



Compensated Neutron Litho Density Log

Company	Pronghorn Operating, LLC.	Company	Pronghorn Operating, LLC.
Well	Harley #3	Well	Harley #3
Field	Cheyenne Wells	Field	Cheyenne Wells
County	Cheyenne	County	Cheyenne
State	Colorado	State	Colorado
Location:	1869 FSL & 2013 FWL	API # :	05-017-07747
SEC 5	TWP 14S	RGE	44W
Permanent Datum	G.L.	Elevation	4298 ft.
Log Measured From	K.B.	16 ft. above perm. datum	
Drilling Measured From	K.B.	G.L.	4298 ft.
Other Services	MAS, IAT		
Date	24-May-2013		
Run Number	One		
Depth Driller	5579'		
Depth Logger	5547'		
Bottom Logged Interval	5530'		
Top Log Interval	3900'		
Casing Driller	13.375" @ 493'		
Casing Logger	492'		
Bit Size	12.25" & 7.875"		
Type Fluid in Hole	WBM		
Density / Viscosity	8.8 / 48		
pH / Fluid Loss	8.5 / 9.6		
Source of Sample	Mud Pit		
Rm @ Meas. Temp	1.21 @ 75 °F		
Rmf @ Meas. Temp	0.96 @ 75 °F		
Rmc @ Meas. Temp	1.57 @ 75 °F		
Source of Rmf / Rmc	Calculated		
Rm @ BHT	0.7 @ 130 °F		
Time Circulation Stopped	15:00		
Time Logger on Bottom	25-May-2013 @ 00:00		
Maximum Recorded Temperature	130 °F		
Equipment Number	10002		
Location	Brighton		
Recorded By	B. Oetting		
Witnessed By	J. Flora		

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Equipment and Log Data

Service Order: 23247

Gamma		Density		Neutron		Sonic		IAT	
Run No.	One	Run No.	One	Run No.	One	Run No.	One	Run No.	One
Serial No.	9990	Serial No.	0872	Serial No.	7939	Serial No.	10010072	Serial No.	10110
O.D.	3.375 in.	Source No.	50130B	Source No.	66010B	Centralizers	2	Standoffs	2 @ 0.5"
		O.D.	4.5 in.	O.D.	3.375 in.	O.D.	3.375 in.	O.D.	3.875 in.

Logging Pass Data

General			Gamma		Density			Neutron			Sonic			IAT	
			Scales		Scales			Scales			Scales			Scales	
Run	Depths		Left	Right	Left	Right	Matrix	Left	Right	Matrix	Left	Right	Matrix	Left	Right
One	TD	CSG	0	150	0.3	-0.1	2.71 g/cc	0.3	-0.1	Lime	0.3	-0.1	47.6 usec	0.12	2000

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

First run in hole
Tools ran slick due to hole conditions
5.5" production casing used to calculate annular hole volumes
Chlorides reported at: 3500 ppm

YOUR CREW TODAY: A. Hughes, E. Soto

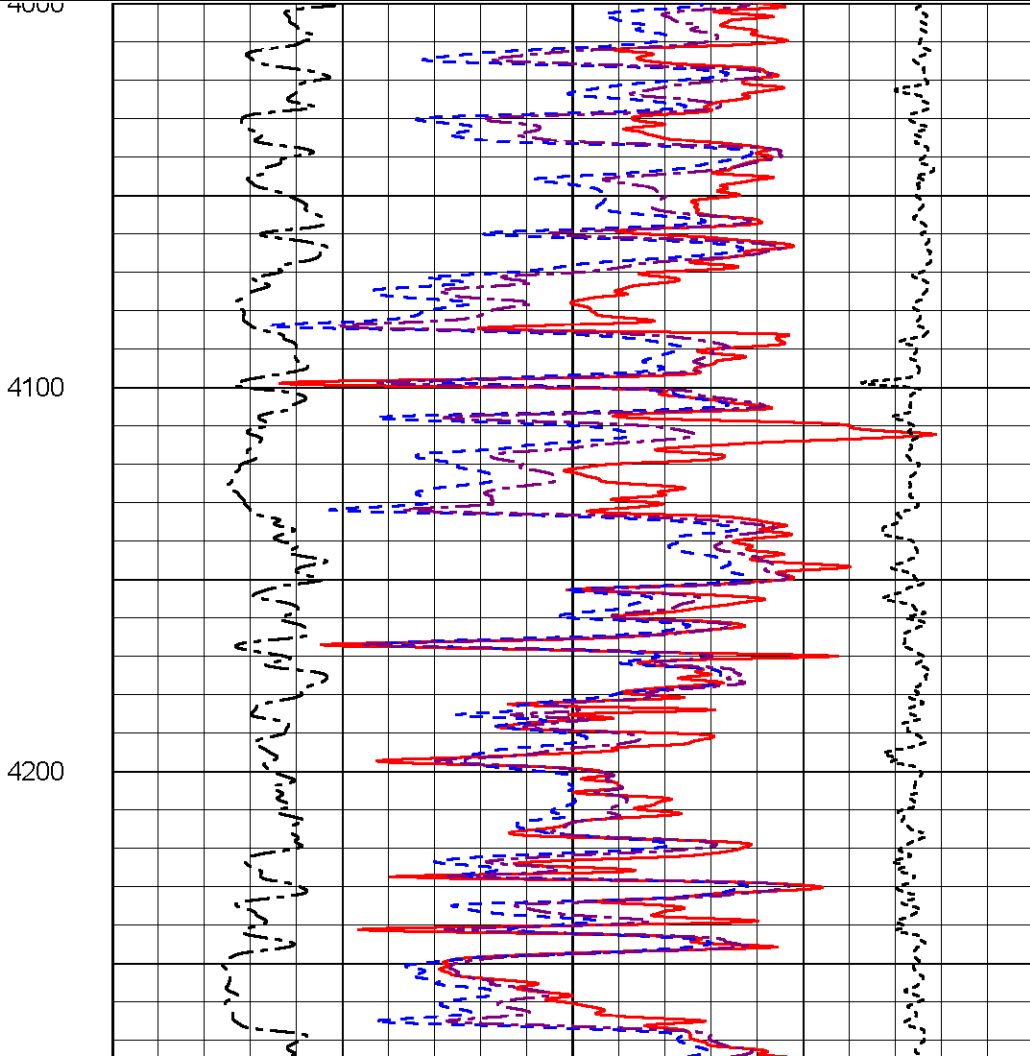
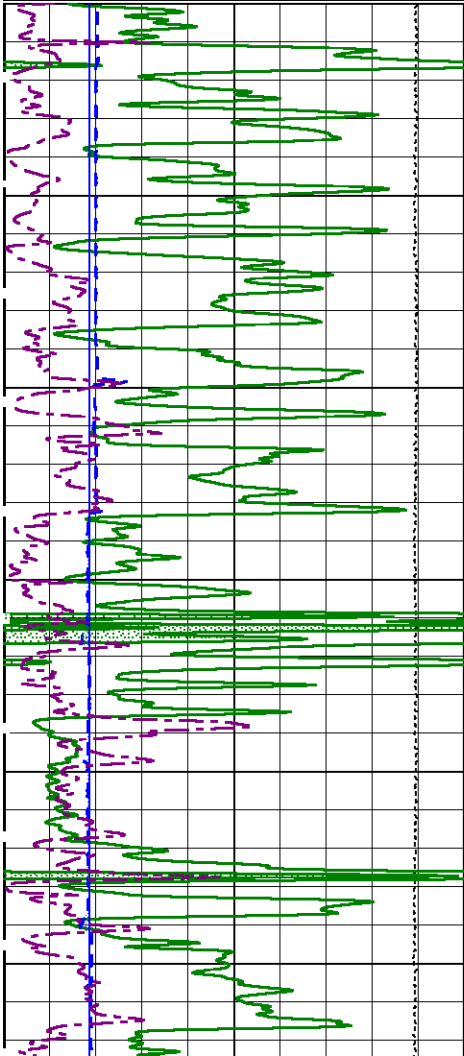


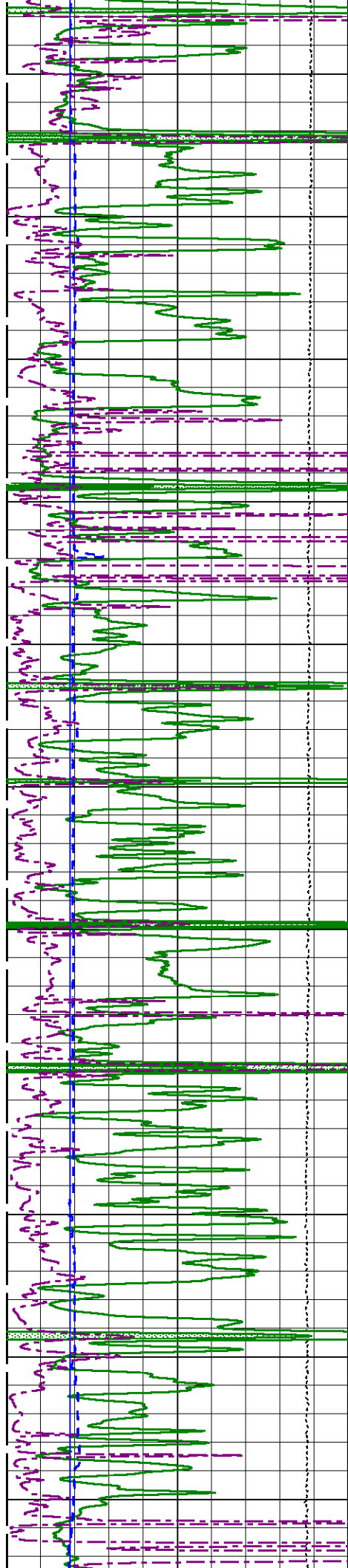
Main Pass

Database File: pronghorn_harley_3.db
Dataset Pathname: lime
Presentation Format: poro_ph2
Dataset Creation: Sat May 25 02:32:32 2013
Charted by: Depth in Feet scaled 1:600

0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
0	Rwa (Ohm-m)	1
Line Tension		
10000	(lb)	0

0.3	Density Porosity		-0.1
0.3	Neutron Porosity		-0.1
0	PE	10 0.8	Density Correction (g/cc) -0.2
0.3	Cross Plot Porosity		-0.1





4300

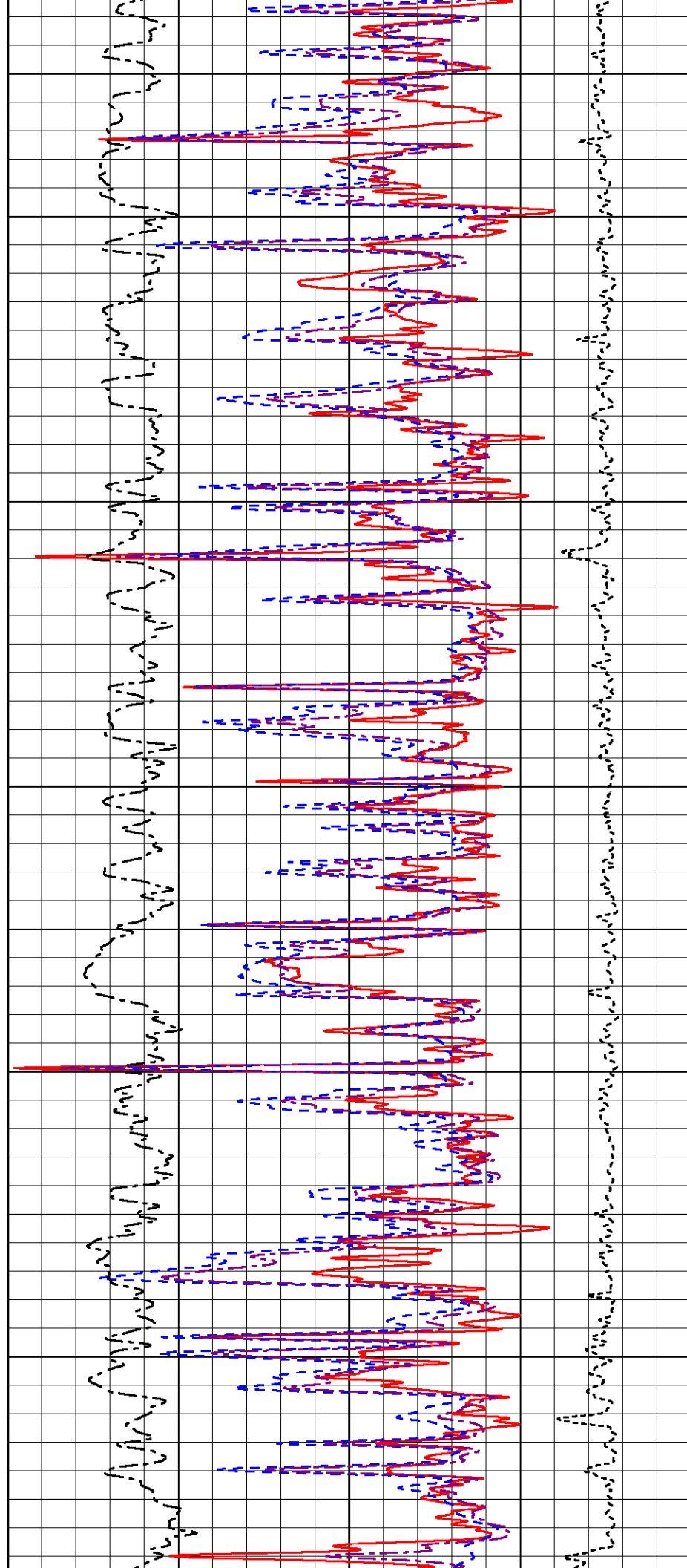
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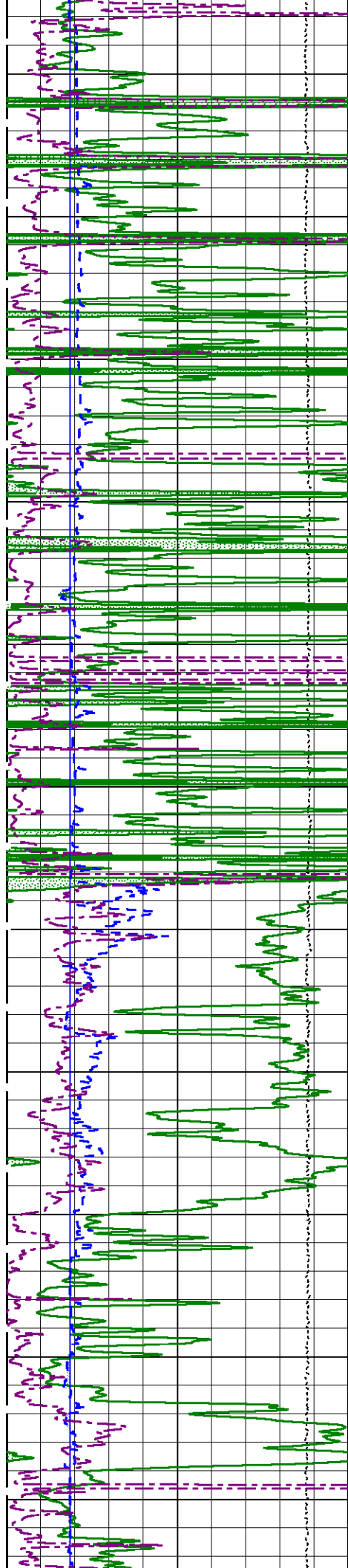
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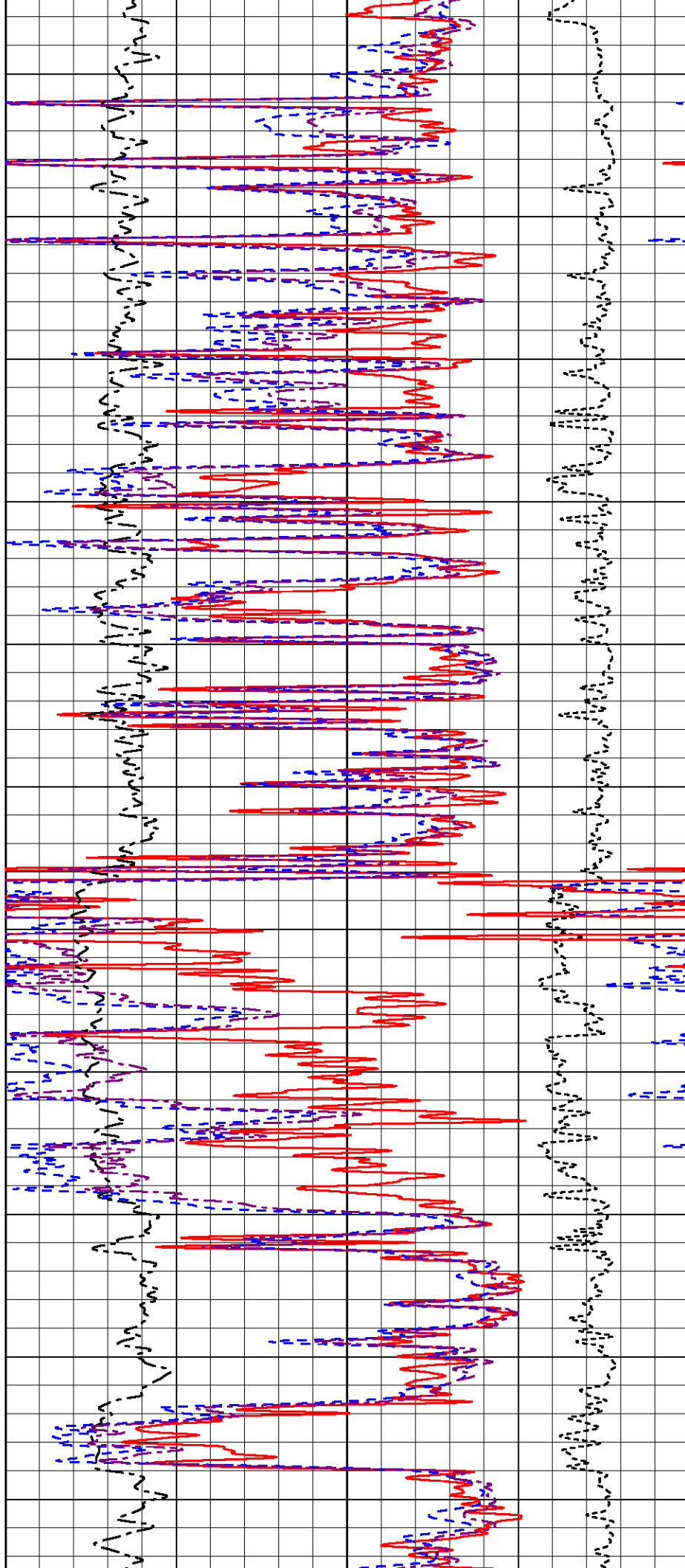
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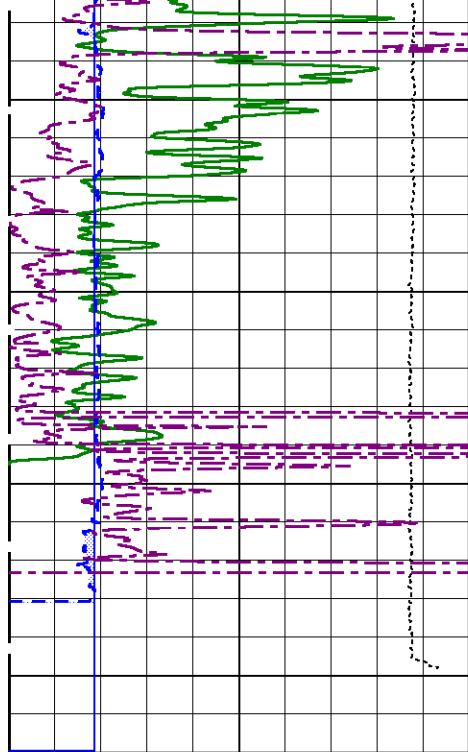
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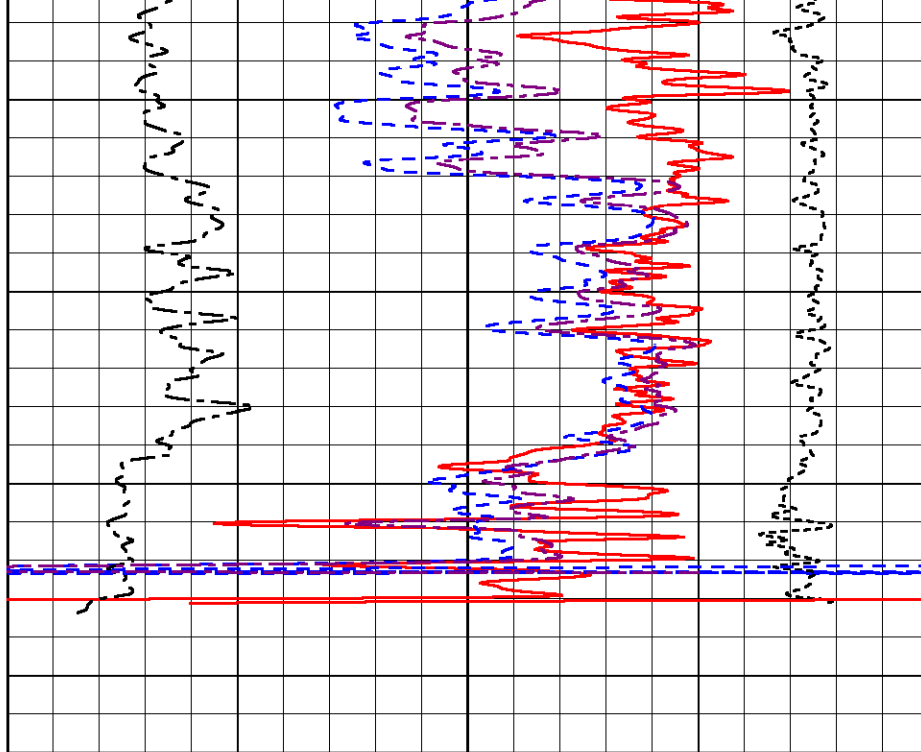




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0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
0	Rwa (Ohm-m)	1
Line Tension		
10000	(lb)	0



0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10
0.8	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1

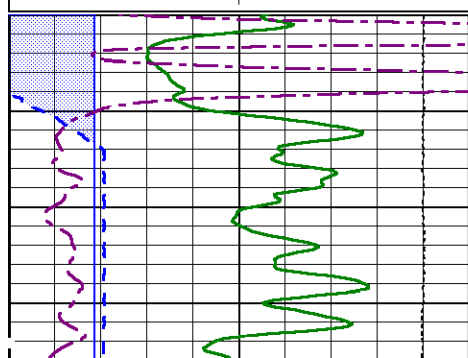


Main Pass

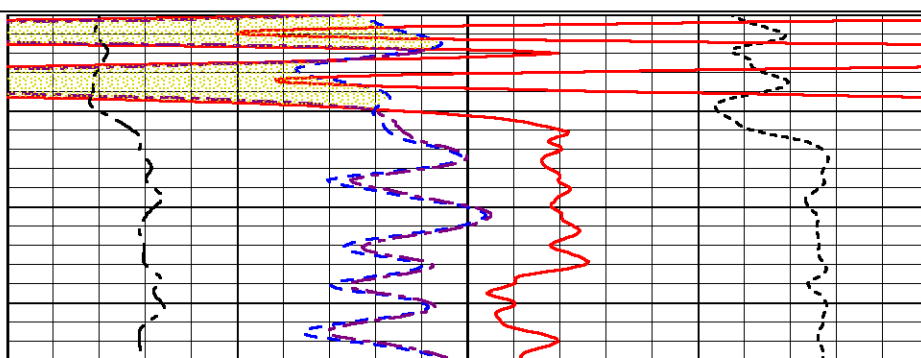
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 Presentation Format: poro_ph5
 Dataset Creation: Sat May 25 02:32:32 2013
 Charted by: Depth in Feet scaled 1:240

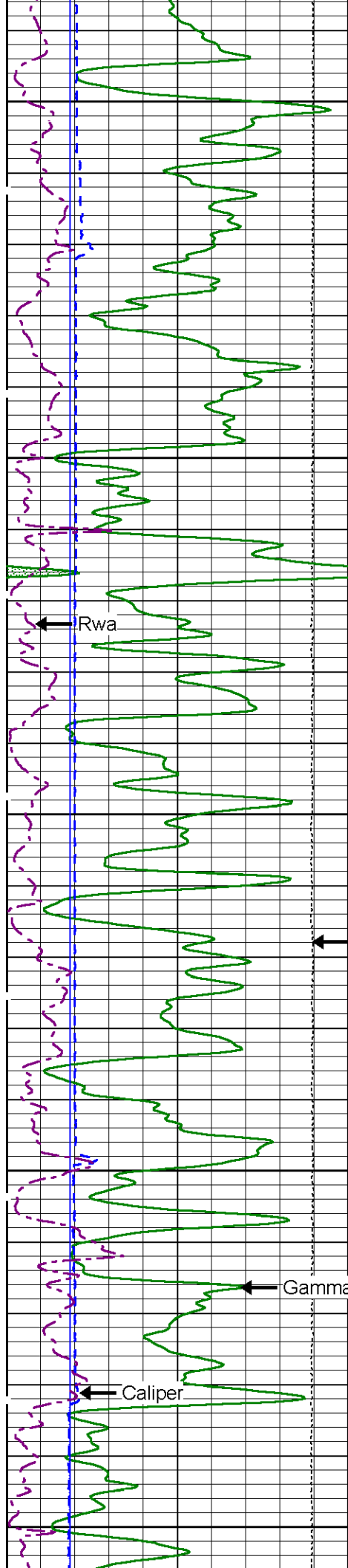
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
0	Rwa (Ohm-m)	1
Line Tension		
10000	(lb)	0

0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10
0.8	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1



5500





4000

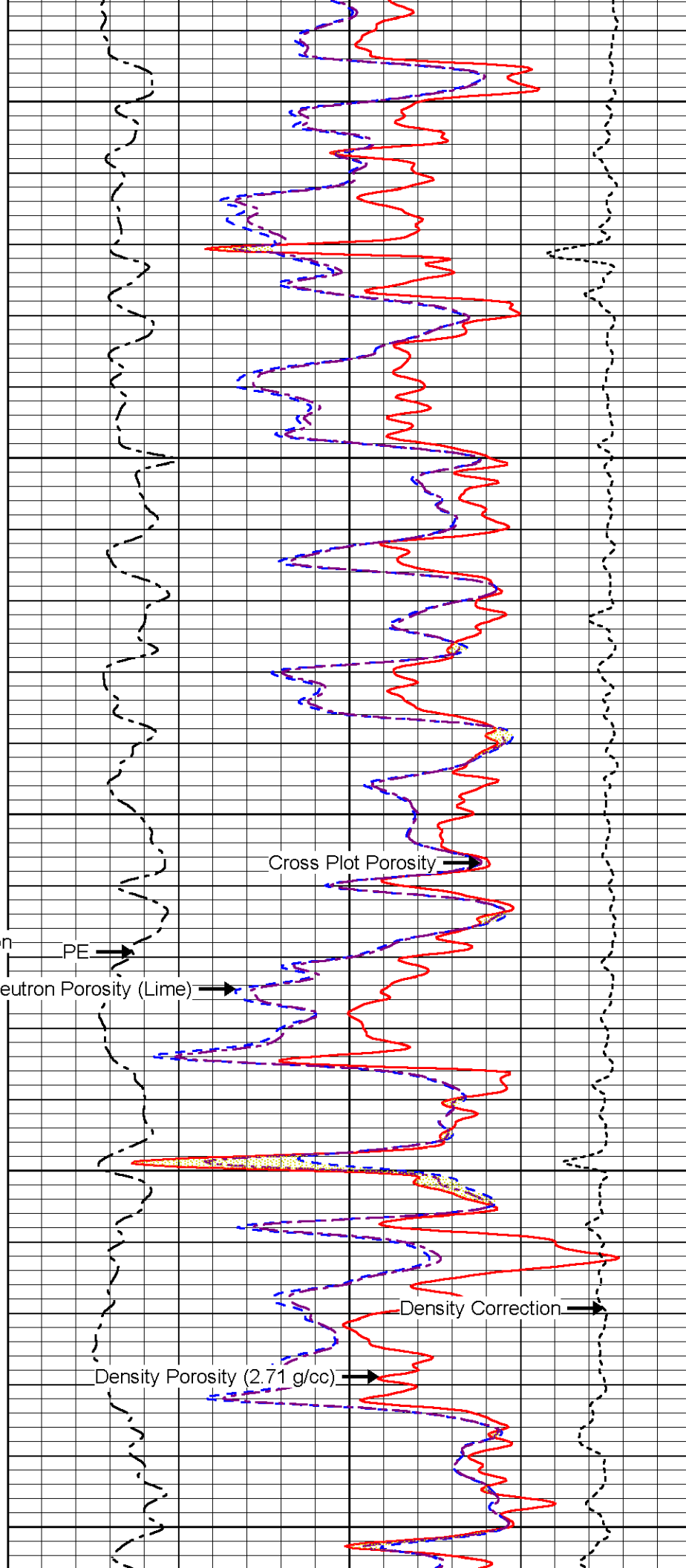
Rwa

Line Tension

Gamma Ray

Caliper

4100



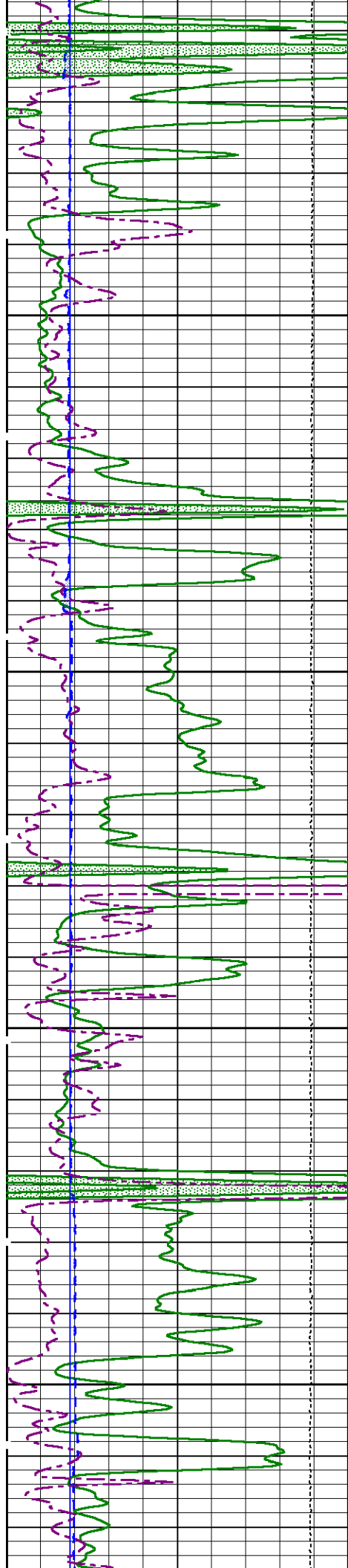
Cross Plot Porosity

PE

Neutron Porosity (Lime)

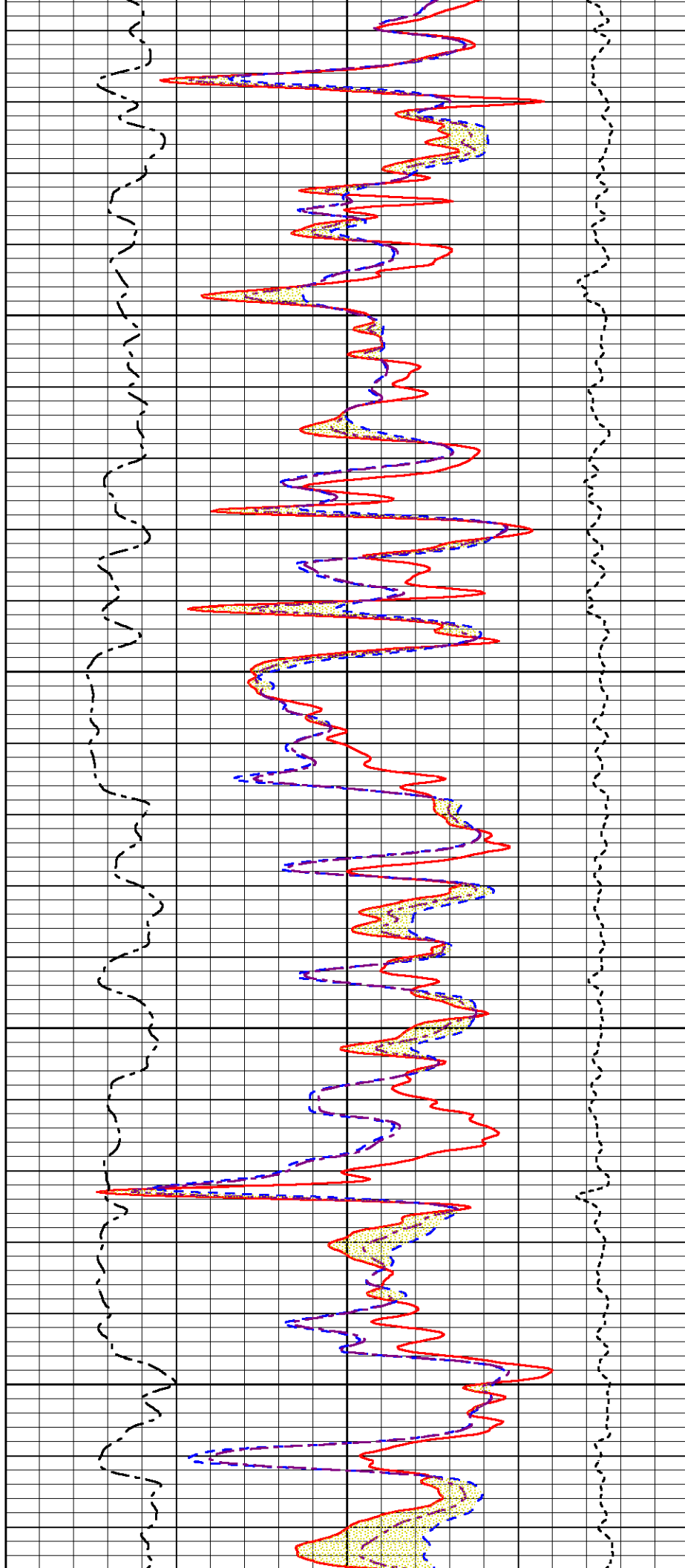
Density Correction

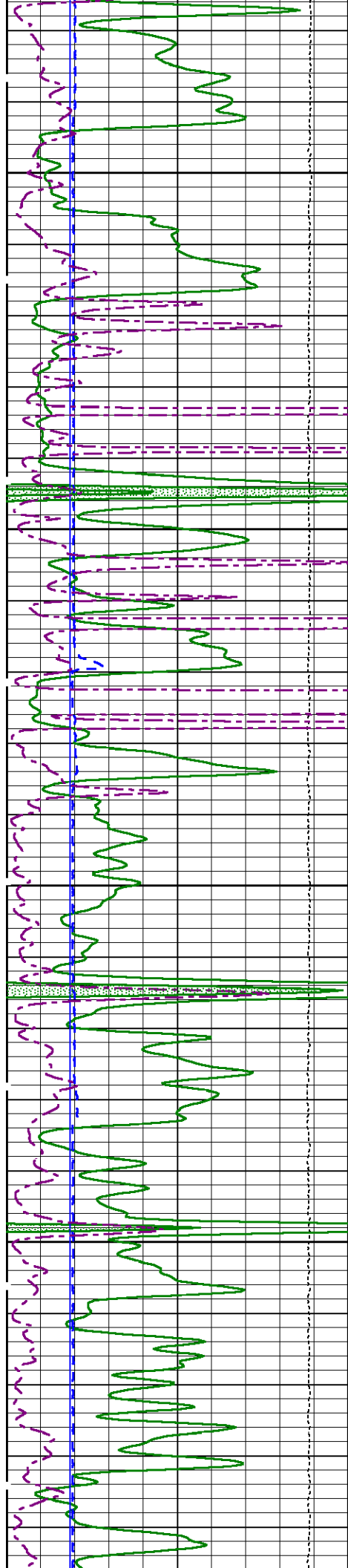
Density Porosity (2.71 g/cc)



4200

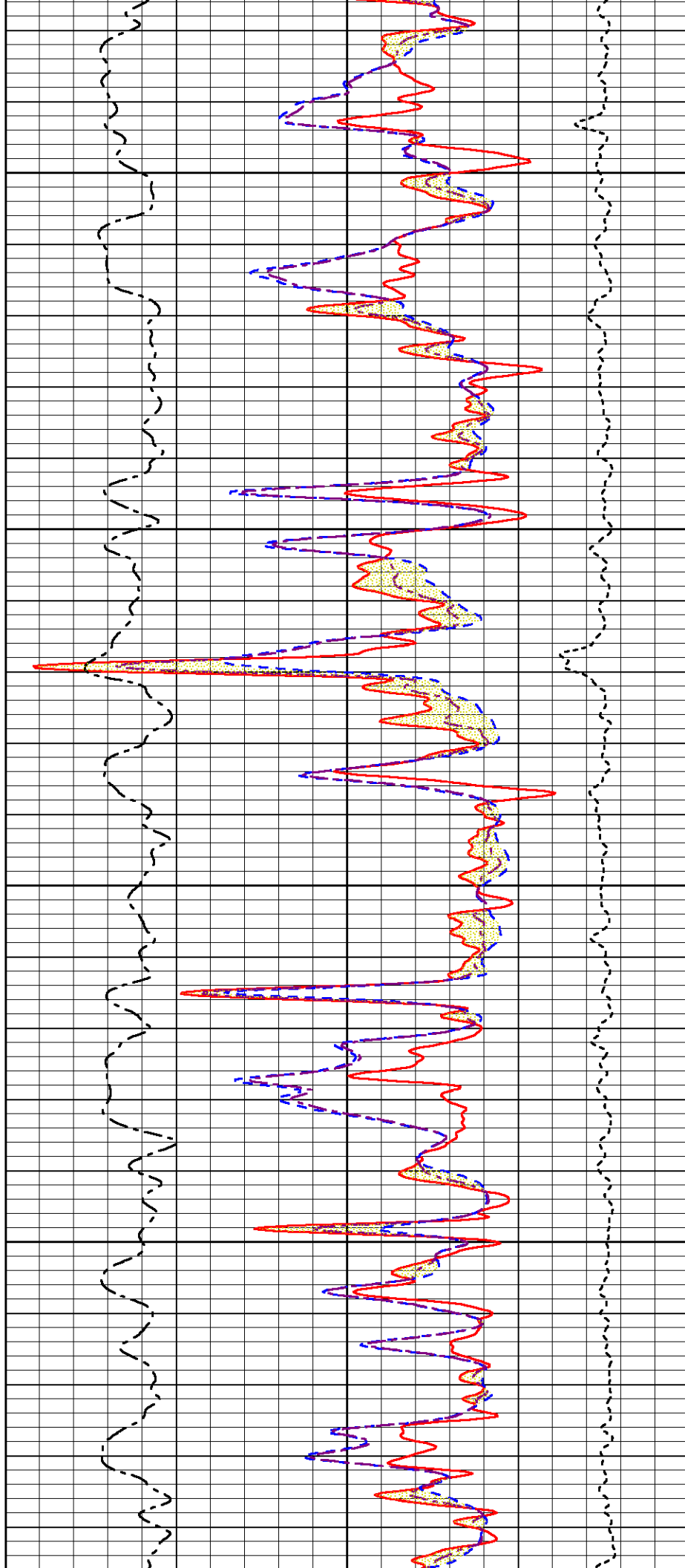
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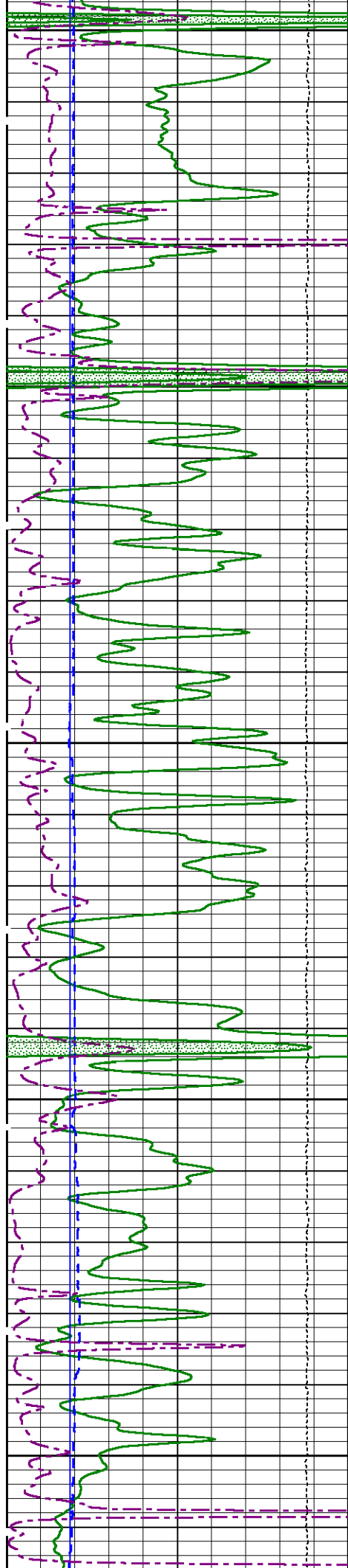




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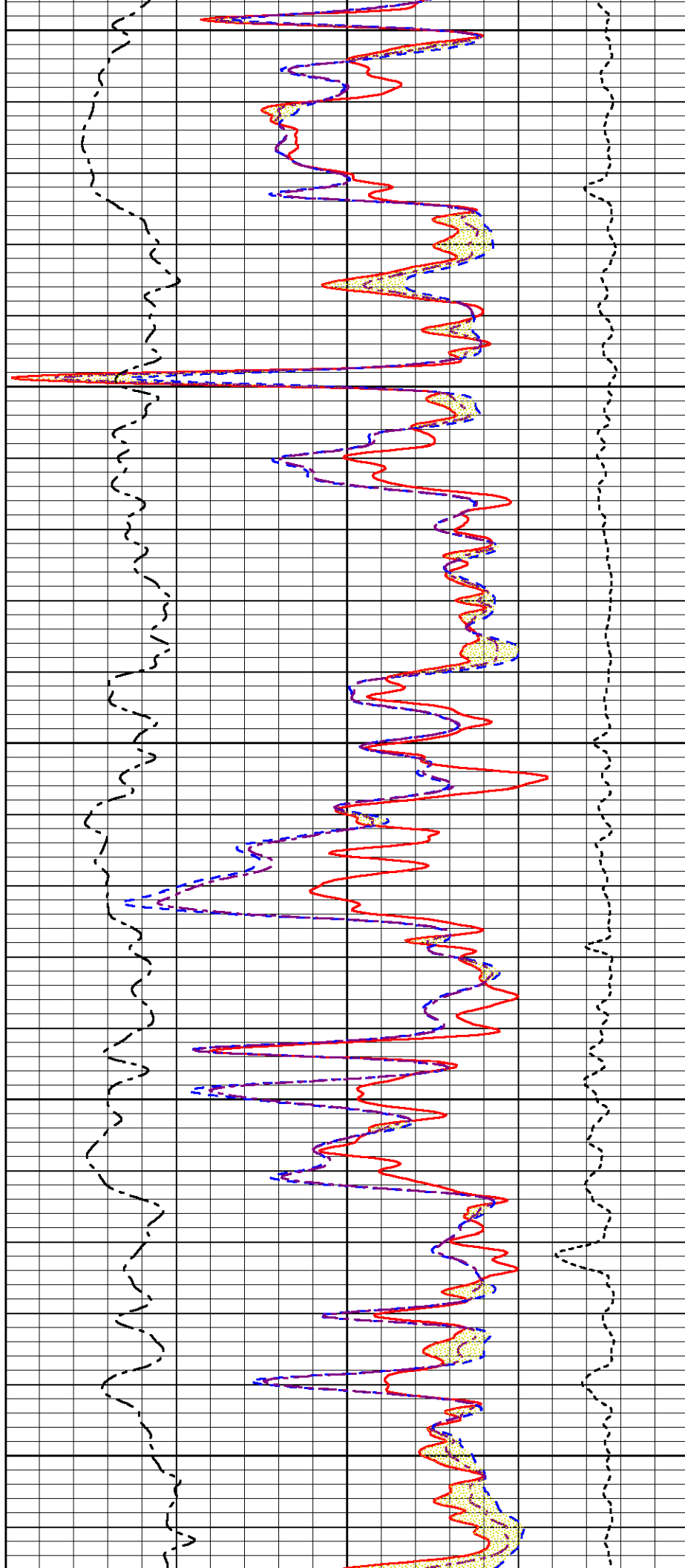


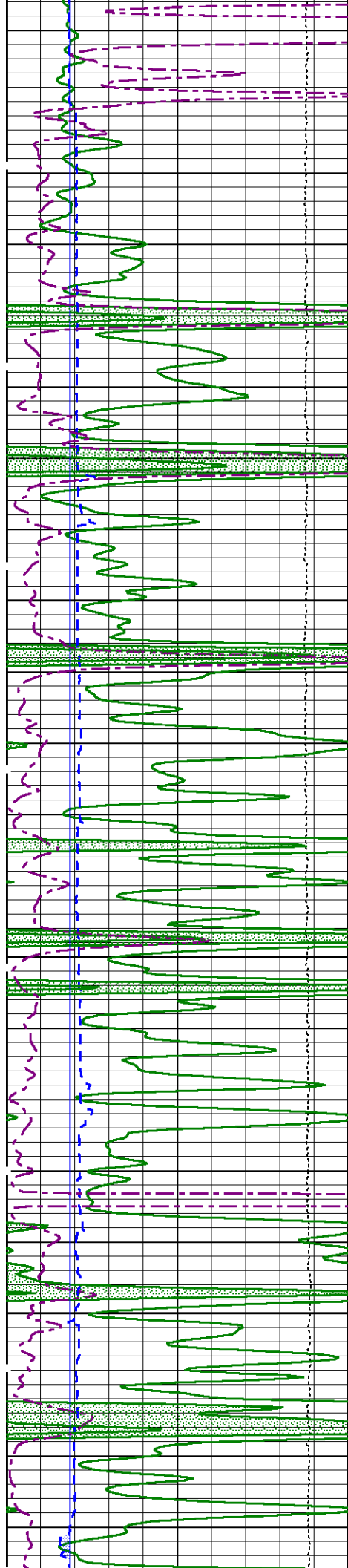


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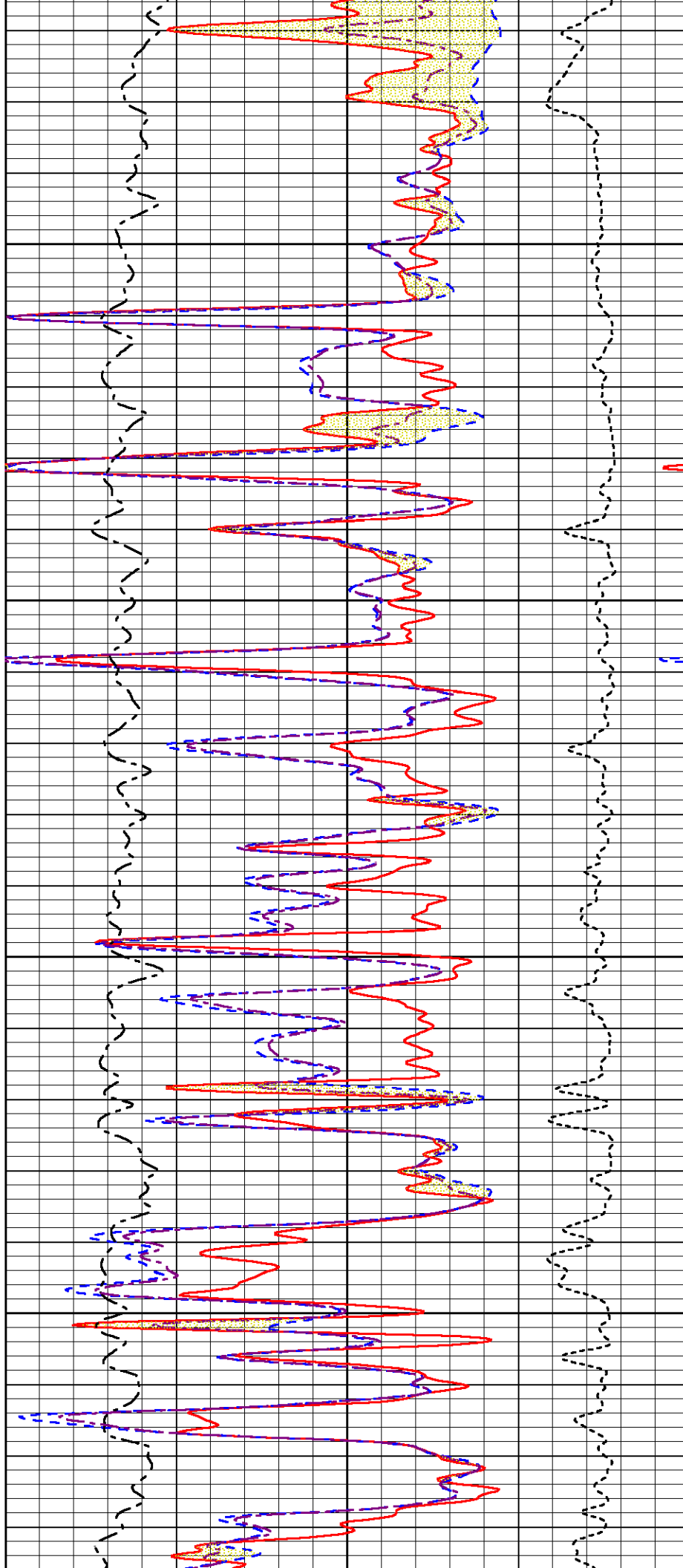
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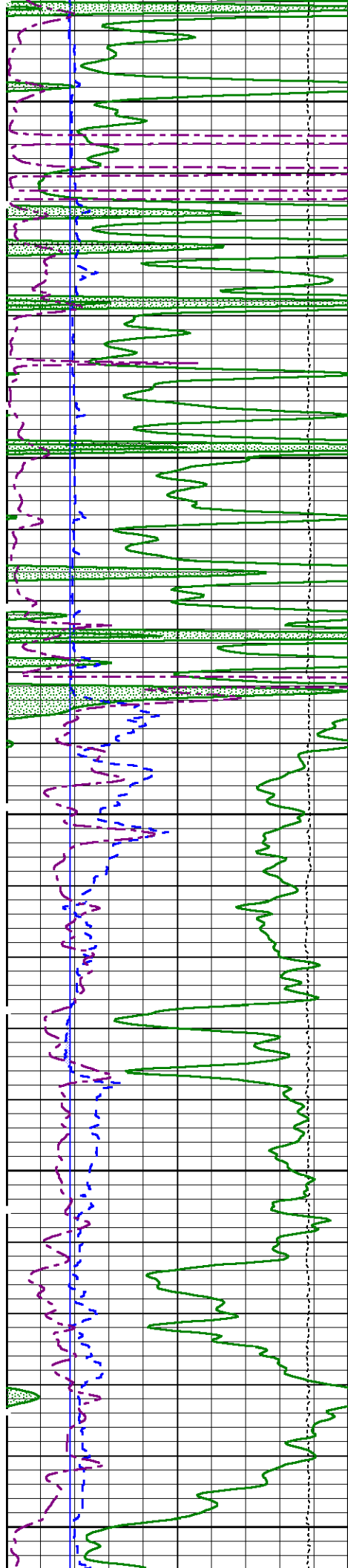




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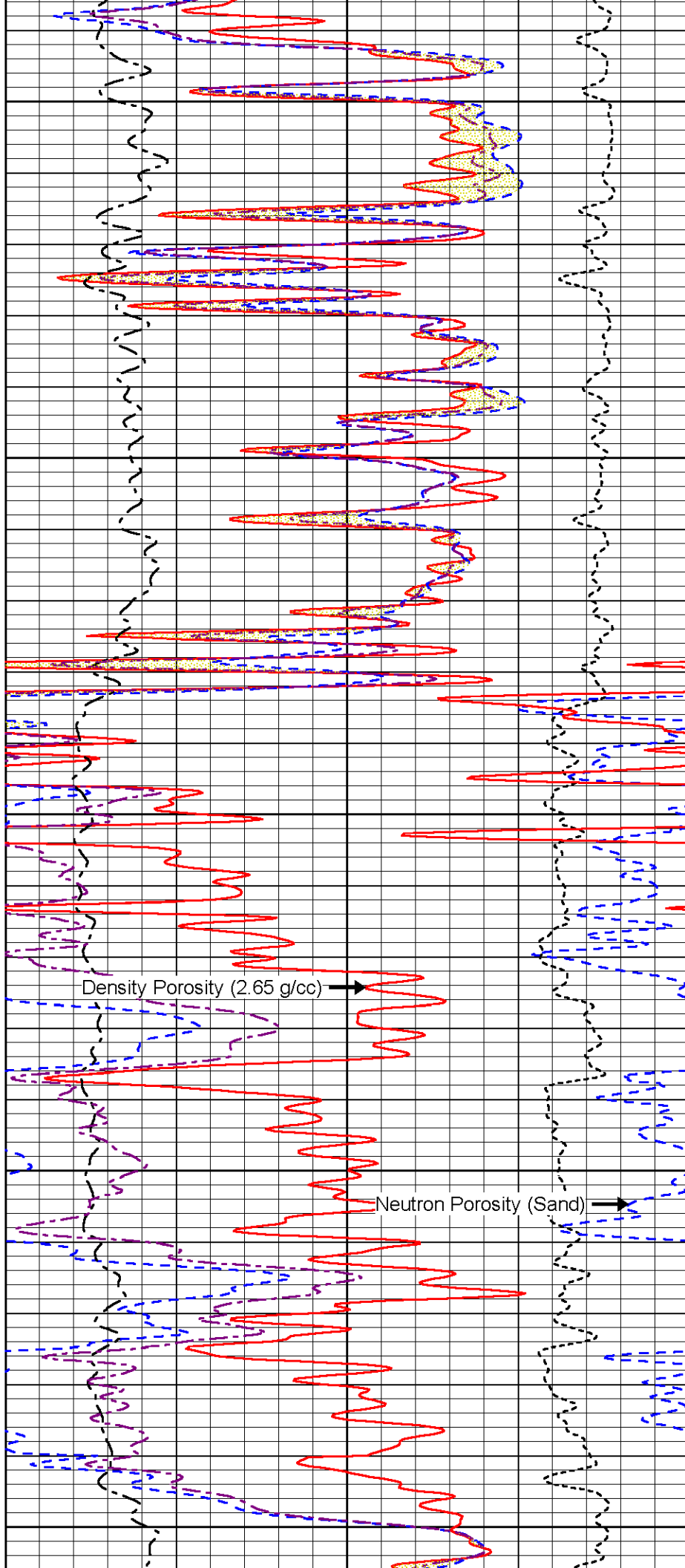
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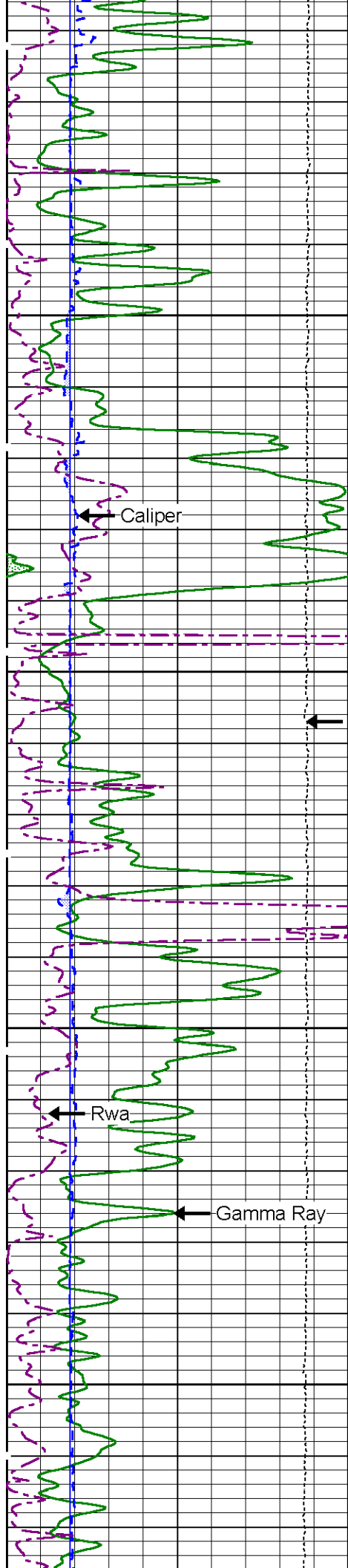
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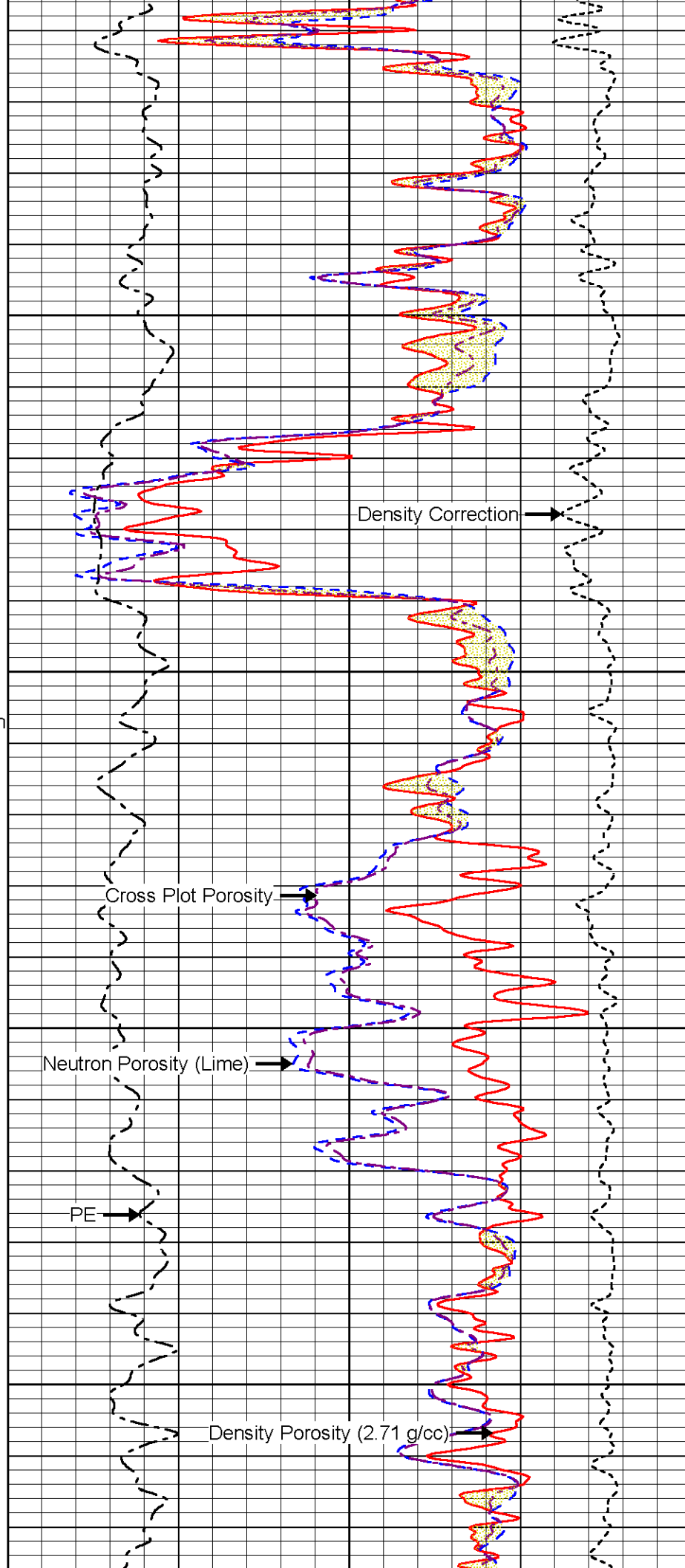
Density Porosity (2.65 g/cc) →

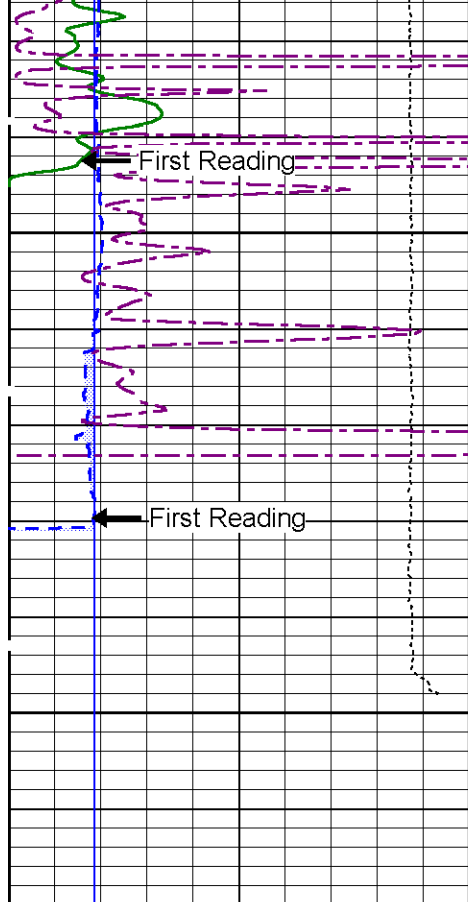
Neutron Porosity (Sand) →



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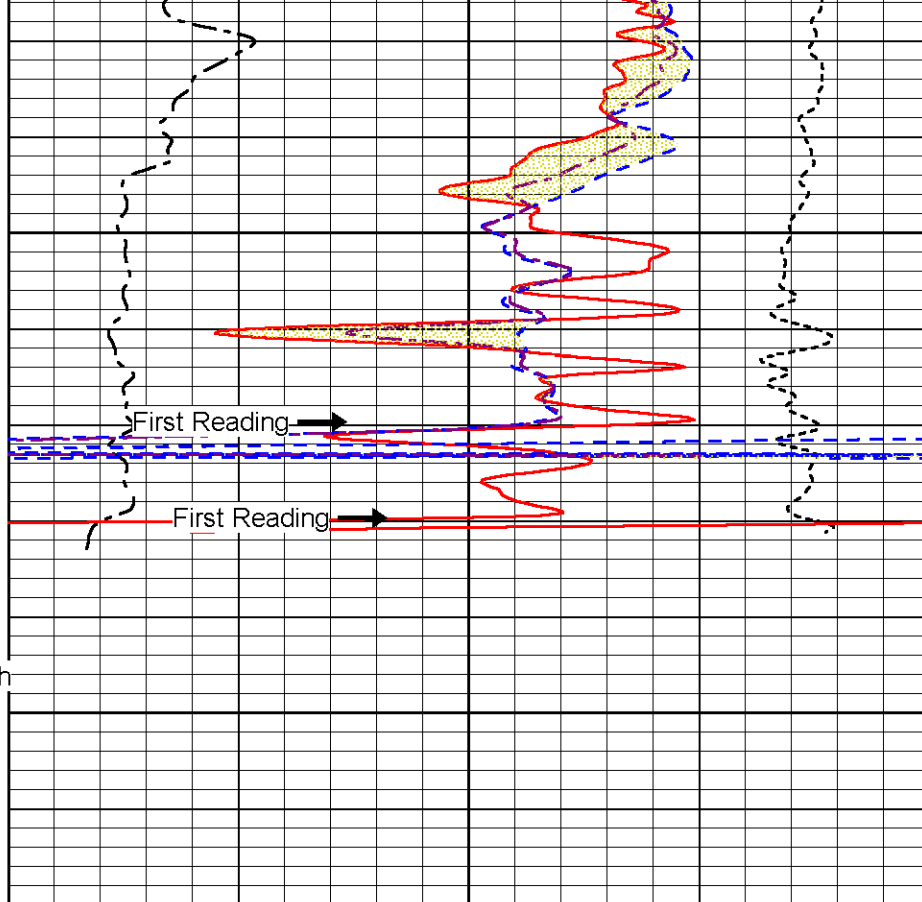




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Total Depth

0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
0	Rwa (Ohm-m)	1
Line Tension		
10000	(lb)	0



0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Cross Plot Porosity	-0.1

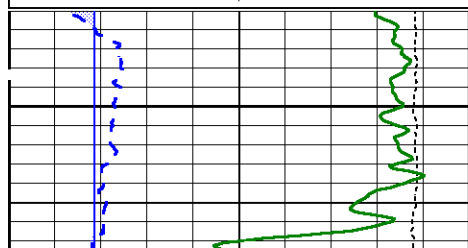


Repeat Pass

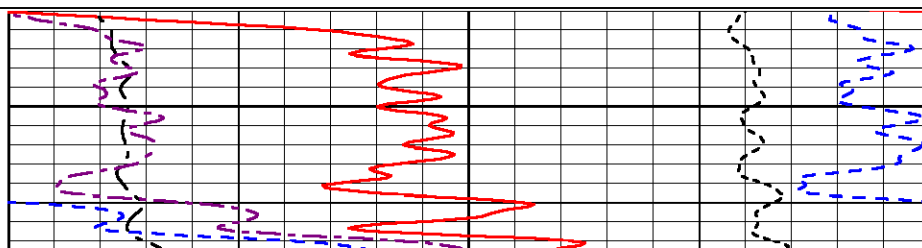
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 Dataset Creation: Sat May 25 00:02:13 2013 by Log Sondex V7.03
 Charted by: Depth in Feet scaled 1:240

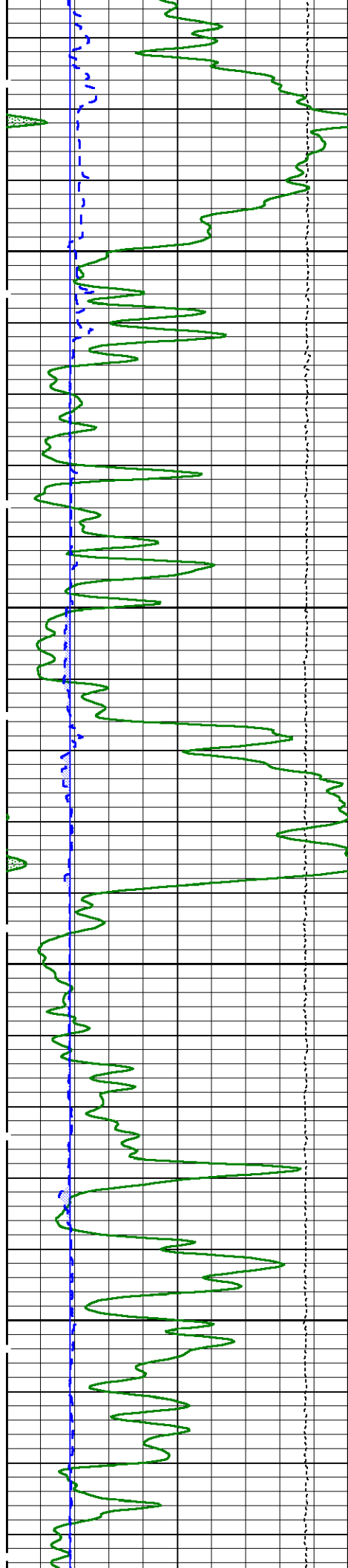
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
Line Tension		
10000	(lb)	0

0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Cross Plot Porosity	-0.1



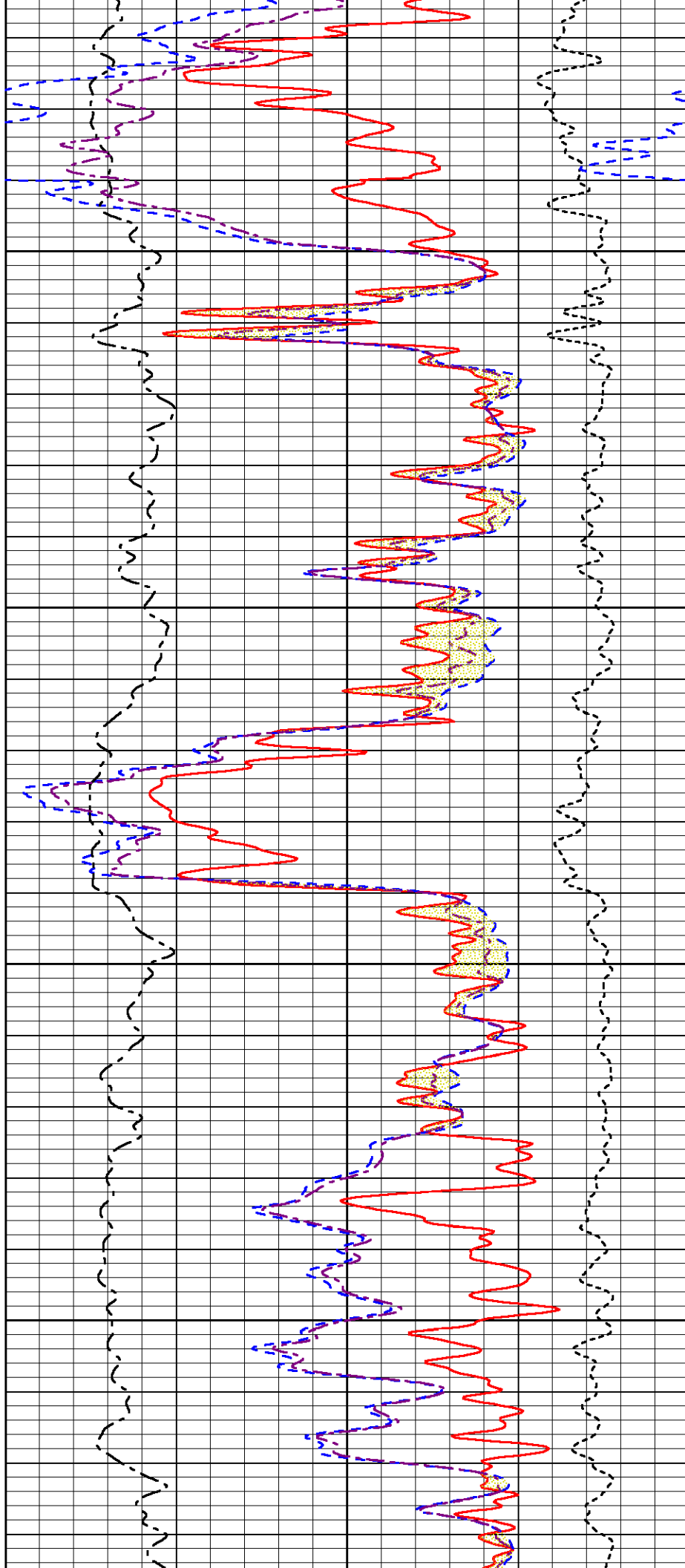
5200





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493.00 ft - 1700.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Limestone	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.71	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 12.25							

1700.00 ft - 5125.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Limestone	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.71	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

5125.00 ft - 5240.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Sandstone	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.65	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

5240.00 ft - Bottom

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0

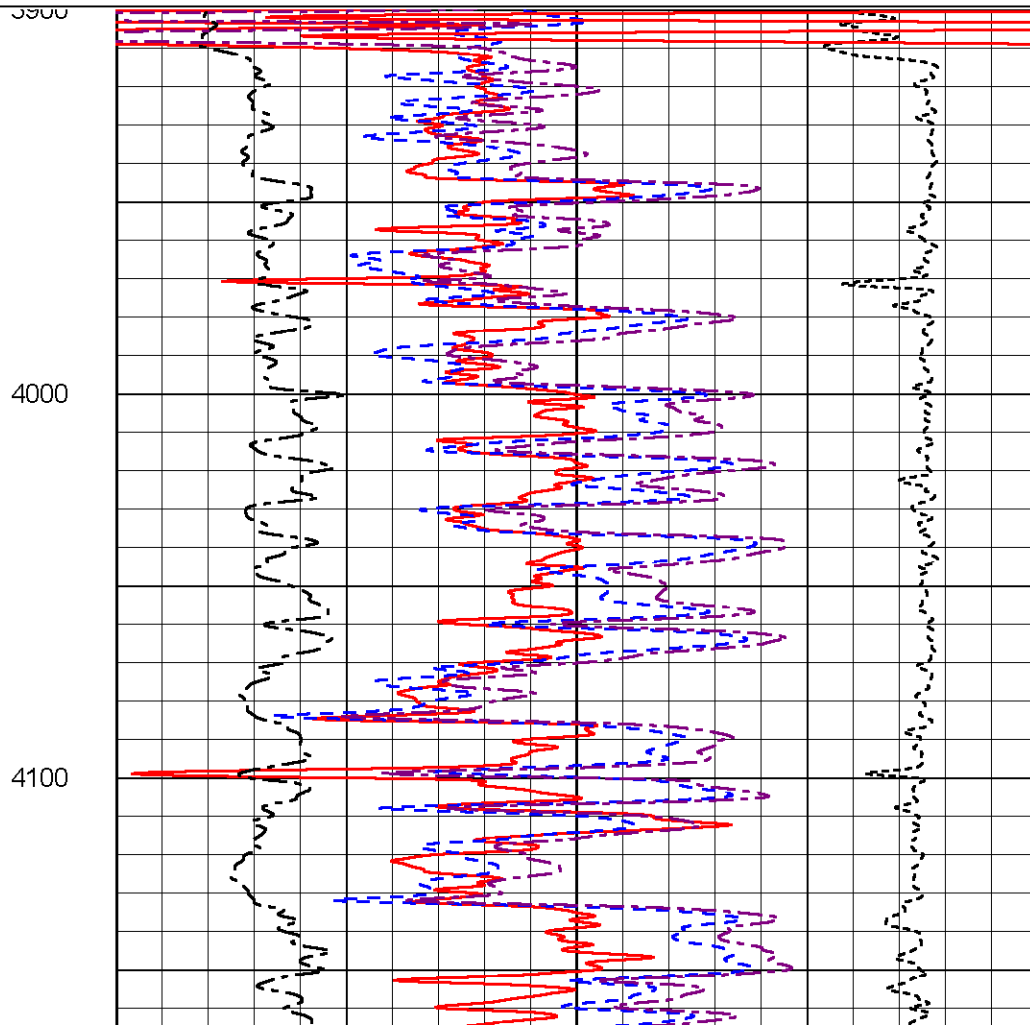
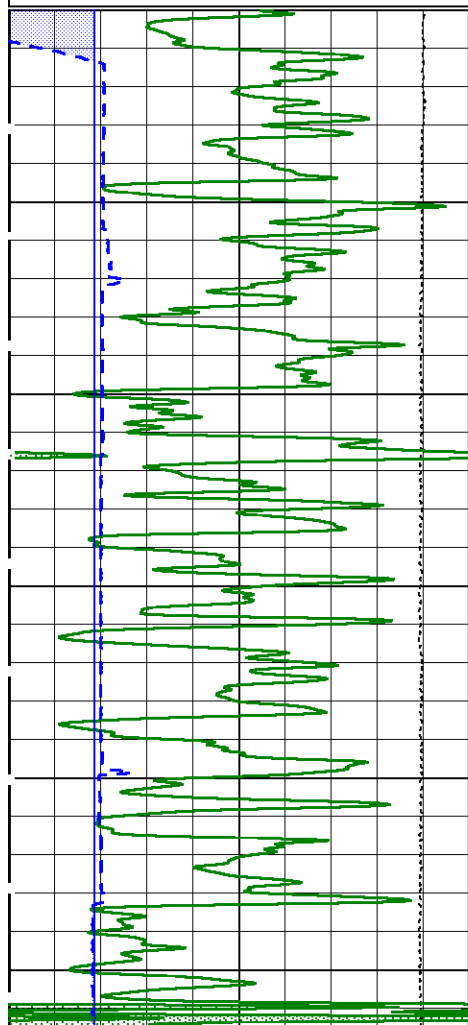
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Limestone	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.71	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

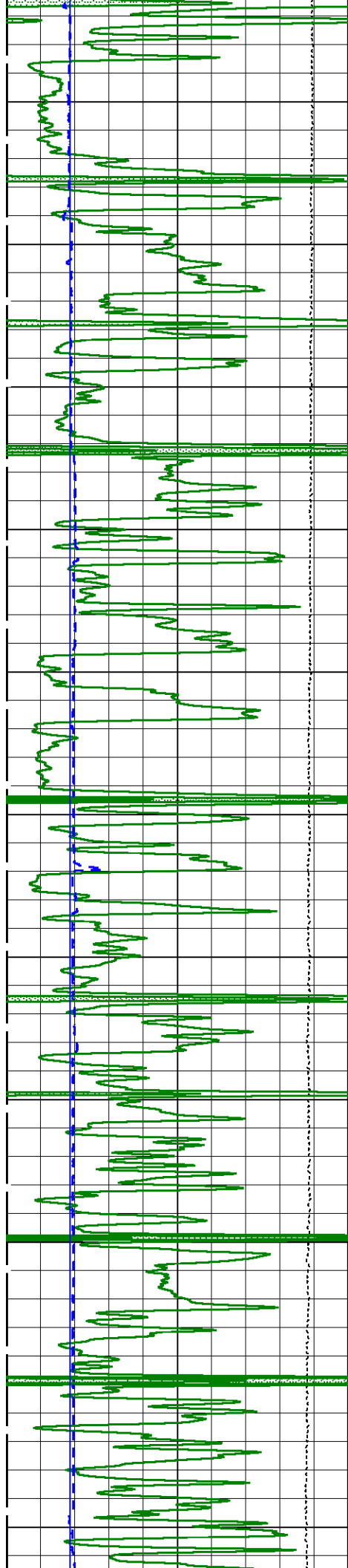


Main Pass

Database File: pronghorn_harley_3.db
 Dataset Pathname: pass6.4
 Presentation Format: poro_ph2
 Dataset Creation: Sat May 25 02:58:03 2013 by Calc Sondex V7.03
 Charted by: Depth in Feet scaled 1:600

0	Gamma Ray (GAPI)	150	0.3	Density Porosity	-0.1
6	Caliper (in)	16	0.3	Neutron Porosity	-0.1
6	BitSize (in)	16	0	PE	10
	Line Tension		0.8	Density Correction (g/cc)	-0.2
	10000 (lb)	0	0.3	Cross Plot Porosity	-0.1





4200

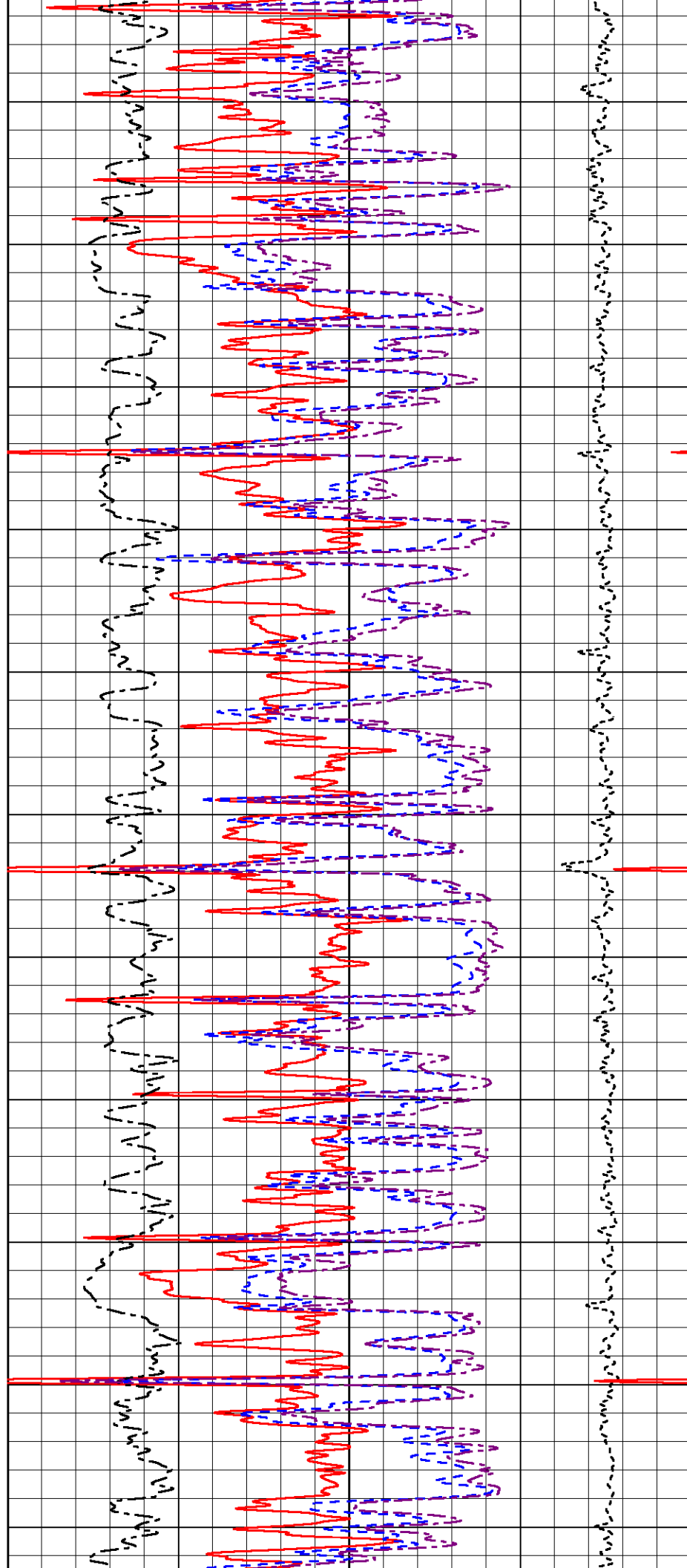
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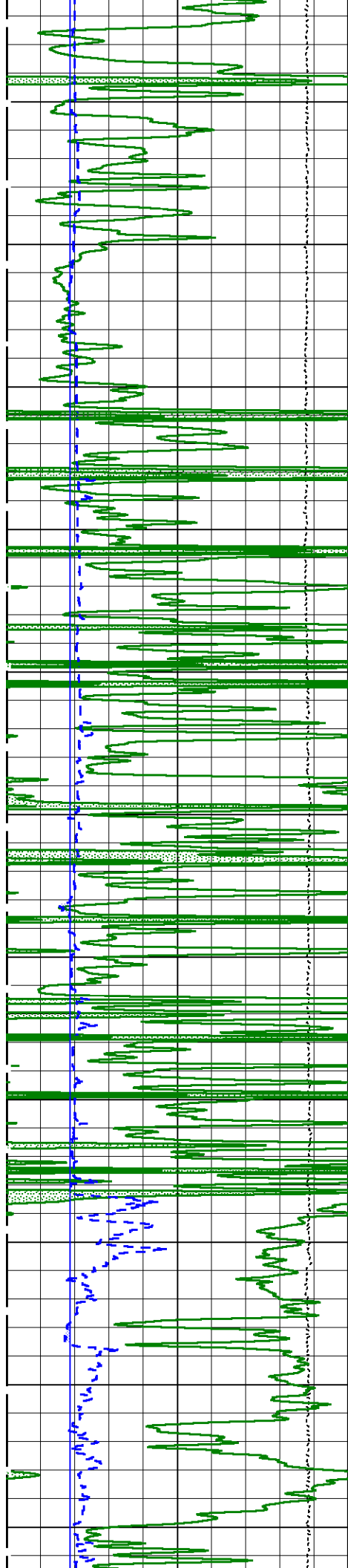
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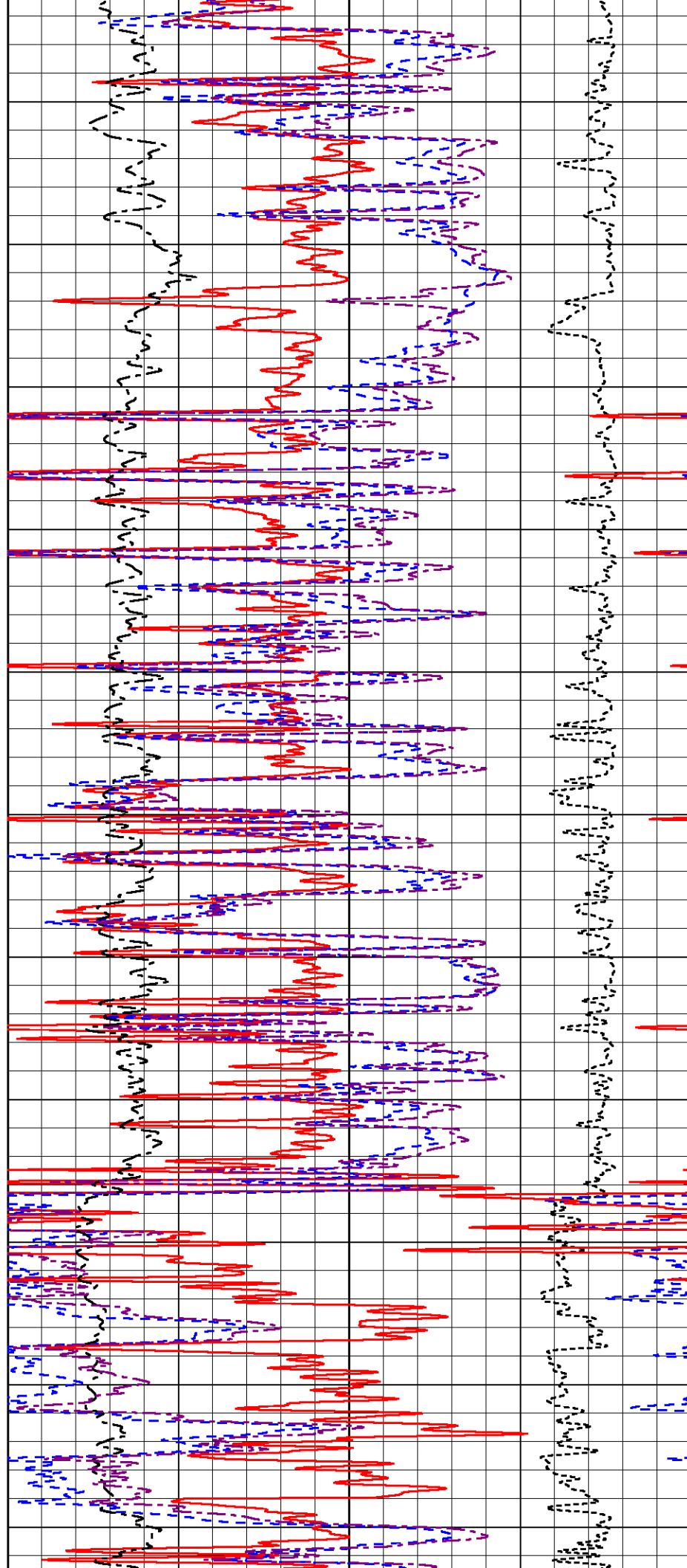
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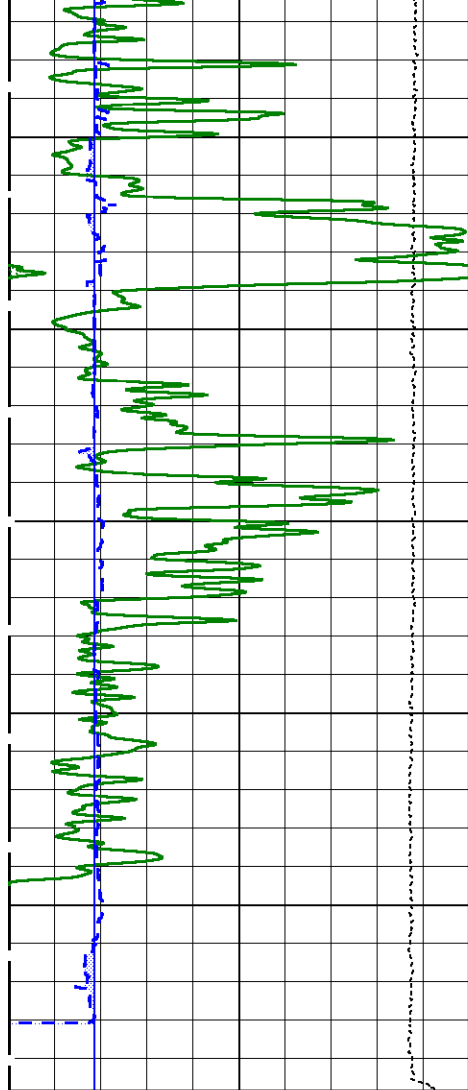
4900

5000

5100

5200



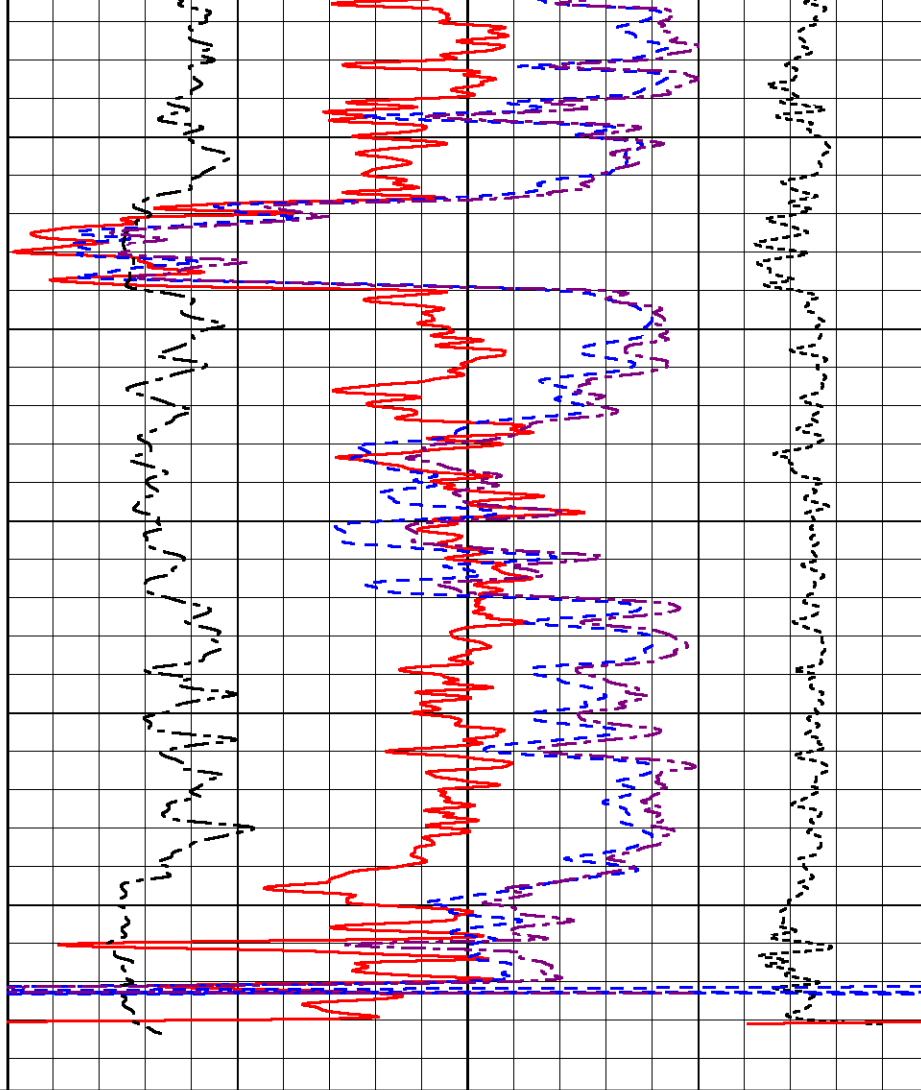


0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
Line Tension		
10000 (lb)		0

5300

5400

5500



0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1

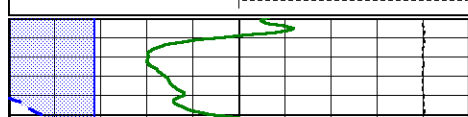


Main Pass

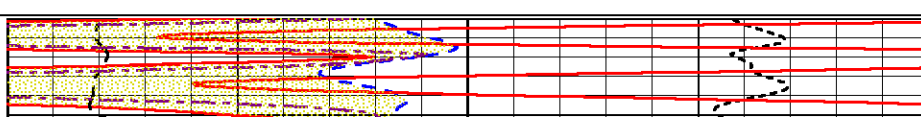
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 Presentation Format: poro_ph5
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 Charted by: Depth in Feet scaled 1:240

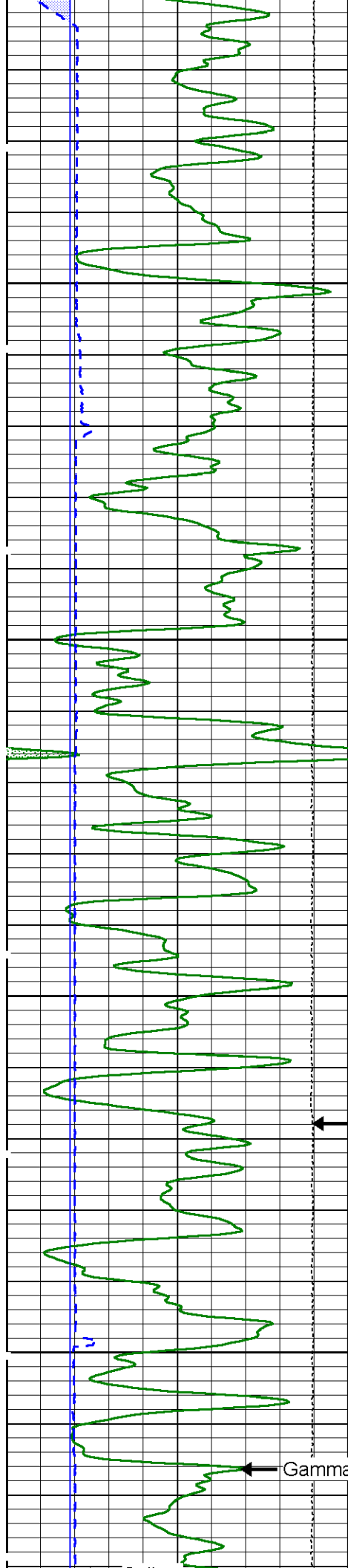
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
Line Tension		
10000 (lb)		0

0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1



5300

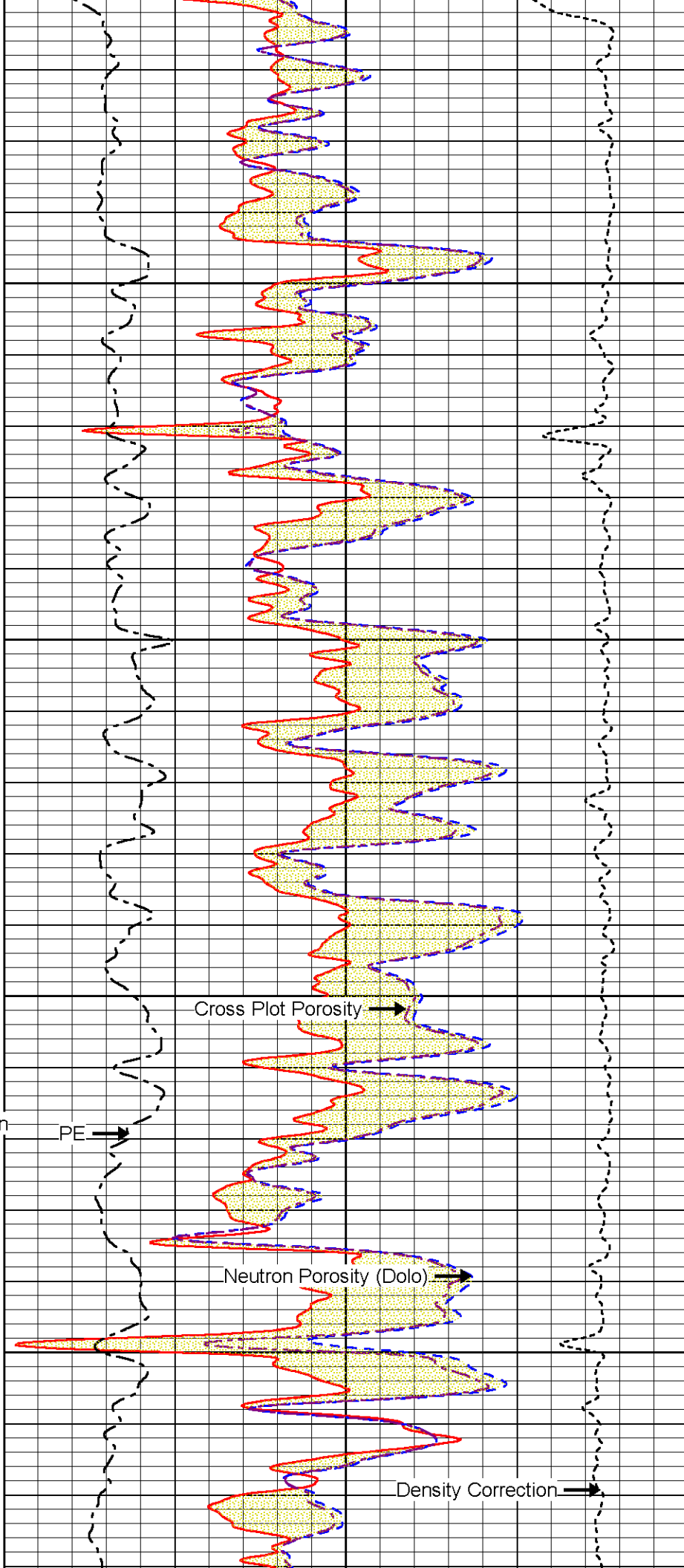




Line Tension

4000

4100

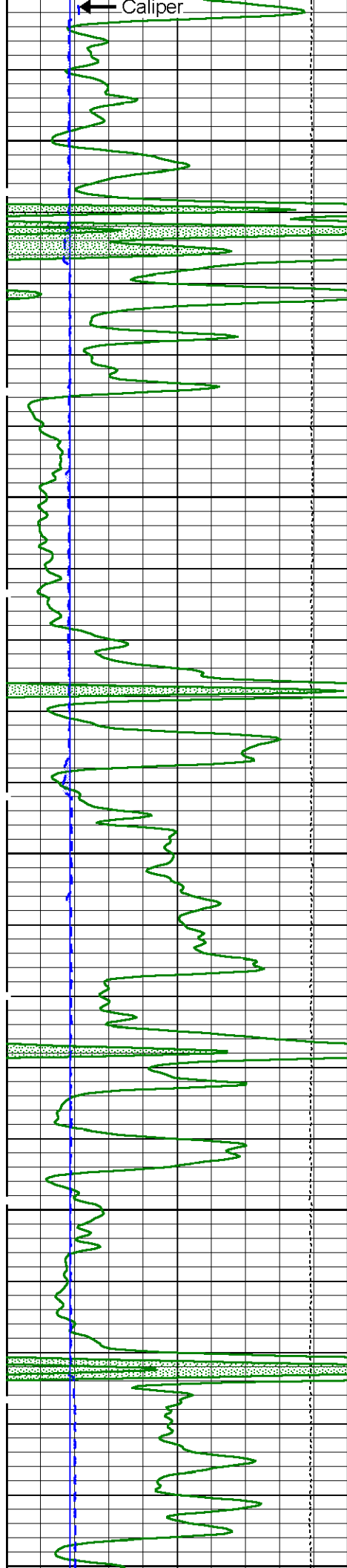


PE

Cross Plot Porosity

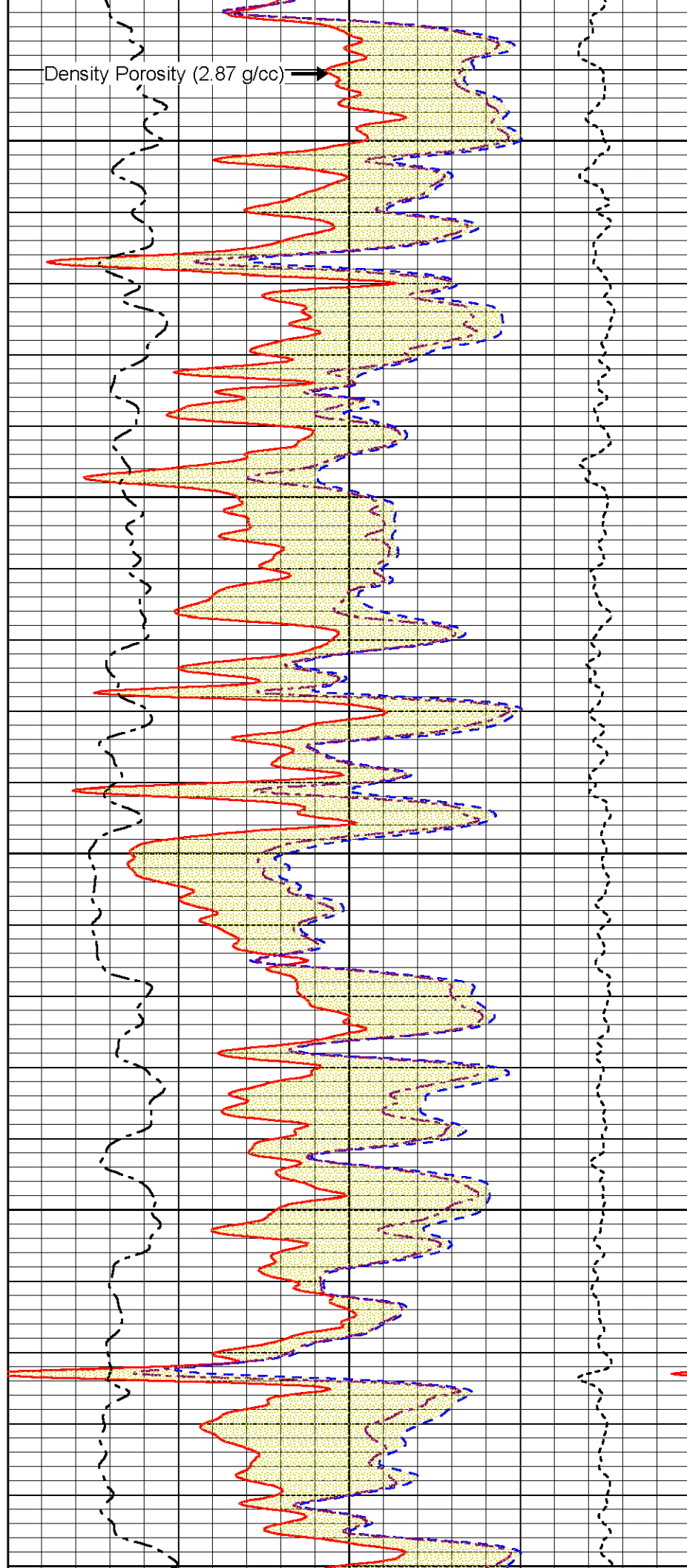
Neutron Porosity (Dolo)

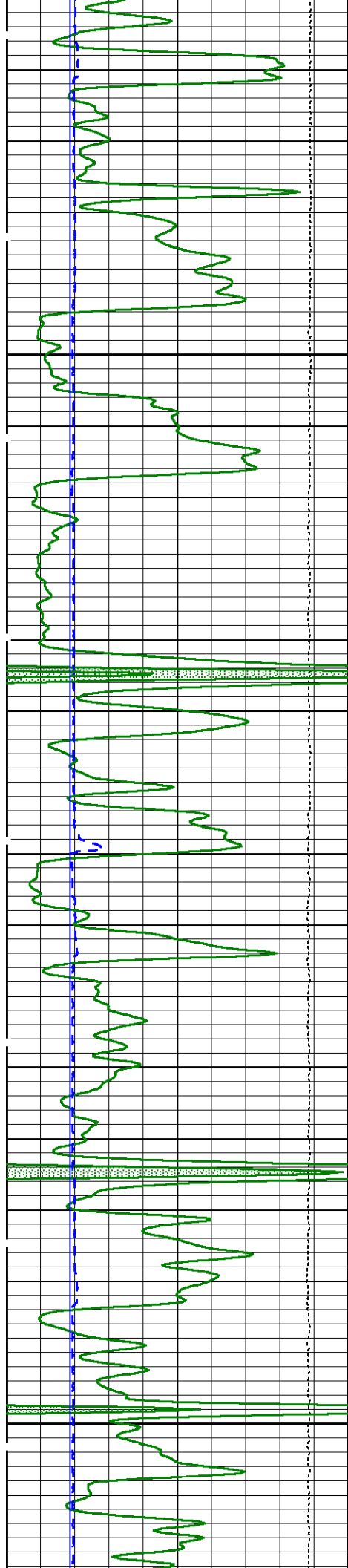
Density Correction



4200

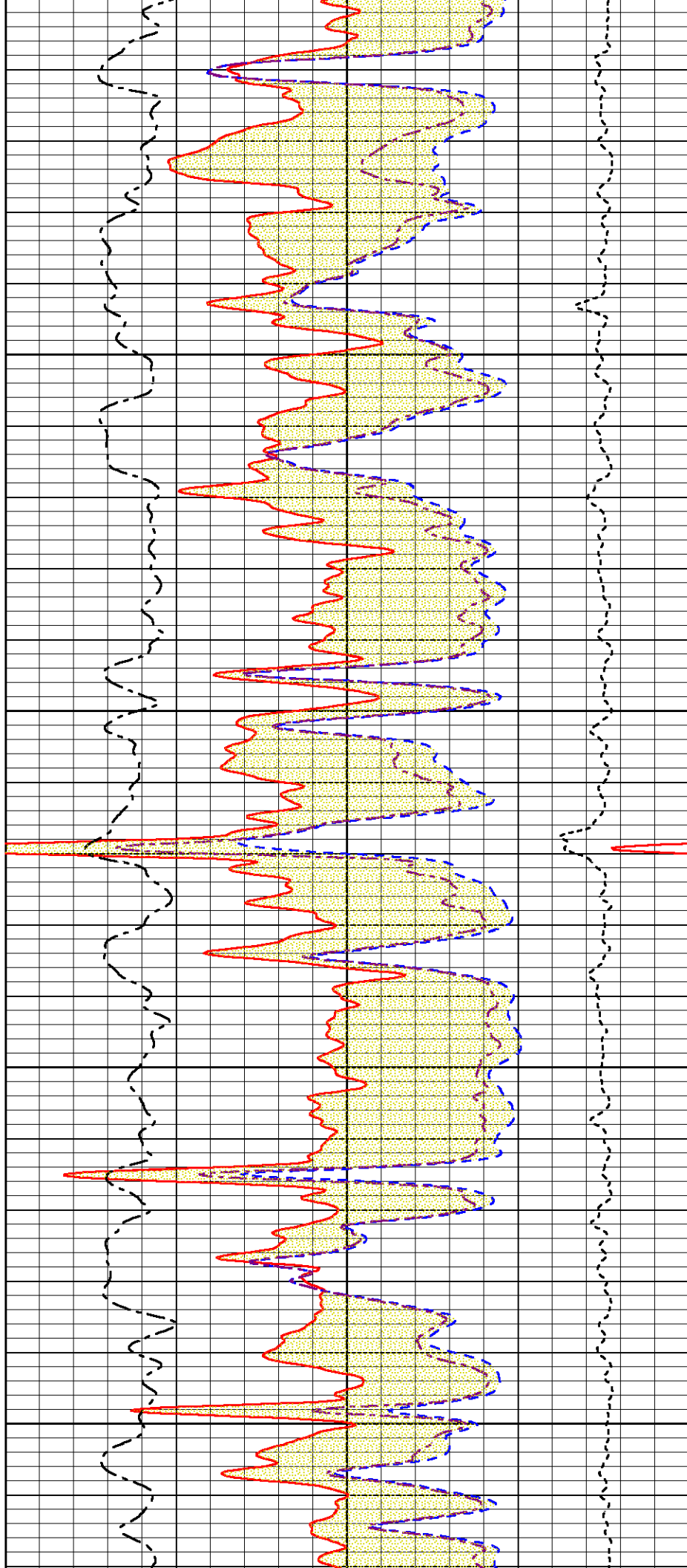
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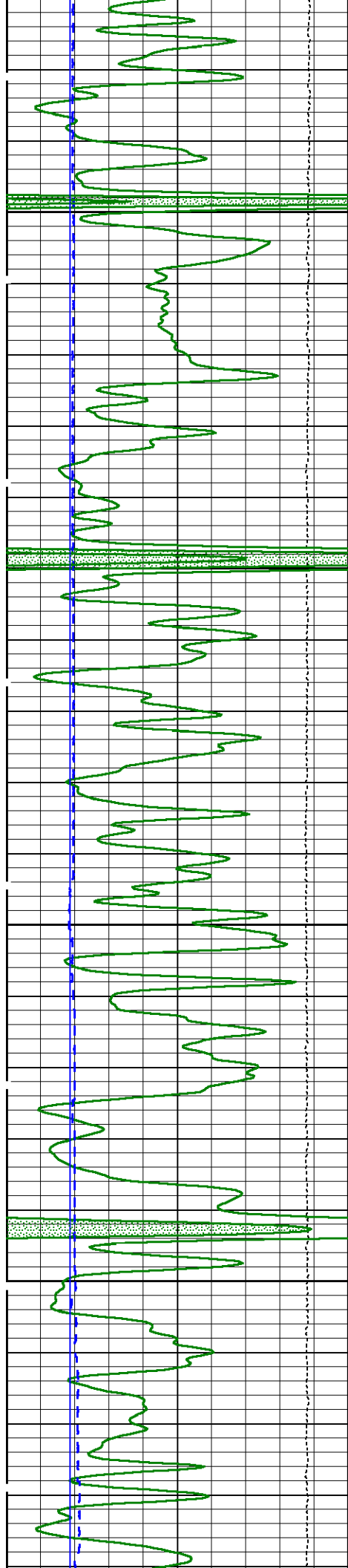




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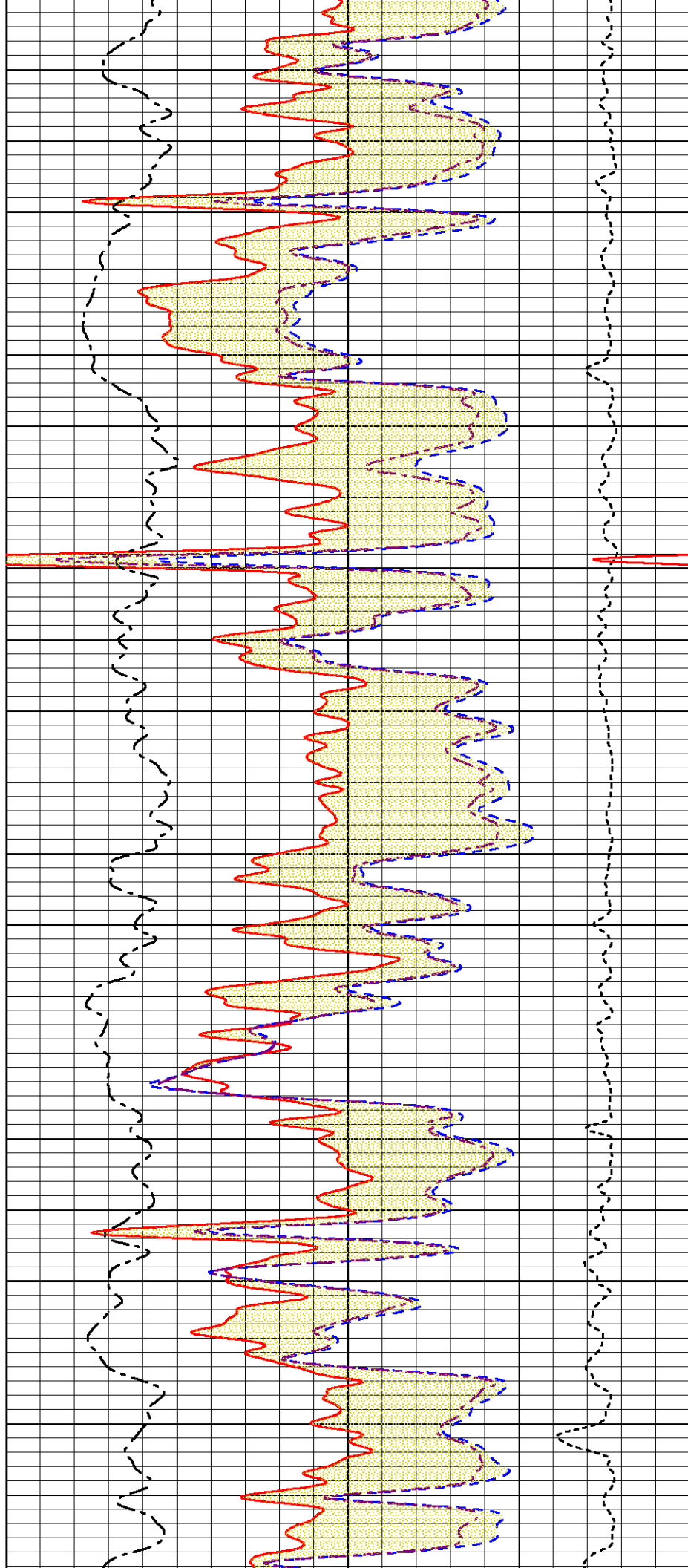
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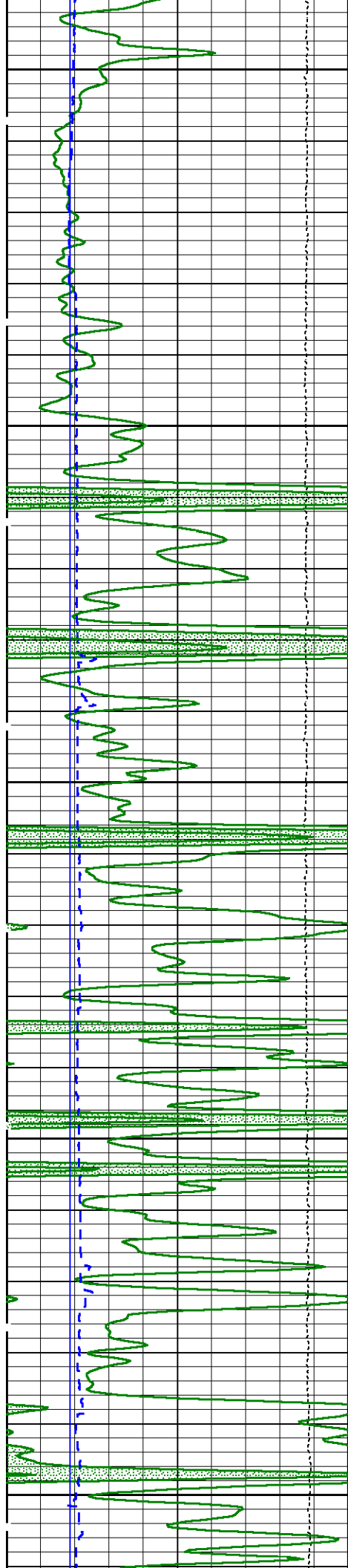




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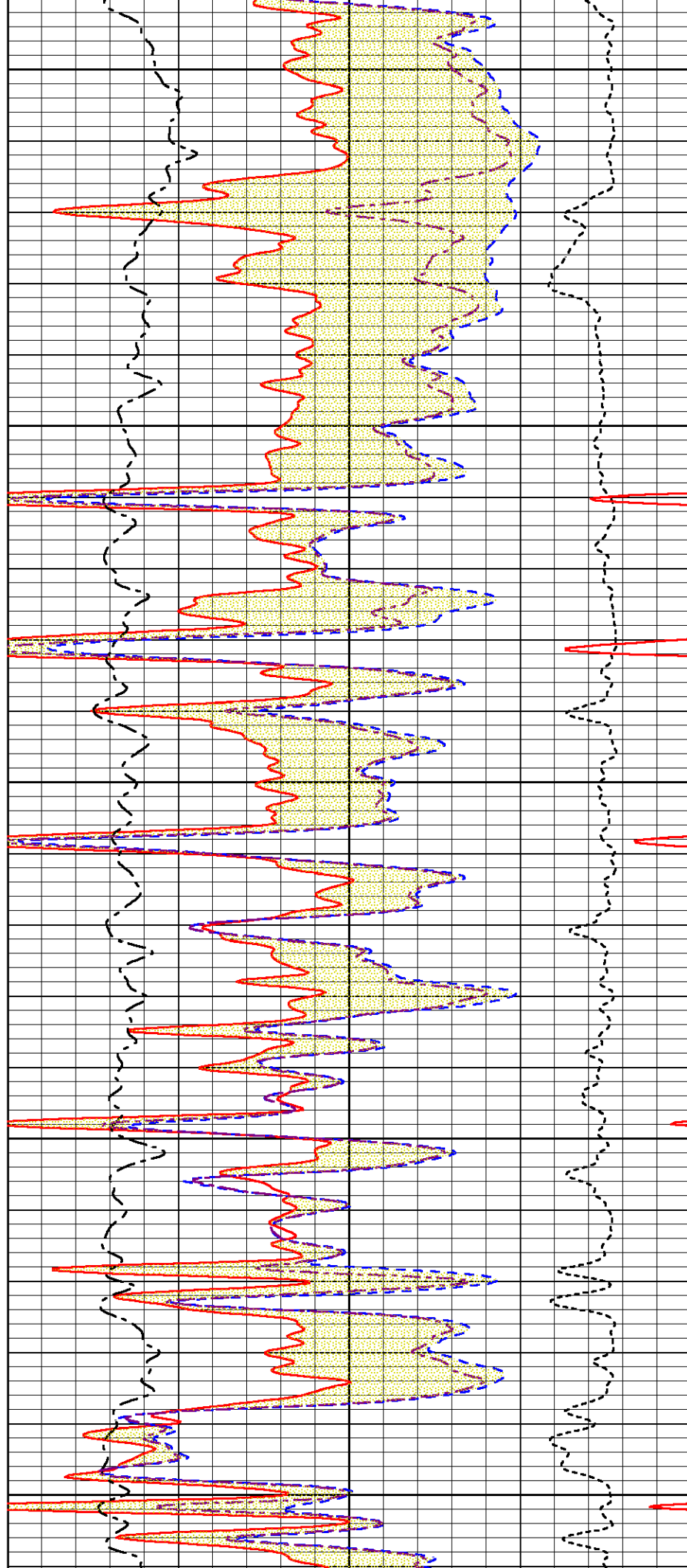


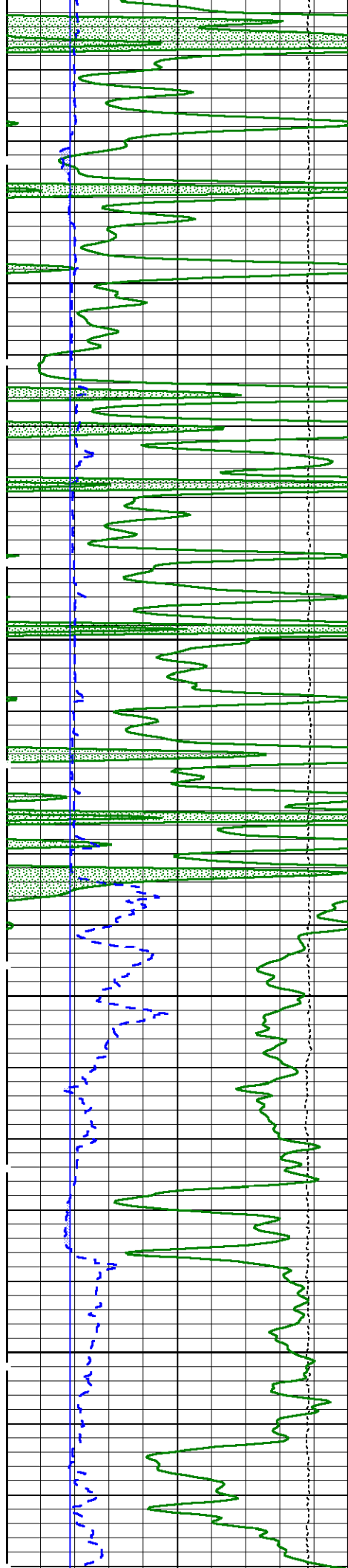


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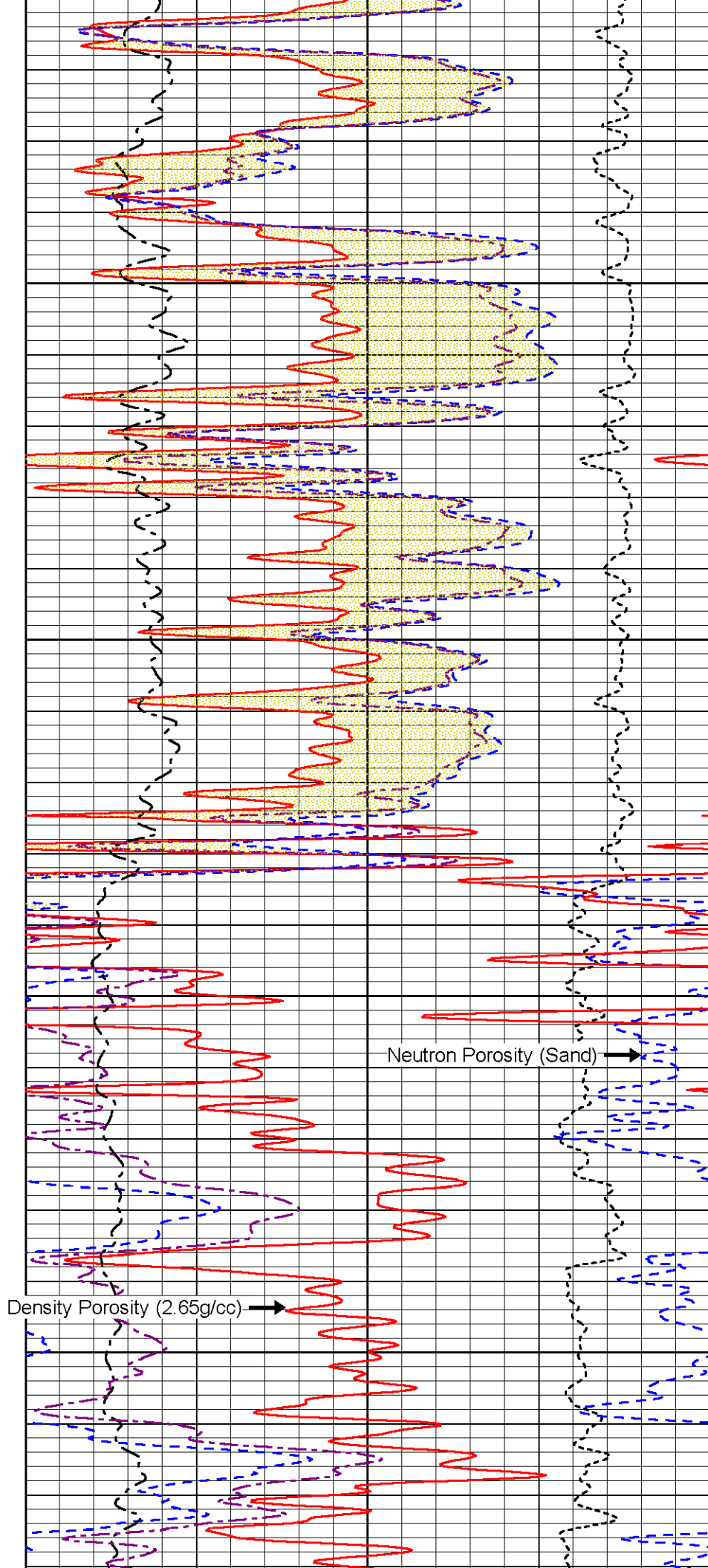
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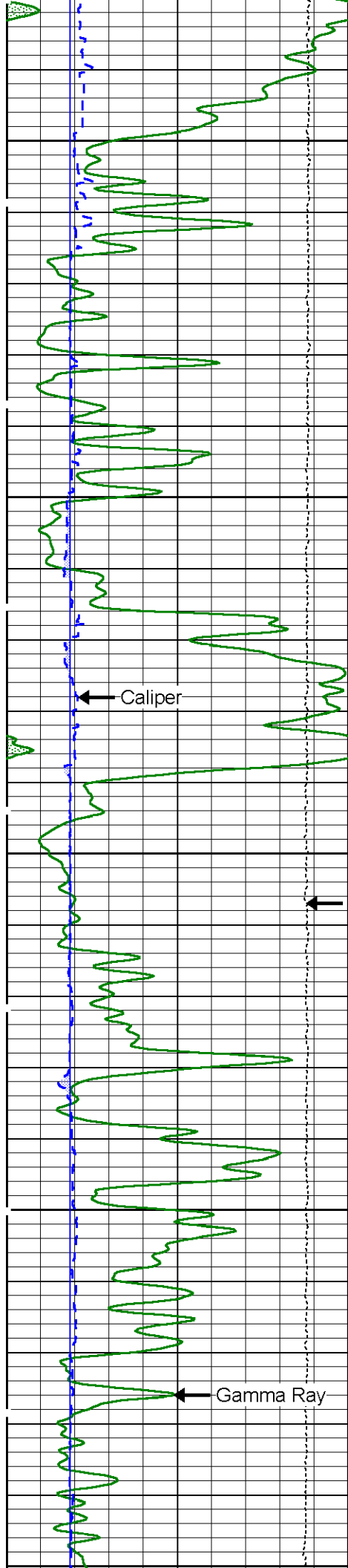




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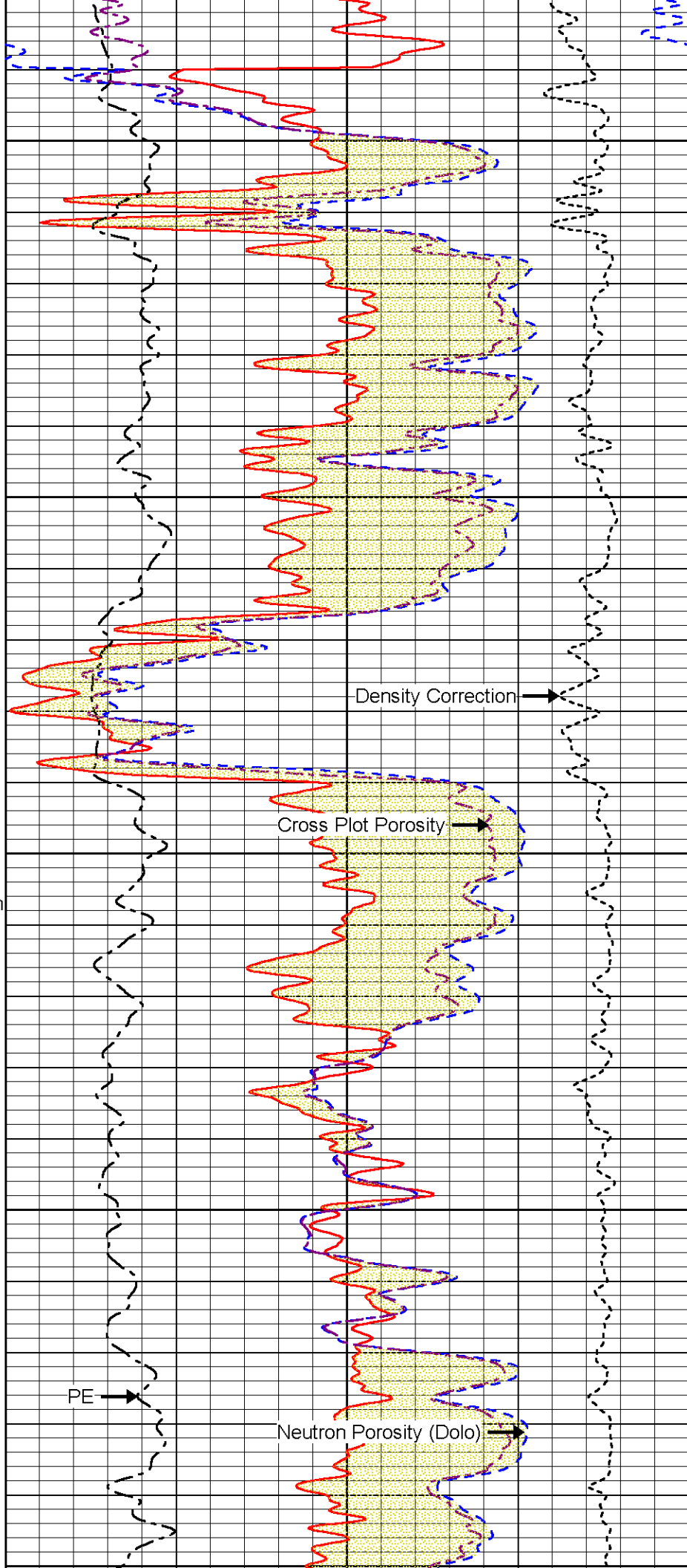
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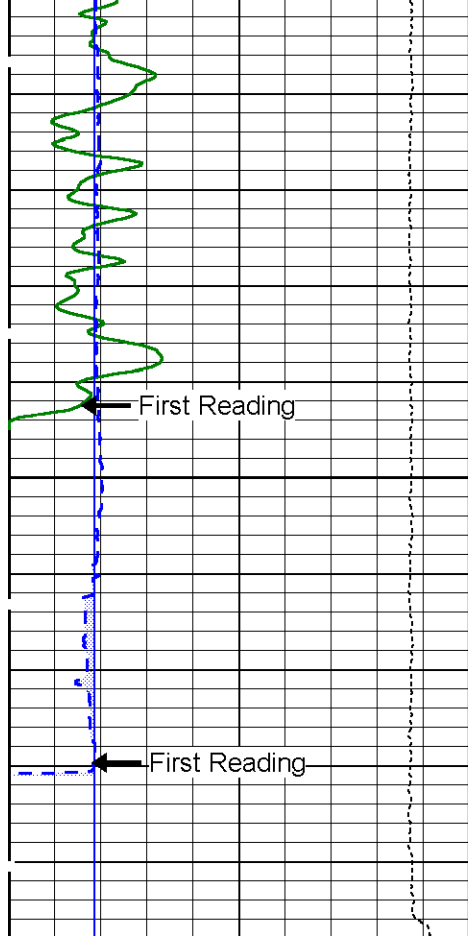




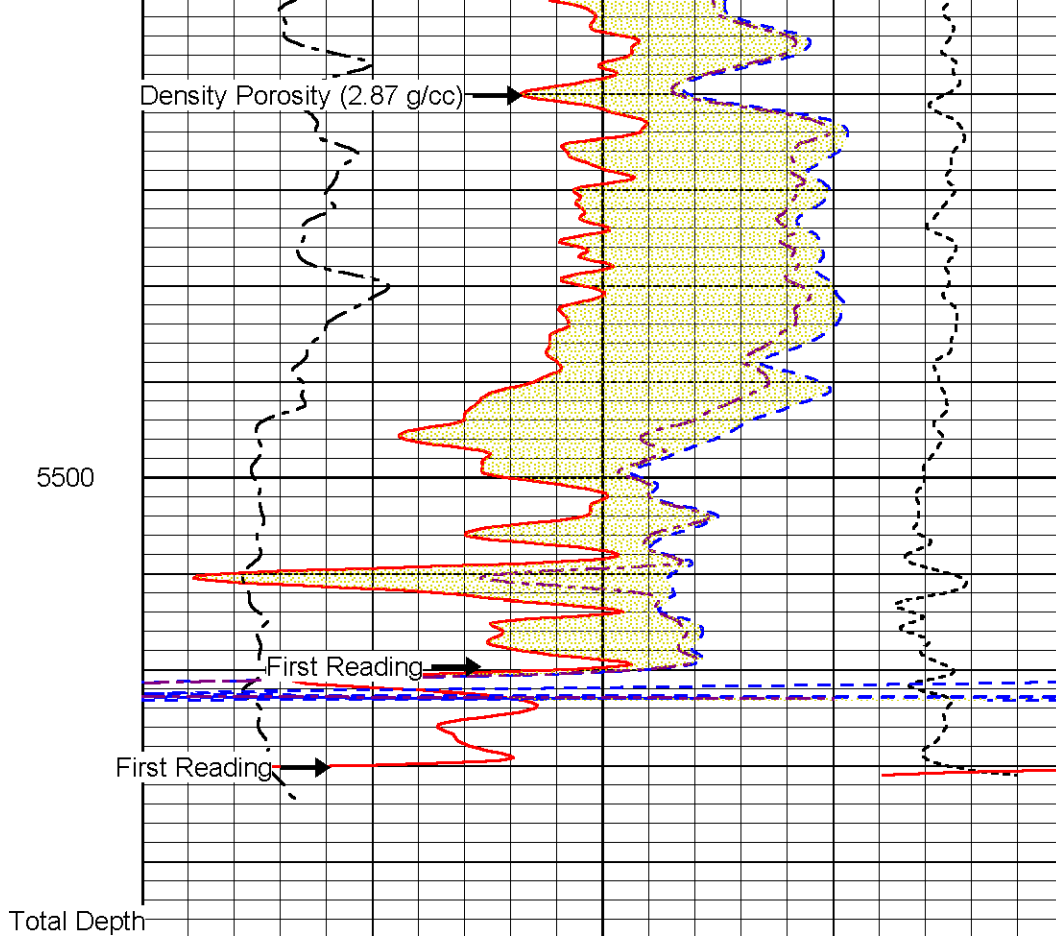
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5400





0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
Line Tension		
10000	(lb)	0



0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1

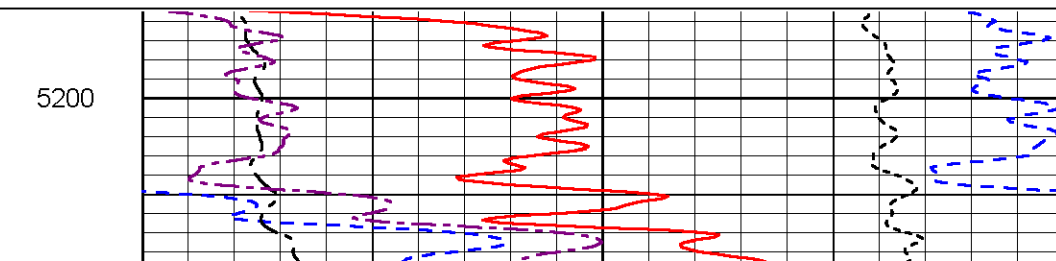
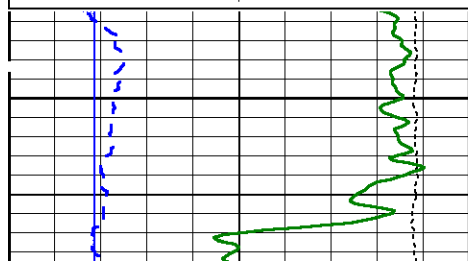


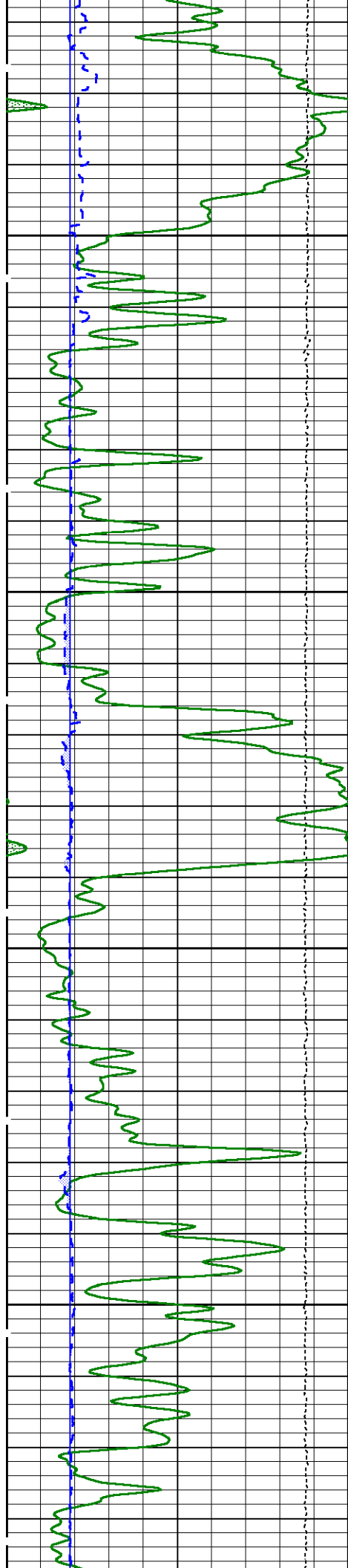
Repeat Pass

Database File: pronghorn_harley_3.db
 Dataset Pathname: pass5.1
 Presentation Format: poro_ph5
 Dataset Creation: Sat May 25 02:51:04 2013 by Calc Sondex V7.03
 Charted by: Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
6	BitSize (in)	16
Line Tension		
10000	(lb)	0

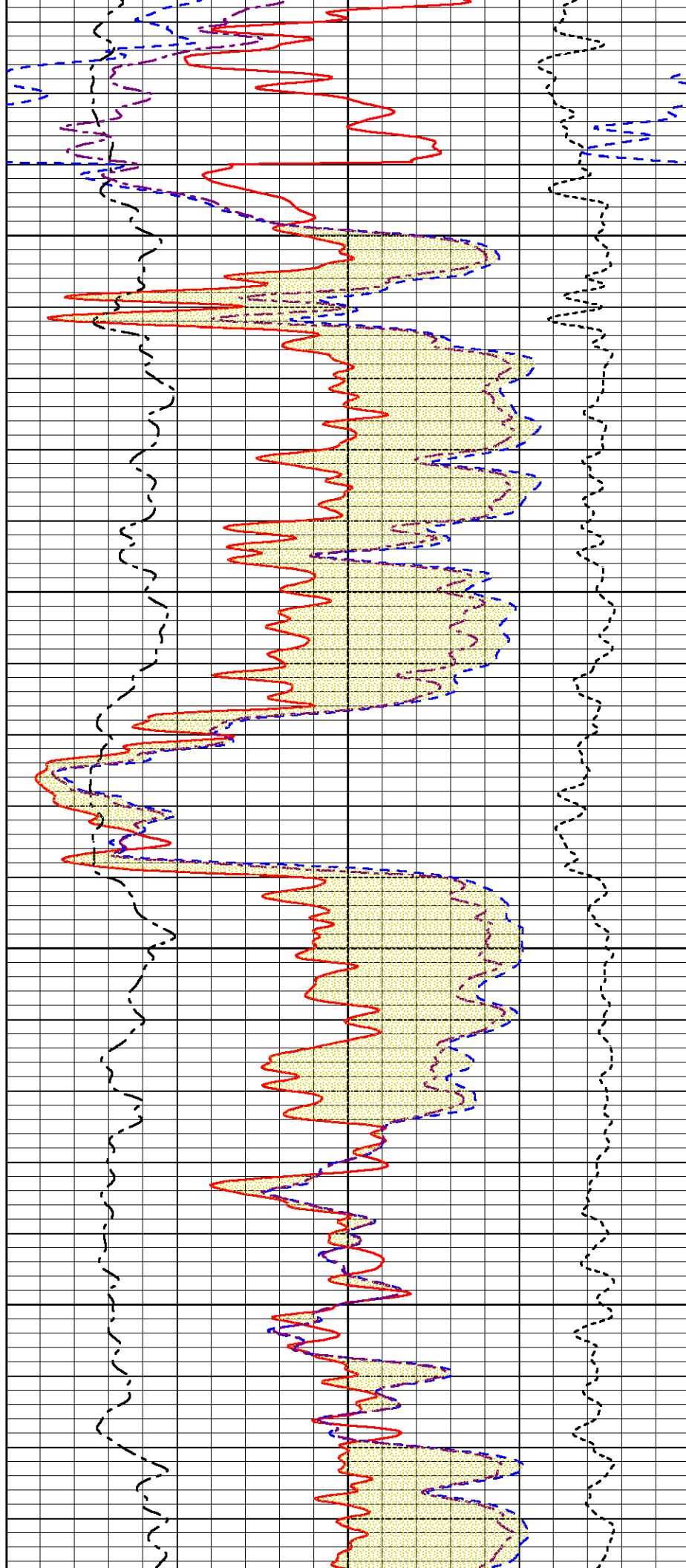
0.3	Density Porosity	-0.1
0.3	Neutron Porosity	-0.1
0	PE	10 0.8
0.3	Density Correction (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1





5300

5400



493.00 ft - 1700.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Dolomite	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.87	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 12.25							

1700.00 ft - 5125.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Dolomite	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.87	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

5125.00 ft - 5240.00 ft

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 55.5	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT Yes	CASED? No	CASEWGHT lb/ft 17	NPORSEL Sandstone	AIR_HOLE? No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.65	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

5240.00 ft - Bottom

MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	COMPACT 1	SVFLUID usec/ft 189	SVMATRIX usec/ft 47.6	FRMSALIN kppm 0	MUDSALIN kppm 0
DEVI	SRETEMP	SO	DE-CENT	CASED?	CASEWGHT	NPORSEL	AIR_HOLE?

DEW 0	CRTTEMP degF 68	CO in 1.5	DE GEM Yes	CASEOD No	CASEWGT lb/ft 17	IN CRCLL Dolomite	AIR CRCLL No
MudWgt lb/gal 8.8	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.87	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5579	BOTTEMP degF 130
BOREID in 7.875							

Calibration Report								
Database File:		pronghorn_harley_3.db						
Dataset Pathname:		pass6						
Dataset Creation:		Sat May 25 00:21:05 2013 by Log Sondex V7.03						
Induction Array Tool Calibration Report								
Serial Number:				B10110				
Tool Model:				002				
Master Calibration Performed:				Wed Aug 24 08:34:17 2011				
Temperature:				74.0 degF				
Sonde Error:								
Array	1	2	3	4	5	6	7	
Real	191.9	-13.8	-40.9	-15.9	-3.1	0.7	3.4	mmho/m
Imaginary	33.1	-17.8	-19.8	-16.7	-24.3	-1.9	5.8	mmho/m
Loop Gain:								
Array	1	2	3	4	5	6	7	
Loop (real)	537.7	678.5	1295.3	1394.1	1144.8	712.8	404.8	mmho/m
Loop (imaginary)	73.3	92.5	389.8	419.5	344.5	214.5	121.8	mmho/m
Real	762.6	736.2	1247.9	1380.3	1164.3	741.8	425.4	mmho/m
Imaginary	109.3	84.7	369.6	408.4	328.0	221.5	135.1	mmho/m
Gain (real)	0.942	0.905	1.005	0.999	0.981	0.962	0.959	
Gain (imaginary)	0.961	0.902	1.001	0.987	0.978	0.960	0.942	
Before Survey Verification Performed:				Thu Oct 04 13:29:32 2012				
Sonde 1 Temperature:				83.1 degF				
Sonde 2 Temperature:				86.7 degF				
Array 1 Temperature:				83.1 degF				
Array	1	2	3	4	5	6	7	
TxIR	-0.0	-0.0	0.1	0.1	0.1	0.1	0.1	
TxIX	-0.0	-0.0	-0.2	-0.2	-0.2	-0.2	-0.2	
Tx Magnitude	0.0	0.0	0.2	0.2	0.2	0.2	0.2	
Gain	121.5	180.0	190.0	190.0	190.0	190.0	190.0	
RxCR	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	
RxCX	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
RxC Magnitude	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Tool Module Parameters								
Software Version:				1.9.1.0				
Borehole Size Source:				CALI				
Mud Resistivity Source:				Hilchie				
Mud Resistivity At Surface:				1.40 Ohm-m				
Mud Resistivity Surface Temperature:				65.0 degF				
Borehole Corrections:				Automatic				
Minimum Standoff:				0.4 in				

Serial Number:
Tool Model:B0872S50130B
002

Caliper Calibration Performed:

Fri May 24 20:21:14 2013

	Diameter		Reading	
Small Ring:	3.800	in	978.200	cps
Large Ring:	8.100	in	1440.000	cps
Gain:	0.0093			
Offset:	-6.2084			

Master Calibration Performed:

Wed Mar 06 10:52:06 2013

Source Number: 50103
 Medium: Air
 Al Block Density: 2.6013 g/cc

	Background	Al Block	Al Block + Fe	
SS1	824.5	4450.0	3821.3	cps
SS2	2318.8	30000.0	25767.6	cps
SSTOTAL	5436.6	47889.7	40834.0	cps
LITH	94.3	481.5	292.5	cps
LL	186.3	809.1	716.4	cps
LU	531.7	1063.6	991.7	cps
LS	718.0	1872.6	1708.1	cps
LSTOTAL	1360.4	4538.8	3713.8	cps
SSHV	1476.1	1480.8	1480.9	V
LSHV	1409.7	1412.0	1413.2	V
SSFF	0.005	0.008	0.004	
LSFF	0.009	0.008	-0.009	

Before Survey Verification Performed:

After Survey Verification Performed:

	Master Background	Before Survey Background	After Survey Background	
SS1	824.5			cps
SS2	2318.8			cps
SSTOTAL	5436.6			cps
LITH	94.3			cps
LL	186.3			cps
LU	531.7			cps
LS	718.0			cps
LSTOTAL	1360.4			cps
SSHV	1476.1			V
LSHV	1409.7			V
SSFF	0.005			
LSFF	0.009			

Tool Module Parameters

Software Version: 2.5.1.0
 Borehole Size Source: CALI
 Pad Type: 2

Compensated Neutron Tool Calibration Report

Serial Number:
Tool Model:C7939S66010B
009

Source Number: 66010B

Short Spacing Counts:	6649.41	cps
Long Spacing Counts:	260.18	cps
High Voltage:	1335.88	V

Target Ratio:	23.9200
Ratio:	25.5572
K-Factor:	0.9359

Before Survey Verification Performed:
After Survey Verification Performed:

Verifier Number: 6494

Verifier Values	Master Cal	Before Survey	After Survey
Short Spacing Counts:	251.77		cps
Long Spacing Counts:	262.36		cps
High Voltage:	1335.93		V
Ratio:	0.9596		

Tool Module Parameters

Software Version:	1.5.0.0
Borehole Size Source:	CALI
Clip Crossplot Porosity:	YES

Spectral Gamma Ray Tool Calibration Report

Serial Number:	220344
Tool Model:	002

Performed: Wed Mar 27 10:17:59 2013

Source Number:	Th Blanket #14	
Calibrator Value:	217.0	API

Background Reading:	476.3	cps
Calibrator Reading:	2122.6	cps

Sensitivity:	0.132	API / cps
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Performed:

Verifier Number:

Concentrations	K %	U ppm	T ppm
K Peak:			
U Peak:			
T Peak:			

Before Survey Verification Performed:
After Survey Verification Performed:

	Before Survey	After Survey
Background Reading:		cps
Verifier Reading:		cps
K Peak:		
U Peak:		
T Peak:		

Tool Module Parameters

Software Version:

1.8.9.1

Gamma Ray Calibration Report

Serial Number:

10009990

Tool Model:

001

Performed:

Wed Mar 27 09:56:46 2013

Calibrator Value:

236.0

GAPI

Background Reading:

205.7

cps

Calibrator Reading:

961.5

cps

Sensitivity:

0.3122

GAPI/cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
CHD	59.35		CHD-001 (000004) Cable Head	2.19	3.38	35.00
GR	54.47		XTU-008 (10007730) Crossover Ultrawire Toolbus to Ultralink	2.08	3.38	47.00
			GRT-001 (10009990) Gamma Ray Tool	3.22	3.38	69.00
SGR	48.79		SGR-002 (220344) Spectral Gamma Ray Tool	4.94	3.88	120.00
WVFUTRF	40.72		MAS-001SS (10010072SS) Multi Array Sonic Tool (SS)	14.28	3.38	242.00
WVFUTRN	39.72					
WVFLTRF	39.72					
WVFLTRN	38.72					
OJT	32.64		OJT-001 (000002) OH Offset Joint	2.46	3.38	56.00
CNLSC	27.16		CNL-009 (C7939S66010B) Compensated Neutron Logging Tool	5.27	3.38	125.00
CNSSC	26.66					
LDT	17.00		LDT-002 (B0872S50130B) Litho Density Tool	9.75	4.50	310.00

