

# HALLIBURTON

## DUAL SPACED NEUTRON SPECTRAL DENSITY LOG

COMPANY	HERMAN L. LOEB, LLC.		
WELL	ROSENBERGER #2-29		
FIELD/BLOCK	EINSEL		
COUNTY	KIOWA		
STATE	KANSAS		
COMPANY	HERMAN L. LOEB, LLC.	WELL	ROSENBERGER #2-29
FIELD/BLOCK	EINSEL	COUNTY	KIOWA
COUNTY	KIOWA	STATE	KANSAS
API No.	15-097-21788-00-00	Location	(SHL) 1625' FSL & 805' FEL SE-SW-NE-SE
Sect.	27	Twp.	27S
Rge.	18W	Elev.	2204.0 ft
Drilling measured from	KB	Log measured from	KB
Permanent Datum	GL	Other Services:	DSN/SDL MICROLOG ACRT MRIL
Drilling measured from	KB		

Date	27-Mar-14	Elev.: K.B.	2217.0 ft
Run No.	ONE	D.F.	2216.0 ft
Depth - Driller	4832.00 ft	G.L.	2204.0 ft
Depth - Logger	4828.0 ft		
Bottom - Logged Interval	4825		
Top - Logged Interval	2400		
Casing - Driller	8.625 in @ 636.0 ft		
Casing - Logger	637.0 ft		
Bit Size	7.875 in @		
Type Fluid in Hole	Water Based Mud		
Density	9.2 ppg	60.00 s/qt	
PH	10.00 pH	10.4 cp/m	
Source of Sample	MUD PIT		
Rm @ Meas. Temperature	0.580 ohmm @ 71.00 degF		
Rmf @ Meas. Temperature	0.49 ohmm @ 71.00 degF		
Rmc @ Meas. Temperature	0.660 ohmm @ 71.00 degF		
Source Rmf	CALCULATED	CALCULATED	
Rm @ BHT	0.37 ohmm @ 115.0 degF		
Time Since Circulation	7.2500 hr		
Time on Bottom	27-Mar-14 08:10		
Max. Rec. Temperature	115.0 degF @ 4828.0 ft		
Equipment	11230668 LIBERAL		
Recorded By	SHELDON INGERSOLL		
Witnessed By	J. CHRISTENSEN		

Fold here

Service Ticket No.: 901221026      API Serial No.: 15-097-21788-00-00      PGM Version: WL INSITE R4.2.0 (Build 2)

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.		@	@				
Rmc @ Meas. Temp.		@	@				
Source Rmf	Rmc						
Rm @ BHT		@	@				
Rmf @ BHT		@	@				
Rmc @ BHT		@	@				

EQUIPMENT DATA							
GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	10748374	Serial No.		Serial No.	10673790	Serial No.	10735145
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.		Diameter	5.3"	Diameter	3.625"
Detector Model No.	T-102	Spacing		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	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	4828	2400	REC	0	150				30	-10	2.71 gm/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING.

CHLORIDES REPORTED AT 7400 ppm.

RUN 1 = GAMMA-ACRT

RUN 2 = GAMMA-DSN-SDL

RUN 3 = MRIL

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.

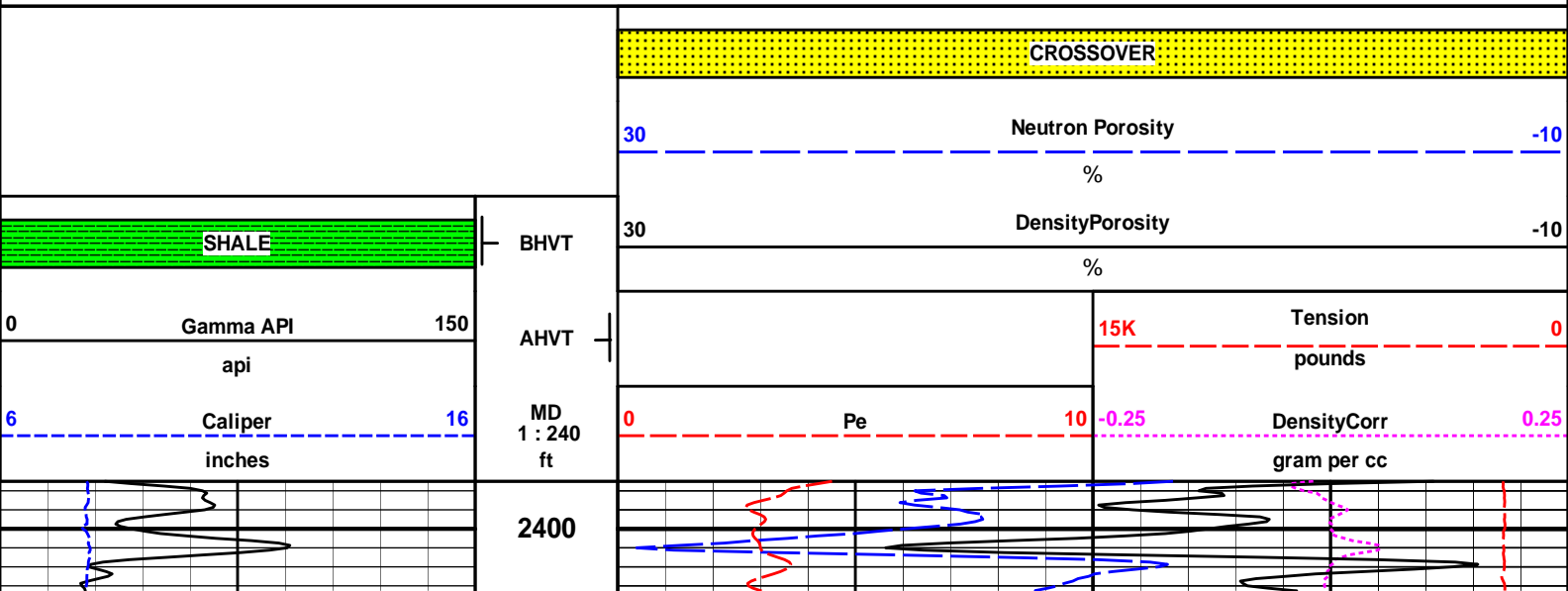
HALLIBURTON



Plot Time: 27-Mar-14 09:24:54  
 Plot Range: 2395 ft to 2605 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL UPPER DETAIL\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

# 5 INCH MAIN LOG

## UPPER DETAIL





SHALE	BHVT	30	DensityPorosity	-10
			%	
		30	Neutron Porosity	-10
			%	
		CROSSOVER		

**HALLIBURTON**

Plot Time: 27-Mar-14 09:24:55  
 Plot Range: 2395 ft to 2605 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL UPPER DETAIL\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

## 5 INCH MAIN LOG

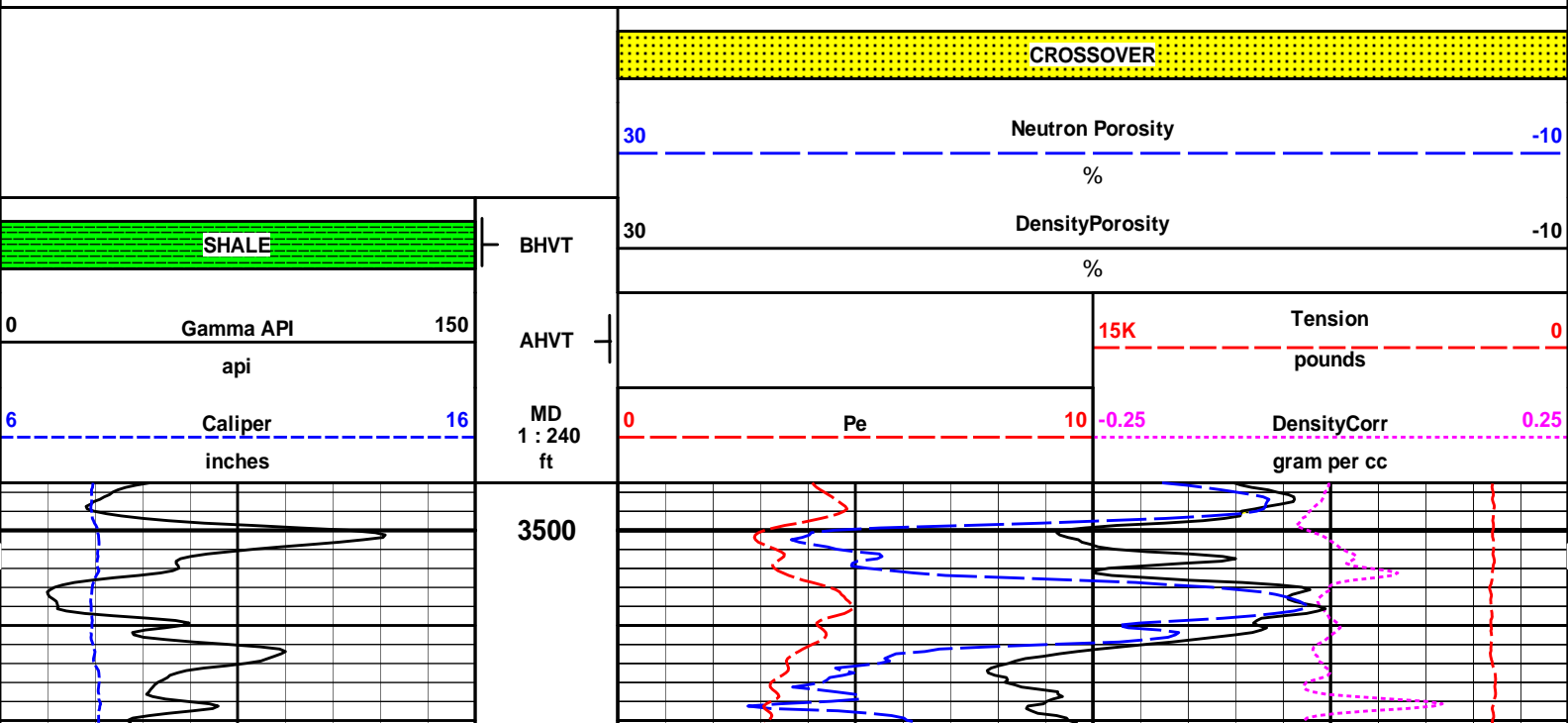
UPPER DETAIL

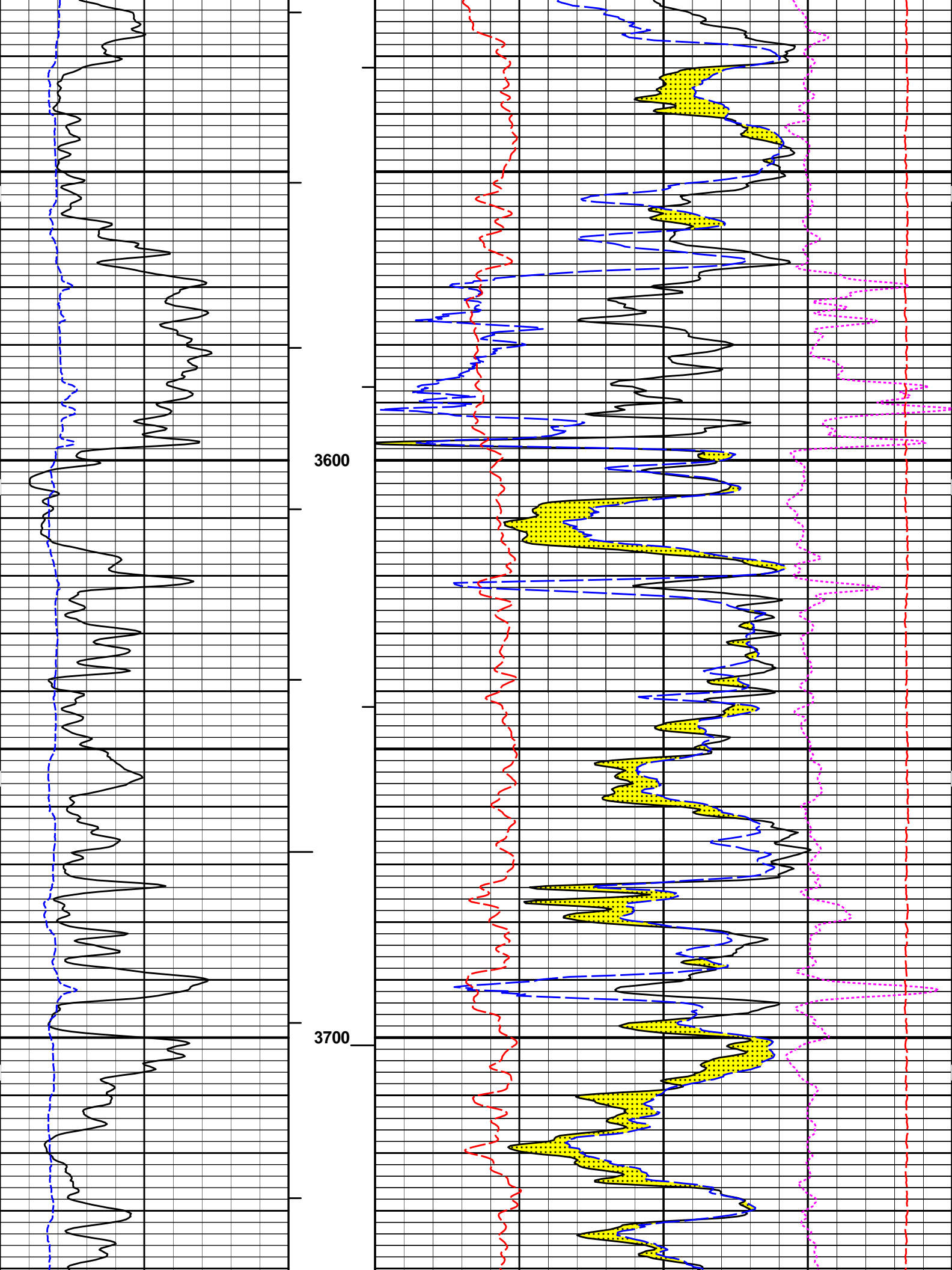
**HALLIBURTON**

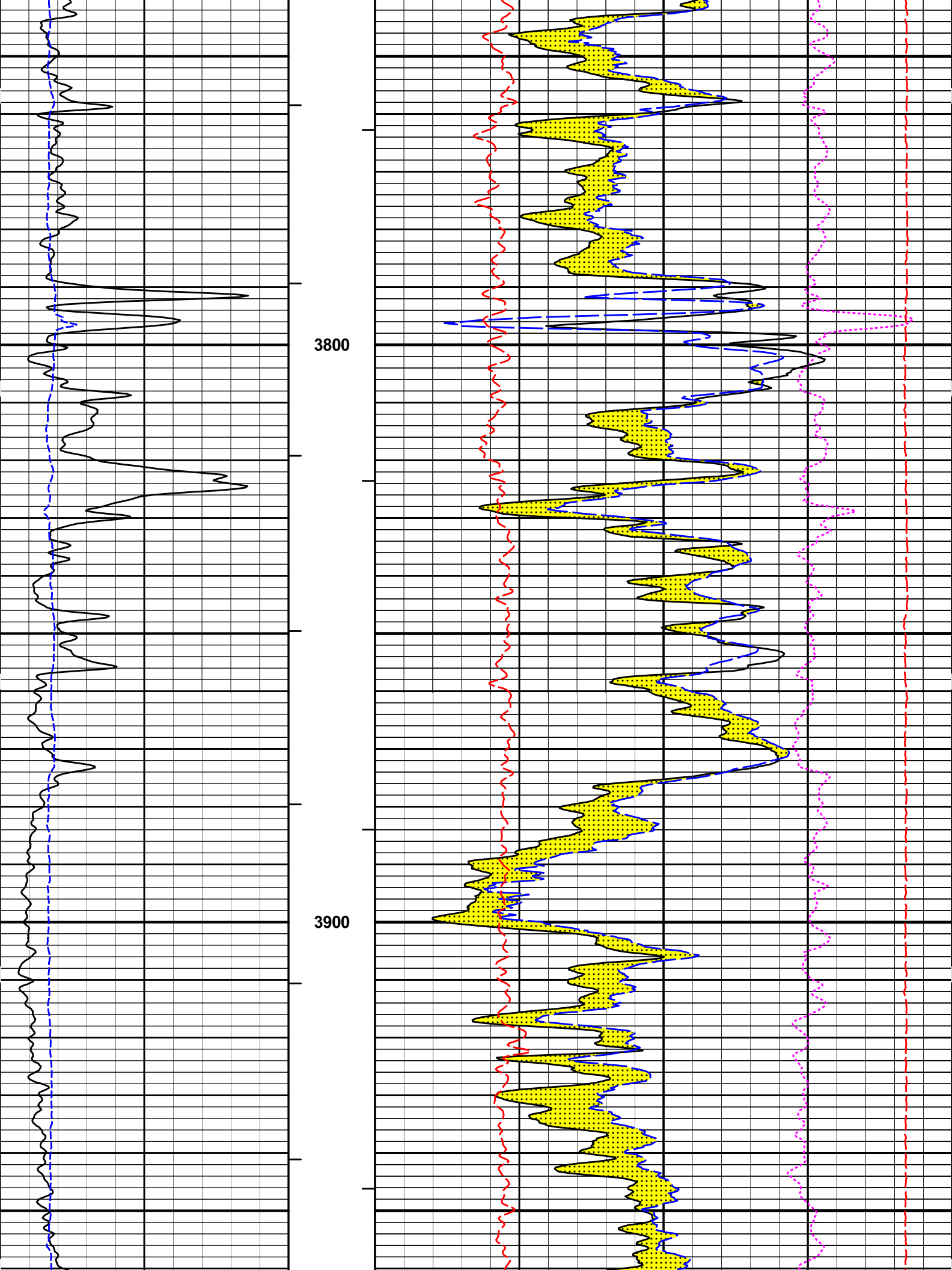
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 Plot Range: 3495 ft to 4844 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL LOWER DETAIL\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

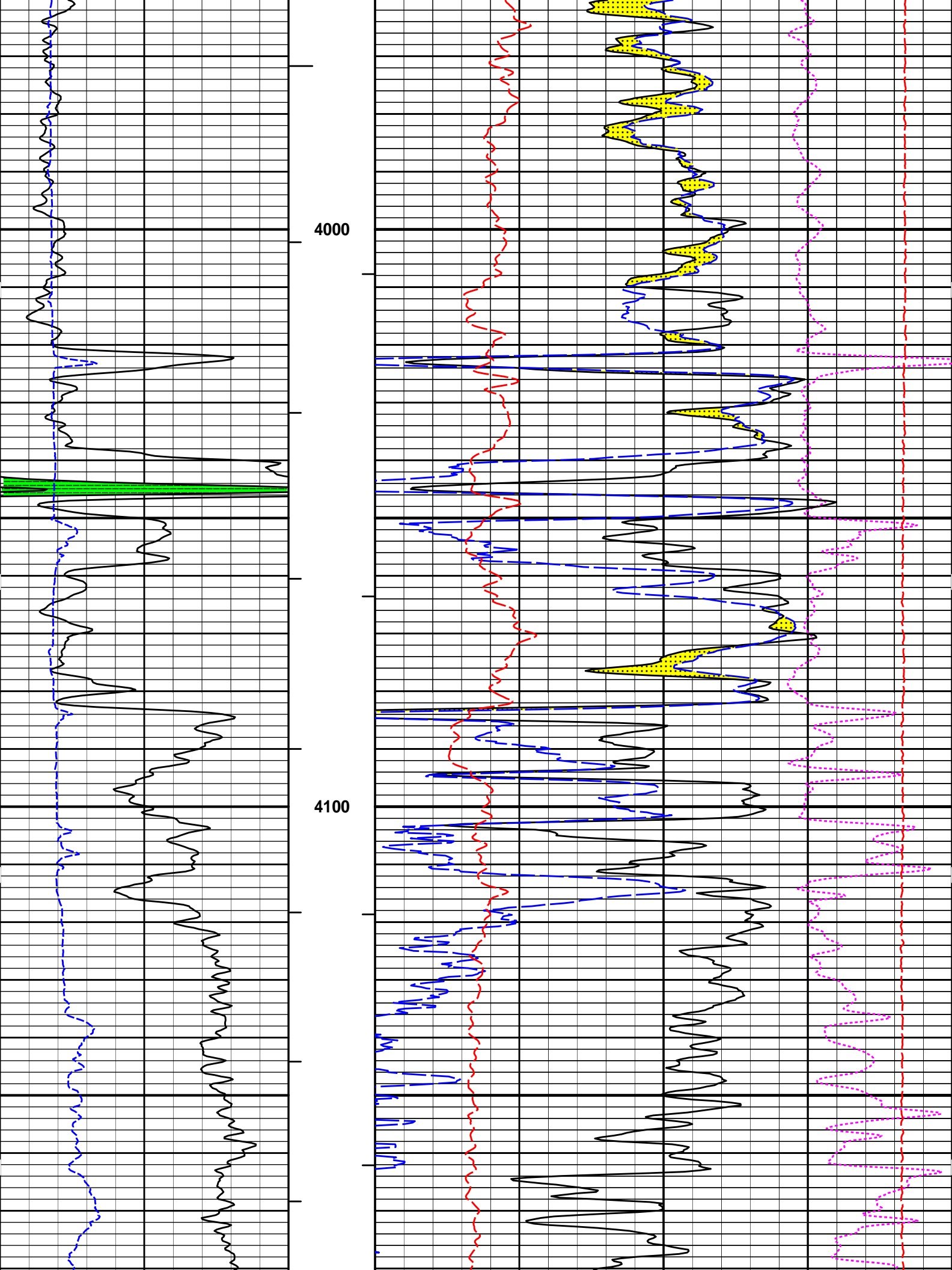
## 5 INCH MAIN LOG

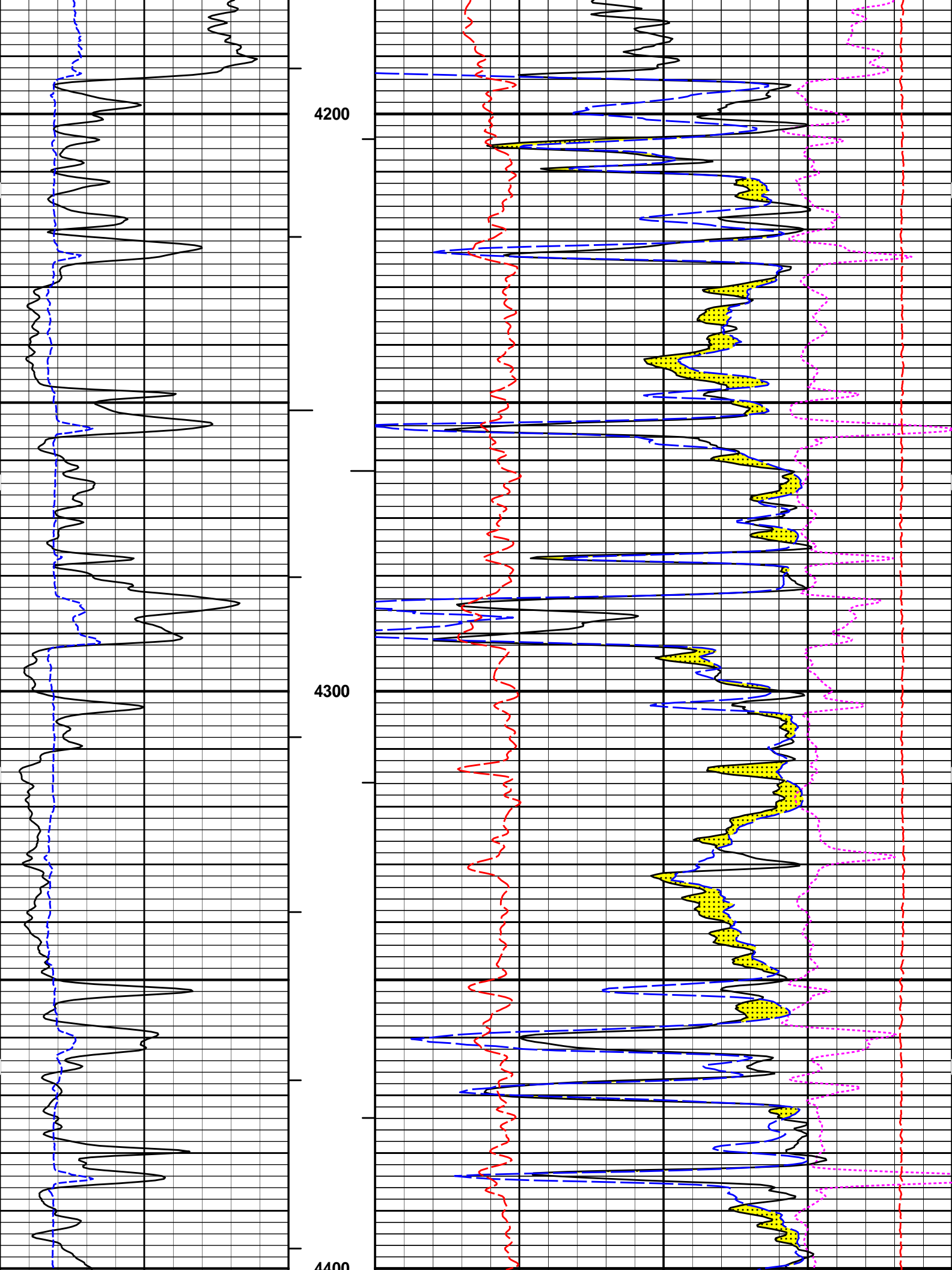
LOWER DETAIL

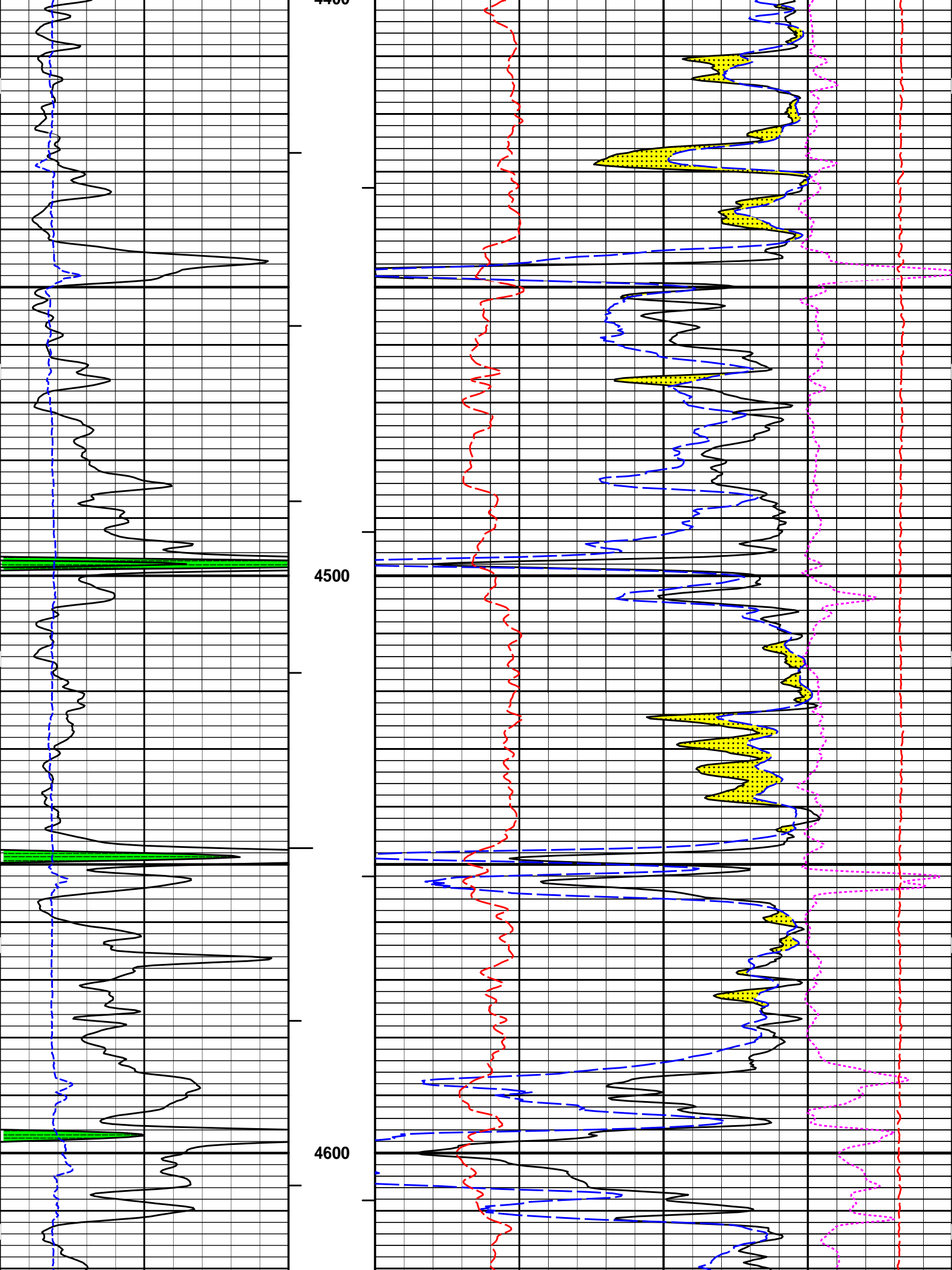


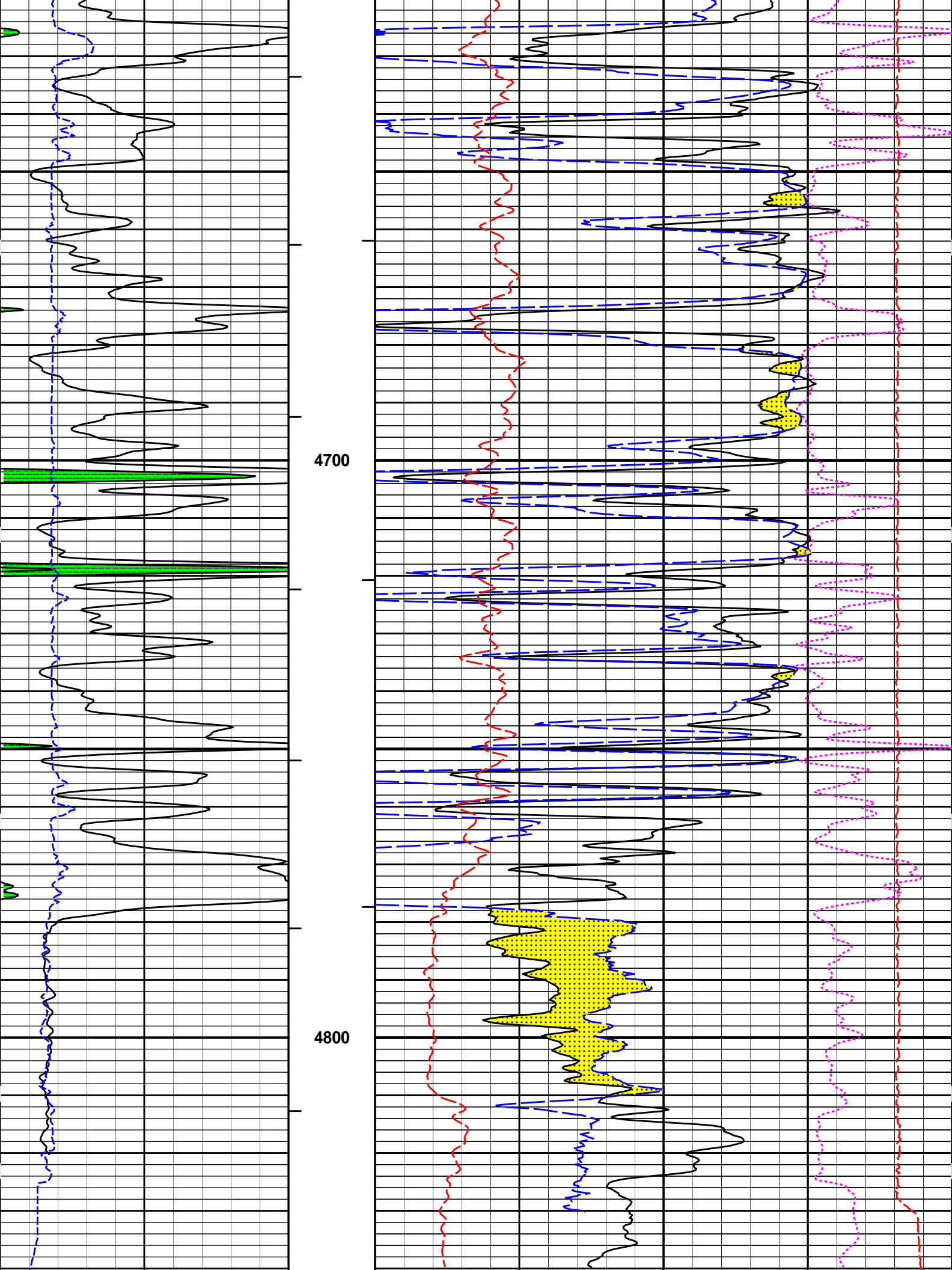












6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
			ft						
0	Gamma API	150	AHVT			15K		Tension	0
	api							pounds	
			BHVT	30				DensityPorosity	-10
	SHALE							%	
				30				Neutron Porosity	-10
								%	
								CROSSOVER	

**HALLIBURTON**

Plot Time: 27-Mar-14 09:24:57  
 Plot Range: 3495 ft to 4844 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL LOWER DETAIL\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

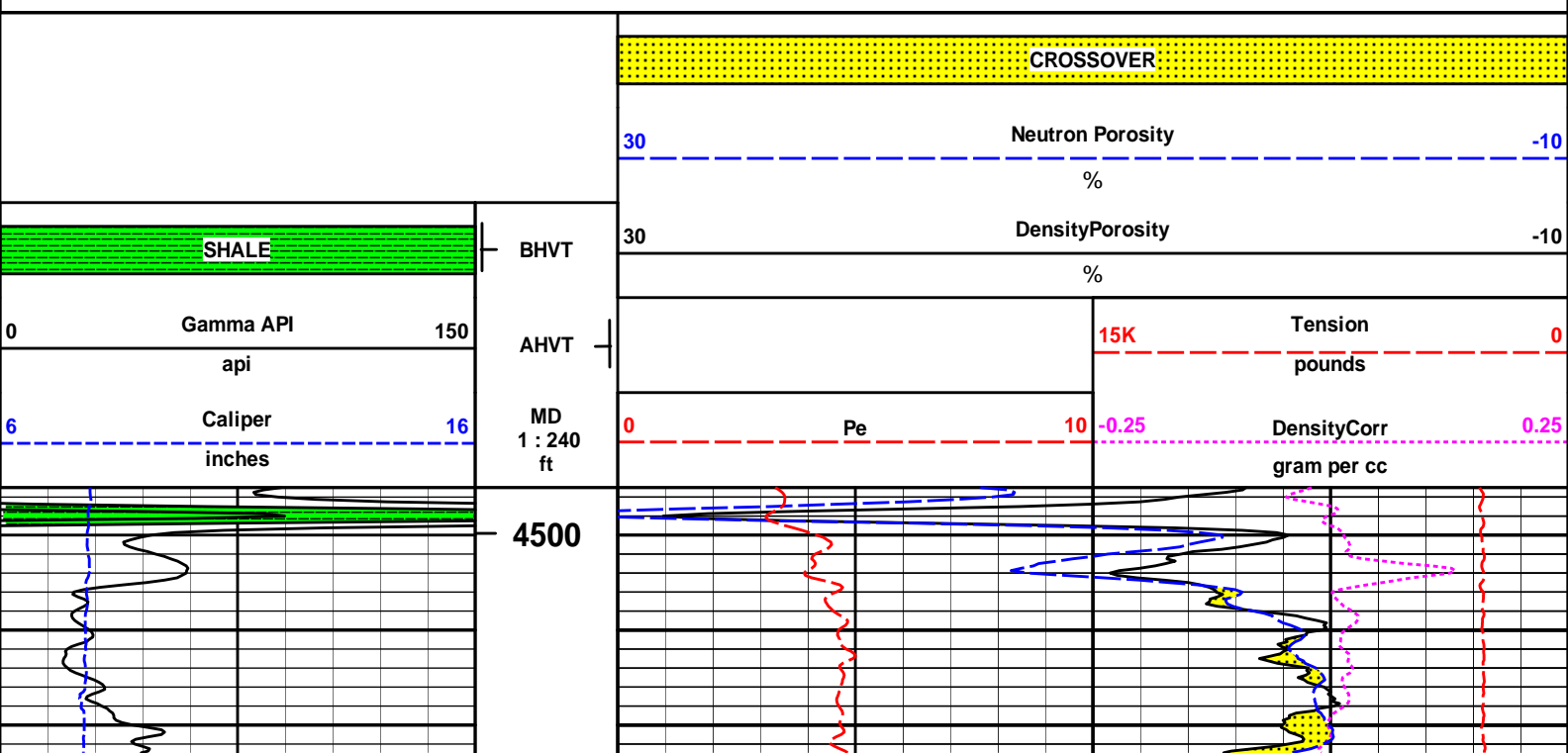
### 5 INCH MAIN LOG

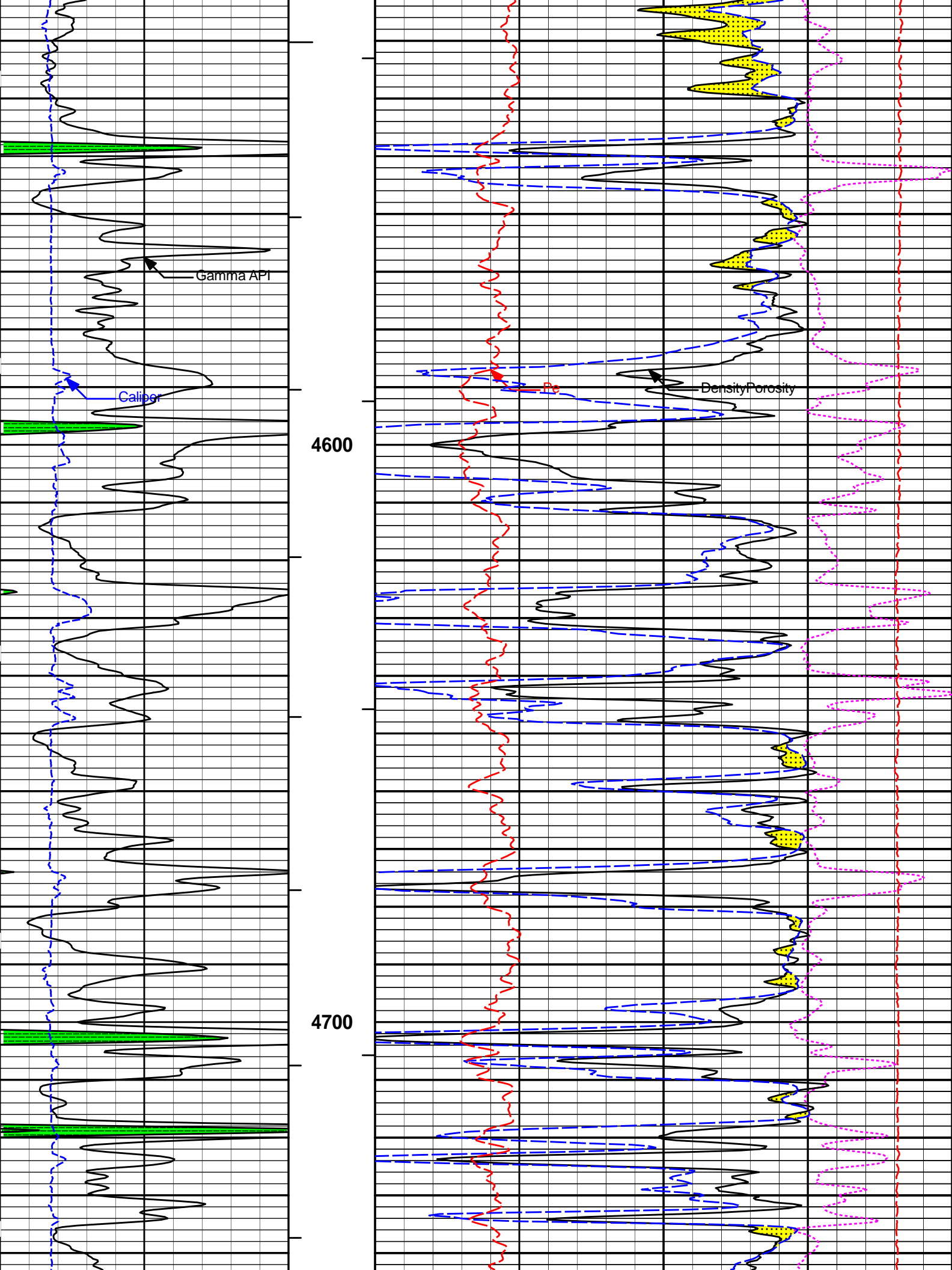
LOWER DETAIL

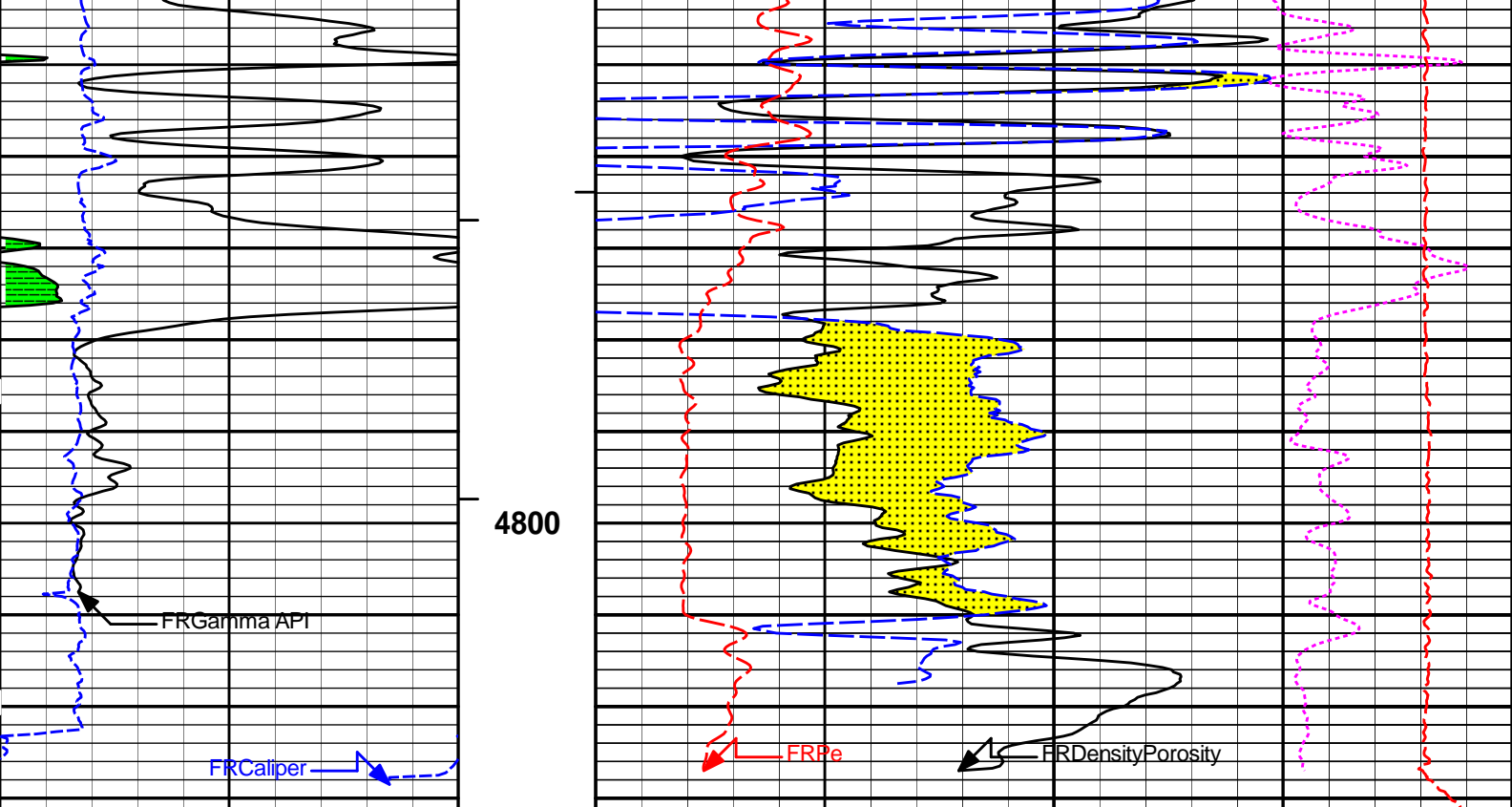
**HALLIBURTON**

Plot Time: 27-Mar-14 09:24:57  
 Plot Range: 4495 ft to 4831.83 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL REPEAT\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_REP\_LIB

### REPEAT SECTION







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: 27-Mar-14 09:24:58  
 Plot Range: 4495 ft to 4831.83 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL REPEAT\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_REP\_LIB

## REPEAT SECTION

**HALLIBURTON** Plot Time: 27-Mar-14 09:24:58  
 Plot Range: 2395 ft to 2605 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL UPPER DETAIL\  
 Plot File: \\LOCAL-ROSENBERGER2-29\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

## 5 INCH MAIN LOG

UPPER DETAIL

**SHALE**

0 Gamma Ray 150  
api

18 FarQuality -2

-18 NearQuality 2

6 Caliper 16  
inches

BHV  
ft3

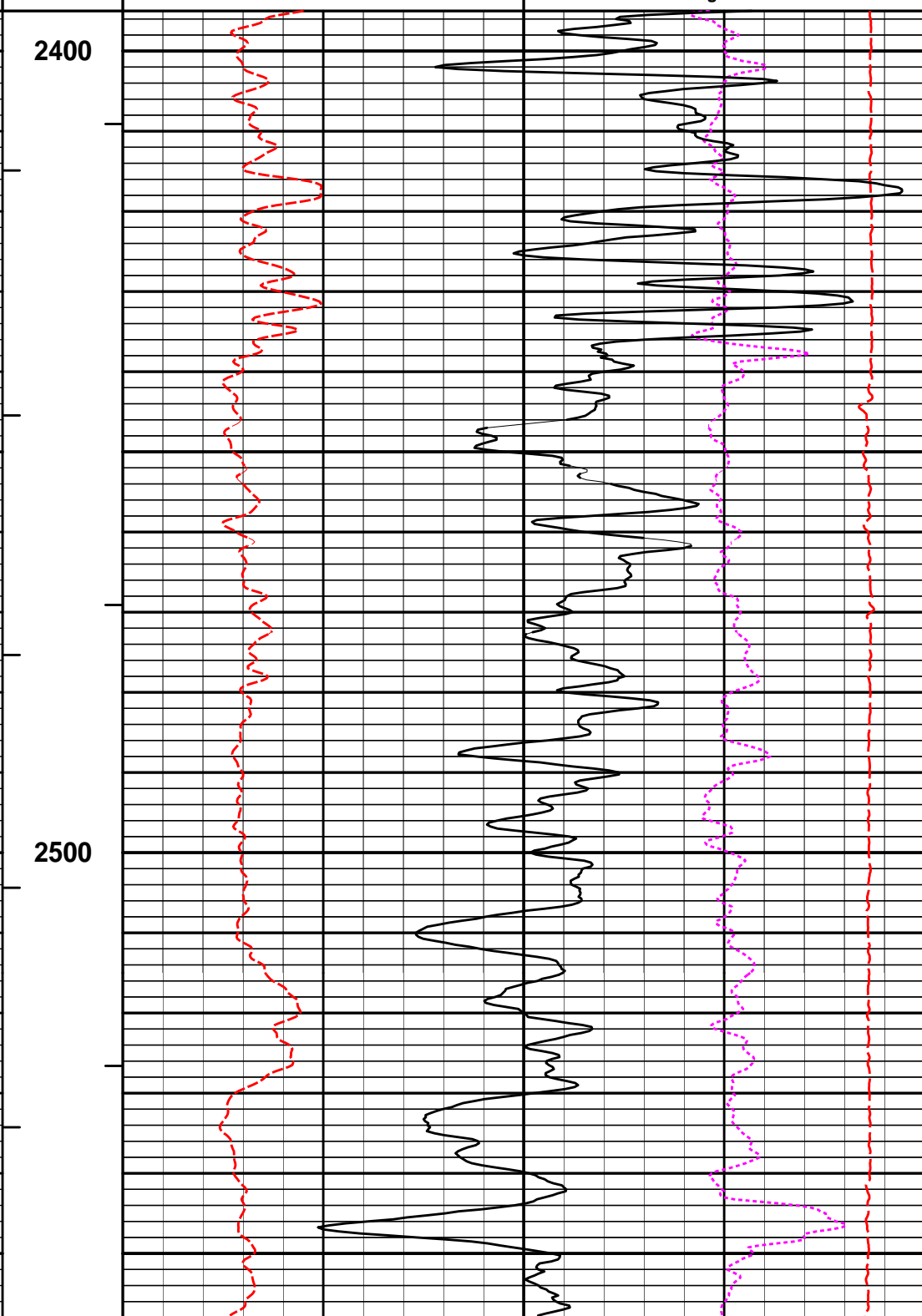
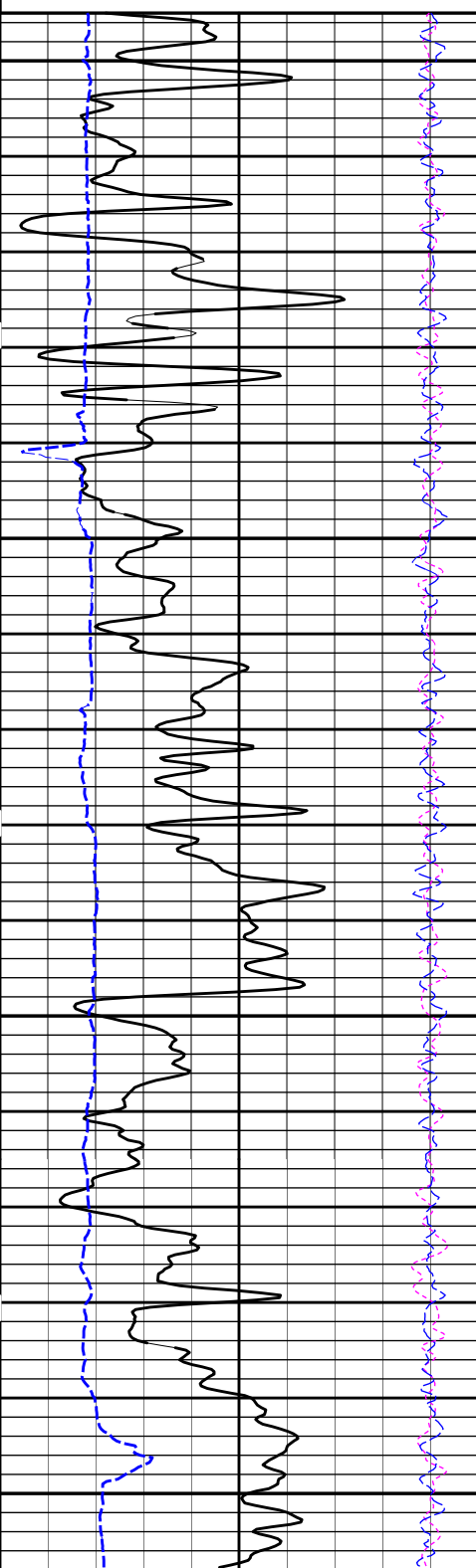
2 Bulk Density 3  
g/cc

AHV  
ft3

15K Tension 0  
pounds

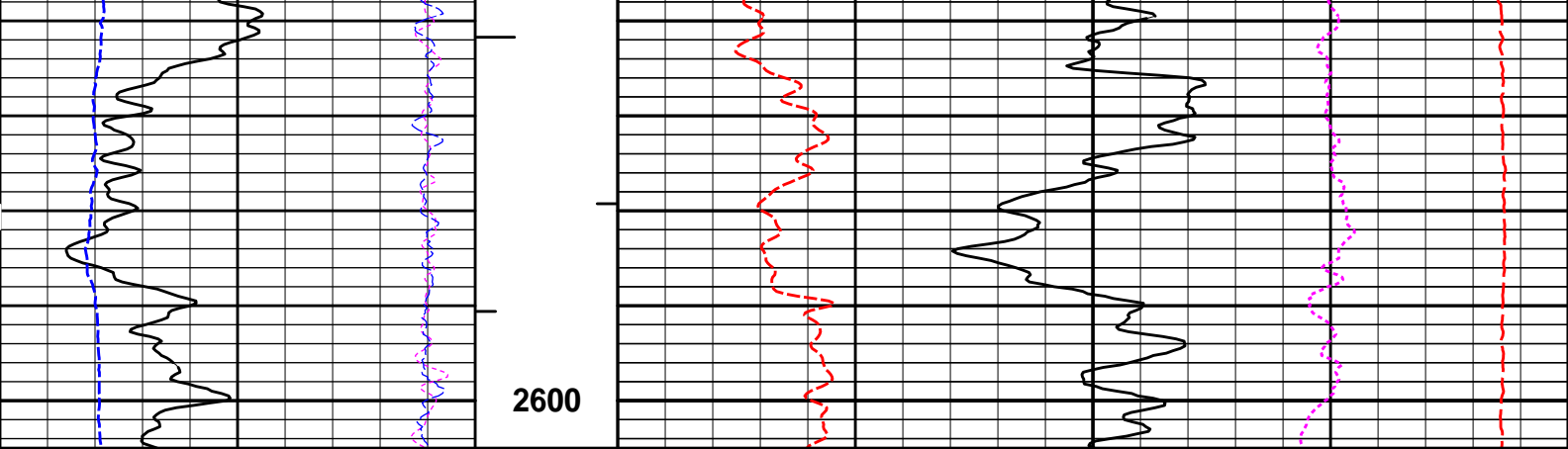
MD  
1 : 240  
ft

0 Pe 10 -0.25 DensityCorr 0.25  
g/cc



2400

2500



6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					g/cc	
			ft						
-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** Plot Time: 27-Mar-14 09:24:59  
 Plot Range: 2395 ft to 2605 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL UPPER DETAIL\  
 Plot File: \\-LOCAL-ROSENBERGER2-29\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

## 5 INCH MAIN LOG

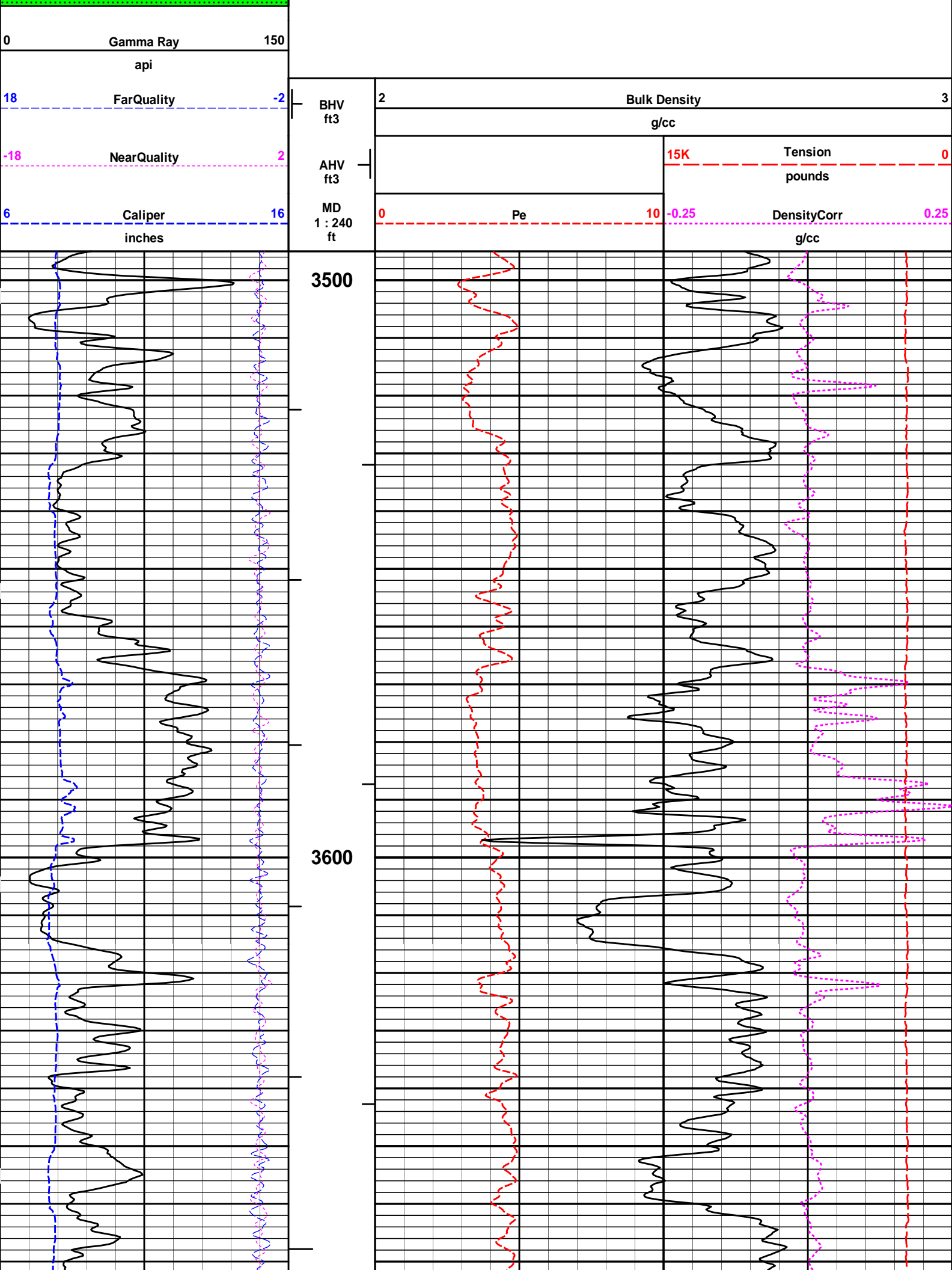
UPPER DETAIL

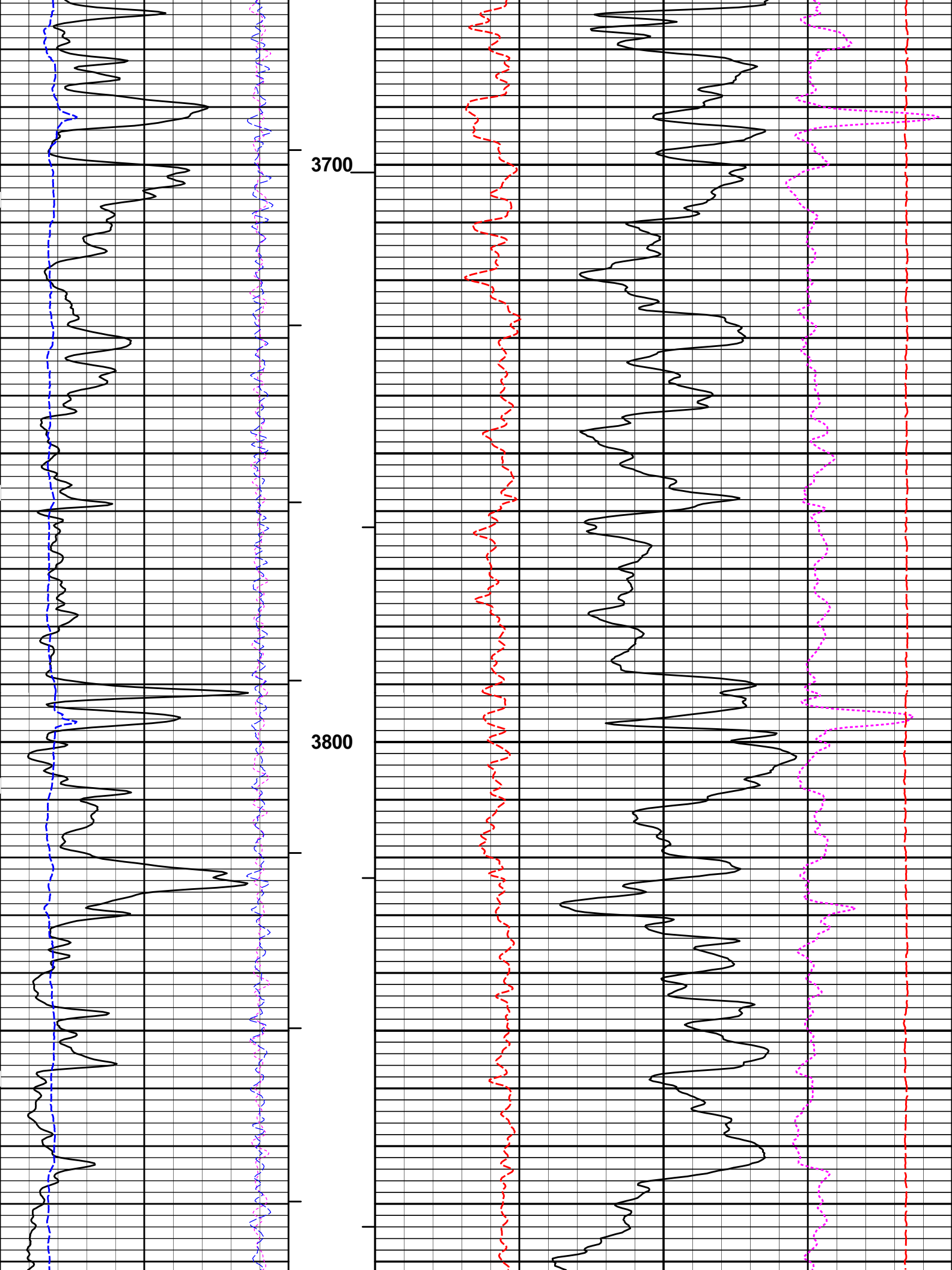
**HALLIBURTON** Plot Time: 27-Mar-14 09:25:00  
 Plot Range: 3495 ft to 4844 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL LOWER DETAIL\  
 Plot File: \\-LOCAL-ROSENBERGER2-29\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

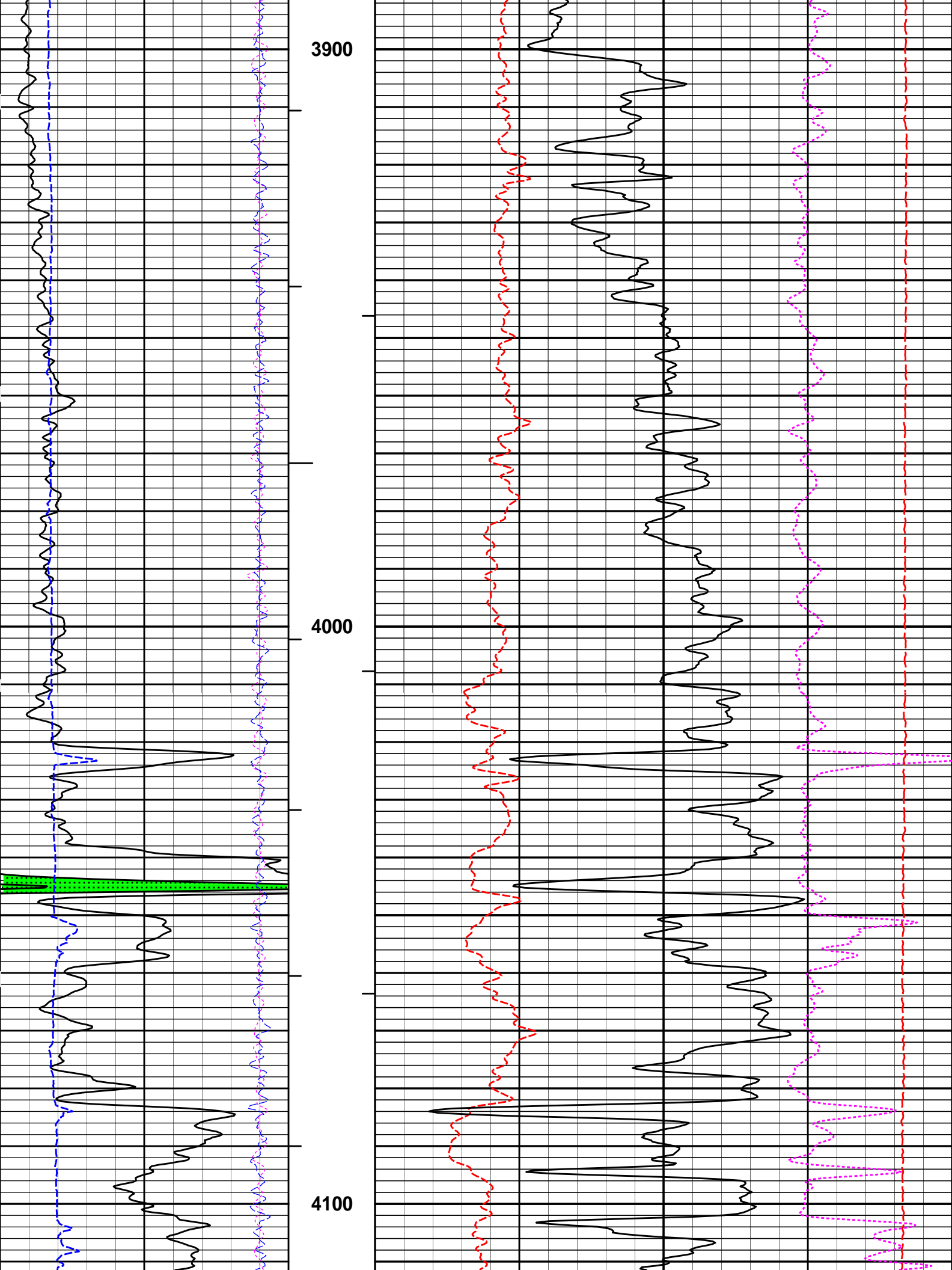
## 5 INCH MAIN LOG

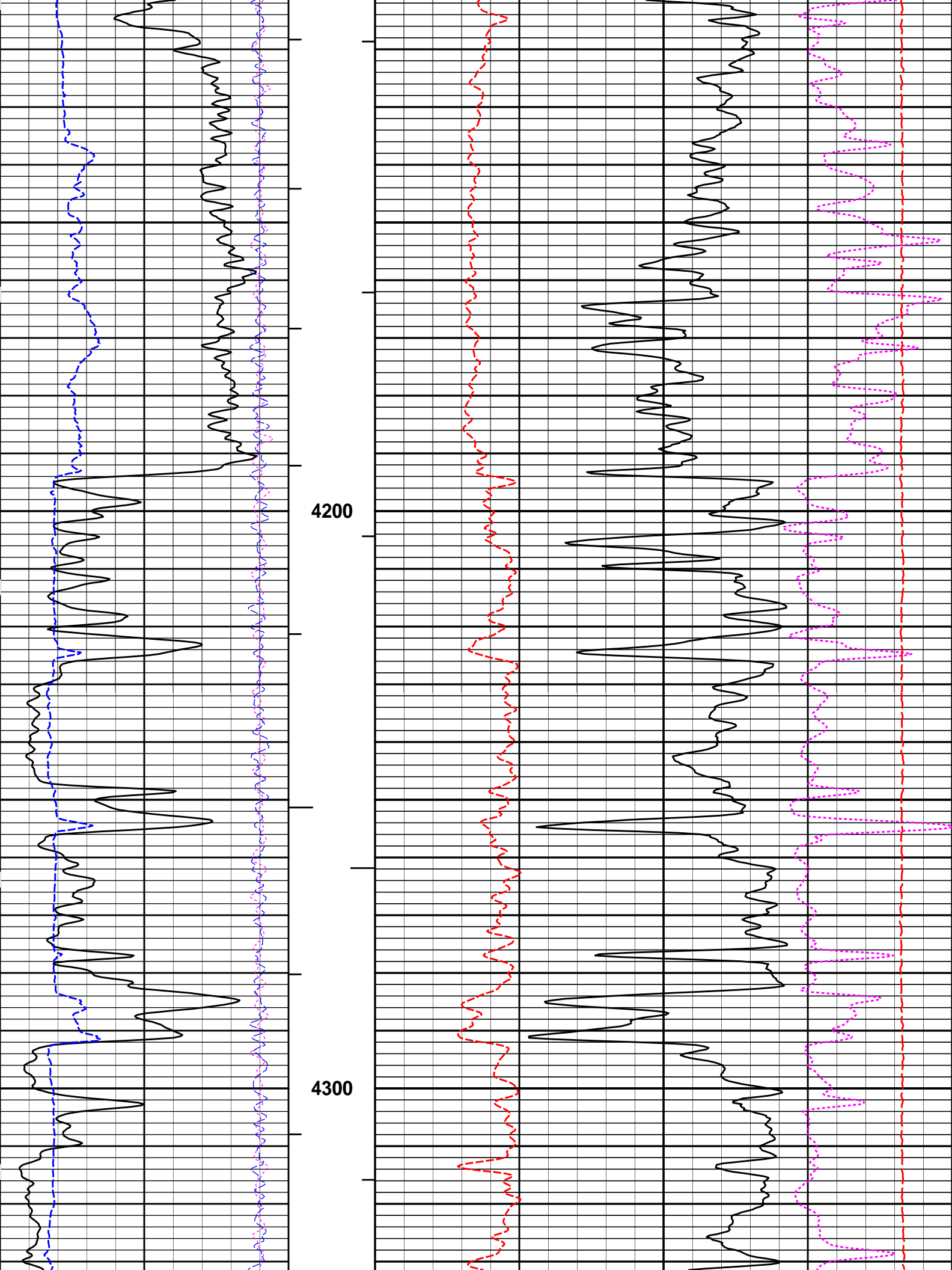
LOWER DETAIL

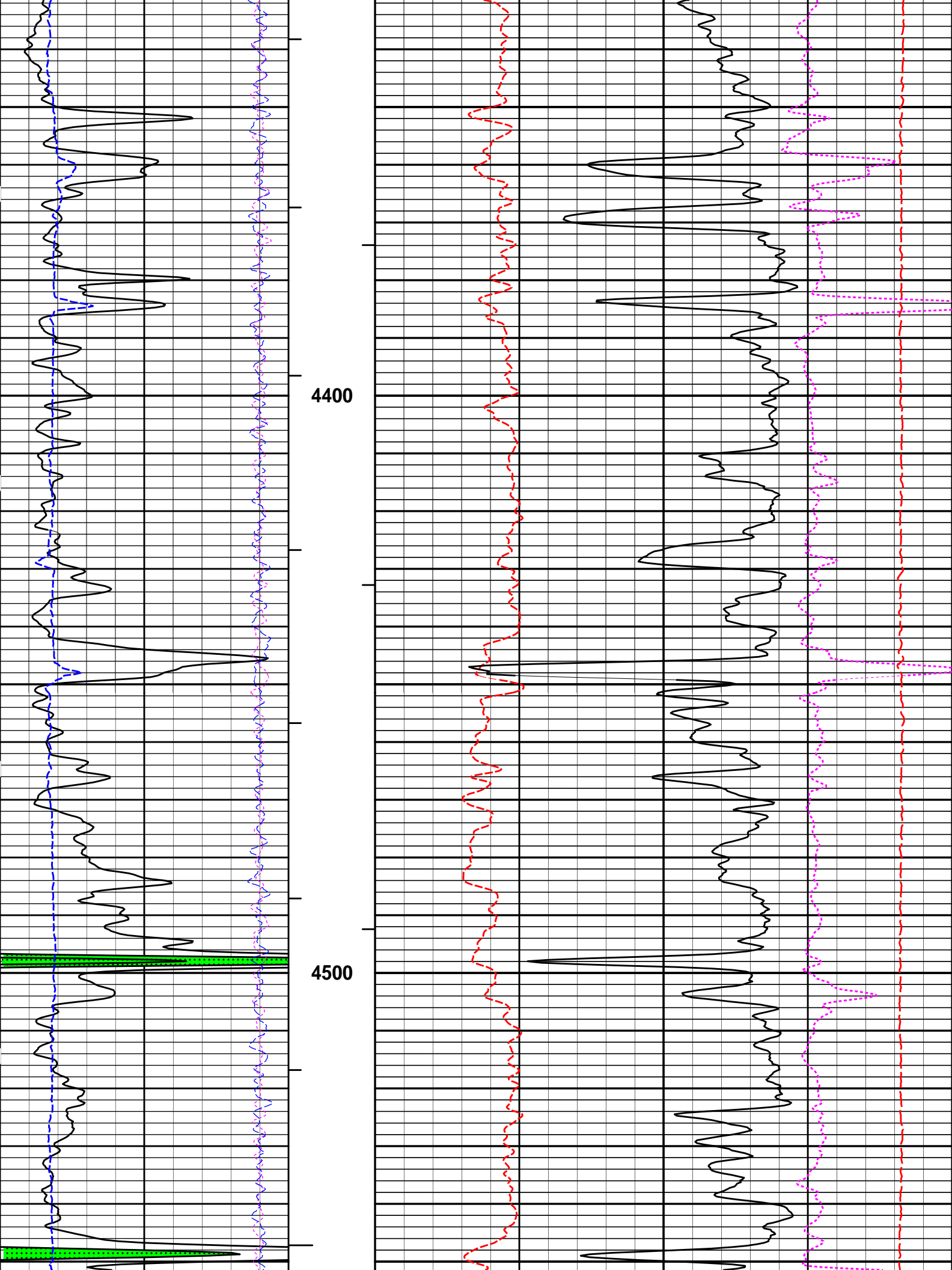
SHALE

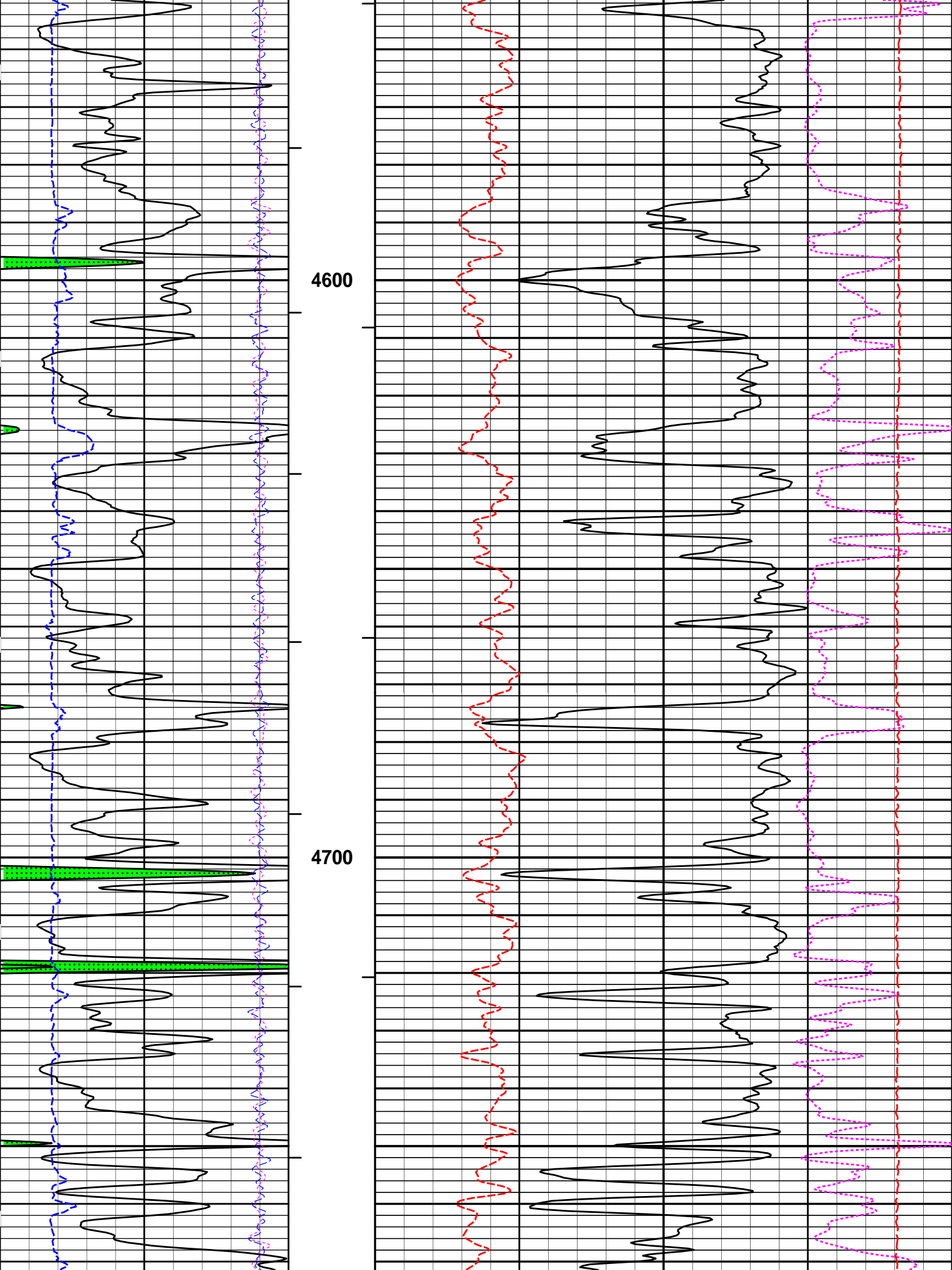


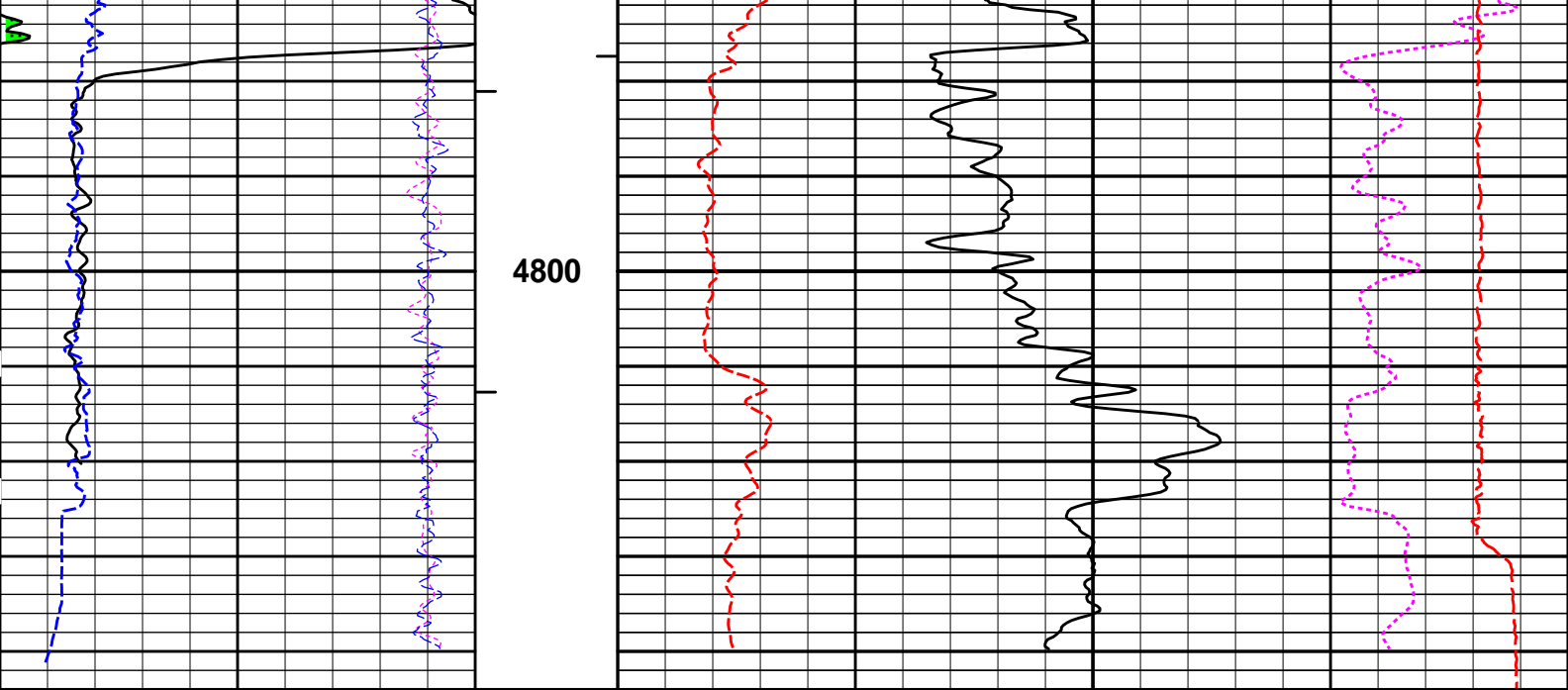












6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					g/cc	
	NearQuality	2	AHV				15K	Tension	0
			ft3					pounds	
18	FarQuality	-2	BHV	2	Bulk Density				3
			ft3		g/cc				
0	Gamma Ray	150							
	api								
SHALE									

**HALLIBURTON**

Plot Time: 27-Mar-14 09:25:01  
 Plot Range: 3495 ft to 4844 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL LOWER DETAIL\  
 Plot File: \\-LOCAL-ROSENBERGER2-29\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

## 5 INCH MAIN LOG

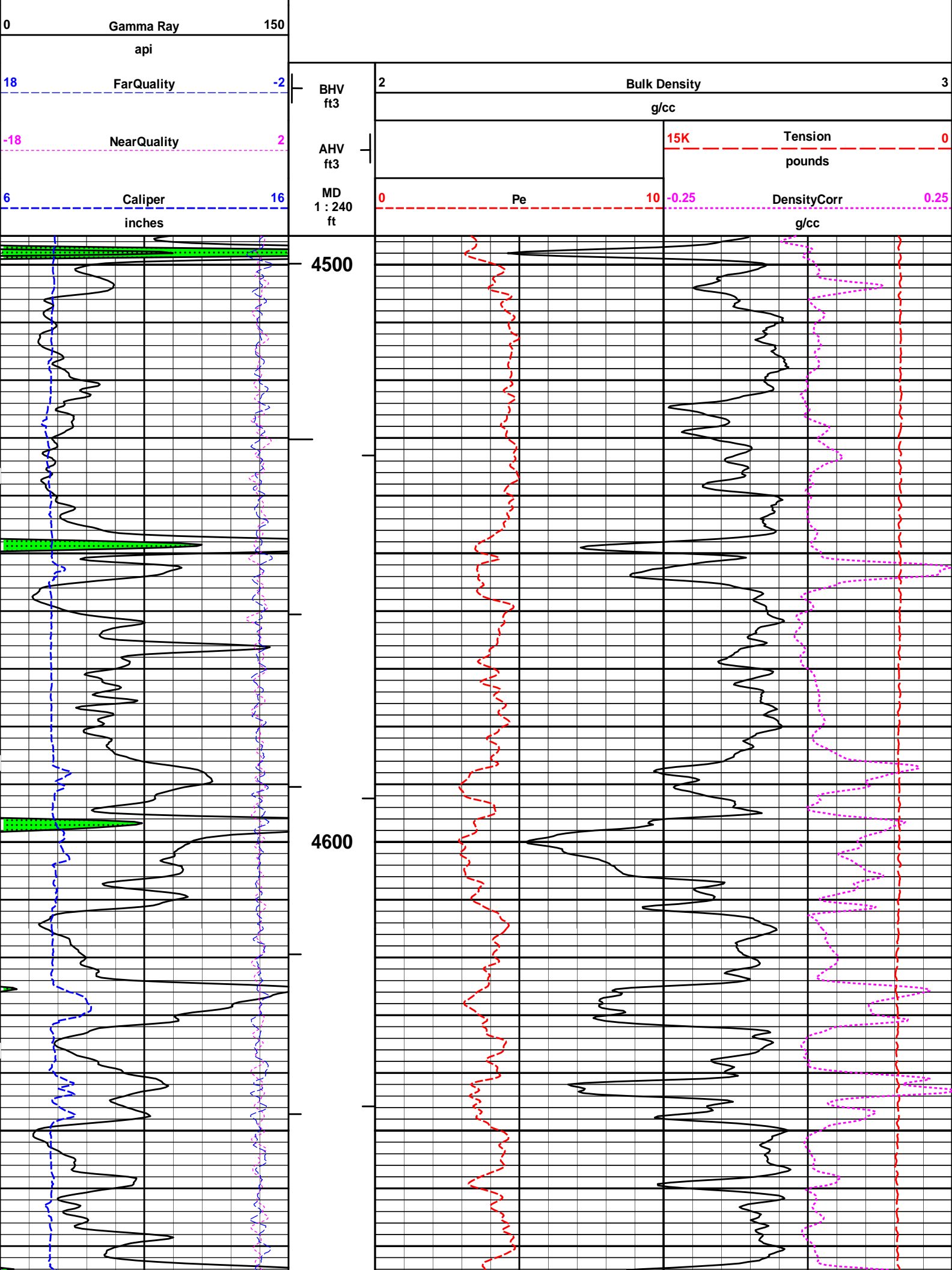
LOWER DETAIL

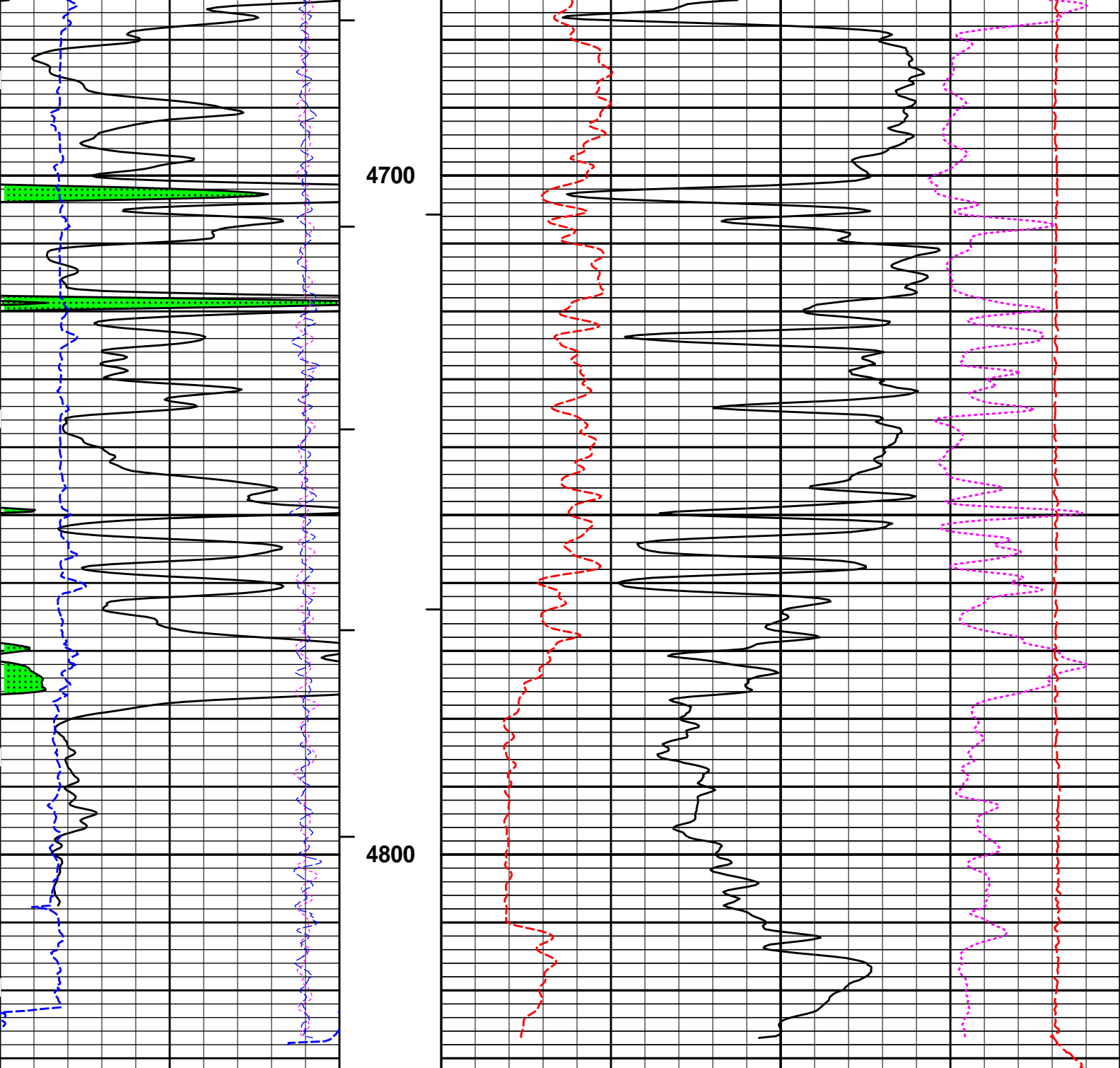
**HALLIBURTON**

Plot Time: 27-Mar-14 09:25:01  
 Plot Range: 4495 ft to 4831.83 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL REPEAT\  
 Plot File: \\-LOCAL-ROSENBERGER2-29\Well Based\POROSITY\BULKD\_5\_REP\_LIB

## REPEAT SECTION

SHALE





6	Caliper	16	MD	0	Pe	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**

Plot Time: 27-Mar-14 09:25:02  
 Plot Range: 4495 ft to 4831.83 ft  
 Data: ROSENBERGER2-29\Well Based\R1 DSN SDL REPEAT\  
 Plot File: \\LOCAL\ROSENBERGER2-29\Well Based\ROPOSIT\BULK.D 5 PER.LIB

# REPEAT SECTION

**HALLIBURTON**

## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS-CH_696 37.50 lbs		Ø 2.750 in →		← Temperature @ 35.12 ft	3.03 ft	36.15 ft
SP Sub-12345678 60.00 lbs		Ø 3.625 in →		← SP @ 31.34 ft	3.74 ft	33.12 ft
GTET-10748374 165.00 lbs		Ø 3.625 in →		← GammaRay @ 23.32 ft	8.52 ft	29.38 ft
DSN Decentralizer-10735145 6.60 lbs		Ø 5.000 in* →				20.86 ft
DSNT-10735145 174.00 lbs		Ø 3.625 in →		← DSN Far @ 13.92 ft ← DSN Near @ 13.17 ft	9.69 ft	11.17 ft
SDLT-10673803 360.00 lbs	SDLT Pad-10673790 65.00 lbs Microlog Pad-10673803 8.00 lbs	Ø 4.500 in → Ø 4.750 in* → Ø 4.750 in* →		← Microlog @ 3.36 ft ← SDL Caliper @ 3.18 ft ← SDL @ 3.17 ft	10.81 ft	0.36 ft
RBP-25K-00000001 16.00 lbs		Ø 4.750 in → Ø 3.370 in →			0.36 ft	0.00 ft

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	CH_696	37.50	3.03	33.12	300.00
SP	SP Sub	12345678	60.00	3.74	29.38	300.00
GTET	Gamma Telemetry Tool	10748374	165.00	8.52	20.86	60.00
DSNT	Dual Spaced Neutron	10735145	174.00	9.69	11.17	60.00

DCNT	DSN Decentralizer	10735145	6.60	5.13 *	14.50	300.00
SDLT	Spectral Density Tool	10673803	360.00	10.81	0.36	60.00
SDLP	Density Insite Pad	10673790	65.00	2.55 *	2.57	60.00
MICP	Microlog Pad	10673803	8.00	1.00 *	2.86	60.00
BLNS	Bull Plug	00000001	16.00	0.36	0.00	300.00
<b>Total</b>			<b>892.10</b>	<b>36.15</b>		
			* Not included in Total Length and Length Accumulation.			
Data: ROSENBERGER2-29\0002 GTET-DSN-SDL-BP\IDLE						Date: 27-Mar-14 06:16:57

**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	9.200	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	0.580	ohmm
	SHARED	TRM	Temperature of Mud	71.0	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	4828.00	ft
	SHARED	BHT	Bottom Hole Temperature	115.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	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	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	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	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	

DSNT	DEOR	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	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
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
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	

BOTTOM

Data: ROSENBERGER2-29\0002 GTET-DSN-SDL-BP\005 27-Mar-14 07:59 Up @4845.0f

Date: 27-Mar-14 08:17:08

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 10748374

Reference Calibration Date: 05-Mar-14 16:34:57

Engineer: thomas hyde

Calibration Date: 18-Mar-14 09:50:24

Software Version: WL INSITE R4.2.0 (Build 2)

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	34.3	33.1	api
Background + Calibrator	274.5	265.1	api
Calibrator	240.2	232.0	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 10748374

Reference Calibration Date: 18-Mar-14 09:50:24

Engineer: SHELDON INGERSOLL

Calibration Date: 26-Mar-14 23:24:02

Software Version: WL INSITE R4.2.0 (Build 2)

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	33.1	43.2	api
Background + Calibrator	265.1	266.5	api
Calibrator	232.0	223.3	api

Shop	Field	Difference	Tolerance
232.0	223.3	8.7	+/- 9.00

## DUAL SPACED NEUTRON SHOP CALIBRATION

**Tool Name:** DSNT - 10735145

**Reference Calibration Date:** 19-Feb-14 12:37:26

**Engineer:** THOMAS K HYDE

**Calibration Date:** 18-Mar-14 11:38:05

**Software Version:** WL INSITE R4.2.0 (Build 2)

**Calibration Version:** 1

Logging Source S/N: DSN-436

Tank Serial Number: LIBERAL

Reference value assigned to Tank: 51.680

Snow Block S/N: 668

Calibration Tank Water Temperature: 68 degF

Min. Tool Housing Outside Diameter: 3.620 in

### CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.946	0.942	0.900 - 1.100

### WATER TANK SUMMARY (Horizontal Water Tank)

Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2117	0.2107	0.0010	+/- 0.0020
Calibrated Ratio:	9.75	9.72	0.035	+/- 0.050

### VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0610	0.02000 - 0.09000

### PASS/FAIL SUMMARY

Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

## DUAL SPACED NEUTRON FIELD CALIBRATION

**Tool Name:** DSNT - 10735145

**Reference Calibration Date:** 18-Mar-14 11:38:05

**Engineer:** SHELDON INGERSOLL

**Calibration Date:** 26-Mar-14 23:31:14

**Software Version:** WL INSITE R4.2.0 (Build 2)

**Calibration Version:** 1

Logging Source S/N: DSN-436

Snow Block S/N: 668

### NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0610	0.0665	0.0055	+/- 0.0150

### PASS/FAIL SUMMARY

Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

## DENSITY CALIPER SHOP CALIBRATION

**Tool Name:** SDLT - 10673803

**Reference Calibration Date:** 19-Feb-14 11:36:45

**Engineer:** thomas hyde

**Calibration Date:** 18-Mar-14 10:01:07

**Software Version:** WL INSITE R4.2.0 (Build 2)

**Calibration Version:** 1

## CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4075.69	-4085.93	-7000.00 - -1000.00
Pad Gain	0.0003810	0.0003931	0.000200 - 0.000600
Arm Offset	-4794.44	-4798.17	-5000.00 - 3000.00
Arm Gain	0.0005107	0.0004777	0.000300 - 0.000700
Arm Power	-0.000005244	-0.000002983	-0.000010000 - 0.000010000

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)	1.94	2.00	0.06	+/- 0.20
Medium Ring (in)	3.64	3.75	0.11	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.63	6.50	-0.13	+/- 0.20
Medium Ring (in)	8.45	8.25	-0.20	+/- 0.20
Large Ring (in)	15.08	15.00	-0.08	+/- 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

Tool Name: SDLT - 10673803

Reference Calibration Date: 18-Mar-14 10:01:07

Engineer: SHELDON INGERSOLL

Calibration Date: 26-Mar-14 23:24:49

Software Version: WL INSITE R4.2.0 (Build 2)

Calibration Version: 1

## MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.79	0.04	+/- 0.10
Ring Diameter	8.25	8.36	0.11	+/- 0.15

## PASS/FAIL SUMMARY

Pad Extension Check: Passed  
 Diameter Check: Passed

## SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 10673790

Reference Calibration Date: 19-Feb-14 11:23:10

Engineer: THOMAS K HYDE

Calibration Date: 18-Mar-14 10:48:55

Software Version: WL INSITE R4.2.0 (Build 2)

Calibration Version: 1

Logging Source S/N: 5073 GW

Aluminum Block S/N: LIBERAL

Density: 2.598g/cc

Pe: 3.170

Magnesium Block S/N: LIBERAL

Density: 1.684g/cc

Pe: 2.598

## DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
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Near Bar Gain	1.0082	0.9850	0.90 - 1.10
Near Dens Gain	0.9895	0.9736	0.90 - 1.10
Near Peak Gain	0.9720	0.9414	0.90 - 1.10
Near Lith Gain	0.9540	0.9240	0.90 - 1.10
Far Bar Gain	1.0086	1.0073	0.90 - 1.10
Far Dens Gain	0.9960	0.9962	0.90 - 1.10
Far Peak Gain	0.9909	0.9892	0.90 - 1.10
Far Lith Gain	0.9599	0.9580	0.90 - 1.10

Near Bar Offset	0.1793	0.3884	NONE
Near Dens Offset	0.3417	0.4803	NONE
Near Peak Offset	0.4836	0.7358	NONE
Near Lith Offset	0.6209	0.8683	NONE
Far Bar Offset	0.1011	0.1128	NONE
Far Dens Offset	0.1824	0.1787	NONE
Far Peak Offset	0.1763	0.1867	NONE
Far Lith Offset	0.3379	0.3463	NONE

Near Bar Background	850.08	846.71	700 - 1450
Near Dens Background	278.54	278.15	230 - 480
Near Peak Background	123.16	122.26	100 - 210
Near Lith Background	151.16	150.35	125 - 260
Far Bar Background	568.95	566.98	450 - 900
Far Dens Background	222.59	222.54	175 - 345
Far Peak Background	88.29	87.78	70 - 140
Far Lith Background	92.30	92.97	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.686	1.684	-0.002	+/- 0.015
Pe	2.548	2.554	0.006	+/- 0.150
ALUMINUM				
Density (g/cc)	2.594	2.598	0.004	+/- 0.01500
Pe	3.136	3.122	-0.014	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0014	+/- 0.0110	0.0000	+/- 0.0140
Magnesium Block	-0.0009	+/- 0.0110	-0.0008	+/- 0.0140
Aluminum Block	0.0018	+/- 0.0110	0.0009	+/- 0.0140
Resolution	8.61	6.00 - 11.50	8.99	6.00 - 11.50
Internal Verifier(B+D+P+L)	1397	1200 - 2700	970	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

<b>Tool Name:</b> SDLT Pad - 10673790	<b>Reference Calibration Date:</b> 18-Mar-14 10:48:55
<b>Engineer:</b> THOMAS K HYDE	<b>Calibration Date:</b> 26-Mar-14 23:22:44
<b>Software Version:</b> WL INSITE R4.2.0 (Build 2)	<b>Calibration Version:</b> 1

Pad Temperature: 68.2 degF

#### DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1397.473	1402.492	5.019	15.098
Far (B+D+P+L) cps	970.273	971.414	1.141	16.747
Near Resolution	8.61	8.59	-0.020	0.50
Far Resolution	8.99	9.10	0.110	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	223.3	-----	8.7	+/- 9.00	api
<b>DSNT-10735145</b>						
Snow-Block Porosity	0.0610	0.0665	-----	-0.0055	+/- 0.0150	decP
<b>SDLT-10673803</b>						
Pad Extension	3.75	3.79	-----	-0.04	+/-0.10	in
Ring Diameter	8.25	8.36	-----	-0.11	+/-0.15	in
<b>SDLT Pad-10673790</b>						
Near(B+D+P+L)	1397.473	1402.492	-----	-5.019	+/-15.098	cps
Far(B+D+P+L)	970.273	971.414	-----	-1.141	+/-16.747	cps

Data: ROSENBERGER2-29\0002 GTET-DSN-SDL-BP\005 27-Mar-14 07:59 Up @4845.0f Date: 27-Mar-14 08:17:35

**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>Rwa / CrossPlot</b>				
TPUL	Tension Pull	36.15	NO	
BS	Bit Size	36.15	NO	
HDIA	Measured Hole Diameter	0.00	NO	
<b>CH_HOS</b>				
DHTN	DownholeTension	0.00	BLK	0.000
<b>SP Sub</b>				

PLTC	Plot Control Mask	31.34	NO	
SP	Spontaneous Potential	31.34	BLK	1.250
SPR	Raw Spontaneous Potential	31.34	NO	
SPO	Spontaneous Potential Offset	31.34	NO	
<b>GTET</b>				
TPUL	Tension Pull	23.32	NO	
GR	Natural Gamma Ray API	23.32	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	23.32	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	23.32	W	1.416 , 0.750
HDIA	Measured Hole Diameter	0.00	NO	
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
<b>DSNT</b>				
TPUL	Tension Pull	13.07	NO	
RNDS	Near Detector Telemetry Counts	13.17	BLK	1.417
RFDS	Far Detector Telemetry Counts	13.92	TRI	0.583
DNTT	DSN Tool Temperature	13.17	NO	
DSNS	DSN Tool Status	13.07	NO	
ERNR	Near Detector Telemetry Counts EVR	13.17	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	13.92	BLK	0.000
ENTM	DSN Tool Temperature EVR	13.17	NO	
HDIA	Measured Hole Diameter	0.00	NO	
<b>SDLT</b>				
TPUL	Tension Pull	3.17	NO	
PCAL	Pad Caliper	3.17	TRI	0.250
ACAL	Arm Caliper	3.17	TRI	0.250
<b>SDLT Pad</b>				
TPUL	Tension Pull	3.16	NO	
NAB	Near Above	2.99	BLK	0.920
NHI	Near Cesium High	2.99	BLK	0.920
NLO	Near Cesium Low	2.99	BLK	0.920
NVA	Near Valley	2.99	BLK	0.920
NBA	Near Barite	2.99	BLK	0.920
NDE	Near Density	2.99	BLK	0.920
NPK	Near Peak	2.99	BLK	0.920
NLI	Near Lithology	2.99	BLK	0.920
NBAU	Near Barite Unfiltered	2.99	BLK	0.250
NLIU	Near Lithology Unfiltered	2.99	BLK	0.250
FAB	Far Above	3.34	BLK	0.250
FHI	Far Cesium High	3.34	BLK	0.250
FLO	Far Cesium Low	3.34	BLK	0.250
FVA	Far Valley	3.34	BLK	0.250
FBA	Far Barite	3.34	BLK	0.250
FDE	Far Density	3.34	BLK	0.250
FPK	Far Peak	3.34	BLK	0.250
FLI	Far Lithology	3.34	BLK	0.250
PTMP	Pad Temperature	3.17	BLK	0.920
NHV	Near Detector High Voltage	2.57	NO	
FHV	Far Detector High Voltage	2.57	NO	
ITMP	Instrument Temperature	2.57	NO	
DDHV	Detector High Voltage	2.57	NO	
HDIA	Measured Hole Diameter	0.00	NO	

Microlog Pad

TPUL	Tension Pull	3.36	NO	
MINV	Microlog Lateral	3.36	BLK	0.750
MNOR	Microlog Normal	3.36	BLK	0.750

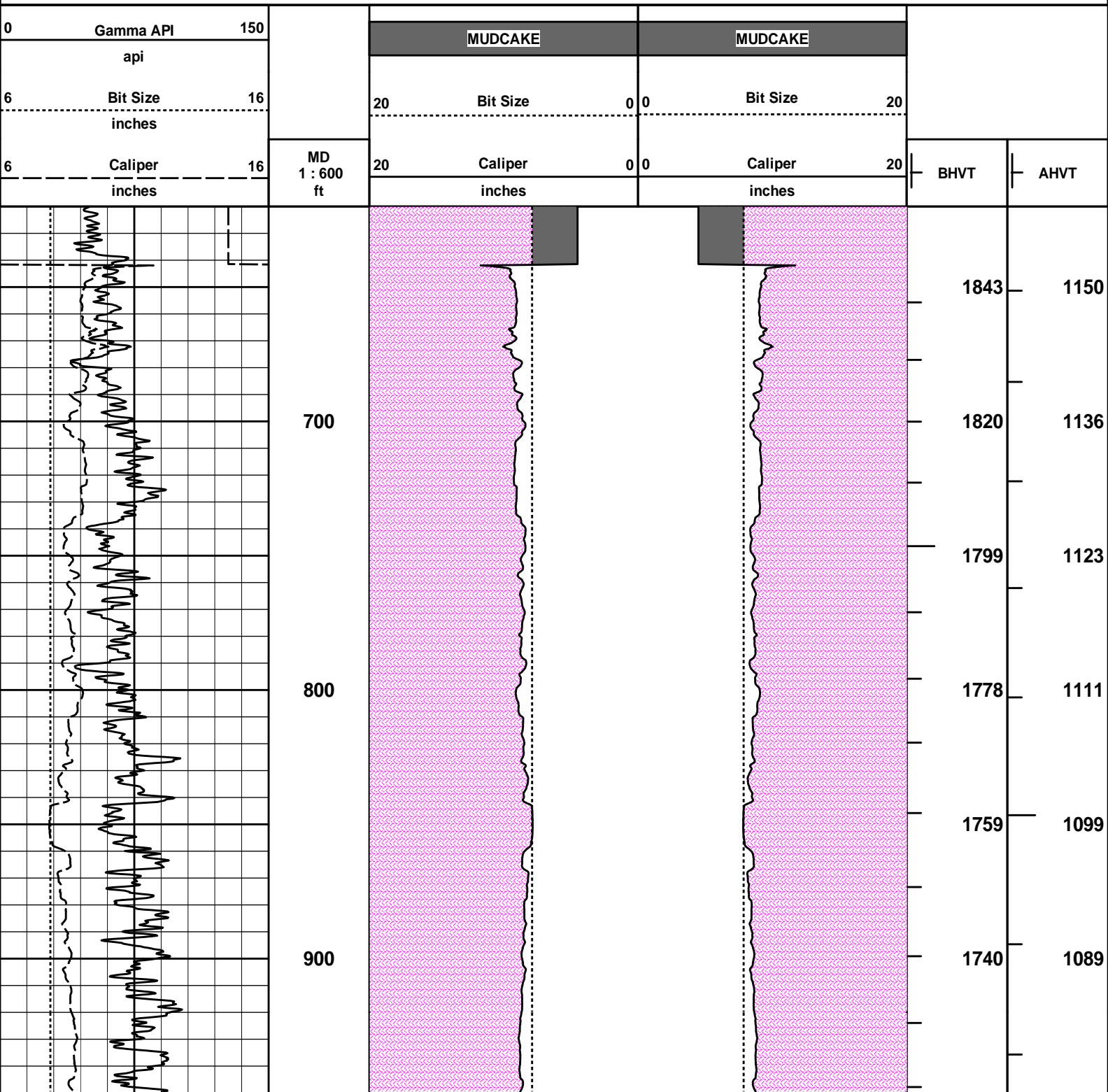
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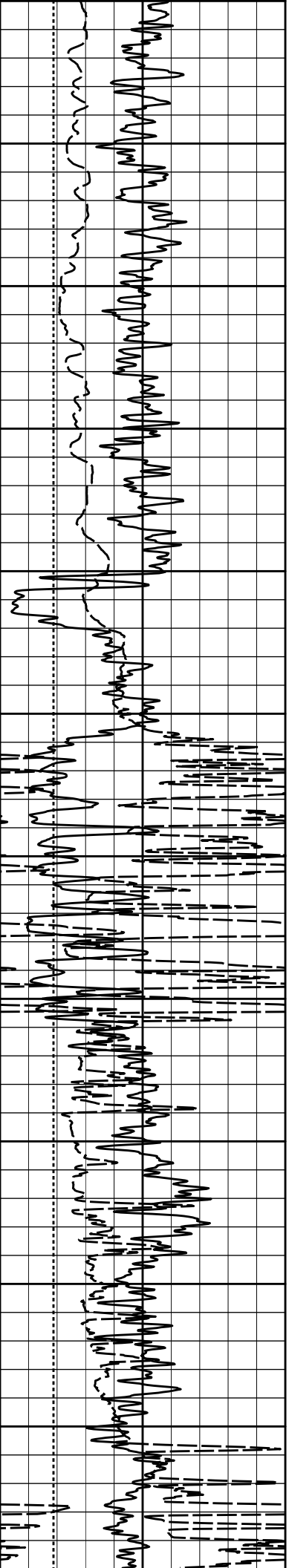
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## ANNULAR HOLE VOLUME PLOT





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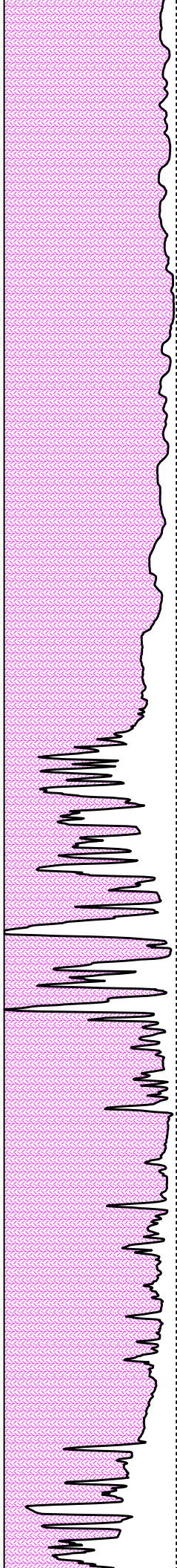
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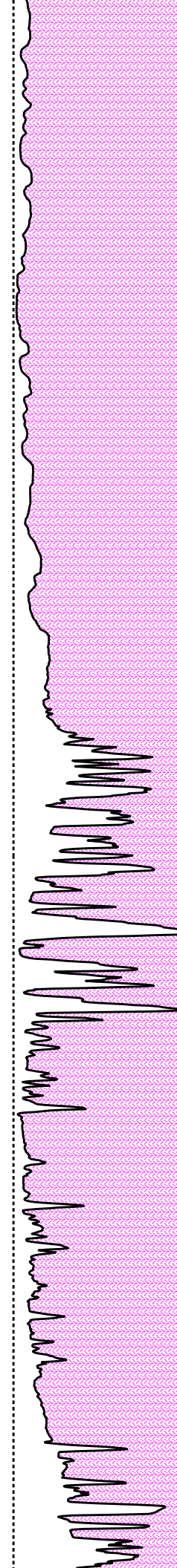
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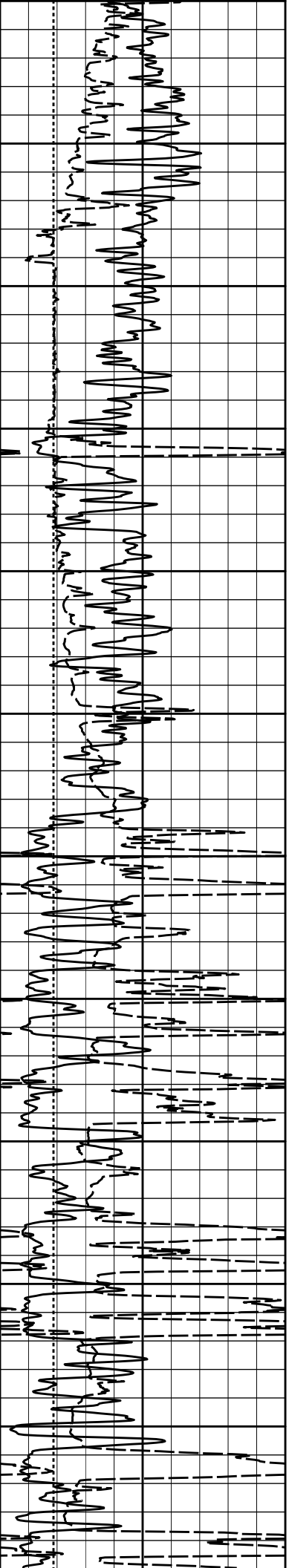
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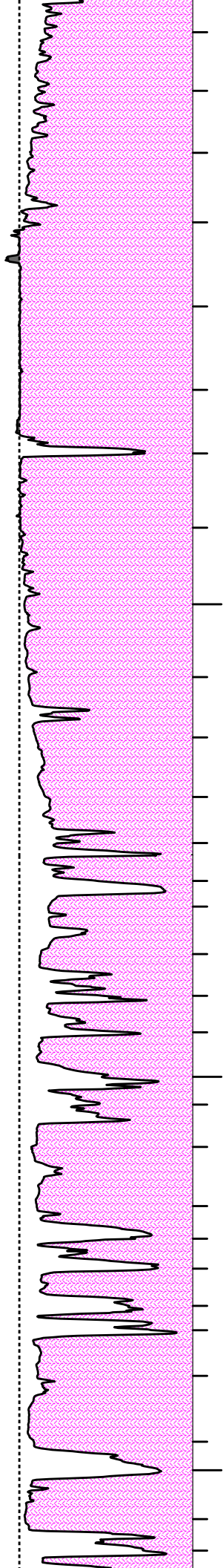
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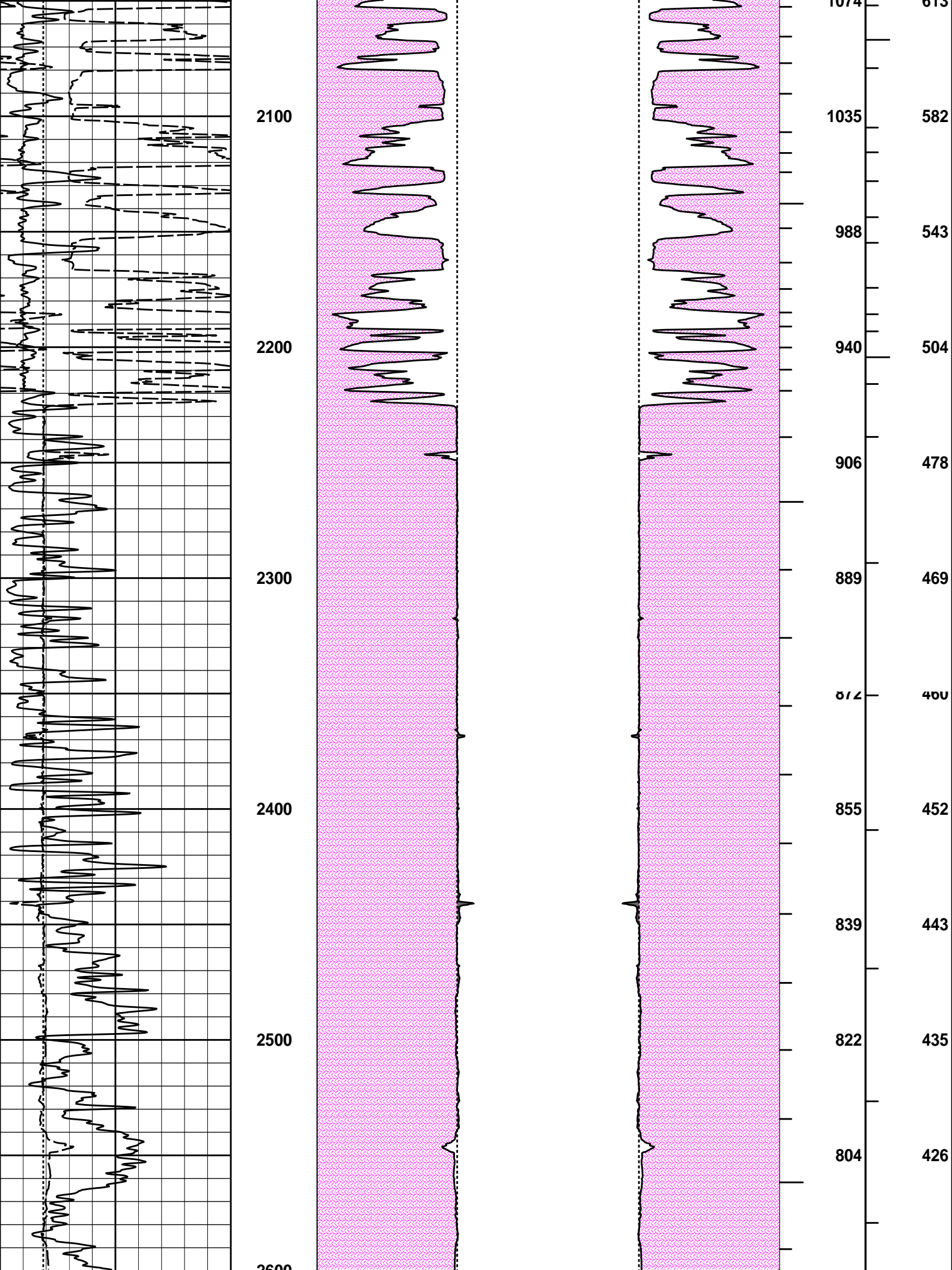


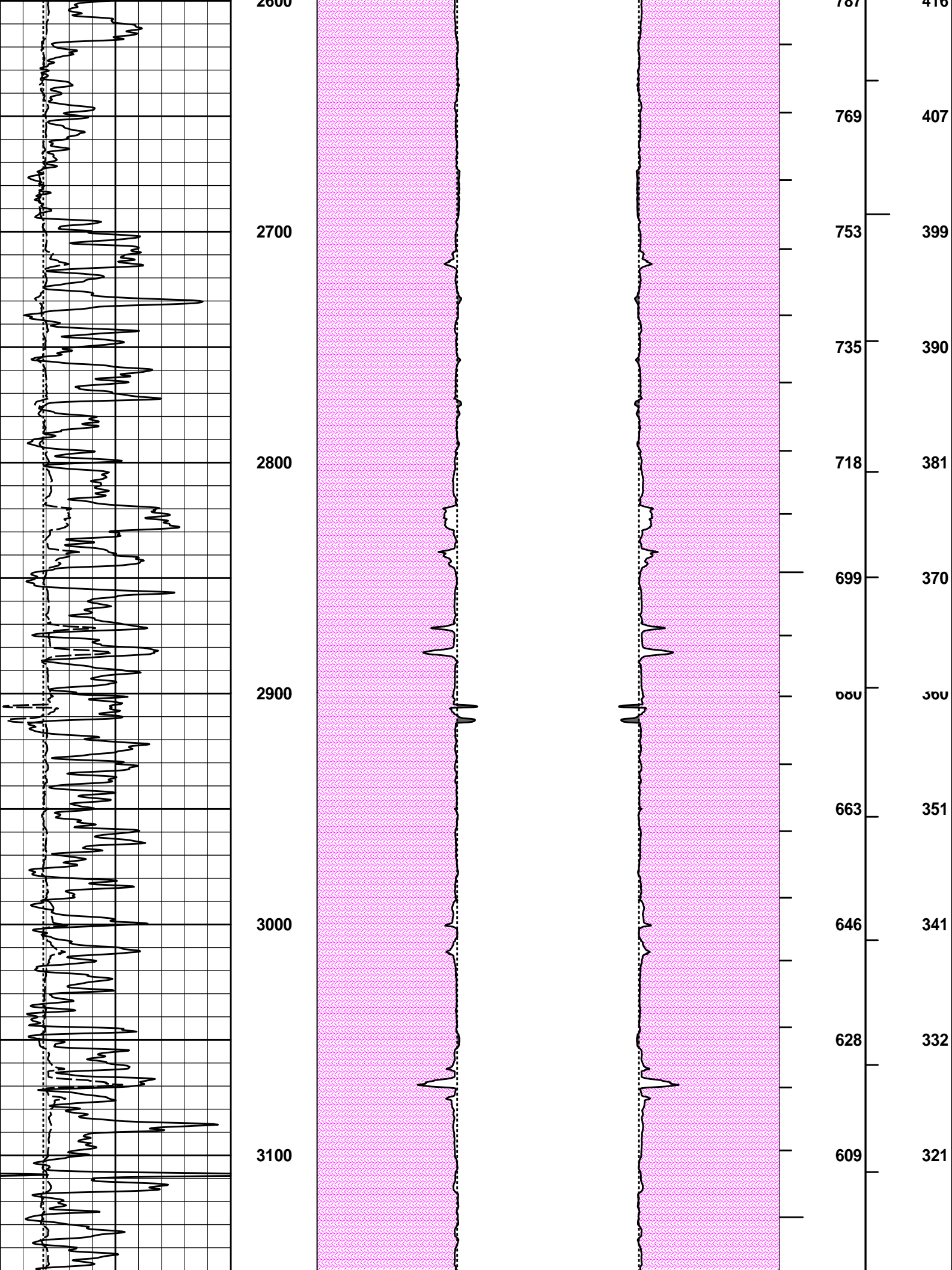
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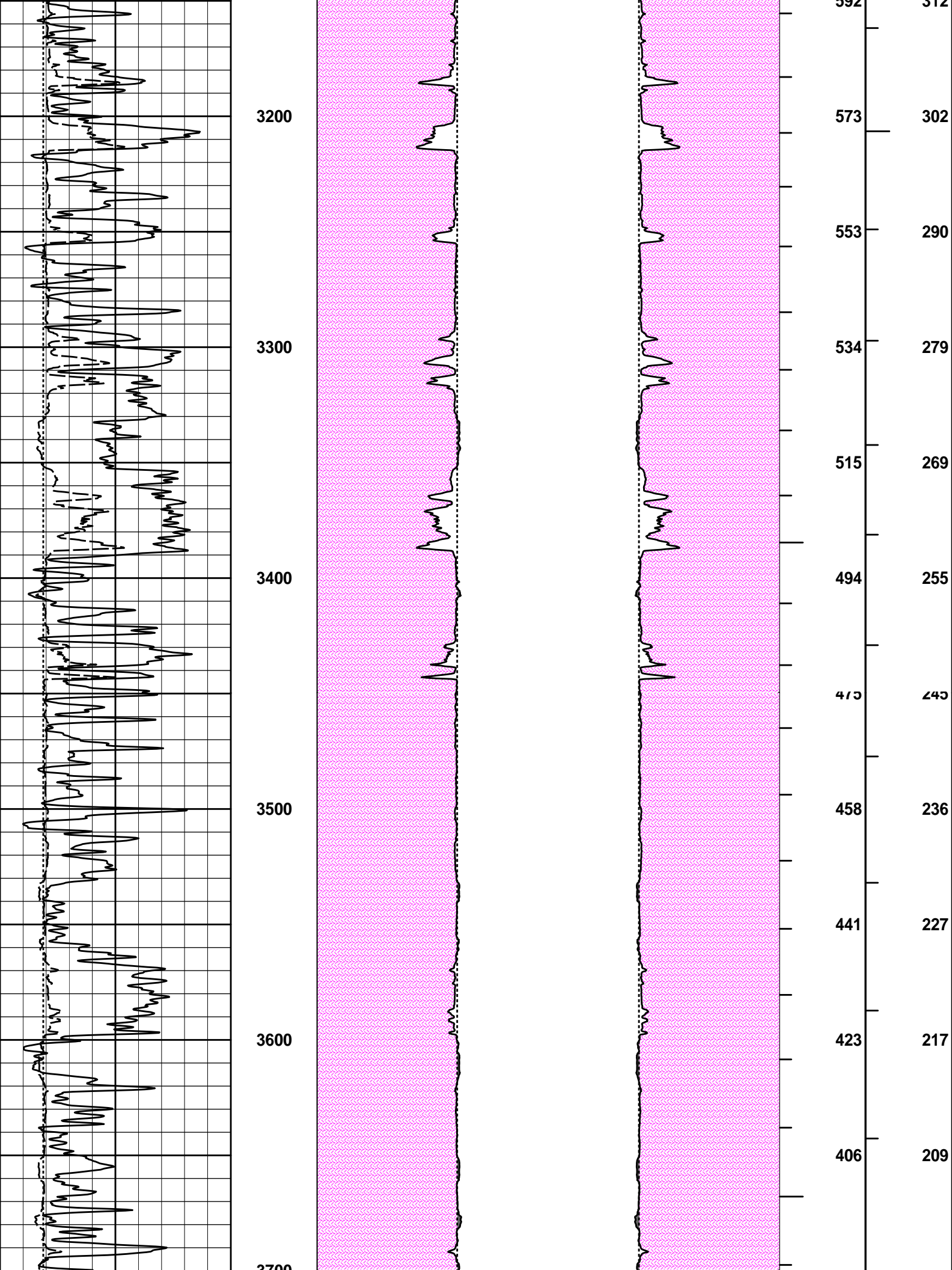


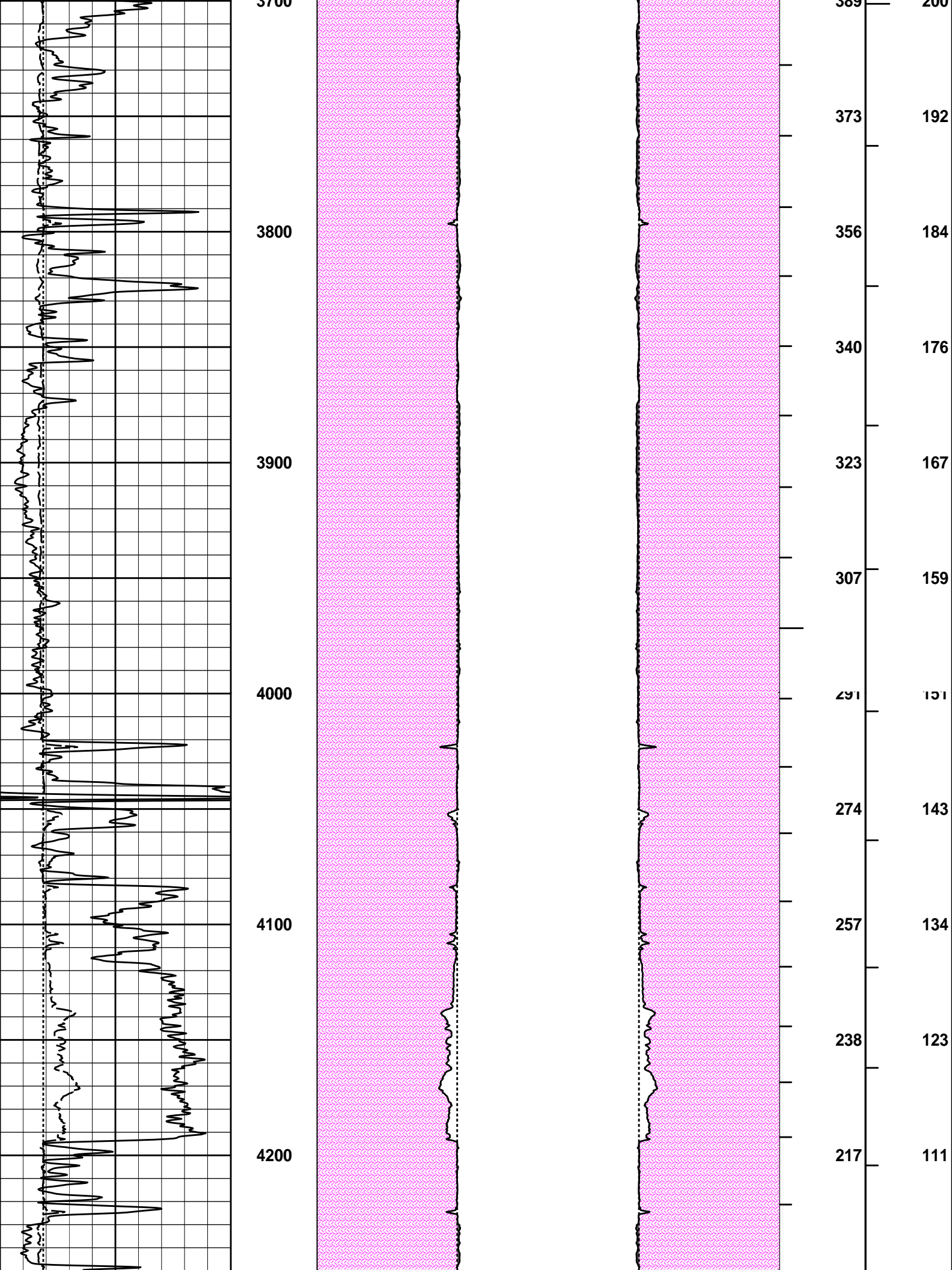
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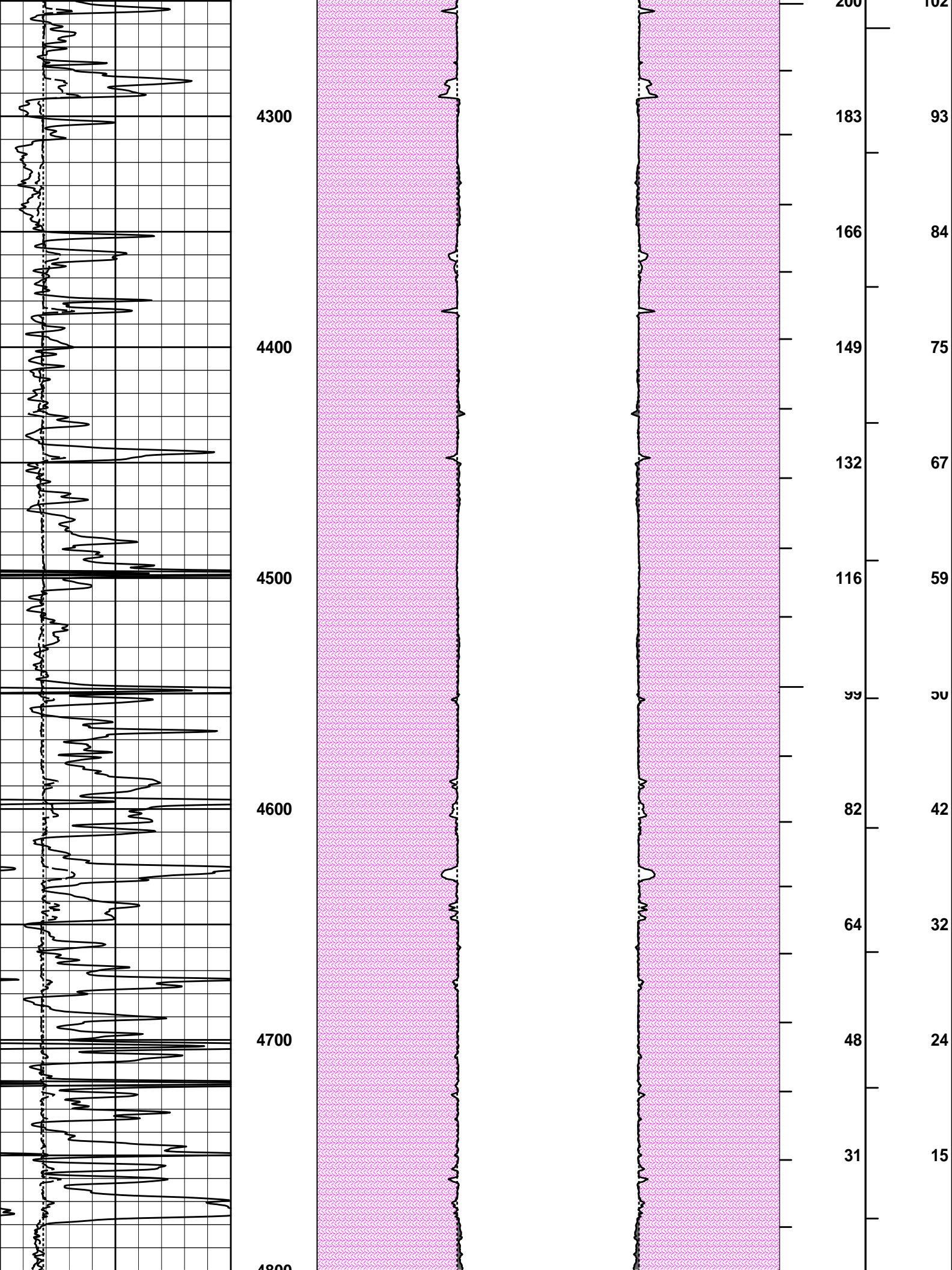
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	inches			inches					
6	Bit Size	16	20	Bit Size	0 0	Bit Size	20		
	inches								
0	Gamma API	150							
	api								
				MUDCAKE		MUDCAKE			

**HALLIBURTON**

Plot Time: 27-Mar-14 09:25:05  
 Plot Range: 620 ft to 4844 ft  
 Data: ROSENBERGER2-29\Well Based\R2 DSN SDL CASING\  
 Plot File: \\-LOCAL-ROSENBERGER2-29\Well Based\POROSITY\AHV\_2\_IQ\_LIB

## ANNULAR HOLE VOLUME PLOT

COMPANY	HERMAN L. LOEB, LLC.		
WELL	ROSENBERGER #2-29		
FIELD	EINSEL		
COUNTY	KIOWA	STATE	KANSAS
<b>HALLIBURTON</b>		DUAL SPACED NEUTRON SPECTRAL DENSITY LOG	