

**Weatherford****ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY										GRAND MESA OPERATING COMPANY									
WELL										DBY #5-16									
FIELD										WILDCAT									
PROVINCE/COUNTY										SCOTT									
COUNTRY/STATE										U.S.A. / KANSAS									
LOCATION										1556' FNL & 2119' FEL									
										NE NW SW NE									
SEC	TWP		RGE		Other Services					MML									
16	16S		33W		MPD/MDN														
API Number					15-171-20924														
Permit Number																			
Permanent Datum G.L., Elevation 2969 feet															Elevations:				
Log Measured From KB															KB				
Drilling Measured From K.B.															DF				
															GL				
Date															21-JAN-2013				
Run Number															ONE				
Service Order															3537849				
Depth Driller															4740.00				
Depth Logger															4740.00				
First Reading															4737.00				
Last Reading															221.00				
Casing Driller															221.00				
Casing Logger															221.00				
Bit Size															7.875				
Hole Fluid Type															CHEMICAL				
Density / Viscosity															9.20 lb/USg				
PH / Fluid Loss															10.00				
Sample Source															FLOWLINE				
Rm @ Measured Temp															0.58 @ 93.0				
Rmf @ Measured Temp															0.46 @ 93.0				
Rmc @ Measured Temp															0.70 @ 93.0				
Source Rmf / Rmc															CALC				
Rm @ BHT															0.49 @ 112.0				
Time Since Circulation															4 HOURS				
Max Recorded Temp															112.00				
Equipment / Base															13057				
Recorded By															LYNN SCOTT				
Witnessed By															KENT MATSON				
IOB#															LB13-019				

BOREHOLE RECORD

Last Edited: 21-JAN-2013 18:46

Bit Size inches	Depth From feet	Depth To feet
7.875	221.00	4740.00

CASING RECORD

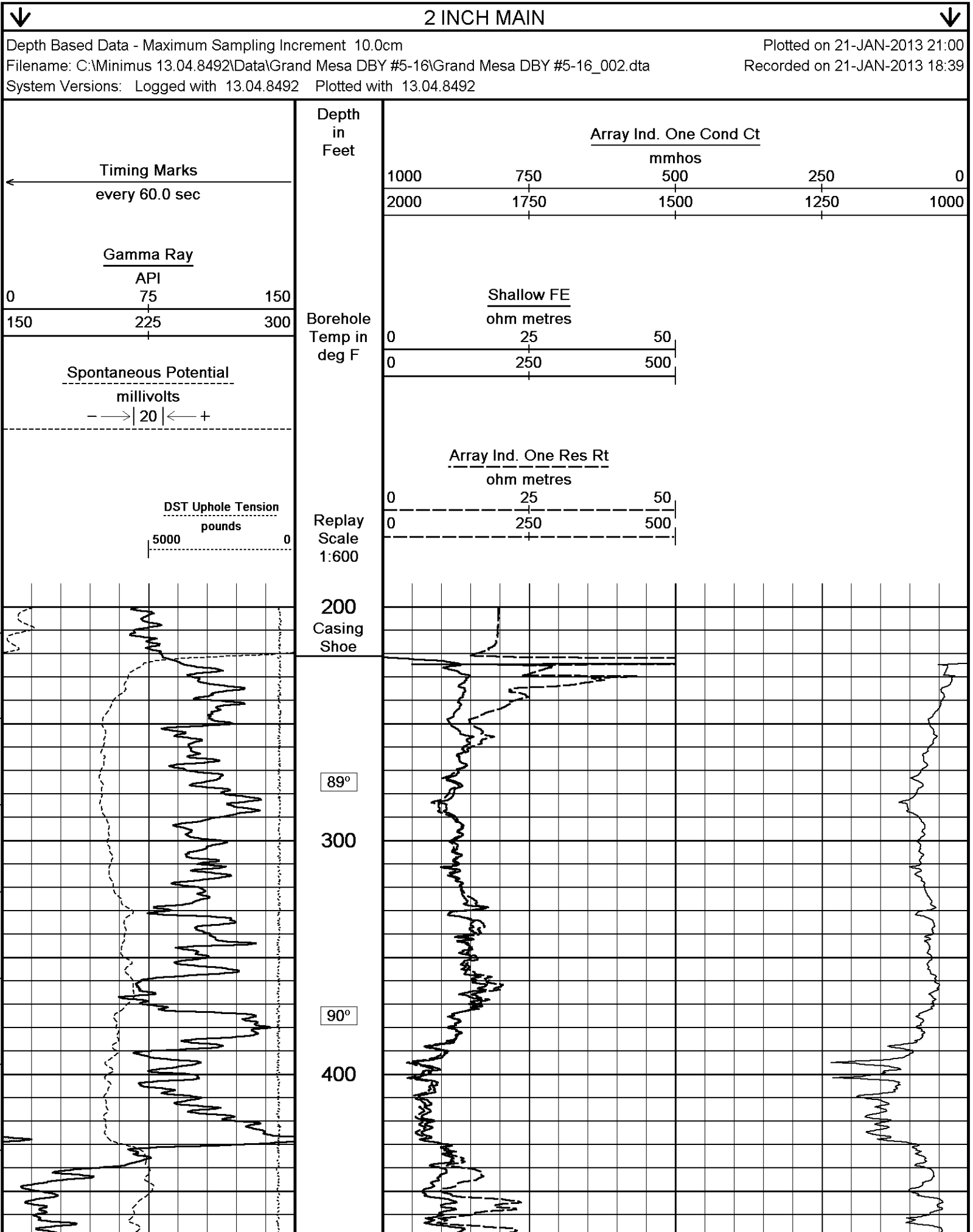
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	221.00	24.00

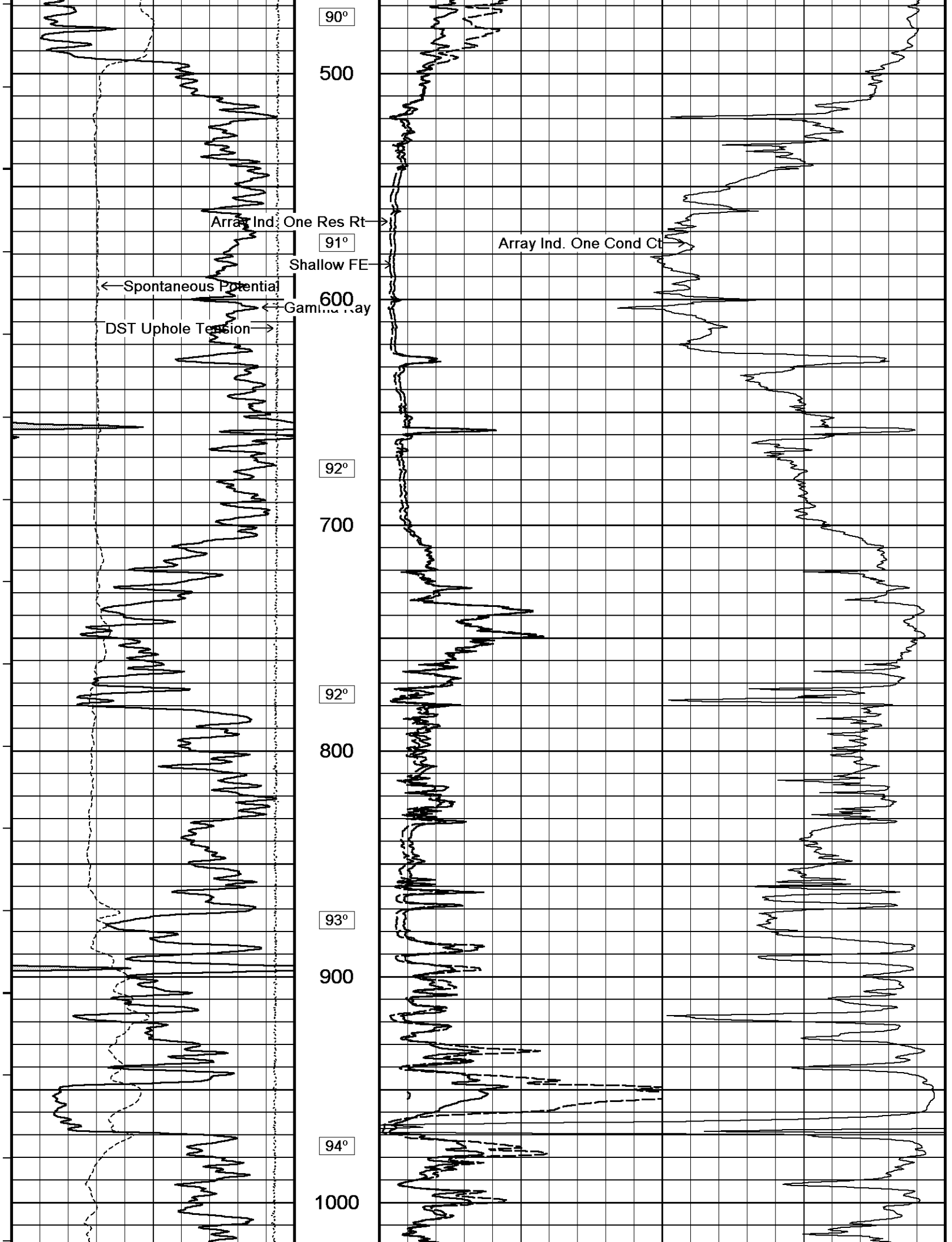
REMARKS

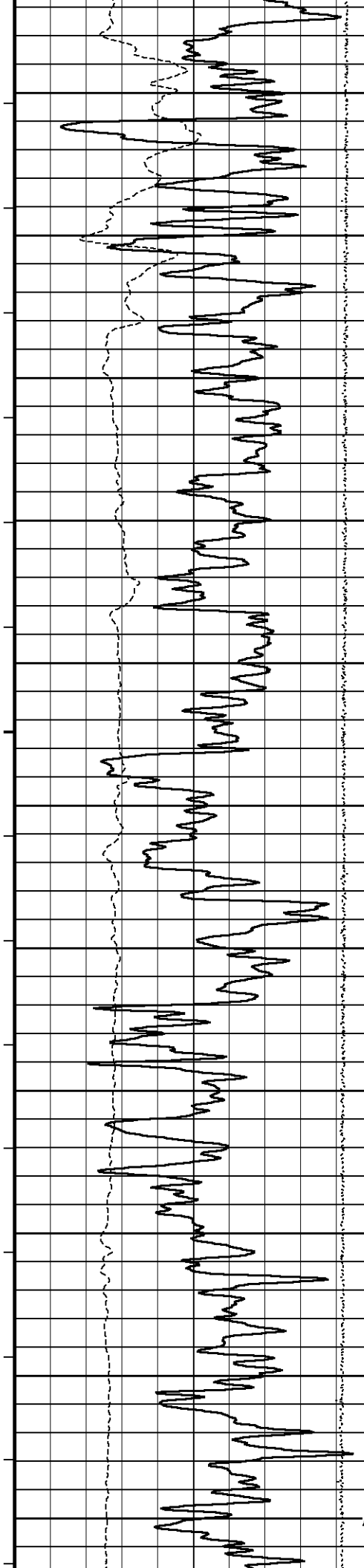
Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 0.5 Inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface Casing= 2354 cu. ft.
Annular volume with 5.5 inch production casing from TD to 3700 ft.= 258 cu. ft.
Service order: #3537849
Rig: Murfin #24
Engineer: L. Scott
Operator(s): B. Reeves

Software duplicates the pH value onto the fluid loss. The fluid loss is 8.0

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 interpretations, and we shall not, except in the case of gross or wilful 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







94°

1100

95°

1200

96°

1300

96°

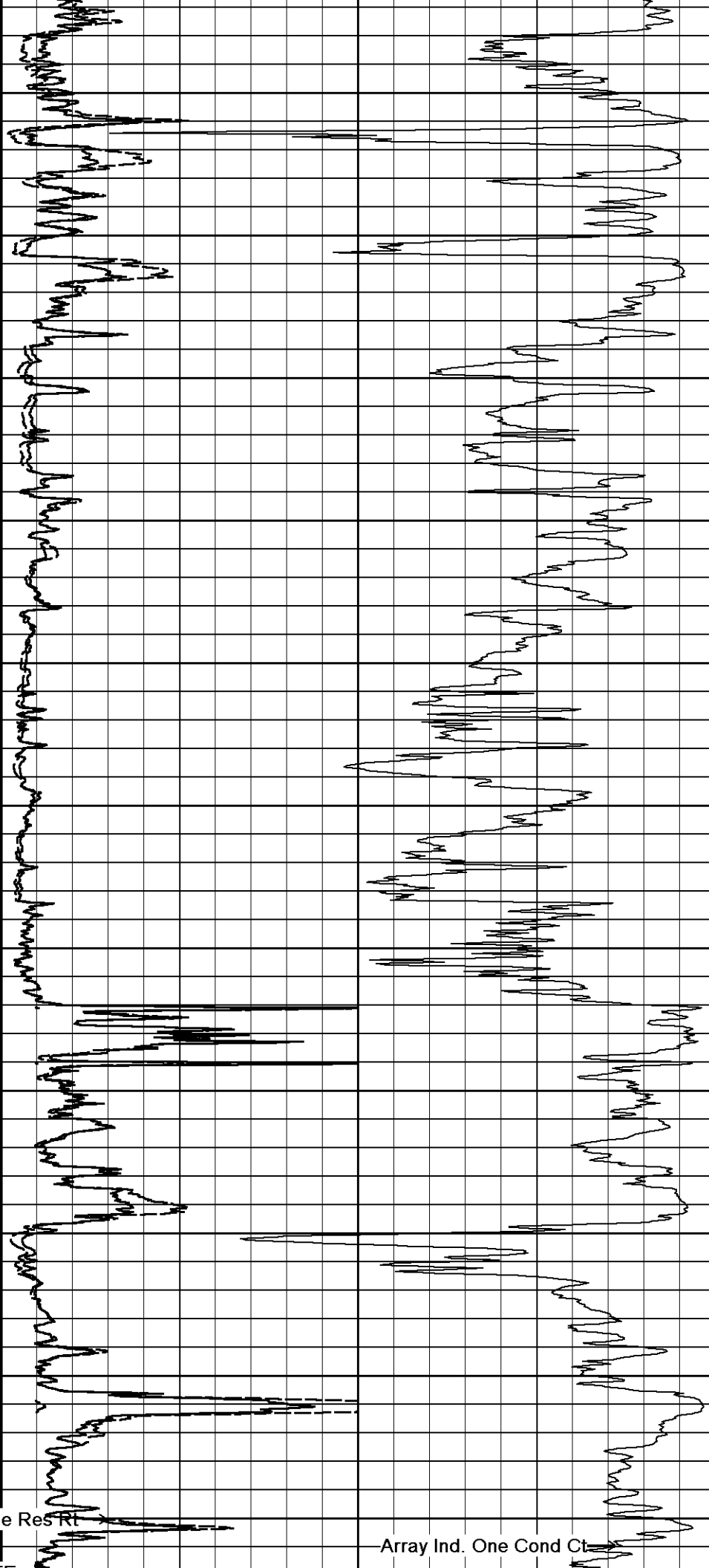
1400

97°

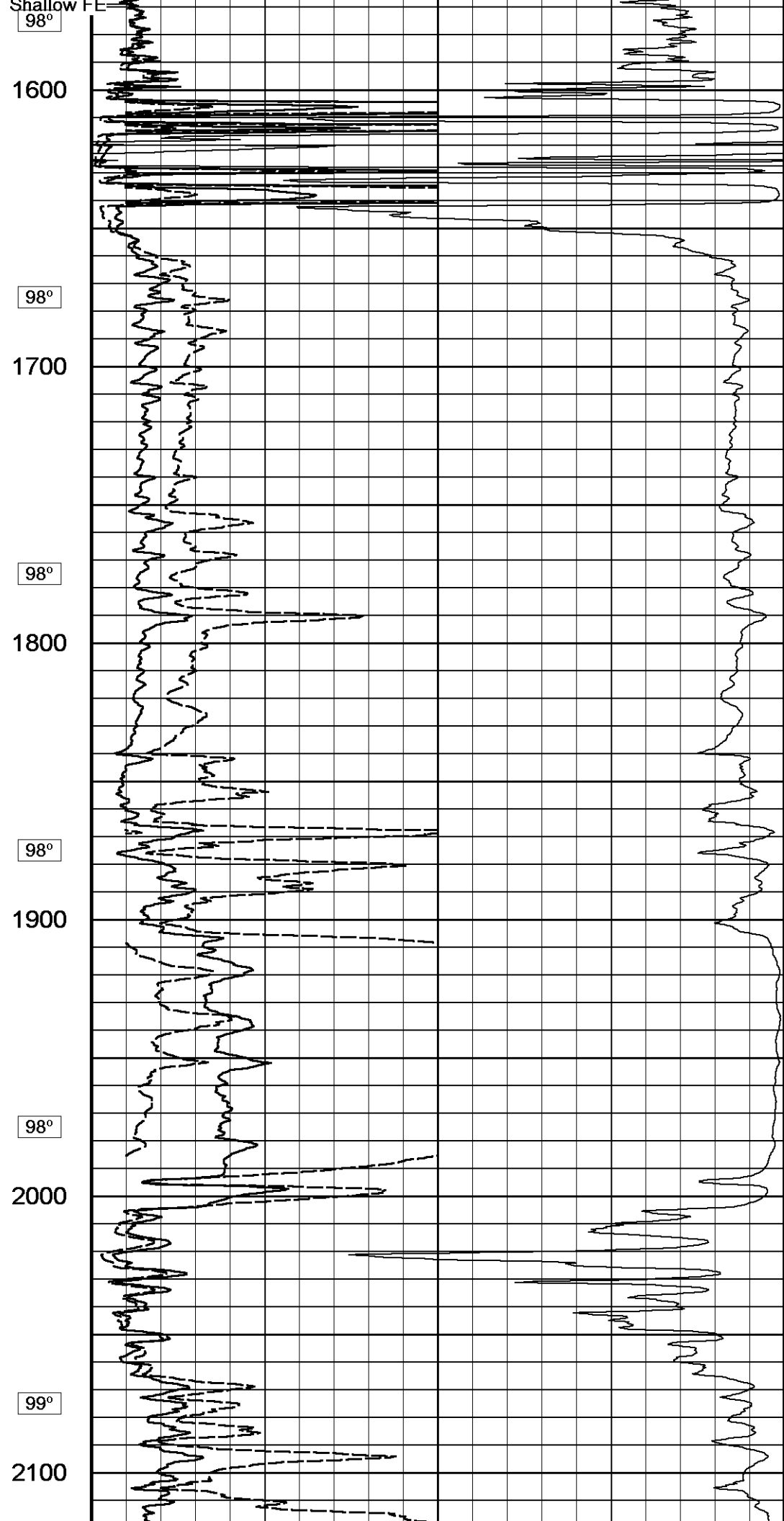
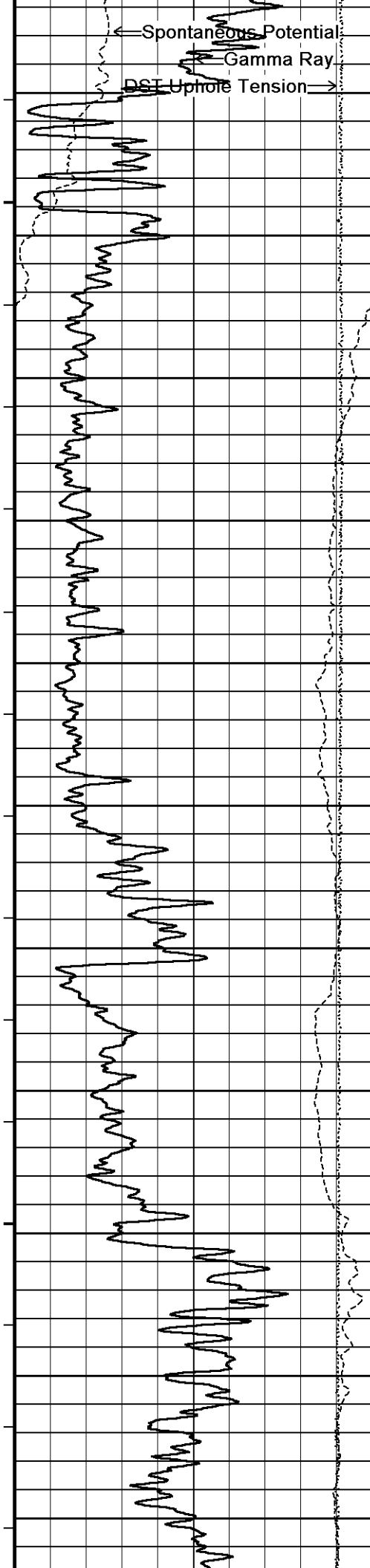
1500

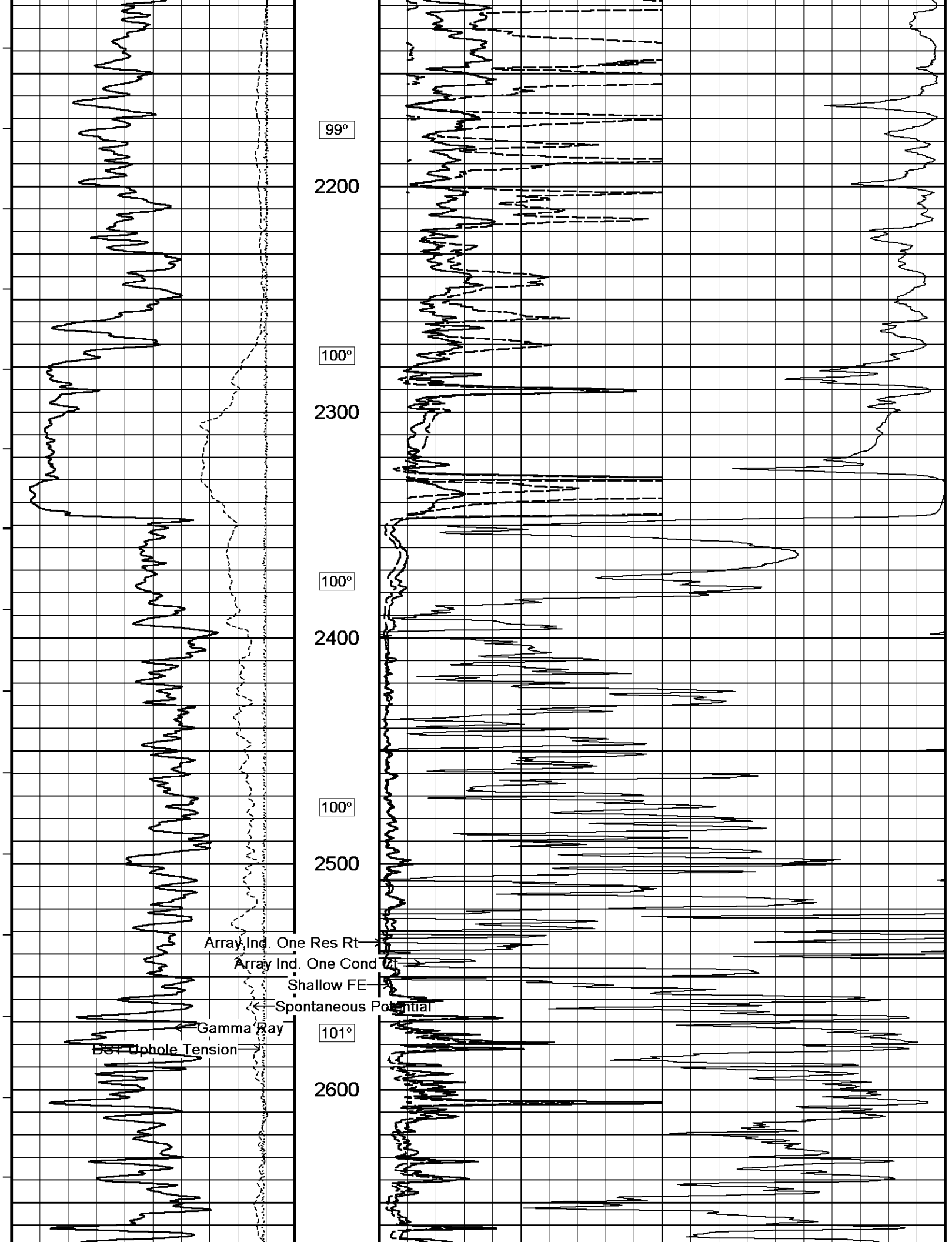
Array Ind. One Res Rt

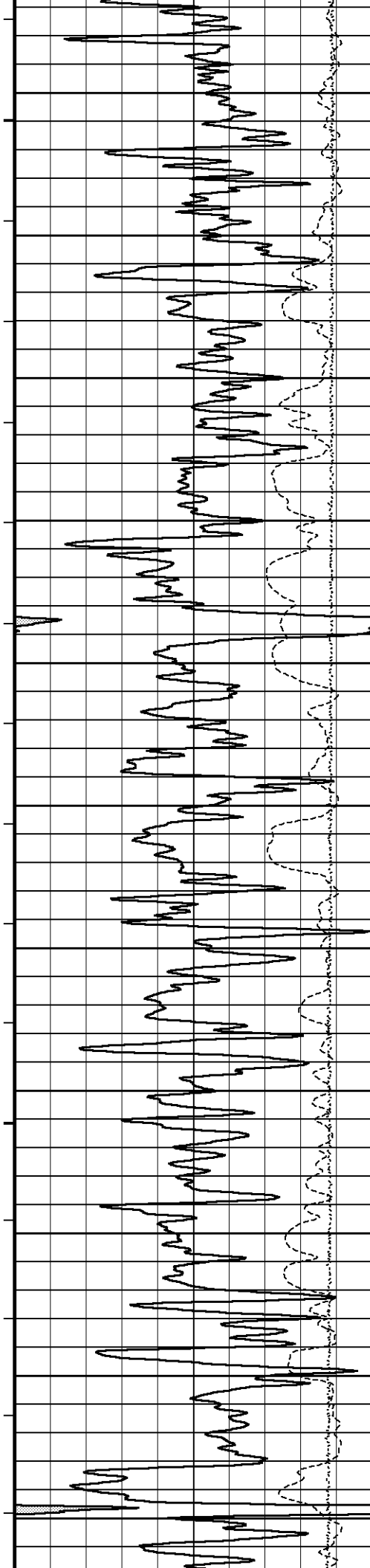
0.1



Array Ind. One Cond Ct







101°

2700

102°

2800

102°

2900

102°

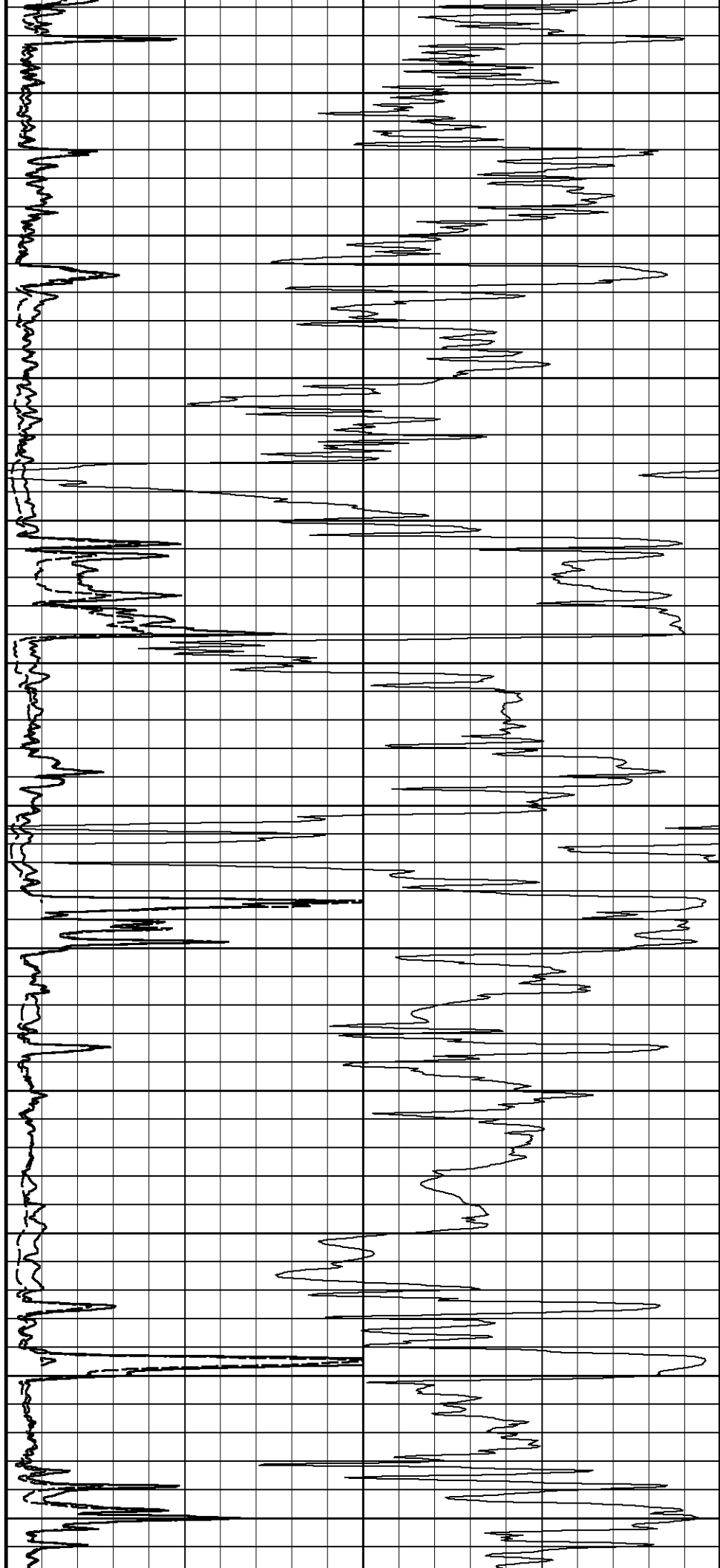
3000

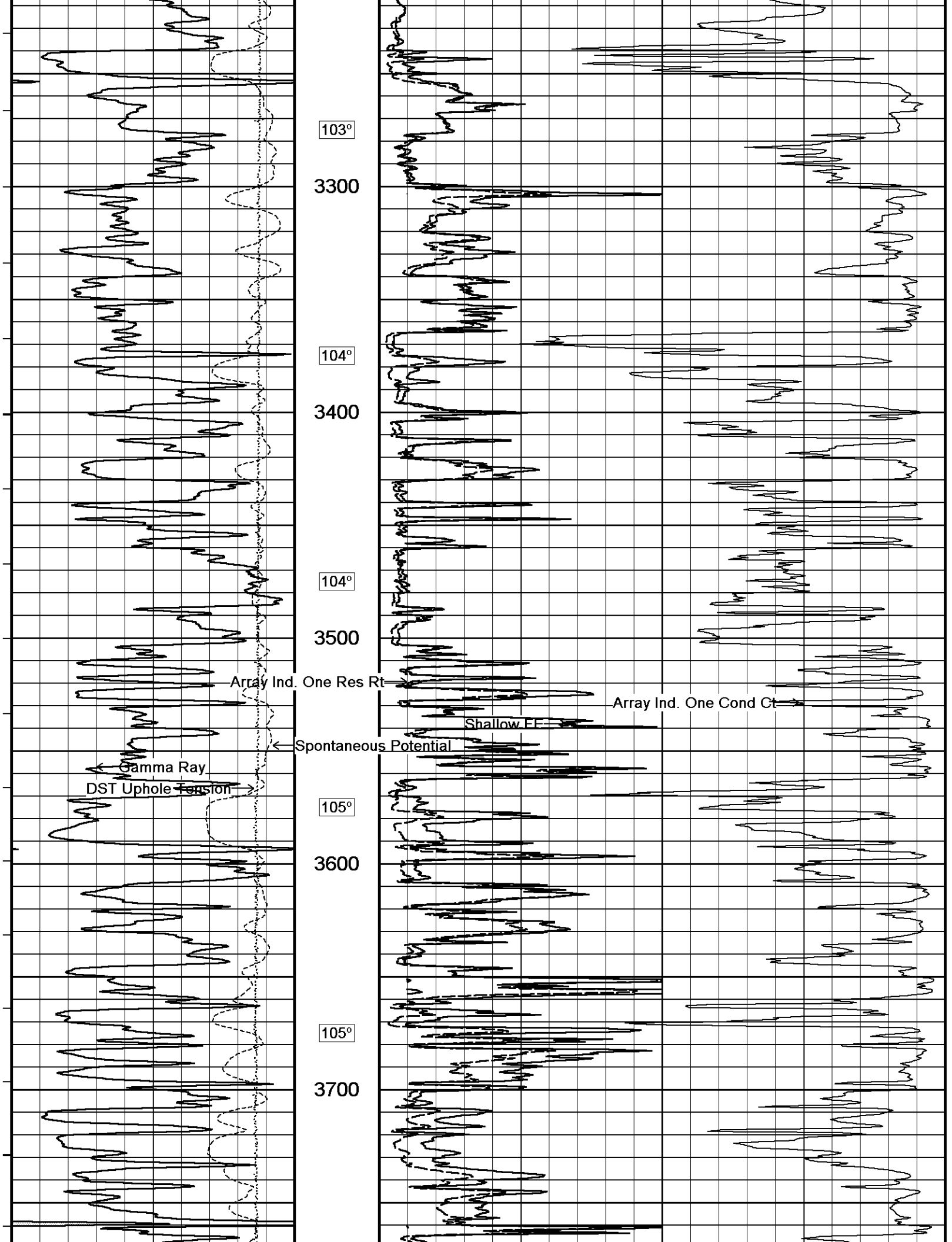
103°

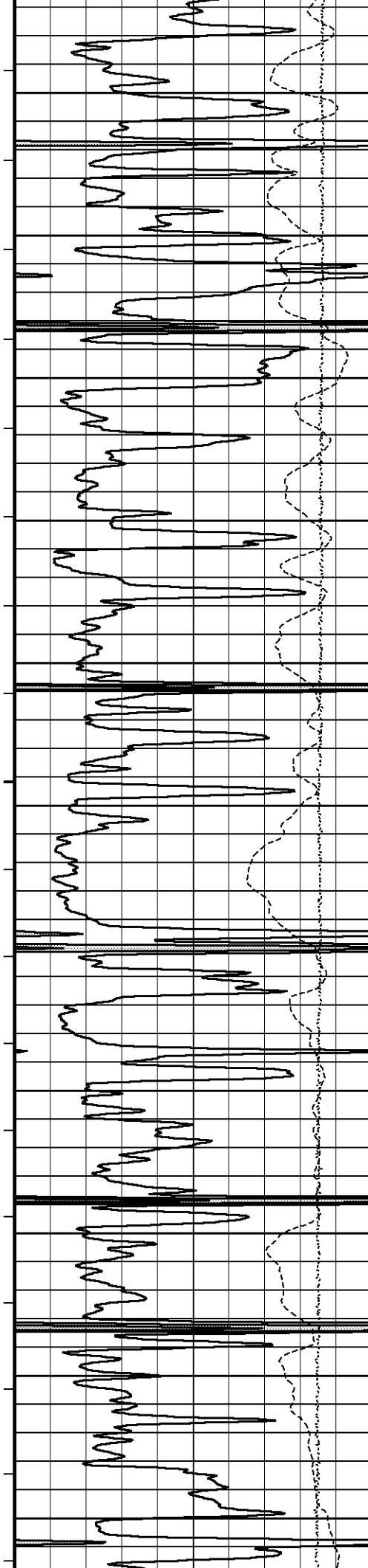
3100

103°

3200







105°

3800

106°

3900

107°

4000

108°

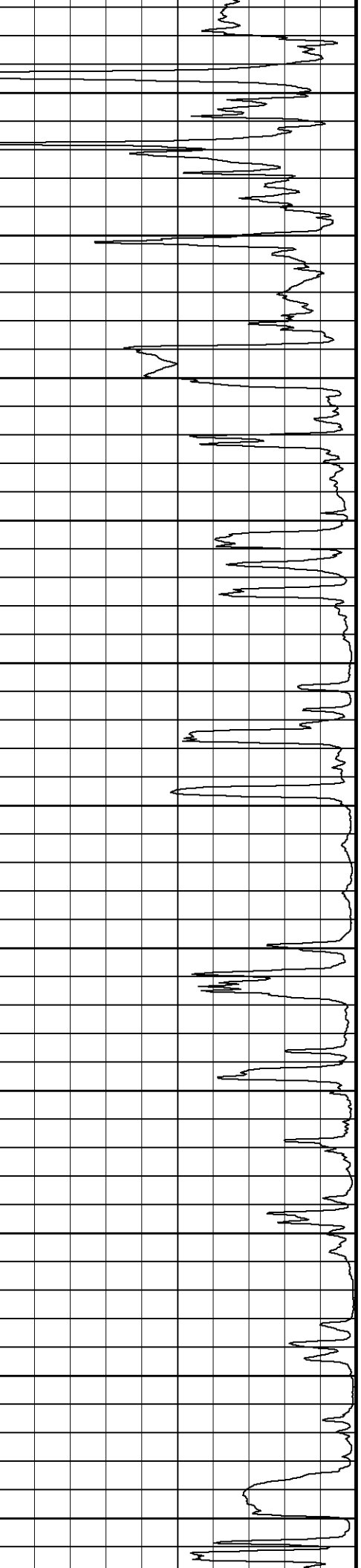
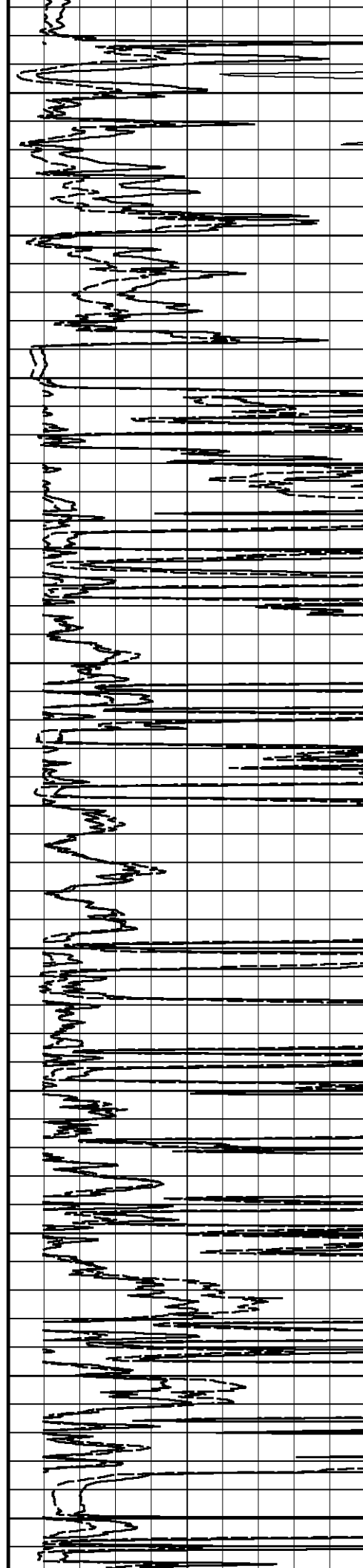
4100

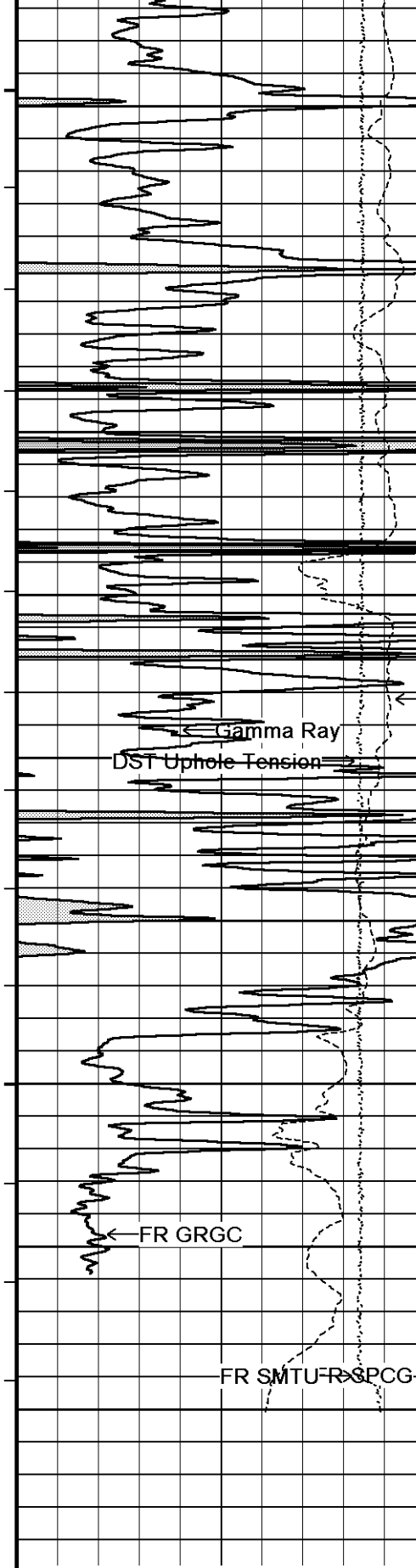
108°

4200

109°

4300





Timing Marks
every 60.0 sec

Gamma Ray

109°

4400

110°

4500

111°

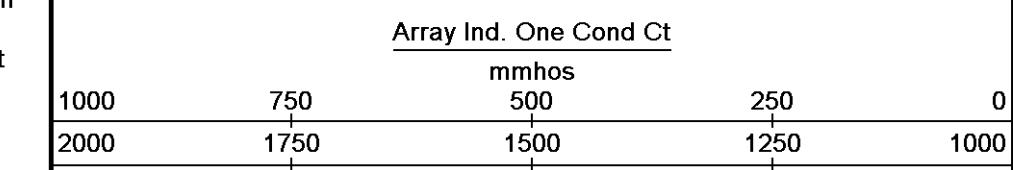
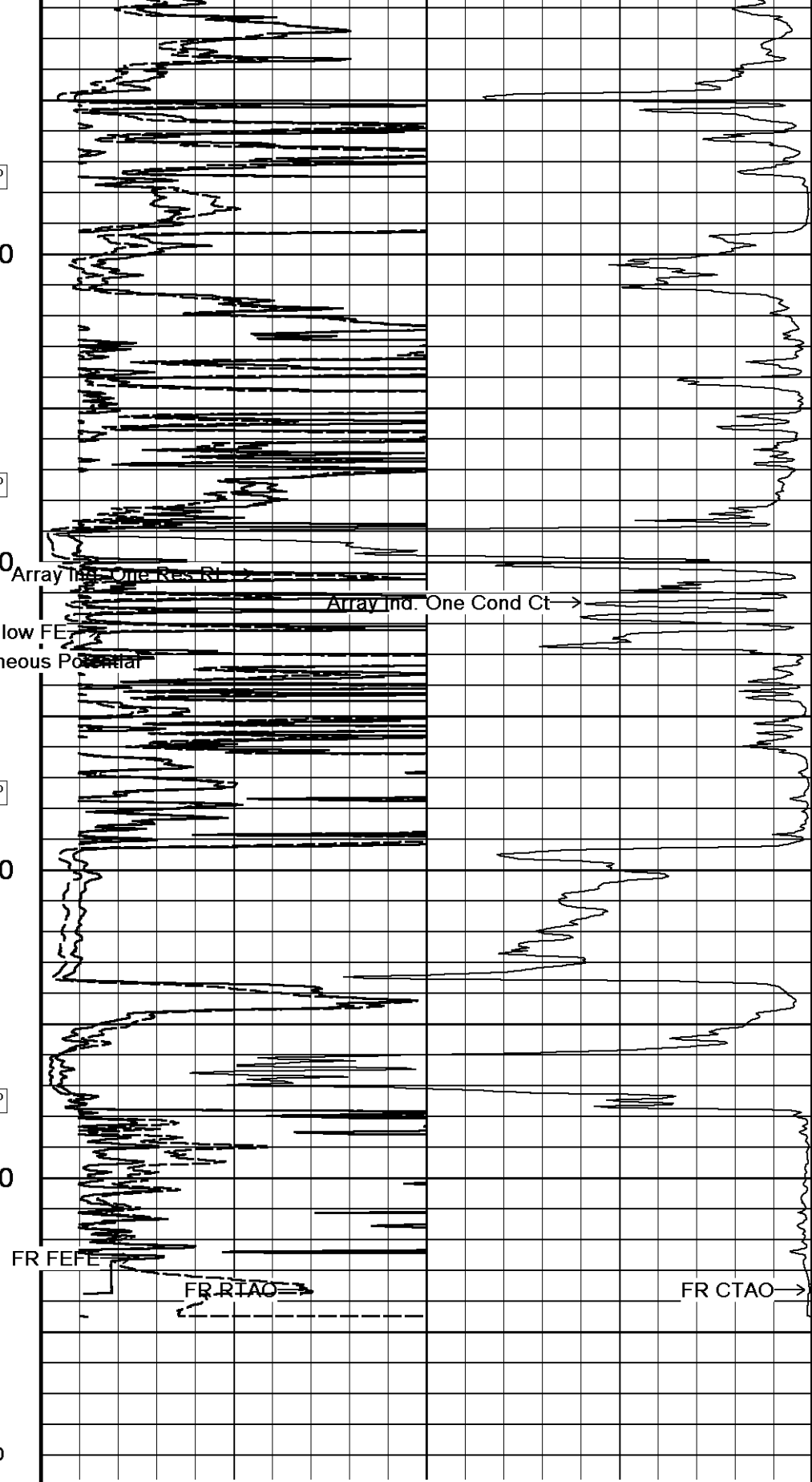
4600

112°

4700

4790

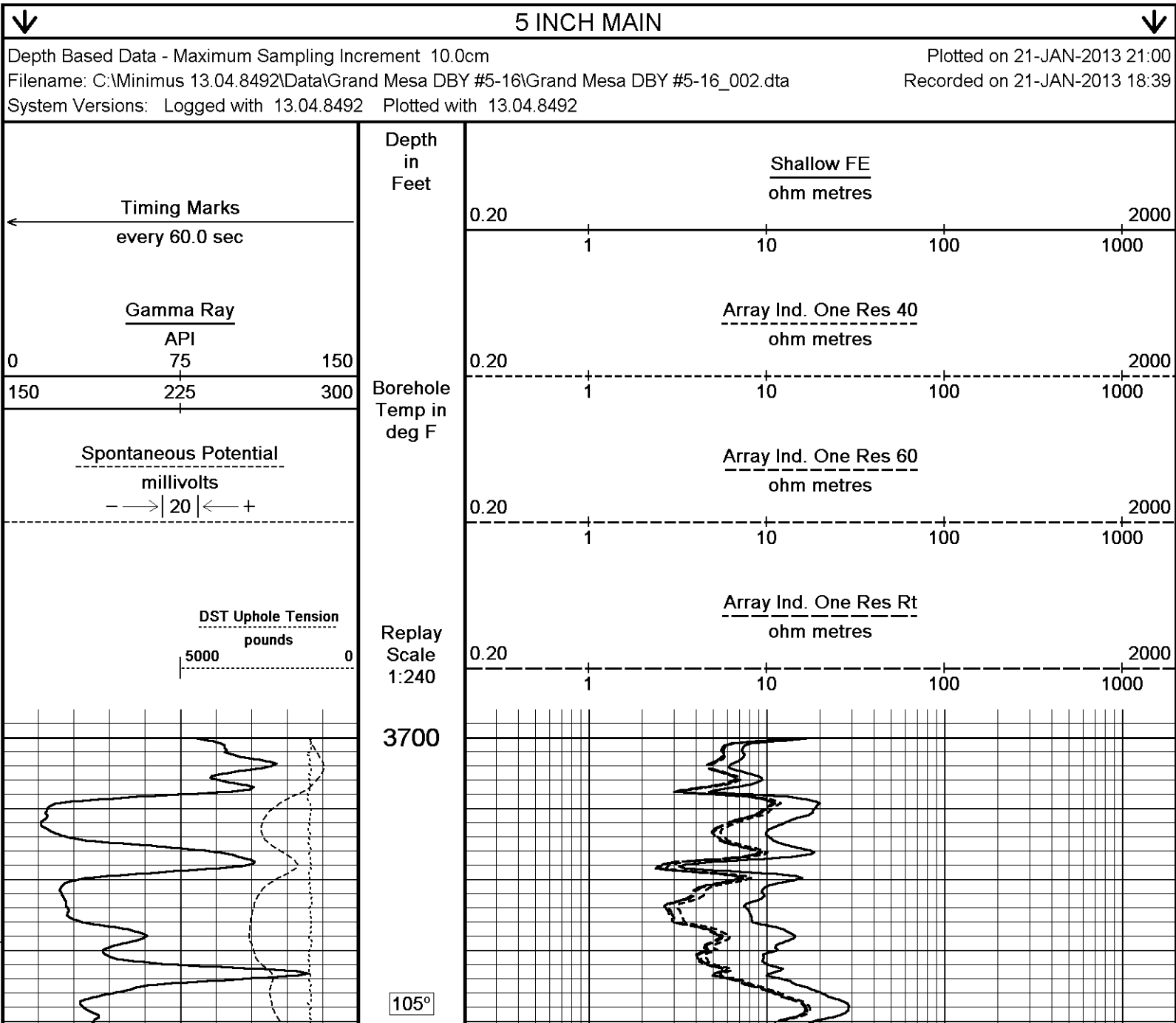
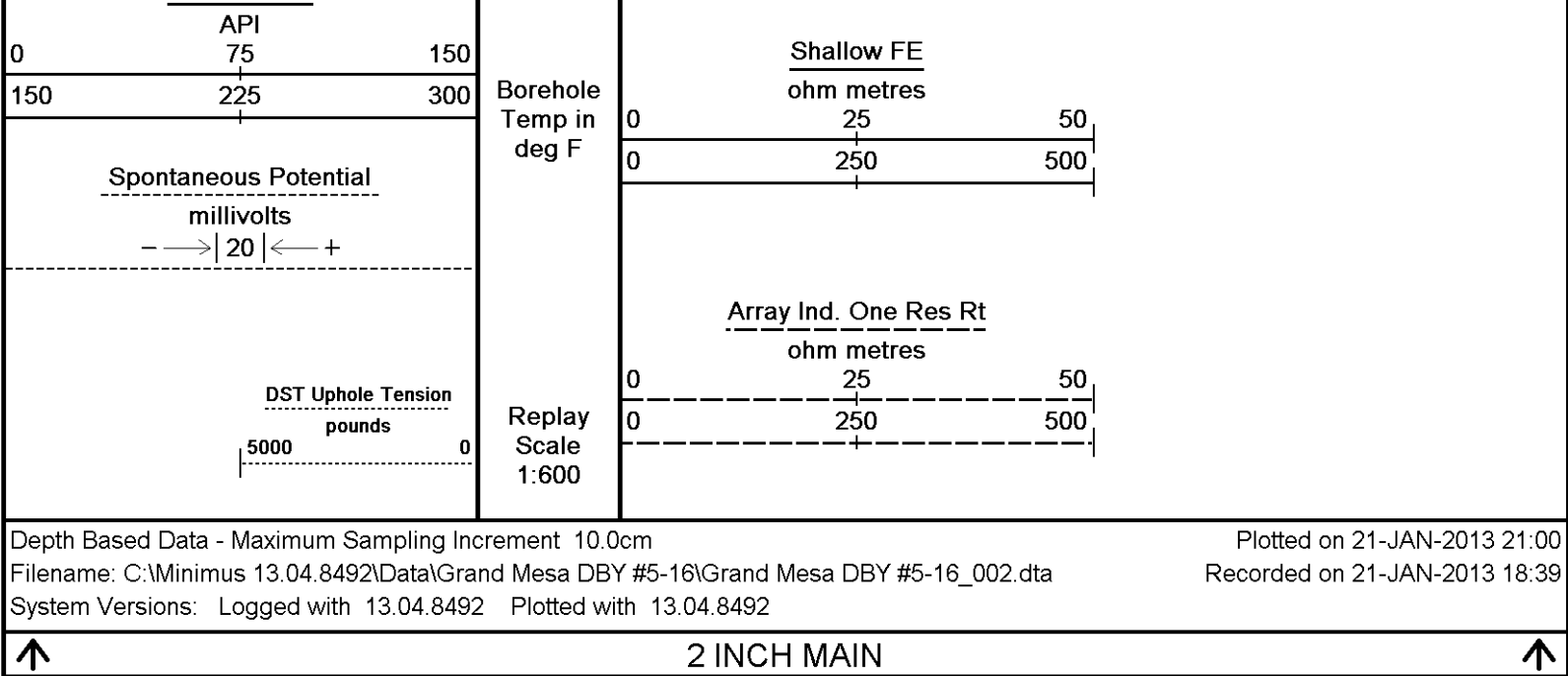
Depth
in
Feet

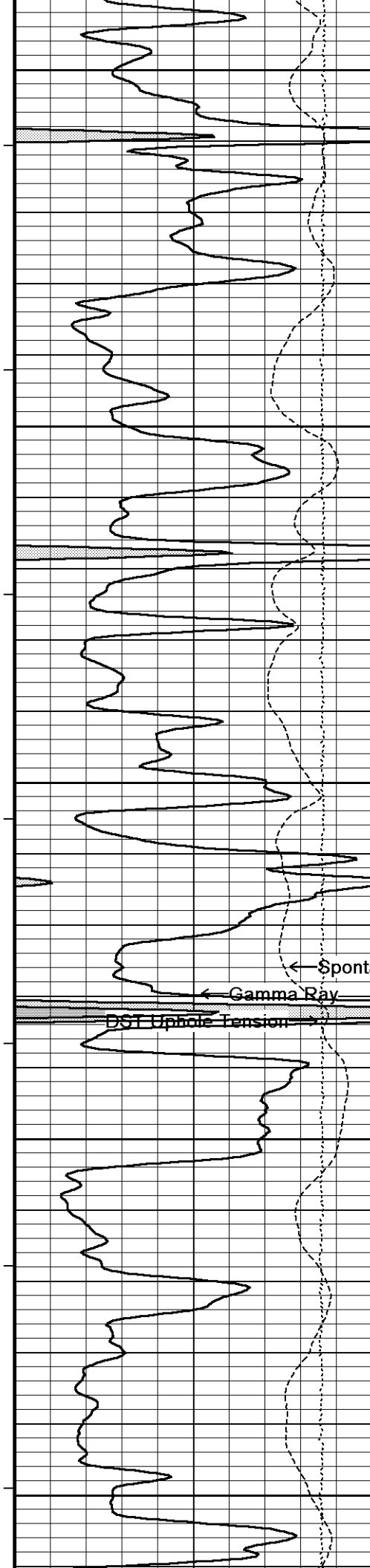


Array Ind. One Cond Ct

mmhos

1000 750 500 250 0
2000 1750 1500 1250 1000





3750

105°

3800

106°

3850

← Spontaneous Potential

← Gamma Ray

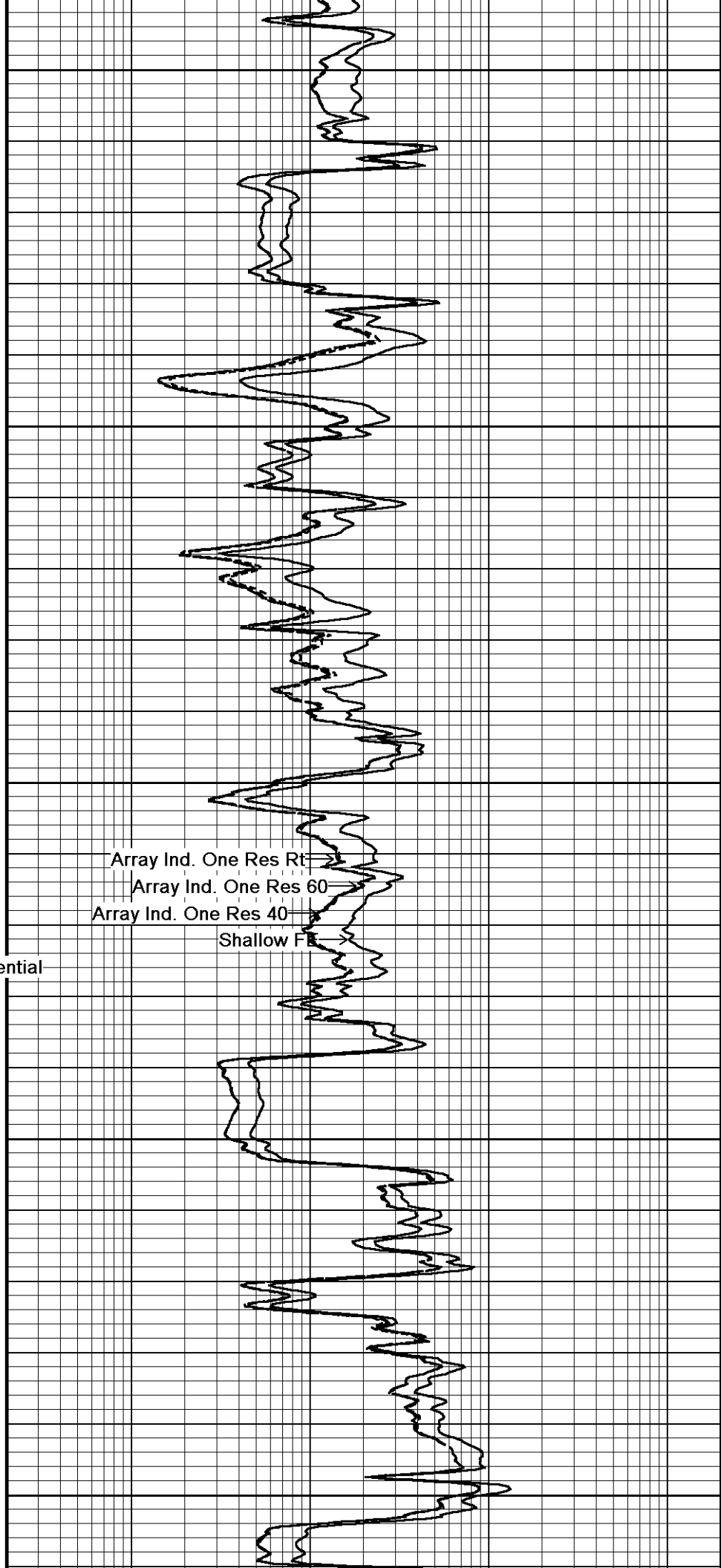
DST Uphole Tension

106°

3900

107°

3950

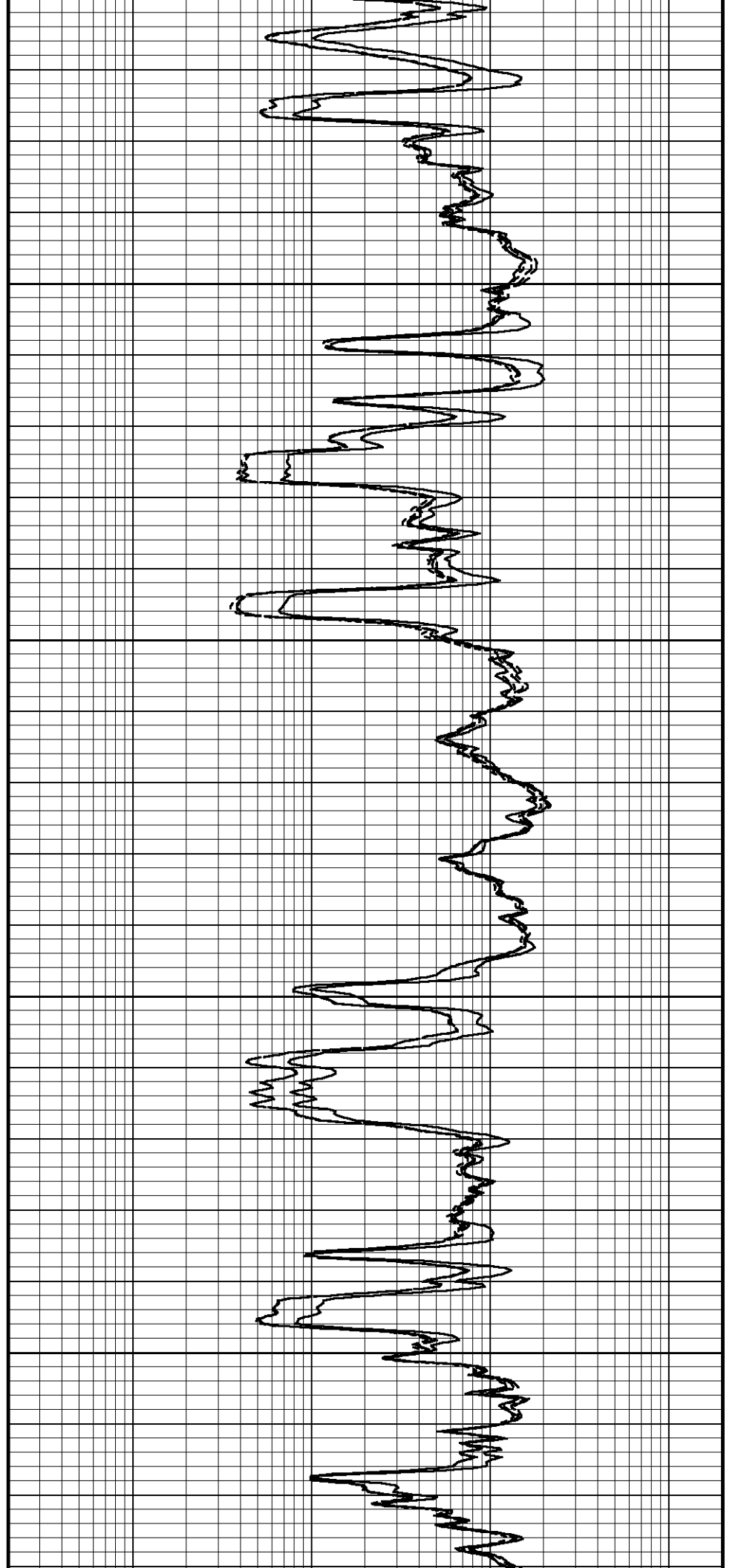
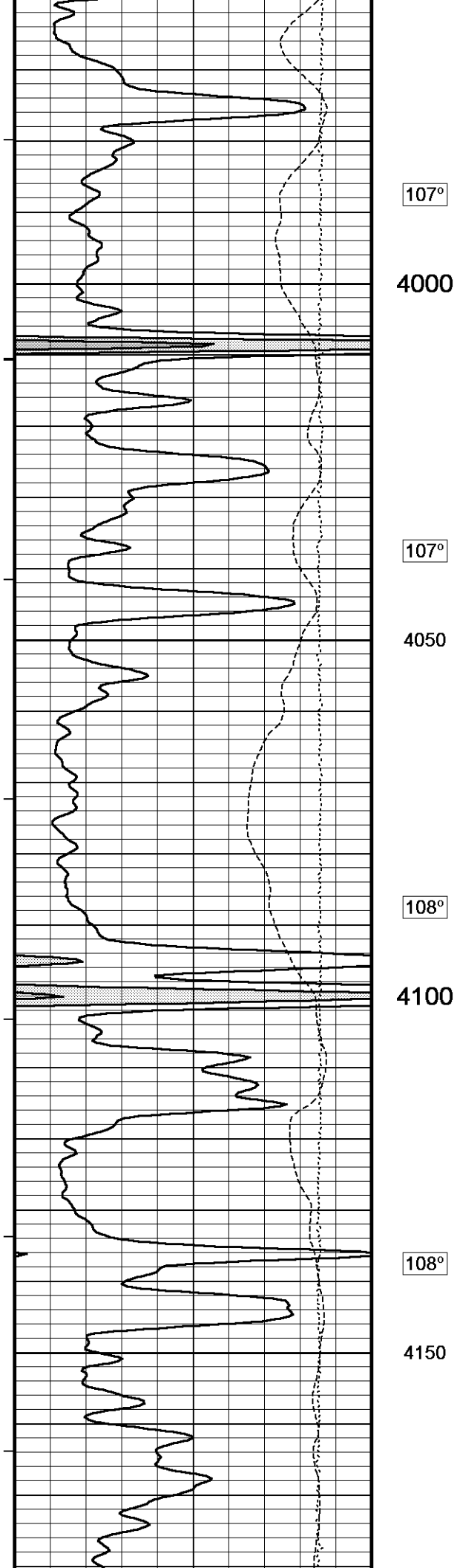


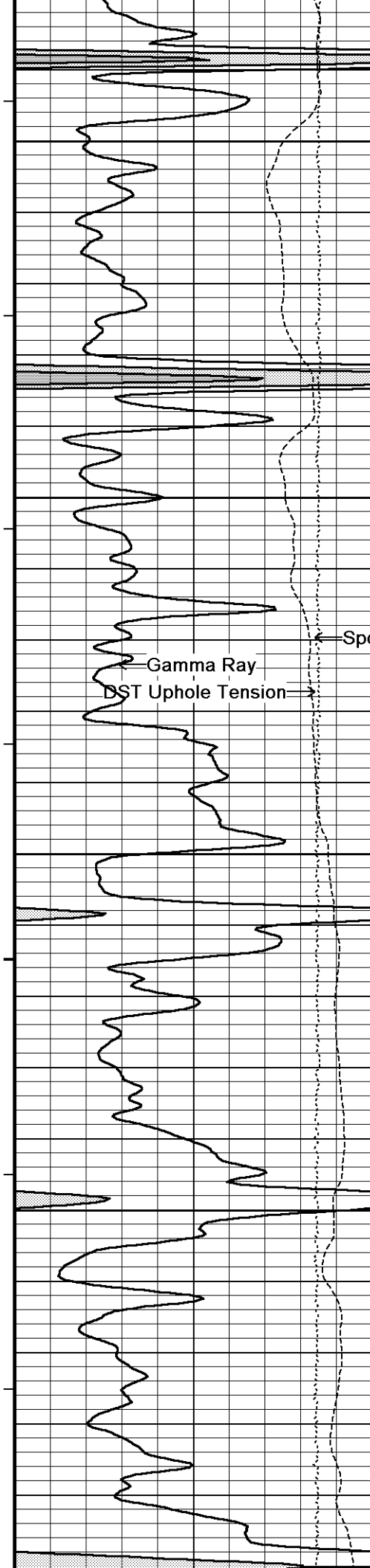
Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow F





108°

4200

108°

4250

Spontaneous Potential

Gamma Ray

DST Uphole Tension

109°

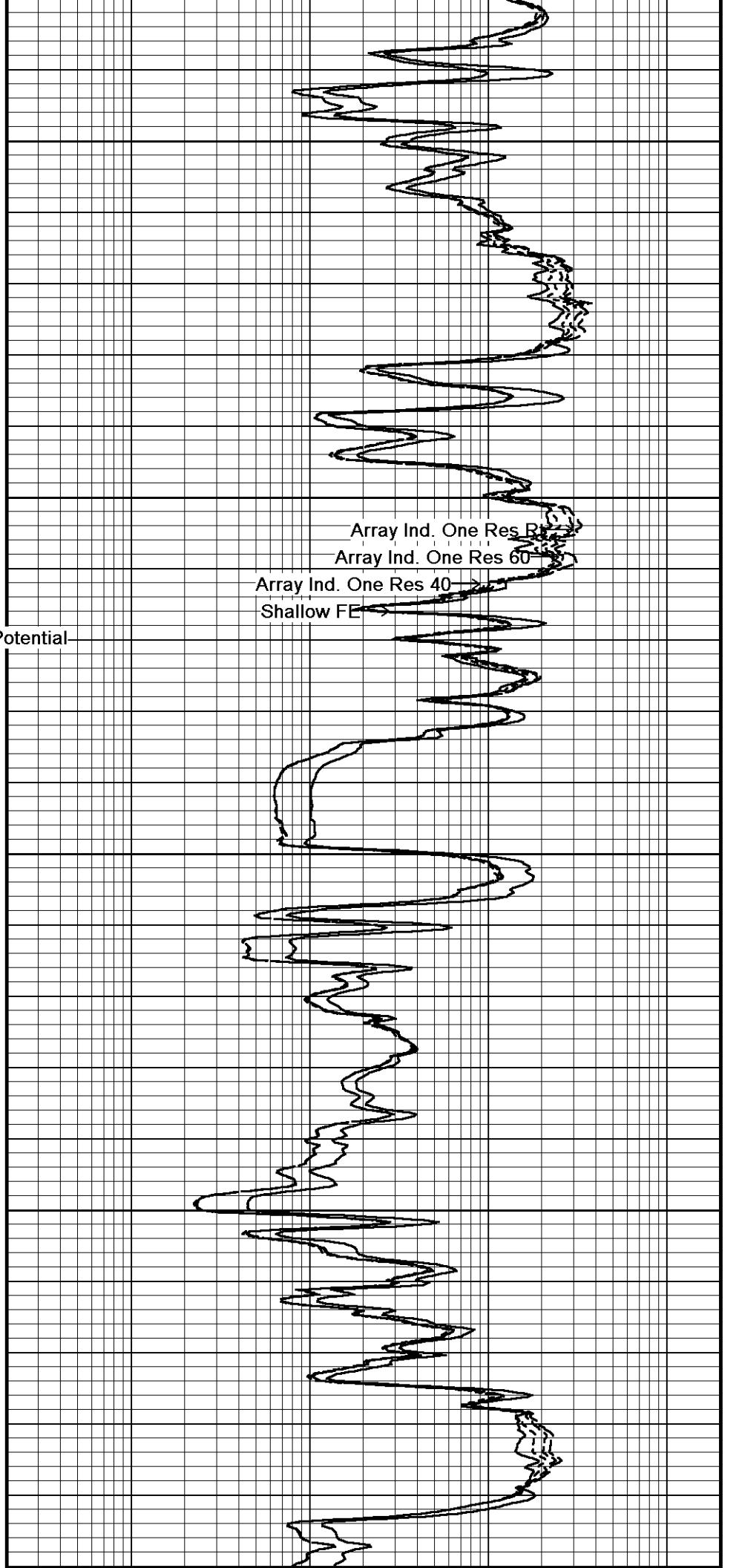
4300

109°

4350

110°

4400

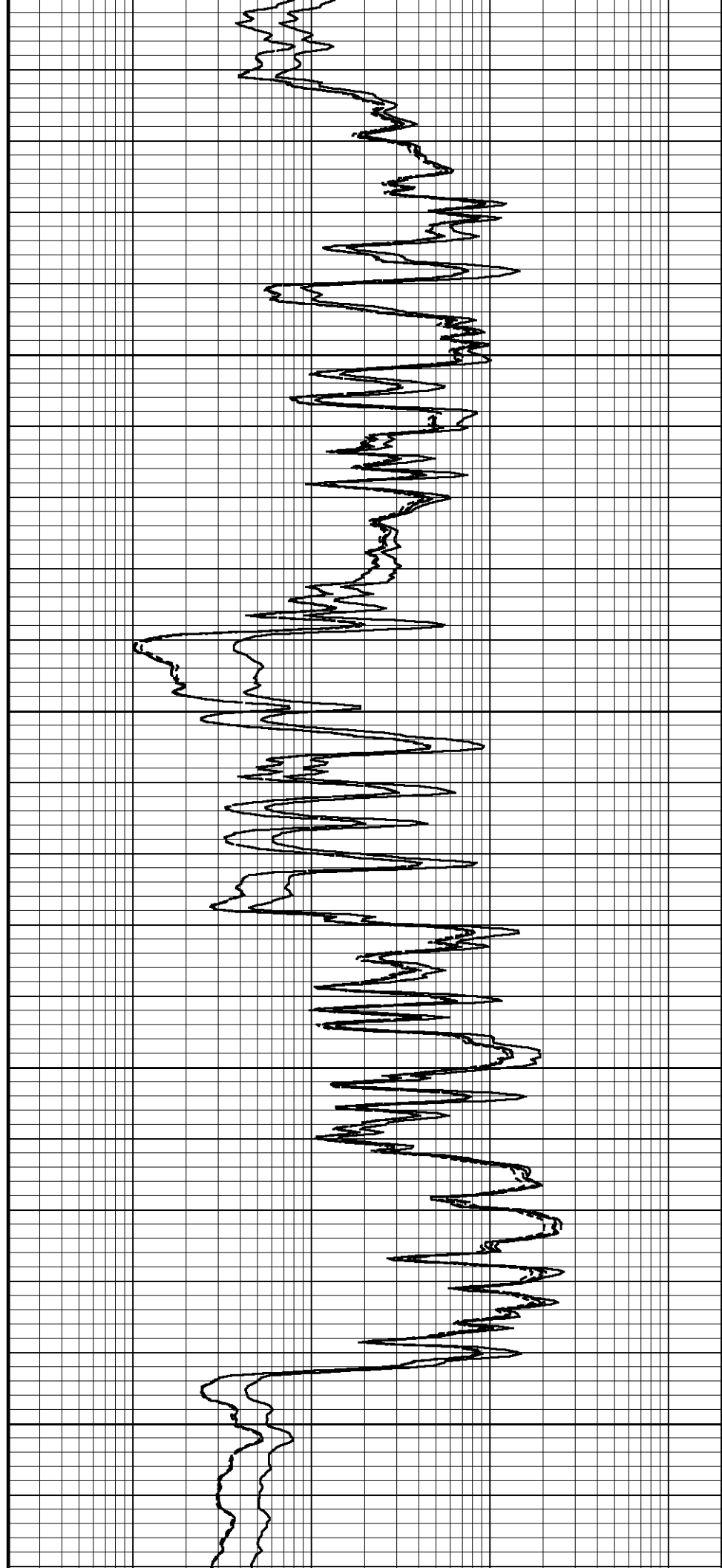
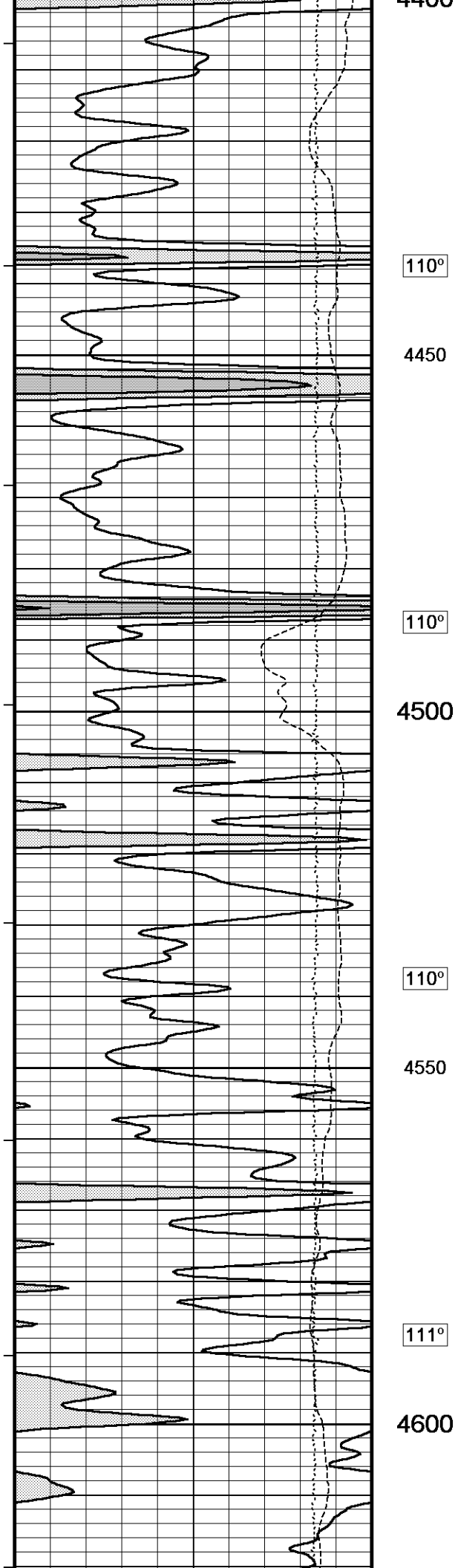


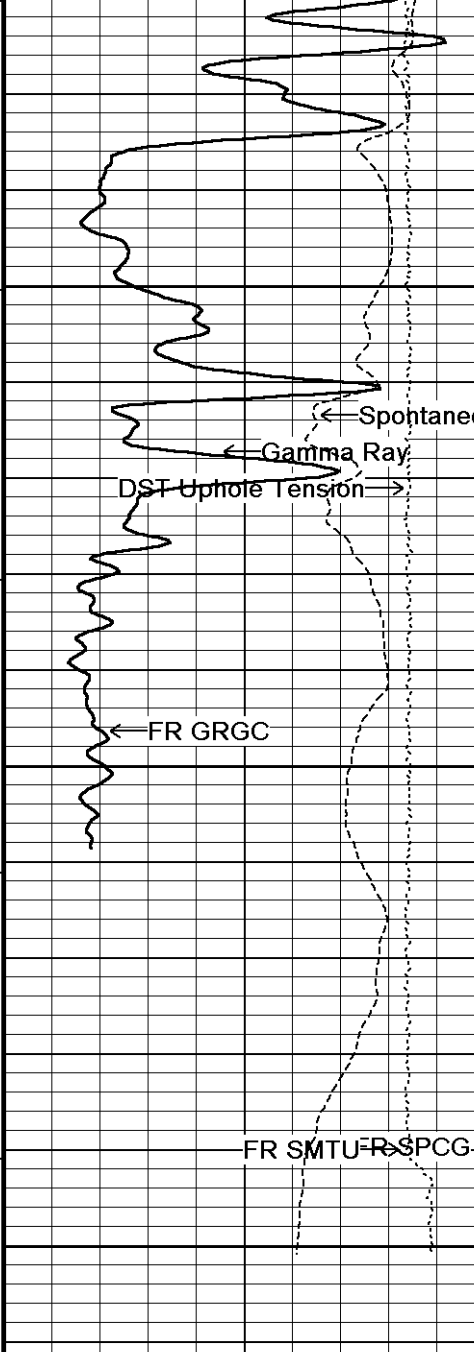
Array Ind. One Res R

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE





112°

4650

112°

4700

4750

4760
Depth
in
Feet

Timing Marks
every 60.0 sec

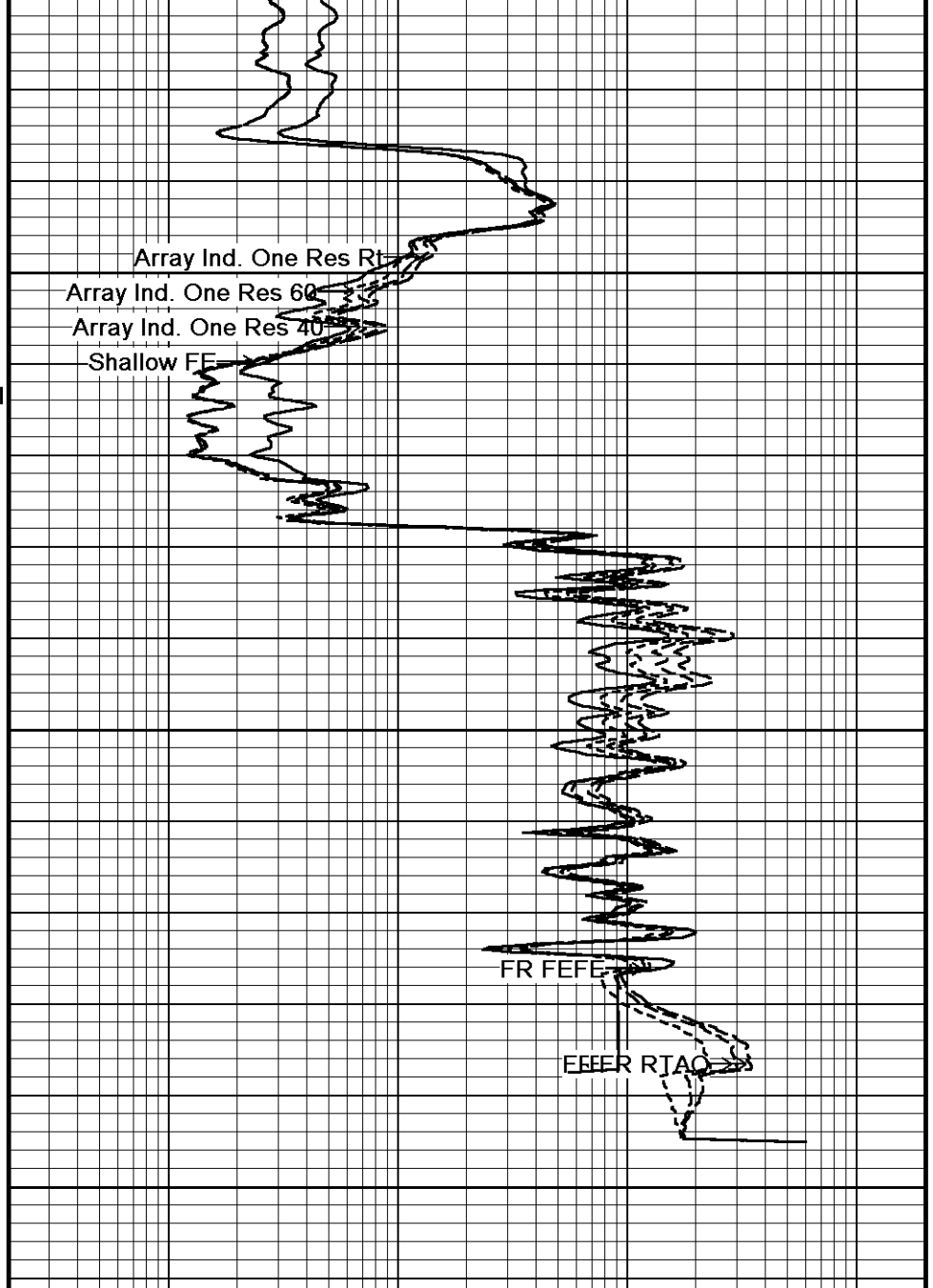
Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
- - -> | 20 | < - +

DST Uphole Tension
pounds
5000 0

Borehole
Temp in
deg F

Replay
Scale
1:240



Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

FR FEFE

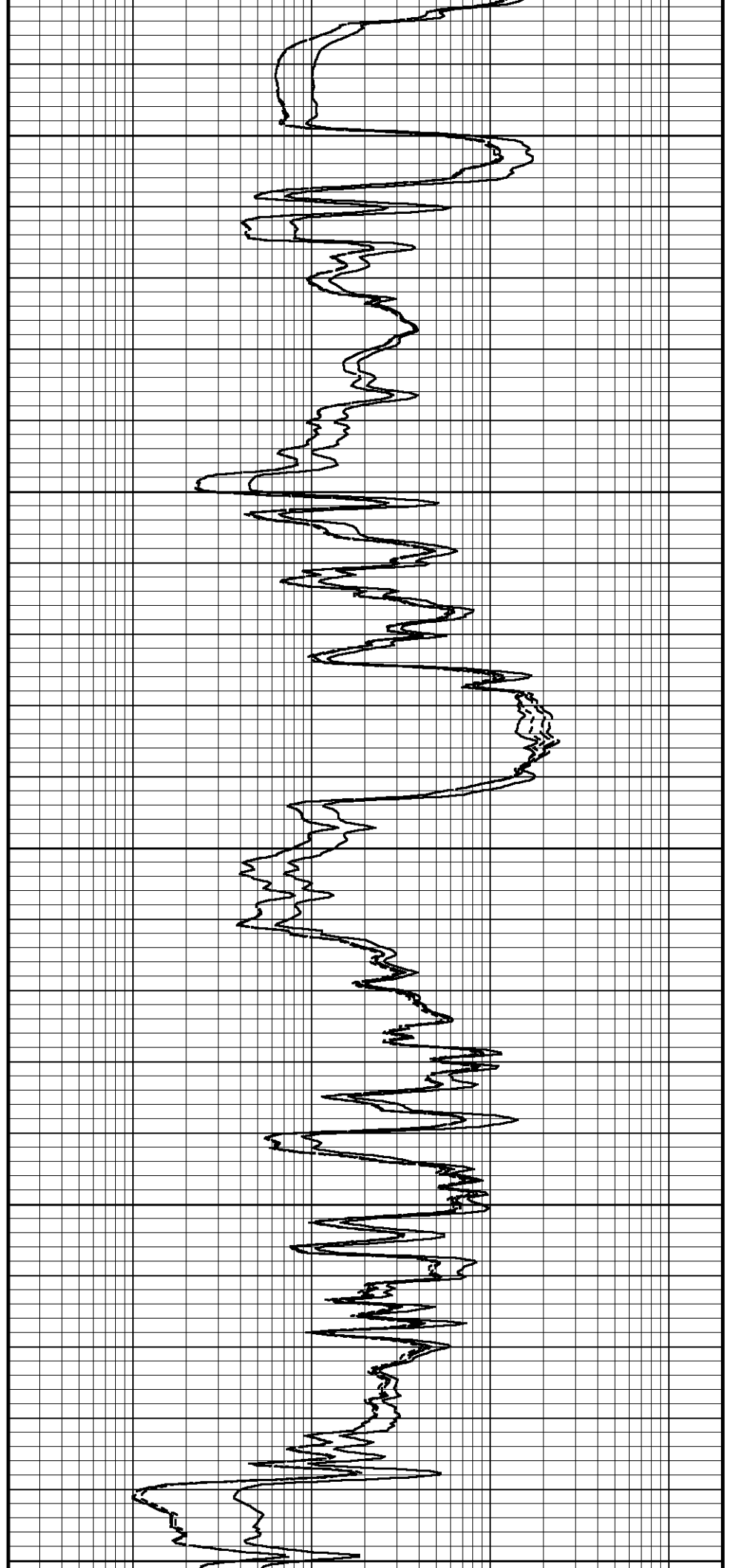
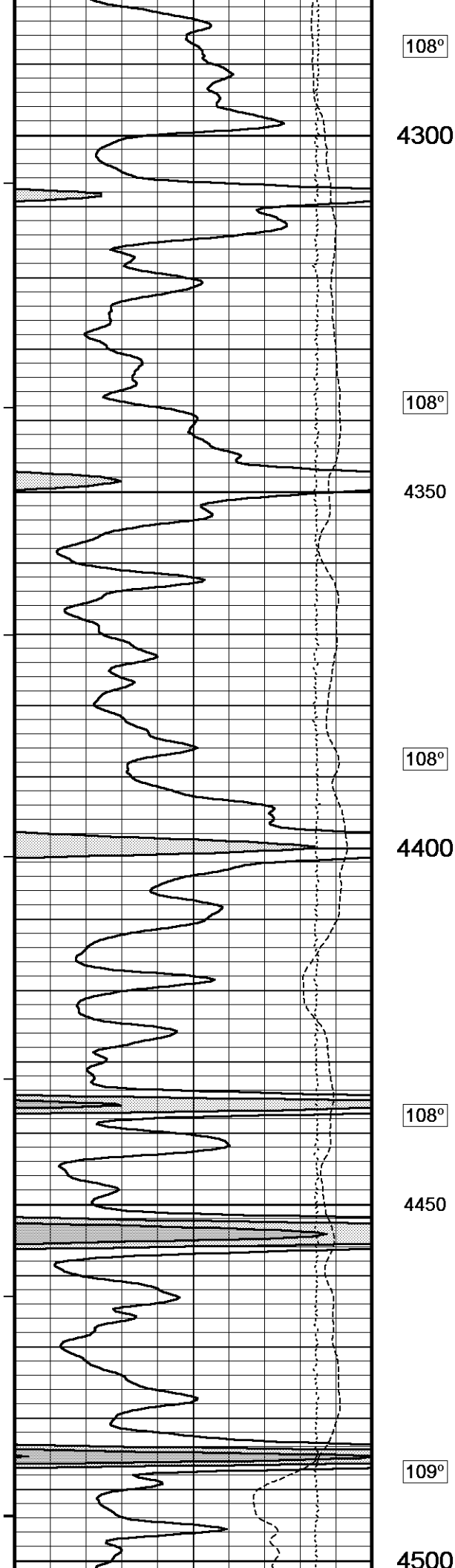
FBFR RTAC

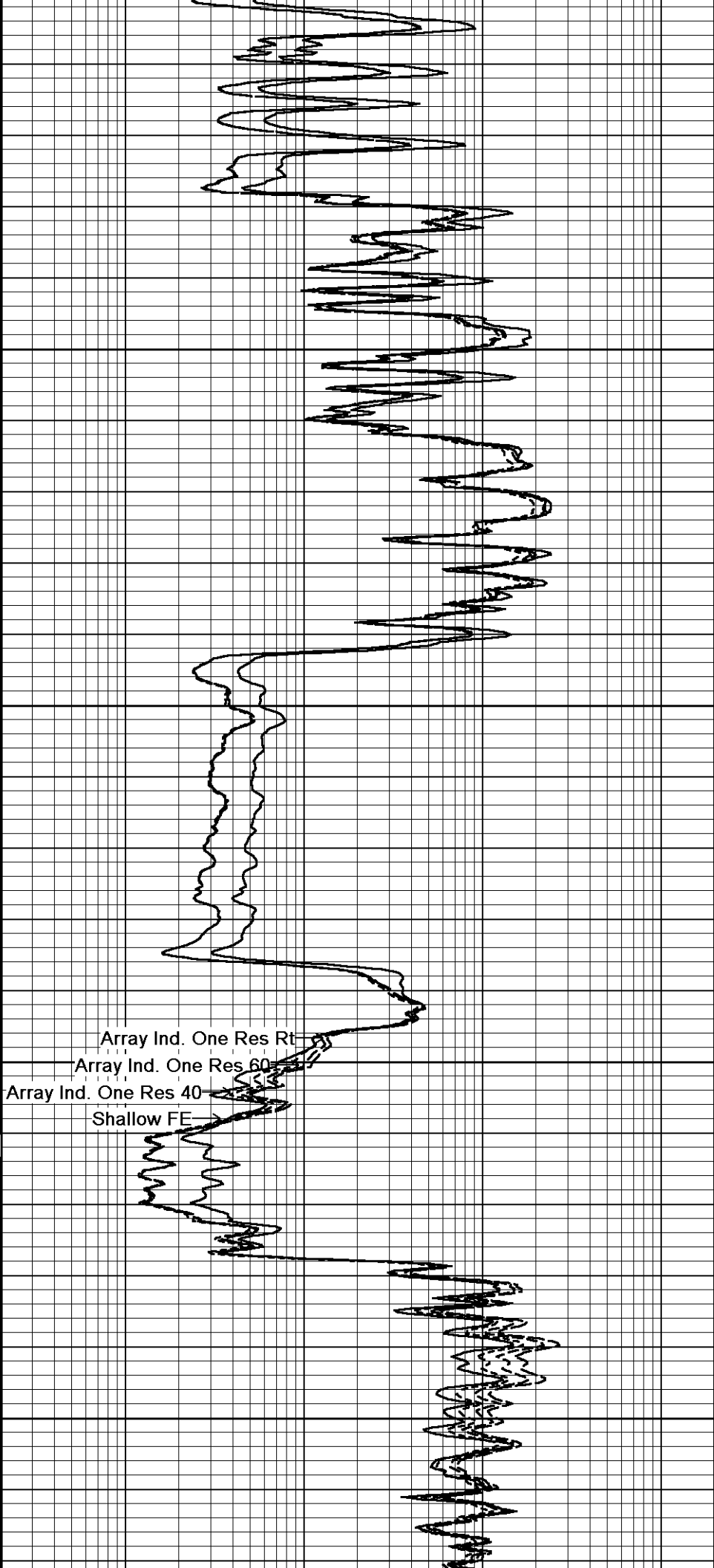
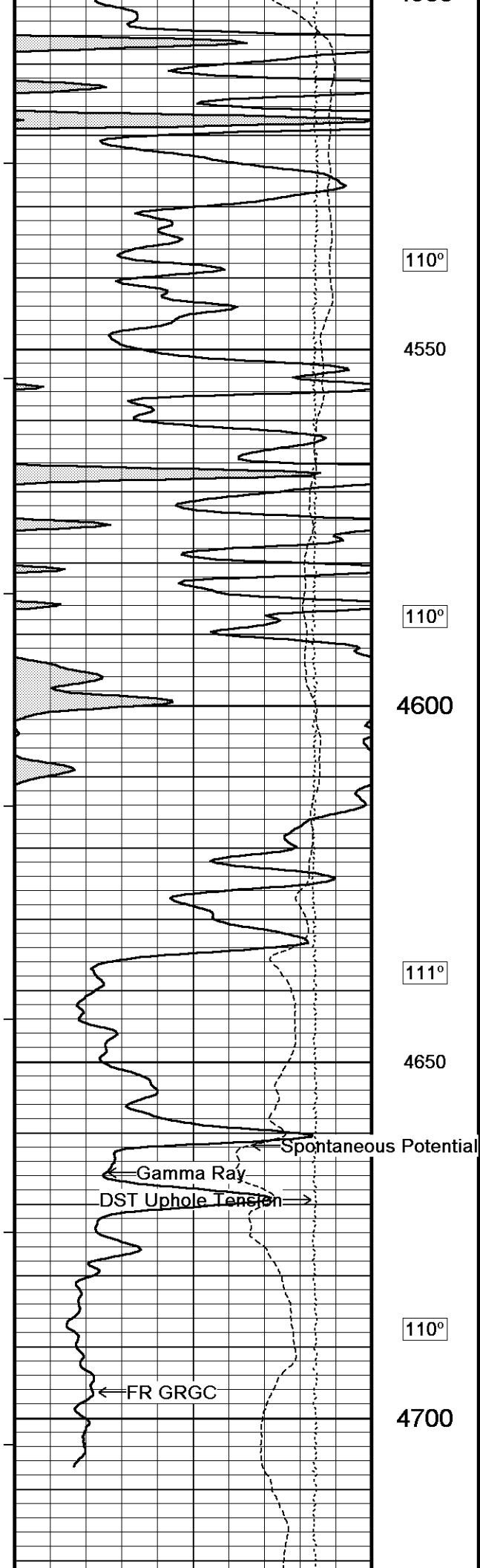
Shallow FE
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000





FR SMTUR SPCG

FR FEER

FIFR R600

4750

4760

Depth
in
FeetTiming Marks
every 60.0 sec

Gamma Ray

API

75

0 150

225

150 300

Spontaneous Potential

millivolts

- -> 20 | <- +

DST Uphole Tension

pounds

5000

0

Borehole
Temp in
deg FReplay
Scale
1:240Shallow FE
ohm metres

0.20

2000

1

10

100

1000

Array Ind. One Res 40

ohm metres

0.20

2000

1

10

100

1000

Array Ind. One Res 60

ohm metres

0.20

2000

1

10

100

1000

Array Ind. One Res Rt

ohm metres

0.20

2000

1

10

100

1000

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 21-JAN-2013 21:00

Filename: C:\Minimus 13.04.8492\Data\Grand Mesa DBY #5-16\Grand Mesa DBY #5-16_001.dta

Recorded on 21-JAN-2013 18:11

System Versions: Logged with 13.04.8492 Plotted with 13.04.8492



REPEAT SECTION



BEFORE SURVEY CALIBRATION

C:\Minimus 13.04.8492\Data\Grand Mesa DBY #5-16\Grand Mesa DBY #5-16_001.dta

General Constants All 000

Last Edited on 21-JAN-2013,15:01

General Parameters

Mud Resistivity	0.580	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	Density Caliper	

Rwa Parameters

Porosity used	Base Density Porosity
Resistivity used	Array Ind. Four Res Rt
RWA Constant A	1.000
RWA Constant M	2.000

Down-hole Tension Calibration SMS 0

Field Calibration on 18-JAN-2013 01:57

Reading No	Measured	Calibrated (lbs)
1	15220.96	0.00
2	15827.69	390.00

SP Calibration MCG-C 208

Field Calibration on 27-DEC-2012 10:06

	Measured	Calibrated (mV)
Reference 1	100.9	100.0
Reference 2	-100.6	-100.0

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 05-NOV-2012,14:26

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

High Resolution Temperature Constants MCG-C 208

Last Edited on 05-NOV-2012,14:25

Pre-filter Length 11

Gamma Calibration MCG-C 208

Field Calibration on 20-JAN-2013 14:04

	Measured	Calibrated (API)
Background	71	50
Calibrator (Gross)	1115	775
Calibrator (Net)	1044	725

Gamma Constants MCG-C 208

Last Edited on 20-JAN-2013,16:54

Gamma Calibrator Number	GR38	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Micro Laterolog Calibration MMR-A 11

Base Calibration on 31-DEC-1999 00:00

Field Check on 31-DEC-1999 00:00

Base Calibration

	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
	0.0	0.0	0.0	0.0
	Base Check (ohm-m)		Field Check (ohm-m)	
	0.0		0.0	

Micro Laterolog Constants MMR-A 11

Last Edited on 12-NOV-2012,01:59

Pad Type	6 in Solid Nylon B23059	
Micro Laterolog K Factor	0.0128	
Standoff Offset	0.0000	inches

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper	N/A	
Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	68.00	Deg F
Mud Cake Resistivity Source	Constant Value	
Temp. Source Rmc Correc.	N/A	

Caliper Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:32

Field Calibration on 20-JAN-2013 13:49

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13881	5.98
2	17138	7.97
3	20398	9.86
4	24351	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Field Calibration	Measured Caliper (in) 5.98	Actual Caliper (in) 5.98
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Micro Normal and Micro Inverse Calibration MMR-A 11				Base Calibration on 16-JAN-2013 10:36 Field Check on 20-JAN-2013 13:50
Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated Resistor 1	Resistor 2
Micro Normal	12.3	59.9	5.0	25.0
Micro Inverse	15.5	77.5	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	76.3		76.3	
Micro Inverse	58.7		58.7	

Micro Normal and Micro Inverse Constants MMR-A 11				Last Edited on 05-NOV-2012,13:54
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	0.0000 inches			

Neutron Calibration MDN-A.B 65				Base Calibration on 13-DEC-2012 16:03	
				Field Check on 20-JAN-2013 14:00	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far	Near	Far	
	2945	91	3714	110	
Ratio	32.377		33.764		
Field Calibrator at Base					
			Calibrated (cps)		
			1743	2519	
Ratio	0.692				
Field Check					
			Calibrated (cps)		
			1729	2508	
Ratio	0.691				

Neutron Constants MDN-A.B 65			Last Edited on 21-JAN-2013,15:01		
Neutron Source Id	PN-521				
Neutron Jig Number	5824NE				
Epithermal Neutron	No				
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	Constant Value				
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	Constant Value				
Formation Fluid Salinity	0.00	kppm			
Barite Mud Correction	Not Applied				

FE Calibration MFE-B.J 352				Base Calibration on 16-JAN-2013 10:20 Field Check on 20-JAN-2013 13:39
Base Calibration				
		Measured	Calibrated (ohm-m)	
Reference 1		0.0	0.0	
Reference 2		964.3	126.8	
Base Check			281.2	
Field Check			281.4	

FE Constants MFE-B.J 352				Last Edited on 21-JAN-2013,15:01
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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

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22
Field Check on 20-JAN-2013 13:34

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2

Array Temperature 78.4 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.5	3849.8
2			31.7	3628.2
3			28.6	3048.8
4			18.3	2079.0
Deep			16.1	1911.2
Medium			42.5	4059.5
Shallow			49.5	5480.8

Array Temperature 61.2 Deg F

Induction Constants MAI-A.A 45

Last Edited on 21-JAN-2013,15:01

Induction Model

Caliper for Borehole Corr.	RtAP-WBM	
Hole Size for Borehole Correction	Density Caliper	
Tool Centred	N/A	inches
Stand-off Type	No	
Stand-off	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 45				Field Calibration on 13-DEC-2012,10:54	
Lower	Measured	50.00	Calibrated(Deg F)	50.00	
Upper		75.00		75.00	
High Resolution Temperature Constants MAI-A.A 45				Last Edited on 13-DEC-2012,10:53	
Pre-filter Length		11			
Caliper Calibration MPD-B 31				Base Calibration on 13-DEC-2012 14:11 Field Calibration on 20-JAN-2013 13:40	
Base Calibration					
Reading No	Measured	Calibrator Size (in)			
1	15472	3.99			
2	24160	5.98			
3	32703	7.97			
4	41008	9.86			
5	50231	11.92			
6	N/A	N/A			
Field Calibration					
	Measured Caliper (in)	Actual Caliper (in)			
	5.97	5.98			
Photo Density Calibration MPD-B 31				Base Calibration on 13-DEC-2012 14:32 Field Check on 20-JAN-2013 13:48	
Density Calibration					
Base Calibration					
	Near	Measured	Calibrated (sdu)		
		Far	Near	Far	
Reference 1	46489	23675	59556	30836	
Reference 2	18873	1941	24941	2541	
Field Check at Base					
	683.9	844.6			
Field Check					
	684.3	844.8			
PE Calibration					
Base Calibration					
	WS	Measured	Calibrated		
		WH	Ratio		
		Ratio			
Background	126	608			
Reference 1	18821	46368	0.409		
Reference 2	5566	18789	0.299		
Field Check at Base					
	125.8	608.0			
Field Check					
	126.2	608.8			
Density Constants MPD-B 31				Last Edited on 20-JAN-2013,16:54	
Density Source Id 254					
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 1.10 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
0.00
0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Grand Mesa DBY #5-16\Grand Mesa DBY #5-16_001.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

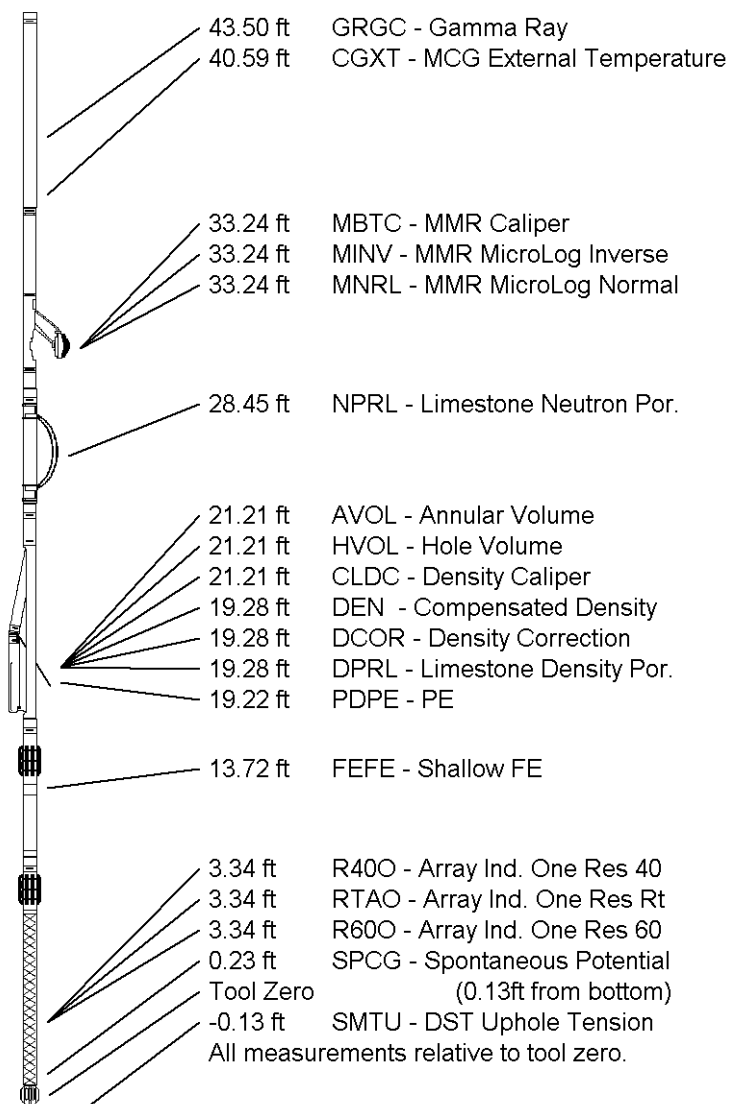
Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.78 ft Weight: 383.6 lb



COMPANY	GRAND MESA OPERATING COMPANY
WELL	DBY #5-16
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

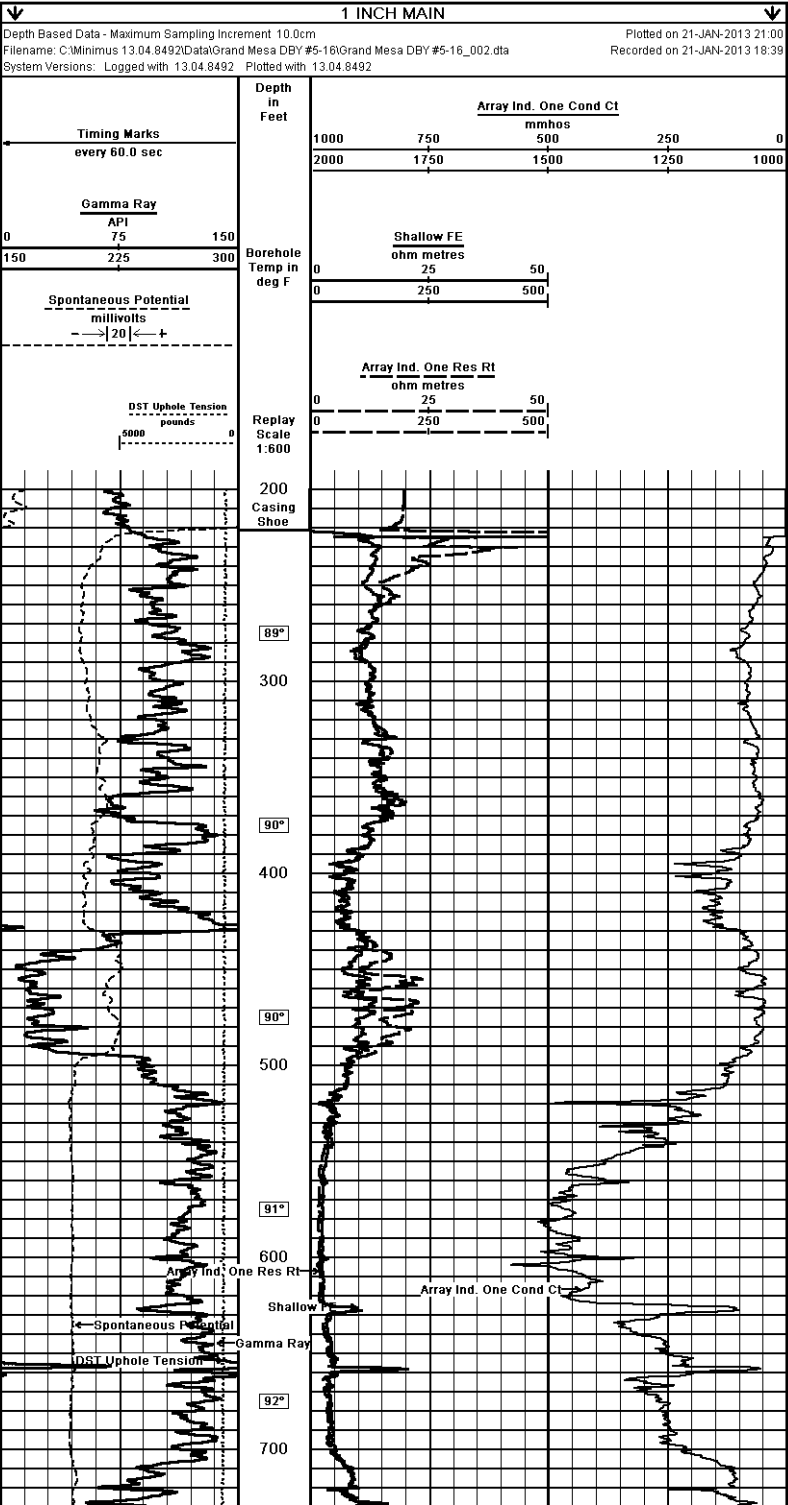
Elevation Kelly Bushing	2974.00	feet	First Reading	4737.00	feet
Elevation Drill Floor	2973.00	feet	Depth Driller	4740.00	feet
Elevation Ground Level	2969.00	feet	Depth Logger	4740.00	feet

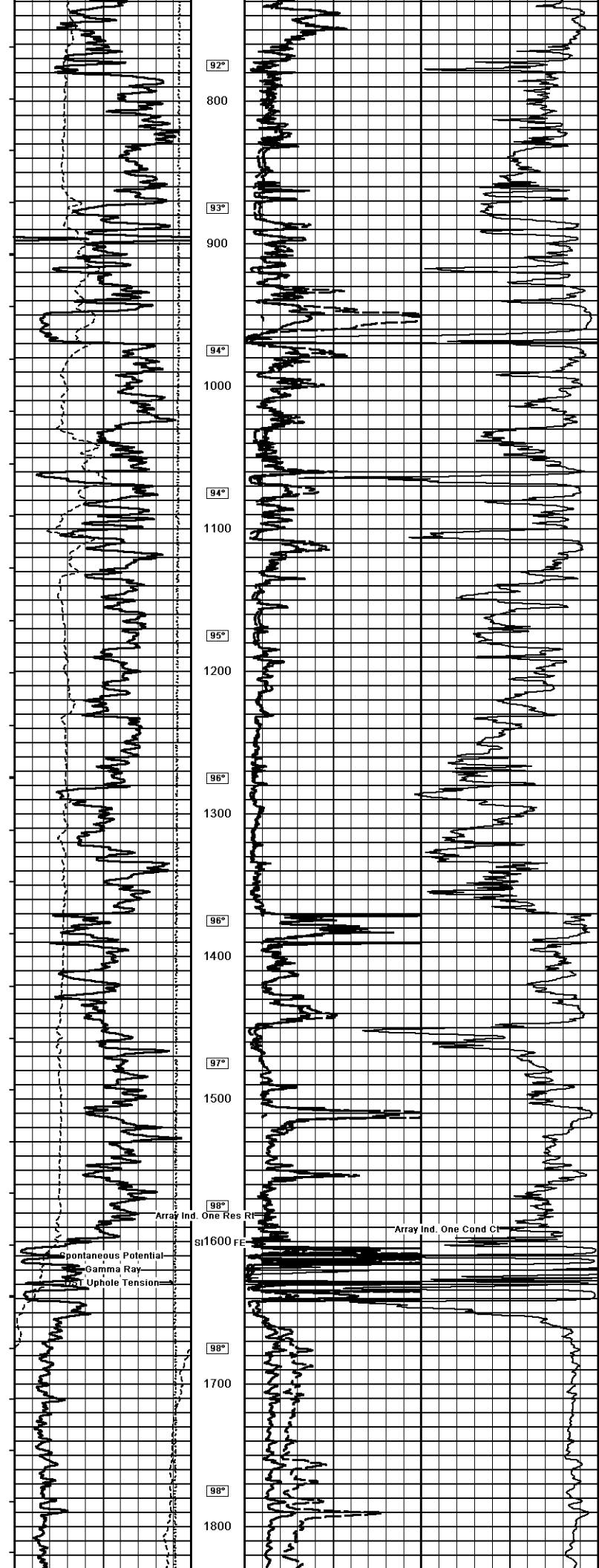


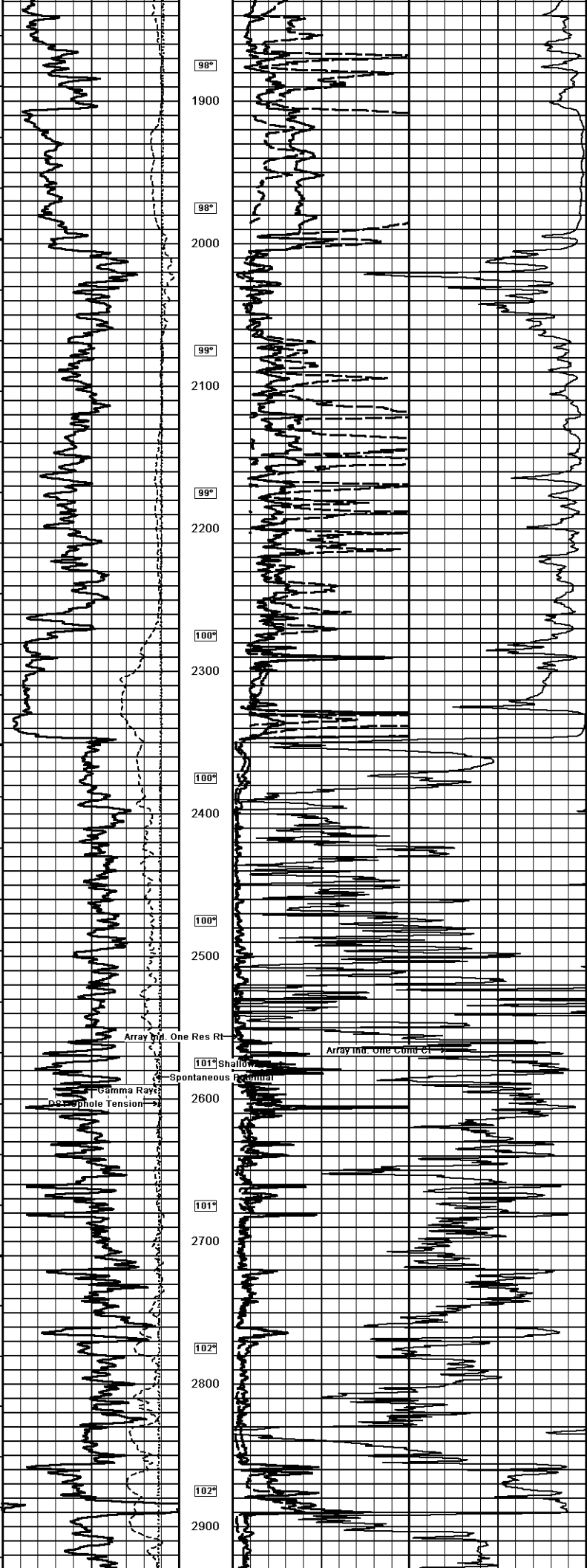
Weatherford®

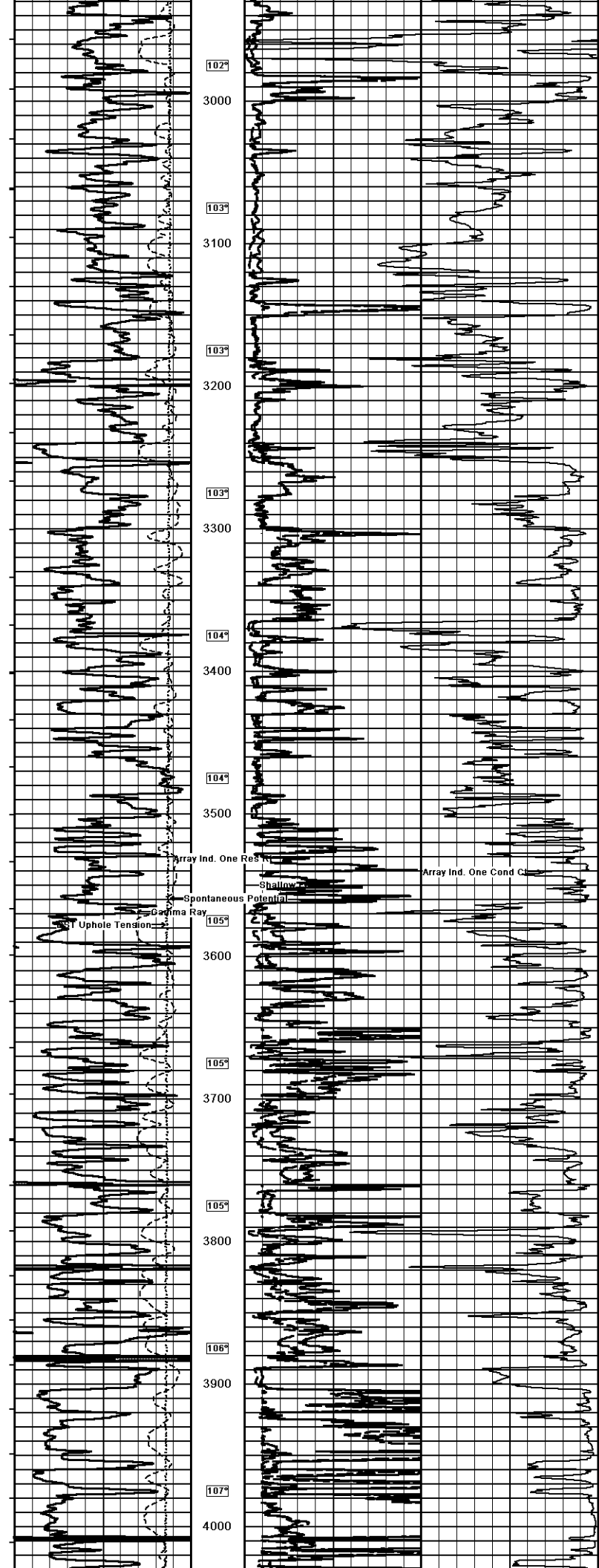
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

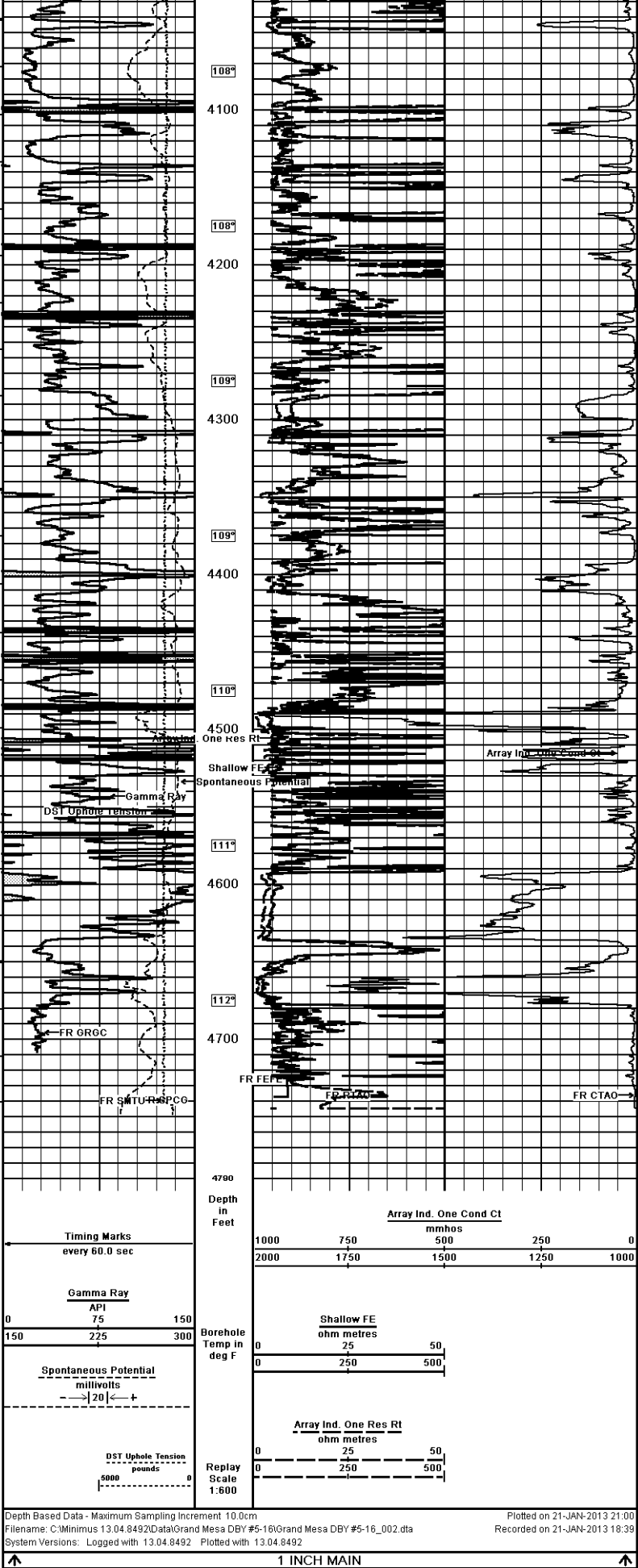
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY GRAND MESA OPERATING COMPANY			
WELL DBY #5-16			
FIELD WILDCAT			
PROVINCE/COUNTY SCOTT			
COUNTRY/STATE U.S.A. / KANSAS			
LOCATION 1556' FWL & 2119' FEL NE NW SW NE			
SEC	TYPE	TRSE	Other Services
10	16S	33W	MP/DMD/M
AP Number	15-171-20924		MML
Permanent Datum G.L. Elevation 2869 feet			
Log Measured From KB			
Drilling Measured From K.B.			
Date	21-JAN-2013		
Run Number	ONE		
Service Order	3537849		
Depth Driller	4740.00 feet		
Depth Logger	4740.00 feet		
First Reading	4737.00 feet		
Last Reading	221.00 feet		
Casing Driller	221.00 feet		
Casing Logger	221.00 inches		
Bit Size	7 8/5		
Hole Fluid Type	CHEMICAL		
Density/Viscosity	9.20 lb/USg 49.00 cP		
PH / Fluid Loss	10.00		
Sample Source	FLOWLINE		
Rim @ Measured Temp	0.58 @ 93.0 ohm-m		
Rim @ Measured Temp	0.46 @ 93.0 ohm-m		
Rim @ Measured Temp	0.70 @ 93.0 ohm-m		
Source Print Rmc	CALC		
Rim @ BHT	0.49 @ 12.0 ohm-m		
Time Since Circulation	4 HOURS		
Max Recorded Temp	112.00 degF		
Equipment Base	1305' LUB		
Recorded By	LINN SCOTT		
Witnessed By	KENT WATSON		
LOG#	LB13-019		











COMPANY	GRAND MESA OPERATING COMPANY
WELL	DBY #5-16
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS
Elevation Kelly Bushing	2974.00 feet
First Reading	4737.00 feet

Elevation Drill Floor	2973.00	feet	Depth Driller	4740.00	feet
Elevation Ground Level	2969.00	feet	Depth Logger	4740.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG