



# Composite Log

Company Pronghorn Operating, LLC  
Well Nattie #1  
Field Cheyenne Wells  
County Cheyenne State Colorado

Location: 620' FSL & 660' FEL  
SEC 6 TWP 14 S RGE 44 W  
Permanent Datum GL Elevation 4309 ft.  
Log Measured From KB , 17 ft. above perm. datum  
Drilling Measured From KB  
Other Services  
K.B. 4326 ft.  
D.F. 4325 ft.  
G.L. 4309 ft.

Date	24-July-13		
Run Number	One		
Depth Driller	5622'		
Depth Logger	5624'		
Bottom Logged Interval	5618'		
Top Log Interval	4000'		
Casing Driller	13.375" @ 464'	@	@
Casing Logger	464'		
Bit Size	7.875"	@	@
Type Fluid in Hole	WBM		
Density / Viscosity	9.2/55		
pH / Fluid Loss	9.8/6.9		
Source of Sample	Mud Pit		
Rm @ Meas. Temp	1.2 @ 75°F	@	@
Rmf @ Meas. Temp	0.9 @ 75°F	@	@
Rmc @ Meas. Temp	1.5 @ 75°F	@	@
Source of Rmf / Rmc	Calculated		
Rm @ BHT	0.7 @ 129°F	@	@
Time Circulation Stopped	9:00		
Time Logger on Bottom	15:30		
Maximum Recorded Temperature	129°F		
Equipment Number	10002		
Location	Brighton		
Recorded By	L. Schubert		
Witnessed By	J. Thorson/F. Rabbio		

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## Equipment and Log Data

Service Order:

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.	7985	Serial No.	0072	Serial No.	0110
O.D.	3.375 in.	Source No.	50130B	Source No.	66010B	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	TD 4000'	0	150	0.3	-0.1	2.71 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

First run in hole  
Tools ran slick due to hole conditions  
LCM = 10lb/br  
5.5" production casing used to calculate annular hole volumes  
Chlorides reported at: 1600ppm

YOUR CREW TODAY: A. Hughes / E. Soto



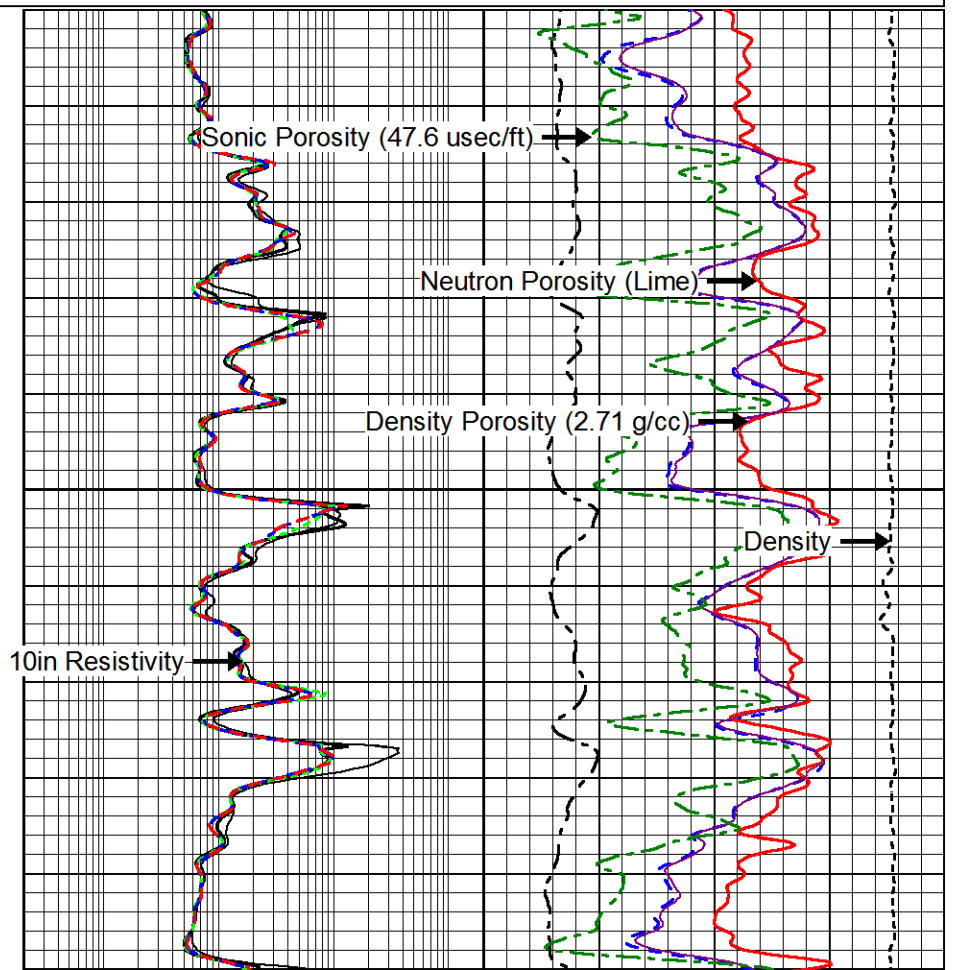
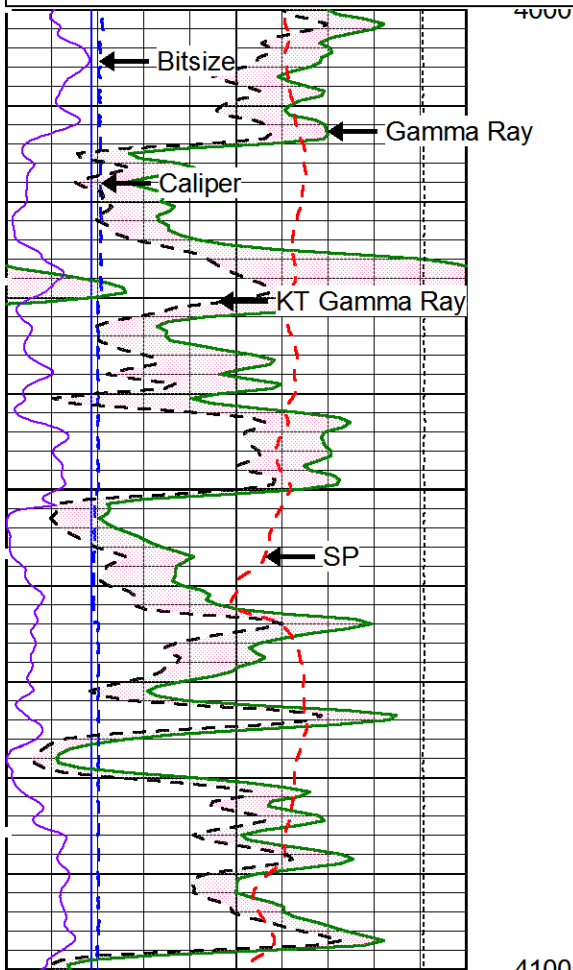
# Main Pass

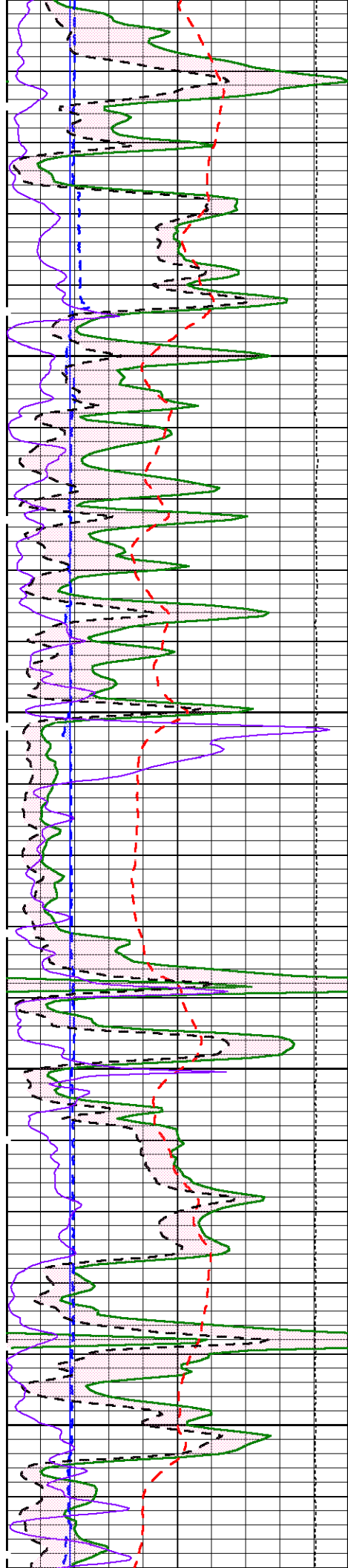
Database File: proghorn\_nattie\_1.db  
 Dataset Pathname: Main  
 Presentation Format: a4pronl  
 Dataset Creation: Thu Jul 25 11:07:30 2013  
 Charted by: Depth in Feet scaled 1:240

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
0.2	20in Resistivity (Ohm-m)	2000
0.2	30in Resistivity (Ohm-m)	2000
0.2	60in Resistivity (Ohm-m)	2000
0.2	90in Resistivity (Ohm-m)	2000

0.3	Neutron Porosity (Lime)	-0.1
0.3	Density Porosity (2.71 g/cc)	-0.1
0	PE	10
Density Correction		
	0.8 (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1
0.3	Sonic Porosity (47.6 usec/ft)	-0.1

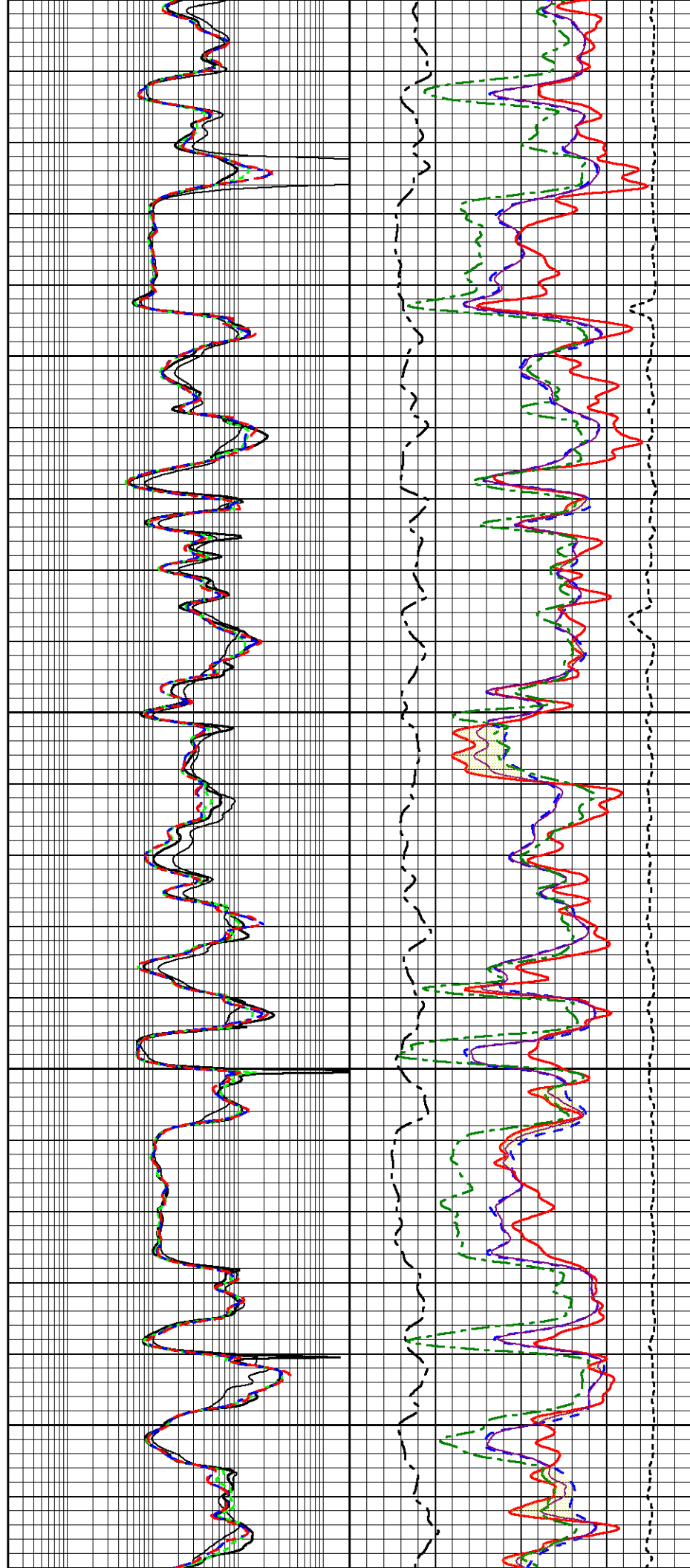


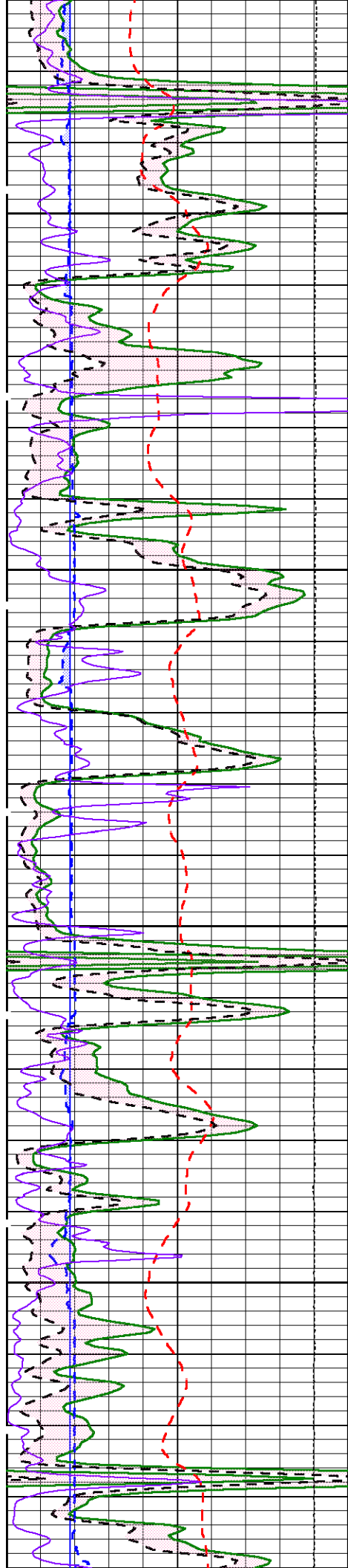


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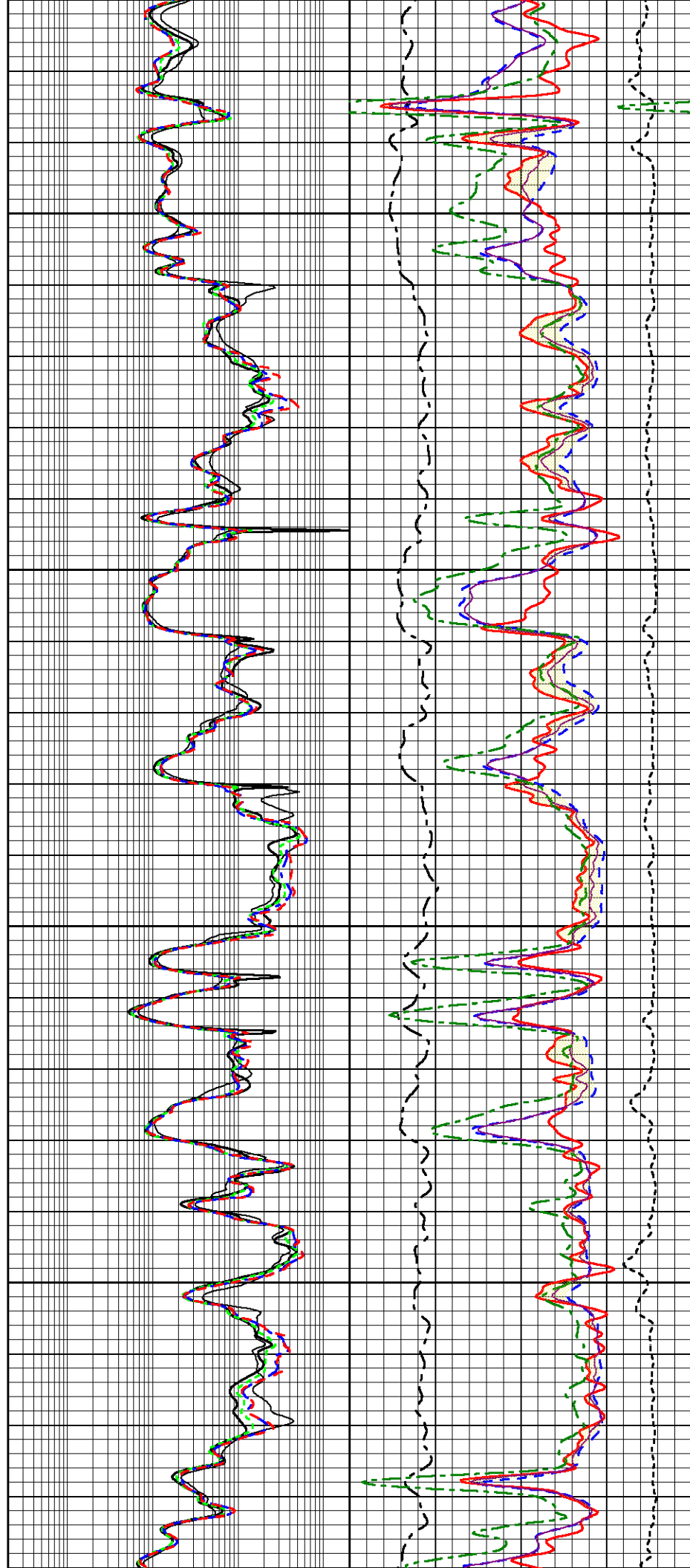
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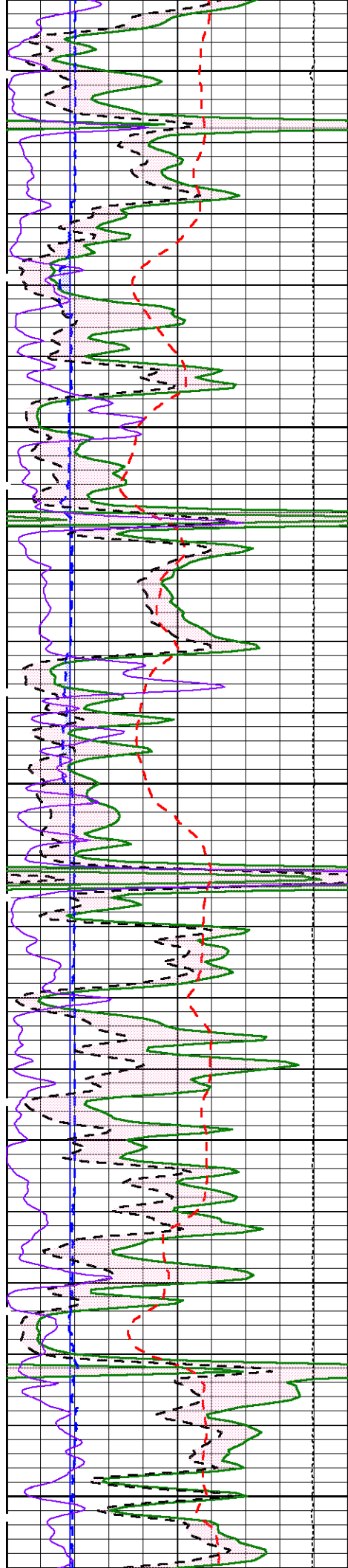


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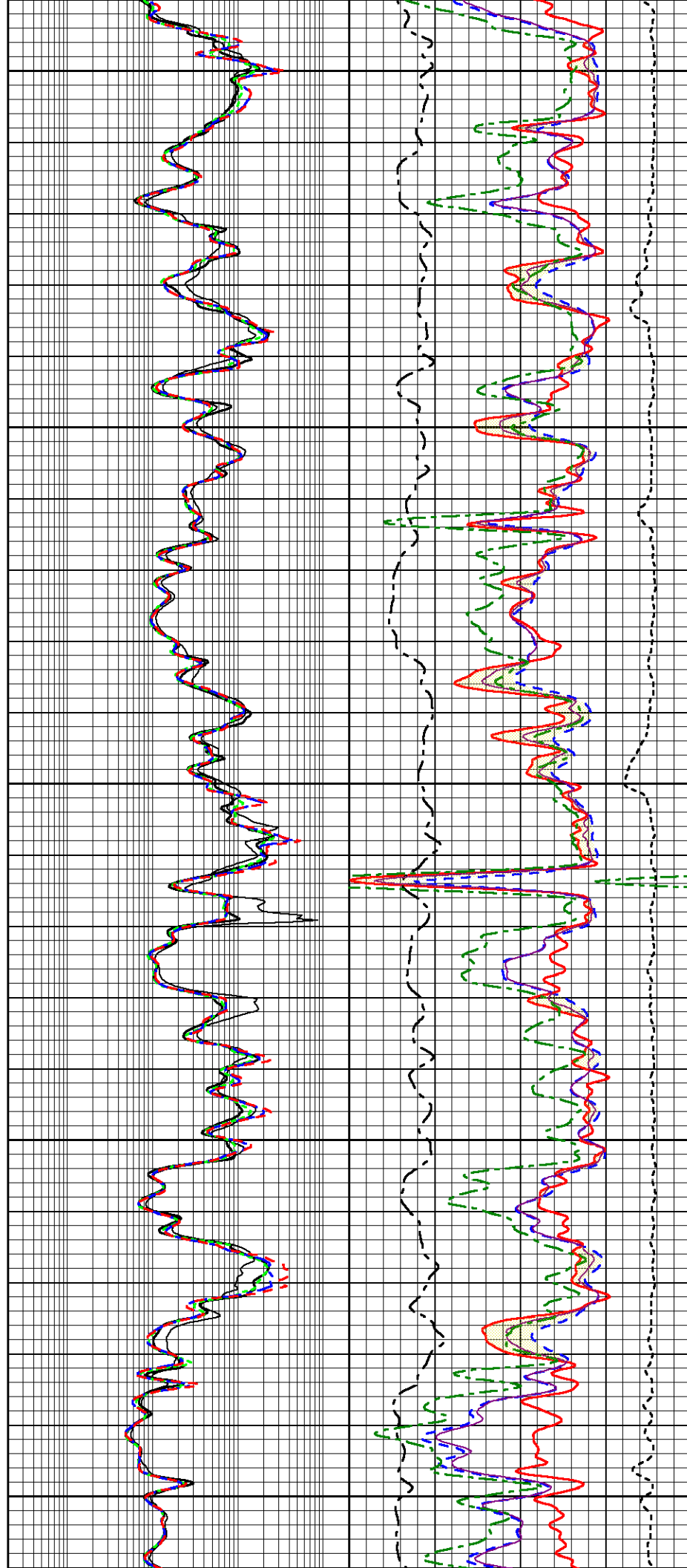


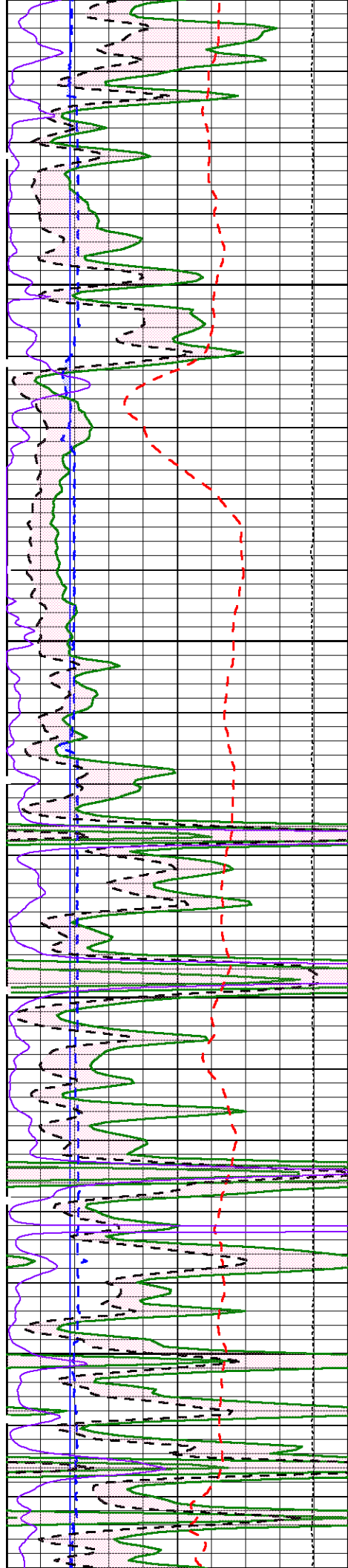




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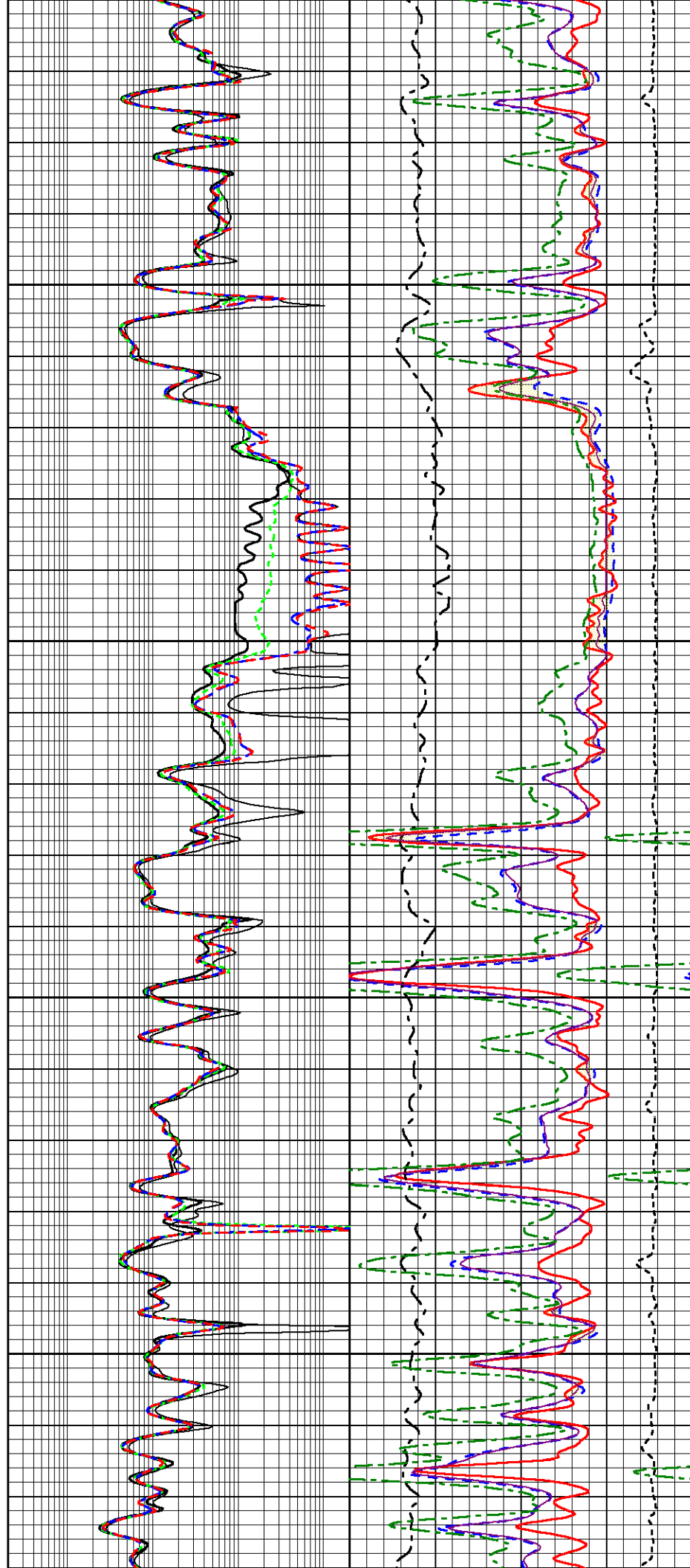
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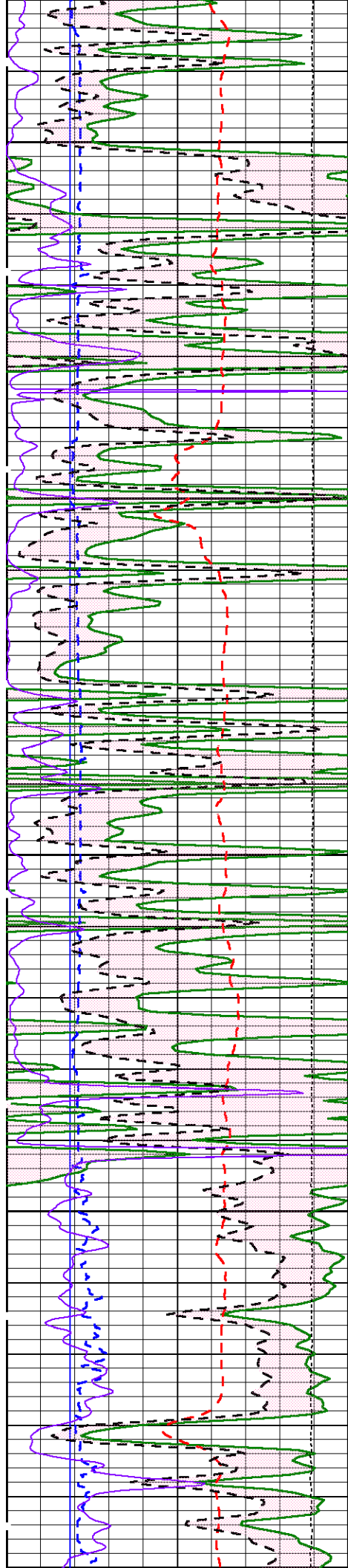




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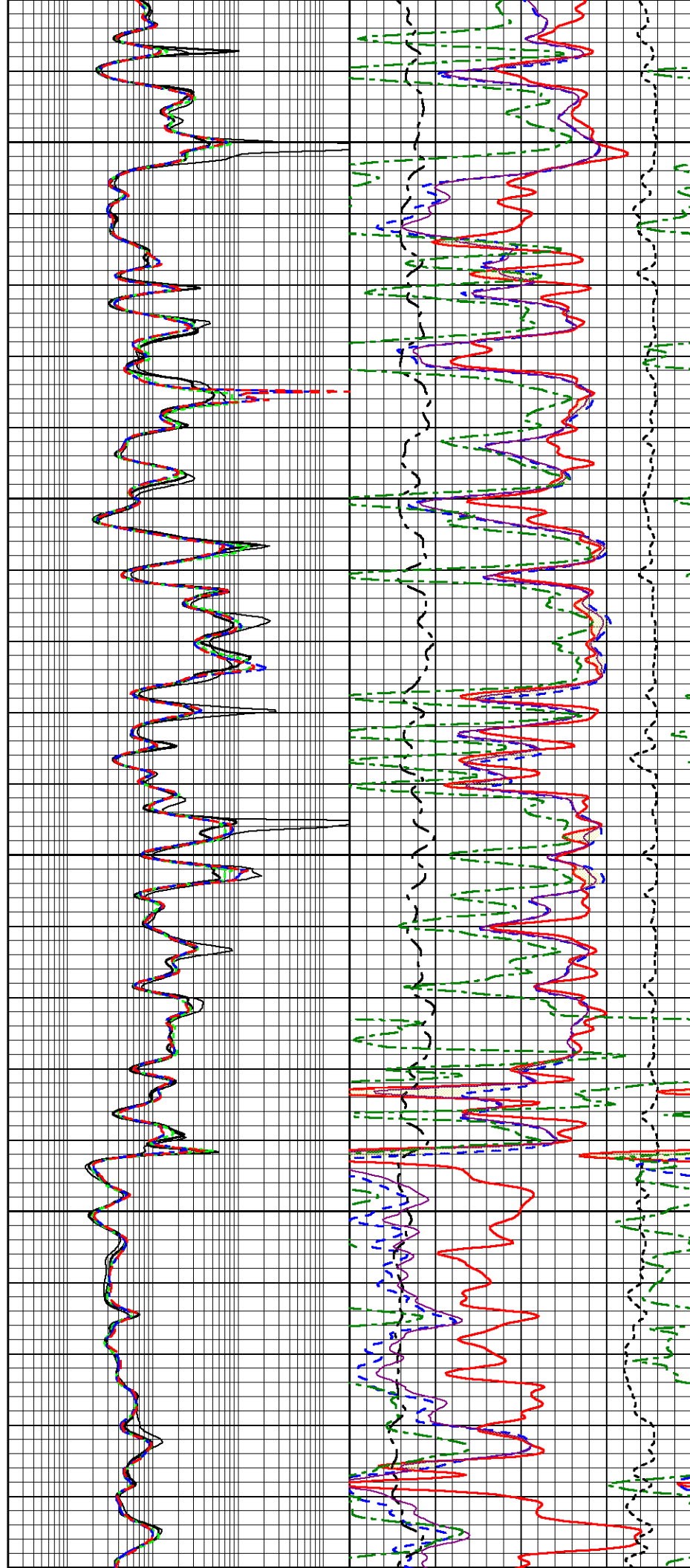


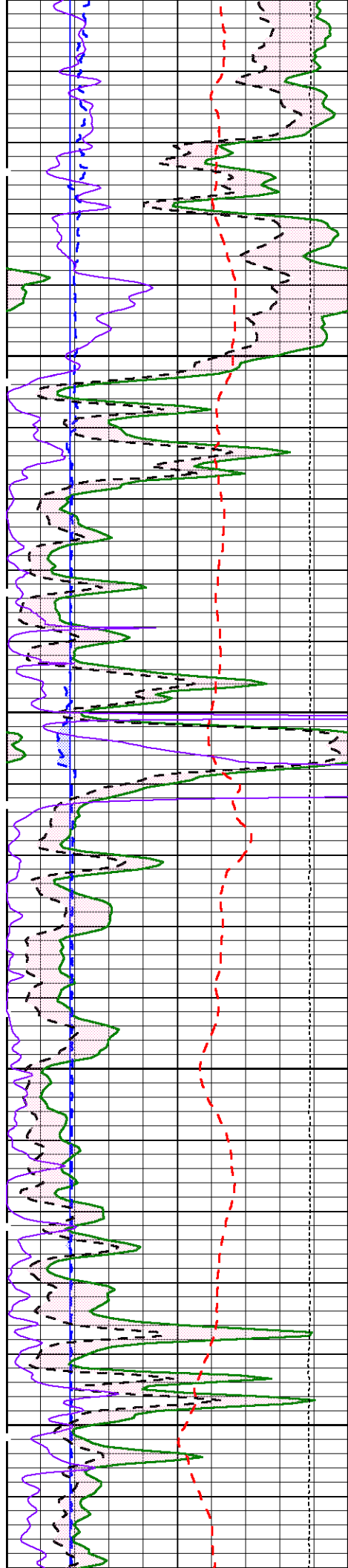


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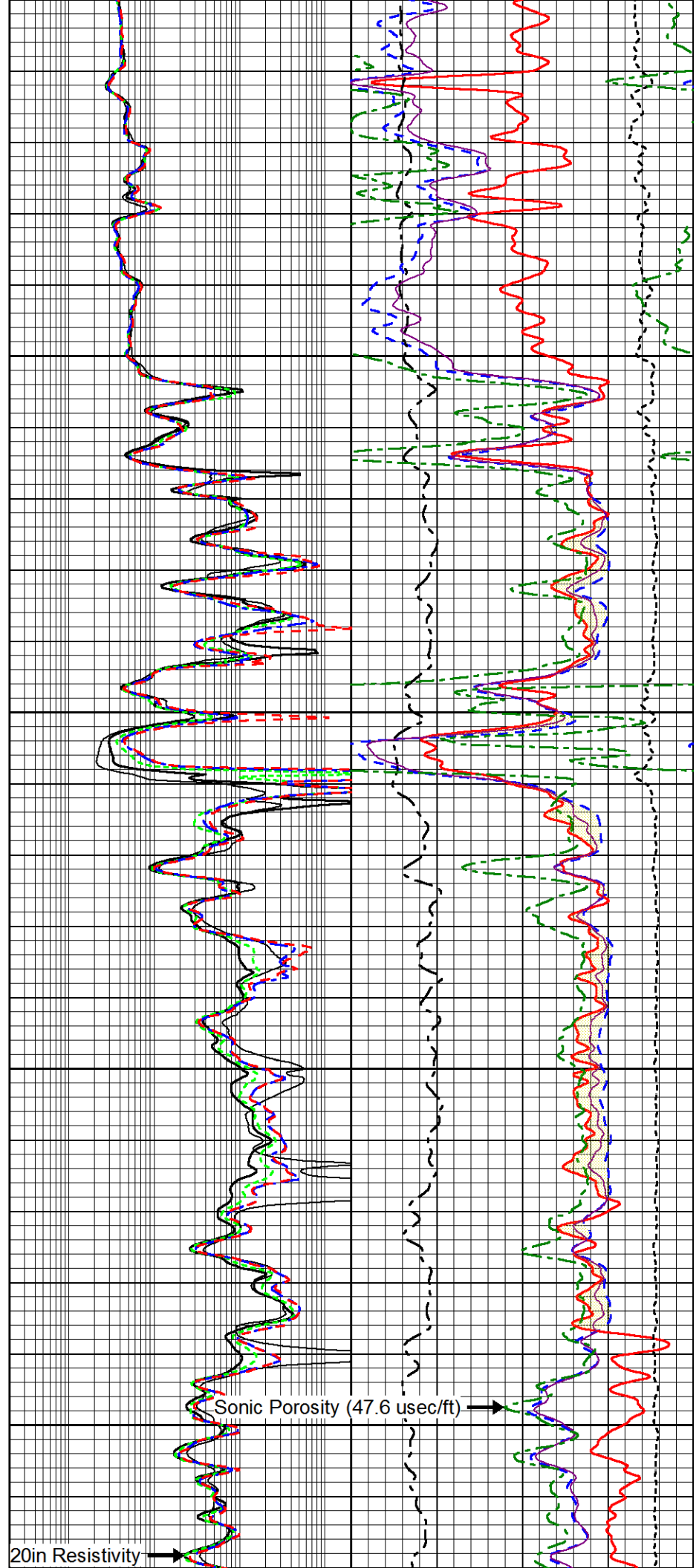




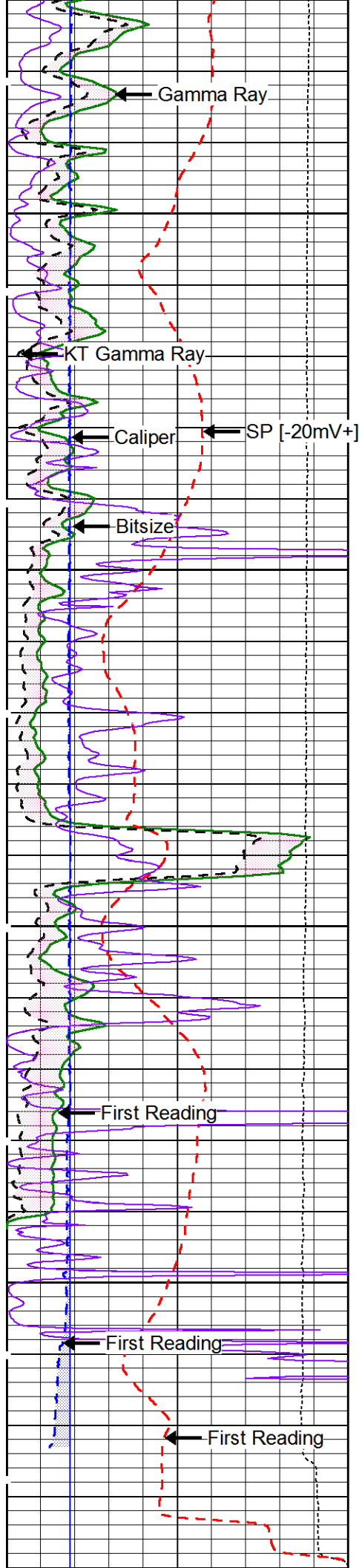
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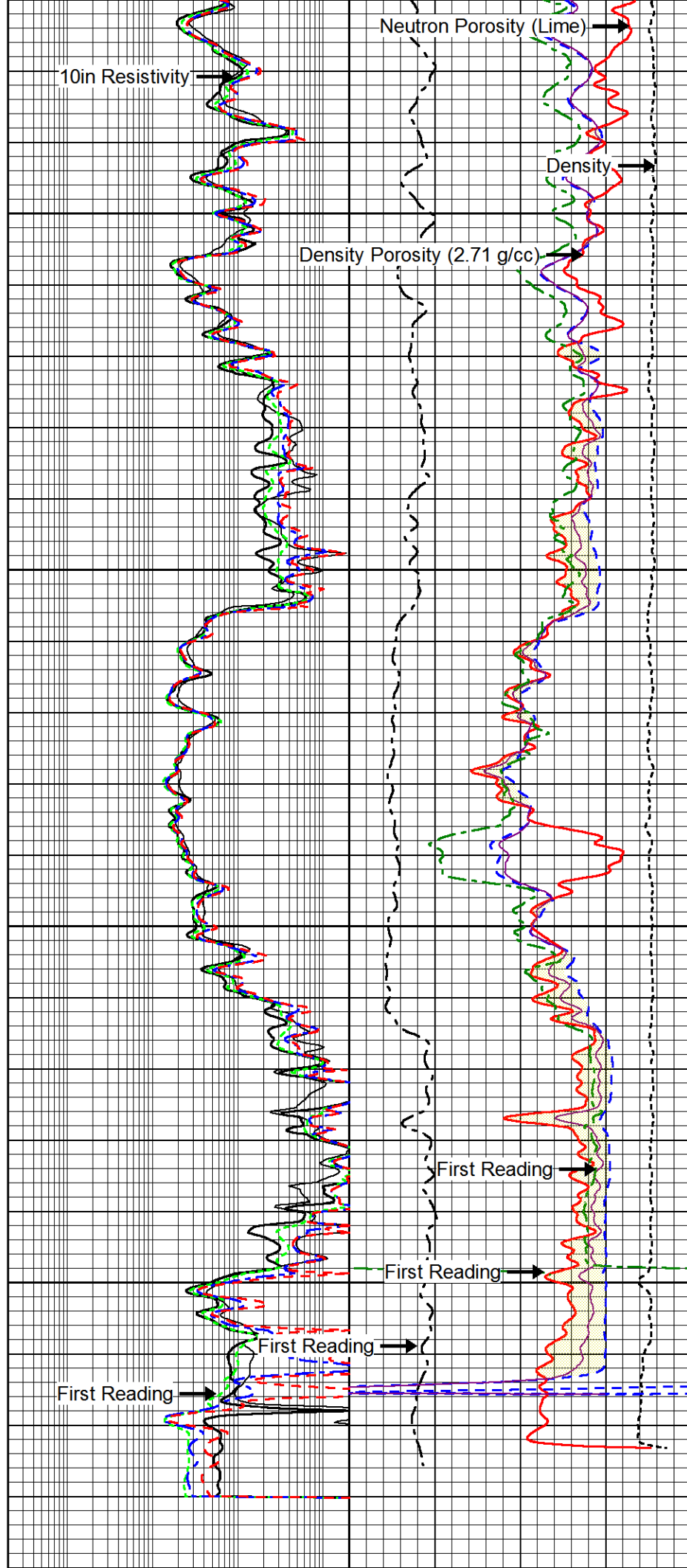






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6	Bitsize (in)	16
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
SP [-20mV+]		
0	KT Gamma Ray (GAPI)	150
0	Rwa (Ohm-m)	1
Tension		
	10000 (lb)	0

0.2	10in Resistivity (Ohm-m)	2000
0.2	20in Resistivity (Ohm-m)	2000
0.2	30in Resistivity (Ohm-m)	2000
0.2	60in Resistivity (Ohm-m)	2000
0.2	90in Resistivity (Ohm-m)	2000

0.3	Neutron Porosity (Lime)	-0.1
0.3	Density Porosity (2.71 g/cc)	-0.1
0	PE	10
Density Correction		
	0.8 (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1
0.3	Sonic Porosity (47.6 usec/ft)	-0.1



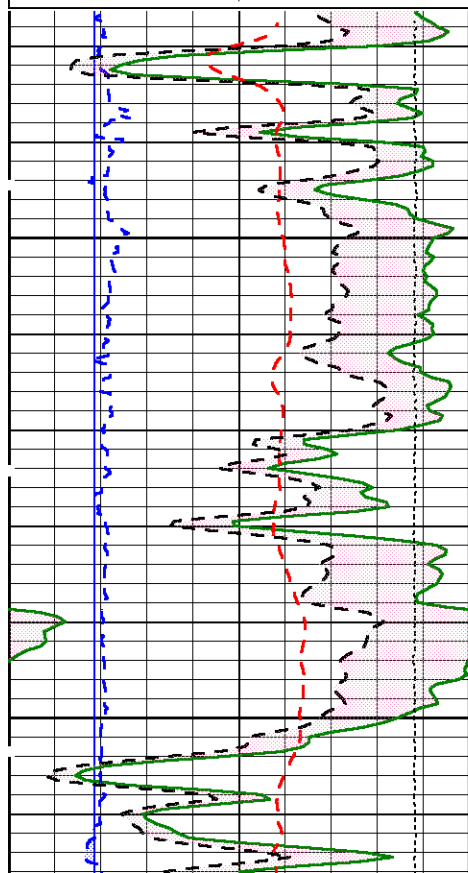
# Repeat Pass

Database File: proghorn\_nattie\_1.db  
Dataset Pathname: pass3  
Presentation Format: a4pronl  
Dataset Creation: Wed Jul 24 15:26:37 2013 by Log Sondex V7.03  
Charted by: Depth in Feet scaled 1:240

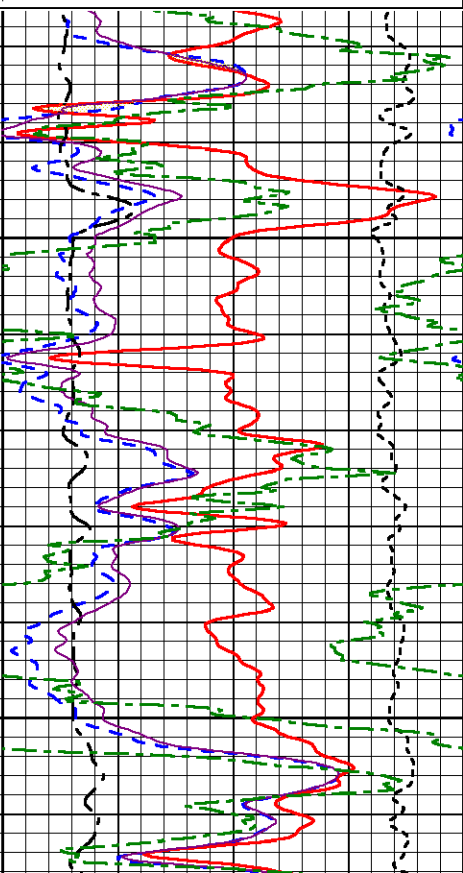
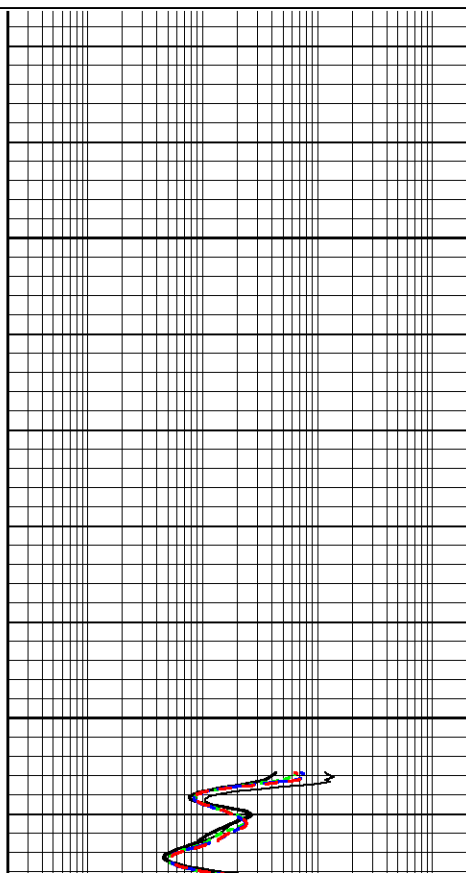
6	Bitsize (in)	16
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
SP [-20mV+]		
0	KT Gamma Ray (GAPI)	150
Tension		
	10000 (lb)	0

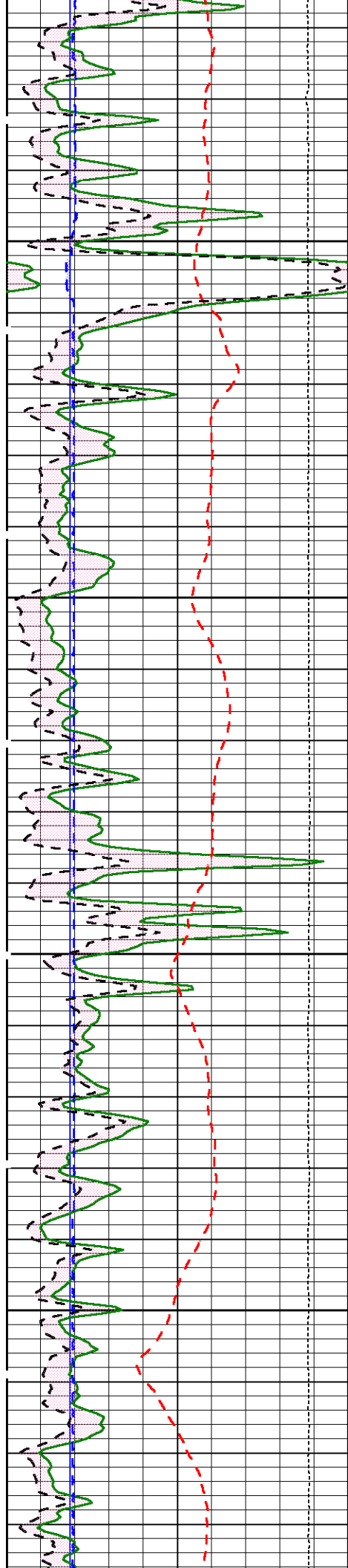
0.2	10in Resistivity (Ohm-m)	2000
0.2	20in Resistivity (Ohm-m)	2000
0.2	30in Resistivity (Ohm-m)	2000
0.2	60in Resistivity (Ohm-m)	2000
0.2	90in Resistivity (Ohm-m)	2000

0.3	Neutron Porosity (Lime)	-0.1
0.3	Density Porosity (2.71 g/cc)	-0.1
0	PE	10
Density Correction		
	0.8 (g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1
0.3	Sonic Porosity (47.6 usec/ft)	-0.1



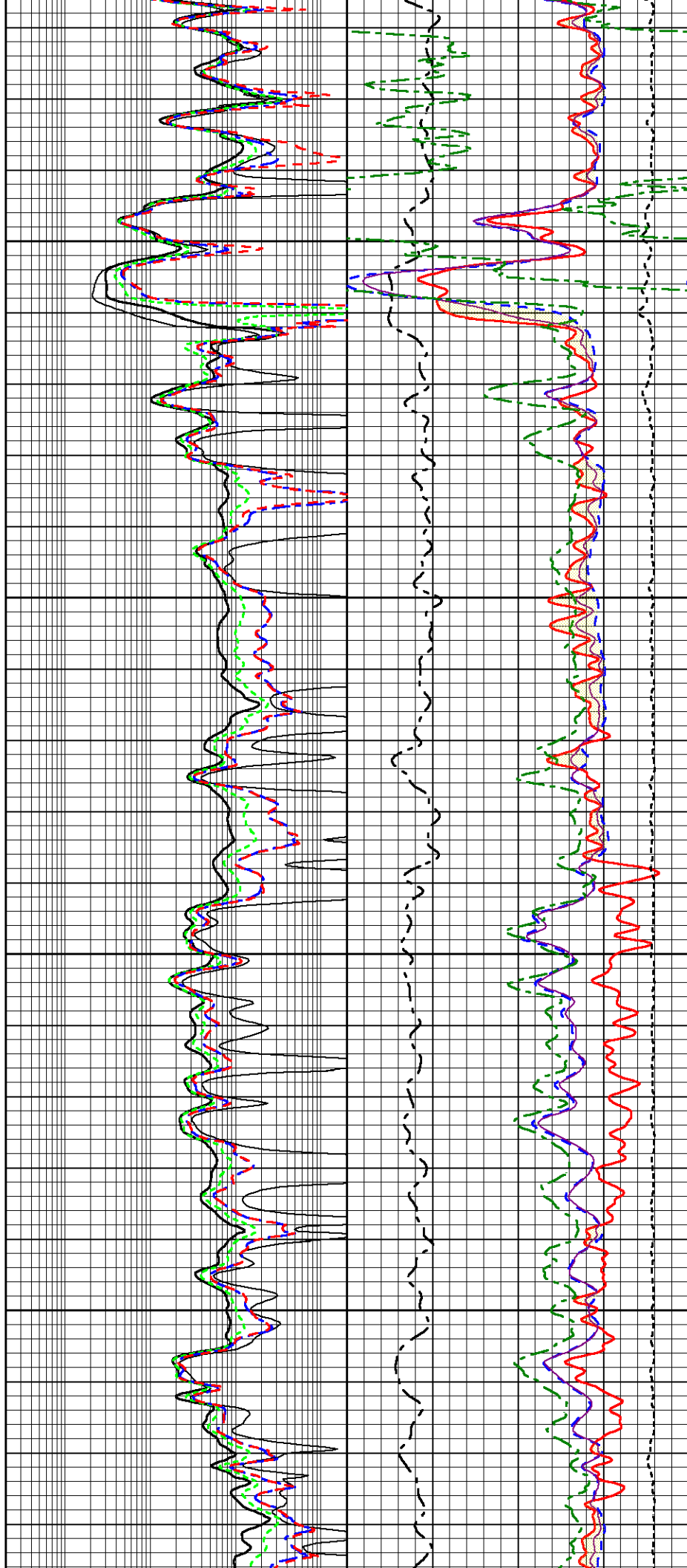
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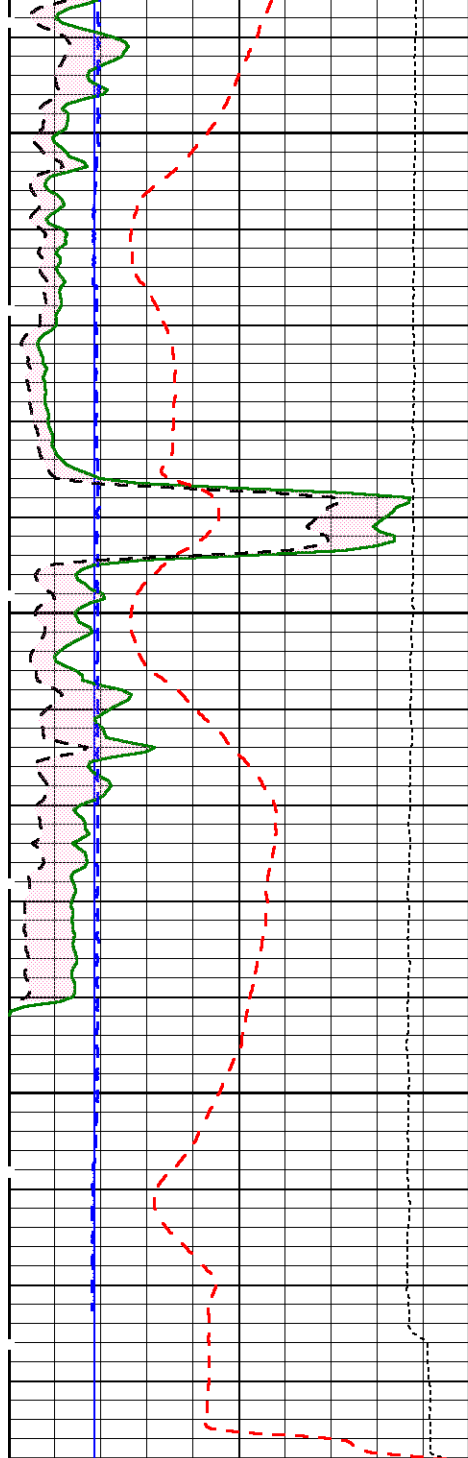




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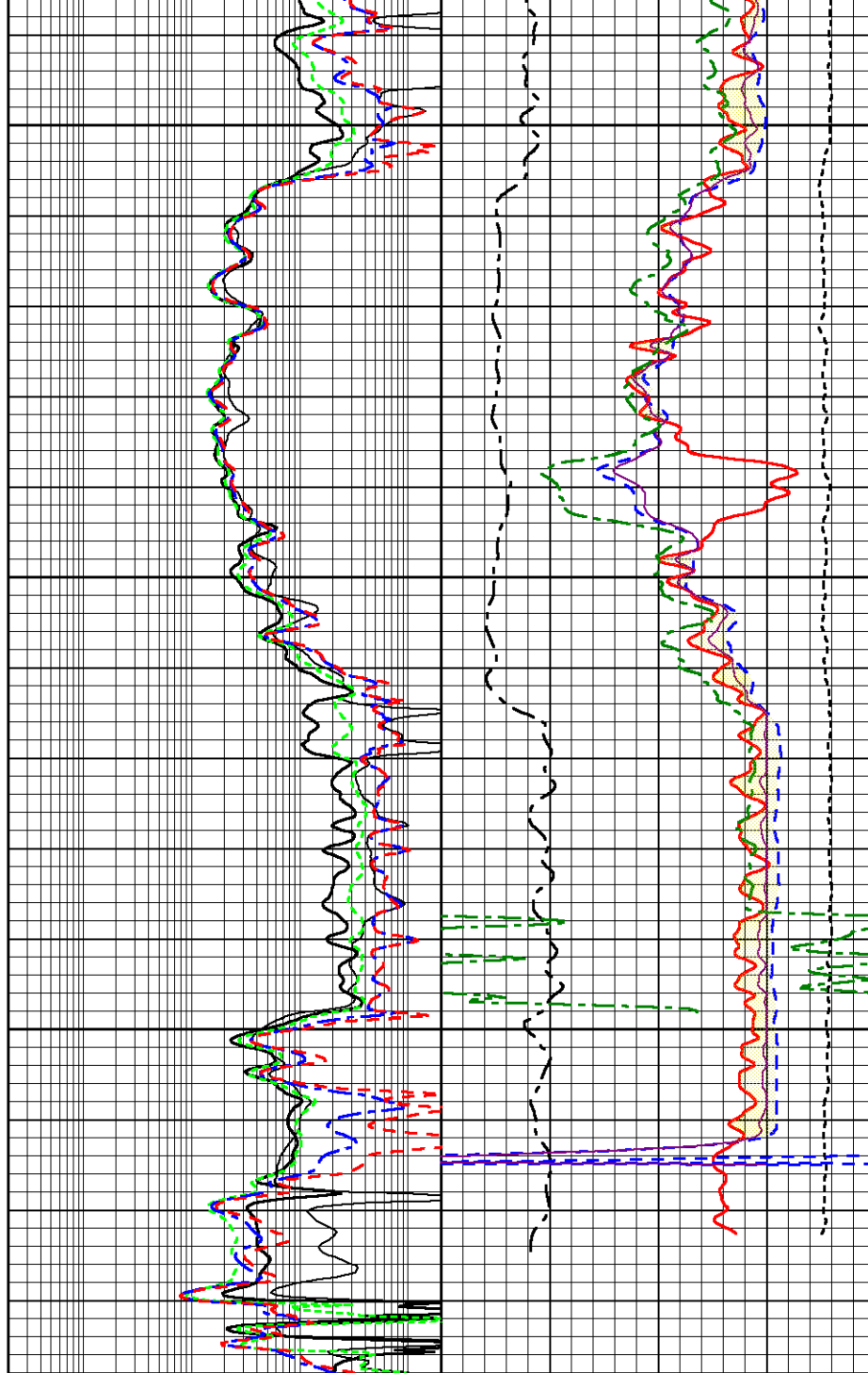




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6	Bit size (in)	16
0	Gamma Ray (GAPI)	150
6	Caliper (in)	16
SP [-20mV+]		
0	KT Gamma Ray (GAPI)	150
Tension		
10000	(lb)	0



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



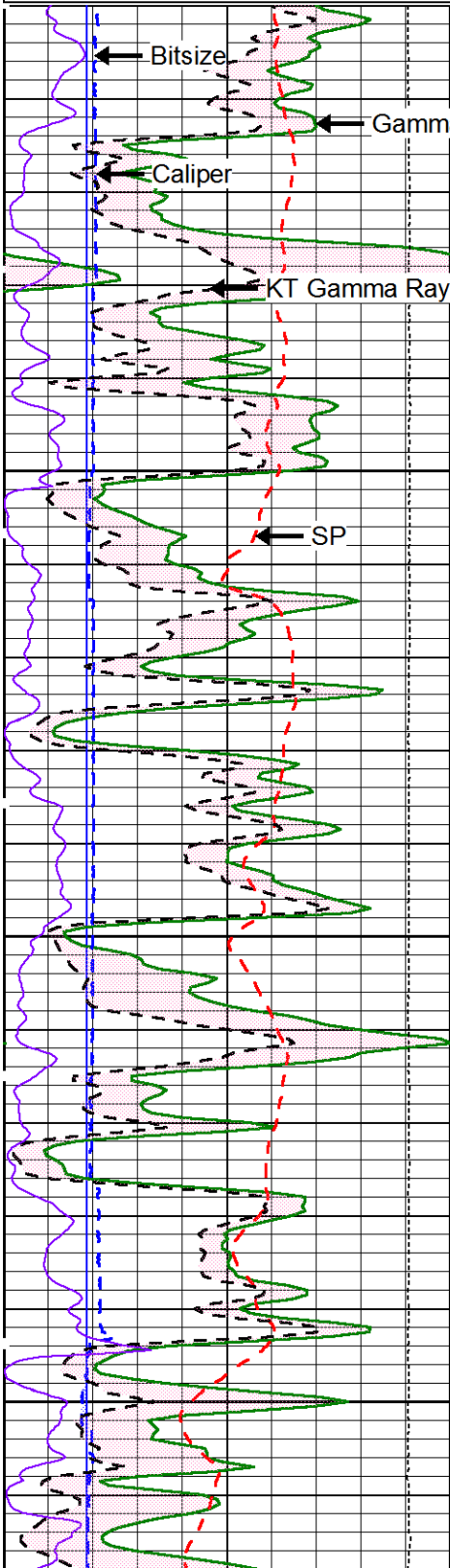
# Main Pass



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		

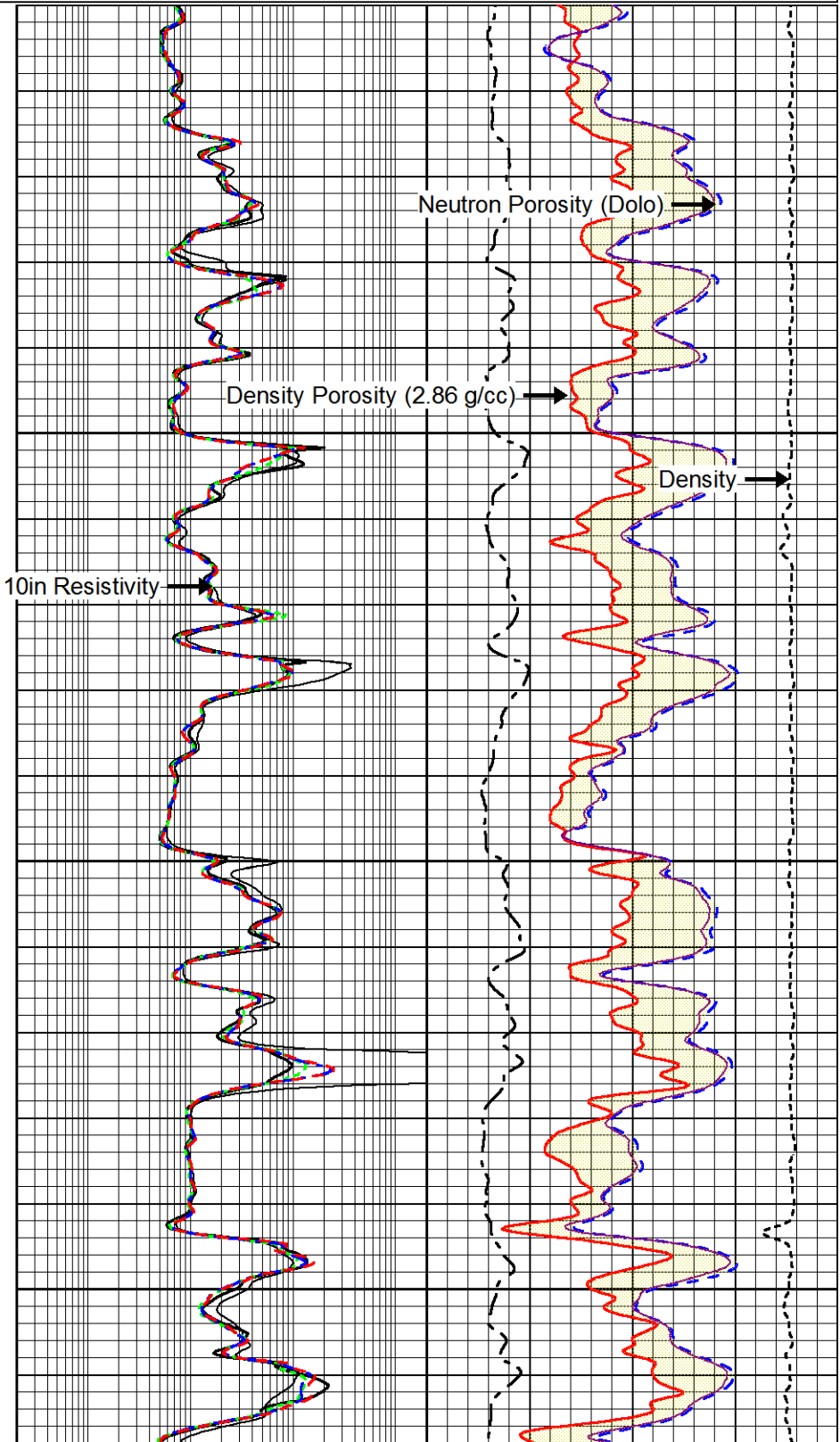
0.2	10in Resistivity (Ohm-m)	2000
0.2	20in Resistivity (Ohm-m)	2000
0.2	30in Resistivity (Ohm-m)	2000
0.2	60in Resistivity (Ohm-m)	2000
0.2	90in Resistivity (Ohm-m)	2000

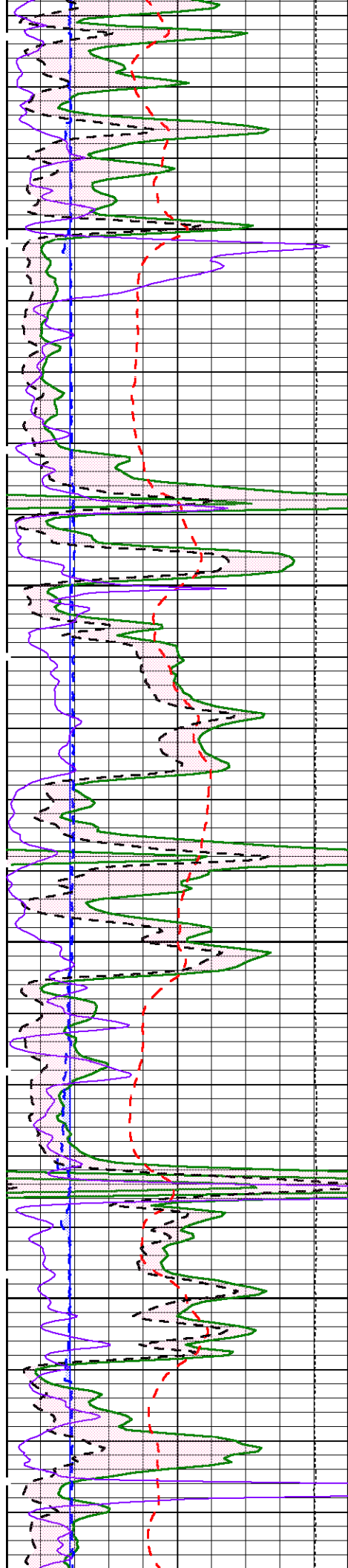
0.3	Neutron Porosity (Dolo)	-0.1
0.3	Density Porosity (2.86 g/cc)	-0.1
0	PE	10
Density Correction		
0.8	(g/cc)	-0.2
0.3	Cross Plot Porosity	-0.1



4000

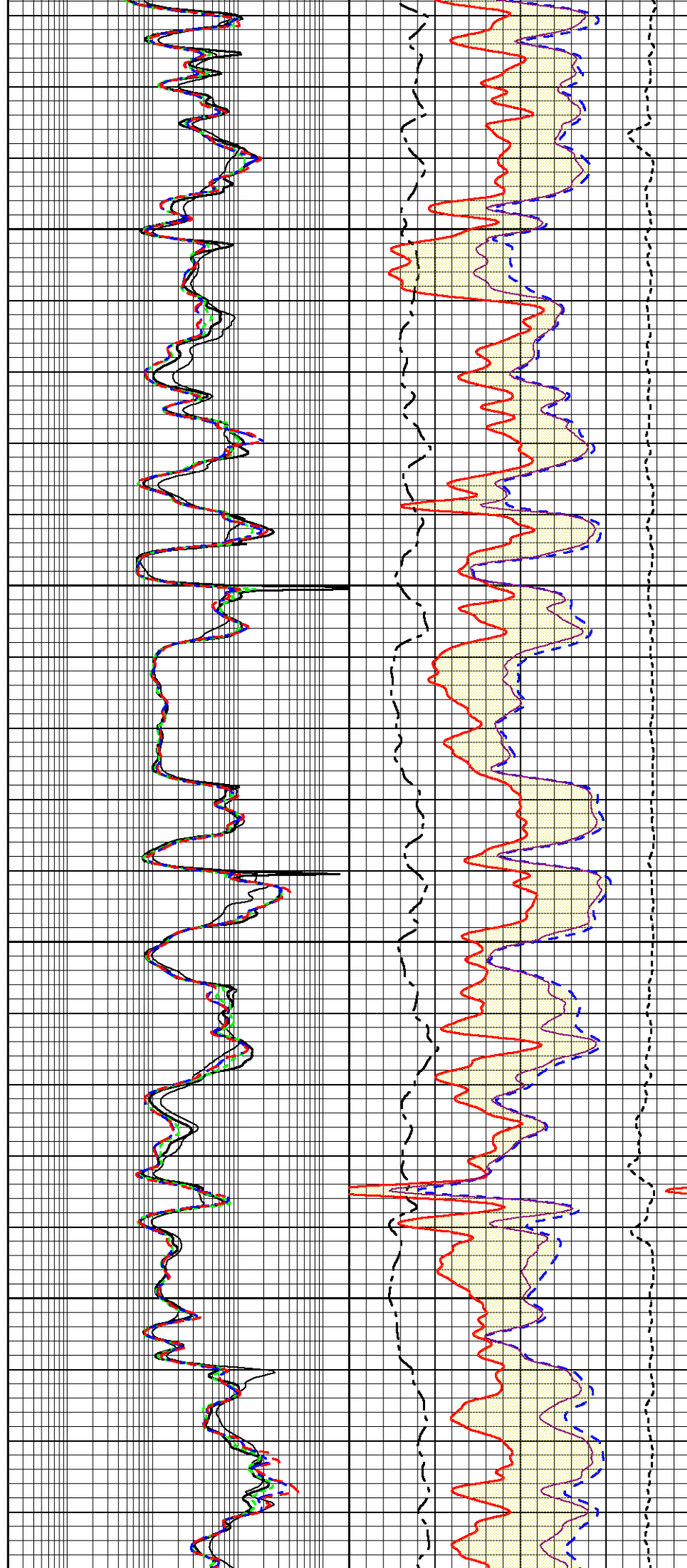
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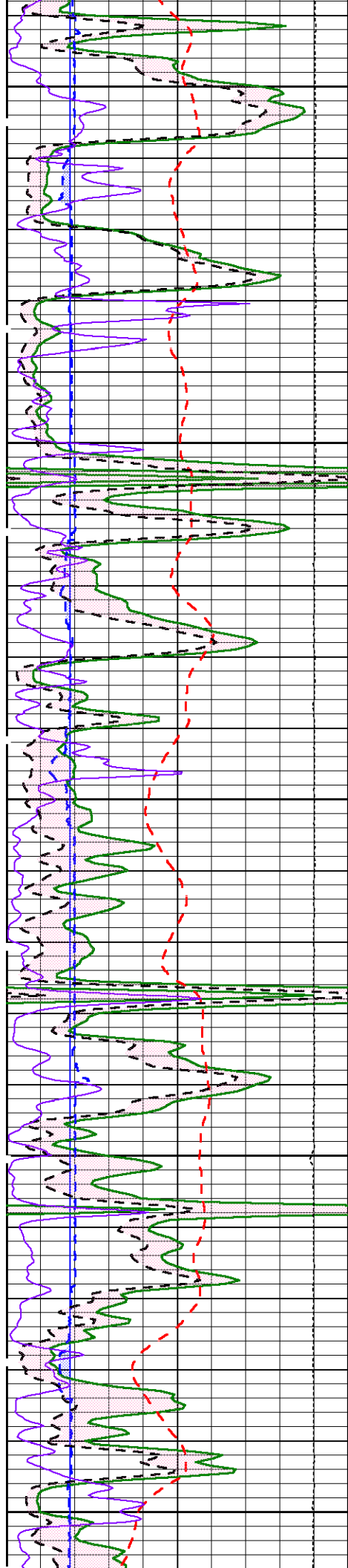




4200

4300

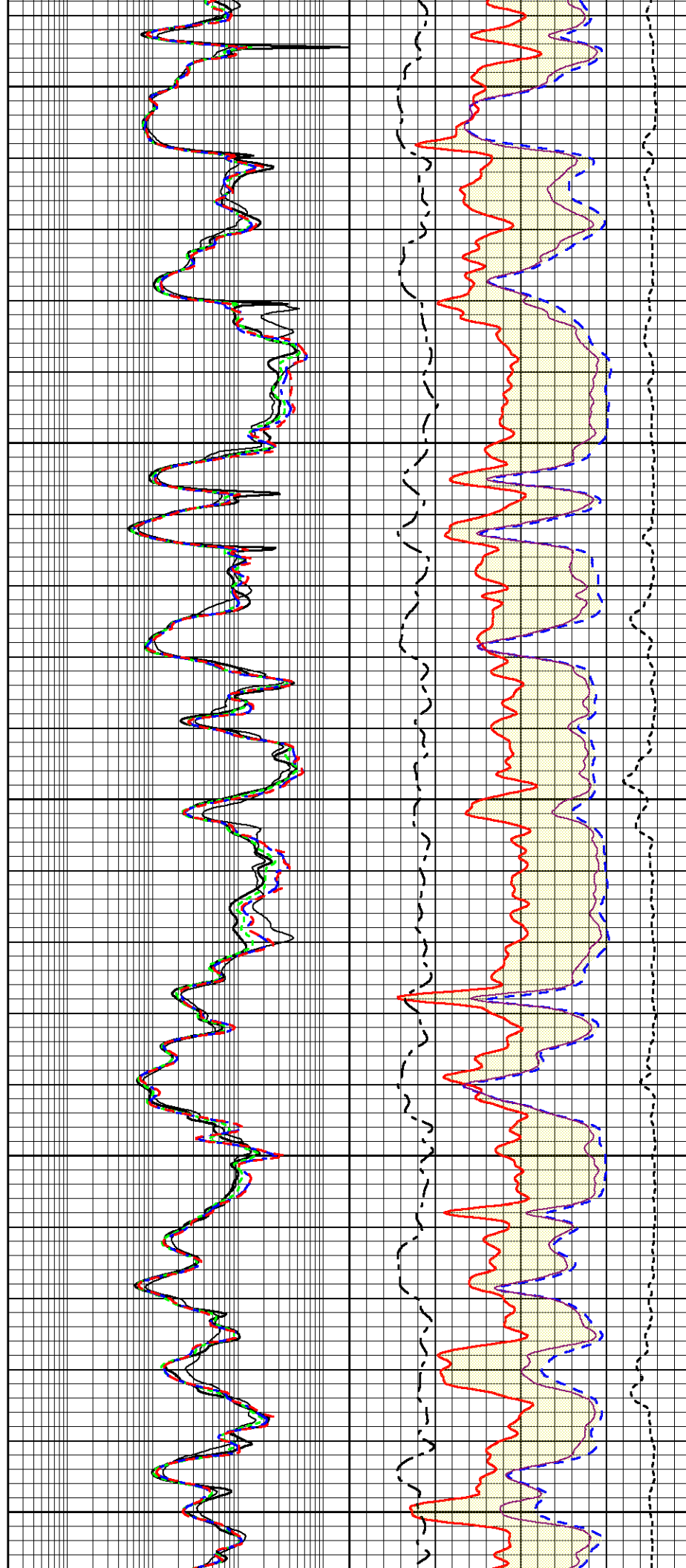




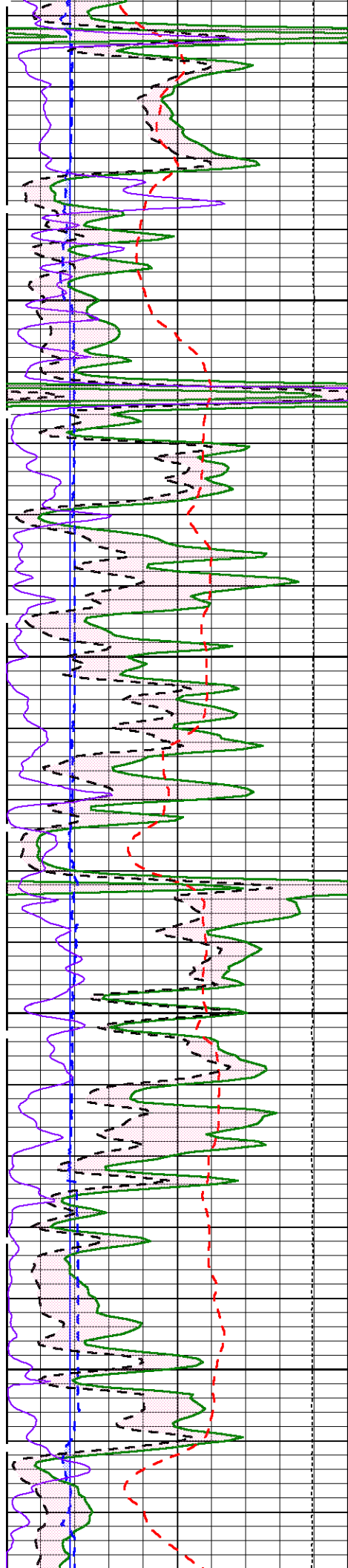
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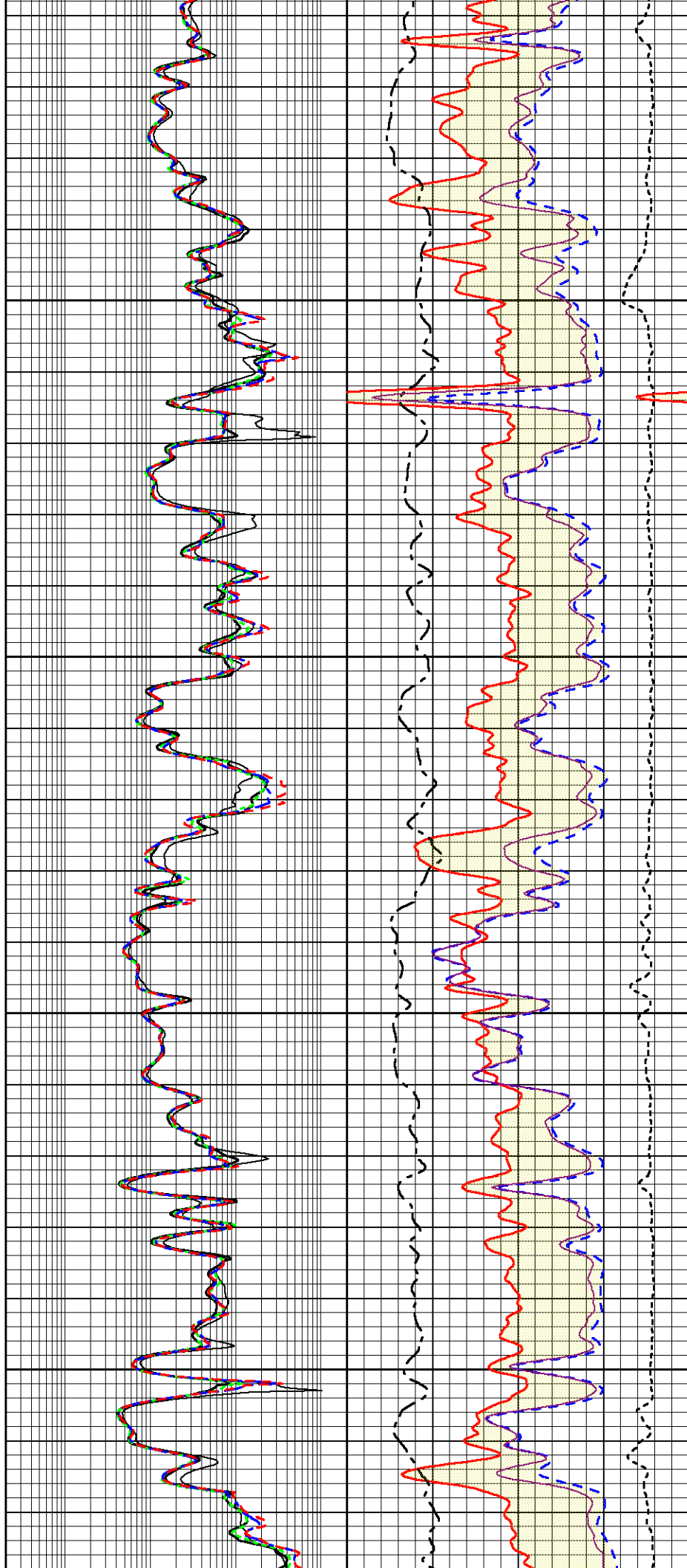




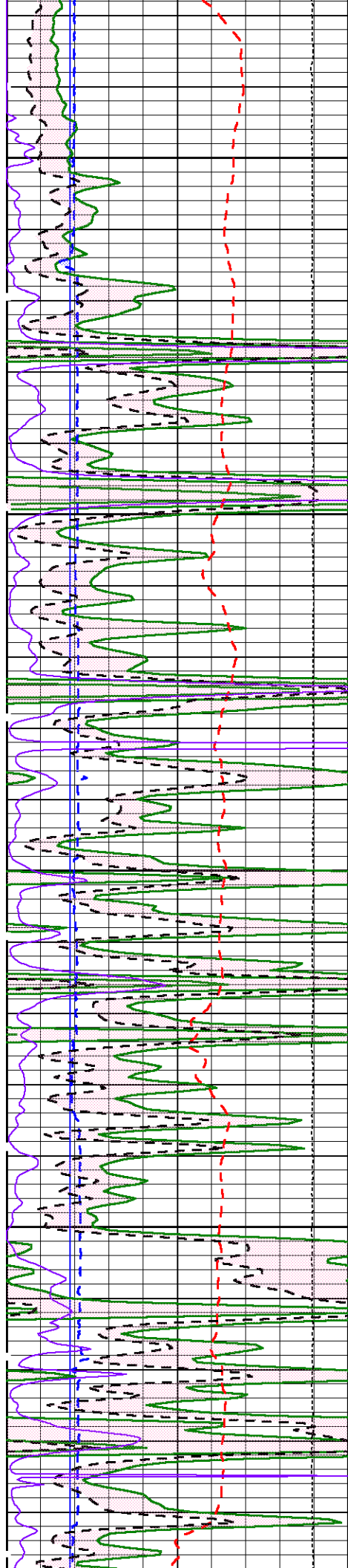


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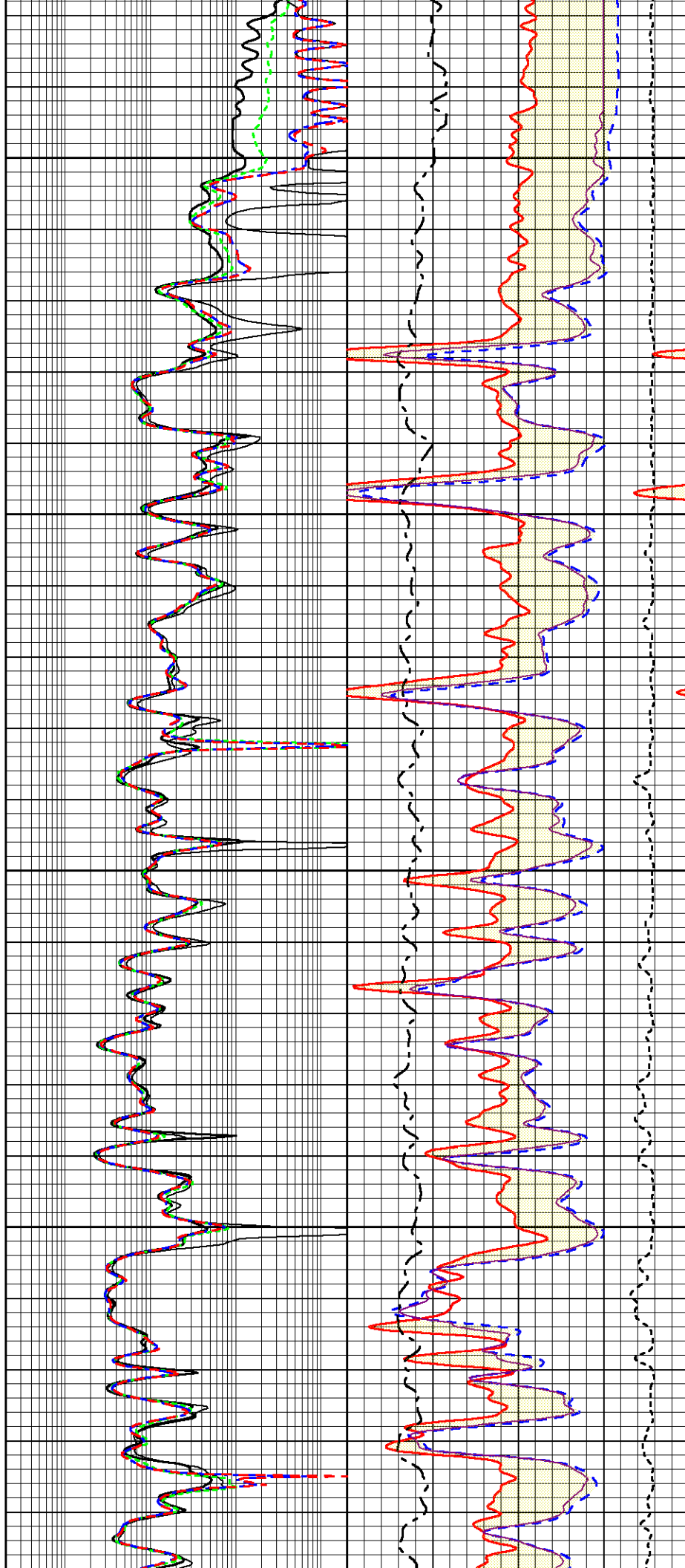


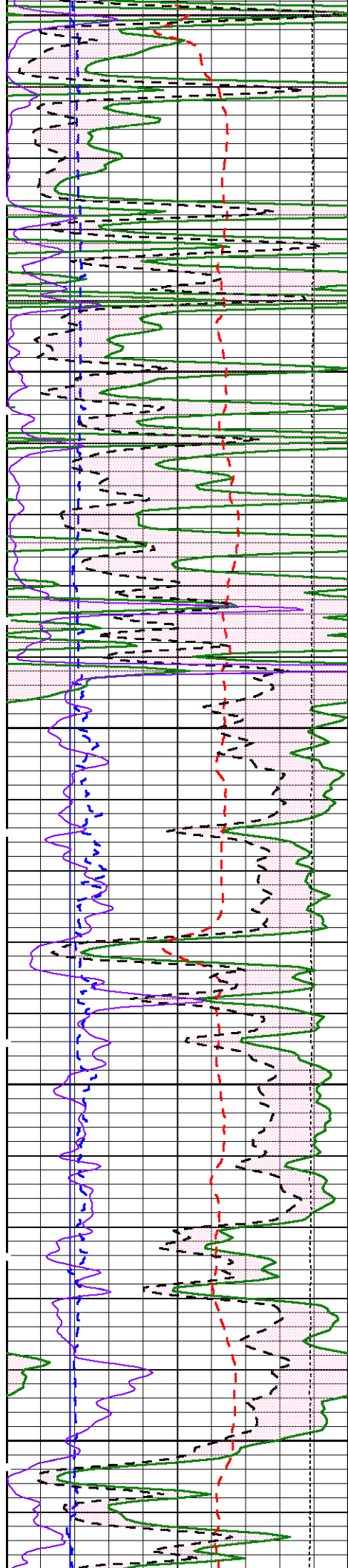




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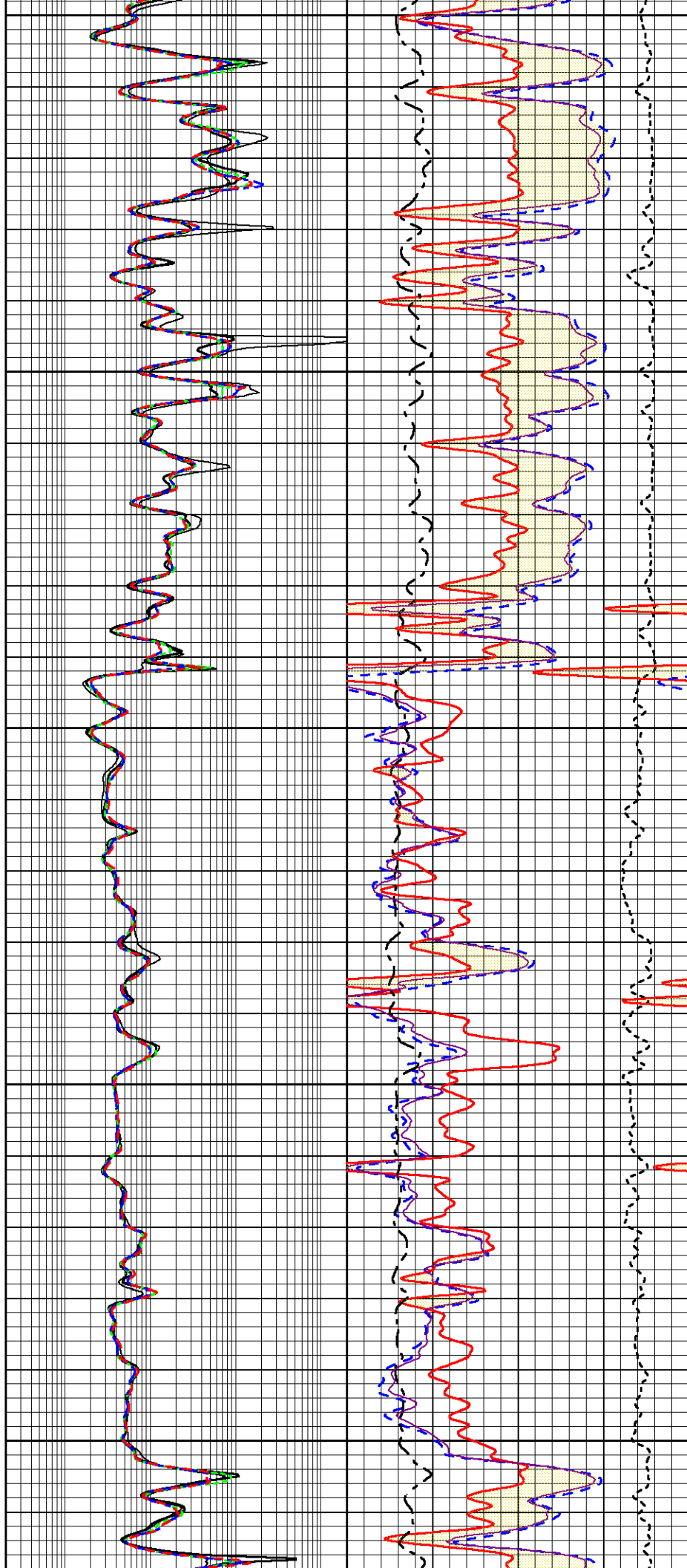
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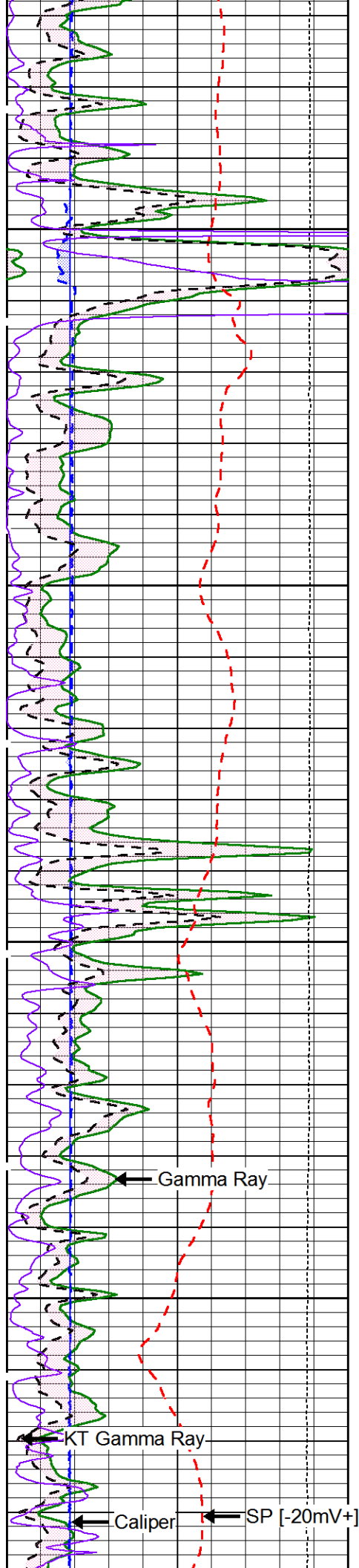




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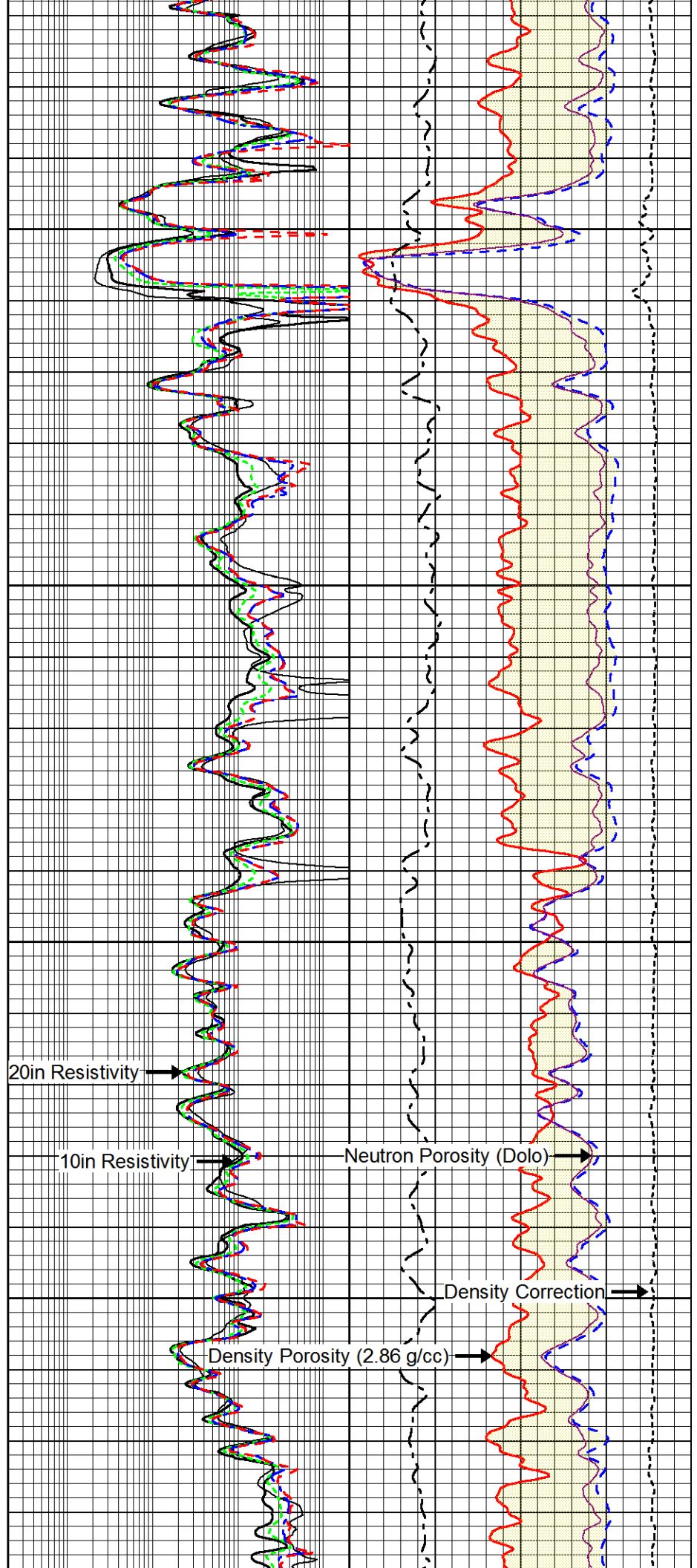
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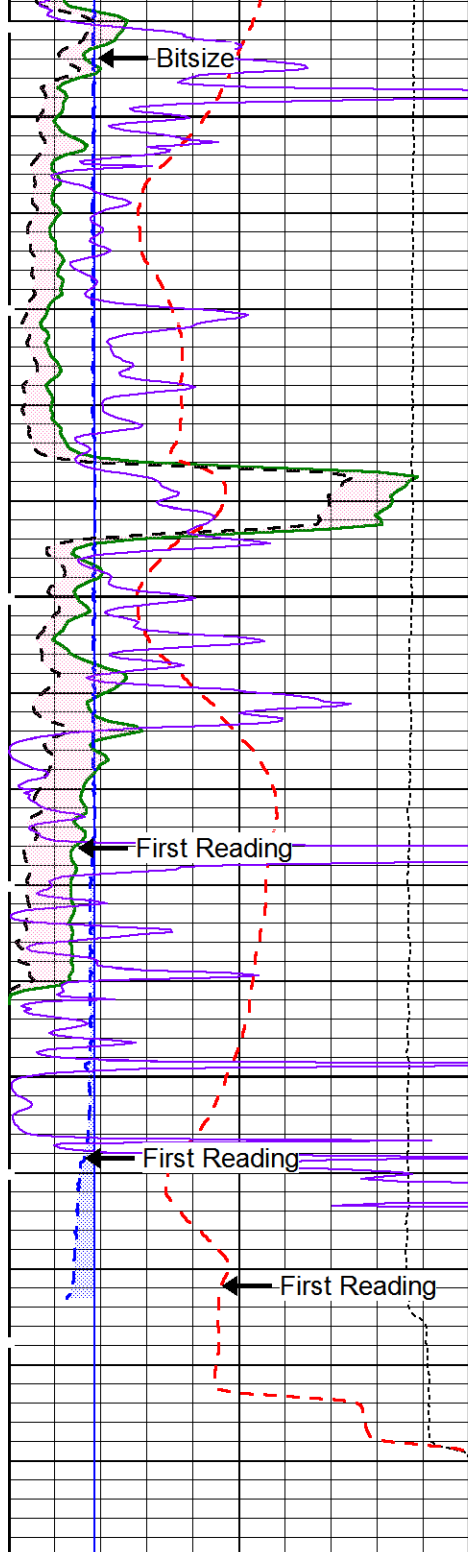


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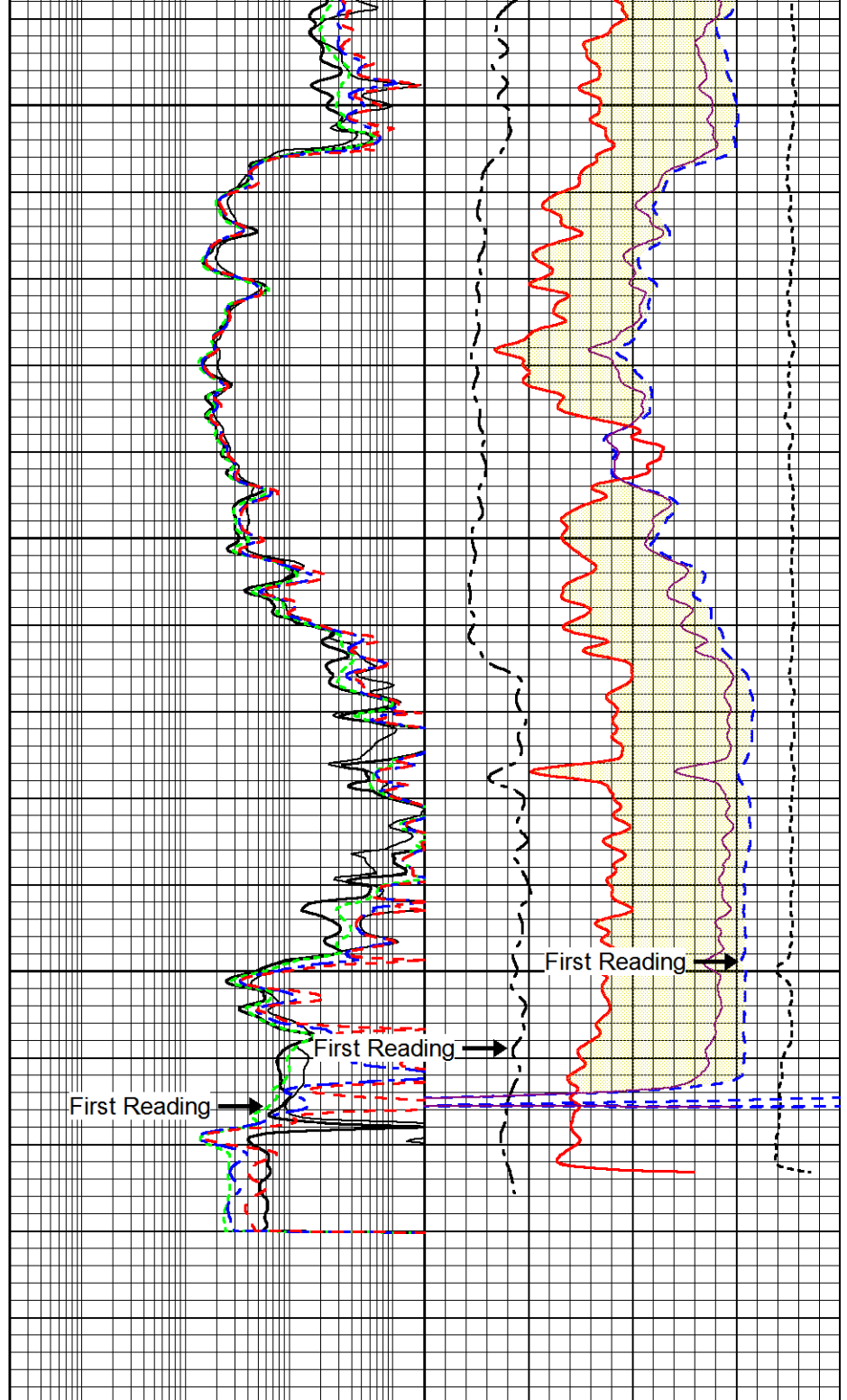


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Total Depth

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 (Dolo)	-0.1
0.2	20in Resistivity (Ohm-m)	2000	0.3	Density Porosity (2.86 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

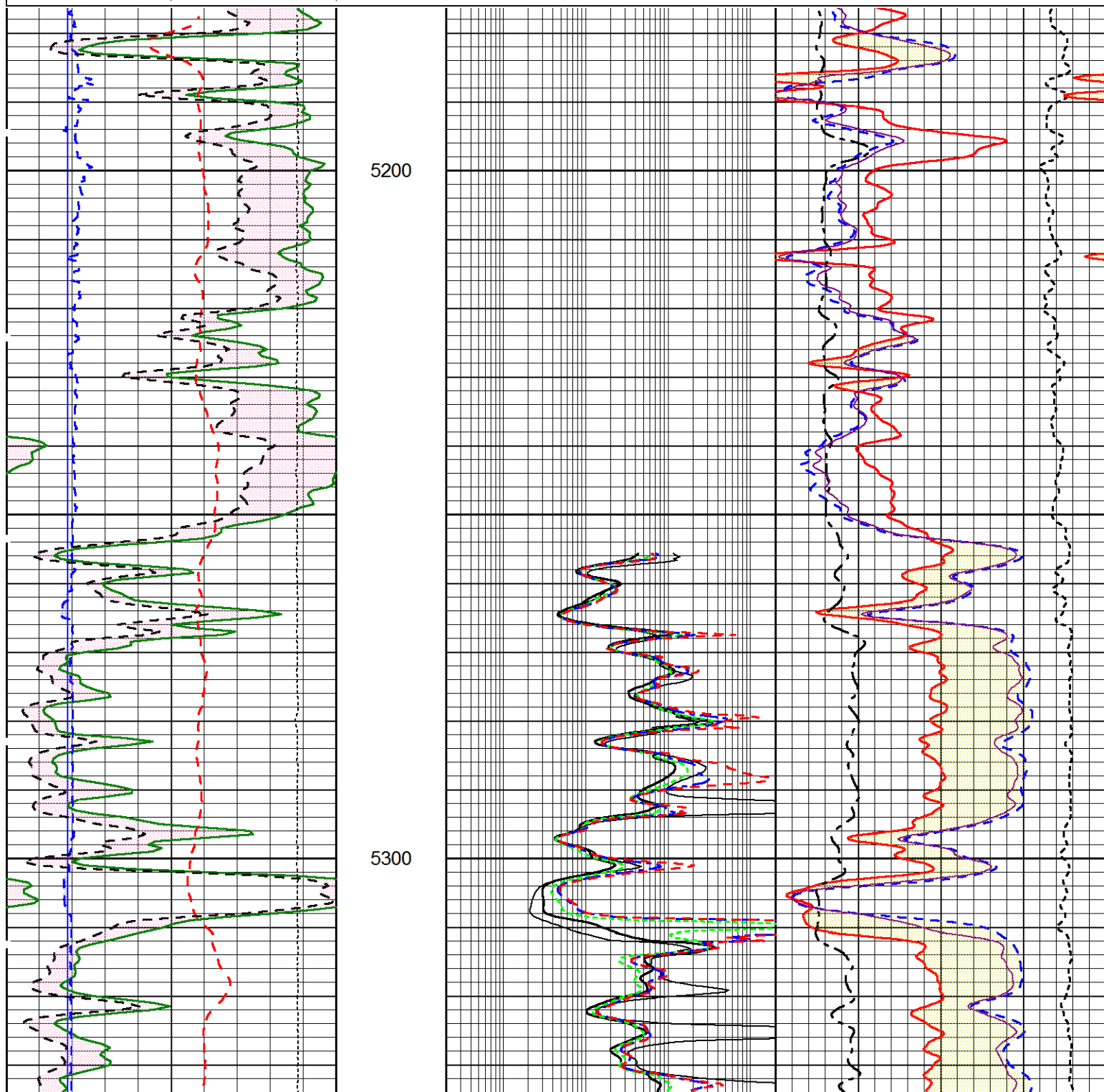


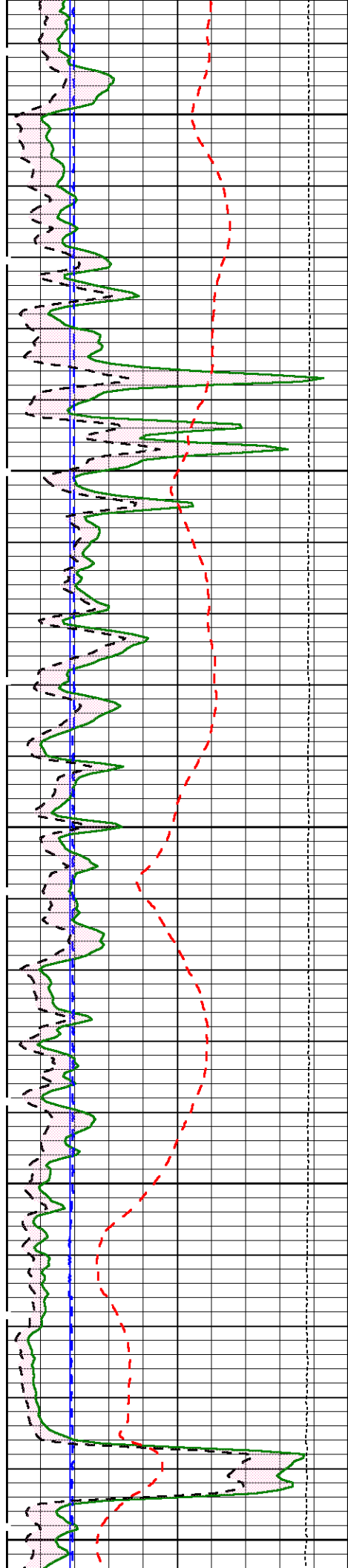
Repeat Pass



Database File: proghorn\_nattie\_1.db  
Dataset Pathname: pass3  
Presentation Format: a3prond  
Dataset Creation: Wed Jul 24 15:26:37 2013 by Log Sondex V7.03  
Charted by: Depth in Feet scaled 1:240

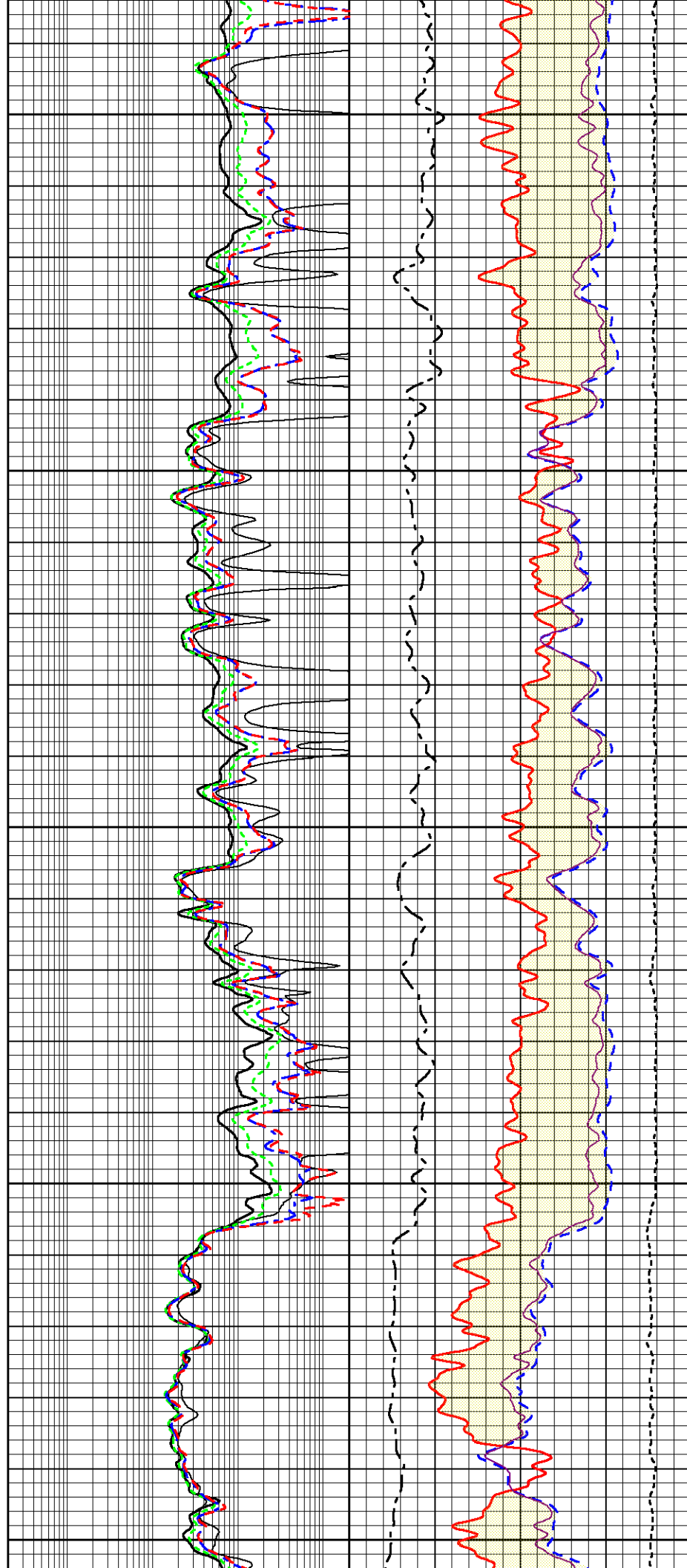
6	Bitsize (in)	16	0.2	10in Resistivity (Ohm-m)	2000	0.3	Neutron Porosity (Dolo)	-0.1
0	Gamma Ray (GAPI)	150	0.2	20in Resistivity (Ohm-m)	2000	0.3	Density Porosity (2.86 g/cc)	-0.1
6	Caliper (in)	16	0.2	30in Resistivity (Ohm-m)	2000	0	PE	10
	SP [-20mV+]		0.2	60in Resistivity (Ohm-m)	2000		Density Correction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

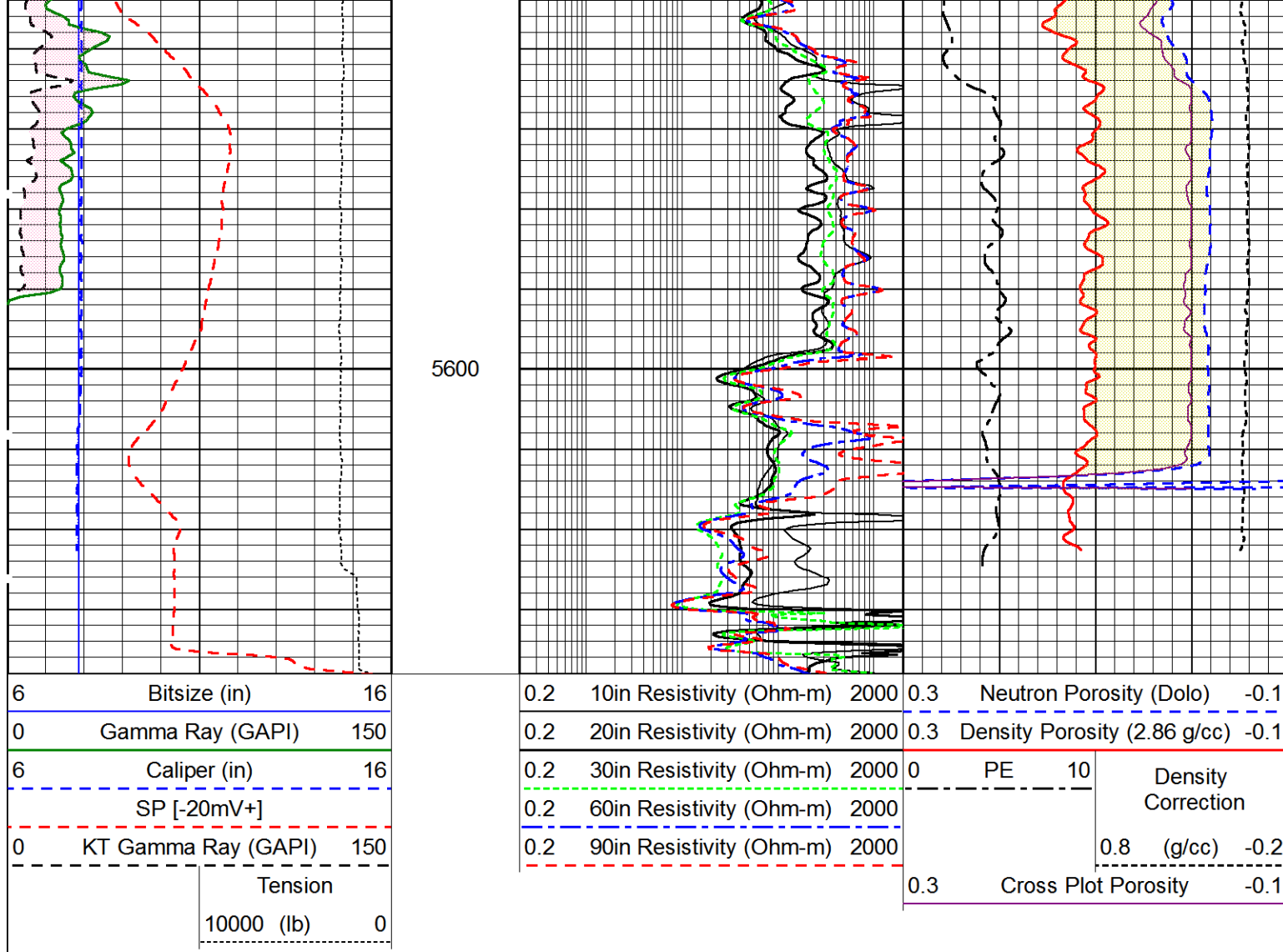




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## Log Variables

Database: C:\Warrior\Data\proghorn\_nattie\_1.db

Dataset: field/well/run1/pass4

### Top - 464.00 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	<b>CASED?</b>  Yes	CASEWGHT lb/ft 11.5	NPORSEL Limestone	AIR_HOLE? No
MudWgt lb/gal 9	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.71	SPSHIFT mV 0	CASEOD in 5.5	PERFS 0	TDEPTH ft 5622	BOTTEMP degF 100
BOREID in 7.875	A 1	M 2					

### 464.00 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
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DEVI ° 0	SRFTEMP degF 68	SO in 1.5	DE-CENT  Yes	CASED?  No	CASEWGHT lb/ft 11.5	NPORSEL  Limestone	AIR_HOLE?  No
MudWgt lb/gal 9	FLUIDDEN g/cc 1	MATRXDEN g/cc 2.71	SPSHIFT mV 0	CASEOD in 5.5	PERFS  0	TDEPTH ft 5622	BOTTEMP degF 100
BOREID in 7.875	A  1	M  2					

Database File: proghorn_nattie_1.db		Calibration Report	
Dataset Pathname: pass4			
Dataset Creation: Wed Jul 24 15:50:51 2013 by Log Sondex V7.03			

Induction Array Tool Calibration Report	
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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:	1.9.3.0
Borehole Size Source:	CALI
Mud Resistivity Source:	Hilchie
Mud Resistivity At Surface:	1.20 Ohm-m
Mud Resistivity Surface Temperature:	75.0 degF
Borehole Corrections:	Automatic
Minimum Standoff:	0.4 in



## Litho Density Tool Calibration Report

Serial Number: B0872S50130B  
Tool Model: 002

Caliper Calibration Performed: Wed Jun 26 11:30:27 2013

	Diameter		Reading	
Small Ring:	6.000	in	1355.300	cps
Large Ring:	13.000	in	2004.700	cps
Gain:	0.0108			
Offset:	-8.6090			

Master Calibration Performed: Wed Jun 26 11:01:57 2013

Source Number: 50103  
Medium: Water  
Al Block Density: 2.5982 g/cc

	Background	Al Block	Al Block + Fe	
SS1	822.8	4393.2	3697.5	cps
SS2	2307.7	29712.2	25027.5	cps
SSTOTAL	5405.6	47464.6	39740.1	cps
LITH	95.7	489.9	293.8	cps
LL	188.5	811.2	710.8	cps
LU	538.1	1063.3	983.9	cps
LS	726.6	1874.5	1694.7	cps
LSTOTAL	1375.4	4558.6	3691.5	cps
SSHV	1470.6	1473.6	1474.1	V
LSHV	1403.7	1405.6	1406.1	V
SSFF	0.010	0.007	0.002	
LSFF	0.010	0.002	-0.002	

Before Survey Verification Performed:

After Survey Verification Performed:

	Master Background	Before Survey Background	After Survey Background	
SS1	822.8			cps
SS2	2307.7			cps
SSTOTAL	5405.6			cps
LITH	95.7			cps
LL	188.5			cps
LU	538.1			cps
LS	726.6			cps
LSTOTAL	1375.4			cps
SSHV	1470.6			V
LSHV	1403.7			V
SSFF	0.010			
LSFF	0.010			

## Tool Module Parameters

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

## Compensated Neutron Tool Calibration Report

Serial Number: C7985S66010B  
Tool Model: 009

Master Calibration Performed:	Wed Jun 26 13:58:43 2013		
Source Number:	66010B		
Short Spacing Counts:	6360.43	cps	
Long Spacing Counts:	264.66	cps	
High Voltage:	1375.16	V	
Target Ratio:	23.9200		
Ratio:	24.0320		
K-Factor:	0.9953		

Before Survey Verification Performed:				
After Survey Verification Performed:				
Verifier Number:	6494			
Verifier Values	Master Cal	Before Survey	After Survey	
Short Spacing Counts:	235.02			cps
Long Spacing Counts:	257.56			cps
High Voltage:	1375.14			V
Ratio:	0.9125			

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

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Spectral Gamma Ray Tool Calibration Report
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Serial Number:	220344
Tool Model:	002

Performed:	Wed Jun 26 13:25:33 2013		
Source Number:	Th Blanket #12		
Calibrator Value:	217.0	API	
Background Reading:	477.0	cps	
Calibrator Reading:	2090.4	cps	
Sensitivity:	0.135	API / cps	

Performed:			
Verifier Number:			
	K %	U ppm	T ppm
Concentrations			
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:

1.8.9.5

## 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

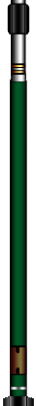
cps

Sensitivity:

0.3122

GAPI/cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
CHD	58.19		CHD-001 (000004) Cable Head	2.19	3.38	35.00
GR	53.31		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	47.63		SGR-002 (220344) Spectral Gamma Ray Tool	4.94	3.88	120.00
WVFUTRF	39.56		MAS-001SS (10010072SS) Multi Array Sonic Tool (SS)	14.28	3.38	242.00
WVFUTRN	38.56					
WVFLTRF	38.56					
WVFLTRN	37.56					
KJT	31.48		KJT-001 (000001) Knuckle Joint	2.86	3.38	72.00
CNLSC	25.59		CNL-009 (C7985S66010B) Compensated Neutron Logging Tool	5.27	3.38	125.00
CNSSC	25.09					
LDT	15.44		LDT-002 (B0872S50130B) Litho Density Tool	9.75	4.50	310.00

IAT	8.44		IAT-002 (B10110) Induction Array Tool	13.22	3.88	196.00
SP BN	0.42 0.38		BN-SOFF (000001) Bottom Nose Standoff	0.38	6.88	6.00
<p>Dataset: proghorn_nattie_1.db: field/well/run1/pass4</p> <p>Total Length: 58.19 ft</p> <p>Total Weight: 1222.00 lb</p> <p>O.D.: 6.88 in</p>						