NABORS COMPLETION & PRODUCTION SERVICES CO.

DUAL INDUCTION LOG

Company MULL DRILLING COMPANY, INC.
Well APC - BETTY #1-27
Field
County CHEYENNE
State COLORADO

Company MULL DRILLING COMPANY, INC.
Well APC - BETTY #1-27
Field
County CHEYENNE State COLORADO
Location: API # : 05-017-07779-0000
865' FSL & 1878' FEL
SW/4 - SE/4
SEC 27 TWP 16S RGE 45W

Permanent Datum	GROUND LEVEL	Elevation 4227	Other Services CDL/CNL/PE MEL/SON
Log Measured From	KELLY BUSHING 11' A.G.L.		Elevation K.B. 4238
Drilling Measured From	KELLY BUSHING		D.F. 4236 G.L. 4227

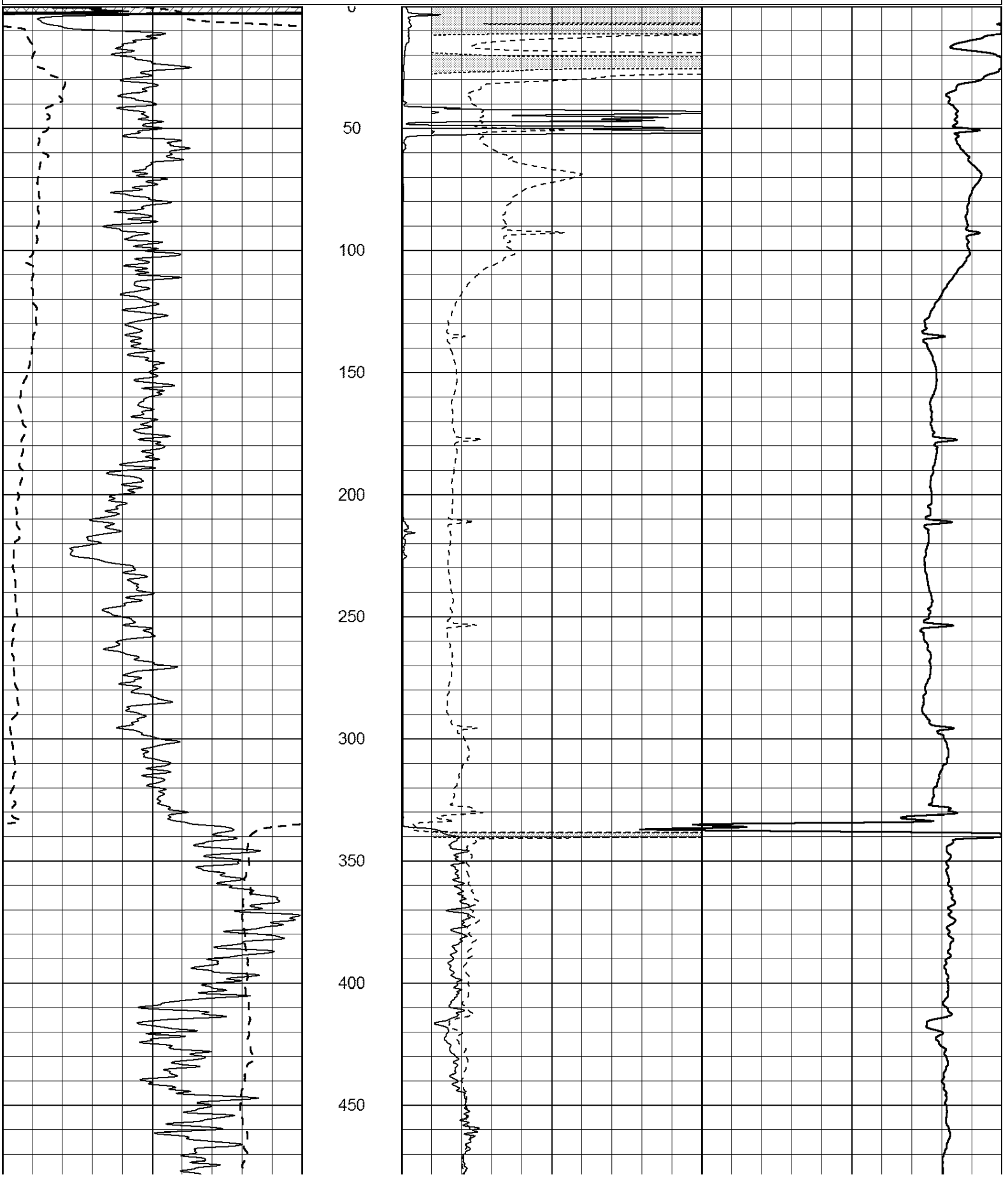
Date	1/23/14		
Run Number	ONE		
Depth Driller	5490		
Depth Logger	5494		
Bottom Logged Interval	5492		
Top Log Interval	0		
Casing Driller	8 5/8" @ 343		
Casing Logger	339		
Bit Size	7 7/8"		
Type Fluid in Hole	CHEMICAL MUD	CHLORIDES 4000 PPM	
Density / Viscosity	9.3/58		
pH / Fluid Loss	10.5/8.0		
Source of Sample	FLOWLINE		
Rm @ Meas. Temp	.75 @ 72F		
Rmf @ Meas. Temp	.56 @ 72F		
Rmc @ Meas. Temp	.89 @ 72F		
Source of Rmf / Rmc	MEASUREMENT		
Rm @ BHT	.42 @ 129F		
Time Circulation Stopped	2 HOURS		
Time Logger on Bottom			
Maximum Recorded Temperature	129F		
Equipment Number	4010		
Location	HAYS, KANSAS		
Recorded By	JEFF GRONEWEG		
Witnessed By	PHIL ASKEY		

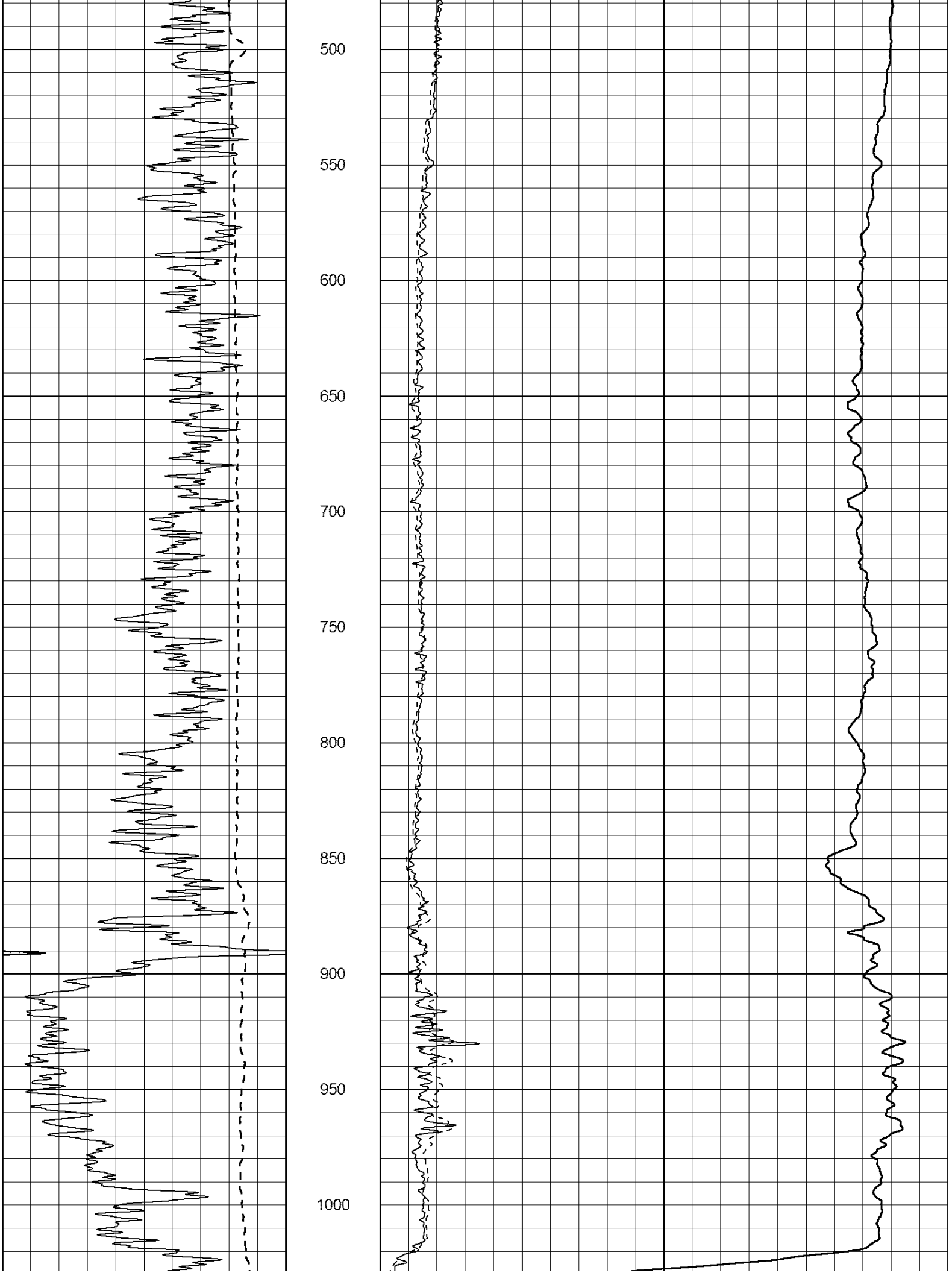
<<< Fold Here >>>

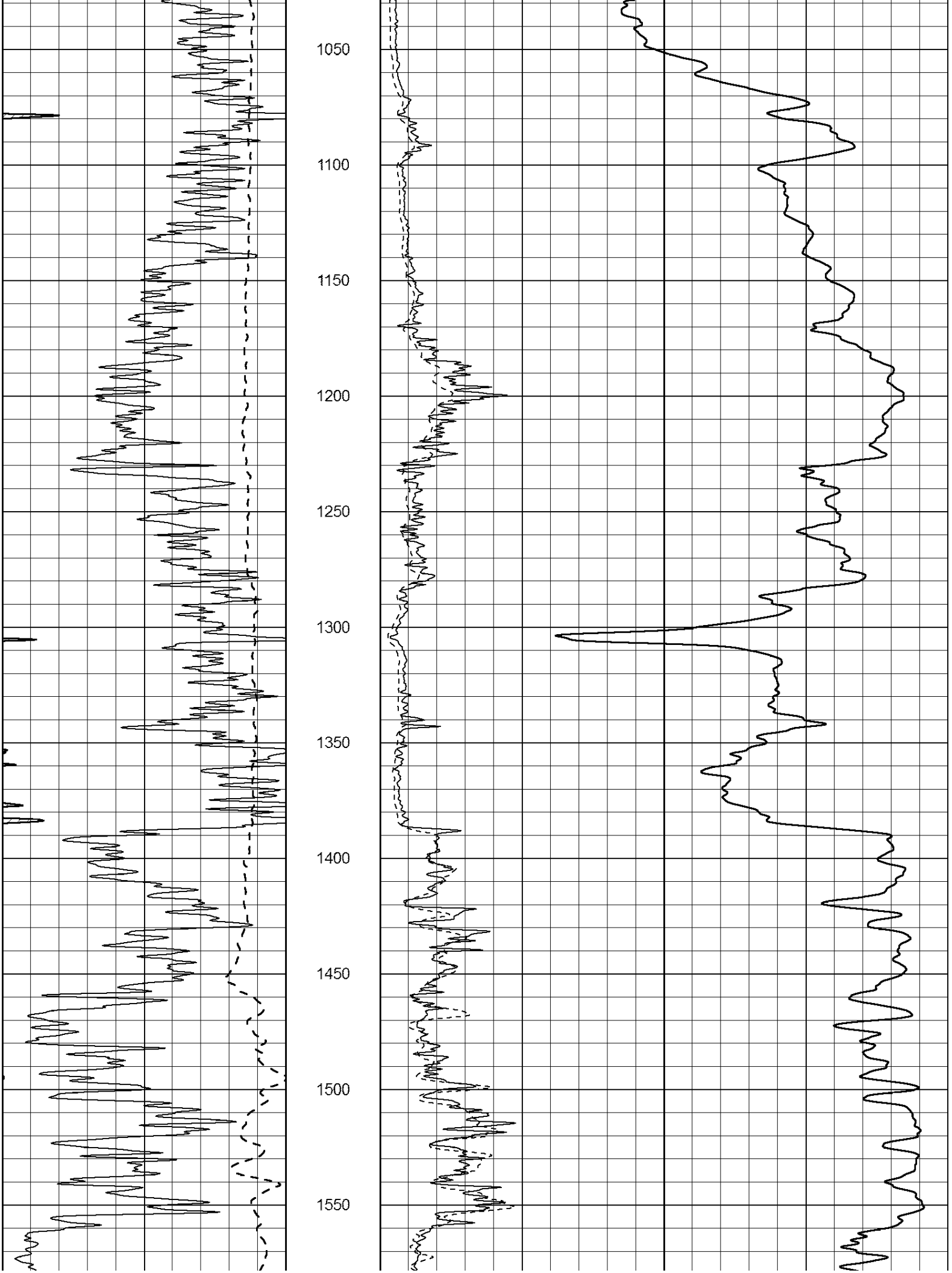
Comments

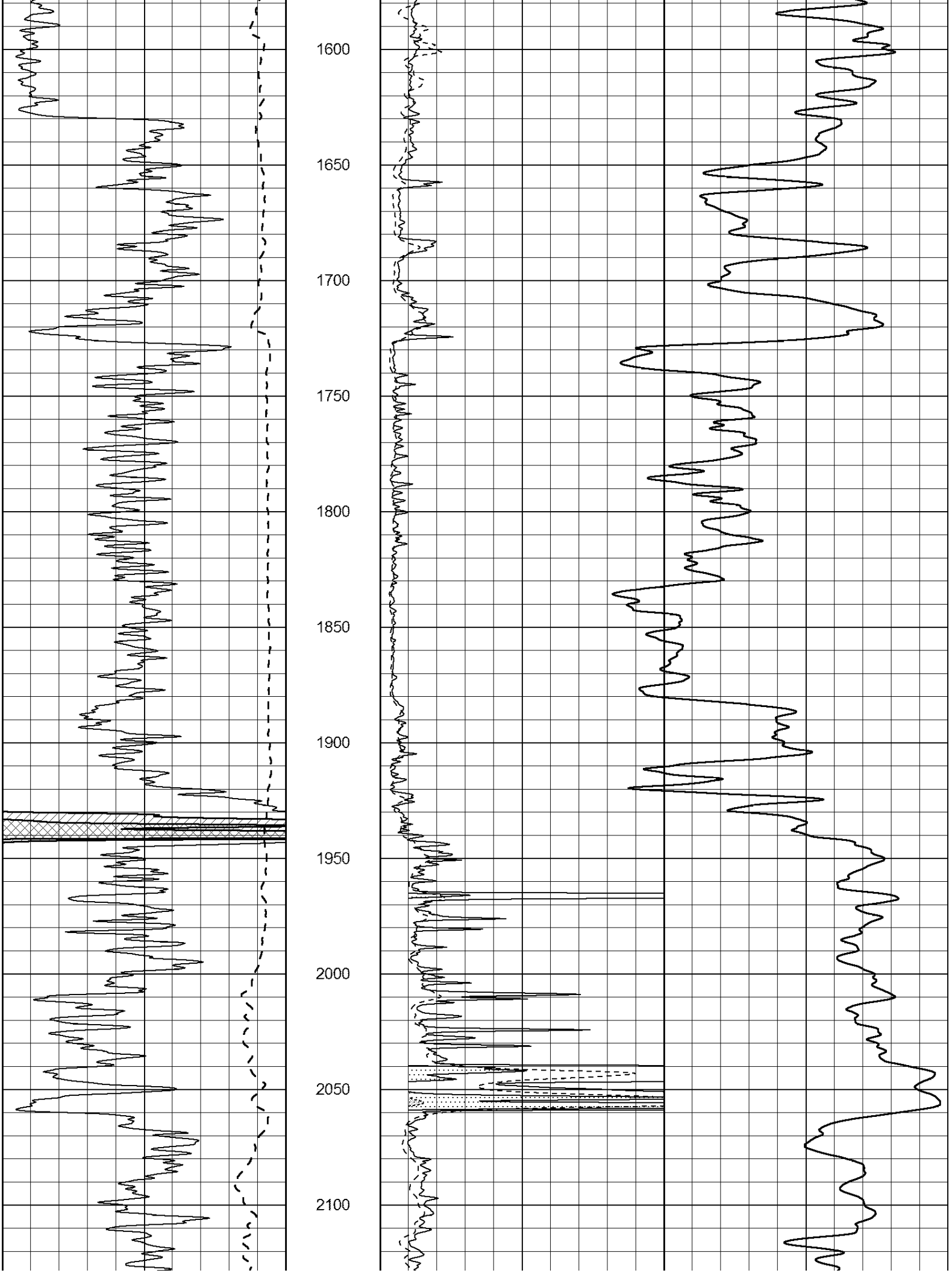
THANK YOU FOR USING NABORS, HAYS, KS. (785) 628-6395
DIRECTIONS:
CHEYENNE WELLS, COLORADO - 14 MILES SOUTH ON HWY 385 TO RD C
6 MILES WEST TO T IN ROAD - 1/2 MILE SOUTH - WEST INTO

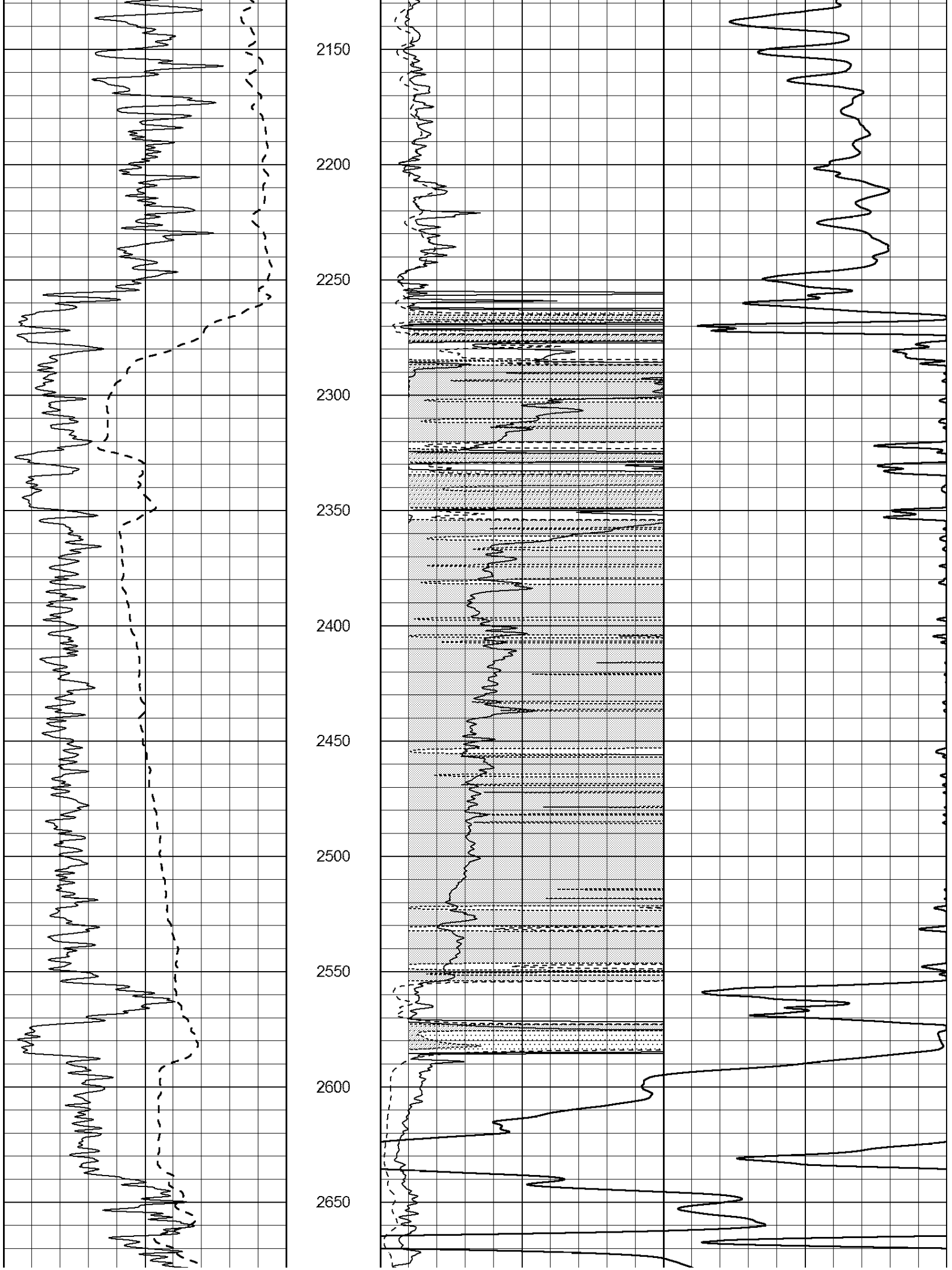
Database File:	23879pe.db
Dataset Pathname:	pass4.3
Presentation Format:	_dil2
Dataset Creation:	Thu Jan 23 12:46:54 2014 by Calc Open-Cased 090629
Charted by:	Depth in Feet scaled 1:600

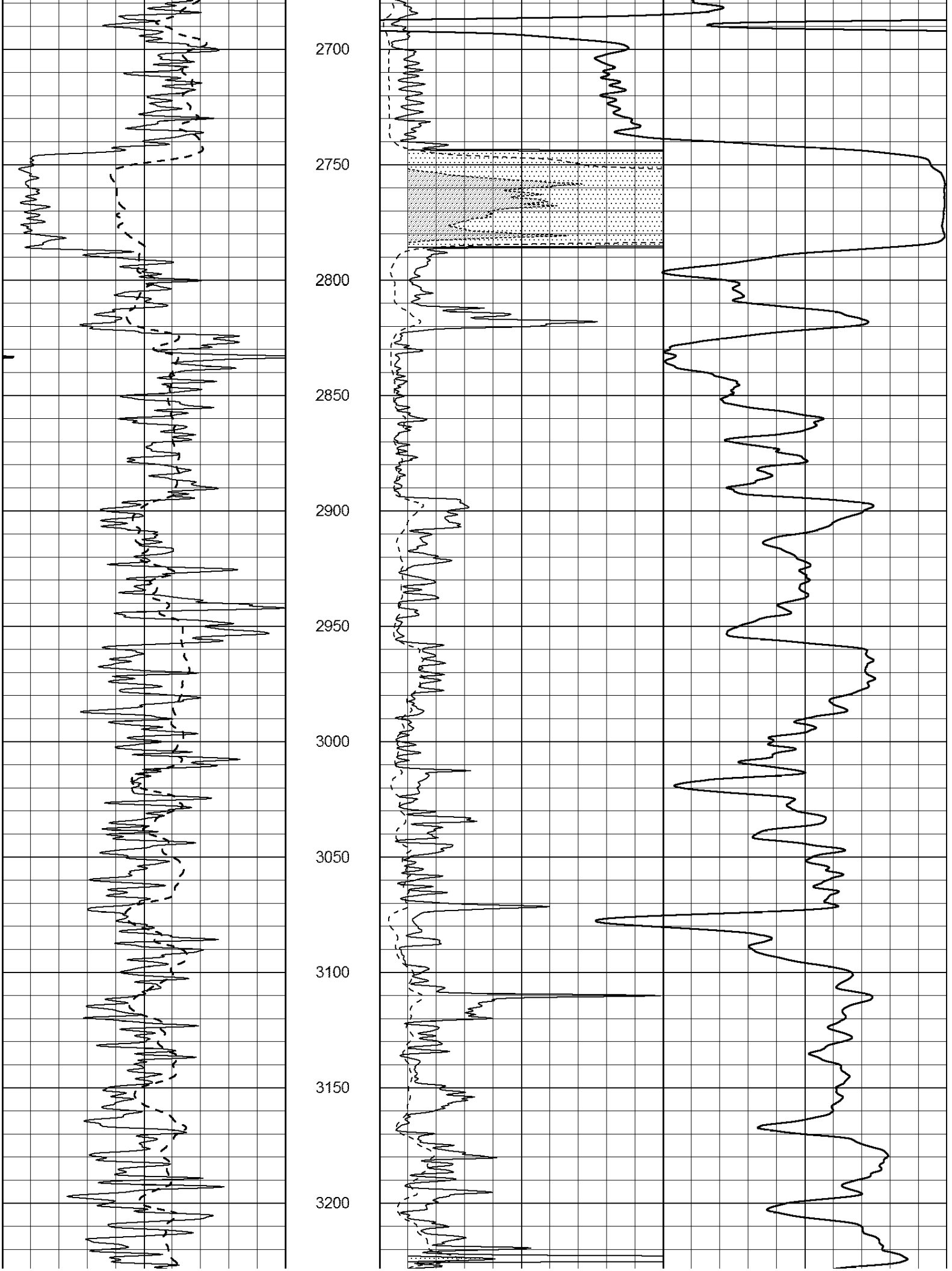

0 Gamma Ray (GAPI) 150
-100 SP (mV) 100
0 RLL3 (Ohm-m) 50
0 RILD (Ohm-m) 50
1000 CILD (mmho/m) 0
50 RILD X10 (Ohm-m) 500
50 RLL3 X10 (Ohm-m) 500
0
50
100
150
200
250
300
350
400
450

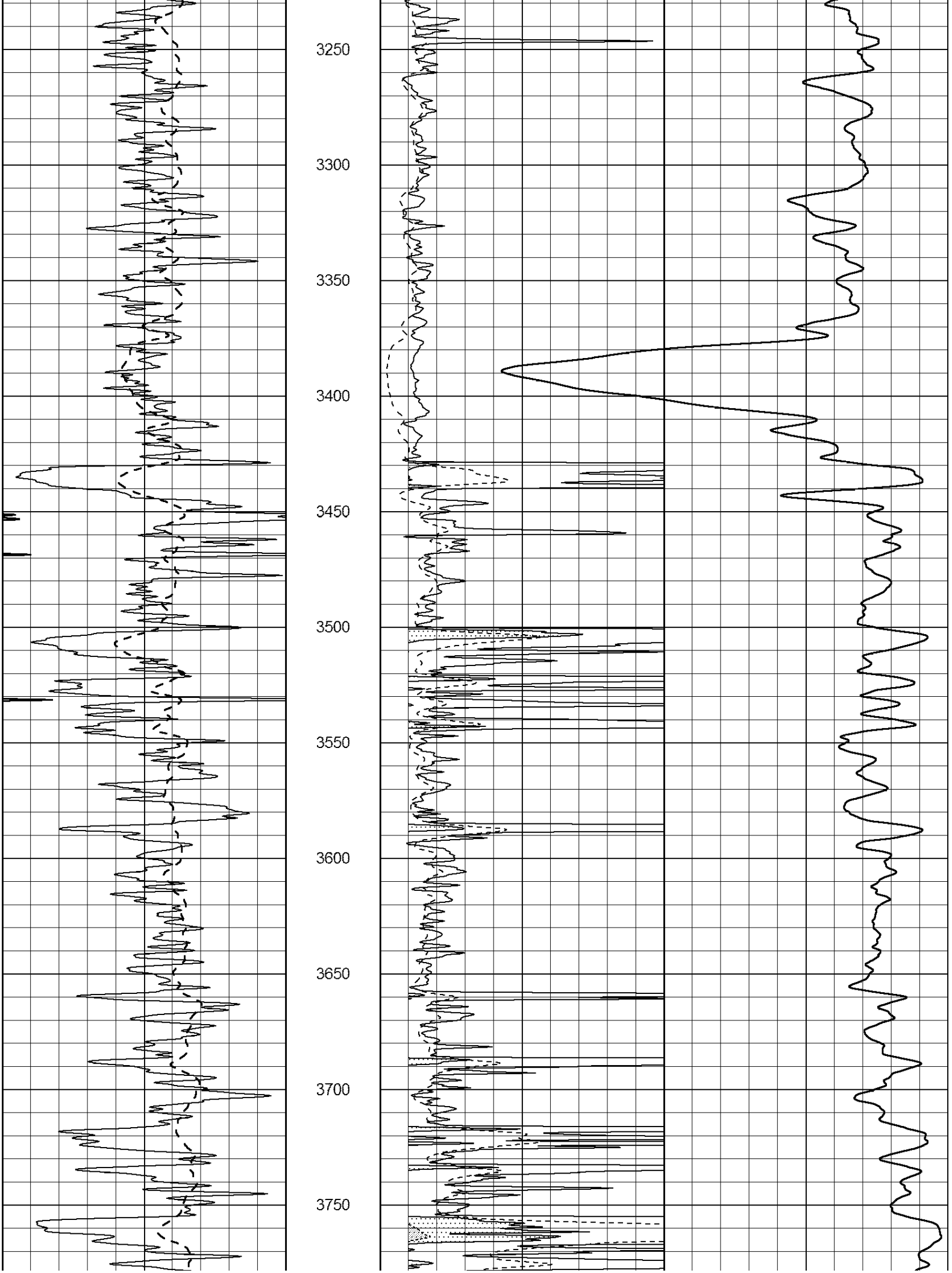

500
550
600
650
700
750
800
850
900
950
1000

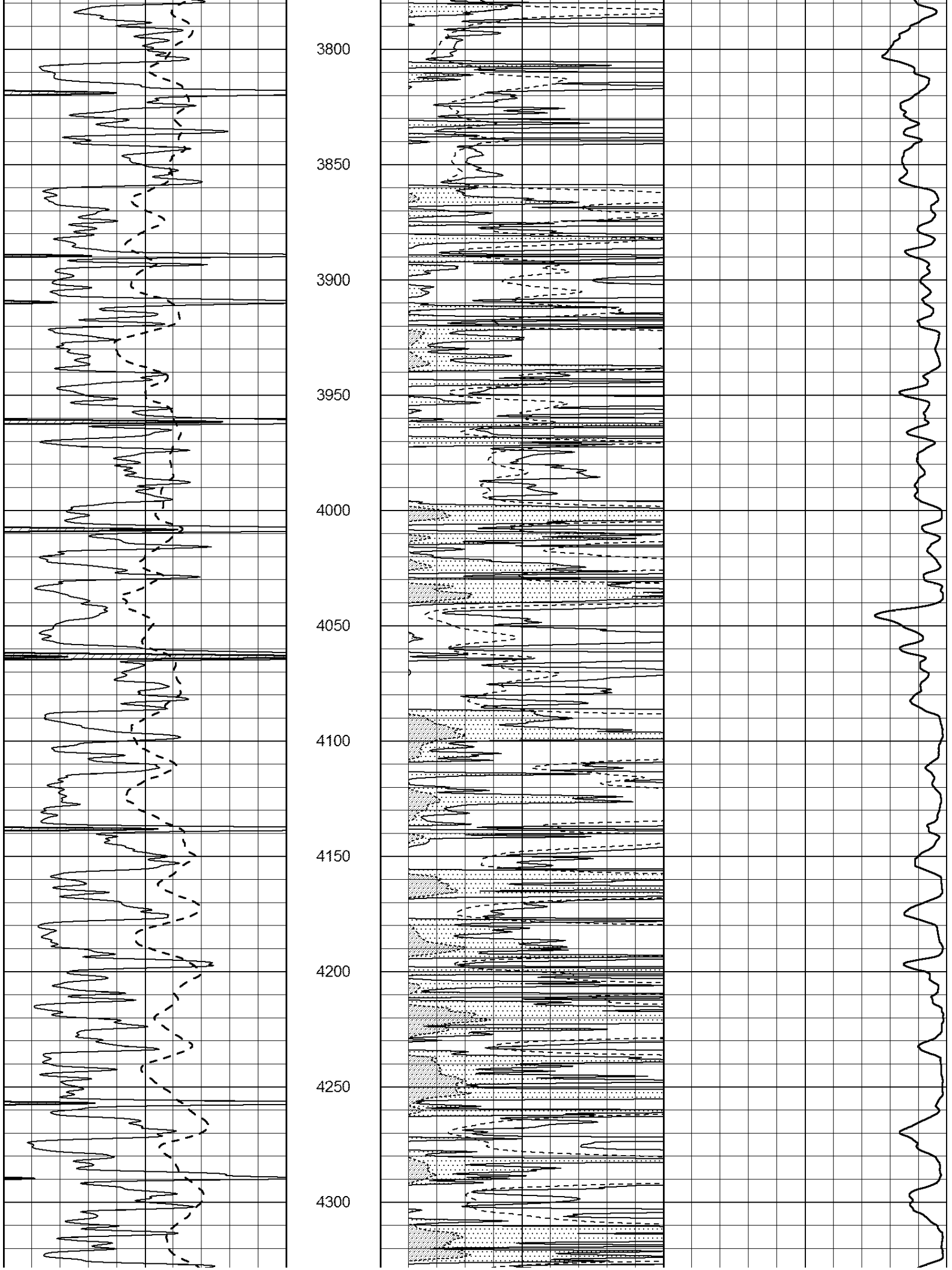

1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550

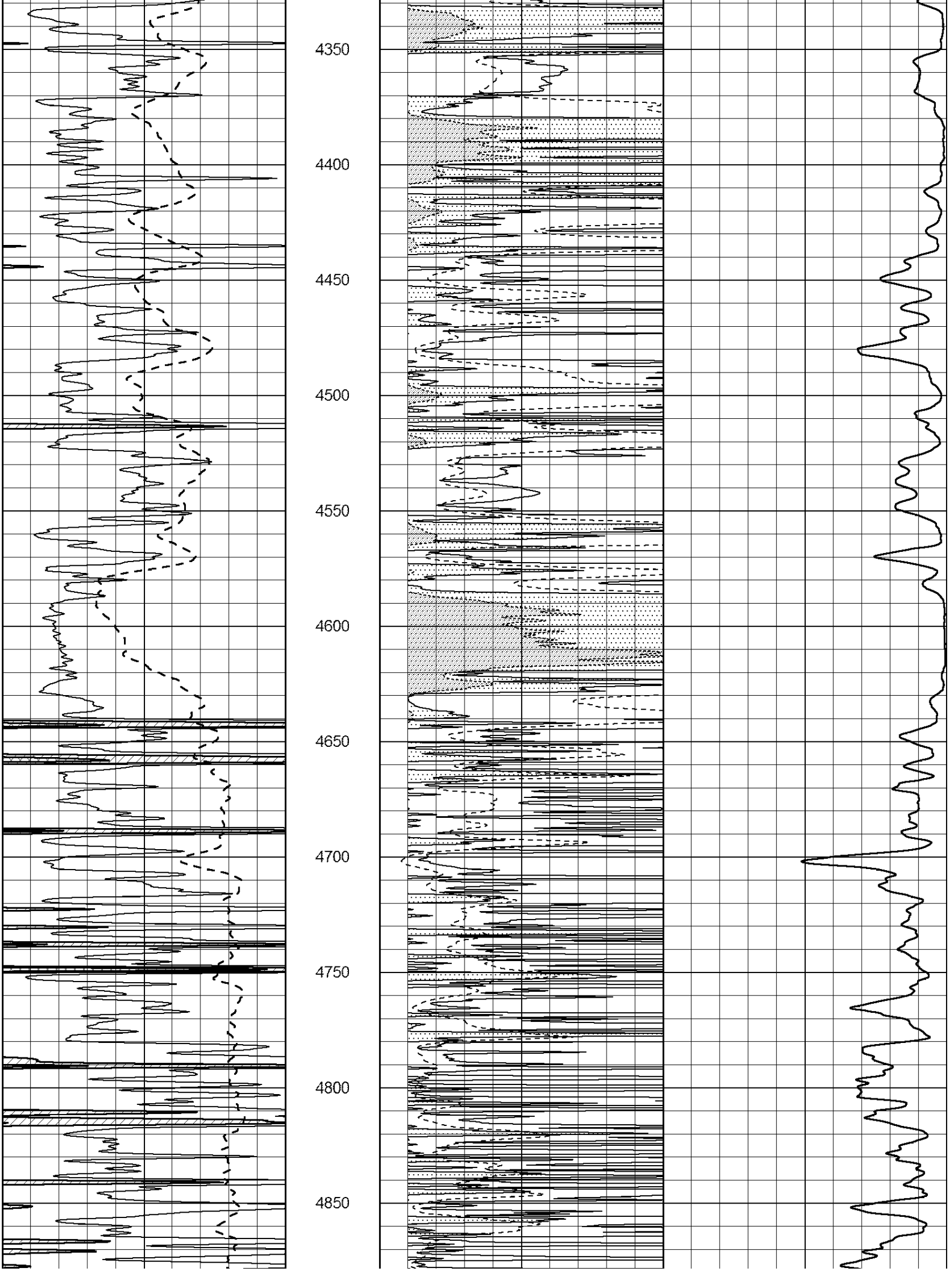

1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100

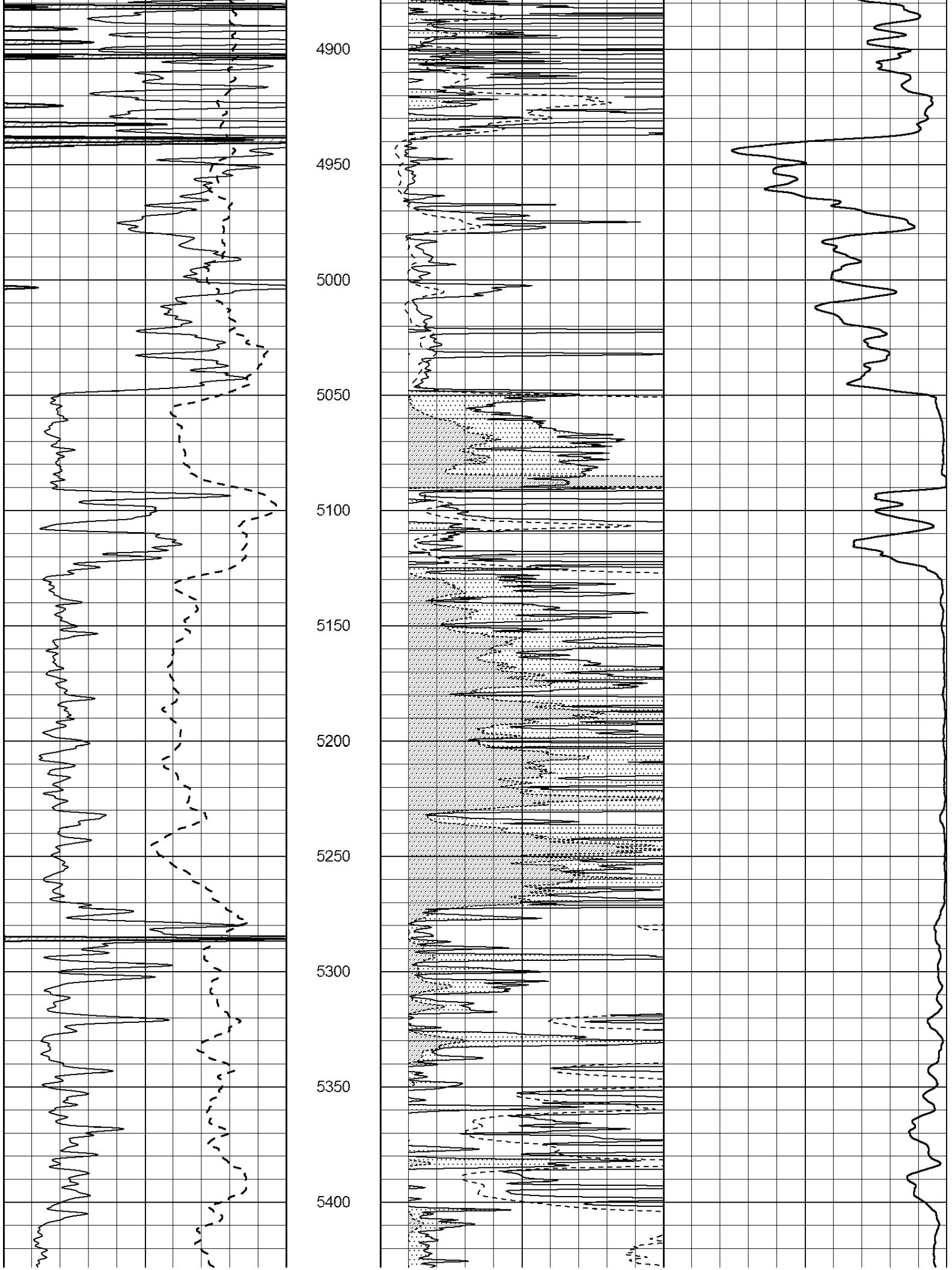

2150
2200
2250
2300
2350
2400
2450
2500
2550
2600
2650

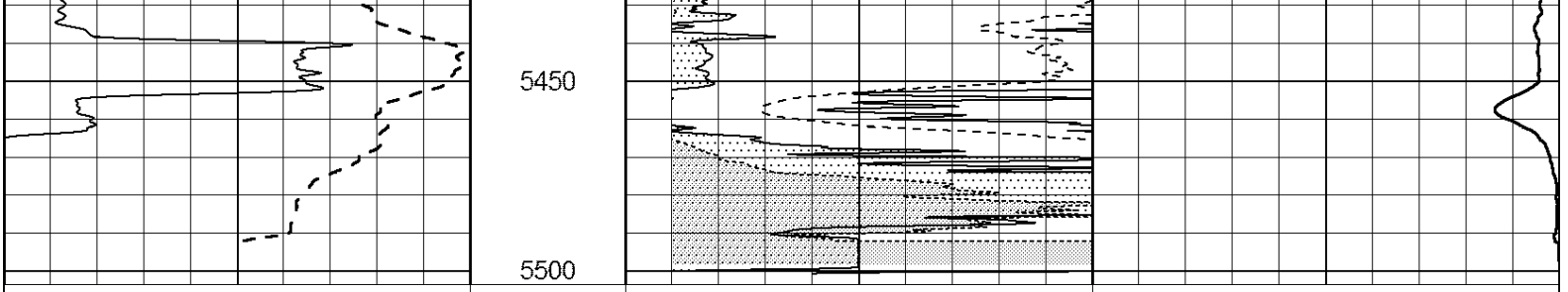

2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3200


3250
3300
3350
3400
3450
3500
3550
3600
3650
3700
3750

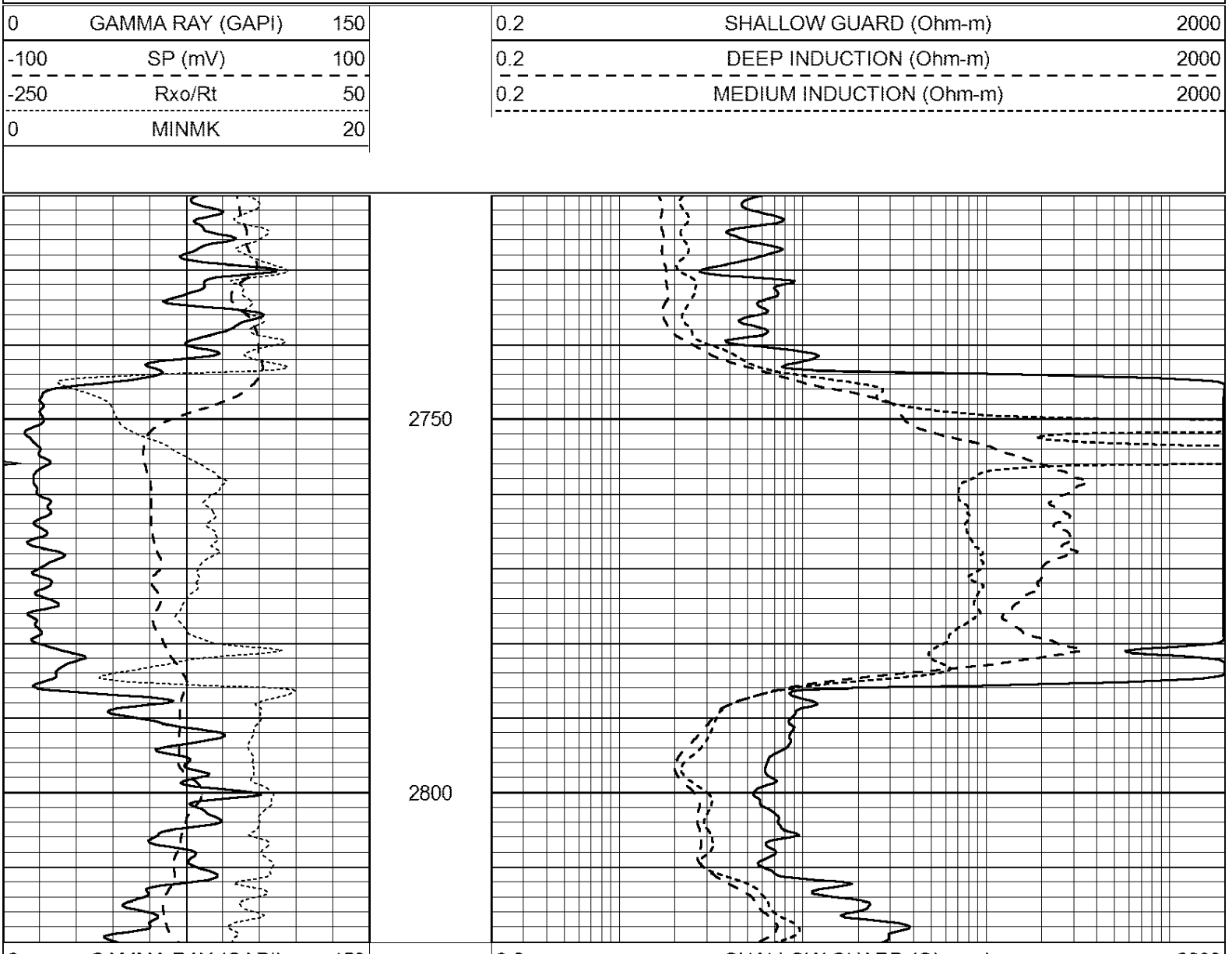

3800
3850
3900
3950
4000
4050
4100
4150
4200
4250
4300


4350
4400
4450
4500
4550
4600
4650
4700
4750
4800
4850


4900
4950
5000
5050
5100
5150
5200
5250
5300
5350
5400



Database File: 23879pe.db
Dataset Pathname: pass4.3
Presentation Format: _dil
Dataset Creation: Thu Jan 23 12:46:54 2014 by Calc Open-Cased 090629
Charted by: Depth in Feet scaled 1:240

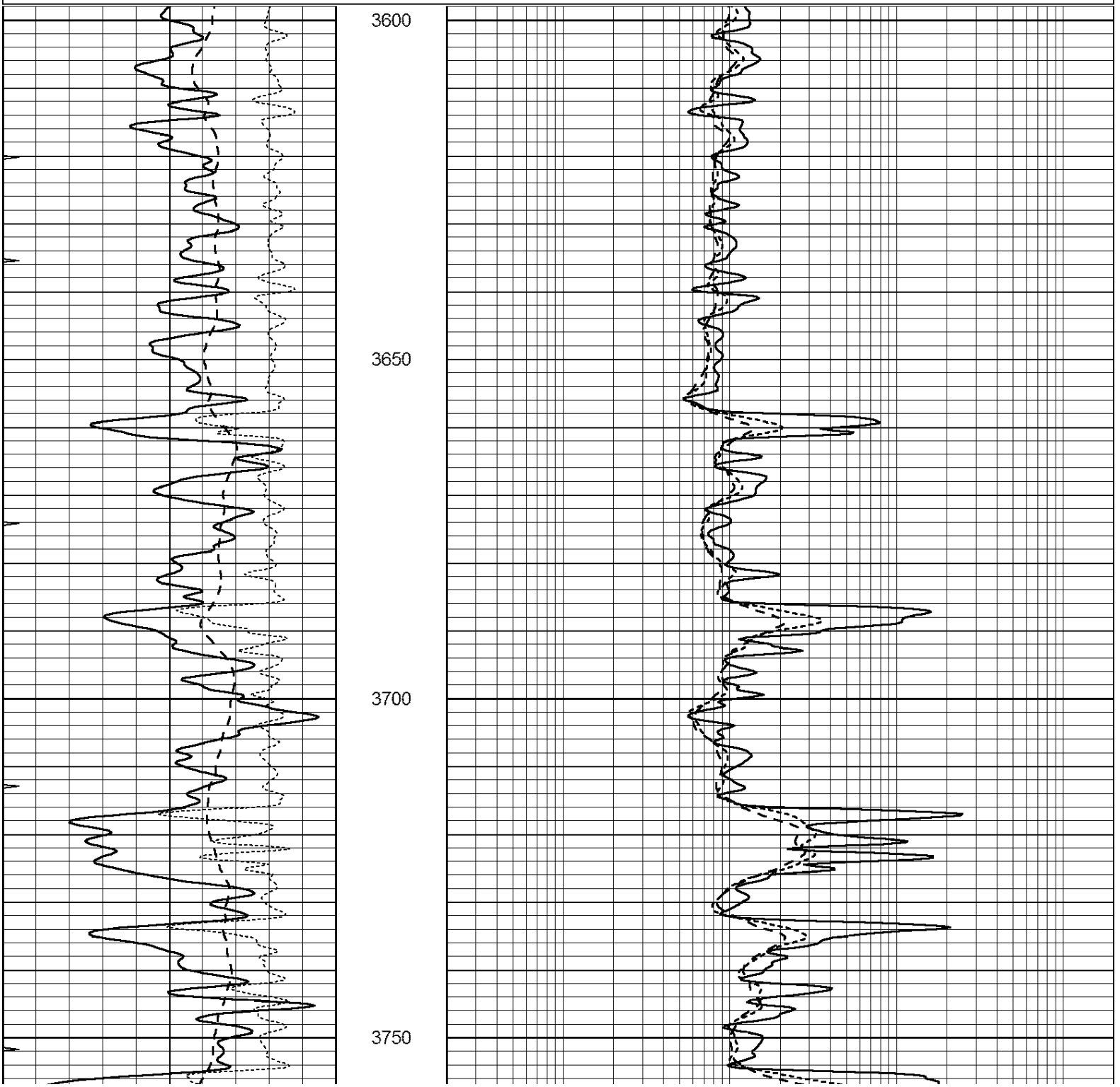


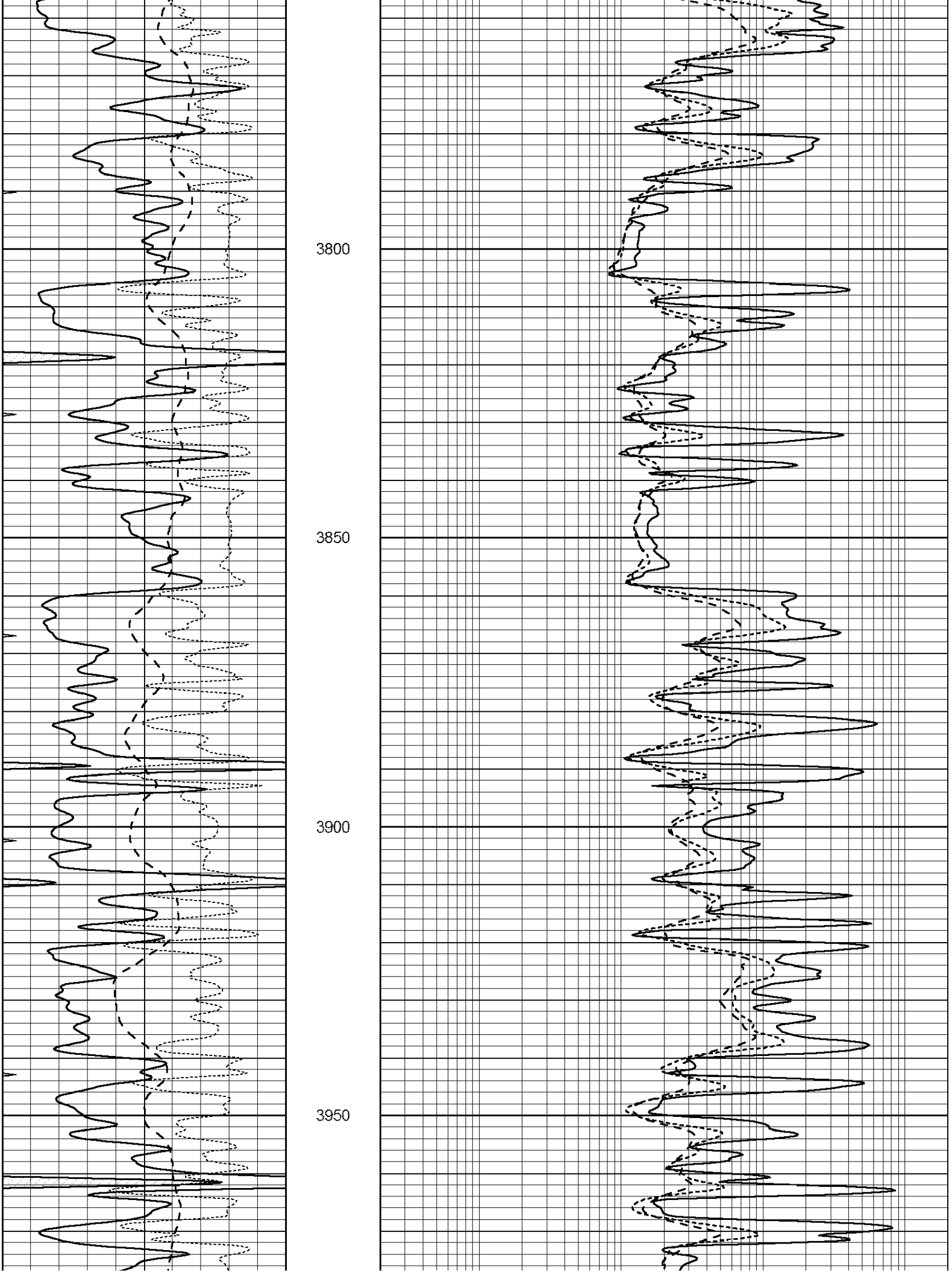
0	MINMK	20

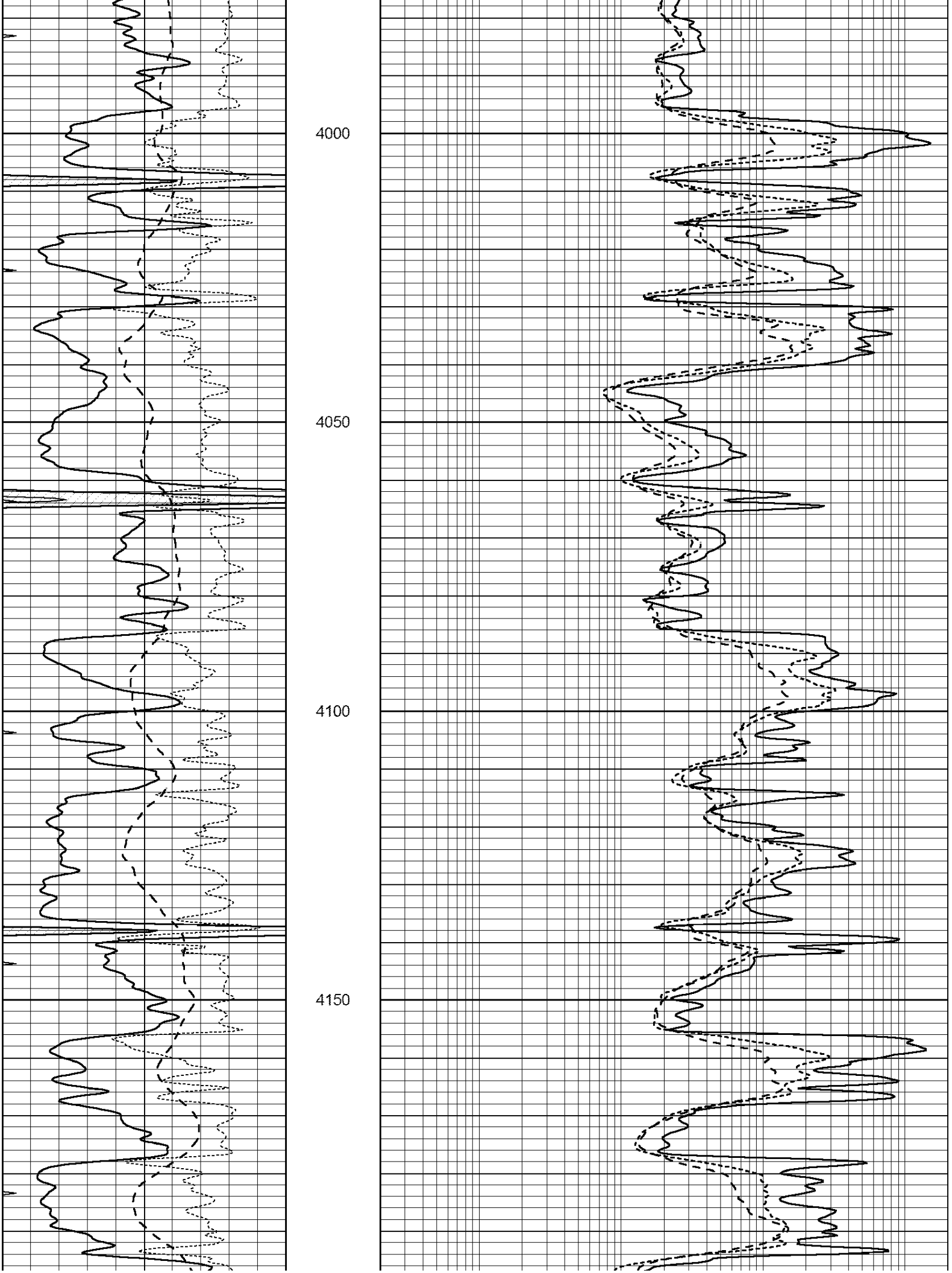
Database File:	23879pe.db
Dataset Pathname:	pass4.3
Presentation Format:	_dil
Dataset Creation:	Thu Jan 23 12:46:54 2014 by Calc Open-Cased 090629
Charted by:	Depth in Feet scaled 1:240

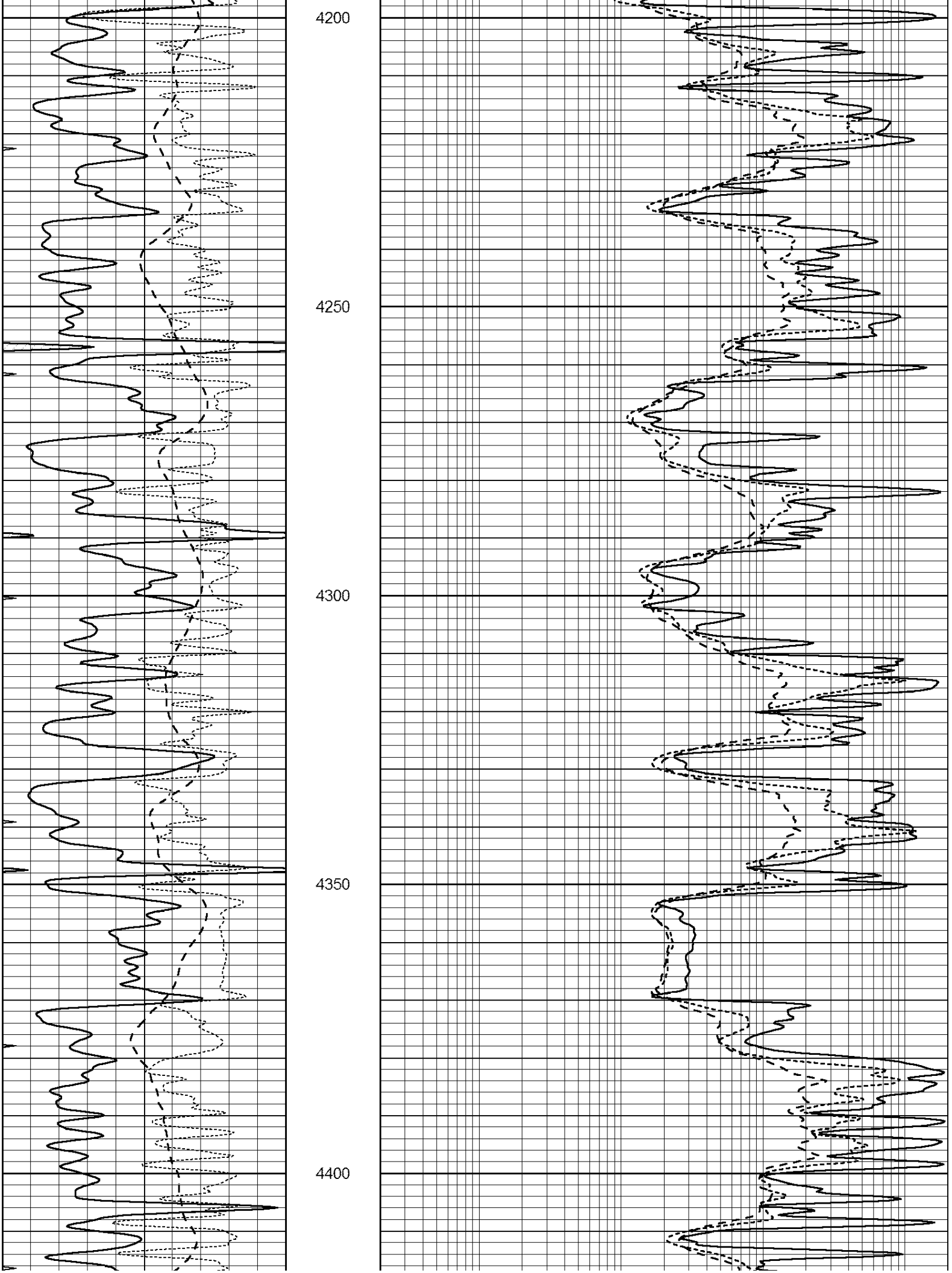
0	GAMMA RAY (GAPI)	150
-100	SP (mV)	100
-250	Rxo/Rt	50
0	MINMK	20

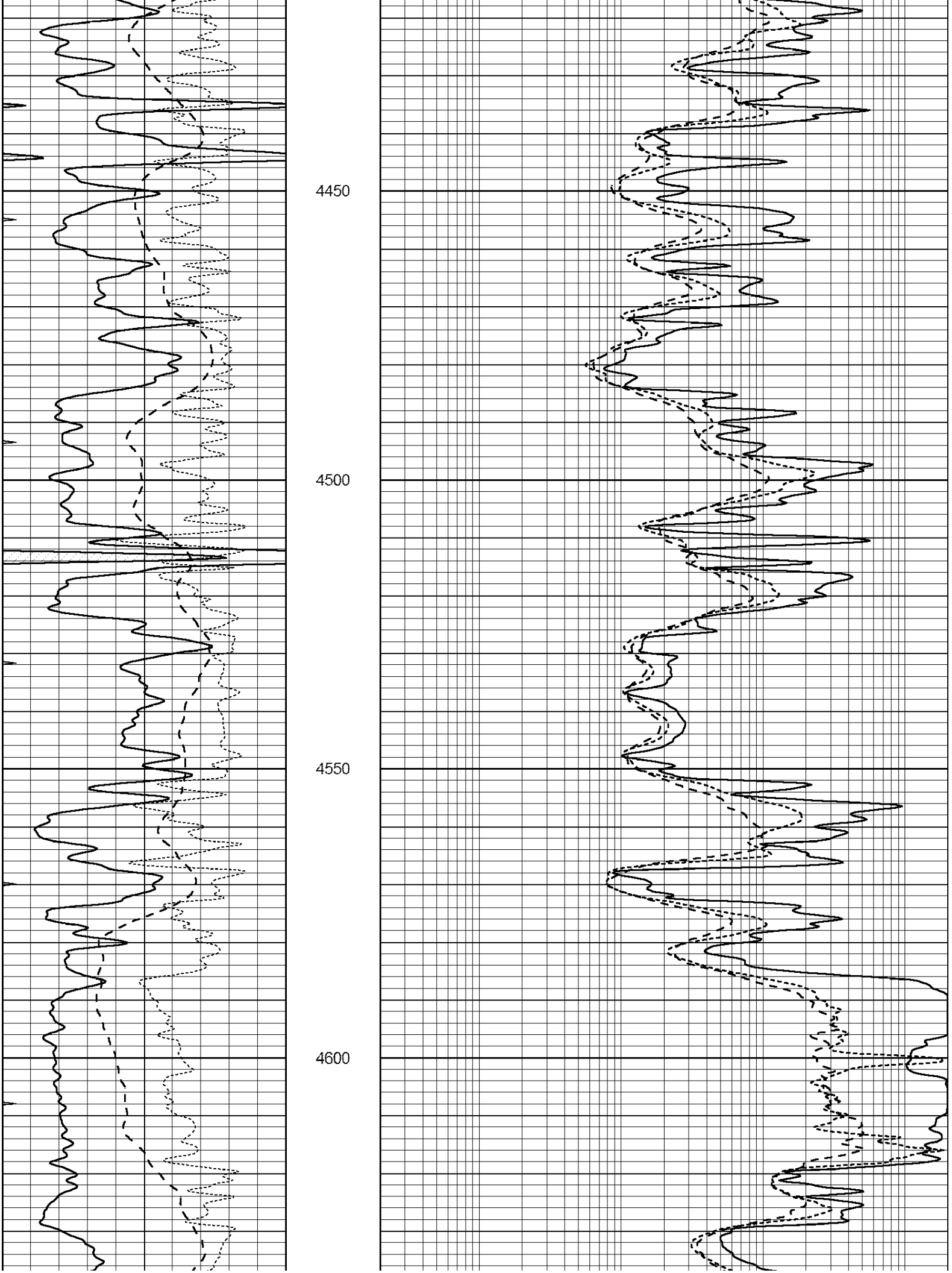
0.2	SHALLOW GUARD (Ohm-m)	2000
0.2	DEEP INDUCTION (Ohm-m)	2000
0.2	MEDIUM INDUCTION (Ohm-m)	2000

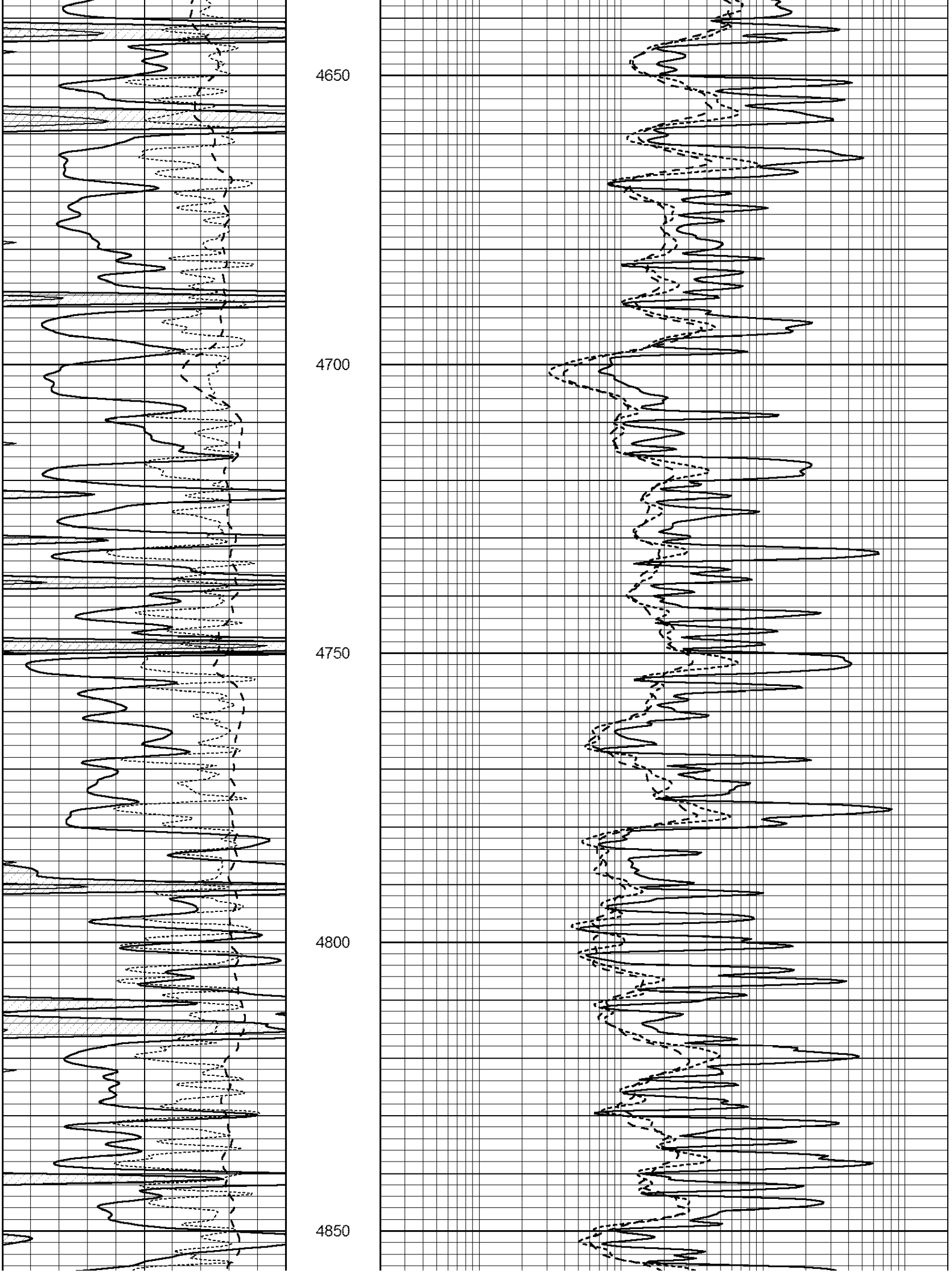


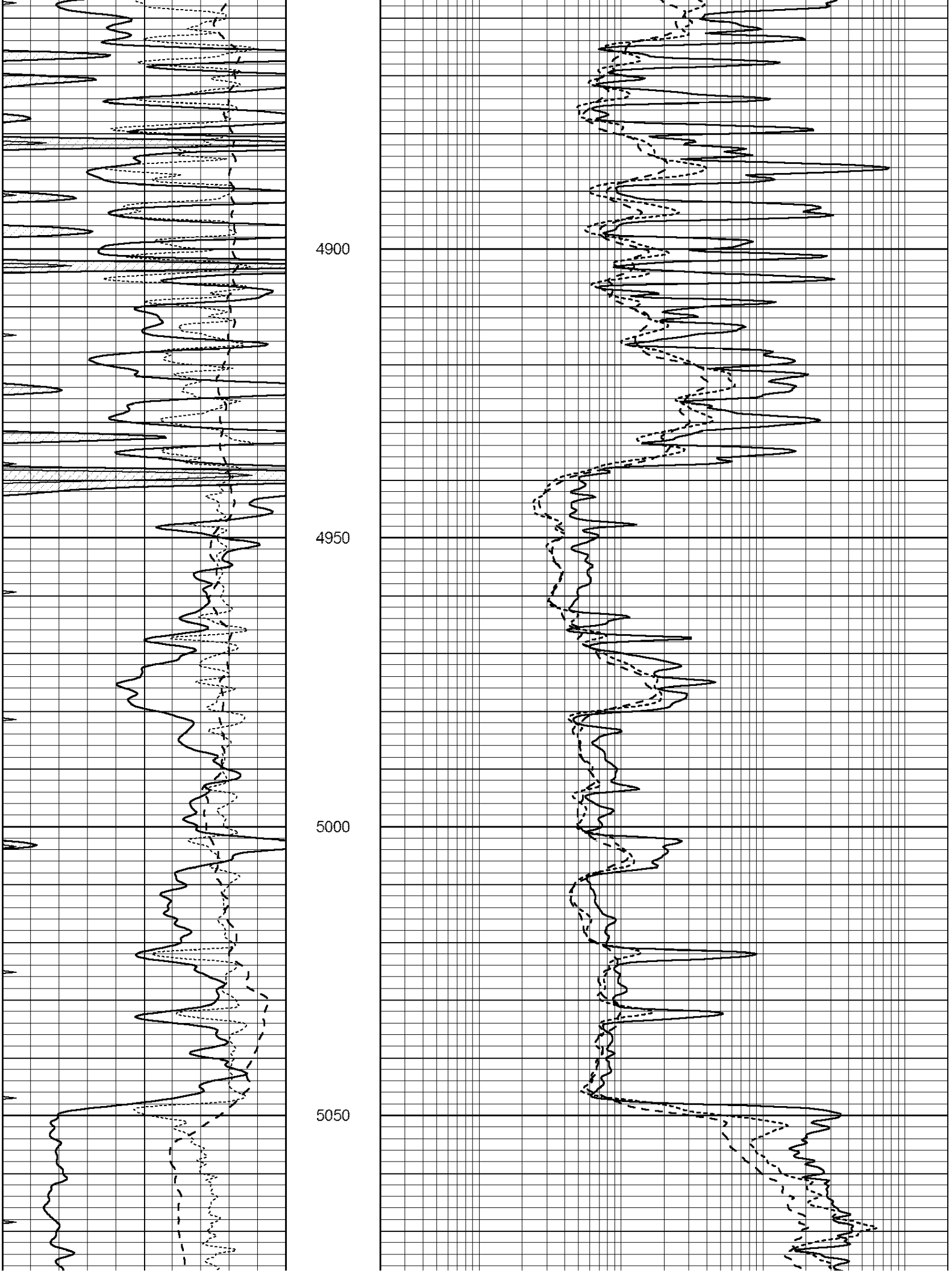

3800
3850
3900
3950

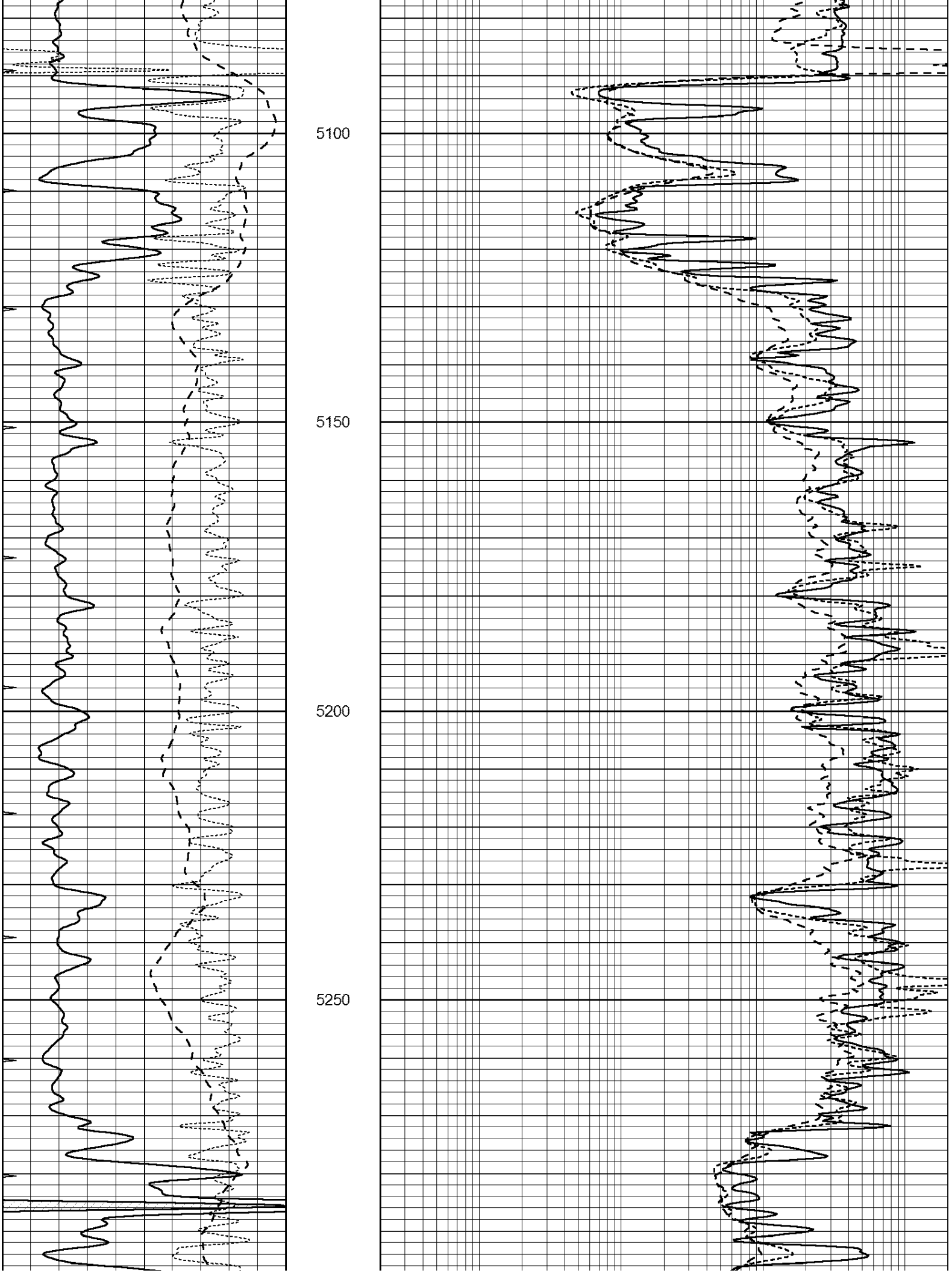

4000
4050
4100
4150

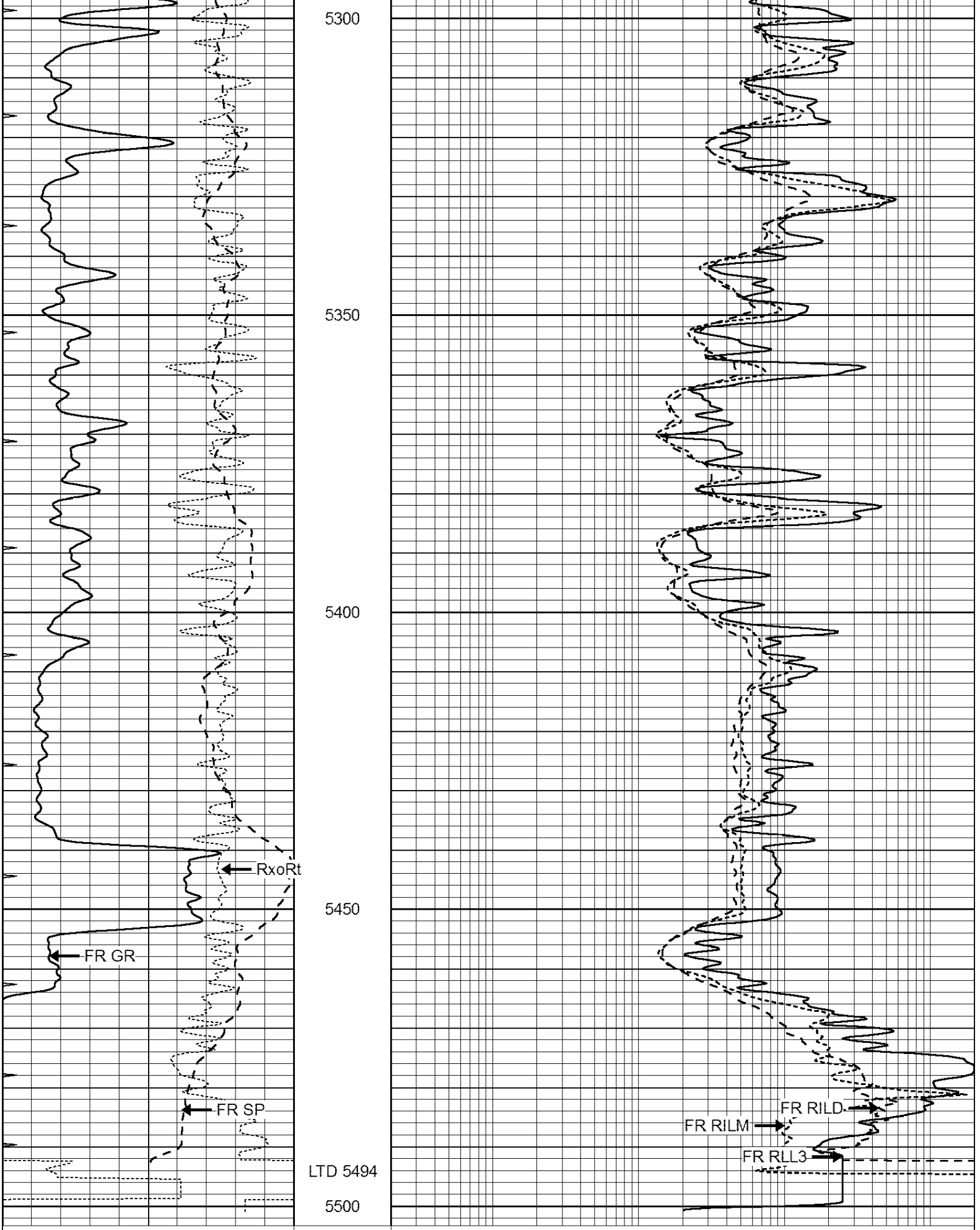

4200
4250
4300
4350
4400


4450
4500
4550
4600


4650
4700
4750
4800
4850


4900
4950
5000
5050


5100
5150
5200
5250


5300
5350
5400
5450
5500
RxoRt
FR GR
FR SP
LTD 5494
FR RILD
FR RILM
FR RLL3
0
GAMMA RAY (GAPI)
150
-100
SP (mV)
100
-250
Rxo/Rt
50
0.2
SHALLOW GUARD (Ohm-m)
2000
0.2
DEEP INDUCTION (Ohm-m)
2000
0.2
MEDIUM INDUCTION (Ohm-m)
2000

0	MINMK	20

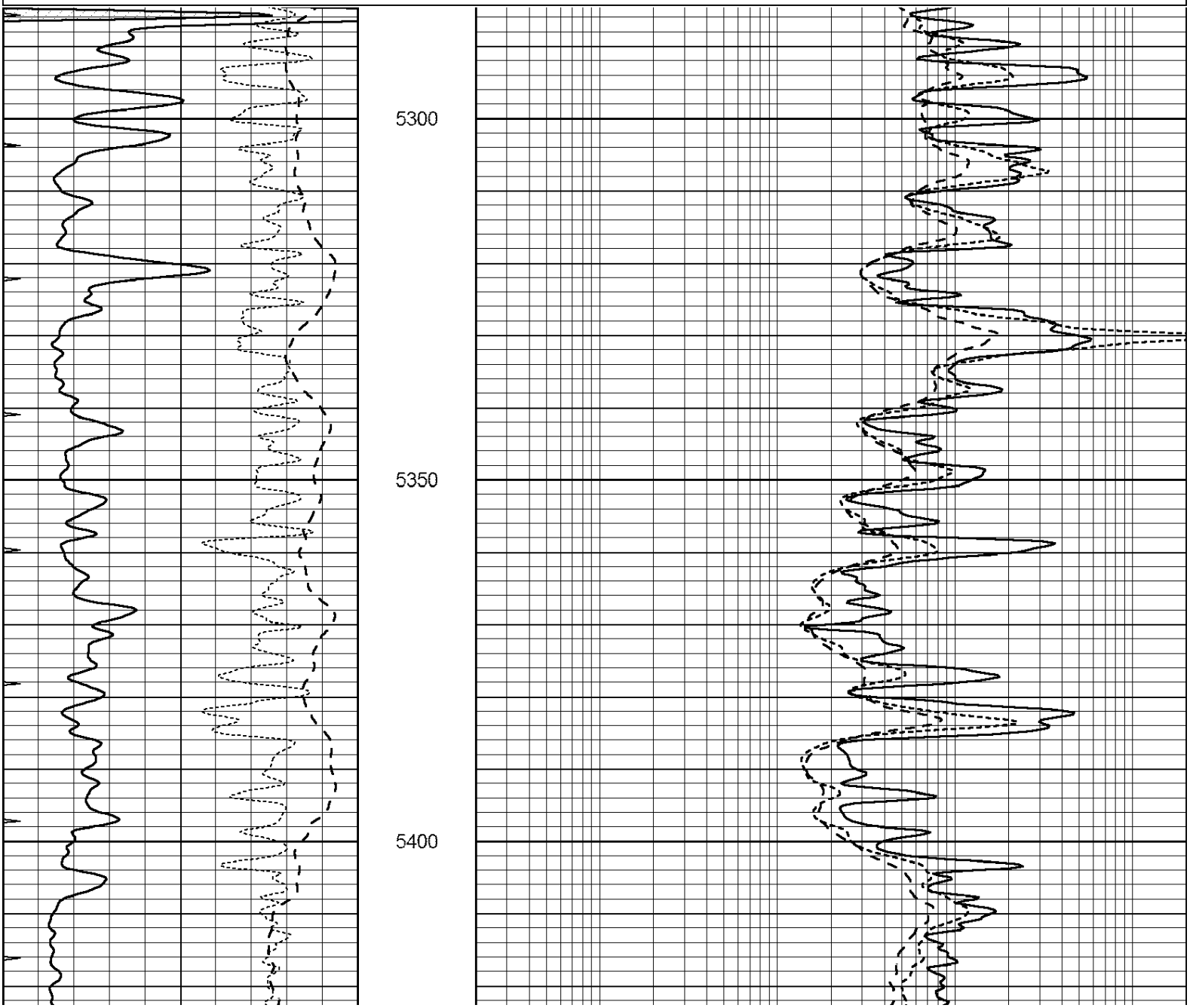
NABORS
COMPLETION & PRODUCTION SERVICES CO.

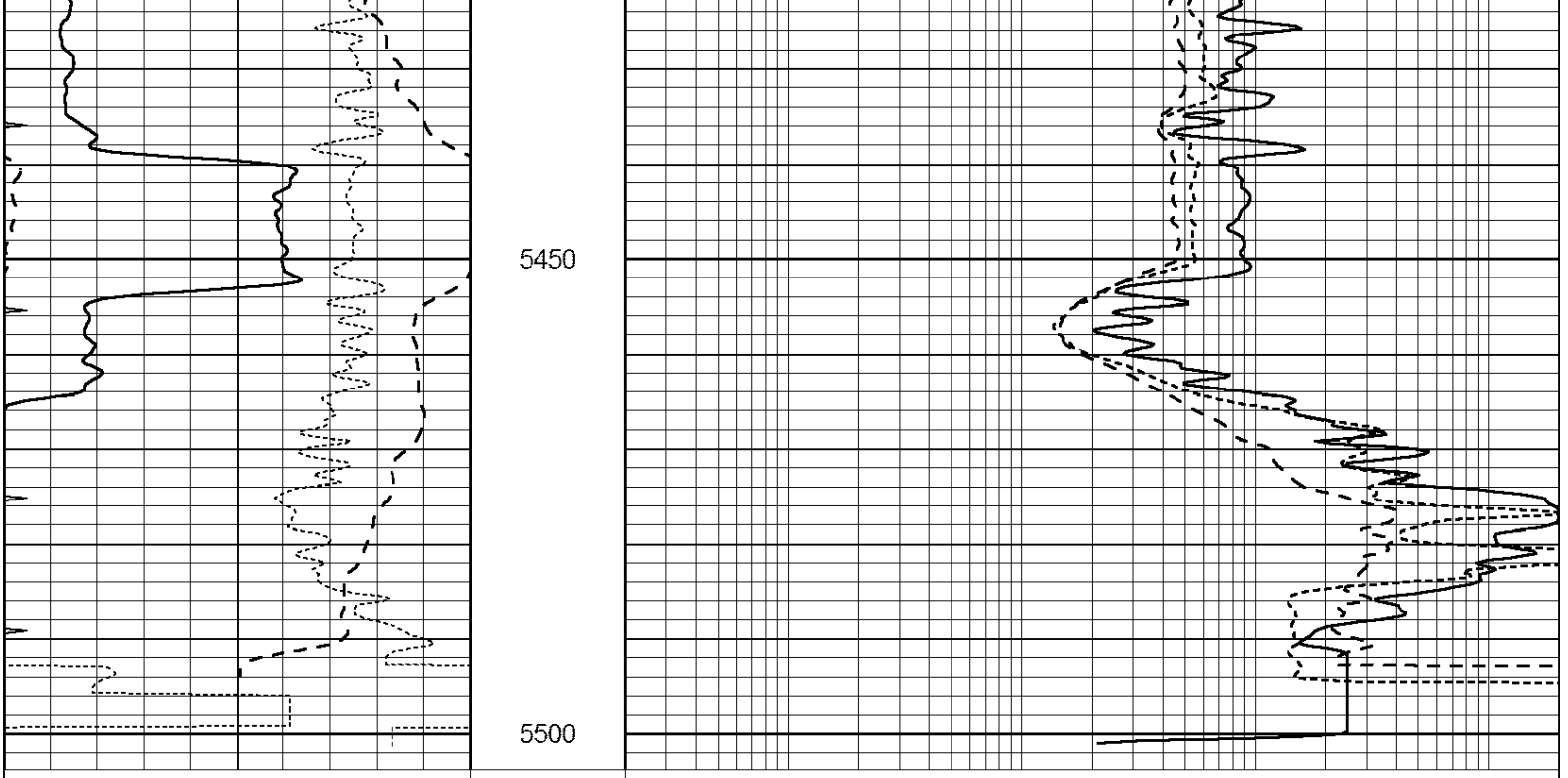
REPEAT SECTION

Database File: 23879pe.db
Dataset Pathname: pass3.3
Presentation Format: _dil
Dataset Creation: Thu Jan 23 12:18:13 2014
Charted by: Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150
-100	SP (mV)	100
-250	Rxo/Rt	50
0	MINMK	20

0.2	SHALLOW GUARD (Ohm-m)	2000
0.2	DEEP INDUCTION (Ohm-m)	2000
0.2	MEDIUM INDUCTION (Ohm-m)	2000





0	GAMMA RAY (GAPI)	150
-100	SP (mV)	100
-250	Rxo/Rt	50
0	MINMK	20

0.2	SHALLOW GUARD (Ohm-m)	2000
0.2	DEEP INDUCTION (Ohm-m)	2000
0.2	MEDIUM INDUCTION (Ohm-m)	2000

Calibration Report

Database File: 23879pe.db
Dataset Pathname: pass4.3
Dataset Creation: Thu Jan 23 12:46:54 2014 by Calc Open-Cased 090629

Dual Induction Calibration Report

Serial-Model:	PROBE8-DILG
Surface Cal Performed:	Fri Aug 01 06:33:19 2008
Downhole Cal Performed:	Mon Jul 28 11:08:27 2008
After Survey Verification Performed:	Mon Jul 28 11:08:27 2008

Surface Calibration

	Readings			References			Results	
Loop:	Air	Loop		Air	Loop		m	b
Deep	0.015	0.648	V	0.000	400.000	mmho/m	632.616	-9.730
Medium	0.029	0.796	V	0.000	464.000	mmho/m	605.049	-17.680
Internal:	Zero	Cal		Zero	Cal		m	b
Deep	0.017	0.657	V	0.000	400.000	mmho/m	625.153	-10.619
Medium	0.016	0.757	V	0.000	464.000	mmho/m	625.992	-9.739

Downhole Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		m'	b'
Deep	0.000	0.000	mmho/m	2.011	405.777	mmho/m	1.000	0.000
Medium	0.000	0.000	mmho/m	7.590	503.393	mmho/m	1.000	0.000
LL3		7.500	V		1500.000	Ohm-m		
		0.000	V		20.000	Ohm-m		

	-7.200	V		3800.000	mmho-m

After Survey Verification

	Readings			Targets			Results	
	Zero	Cal		Zero	Cal		m'	b'
Deep	0.000	0.000	mmho/m	0.000	0.000	mmho/m	0.000	0.000
Medium	0.000	0.000	mmho/m	0.000	0.000	mmho/m	0.000	0.000
LL3		1.000	Ohm-m		1.000	Ohm-m		
		0.000	Ohm-m		0.000	Ohm-m		
		1.000	mmho-m		1.000	mmho-m		

Litho Density Calibration Report
Serial: 001 Model: PRB

Master Calibration — Performed Thu Sep 17 09:57:21 2009

	Background	Magnesium	Aluminum	Sandstone	
Window 1	2056.0	9796.8	3673.1	10821.3	cps
Window 2	1920.0	8541.1	3303.5	9307.2	cps
Window 3	1563.1	4735.7	2212.8	5017.5	cps
Window 4	466.0	466.1	465.6	471.5	cps
Long Space	0.0	6621.1	1383.5	7387.2	cps
Short Space	2.5	2361.7	1523.2	2534.0	cps
Rho		1.7100	2.5900	1.3800	g/cc
Pe		0.0000	2.5700	1.5500	

Rib Angle	: 44.4	Rib Slope	: 0.978	Density/Spine Ratio	: 0.541
Spine Angle	: 74.4	Spine Slope	: 3.570	Spine Intercept	: -18.9

Before Survey Verification — Performed Wed Dec 31 18:00:00 1969

Window 1	0.0	0.0	0.0	0.0	cps
Window 2	0.0	0.0	0.0	0.0	cps
Window 3	0.0	0.0	0.0	0.0	cps
Window 4	0.0	0.0	0.0	0.0	cps
Long Space	0.0	0.0	0.0	0.0	cps
Short Space	0.0	0.0	0.0	0.0	cps
Measured Rho		0.0000	0.0000	0.0000	g/cc
Measured Correction		0.0000	0.0000	0.0000	g/cc
Measured Pe			0.0000	0.0000	

After Survey Verification — Performed Wed Dec 31 18:00:00 1969

Window 1	0.0	0.0	0.0	0.0	cps
Window 2	0.0	0.0	0.0	0.0	cps
Window 3	0.0	0.0	0.0	0.0	cps
Window 4	0.0	0.0	0.0	0.0	cps
Long Space	0.0	0.0	0.0	0.0	cps
Short Space	0.0	0.0	0.0	0.0	cps
Measured Rho		0.0000	0.0000	0.0000	g/cc
Measured Correction		0.0000	0.0000	0.0000	g/cc
Measured Pe			0.0000	0.0000	

Compensated Neutron Calibration Report

Serial Number: 6I
Tool Model: G

CALIBRATION

Detector	Readings		Target		Normalization
Short Space	1.00	cps	1.00	cps	1.0000
Long Space	1.00	cps	1.00	cps	1.0000

PRE-SURVEY VERIFICATION

	Detector	Readings		Measured		Target	
1)	Short Space		cps				
	Long Space		cps		pu		pu
2)	Short Space		cps				
	Long Space		cps		pu		
3)	Short Space		cps				
	Long Space		cps		pu		

POST-SURVEY VERIFICATION

	Detector	Readings		Measured		Target	
1)	Short Space		cps				
	Long Space		cps		pu		pu
2)	Short Space		cps				
	Long Space		cps		pu		pu
3)	Short Space		cps				
	Long Space		cps		pu		pu

Gamma Ray Calibration Report

Serial Number:	GR6	
Tool Model:	OPEN	
Performed:	Fri Nov 29 08:34:37 2013	
Calibrator Value:	150.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	276.0	cps
Sensitivity:	0.6035	GAPI/cps