 PID = <det
E				156.0' - Gravelly SAND (13% Gravel, 85% SAND) (5% cp, 5% mp, 3% fp 2% vfp, 10% cs, 35% ms 30% fs 20% vfs (10YR 5/6, ol. br. Wet) (10YR 4/3 tan, Dry) Dry, poorly sorted, subrd., Rx w/10% HCL Str. 75% Felsic, 25% Mafic, non pl., semi cemented	Pull 156.0' sample 1415 PID = <det Lith. change
160					

A-6000-382 (04/90)

9313018.1107

BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 9 of 12

Location 200W/LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 = Brass Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment cable Tool - B.E. - 22W

Prepared By Bryan Walz / B. Walz EsI (Sign/Print Name) Date 4/17/91

Reviewed By RB Mercer RB Mercer (Sign/Print Name) Date 29 Apr 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	2c,7h,1Rad 1moist	DB		160.0' - Sandy GRAVEL (30% Gravel, 65% sand, 5% silt) VCP 2%, CP 3%, MP 5%, FP 10%, VFP 10%. Sand - 10% VCS, 10% CS, 20% MS, 15% FS, 10% VFS, Silt - 5% (10YR 4/3 br. wet) (10YR 5/2 tan dry) dry subrd, poorly sorted, strong rx w/ 10% HCL 15% mafic, 85% felsic, some mag grains, nonplastic	Pull 160.0' sample 0845 PID = <det
	1Rad 2Lith	6/16/42/66 100% ST		159.7'-161.7' - same as 160.0' description w/ tr of LC SSC.	Pull ST 159.7'-161.7' 0900 PID = <det
165	1 CaCO3 1Rad 2Lith	HT		165.0' - Sandy GRAVEL (30% GRAVEL, 65% sand, 5% silt) 5% CP, 5% MP, 10% FP, 10% VFP, 15% VCS, 15% CS, 15% MS, 10% FS, 10% VFS, 5% silt, (10YR, 4/3, br., wet) (10YR, 6/2 tan, Dry) H_2O Added (wet), subrd.-ang, rx w/10% HCL weak, 60% mafic 40% felsic, some mag. grs, nonpl., poorly sorted	Pull 165.0' sample 1055 PID = <det 4/22/91 HT
170	1 CaCO3 1 moist 2Lith	HT		170.0' - Sandy GRAVEL (55% GRAVEL, 40% sand, 5% silt) 10% CP, 15% MP, 15% FP, 15% VFP, 10% VCRS, 10% CRS, 10% MRS, 5% FRS, 5% VFS, 5% silt, (10YR, 4/3, br., wet) (10YR, 6/2, tan, Dry) Wet, subrd.-ang. rx w/10% HCL weak, 80% mafic, >15% felsic, <5% quartzite, non mag. non pl., poorly sorted	Pull 170.0' sample 1445 PID = <det. 4/23/91 GW 4/24/91
175	1CaCO3 1Rad 2Lith	HT		175.0' - Same as above w/ less silt & some VCP (10YR 7/2 tan, Dry), less mafics, olivine	Pull 175.0' sample 0925 PID = <det. 4/24/91
180					

9313018.1466

BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 10 of 12

Location 200 W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.76 - Blatts Cap

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. - 22W

Prepared By Bryan Walz / B. Walz ESI (Sign/Print Name) Date 4/24/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91

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
180	2Lith, 1Rad ~~1caco3~~	HT BW 4/24/91		180.0' - Sandy GRAVEL (60% GRAVEL <40 ~~35%~~ Sand, ~~<5%~~ Silt) (30% VCP,	Pull 180.0' sample 1310 PID = < det.
		7/100 48%		15% CP, 5% mp 5% fP, 5% VFP, 10%	
182.3	1Rad 2Lith	ST		VCS, 5% CS, 5% ms, 10% fS, <10% vfS,	
				Tr. silt, (10YR 2/1, bk, & 10YR 4/2 br, wet)	Pull 182.3' ST 0900
				(10YR 7/1, tan Dry) Dry, poorly sorted	PID = < det. 4/25/91
				-vfs, rd.-subang., 60% Mafic, 40%	refusal on 2nd 6"
				Felsic, Rx w/10% HCL weak, some mag	Interval, 5" penetration
	1caco3 1Rad 2Lith			non. pl., BK. decomposing basalt	after 100 blows w/1400#
185		HT		182.3'-183.1' - Same as above	stem.
				185.0' - same as above	Pull 185.0' sample 1410
					PID = < det. 4/25/91
	1caco3 1Rad 2Lith	HT			
190				190.0' - same as above with	Pull 190.0' sample 1045
				epidote & sl. increase in	PID = < det 4/26/91
				basalt & silt	
	1Rad 1caco3 2Lith	HT			
195				195.0' - same as above	Pull 195.0' sample 1425
				no epidote found	PID = < det. 4/26/91
				198.9' - 200.4' ~~SAND dense~~ @	BW 4/30/91
				~~200'~~ Gravelly SAND (20% Gravel,	
				80% SAND) 5% VCP, 5% CP,	
		14/50/47 75%		5% mp 5% fP, 5% CS, 35% ms,	
	2Lith 1Rad	ST		20% fS, 20% vfS (10YR 3/2, br., wet)	
				(10YR 7/2, tan Dry) Dry, poorly	Pull ST 198.9'-200.4'
				sorted, rd.-subrd., 30% mafic, 30%	PID = < det.
200				quartz, 40% felsic, Rx w/10% HCl weak, mag.	4/30/91 1135

muscovite, pyrite

A-6000-382 (04/90)

9313018.1145

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

BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 11 of 12

Location 200 W / LLBG WM-4

Elevation 686.78' - Brass Cap

Driller Kelly Olson

Prepared By B Walz / B Walz ESI (Sign/Print Name) Date 4/29/91

Project W-017 / LLBG

Drilling Contractor Kaiser Engineering Hanford

Drilling Method and Equipment Cable Tool - B.E. - 22cv

Reviewed By R.D. Miller (Sign/Print Name) Date 5/3/91

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 1CaCO3	HT		200.0'- Gravelly SAND (20% Gravel 80% SAND) 5% VCP, 5% CP, 5% MP, 5% FP, 5% CS, 35% MS, 20% FS, 20% VFS, (10YR 3/2, br. wet) (10YR 7/2, tan, Dry) Dry, poorly sorted, rd.-subrd., 30% Mafic 30% Quartz, 40% Felsic, Rx w/10% HCL weak, nonpl., some mag. grs., some musc. & pyrite	Pull 200' sample 0930 PID = <det 4/30/91
205	1Rad 1CaCO3 2Lith	HT		205.0'- sandy GRAVEL (35% GRAVEL, 65% Sand, tr. silt) 5% VCP, 5% CP, 10% MP, 5% FP, 5% VFP, 5% VCS, 10% CS, 20% MS, 15% FS, 15% VFS, tr. silt (10YR 3/2 br. wet) (10YR 7/2, tan, Dry) Poorly Sorted, rd.-subrd., 5% Quartz, 55% Mafic 40% felsic, (Pyroxene, epidote, olivine, hornblend) Rx w/10% HCL weak, nonpl., few mag grs	Pull 205' sample 0925 PID = <det 5/1/91
210	1Rad 1CaCO3 2Lith	HT		210.0'- Gravelly SAND (20% Gravel, <80% SAND, tr. silt) 5% VCP, 5% CP, 5% MP, 5% FP, 5% VCS, 10% CS, 25% MS, 20% FS, 20% VFS, tr. silt, (10YR 3/2, br. wet) (10YR 7/2, tan, Dry) (HT), Poorly Sorted, rd.-subrd., 5% Qtz, 60% Mafic 35% Felsic, Rx w/10% HCL NONE-WK, nonpl.	Pull 210' sample 1330 PID = <det 5/1/91
215	1Rad 1CaCO3 2Lith	HT		215.0' - same as above with an increase in Mafics	Pull 215' sample 0945 5/2/91 PID = <det.
220					

A-6000-382 (04/90)

9313018.1468

BOREHOLE LOG

Boring or Well No. 299-W18-27

Sheet 12 of 12

Location 200W / LLBG WM-4

Project W-017 / LLBG

Elevation 686.78 = Bigs Sup.

Drilling Contractor Kaiser Engineering Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - B.E. - 22W

Prepared By B. Walz / B Walz ESI (Sign/Print Name) Date 5/2/91

Reviewed By [signature] / VL King (Sign/Print Name) Date 9/11/92

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 8" CS casing, .76 ft drive shoe
220	1Rad, 1CaCO3, 2Lith	HT		220.0' - Sandy GRAVEL (35% GRAVEL, 60% sand, 5% silt) 5% vcp, 10% cp, 10% mp, 5% fp, 5% vfp, 5% vcs, 10% cs, 20% ms, 15% fs, 10% vfs, 5% silt, (10YR 3/2 br. wet) (10YR 7/2 tan, Dry) (HT) poorly sorted, rd.-subrd., 60% Mafic, <40% Felsic, Tr. quartz, Rx w/10% HCL NONE nonpl.	Pull 220' sample 1350 PID = <det. 5/2/91 Begin shift 5/3/91 @ 700
	1CaCO3 1Rad 2Lith				
225		HT		225.0' - Sandy GRAVEL (45% GRAVEL, <55% sand, tr. silt) 5% vcp, 10% cp, 10% mp, 10% fp, 10% vfp, 5% vcs, 10% cs, 15% ms, 15% fs, 10% vfs, tr. silt, (10YR 3/2 br. wet) (10YR 7/2, tan, Dry) (HT) poorly sorted, rd-subrd, <55% Mafic, 45% Mafic, tr. quartzite Rx w/10% HCL NONE, nonpl.	Pull 225' sample 1350 PID = <det 5/3/91
	2Sieve 1CaCO3 1Rad 2Lith	12/24 lbs/10 100% ST			BW 5/3/91 End Shift 5/3/91 @ 1500
230				230.0' - Sandy GRAVEL (<65% GRAVEL, 35% sand, Tr. silt) tr. sc, 15% vcp, 15% cp, 15% mp, 10% fp, <10% vfp, 10% vcs, 10% cs, 5% ms, 5% fs, 5% vfs, tr. silt (10YR 3/2 br., wet) (to 2.5Y 6/4 ol. br., Dry) wet, very poorly sorted, rd.-subrd., 55% Felsic, 40% Mafic, 5% quartzite, Muscovite, Rx w/10% HCL None, nonpl., Fe Stains, Degen. Mat. (some mag. grs.)	Begin 5/6/91 @ 700 drilling Pull 230.0' sample 1150 PID = <det 5/6/91
	1Rad 1CaCO3 2Lith	HT			
235				235.0' - same as above	Pull 235.0' sample 1450 PID = <det 5/6/91
					TD = 229.0' 5/6/91 @ 1115 End of Shift 5/6/91 @ 1500
240					

A-6000-382 (04/90)

9313018.1155

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

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

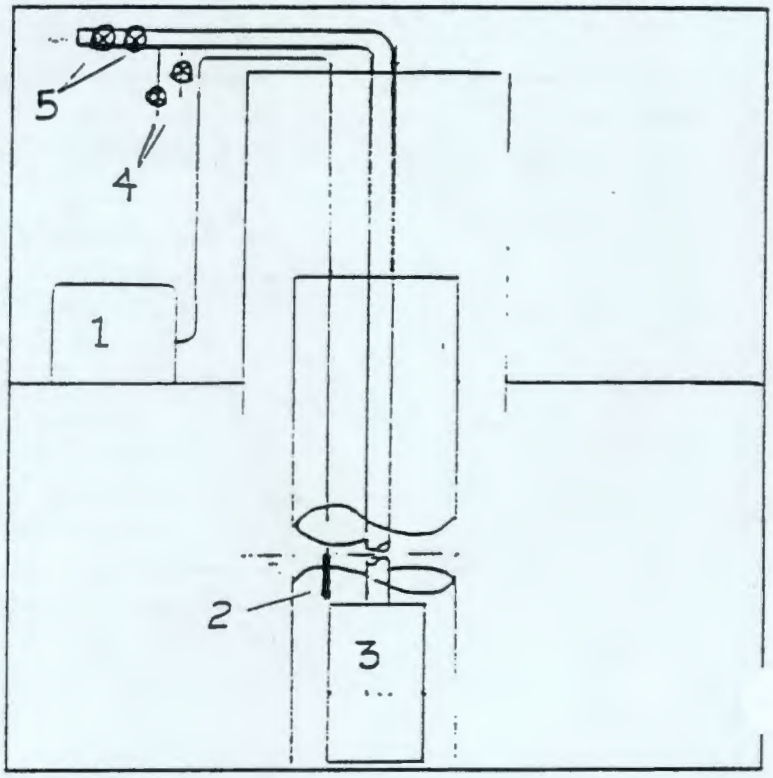
Well Designation 299-W18-27 Depth 241.5' BTOC 6"

VALIDAT
KDR 7/24
SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-350976
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

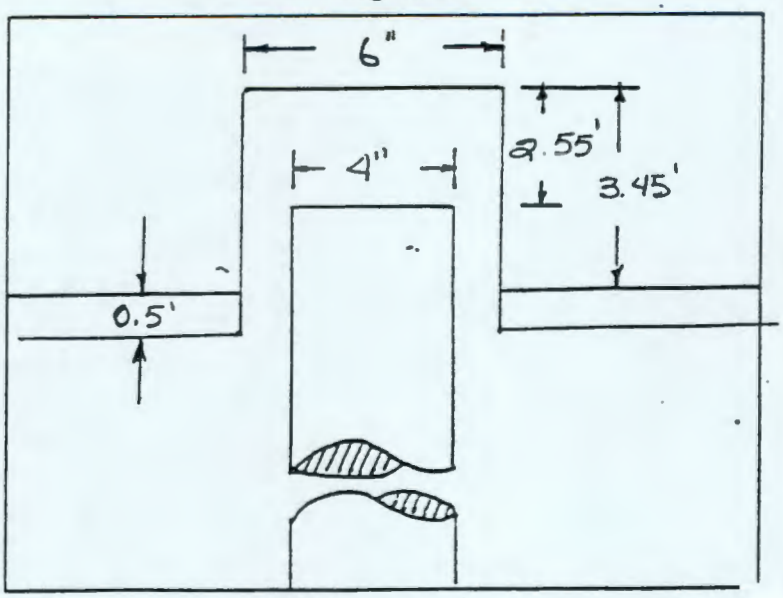
Diagram



Well Head

Comments

Diagram



Signature of Recorder JAMES A. COATES JAMES A. COATES Date 7-19-91

A-6000-417 (08/89)

9313018.1470

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WELL DEVELOPMENT FORM

Well Designation 299-W18-27 Well Depth 241.5' BTOC.

Screened Interval 241.5'-220.7' BTOC.6" Date Well Development is Performed 7-18-91.

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 ~~DISCHARGE~~ CONSTANT Pump Depth 240.3' BTOC 6" Pump Start Time 0947

Flow Rate 5.6GPM Accumulated Flow 1010 GALS. Pump Stop Time 1245

Turbidity (NTU)	>100	47	28	29	17	14	16	13
	6.7	6.5	5.5	4.2	—	—	—	—

Comments _____

Signature of Recorder James A Coates JAMES A. COATES Date 7-19-91

Sign and Print Name 11-23

9313018.1151

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

DRAWDOWN/RECOVERY

Well Designation 299-W18-27 Date 7-18-91

Well Depth 241.5' (BTOC 6") Screened Interval 241.5' - 220.7'

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E-TAPE / TRANSDUCER N ET-5 / 350976 Calibation Due 8-21-91 / 5-9-92

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

Measuring Point TOP OF 6" CASING - (TOC 6") Pump Start Time 0947 Pump Stop Time 1245

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				4.25 GALS / 41 SEC = 6.2 GPM
				5 GALS / 54 SEC - 5.6 GPM
				5 GALS / 56.7 SEC 5.3 GPM.
				5 GALS / 56.1 SEC 5.3 GPM
				A/E 5.6 GPM.
		SEE ATTACHED DATA		

Signature of Recorder ~~James A. Coates~~ JAMES A. COATES Date 7-19-91.

Sign and Print Name

A-6000-402 (03/90)

9313018.1472

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Page 2 of 7

WELL 2-W18-27 BASELINE 1

SE2000
Environmental Logger
07/19 08:54

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 09:31:35

Elapsed Time	INPUT 1
0.0000	223.596
1.0000	223.596
2.0000	223.596
3.0000	223.600
4.0000	223.600
5.0000	223.600
6.0000	223.596
7.0000	223.596
8.0000	223.596
9.0000	223.596
10.0000	223.593

END

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Page 3 of 7

WELL 2-W18-27 DRAWDOWN

SE2000
Environmental Logger
07/19 08:51

Unit# 192 Test 1

INPUT 1: Level (F) TOC

JAC 7-23-91

Reference	~~231.119~~ 223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 10:05:31

Elapsed Time	INPUT 1
0.0000	224.027
0.0083	223.504
0.0166	223.878
0.0250	224.080
0.0333	224.213
0.0416	224.365
0.0500	224.492
0.0583	224.625
0.0666	224.755
0.0750	224.872
0.0833	224.996
0.1000	225.224
0.1166	225.452
0.1333	225.658
0.1500	225.867
0.1666	226.070
0.1833	226.266
0.2000	226.443
0.2166	226.624
0.2333	226.804
0.2500	226.975
0.2666	227.143
0.2833	227.305
0.3000	227.457
0.3166	227.622
0.3333	227.777
0.4166	228.398
0.5000	229.009
0.5833	229.535
0.6666	230.007

9313018.1474

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WELL 2-W18-27 DRAWDOWN

0.7500	230.409
0.8333	230.754
0.9166	230.681
1.0000	230.466
1.0833	230.301
1.1666	230.146
1.2500	230.029
1.3333	229.943
1.4166	229.864
1.5000	229.779
1.5833	229.737
1.6666	229.696
1.7500	229.630
1.8333	229.589
1.9166	229.554
2.0000	229.494
2.5000	229.348
3.0000	229.367
3.5000	229.427
4.0000	229.519
4.5000	229.601
5.0000	229.661
5.5000	229.722
6.0000	229.775
6.5000	229.820
7.0000	229.852
7.5000	229.899
8.0000	229.943
8.5000	229.975
9.0000	229.997
9.5000	230.032
10.0000	230.070
12.0000	230.175
14.0000	230.254
16.0000	230.327
18.0000	230.371
20.0000	230.425
22.0000	230.463
24.0000	230.472
26.0000	230.507
28.0000	230.545
30.0000	230.577
32.0000	230.593
34.0000	230.612
36.0000	230.631
38.0000	230.656
40.0000	230.666
42.0000	230.675
44.0000	230.697
46.0000	230.704

9313018.1475

7 of 9
Page 5 of 7

WELL 2-W18-27 DRAWDOWN

48.0000	230.713
50.0000	230.723
52.0000	230.735
54.0000	230.767
56.0000	230.770
58.0000	230.776
60.0000	230.799
62.0000	230.780
64.0000	230.811
66.0000	230.833
68.0000	230.840
70.0000	230.843
72.0000	230.849
74.0000	230.871
76.0000	230.852
78.0000	230.875
80.0000	230.890
82.0000	230.875
84.0000	230.878
86.0000	230.900
88.0000	230.903
90.0000	230.900
92.0000	230.913
94.0000	230.922
96.0000	230.928
98.0000	230.935
100.000	230.935
105.000	230.951
110.000	230.966
115.000	230.976
120.000	230.992
125.000	230.998
130.000	231.042
135.000	231.068
140.000	231.074
145.000	231.080
150.000	231.084
155.000	231.087

END

9313018.1476

Page 6 of 7

WELL 2-W18-27 RECOVERY

SE2000
Environmental Logger
07/19 08:49

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 12:51:30

Elapsed Time	INPUT 1
0.0000	233.105
0.0083	232.956
0.0166	232.769
0.0250	232.589
0.0333	232.421
0.0416	232.253
0.0500	232.092
0.0583	231.930
0.0666	231.772
0.0750	231.616
0.0833	231.461
0.1000	231.160
0.1166	230.840
0.1333	230.558
0.1500	230.289
0.1666	230.029
0.1833	229.776
0.2000	229.529
0.2166	229.288
0.2333	229.057
0.2500	228.832
0.2666	228.610
0.2833	228.395
0.3000	228.186
0.3166	227.986
0.3333	227.787
0.4166	226.963
0.5000	226.172
0.5833	225.522
0.6666	225.038

9313018.1147

9 of 9
Page 7 of 7

WELL 2-W18-27 RECOVERY

0.7500	224.683
0.8333	224.401
0.9166	224.185
1.0000	224.018
1.0833	223.878
1.1666	223.752
1.2500	223.653
1.3333	223.577
1.4166	223.511
1.5000	223.463
1.5833	223.435
1.6666	223.413
1.7500	223.378
1.8333	223.349
1.9166	223.343
2.0000	223.346
2.5000	223.603
3.0000	223.815
3.5000	223.891
4.0000	223.919
4.5000	223.942
5.0000	223.970
5.5000	223.980
6.0000	223.986
6.5000	223.989
7.0000	223.986
7.5000	223.983
8.0000	223.980
8.5000	223.973
9.0000	223.964
9.5000	223.957
10.0000	223.948

END

9313018.1478

1 of 1

VALIDATED
KDR 7/26/9
SIGNATURE/DATE

SAMPLING PUMP INSTALLATION FORM

Project: W-017 Well Number 299-W18-27

Pump Type HYDROSTAR Pump Model: 8001

Date Installed: 7-18-91 Installed by: B. STRODE/M.

Depth to water: 223.6' BTOC Depth to Bottom 241.5' BTOC

Reported Depth to water: NA

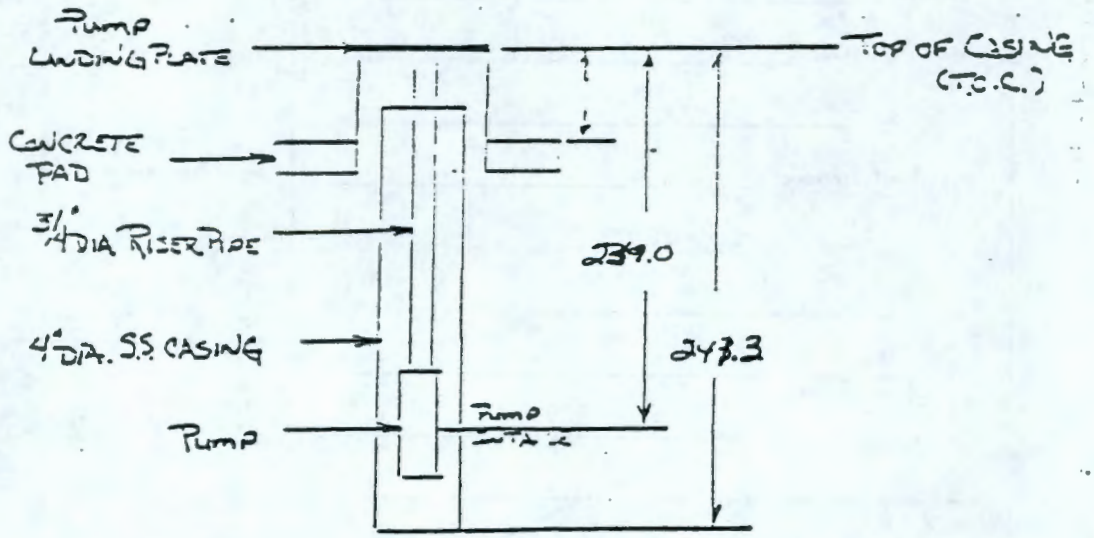
Screened Interval: 241.5'-220.72' BTOC
20.78

Pump/Riser Pipe Description:
pipe: 3/4" S.S.
pump length: 4.2
pump screen length: 1.9
material cleaning: MANUFACTURER

Comments:

PUMP INSTALLATION SKETCH

Total material length 241.3'
Loc. of pump intake: 239.0



Completed By: J.A. Coates Date: 5/6/92

BOREHOLE TEST INFORMATION

VALIDATED KDR 2/26/92 SIGNATURE/DATE

Borehole 299-W18-27 Borehole Diameter 4" Hanford Coordinates - NA -

Interval Tested 241.5' - 220.7' BTOC 6" Depth Interval 245.' - 220.7'

Test Type INSTANTANEOUS SLUG INJECTION / WITHDRAWAL Borehole Depth 241.5'

Instruction Used WHC-CM-7-7-E11 10.1

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOLINST ET-5
DATA LOGGER	IN-SITU INC 21CB 192
PRESSURE TRANSDUCER.	IN-SITU INC. SN. 350976
SLUGGING ROD	6.02' X 2" DIA = .1373 ft².

MEASUREMENT DATUM

Control Datum TOP OF 6" CASING (TOC 6")

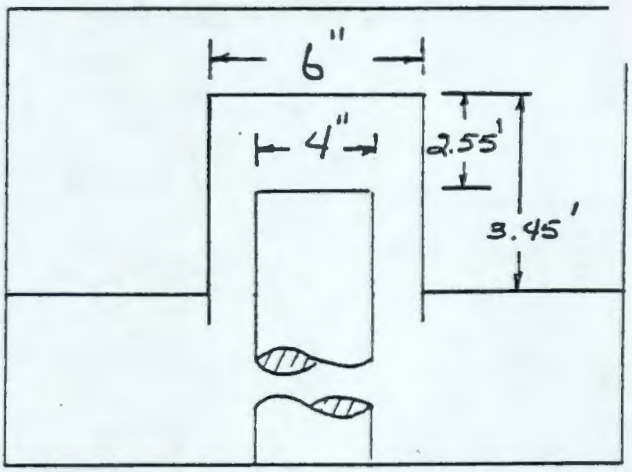
Elevation NA

Electric Sounder TOC 6"

Steel Tape NA

Pressure Transducer TOC 6"

WELL HEAD DIAGRAM



COMMENTS

Recorded by ~~JAMES A. COATES~~ JAMES A. COATES 7-19-91

Sign and Print Name Date

9313018.1480

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

INSTANTANEOUS SLUG TEST DATA SHEET

-INJECTION-

Borehole 299-W18-27

Interval Tested 241.5'-220.7' TOC 6"

Depth to Water 223.6'

Date 7-18-91

Measured by JAMES A. COATES

Slug Volume .1373 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time START TIME 1419 BASELINE INJECTION / JAC 7-19-91 1432 INJECTION

Transducer Measurement Units FEET.

Depth to Transducer 14.74' BWL

Initial Pressure (P_i) 223.60'

Slug Level or Pressure (P_{max}) 231.956'

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 (Sign and Print Name) 7/23/91 (Date)

BD-6000-293 (07/90)

WELL 2-W18-27 BASELINE INJECTION

SE2000
Environmental Logger
07/19 08:48

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 14:19:31

O-Time	E-Time	D-T-W:Ft
1419.517	0	223.596
1420.517	1	223.59
1421.517	2	223.587
1422.517	3	223.584
1423.517	4	223.581
1424.517	5	223.581
1425.517	6	223.584
1426.517	7	223.581
1427.517	8	223.577
1428.517	9	223.581
1429.517	10	223.577
1430.517	11	223.577

9313018.1482

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Page 3 of 4

WELL 2-W18-27 INJECTION

SE2000
Environmental Logger
07/19 08:47

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 14:32:24

O-Time	E-Time	D-T-W:Ft
1432.4	0	222.152
1432.408	0.0083	221.956
1432.416	0.0166	221.892
1432.425	0.025	224.866
1432.433	0.0333	222.044
1432.441	0.0416	223.15
1432.45	0.05	222.77
1432.458	0.0583	222.741
1432.466	0.0666	222.909
1432.475	0.075	222.839
1432.483	0.0833	222.915
1432.5	0.1	222.934
1432.516	0.1166	222.957
1432.533	0.1333	222.979
1432.55	0.15	222.998
1432.566	0.1666	223.014
1432.583	0.1833	223.029
1432.6	0.2	223.042
1432.616	0.2166	223.055
1432.633	0.2333	223.064
1432.65	0.25	223.077
1432.666	0.2666	223.09
1432.683	0.2833	223.096
1432.7	0.3	223.102
1432.716	0.3166	223.112
1432.733	0.3333	223.118
1432.816	0.4166	223.147
1432.9	0.5	223.172
1432.983	0.5833	223.194
1433.066	0.6666	223.213

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WELL 2-W18-27 INJECTION

1433.15	0.75	223.232
1433.233	0.8333	223.251
1433.316	0.9166	223.264
1433.4	1	223.276
1433.483	1.0833	223.289
1433.566	1.1666	223.302
1433.65	1.25	223.314
1433.733	1.3333	223.321
1433.816	1.4166	223.333
1433.9	1.5	223.343
1433.983	1.5833	223.349
1434.066	1.6666	223.362
1434.15	1.75	223.365
1434.233	1.8333	223.378
1434.316	1.9166	223.381
1434.4	2	223.384
1434.9	2.5	223.425
1435.4	3	223.454
1435.9	3.5	223.476
1436.4	4	223.492
1436.9	4.5	223.504
1437.4	5	223.511
1437.9	5.5	223.52
1438.4	6	223.53
1438.9	6.5	223.533
1439.4	7	223.536
1439.9	7.5	223.542
1440.4	8	223.542
1440.9	8.5	223.549
1441.4	9	223.546
1441.9	9.5	223.549
1442.4	10	223.552
1444.4	12	223.555

9313018.1484

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

INSTANTANEOUS SLUG TEST DATA SHEET

-WITHDRAWAL-

Borehole 299-W18-27

Interval Tested 241.5'-220.7' BTOC 6"

Depth to Water 223.6'

Date 7-18-91

Measured by JAMES A. COATES

Slug Volume .1373 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time START 1445 END 1455

Transducer Measurement Units FEET

Depth to Transducer 14.74' BTOC 6"

Initial Pressure (P_i) 223.6'

Slug Level or Pressure (P_{max}) 225.9'

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 (Sign and Print Name) JAMES A. COATES 7-23-91 (Date)

BD-6000-293 (07/90)

9313018.1147

7018
Page 2 of 3

WELL 2-W18-27 WITHDRAWAL

SE2000
Environmental Logger
07/19 08:42

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	223.600
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/18 14:45:41

O-Time	E-Time	D-T-W:Ft
1445.683	0	223.175
1445.691	0.0083	225.06
1445.699	0.0166	225.972
1445.708	0.025	225.411
1445.716	0.0333	225.313
1445.724	0.0416	225.186
1445.733	0.05	225.196
1445.741	0.0583	225.139
1445.749	0.0666	225.101
1445.758	0.075	225.057
1445.766	0.0833	225.025
1445.783	0.1	224.955
1445.799	0.1166	224.889
1445.816	0.1333	224.828
1445.833	0.15	224.768
1445.849	0.1666	224.718
1445.866	0.1833	224.661
1445.883	0.2	224.61
1445.899	0.2166	224.562
1445.916	0.2333	224.518
1445.933	0.25	224.477
1445.949	0.2666	224.439
1445.966	0.2833	224.401
1445.983	0.3	224.366
1445.999	0.3166	224.334
1446.016	0.3333	224.303
1446.099	0.4166	224.195
1446.183	0.5	224.109
1446.266	0.5833	224.052
1446.349	0.6666	224.008

9313018.1486

Bdl
Page 3 of 3

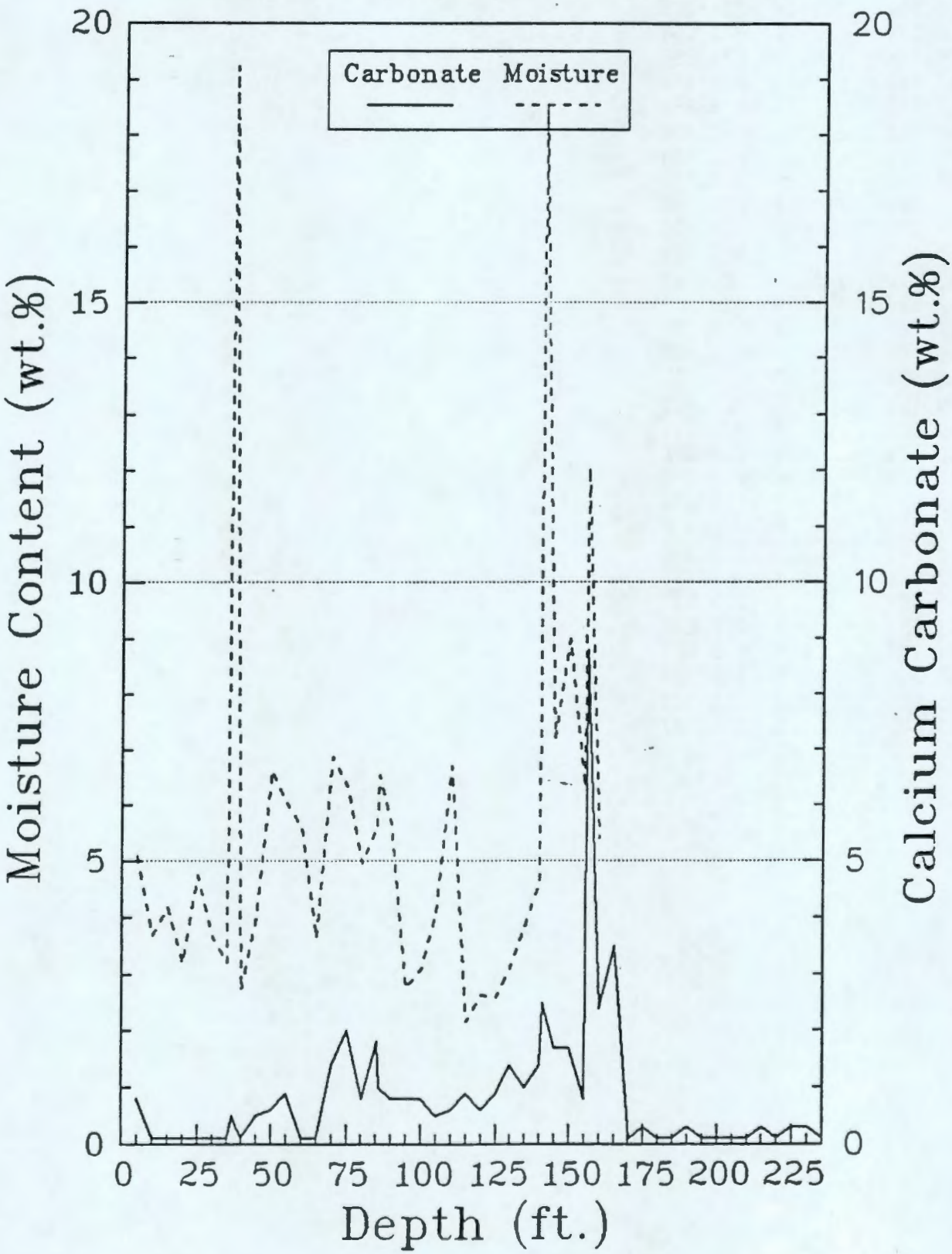
WELL 2-W18-27 WITHDRAWAL

1446.433	0.75	223.973
1446.516	0.8333	223.948
1446.599	0.9166	223.923
1446.683	1	223.904
1446.766	1.0833	223.885
1446.849	1.1666	223.869
1446.933	1.25	223.853
1447.016	1.3333	223.84
1447.099	1.4166	223.824
1447.183	1.5	223.815
1447.266	1.5833	223.805
1447.349	1.6666	223.796
1447.433	1.75	223.783
1447.516	1.8333	223.78
1447.599	1.9166	223.771
1447.683	2	223.767
1448.183	2.5	223.733
1448.683	3	223.701
1449.183	3.5	223.682
1449.683	4	223.657
1450.183	4.5	223.638
1450.683	5	223.619
1451.183	5.5	223.606
1451.683	6	223.6
1452.183	6.5	223.596
1452.683	7	223.59
1453.183	7.5	223.587
1453.683	8	223.587
1454.183	8.5	223.581
1454.683	9	223.581
1455.183	9.5	223.581
1455.683	10	223.577

9310068.1

VALIDATED
KDR 2/24/92
SIGNATURE/DATE

WELL 299-W18-27



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~~Sect~~ 282

	A	B	C
1	WELL 299-W18-27		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	0.8	5.09
7	10	0.1	3.69
8	15	0.1	4.18
9	20	0.1	3.21
10	25	0.1	4.75
11	30	0.1	3.65
12	35	0.1	3.21
13	37	0.5	19.22
14	40	0.1	2.72
15	45	0.5	3.99
16	50	0.6	6.61
17	55	0.9	6.04
18	60	0.1	5.6
19	65	0.1	3.63
20	70	1.4	6.87
21	75	2	6.34
22	80	0.8	4.97
23	85	1.8	5.63
24	86	1	6.55
25	90	0.8	5.69
26	95	0.8	2.76
27	100	0.8	3.08
28	105	0.5	4.09
29	110	0.6	6.7
30	115	0.9	2.17
31	120	0.6	2.64
32	125	0.9	2.6
33	130	1.4	3.12
34	135	1	3.84
35	140	1.4	4.62
36	141	2.5	18.49
37	145	1.7	7.2
38	150	1.7	9.01
39	155	0.8	6.32
40	156	8.8	12.05
41	160	2.4	5.42
42	165	3.5	
43	170	0.9	
44	175	0.3	
45	180	0.1	
46	185	0.1	
47	190	0.3	
48	195	0.1	
49	200	0.1	
50	205	0.1	
51	210	0.1	
52	215	0.3	
53	220	0.1	
54	225	0.3	
55	230	0.3	
56	235	0.1	

9313018.1155

~~10643~~

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0842 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-8-91

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

REMARKS 299-W18-27
229-231'

RECEIVED BY: R.G. ALEXANDER DATE 5-8-91

APPROVED BY: R.G. ALEXANDER DATE 5-8-91

9313018.1490

1-0842

RADIATION RELEASE

Bldg. 299-W18-27 Expiration Date 5/8/91

Released By [signature]
Health Physics

Remarks 229.0' - 231.0'

54-3000-022 (01/89)

1-0842

RADIATION RELEASE

Bldg. 299-W18-27 Expiration Date 5/8/91

Released By [signature]
Health Physics

Remarks 229.0' - 231.0'

54-3000-022 (01/89)

20-40 SAND / 10 SCOT

~~10613~~

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0842 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-8-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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	1311.1	0	0	100
1½		106.9	8.2	91.8
1		406.4	31.0	69.0
¾		539.5	41.2	58.8
½		694.9	53.0	47.0
⅜		755.0	57.6	42.4
4		861.9	65.7	34.3
10	190.1	32.0	16.8	28.5
40		62.4	32.8	23.0
60		93.7	49.3	17.4
100		126.0	66.3	11.6
200		143.6	75.5	8.4

Finess 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 FINE GRADING

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: R.G. ALEXANDER Date 5-9-91

A-6400-204(2-87)

9313018.1

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0842

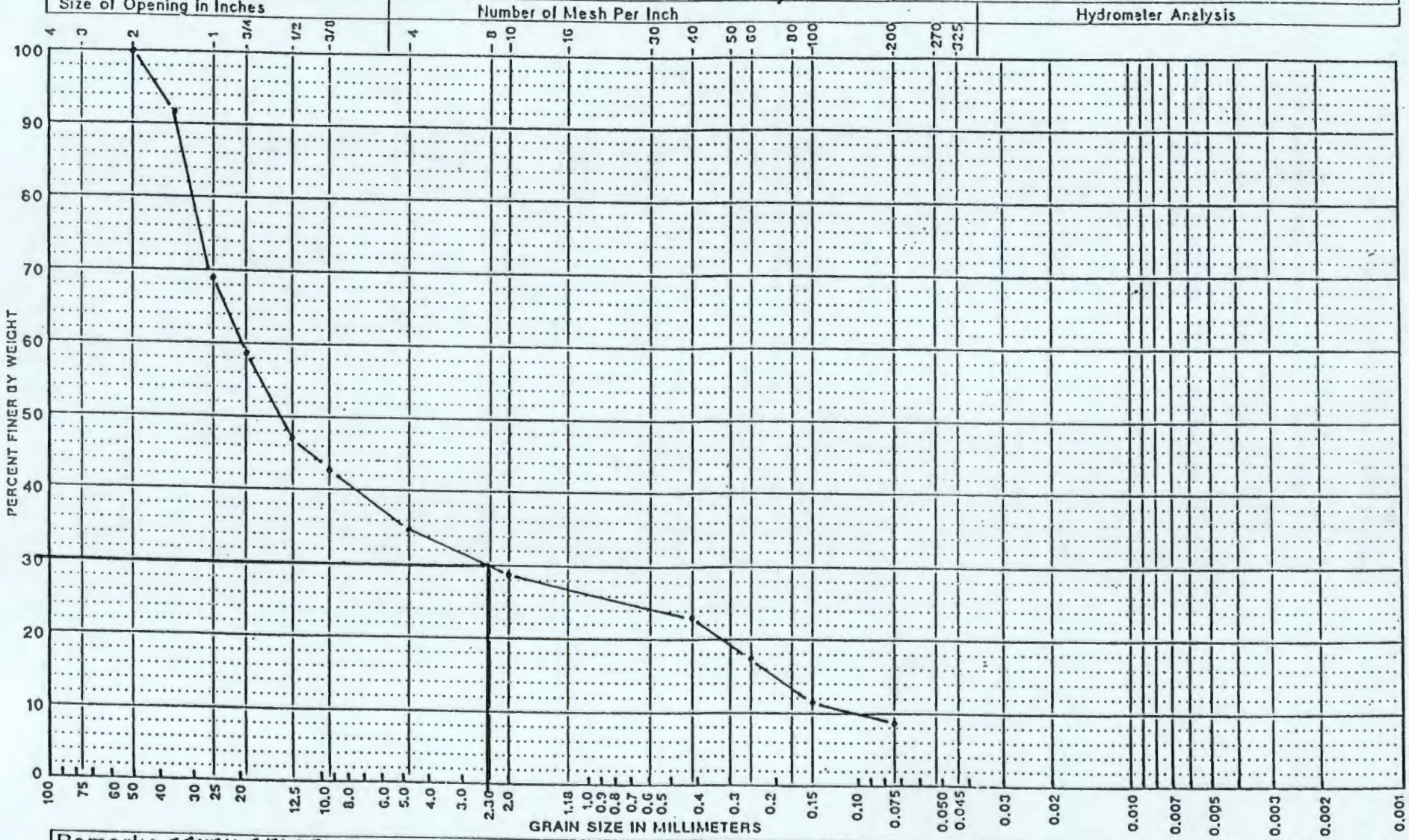
Page 1 of 1

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 JERRY LENGLAND

Date 5-8-91



Remarks SANDY GRAVEL

-W18-27 229.231'

All data are accurately and completely recorded. The test c---tor was trained and used calibrated instrument=

C ed By: R.G. ALEXANDER Date 5-9-91

~~12613~~

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0842 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-8-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3210 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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
4	190.1	0	0	100
10		32.0	16.8	83.2
40		62.4	32.8	67.2
60		93.7	49.3	50.7
100		126.0	66.3	33.7
200		143.6	75.5	24.5
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

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: RG ALEXANDER Date 5-9-91

A-6400-204(2-87)

9313018.1135

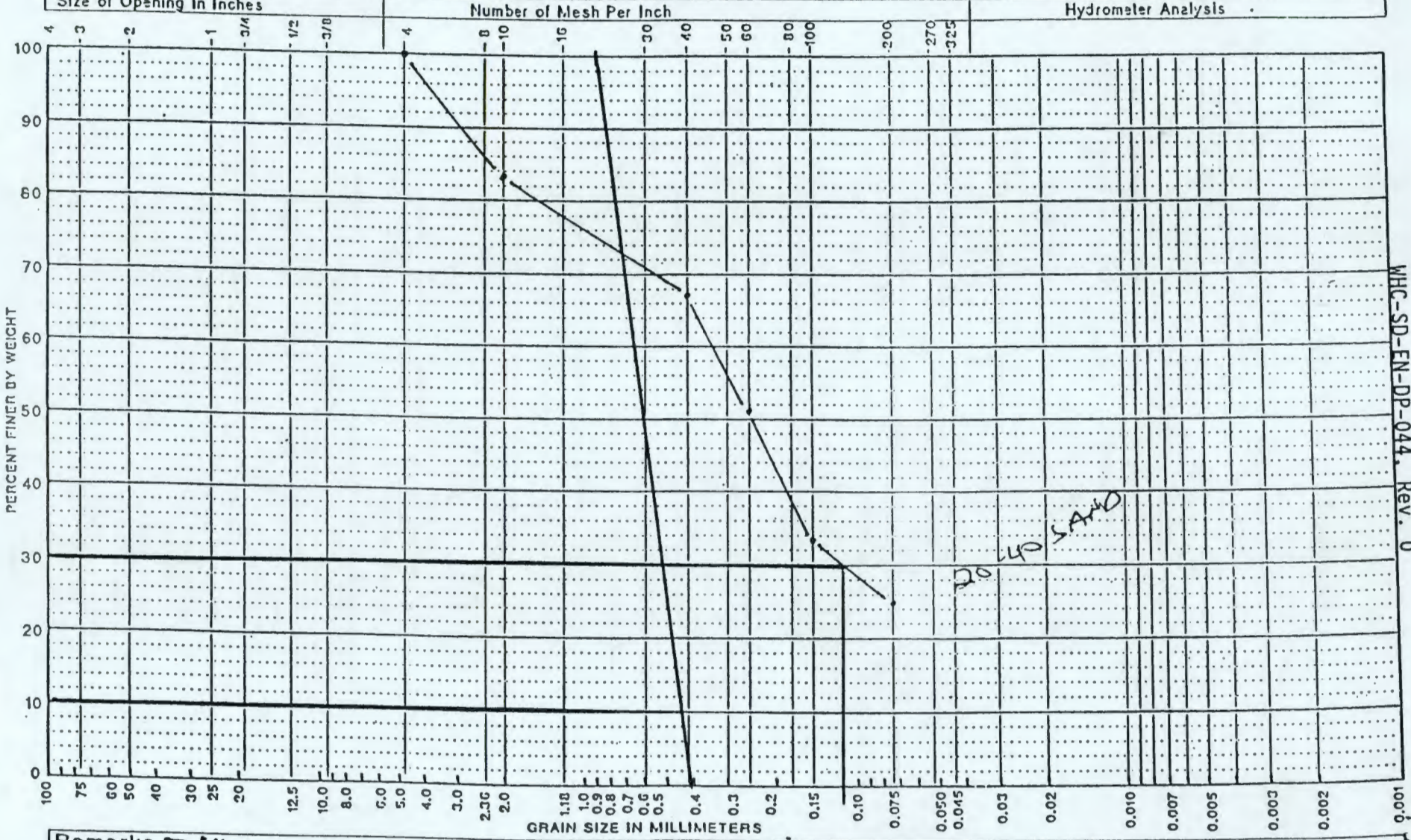
9313018.1494

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0842 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 5-8-91



Remarks - #4

299.W18.27 229.231'

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

Checked By: R.G. ALEXANDER Date 5-9-91

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

VALIDATED KDR 2/26/92 SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFET

Requested by:	Phone No.	Well No.	Date:
		W18-27	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'	4.5.91	SOIL	4.8.91	0698.91	21.7	2.0
10'				0699.91	13.6	0.3
15'				0700.91	14.0	0.8
20'				0701.91	14.2	<D
25'				0702.91	17.5	<D
30'				0703.91	17.3	0.4
35'				0704.91	17.3	1.5
37'	4.8.91		4.9.91	0707.91	21.9	1.2
40'				0708.91	13.3	<D
45'				0709.91	17.7	<D
50'				0710.91	22.3	0.9
55'			4.10.91	0711.91	25.7	0.6
60'				0712.91	17.1	1.2
65'	4.11.91		4.11.91	0724.91	15.4	0.7
70'				0725.91	23.8	<D
75'				0726.91	10.6	0.4
80'				0729.91	12.2	1.8
85'				0730.91	15.5	<D
86'				0737.91	23.2	3.4
90'	4.12.91		4.17.91	0746.91	19.0	1.4
95'				0747.91	22.1	<D
100'				0748.91	15.1	<D
105'	4.17.91		4.22.91	0798.91	24.2	2.0
110'				0763.91	36.4	0.6
115'				0764.91	25.5	0.5
119'				0765.91	20.3	1.7
120'				0766.91	38.8	0.8
125'			4.23.91	0769.91	31.6	0.9
130'				0770.91	18.2	0.4
135'				0779.91	29.4	1.1
140'				0780.91	27.8	3.5
141'				0781.91	29.4	0.5

Performed By: _____ Date: _____

Page: ____ of ____

A-6000-829 (10/91)

~~2 of 10~~

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 2

Requested by:	Phone No.	Well No.	Date:
		1W18-27	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
140'-142'		SOIL		0782.91	23.8	2.5
145'				0783.91	30.6	1.3
145'-147'				0784.91	37.0	<D
150'				0785.91	29.0	1.3
155'				0792.91	34.6	1.7
156				0793.91	11.4	0.4
159.7-161.	4.22.91		4.24.91	0801.91	21.6	0.6
160'				0810.91	13.0	1.5
165'			4.26.91	0828.91	22.9	1.1
170'	4.24.91		4.24.91	0841.91	11.4	<D
175'	4.25.91		4.30.91	0842.91	16.4	<D
180'				0843.91	20.6	0.5
181.1-182.3	4.26.91			0854.91	9.2	0.7
185				0855.91	16.4	
190'	4.29.91		4.30.91	0864.91	13.5	0.4
195'				0865.91	10.0	1.6
198'	5.1.91		5.1.91	0884.91	14.5	1.3
200'				0885.91	15.2	0.3
205'	5.2.91		5.2.91	0887.91	18.4	1.7
210'				0888.91	17.7	0.4
215'	5.3.91		5.3.91	0899.91	9.1	<D
220'				0902.91	7.2	1.1
225'	5.6.91		5.6.91	0913.91	20.0	<D
229-231'			5.7.91	0925.91	19.3	<D
230'	5.7.91			0928.91	19.4	0.8
235'	5.9.91		5.9.91	0948.91	15.4	0.4

Performed By: _____ Date: _____

Page: ____ of ____

A-6000-829 (10/

9313018.1496

Westinghouse Hanford Company | **LOG HEADER** |

Well No. 299-W18-27 Area 200 West Date 4/18/91

Log Run *1' Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 686.78' Brass Cap

Survey Coordinates 135226.8 N 566090.5 E

Log Measured From Ground Surface

Location Description West Perimeter of 200 West

Ground Surface Elevation 686.78' Brass Cap

Surface Temperature 14.5 °C Weather Clear - Warm

BOREHOLE INFORMATION

Driller Kelly Olsen

Drill Rig Type Cable Tool	Bit Type/Diameter Drive Barrel / 8"
Borehole Diameter(s)/Depth 12"/20.0'	10"/160.5'
Depth Driller 160.5'	Depth Logger 160.0'
Liquid Level NA	Liquid Density NA
Temperature NA	

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.98' -20.00'
Type 10" Carbon Steel Sch. 40	Interval +1.1' - 158.89'
Type	Interval
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.4' high

Centralizer was used

* Survey data from Kaiser 12/15/92

11-49/50

9313018.1497

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: 8/90 | Calibration Reference: PNL-7460 UL-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: 160.0' | To: 4.0'

Rerun(s): 105.0' to 50.0'

Pre Survey Verification: Position 1: 272.3 eU | Position 2: 47.6 | Background: 65 c/s

Base Calibration Difference: Position 1: 19.1 eU | Position 2: 0.9 eU

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

Start Time: 1100 | Completion Time: 1300

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: 273.9 eU | Position 2: 48.0 eU | Background: 70 c/s

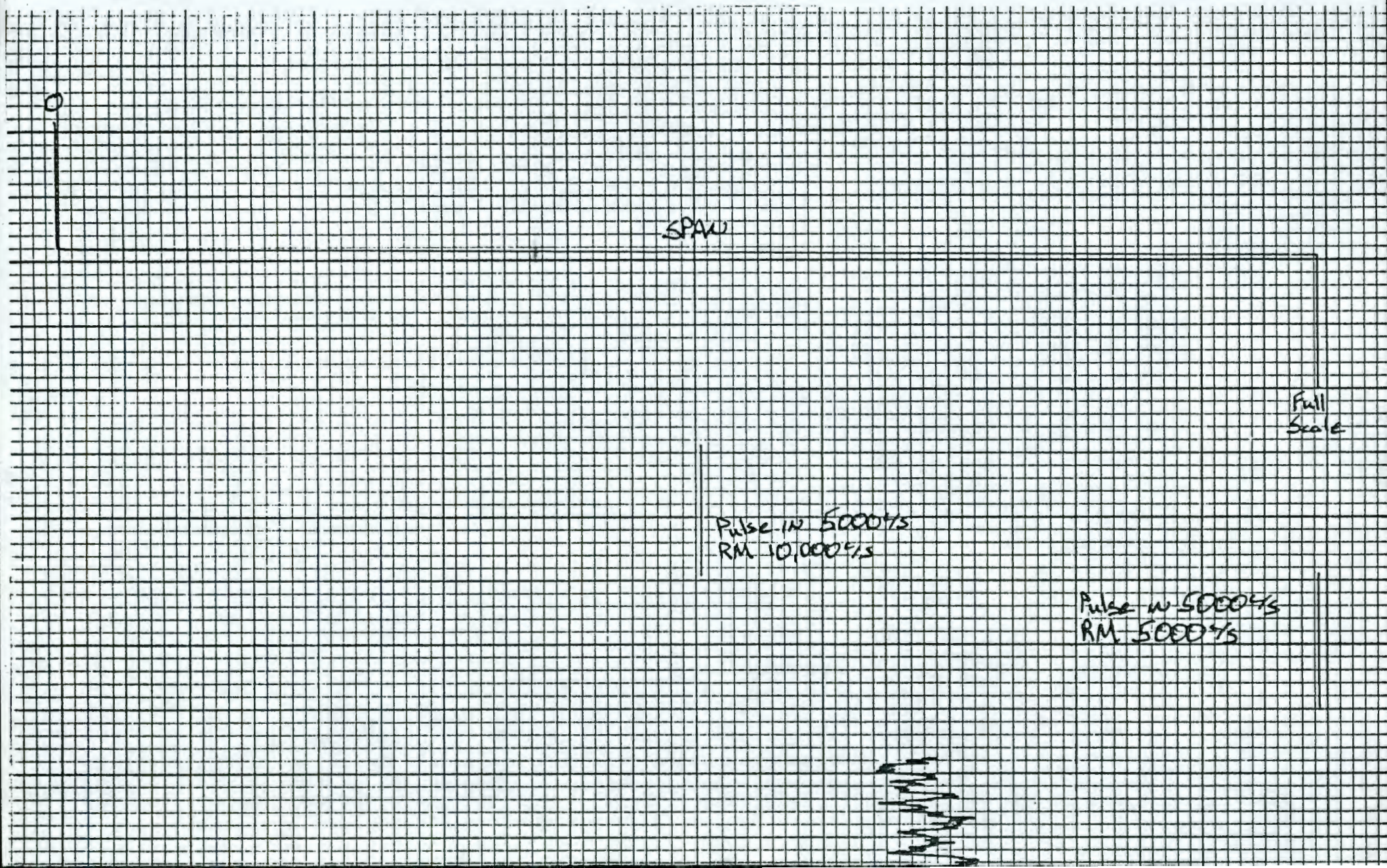
Percent Change: Position 1: 0.6% | Position 2: 0.8%

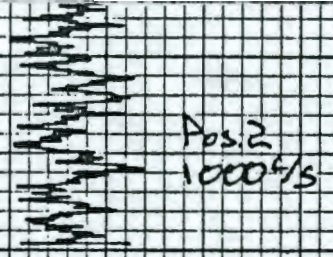
Comments: Return Error = +0.4'

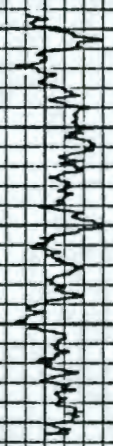
Centralizer used.

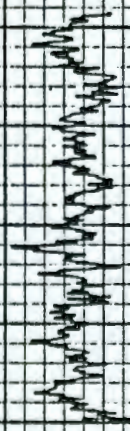
Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 4/18/91

A-6000-520 (05/90)





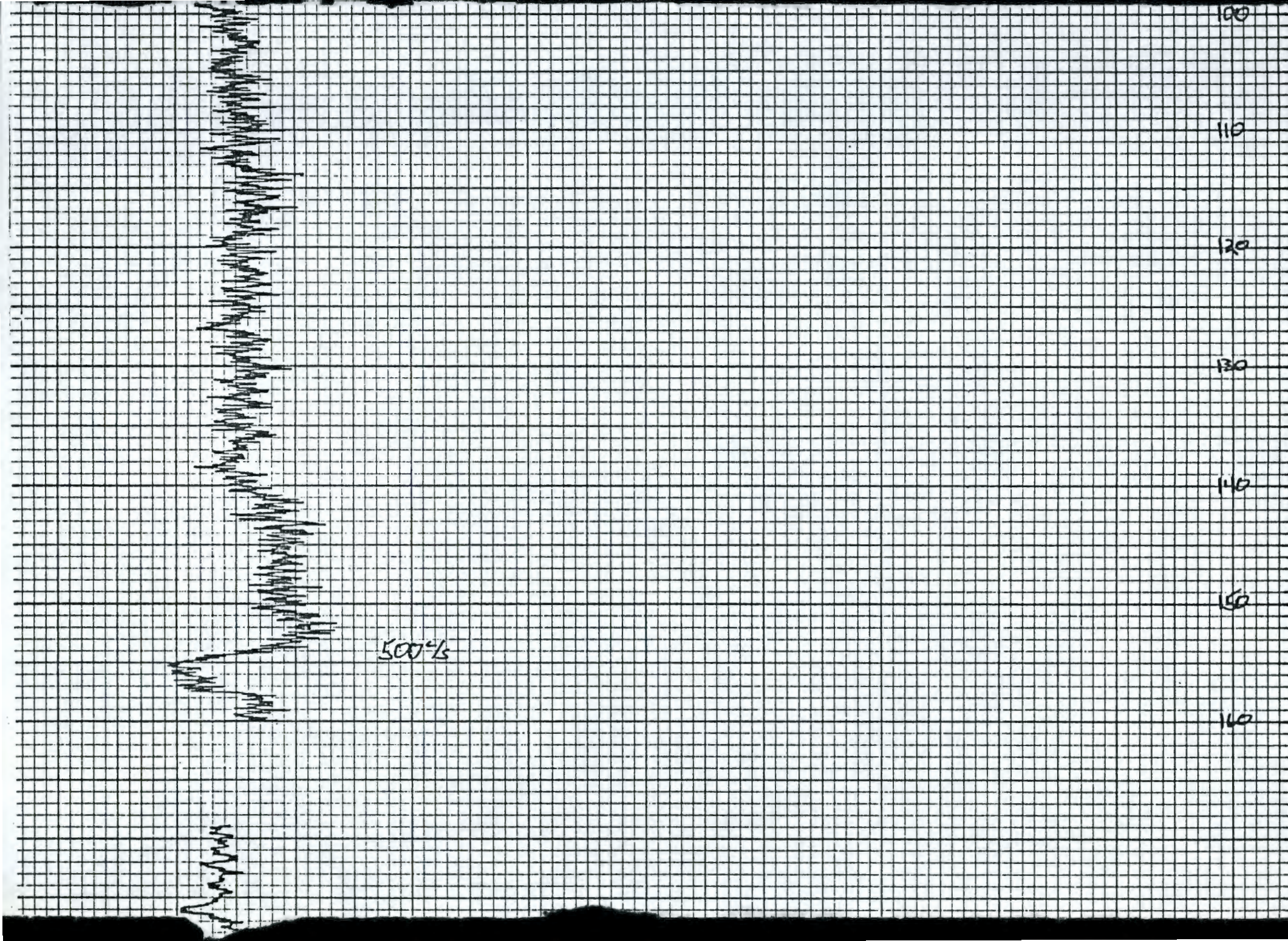


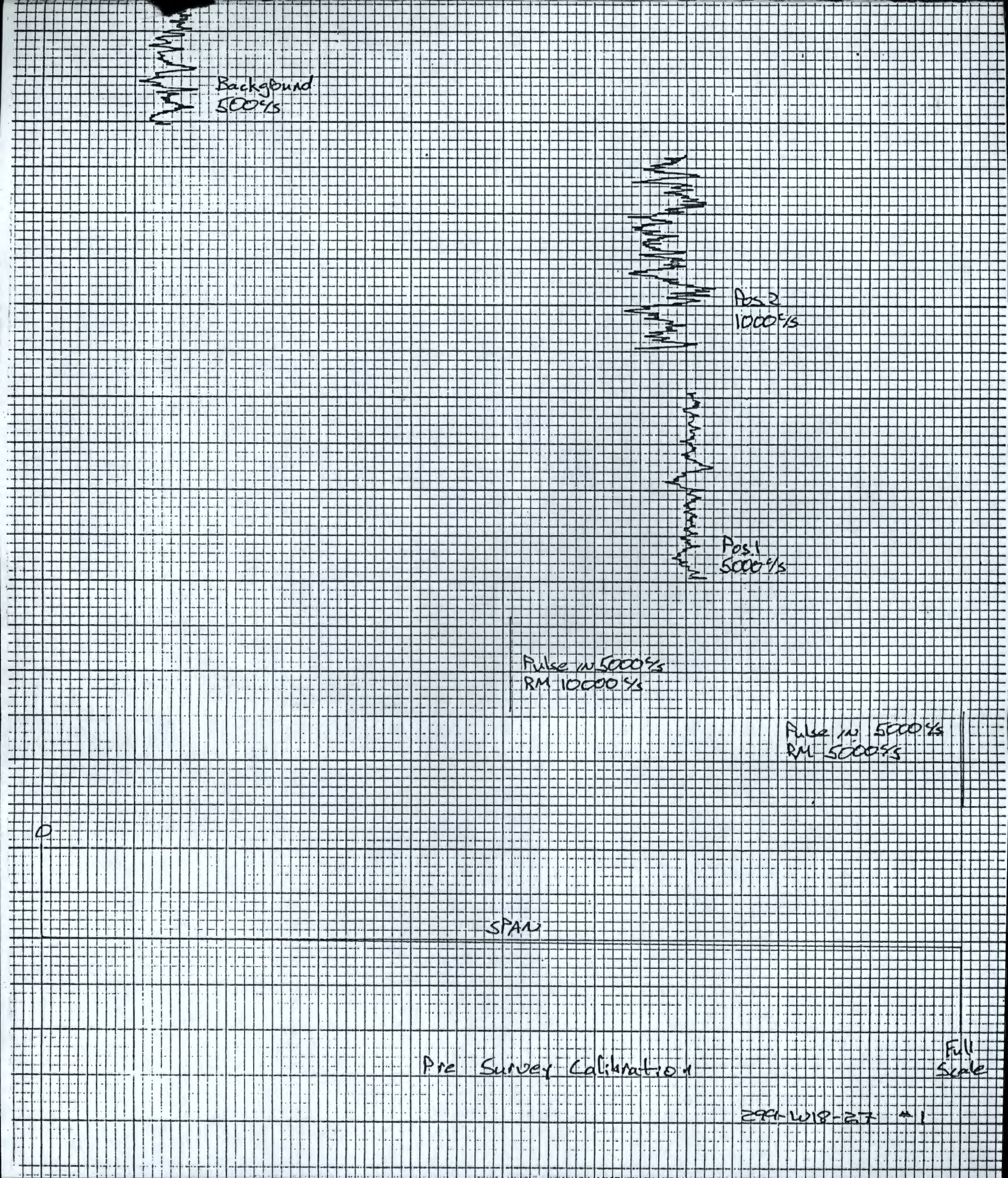


Post Survey Calibration

60
70
80
90
100
Repeat Section
500%
10
20

30
40
50
60
70
80
90


100
110
120
130
140
150
160
500 °/s


Background
500c/s
Pos 2
1000c/s
Pos 1
5000c/s
Pulse in 5000c/s
RM 10000c/s
Pulse in 5000c/s
RM 5000c/s
0
SPAN
Pre Survey Calibration
Full Scale
299-W18-27 #1

Westinghouse Hanford Company | LOG HEADER |

Well No. 299-W18-27 Area 200 West Date 5/7/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 686.78' Brass Cap

Survey Coordinates 135226.8 N 566090.5 E

Log Measured From Ground Surface

Location Description West Perimeter Road

Ground Surface Elevation 686.78' Brass Cap

Surface Temperature 19.3' Weather Cloudy-Cool

BOREHOLE INFORMATION

Driller Kelly Olsen

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

Borehole Diameter(s)/Depth 12"/20.0' 10"/158.9' 8"/237.4'

Depth Driller 237.7' | Depth Logger 237.0'

Liquid Level 219.5' | Liquid ~~Density~~ Appearance Silty

Temperature 18.0°C

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval 0.98' - 20.00'
Type 10" Carbon Steel Sch. 40	Interval +1.1' - 158.89'
Type 8" Carbon Steel Sch. 40	Interval ~~5.0'~~ +2.6' - 237.43
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.25' high

Centralizer used.

*Survey data from Kaiser 12/15/92

11-19/91

A-6000-520 (05

9313018.1498

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: 237.0' | To: 130.0'

Rerun(s): 170.0' to 140.0'

Pre Survey Verification: Position 1: 279.4 eU | Position 2: 48.4 eU | Background: 75 c/s

Base Calibration Difference: Position 1: 12.0 eU | Position 2: 0.1 eU

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

Start Time: 1245 | Completion Time: 1430

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: 273.9 eU | Position 2: 48.4 eU | Background: 70 c/s

Percent Change: Position 1: 2.0% | Position 2: 0.0%

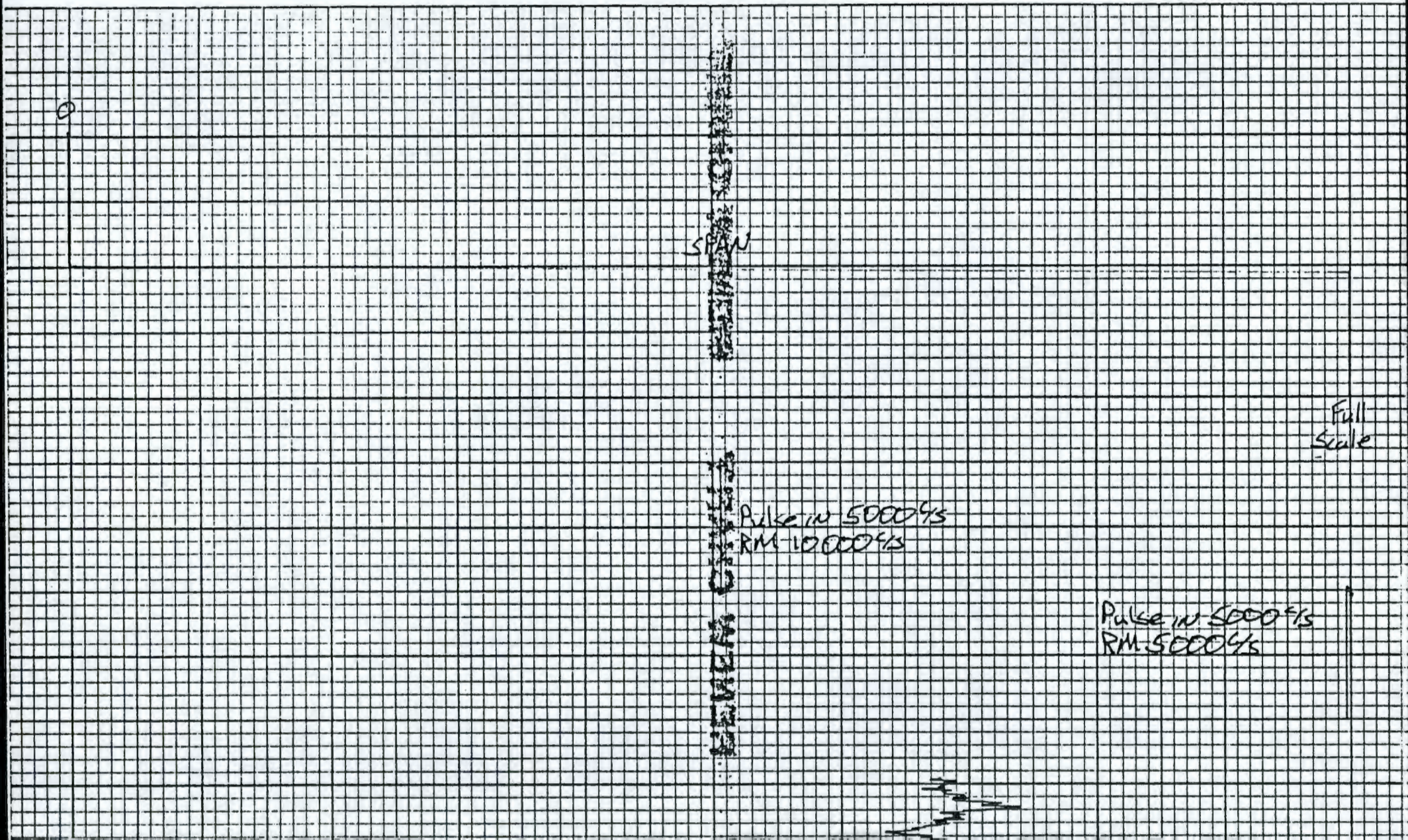
Comments: [illegible]

Comments Return Error = 0.25 high

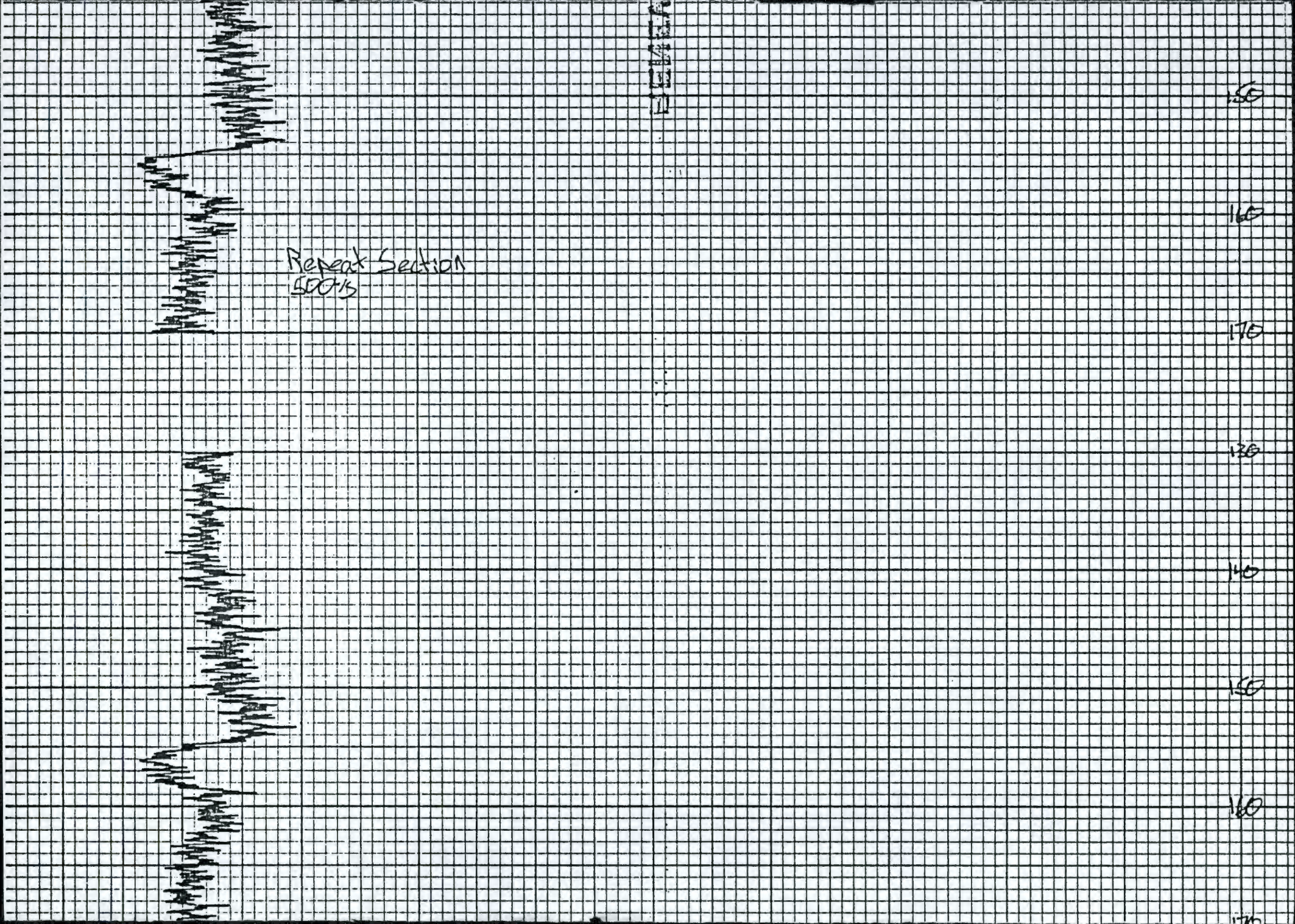
Centralizer used.

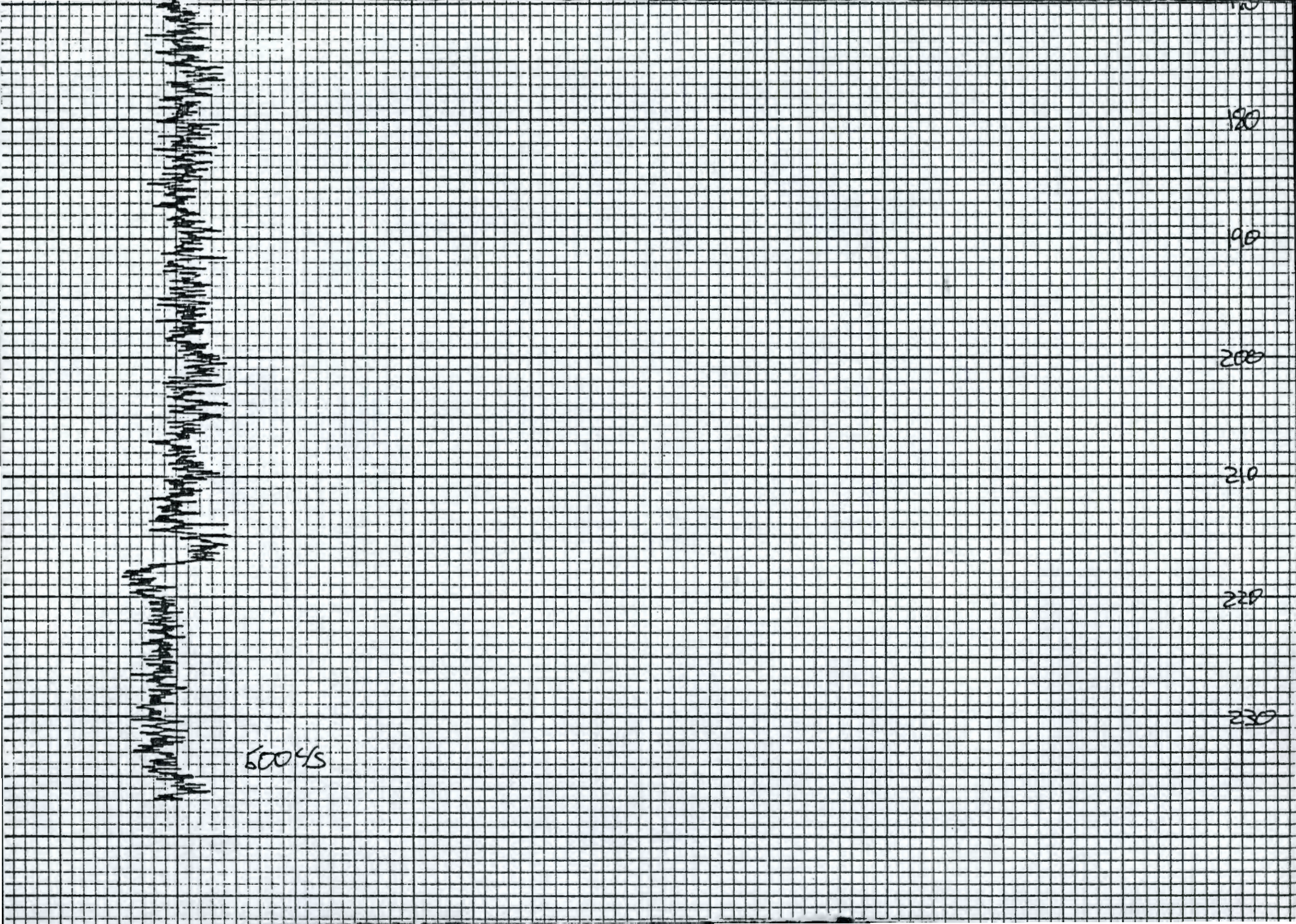
Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E KOS Date: 5-7-91

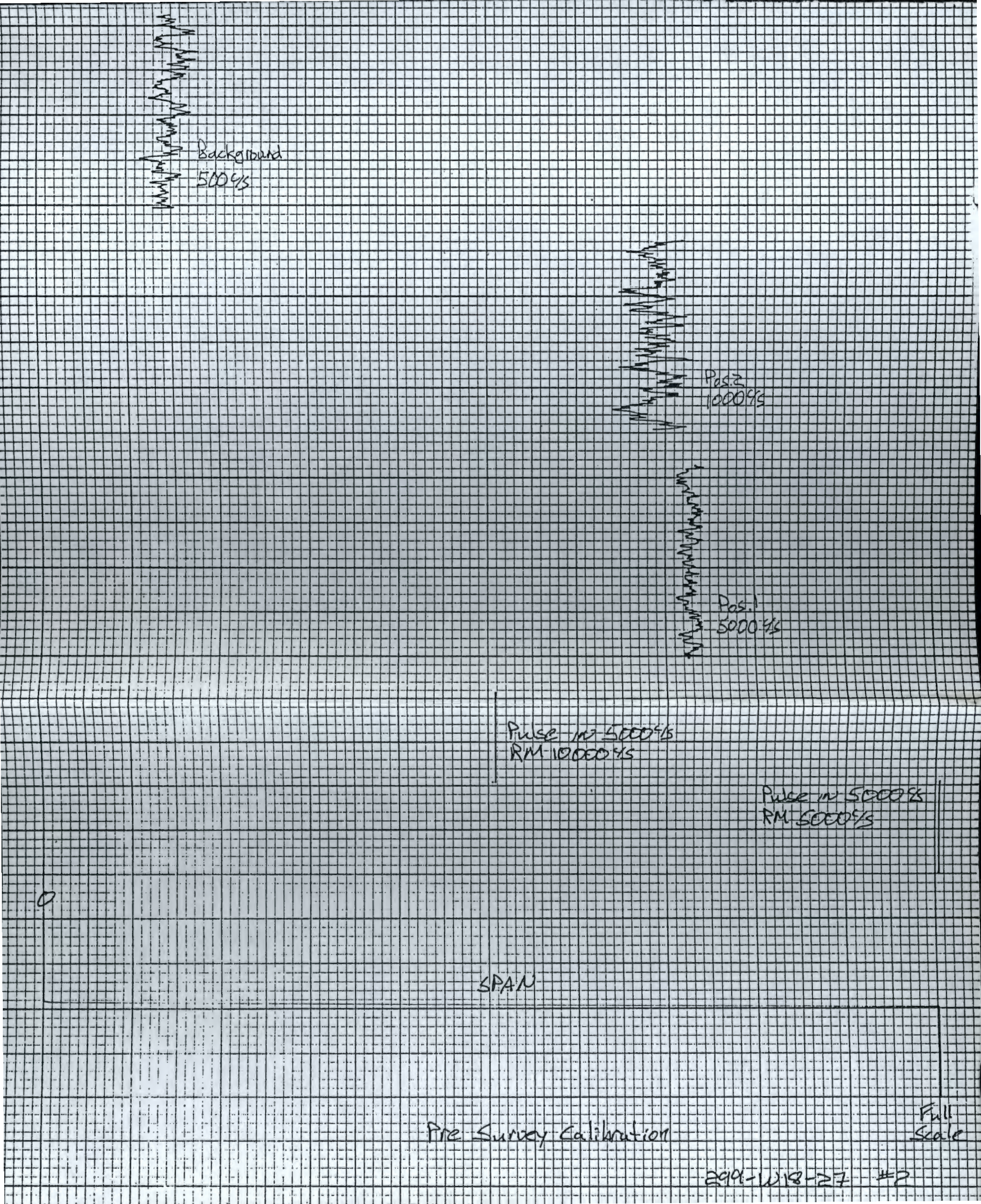
A-6000-520 (05/90)



Pos. 2
1000 °/s
Pos. 1
5000 °/s
Background
500 °/s
Post Survey Calibration


Repeat Section
500/s
150
160
170
180
140
150
160


180
190
200
210
220
230
600 ys


Background
500 γ/s
Pos. 2
1000 γ/s
Pos. 1
5000 γ/s
Pulse in 5000 γ/s
RM 10000 γ/s
Pulse in 5000 γ/s
RM 5000 γ/s
0
SPAN
Pre Survey Calibration
Full Scale
299-W18-27 #2

12.0 WELL 299-W18-28

12.1 DRILLING

Construction of this well began on 8 April 1991 and total depth of 231.1 feet was reached on 10 May 1991. The well was drilled using a cable tool rig. Approximately 373 gallons of water were added during drilling activities. Specific well construction information is located in Table 12.1. 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 12.1 299-W18-28 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.3	ALS
	10"	158.0	ALS
	8"	229.4	ALS
Gross Gamma Logging	19 April	147	0
	9 May	228.7	115.0
Permanent Casing	4"	208.1	ALS
Screen	4" 10-Slot	229.2	208.1
Filter Pack	20-40 Silica Sand	229.5	205.4
Annular Seal	Bentonite Pellets	205.4	201.5
	Bentonite Crumbles	201.5	20.0
	Cement Grout	20.0	2.2
Concrete Pad	4'x4'x6"	2.2	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 137.5 feet BLS and were primarily sand and sandy gravel with some silt and clay. Approximately 12.5 feet (137.5-150 feet BLS) of silt and sand with 2 feet of caliche at the base represents the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (150-230 feet BLS).

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 12.1. Reproductions of these logs are also located at the end of this section.

12.2 WELL COMPLETION

Well completion began on 16 May 1991 and was completed on 4 June 1991. Static water level at the time of completion was 209.3 feet below land surface (BLS). Completion details are presented in Table 12.1. 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 East West datum) coordinates were established for the centerline of the well. Documentation of well completion activities can be found in the Well Construction Report.

12.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 17 July 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 123 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 17 July with the intake located 230.2 feet below the top of the protective casing.

12.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 16 and 17 July 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests. Results from these tests are presented in Table 12.2. Raw data from the aquifer testing at 299-W18-28 are located at the end of this section.

9313018.1500

Table 12.2 Hydrologic Testing Results from 299-W18-28				
Formation: Ringold		Lithology: Sandy Gravel	Interval Tested*: 213.2-233.2	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Drawdown	16 Jul 91	Not Interpretable	----	----
Recovery	16 Jul 91	Not Interpretable	----	----
Slug Injection	17 Jul 91	Not Interpretable	----	----
Slug Withdrawal	17 Jul 91	Not Interpretable	----	----

* Depth below top of 6" protective casing

9313018.1?

LLBG / WMA-4

WELL 299-W18-28

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4-8-91	5-10-91	24	N/A	~~229.5'~~ 230.1 RDM 12 Jul	5-3-91 209.4 5-6-91 208.8 5-8-91 209.0 5-9-91 209.7 5-10-91 209.1	373 GALLONS

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
5-16-91	6-4-91	5	5-16-91 209.3'	229.7'	208.1'-229.2'	35 GALLONS REMOVED TO DEVELOP FILTER PACK

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	7-16-91 7-17-91	7-16-91 7-17-91	7-17-91	~~50~~ 123

COMMENTS:

195

WELL CONSTRUCTION REPORT

VALIDATED KDR 2/28/92 SIGNATURE/DATE

Specification No. WHC-S-014 Rev No. 5

CCNs 144240, 144241

Project RCRA W-017 LEBG

Location 200W

Drilling Company Kaiser Engineers Hanford

Driller D. Ludtke Lic. # 1333 Jody (1900) Carpenter

Other (Companies) Blair Construction

Geologist(s) Robert F. Raidl, Brian Walz, Stacey W. Callison, J.A. Lamb

Well No. 299-W18-28 Temp. Well No. NA

Coordinates N: 135,107.1; E: 566,092.9 (LAMBERT)

Casing Elev. 679.99' Ground Elev. 676.51 BRASS CAP

Drilling Method

Verification Method Visual Observation

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

			Initials	Date
Rotary	Air NA	Mud NA	NA	NA
Cable Tool	D 0.0-150	H 150-230	BGW	5/9/91
Drilling Fluid	Raw water	373 GAL	BGW	5/9/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gamma Log	0 - 147	4/9/91
Gross Gamma	229.7' - 1150'	5/9/91
	-	
	-	
	-	

Completion Data

Drilled Depth 230.1

Completed Depth 229.7'

Date Started 4/8/91

Date Completed 5/9/91

Static Water Level/Date 209.4' BLS 5/8/91

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 7-17-91

Completion Results

Cleaning

Verification Method Visual Inspection / Direct Observ.

Criteria WHC-S-014, 7.6, 7.7, 4.2.2. WHC-CN-77 sec 5.4

	Initials	Date
Drilling Tools/Rig	RFR	4/8/91
Temporary Materials	RFR	4/8/91
Permanent Materials	BGW	5/9/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014, 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	BGW	5/9/91
Material Packing	BGW	5/9/91

Screen

Type	Length	Slot Size
T304 Wesco Cont. Wire Wrap 4" S.S.	20.77'	0.010

Depth(s) 208.1' - 229.2'

Verification Method Steel Tape Measurement

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

Initials SWC Date 6/4/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014, 7.2

	Identify	Initials	Date
Additives	Raw water	BGW	5/9/91
Lubricants	Well Guard	BGW	4/23/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014 8.2

Initials BGW Date 5/9/91

A-6000-436 (09/90)

9312018.1258

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W18-28

Casing (permanent)

Type	Size	Placement
4" T304 S.S. casing	4" ID	+2.8' - 229.2'
		-
		-
		-

Verification Method: Measure using steel tape

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

Initials: SWC Date: 6/4/91

Well Protection

Verification Method: Visual, Measure w/tape

Criteria: WHC-S-014 4.2.10

	Initials	Date
Protective Posts	KDR	2/28/92
Protective Casing	KDR	
Site Restored	KDR	
Cap, Hasp and Lock	KDR	
Surface Pad	KDR	

Annular Seal/Filter Pack

Verification Method: Measure using steel tape Criteria: WHCS-014, 4.2.6, 4.2.7, 4.2.8, 4.2.9 RFR 4/12/91 ~~5.32~~ 531

Type	Interval	Volume	Initials	Date
20-40 sand	229.5' - 205.4'	9.5-100# bags (10.6 ft³)	SWC	5/31/91
1/4" Bentonite Pellets	205.4' - 201.5'	4-50# buckets (2.5 ft³)	SWC	5/31/91
8-20 mesh bentonite crumbles	201.5' - 20.0'	204-50# bags (144.8 ft³)	SWC	6/4/91
15 lb/gal portland cement grout	20.0' - 2.2'	160 gal H₂O 24-94# bags cement (30.8 ft³)	SWC	6/4/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014

	Initials	Date
Measurement Point/Surveyed	KDR	2/28/92
Protective Casing/Brass Cap Surveyed	KDR	
Well Number Stenciled	KDR	
Brass Cap Labeled	KDR	

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014, 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	7-17-91
Installed	JAC	7-17-91
Pump Tested	JAC	7-17-91

Other (initial if performed)

NA Well Abandonment NA Downhole TV Inspection KDR Complete As-Built Diagram, Driller's/Geologist's Logs

7-17 7-16-91 JAC Well Development

Comments/Remarks

Reviewed By (Sign/Print Name) KD Reynolds Date 2/28/92

A-6000-436 (09/90)

9313018.1504

395

WELL SUMMARY SHEET

Boring or Well No. 299-W18-28

Sheet 1 of 2

Location 200 W (16th + Dayton) WMA-4

Project W-017 / LLBG

Elevation 677' ground surface

Drilling Contractor Kaiser Engineers Hanford

Driller Completion Driller - Jody Carpenter (1900)

Drilling Method and Equipment Cable Tool - Wellmaster 1250 BE-22W

Prepared By Stacy W. Callison / Stacy W. Callison (Sign/Print Name) Date 6/5/91

Reviewed By Edward C. Rogers / Edward C. Rogers (Sign/Print Name) Date 12/20/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
				slightly gravelly SAND
12" OD CS casing to 19.3' bls		10		" " "
top of cement grout 2.2'				" " "
		19.3 20		" " "
top of 8-20 bentonite				" " "
crumbles @ 20.0' bls		30		slightly silty SAND (30-35')
				sandy GRAVEL (35-40')
		40		SAND (40-50')
				"
				"
		50		gravelly SAND (50-55')
				GRAVEL (55-72') sl. calcareous
		60		"
				"
		70		SAND (72-85') sl. calcareous
				"
		80		"
				SAND (85-100') tr. silt, sl. calc.
		90		"
				"
		100		SAND (100-117') sl. calc.
				"
		110		" clay lens (117-117.5)
10" OD CS casing to 158.0' bls		120		SAND (117.5-130') sl. calc.
				"
				"
		130		silty SAND (130-137.5)
				SILT (137.5-140') tr. clay
		140		SAND (140-145') v. fine
				SILT (145-148') caliche (148-150')
		160		sandy GRAVEL (150-155')
		158.0 160		gravelly SAND (155-165')
				" "

12-7

A-6000-384 (04/90)

9313018.1585

4 of 5

WELL SUMMARY SHEET

Boring or Well No. 299-W18-28

Sheet 2 of 2

Location 200 W (16th & Dayton) WMA-4

Project W-017 / LLBG

Elevation 677' ground surface

Drilling Contractor Kaiser Engineers Hanford

Driller Completion Driller - Jody Carpenter

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By Stacey W. Collison / Stacey W. Collison (Sign/Print Name) Date 6/5/91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 12/29/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
		170		gravelly SAND (165-175')
Water level @ 209.4' bls				" "
		180		GRAVEL (175-195')
				"
top of 1/4" bentonite pellets		190		"
@ 201.5' bls				"
		200		gravelly SAND (195-200')
top of sand 205.4' bls		201.5 / 205.4		sandy GRAVEL (200-230.1')
SWL 209.4' bls 05/22/91		208.1		" "
top of screen @ 208.1' bls		210		" "
		220		" "
bottom of screen @ 229.2'				" "
229.2'		229.4 / 230		" "
				230.1' bls T.D.
TD - 229.7' bls				

12-8

A-6000-384 (04/90)

9313018.1506

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

BOREHOLE LOG

KDR 2/26/92

Boring or Well No 299-W18-28

Sheet 1 of 12

Location 200 W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Brass Cap.

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool - Wellmaster 1250

Prepared By RFRaidl / RFRaidl (Sign/Print Name) Date 4/8/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/11/91

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 - 5.0: Slightly Gravelly SAND	Started drilling 1415 4/8/91
5	2 lith 1 moist 1 rad	DB 7.5in		5.0 ft Slightly Gravelly SAND 5% gravel (f-vfp), 95% sand (5% cs, 60% ms, 30% fs) trace fines, 10YR 5/4 yellowish brn - wet, 2.5 YR 3/4 dk reddish brn - dry, moist, well sorted (1-3), ang., 75% felsic, 25% mafic, no HCl reac.	1420 PID = < det
10	2 lith 1 moist 1 rad	7.5 in DB		10 ft. As Above except: SAND (50% cs, 40 ms, 5% fs) 50% felsic, 50% mafic	1440, PID = < det
15	2 lith 1 moist 1 rad	7.5 in DB		15 ft. Slightly Gravelly SAND same as 5.0 ft sample	1450, PID = < det Started 0805, 4/9/91 PID = < det
20	2 lith 1 moist 1 rad	7.5 in DB		12-9	12 in ID casing inst. to 19.25 ft.

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A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 2 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 626.51 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RFRaidl / RFRaidl (Sign/Print Name) Date 4/9/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/11/91

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				20 ft Slightly Gravelly SAND, 5% grav (f-mp), 95% sand (40% cs, 50% ms, 5% fs), tr. fines, 2.5Y 5/2 grayish brn-dry, 10YR 6/4 lt. yellowish brn-wet. moist, well sorted (1-3), ang, 60% mafic, 40% felsic, NO HCl reac. RFR 4/10/91	1015, PID = < det
	2 lith 1 moist 1 rad	7.5 in DB			
25				25 ft Slightly Gravelly SAND as above	1055, PID = < det
				27 ft Slightly Gravelly SAND as above	1240 PID = < det
	C VOA RFR 4/10/91	4 in Split spoon			
	2 lith 1 moist 1 rad	7.5 in DB		30 ft Slightly Silty Sand 95% sand (10% cs, 60 ms, 25% fs), 0-5% fines; 10YR 7/4 v. pale brn-wet 10YR 3/1 v dk gray-dry; moist, well sorted (1-3), ang, 75% mafic, 25% felsic No HCl reac.	0855 4/10/91 PID = < det
30					
	1 rad 2 lith 1 moist	7.5 in DB		RFR 4/10/91 35 ft Sandy GRAVEL: 30% gravel (1% cp, 9% f-mp, 20% fp) 70% sand (20% cs, 40% ms, 10% fs); 10YR 7/4 v pale brn-wet, 10YR 3/1 v dk gray-dry, moist, mod sorted (3-5) ang, 75% mafic, 25% felsic No HCl reac.	0900, PID = < det
35					
	1 moist 1 rad 2 lith	7.5 in DB		12-10	1025, PID = < det
40					

A-6000-382 (04/90)

9313018.1508

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

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 3 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RFRaidl/RFRaidl (Sign/Print Name) Date 4/10/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/12/91

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
40				40 ft SAND; (5%cs, 70%ms, 25%fs)	1025; PID = < det
				10YR 6/4 lt yellowish brn - wet,	
				10YR 5/3 brn, dry. moist, well	
				sorted, ang, 75% felsic 25% matic,	
				No HCl reaction	
	2 lith 1 moist 1 rad	7.5 in DB			
45				45 ft SAND as above	1050; PID = < det
		7.5 in DB			
					1330; PID = < det
	VOC	4 in Split Spoon			
	2 lith 1 moist 1 rad	7.5 in DB			
50				50 ft Gravelly SAND	1400; PID = < det
				10% Gravel (f-vfp), 90%	
				SAND (5%cs, 75%ms, 10%fs);	
				10YR 5/3 brn wet, 10YR 6/4 - dry,	
				moist, mod sorted (3-5) ang -	
				subang, 60% felsic, 40%	
				matic, No HCl reaction	
		7.5 in DB			
	2 lith 1 moist 1 rad				
55				55 ft GRAVEL	1430; PID = < det
				75% gravel, (10% sc,	
				25% cp, 25% mp, 15% f-vfp);	
				25% sand, (15% cs, 10% ms)	
				10YR 6/4 lt yellowish brn - wet,	
				10YR 5/3 dry, dry, poorly	Start drilling 0830 4/11/91
				sorted subang - subrounded	
				75% matic, 25% felsic, ~~No~~ Sl.	RFR 4/11/91
				HCl reaction.	
	2 lith 1 moist 1 rad	7.5 in DB			
60				12-11	0930, PID = < det

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W18-28

Sheet 4 of 12

Location 200W LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Bingis Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke, #1333

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RF Raidl / RF Raidl (Sign/Print Name) Date 4/10/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/13/91

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				60ft GRAVEL 60% gravel (5% sc-vcp, 20% mp-cp, 35% f-vfp), 40% sand (20% cs, 10% ms, 10% fs), tr fines, 10YR 6/4 - lt yellowish brn: wet, 10YR 5/3 dry, nat: dry poorly sorted (6) subang to subrd sand - 50% felsic, 50% mafic grav ≅ 100% mafic, sl HCl reaction	
	2 lith 1 mod 1 rad.	7.5" DB			
65				65 ft. GRAVEL; 70% gravel (15% sc-vcp, 25% vcp-cp, 10% mp, 20% vfp-fp) tr fines, 10YR 6/4 - lt yellowish brn - wet, 10YR 5/3 dry, nat: dry poorly sorted (6) subang to subrd sand - 50% felsic, 50% mafic, grav ≅ 100% mafic, sl. HCl reac.	1310; PID = < det
		7.5" DB			
67	4" split tube VOC	21/6 in 33/6 in 47/6 in 70/6 in			1320: PID = < det
69	2 lith 1 mod 1 rad	7.5 in DB		67 ft As Above (GRAVEL)	1045 Started drilling 4/12/91
70				70ft GRAVEL, as above except - moist	1100; PID = < det
	1 rad 2 lith 1 moist	7.5 in DB		72 ft. SAND (5% cs, 75% ms, 20% fs) tr. fines. 10YR 6/4 lt yellowish brn wet, 7.5YR 6/4 light brn - dry; nat - moist, well sorted (1-2), subang, 90% felsic, 10% mafic, No HCl reaction	1115, PID = < det
	1 rad 2 lith 1 moist	7.5 in DB			
75				75 ft SAND as above	1245; PID = < det
				12-12	
80	1 rad 2 lith 1 mod	7.5 in DB		80 ft SAND as above	1445; PID = < det

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BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 5 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.31 Basis Cgr

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke / K. Olson Lic. 1217

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RFRaidl / RF Raidl (Sign/Print Name) Date 4/15/91

Reviewed By KDR/KentD Reynolds (Sign/Print Name) Date 2/26/92

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
				85 ft - 100 ft SAND sl silty.	
				95% Sand (5% cs, 75% cms, 15% fs)	
				0-5% fines: 10YR 6/4 lt	
				yellowish brn - wet, 7.5YR 6/4 lt brn	
				dry, net = dry; well sorted (1-2)	
				subang, 75% felsic (incl qtz), 25%	
				metic, sl. HCl reaction	
					Started drilling 0745 4/15/91
	2 lith 1 moist 1 rad				
85		7.5" DB			1000; PID = < det
87		7.5" DB		87 ft SAND, sl silty, as above	1025 · PID = < det
	VOC	4" split tube			
89					
90	2 lith 1 moist 1 rad	7.5" DB		90 ft SAND sl. silty as above	1110; PID = < det
95	2 lith 1 moist 1 rad	7.5" DB		95 ft SAND as above	1400; PID = < det
				12-13	
100	2 lith 1 moist 1 rad	7.5" DB			1500 · PID = < det

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W18-28

Sheet 6 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Bins Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Lydtke Lic # 1339

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RF Raidl / RF Raidl (Sign/Print Name) Date 4/16/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/20/91

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
100				100 ft - 117 ft SAND	1500, PID = < det
				(5% cs, 60% ms, 35% fs) 10YR	
				6/4 lt yellowish brn - wet,	
				10YR 6/4 lt brn - dry, natural	Started 0800 4/16/91
				moist, well sorted (1-2),	cased to 97.6 ft
	RFR 4/16/91			subang, 75% felsic, 25% mafic,	
				sl. HCl reaction	
	1 moist 2 lith 1 rad	7.5" DB			
105				105 ft SAND as above	1015, PID = < det
	1 moist 2 lith 1 rad	7.5" DB		110 ft SAND, as above	1115, PID = < det
110					
					cased to 107.8 ft
		7.5" DB		112-114: SAND, as above	1400, PID = < det
	VOC	4" ST			
	1 moist 2 lith 1 rad	7.5" DB		115 ft SAND, as above	1430; PID = < det
115					Start work 0715 4/17/91
				4/17/91 RFR	Cased to 117.8 ft
				117.0 ft Sy CLAY;	
				-117.5 ft	
				(75% clay, mod plastic,	
				25% sand (15% ms, 10% fs);	
				2.5 YR 5/4 - lt olive brn, wet,	
	1 moist 2 lith 1 rad	7.5" DB		10YR 5/3 - brn - dry, nat = sl. moist	
120				sand frac is well sorted, mostly felsic	

A-6000-382 (04/90)

9313018.1512

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

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 7 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RF Raidl / RF Raidl (Sign/Print Name) Date 4/17/91

Reviewed By RB Mercer / RB Mercer (Sign/Print Name) Date 4/29/91

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
120				clay (continued), sl. micaceous, strong HCl reaction	
				120 ft SAND	0930, PID: < det
				95% Sand (5% cs, 50% ms, 40% fs), tr-5% fines, 10YR 6/4 wet, lt yellowish brn, 2.5YR 5/2 grayish brn, well sorted (1-2), subang, 75% felsic 25% mafic, sl. micaceous, mod HCl reac.	
	1 RFR 4/16/91 2 moist 1 rad 2 lith	7.5 in DB			
125				125 ft SAND (as above)	1040; PID = < det
	1 moist 2 lith 1 rad	7.5 in DB			
130				130 ft SILTY SAND	1335, PID: < det
				55% Sand (45% fs, 10% ms), 45% Silt (nonplastic) 10YR 6/4 lt yellowish brn-dry; nat = dry, well sorted sand fraction (1-2) subang, 90% felsic, 10% mafic sl. micaceous, mod HCl reaction	1430, PID = < det
	VOC Perm 1 moist 2 lith 1 rad	Blows: 11/6, 23/6, 34/6, 41/6 7.5 in DB			
135				135 ft SILTY SAND	1445, PID = < det
				75% Sand (50% fs, 25% ms) 25% Silt 10YR 6/4, lt yellowish brn- RFR 4/16/91 ~~dry~~ wet, 2.5YR 7/2 lt gray-dry, nat = dry, sand portion well sorted, subang, mostly felsic, non-plas, strong HCl reaction.	4/18/91 1255, PID = < det
	1 moist 2 lith 1 rad	7.5 in DB			
[illegible]				137.5 SILT tr clay (2.5YR 7/2 lt gray-dry, 10YR 5/3 brn-wet), nat = dry, strong HCl react, non plastic, calc. cement	
140	1 moist 2 lith 1 rad	7.5 in DB			1330, PID = < det

12-15

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 8 of 12

Location 200W, LLBG, WMA-4

Project W-017/LLBG

Elevation 671.51 fmsl

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Wellmaster 1250

Prepared By RF Raidl / RF Raidl (Sign/Print Name) Date 4/19/91

Reviewed By RD Miller (Sign/Print Name) Date 5/2/91

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
140				140 ft SAND	
				(100 fs) 2.5Y 7/2 lt gray dry,	
				10YR 5/3 - wet, brn, net = dry,	
				well sorted, subang. 90% felsic,	
				10% mafic, strong HCl reac.	
	1 moist 2 lith 1 rad	7.5 in DB		145 ft SILT	1413 PID = < det
145				70% silt, non plastic, 30%	
				Sand (f-vfs), 5Y 5/4 - wet,	
				2.5Y 6/2 lt brnish gray - dry,	4/19/91
				net = dry well sorted subang,	
				strong HCl reac.	
		7.5 in DB			
	1 moist 2 lith 1 rad	4 in Split tube		148 ft CALICHE - gravelly calcarious SAND, trace silt, non-plastic 60% sand - 20% vcse, 60% cse, 20% m; 40% gravel - 10% vcp, 30% cp, 10% mp, 5% fp, gravel is subround to angular 5% vfp very poorly sorted, strong rx w/ 10% HCL, dry, 20% mafic, 80% felsic, 2.5Y 5/3 light olive brown (dry) 2.5Y 4/2 grayish brown (wet)	Cased to 149.1 ft
150				150 ft SANDY GRAVEL	
				60% gravel: 10% vcp, 15% cp, 10% mp, 35% fp, 30%	
				vfp; angular 40% sand, 10% csp, 20% mod. 70% fine	1354 PID < det.
				and very fine. strong rx. to 10% HCL, non-plastic, dry	
				10YR 7/4, very pale brown (dry) 10YR 7/2, light gray (wet)	
				poorly sorted	
	1 moist 2 lith 1 rad.	RFR 4/19/91 ~~7.5 in DB~~ Hand Tool			
155				155 ft. gravelly SAND	4/24/91
				30% gravel: subround to round, 10% fp, 20%	0815 PID < det.
				vfp; 70% sand: 35% coarse, 35% medium	
				slight reaction to 10% HCL, moderately well	water added to hole,
				sorted, 2.5Y 4/2, dark grayish brown - wet	moisture content unknown
				50% mafic, 50% felsic	
160					

A-6000-382 (04/90)

9313018.1514

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 9 of 12

Location 200W, LLBG, WMA-4

Project W-017/LLBG

Elevation 676.51 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Onwego rig #2

Prepared By Paul W. Anderson / P.W. Anderson (Sign/Print Name) Date 4/24/91

Reviewed By KDR / Kent D Reynolds (Sign/Print Name) Date 7/26/92

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
160.0	1 moist 1 rad. 21 th	Hard Tool		160.0 ft slightly gravelly SAND 10% gravel: 10% vfp, subround; 90% sand: 45% cse, 45% med., no reaction to 10% HCL well sorted, 80% mafic, 20% felsic, 2.5Y 3/2 very dark grayish brown	0845 PID < DET. water added to hole, ~~but~~ moisture content unknown
	1 moist 21 th 1 rad.	Hard Tool			
165.0				165.0 ft: gravelly SAND 50% gravel: subangular to rounded, 15% cp, 15% mp, 10% fp, 10% vfp; 50% SAND: 25% cse, 25% medium-coarse is subround to subangular, poorly sorted, no reaction to 10% HCL, 50% felsic, 50% mafic; 10YR 4/3 brown (wet) 2.5Y 6/2 light brownish grey (dry)	0928 PID < det.
	1 moist 21 th 1 rad.	Hard Tool			
170.0				170.0 ft.: gravelly SAND 30% gravel: angular to rounded; 15% mp, 15% fp, 70% sand: 40% coarse, 30% medium, moderately well sorted, no reaction to 10% HCL 50% mafic, 50% felsic 2.5Y 6/2 light brownish grey-wet 10YR 7/2 light grey-dry	1315 PID < det.
173.0	split tube	12-33-69			
175.0	1 moist.			175.0 ft: sandy GRAVEL	
	2 lith. 1 rad.	Hard Tool		70% rounded to angular (broken by hard tool) gravel: 5% small cobbles, 10% vcp, 20% cp, 20% mp, 15% fp; 30% sand: 20% fs, 10% vfs (some may be rock flour from hard tool) poorly sorted, dry, 70% mafic, 30% felsic 5YR 7/1 light grey-dry 2.5Y 5/2 grayish brown-wet no reaction to 10% HCL	1045 SSO: PID < det.
180.0				12-17	

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 10 of 12

Location 200W, LLBG, WMA4

Project W-017/LLBG

Elevation 676.51 Bricks Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool, Onwegorig #2

Prepared By Paul W. Anderson / P.W. Anderson (Sign/Print Name) Date 4/26/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91

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
180.0	1 moist 2 lith. 1 rad.	H.T.		180.0' sandy GRAVEL same as last sampled interval (175.0')	1415 PID < det.
	1 moist 2 lith 1 rad			185 ft Sandy GRAVEL: same as material described at 175.0 ft	4/29/91 1018 PID < det
185		HT			
	1 moist 2 lith 1 rad			190 ft Sandy GRAVEL, same as material described at 175.0 ft.	1140, PID < det 4/30/91 Cased to 191 ft
190		HT			0945, PID < det
	VOC	43/6 50/6 ST			1045, PID < det
	1 moist 2 lith 1 rad	HT		195 ft Gravelly SAND Crushed mafic and granitic particles in subrounded qtz sand matrix; approx 75% qtz, 25% mafics, most mafics are ang-subang, no HCl reaction.	1145, PID = < det
195					
	1 moist 2 lith 1 rad	HT		12-18	1345, PID < det
200					

9313018.1516

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 11 of 12

Location 200W, 200E, WMA-4

Project W-017 / 200E

Elevation 676.51 Brass Cap

Drilling Contractor Kaiser Engineers Hanford

Driller D. Ludtke #1333

Drilling Method and Equipment Cable Tool - Wellmaster 1250

Prepared By SJ Harris / Samuel T Harris (Sign/Print Name) Date 5/2/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/2/91 DAM

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
200	1moist 2lith 1rad	HT		200 ft Sandy GRAVEL	1345, PID = < det
205				205 ft: Sandy GRAVEL as above	PID = < det, 1500
					5/1/91
	1moist 2lith 1rad	HT			5/2/91
210				210 ft Sandy GRAVEL	0835 PID = < det
				Crushed matic and granitic fragments 50% matic, 30% qtz, 20% felsic most matics are angular, some subang qtz grains are angular to subrd. No reaction w/ 10% HCL	
215	1moist 2lith 1rad	HT		215 ft Sandy GRAVEL	1005 PID = < det
		HT		Same as material described at 210	5/3/91
					0845 PID = < det
	1moist 2lith 2sieve 1rad	ST			W.L = 209.4, 0915
					W.L = 210.0 1100

12-19

9313018.1113

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

BOREHOLE LOG

Boring or Well No 299-W18-28

Sheet 12 of 12

Location 200W, LLBG, WMA-4

Project W-017 / LLBG

Elevation 676.51 Bkts Cap

Drilling Contractor Kaiser Engineers - Hanford

Driller Kelly Olson

Drilling Method and Equipment Cable Tool - Bucyrus Erie 22W

Prepared By RF Rudd / RF Raidl (Sign/Print Name) SJ Hughes Date 5/6/91

Reviewed By KDR / KD Reynolds (Sign/Print Name) Date 2/26/92

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
220				228 - 219.8 Sandy GRAVEL.	Cased to 221.8 ft
				50% Gravel (5% vcp 15% cp,	
				10% mp, 10% fp, 10% vfp) 50%	
				Sand (20% vcs-cs, 20% ms, 10% fs)	
				2.5Y 4/2 dk grayish brn - wet, 2.5Y	
				6/2 lt. brownish gray, dry, not	
				wet, poorly sorted, qtz particles	
	1 moist 21.4 ft trail	HT		subrded, mafics angular, 50%	
225				felsic, 50% mafic, ~~felsic~~ RFR 5/6/91	
				(40% qtz), v sl HCl reaction,	
				mafics deeply wthrd to decomp.	
				225': Sandy GRAVEL	5/8/91 PID = <Det
				Crushed mafic and granitic material	
				30% mafic, 40% qtz, 30% felsic	
				fragments are ang to subang no reaction	
				w/ 10% HCL 2.5Y 4/2 dk grayish brn wet	
	1 moist 21.4 ft trail	HT		230' Sandy GRAVEL	
230		TD		Crushed mafic and granitic material	
				40% mafic, 30% qtz, 30% felsic	
				frag are ang to subang no reaction	
				w/ 10% HCL 2.5Y 4/2 dk grayish brn wet	5/9/91 PID = <Det

A-6000-382 (04/90)

9313018.1518

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

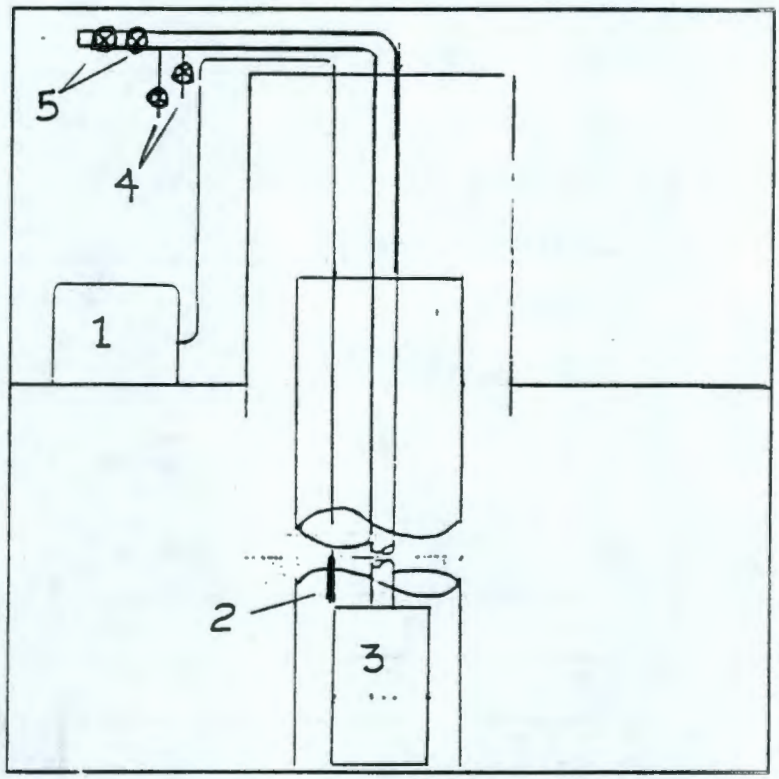
Well Designation 299-W18-28 Depth 233.2' BTOC 6"

VALIDATED
KDR 2/26/92
SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-350976.
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

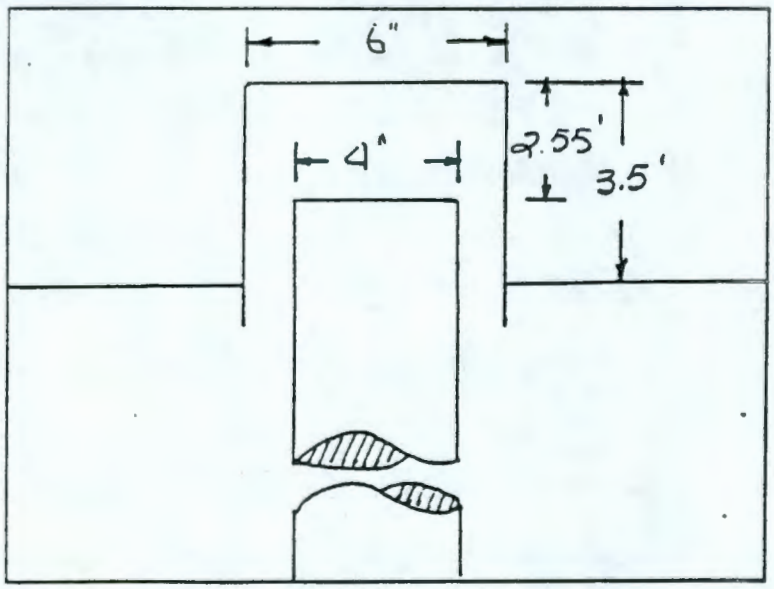
Diagram



Well Head

Comments

Diagram



Signature of Recorder JAMES A. COATES JAMES A. COATES Date 7-19-91

9313018.1??

2 of 9

WELL DEVELOPMENT FORM

Well Designation 299-W18-28 Well Depth 233.2' BTOC 6"

Screened Interval 233.2'-212.4' Date Well Development is Performed 7-16 ; 7-17-91

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 _____ Pump Depth 230.2' Pump Start Time 1409 7-16-91 1215 7-17-91

Flow Rate 0.78 GPM Accumulated Flow 123 GALS Pump Stop Time 1521 7-16-91 1353 7-17-91

Turbidity (NTU) 92, 84, 78, 44, 12, 5.5, 4.2, —

—, —, —, —, —, —, —, —

Comments BAILED 35 GALS. OF PURGE WATER TO REMOVE SAND FROM BOTTOM OF WELL-

Signature of Recorder JAMES A. COATES JAMES A. COATES Date 7-19-91.

Sign and Print Name

12-22

A-6000-393 (03/90)

9313018.1520

3 of 9

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

DRAWDOWN/RECOVERY

Well Designation 299-W18-28 Date 7-16-91

Well Depth ~~241.5' BTOC 6"~~ JAC 7-19-91 233.2' BTOC 6" Screened Interval ~~241.5 - 230.7'~~ JAC 7-19-9 233.2'-212.4'

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level ~~ETAPE~~/TRANSDUCER S. N ET-5/350976 Calibation Due 8-21-91/5-9-92

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

Measuring Point TOP OF CASING 6" Pump Start Time 1409/1518 Pump Stop Time 1411/1521

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD
				5 GALS/25 SEC = 12 GPM - 1ST ATTEMPT
				5 GALS/75 SEC = 4 GPM - 2ND ATTEMPT
		SEE ATTACHED DATA		

Signature of Recorder JAMES A. COATES, JAMES A. COATES Date 7-24-91

Sign and Print Name

A-6000-402 (03/90)

9313018.1?

4 of 9
Page 2 of 7

WELL 2-W18-28 BASELINE

SE2000
Environmental Logger
07/17 07:41

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	213.200
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 13:58:09

Elapsed Time	INPUT 1
0.0000	213.095
1.0000	213.108
2.0000	213.127
3.0000	213.139
4.0000	213.146
5.0000	213.158
6.0000	213.165
7.0000	213.171
8.0000	213.184
9.0000	213.190
10.0000	213.193

9313018.1522

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Page 3 of 7

WELL 2-W18-28 DRAWDOWN 2

SE2000
Environmental Logger
07/17 07:30

Unit# 192 Test 6

INPUT 1: Level (F) TOC

Reference	~~230.180~~ 213.200 JAC 7-22-91
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 15:19:02

Elapsed Time	INPUT 1
0.0000	213.056
0.0083	214.054
0.0166	214.485
0.0250	214.478
0.0333	214.390
0.0416	214.545
0.0500	214.808
0.0583	214.998
0.0666	215.204
0.0750	215.311
0.0833	215.489
0.1000	215.783
0.1166	216.094
0.1333	216.395
0.1500	216.705
0.1666	217.006
0.1833	217.320
0.2000	217.617
0.2166	217.915
0.2333	218.206
0.2500	218.498
0.2666	218.786
0.2833	219.087
0.3000	219.388
0.3166	219.657
0.3333	219.952
0.4166	221.200
0.5000	222.530
0.5833	223.876
0.6666	225.146

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Page 4 of 7

WELL 2-W18-28 DRAWDOWN 2

0.7500	226.413
0.8333	227.155
0.9166	226.990
1.0000	226.847
1.0833	226.724
1.1666	226.572
1.2500	226.429
1.3333	226.271
1.4166	226.119
1.5000	225.979
1.5833	225.878
1.6666	225.729
1.7500	225.593
1.8333	225.441
1.9166	225.346
2.0000	225.203
2.5000	224.434
3.0000	224.883
3.5000	229.084
4.0000	227.196

END

9313018.1524

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Page 5 of 7

WELL 2-W18-28 RECOVERY

SE2000
Environmental Logger
07/17 07:39

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	230.180
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 14:20:19

Elapsed Time	INPUT 1
0.0000	230.176
0.0083	230.183
0.0166	230.180
0.0250	230.180
0.0333	230.180
0.0416	230.180
0.0500	230.113
0.0583	230.015
0.0666	229.904
0.0750	229.799
0.0833	229.685
0.1000	229.467
0.1166	229.264
0.1333	229.068
0.1500	228.865
0.1666	228.662
0.1833	228.479
0.2000	228.295
0.2166	228.114
0.2333	227.931
0.2500	227.760
0.2666	227.582
0.2833	227.414
0.3000	227.240
0.3166	227.066
0.3333	226.898
0.4166	226.147
0.5000	225.387
0.5833	224.703
0.6666	224.107

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Page 6 of 7

WELL 2-W18-28 RECOVERY

0.7500	223.575
0.8333	223.056
0.9166	222.476
1.0000	222.052
1.0833	221.637
1.1666	221.257
1.2500	220.880
1.3333	220.535
1.4166	220.240
1.5000	219.987
1.5833	219.755
1.6666	219.530
1.7500	219.340
1.8333	219.169
1.9166	219.020
2.0000	218.891
2.5000	218.495
3.0000	218.327
3.5000	218.165
4.0000	218.007
4.5000	217.855
5.0000	217.706
5.5000	217.570
6.0000	217.440
6.5000	217.313
7.0000	217.193
7.5000	217.076
8.0000	216.965
8.5000	216.854
9.0000	216.749
9.5000	216.645
10.0000	216.547
12.0000	216.182
14.0000	215.872
16.0000	215.619
18.0000	215.387
20.0000	215.169
22.0000	214.969
24.0000	214.792
26.0000	214.637
28.0000	214.507
30.0000	214.390
32.0000	214.288
34.0000	214.196
36.0000	214.111
38.0000	214.044
40.0000	213.978
42.0000	213.918
44.0000	213.864
46.0000	213.819

9313018.1526

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Page 7 of 7

WELL 2-W18-28 RECOVERY

48.0000	213.775
50.0000	213.743
52.0000	213.705
54.0000	213.674
56.0000	213.645

END

9313018.1522

1 of 1

SAMPLING PUMP INSTALLATION FORM

VALIDATED
KDR
SIGNATURE

Project: W-017

Well Number: 299-W18-28

Pump Type: HYDROSTAR

Pump Mode: 8001

Date Installed: 7-17-91

Installed by: B. STRODE / M. MUNSON (KEH)

Depth to water: 14.42

Depth to Bottom:

Reported Depth to water:

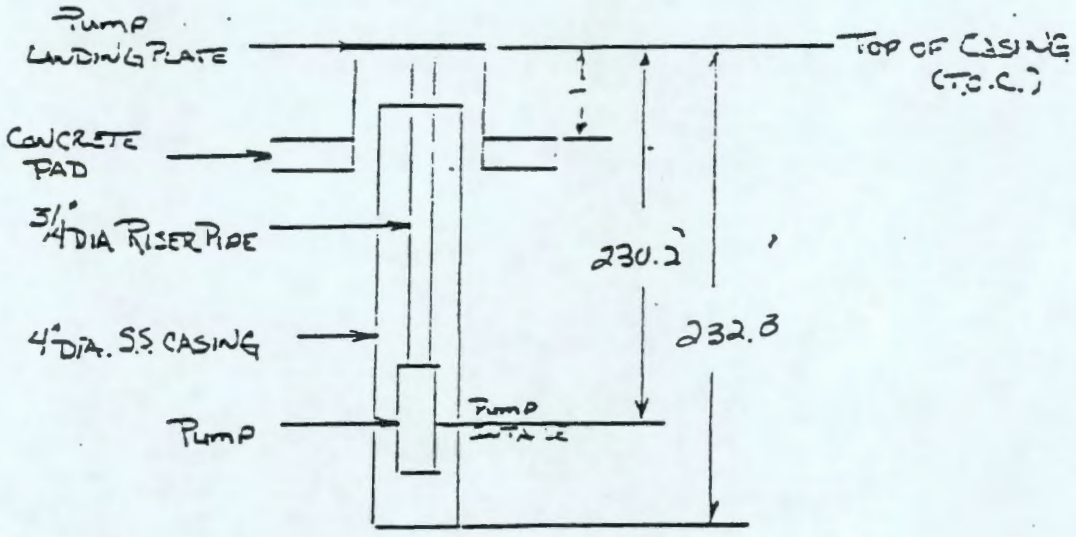
Screened Interval: (20.77) 233.2 - 212.4/3' BTOC

Pump/Riser Pipe Description:
pipe: 3/4" S.S. DISCHARGE
pump length: 4.2
pump screen length: 1.9
material cleaning: MANUFACTURE

Comments:

PUMP INSTALLATION SKETCH

Total material length 232.3'
Loc. of pump intake: 230.2'



Completed By: J.A. COATES

Date: 2/10/92

9313018.1528

BOREHOLE TEST INFORMATION
WHC-SD-EN-DP-044, Rev. 0

VALIDATED
KDR 3/26/92
SIGNATURE/DATE

Borehole: C-79-W18-28 Borehole Diameter: 4" Hanford Coordinates: — NA —

Interval Tested: 233.2'-212.4' BTOC 6' Depth Interval: 233.2'-212.4'

Test Type: INSTANTANEOUS SLUG INJECTION/WITHDRAWAL Borehole Depth: 233.2'

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

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-
DATA LOGGER.	IN-SITU INC. S.N.-
PRESSURE TRANSDUCER	IN-SITU INC. S.N.-
SLUGGING ROD	~~6'x2"~~ JAC 7-24-91 6.2'x2" .137 ft³
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

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

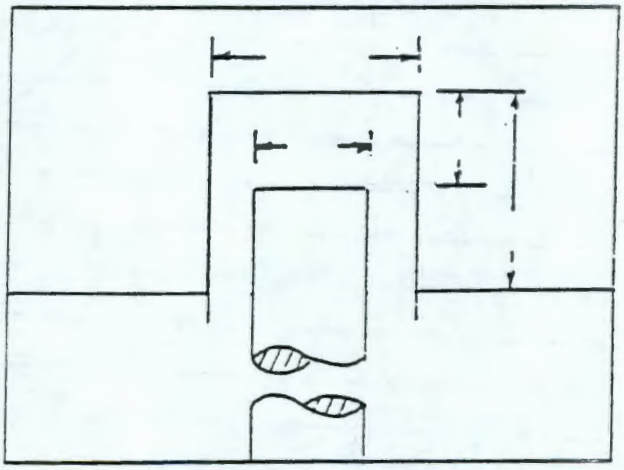
Elevation: NA

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
Sign and Print Name

7-24-91
Date

BD-6000-295 (05/89)

9313018.1?3

INSTANTANEOUS SLUG TEST DATA SHEET

-INJECTION

Borehole 299-W18-28

Interval Tested 233.2'-212.4' BTOC 6"

Depth to Water ≈13.20'

Date 7-17-91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1005 START BASELINE -1034 STOP INJECTION

Transducer Measurement Units FEET.

Depth to Transducer 14.42' BWL.

Initial Pressure (P_i) ~~14.42~~ 7-24-91 213.20

Slug Level or Pressure (P_{max}) 210-298'

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 (Sign and Print Name) JAMES A. COATES 7-24-91 (Date)

BD-6000-293 (07/90)

9313018.1530

378

WELL 2-W18-28 BASELINE

SE2000
Environmental Logger
07/17 07:41

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	213.200
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 13:58:09

Elapsed Time	INPUT 1
0.0000	213.095
1.0000	213.108
2.0000	213.127
3.0000	213.139
4.0000	213.146
5.0000	213.158
6.0000	213.165
7.0000	213.171
8.0000	213.184
9.0000	213.190
10.0000	213.193

rAO

428

WELL 2-W18-28 INJECTION

SE2000
Environmental Logger
07/18 07:28

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	213.200
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/17 10:21:15

O-Time	E-Time	D-T-W:Ft
1021.25	0	210.298
1021.258	0.0083	212.091
1021.266	0.0166	211.689
1021.275	0.025	211.597
1021.283	0.0333	212.351
1021.291	0.0416	220.95
1021.3	0.05	210.425
1021.308	0.0583	213.041
1021.316	0.0666	213.028
1021.325	0.075	212.449
1021.333	0.0833	212.233
1021.35	0.1	212.423
1021.366	0.1166	212.693
1021.383	0.1333	212.623
1021.4	0.15	212.614
1021.416	0.1666	212.617
1021.433	0.1833	212.62
1021.45	0.2	212.62
1021.466	0.2166	212.626
1021.483	0.2333	212.629
1021.5	0.25	212.633
1021.516	0.2666	212.636
1021.533	0.2833	212.636
1021.55	0.3	212.639
1021.566	0.3166	212.642
1021.583	0.3333	212.642
1021.666	0.4166	212.648
1021.75	0.5	212.655
1021.833	0.5833	212.658
1021.916	0.6666	212.664

9313018.1532

WELL 2-W18-28 INJECTION

1022	0.75	212.671
1022.083	0.8333	212.674
1022.166	0.9166	212.677
1022.25	1	212.68
1022.333	1.0833	212.683
1022.416	1.1666	212.686
1022.5	1.25	212.69
1022.583	1.3333	212.693
1022.666	1.4166	212.693
1022.75	1.5	212.696
1022.833	1.5833	212.699
1022.916	1.6666	212.699
1023	1.75	212.705
1023.083	1.8333	212.705
1023.166	1.9166	212.709
1023.25	2	212.712
1023.75	2.5	212.724
1024.25	3	212.737
1024.75	3.5	212.743
1025.25	4	212.753
1025.75	4.5	212.756
1026.25	5	212.762
1026.75	5.5	212.769
1027.25	6	212.772
1027.75	6.5	212.778
1028.25	7	212.778
1028.75	7.5	212.781
1029.25	8	212.785
1029.75	8.5	212.781
1030.25	9	212.788
1030.75	9.5	212.794
1031.25	10	212.794
1033.25	12	212.797

9413108.1733

INSTANTANEOUS SLUG TEST DATA SHEET

-WITHDRAWAL-

Borehole 299-W18-28

Interval Tested 233.2'-212.4 BTOC.6"

Depth to Water 213.2

Date 7-17-91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1037 START TO 1051 END

Transducer Measurement Units FEET

Depth to Transducer 14.42' BWL

Initial Pressure (P_i) 212.8'

Slug Level or Pressure (P_{max}) 214.2'

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 (Sign and Print Name) JAMES A. COATES 7-24-91 (Date)

BD-6000-293 (07/9

9313018.1534

798

WELL 2-W18-28 WITHDRAWAL

SE2000
Environmental Logger
07/18 07:24

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	212.800
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/17 10:37:28

O-Time	E-Time	D-T-W:Ft
1037.467	0	213.49
1037.475	0.0083	212.508
1037.483	0.0166	214.206
1037.492	0.025	213.408
1037.500	0.0333	210.373
1037.508	0.0416	213.737
1037.517	0.05	212.961
1037.525	0.0583	213.123
1037.533	0.0666	212.733
1037.542	0.075	213.078
1037.550	0.0833	212.895
1037.567	0.1	213.002
1037.583	0.1166	212.999
1037.600	0.1333	212.955
1037.617	0.15	212.948
1037.633	0.1666	212.936
1037.650	0.1833	212.929
1037.667	0.2	212.923
1037.683	0.2166	212.92
1037.700	0.2333	212.92
1037.717	0.25	212.92
1037.733	0.2666	212.917
1037.750	0.2833	212.914
1037.767	0.3	212.917
1037.783	0.3166	212.914
1037.800	0.3333	212.91
1037.883	0.4166	212.901
1037.967	0.5	212.891
1038.050	0.5833	213.93
1038.133	0.6666	213.766

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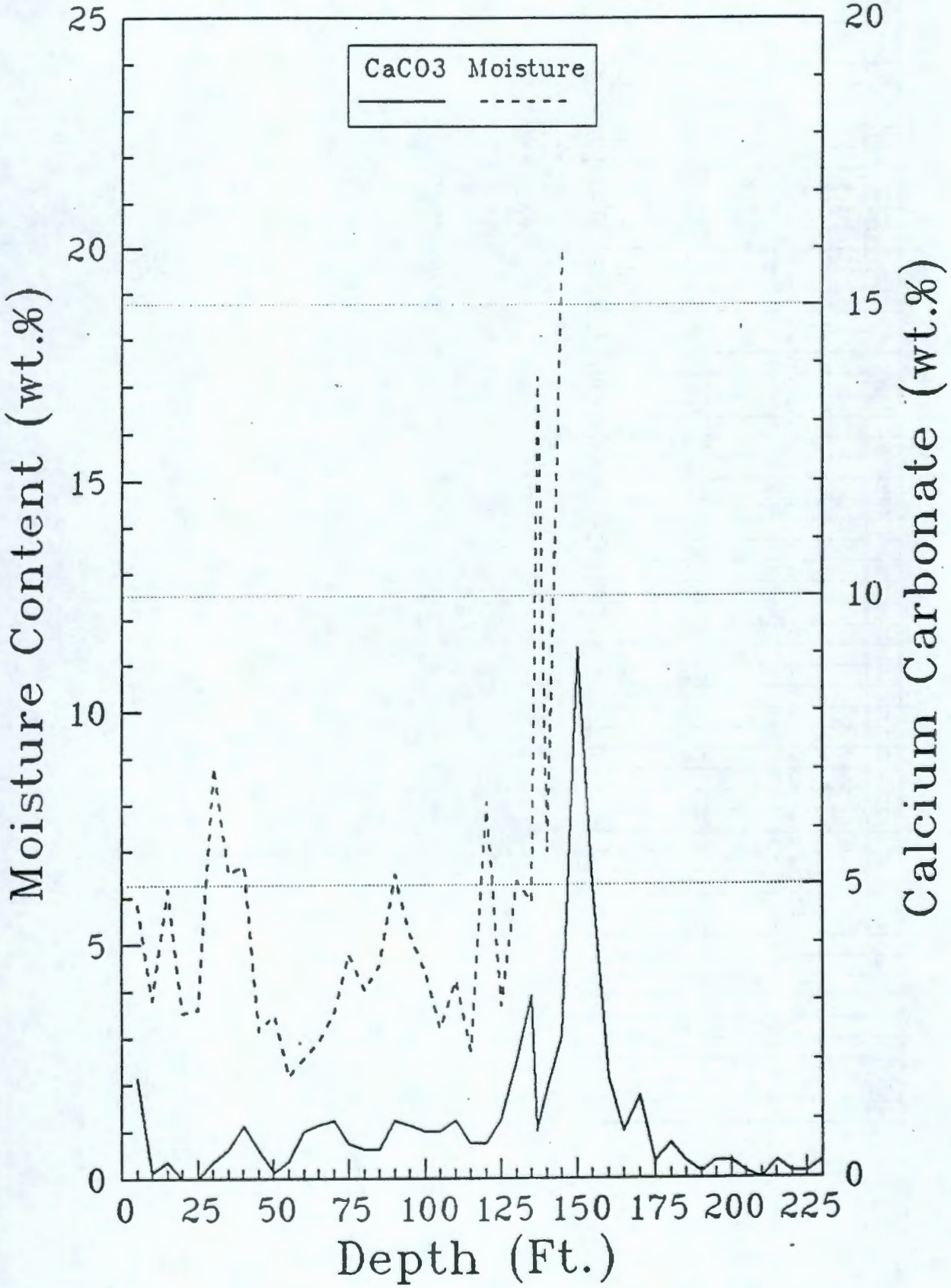
WELL 2-W18-28 WITHDRAWAL

1038.217	0.75	213.623
1038.300	0.8333	213.544
1038.383	0.9166	213.474
1038.467	1	213.417
1038.550	1.0833	213.366
1038.633	1.1666	213.325
1038.717	1.25	213.287
1038.800	1.3333	213.256
1038.883	1.4166	213.23
1038.967	1.5	213.208
1039.050	1.5833	213.186
1039.133	1.6666	213.17
1039.217	1.75	213.154
1039.300	1.8333	213.138
1039.383	1.9166	213.126
1039.467	2	213.113
1039.967	2.5	213.056
1040.467	3	213.012
1040.967	3.5	212.983
1041.467	4	212.958
1041.967	4.5	212.939
1042.467	5	212.926
1042.967	5.5	212.914
1043.467	6	212.898
1043.967	6.5	212.891
1044.467	7	212.879
1044.967	7.5	212.872
1045.467	8	212.869
1045.967	8.5	212.866
1046.467	9	212.857
1046.967	9.5	212.857
1047.467	10	212.853
1049.467	12	212.838
1051.467	14	212.825

9313018.1536

VALIDATED: KDR 3/24/92
SIGNATURE/DATE

WELL 299-W18-28



8of13

	A	B	C
1	WELL 299-W18-28		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1.7	5.85
7	10	0.1	3.8
8	15	0.3	6.17
9	20	0	3.52
10	25	0	3.58
11	30	0.3	8.84
12	35	0.5	6.51
13	40	0.9	6.68
14	45	0.5	3.13
15	50	0.1	3.49
16	55	0.3	2.17
17	60	0.8	2.56
18	65	0.9	2.9
19	70	1	3.53
20	75	0.6	4.79
21	80	0.5	4.02
22	85	0.5	4.55
23	90	1	6.48
24	95	0.9	5.2
25	100	0.8	4.39
26	105	0.8	3.18
27	110	1	4.23
28	115	0.6	2.72
29	120	0.6	8.06
30	125	1	3.67
31	130	2	6.33
32	135	3.1	5.89
33	137	0.8	17.19
34	140	1.5	6.97
35	145	2.4	19.91
36	150	9.1	
37	155	5	
38	160	1.7	
39	165	0.8	
40	170	1.4	
41	175	0.3	
42	180	0.6	
43	185	0.3	
44	190	0.1	
45	195	0.3	
46	200	0.3	
47	205	0.1	
48	210	0	
49	215	0.3	
50	219.8	0.1	
51	225	0.1	
52	230	0.3	
53			
54			
55			
56			

9313018.1538

KJK 11/12/91
20 slot
10-20 sand

TEST REQUEST

WELL NO. 299-W11-28 DEPTH 232'

SAMPLE/SPECIMEN NO. 2-0551 COST CODE/WORK ORDER NO. R331H

REQUESTED BY: ORG. 81232 PERSON B. WILLIAMS DATE 11-11-91

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

REMARKS

RECEIVED BY: R.G. ALEXANDER DATE 11-11-91

APPROVED BY: R.G. ALEXANDER DATE 11-11-91

RADIATION RELEASE

Bldg 299 W11-28 Expiration Date 11/13/91

Released By TEC
Health Physics

Remarks 532

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299 W11-28 Expiration Date 11/13/91

Released By LRD
Health Physics

Remarks 232

54-3000-022 (01/89)

206 13
LSW

SIEVE ANALYSIS DATA SHEET

Sample No. 2-0551 Page 1 of 1

Tested By: JERRY L ENGLAND Date 11-11-91
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- 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	958.3	0	0	100
1½		176.4	18.4	81.6
1		207.2	21.6	78.4
3/4		282.4	29.5	70.5
1/2		402.0	42.0	58.0
3/8		482.1	50.3	49.7
4		605.9	63.2	36.8
10	110.5	22.1	20.0	29.4
40		42.4	38.4	22.7 ~~55.5~~
60		60.5	54.8	16.6
100		73.2	66.2	12.4
200		81.6	73.9	9.6

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: L.G. Alexander Date 11-11-91

A-6400-204(2-87)

9313018.1540

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0551

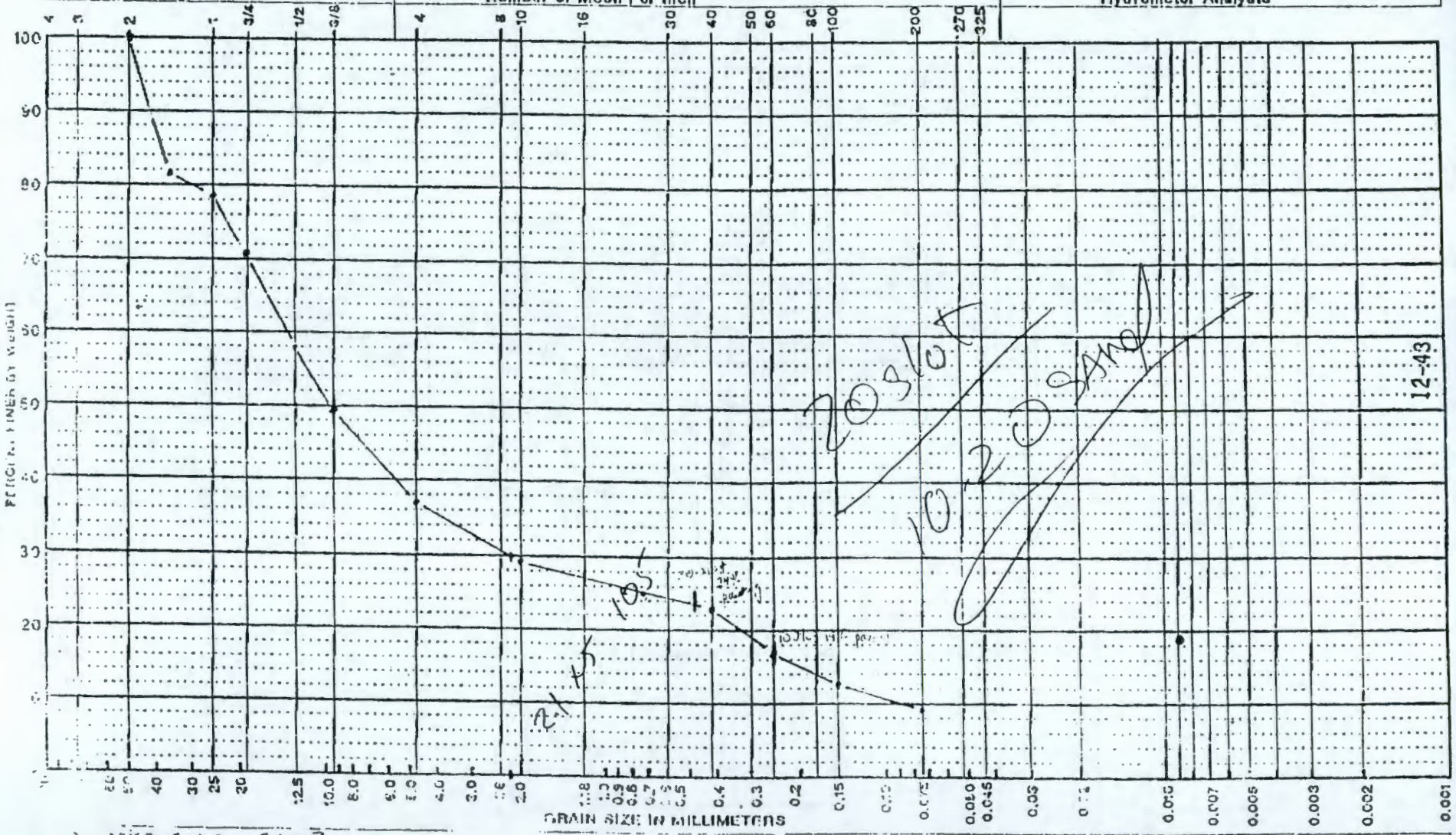
Page 1 of 1

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 11-11-91



SANDY GRAVEL

299. 11-28

232.

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

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

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

93130181

4 of 5
13 LSW

SIEVE ANALYSIS DATA SHEET

Sample No. 2.0551 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 11-11-91
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 SAND Sieve Time 10 (min)

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

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	1105	0	0	100
10		22.1	20.0	80.0
40		42.4	38.4	61.6
60		60.5	54.8	45.2
100		73.2	66.2	33.8
200		81.6	73.9	26.1
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

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 11-11-91

A-6400-204(2-87)

9313018.1542

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0561

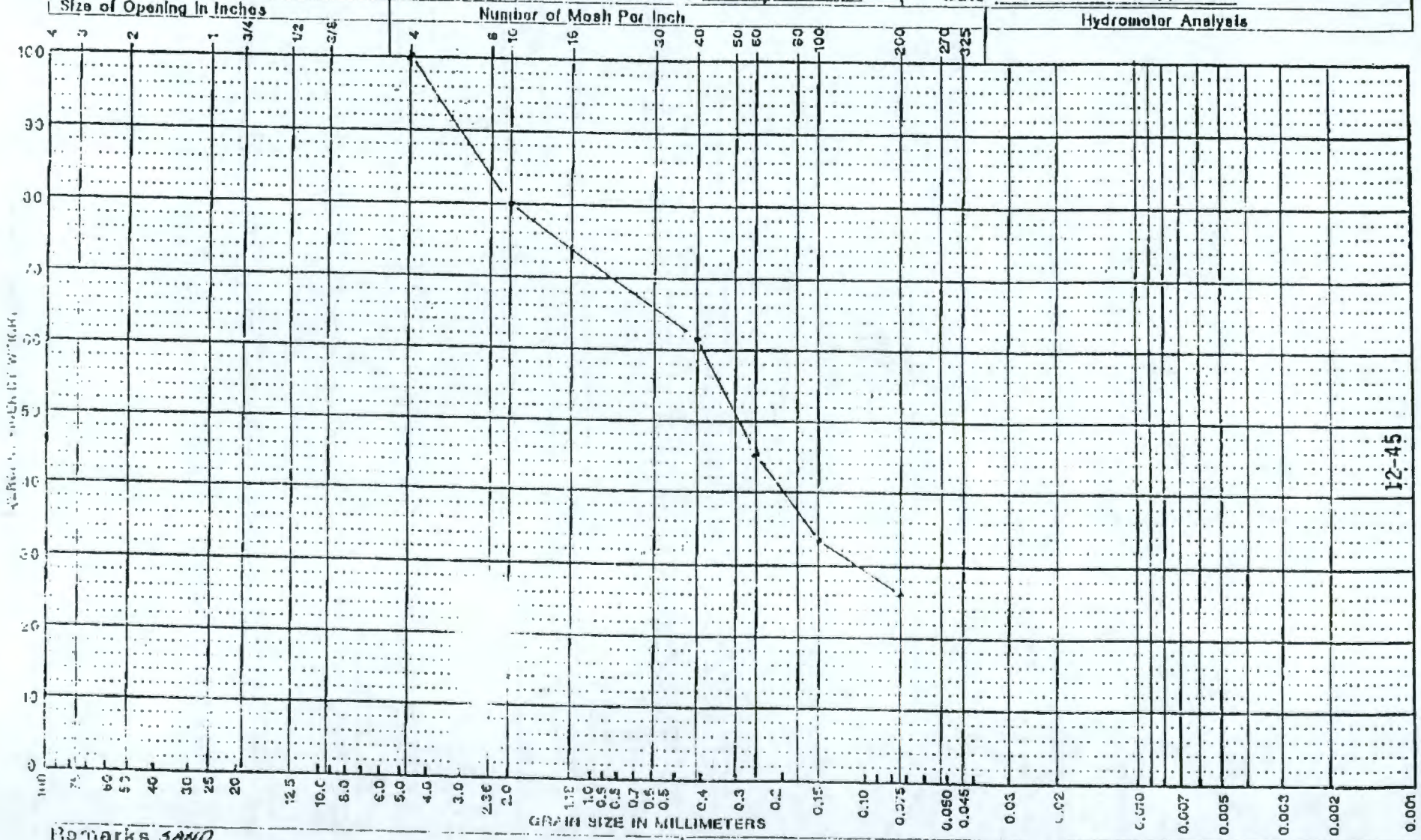
Page 1 of 1

Procedure No. GEL-01 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 11-11-91



Remarks SAND

299-W11-28 C32'

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

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

12-45

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

Sor #13

9313018.1

18-24
FIVE

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0841 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-28
218.5-219.8

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

10S10T /20-40

9313018.1544

1-0841

RADIATION RELEASE

Bldg. 299-W18-28 Expiration Date 5-7-91

Released By K.E. LaBrambois
Health Physics

Remarks 218.5 - 219.8

54-3000-022 (01/89)

1-0841

RADIATION RELEASE

Bldg. 299-W18-28 Expiration Date 5-7-91

Released By K.E. LaBrambois
Health Physics

Remarks 218.5 - 219.8

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0841 Page 1 of 1

Tested By: JERRY L ENGLAND Date 5-7-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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
4	201.1	0	0	100
10	↓	42.8	21.3	78.7
40	↓	82.5	41.0	59.0
60	↓	100.8	50.1	49.9
100	↓	124.8	62.1	37.9
200	↓	147.1	73.2	26.8
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

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 5-8-91

A-6400-204(2-87)

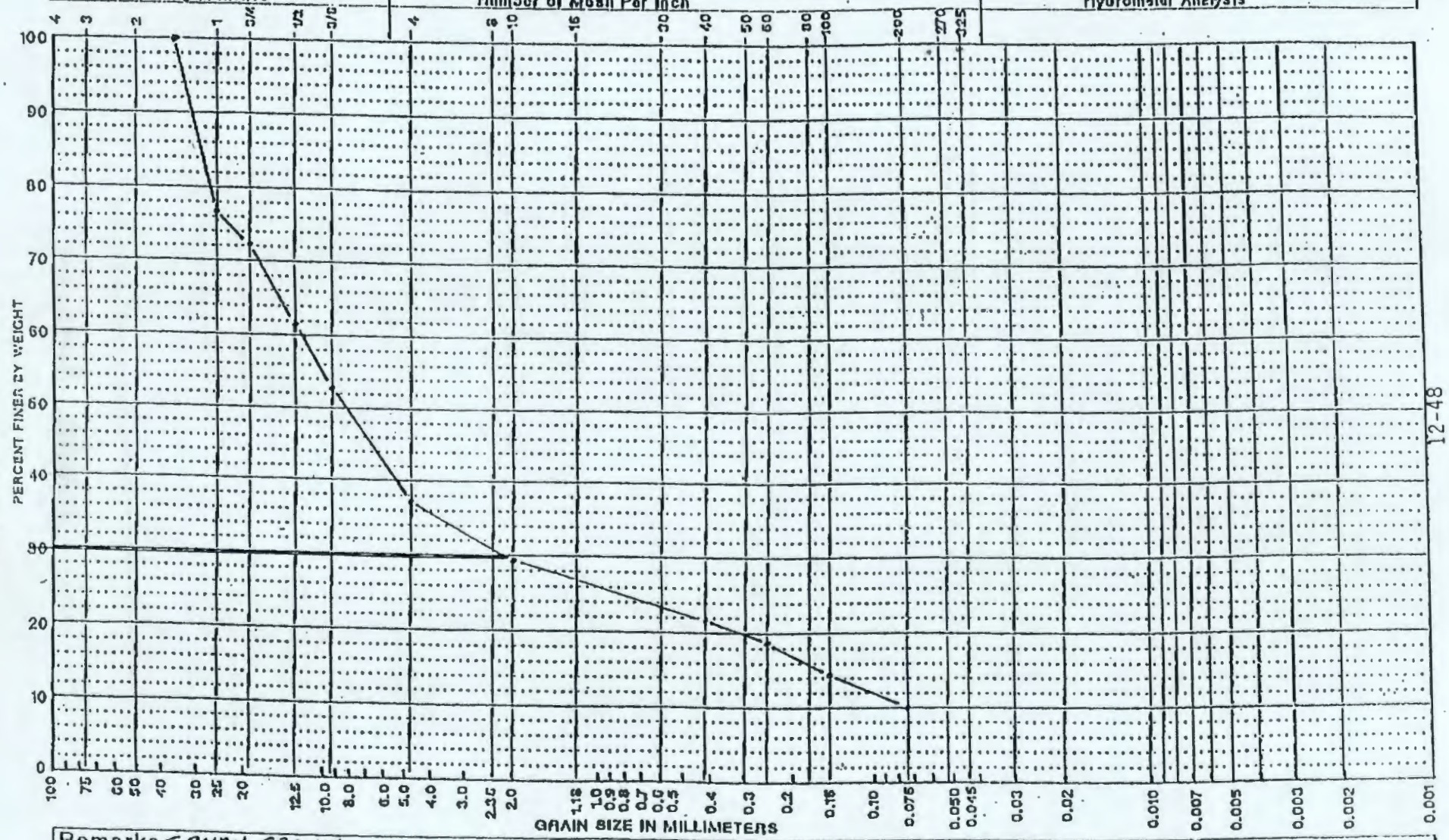
9313018.1FUP

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0841 Page 1 / 1

Procedure No. ETAL-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 5-7-91



Remarks SANDY GRAVEL

299-W18-20 21.85-21.98'

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

Checked By: R.G. ALEXANDER Date 5-8-91

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

12-48

9313018.1546

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0841 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-7-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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
1 1/2	1087.4	0	0	100
1		257.1	23.6	76.4
3/4		303.7	27.9	72.1
1/2		416.6	38.3	61.7
3/8		516.1	47.5	52.5
4		682.4	62.8	37.2
10	201.1	42.8	21.3	29.3
40		82.5	41.0	21.9
60		100.8	50.1	18.6
100		124.8	62.1	14.1
200		147.1	73.2	10.0
N/A	N/A	N/A	N/A	N/A

Finess Modules (FM) N/A (See ASTM C 136-85, 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 FINE GRADING

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: R.G. ALEXANDER Date 5-8-91

A-6400-204(2-87)

13613

GRAIN SIZE ANALYSIS PLOT

mple No. 1-0841

Page 1 of 1

Procedure No. ETHL-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 5-7-91

Remarks #4 MINUS

299-W18-28 218.5-219.5'

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

Checked By: R.G. ALEXANDER Date 5-8-91

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

12-50

93130B.1548

VALIDATED
KDR 4/22/92
SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 1 of 2

Requested by:	Phone No.	Well No.	Date:
		W18-28	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'	4.10.91	SOIL	4.10.91	0716.91	17.0	<D
10'				0717.91	20.8	<D
15'				0718.91	15.3	<D
20'				0719.91	16.8	1.5
25'				0720.91	12.6	0.8
30'	4.11.91		4.11.91	0727.91	20.4	2.4
35'				0728.91	14.3	0.5
40'				0731.91	21.8	1.0
45				0732.91	25.2	0.6
50'				0733.91	20.0	0.8
55	4.24.91		4.24.91	0836.91	14.0	<D
60'	4.12.91		4.22.91	0756.91	37.6	2.1
65				0749.91	13.2	1.7
70	4.15.91		4.22.91	0760.91	11.4	<D
72				0761.91	28.2	1.0
75				0762.91	25.9	1.6
80	4.17.91		4.22.91	0768.91	16.6	<D
85			4.22.91	0786.91	25.4	1.4
90				0790.91	26.2	0.7
95				0788.91	25.1	1.0
100				0789.91	22.9	0.8
105				0790.91	21.8	0.3
110				0791.91	26.1	1.2
115				0797.91	22.2	1.1
117	4.18.91		4.24.91	0804.91	21.8	<D
120				0805.91	21.2	0.7
125				0806.91	25.9	1.4
130	4.22.91			0807.91	25.6	2.0
135				0808.91	30.1	0.6
140			4.26.91	0817.91	25.0	2.8
145				0818.91	25.0	0.6
148	4.23.91			0823.91	1.3	<D

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1518

202

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Page 2

Requested by:	Phone No.	Well No.	Date:
		LW 15.28	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
150	4.23.91	SOIL	4.26.91	0824.91	19.3	1.7
155				0847.91	16.0	1.1
160				0844.91	8.2	1.4
165				0845.91	17.6	<D
170				0846.91	11.8	<D
175	4.29.91		4.30.91	08[illegible].91	7.2	<D
180				0863.91	14.2	<D
185	4 30.91			0876.91	9.4	1.6
190				0877.91	20.5	0.9
195	5.1.91		5.1.91	0882.91	17.2	1.2
200	5.1.91		5.1.91	0883.91	24.1	0.7
205	5.2.91		5.2.91	0889.91	20.6	2.1
210	5.3.91		5.3.91	0900.91	13.1	<D
215	5.3.91		5.3.91	0901.91	19.7	0.4
218.5-217	5.6.91		5.6.91	0905.91	10.8	1
225	5.9.91		5.9.91	0949.91	9.6	<D
230	5.10.91		5.13.91	09[illegible].91	12.3	<D
137	4.22.91		4.26.91	0816.91	19.0	0.3

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1550

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W18-28 Area 200 West Date 4/19/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 676.51' Brass Cap

Survey Coordinates 135107.1 N 566092.9 E

Log Measured From Ground Surface

Location Description West Perimeter of 200 West Area

Ground Surface Elevation 676.51' Brass Cap

Surface Temperature 15.6°C Weather Clear - Warm

BOREHOLE INFORMATION

Driller Darrel Ludtke

Drill Rig Type Cable Tool	Bit Type/Diameter Drive Barrel / 10"
Borehole Diameter(s)/Depth 12" / 19.25'	10" / 148.5'
Depth Driller 148.5'	Depth Logger 147.4'
Liquid Level NA	Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch. 40	Interval +0.7' - 19.25'
Type 10" Carbon Steel Sch. 40	Interval +2.4' - 148.73'
Type	Interval
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.25' high
Centralizer was used
* Survey data from Kaiser 12/15/92 PAM

12-54

9313018.1551

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 UL-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 μsec. | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 147.4' | To: 2.7'

Rerun(s): 80.0' to 35.0'

Pre Survey Verification: Position 1: 282.9 eU | Position 2: 48.8 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 8.5 eU | Position 2: 0.3 eU

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

Start Time: 1030 | Completion Time: 1300

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: 278.6 eU | Position 2: 47.6 eU | Background: 60 c/s

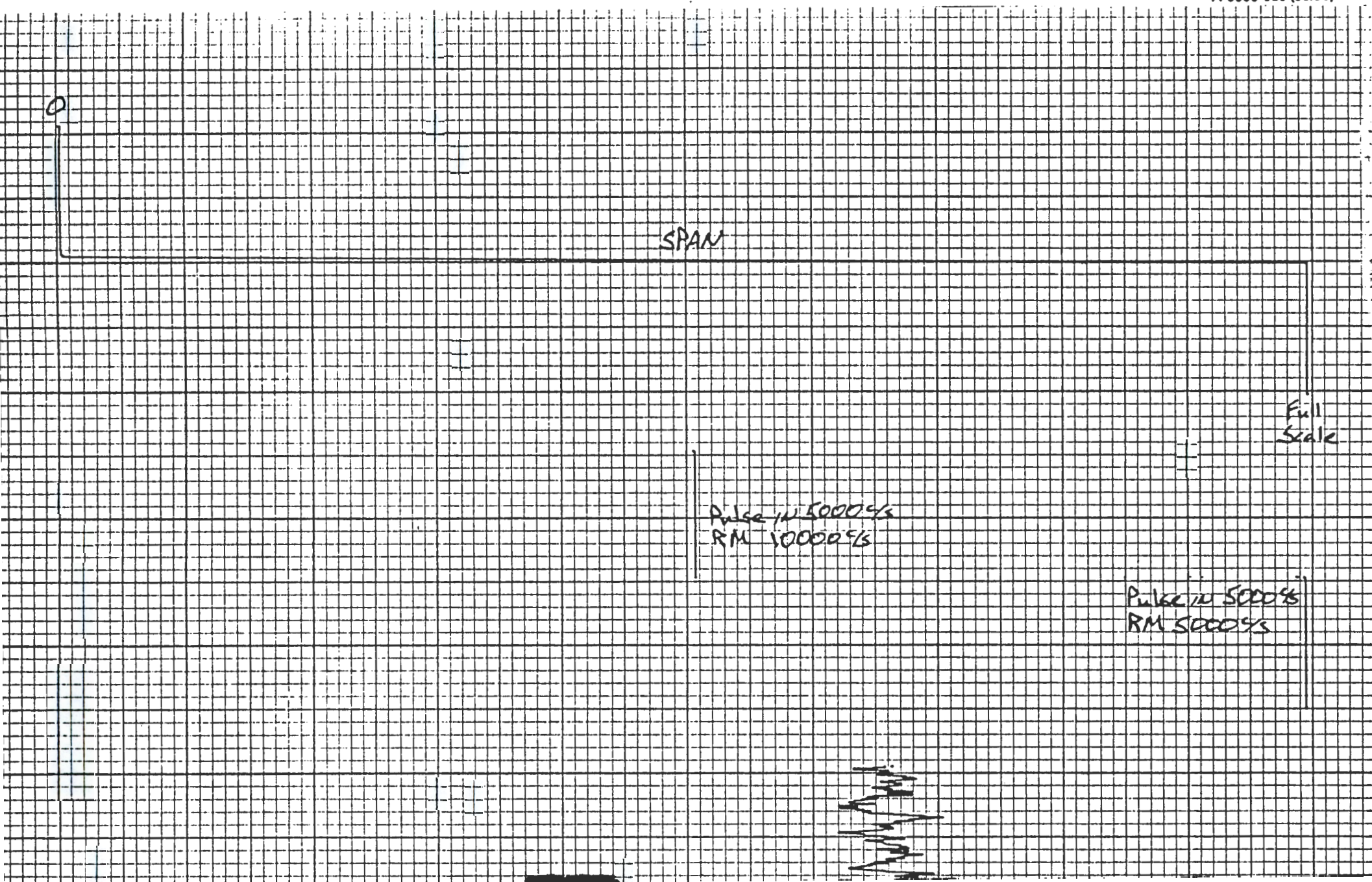
Percent Change: Position 1: 1.5% | Position 2: 2.5%

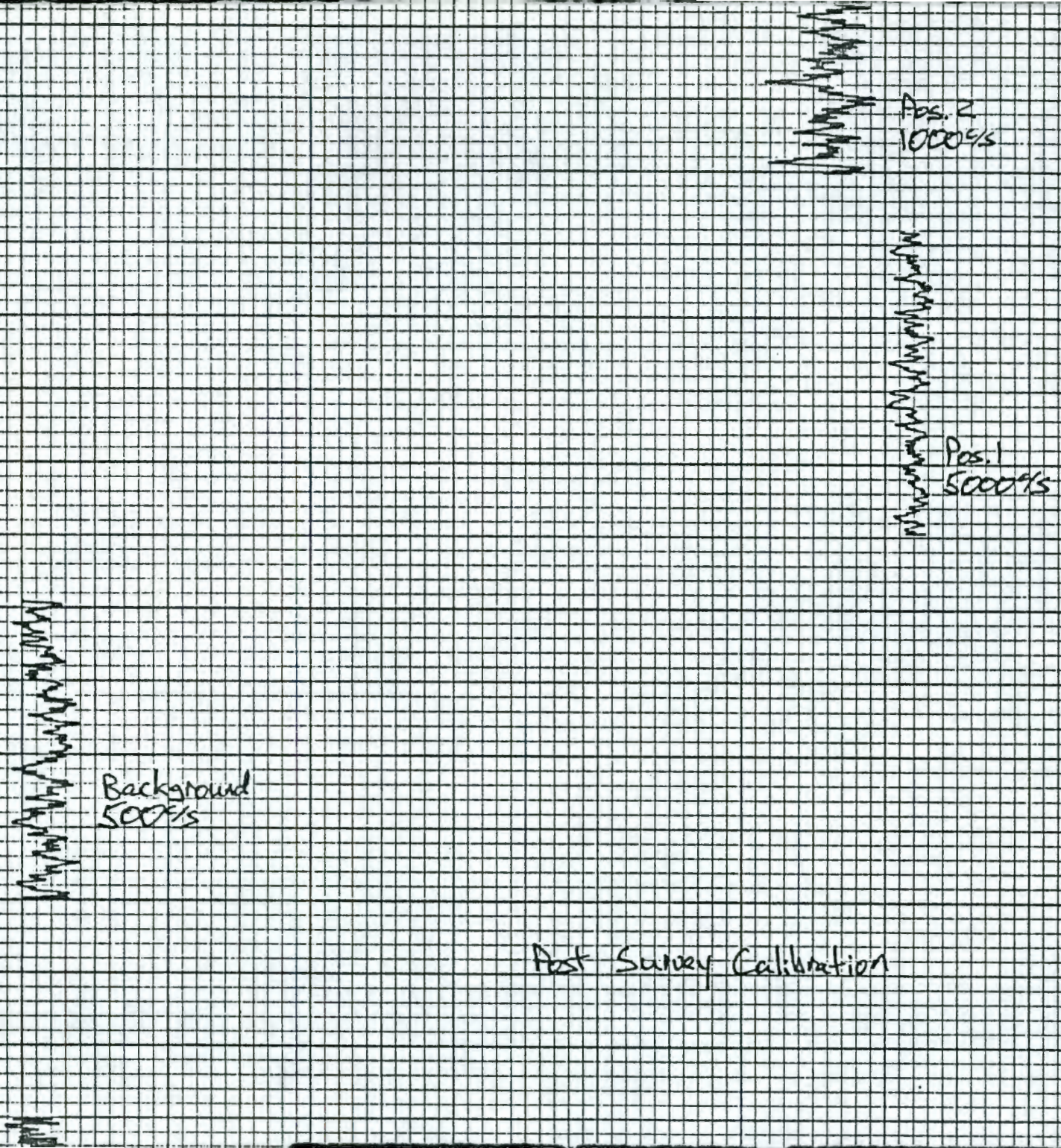
Comments: Return Error = +0.25' high

Centralizer used.

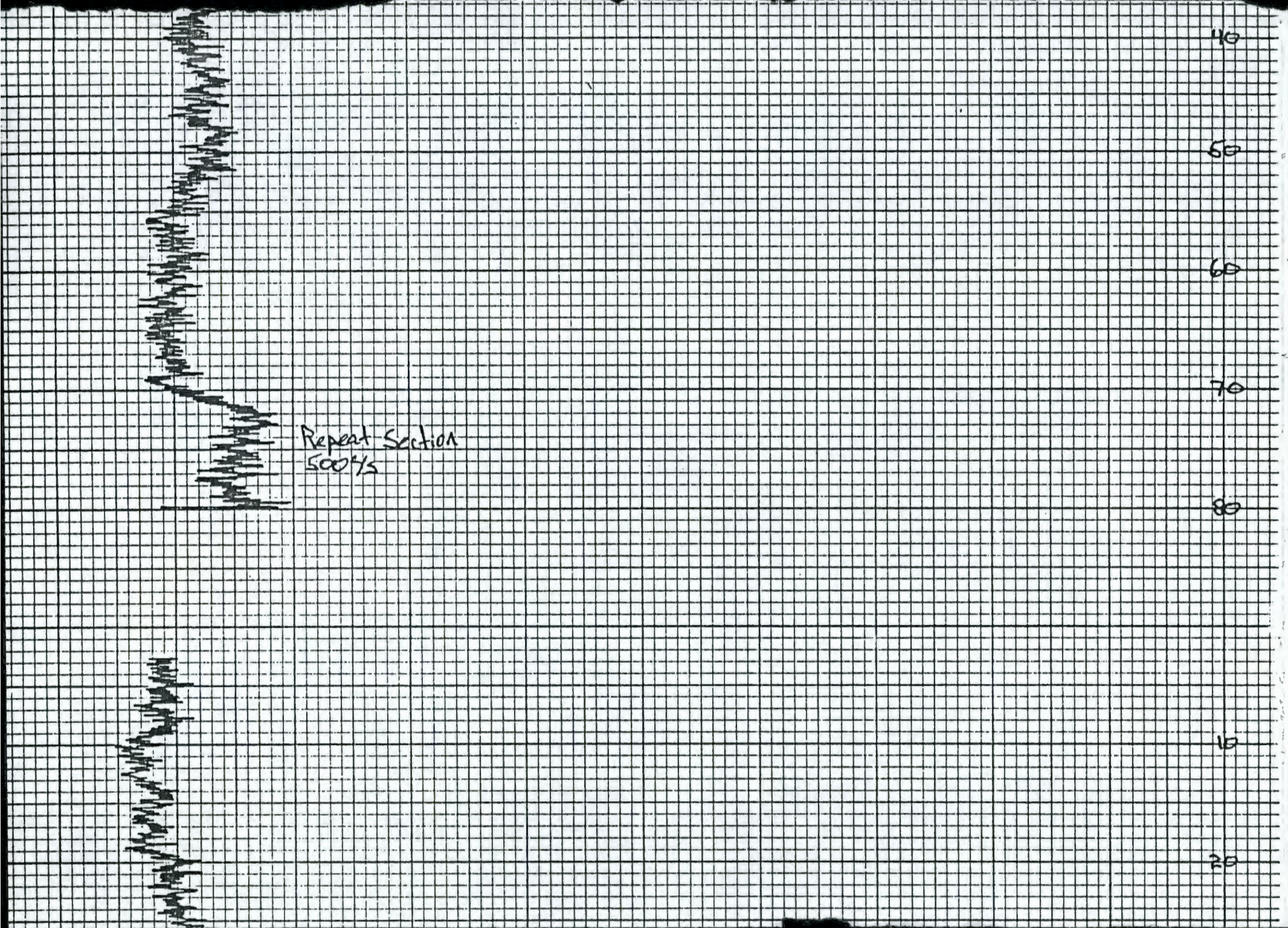
Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 4/19/91

A-6000-520 (05/90)





Post Survey Calibration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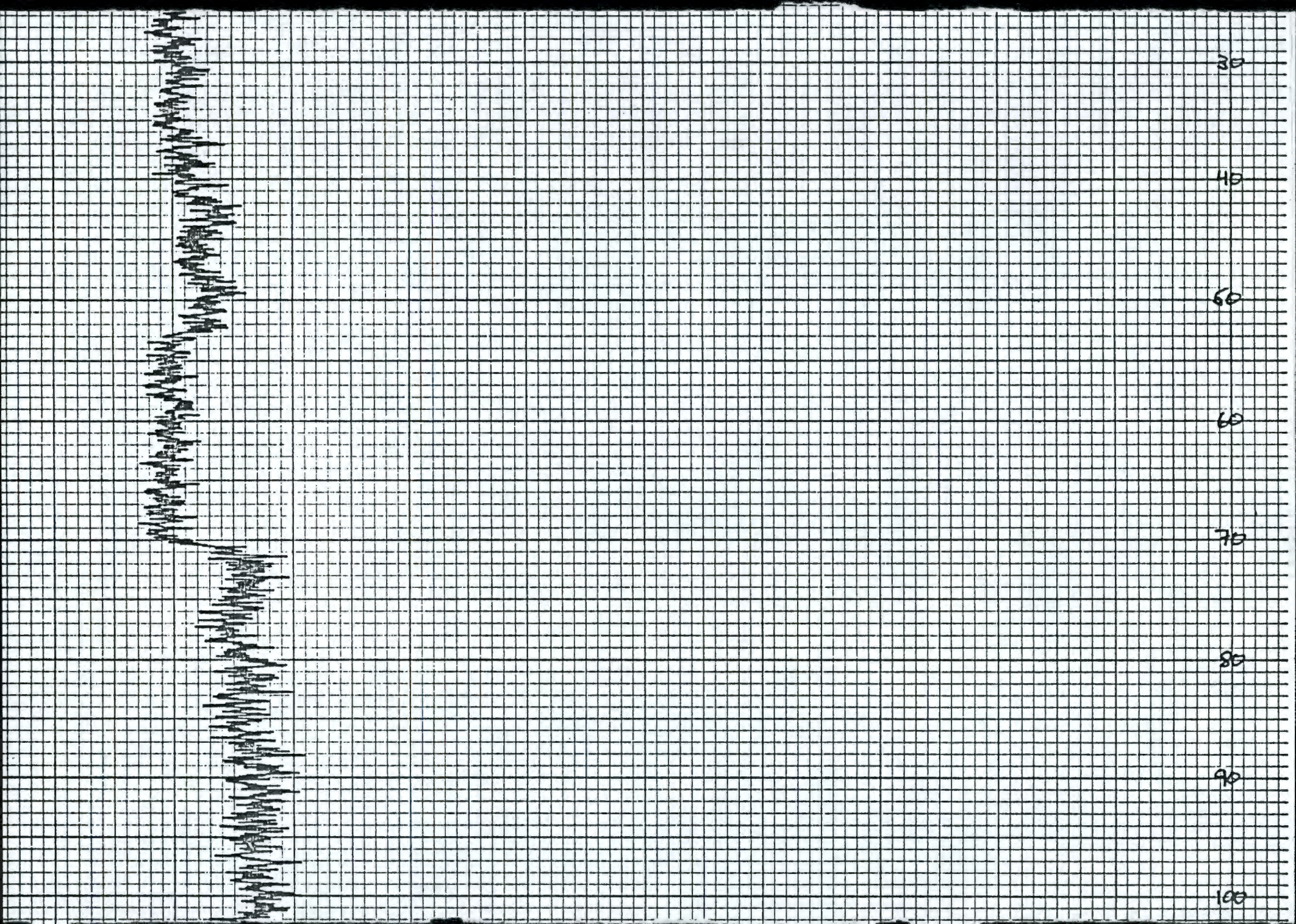
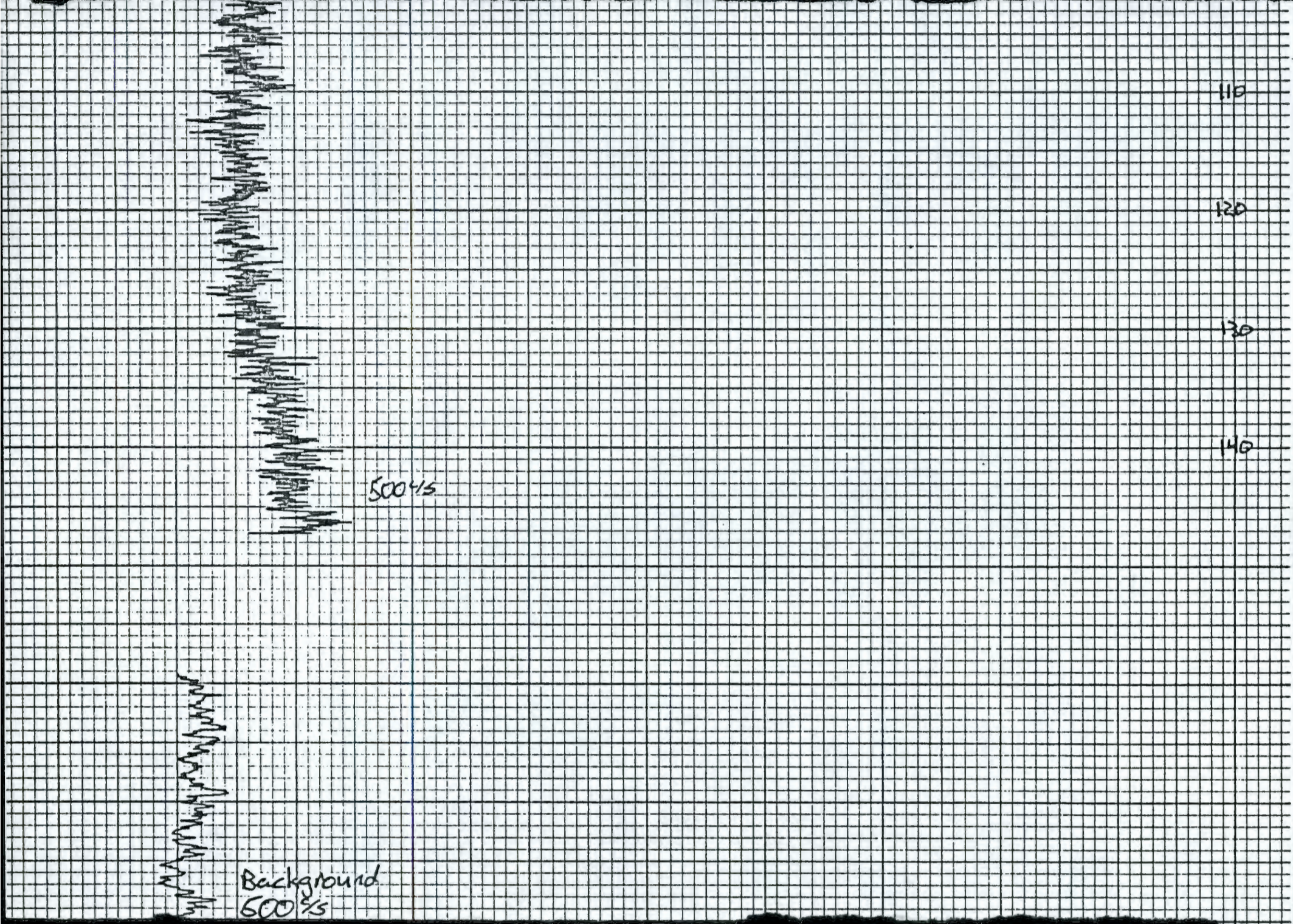
500 ft/s
40
50
60
70
80
10
20


30
40
60
60
70
80
90
100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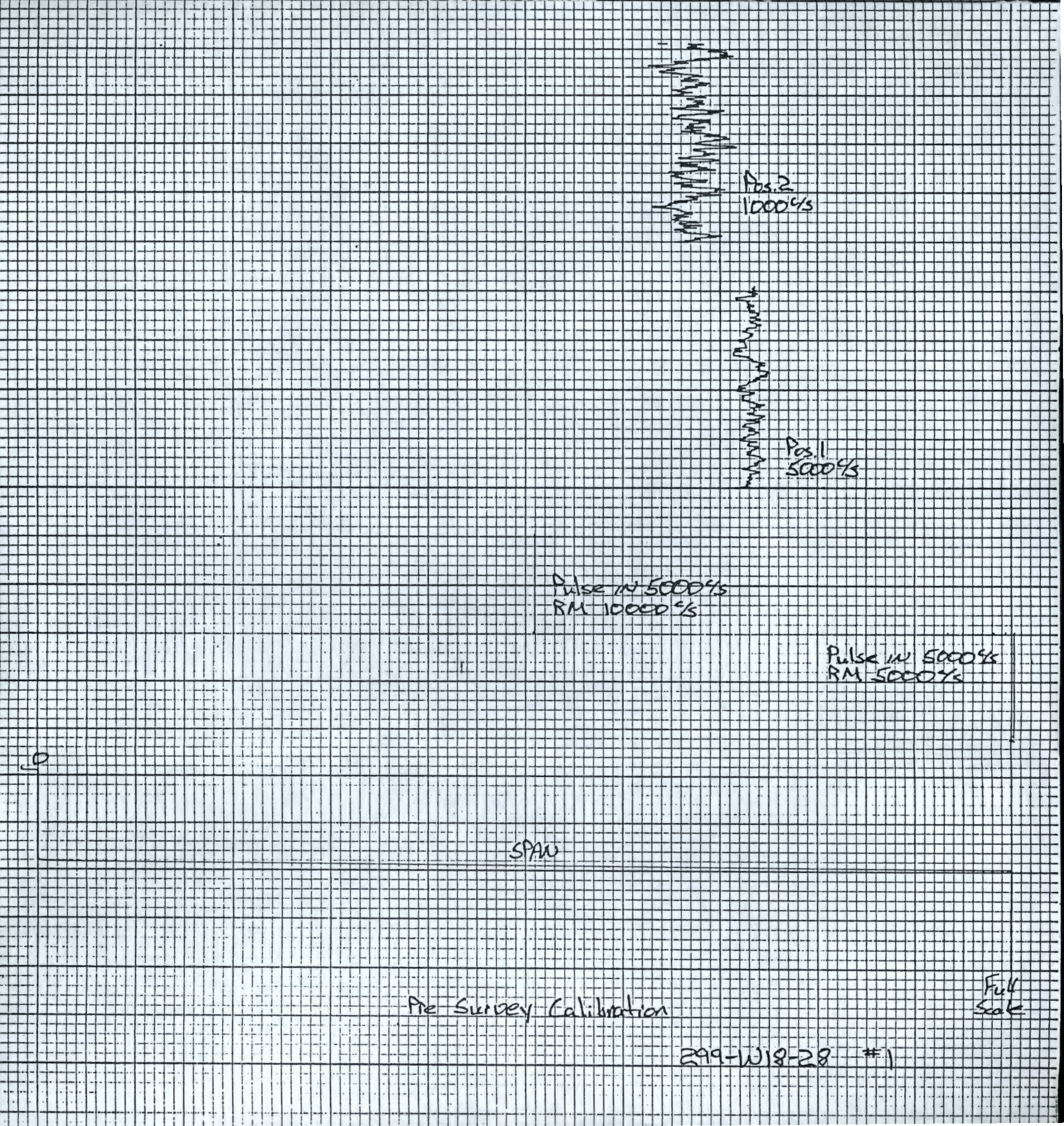
120
130
140
500 c/s
Background
600 c/s


Pos. 2
1000 c/s
Pos. 1
500 c/s
Pulse IN 500 c/s
RM 10000 c/s
Pulse IN 500 c/s
RM 500 c/s
0
SPAN
Pre Survey Calibration
Full Scale
299-W18-28 #1

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

Well No. 299-W18-28 Area 200 West Date 5/9/91

Log Run #2 Log Type Gamma (Gross)

Elevation Datum NGVD29 * Elevation 676.51' Brass Cap

Survey Coordinates 135107.1 N 566042.9 E

Log Measured From Ground Surface

Location Description 200 West Perimeter Road

Ground Surface Elevation 676.51' Brass Cap

Surface Temperature 16.1 °C Weather Cloudy & Cool

BOREHOLE INFORMATION

Driller Kelly Olson

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

Borehole Diameter(s)/Depth 12"/19.3' 10"/158.0' 8"/229.7'

Depth Driller 229.7'. Depth Logger 228.7'

Liquid Level 209. Liquid ~~Density~~ Appearance Silty

Temperature 18.0°C

CASING RECORD

Type 12" Carbon Steel Sch. 40 Interval +1.0' - 19.25

Type 10" Carbon Steel Sch. 40 Interval +1.3' - 157.96

Type 8" Carbon Steel Sch. 40 Interval +1.3' - 229.3'

Type Interval

Well Screen Interval NA

Comments: Return Error = +0.1' high

Centralizer was used.

* Survey data from Kaiser 12/5/91 RAM

12-11/92

12-55/56

A-6000-520 (05/90)

9313018.1552

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	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	228.7	To	115.0'
Rerun(s)	170.0' to 140.0'		
Pre Survey Verification:	Position 1 277.4 eU	Position 2 48.8 eU	Background 50 c/s
Base Calibration Difference:	Position 1 14.0 eU	Position 2 0.3 eU	
Logging Speed	5 ft./min	Rerun Scales, CPS/in.	50 c/s/in
Start Time	1230	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 1 273.3 eU	Position 2 47.9 eU	Background 52 c/s
Percent Change:	Position 1 1.5%	Position 2 1.8%	

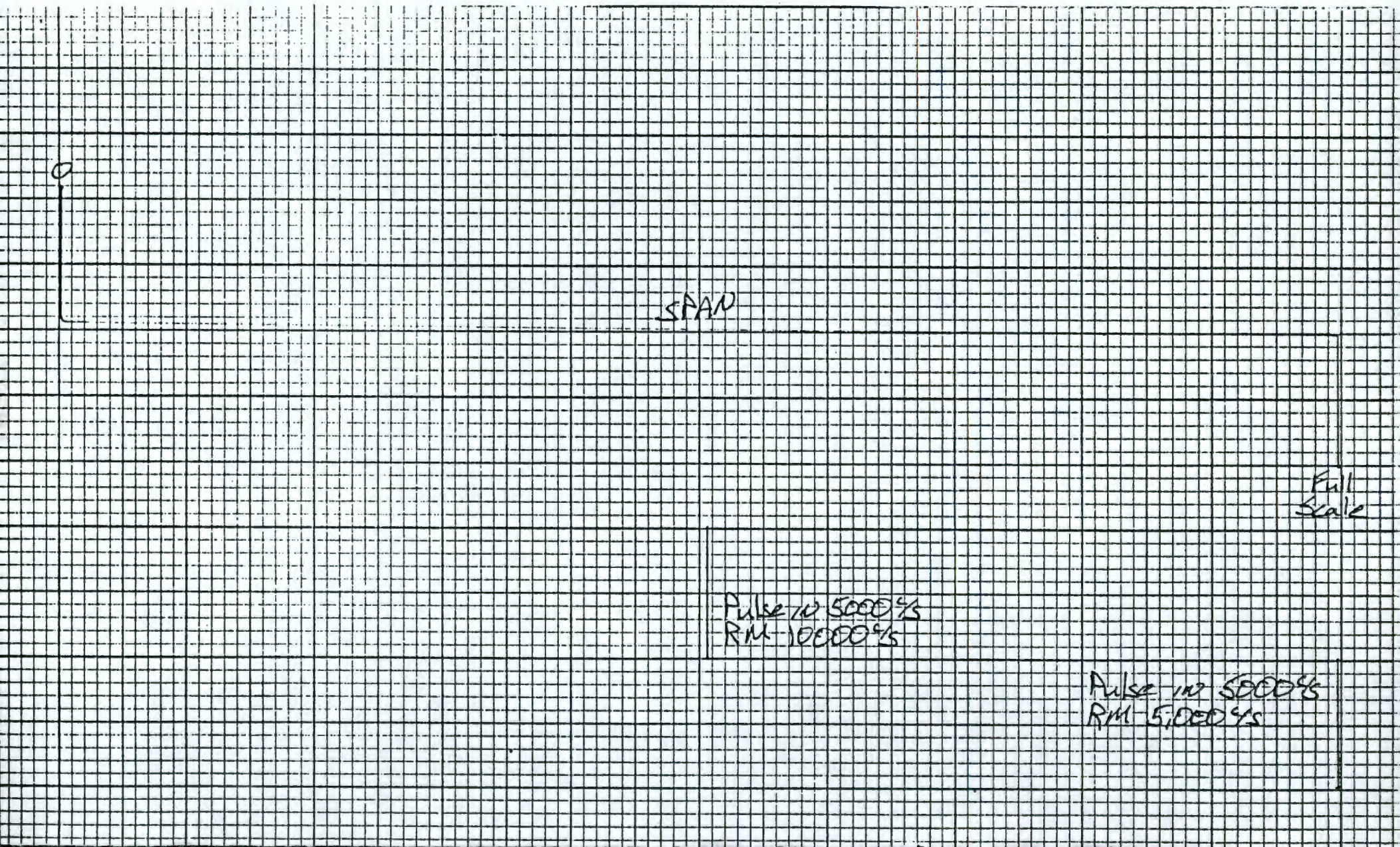
Comments Rel. to Gamma = +0.1' high

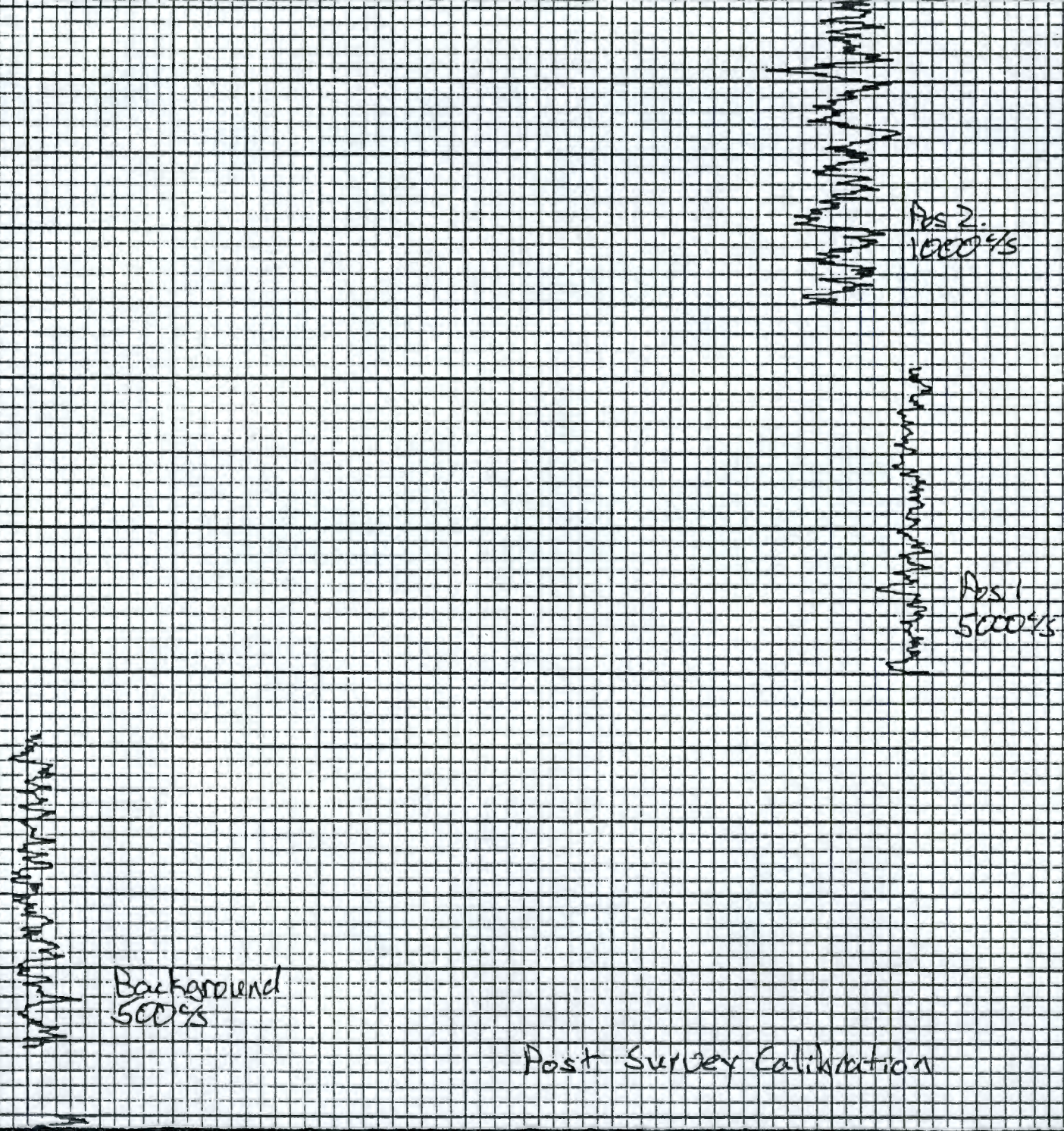
Remark after 3.1 high

Centralizer used.

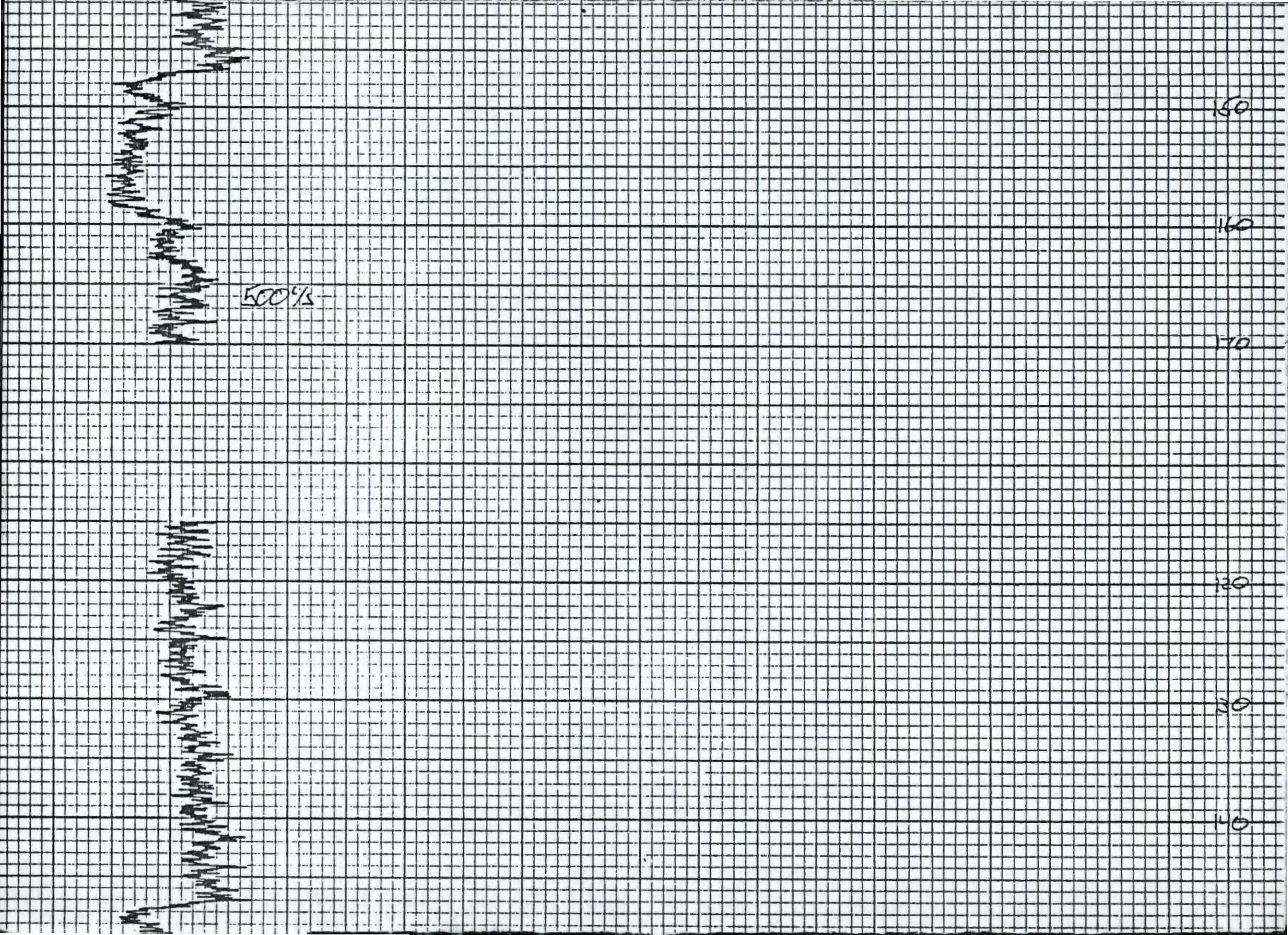
Witnessed and Verified by: (sign and print name) Kent Reynolds / Kent Reynolds Date: 5/9/91

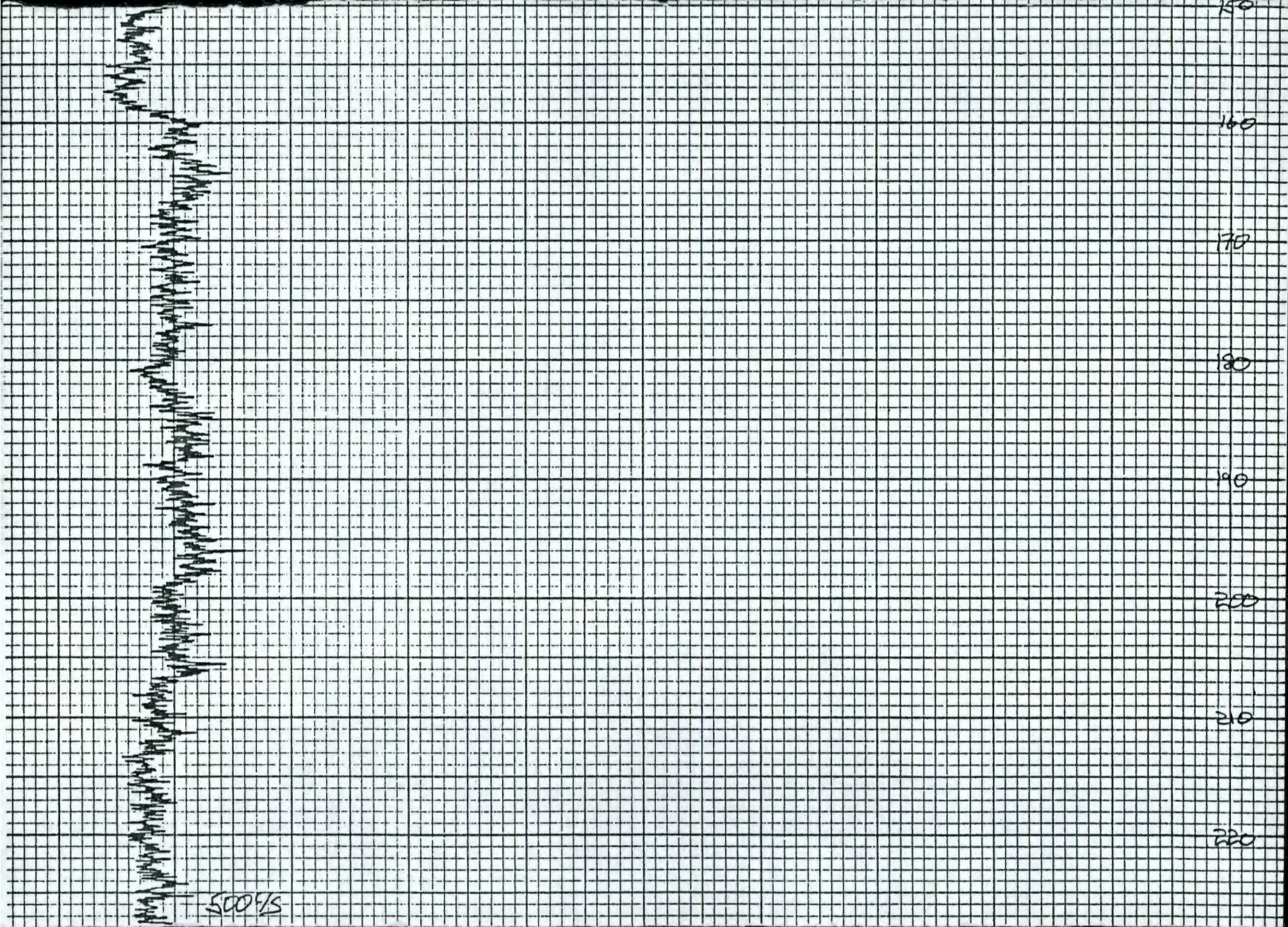
A-6000-520 (05/90)

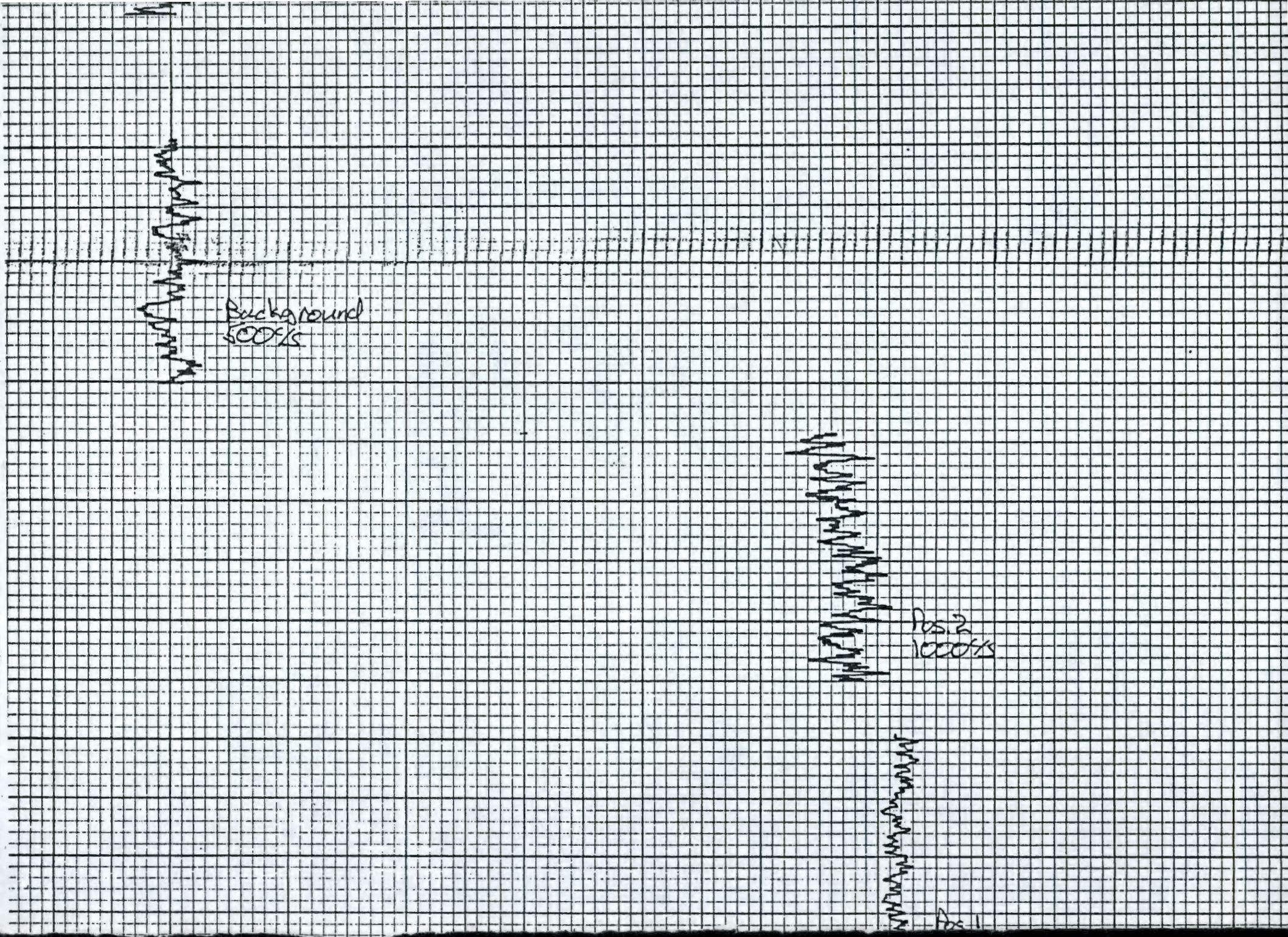




Post Survey Calibration


500%
150
160
170
120
130
140


150
160
170
180
190
200
210
220
500°/s


Background
500c/s
Pos 2
1000c/s
Pos 1

} 5000 °/s

Pulse in 5000 °/s
RM 10,000 °/s

Pulse in 5000 °/s
RM 5000 °/s

0

SPAN

Pre-Survey Calibration

Full Scale

299-W18-28 #2

13.0 WELL 299-W18-29

13.1 DRILLING

Construction of this well began on 28 March 1991 and total depth of 150 feet was reached on 1 May 1991. The well was drilled using a cable tool rig. Approximately 40 gallons of water were added during drilling activities. Specific well construction information is located in Table 13.1. 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 13.1 299-W18-29 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.5	ALS
	10"	140.6	ALS
Gross Gamma Logging	17 April	135	15
Backfill	Hole Plug	148.0	135.5
Permanent Casing	4"	119.0	ALS
Screen	4" 5-Slot	135.0	119.0
Filter Pack	20-40 Silica Sand	135.5	112.7
Annular Seal	Bentonite Pellets	112.7	107.2
	Bentonite Crumbles	107.2	18.8
	Cement Grout	18.8	2.8
Concrete Pad	4'x4'x6"	2.8	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 128 feet BLS and were primarily sand and sandy gravel with some silt and clay. Approximately 19 feet (128-147 feet BLS) of sandy silt with a 0.5 foot caliche layer (140-140.5 feel BLS) represents the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (147-150 feet BLS).

The borehole was advanced primarily by the drive barrel however some hard tool drilling was done in more resistant zones. This borehole was originally intended to monitor the top of the unconfined aquifer however, perched water was encountered between 122 and 142 feet BLS. Two unsuccessful attempts were made to isolate the perched water. It was then decided to seal the bottom of

the borehole and install a screen to monitor the perched zone. 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 13.1. Reproductions of these logs are also located at the end of this section.

13.2 WELL COMPLETION

Well completion began on 9 May 1991 and was completed on 6 June 1991. Static water level at the time of completion was 126.3 feet below land surface (BLS). Completion details are presented in Table 13.1. 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. Documentation of well completion activities can be found in the Well Construction Report.

13.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 15 and 16 July 1991 using a bailer and subsequently a dedicated Hydrostar pump with the intake located 137.4 feet below the top of the protective casing. Approximately 372 gallons of water were removed to develop the well.

13.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 15 and 16 July 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the data was insufficient for valid analysis. Results from these tests are presented in Table 13.2. A slug withdrawal data plot is shown in Figure 13.1. Raw data from the aquifer testing at 299-W18-29 are located at the end of this section.

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Table 13.2 Hydrologic Testing Results from 299-W18-29				
Formation: Hanford		Lithology: Sand/Sandy Silt	Interval Tested*: 126.3-139.4	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	16 Jul 91	Not Interpretable	----	----
Recovery	16 Jul 91	Not Interpretable	----	----
Slug Injection	15 Jul 91	Not Interpretable	----	----
Slug Withdrawal	15 Jul 91	Bouwer-Rice (1989)	10	----

* Depth below top of 6" protective casing

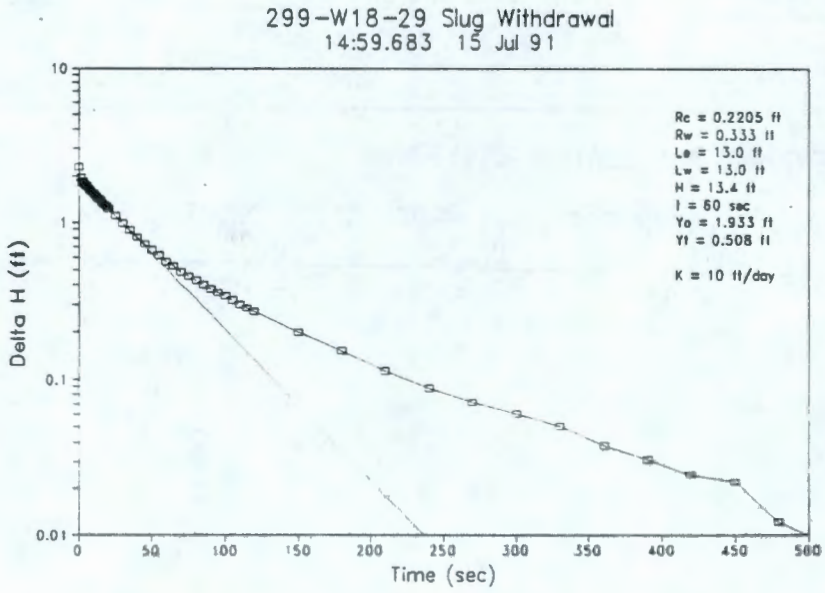

Figure 13.1 299-W18-29 Slug Withdrawal Plot.

LLBG FACILITY

WELL 299-W18-29

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
3-28-91	5-1-91	25	N/A	150.'	4-10-91 124.0' 4-11-91 121.9' 4-12-91 122.7' 4-15-91 131.5' 4-19-91 130.2' 4-23-91 137.4' 4-25-91 134.5'	~40 GALLONS for DRILLING 70 GALLONS for DRILLING FLU 73 GALLONS MIX for BENT GR

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
5-9-91	6-6-91	7	5-9-91 126.3' 5-16-91 126.7	138.9	119.0-135.0	200 GALLONS ADDED for DRILLING ASSUMED DRILLED OUT 5-16-91 35 GALLONS REMOVED TO DEVELOP GRAVEL PACK 6-5-91

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	7-15-91 7-16-91	7-15-91 7-16-91	7-15-91	372

COMMENTS:

9313018.1556

VALIDATED KDR 3/19/92 SIGNATURE/DATE

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WELL CONSTRUCTION REPORT

Specification No. WHC-S-014 Rev No. 5

ECNs 144240, 144241, 144234

Project RCRA W-017 LLBG

Location 200 W

Drilling Company Kaiser Engineers Hanford

Driller Darrel Ludtke (1333), Lenny Bultena (0016), Moe Wrasper (1909), Jody Carpenter (1900)

Other (Companies)

Geologist(s) Stacey W. Collison (EBASCO), J.A. Coate, Nancy Ballantyne

Well No. 299-W18-29 Temp. Well No. NA

Coordinates N: 135,028.4; E: 566,561.2 (LAMBERT)

Casing Elev. 670.14' Ground Elev. 670.65' BRASS CAP

Drilling Method

Verification Method Visual Observation

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

			Initials	Date
Rotary	Air NA	Mud NA	NA	NA
Cable Tool	D 0'-140.5'	H 140.5'-150'	SWC	5/7/91
Drilling Fluid Raw Water	3 gal.	37 gal	SWC	5/9/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Spectral gamma	0.0' - 20.0'	4/16/91
Spectral gamma	95.0' - 136.7'	4/16/91
gross gamma	4.0' - 135'	4/17/91
	-	
	-	

Completion Data

Drilled Depth 150.0'

Completed Depth 135.5' (bottom of 20-40 sand)

Date Started 3/29/91

Date Completed 6/6/91

Static Water Level/Date 121.9' (4/11/91)

124.8' (4/11/91), 122.8 (4/12/91)

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 7-15-91

Completion Results

Cleaning

Verification Method Visual Inspection (and direct observation of drill rig cleaning)

Criteria WHC-S-014, 7.7, 7.6, 4.2.2; WHC-CN-7-7 sec. 5.4

	Initials	Date
Drilling Tools/Rig	SWC	3/29/91
Temporary Materials	SWC	3/29/91
Permanent Materials	SWC	5/10/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	SWC	5/10/91
Material Packing	SWC	5/10/91

Screen

Type	Length	Slot Size
4" Type 304L SS	5/20/91 SWC 16.03'	5 slot

Depth(s) 119.0' - 135.0'

Verification Method Verify using steel tape

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

Initials NB for SWC Date 9/16/92

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014 7.2

	Identify	Initials	Date
Additives	Raw Water	SWC	4/8/91
Lubricants	Well Guard	SWC	4/12/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014 8.2

Initials SWC Date 5/9/91

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WELL CONSTRUCTION REPORT
(continuation sheet)

299-W18-29

Casing (permanent)

Type	Size	Placement
Type 304 SS	4" ØD	+6' - ~~147.0'~~ 135.0 (6/6/91 SWC)

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: 5/17/91

Well Protection

Verification Method: Visual, Measure w/ tape

Criteria: WHC-S-014 4.2.10

	Initials	Date
Protective Posts	KDR	3/19/92
Protective Casing	KDR	3/19/92
Site Restored	KDR	3/19/92
Cap, Hasp and Lock	KDR	3/19/92
Surface Pad	KDR	3/19/92

Annular Seal/Filter Pack

Verification Method: Verify using steel tape

Criteria: WHC-S-014 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1 or ~~5.3.2~~ (4/23/91 SWC)

Type	Interval	Volume	Initials	Date
20-40 silica sand	135.5' - 112.7'	40-100 lb bags (44.8 ft³)	SWC	6/6/91
1/4" bentonite pellets	112.7' - 107.2	4-50 lb buckets (25 ft³)	SWC	6/6/91
8-20 mesh bentonite crumbles	107.2' - 18.8'	71-50 lb bags (50.4 ft³)	SWC	6/6/91
15 lb/gal cement grout	18.8' - 2.8'	21-94 lb bags cement, 120-gal H_2O (27.0 ft³)	SWC	6/6/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/19/92
Protective Casing/Brass Cap Surveyed	KDR	3/19/92
Well Number Stenciled	KDR	3/19/92
Brass Cap Labeled	KDR	3/19/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	7-15-91
Installed	JAC	7-15-91
Pump Tested	JAC	7-15-91

Other (initial if performed)

NA Well Abandonment; NA Downhole TV Inspection; SWC Complete As-Built Diagram, Driller's/Geologist's Logs; 7-16-91 JAC Well Development

Comments/Remarks: WHC-S-014 Rev. 5 sec. 7.5 Perched Water was encountered @ 124' bls. The perched zone was sealed off @ 140' bls (end of 10" cs casing) using a 11 lb/gal pure gold grout. Approximately 15 feet of grout was used. Seal failed. The well will be put in the perched zone

Reviewed By (Sign/Print Name): KD Reynolds KD Reynolds Date: 3/19/92

9313018.1568

3 of 4

WELL SUMMARY SHEET

Boring or Well No. 299-W18-29

Sheet 1 of 1

6 7/8 LS BRASS CAP

Location 200 West 16th Street WMA-4

Project W-017 LLBG

Elevation Judy Carpenter (Completion Driller)

Drilling Contractor Kaiser Engineers Hanford

Driller Darrel Ludtke / Henry Bulteau / Moe Wrasper

Drilling Method and Equipment Cable Tool / BE-22W

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison

Date 4/4/91

Reviewed By Edward C. Rafuse (Sign/Print Name)

Date 12/22/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12" ØD carbon steel casing from +0.6 to 19.5' b/s				silty SAND
		10		gravelly SAND
				sandy GRAVEL
cement grout from +2.8 - ~~19.0~~ 18.8' b/s Rev 9/19/91		19.5		" "
		20		" "
10" ØD carbon steel casing from + 2.2' to 140.6' b/s				" "
		30		" "
				" "
		40		" "
8" ØD casing removed before well construction				" "
		50		SAND
				slightly silty SAND
4" ØD stainless steel casing from + 6.1 to 135.0' b/s		60		SAND
				"
		70		"
				"
top of bentonite crumbles @ ~~19.0~~ 18.8' b/s Rev 9/19/91		80		sandy GRAVEL
				" "
top 1/4" bentonite pellets @ 107.2' b/s		90		" "
				" "
top of sand pack @ 112.7' b/s		100		" " (silt @ 98')
				SAND
top of screen @ 119.0' b/s		107.2		"
		110		" perched water @ 122.75'
bottom of screen @ 135.0' b/s		112.7		" on 4/12/91
		119.0 / 120		"
Hole plug from 135.5 - 148.0'		122.1		sandy SILT (silt @ 128')
		130		" "
Water level @ 122.1' b/s 6/6/91		135.0 TD / 135.5		" "
		140 / 140.6		caliche @ 140.5' b/s
		148.0		slightly silty sandy GRAVEL
		150		
		E		
		160		
TD of hole @ 150.0' b/s		13-7		

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

BOREHOLE LOG

VALIDATED KDR 2/26/92 SIGNATURE/DATE

Boring or Well No. 299-W18-29

Sheet 1 of 8

Location 200 West

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Darrel Ludtke

Drilling Method and Equipment Cable Tool

Prepared By Stacey W Callison (Sign/Print Name) Stacey W. Callison Date 3/28/91

Reviewed By R.D. Miller (Sign/Print Name) Date 4/1/91 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
				S	casing depth = cd
5'	2 lith 1 moist 1 rad	DB		(5') silty SAND (85% sand, 15% silt) MS-35% FS-25% VFS-25% silt 2.5Y 4/3 olive brown (damp) silt 2.5Y 6/3 lt. yellowish brown (dry) damp sample, 60% mafic 40% felsic mica present	3/24/91 cd = 0' bls surveyed clean w/SIP-GM gradational lith change @ ~7.5' bls
10'	2 lith 1 moist 1 rad	DB		(10') gravelly SAND (75% sand 25% gravel) SC-5% VCP-10% CP-5% MP-5% MS-40% FS-20% VFS-15%, damp angular to subangular, 60% mafic 40% felsic, NO 10% HCL rxn, mica present	3/24/91 cd = 0' bls surveyed clean w/SIP+GM gradational lith change @ ~12' bls
15'	2 lith 1 moist 1 rad	DB		(15') Sandy GRAVEL (40% gravel 60% sand) MP-5% FP-15% VFP-20% VCS-30% CS-25% MS-5%, damp to dry, 60% mafic 40% felsic, angular, NO 10% HCL rxn No mica	3/24/91 cd = 0' bls surveyed clean w/SIP+GM
20'					

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No. 299-W18-29

Sheet 2 of 8

Location 200 West 16th street

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Darrel Ludtke

Drilling Method and Equipment Cable Tool

Prepared By Stacey W. Callison (Sign/Print Name) Stacey Callison

Date 4/1/91

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

Date 4/3/91

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 moist 1 rad	DB		(20') sandy GRAVEL (40% gravel 60% sand) MP 5% FP 15% VFP-20% VCS-30% CS-25% MS-5% damp to dry 60% mafic 40% felsic angular, No 10% HCL rxn, No mica	4/1/91 cd ≈ 20' bls surveyed clean w/SIP+GM very clean sample
25'	2 lith 1 moist 1 rad	DB		(25') sandy GRAVEL (40% gravel 60% sand) same as above	4/1/91 10" CS casing cd ≈ 20' bls surveyed clean w/SIP+GM drillers says he is hitting coarse gravels @ ~27' bls
30'	2 lith 1 moist 1 rad	DB		(30') sandy GRAVEL (45% gravel 55% sand) MP-10% FP-15% VFP-20% VCS-30% CS-20% MS-5% damp to dry, 70% mafic 30% felsic subangular, No 10% HCL rxn, No mica	4/1/91 cd ≈ 24' bls surveyed clean w/SIP+GM 1 large cobble in sample broken (angular) sample is slightly coarser drilling slows boulder in cuttings
35'	2 lith 1 moist 1 rad	DB		(35') sandy GRAVEL (40% gravel 60% sand) VCP-10% CP-10% MP-10% FP-5% VFP-5% VCS-20% CS-20% MS-10% FS-10% damp to dry 70% mafic 30% felsic, subrounded No 10% HCL rxn, No mica	4/1/91 cd ≈ 30' bls surveyed clean w/SIP+GM
40'					

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9313018.1551

BOREHOLE LOG

Boring or Well No. 299-W18-29

Sheet 3 of 8

Location 200 West 16th street

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Darrel Ludtke

Drilling Method and Equipment Cable Tool

Prepared By Stacey W Collison (Sign/Print Name) Stacey W Collison

Date 4/2/91

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

Date 4/4/91

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'	2 lith 1 moist 1 rad	DB		(40') sandy GRAVEL (80% gravel 20% sand) SC-20% VCP-20% CP-15% MP-10% FP-10% VFP 5% VCS-10% CS-10%, damp to dry 80% mafic 20% felsic, subrounded subangular No 10% HCL rxn, No mica	4/2/91 cd = 35' bls surveyed clean w/ SIP + GM soil becoming very coarse hard slow drilling, hard to keep soil in DB sands @ 42' bls
45'	2 lith 1 moist 1 rad	DB		(45') sandy GRAVEL (70% gravel 30% sand) SC-20% VCP-0% CP-20% MP-10% FP-10% VCS-15% CS-10% MS-5% damp, 80% mafic 20% felsic, subangular, moderate 10% HCL rxn, No mica gradational contact @ ~47' bls	4/2/91 cd = 38' bls slow drilling surveyed clean w/ SIP + GM sample less coarse than previous small white band w/ strong 10% HCL rxn small cobbles may be due to sloughing fine sands
50'	2 lith 1 moist 1 rad	DB		(50') SAND (sand 95% 5% silt) MS-25% FS-45% VFS-25% silt 2.5Y 4/3 olive brown (wet) silt 2.5Y 6/3 yellowish brown (dry) damp, 60% mafic 40% felsic, No 10% HCL rxn mica present	4/2/91 cd = 38' bls surveyed clean w/ SIP + GM sands more mafic + coarse small silt lense @ 52' bls
55'	2 lith 1 moist 1 rad	DB		(55') slightly silty SAND (90% sand 10% silt) FS-40% VFS-50% silt 2.5Y 5/4 lt. olive brown (damp) silt 2.5Y 6/3 yellowish brown (dry) damp, well sorted, 60% mafic 40% felsic, No 10% HCL rxn Mica present	4/3/91 cd = 48' bls surveyed clean w/ SIP + GM drilling speeds up sand changed to finer @ 50' bls
60'					

A-6000-382 (04/90)

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

BOREHOLE LOG

Boring or Well No 299-W18-29

Sheet 4 of 8

Location 200 West 16th Street

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Darrel Ludtke

Drilling Method and Equipment Cable Tool BE-22W

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison

Date 4/4/91

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

Date 4/5/91

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'	3 mason 1 moist 1 rad	DB		(60') SAND (95% sand 5% silt)	4/4/91 cd ≈ 55' bls
				wet (2.5Y 3/2) very dk grayish brown	fast drilling, 10" CS casing
				dry (2.5Y 5/3) lt. olive brown	surveyed clean w/SIP+GM
				MS-35% FS-30% VFS-30%, damp	
				well sorted, 70% mafic 30% felsic	
				No 10% HCL rxn	
					silt lenses @ ≈ 64' bls
	3 mason 1 moist 1 rad	DB		(65') SAND (95% sand 5% silt)	4/4/91 cd ≈ 55' bls
65'				wet (2.5Y 3/2) very dk grayish brown	fast drilling, 10" CS casing
				dry (2.5Y 7/3) pale yellow	surveyed clean w/SIP & GM
				MS-40% FS-30% VFS-25%, damp	
				well sorted 70% mafic 30% felsic	silt base @ 50.5' bls
				No 10% HCL rxn	
				(70') SAND (95% sand 5% silt)	4/4/91 cd ≈ 55' bls
	3 mason 1 moist 1 rad	DB		wet natural (2.5Y 4/3) olive brown	fast drilling, 10" CS casing
70'				dry (7/3 2.5Y) pale yellow	surveyed clean w/SIP+GM
				MS-40% FS-30% VFS-25%, damp	
				well sorted, 75% mafic 25% felsic	
				No 10% HCL rxn	
					silt lenses @ ~ 72' bls
				(75') SAND (95% sand 5% silt)	4/4/91 cd ≈ 55' bls
	3 mason 1 moist 1 rad	DB		natural (2.5Y 4/3) olive brown	fast drilling, 10" casing
75'				dry (2.5Y 6/2) light brownish gray	surveyed clean w/SIP+GM
				CS-16% MS-40% FS-30% VFS-10%	
				well sorted, 75% mafic 25% felsic	trace of CP
	3 mason 1 moist 1 rad	DB		No 10% HCL rxn	
77'				(77') sandy GRAVEL (80% gravel 20% sand)	4/4/91 cd ≈ 55' bls
				natural (2.5Y 4/3) olive brown	drilling slows
	1 rad 1 moist 3 mason	ST		dry (2.5Y 6/2) lt. brownish gray	surveyed w/SIP + GM det
				VCP-20% CP-15% MP-20% FP-15% VFP-10%	some gravels have white rinds
78.9'		7/33/40/40		VCS-10% CS-5% MS-5% poorly sorted, damp,	which react strongly w/10% HCL
				80% mafic 20% felsic, strong 10% HCL rxn	carbon tet detected @ 77' bls
80'					@ 20 ppm

A-6000-382 (04/90)

9313018.1553

BOREHOLE LOG

Boring or Well No. 299-W18-29

Sheet 5 of 8

Location 200 West 16th Street

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Lenny Bultena

Drilling Method and Equipment Cable Tool / BE-22W

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison Date 4/5/91

Reviewed By RD Miller (Sign/Print Name) Date 4/11/91

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'		ST End		(78.9'-80.9') sandy GRAVEL (60% gravel 40% sand) nat. 2.5Y 4/3 olive brown dry 2.5Y 6/2 lt. brownish gray VCP-25% CP-10% MP-10% FP-10% VFP-5% VCS-20% CS-10% MS-5% FS-5%, damp, poorly sorted. 75% mafic 25% felsic gravel 50% - subrounded 50% - subangular No 10% HCL rxn	4/5/91 cd = 59' b/s 10" CS casing surveyed w/ SIP + GM < det
	3 mason CaCO3 1 moist 1 rad	4/8/91 SWL DB		(85') sandy GRAVEL (60% gravel 40% sand) same as above moisture content dry	4/8/91 cd = 84' b/s 10" CS casing surveyed w/ SIP + GM < det cuttings dry had to add ~3 gallons water so soil will stay in DB 8" DB
85'					
90'	3 mason 1 moist 1 rad	DB		(90') sandy GRAVEL (85% gravel 15% sand) nat (2.5Y 4/3) olive brown dry 2.5Y 6/2 lt. brownish gray LC-10% SC-15% VCP-10% CP-10% MP-15% FP-15% VFP-10% VCS-10% CS-5%, damp to dry, very poorly sorted. 80% mafic 20% felsic gravel subangular to subrounded. strong 10% HCL rxn on rinds of gravel	4/8/91 cd = 89' b/s 10" CS casing slow drilling surveyed w/ SIP + GM < det gravels have some rinds
95'	3 mason 1 moist 1 rad	DB		(95') sandy GRAVEL (85% gravel, 15% sand) dk grayish brown (2.5Y 4/2) natural lt. brownish gray (2.5Y 6/2) dry CP-25% MP-25% FP-20% VFP-15% VCS-10% CS-5%, damp, poorly sorted 80% mafic 20% felsic, gravel subangular to subrounded, sand subangular, strong rxn to 10% HCL	4/9/91 cd = 94' b/s 10" CS casing, slow drilling surveyed w/ SIP + GM < det sample less coarse than previous sands reacted strongly w/ the HCL
98'	3 mason 1 moist 1 rad	DB		(98') SILT (95% silt 5% sand) olive brown (2.5Y 4/3) natural VFS-5% SiH-95% damp, well sorted pale yellow (2.5Y 7/3) dry Mica present, strong rxn to 10% HCL	4/9/91 cd = 98' b/s 10" CS casing surveyed w/ SIP + GM < det ~1.5' thick silt sharp contact
98.5'		ST 8/12/38/43			
100'					

A-6000-382 (04/90)

9313018.1564

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

BOREHOLE LOG

Boring or Well No 299-W18-29

Sheet 6 of 8

Location 200 West 16th Street

Project W-017 LLBG

Elevation 670.65

Drilling Contractor Kaiser Engineers Hanford

Driller Lenny Bultena

Drilling Method and Equipment Cable Tool / BE-22W

Prepared By Stacey W. Callison (Sign/Print Name) Date 4/8/91

Reviewed By KD Reynolds / KDR (Sign/Print Name) Date 7/26/92

Stacey W. Callison

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' 100.5'		ST End		(98.5'-100.5') sandy GRAVEL (60% gravel 40% sand) dk grayish brown (2.5Y 4/2) natural lt. brownish gray (2.5Y 6/2) dry VCP-5% CP-15% MP-15% FP-15% VFP-10% VCS-15% CS-15% MS-10%, damp, poorly sorted, 80% mafic 20% felsic gravel-angular to subangular, sand-subangular, strong rxn to 10% HCL	4/9/91 cd ≈ 98' b/s 10" cs casing surveyed w/ SIP+GMC det sample is less coarse than previous gravels
105'	3 mason 1 moist 1 rad	DB		(105') SAND (95% sand 5% silt) lt. olive brown (2.5Y 5/3) natural lt. yellowish brown (2.5Y 6/3) dry MS-50% FS-25% VFS-20%, damp very well sorted, 70% mafic 30% felsic subangular, mica present, some rxn to 10% HCL	4/10/91 cd ≈ 99' b/s 10" cs casing, fast drilling surveyed w/ SIP+GM < det sands start @ ~101' b/s gradational contact small silt lense @ 114' b/s
110'	3 mason 1 moist 1 rad	DB		(110') SAND (95% sand 5% silt) lt. olive brown (2.5Y 5/3) natural VCS-10% CS-35% MS-35% FS-15% damp, well sorted, 75% mafic 25% felsic subangular to angular, mica present lt. yellowish brown (2.5Y 6/3) dry some rxn to 10% HCL	4/10/91 cd ≈ 99' b/s 10" cs casing, fast drilling surveyed w/ SIP+GM < det coarser sands @ ~107' b/s 0.5' thick silt lense @ 116' b/s
115'	3 mason 1 moist 1 rad	DB		(115') SAND (95% sand 5% silt) same as above	4/10/91 cd ≈ 99' b/s 10" cs casing surveyed w/ SIP+GM < det silt lenses @ 117' b/s
120'		ST			

A-6000-382 (04/90)

9313018.1555

BOREHOLE LOG

Boring or Well No. 299-W18-29

Sheet 7 of 8

Location 200 West 16th Street

Project W-017 LLBG

Elevation 670.65'

Drilling Contractor Kaiser Engineers Hanford

Driller Lenny Bultena

Drilling Method and Equipment Cable Tool / BE-22W

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison

Date 4/10/91

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

Date 4/17/91

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
120'	3 mason 1 moist 1 rad	4/6/8/20		(120'-122') SAND (95% sand 5% silt)	4/10/91 cd ≈ 99' bls
				lt. olive brown (2.5Y 5/3) natural	10" cs casing
				lt. yellowish brown (2.5Y 6/3) dry	surveyed w/ SIP + GM < det
122'		ST End		VCS-10% CS-35% MS-35% FS-15%	sample has more moisture
				dump, well sorted, 75% mafic 25% felsic	than previous
				subangular to angular, mica present	
				some rxn to 10% HCL	
	3 mason 1 moist 1 rad	DB		(125') SAND (95% sand 5% silt)	4/11/91 cd ≈ 123' bls
125'				same as above	10" cs casing
				sample moist	surveyed w/ SIP + GM < det
					sample has more moisture than
				(128') SILT (95% silt 5% sand)	previous
	3 mason 1 moist 1 rad	DB		lt. olive brown (2.5Y 5/3) natural	4/11/91 cd ≈ 127' bls
				lt. yellowish brown (2.5Y 6/3) dry	10" cs casing
128'				damp, very well sorted, mica present	surveyed w/ SIP + GM < det
				moderate rxn to 10% HCL	sharp contact @ 128' bls
		ST start			silt is ≈ 0.5' thick
129'	3 mason 1 moist 1 rad 3 chem	8/10/17/23		(129'-131') sandy SILT (65% silt 35% sand)	small silt lenses @ 127' bls
				lt. olive brown (2.5Y 5/3) natural	4/11/91 cd ≈ 129' bls
				lt. yellowish brown (2.5Y 6/3) dry	10" cs casing
131'		ST End		FS-15% VFS-20% silt-65%	surveyed w/ SIP + GM < det
	1 perm 1 mason 1 rad 3 chem	ST start 3/4/14/16		moist, very well sorted, 75% mafic 25% felsic	
				subangular, mica present, md. rxn to 10% HCL	
				(131'-133') sandy SILT (80% silt 20% sand)	4/12/91 cd ≈ 129' bls
133'		ST End		lt. olive brown (2.5Y 5/3) natural	10" cs casing
	1 perm 1 mason 1 rad 3 chem	ST start 3/6/9/15		lt. yellowish brown (2.5Y 6/3) dry	surveyed w/ SIP + GM < det
EP?				VFS-20%, moist to wet, very well sorted	
				sand 75% mafic 25% felsic, md rxn to 10% HCL	
135'		ST End		(133'-135') sandy SILT (80% silt 20% sand)	4/12/91 cd ≈ 129' bls
				same as above	surveyed w/ SIP + GM < det
DP					
136.5'				(136.5'-138.5') sandy SILT (80% silt 20%	4/12/91 cd ≈ 136' bls
	1 perm 3 mason 1 rad 1 moist	ST start 8/8/16/21		sand) same as above	surveyed w/ SIP + GM < det
				mottled heavily	
				(138.5'-140.5') sandy SILT (80% silt 20%	4/12/91 cd ≈ 138' bls
138.5'		ST End		sand) same as above	
	1 perm 1 mason 1 rad	ST start 7/18/18/25		mottled	
				13-14	

9313018.1566

BOREHOLE LOG

Boring or Well No. 299-W18-29

Sheet 8 of 8

Location 200 West 16th Street

Project W-017 LLBG

Elevation 670.65'

Drilling Contractor Kaiser Engineers Hanford

Driller Lenny Bultena / Moe Wrasper

Drilling Method and Equipment Cable Tool BF-22W

Prepared By Stacey W. Callison (Sign/Print Name) Stacey W. Callison

Date 4/10/91

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

Date 5/10/91

Depth feet (340) 4/10/91 gwc	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' 140.5'		ST End		(140.5') CALICHE (60% gravel, 30% sand 10% silt) lt. olive brown (2.5Y 5/3) natural lt. yellowish brown (2.5Y 6/4) dry VFP - very strong rxn to 10% HCL, mod. sorted, CP-15% MP-15% FP-15% VFP-15% VCS-10% CS-10% MS-10%	caliche in ST shoe starts @ 140.5' b/s small sample hard to classify caliche thickness unknown due to HT drilling
PP				(145') SAND (95% sand 5% gravel) lt. olive brown (2.5Y 5/3) natural lt. yellowish brown (2.5Y 6/3) dry VFP-5% VCS-50% CS-20% MS-15% FS-10% well sorted, subangular, 60% mafic 40% felsic, very strong rxn to 10% HCL,	caliche like sand cemented 4/22/91 cd: 145' slow drilling 8" cs casing
145'	3 mason 1 $CaCO_3$ 1 rad	HT			
148'	3 chem 3 mason 1 $CaCO_3$ 1 rad	ST start 4/15/82/101		(148'-150') slightly silty sandy GRAVEL (65% gravel, 25% sand, 10% silt) vy dk grayish brown (2.5Y 3/2) wet lt. brownish gray (2.5Y 6/2) dry VCP-10% CP-15% MP-15% FP-15% VFP-15% VCS-10% CS-5% MS-10%, moderately sorted, subangular, 70% mafic 30% felsic strong rxn to 10% HCL, mottled	4/23/91 cd: 148' b/s slow hard drilling 8" cs casing water @ 134' very strongly cemented, bottom of ST was powdery dry
150'		ST End			
			TD		
155'					
160'					

A-6000-382 (04/90)

9313018.151

lot 8

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

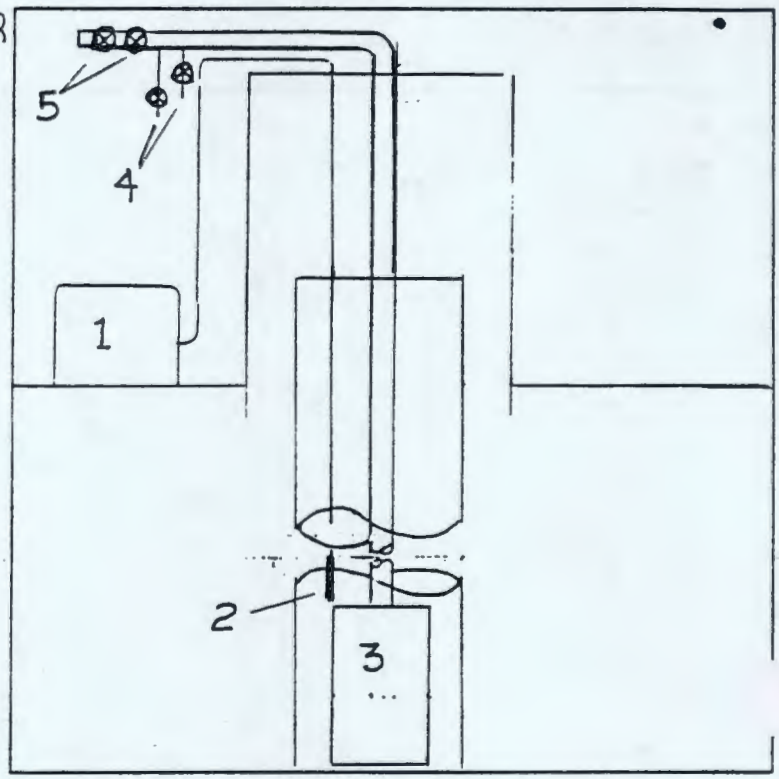
Well Designation 299-W18-29 Depth 139.35' BTOC.6"

VALIDATED KDR 3/26/9 SIGNATURE DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K-192
2	TRANSDUCER SN-350976
3	PUMP - HYDRO STAR.
4	SAMPLING PORTS
5	SHUT OFF VALVES

Diagram

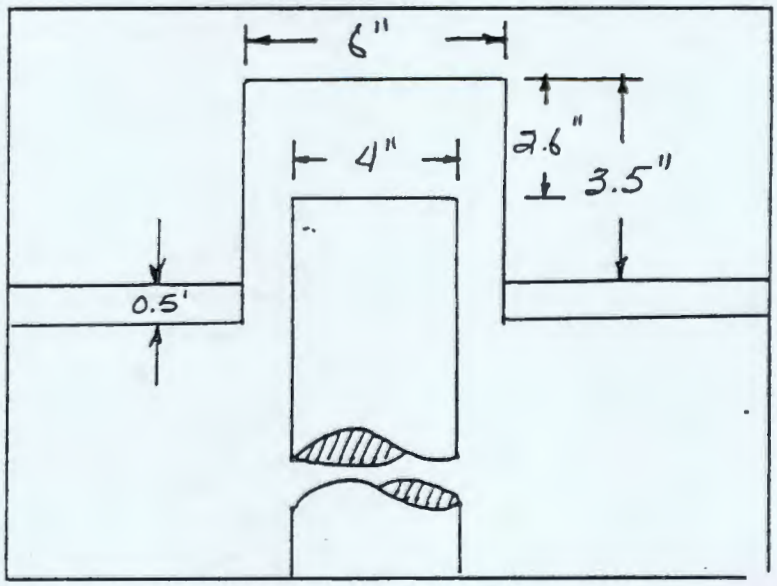


Well Head

Comments

BECAUSE OF THE CONSTRUCTION OF THE SCREEN THAT WAS USE IN WELL 299-W18-29 THE SUMBMERSIBLE NORMALLY USED IN DEVELOPMENT COULD NOT BE SET TO DEPTH. A POSSITIVE DISPLACEMENT PISTON PUMP (HYDROSTAR) WAS USED.

Diagram



Signature of Recorder JAMES A. COATES JAMES A. COATES Date 7-25-91

A-6000-417 (08/89)

9313018.1568

2 of 8

WELL DEVELOPMENT FORM

Well Designation 299-W18-29 Well Depth 139.35'

Screened Interval 139.35' - 123.35' BTOC 6" Date Well Development is Performed 7-15/16-91

BAILING

Water Level Prior to Bailing 126.3' Time of Measurement 1000

Volume of Bailer 3.5 GALS. Number of Bails Removed 50 Gallons 110 GALS.

Summary Description of Water Removed MODERATELY TURBID W/ SOME SAND - SLIGHT

Water Level After Bailing - NA - Time of Measurement - NA -

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 DISPLACE. PISTON TYPE Pump Depth 137.4' Pump Start Time 1050 (7-16-91)

Flow Rate 2.8 GPM Accumulated Flow 262 GALS Pump Stop Time 1208

Turbidity (NTU) 40, >100, 46, 26, 20.5, 2.3, 2-4, - NA -

NA

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

Comments _____

Signature of Recorder James A. Coates JAMES A. COATES Date 7-25-91

Sign and Print Name

A-6000-393 (03/90)

9313018.1552

DRAWDOWN/RECOVERY

Well Designation 299-W18-29 Date 7-16-91

Well Depth 139.35' BTOC 6" Screened Interval 139.35- 123.35'

Pumping Method POSITIVE DISPLACEMENT PISTON TYPE PUMP

Equipment Used to Measure Water Level E-TAPE/TRANSDUCER'S N ET-5/325976 Calibation Due 8-21-91/5-9-92

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

Measuring Point TOP OF 6" CASING TOC 6" Pump Start Time 1050. Pump Stop Time 11:07

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD 2.8 GPM
		SEE ATTACHED DATA		

Signature of Recorder JAMES A. COATES JAMES A. COATES Date 7-25-91

Sign and Print Name 13-18

A-6000-402 (03/90)

9313018.1570

4 of 8

Kge 2 of 6

WELL 2-W18-29 BASELINE

SE2000
Environmental Logger
07/17 07:49

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	126.320
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 10:37:54

Elapsed Time	INPUT 1
0.0000	126.320
5.0000	126.329
10.0000	126.335

END

9313018.157

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PAGE 30of6

WELL 2-W18-29 DRAWDOWN

SE2000
Environmental Logger
07/17 07:46

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	126.320
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 10:52:02

Elapsed Time	INPUT 1
0.0000	126.415
0.0083	126.586
0.0166	126.620
0.0250	126.237
0.0333	127.387
0.0416	125.870
0.0500	126.475
0.0583	127.102
0.0666	126.766
0.0750	126.411
0.0833	127.400
0.1000	126.164
0.1166	126.896
0.1333	127.156
0.1500	127.077
0.1666	128.122
0.1833	127.127
0.2000	127.910
0.2166	126.766
0.2333	127.878
0.2500	127.688
0.2666	127.982
0.2833	127.758
0.3000	127.289
0.3166	128.214
0.3333	128.134
0.4166	128.610
0.5000	128.454
0.5833	129.015
0.6666	129.348
0.7500	129.534
0.8333	129.702
0.9166	130.174
1.0000	130.282
1.0833	130.406
1.1666	130.637

9313018.1572

WELL 2-W18-29 DRAWDOWN

1.2500	130.862
1.3333	131.128
1.4166	131.378
1.5000	131.508
1.5833	131.777
1.6666	131.888
1.7500	131.948
1.8333	132.255
1.9166	132.325
2.0000	132.623
2.5000	133.557
3.0000	134.333
3.5000	135.154
4.0000	136.110
4.5000	137.026
5.0000	137.235
5.5000	137.200
6.0000	137.212
6.5000	137.212
7.0000	137.212
7.5000	137.209
8.0000	137.212
8.5000	137.231
9.0000	137.228
9.5000	137.225
10.0000	137.231
12.0000	137.225

END

9313018.1577

WELL 2-W18-29 RECOVERY

SE2000
Environmental Logger
07/17 07:43

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	126.320
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/16 11:07:32

E-Time	INPUT 1
0	140.74
0.0083	140.74
0.0166	140.74
0.025	140.74
0.0333	140.74
0.0416	140.74
0.05	140.74
0.0583	140.74
0.0666	140.743
0.075	140.724
0.0833	140.705
0.1	140.667
0.1166	140.629
0.1333	140.594
0.15	140.556
0.1666	140.522
0.1833	140.487
0.2	140.449
0.2166	140.414
0.2333	140.379
0.25	140.344
0.2666	140.309
0.2833	140.274
0.3	140.24
0.3166	140.202
0.3333	140.167
0.4166	140.012
0.5	139.844
0.5833	139.679
0.6666	139.521
0.75	139.356
0.8333	139.182
0.9166	139.001
1	138.824
1.0833	138.65
1.1666	138.472

9313018.1574

WELL 2-W18-29 RECOVERY

1.25	138.311
1.3333	138.165
1.4166	138.045
1.5	137.94
1.5833	137.835
1.6666	137.728
1.75	137.607
1.8333	137.487
1.9166	137.37
2	137.25
2.5	136.53
3	135.846
3.5	135.254
4	134.697
4.5	134.111
5	133.559
5.5	133.059
6	132.615
6.5	132.194
7	131.814
7.5	131.51
8	131.26
8.5	131.063
9	130.911
9.5	130.794
10	130.699
12	130.443
14	130.303
16	130.224
18	130.17
20	130.139
22	130.107
24	130.085

END

9313018.157

Page 1/1

VALIDATED
KDR 7/26/92
[illegible] DATE

SAMPLING PUMP INSTALLATION FORM

Project: W-017 Well Number 299-W18-29

Pump Type HYDROSTAR Pump Model 800'

Date Installed: 7/15/92 Installed by: B DITRODE/M MUNSON

Depth to water: 126.1' BTOC Depth to Bottom 139.35 BTOC

Reported Depth to water: -NA-

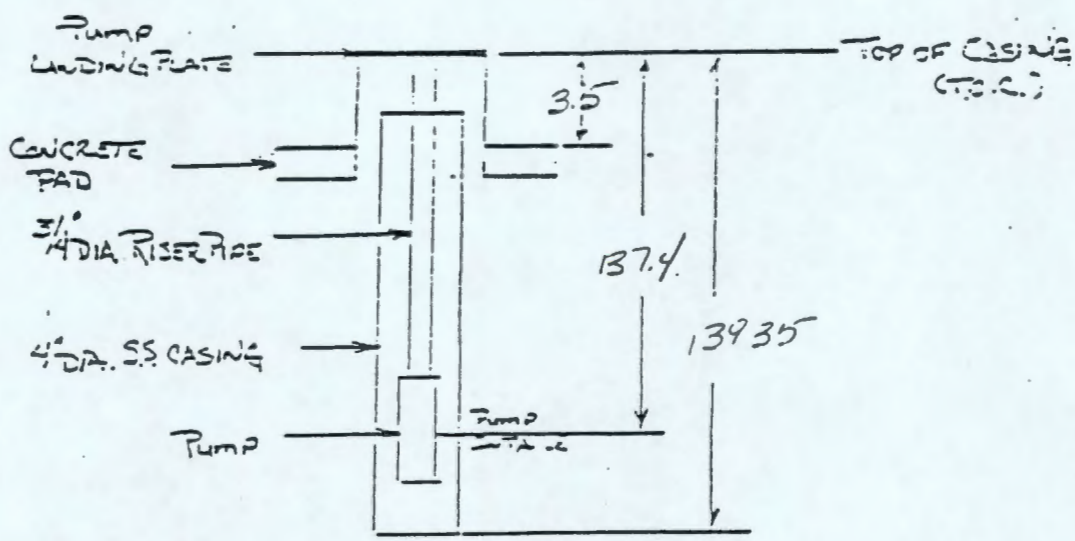
Screened Interval: (16.03) 139.35 - 123.32' BTOC

Pump/Riser Pipe Description:
pipe: 3/4" S.S DISCHARGE
pump length: 43
pump screen length 14
material cleaning: MANUFACTURER

Comments:

PUMP INSTALLATION SKETCH

Total material length 139.3
Loc. of pump intake: 137.4



Completed By: J.A. COATES Date: 7/15/92

9313018.1576

BOREHOLE TEST INFORMATION

VALIDATED KD2 2/26/92 SIGN TITLE/DATE

Borehole 299-W18-29 Borehole Diameter 4" Hanford Coordinates — N/A —

Interval Tested 139.35' - 123.35' BTOC 6" Depth Interval 139.35' - 123.35'

Test Type INSTANTANEOUS SLUG INJECTION & WITHDRAWAL Borehole Depth 139.35'

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

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-ET-5
DATA LOGGER.	IN-SITU INC. S.N.-2K192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.-350976.
SLUGGING ROD	62' X 2' .137 ft²
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

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

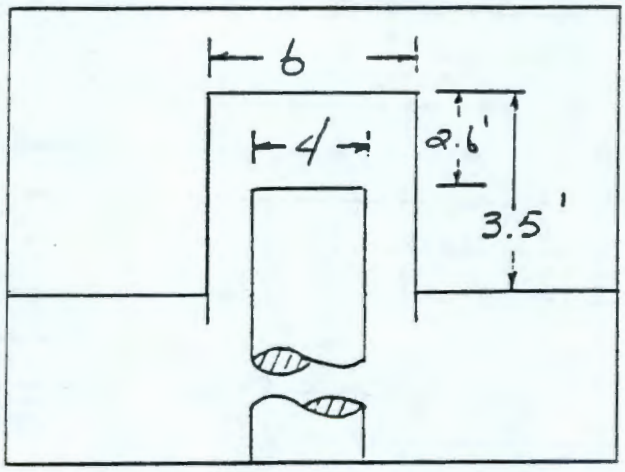
Elevation NA

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 7-25-91

Sign and Print Name Date

9313018.157

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

INSTANTANEOUS SLUG TEST DATA SHEET

-WITHDRAWAL-

Borehole 299-W18-29

Interval Tested 139.35'-123.35' BTOC .6'

Depth to Water 126.2'

Date 7-15-91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time START 1503 - END 1515

Transducer Measurement Units FEET

Depth to Transducer 12.253' BWL.

Initial Pressure (P_i) 126.32'

Slug Level or Pressure (P_{max}) 128.62'

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) 7-25-91 (Date)

BD-6000-293 (07/90)

9313018.1578

Page 2 of 3 5 of 4

WELL 2-W18-29 WITHDRAWAL

SE2000
Environmental Logger
07/16 08:14

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	126.320
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000

Step 0 7/15 14:59.683

O-Time	E-Time	D-T-W:Ft
1459.683	0	120.102
1459.691	0.0083	128.622
1459.699	0.0166	128.115
1459.708	0.025	128.264
1459.716	0.0333	128.166
1459.724	0.0416	128.163
1459.733	0.05	128.141
1459.741	0.0583	128.119
1459.749	0.0666	128.087
1459.758	0.075	128.062
1459.766	0.0833	128.052
1459.783	0.1	128.008
1459.799	0.1166	127.967
1459.816	0.1333	127.929
1459.833	0.15	127.894
1459.849	0.1666	127.859
1459.866	0.1833	127.827
1459.883	0.2	127.789
1459.899	0.2166	127.761
1459.916	0.2333	127.726
1459.933	0.25	127.697
1459.949	0.2666	127.663
1459.966	0.2833	127.634
1459.983	0.3	127.606
1459.999	0.3166	127.577
1500.016	0.3333	127.552
1500.099	0.4166	127.434
1500.183	0.5	127.314
1500.266	0.5833	127.213
1500.349	0.6666	127.124
1500.433	0.75	127.051
1500.516	0.8333	126.988
1500.599	0.9166	126.937
1500.683	1	126.886
1500.766	1.0833	126.848
1500.849	1.1666	126.807

9313018.1679

WELL 2-W18-29 WITHDRAWAL

1500.933	1.25	126.776
1501.016	1.3333	126.747
1501.099	1.4166	126.722
1501.183	1.5	126.696
1501.266	1.5833	126.677
1501.349	1.6666	126.658
1501.433	1.75	126.639
1501.516	1.8333	126.62
1501.599	1.9166	126.605
1501.683	2	126.589
1502.183	2.5	126.519
1502.683	3	126.472
1503.183	3.5	126.434
1503.683	4	126.408
1504.183	4.5	126.392
1504.683	5	126.38
1505.183	5.5	126.37
1505.683	6	126.358
1506.183	6.5	126.351
1506.683	7	126.345
1507.183	7.5	126.342
1507.683	8	126.332
1508.183	8.5	126.329
1508.683	9	126.329
1509.183	9.5	126.323
1509.683	10	126.326
1511.683	12	126.316

9313018.1580

INSTANTANEOUS SLUG TEST DATA SHEET

-INJECTION-

hole 299-W18-29

Interval Tested 139.35' - 123.35' BTOC. 6"

Depth to Water 126.2' BTOC 6"

Date 7-15-91

Measured by JAMES A. COATES

Slug Volume .137 ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time START 1435 · END 1501

Transducer Measurement Units FEET.

Depth to Transducer 12.253' BWL.

Initial Pressure (P_i) 126.32'

Slug Level or Pressure (P_{max}) 120.03'

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 JAMES A. COATES (Sign and Print Name) JAMES A. COATES 7-25-91 (Date)

BD-6000-293 (07/90)

Page 2 of 5

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WELL 2-W18-29 BASELINE FOR INJECTION

SE2000
Environmental Logger
07/16 08:24

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	126.320
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 07/15 14:31.983

O-Time	E-Time	D-T-W:Ft
1431.983	0	126.316
1431.991	0.0083	126.32
1431.999	0.0166	126.32
1432.008	0.025	126.32
1432.016	0.0333	126.32
1432.024	0.0416	126.32
1432.033	0.05	126.316
1432.041	0.0583	126.316
1432.049	0.0666	126.316
1432.058	0.075	126.32
1432.066	0.0833	126.32
1432.083	0.1	126.316
1432.099	0.1166	126.32
1432.116	0.1333	126.32
1432.133	0.15	126.32
1432.149	0.1666	126.316
1432.166	0.1833	126.32
1432.183	0.2	126.316
1432.199	0.2166	126.316
1432.216	0.2333	126.316
1432.233	0.25	126.316
1432.249	0.2666	126.316
1432.266	0.2833	126.316
1432.283	0.3	126.32
1432.299	0.3166	126.32
1432.316	0.3333	126.316
1432.399	0.4166	126.316
1432.483	0.5	126.32
1432.566	0.5833	126.32
1432.649	0.6666	126.32
1432.733	0.75	126.32
1432.816	0.8333	126.323
1432.899	0.9166	126.32
1432.983	1	126.32
1433.066	1.0833	126.32
1433.149	1.1666	126.32

9313018.1582

Page 3 of 5

7 of 9

WELL 2-W18-29 BASELINE FOR INJECTION

1433.233	1.25	126.316
1433.316	1.3333	126.316
1433.399	1.4166	126.32
1433.483	1.5	126.32
1433.566	1.5833	126.32
1433.649	1.6666	126.32
1433.733	1.75	126.316
1433.816	1.8333	126.32
1433.899	1.9166	126.316
1433.983	2	126.316
1434.483	2.5	126.316
1434.983	3	126.316
1435.483	3.5	126.316
1435.983	4	126.32
1436.483	4.5	126.32
1436.983	5	126.316
1437.483	5.5	126.32
1437.983	6	126.32
1438.483	6.5	126.316
1438.983	7	126.32
1439.483	7.5	126.313
1439.983	8	126.316
1440.483	8.5	126.32
1440.983	9	126.313
1441.483	9.5	126.316
1441.983	10	126.316

WELL 2-W18-29 INJECTION

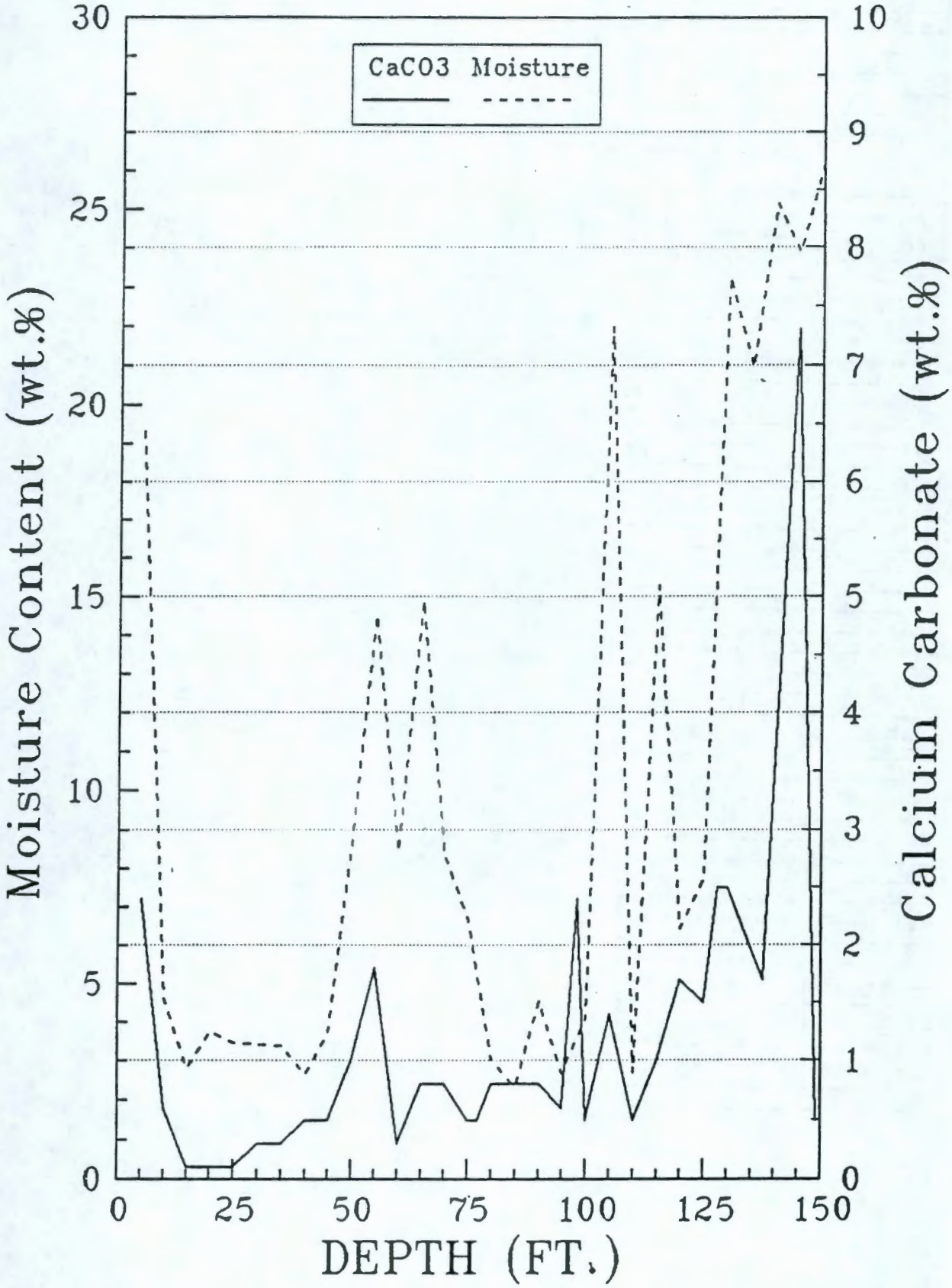
1446.617	1.25	125.968
1446.700	1.3333	125.981
1446.783	1.4166	125.99
1446.867	1.5	126.003
1446.950	1.5833	126.012
1447.033	1.6666	126.025
1447.117	1.75	126.031
1447.200	1.8333	126.041
1447.283	1.9166	126.047
1447.367	2	126.057
1447.867	2.5	126.101
1448.367	3	126.133
1448.867	3.5	126.158
1449.367	4	126.183
1449.867	4.5	126.202
1450.367	5	126.218
1450.867	5.5	126.228
1451.367	6	126.24
1451.867	6.5	126.25
1452.367	7	126.253
1452.867	7.5	126.259
1453.367	8	126.262
1453.867	8.5	126.269
1454.367	9	126.275
1454.867	9.5	126.278
1455.367	10	126.288
1457.367	12	126.288

9313018.1584

VALIDATED
KDR 7/26/92
SIGNATURE/DATE

192

WELL 299-W18-29



9313018.1507

2g2

	A	B	C
1	WELL 299-W18-29		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	2.4	19.29
7	10	0.6	4.6
8	15	0.1	2.78
9	20	0.1	3.74
10	25	0.1	3.47
11	30	0.3	3.4
12	35	0.3	3.39
13	40	0.5	2.65
14	45	0.5	3.68
15	50	1	8.71
16	55	1.8	14.52
17	60	0.3	8.45
18	65	0.8	14.91
19	70	0.8	8.31
20	75	0.5	6.65
21	77	0.5	3.01
22	80	0.8	2.3
23	85	0.8	4.53
24	90	0.8	2.67
25	95	0.6	4.09
26	98	2.4	21.97
27	100	0.5	2.69
28	105	1.4	15.28
29	110	0.5	6.42
30	115	1	7.72
31	120	1.7	23.25
32	125	1.5	20.95
33	128	2.5	25.13
34	130	2.5	23.89
35	137.5	1.7	26.15
36	145	7.3	25.67
37	149	0.5	6.59
38			
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9313018.1586

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0836 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-29
125'

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

ARCHIVE

9313018.1557

1-0836

RADIATION RELEASE

Bldg. W-18-29 Expiration Date 5-6-91

Released By [illegible]
Health Physics

Remarks 125'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0836 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-6-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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
10	130.6	0	0	100
40		24.8	19.0	81.0
60		57.4	44.0	56.0
100		81.7	62.6	37.4
200		106.8	81.8	18.2
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

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 5-6-91

A-6400-204(2-87)

9313018.1588

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0836

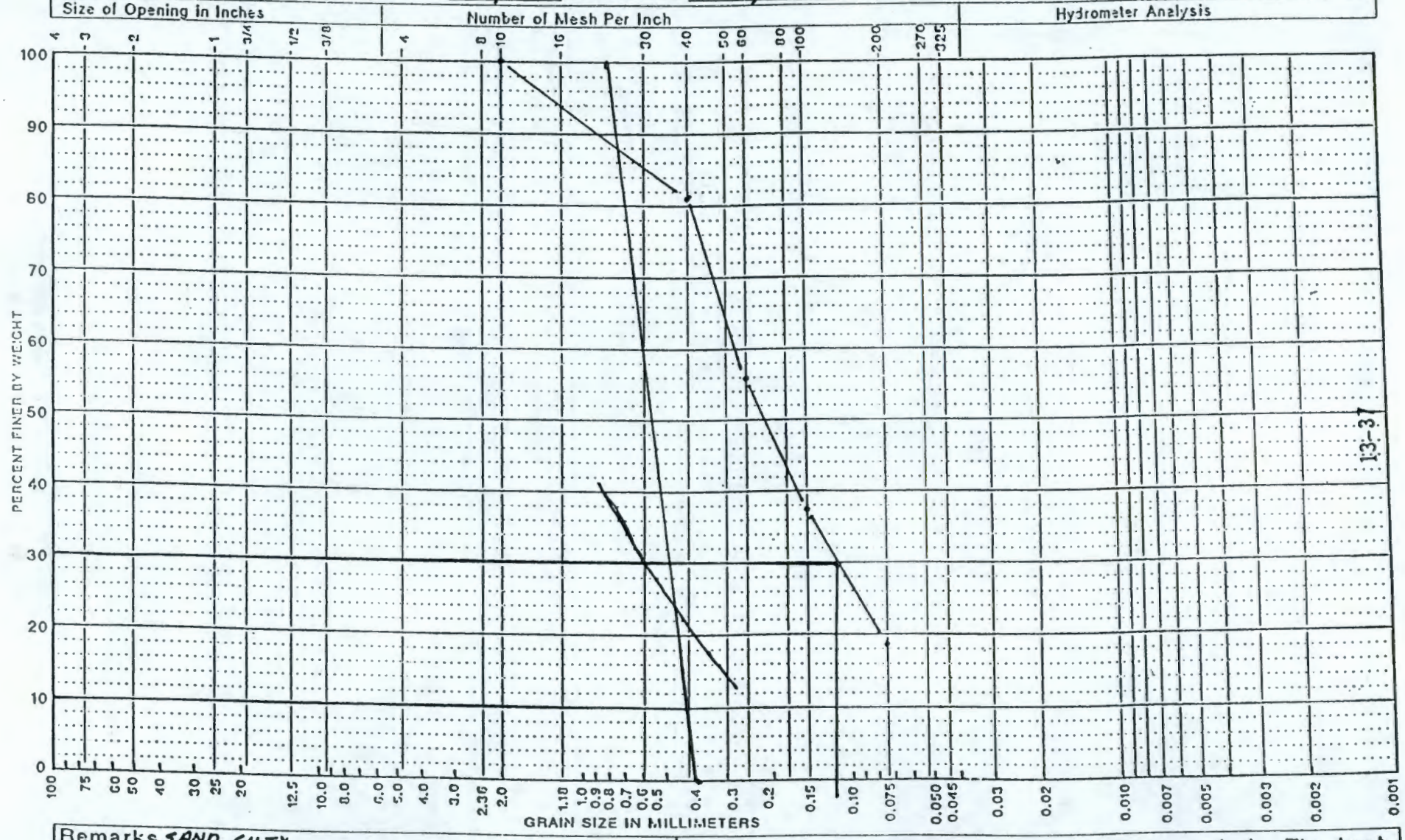
Page 1 of 1

Procedure No. ETAL-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



Remarks SAND, SILTY

299-W18-29 125'

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

Checked By: R.G. ALEXANDER Date 5-6-91

13-37

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

9313018.1556

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0837 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-29 128'

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

ARCHIVE

9313018.1590

1-0837

RADIATION RELEASE

WBN ~~Bldg.~~ W-18-2C Expiration Date 5-6-91

Released By R Palmer
Health Physics

Remarks 128'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0837 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-6-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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 CLAY Sieve Time 10 (min)

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

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
10	202.47	0	0	100
40	↓	0.3	0.2	99.8
60	↓	0.4	0.2	99.8
100	↓	0.6	0.3	99.7
200	↓	1.1	0.5	99.5
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

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 5-6-91

A-6400-204(2-87)

9313018.155

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0837

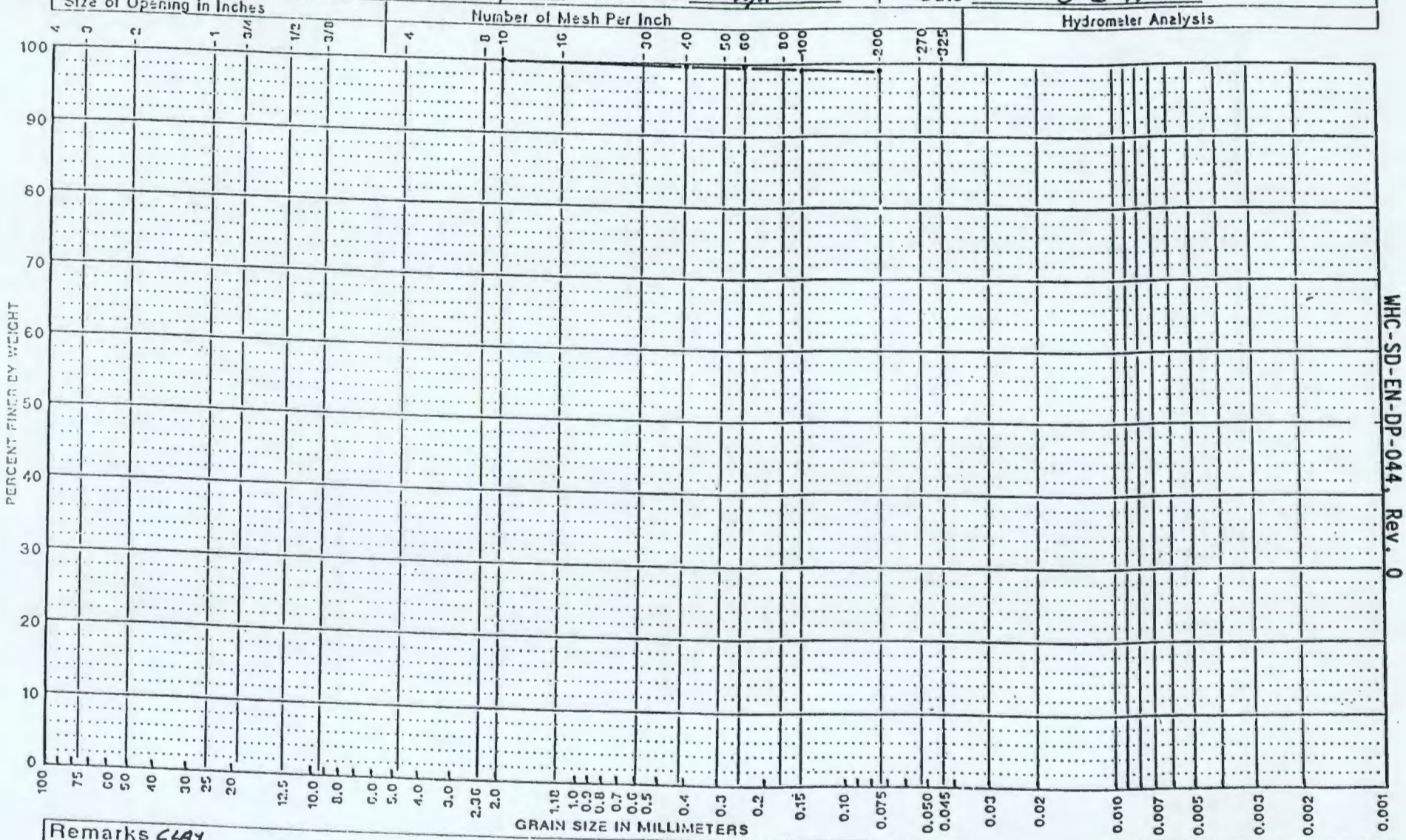
Page 1 of 1

Procedure No. ETAL-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 5-6-91



Remarks CLAY

299-W18-29 128'

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

Checked By: R.G. ALEXANDER Date 5-6-91

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0838 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-29
129-131'

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

ARCHIVE

1-0838

RADIATION RELEASE

WSU Bldg. W-18-29 Expiration Date 5-6-91

Released By R Palmer
Health Physics

Remarks 129-131'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0838 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-6-91
Procedure No: ETAL-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 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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 SILTY SAND Sieve Time 10 (min)

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

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
10	157.6	0	0	100
40		0.9	0.6	99.4
60		3.3	2.1	97.9
100		6.8	4.3	95.7
200		27.3	17.3	82.7
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

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: _____ Date _____

A-6400-204(2-87)

9313018.1594

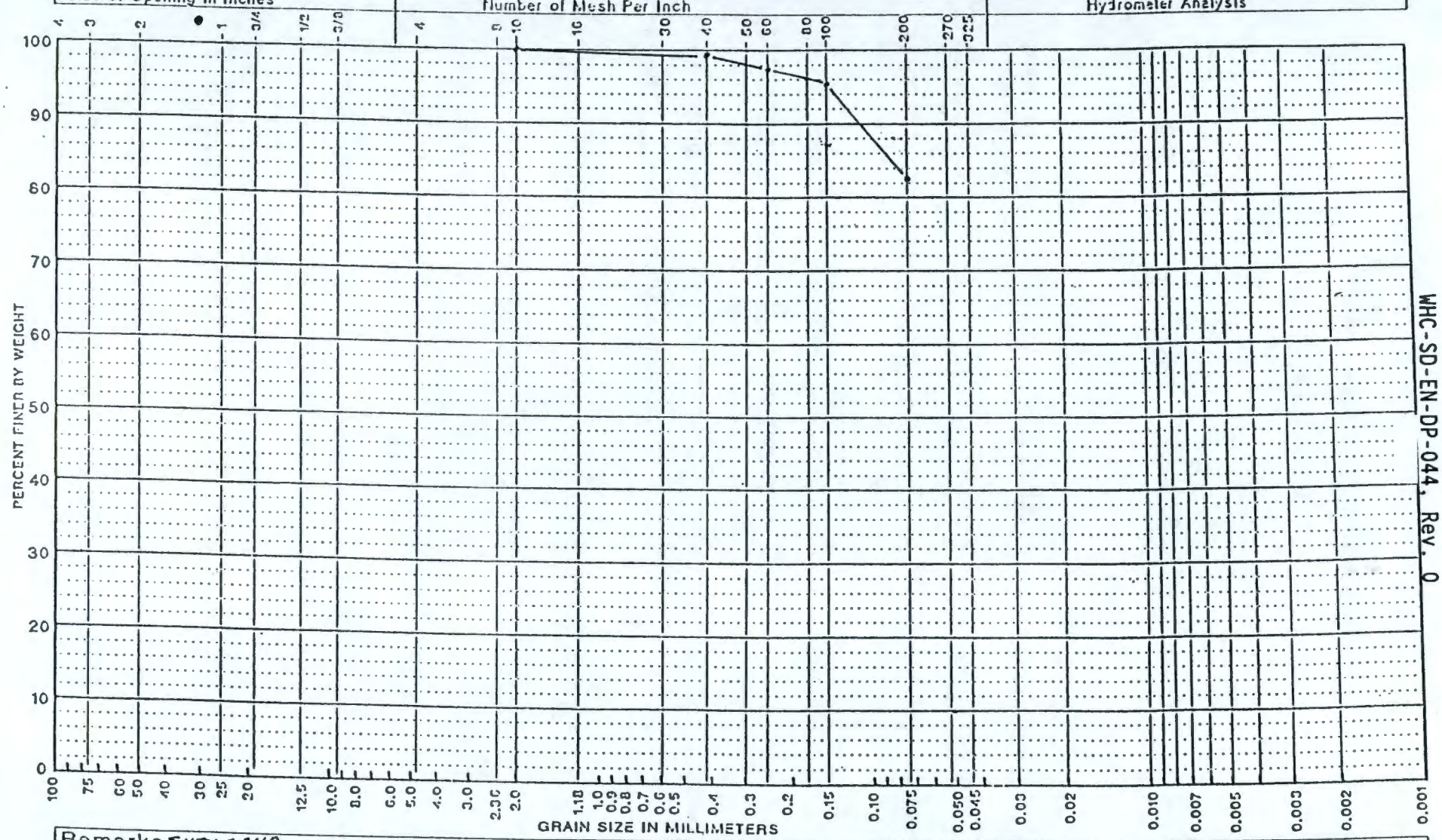
9313018.1505

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0838 Page 1 of 1

Procedure No. ETAL-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



Remarks SILTY SAND

299-W18-29 129-131'

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

Checked By: R.G. ALEXANDER Date 5-6-91

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0839 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-29 131-133'

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

ARCHIVE

9313018.1596

1.0839

RADIATION RELEASE

WGC Bldg. W-18-29 Expiration Date 5-6-91

Released By R.B. Palmer
Health Physics

Remarks 131'-133'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1.0039 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-6-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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 SILTY CLAY Sieve Time 10 (min)

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

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
60	143.9	0	0	100
100	↓	0.2	0.1	99.9
200	↓	4.2	2.9	97.1
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

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
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 5-6-91

A-6400-204(2-87)

9313018.155

9313018.1598

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0839

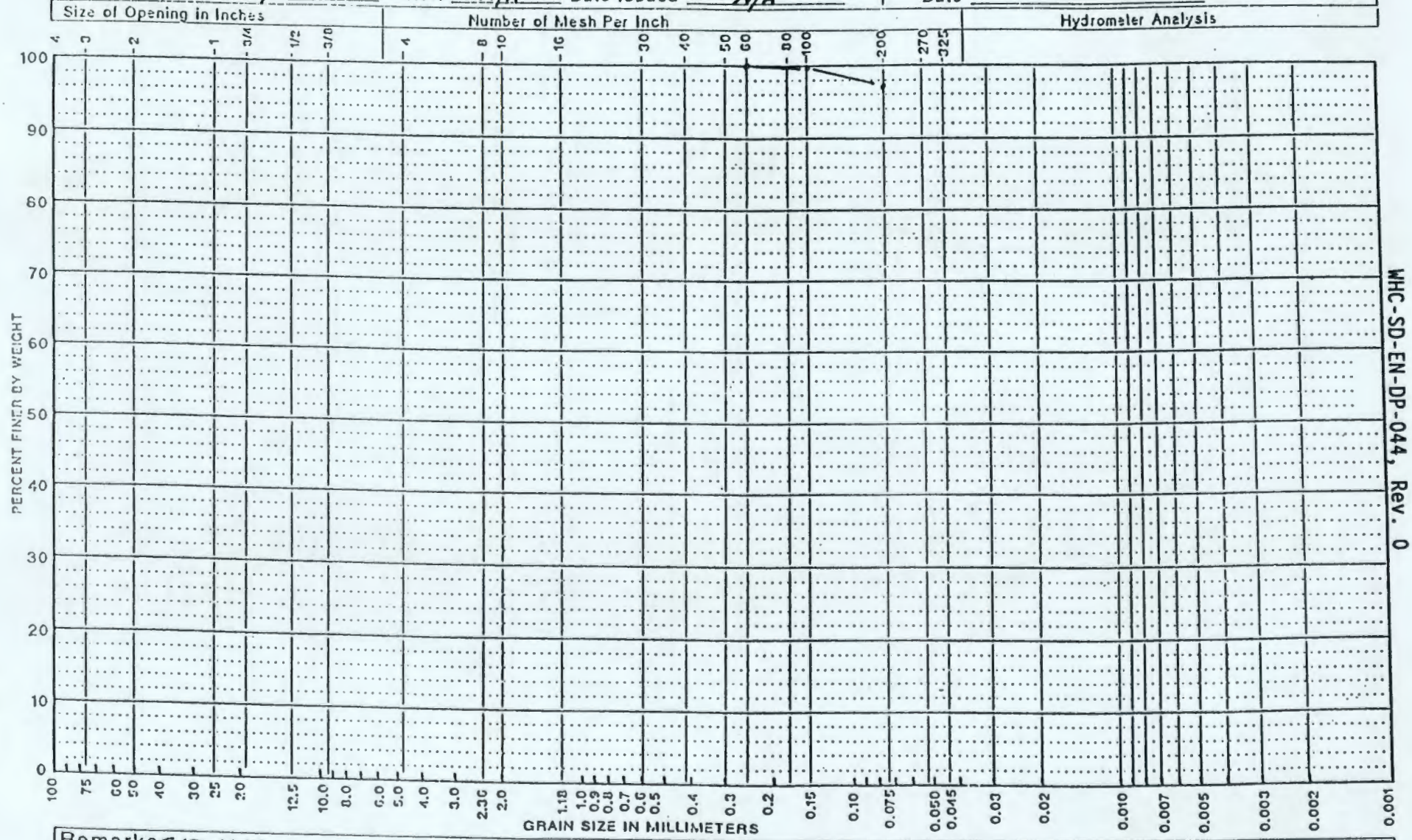
Page 1 of 1

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



Remarks SILTY CLAY

299-W18-29 131-133'

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

ecked By: R.G. ALEXANDER Date 5-6-

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

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-0840 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 5-6-91

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

REMARKS 299-W18-29
133-135'

RECEIVED BY: R.G. ALEXANDER DATE 5-9-91

APPROVED BY: R.G. ALEXANDER DATE 5-9-91

ARCHIVE

9313018.1559

1.0840

RADIATION RELEASE

Well ~~Bldg.~~ W-18-29 Expiration Date 5-6-91

Released By B Pahren
Health Physics

Remarks 133'-135'

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 1-0840 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 5-6-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 6-21-91
Thermometer: ETAL- 0007 Calibration Due Date 8-1-91
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 SILTY CLAY Sieve Time 10 (min)

Reduced by ∞ Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
60	198.1	0	0	100
100	↓	0.6	0.3	99.7
200	↓	22.0	11.1	88.9
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

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 5-6-91

A-6400-204(2-87)

9313018.1600

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-0840

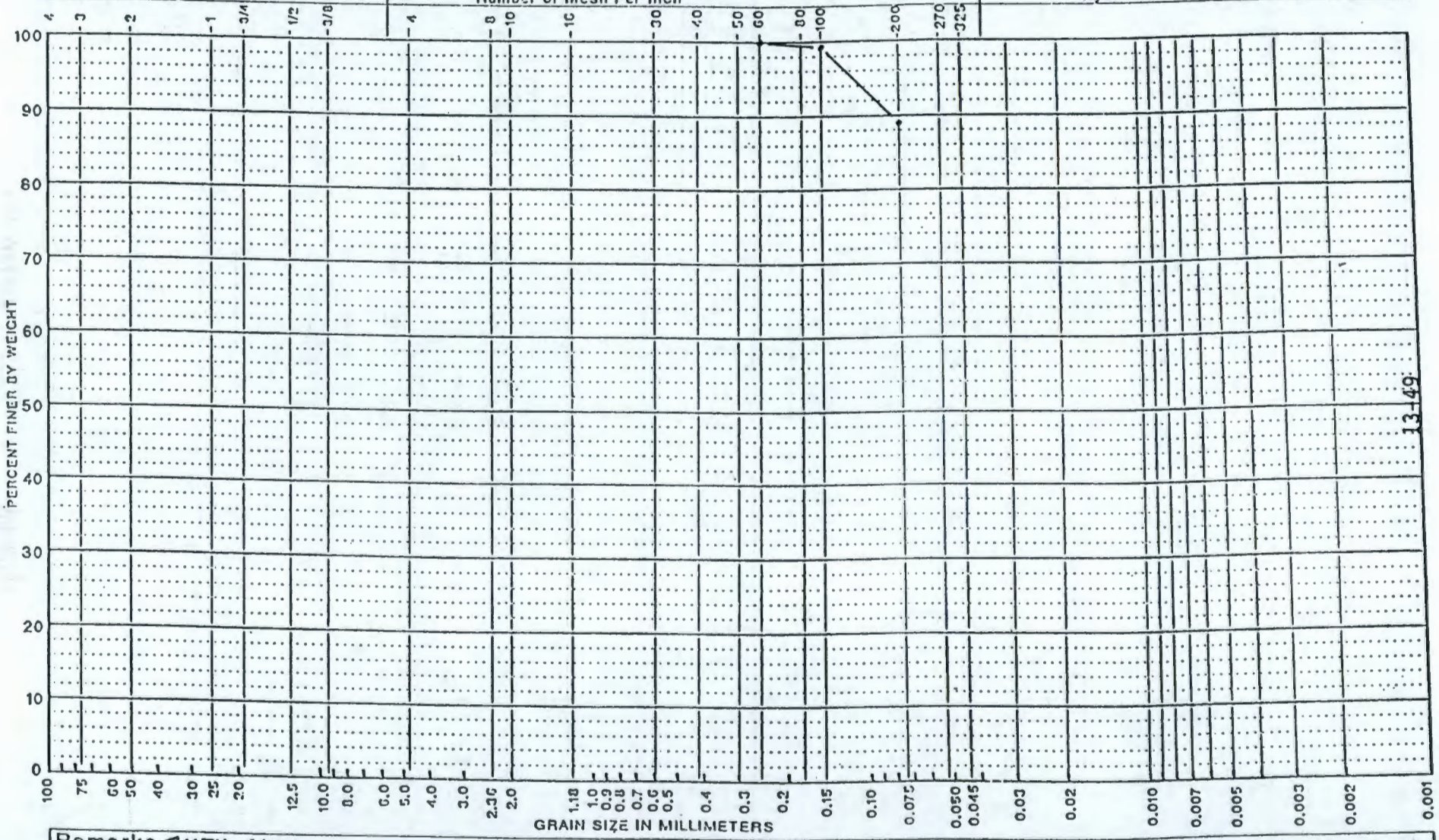
Page 1 of 1

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



Remarks SILTY CLAY

299-W18-29 133-135'

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

Checked By: R.G. ALEXANDER Date 5-6-91

13-49

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

9313018.1691

VALIDATED
KDR 2/24/92
SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:

Phone No.

Well No. W18-29

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'	4.1.91	SOIL	4.2.91	0649.91	50.5	1.2
10'				0650.91	55.0	0.5
15'				0651.91	26.6	0.2
20'	4.2.91		4.4.91	0678.91	14.2	0.3
25'				0679.91	10.3	0.2
30'			4.5.91	0680.91	9.0	0.8
35'				0681.91	11.3	0.4
40'	4.3.91			0681.91	12.4	0.3
45'				0690.91	10.9	0.4
50'				0691.91	21.8	<D
55'				0692.91	16.4	1.3
60'	4.5.91			0693.91	17.8	<D
65'				0694.91	10.8	<D
70'				0695.91	14.3	<
77'				0697.91	18.8	1.
78.9'-80.9'	4.8.91		4.10.91	0713.91	17.7	0.8
85'				0714.91	21.9	<D
90'				0715.91	16.4	0.9
95'	4.10.91			0721.91	10.2	0.3
98'				0722.91	24.7	8.5
98.5'-100.5'				0723.91	17.5	<D
105'	4.11.91		4.17.91	0734.91	9.6	1.0
110'	4.12.91			0740.91	25.7	1.0
115'				0743.91	25.0	1.7
120'-122'				0738.91	26.5	1.6
125'				0741.91	17.6	<D
128'				0742.91	34.2	8.7
129'-131'	4.15.91		4.22.91	0753.91	27.1	2.0
131'-133'				0754.91	37.1	2.3
~~133'-135'~~ 133'-135'				0755.91	27.7	<D
135'-138'				0756.91	37.6	2
145'	4.23.91		4.29.91	0834.91	13.6	0.

Performed By: _____

Date: _____

Page: ____ of ____

A-6000-829 (10/91)

9313018.1602

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

quested by:	Phone No.	Well No.	Date:
		W18-29	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
150'	4.23.91	SOIL	4.29.91	08.10.91	13.3	1.7
75'	4.5.91		4.5.91	06.16.91	14.2	0.4

Performed By: _____ Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1650

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Well No. 299-W18-29 ~~25~~ DEK 4/17/91 Area 200 West Date 4/17/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 670.65' Brass Cap

Survey Coordinates 135028.4 N 566561.2 E

Log Measured From Ground Surface

Location Description North of ZR Trench, West of 16th. St.

Ground Surface Elevation 670.65' Brass Cap

Surface Temperature 12.5 °C Weather Clear Warm

BOREHOLE INFORMATION

Driller Lenny Bultena

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

Borehole Diameter(s)/Depth 12"/19.58' 10"/140.0'

Depth Driller 135.0' | Depth Logger 135.0'

Liquid Level ~~N/A~~ 131.4' | Liquid Density Appearance ~~N/A~~ Muddy

Temperature ~~N/A~~ 21.7°C

CASING RECORD

Type 12" Carbon Steel Sch. 40 | Interval +0.6 - 19.4'

Type 10" Carbon Steel Sch. 40 | Interval +1.05 - 140.0'

Type | Interval

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.3' high

Centralizer was used.

Perched Water Present

* Survey data from Kaiser 12/15/92 RDM

13-53/51

A-6000-520 (05

9313018.1604

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: 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: 135.0'

To: 4.0'

Rerun(s): 135.0' – 90.0'

Pre Survey Verification: Position 1: 278.6 eU

Position 2: 48.4 eU

Background: 60 c/s

Base Calibration Difference: Position 1: 12.8 eU

Position 2: 0.1 eU

Logging Speed: 5 ft./min

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

Start Time: 0800

Completion Time: 1230

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: 274.6 eU

Position 2: 48.0 eU

Background: 60 c/s

Percent Change: Position 1: 1.4%

Position 2: 0.8%

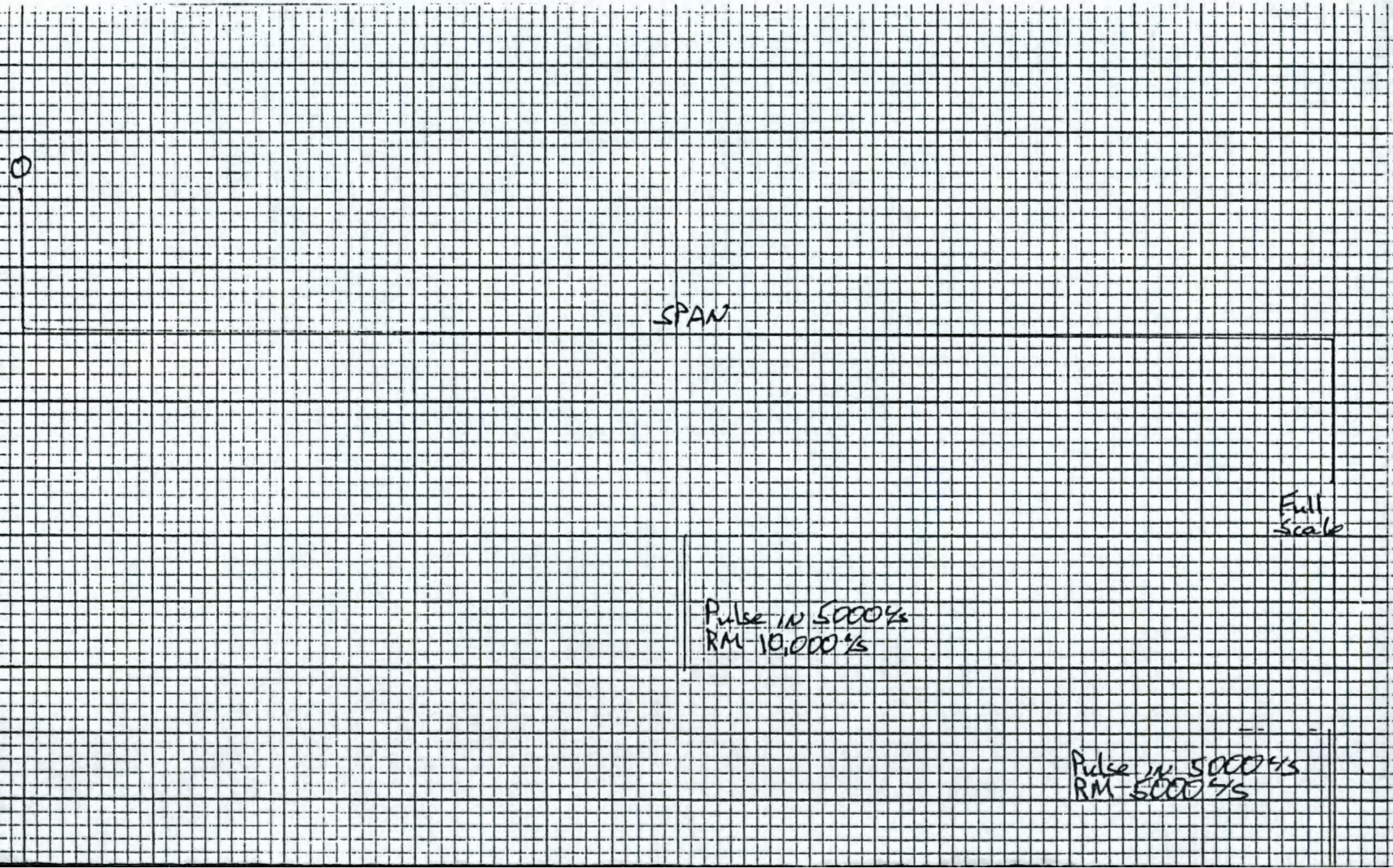
Comments:

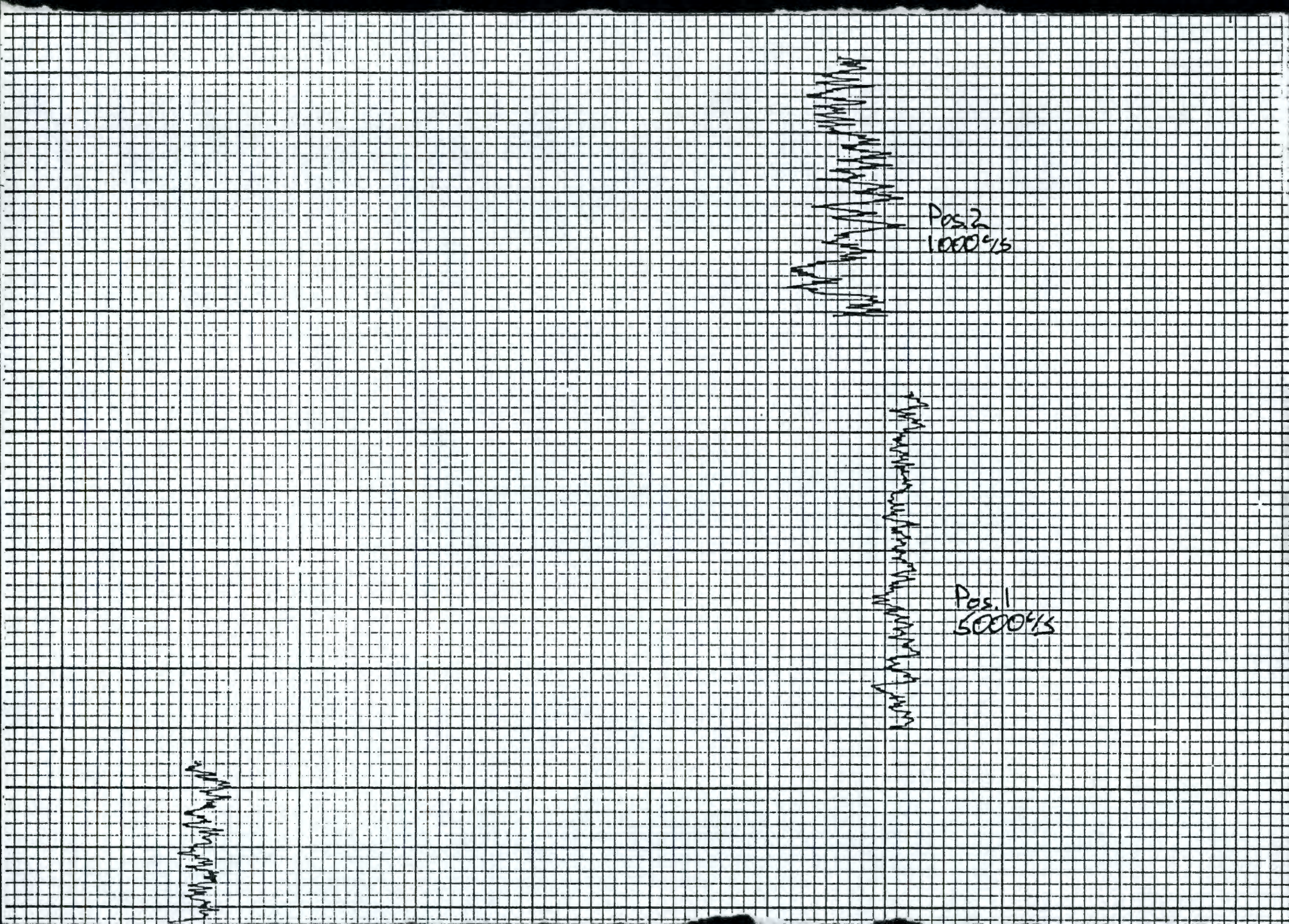
Comments Return Error = 0.5 high

Centralizer used.

Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E KOS Date: 4/17/91

A-6000-520

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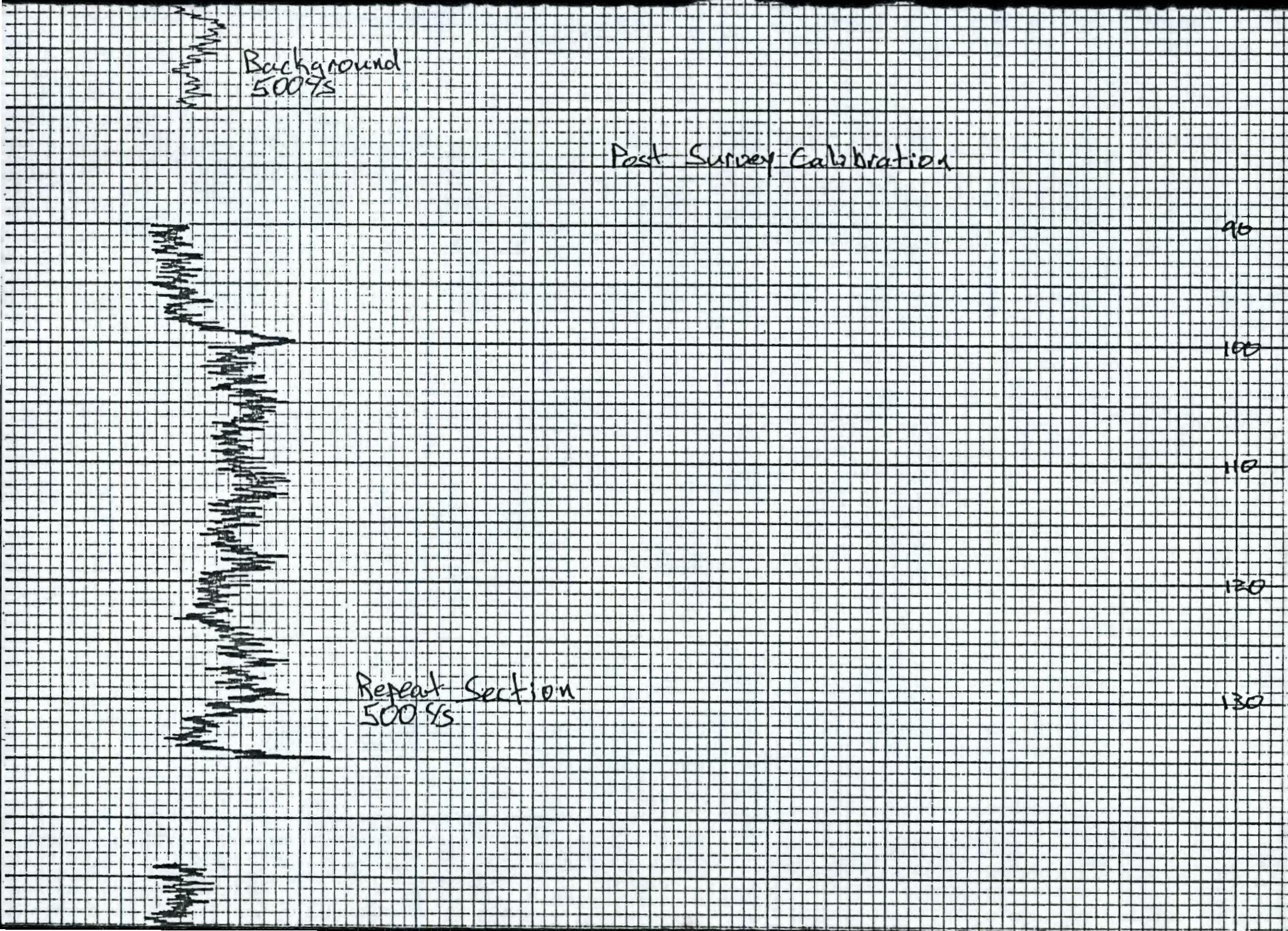
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Repeat Section
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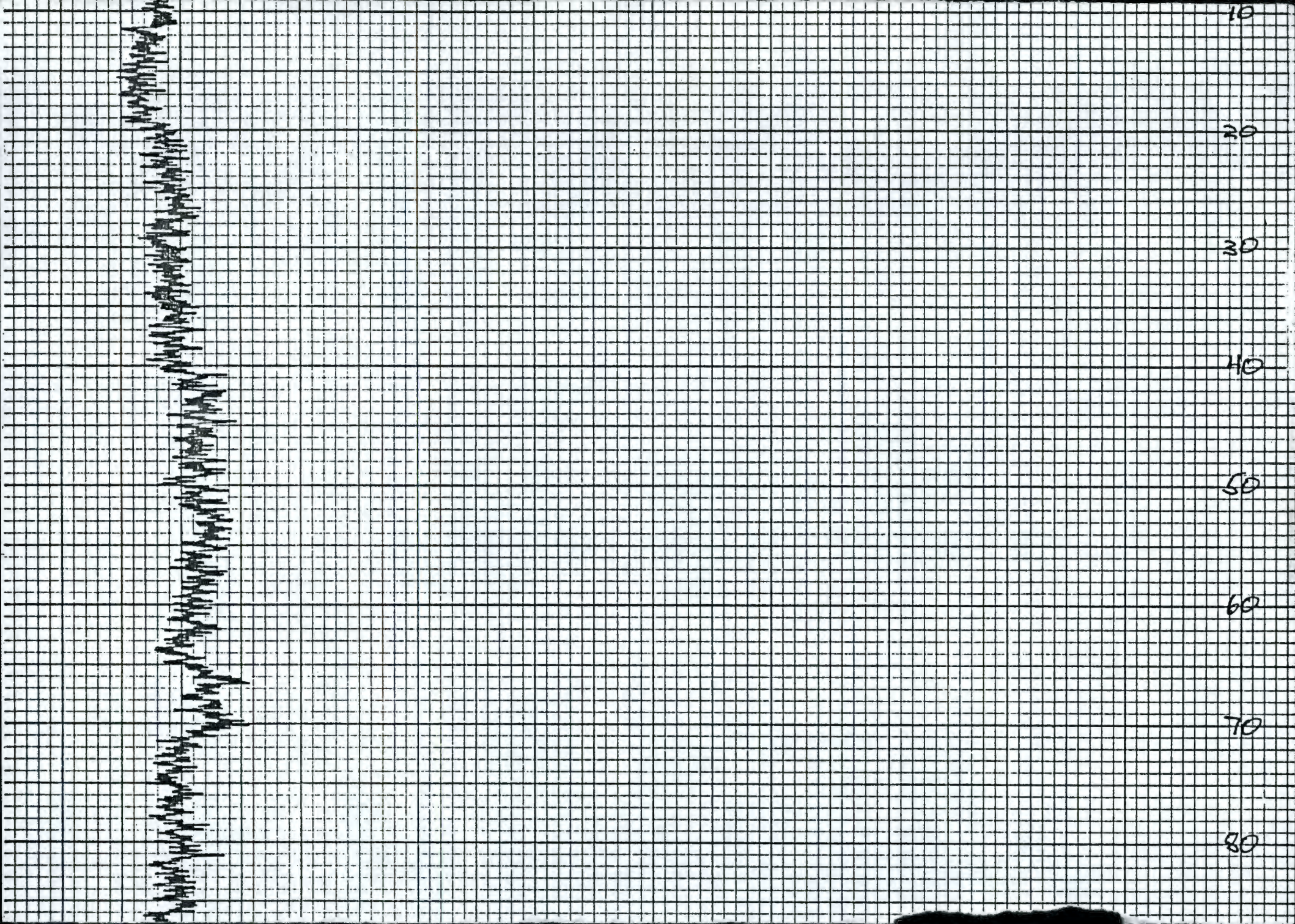
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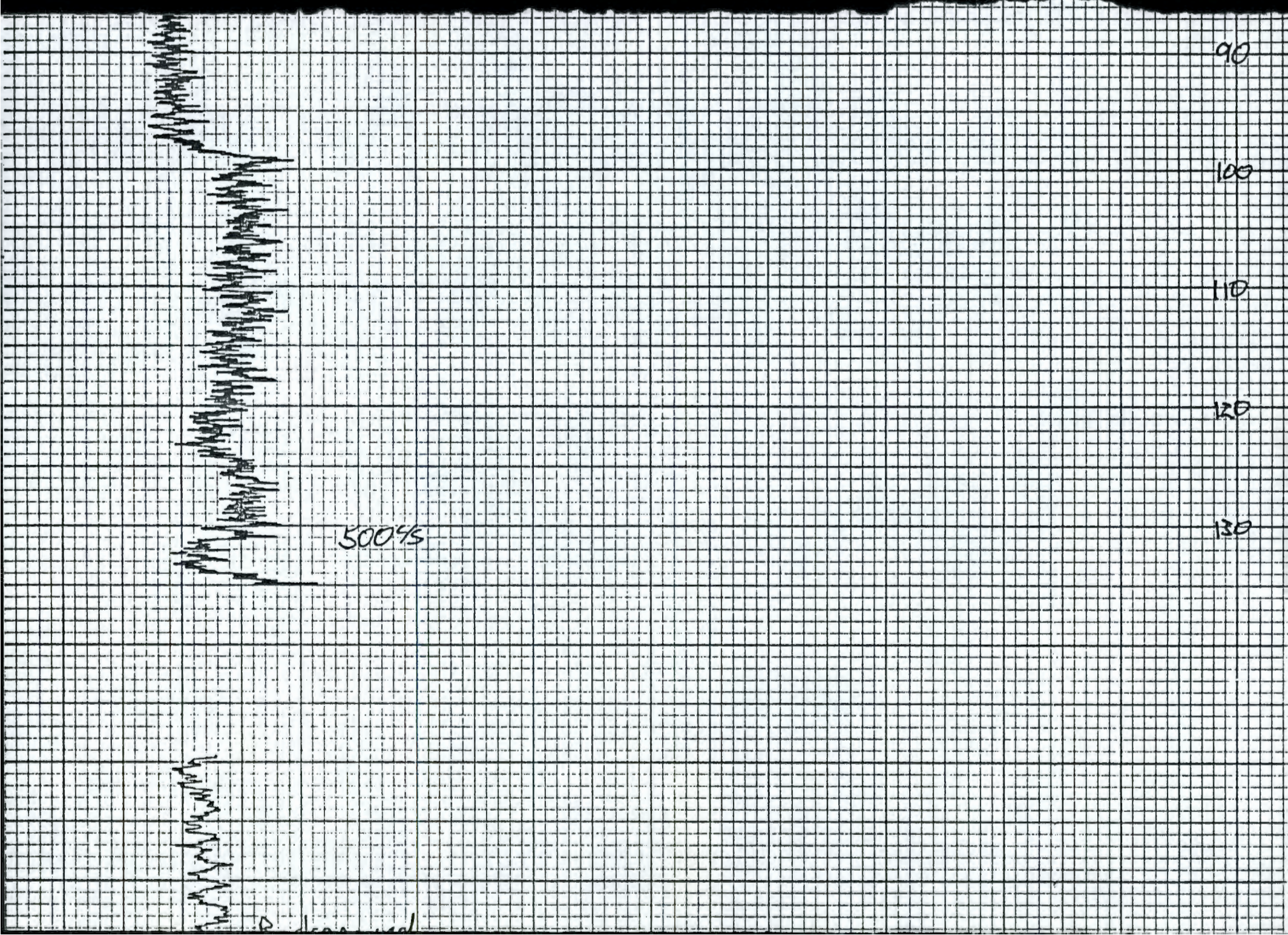
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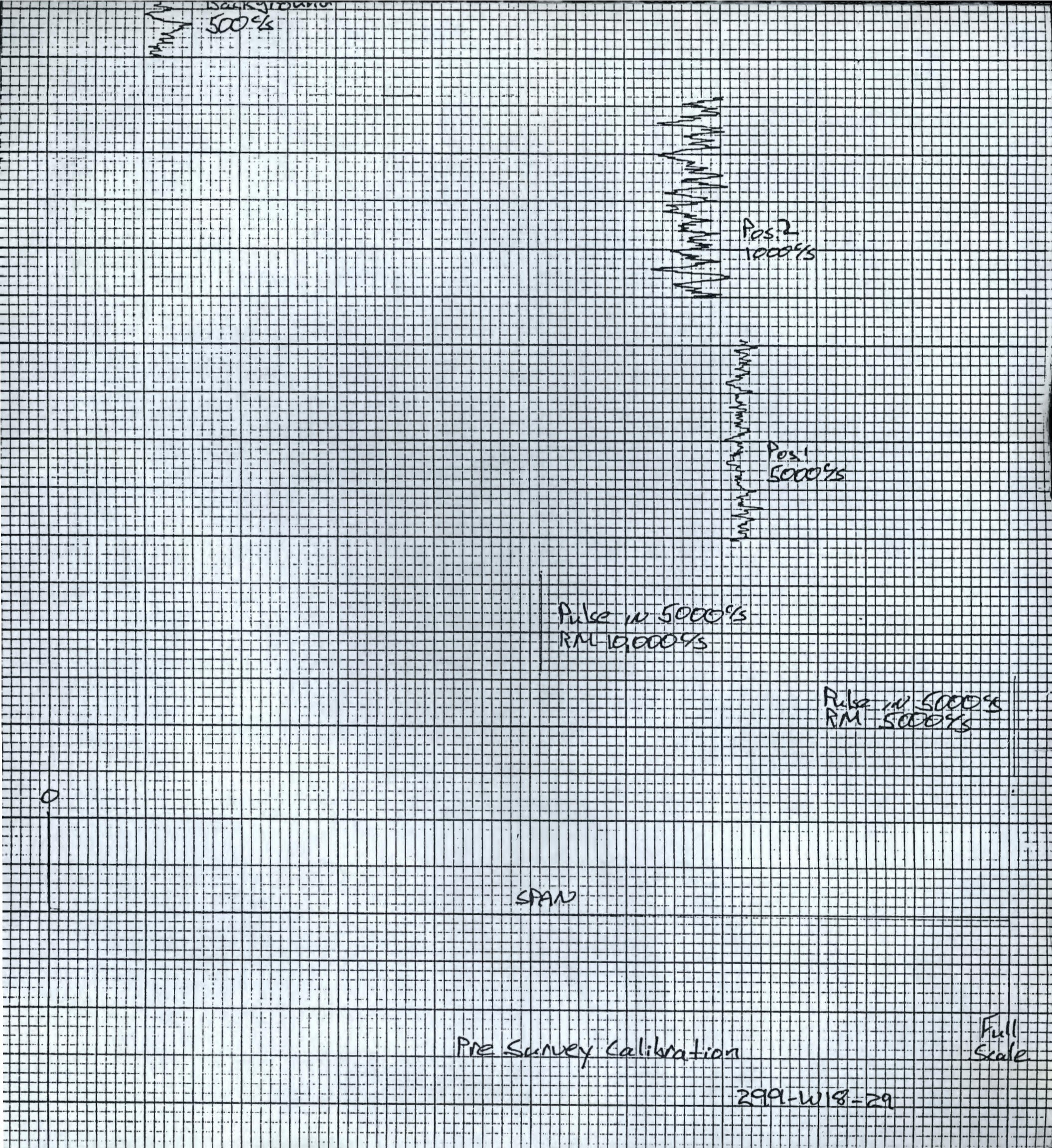
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Pos 1
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Pulse in 5000°/s
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Pulse in 5000°/s
RM 5000°/s
0
SPAN
Pre Survey Calibration
Full Scale
299-W18-29