MICRORESISTIVITY LOG

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	VONDRACEK 4-1
FIELD	PECHANEC SOUTHWEST
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2310' FSL & 452' FEL

SEC 4	TWP 19S	RGE 17W
Latitude		
Longitude		
API Number	15-165-22088	

Other Services
MPD/MDN MAI/MFE
MSS

Permanent Datum GL, Elevation 2104 feet
Log Measured From KB
Drilling Measured From KB @ 7 feet

Elevations:	feet
KB	2111.00
DF	2109.00
GL	2104.00

Date	28-AUG-2014			
Run Number	ONE			
Service Order	7577-96382198			
Depth Driller	3862.00	feet		
Depth Logger	3864.00	feet		
First Reading	3818.00	feet		
Last Reading	3300.00	feet		
Casing Driller	261.00	feet		
Casing Logger	262.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg	52.00 CP		
PH / Fluid Loss	9.00	11.20 ml/30Min		
Sample Source	MUD PIT			
Rm @ Measured Temp	0.42 @ 81.0	ohm-m		
Rmf @ Measured Temp	0.34 @ 81.0	ohm-m		
Rmc @ Measured Temp	0.50 @ 81.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.31 @111.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	111.00	deg F		
Equipment / Base	13244	LIB		
Recorded By	JEFFREY RANDLE			
Witnessed By	KURT TALBOTT			
JOB #	LB14-254			

BOREHOLE RECORD

Last Edited: 28-AUG-2014 03:00

Bit Size inches	Depth From feet	Depth To feet
7.875	261.00	3862.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	261.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
- RUN TWO: MCG, MSS RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
    0.5 INCH STANDOFF USED ON MFE.
    2 X 0.5 INCH STANDOFFS USED ON MSS.
    0.5 INCH STANDOFF USED ON MAI.
- 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 SURFACE CASING: 1604 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 3300 FEET: 127 CU.FT.

- RIG: MAVERICK DRILLING RIG #102.

- ENGINEER: J. RANDLE.

- OPERATOR: J. LaPOINT, S. LARES.

*****RUN TWO SONIC DATA WAS SPLICED INTO RUN ONE DATA TO PROVIDE MORE COMPLETE COVERAGE OF ZONE CLOSEST TO TD PER CUSTOMER REQUEST FOR SONIC DATA ON DETAIL AS CLOSE TO TD AS POSSIBLE.*****

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-AUG-2014 11:01

Filename: C:\Minimus 13.08.2113\Logs\O'Brien Re...\O'Brien Resources Vondracek 4-1 Splice Main.dta — Recorded on 28-AUG-2014 10:03

System Versions: Plotted with 13.08.2113

Timing Marks
every 60.0 sec

Gamma Ray
API
0 — 75 — 150
150 — 225 — 300

Spontaneous Potential
millivolts
– → | 20 | ← +

Bit Size
inches
6 — 11 — 16

MMR Caliper
inches
6 — 11 — 16

DST Uphole Tension
pounds
5000 — 0

Depth in Feet

Borehole Temp in deg F

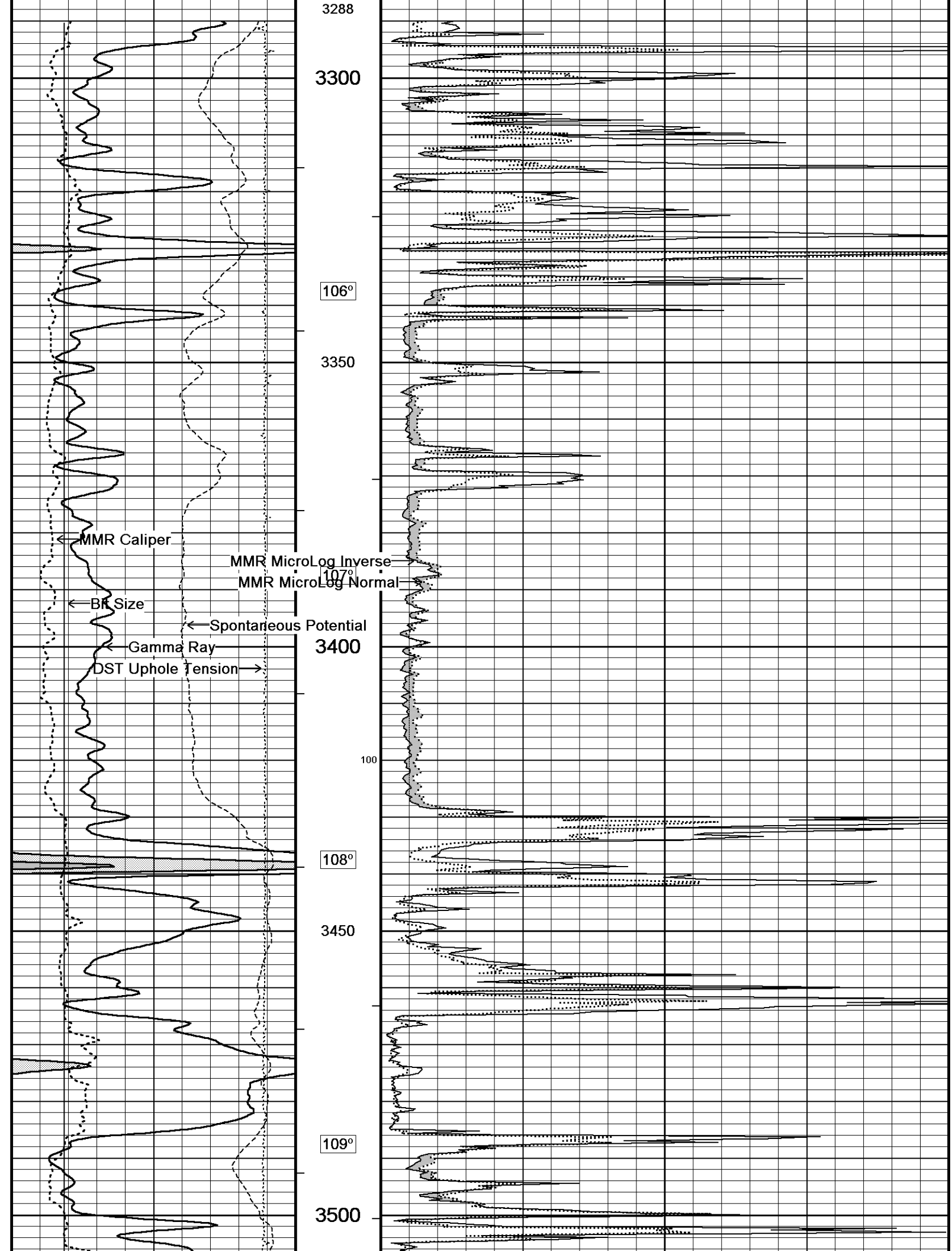
HVI every 10 cu ft

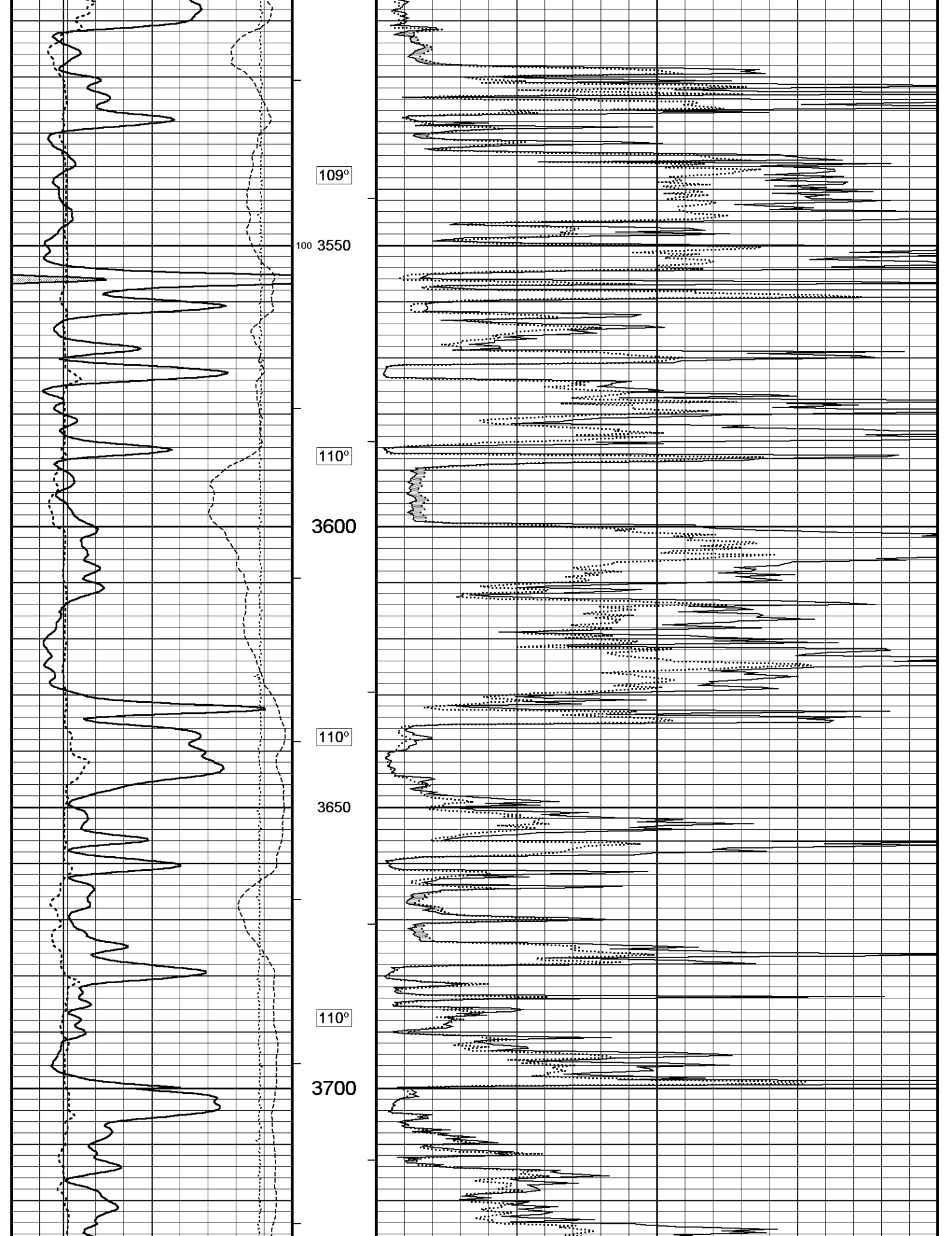
Annular Integral every 10 cu ft

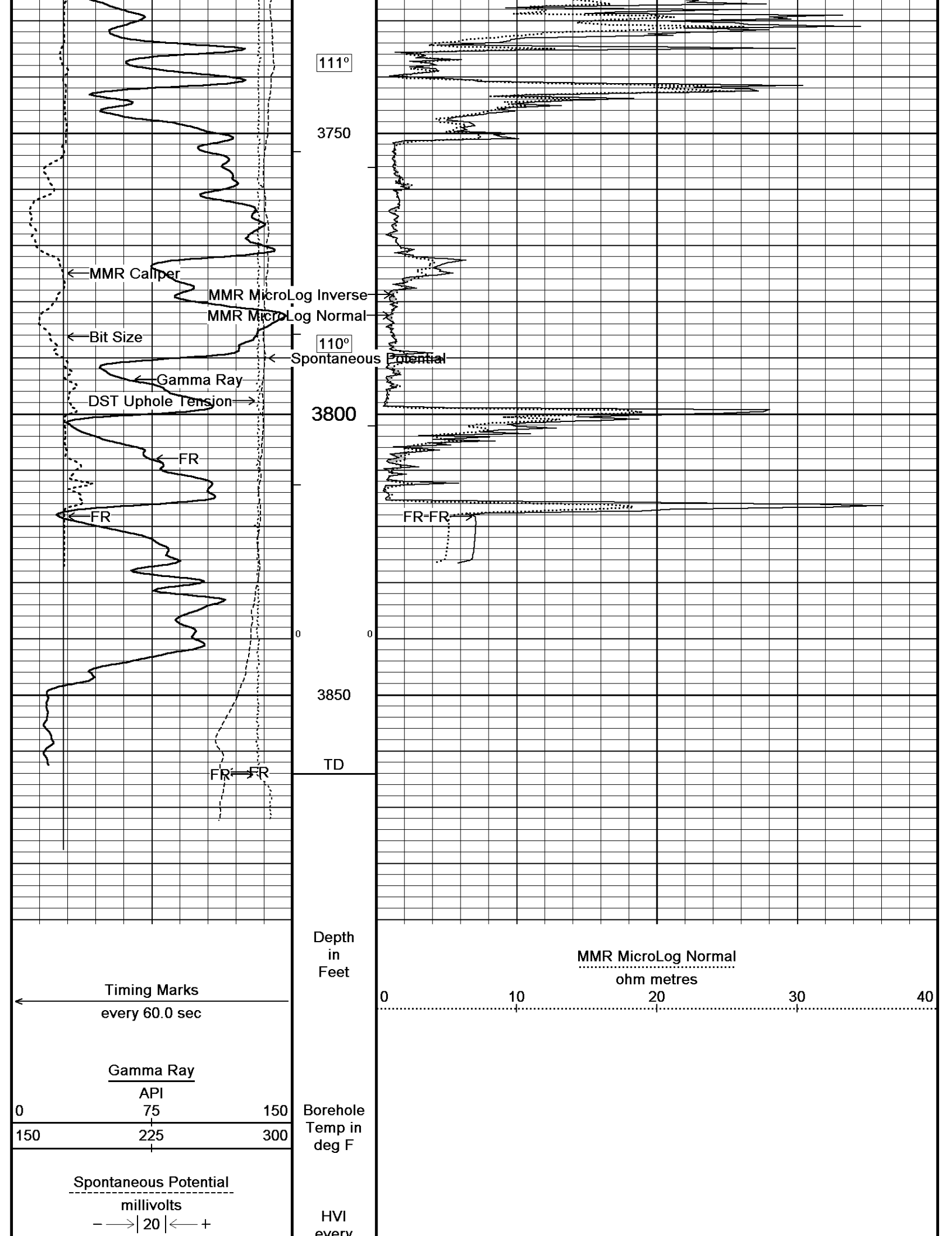
Replay Scale 1:240

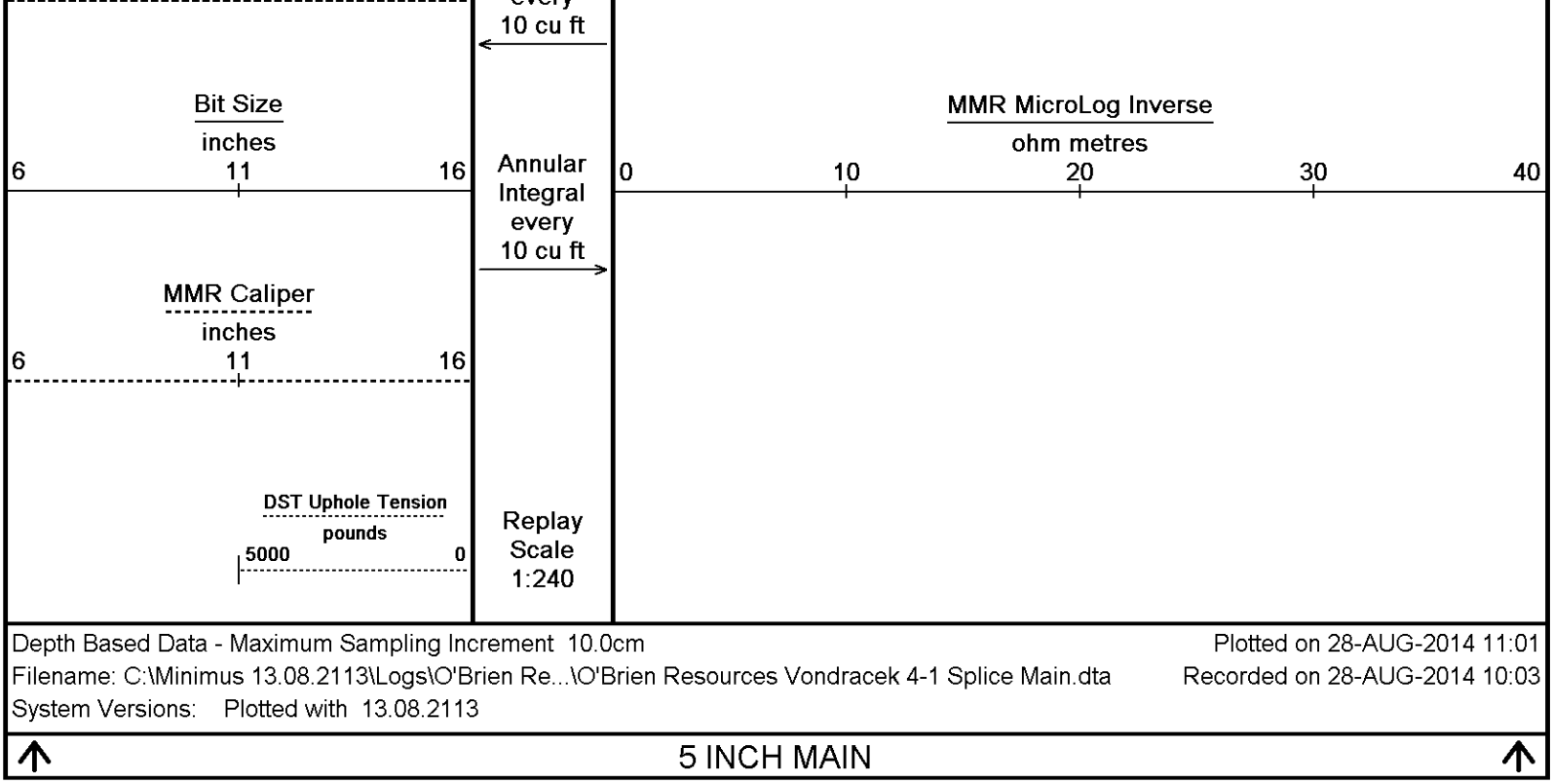
MMR MicroLog Normal
ohm metres
0 — 10 — 20 — 30 — 40

MMR MicroLog Inverse
ohm metres
0 — 10 — 20 — 30 — 40


3288
3300
106°
3350
MMR Caliper
MMR MicroLog Inverse
107°
MMR MicroLog Normal
BR Size
Spontaneous Potential
3400
Gamma Ray
DST Uphole Tension
100
108°
3450
109°
3500


109°
100 3550
110°
3600
110°
3650
110°
3700


111°
3750
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Bit Size
110°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3800
FR
FR
FR FR
0
0
3850
TD
FR FR
Timing Marks
every 60.0 sec
Depth
in
Feet
MMR MicroLog Normal
ohm metres
0
10
20
30
40
Gamma Ray
API
0
75
150
150
225
300
Borehole
Temp in
deg F
Spontaneous Potential
millivolts
20
HVI
every

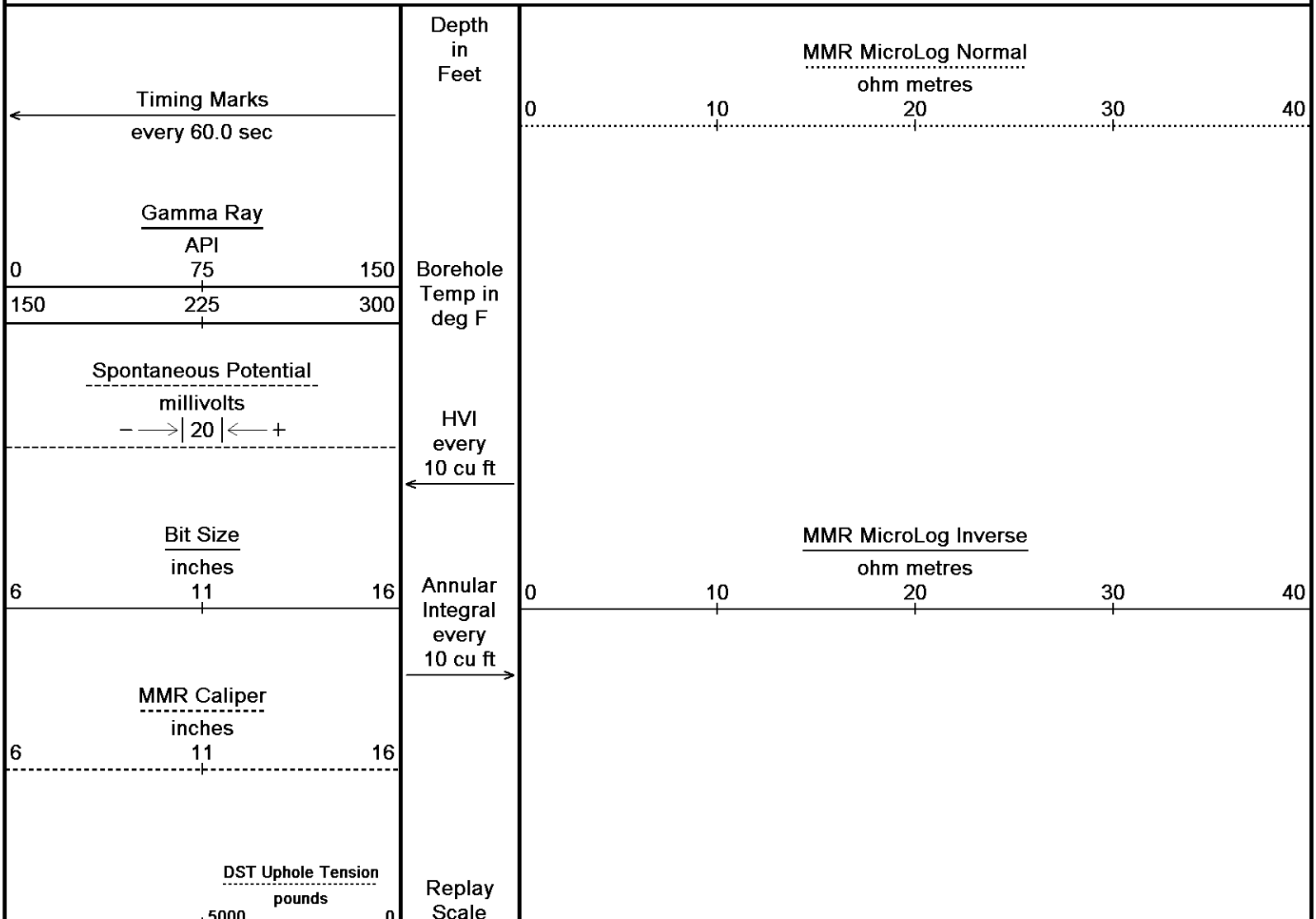


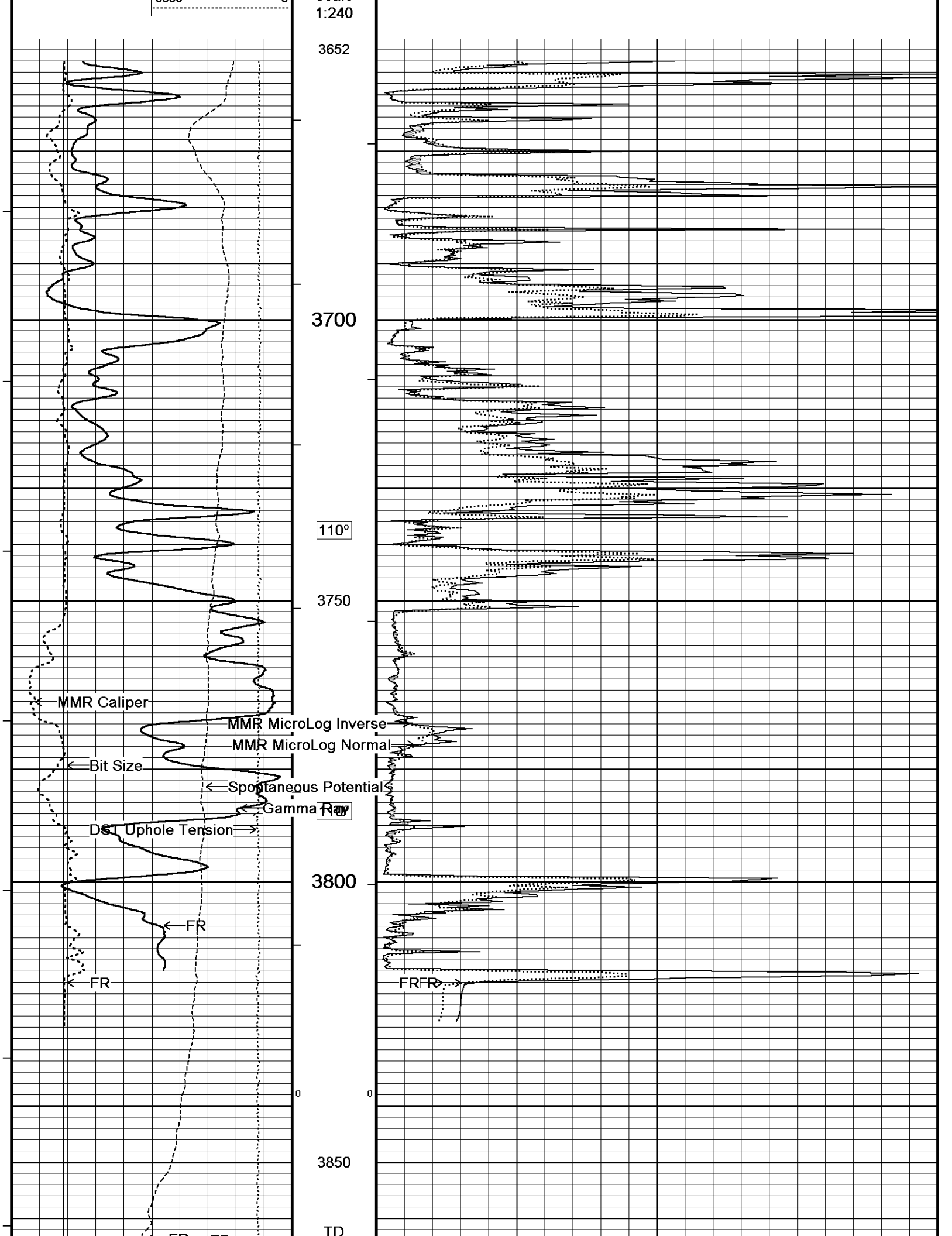
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-AUG-2014 11:01
Filename: C:\Minimus 13.08.2113\Logs\O'Brien Re...\O'Brien Resources Vondracek 4-1 Splice Main.dta — Recorded on 28-AUG-2014 10:03
System Versions: Plotted with 13.08.2113

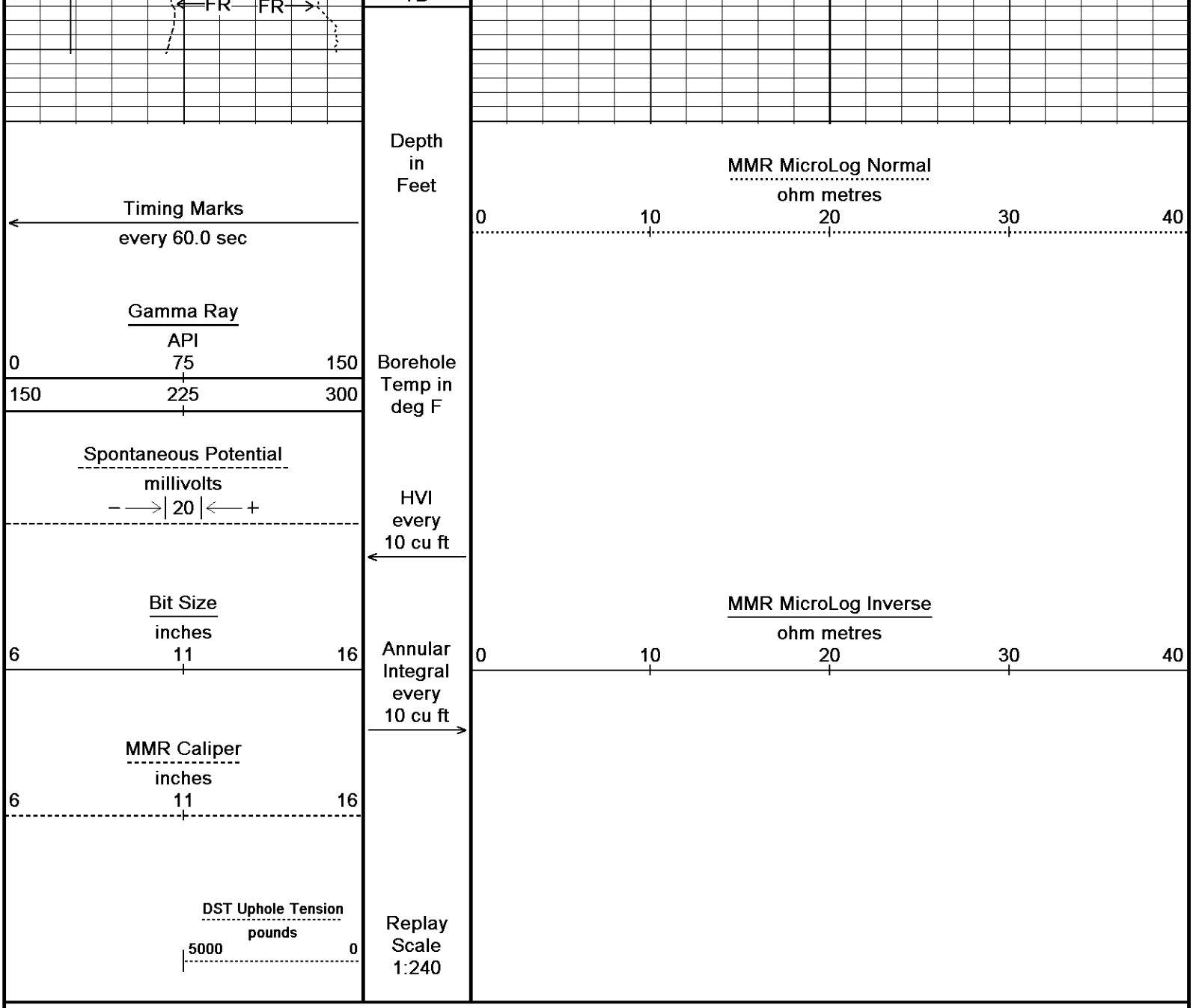
5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-AUG-2014 11:01
Filename: C:\Minimus 13.08.2113\Logs\O'Brien ...\O'Brien Resources Vondracek 4-1 Run 1 Repeat.dta — Recorded on 28-AUG-2014 06:20
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113




1:240
3652
3700
110°
3750
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Bit Size
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3800
FR
FR
FR
FR
0
0
3850
TD



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-AUG-2014 11:01

Filename: C:\Minimus 13.08.2113\Logs\O'Brien ...\O'Brien Resources Vondracek 4-1 Run 1 Repeat.dta — Recorded on 28-AUG-2014 06:20

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\O'Brien Resources Vondracek 4-1\O'Brien Resources Vondracek 4-1 Run 1 Repeat.dta

General Constants All 000 — Last Edited on 28-AUG-2014,03:35

General Parameters		
Mud Resistivity	0.420	ohm-metres
Mud Resistivity Temperature	81.000	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	4.500	inches
Caliper for Differential Caliper	Density 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

Down-hole Tension Calibration SMS 0

Field Calibration on 28-AUG-2014 04:30

Reading No	Measured	Calibrated (lbs)
1	15919.11	0.00
2	16496.06	480.60

SP Calibration MCG-C 208

Field Calibration on 25-AUG-2014 14:59

	Measured	Calibrated (mV)
Reference 1	99.3	98.7
Reference 2	-98.0	-98.9

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 25-AUG-2014 15:11

	Measured	Calibrated (API)
Background	71	48
Calibrator (Gross)	1142	773
Calibrator (Net)	1071	725

Gamma Constants MCG-C 208

Last Edited on 28-AUG-2014,03:18

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	%

Neutron Calibration MDN-B.J 387

Base Calibration on 31-JUL-2014 11:36
Field Check on 25-AUG-2014 15:18

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2985	92	3714	110
Ratio	32.470		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1675	2460
Ratio	0.681	

Field Check

	Calibrated (cps)	
	1690	2481
Ratio	0.689	

Neutron Constants MDN-B.J 387

Last Edited on 25-AUG-2014,15:11

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	

FE Calibration MFE-A.A 55

Base Calibration on 30-JUL-2014 09:41
Field Check on 25-AUG-2014 14:47

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	951.6	126.8
Base Check		281.4
Field Check		281.4

FE Constants MFE-A.A 55

Last Edited on 26-AUG-2014,13:31

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

Sonic Constants MSS-C.K 330

Last Edited on 28-AUG-2014,03:18

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	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	0.00	micro-sec
MX3FT	1500.00	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	0.0000	0.0000
Free Pipe	0.0000	

Peak Amplitude Source

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)	Depth (ft)
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
0.00	0.00	0.00	0.00
0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR No

Use 4' Waveform to derive TR	No	
Use 5' Waveform to derive TR	No	
Use 6' Waveform to derive TR	No	
3' Waveform Discriminator Level	0.30	mV
4' Waveform Discriminator Level	0.30	mV
5' Waveform Discriminator Level	0.15	mV
6' Waveform Discriminator Level	0.15	mV
3' Waveform Filter		
4' Waveform Filter		
5' Waveform Filter		
6' Waveform Filter		
Semblance Level	0.50	
Semblance Window Width	120.00	micro-sec
Sonic 1 Despiker	100.00	micro-sec/ft
Sonic 2 Despiker	100.00	micro-sec/ft

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50
Field Check on 25-AUG-2014 14:46

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			16.2	3861.5
2			31.9	3589.0
3			29.9	2970.1
4			20.8	2125.4
Deep			18.6	1911.7
Medium			43.0	3859.2
Shallow			47.5	5369.4

Array Temperature 92.9 Deg F

Induction Constants MAI-A.A 5

Last Edited on 26-AUG-2014,13:31

Induction Model	RtAP-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	N/A	inches
Tool Centred	No	
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	8.0000	
Stand-off Fin Angle	45.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm Source	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

High Resolution Temperature Calibration MAI-A.A 5

Field Calibration on 21-JAN-2014,15:43

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

High Resolution Temperature Constants MAI-A.A 5

Last Edited on 27-JUN-2014,14:12

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MMR-A 29

Base Calibration on 13-AUG-2014 16:50
Field Check on 25-AUG-2014 14:48

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.2	49.8	5.1	25.6
Micro Inverse	10.0	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.7	93.7
Micro Inverse	62.3	62.3

Micro Normal and Micro Inverse Constants MMR-A 29

Last Edited on 13-AUG-2014,16:47

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

Caliper Calibration MMR-A 29

Base Calibration on 13-AUG-2014 17:05
Field Calibration on 25-AUG-2014 14:50

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13833	5.96
2	17084	7.98
3	20261	9.85
4	24276	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Caliper Calibration MPD-D.A 481

Base Calibration on 23-AUG-2014 13:39
Field Calibration on 25-AUG-2014 14:56

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17257	3.99
2	27352	5.98
3	37398	7.97
4	47224	9.86
5	58327	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.93	7.97

Photo Density Calibration MPD-D.A 481

Base Calibration on 23-AUG-2014 14:06
Field Check on 25-AUG-2014 14:54

Density Calibration

Base Calibration

	Measured	Calibrated (sdu)

	Near	Far	Near	Far
Background	1216	1426		
Reference 1	55706	26385	59556	30836
Reference 2	22306	2607	24941	2541

Field Check at Base

1215.9	1425.6

Field Check

1212.8	1429.7

PE Calibration

Base Calibration	WS	WH	Measured Ratio	Calibrated Ratio
Background	232	1087		
Reference 1	24125	55503	0.439	0.371
Reference 2	6847	22166	0.314	0.272

Field Check at Base

232.2	1087.0

Field Check

230.5	1085.2

Density Constants MPD-D.A 481

Last Edited on 28-AUG-2014,03:18

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	
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 (ft)
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\O'Brien Resources Vondracek 4-1\O'Brien Resources Vondracek 4-1 Run 1 Repeat.dta

CBH-C, Cablehead, 11 pin
CBH-C 265 LG: 2.40 ft WT: 24.3 lb OD: 2.240 in

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.240 in

Compact Micro-Resistivity
MMR-A 29 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

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.

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

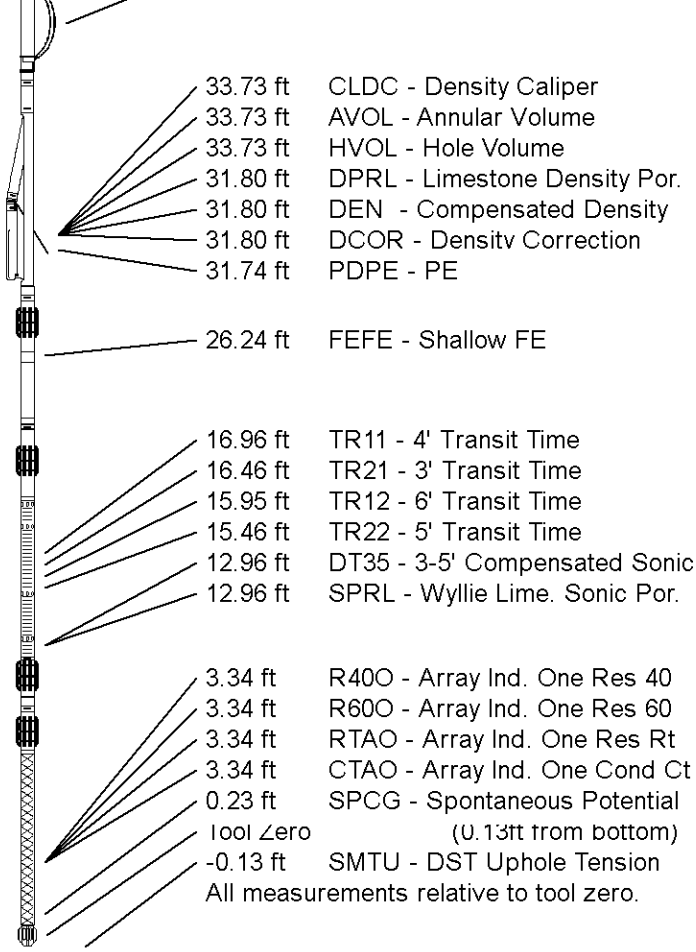
Compact Density/Caliper
MPD-D.A 481 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

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

Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.240 in

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

Total Length: 63.70 ft Weight: 480.6 lb



COMPANY	O'BRIEN RESOURCES, LLC.
WELL	VONDRACEK 4-1
FIELD	PECHANEC SOUTHWEST
PROVINCE/COUNTY	RUSH
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2111.00	feet	First Reading	3818.00	feet
Elevation Drill Floor	2109.00	feet	Depth Driller	3862.00	feet
Elevation Ground Level	2104.00	feet	Depth Logger	3864.00	feet

Weatherford®

MICRORESISTIVITY LOG