



**COMPENSATED  
DENSITY / NEUTRON  
LOG**

Company HARTMAN OIL INC.  
Well LILLIE #5  
Field ARNOLD SOUTHWEST  
County NESS  
State KANSAS

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County NESS State KANSAS

Location: API # : 15-135-26026-0000  
1356' FNL & 1299' FEL  
NW - NW - SE - NE  
Permanent Datum GROUND LEVEL Elevation 2577  
Log Measured From KELLY BUSHING 11' A.G.L.  
Drilling Measured From KELLY BUSHING  
Other Services DIL/MEL  
Elevation  
K.B. 2588  
D.F. 2586  
G.L. 2577

Date	12/4/18		
Run Number	ONE		
Depth Driller	4625		
Depth Logger	4622		
Bottom Logged Interval	4598		
Top Log Interval	3500		
Casing Driller	8 5/8"@267'		
Casing Logger	267		
Bit Size	7 7/8"		
Type Fluid in Hole	CHEMICAL MUD	CHLORIDES 1,500 PPM	
Density / Viscosity	9.1/53		
pH / Fluid Loss	10.5/6.0		
Source of Sample	FLOWLINE		
Rim @ Meas. Temp	1.40@58F		
Rmf @ Meas. Temp	1.05@58F		
Rmc @ Meas. Temp	1.68@58F		
Source of Rmf / Rmc	MEASUREMENT		
Rim @ BHT	.666@122F		
Time Circulation Stopped	2.5 HOURS		
Time Logger on Bottom	10:00 P.M.		
Maximum Recorded Temperature	122F		
Equipment Number	922339		
Location	HAYS, KANSAS		
Recorded By	JEFF LUEBBERS		
Witnessed By	LOREN DEEVER		

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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**

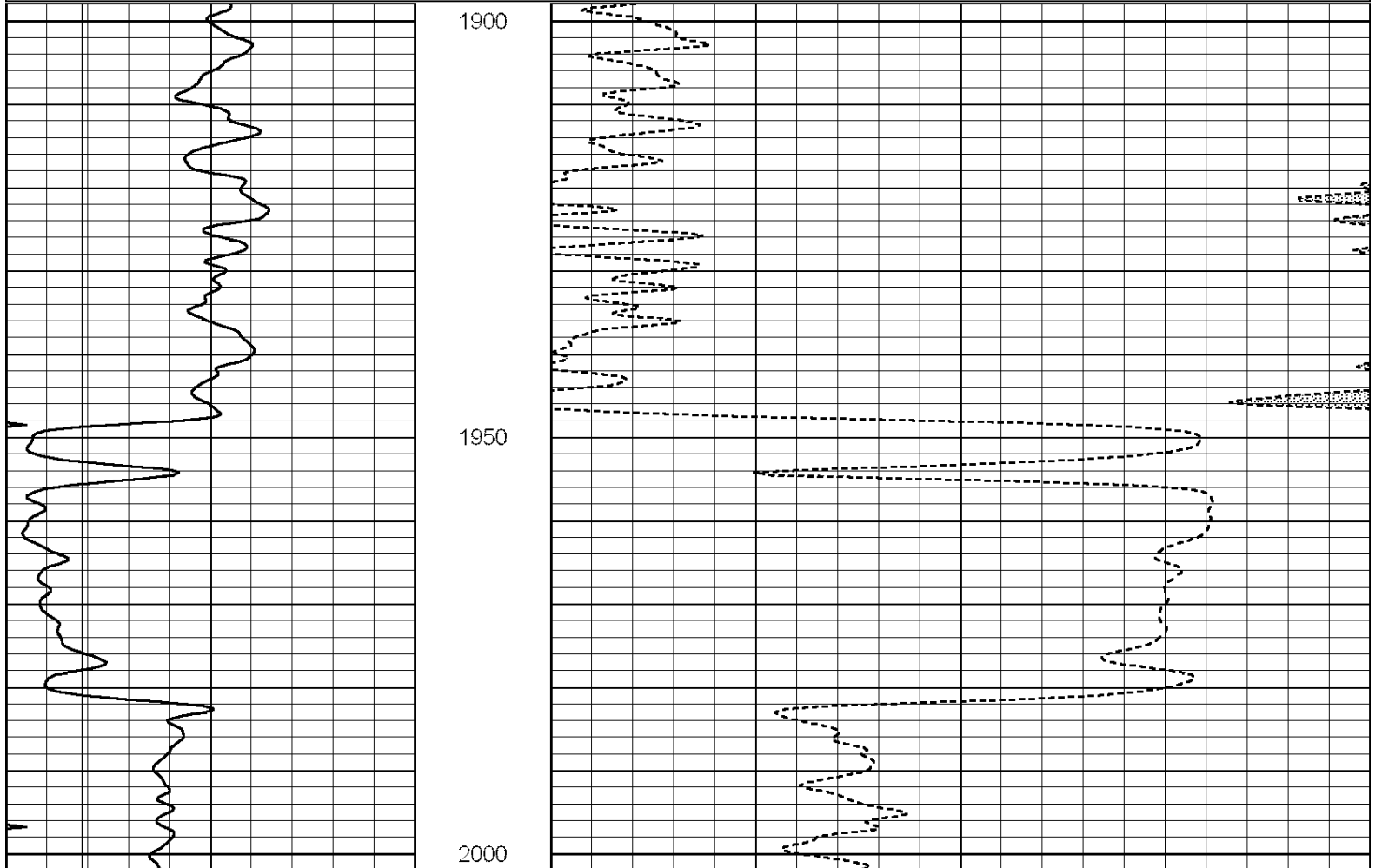
THANK YOU FOR USING ELI WIRELINE HAYS, KANSAS (785) 628-6395  
DIRECTIONS  
ARNOLD, KS., 4W. ON HWY 4 TO"RD. H", 1S., 1/4W., S. INTO



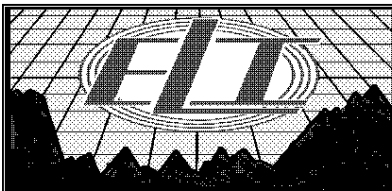
**ANHYDRITE**

Database File: 3068ddn.db  
 Dataset Pathname: pass3.4N  
 Presentation Format: den\_neu  
 Dataset Creation: Tue Dec 04 23:52:22 2018  
 Charted by: Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150	ABHV	30	COMPENSATED NEUTRON (pu)	-10
0	MINMK	20	10 (ft3) 0			
			TBHV			
			0 (ft3) 10			



0	GAMMA RAY (GAPI)	150	ABHV	30	COMPENSATED NEUTRON (pu)	-10
0	MINMK	20	10 (ft3) 0			
			TBHV			
			0 (ft3) 10			

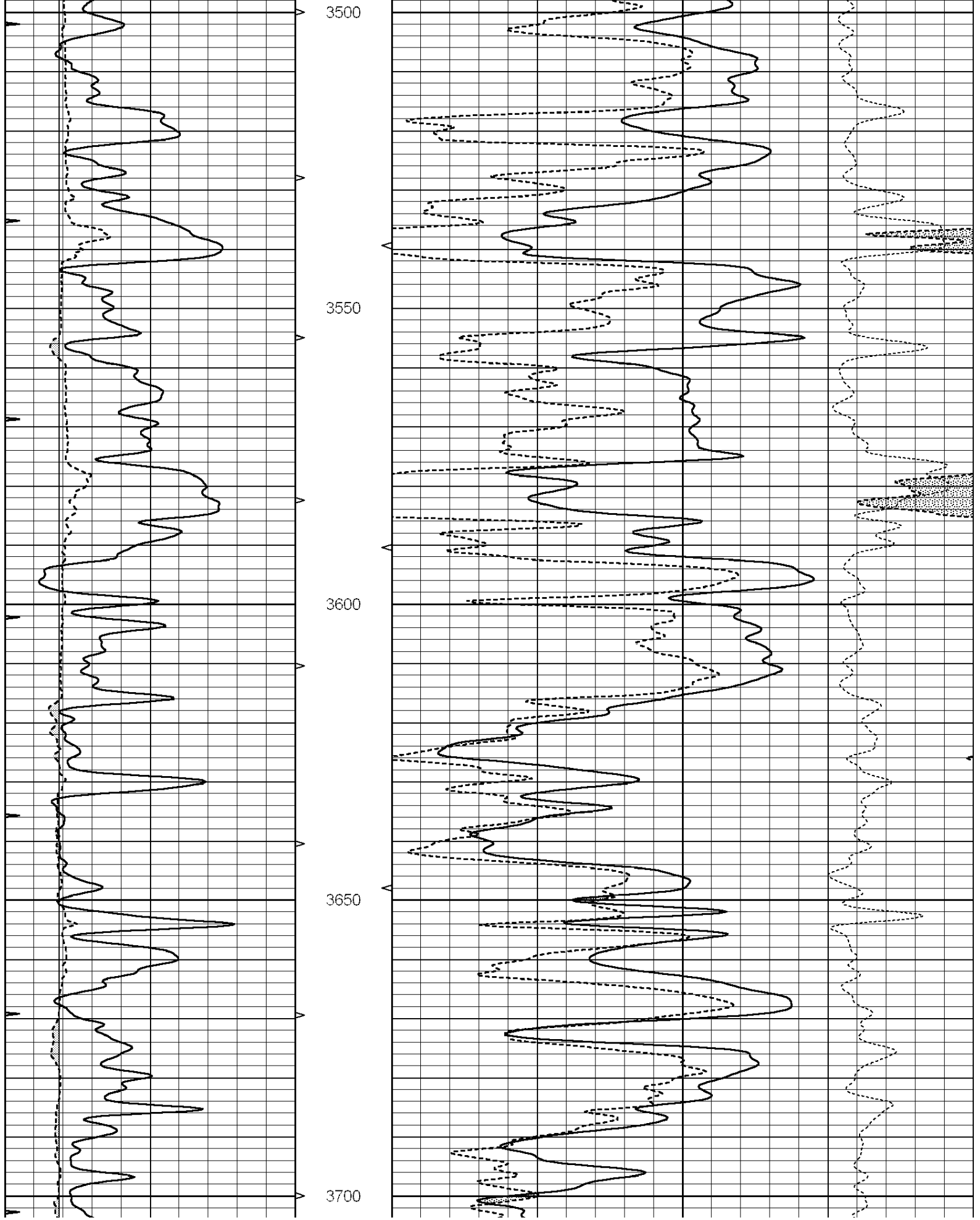


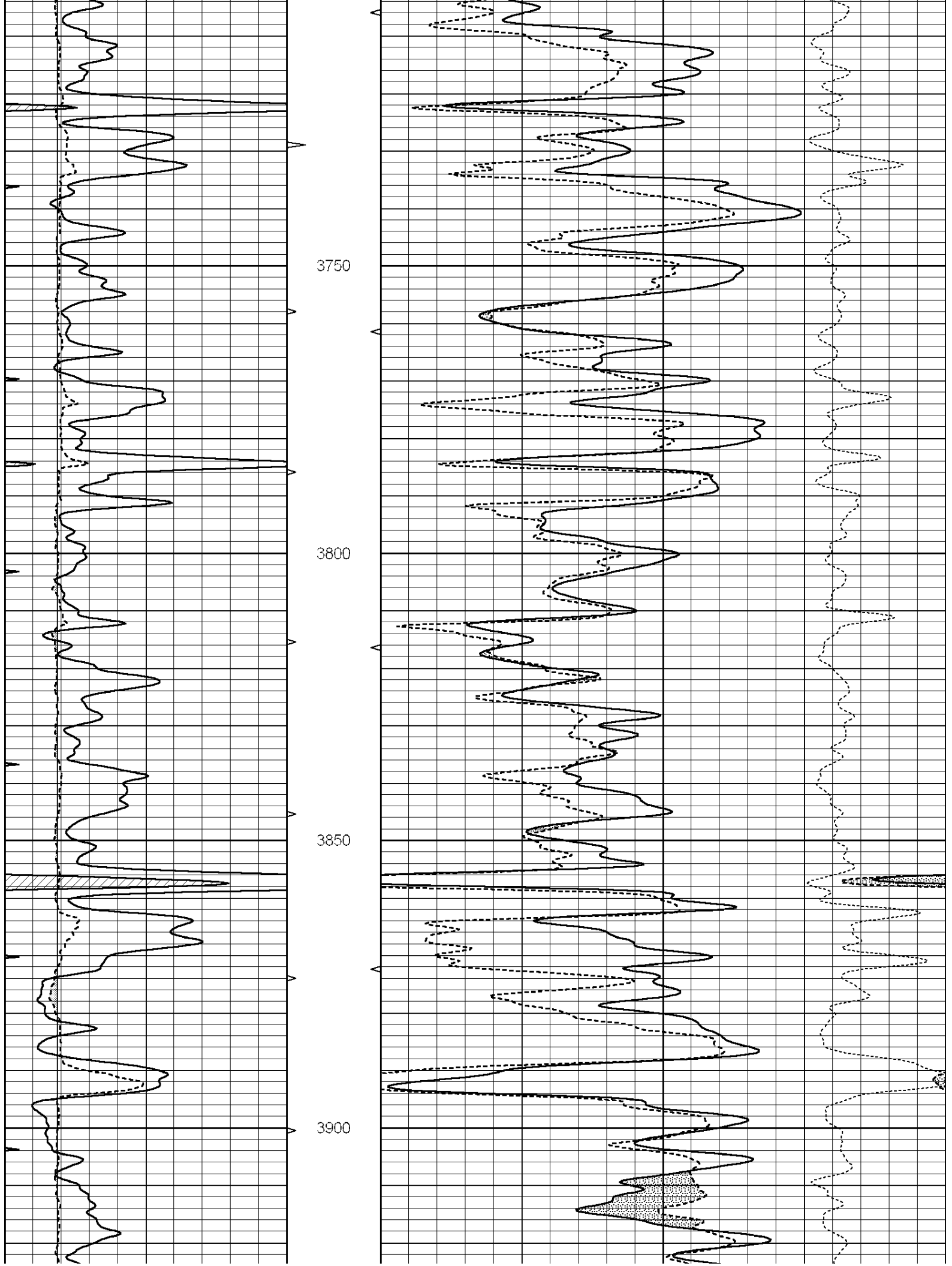
# MAIN SECTION

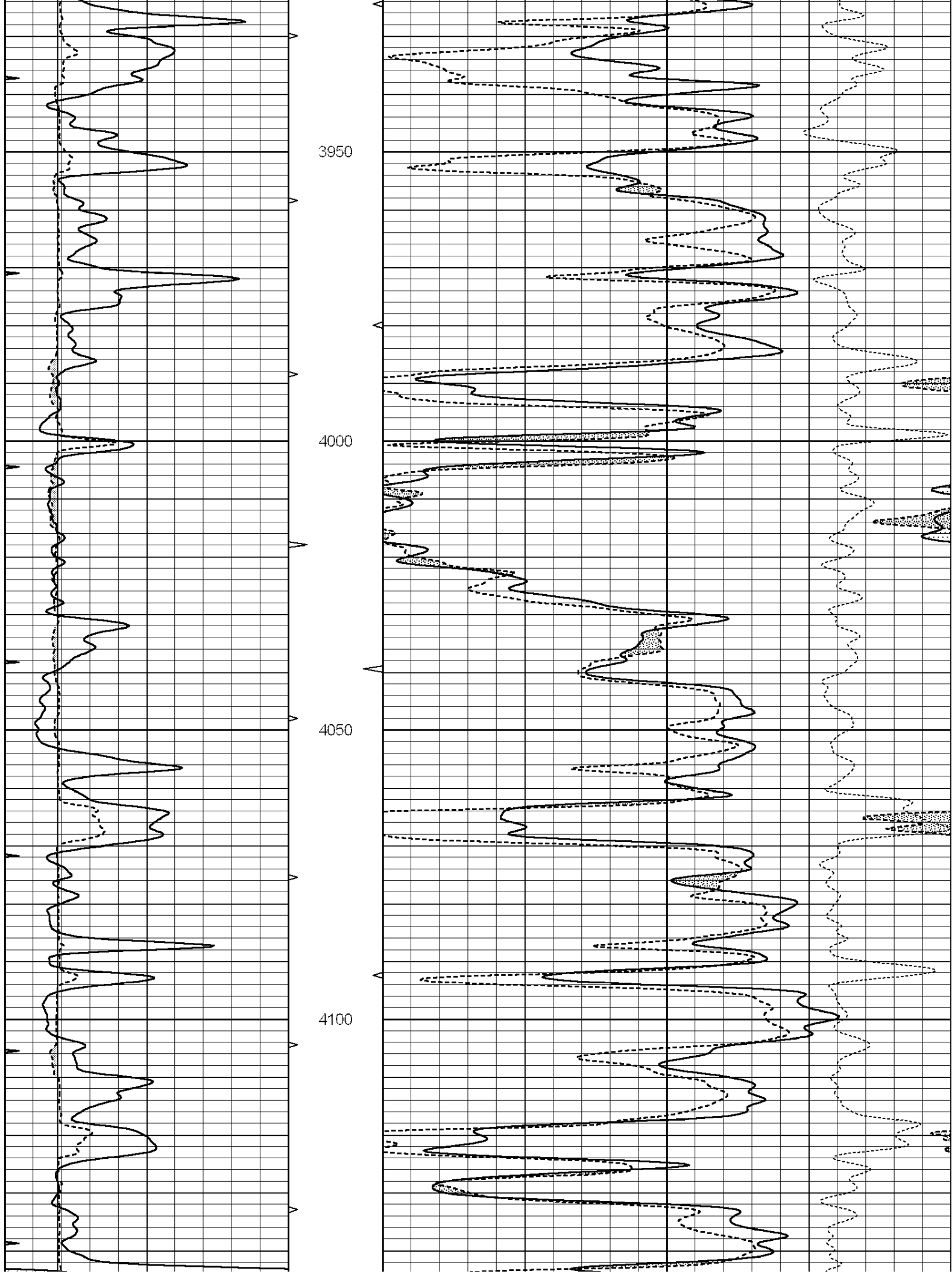
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 Presentation Format: den\_neu  
 Dataset Creation: Tue Dec 04 23:45:47 2018 by Calc SOC 120430  
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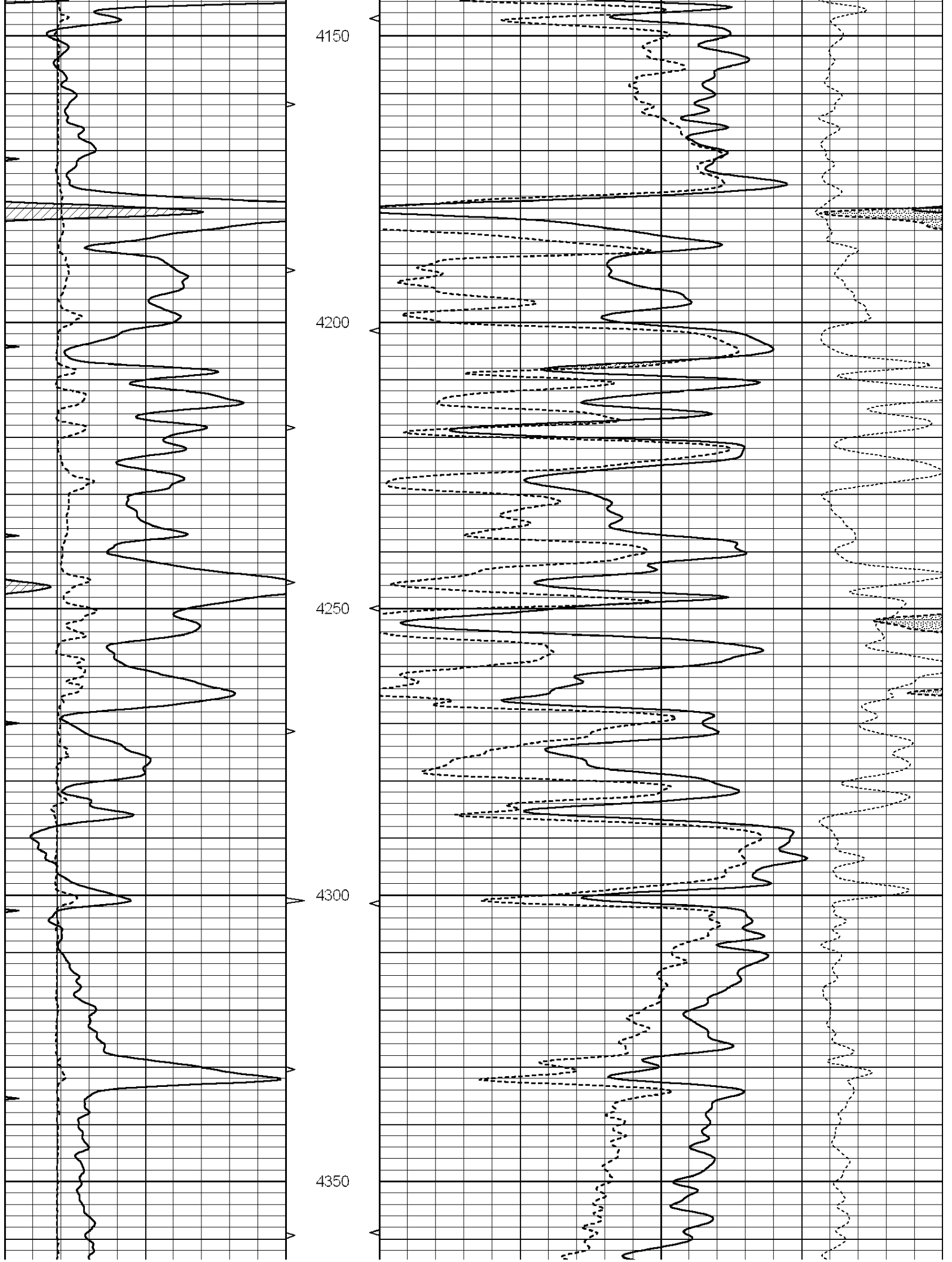
0	GAMMA RAY (GAPI)	150	ABHV	30	COMPENSATED DENSITY (pu)	-10
0	MINMK	20	10 (ft3) 0			
			TBHV			
			0 (ft3) 10			

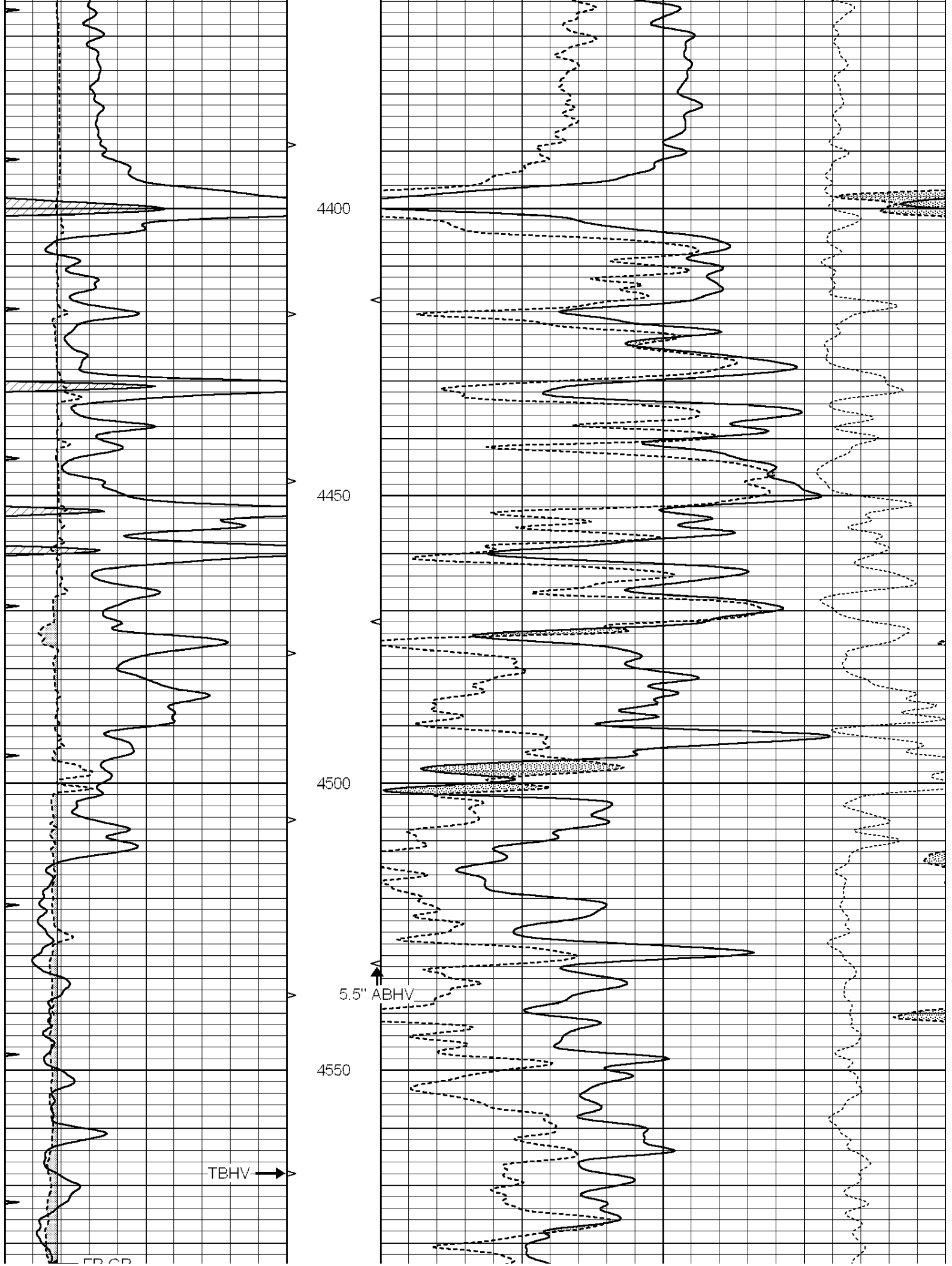
6	DCAL (in)	16	10 (ft3)	0 30	COMPENSATED NEUTRON (pu)	-10	
0	MINMK	20	TBHV		-0.25	CORRECTION (g/cc)	0.25
			0 (ft3)	10			

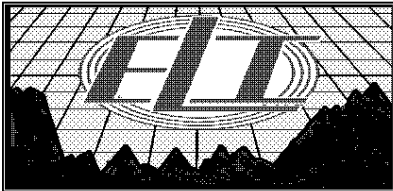
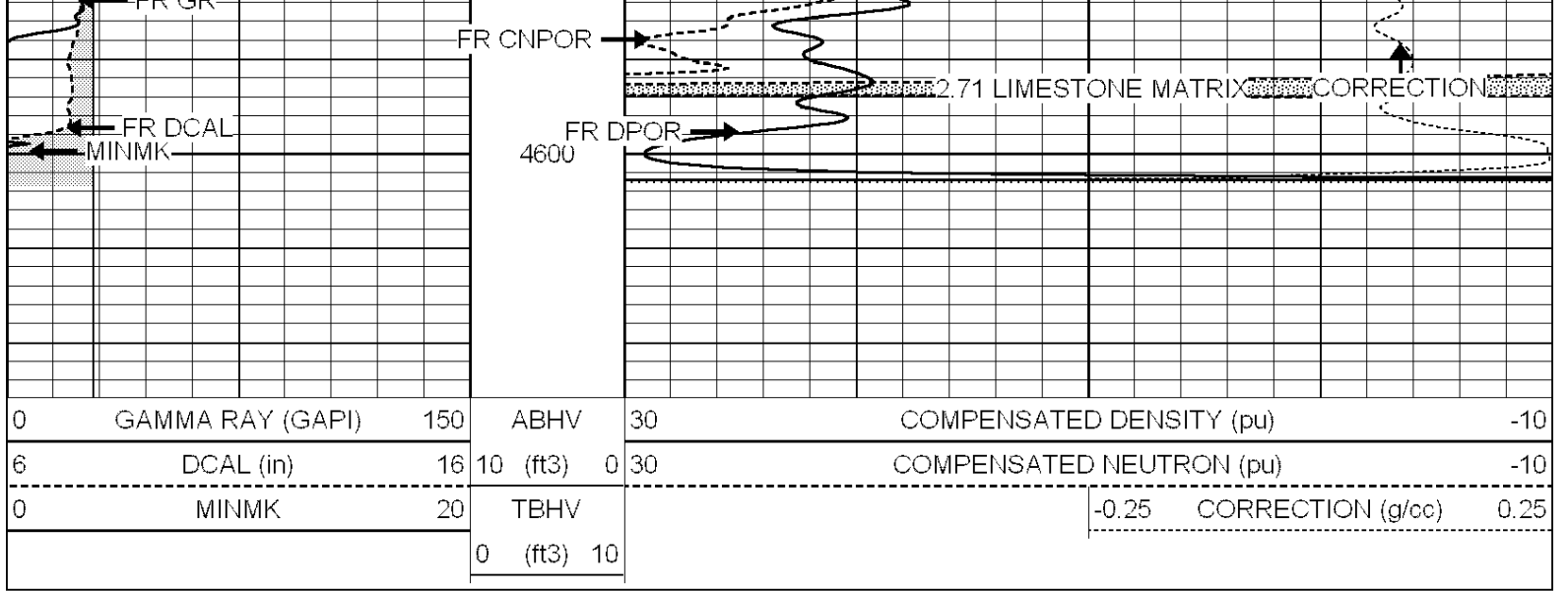








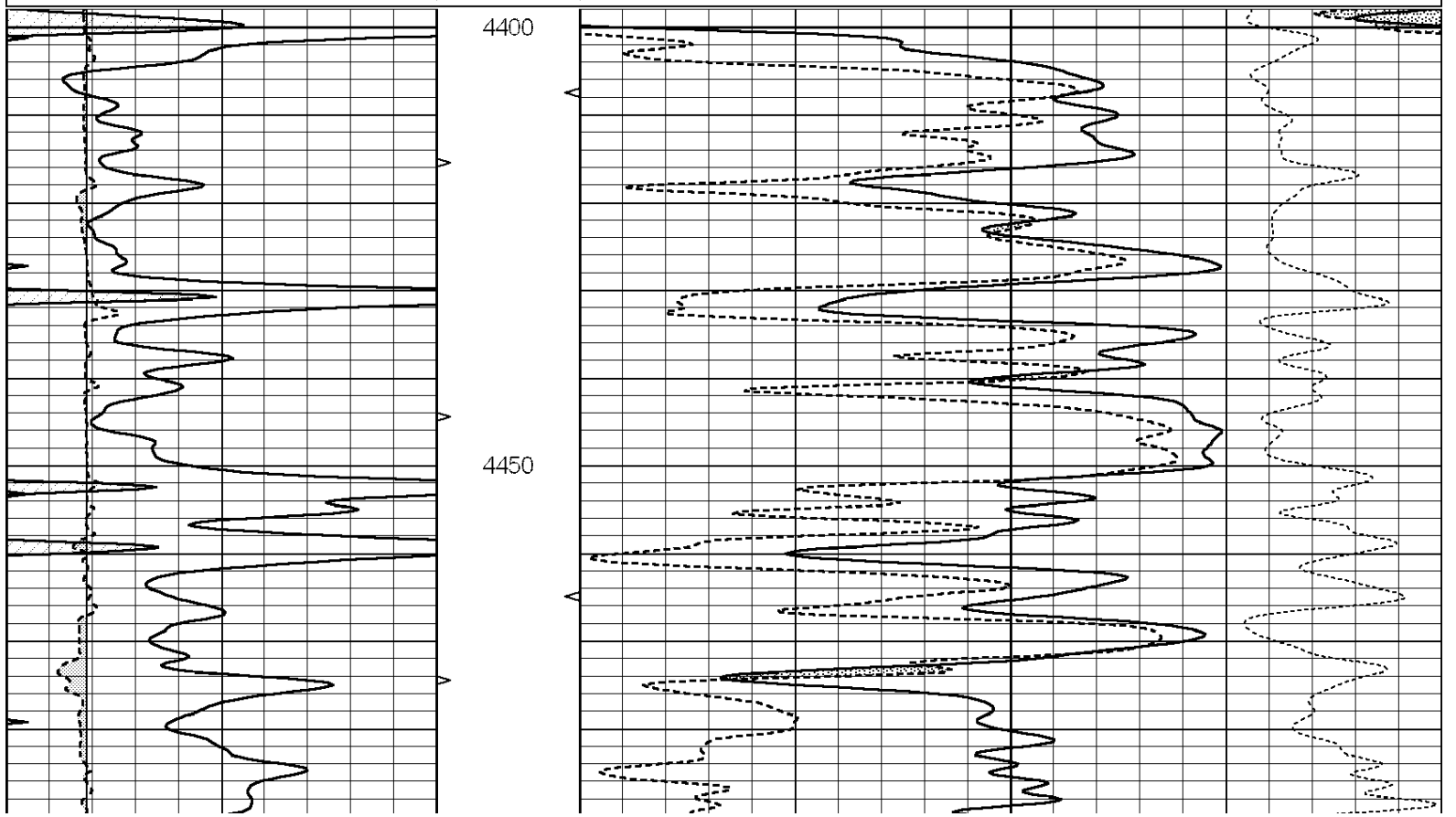


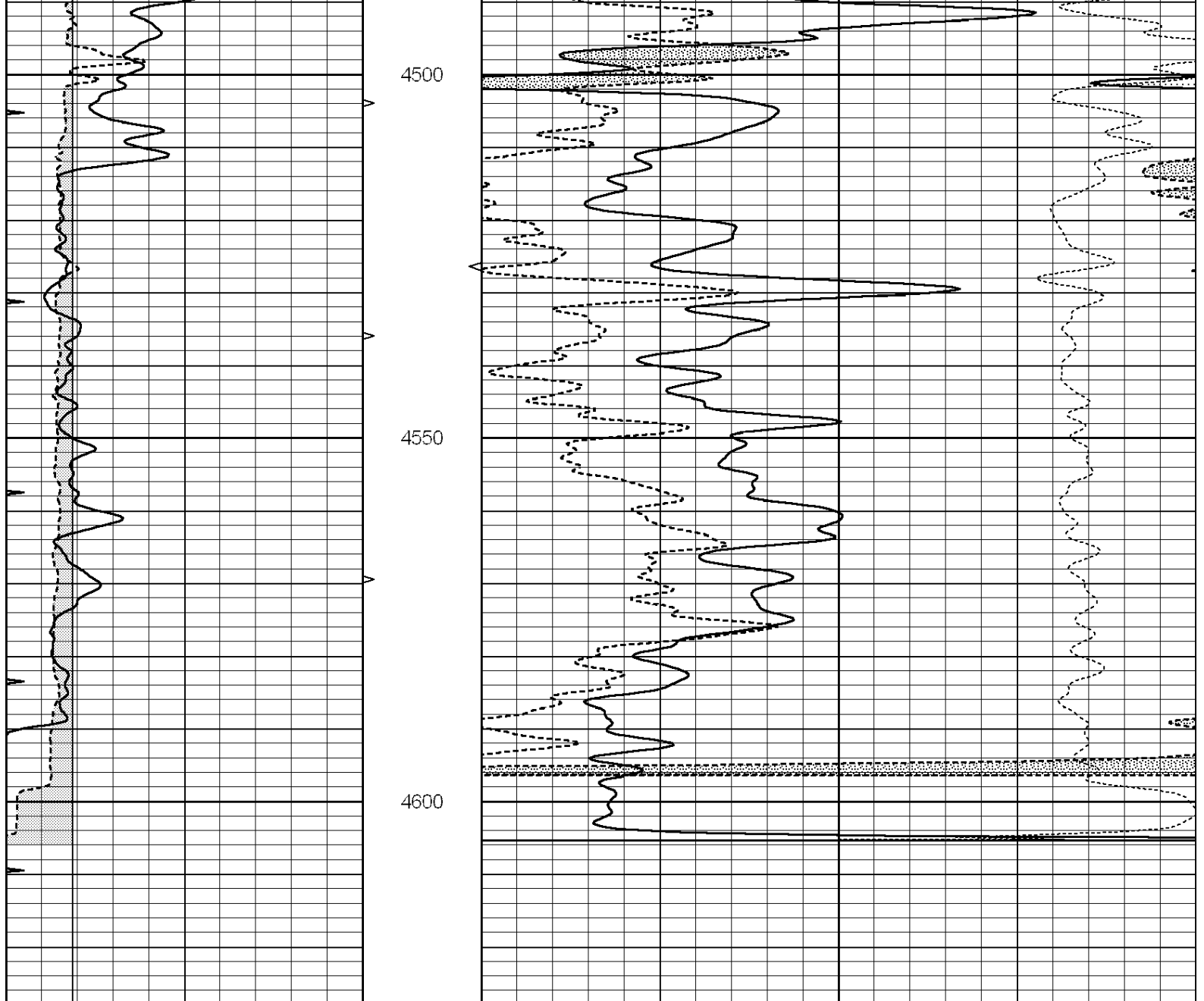


# REPEAT SECTION

Database File: 3068ddn.db  
 Dataset Pathname: pass2.4  
 Presentation Format: den\_neu  
 Dataset Creation: Tue Dec 04 23:50:35 2018 by Calc SOC 120430  
 Charted by: Depth in Feet scaled 1:240

0	GAMMA RAY (GAPI)	150	ABHV	30	COMPENSATED DENSITY (pu)	-10
6	CALIPER (in)	16	10 (ft3)	0 30	COMPENSATED NEUTRON (pu)	-10
0	MINMK	20	TBHV		-0.25	CORRECTION (g/cc) 0.25
			0 (ft3)	10		





0	GAMMA RAY (GAPI)	150	ABHV	30	COMPENSATED DENSITY (pu)	-10
6	CALIPER (in)	16	10 (ft3)	0 30	COMPENSATED NEUTRON (pu)	-10
0	MINMK	20	TBHV		-0.25 CORRECTION (g/cc)	0.25
			0 (ft3)	10		

Calibration Report

Database File: 1598ddn.db  
 Dataset Pathname: pass4  
 Dataset Creation: Wed Aug 30 02:13:00 2017 by Log SOC 120430

Dual Induction Calibration Report

Serial-Model: PROBE7-DILG  
 Surface Cal Performed: Wed Aug 30 00:06:33 2017  
 Downhole Cal Performed: Mon Jul 28 12:02:56 2008  
 After Survey Verification Performed: Mon Jul 28 12:02:56 2008

Surface Calibration		Readings		References		Results	
Loop:	Air	Loop	Air	Loop	m	b	

Deep	-0.014	0.629	V	0.000	400.000	mmho/m	620.000	0.000
Medium	0.039	0.728	V	0.000	464.000	mmho/m	675.000	-44.000
Internal:	Zero	Cal		Zero	Cal		m	b
Deep	0.011	0.610	V	0.000	400.000	mmho/m	667.135	-7.256
Medium	0.005	0.712	V	0.000	464.000	mmho/m	655.677	-3.102

Downhole Calibration								
	Readings			References			Results	
	Zero	Cal		Zero	Cal		m'	b'
Deep	0.000	0.000	mmho/m	14.508	388.384	mmho/m	1.000	0.000
Medium	0.000	0.000	mmho/m	166.367	504.400	mmho/m	1.000	0.000
LL3		7.500	V		1400.000	Ohm-m		
		0.000	V		20.000	Ohm-m		
		-7.200	V		4000.000	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: 002      Model: PRB

Master Calibration		Performed Mon Aug 21 11:27:42 2017				
	Background	Magnesium	Aluminum	Sandstone		
Window 1	837.1	10632.5	2945.1	12110.1	cps	
Window 2	772.0	9117.4	2570.1	10197.3	cps	
Window 3	631.7	4669.0	1481.9	5042.9	cps	
Window 4	187.0	187.5	185.9	189.9	cps	
Long Space	0.0	8345.4	1798.1	9425.3	cps	
Short Space	1.1	1927.9	1285.9	2050.2	cps	
Rho		1.7100	2.5960	1.3800	g/cc	
Pe		0.0000	2.5700	1.5500		
Rib Angle	: 45.2	Rib Slope	: 1.008	Density/Spine Ratio	: 0.558	
Spine Angle	: 75.2	Spine Slope	: 3.790	Spine Intercept	: -19.6	

Before Survey Verification		Performed Wed Dec 31 18:00:00 1969				
	Background	Magnesium	Aluminum	Sandstone		
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				
	Background	Magnesium	Aluminum	Sandstone		
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: 070808  
Tool Model: Probe

PRE-SURVEY VERIFICATION

Detector	Readings	Measured	Target
Short Space	cps		
Long Space	cps	pu	pu

POST-SURVEY VERIFICATION

Detector	Readings	Measured	Target
Short Space	cps		
Long Space	cps	pu	pu

Gamma Ray Calibration Report

Serial Number: 070558  
Tool Model: OPEN\_GR  
Performed: Wed May 31 00:09:32 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 1.0 cps

Sensitivity: 0.2800 GAPI/cps