



# Composite Log

Company Pronghorn Operating, LLC  
Well Harley 2  
Field Cheyenne Wells  
County Cheyenne State Colorado

Company Pronghorn Operating, LLC  
Well Harley 2  
Field Cheyenne Wells  
County Cheyenne  
State Colorado

Location: 708' FNL & 1992 FEL  
SEC 5 TWP 14 S RGE 44 W  
Permanent Datum GL Elevation 4239 ft.  
Log Measured From KB 16 ft. above perm. datum  
Drilling Measured From KB  
Other Services  
K.B. 4255 ft.  
D.F. 4254 ft.  
G.L. 4239 ft.

Date 28-Aug-2013

Run Number	ONE	
Depth Driller	5545'	
Depth Logger	5550'	
Bottom Logged Interval	5549'	
Top Log Interval	3800'	
Casing Driller	13.375" @ 457'	@
Casing Logger	460'	
Bit Size	7.875 "	@
Type Fluid in Hole	WBM	@
Density / Viscosity	8.8/43	
pH / Fluid Loss	9/7	
Source of Sample	Mud Pit	
Rm @ Meas. Temp	1.8 @ 75°F	@
Rmt @ Meas. Temp	1.4 @ 75°F	@
Rmc @ Meas. Temp	2.3 @ 75°F	@
Source of Rmf / Rmc	Calculated	
Rm @ BHT	0.9 @ 153°F	@
Time Circulation Stopped	28-Aug 6:00	
Time Logger on Bottom	28-Aug 13:00	
Maximum Recorded Temperature	153°F	
Equipment Number	10001	
Location	Oklahoma	
Recorded By	Lance Schubert	
Witnessed By	J.Thorson/F.Rabbio	

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## Equipment and Log Data

Service Order: 41207

Gamma		Density		Neutron		Sonic		IAT	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	10047	Serial No.	10110	Serial No.	10088	Serial No.	10038	Serial No.	10107
O.D.	3.375 in.	Source No.	50129B	Source No.	80244B	Centralizers	0	Standoffs	1 @ 1.5
		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
One	5550' 3800'	0	150	0.3	-0.1	2.68 g/cc	0.3	-0.1	Lime	0.3	-0.1

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

GRT, SGR, MAS, CNL, LDT, AND IAT were run in combination  
No LCM reported  
Annular borehole volume calculated for 5.5" casing  
Chlorides 3000 ppm

YOUR CREW TODAY: D.Gosey, J.Brewer

THANK YOU FOR CHOOSING ALLIED WIRELINE. OKLAHOMA CITY, OK. (405) 445-7135.

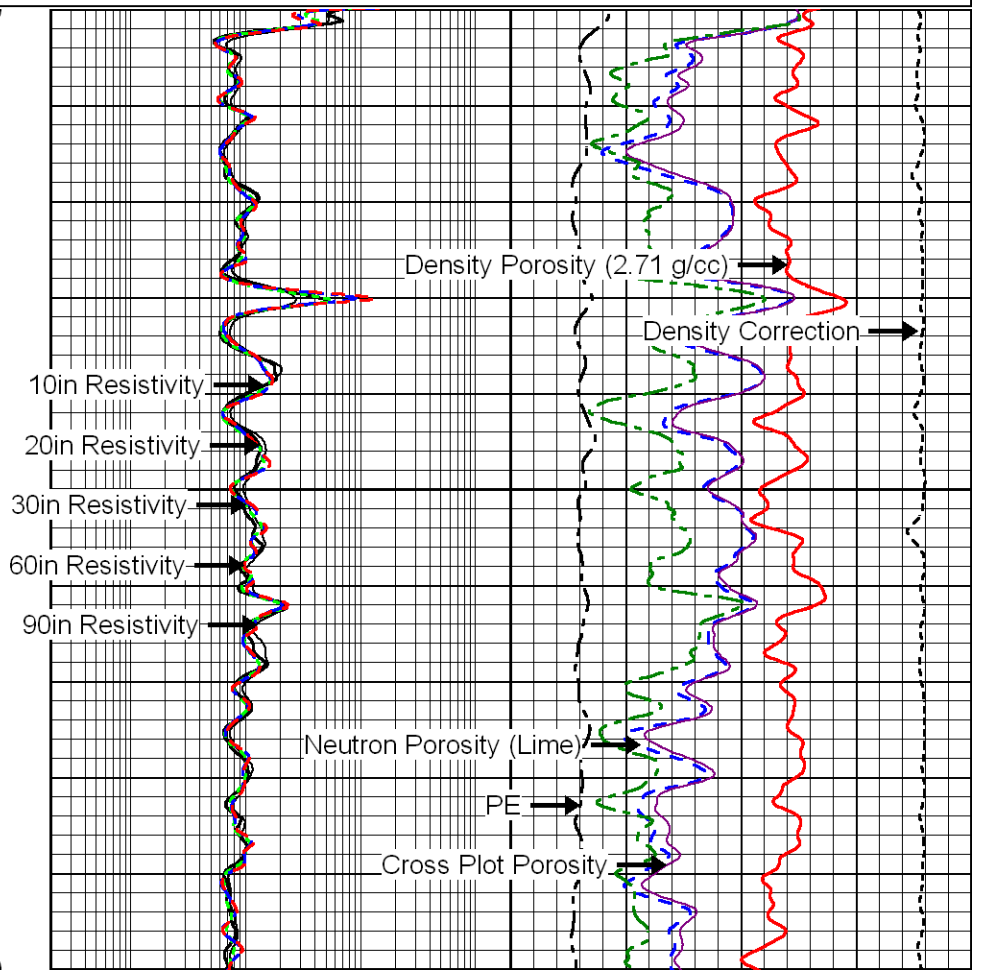
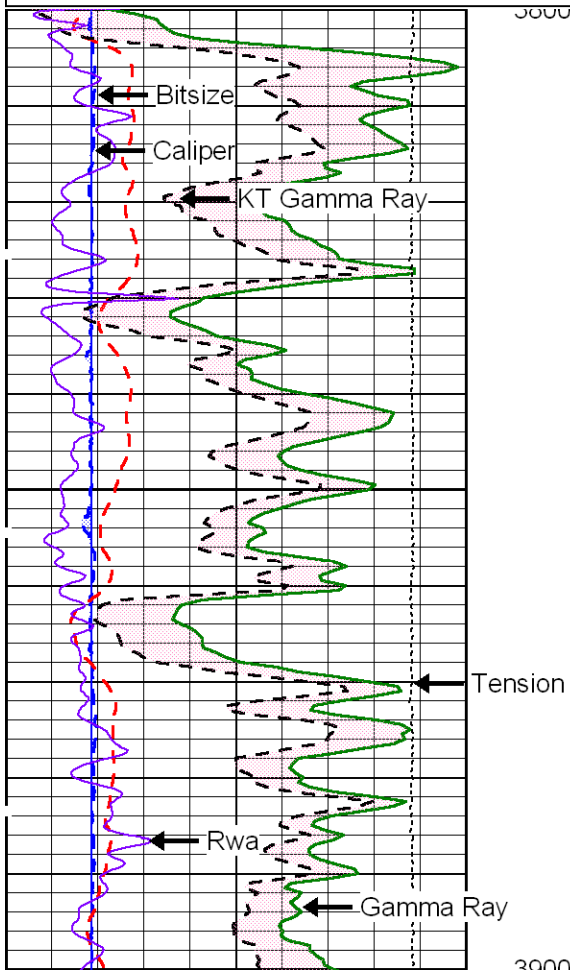


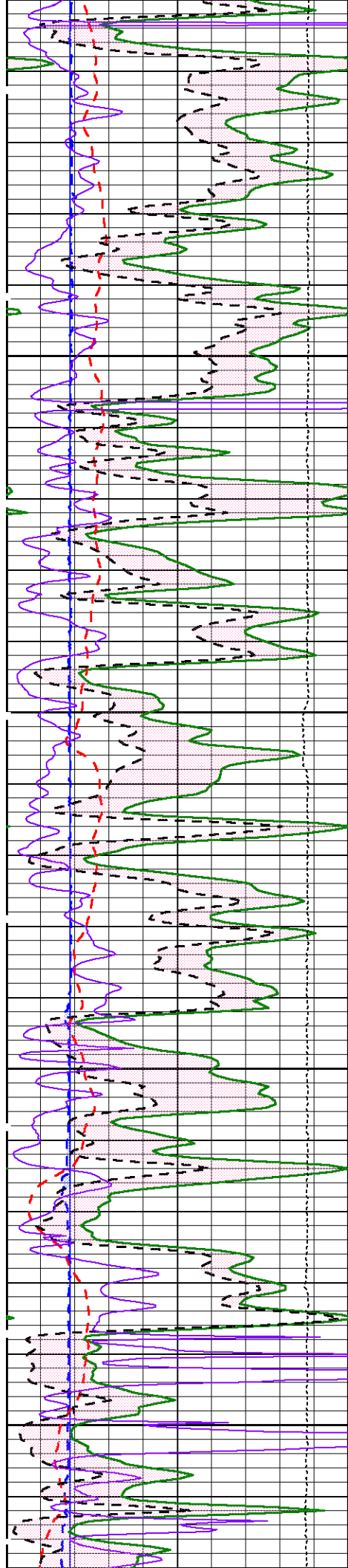
# Main Pass

Database File: pronghorn\_harley2.db  
 Dataset Pathname: pass5.1  
 Presentation Format: a4prnl  
 Dataset Creation: Wed Aug 28 16:07:20 2013 by Calc Sondex V7.03  
 Charted by: Depth in Feet scaled 1:240

6	Bitsize (in)	16
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
SP [-20mV+]		
0	KT Gamma Ray (GAPI)	150
0	Rwa (Ohm-m)	1
Tension		
	10000 (lb)	0

0.2	10in Resistivity (Ohm-m)	2000	0.3	Neutron Porosity (Lime)	-0.1
0.2	20in Resistivity (Ohm-m)	2000	0.3	Density Porosity (2.71 g/cc)	-0.1
0.2	30in Resistivity (Ohm-m)	2000	0	PE	10
0.2	60in Resistivity (Ohm-m)	2000	Density Correction		
0.2	90in Resistivity (Ohm-m)	2000		0.8 (g/cc)	-0.2
			0.3	Cross Plot Porosity	-0.1
			0.3	Sonic Porosity (47.6 usec/ft)	-0.1



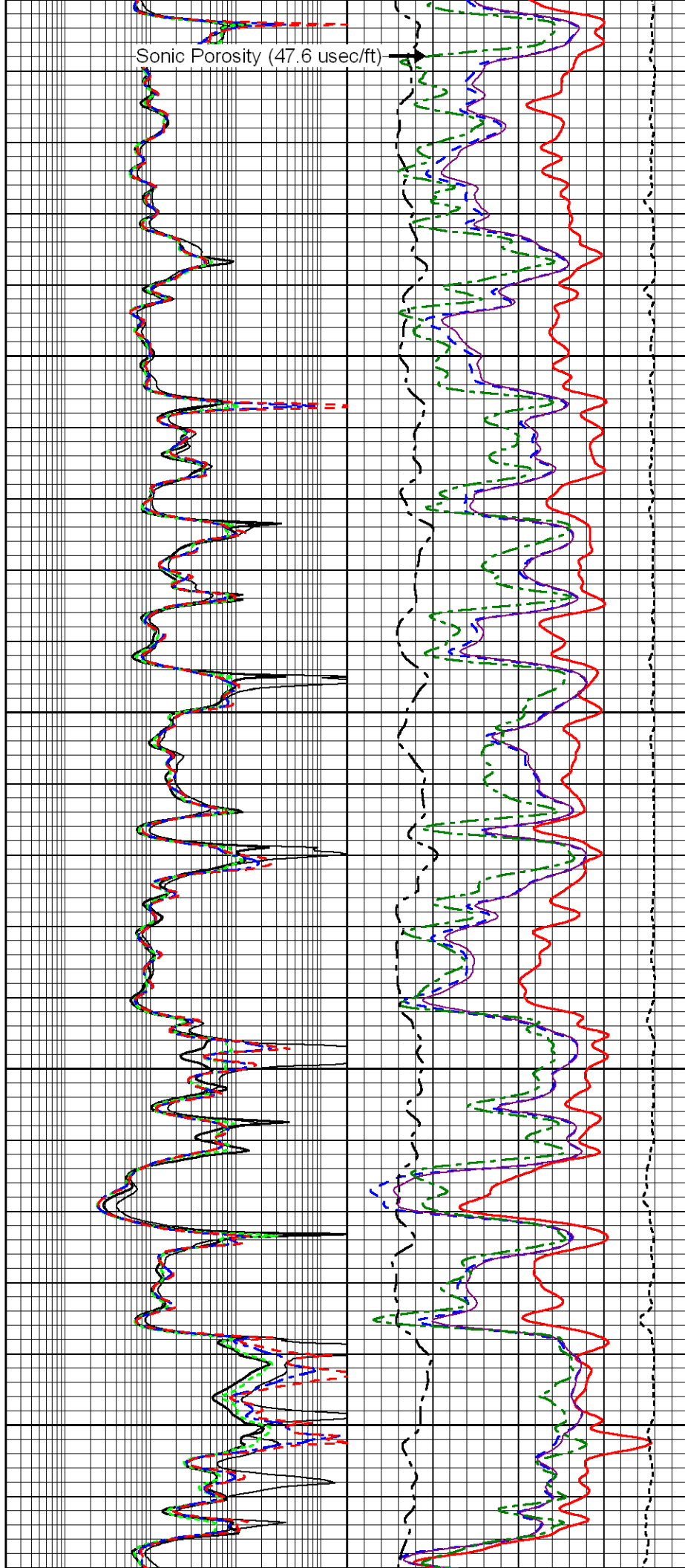


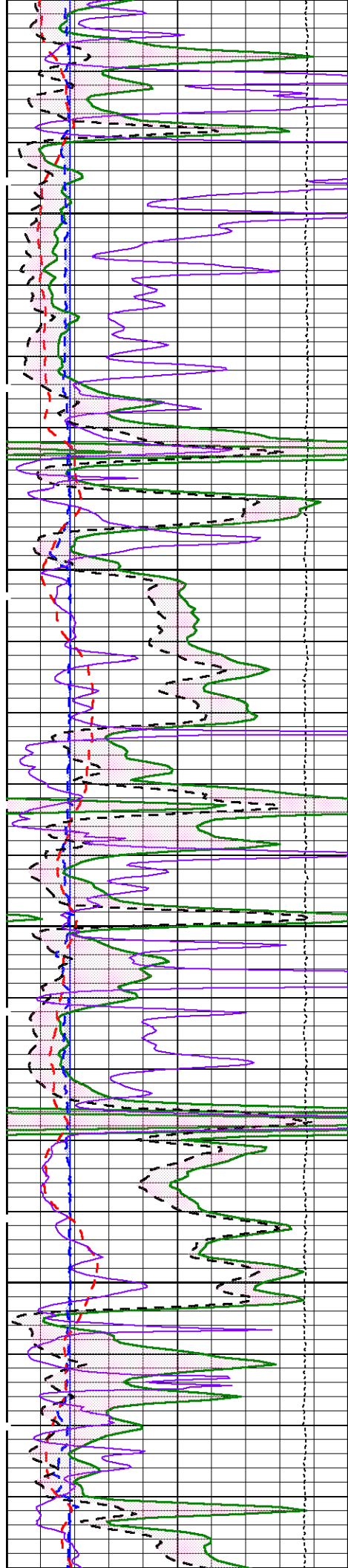
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4000

4100

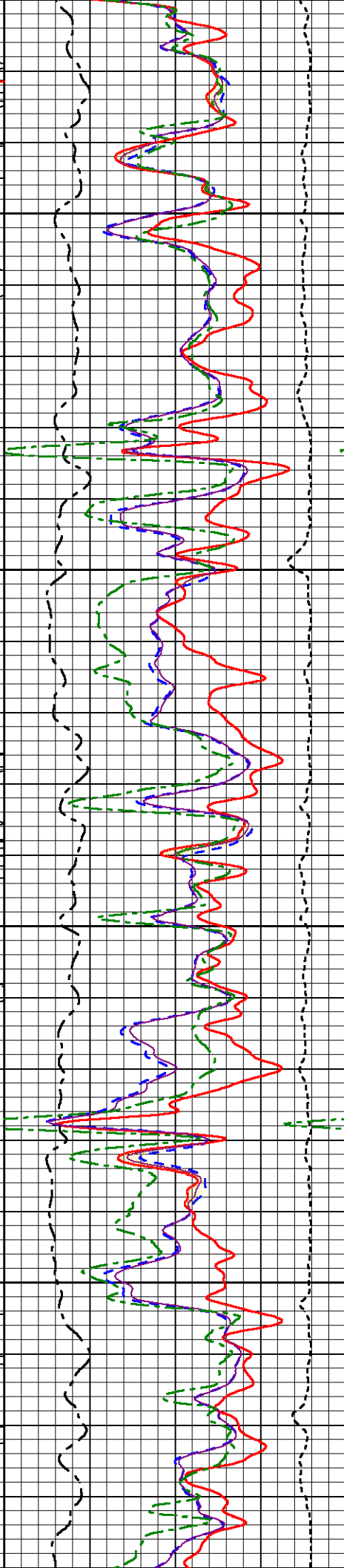
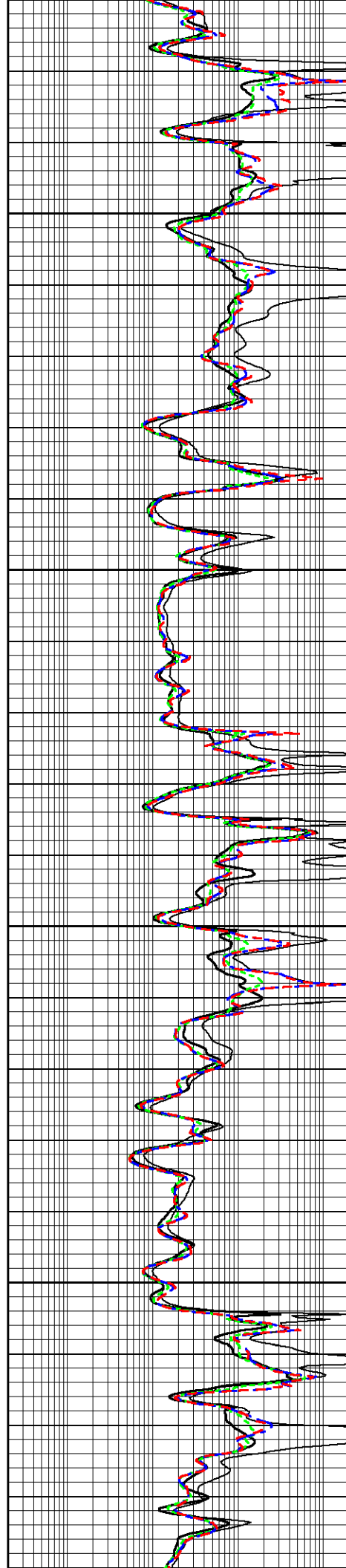
Sonic Porosity (47.6 usec/ft)



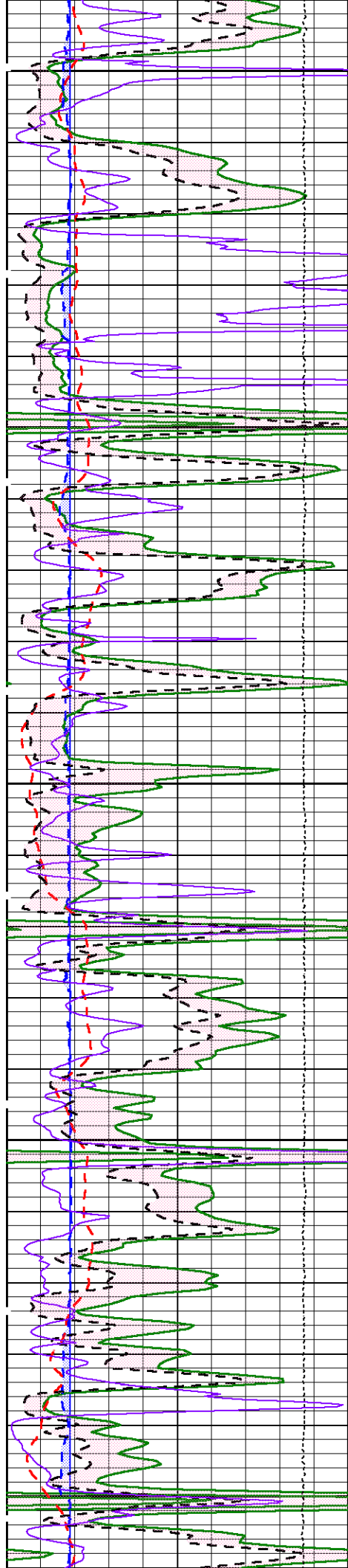


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4300

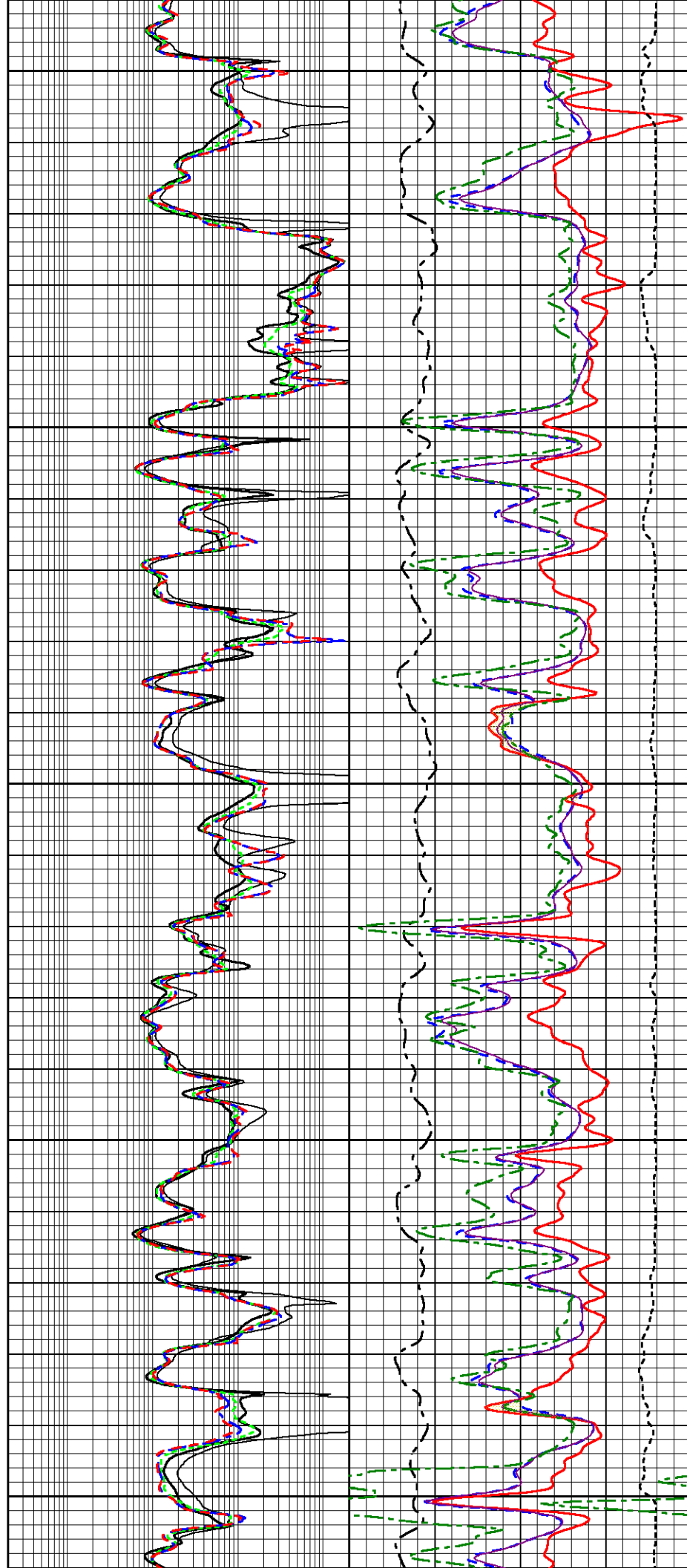


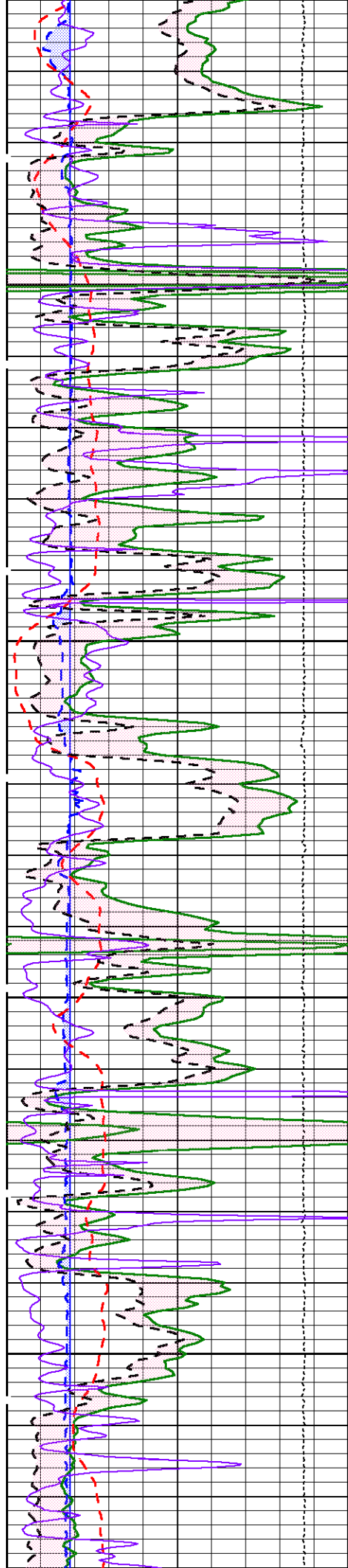




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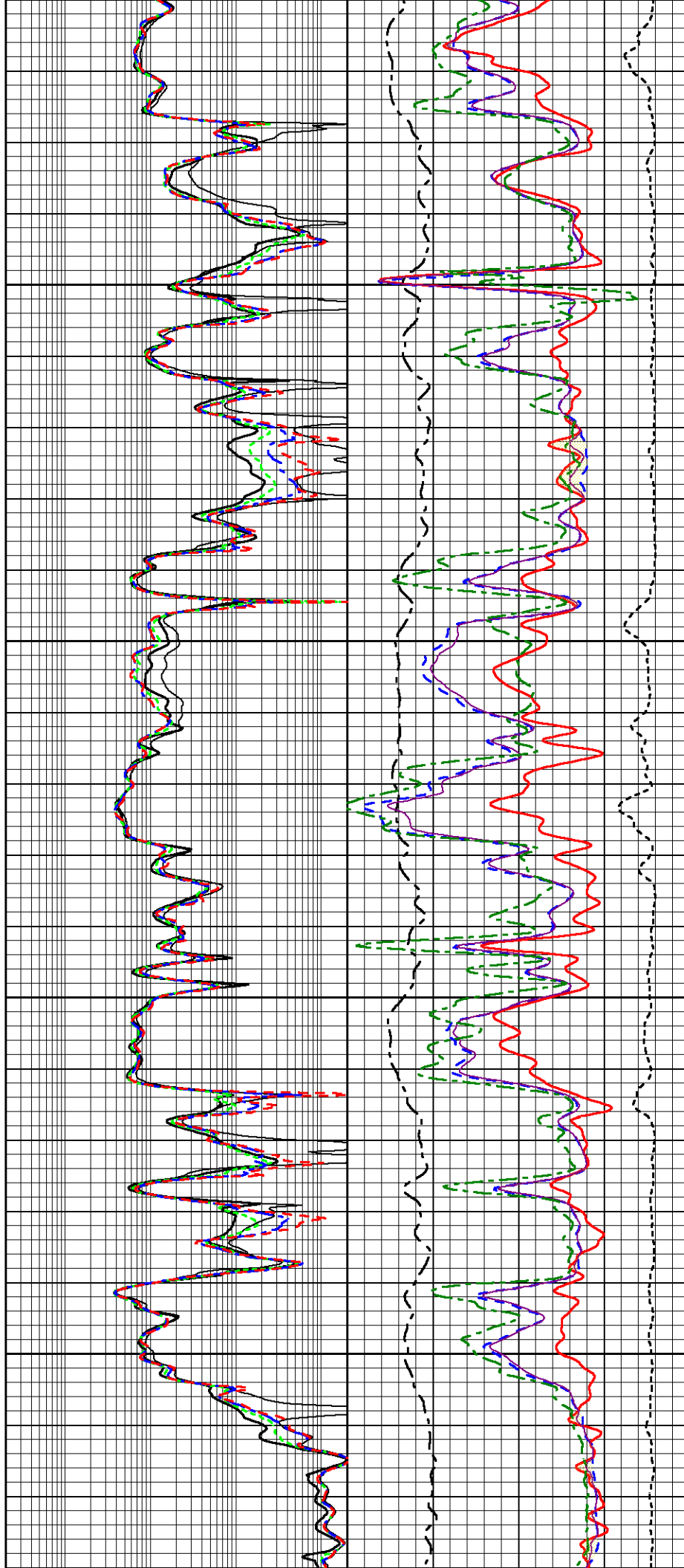
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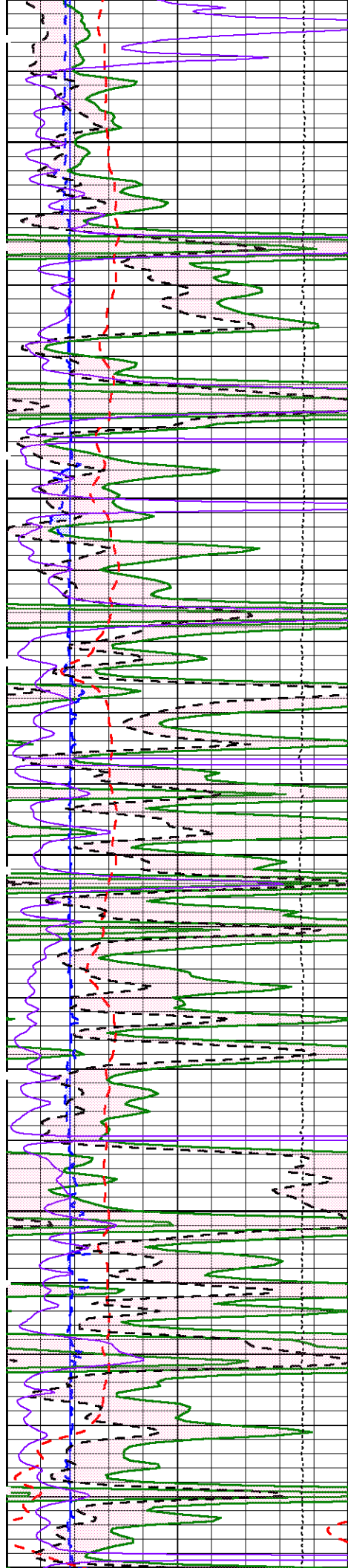




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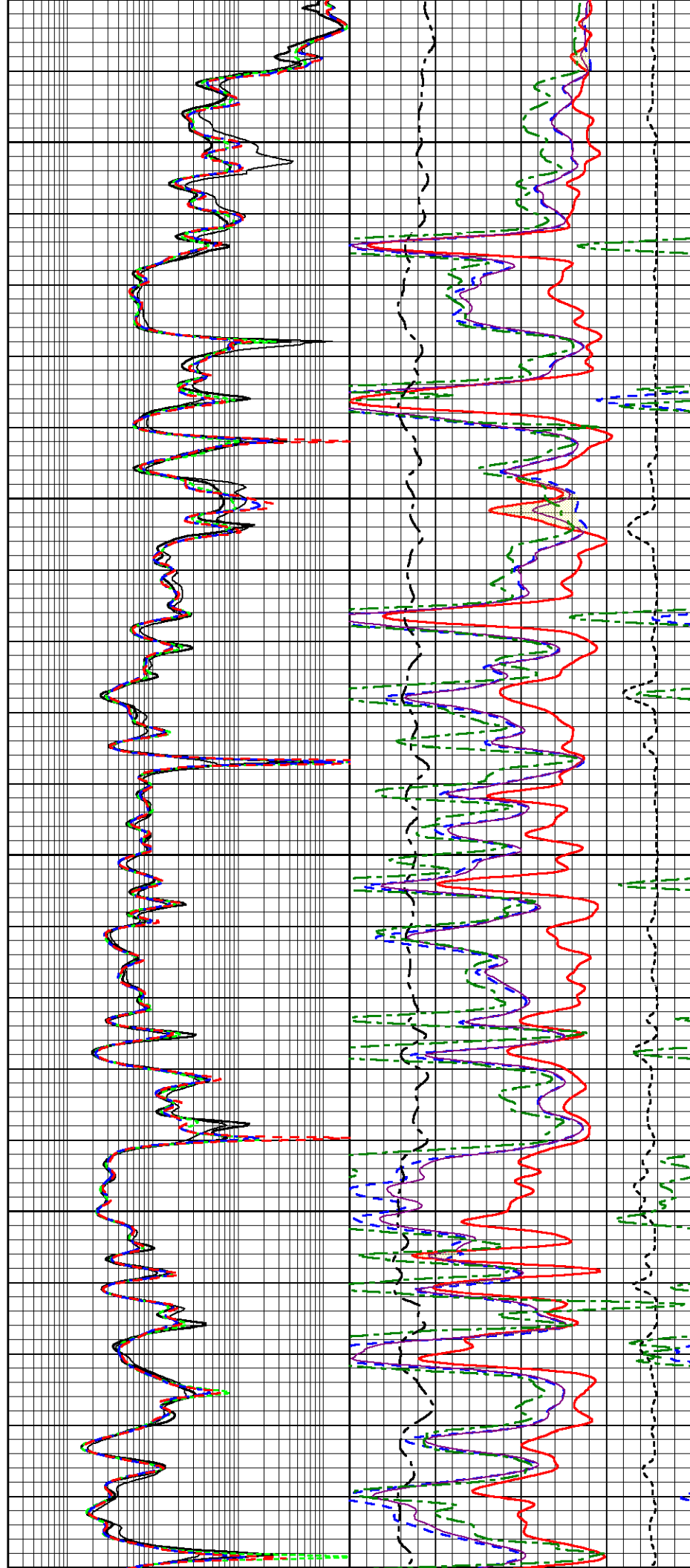




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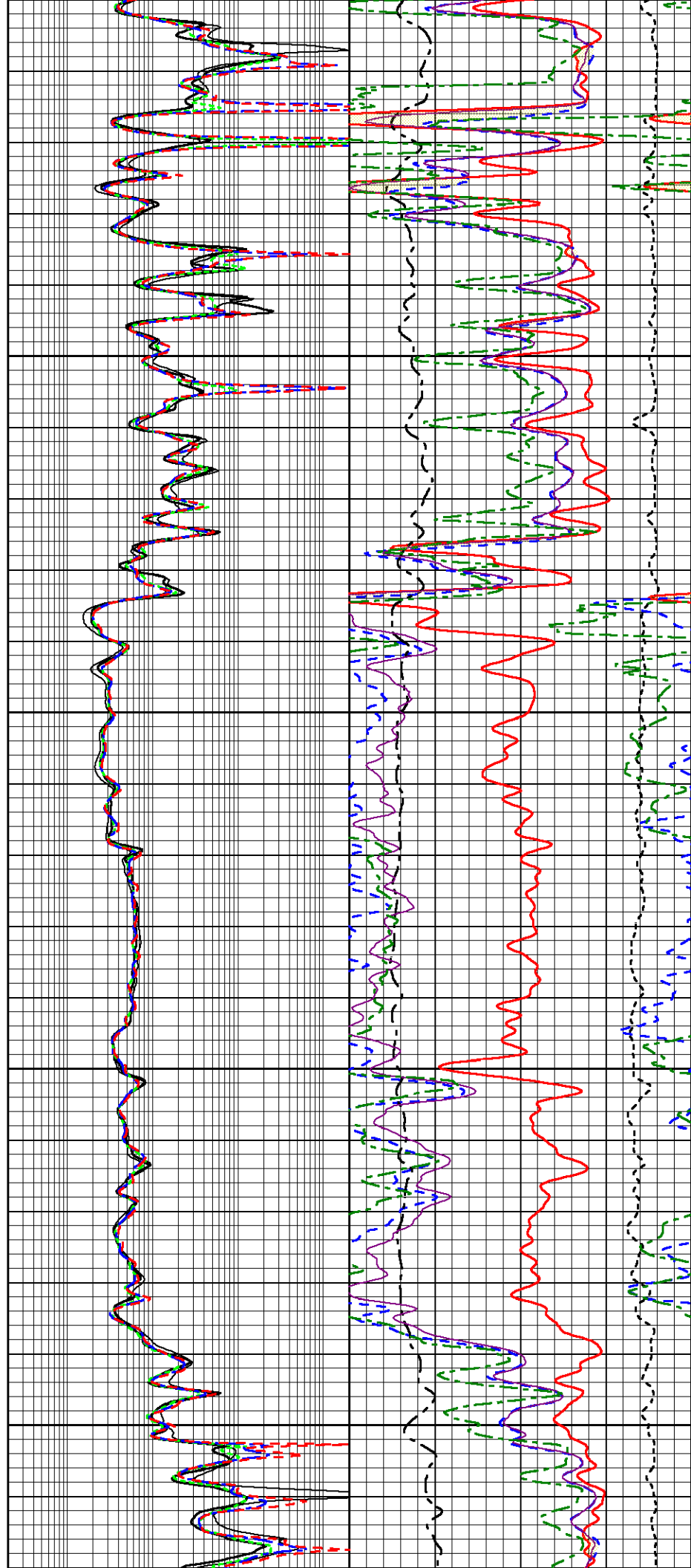
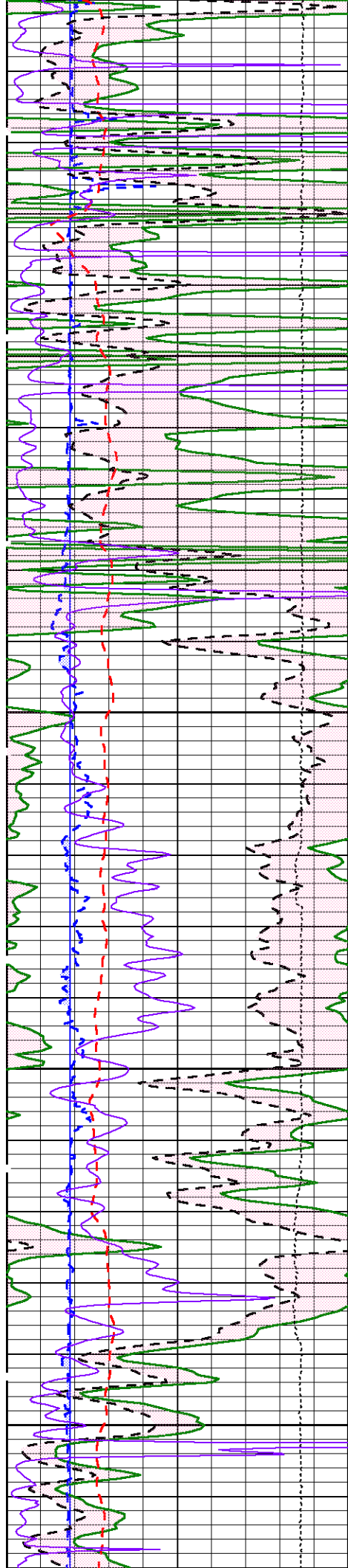




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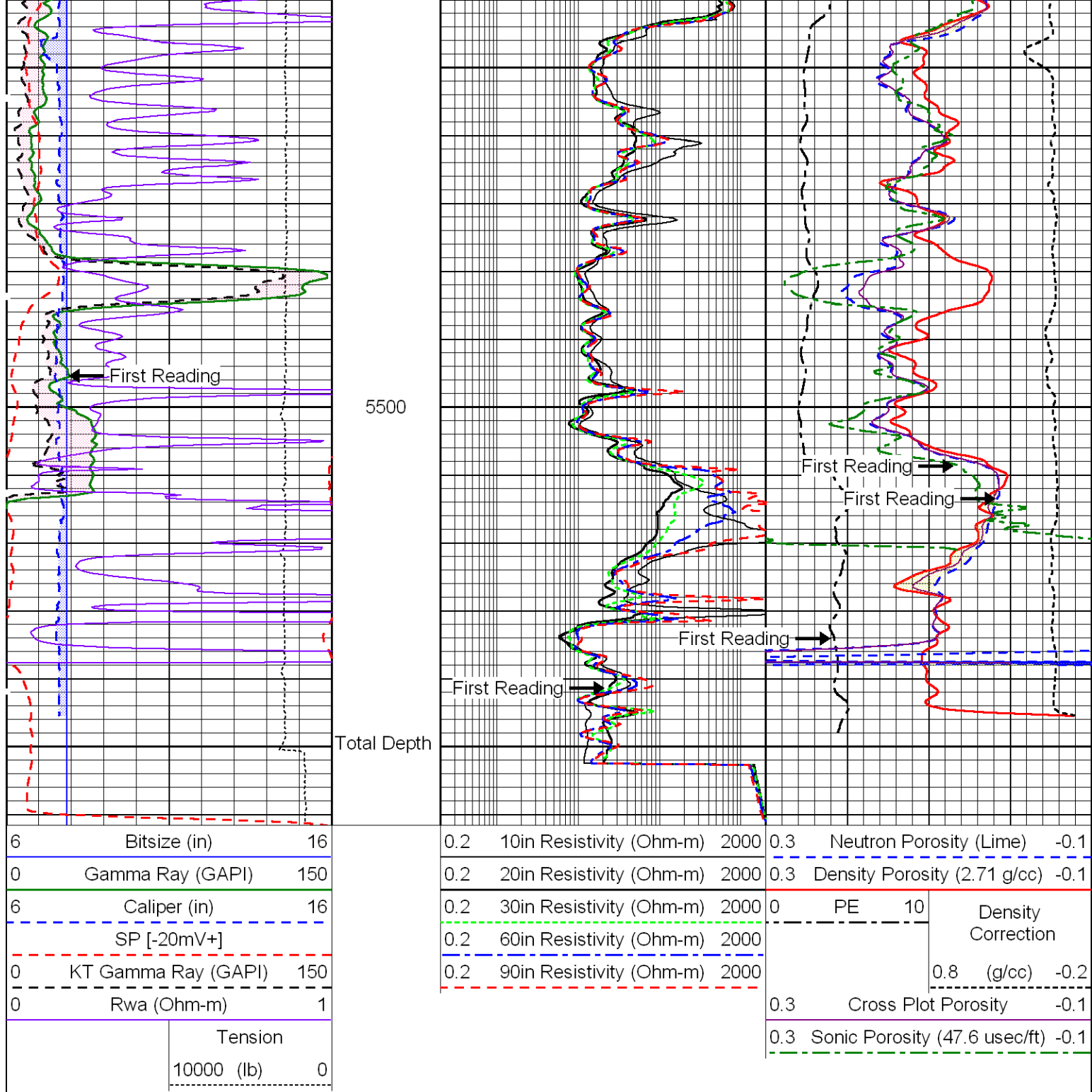
5100

5200









# Repeat Pass

Database File: pronghorn\_harley2.db

Dataset Pathname: pass4.2

Presentation Format: a4prnl

Dataset Creation: Wed Aug 28 17:07:26 2013 by Calc Sondex V7.03

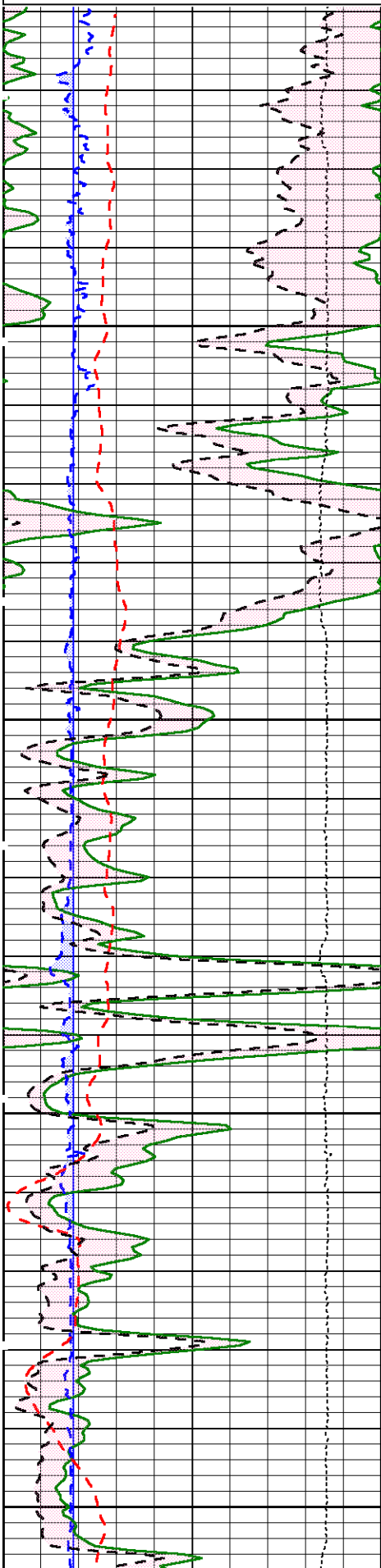
Charted by: Depth in Feet scaled 1:240

6	Bitsize (in)	16	0.2	10in Resistivity (Ohm-m)	2000	0.3	Neutron Porosity (Lime)	-0.1
0	Gamma Ray (GAPI)	150	0.2	20in Resistivity (Ohm-m)	2000	0.3	Density Porosity (2.71 g/cc)	-0.1
6	Caliper (in)	16	0.2	30in Resistivity (Ohm-m)	2000	0	PE	10
						Density		

SP [-20mV+]		
0	KT Gamma Ray (GAPI)	150
Tension		
10000	(lb)	0

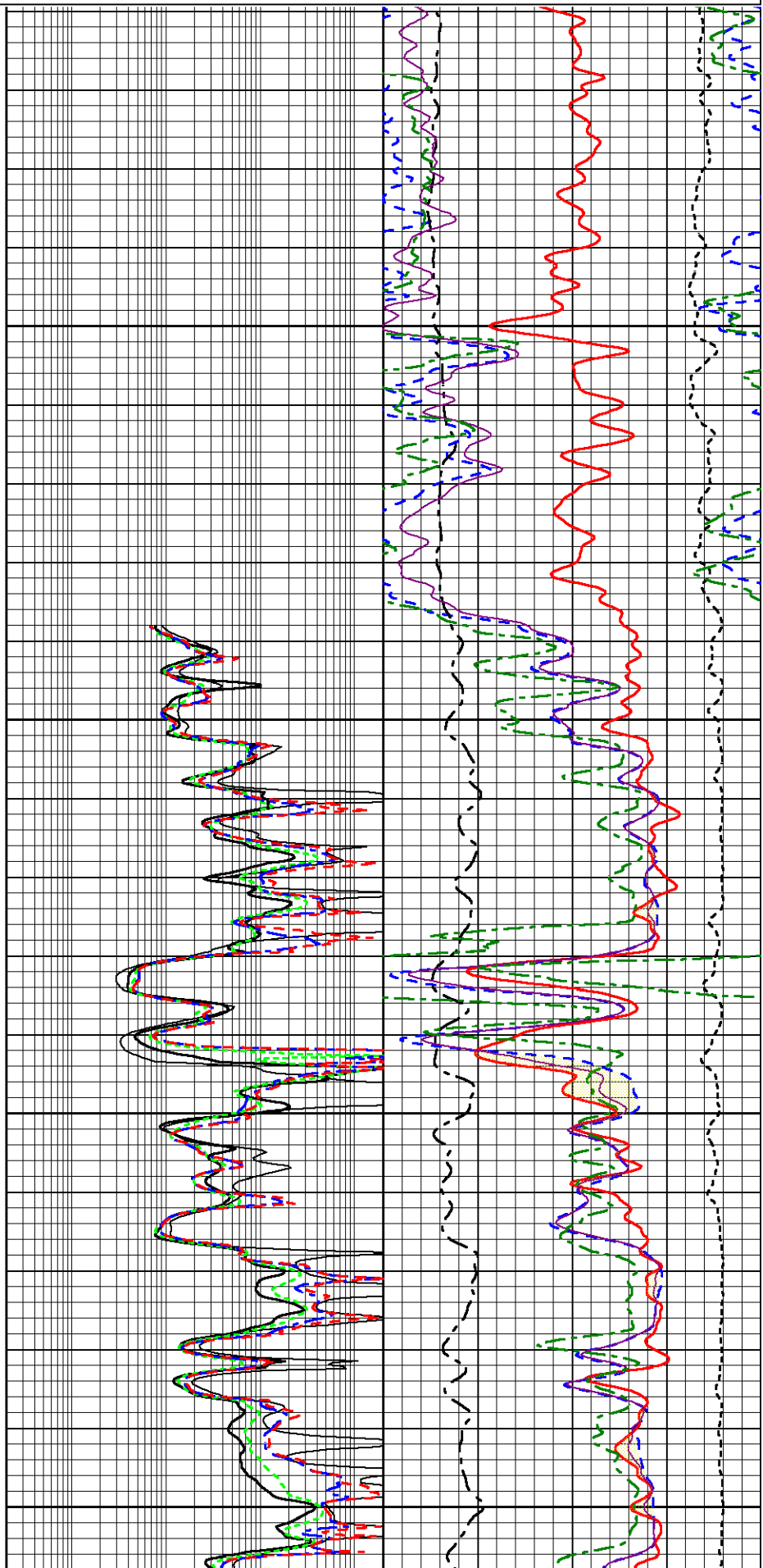
0.2	60in Resistivity (Ohm-m)	2000
0.2	90in Resistivity (Ohm-m)	2000

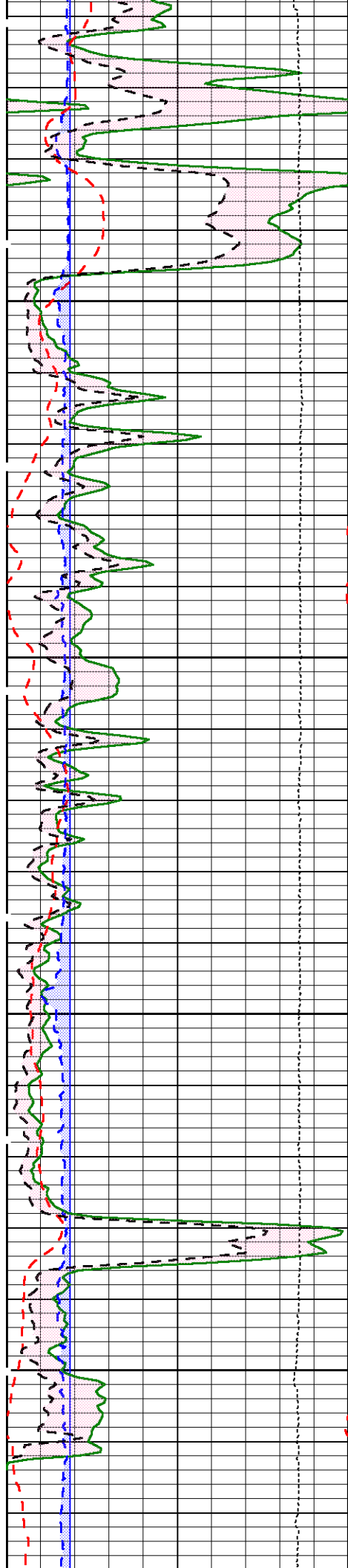
Correction		
0.8	(g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1
0.3	Sonic Porosity (47.6 usec/ft)	-0.1



5200

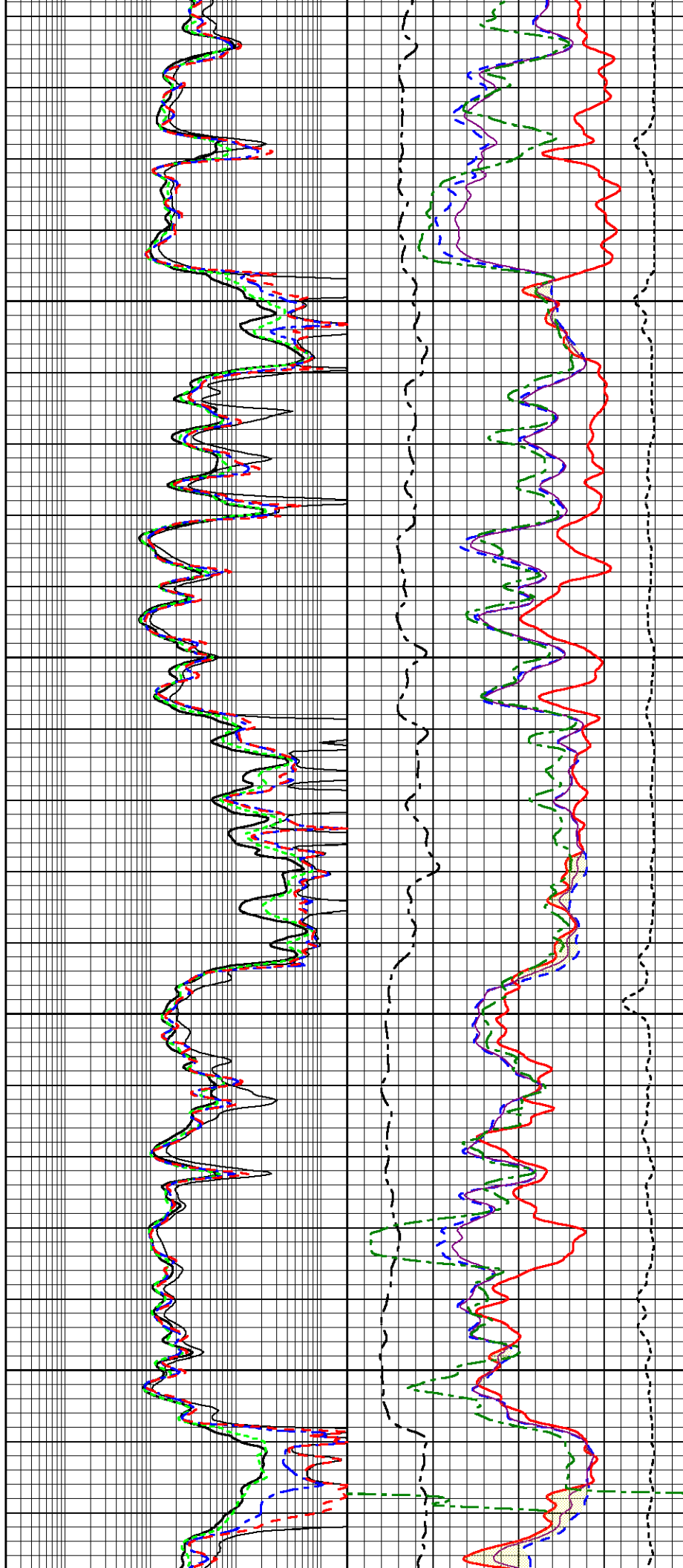
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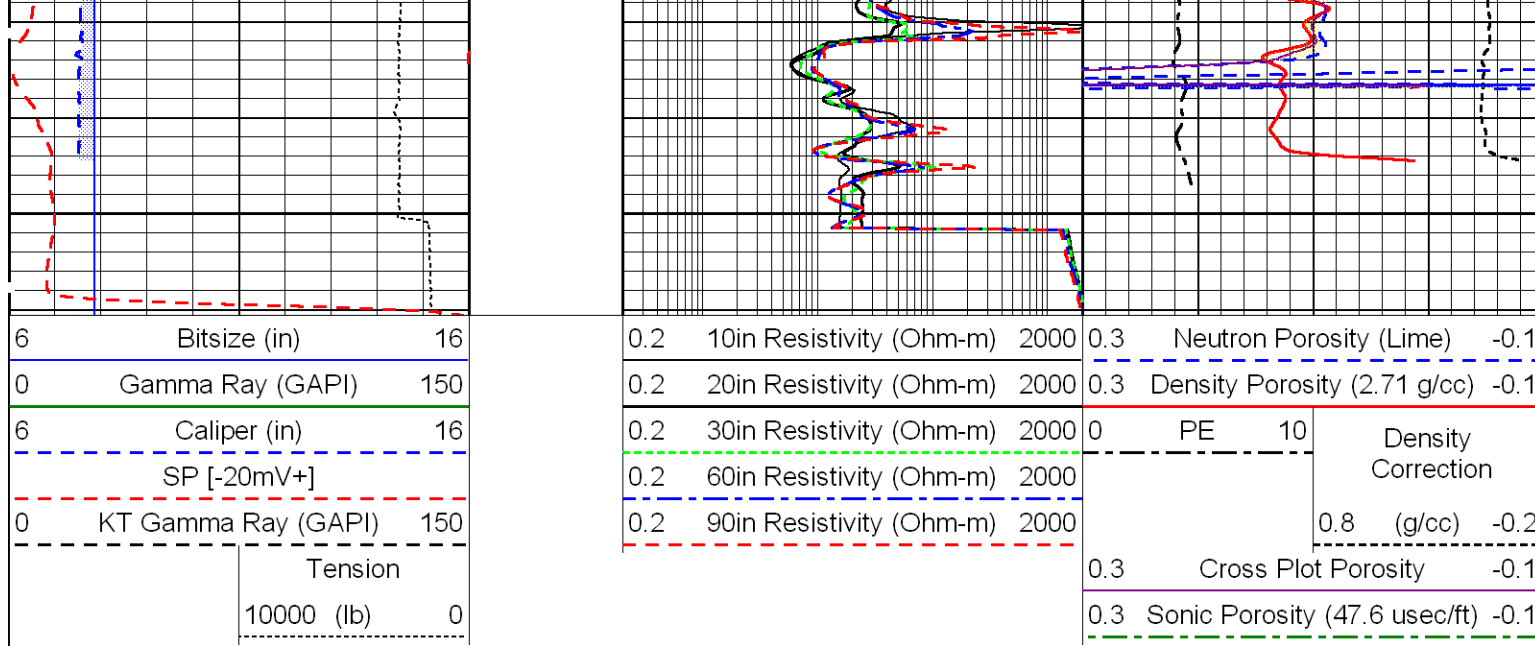


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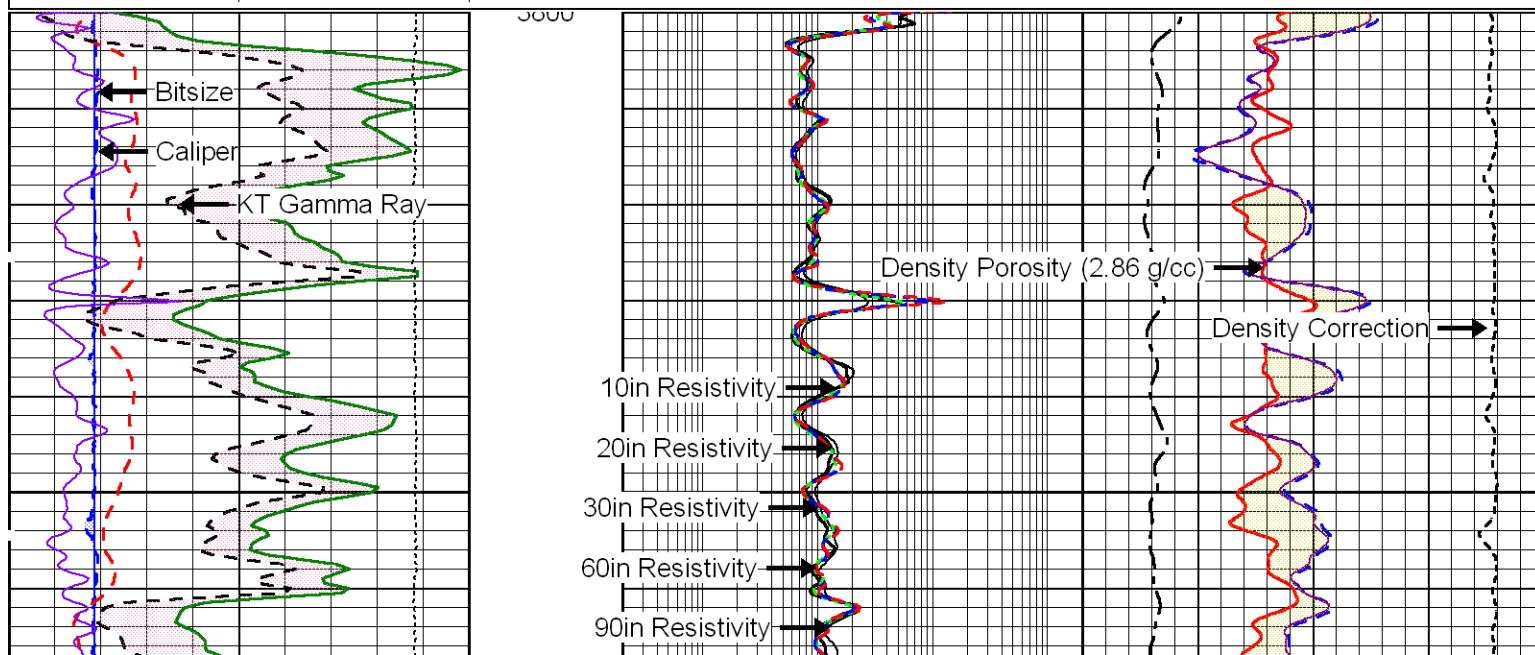
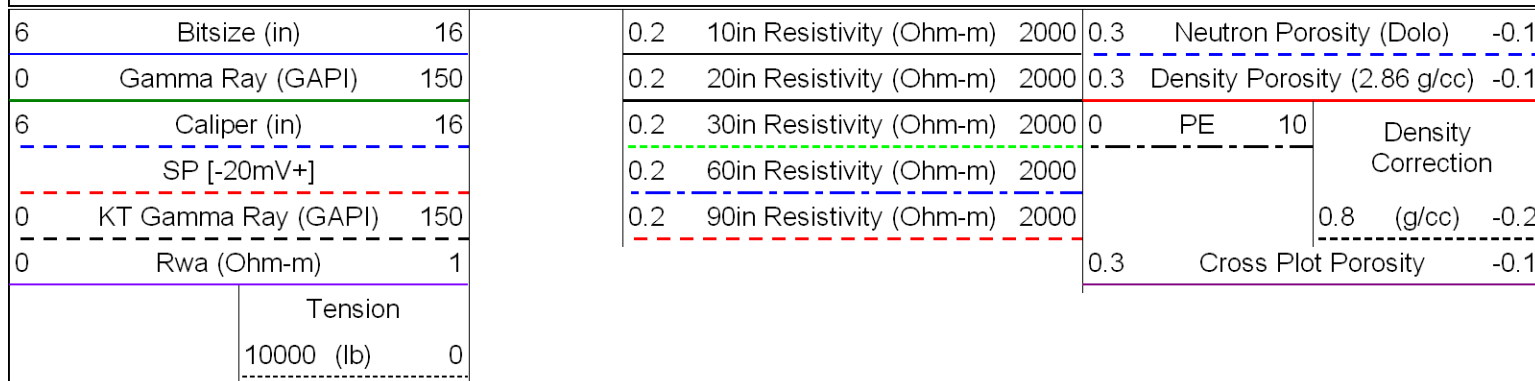


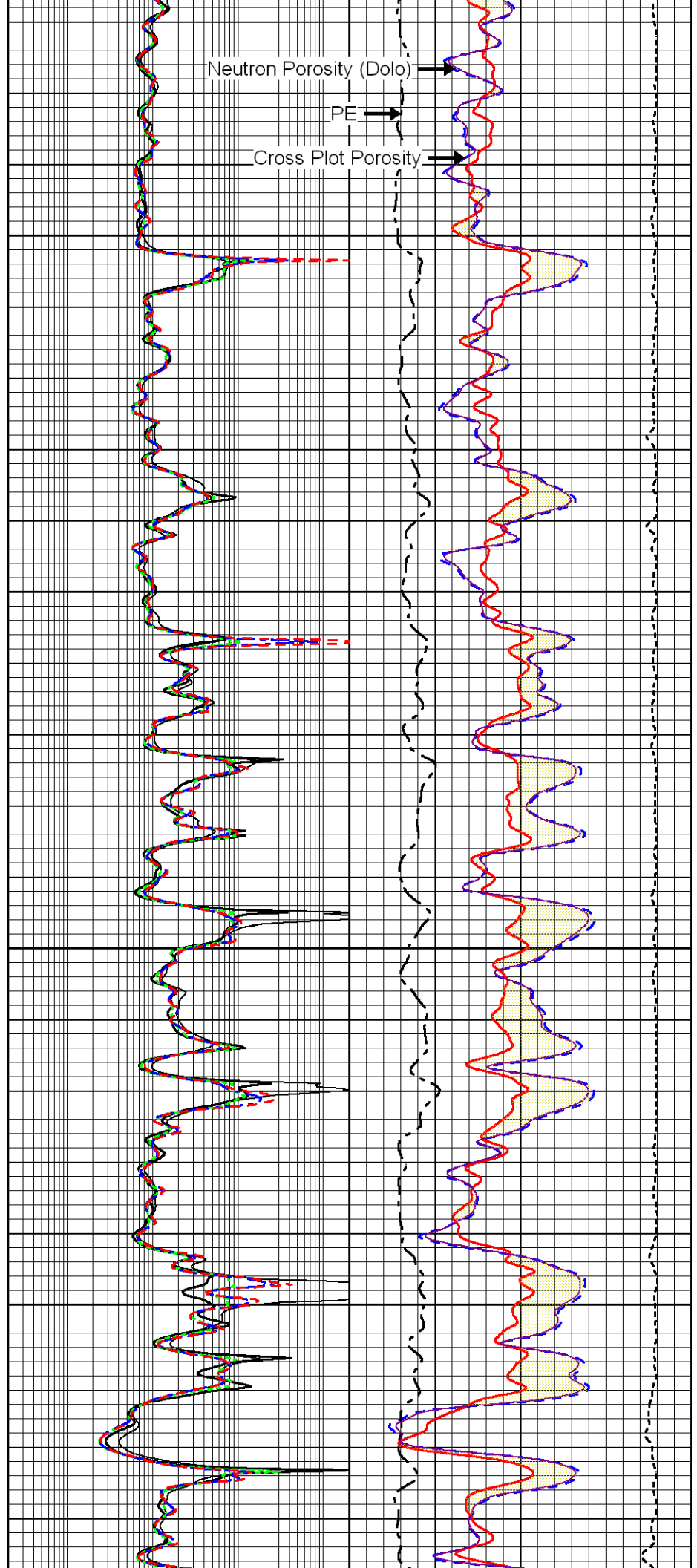
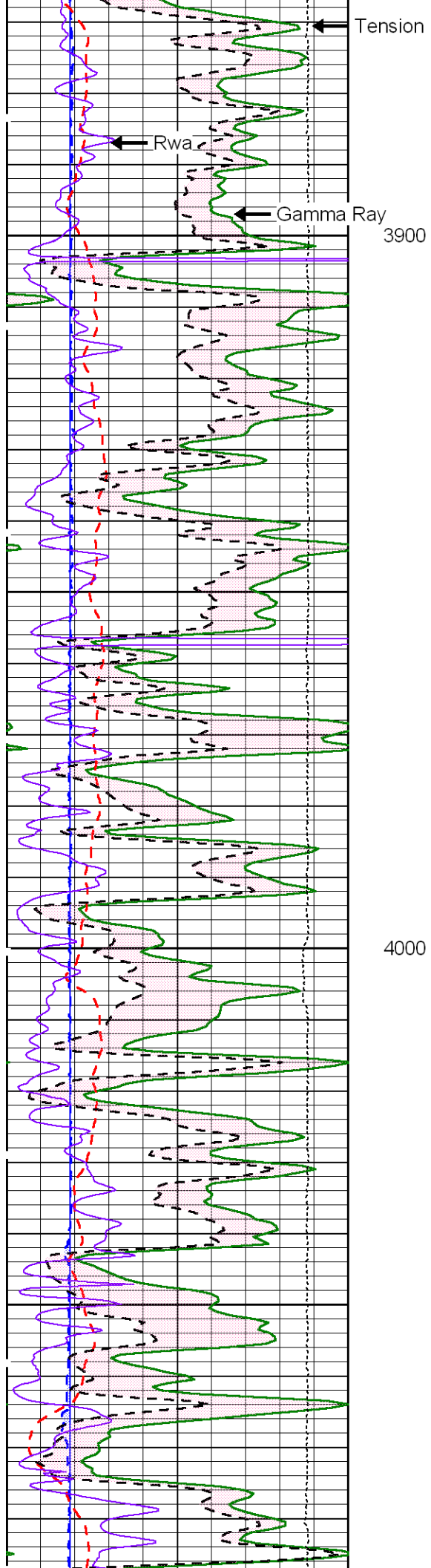


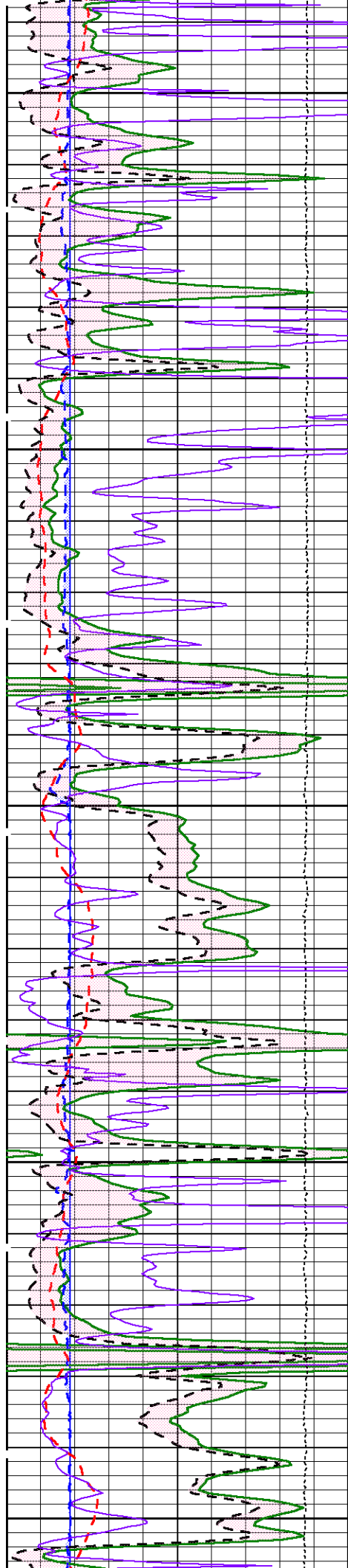


# Main Pass

Database File: pronghorn\_harley2.db  
 Dataset Pathname: pass5.1  
 Presentation Format: a3prond  
 Dataset Creation: Wed Aug 28 16:07:20 2013 by Calc Sondex V7.03  
 Charted by: Depth in Feet scaled 1:240



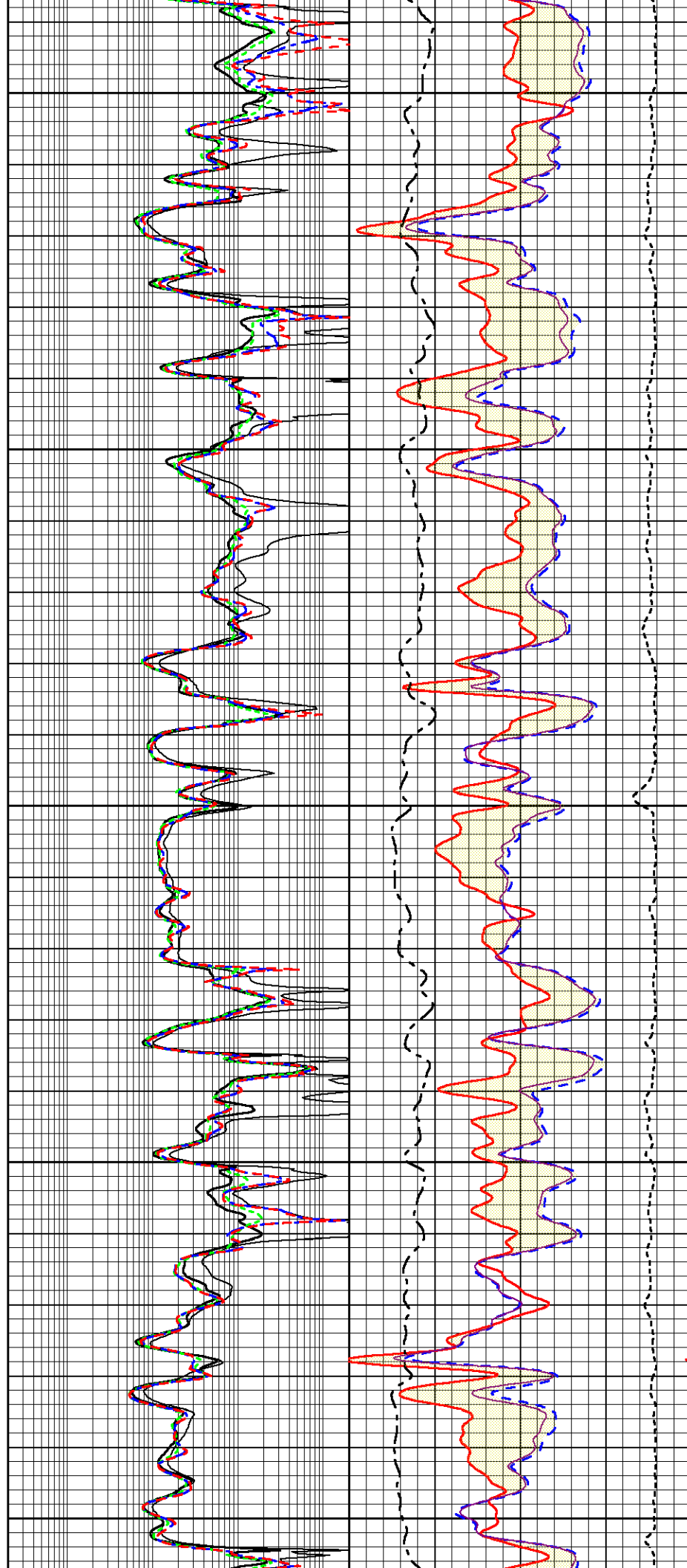


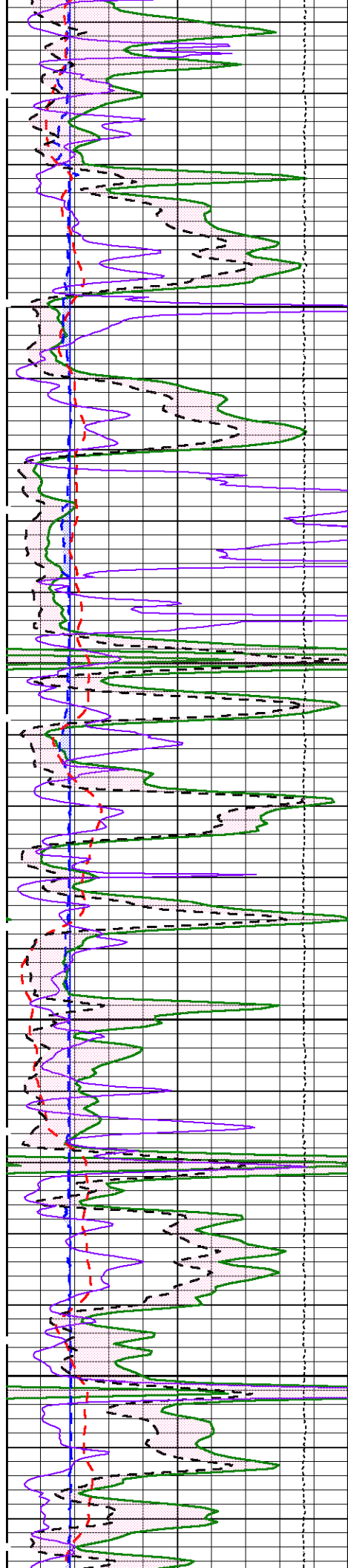


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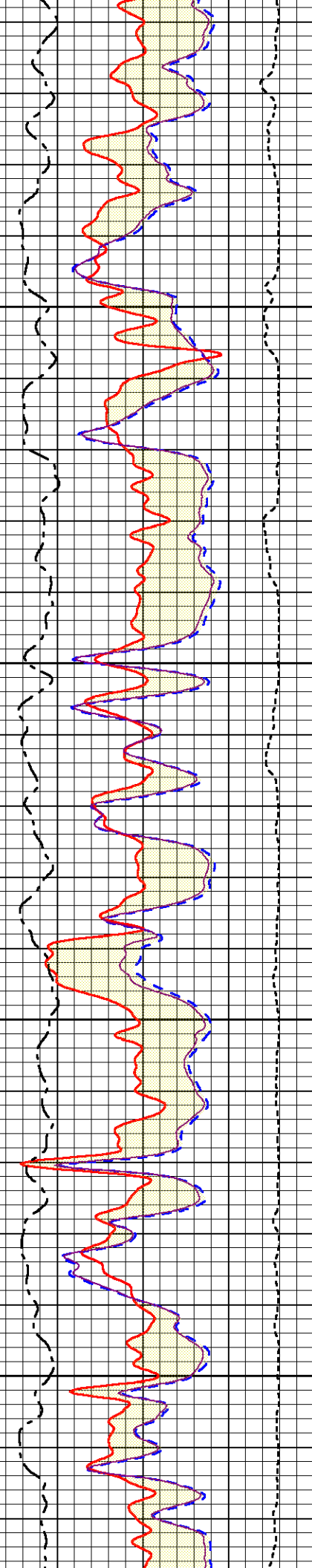
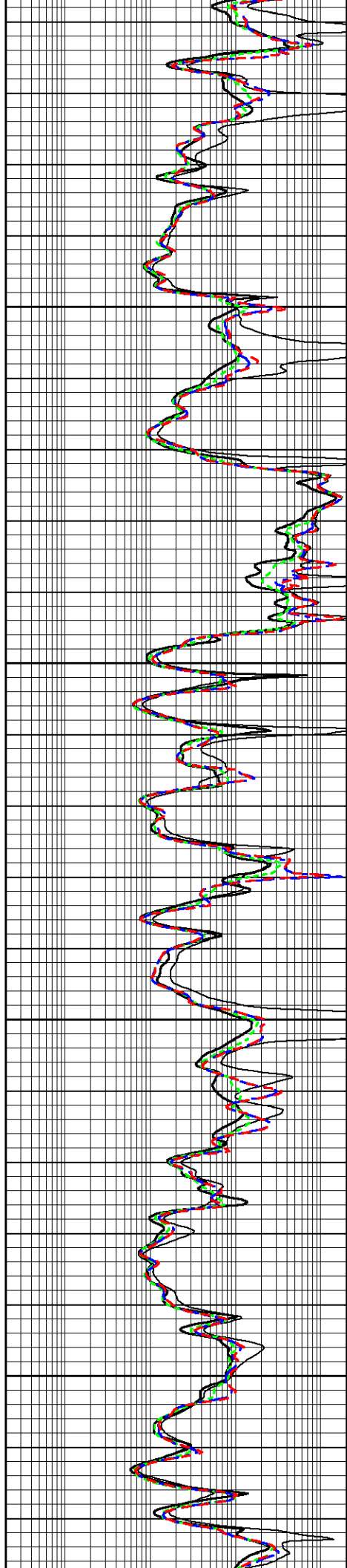
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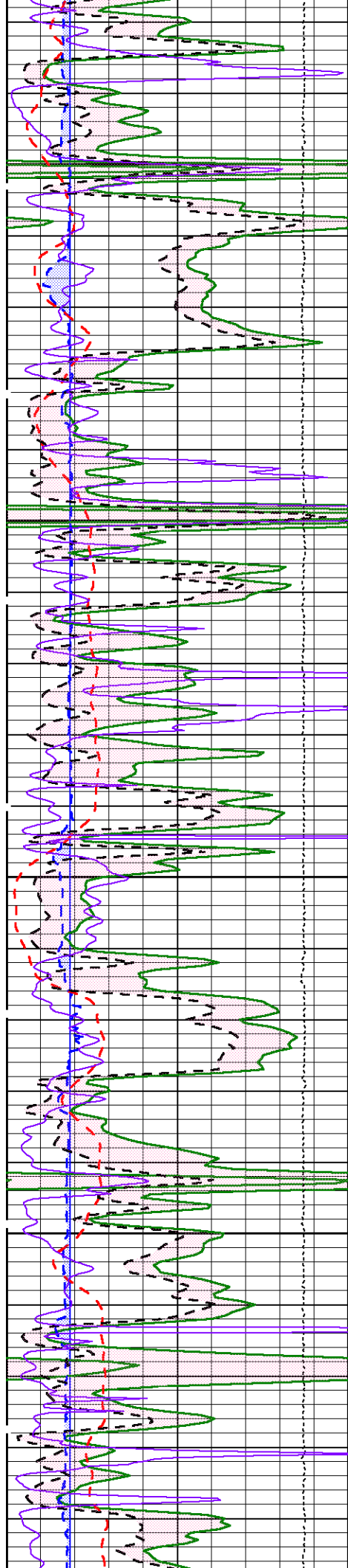


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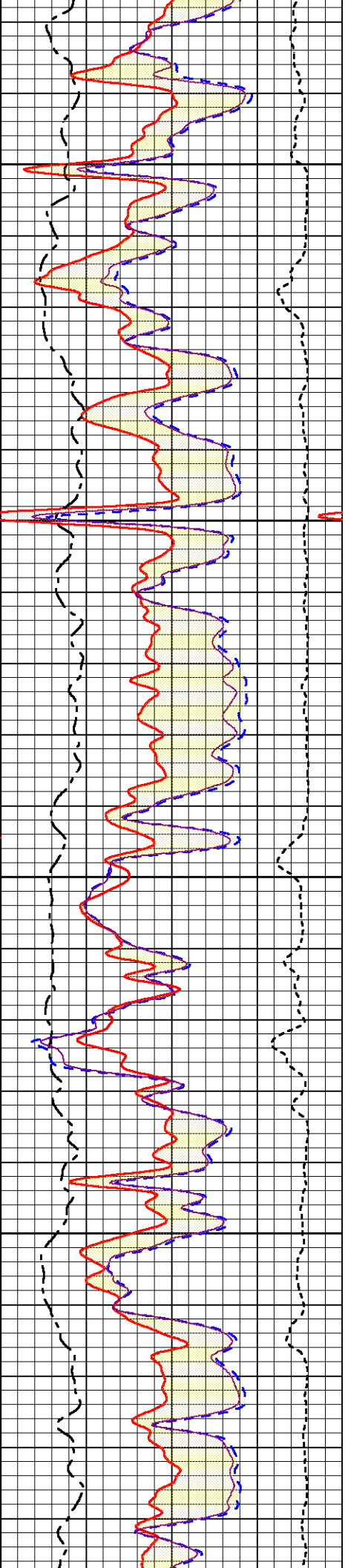
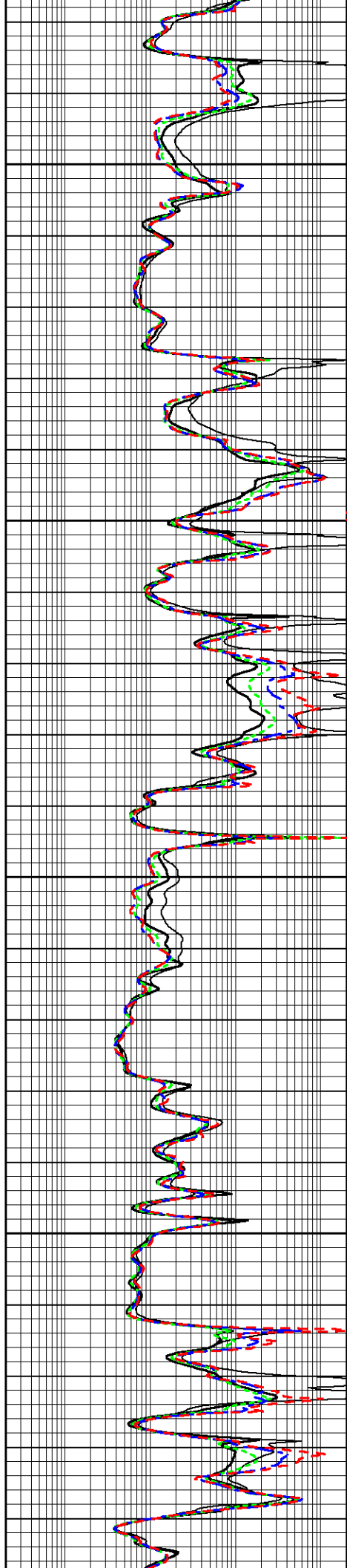


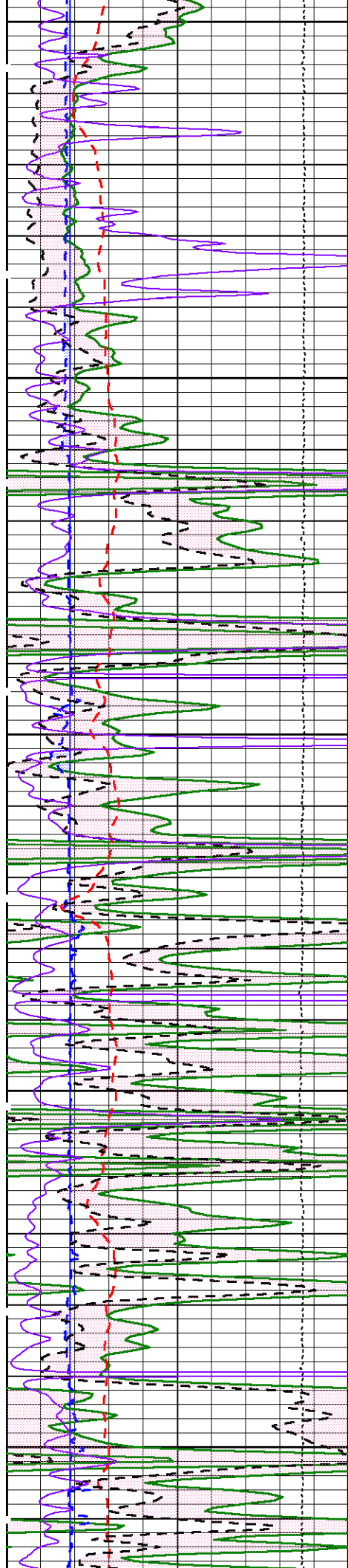




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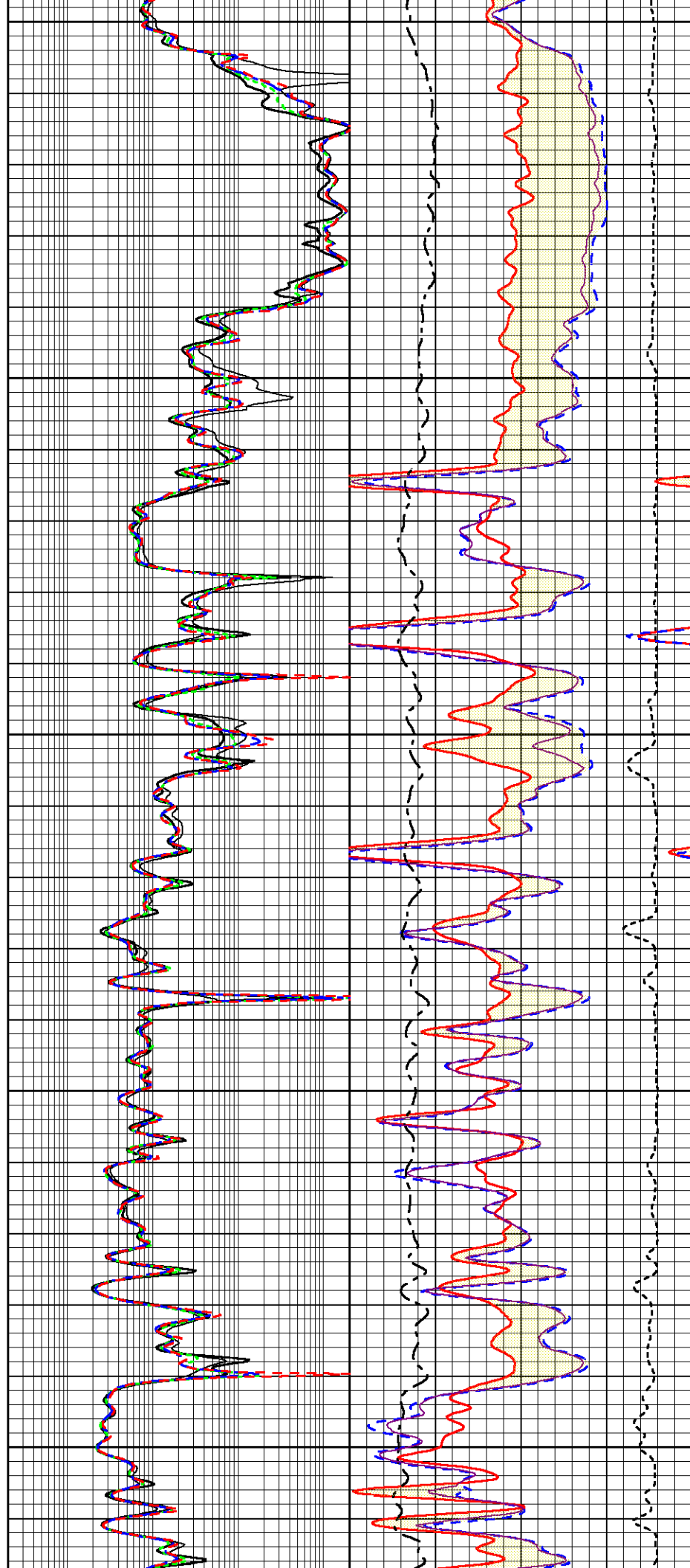
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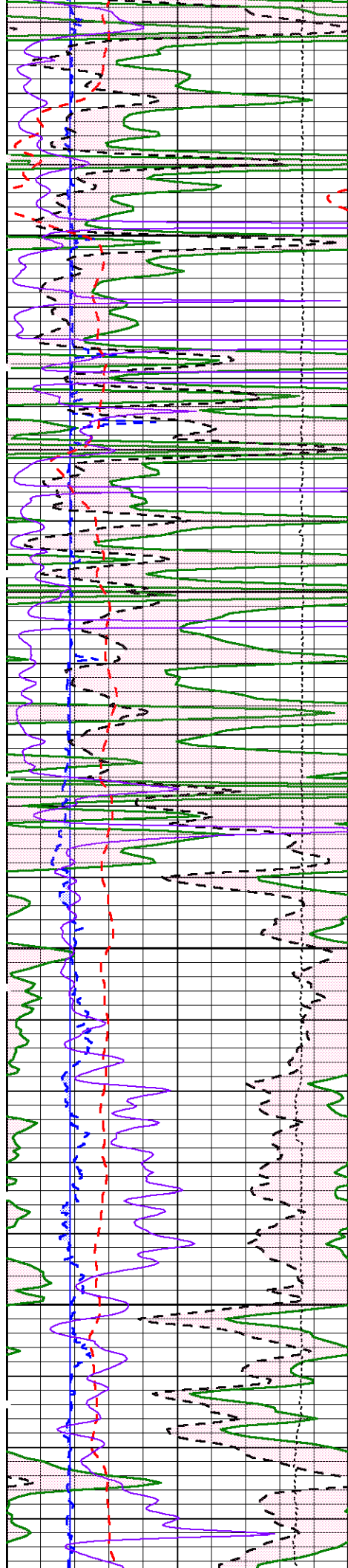




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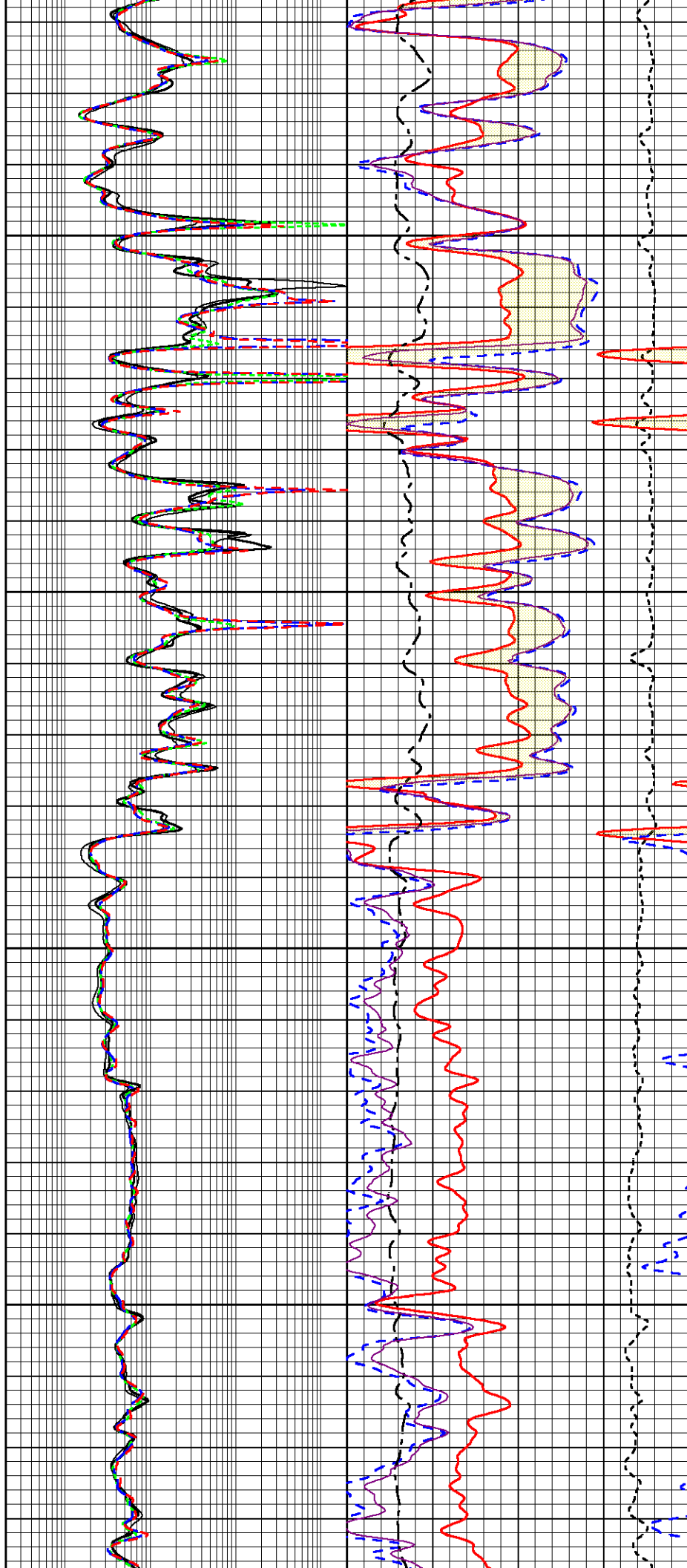
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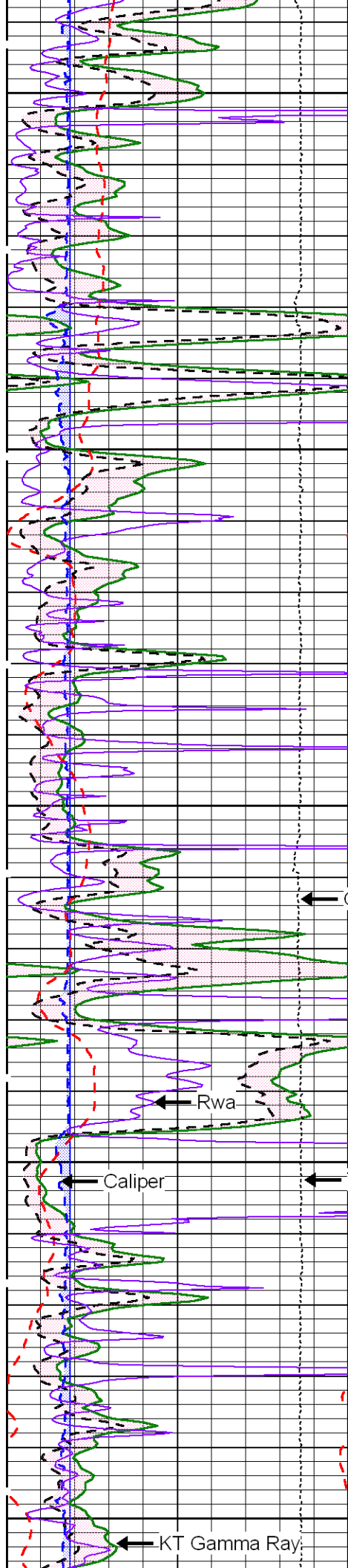


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← Gamma Ray

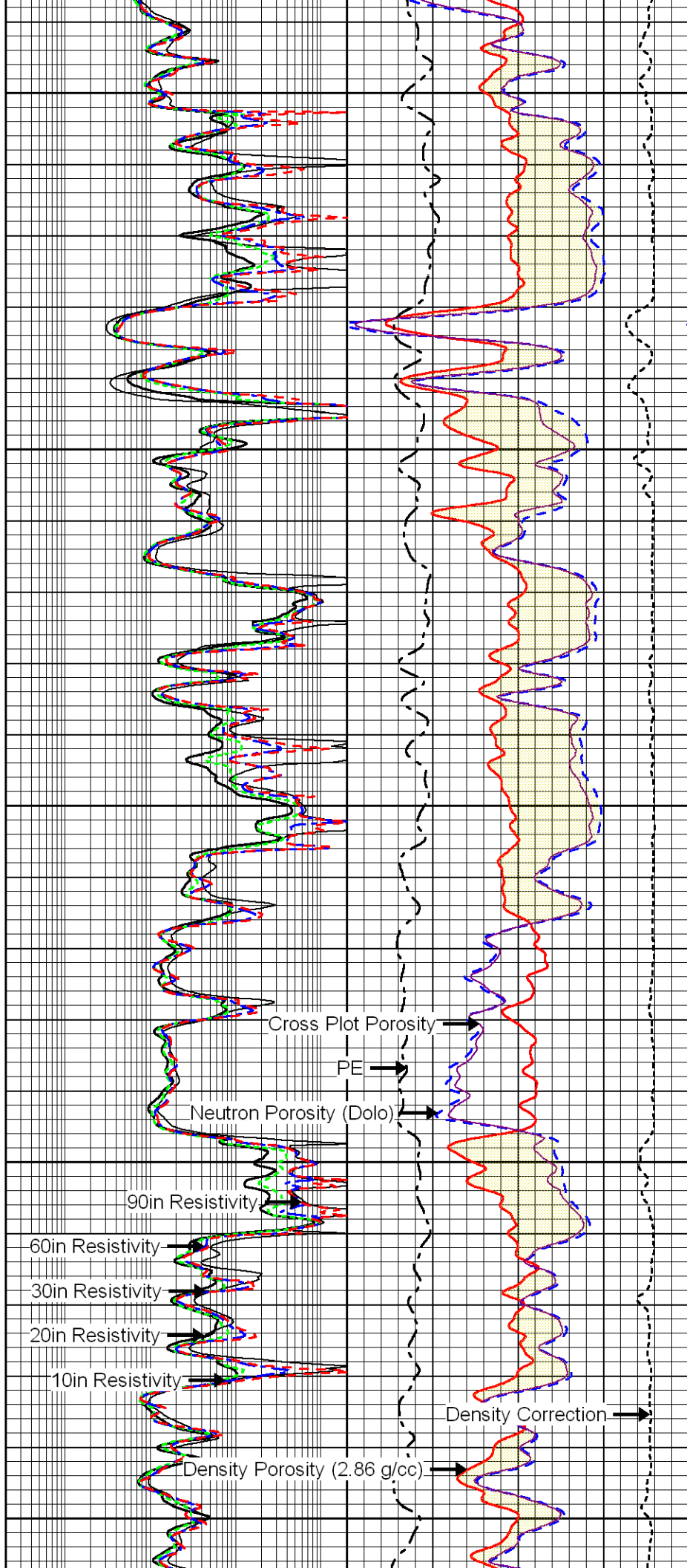
← Rwa

← Caliper

← Tension

← KT Gamma Ray

5400



→ Cross Plot Porosity

→ PE

→ Neutron Porosity (Dolo)

→ 90in Resistivity

→ 60in Resistivity

→ 30in Resistivity

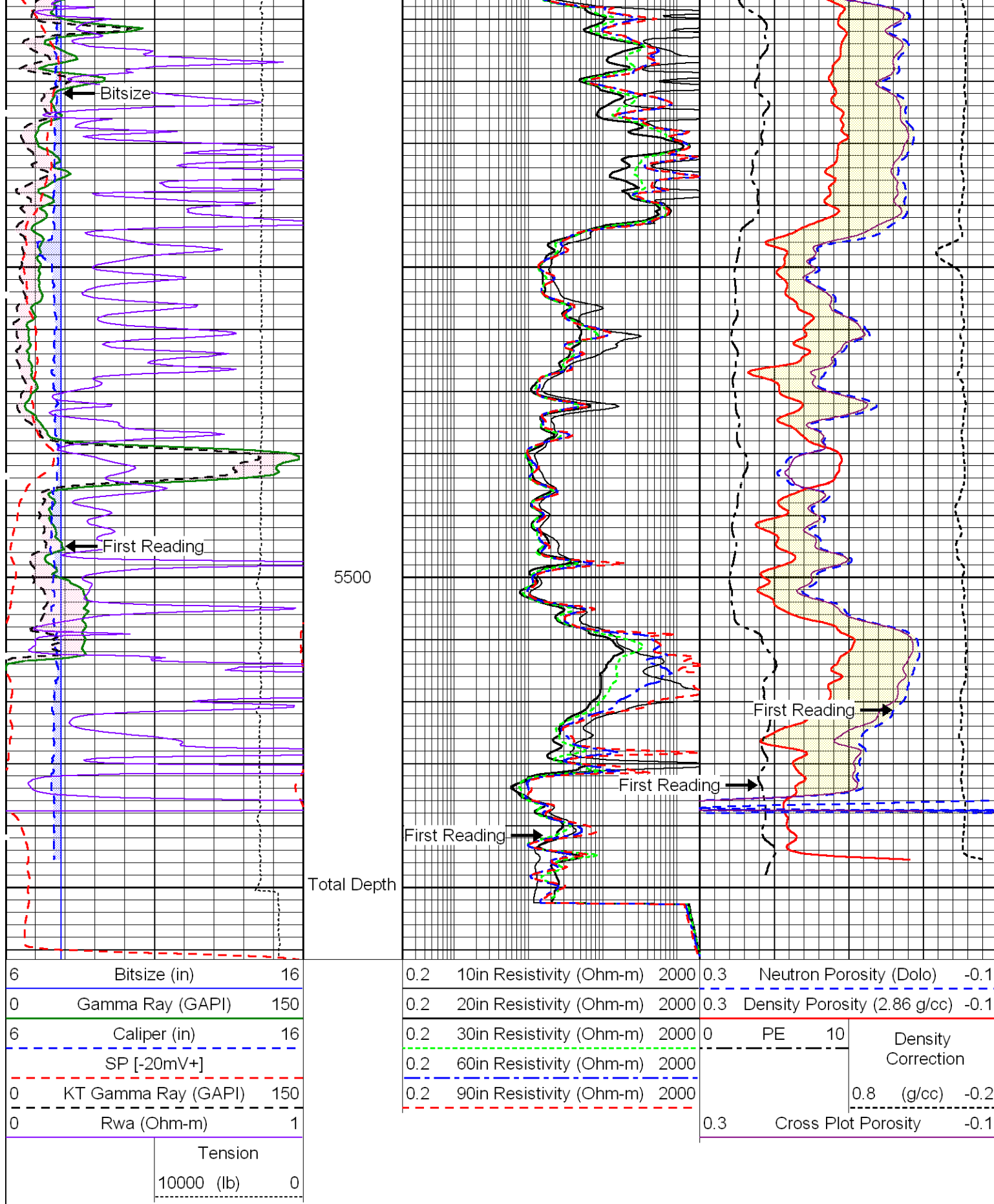
→ 20in Resistivity

→ 10in Resistivity

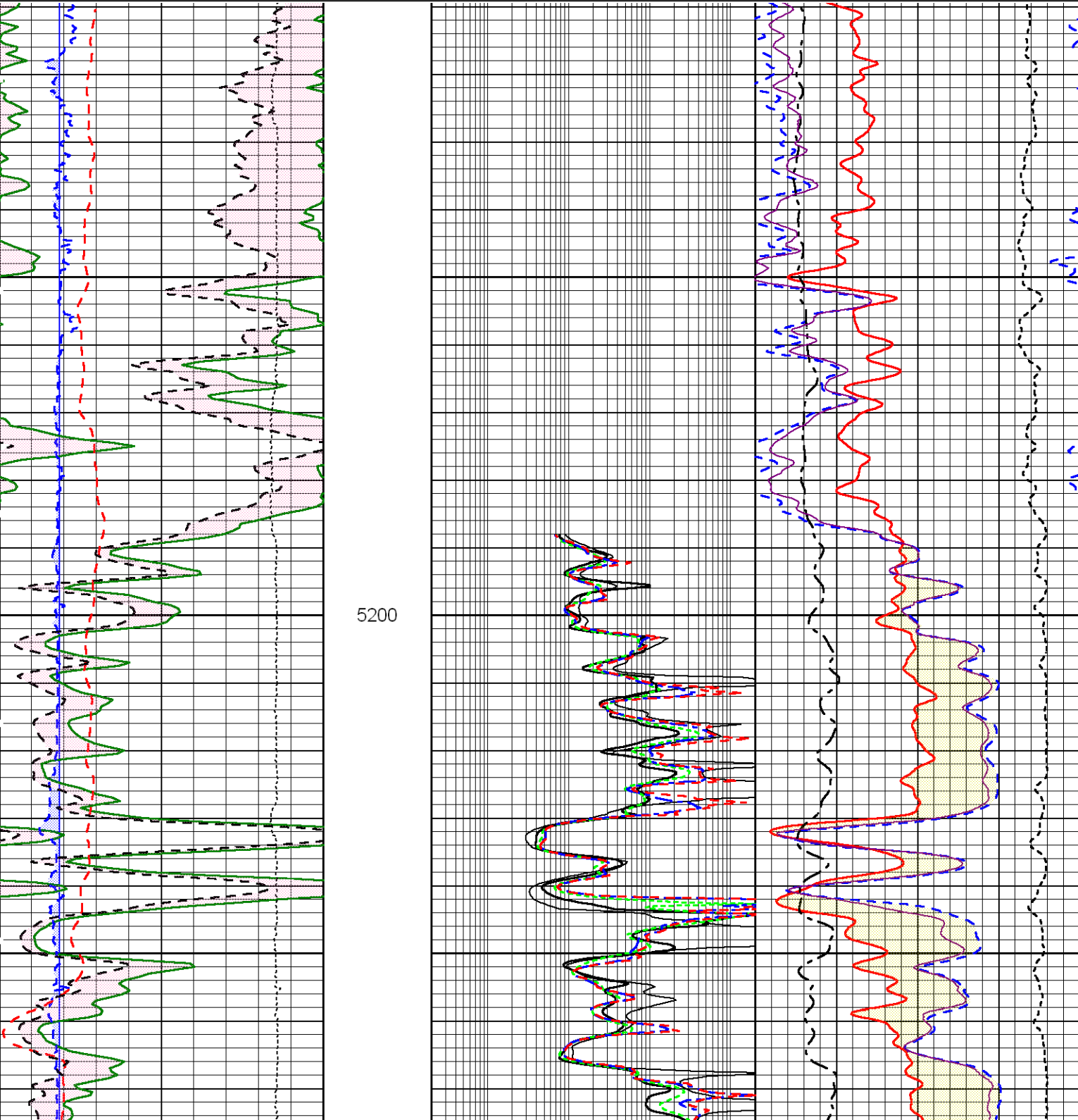
→ Density Porosity (2.86 g/cc)

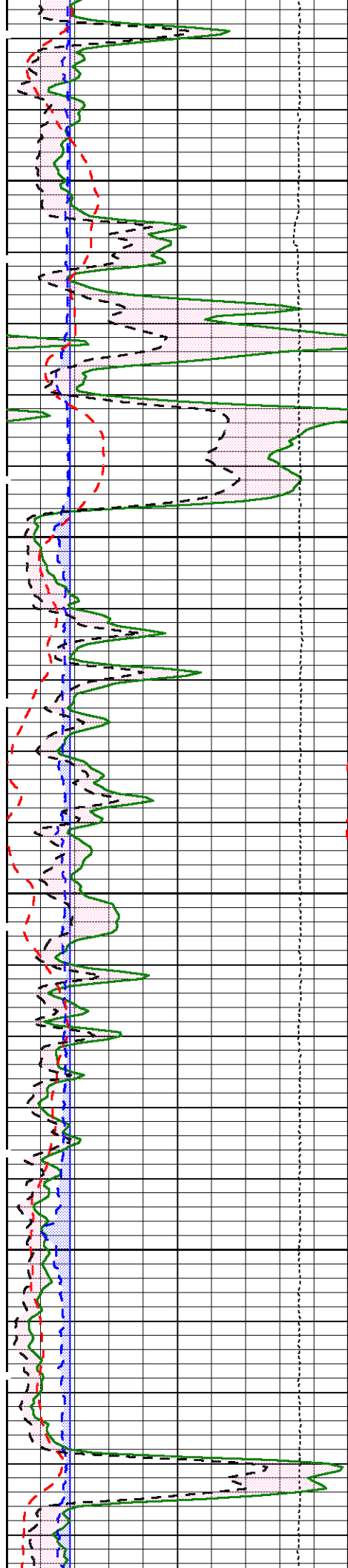
→ Density Correction





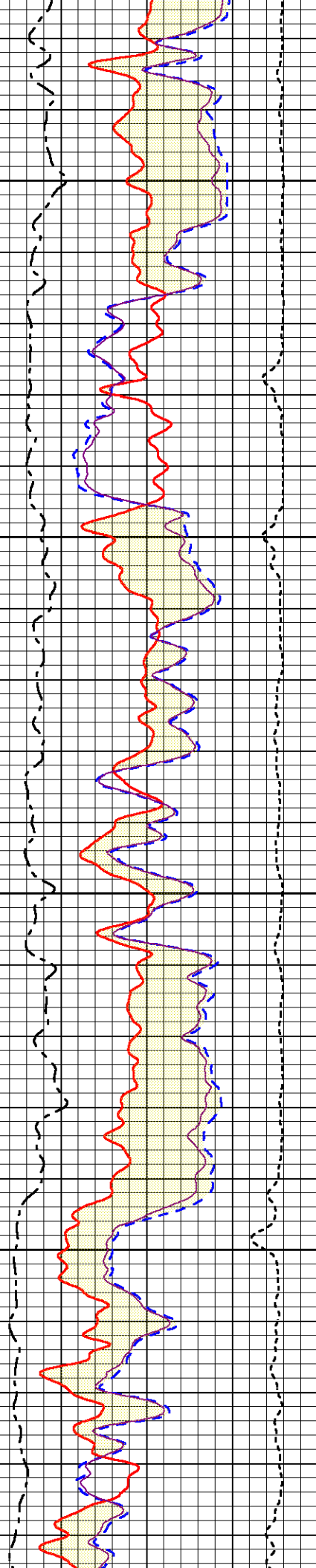
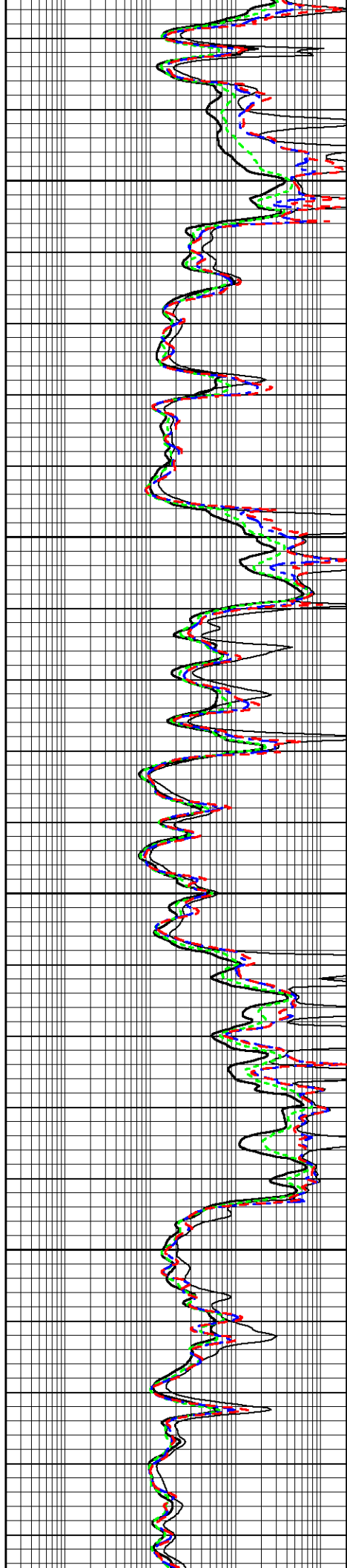
6	Bitsize (in)	16	0.2	10in Resistivity (Ohm-m)	2000	0.3	Neutron Porosity (Dolo)	-0.1
0	Gamma Ray (GAPI)	150	0.2	20in Resistivity (Ohm-m)	2000	0.3	Density Porosity (2.86 g/cc)	-0.1
6	Caliper (in)	16	0.2	30in Resistivity (Ohm-m)	2000	0	PE	10
	SP [-20mV+]		0.2	60in Resistivity (Ohm-m)	2000		Density Correction	
0	KT Gamma Ray (GAPI)	150	0.2	90in Resistivity (Ohm-m)	2000		0.8 (g/cc)	-0.2
	Tension					0.3	Cross Plot Porosity	-0.1
	10000 (lb)	0						

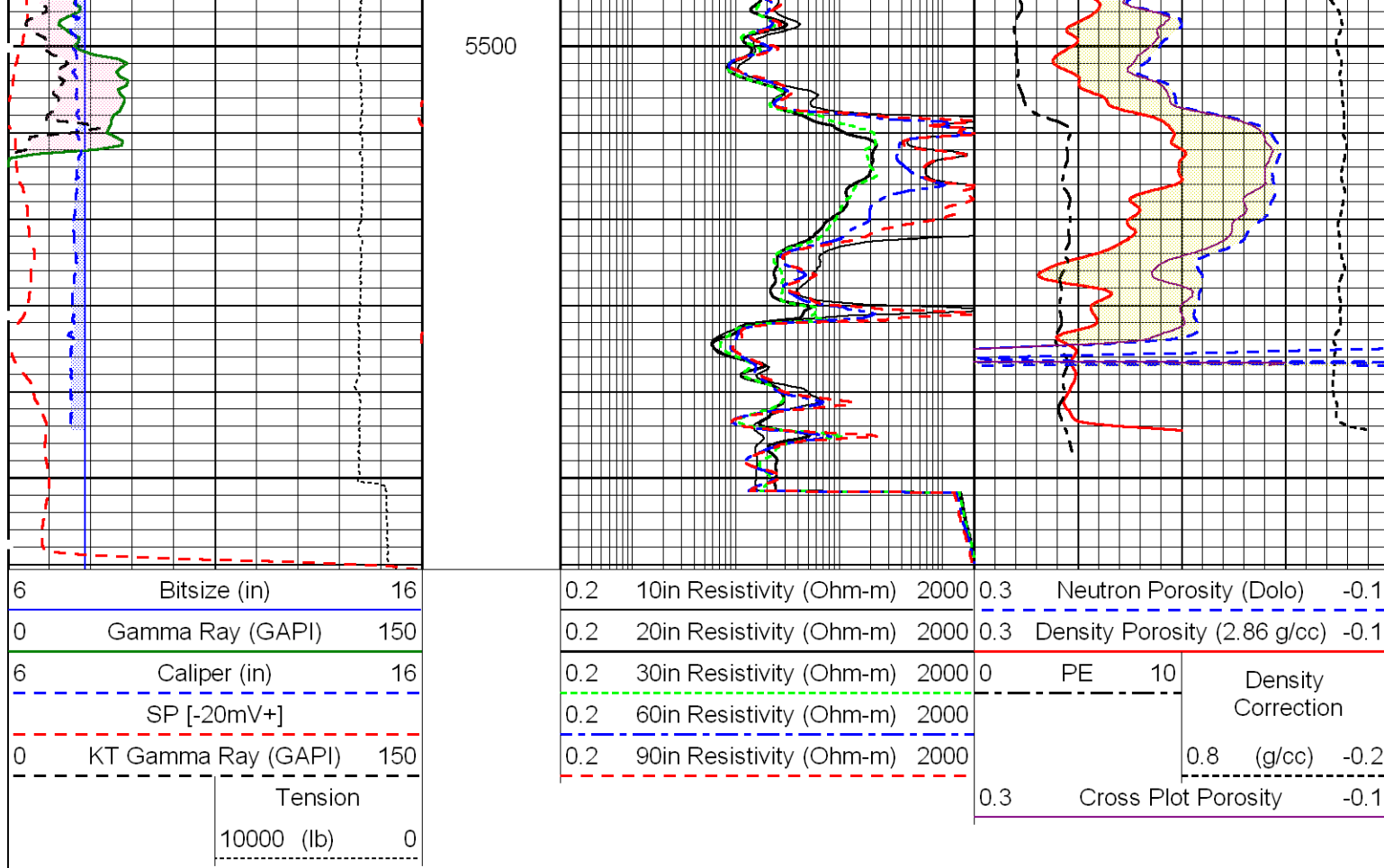




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## Log Variables

Database: C:\Warrior\Data\pronghorn\_harley2.db  
Dataset: field/well/run1/pass5

### Top - 457.00 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 84	SO in 1.5	DE-CENT  Yes	<b>CASED?</b>  <b>Yes</b>	CASEWGHT lb/ft 11.5	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 5545	BOTTEMP degF 150
BOREID in 7.875							

### 457.00 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 84	SO in 1.5	DE-CENT  Yes	CASED?  No	CASEWGHT lb/ft 11.5	NPORSEL  Limestone	AIR_HOLE?  No
MudWgt	FLUIDDEN	MATRXDEN	SPSHIFT	CASEOD	PERFS	TDEPTH	BOTTEMP



lb/gal 8.8	g/cc 1	g/cc 2.71	mV 0	in 5.5	0	ft 5545	degF 150
BOREID in 7.875							

Calibration Report	
Database File:	pronghorn_harley2.db
Dataset Pathname:	pass5
Dataset Creation:	Wed Aug 28 14:08:51 2013 by Log Sondex V7.03

Induction Array Tool Calibration Report
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Serial Number:	B10107
Tool Model:	002

Master Calibration Performed:		Thu Oct 11 11:32:19 2012					
Temperature:		69.9 degF					
Sonde Error:							
Array	1	2	3	4	5	6	7
Real	203.0	-10.5	-39.0	-13.0	-0.3	3.2	6.8 mmho/m
Imaginary	183.8	91.8	-2.5	20.2	8.1	19.7	2.3 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	760.2	719.5	1253.7	1371.8	1162.7	739.4	424.4 mmho/m
Imaginary	251.4	186.8	384.3	435.7	356.0	241.9	127.6 mmho/m
Gain (real)	0.965	0.929	1.002	1.007	0.984	0.968	0.969
Gain (imaginary)	1.084	0.974	1.008	1.010	0.990	0.965	0.972

Before Survey Verification Performed:		Mon Aug 12 20:30:09 2013					
Sonde 1 Temperature:		90.5 degF					
Sonde 2 Temperature:		88.9 degF					
Array 1 Temperature:		87.3 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	124.5	159.5	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	0.1	0.2	0.2	0.2	0.2	0.2
RxC Magnitude	0.2	0.1	0.2	0.2	0.2	0.2	0.2

Tool Module Parameters	
Software Version:	1.9.3.0
Borehole Size Source:	CALI
Mud Resistivity Source:	Hilchie
Mud Resistivity At Surface:	1.20 Ohm-m
Mud Resistivity Surface Temperature:	84.0 degF
Borehole Corrections:	Automatic
Minimum Standoff:	0.4 in

Litho Density Tool Calibration Report
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Serial Number:	B10110S50129B
Tool Model:	002

Caliper Calibration Performed:	Mon Jul 29 11:06:23 2013
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	Diameter		Reading	
Small Ring:	6.000	in	1320.200	cps
Large Ring:	13.000	in	1989.900	cps
Gain:	0.0105			
Offset:	-7.7993			

Master Calibration Performed:	Mon Jul 29 10:47:46 2013
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Source Number:	50129B
Medium:	Water
Al Block Density:	2.5999 g/cc

	Background	Al Block	Al Block + Fe	
SS1	799.5	5383.9	4405.7	cps
SS2	2239.8	33426.2	27598.3	cps
SSTOTAL	5274.2	54010.7	44257.6	cps
LITH	104.7	588.6	348.9	cps
LL	207.3	944.0	813.9	cps
LU	598.5	1238.1	1116.6	cps
LS	805.8	2182.2	1930.5	cps
LSTOTAL	1523.3	5346.3	4239.1	cps
SSHV	1548.9	1554.3	1554.8	V
LSHV	1496.9	1498.4	1498.7	V
SSFF	0.001	0.007	-0.004	
LSFF	-0.002	-0.006	0.002	

Before Survey Verification Performed:	Mon Aug 12 02:13:04 2013
After Survey Verification Performed:	

	Master Background	Before Survey Background	After Survey Background	
SS1	799.5	804.7		cps
SS2	2239.8	2231.4		cps
SSTOTAL	5274.2	5264.0		cps
LITH	104.7	108.8		cps
LL	207.3	207.6		cps
LU	598.5	598.7		cps
LS	805.8	806.3		cps
LSTOTAL	1523.3	1522.3		cps
SSHV	1548.9	1549.6		V
LSHV	1496.9	1495.3		V
SSFF	0.001	0.021		
LSFF	-0.002	0.018		

## Tool Module Parameters

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

## Compensated Neutron Tool Calibration Report

Serial Number:	C10088
Tool Model:	009

Master Calibration Performed:	Thu Aug 15 08:49:02 2013
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Source Number:	80244B
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Short Spacing Counts:	7155.31	cps
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Long Spacing Counts:		284.87	cps
High Voltage:		1336.91	V
Target Ratio:		27.2000	
Ratio:		25.1181	
K-Factor:		1.0829	
Before Survey Verification Performed:			
After Survey Verification Performed:			
Verifier Number:		6493	
Verifier Values	Master Cal	Before Survey	After Survey
Short Spacing Counts:	260.70		cps
Long Spacing Counts:	264.86		cps
High Voltage:	1336.94		V
Ratio:	0.9843		
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:		220365	
Tool Model:		004	
Performed:		Tue Jun 18 12:13:59 2013	
Source Number:		JL11008-18	
Calibrator Value:		244.0	API
Background Reading:		141.2	cps
Calibrator Reading:		1500.1	cps
Sensitivity:		0.180	API / cps
Perfomed:			
Verifier Number:			
		K %	U ppm
Concentrations			T ppm
K Peak:			
U Peak:			
T Peak:			
Before Survey Verification Performed:		Mon Apr 08 16:13:39 2013	
After Survey Verification Performed:		Mon Apr 08 16:21:38 2013	
		Before Survey	After Survey
Background Reading:		140.7	cps
Verifier Reading:		1037.0	cps
K Peak:		Passed	Passed
U Peak:		Passed	Passed
T Peak:		Passed	Passed
Tool Module Parameters			
Software Version:		1.8.9.6	
Gamma Ray Calibration Report			


Serial Number:	C10047	
Tool Model:	001	
Performed:	Thu Jul 18 10:39:23 2013	
Calibrator Value:	147.0	GAPI
Background Reading:	73.5	cps
Calibrator Reading:	531.3	cps
Sensitivity:	0.3211	GAPI/cps

#### Borehole Fluid Resistivity Calibration Report

Serial Number:		P004	
Tool Model:		002	
Master Calibration Performed:		Mon Dec 05 18:05:39 2011	
Resistivity Polynomial Equation:			
0.1429x^3 - 0.4495x^2 + 1.2097x - 0.2854			
Temperature Calibration:			
Reference		Reading	
71.60	degF	559.80	bits
167.00	degF	659.50	bits

#### Head Tension Unit Calibration Report

Serial Number:			00001	
Tool Model:			011	
Performed:			Mon Mar 04 10:52:43 2013	
Point #	Reference		Reading	
1	-19894.000	lb	8957.860	cps
2	-15010.000	lb	13965.100	cps
3	-9998.000	lb	19079.100	cps
4	-5007.000	lb	24133.000	cps
5	-1009.000	lb	28232.100	cps
6	1017.000	lb	30185.400	cps
7	5040.000	lb	34439.700	cps
8	9970.000	lb	39346.900	cps
9	14955.000	lb	44466.000	cps
10	19770.000	lb	49397.800	cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
HTEN	60.22		CHD-001 (000004) Cable Head	2.19	3.38	35.00
			XTU-008 (C10087) Crossover Ultrawire Toolbus to Ultralink	2.08	3.38	47.00
			HTU-011 (00001) Head Tension Unit	2.18	3.38	55.00
BFR	56.58		BFR-002 (P004)	4.39	3.38	94.00
GR	53.80		GRT-001 (C10047) Gamma Ray Tool	3.22	3.38	69.00
SGR	48.12		SGR-004 (220365) Spectral Gamma Ray Tool	4.94	3.88	120.00



