

# HALLIBURTON

## SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY	OXY USA INC.
WELL	DRUSSEL G-1
FIELD/BLOCK	DRUSSEL
COUNTY	FINNEY
STATE	KANSAS
COMPANY	OXY USA INC.
WELL	DRUSSEL G-1
FIELD/BLOCK	DRUSSEL
COUNTY	FINNEY
STATE	KANSAS
API No.	1505522370000
Location	(SHL) 589' FEL & 2958' FSL
Sect.	4
Twp.	26S
Rge.	33W
Other Services:	DSN / SDL MICROLOG BSAT ACRT

Permanent Datum	GL	Elev.: 2900.0 ft
Log measured from	KB	D.F. 2910.0 ft
Drilling measured from	KB	G.L. 2900.0 ft

Date	24-Sep-13
Run No.	ONE
Depth - Driller	5310.00 ft
Depth - Logger	5306.0 ft
Bottom - Logged Interval	5262
Top - Logged Interval	3850
Casing - Driller	8.625 in @ 1643.0 ft
Casing - Logger	1643.0 ft
Bit Size	7.875 in @
Type Fluid in Hole	WATER BASED MUD
Density	9.7 ppg
PH	10.80 pH
Source of Sample	MUD PIT
Rm @ Meas. Temperature	0.690 ohmm @ 85.00 degF
Rmf @ Meas. Temperature	0.59 ohmm @ 85.00 degF
Rmc @ Meas. Temperature	0.790 ohmm @ 85.00 degF
Source Rmf	CALCULATED
Rm @ BHT	0.44 ohmm @ 136.0 degF
Time Since Circulation	12.0 hr
Time on Bottom	24-Sep-13 07:27
Max. Rec. Temperature	136.0 degF @ 5306.0 ft
Equipment	11230668 LIBERAL
Recorded By	S. INGERSOLL
Witnessed By	G. FLAGG

Fold here

Service Ticket No.: 900762415      API Serial No.: 1505522370000      PGM Version: WL INSITE R3.8.4 (Build 5)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES			
Date	Sample No.			Type Log	Depth	Scale Up Hole	Scale Down Hole
Depth-Driller							
Type Fluid in Hole							
Density	Viscosity						
Ph	Fluid Loss						
Source of Sample				RESISTIVITY EQUIPMENT DATA			
Rm @ Meas. Temp	@		@	Run No.	Tool Type & No.	Pad Type	Tool Pos.
Rmf @ Meas. Temp.	@		@	ONE	ACRT	N/A	CENT.
Rmc @ Meas. Temp.	@		@		10929775		
Source Rmf	Rmc						
Rm @ BHT	@		@				
Rmf @ BHT	@		@				
Rmc @ BHT	@		@				

EQUIPMENT DATA							
GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	10748374	Serial No.	10747684	Serial No.	10714945	Serial No.	10755066
Model No.	GTET	Model No.	BSAT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	5.3"	Diameter	3.625"
Detector Model No.	T-102	Spacing	.5'	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	CS-137	Source Type	AM-241BE
Length	8"	LSA [Y/N]		Serial No.	5073GW	Serial No.	DSN-436
Distance to Source	N/A	FWDA [Y/N]		Strength	1.5 CI	Strength	15 CI

LOGGING DATA

GENERAL			GAMMA		ACOUSTIC		DENSITY			NEUTRON				
Run No.	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE		1643	REC	0	150	30	-10	47.6 us/ft	30	-10	2.71 gm/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING.

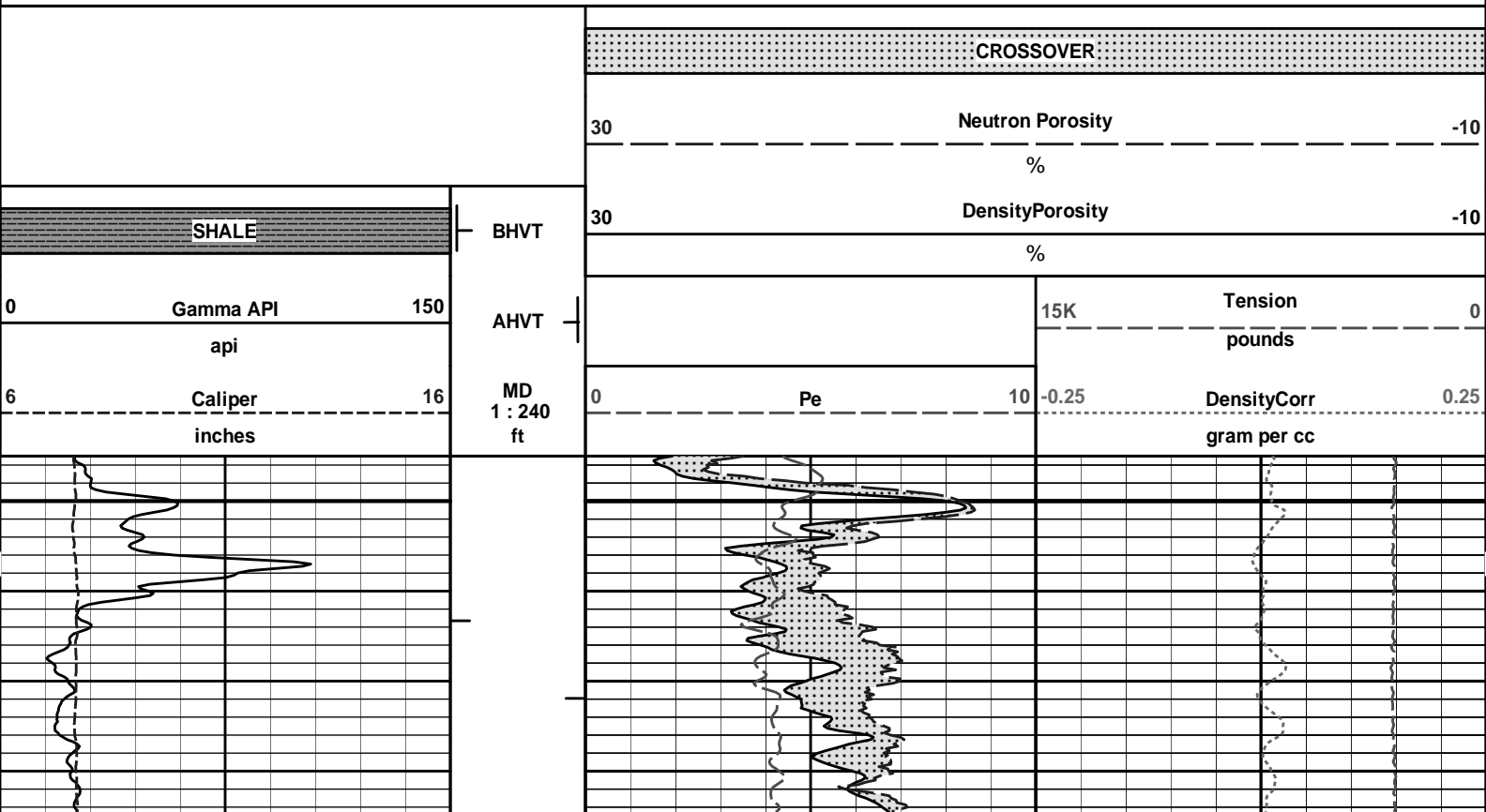
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

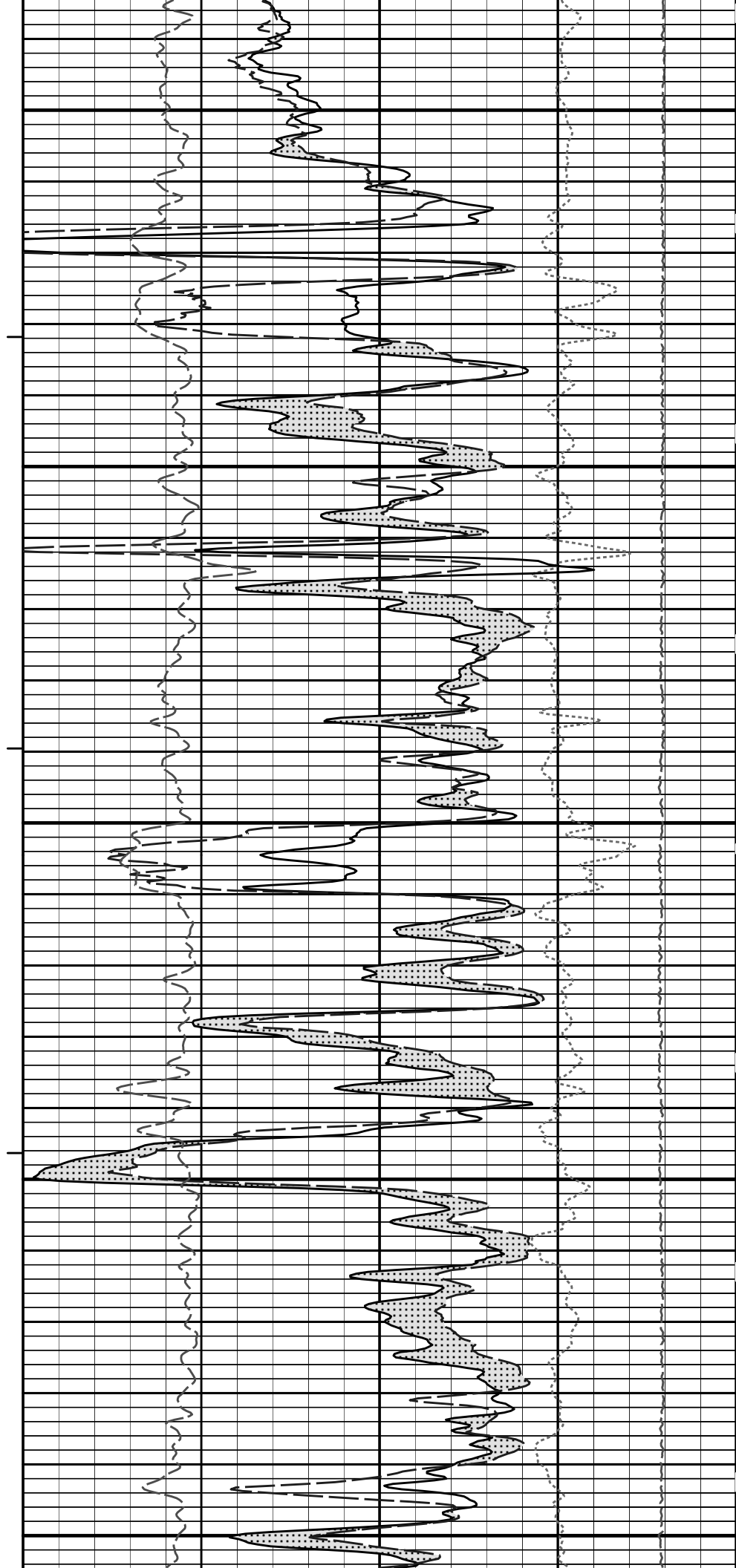
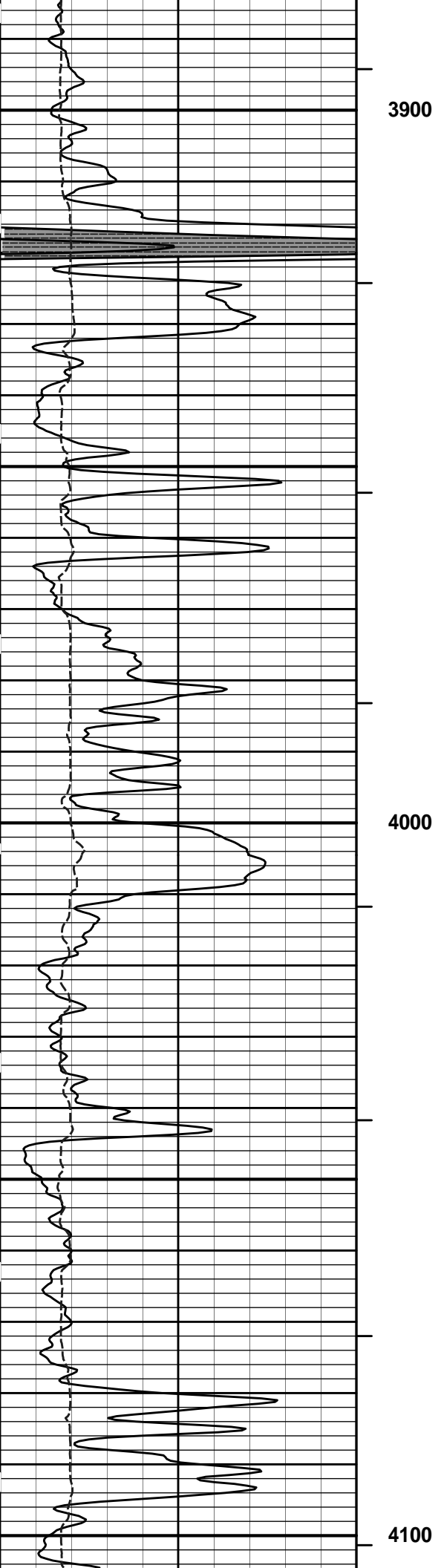
HALLIBURTON

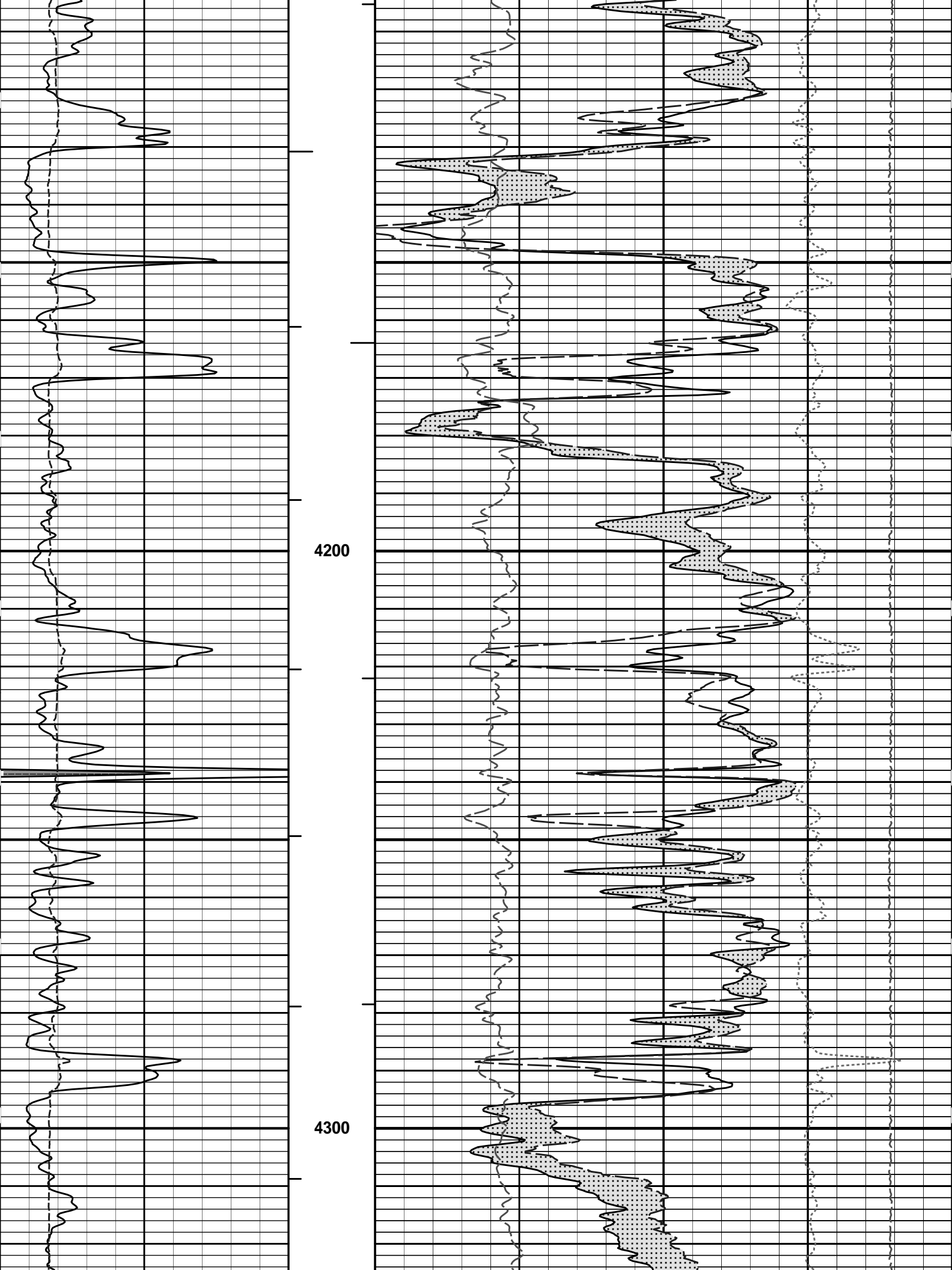


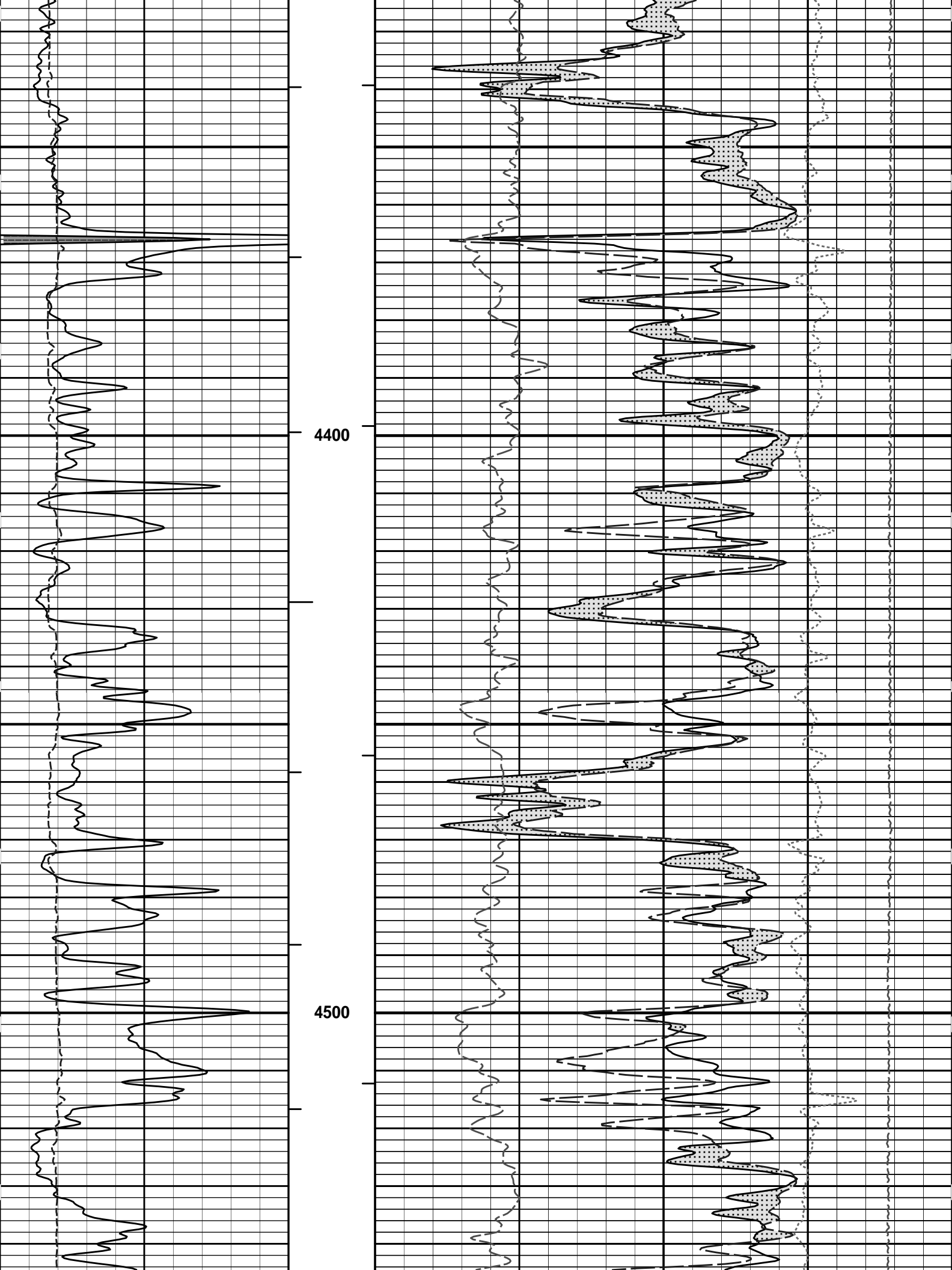
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 Plot Range: 3845 ft to 5309.75 ft  
 Data: DRUSSEL G-1\Well Based\R1 DETAIL\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

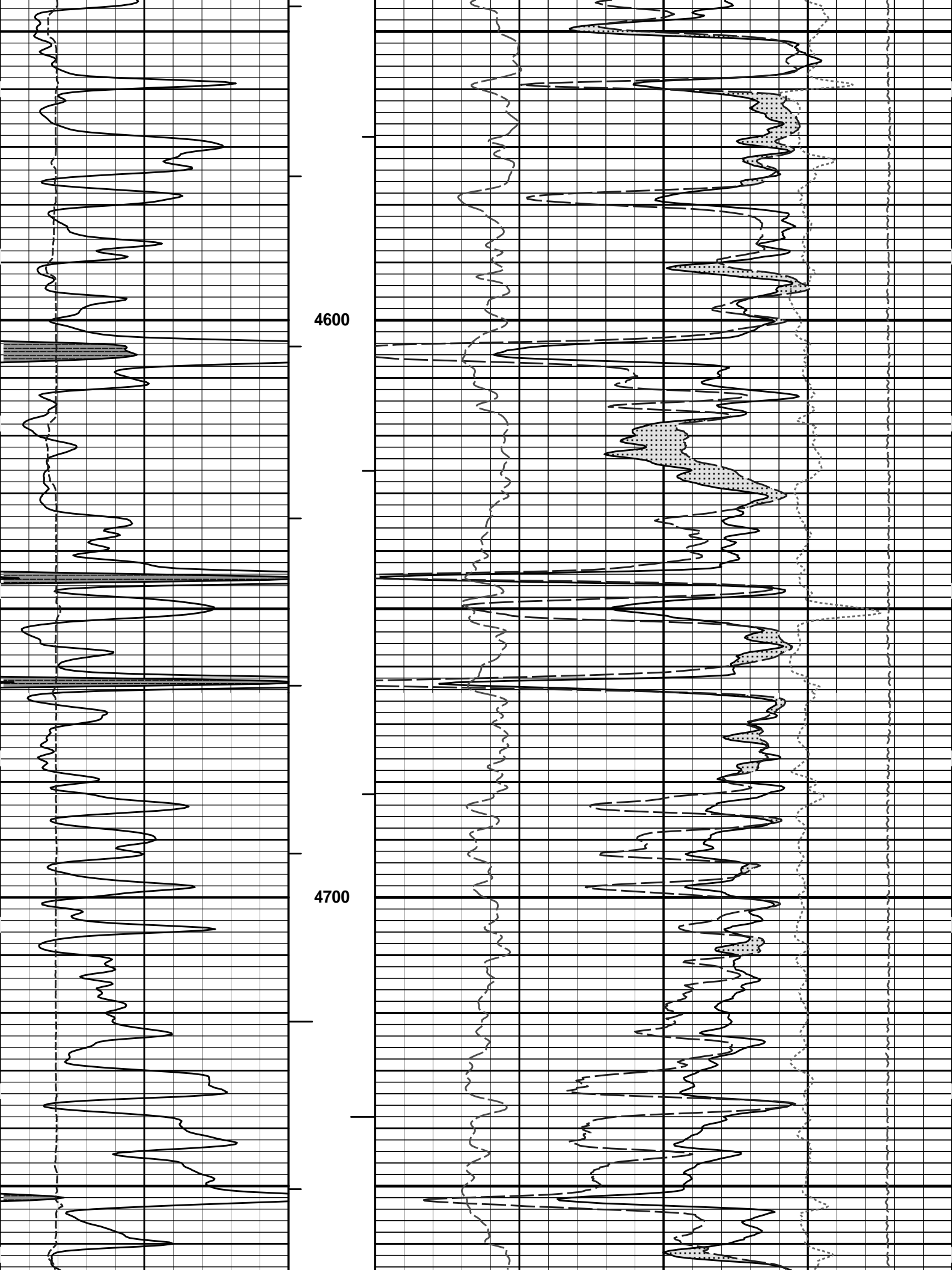
## 5 INCH MAIN LOG

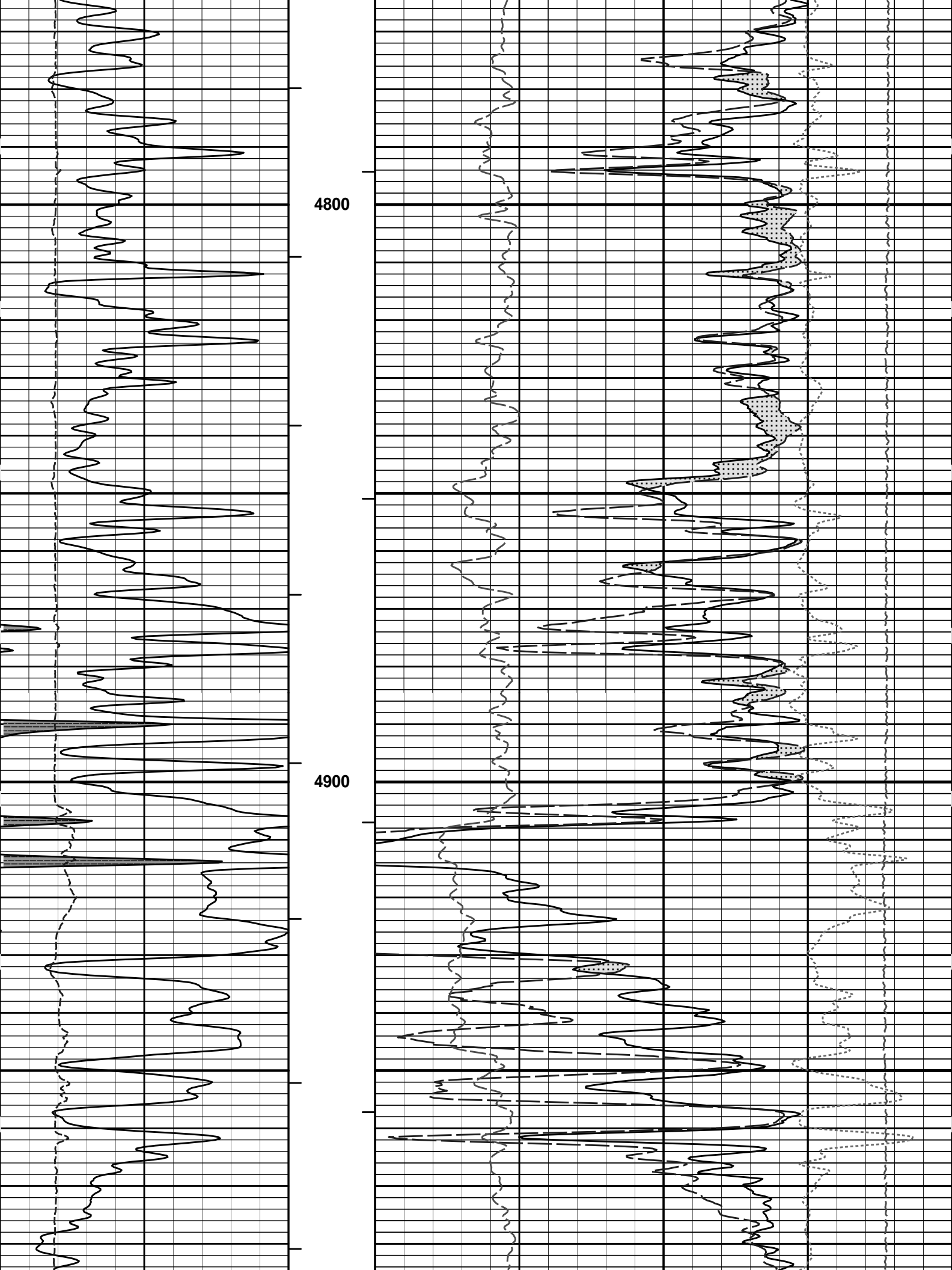


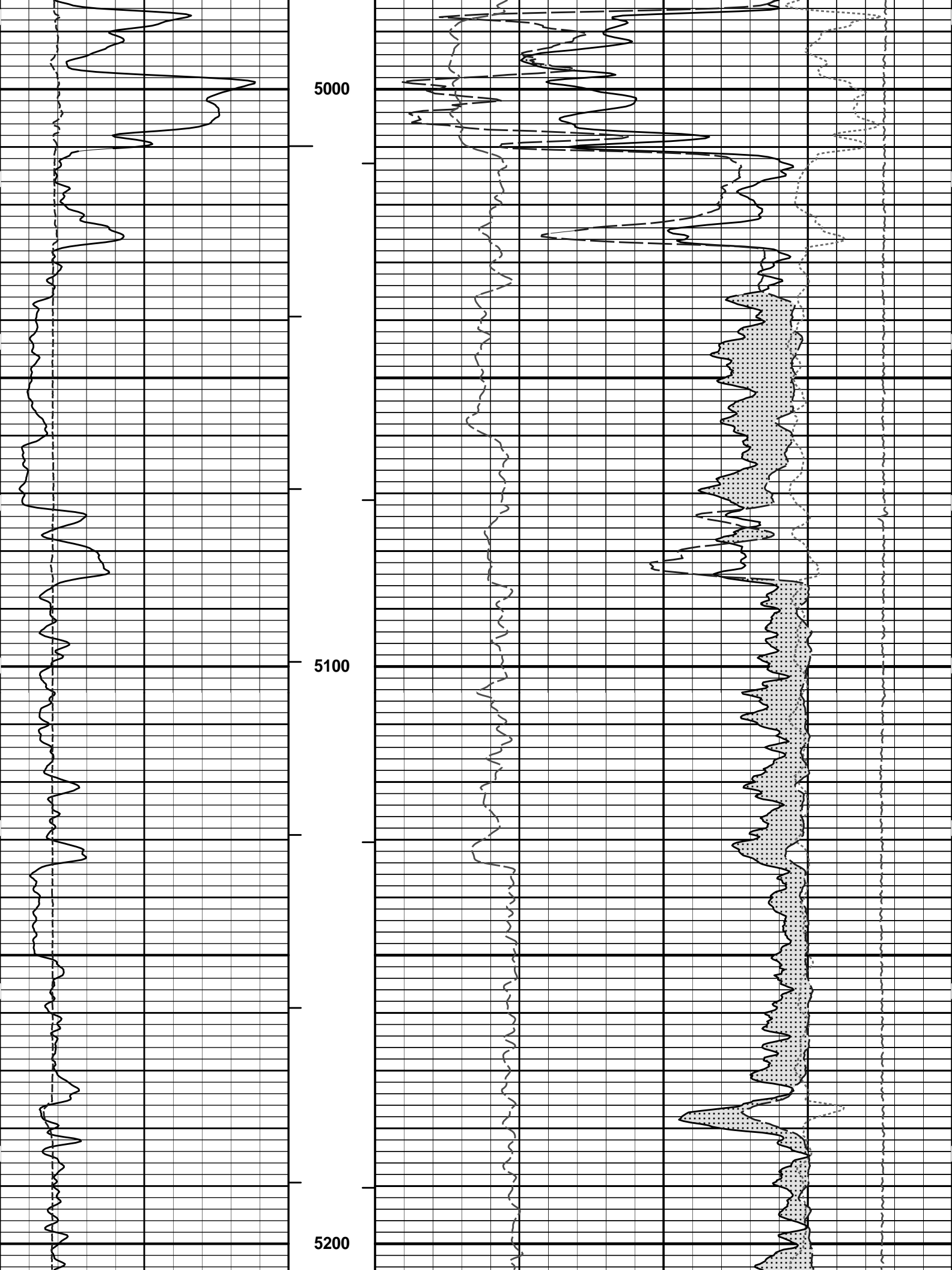


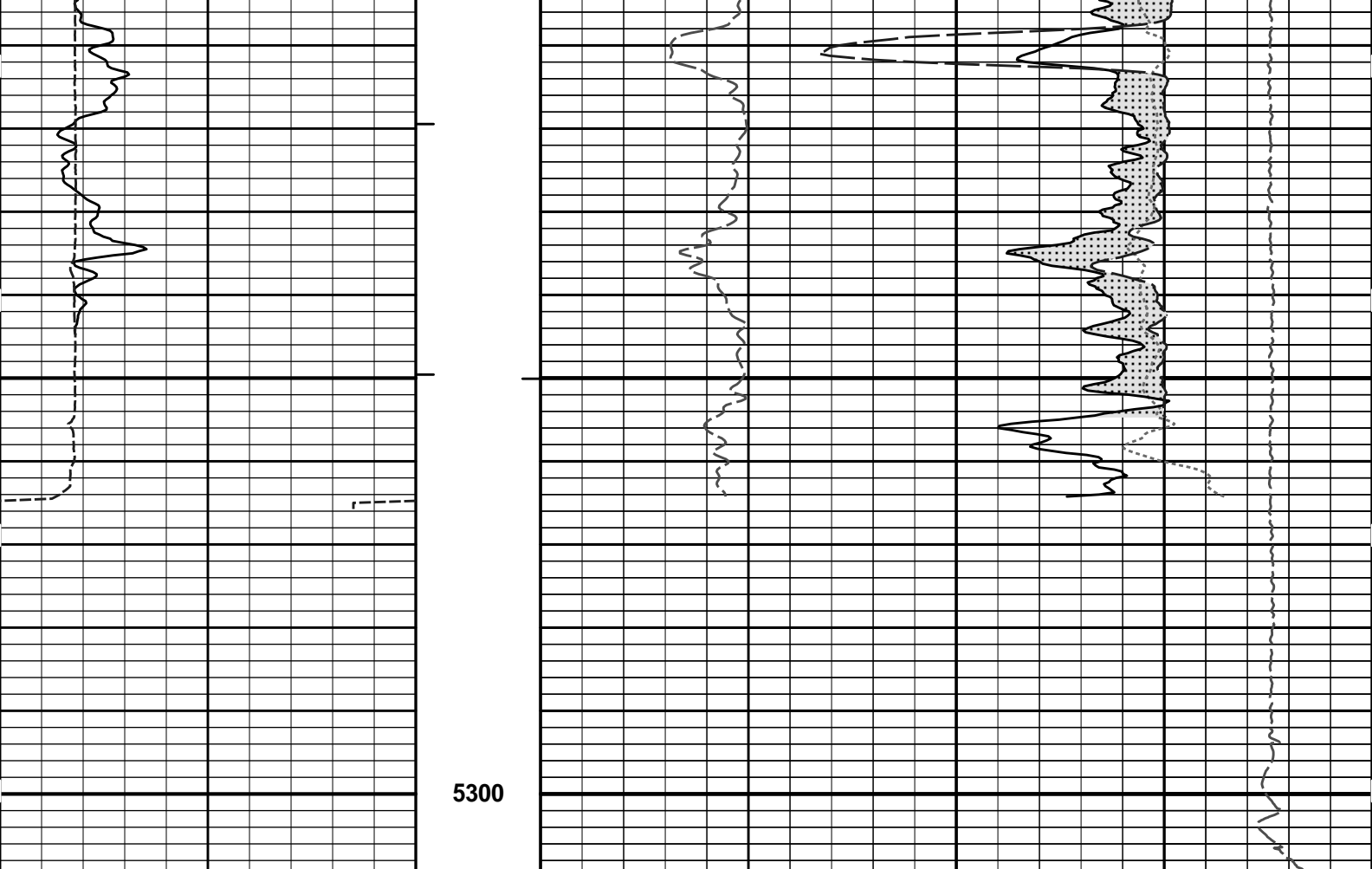












5300

6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

**HALLIBURTON** Plot Time: 24-Sep-13 10:33:05  
 Plot Range: 3845 ft to 5309.75 ft  
 Data: DRUSSEL G-1\Well Based\R1 DETAIL\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_MAIN\_LIB

## 5 INCH MAIN LOG

**HALLIBURTON** Plot Time: 24-Sep-13 10:33:05  
 Plot Range: 4750 ft to 5310.92 ft  
 Data: DRUSSEL G-1\Well Based\R1 REPEAT\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_REP\_LIB

## REPEAT SECTION

SHALE

BHVT

Gamma API 0 150  
api

AHVT

Caliper 6 16  
inches

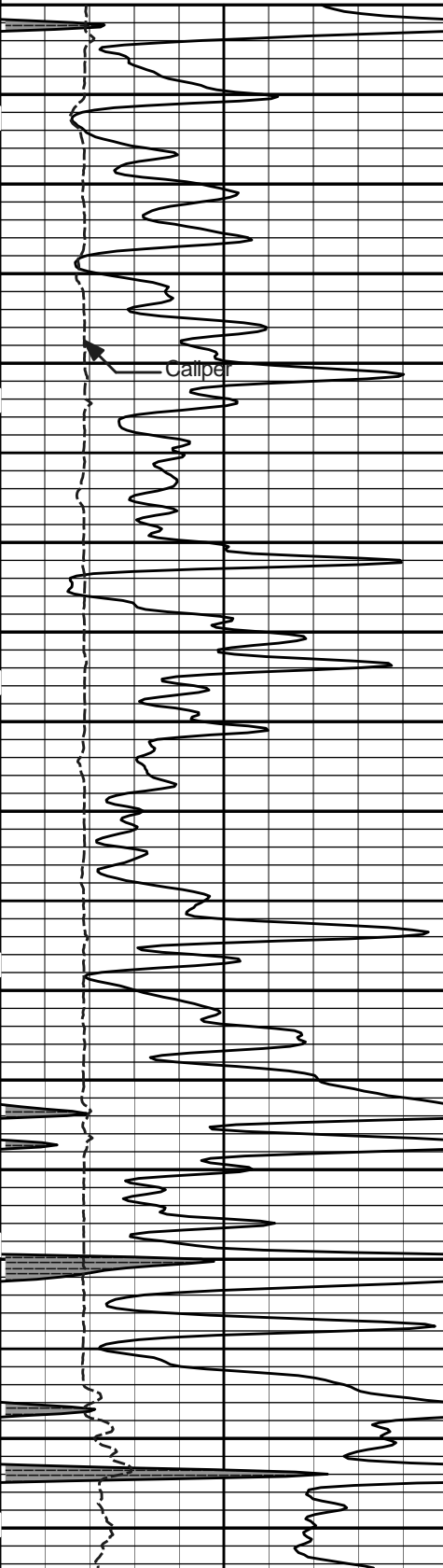
MD  
1 : 240  
ft

30 Neutron Porosity -10  
%

30 DensityPorosity -10  
%

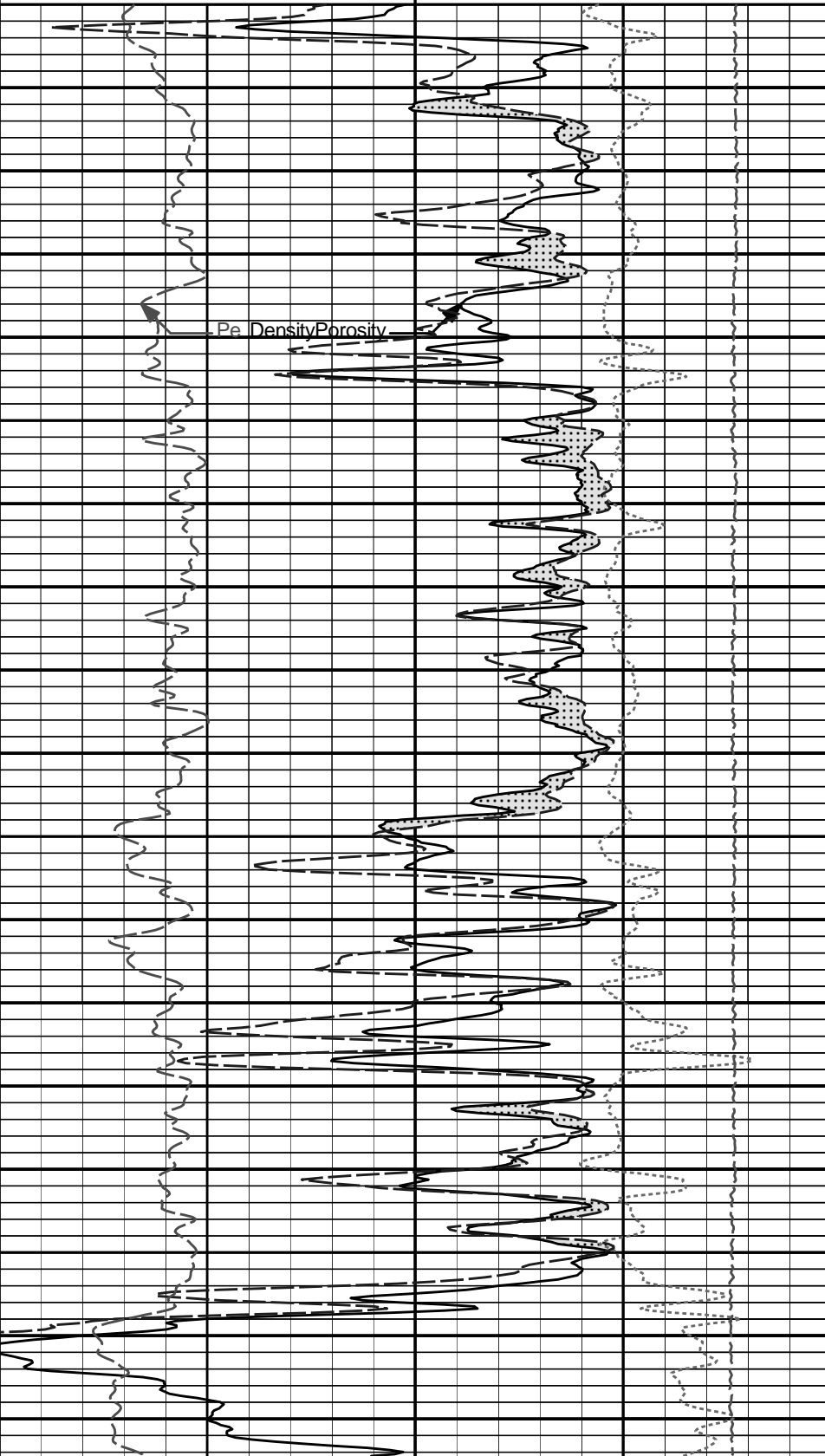
15K Tension 0  
pounds

0 Pe 10 -0.25 DensityCorr 0.25  
gram per cc



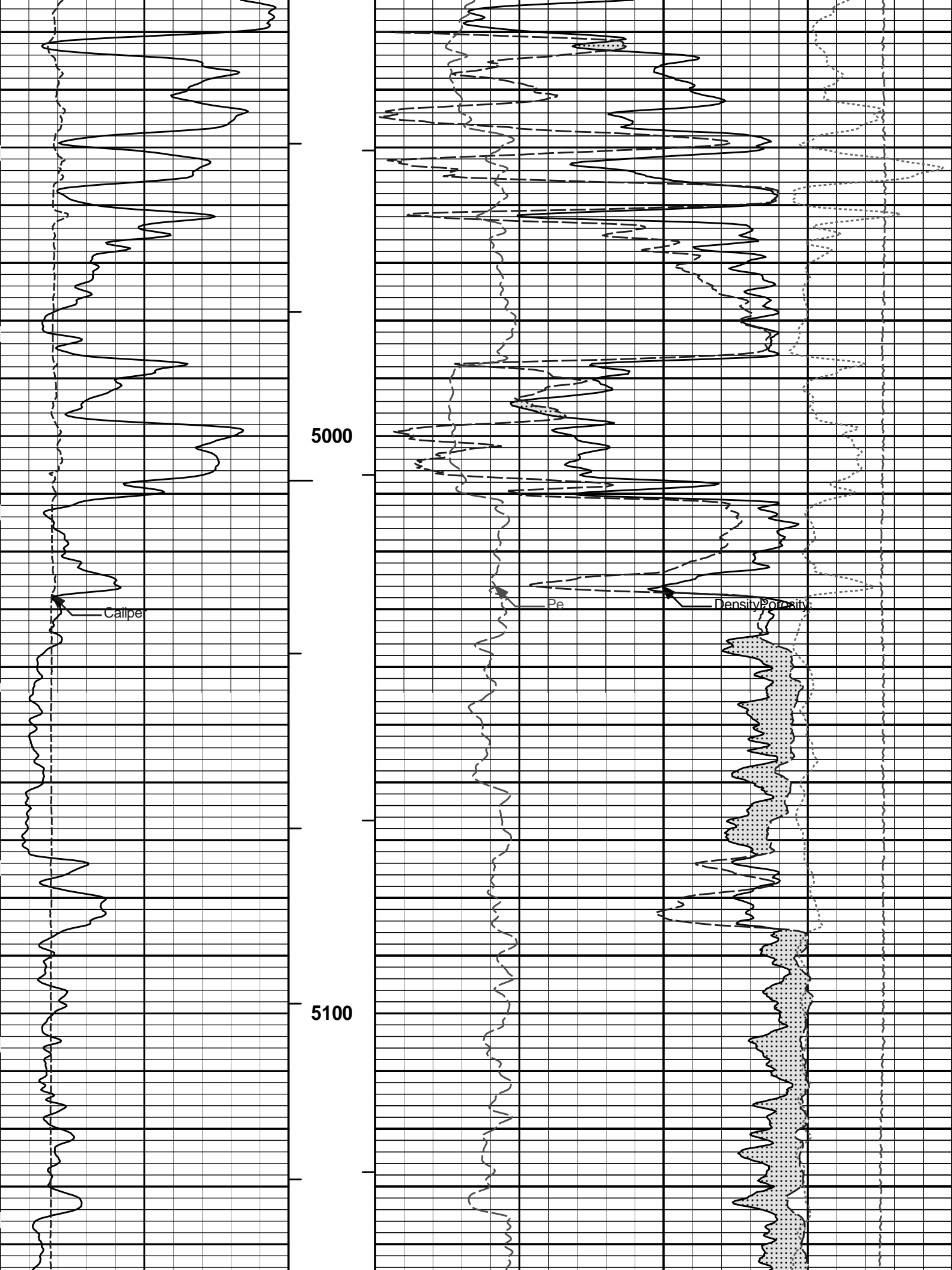
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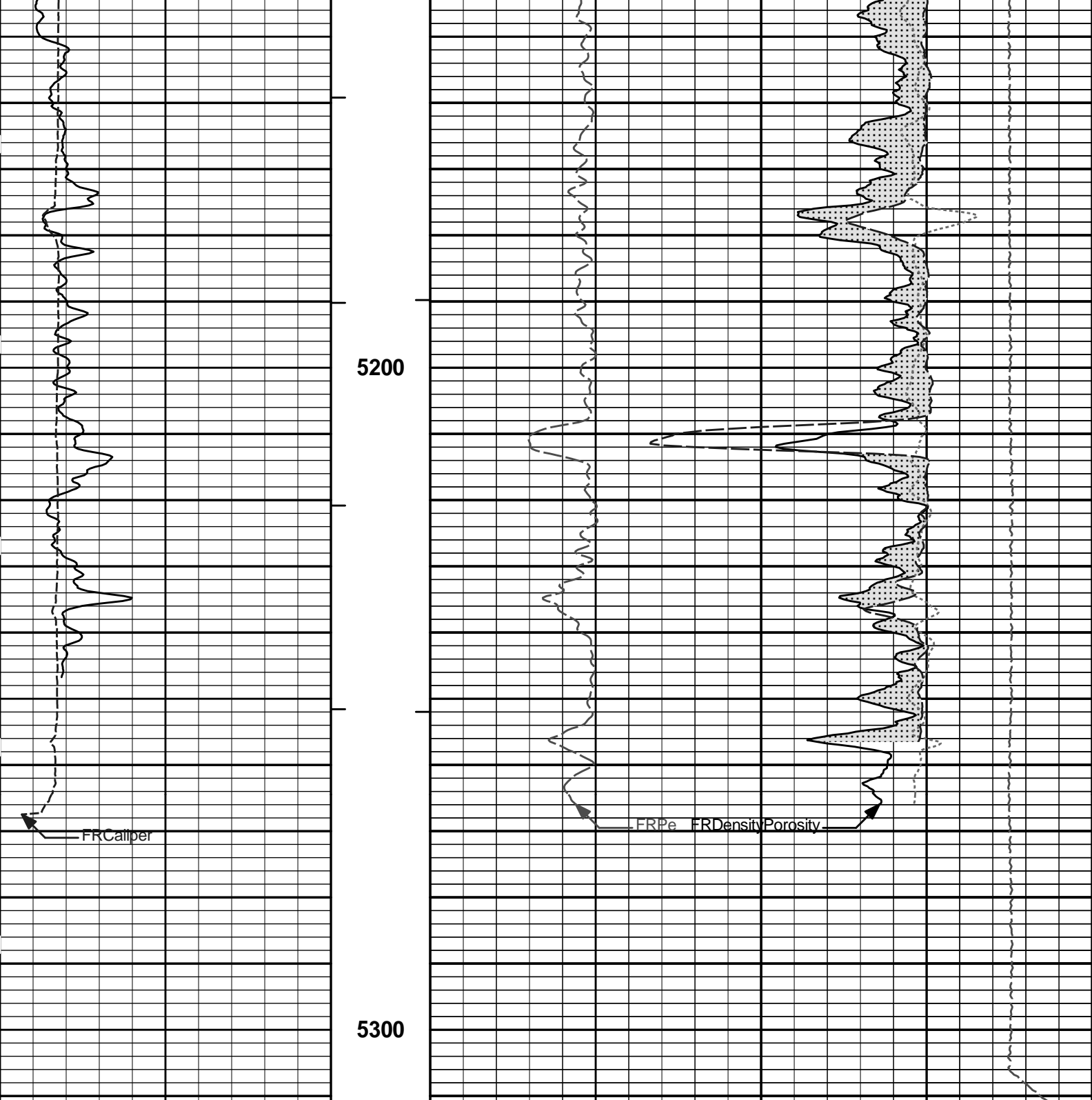
4900



Caliper

Pe DensityPorosity





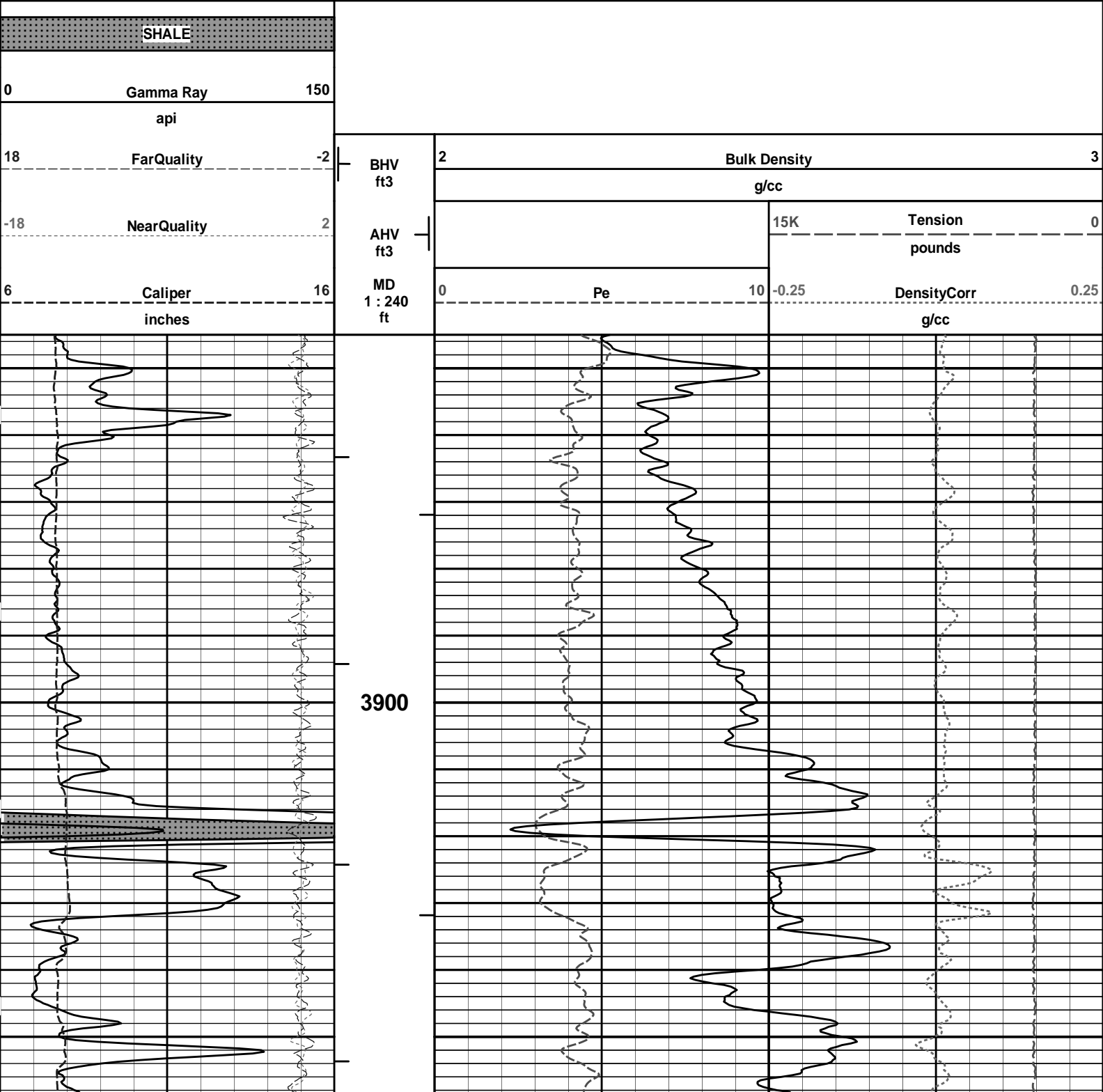
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	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT			15K		Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

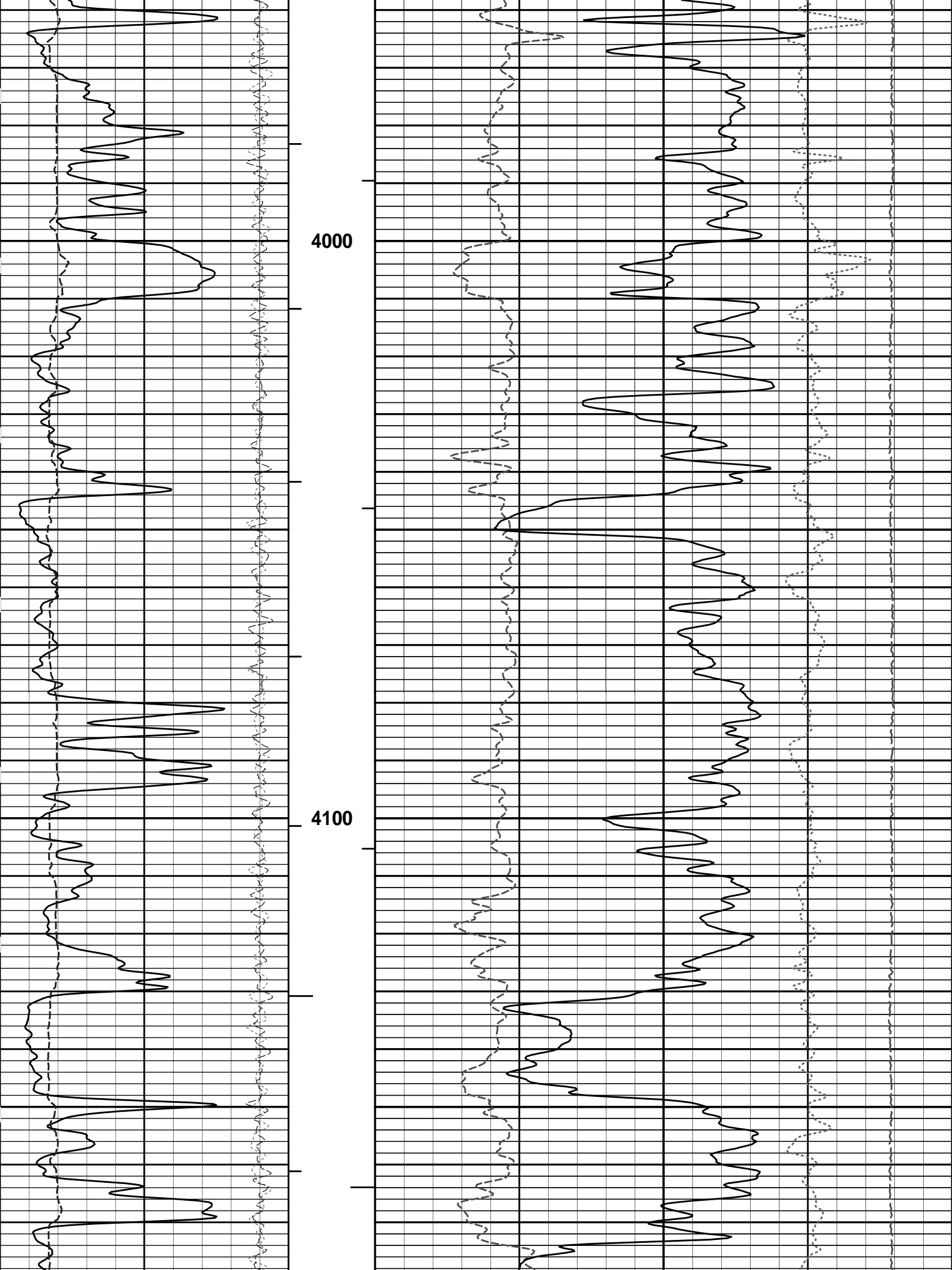
# REPEAT SECTION

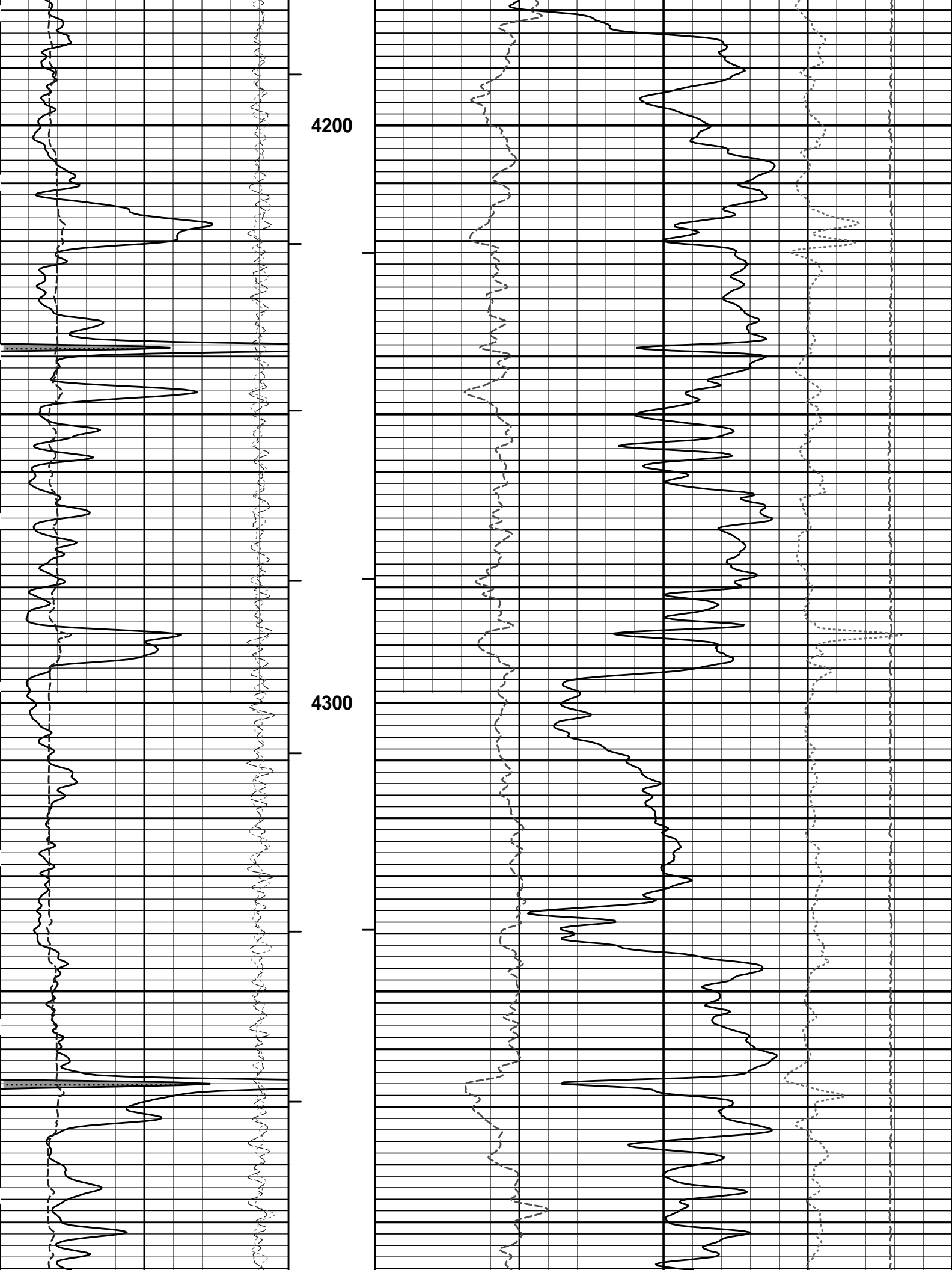
**HALLIBURTON**

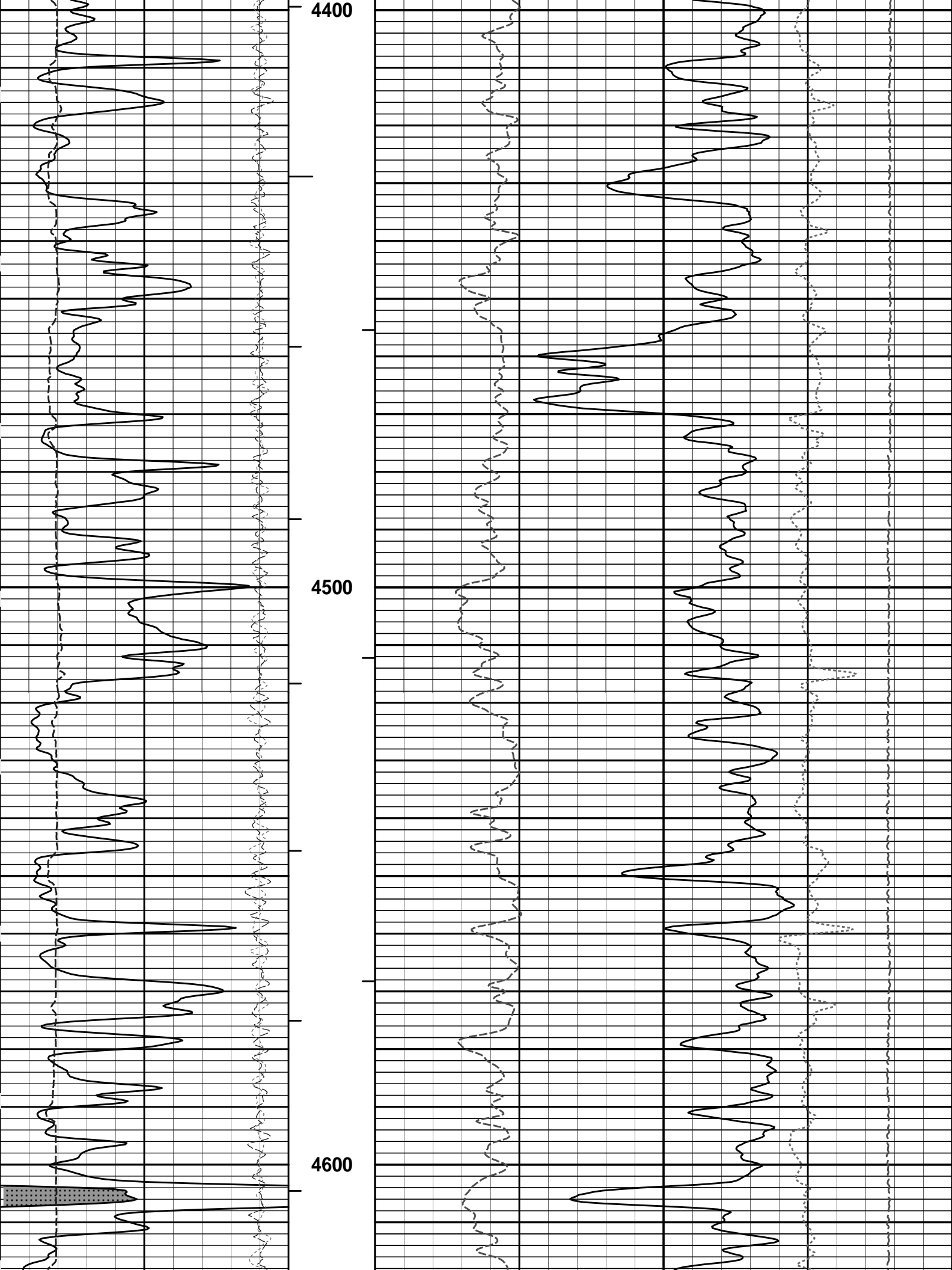
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Data: DRUSSEL G-1\Well Based\R1 DETAIL\  
Plot File: \\-LOCAL-DRUSSEL G-1\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

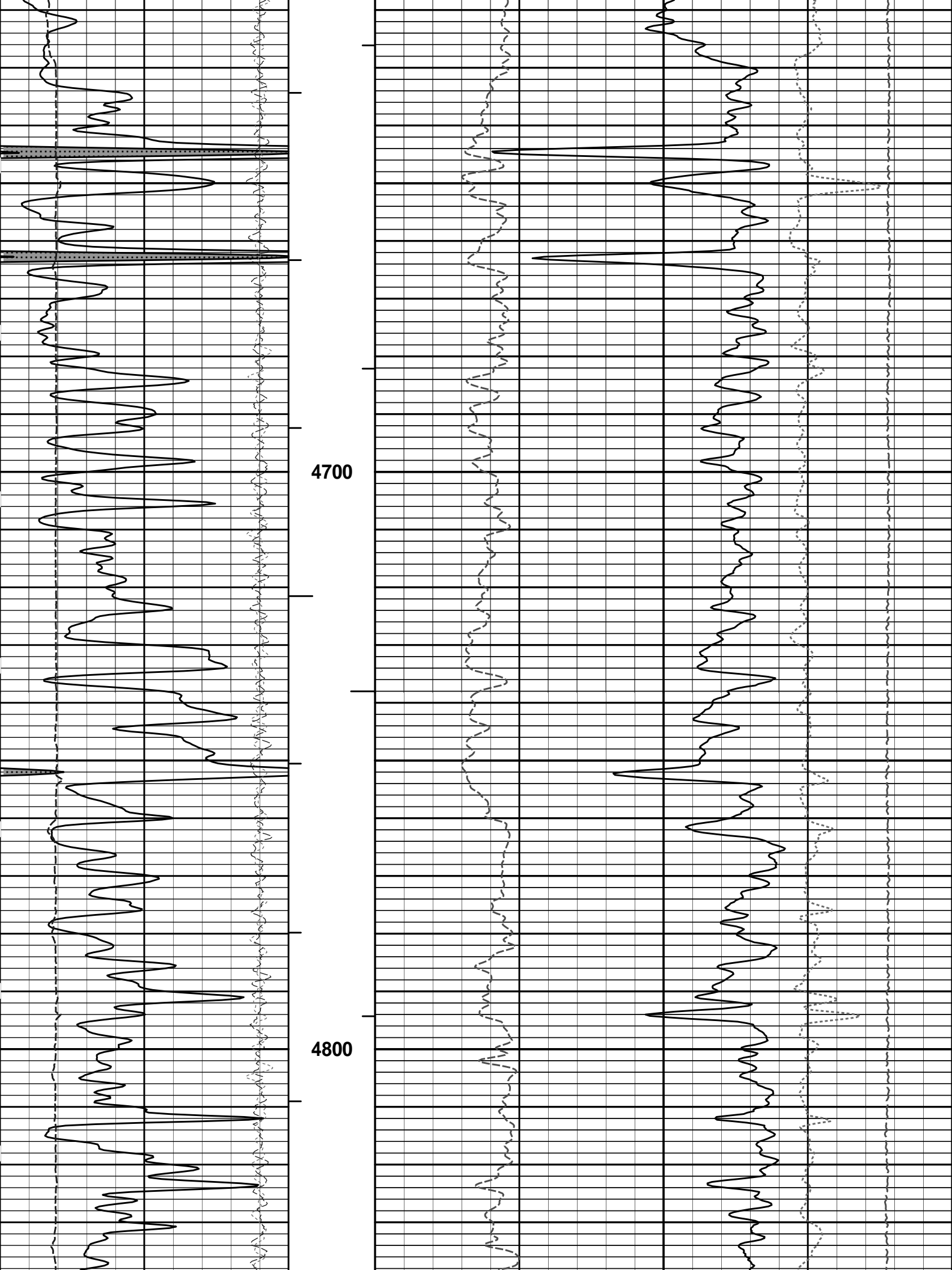
## 5 INCH MAIN LOG

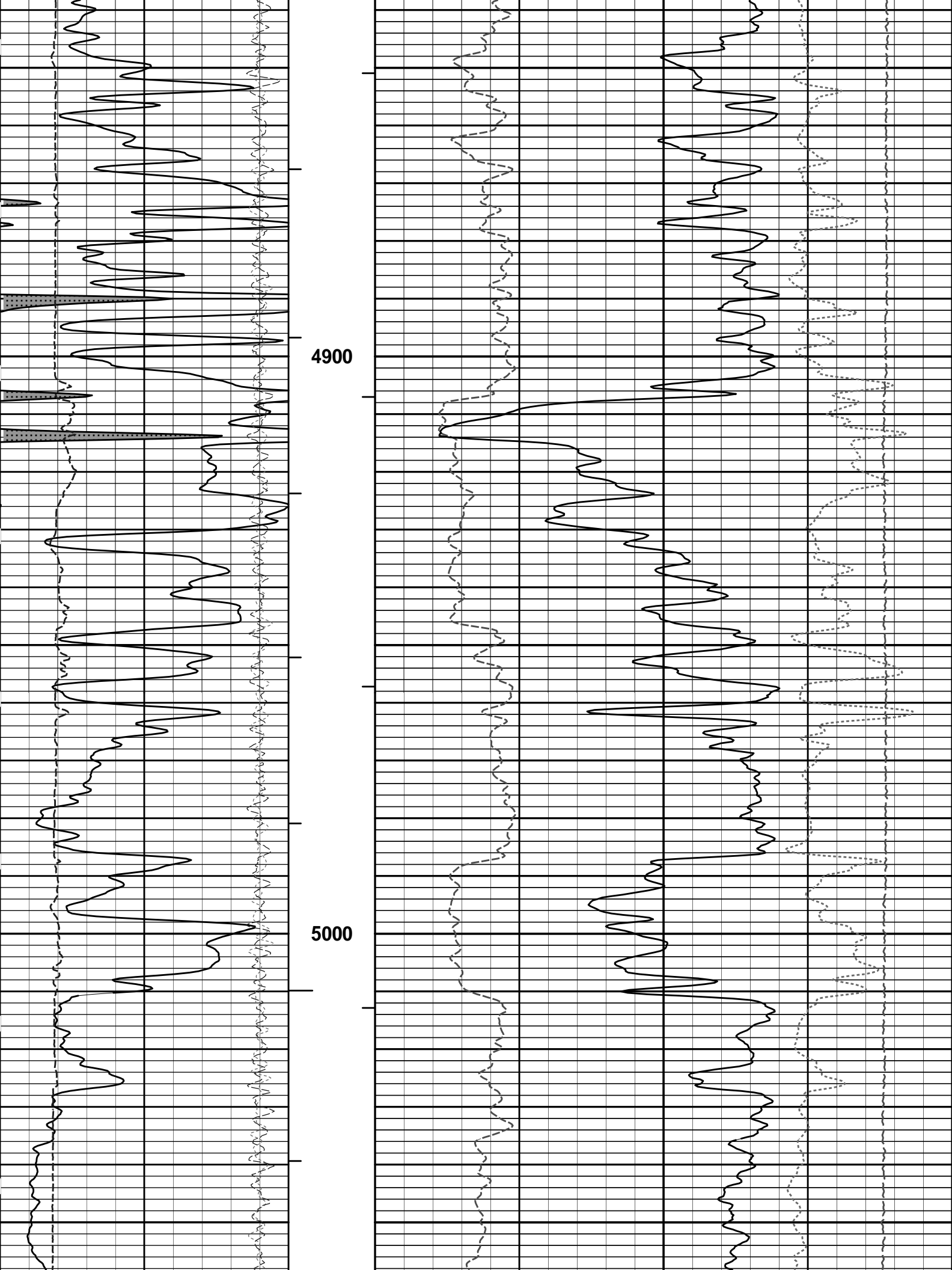


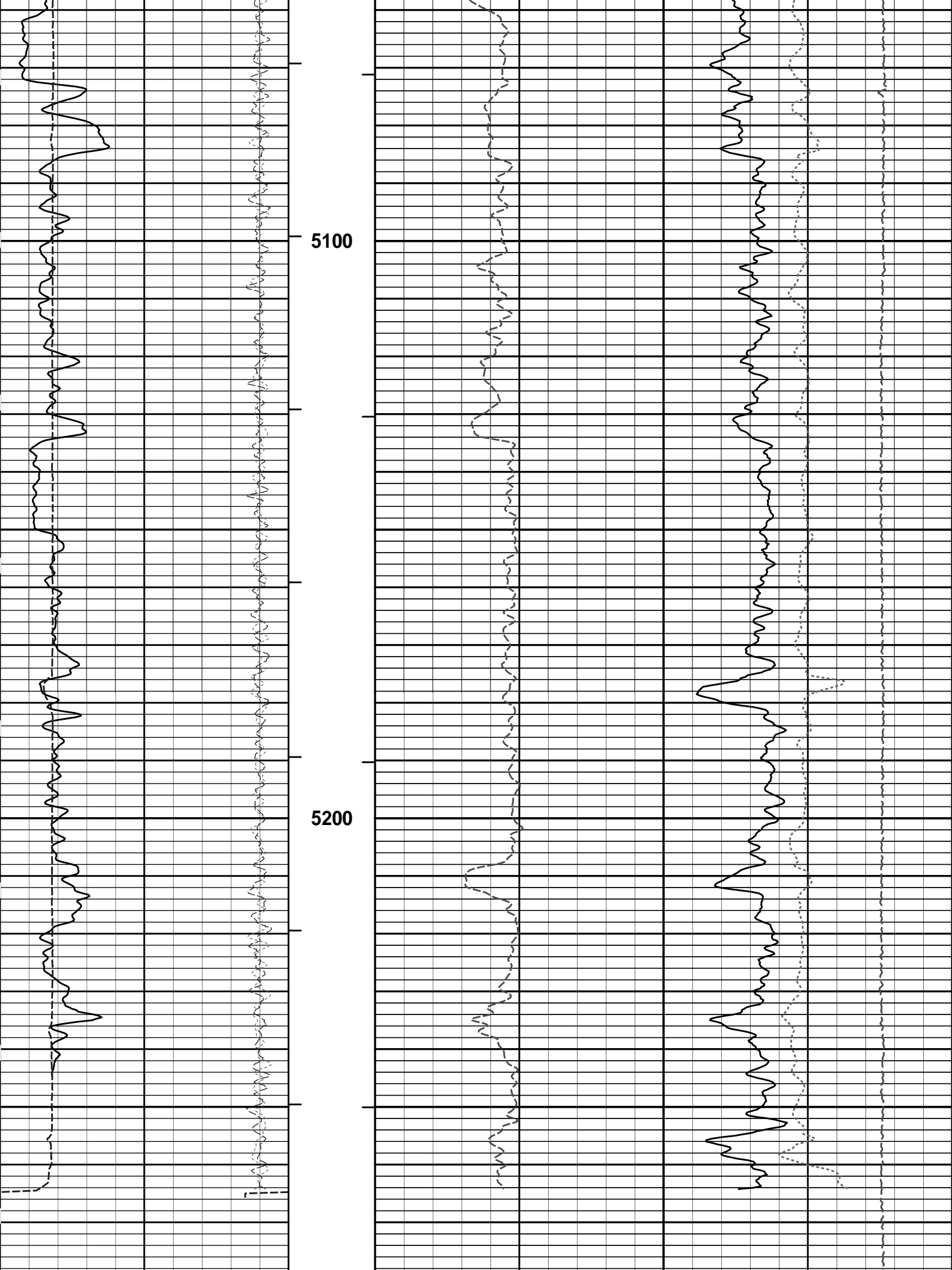












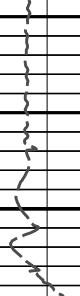
5300

6	Caliper	16
	inches	
-18	NearQuality	2
18	FarQuality	-2
0	Gamma Ray	150
	api	
SHALE		

MD	1 : 240	ft
AHV	ft3	
BHV	ft3	

0	Pe	10
2	Bulk Density	3
	g/cc	

-0.25	DensityCorr	0.25
	g/cc	
15K	Tension	0
	pounds	



HALLIBURTON

Plot Time: 24-Sep-13 10:33:13  
 Plot Range: 3845 ft to 5309.75 ft  
 Data: DRUSSEL G-1\Well Based\R1 DETAIL\  
 Plot File: \\-LOCAL-DRUSSEL G-1\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

### 5 INCH MAIN LOG

HALLIBURTON

Plot Time: 24-Sep-13 10:33:13  
 Plot Range: 4750 ft to 5310.92 ft  
 Data: DRUSSEL G-1\Well Based\R1 REPEAT\  
 Plot File: \\-LOCAL-DRUSSEL G-1\Well Based\POROSITY\BULKD\_5\_REP\_LIB

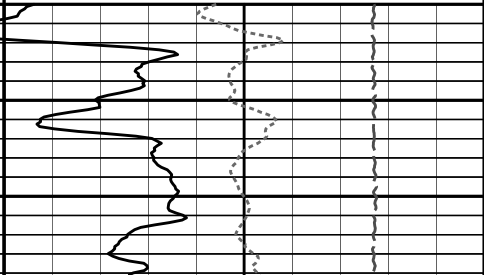
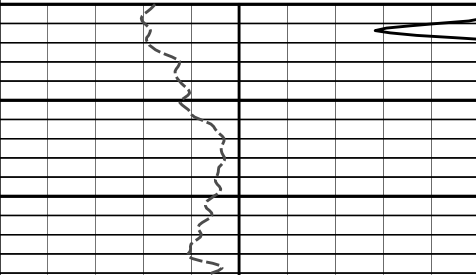
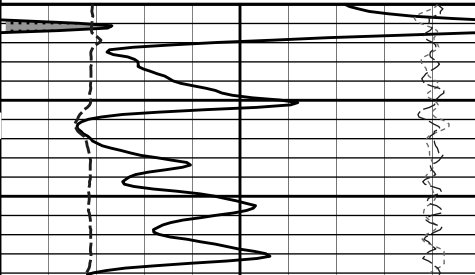
### REPEAT SECTION

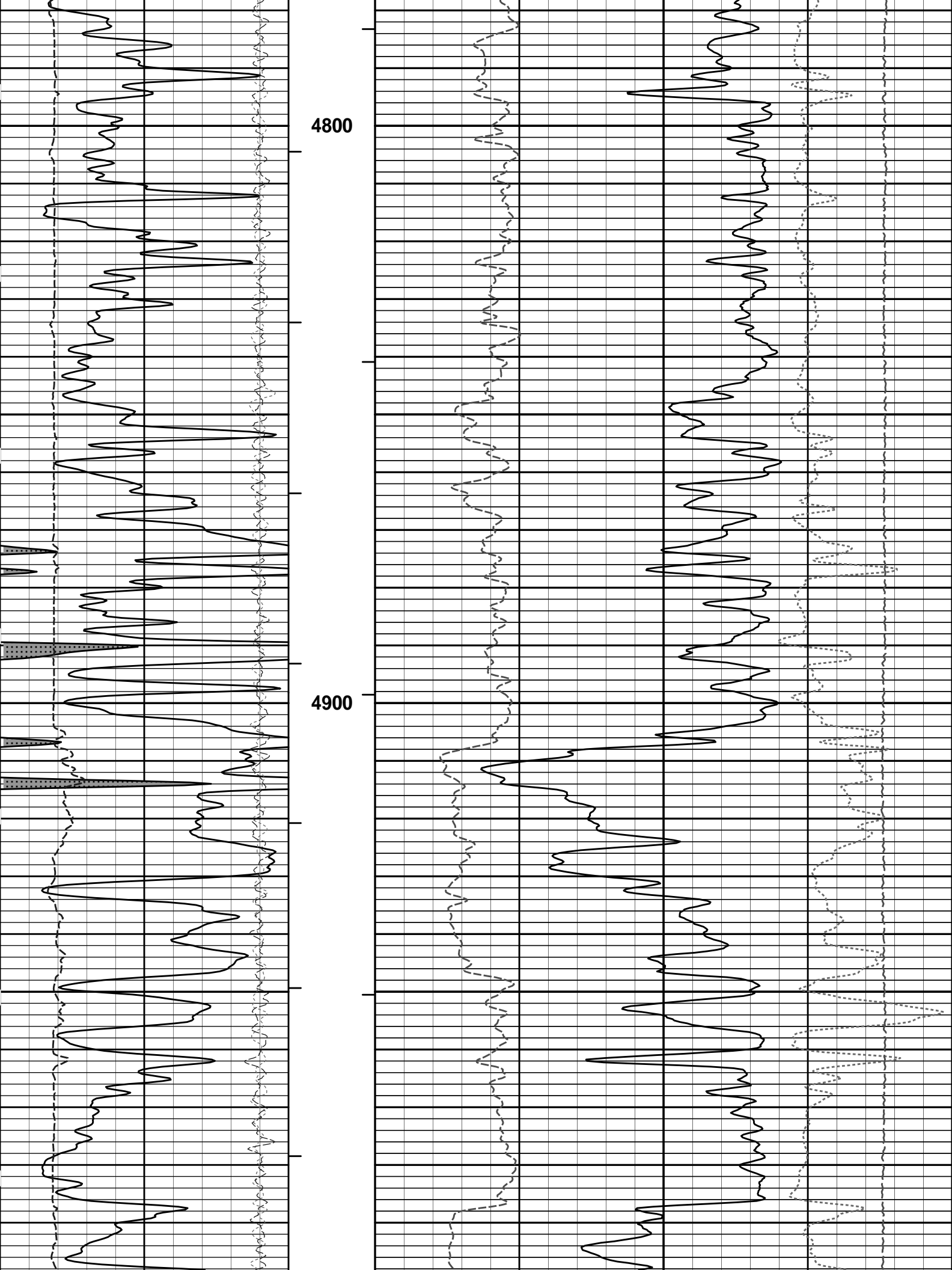
SHALE		
0	Gamma Ray	150
	api	
18	FarQuality	-2
-18	NearQuality	2
6	Caliper	16
	inches	

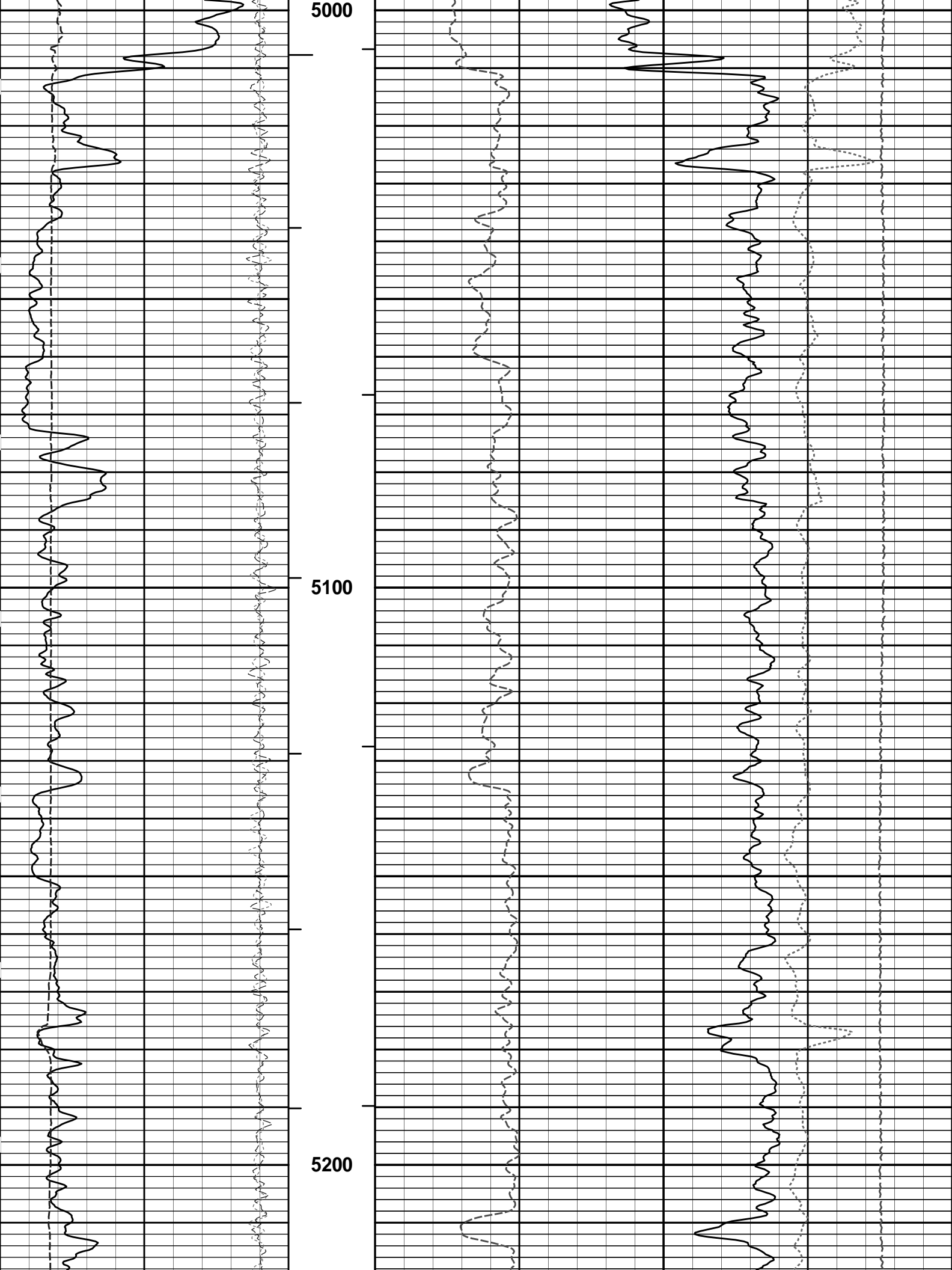
BHV	ft3	
AHV	ft3	
MD	1 : 240	ft

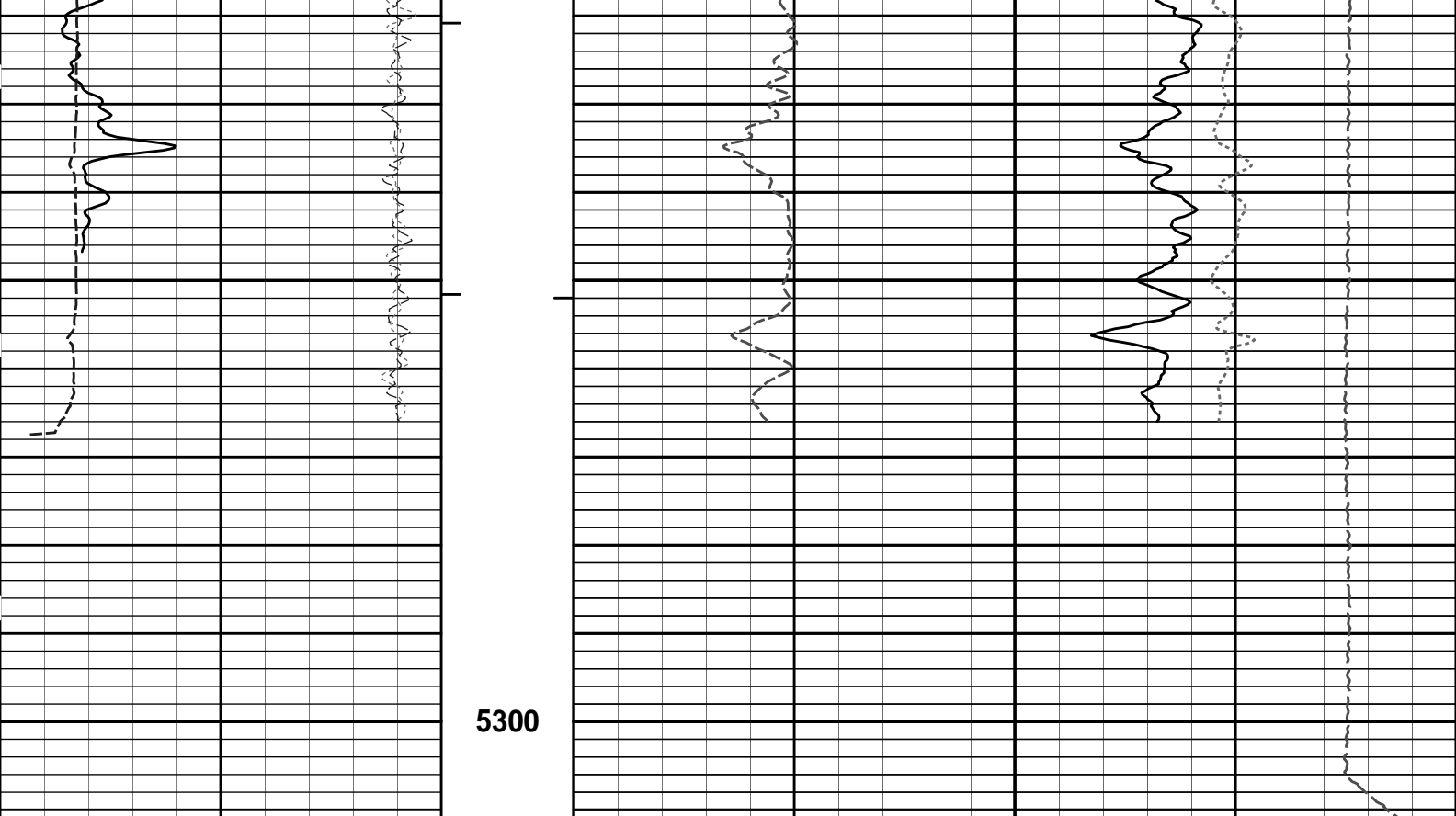
2	Bulk Density	3
	g/cc	
15K	Tension	0
	pounds	
0	Pe	10
	DensityCorr	0.25
	g/cc	

-0.25	DensityCorr	0.25
	g/cc	
15K	Tension	0
	pounds	









6	Caliper	16	MD	0	10	-0.25	DensityCorr	0.25
	inches		1 : 240				g/cc	
-18	NearQuality	2	AHV			15K	Tension	0
			ft3				pounds	
18	FarQuality	-2	BHV	2			Bulk Density	3
			ft3				g/cc	
0	Gamma Ray	150						
	api							
	SHALE							


**HALLIBURTON**

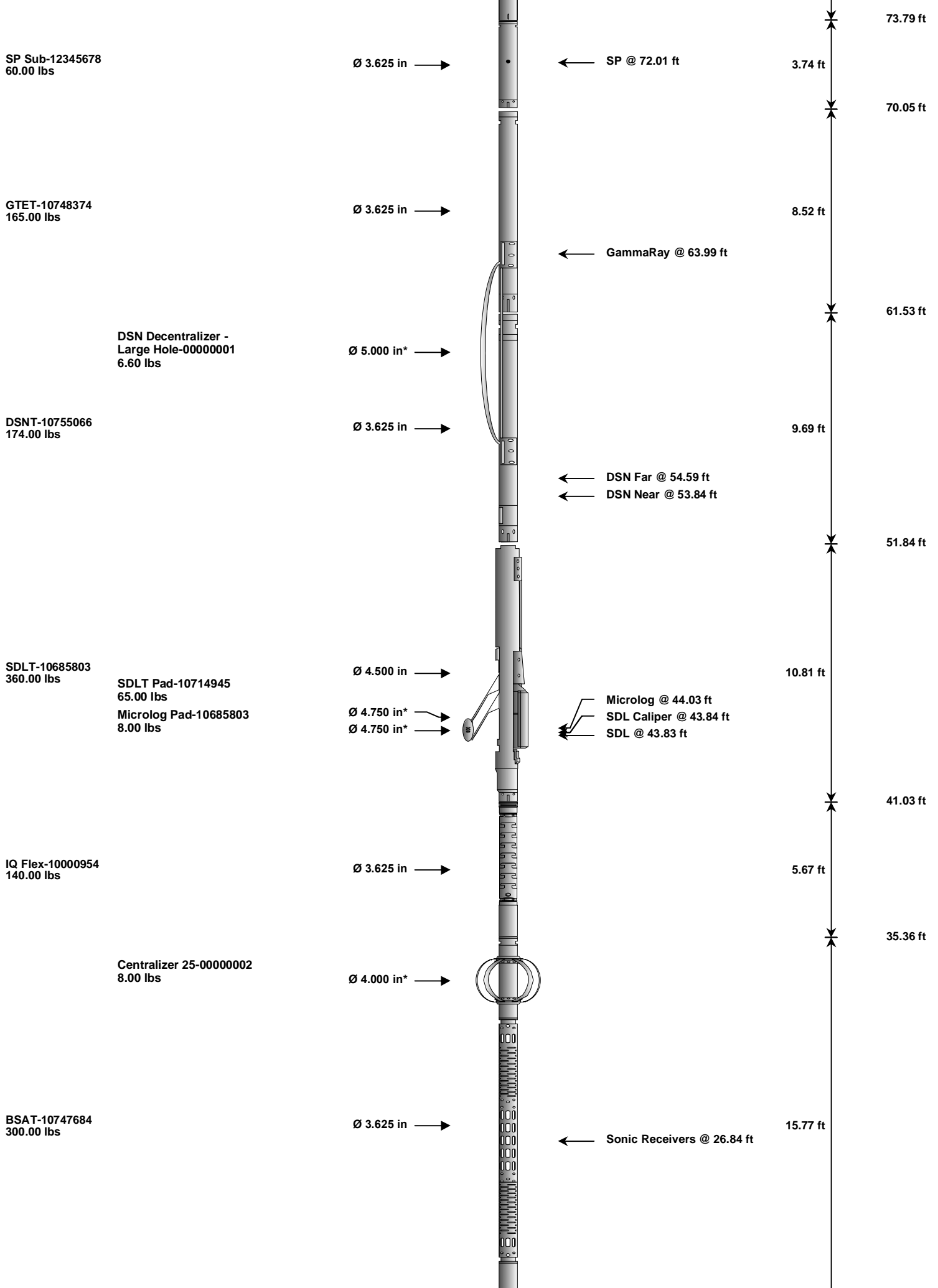
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 Plot Range: 4750 ft to 5310.92 ft  
 Data: DRUSSEL G-1\Well Based\R1 REPEAT\  
 Plot File: \\-LOCAL-DRUSSEL G-1\Well Based\POROSITY\BULKD\_5\_REP\_LIB

## REPEAT SECTION

**HALLIBURTON**

### TOOL STRING DIAGRAM REPORT

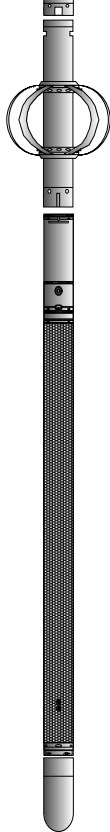
Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-12027542 135.00 lbs		Ø 3.625 in →		← Load Cell @ 76.35 ft ← BH Temperature @ 75.79 ft	6.25 ft	80.04 ft



ACRt Instrument-  
10929776  
50.00 lbs

Centralizer 25-00000003  
8.00 lbs

Ø 3.625 in  
Ø 4.000 in\*



19.58 ft  
5.03 ft  
14.55 ft  
14.22 ft  
0.33 ft  
0.33 ft  
0.00 ft

ACRt Sonde-  
10929775  
200.00 lbs

Ø 3.625 in

← Mud Resistivity @ 13.19 ft

← ACRt @ 9.21 ft

Bull Nose-00000001  
5.00 lbs

Ø 2.750 in

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	12027542	135.00	6.25	73.79	300.00
SP	SP Sub	12345678	60.00	3.74	70.05	300.00
GTET	Gamma Telemetry Tool	10748374	165.00	8.52	61.53	60.00
DSNT	Dual Spaced Neutron	10755066	174.00	9.69	51.84	60.00
DCNT	DSN Decentralizer Large Hole	00000001	6.60	9.42	* 55.17	300.00
SDLT	Spectral Density Tool	10685803	360.00	10.81	41.03	60.00
MICP	Microlog Pad	10685803	8.00	1.00	* 43.53	60.00
SDLP	Density Insite Pad	10714945	65.00	2.55	* 43.24	60.00
IQF	IQ Flex tool	10000954	140.00	5.67	35.36	300.00
BSAT	Borehole Sonic Array Tool	10747684	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	* 32.51	300.00
ACRt	Array Compensated True Resistivity Instrument Section	10929776	50.00	5.03	14.55	300.00
OBCEN	Centralizer - 25 in. Overbody	00000003	8.00	2.08	* 15.87	300.00
ACRt	Array Compensated True Resistivity Sonde Section	10929775	200.00	14.22	0.33	300.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00

**Total** **1,684.60** **80.04**

\* Not included in Total Length and Length Accumulation.

Data: DRUSSEL G-1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BNIDLE

Date: 24-Sep-13 06:20:34

# HALLIBURTON

## PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.700	ppg
	SHARED	WAGT	Weighting Agent	Natural	

SHARED	BSAL	Borehole salinity	0.00	ppm
SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
SHARED	RMUD	Mud Resistivity	1.000	ohmm
SHARED	TRM	Temperature of Mud	75.0	degF
SHARED	CSD	Logging Interval is Cased?	No	
SHARED	ICOD	AHV Casing OD	5.500	in
SHARED	ST	Surface Temperature	75.0	degF
SHARED	TD	Total Well Depth	5310.00	ft
SHARED	BHT	Bottom Hole Temperature	135.0	degF
SHARED	SVTM	Navigation and Survey Master Tool	NONE	
SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
SHARED	TEMM	Temperature Master Tool	NONE	
SHARED	BHSM	Borehole Size Master Tool	NONE	
Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.000	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
BSAT	MBOK	Compute BCAS Results?	Yes	
BSAT	FLLO	Frequency Filter Low Pass Value?	5000	Hz
BSAT	FLHI	Frequency Filter High Pass Value?	27000	Hz
BSAT	DTFL	Delta -T Fluid	189.00	uspf
BSAT	DTMT	Delta -T Matrix Type	User define	
BSAT	DTMA	Delta -T Matrix	47.60	uspf
BSAT	DTSH	Delta -T Shale	100.00	uspf

BSAT	SPEQ	Acoustic Porosity Equation	Wylie	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm

BOTTOM

Data: DRUSSEL G-1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BN\004 24-Sep-13 07:27 Up @5309.8f

Date: 24-Sep-13 08:44:03

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

**Tool Name:** GTET - 10748374

**Reference Calibration Date:** 02-Aug-13 14:20:06

**Engineer:** THOMAS HYDE

**Calibration Date:** 03-Sep-13 10:36:47

**Software Version:** WL INSITE R3.8.4 (Build 5)

**Calibration Version:** 1

Calibrator Source S/N: TB-185

Calibrator API Reference:228.00 api

Equivalent Calibrator API Reference:232.0 api

Measurement	Measured	Calibrated	Units
Background	44.2	44.4	api
Background + Calibrator	275.0	276.4	api
Calibrator	230.8	232.0	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

**Tool Name:** GTET - 10748374

**Reference Calibration Date:** 03-Sep-13 10:36:47

**Engineer:** S. INGERSOLL

**Calibration Date:** 23-Sep-13 23:27:58

**Software Version:** WL INSITE R3.8.4 (Build 5)

**Calibration Version:** 1

Calibrator Source S/N: TB-185

Calibrator API Reference:228.00 api

Equivalent Calibrator API Reference:232.0 api

Field Verification	Shop	Field	Units
Background	44.4	40.6	api
Background + Calibrator	276.4	274.5	api
Calibrator	232.0	233.9	api

Shop	Field	Difference	Tolerance
232.0	233.9	-1.9	+/- 9.00

### DUAL SPACED NEUTRON SHOP CALIBRATION

**Tool Name:** DSNT - 10755066

**Reference Calibration Date:** 01-Jul-13 16:27:31

**Engineer:** THOMAS HYDE

**Calibration Date:** 05-Sep-13 10:15:26

**Software Version:** WL INSITE R3.8.4 (Build 5)

**Calibration Version:** 1

Logging Source S/N: DSN-436

Tank Serial Number: 105060

Reference value assigned to Tank: 51.680

Snow Block S/N: 08910

Calibration Tank Water Temperature: 70 degF

Min. Tool Housing Outside Diameter: 3.620 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value

Gain:	0.952	0.949	0.900 - 1.100
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WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change

Porosity (decp):	0.2114	0.2107	0.0008	+/- 0.0020
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Calibrated Ratio:	9.74	9.72	0.026	+/- 0.050
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VERIFIER		
Measurement	Value	Control Limit

Snow-Block Porosity (decp):	0.0594	0.02000 - 0.09000
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PASS/FAIL SUMMARY	
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Background Check:	Passed
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Gain-Range Check:	Passed
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Snow-Block Check:	Passed
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### DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name: DSNT - 10755066

Reference Calibration Date: 05-Sep-13 10:15:26

Engineer: S. INGERSOLL

Calibration Date: 23-Sep-13 23:32:26

Software Version: WL INSITE R3.8.4 (Build 5)

Calibration Version: 1

Logging Source S/N: DSN-436

Snow Block S/N: 08910

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change

Snow-Block Porosity (decp):	0.0594	0.0658	0.0064	+/- 0.0150
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PASS/FAIL SUMMARY	
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Block Change Check:	Passed
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Snow Block Stat Check:	Passed
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Temperature Check:	Passed
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### DENSITY CALIPER SHOP CALIBRATION

Tool Name: SDLT - 10685803

Reference Calibration Date: 07-Aug-13 16:03:28

Engineer: THOMAS HYDE

Calibration Date: 05-Sep-13 09:46:41

Software Version: WL INSITE R3.8.4 (Build 5)

Calibration Version: 1

Host Tool Name: DSNT - 10755066

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value

Pad Offset	-4540.73	-5035.21	-7000.00 - -1000.00
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Pad Gain	0.0003893	0.0004015	0.000200 - 0.000600
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Arm Offset	-2828.82	-2028.23	-5000.00 - 3000.00
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Arm Gain	0.0005533	0.0005309	0.000300 - 0.000700
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Arm Power	0.00007206	0.00006510	0.000010000 - 0.000010000
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The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER

Tool Diameter: 4.50 in

CALIBRATION RINGS					
Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value	
PAD EXTENSION:					
Small Ring (in)	2.13	2.00	-0.13	+/- 0.20	
Medium Ring (in)	3.83	3.75	-0.08	+/- 0.20	
RING DIAMETER:					
Small Ring (in)	6.36	6.50	0.14	+/- 0.20	
Medium Ring (in)	8.19	8.25	0.06	+/- 0.20	
Large Ring (in)	15.10	15.00	-0.10	+/- 0.20	

PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed
PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed

### SDLT CALIPER FIELD CALIBRATION

<b>Tool Name:</b> SDLT - 10685803	<b>Reference Calibration Date:</b> 05-Sep-13 09:46:41
<b>Engineer:</b> S. INGERSOLL	<b>Calibration Date:</b> 23-Sep-13 23:37:28
<b>Software Version:</b> WL INSITE R3.8.4 (Build 5)	<b>Calibration Version:</b> 1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.70	-0.05	+/- 0.10
Ring Diameter	8.25	8.20	-0.05	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

### SPECTRAL DENSITY SHOP CALIBRATION

<b>Tool Name:</b> SDLT Pad - 10714945	<b>Reference Calibration Date:</b> 08-Aug-13 14:33:02
<b>Engineer:</b> THOMAS HYDE	<b>Calibration Date:</b> 05-Sep-13 09:09:01
<b>Software Version:</b> WL INSITE R3.8.4 (Build 5)	<b>Calibration Version:</b> 1

Logging Source S/N: 5073GW

Aluminum Block S/N: LIBERAL ALUMINUM Density: 2.598g/cc Pe: 3.170

Magnesium Block S/N: LIBERAL MAG BLOCK Density: 1.684g/cc Pe: 2.598

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0388	1.0085	0.90 - 1.10
Near Dens Gain	1.0170	0.9997	0.90 - 1.10
Near Peak Gain	1.0228	0.9751	0.90 - 1.10
Near Lith Gain	0.9941	0.9320	0.90 - 1.10
Far Bar Gain	1.0113	1.0097	0.90 - 1.10
Far Dens Gain	1.0021	0.9993	0.90 - 1.10
Far Peak Gain	0.9966	0.9933	0.90 - 1.10
Far Lith Gain	0.9720	0.9693	0.90 - 1.10

Near Bar Offset	-0.0733	0.2064	NONE
Near Dens Offset	0.0979	0.2553	NONE
Near Peak Offset	0.0284	0.4332	NONE
Near Lith Offset	0.2218	0.7457	NONE
Far Bar Offset	0.0922	0.1155	NONE
Far Dens Offset	0.1623	0.1874	NONE
Far Peak Offset	0.2014	0.2290	NONE
Far Lith Offset	0.3537	0.3758	NONE

Near Bar Background	969.80	966.00	700 - 1450
Near Dens Background	321.20	319.70	230 - 480
Near Peak Background	141.23	140.22	100 - 210
Near Lith Background	172.03	169.95	125 - 260
Far Bar Background	493.95	494.14	450 - 900
Far Dens Background	192.00	191.86	175 - 345
Far Peak Background	75.79	75.83	70 - 140
Far Lith Background	79.52	79.76	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.682	1.684	0.002	+/- 0.015
Pe	2.571	2.564	-0.007	+/- 0.150
ALUMINUM				
Density (g/cc)	2.588	2.598	0.010	+/- 0.01500
Pe	3.185	3.133	-0.052	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0007	+/- 0.0110	-0.0031	+/- 0.0140
Magnesium Block	-0.0014	+/- 0.0110	0.0001	+/- 0.0140
Aluminum Block	-0.0002	+/- 0.0110	0.0007	+/- 0.0140
Resolution	9.84	6.00 - 11.50	9.12	6.00 - 11.50
Internal Verifier(B+D+P+L)	1596	1200 - 2700	842	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

### SPECTRAL DENSITY FIELD CHECK

Tool Name:	SDLT Pad - 10714945	Reference Calibration Date:	05-Sep-13 09:09:01
Engineer:	S. INGERSOLL	Calibration Date:	23-Sep-13 23:40:56
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Pad Temperature: 82.3 degF

**DENSITY FIELD CALIBRATION SUMMARY**

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1595.873	1591.921	-3.952	16.065
Far (B+D+P+L) cps	841.591	843.310	1.719	15.940
Near Resolution	9.84	9.97	0.130	0.50
Far Resolution	9.12	9.40	0.280	1.00

**PASS/FAIL SUMMARY**

Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

**CALIBRATION SUMMARY**

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-10748374</b>						
Gamma Ray Calibrator	232.0	233.9	-----	-1.9	+/- 9.00	api
<b>DSNT-10755066</b>						
Snow-Block Porosity	0.0594	0.0658	-----	-0.0064	+/- 0.0150	decp
<b>SDLT-10685803</b>						
Pad Extension	3.75	3.70	-----	0.05	+/-0.10	in
Ring Diameter	8.25	8.20	-----	0.05	+/-0.15	in
<b>SDLT Pad-10714945</b>						
Near(B+D+P+L)	1595.873	1591.921	-----	3.952	+/-16.065	cps
Far(B+D+P+L)	841.591	843.310	-----	-1.719	+/-15.940	cps

Data: DRUSSEL G-1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BN\004 24-Sep-13 07:27 Un @5309.8f

Date: 24-Sep-13 08:45:04

**HALLIBURTON**

**INPUTS, DELAYS AND FILTERS TABLE**

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
<b>Depth Panel</b>				
TENS	Tension	0.00	NO	
<b>RWCH</b>				
DHTN	DownholeTension	0.00	BLK	0.000
<b>SP Sub</b>				
PLTC	Plot Control Mask	72.01	NO	
SP	Spontaneous Potential	72.01	BLK	1.250
SPR	Raw Spontaneous Potential	72.01	NO	
SPO	Spontaneous Potential Offset	72.01	NO	
<b>GTET</b>				
TPUL	Tension Pull	63.99	NO	
GR	Natural Gamma Ray API	63.99	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	63.99	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	63.99	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	

**DSNT**

TPUL	Tension Pull	53.74	NO	
RNDS	Near Detector Telemetry Counts	53.84	BLK	1.417
RFDS	Far Detector Telemetry Counts	54.59	TRI	0.583
DNTT	DSN Tool Temperature	53.84	NO	
DSNS	DSN Tool Status	53.74	NO	
ERND	Near Detector Telemetry Counts EVR	53.84	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	54.59	BLK	0.000
ENTM	DSN Tool Temperature EVR	53.84	NO	
<b>SDLT</b>				
TPUL	Tension Pull	43.84	NO	
PCAL	Pad Caliper	43.84	TRI	0.250
ACAL	Arm Caliper	43.84	TRI	0.250
<b>BSAT</b>				
TPUL	Tension Pull	26.84	NO	
STAT	Status	26.84	NO	
DLYT	Delay Time	26.84	NO	
SI	Sample Interval	26.84	NO	
TXRX	Raw Telemetry 10 Receivers	26.84	NO	
FRMC	Tool Frame Count	26.84	NO	
GMOD	Gain processing mode	19.58	NO	
<b>ACRt Sonde</b>				
TPUL	Tension Pull	2.73	NO	
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000

F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000
RMUD	Mud Resistivity	12.52	BLK	0.000
F1RT	Transmitter Current Raw 12K X Receiver	2.73	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000
ITMP	Instrument Temperature	2.73	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.73	NO	
TIDV	Instrument Temperature Derivative	2.73	NO	
TUDV	Upper Temperature Derivative	2.73	NO	
TLDV	Lower Temperature Derivative	2.73	NO	
TRBD	Receiver Board Temperature	2.73	NO	

### SDLT Pad

TPUL	Tension Pull	43.83	NO	
NAB	Near Above	43.66	BLK	0.920
NHI	Near Cesium High	43.66	BLK	0.920
NLO	Near Cesium Low	43.66	BLK	0.920
NVA	Near Valley	43.66	BLK	0.920
NBA	Near Barite	43.66	BLK	0.920
NDE	Near Density	43.66	BLK	0.920
NPK	Near Peak	43.66	BLK	0.920
NLI	Near Lithology	43.66	BLK	0.920
NBAU	Near Barite Unfiltered	43.66	BLK	0.250
NLIU	Near Lithology Unfiltered	43.66	BLK	0.250
FAB	Far Above	44.01	BLK	0.250
FHI	Far Cesium High	44.01	BLK	0.250
FLO	Far Cesium Low	44.01	BLK	0.250
FVA	Far Valley	44.01	BLK	0.250
FBA	Far Barite	44.01	BLK	0.250
FDE	Far Density	44.01	BLK	0.250
FPK	Far Peak	44.01	BLK	0.250
FLI	Far Lithology	44.01	BLK	0.250
PTMP	Pad Temperature	43.84	BLK	0.920
NHV	Near Detector High Voltage	43.24	NO	
FHV	Far Detector High Voltage	43.24	NO	
ITMP	Instrument Temperature	43.24	NO	
DDHV	Detector High Voltage	43.24	NO	

### Microlog Pad

TPUL	Tension Pull	44.03	NO	
MINV	Microlog Lateral	44.03	BLK	0.750
MNOR	Microlog Normal	44.03	BLK	0.750

Data: DRUSSEL G-1\0001 SP-GTET-DSN-SDL-FLEX-BSAT-ACRT-BN\004 24-Sep-13 07:27 Up @5309.8f

Date: 24-Sep-13 08:43:22

COMPANY OXY USA INC.

WELL	DRUSSEL G-1		
FIELD	DRUSSEL		
COUNTY	FINNEY	STATE	KANSAS
<b>HALLIBURTON</b>		SPECTRAL DENSITY DUAL SPACED NEUTRON LOG	