MICRORESISTIVITY LOG

COMPANY	GRAND MESA OPERATING COMPANY
WELL	HESS-SMITH #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2414' FNL & 1864' FWL

SEC	TWP	RGE	Other Services
22	12S	32W	MPD/MDN MAI/MFE

API Number 15-109-21178
Permit Number

Permanent Datum GL, Elevation 3027 feet
Log Measured From KB
Drilling Measured From KB

Elevations:	feet
KB	3037.00
DF	3036.00
GL	3027.00

Date	17-MAY-2013			
Run Number	ONE			
Service Order	3537746			
Depth Driller	4735.00	feet		
Depth Logger	4734.00	feet		
First Reading	4701.00	feet		
Last Reading	3734.00	feet		
Casing Driller	225.00	feet		
Casing Logger	224.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg		57.00 CP	
PH / Fluid Loss	10.00		8.00 ml/30Min	
Sample Source	MUDPIT			
Rm @ Measured Temp	1.64 @ 99.0	ohm-m		
Rmf @ Measured Temp	1.31 @ 99.0	ohm-m		
Rmc @ Measured Temp	1.97 @ 99.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	1.40 @116.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	116.00	deg F		
Equipment / Base	13096		LIB	
Recorded By	ADAM SILL			
Witnessed By	KENT MATSON			
JOB #	LB13-139			

BOREHOLE RECORD

Last Edited: 17-MAY-2013 17:16

Bit Size inches	Depth From feet	Depth To feet
7.875	225.00	4735.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	225.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  0.5 INCH STANDOFF USED ON MFE.
  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: 1730 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 3734 FEET: 183 CU. FT.
- RIG: VAL #4

- RIG: VALI #1.

- ENGINEER: A. SILL.

- OPERATOR(S): N. ADAME.

**** WHILE RUNNING IN HOLE BRIDGED OFF AT 2560 FEET, CAME UP AND WENT BACK DOWN AND WENT RIGHT THROUGH IT. ****

**** PULLED TIGHT AT 4709 FEET ON THE REPEAT PASS. CLOSED CALIPERS AND PULLED INTO IT 1000 POUNDS OVER. DROPPED DOWN A LITTLE BIT AND PULLED BACK UP AND PULLED THROUGH. REOPENED CALIPERS AND CONTINUED LOGGING. ****

**** AFTER PULLING TIGHT INSTRUCTED TO JUST LOG OUT OF THE HOLE AND NOT ATTEMPT TO DROP BACK DOWN TO LOG THE MAIN PASS. ****

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-JUN-2013 16:08

Filename: C:\Minimus 13.05.9583\Data\Grand Mesa Hess S...\Grand Mesa Hess-Smith #1-22 Main.dta — Recorded on 17-MAY-2013 19:48

System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

Timing Marks
every 60.0 sec

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

Spontaneous Potential
millivolts
– → | 20 | ← +

MML Caliper
inches
6 — 11 — 16

Bit Size
inches
6 — 11 — 16

DST Uphole Tension
pounds
5000 — 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

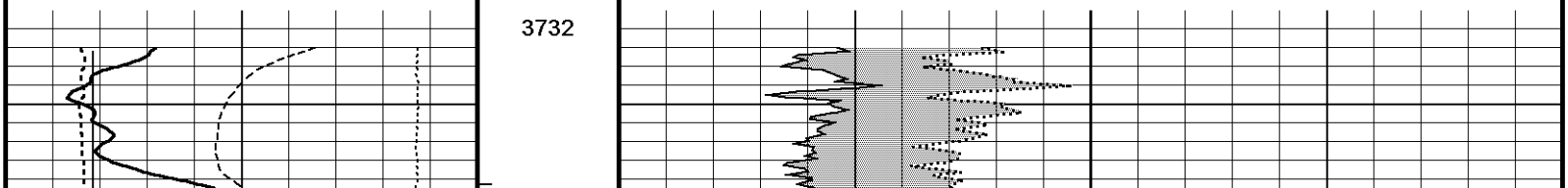
Annular Integral every 10 cu ft

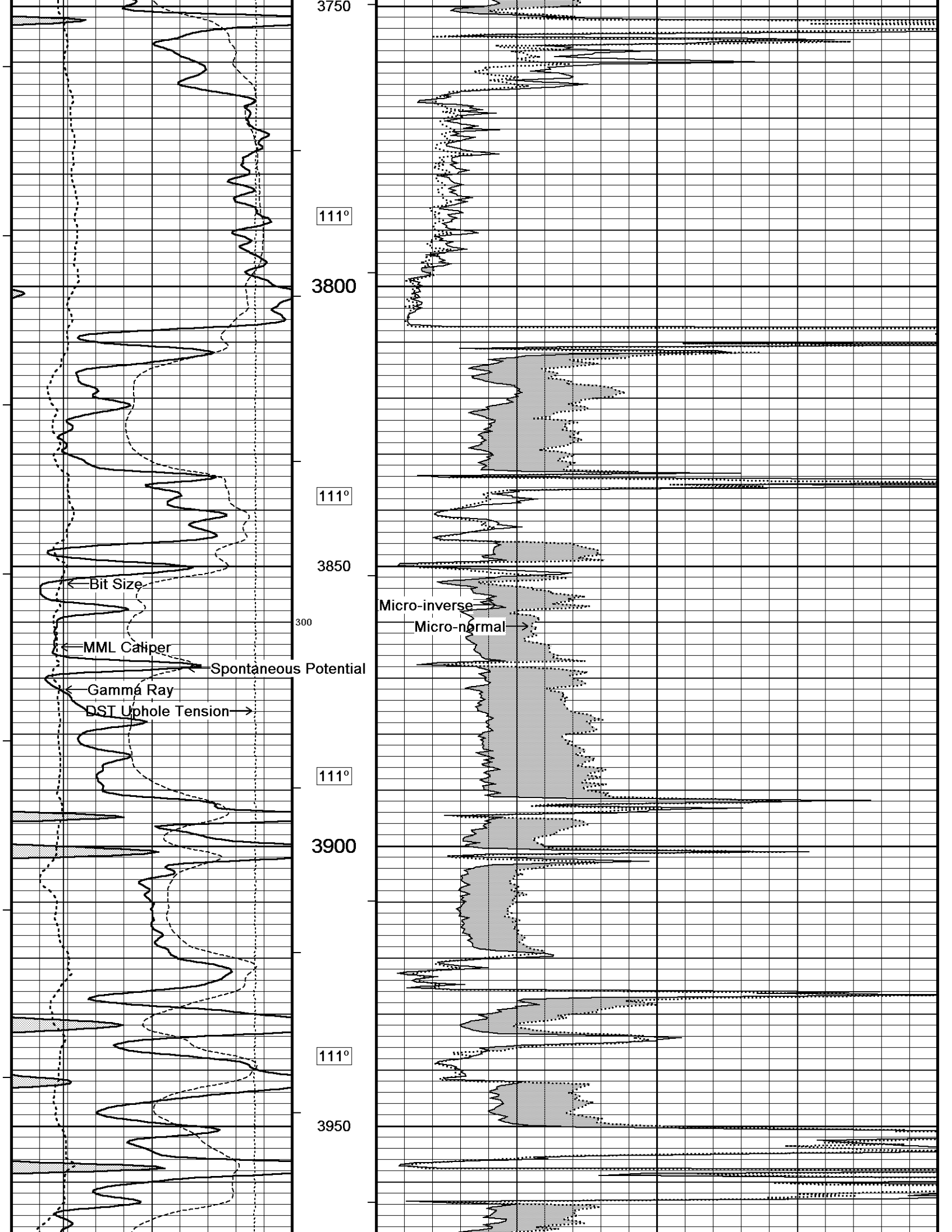
Replay Scale 1:240

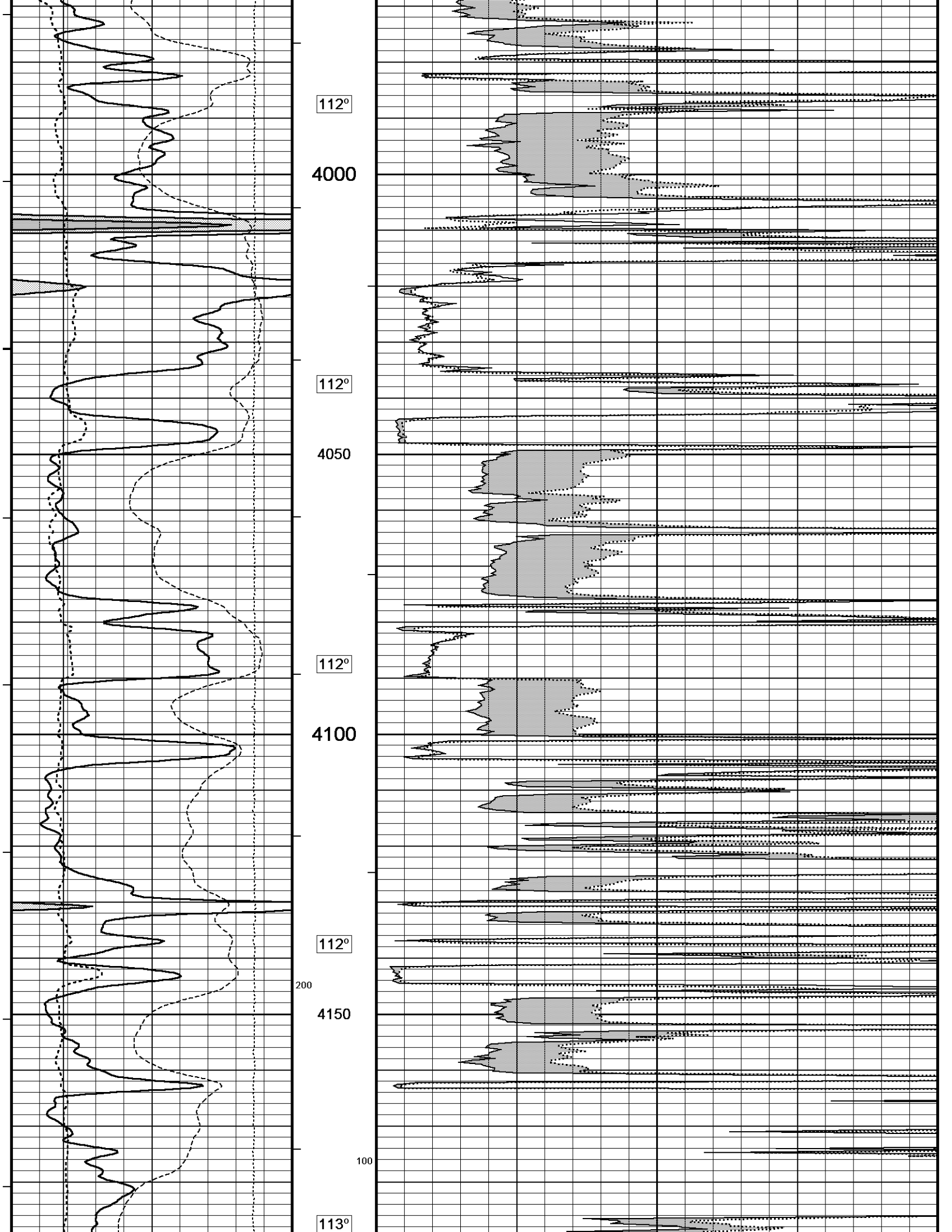
3732

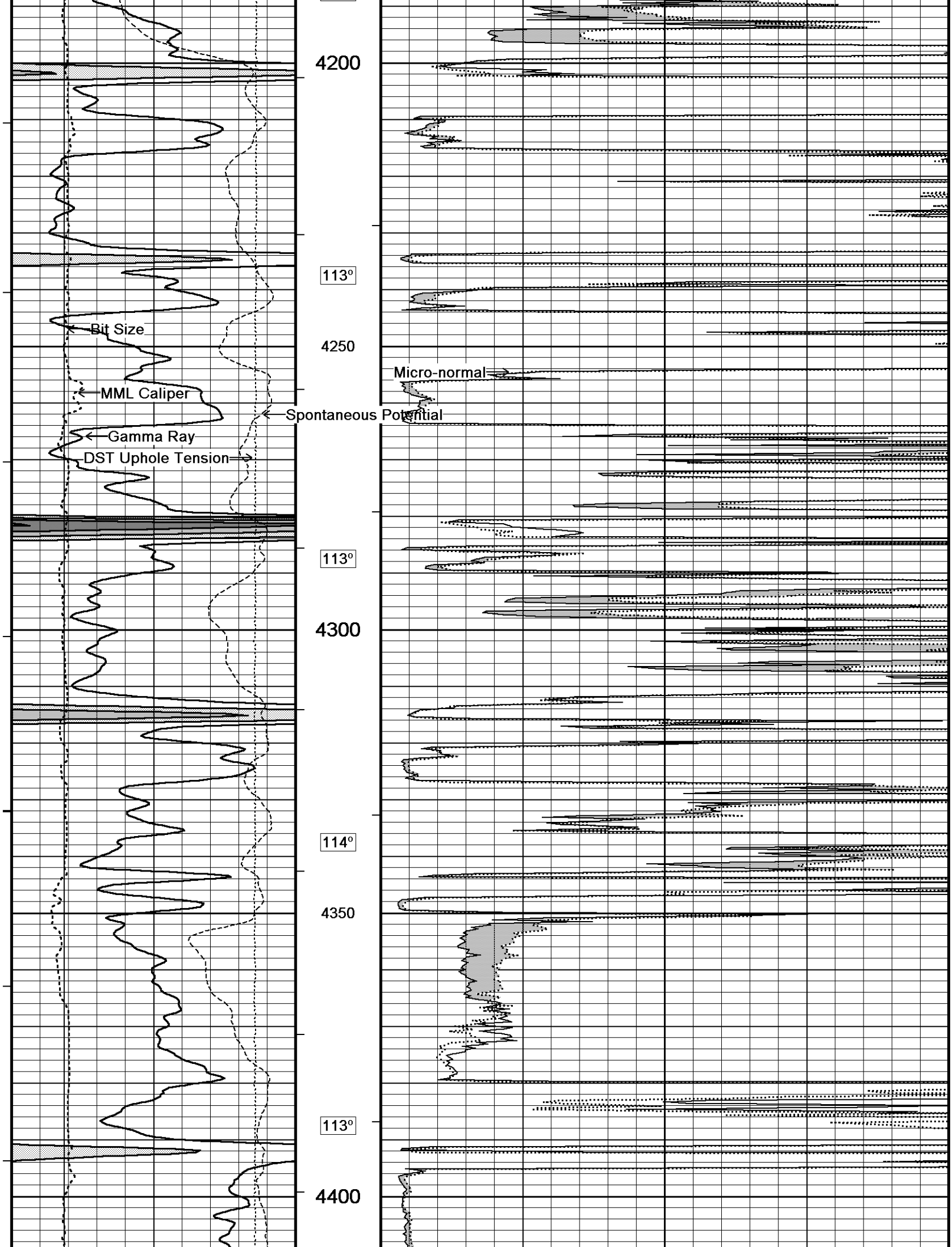
Micro-normal
ohm metres
0 — 10 — 20 — 30 — 40

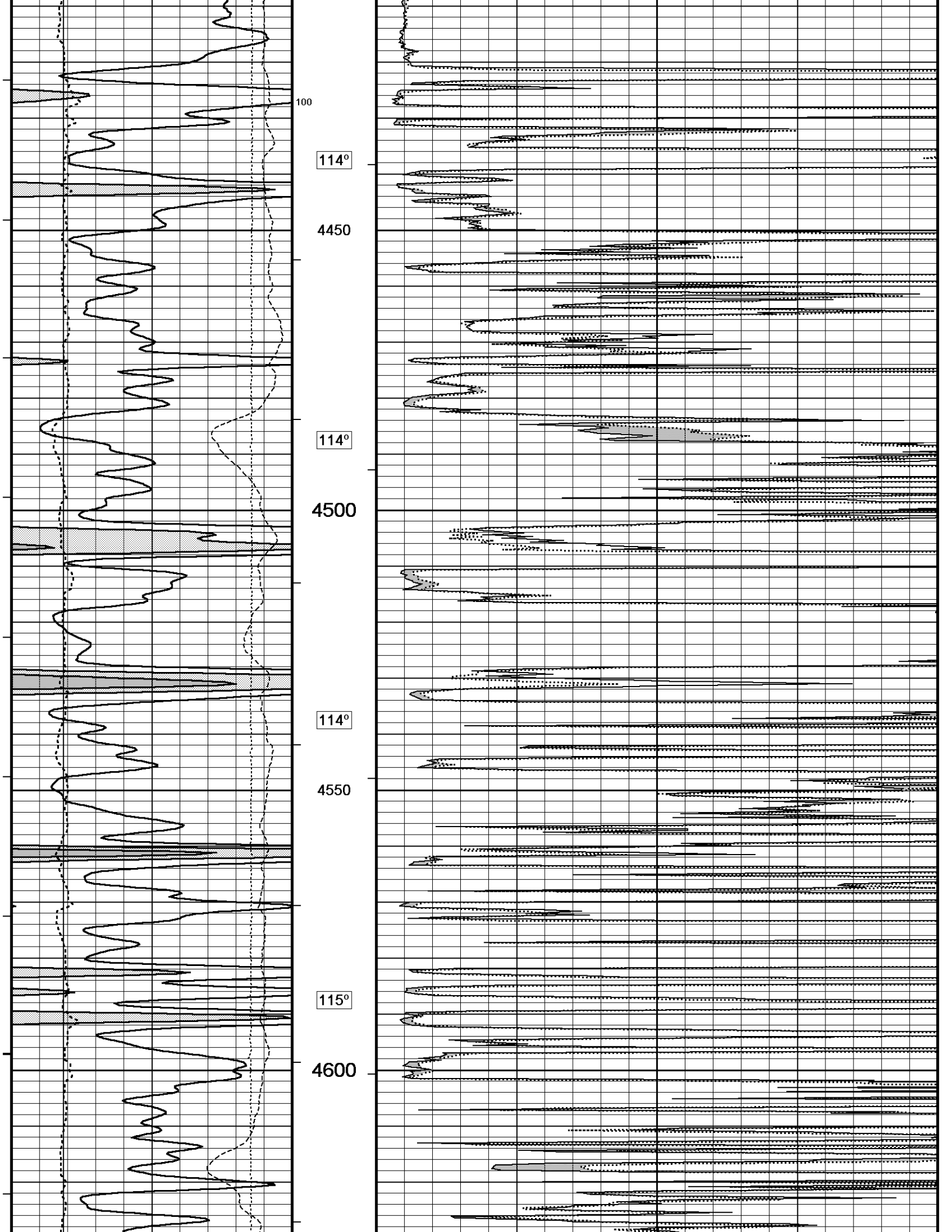
Micro-inverse
ohm metres
0 — 10 — 20 — 30 — 40

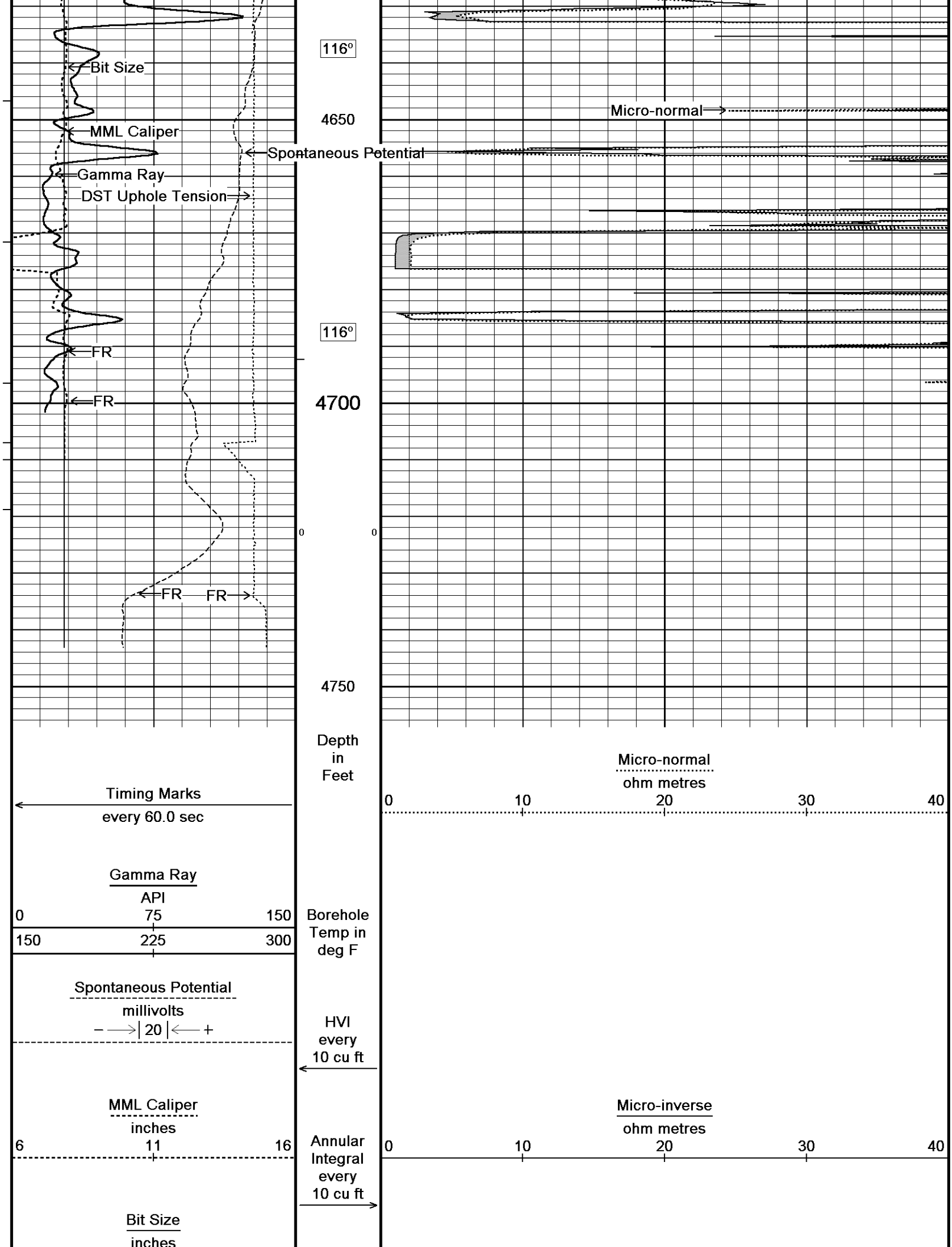


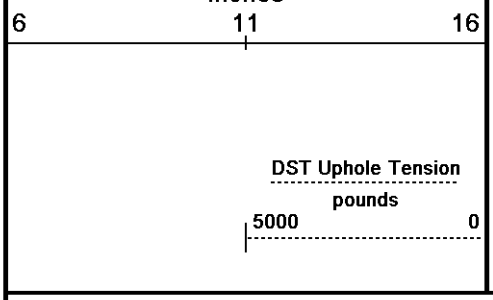

3750
111°
3800
111°
3850
Bit Size
300
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
111°
3900
111°
3950


112°
4000
112°
4050
112°
4100
112°
200
4150
100
113°


4200
113°
Bit Size
4250
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
113°
4300
114°
4350
113°
4400


100
114°
4450
114°
4500
114°
4550
115°
4600


116°
Bit Size
4650
MML Caliper
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
116°
FR
4700
FR
0
0
FR
FR
4750
Depth in Feet
Micro-normal
ohm metres
0
10
20
30
40
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Borehole Temp in deg F
150
225
300
Spontaneous Potential
millivolts
− 20 +
HVI
every 10 cu ft
MML Caliper
inches
6
11
16
Micro-inverse
ohm metres
0
10
20
30
40
Annular Integral every 10 cu ft
Bit Size
inches



Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-JUN-2013 16:08
Filename: C:\Minimus 13.05.9583\Data\Grand Mesa Hess S...\Grand Mesa Hess-Smith #1-22 Main.dta — Recorded on 17-MAY-2013 19:48
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

5 INCH MAIN

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Data\Grand Mesa Hess Smith #1-22\Grand Mesa Hess-Smith #1-22.dta

General Constants All 000

Last Edited on 17-MAY-2013,17:26

General Parameters		
Mud Resistivity	1.640	ohm-metres
Mud Resistivity Temperature	99.000	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	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Four Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Gamma Calibration MCG-D.K 469

Field Calibration on 17-MAY-2013 10:01

	Measured	Calibrated (API)
Background	68	47
Calibrator (Gross)	1128	772
Calibrator (Net)	1060	725

Gamma Constants MCG-D.K 469

Last Edited on 17-MAY-2013,17:25

Gamma Calibrator Number	GRC38	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.K 469

Field Calibration on 07-MAY-2013,09:42

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 07-MAY-2013,09:42

Pre-filter Length	11

Caliper Calibration MML-A 3

Base Calibration on 19-APR-2013 16:27
Field Calibration on 17-MAY-2013 09:51

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14766	5.98
2	17932	7.97
3	21225	9.86
4	25186	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.97	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 19-APR-2013 16:32
Field Check on 17-MAY-2013 09:52

Base Calibration

Channel	Measured Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Calibrated (ohm-m) Resistor 2
Micro Normal	12.2	60.3	5.0	25.0
Micro Inverse	15.7	78.4	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	62.8	62.8
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 17-MAY-2013,09:51

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	1.0000	
Micro Inverse K Factor	1.0000	
Standoff Offset	N/A	inches

Caliper Calibration MPD-B 64

Base Calibration on 19-APR-2013 14:25
Field Calibration on 17-MAY-2013 09:31

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13997	3.99
2	22559	5.98
3	31072	7.97
4	39474	9.86
5	48864	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.10	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Data\Grand Mesa Hess Smith #1-22\Grand Mesa Hess-Smith #1-22.dta

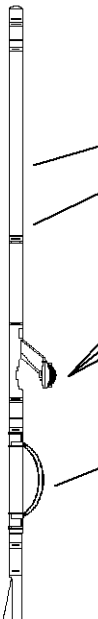
3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

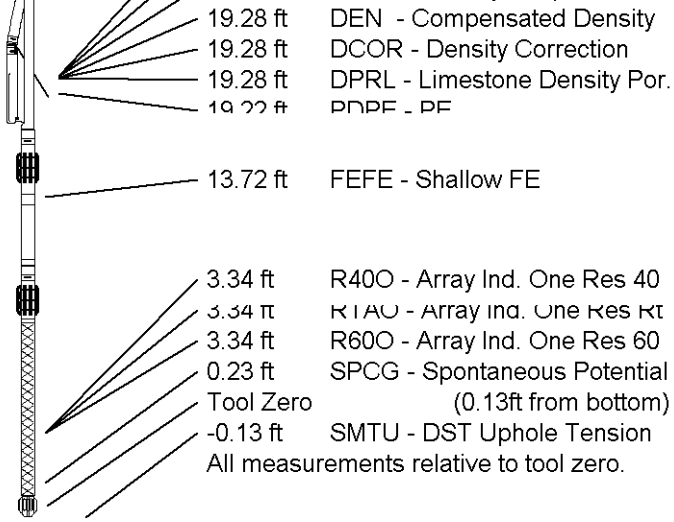


42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
34.24 ft	MLTC - MML Caliper
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY	GRAND MESA OPERATING COMPANY
WELL	HESS-SMITH #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3037.00	feet	First Reading	4701.00	feet
Elevation Drill Floor	3036.00	feet	Depth Driller	4735.00	feet
Elevation Ground Level	3027.00	feet	Depth Logger	4734.00	feet

Weatherford®

MICRORESISTIVITY LOG