COMPENSATED NEUTRON
SONIC POROSITY
OVERLAY

COMPANY	SHAKESPEARE OIL. CO., INC.
WELL	CAMPBELL 4-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	850' FSL & 2000' FEL
PERMIT NUMBER	SE NW SW SE

SEC 17	TWP 13S	RGE 32W	Other Services
Latitude			MAI/MFE MPD
Longitude			
API Number	15-109-21293		

Permanent Datum GL, Elevation 3033 feet
Log Measured From KB
Drilling Measured From KB @ 10 FEET

Elevations:	feet
KB	3043.00
DF	3041.00
GL	3033.00

Date	11-JUN-2014			
Run Number	ONE			
Service Order	5872-89695834			
Depth Driller	4720.00	feet		
Depth Logger	4716.00	feet		
First Reading	4703.00	feet		
Last Reading	3800.00	feet		
Casing Driller	268.00	feet		
Casing Logger	264.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg		65.00 CP	
PH / Fluid Loss	10.50		8.80 ml/30Min	
Sample Source	MUDPIT			
Rm @ Measured Temp	0.64 @ 93.0	ohm-m		
Rmf @ Measured Temp	0.51 @ 93.0	ohm-m		
Rmc @ Measured Temp	0.77 @ 93.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.52 @113.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	113.00	deg F		
Equipment / Base	13244		LIB	
Recorded By	D. COLE			
Witnessed By	T. PRIEST			
JOB #	LB14-178			

BOREHOLE RECORD

Last Edited: 11-JUN-2014 14:01

Bit Size inches	Depth From feet	Depth To feet
7.875	268.00	4720.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
CASING	8.625	0.00	268.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.2113
- TOOLSTRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE:
  - MDN: DUAL BOWSPRING ECCENTRALIZER
  - MFE: 1 X 0.5 INCH STANDOFF
  - MSS: 2 X 0.5 INCH STANDOFF
  - MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST
- TOTAL HOLE VOLUME FROM TD TO 3800 FEET: 370 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 220 CU.FT.

- RIG: HD DRILLING

- ENGINEER: D. COLE

- OPERATOR: K. RINEHART AND D. ALVARADO

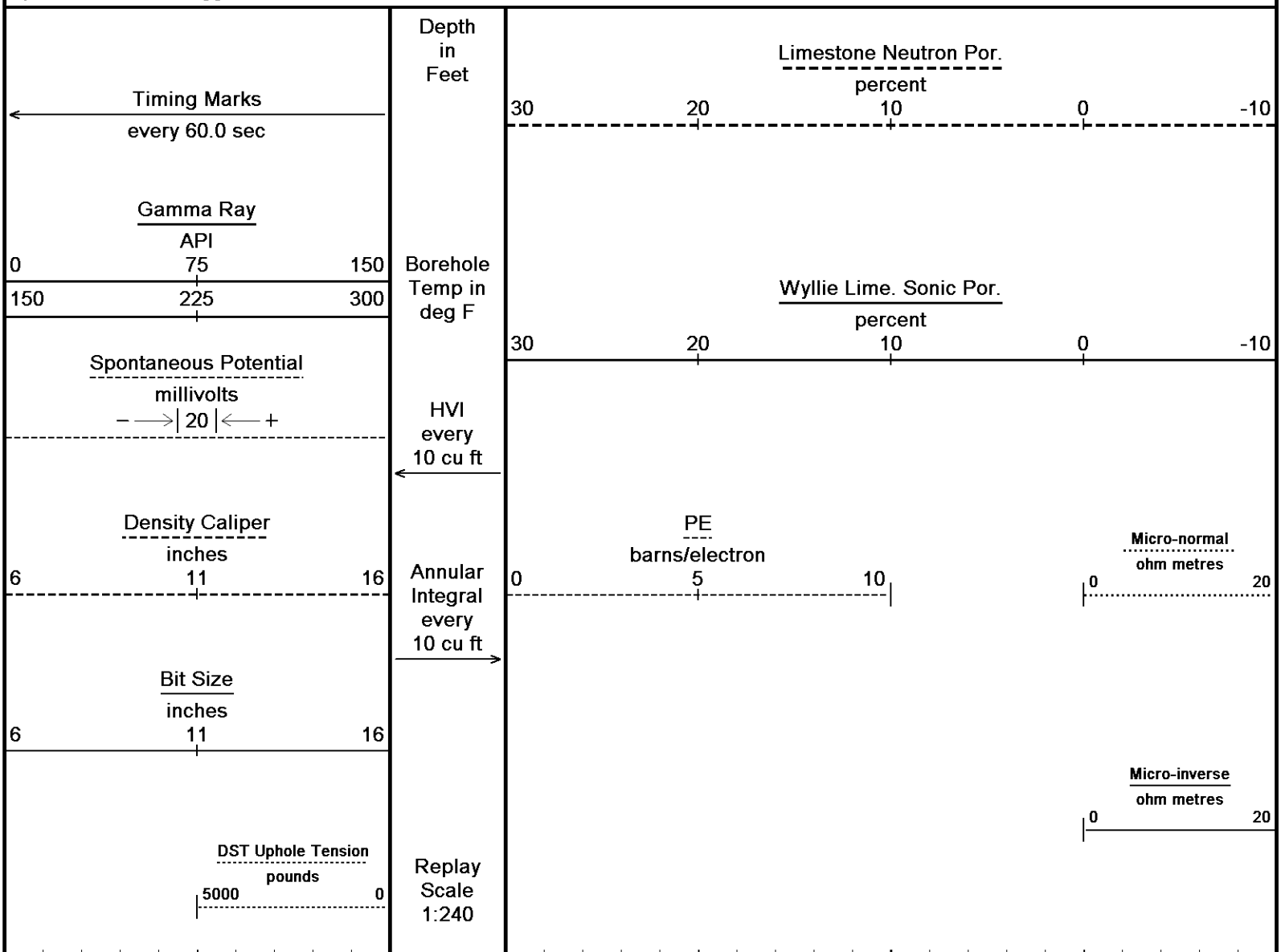
- CHLORIDES: 3500

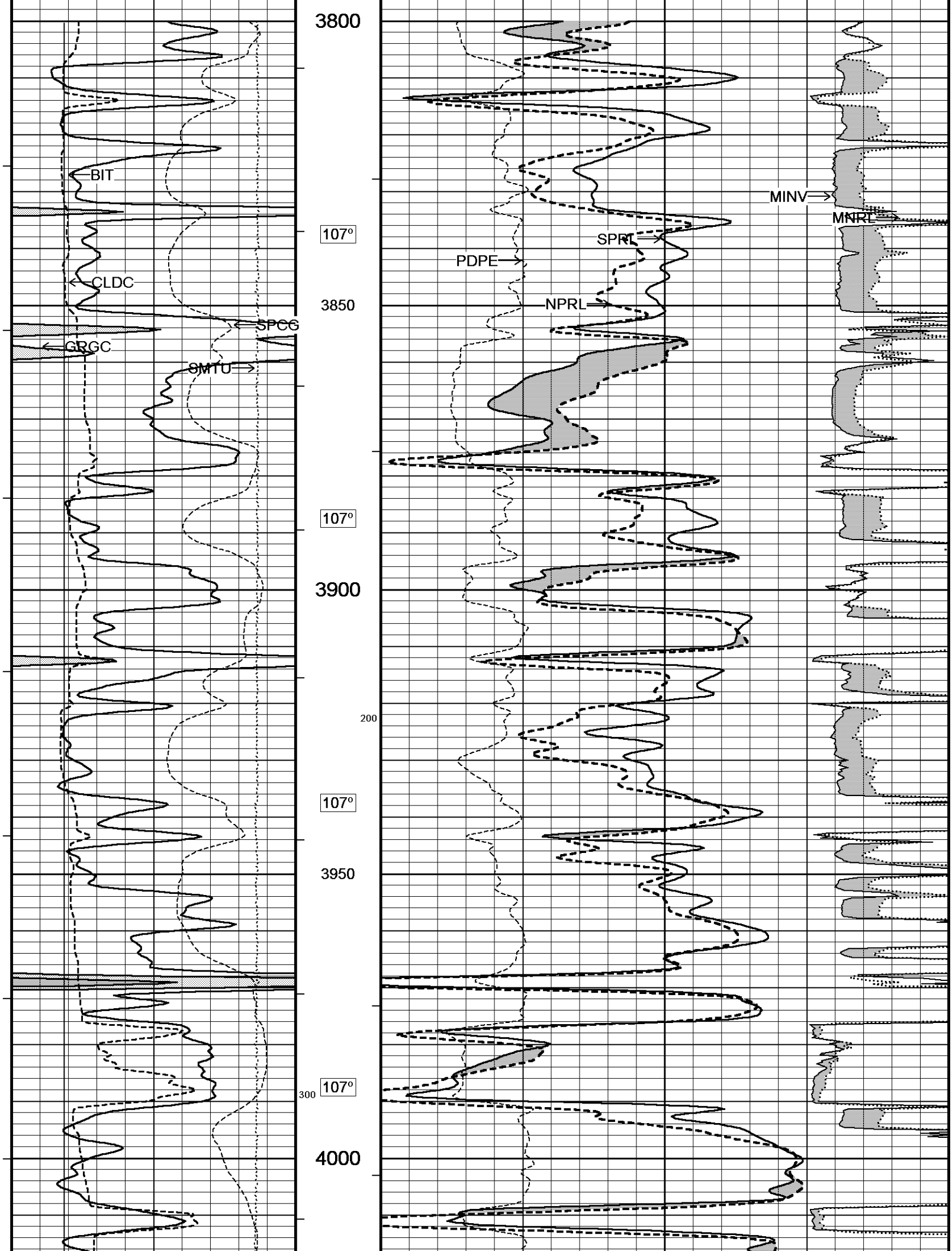
5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 11-JUN-2014 19:44

Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL1.dta

System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

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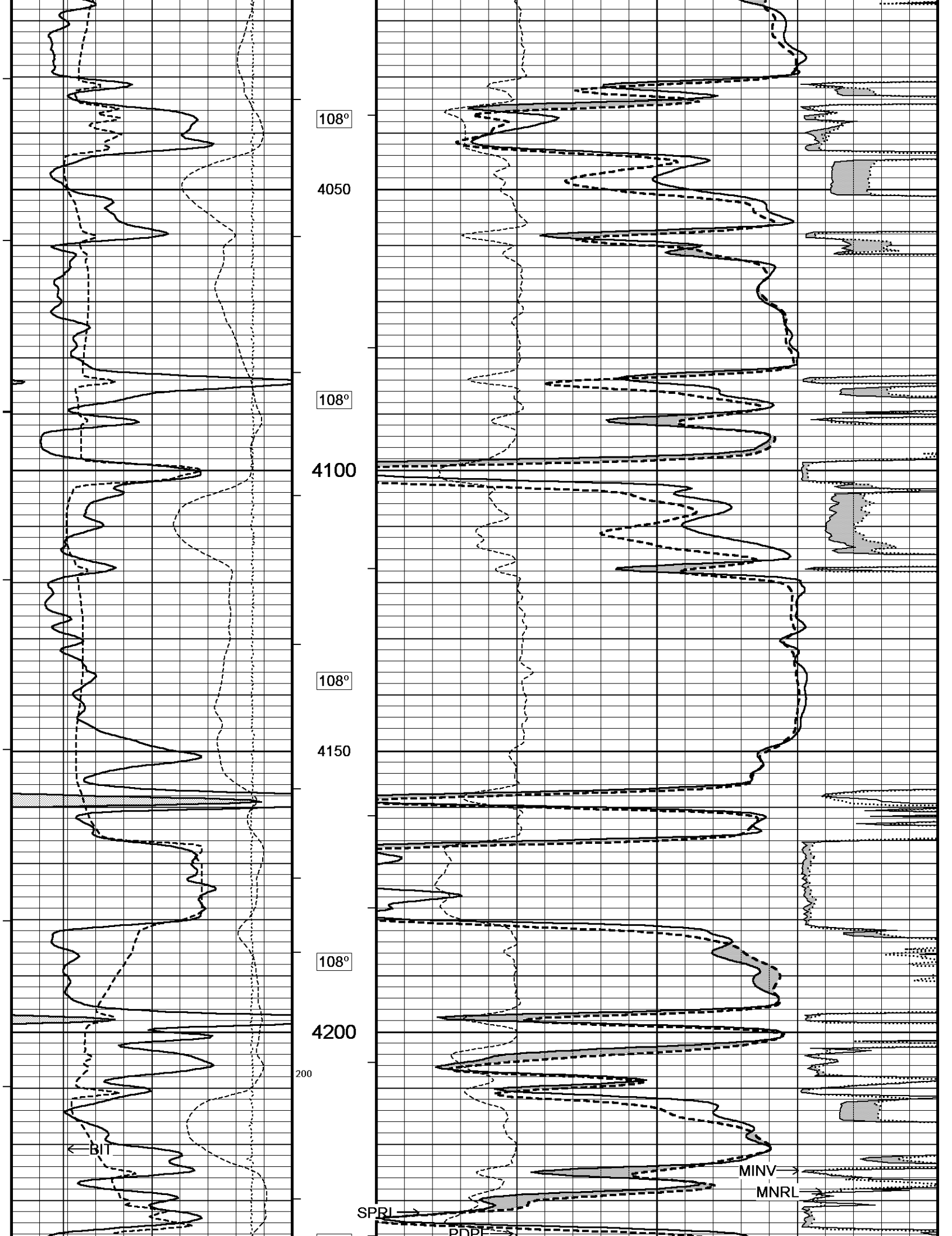
BIT
107°
CLDC
3850
SPCG
GRGC
SMTU
107°
3900
200
107°
3950
300
107°
4000
PDPE
SPRT
NPRL
MINV
MNRL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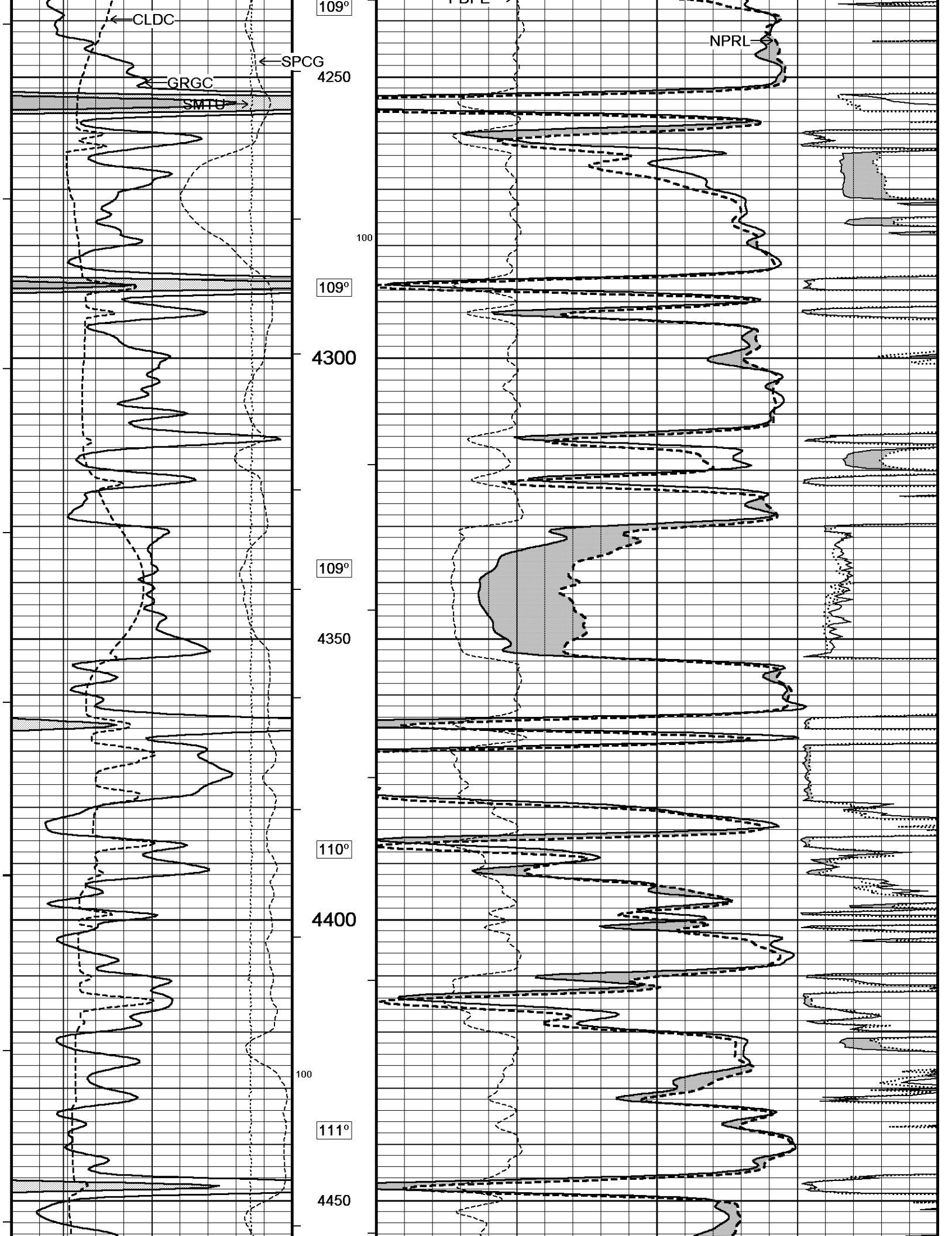
200
BIT
MINV
MNRL
SPRI
PDPE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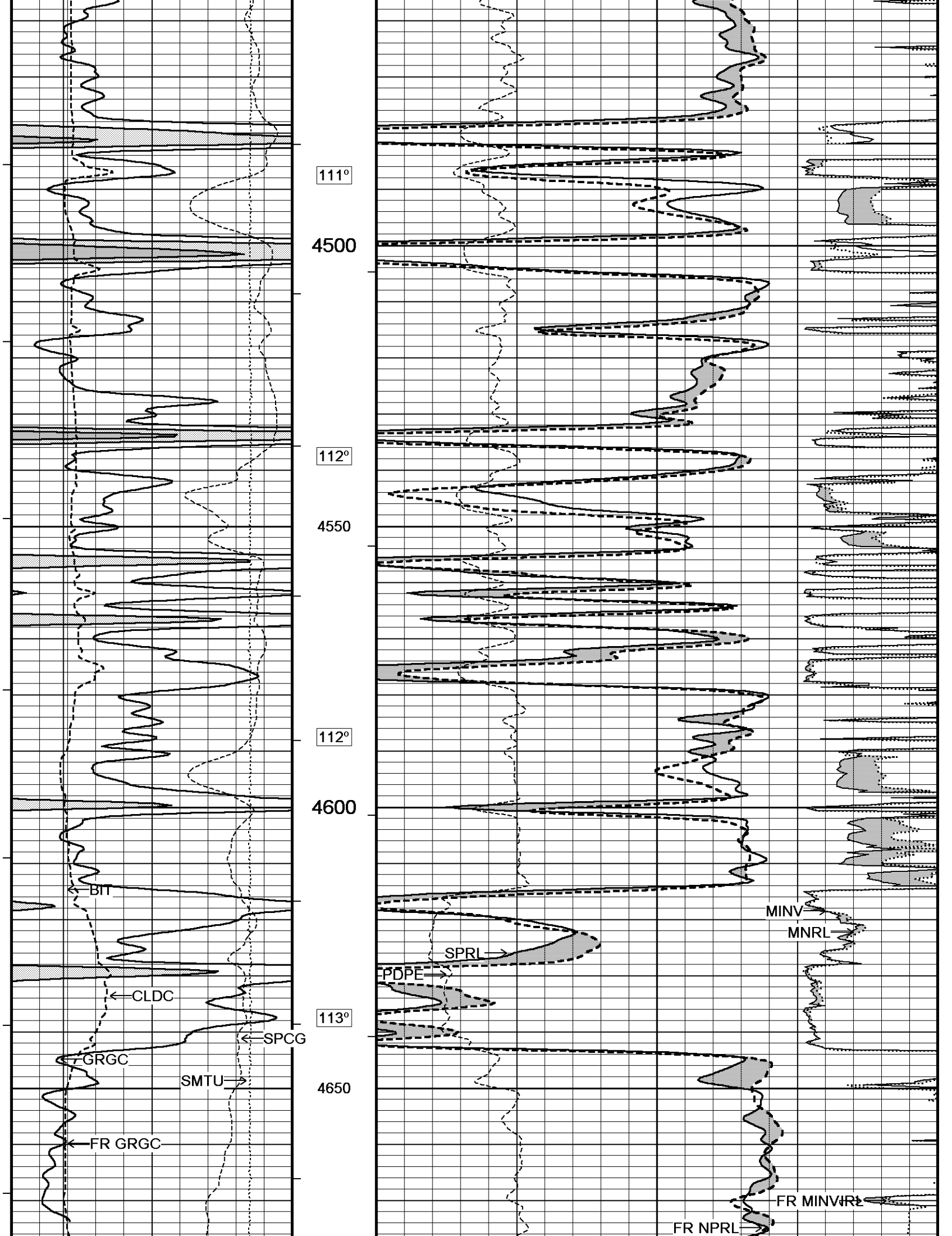
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4500
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4550
112°
4600
113°
4650
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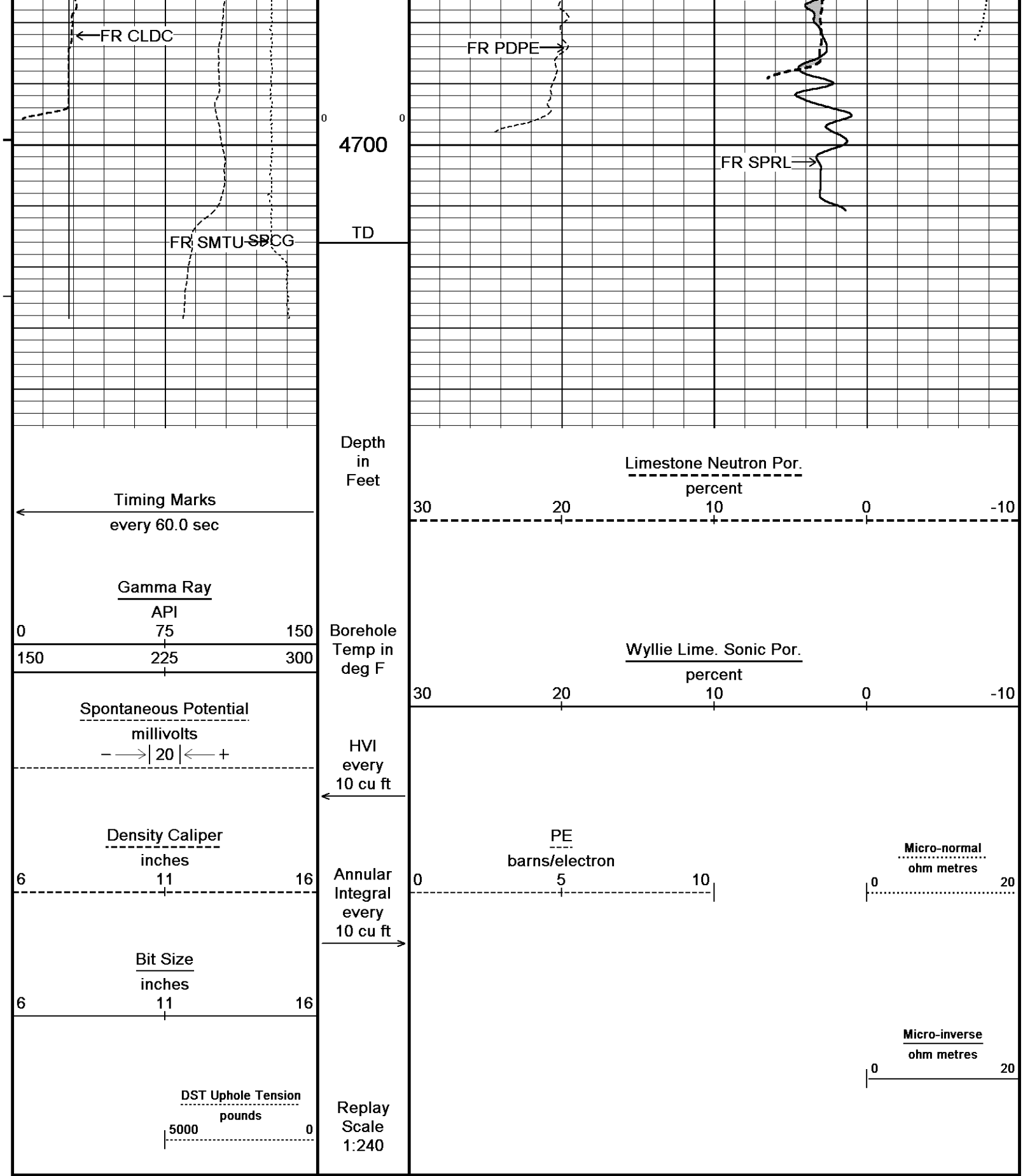
SPCG
GRGC
SMTU
FR GRGC
SPRL
PDPE
MINV
MNRL
FR MINVIRL
FR NPRL



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 11-JUN-2014 19:44

Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL1.dta

System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

5 INCH MAIN

BEFORE SURVEY CALIBRATION

General Constants All 000

Last Edited on 11-JUN-2014,17:41

General Parameters		
Mud Resistivity	0.640	ohm-metres
Mud Resistivity Temperature	93.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches
Caliper for Differential Caliper	MMR Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 23-JAN-2014,17:11

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-C 208

Last Edited on 23-JAN-2014,17:11

Pre-filter Length	11

Gamma Calibration MCG-C 208

Field Calibration on 04-JUN-2014 10:53

	Measured	Calibrated (API)
Background	68	46
Calibrator (Gross)	1134	771
Calibrator (Net)	1067	725

Gamma Constants MCG-C 208

Last Edited on 10-JUN-2014,13:26

Gamma Calibrator Number	GRC038	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:40
Field Check on 04-JUN-2014 10:27

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.1	49.8	5.1	25.6
Micro Inverse	9.9	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	0.5110	
Micro Inverse K Factor	0.3380	
Standoff Offset	0.0000	inches

Neutron Calibration MDN-B.J 387

Base Calibration on 08-MAY-2014 14:03
Field Check on 04-JUN-2014 10:59

Base Calibration

	Measured	Calibrated (cps)

	Measured		Calibrated	
	Near	Far	Near	Far
	2970	91	3714	110
Ratio	32.668		33.764	

Field Calibrator at Base	Calibrated (cps)	
	1688	2486
Ratio	0.679	

Field Check	Calibrated (cps)	
	1689	2475
Ratio	0.683	

Neutron Constants MDN-B.J 387

Last Edited on 08-JUN-2014,15:53

Neutron Source Id	P58125B	
Neutron Jig Number	5824NE	
Epithermal Neutron		
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

Sonic Constants MSS-A.A 73

Last Edited on 10-JUN-2014,13:27

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	

	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Caliper Calibration MPD-D.A 480

Base Calibration on 08-MAY-2014 14:36
Field Calibration on 04-JUN-2014 10:32

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17491	3.99
2	27463	5.98
3	37484	7.97
4	47415	9.86
5	58518	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.98	7.97

Photo Density Calibration MPD-D.A 480

Base Calibration on 08-MAY-2014 14:53
Field Check on 04-JUN-2014 10:37

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1275	1464		
Reference 1	55908	26147	59556	30836
Reference 2	22982	2651	24941	2541

Field Check at Base

1274.5	1464.0

Field Check

1273.2	1468.7

PE Calibration

Base Calibration	Measured WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	241	1140		
Reference 1	23265	55701	0.422	0.371
Reference 2	6806	22836	0.303	0.272

Field Check at Base

240.7	1139.6

Field Check

237.3	1137.1

Density Constants MPD-D.A 480

Last Edited on 10-JUN-2014,13:26

Density Source Id	P50557B
Nylon Calibrator Number	DNCE695
Aluminium Calibrator Number	DACD698
Density Shoe Profile	8 inch
Caliper Source for Processing	Density Caliper
PE Correction to Density	Not Applied

PE Correction to Density	Not Applied	
Mud Density	1.11	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

Matrix density (gm/cc)	Depth (m)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\SHAKESPEARE CAMPBELL 4-17\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

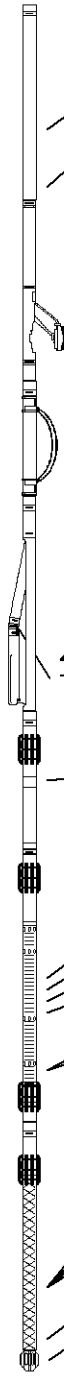
Compact Density/Caliper
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 61.30 ft Weight: 456.4 lb



56.02 ft	GRGC - Gamma Ray
53.11 ft	CGXT - MCG External Temperature
45.76 ft	MINV - MMR MicroLog Inverse
45.76 ft	MNRL - MMR MicroLog Normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	CLDC - Density Caliper
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	DT35 - 3-5' Compensated Sonic
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	CTAO - Array Ind. One Cond Ct
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL. CO., INC.
WELL	CAMPBELL 4-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3043.00	feet	First Reading	4703.00	feet
Elevation Drill Floor	3041.00	feet	Depth Driller	4720.00	feet
Elevation Ground Level	3033.00	feet	Depth Logger	4716.00	feet

Weatherford®

COMPENSATED NEUTRON

SONIC POROSITY

OVERLAY