



Weatherford[®]

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY GRAND MESA OPERATING COMPANY
 WELL BREIT-HOSS #1-22
 FIELD WILDCAT
 PROVINCE/COUNTY NESS
 COUNTRY/STATE U.S.A. / KANSAS
 LOCATION 118' FSL & 1952' FEL
 SW SE SW SE

SEC 22	TWP 19S	RGE 23W	Other Services MPD/MDN	MML	Elevations: KB 2239.00 DF 2238.00 GL 2234.00
API Number	15-135-25530		Permanent Datum G.L., Elevation 2234 feet		
Permit Number	Log Measured From KB				
Drilling Measured From K.B.					
Date	14-FEB-2013				
Run Number	ONE				
Service Order	3538970				
Depth Driller	4470.00 feet				
Depth Logger	4470.00 feet				
First Reading	4467.00 feet				
Last Reading	221.00 feet				
Casing Driller	220.00 feet				
Casing Logger	221.00 inches				
Bit Size	7.875				
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.30 lb/USg	48.00			
PH / Fluid Loss	10.50	10.50			
Sample Source	FLOWLINE				
Rm @ Measured Temp	0.85 @ 87.0	ohm-m			
Rmf @ Measured Temp	0.68 @ 87.0	ohm-m			
Rmc @ Measured Temp	1.02 @ 87.0	ohm-m			
Source Rmf / Rmc	CALC	CALC			
Rm @ BHT	0.68 @109.0	ohm-m			
Time Since Circulation	4 HOURS				
Max Recorded Temp	109.00	deg F			
Equipment / Base	13096	LIB			
Recorded By	LYNN SCOTT				
Witnessed By	JOHN GOLDSMITH				
JOB#	LB13-045				

BOREHOLE RECORD

Last Edited: 13-FEB-2013 23:17

Bit Size inches	Depth From feet	Depth To feet
7.875	220.00	4470.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	220.00	24.00

REMARKS

Tools Used: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
 Hardware: MPD: 8 inch profile plate used.
 MAI and MFE: 0.5 Inch standoffs used.
 MDN: Dual Bowspring used.
 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.
 Annular volume with 5.5 inch production casing from TD to 3450 feet = 240 cubic feet
 Total hole volume from TD to Surface casing= 2437 cubic feet
 Service order #3538970
 Rig: Murfin #24
 Engineer: L. Scott
 Operator(s): M. Stegman

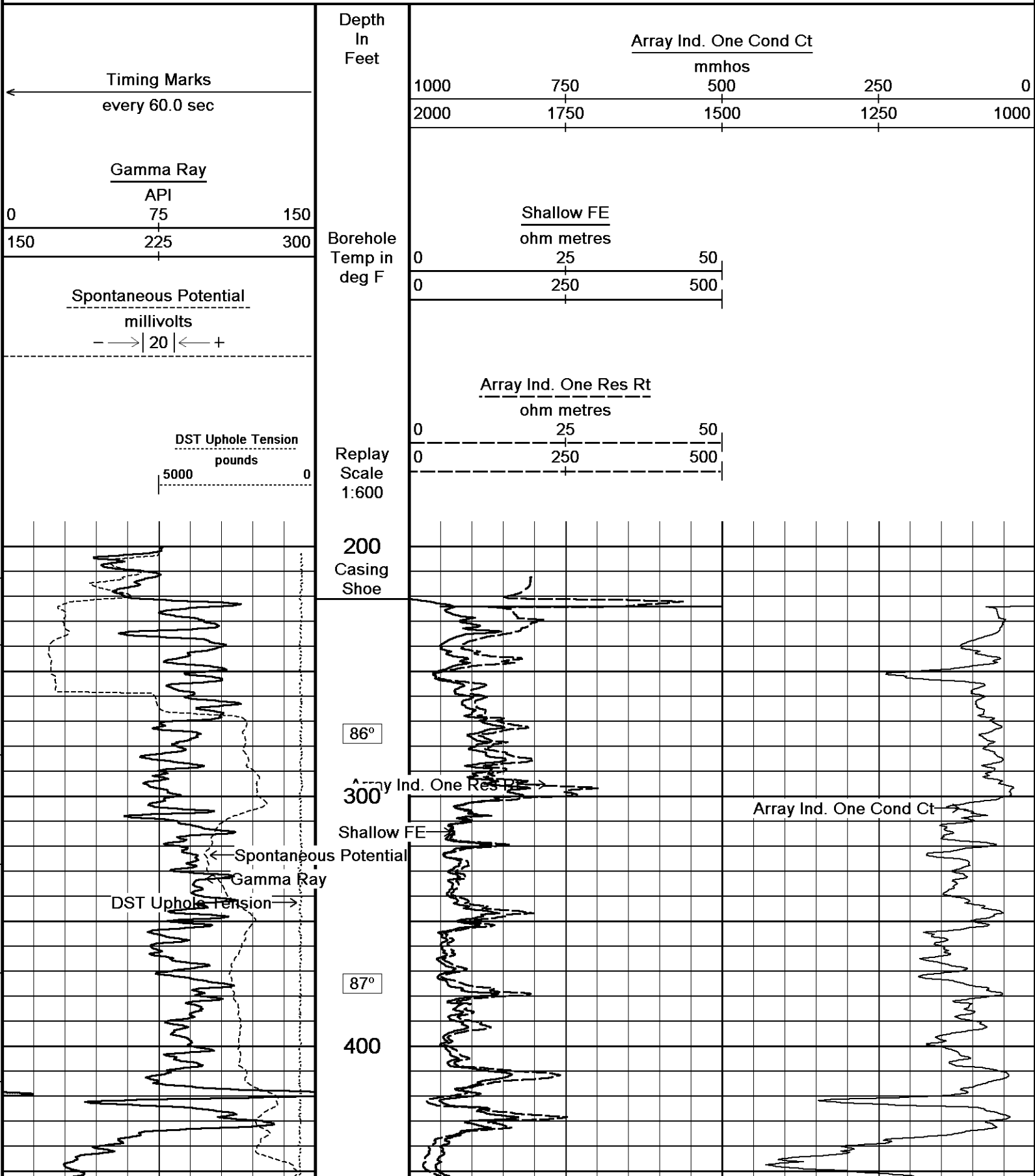
The software duplicates the pH value onto the fluid loss value. The fluid loss is 6.8.

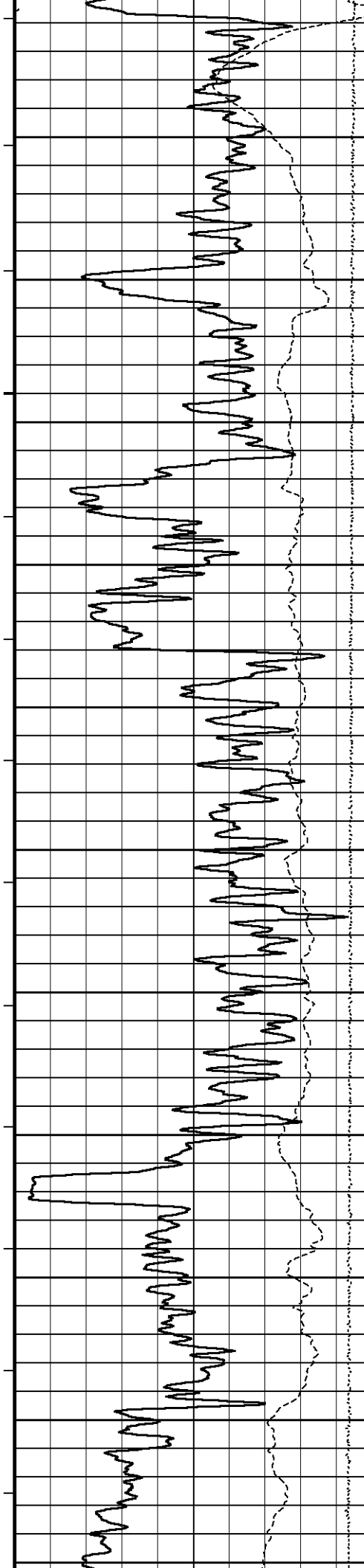
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy

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 employees. These interpretations are also subject to our general terms and conditions in our price schedule.

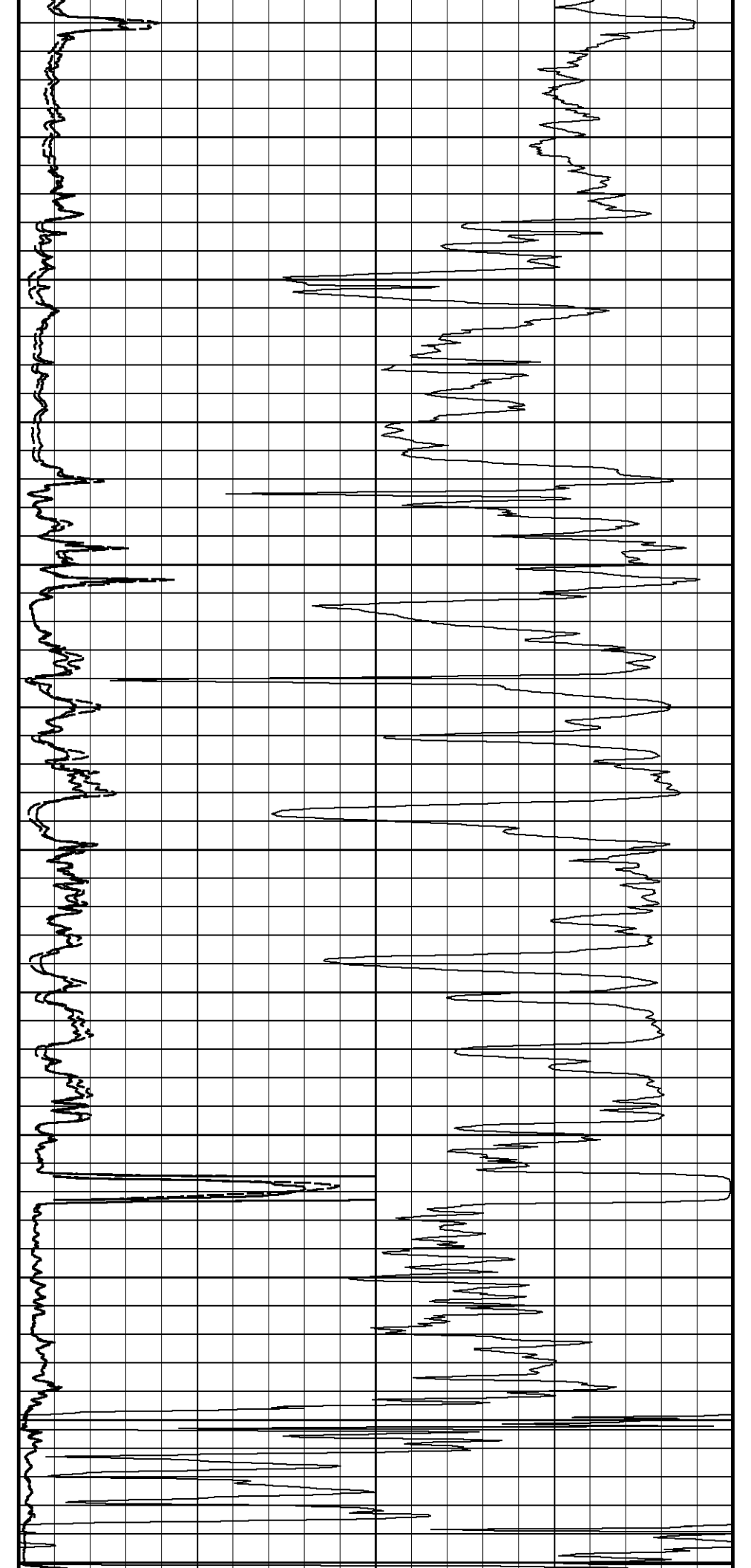
2 INCH MAIN

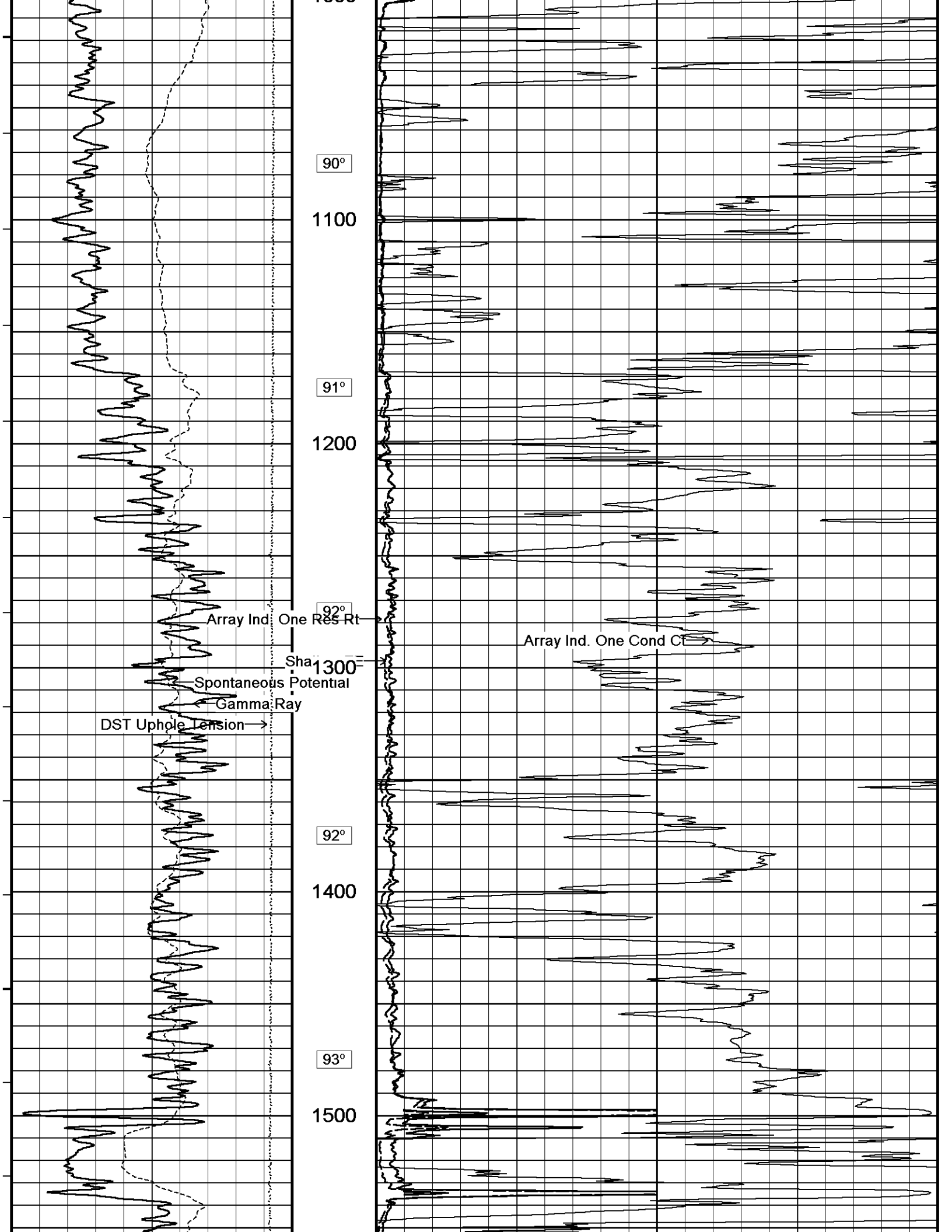
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 14-FEB-2013 01:20
 Filename: C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss ...\Grand Mesa Breit-Hoss 1-22_002.dta Recorded on 13-FEB-2013 23:15
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

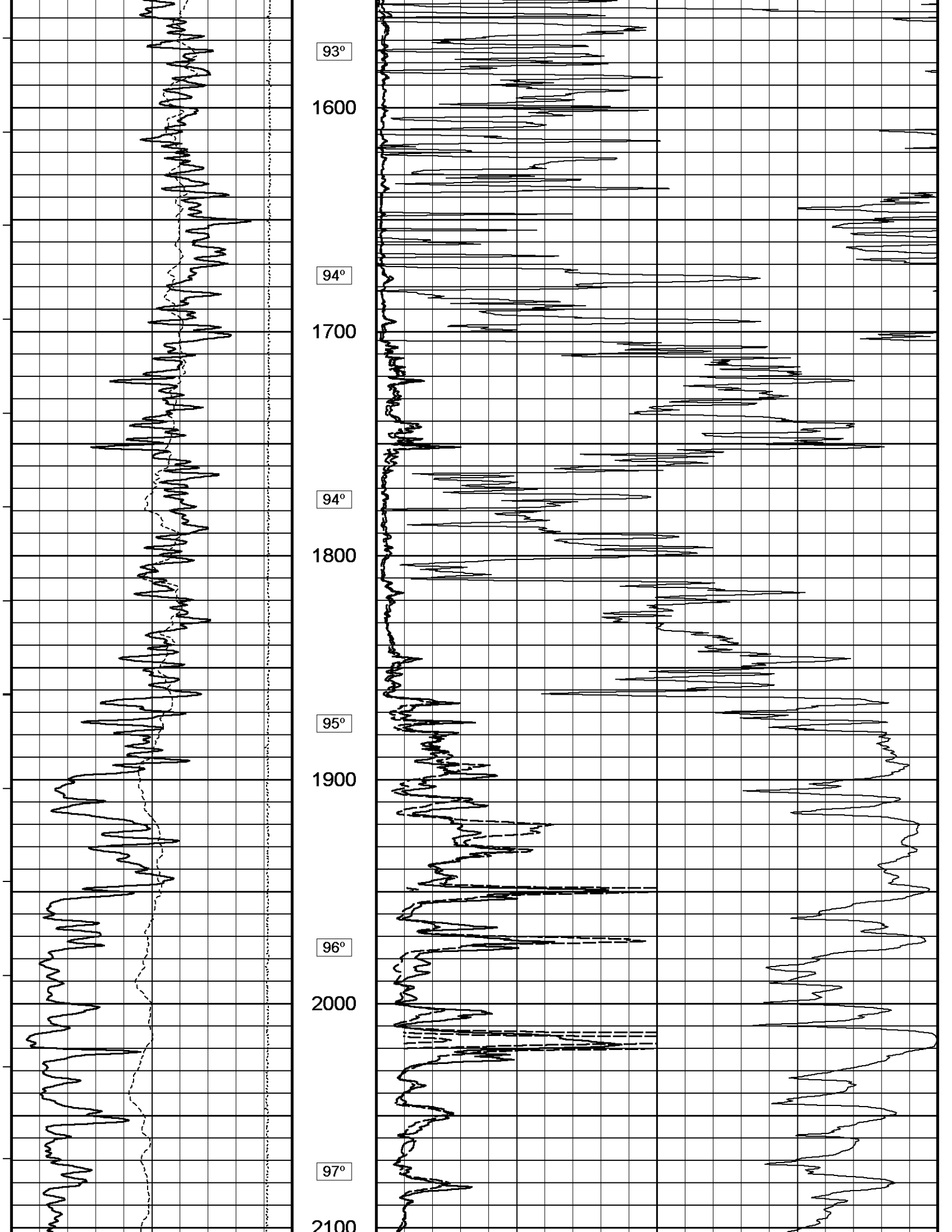


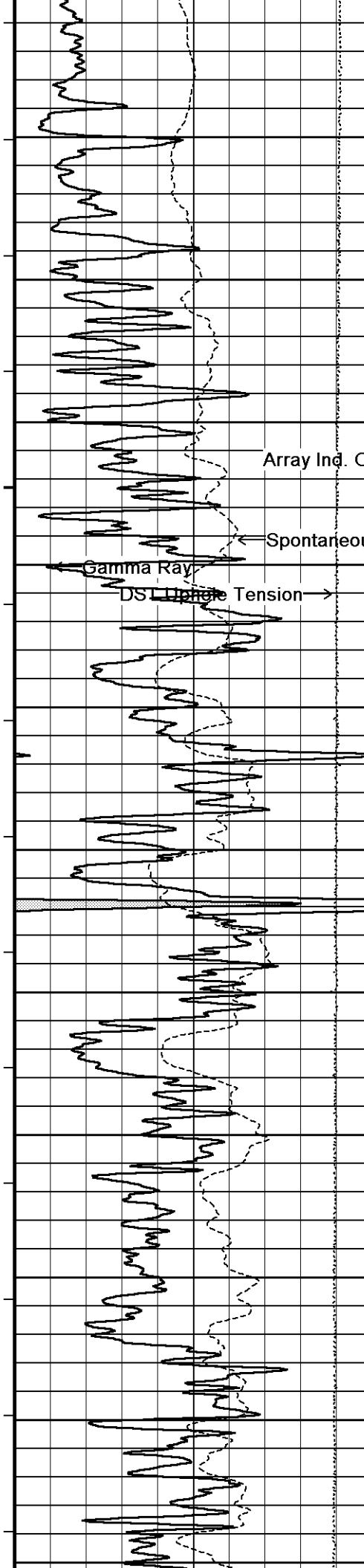


87°
500
88°
600
89°
700
89°
800
88°
900
89°
1000

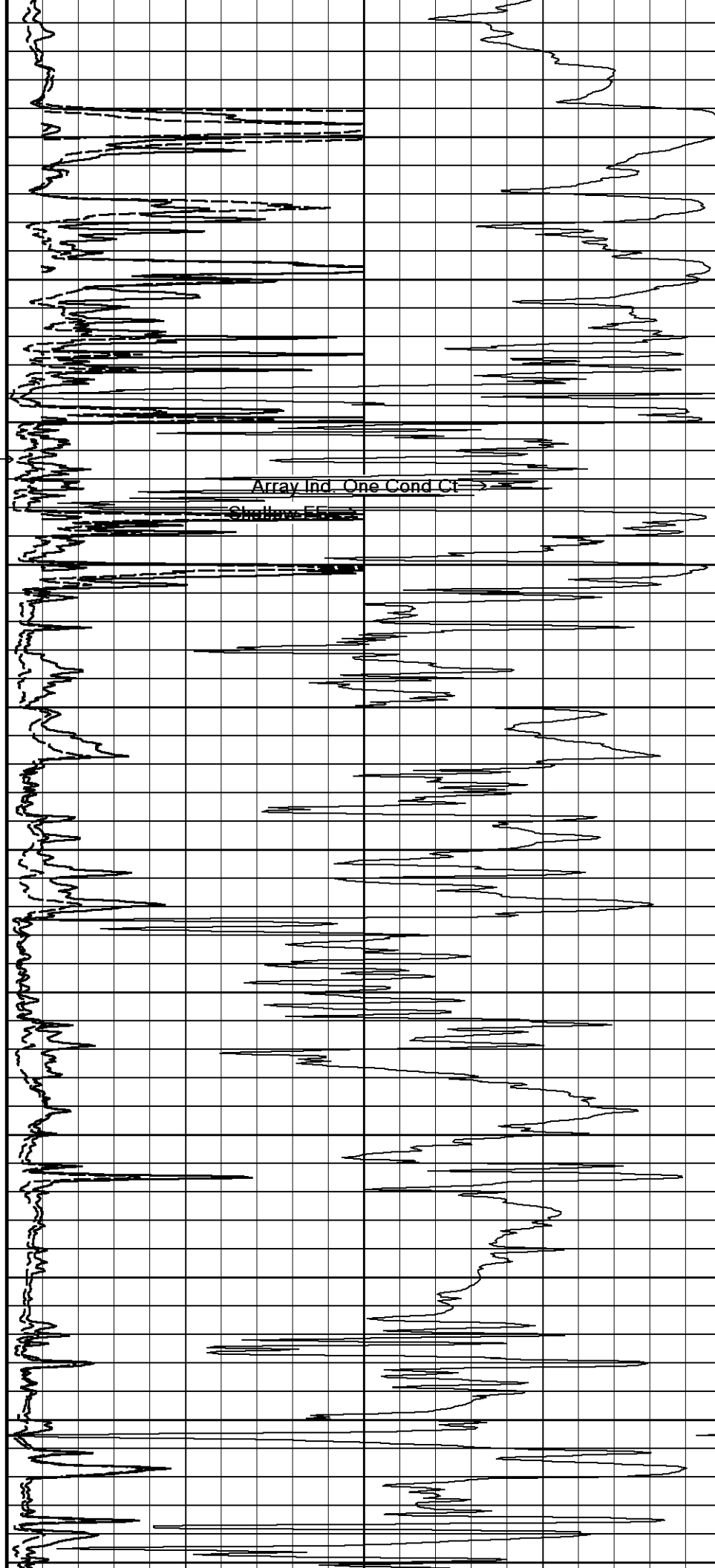






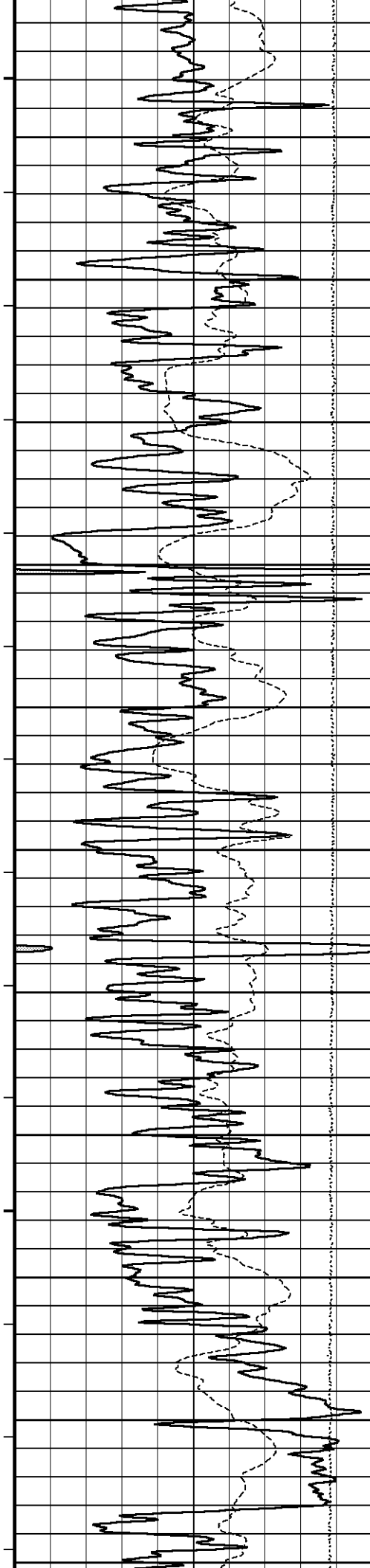


2100
96°
2200
96°
2300
97°
2400
97°
2500
98°
2600



Array Ind. One Res Rt
Spontaneous Potential
Gamma Ray
DST Uplift Tension

Array Ind. One Cond Ct
Shallow Elect



98°

2700

99°

2800

99°

2900

100°

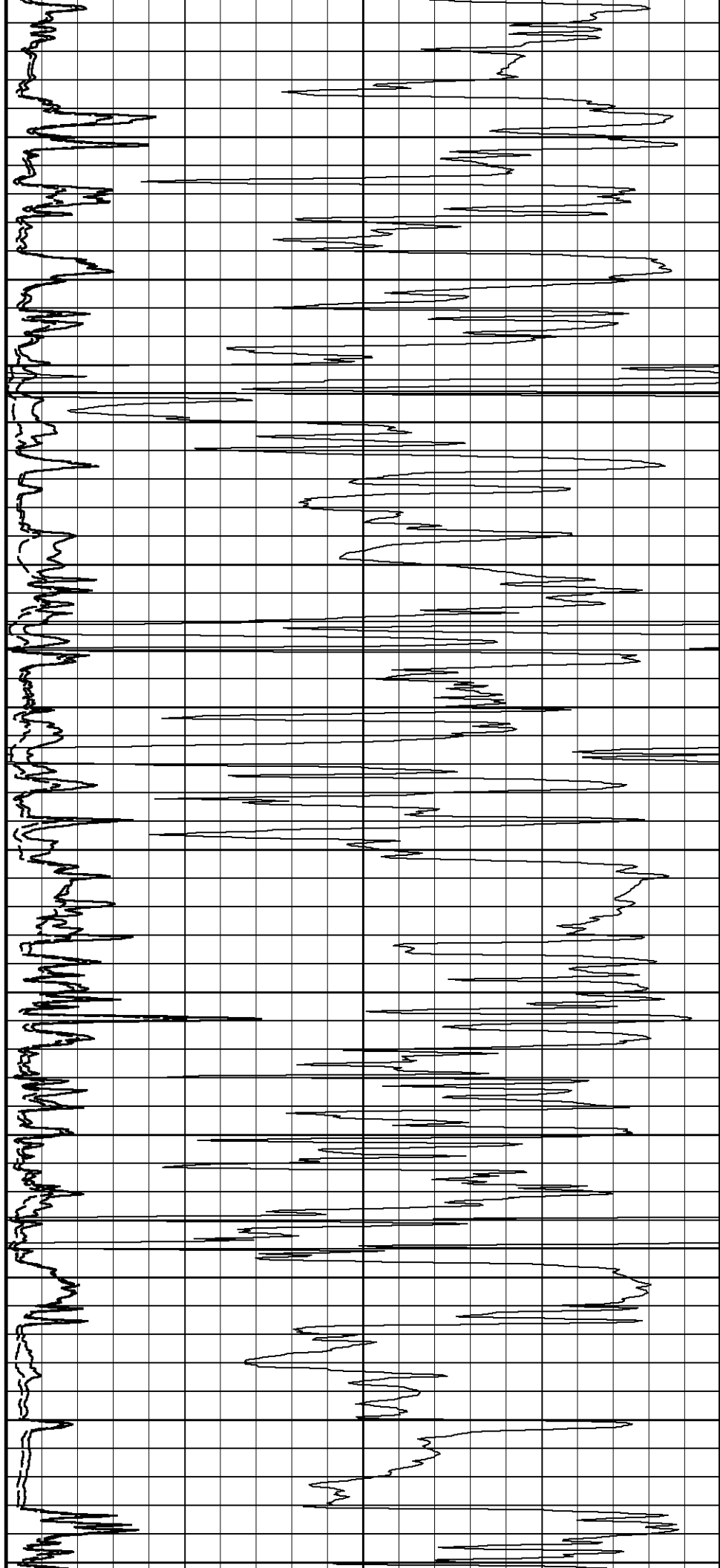
3000

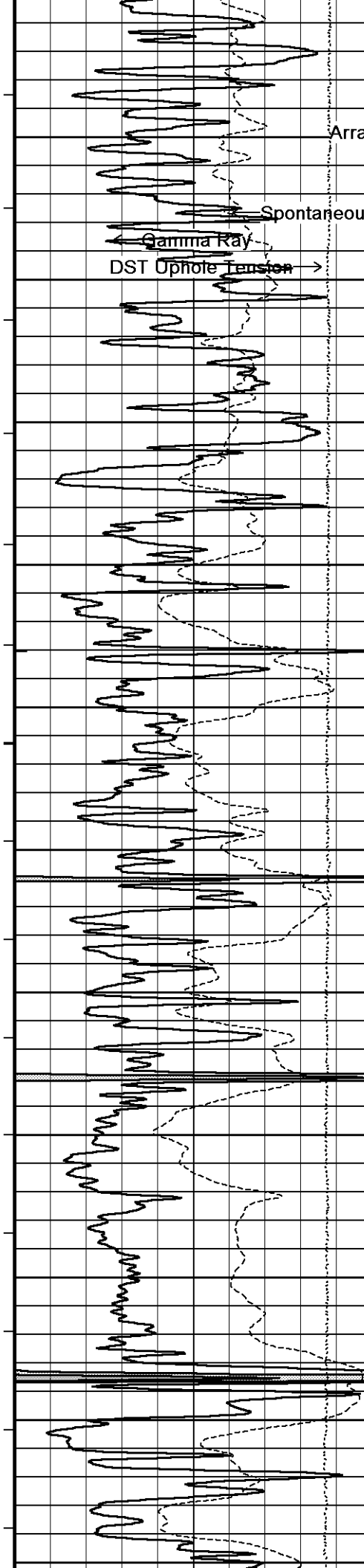
100°

3100

101°

3200





Array Ind. One Res R

Shallow FE

102°

3300

102°

3400

103°

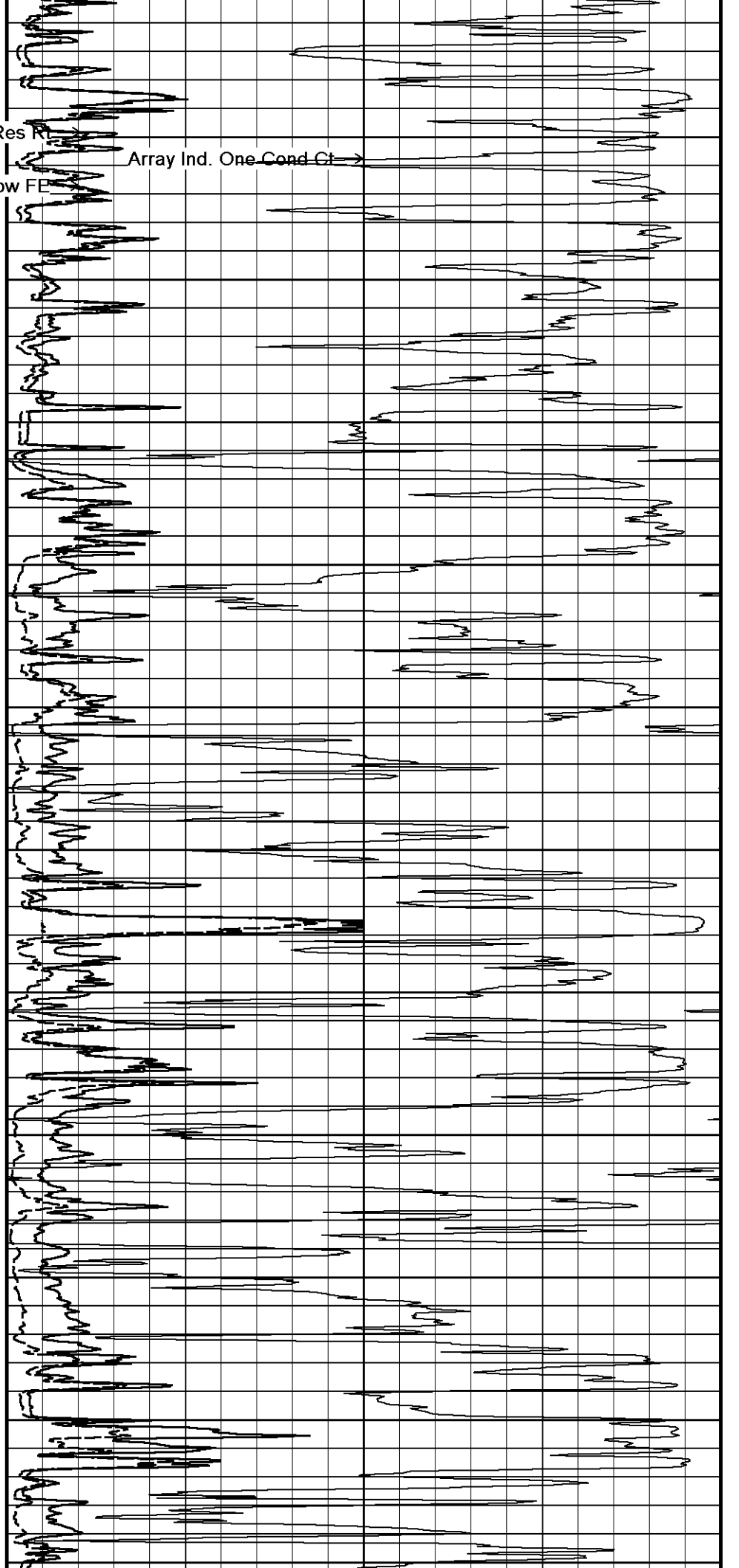
3500

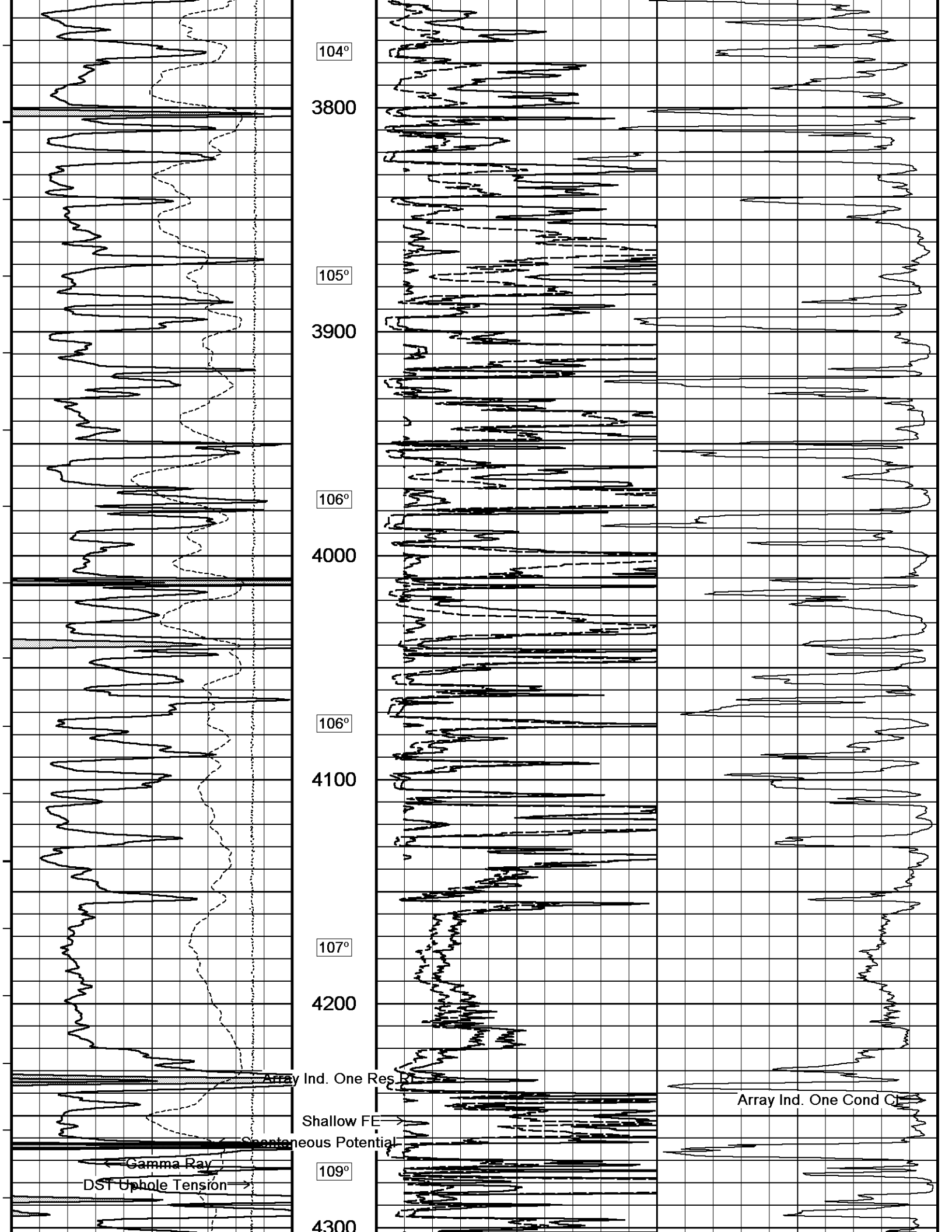
103°

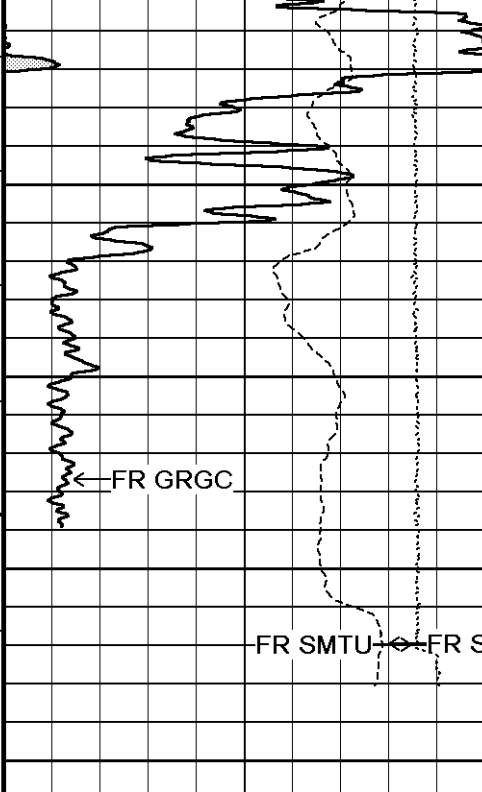
3600

103°

3700







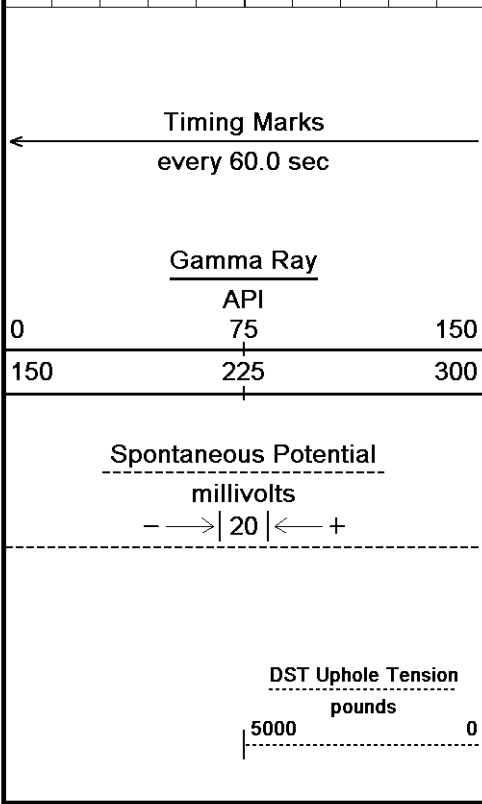
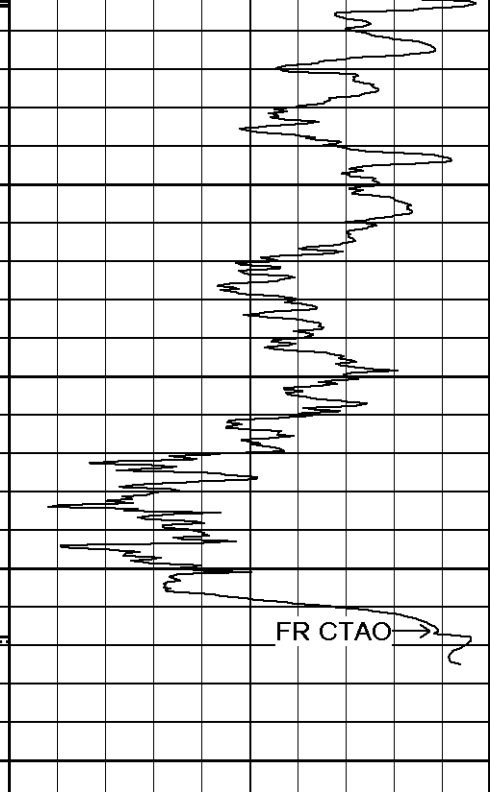
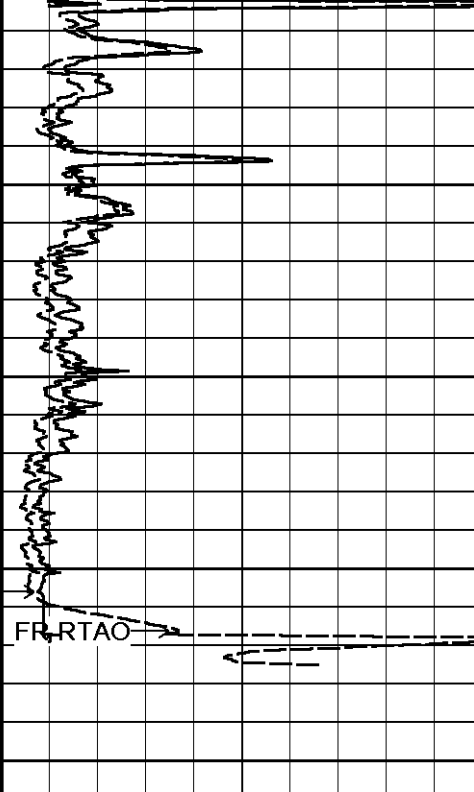
110°

4400

FR FEFE

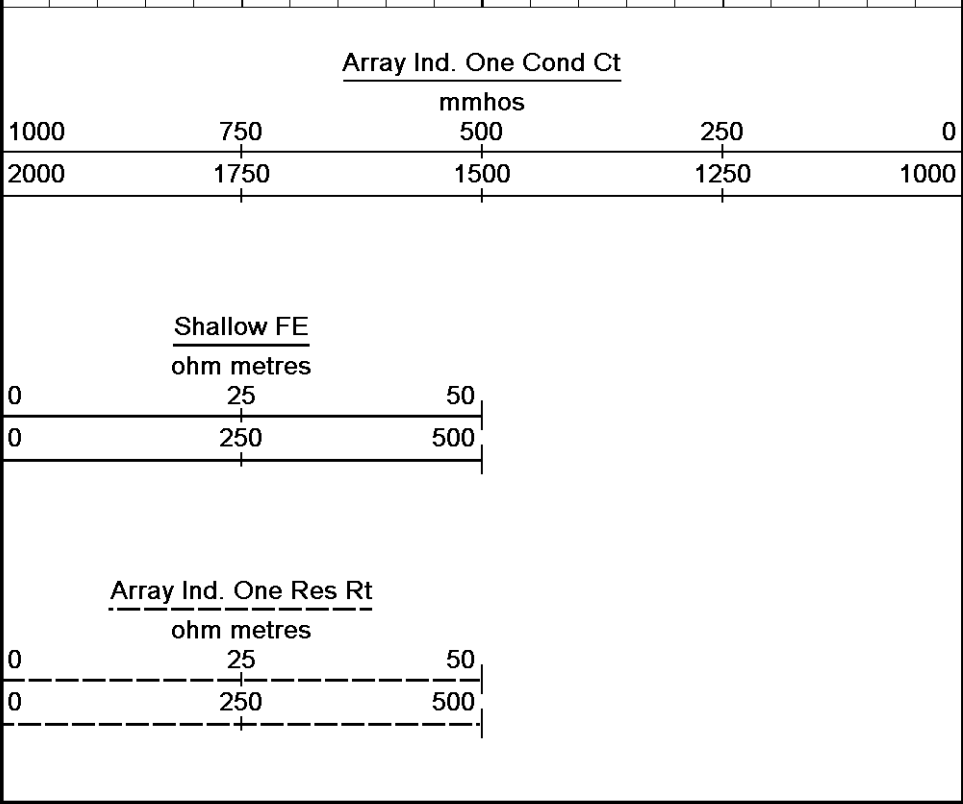
4500

Depth
In
Feet



Borehole
Temp in
deg F

Replay
Scale
1:600

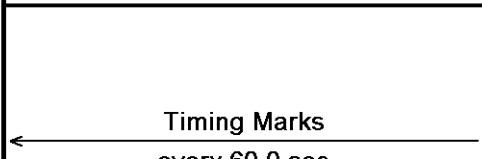


Depth Based Data - Maximum Sampling Increment 10.0cm
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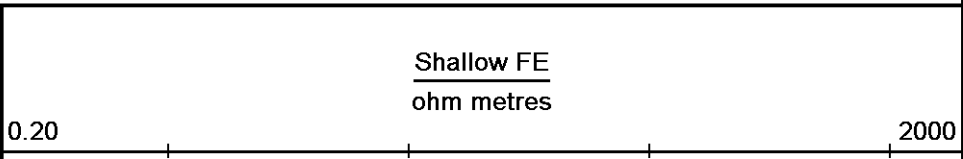
↑ 2 INCH MAIN ↑

↓ 5 INCH MAIN ↓

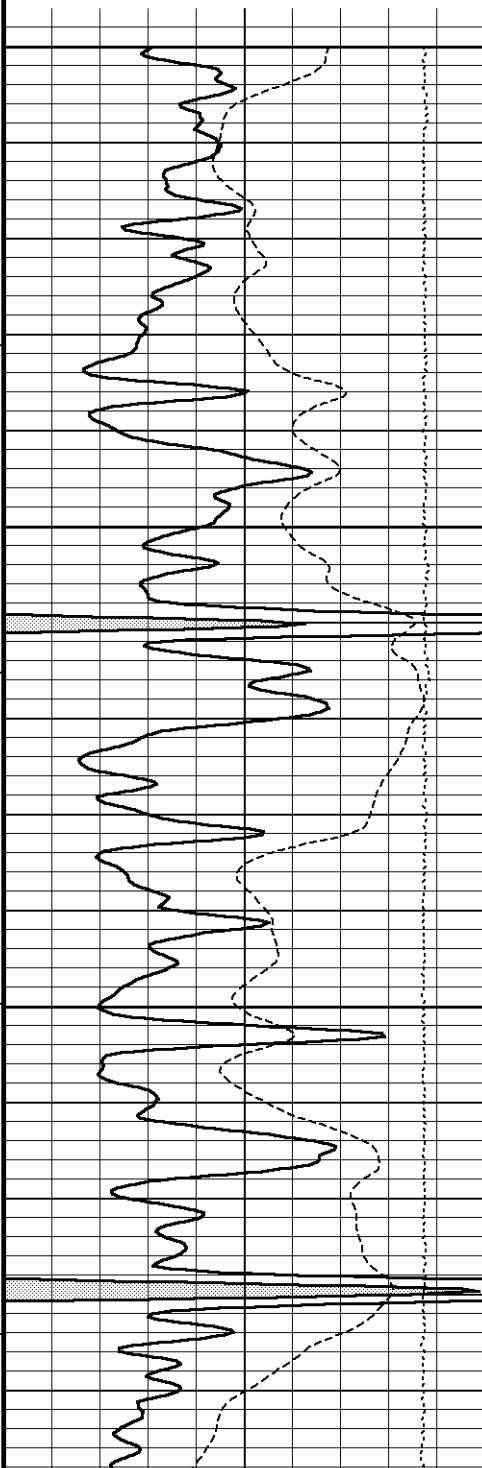
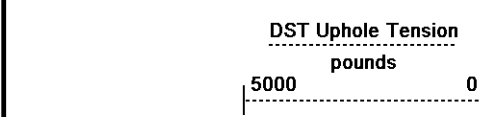
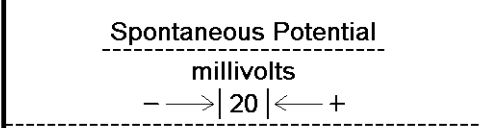
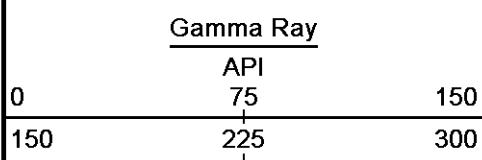
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 14-FEB-2013 01:20
 Filename: C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss ...\Grand Mesa Breit-Hoss 1-22_002.dta
 Recorded on 13-FEB-2013 23:15
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492



Depth
in
Feet



every 60.0 sec



Borehole Temp in deg F

Replay Scale 1:240

3450

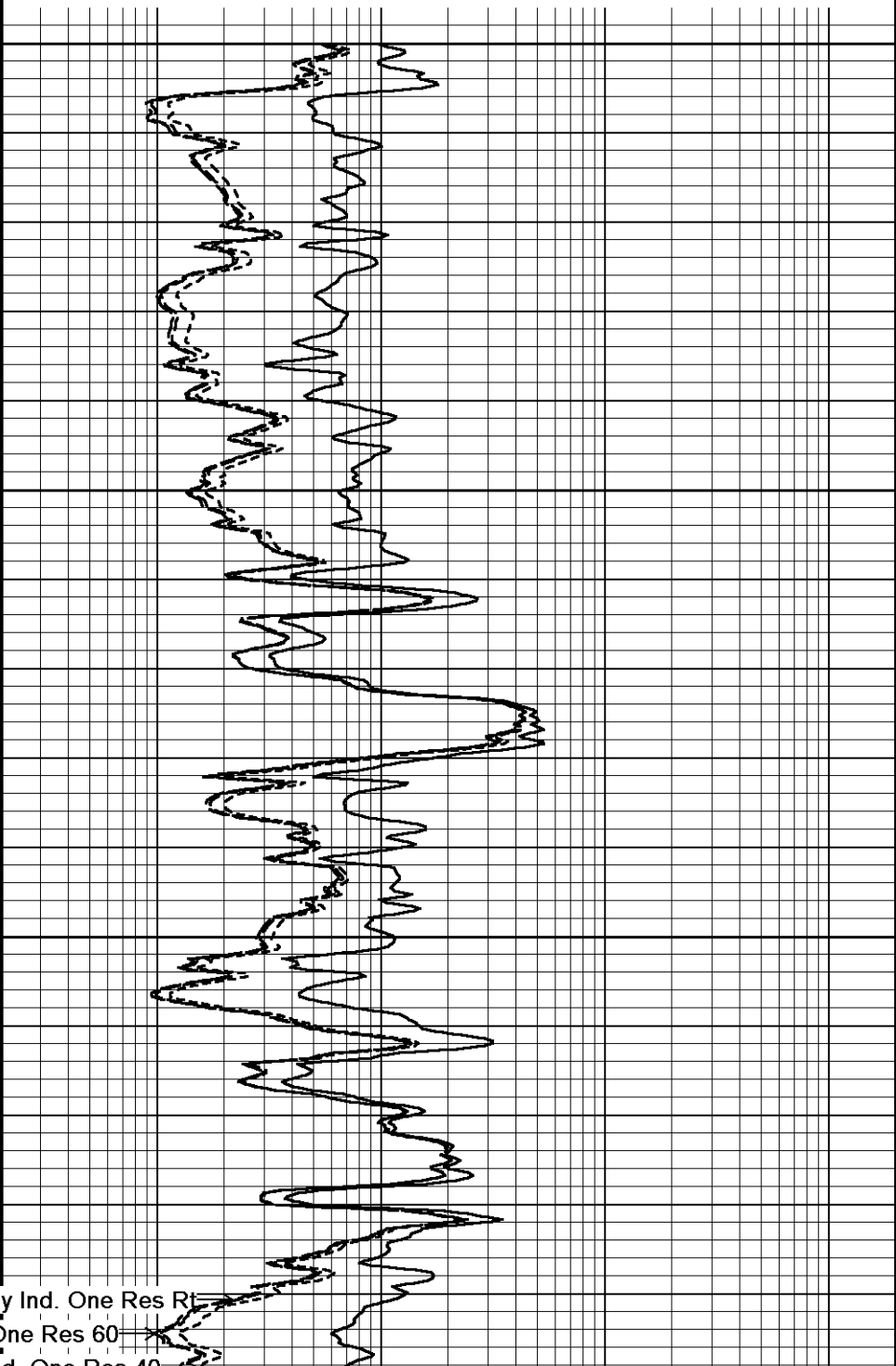
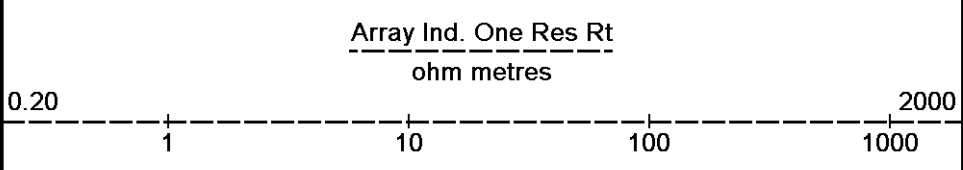
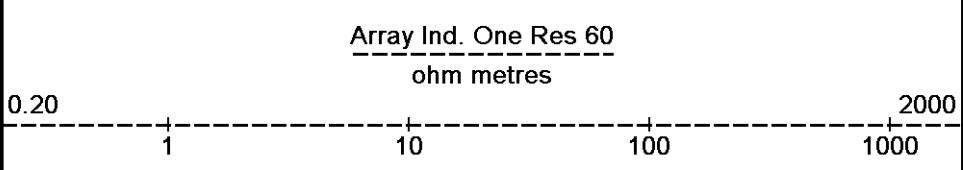
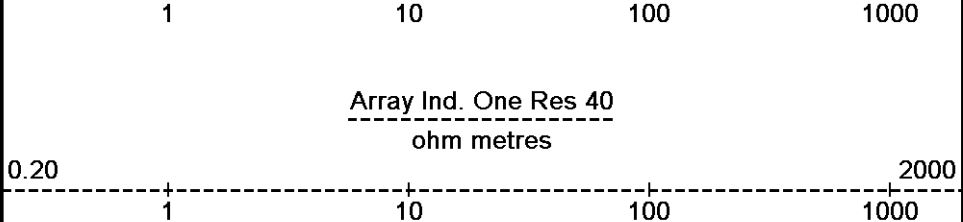
103°

3500

103°

3550

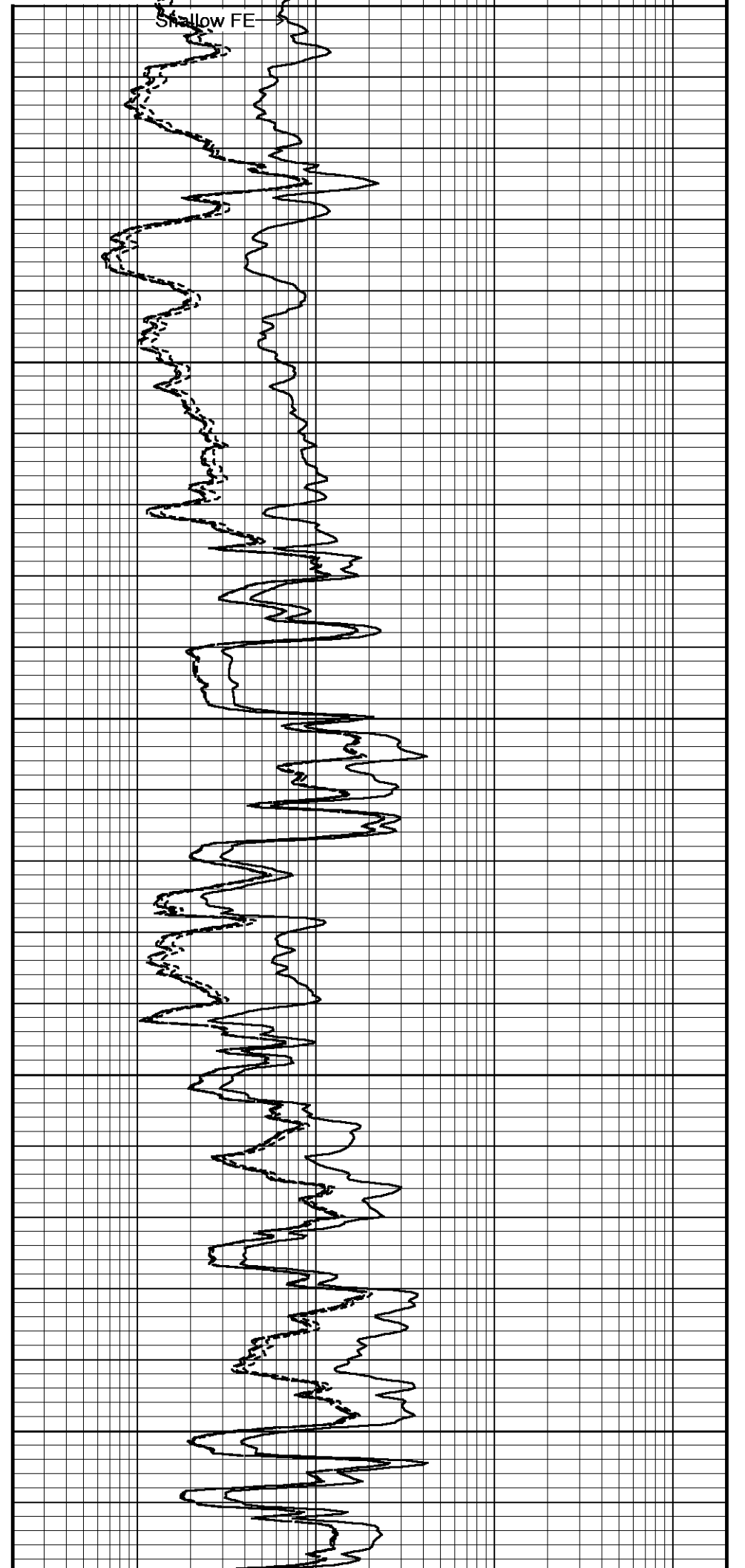
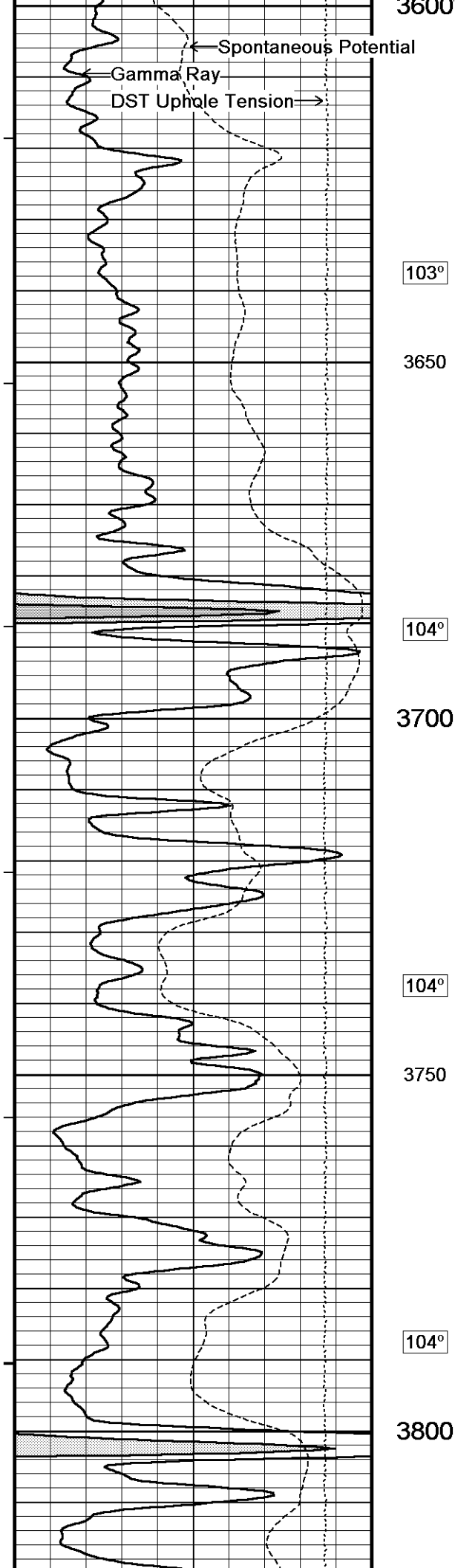
103°

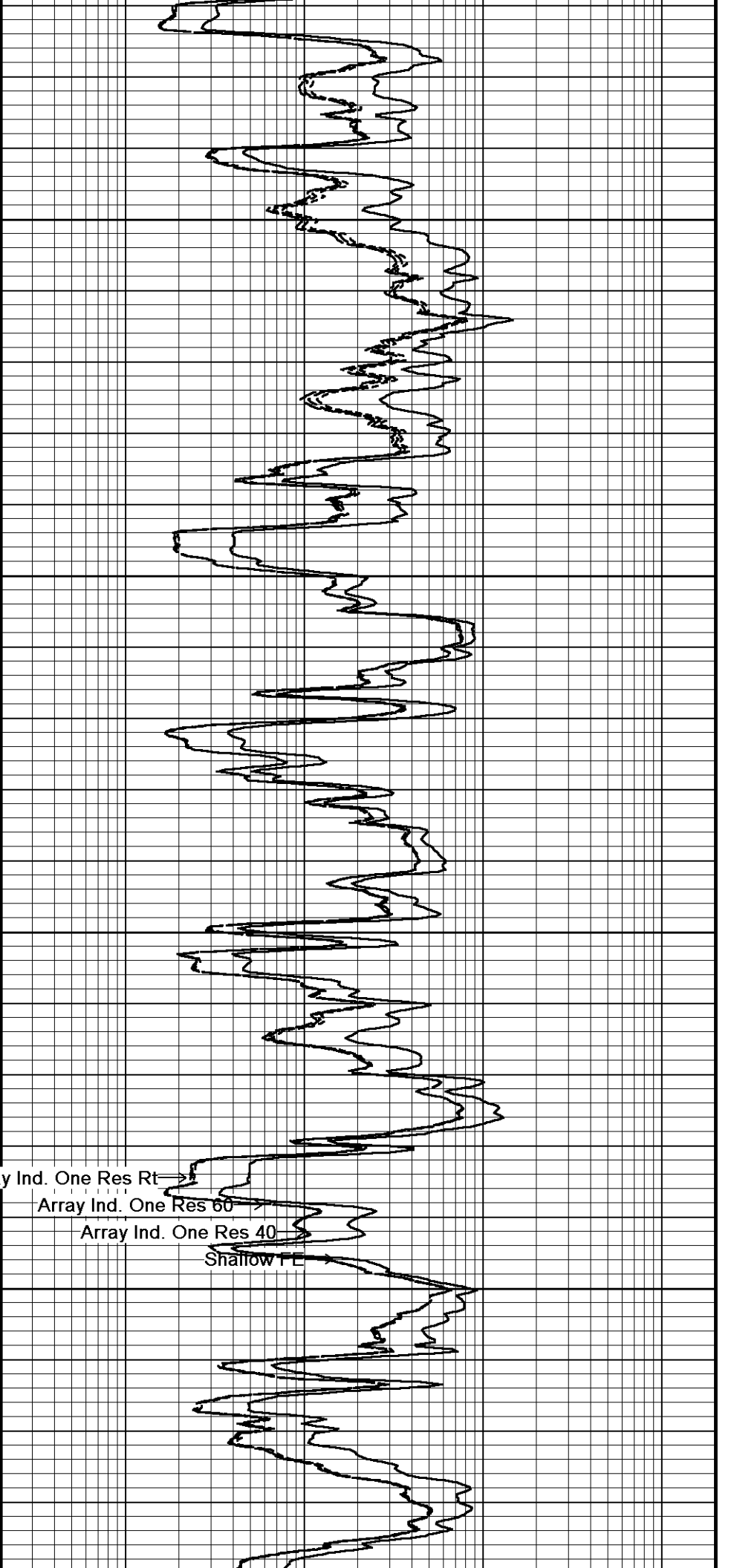
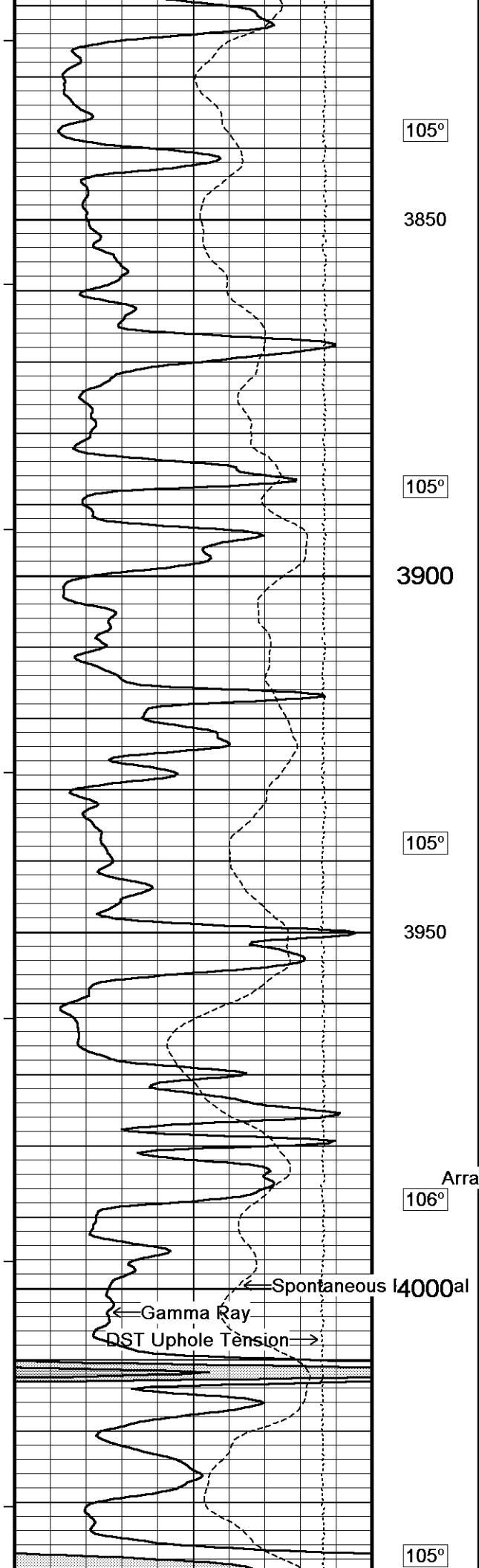


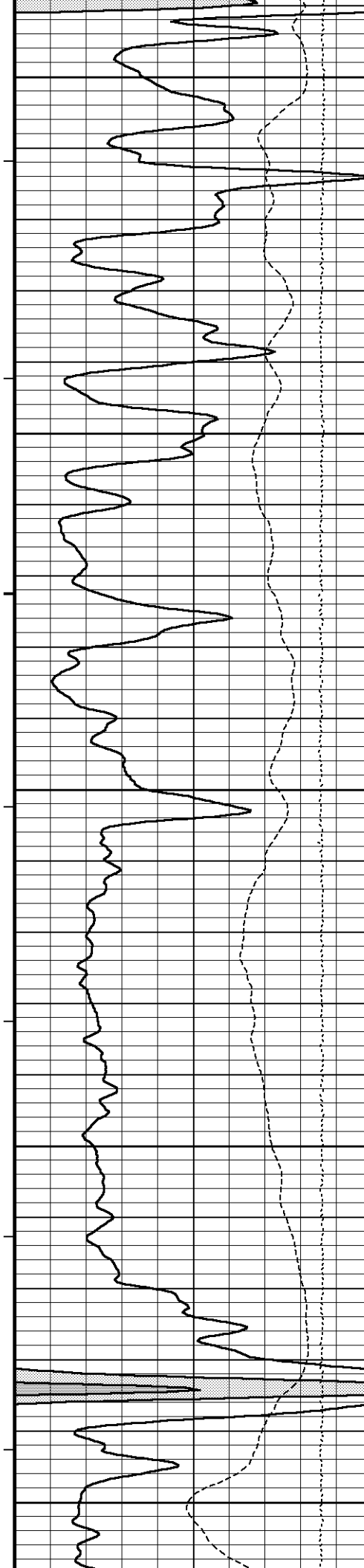
Array Ind. One Res Rt

Array Ind. One Res 60

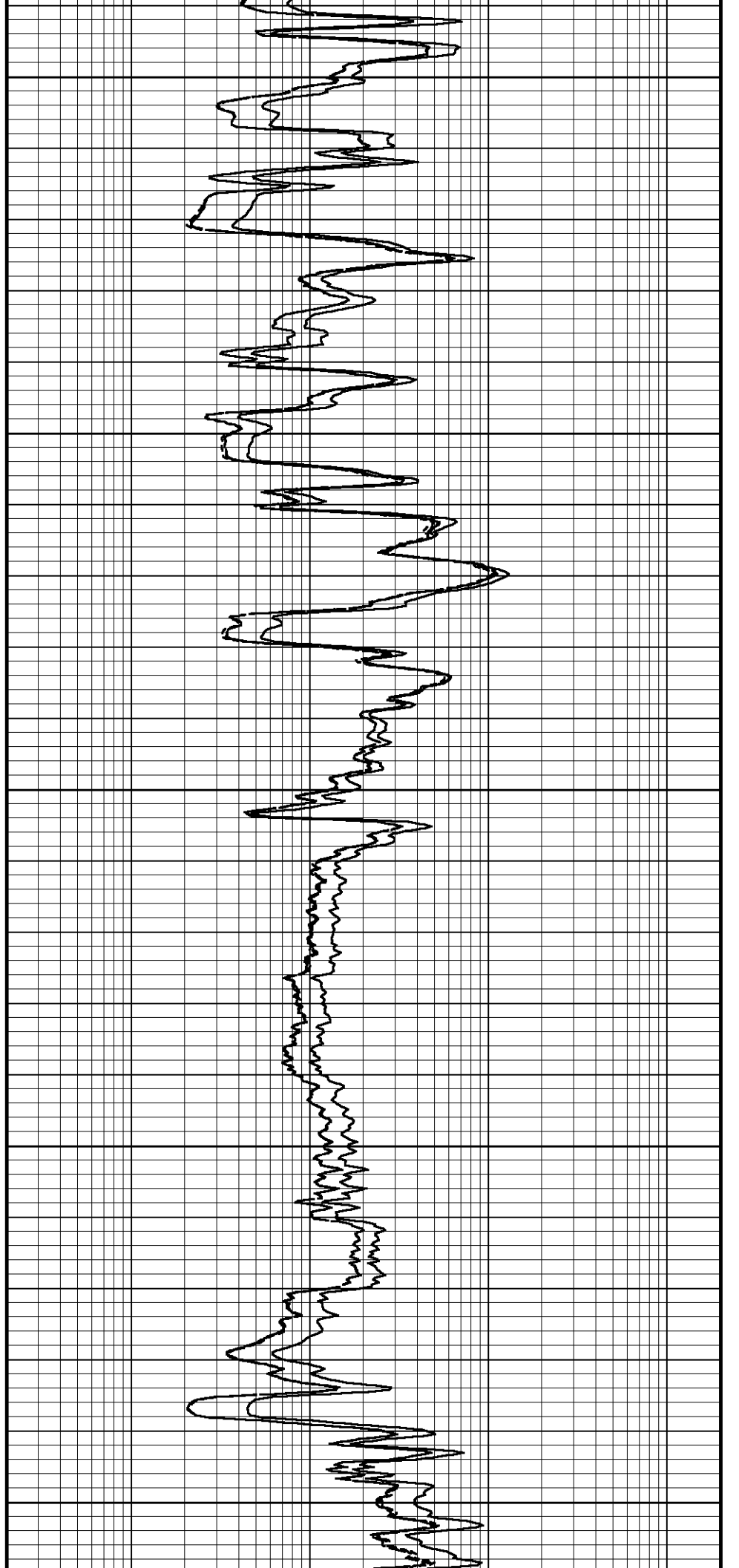
Array Ind. One Res 40

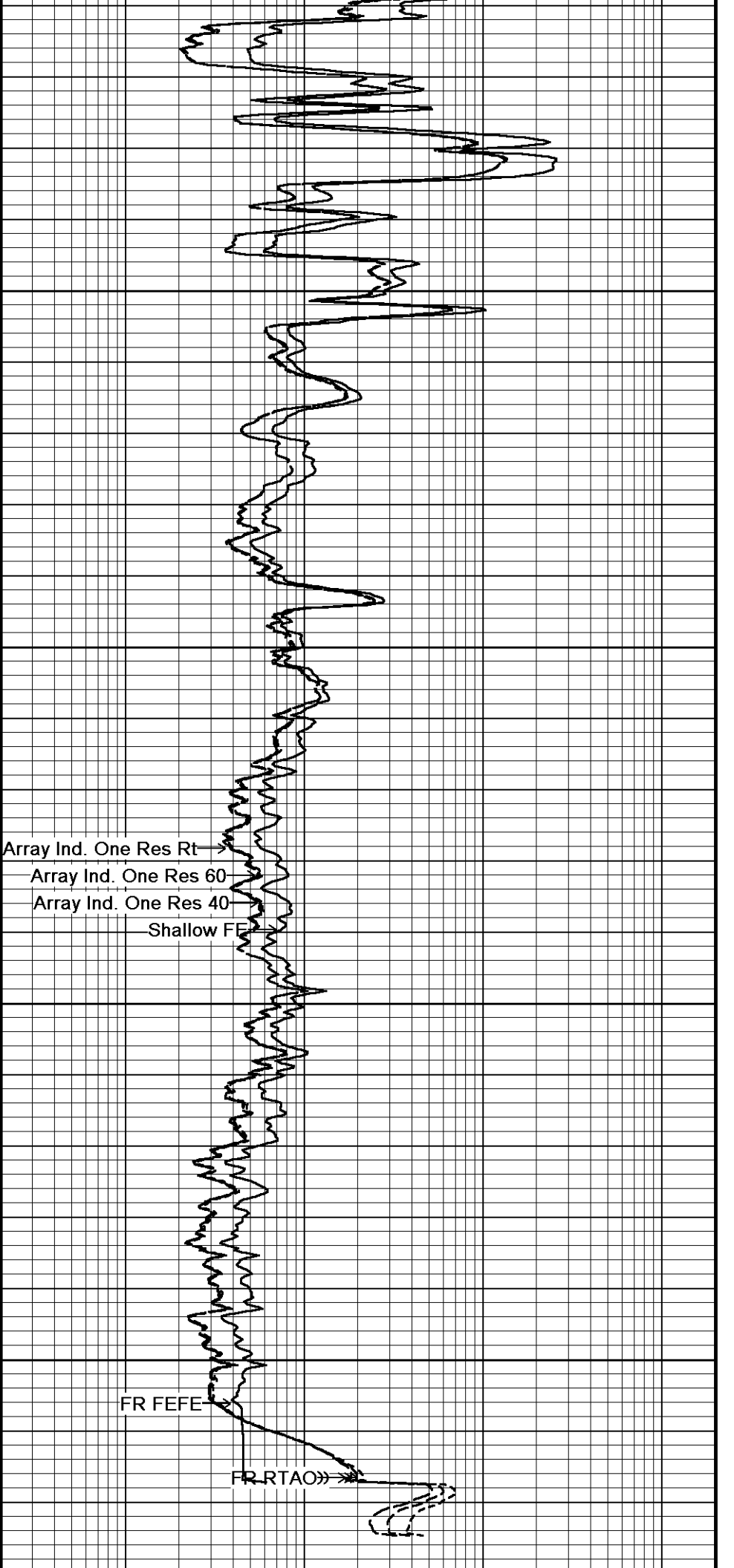
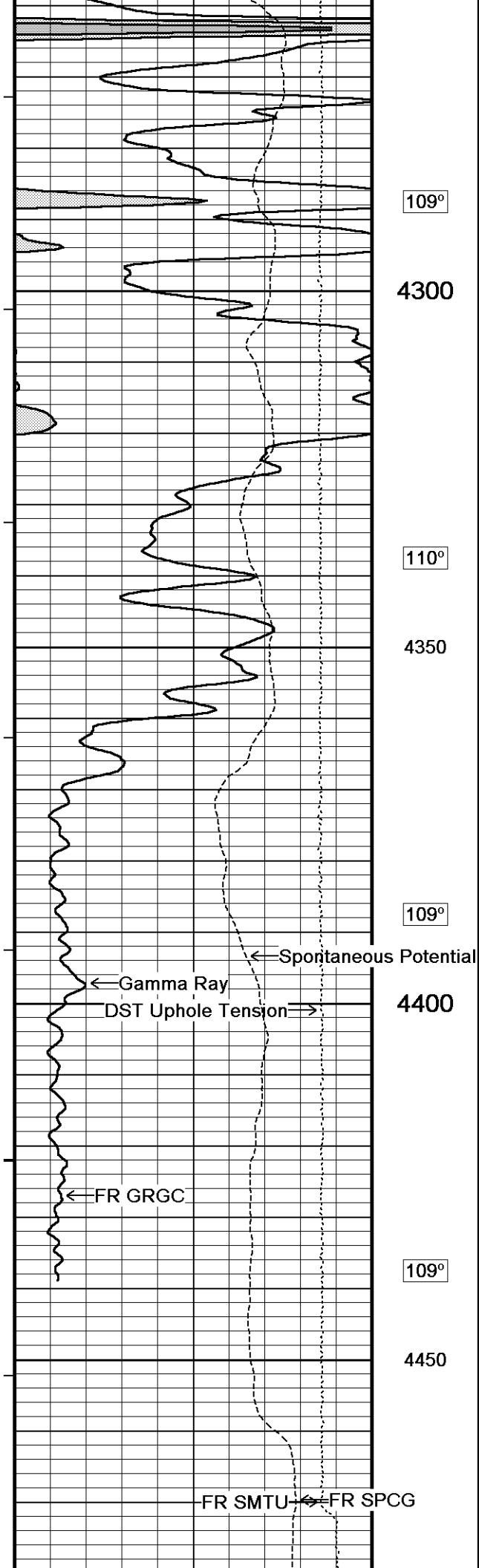


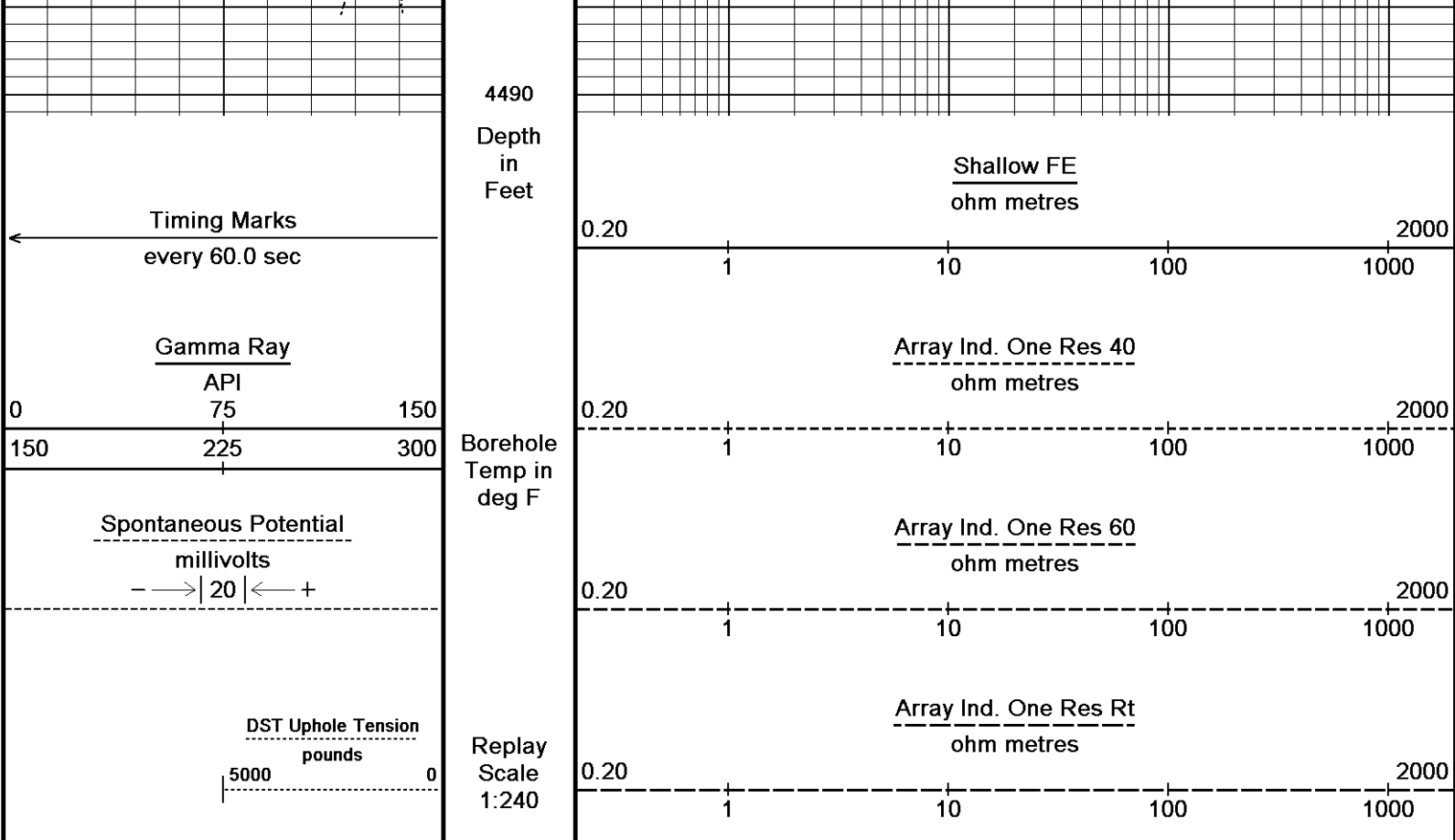




4050
106°
4100
107°
4150
107°
4200
108°
4250





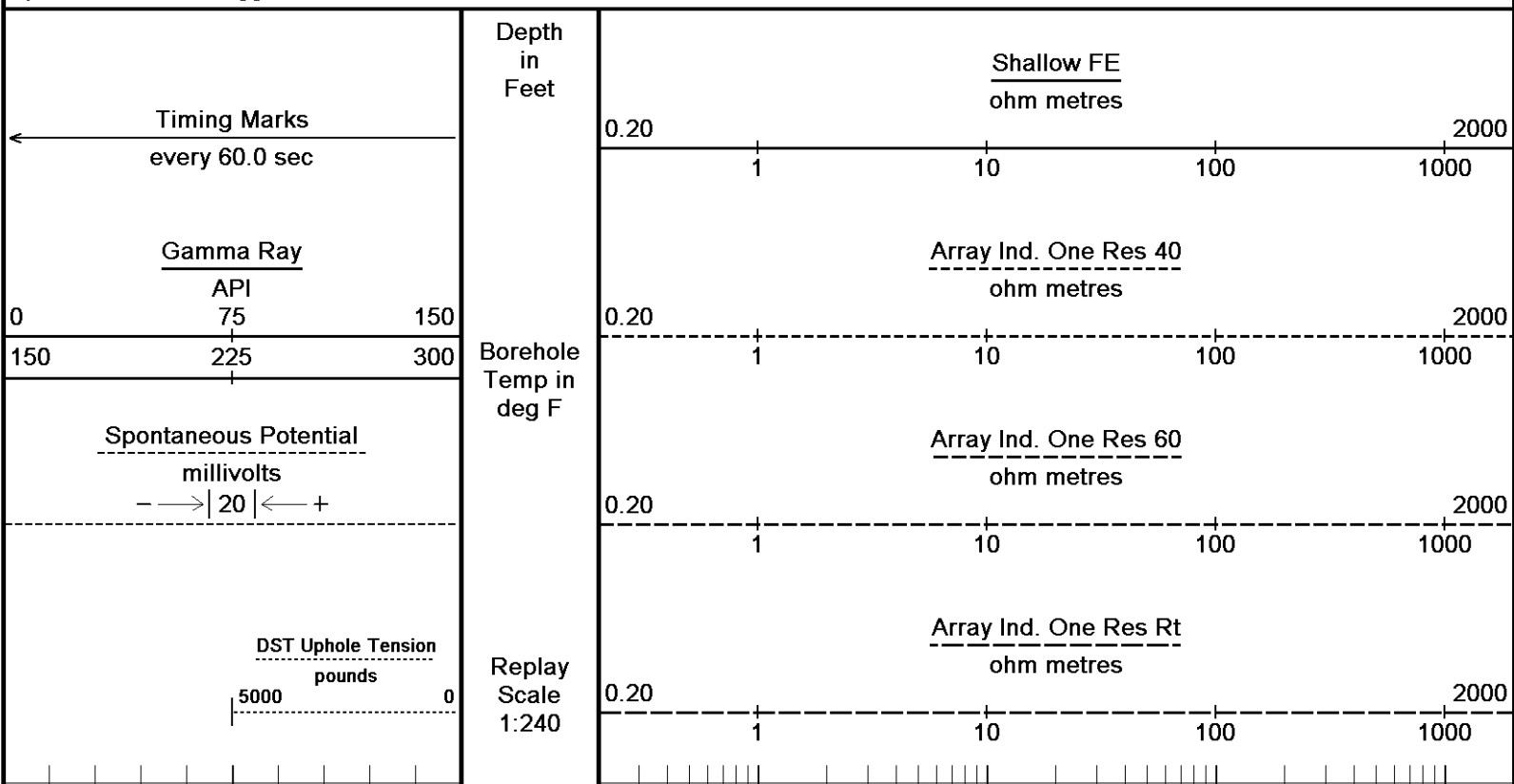


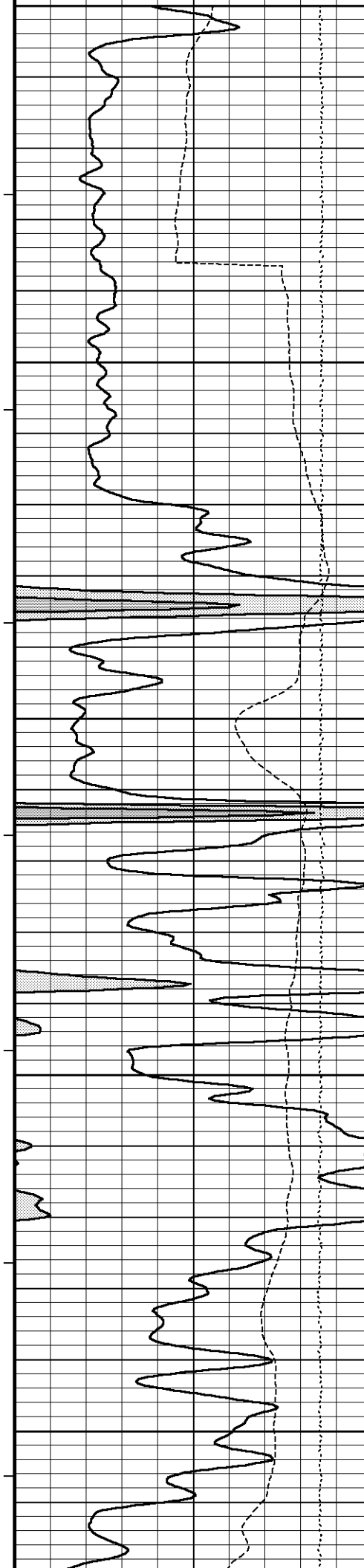
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 14-FEB-2013 01:20
 Filename: C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss ...\Grand Mesa Breit-Hoss 1-22_002.dta Recorded on 13-FEB-2013 23:15
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

↑ 5 INCH MAIN ↑

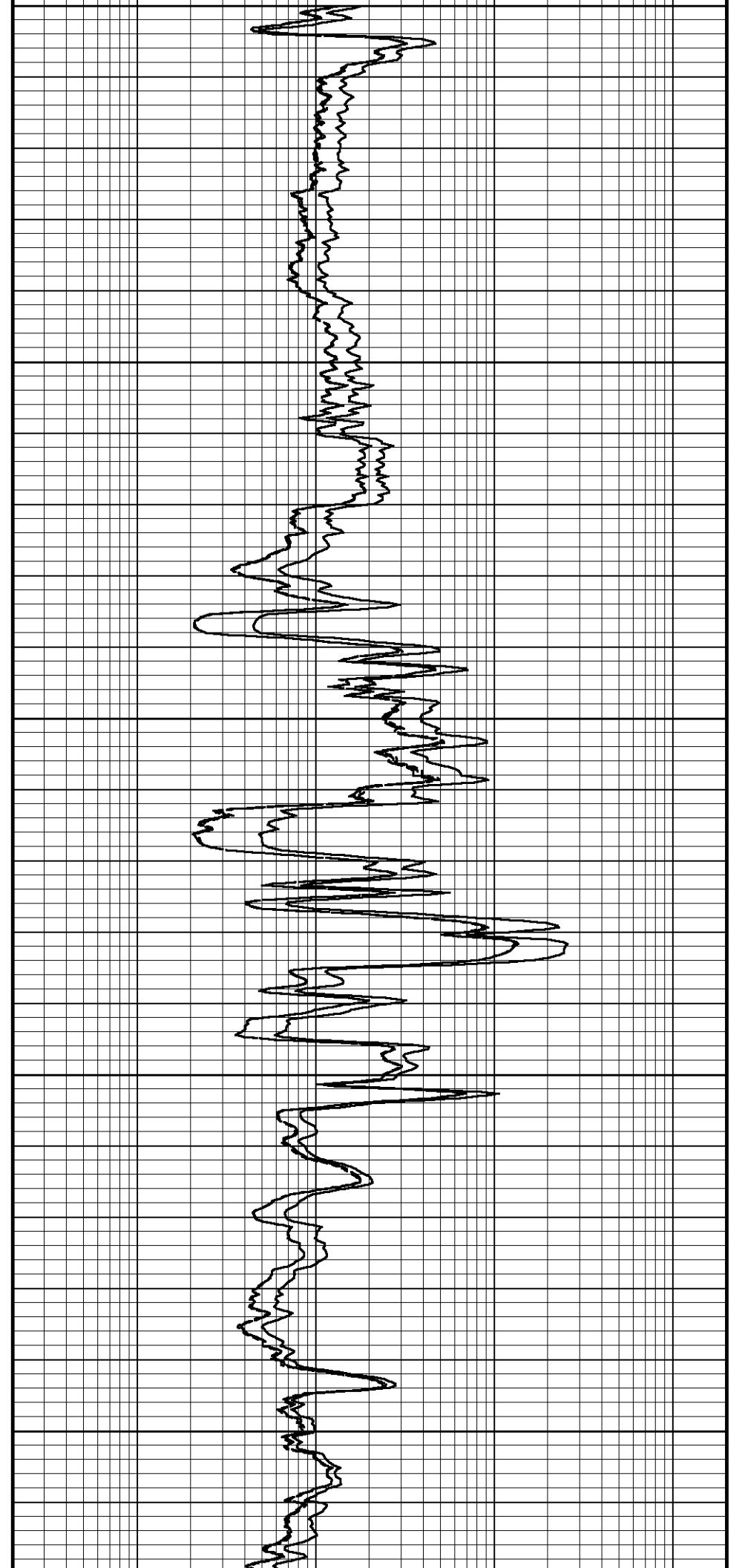
↓ REPEAT SECTION ↓

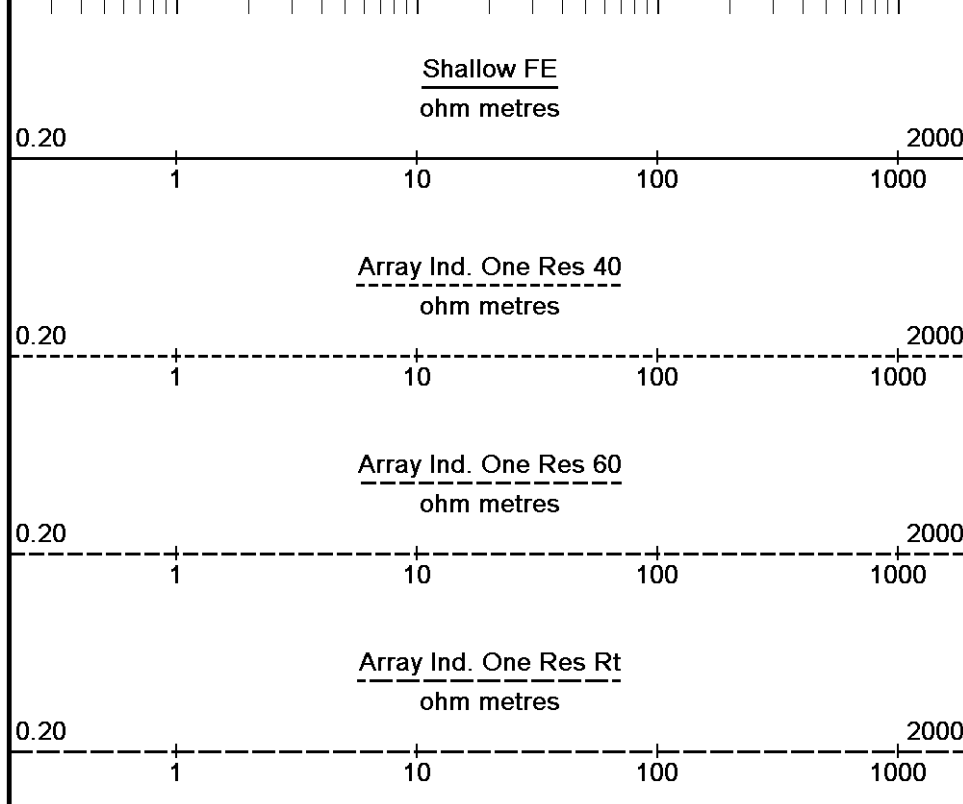
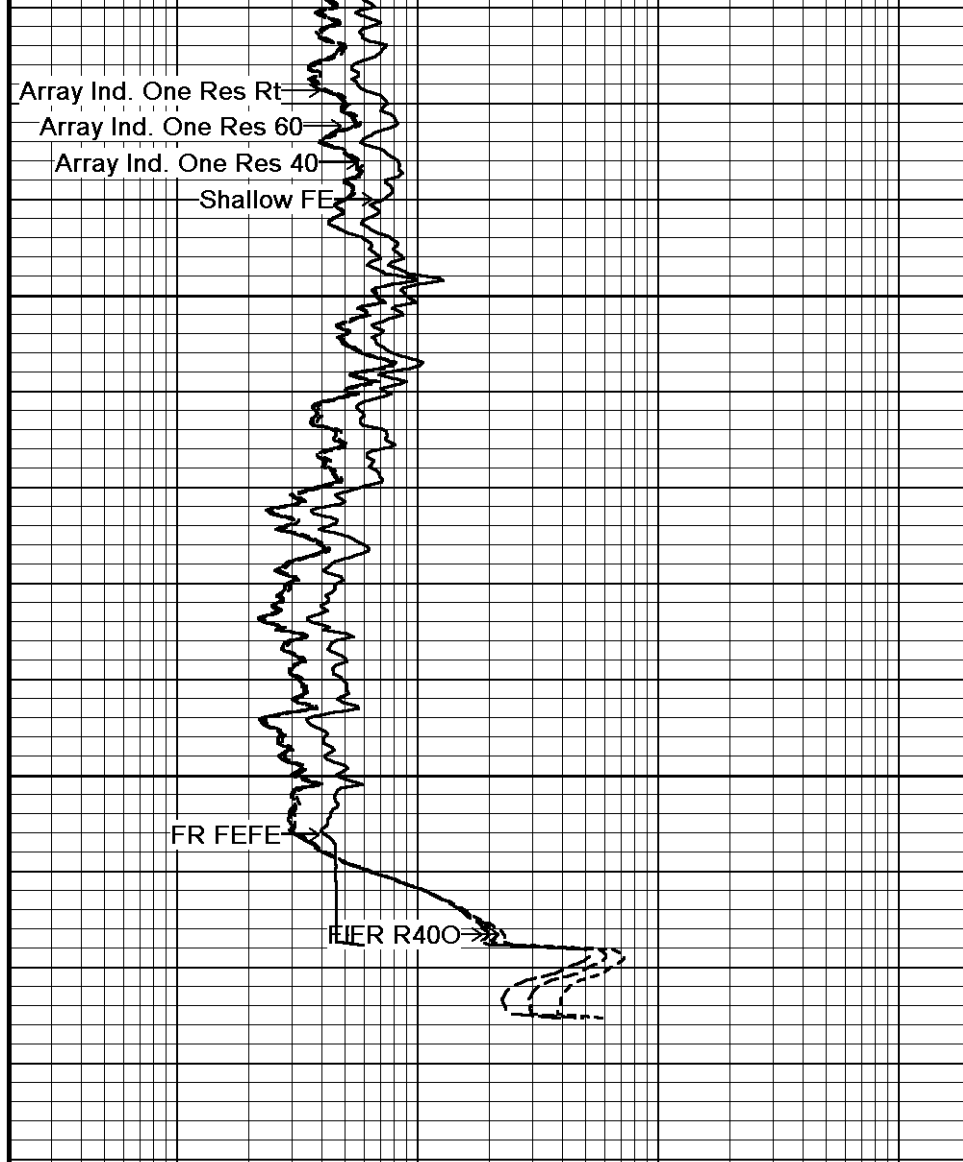
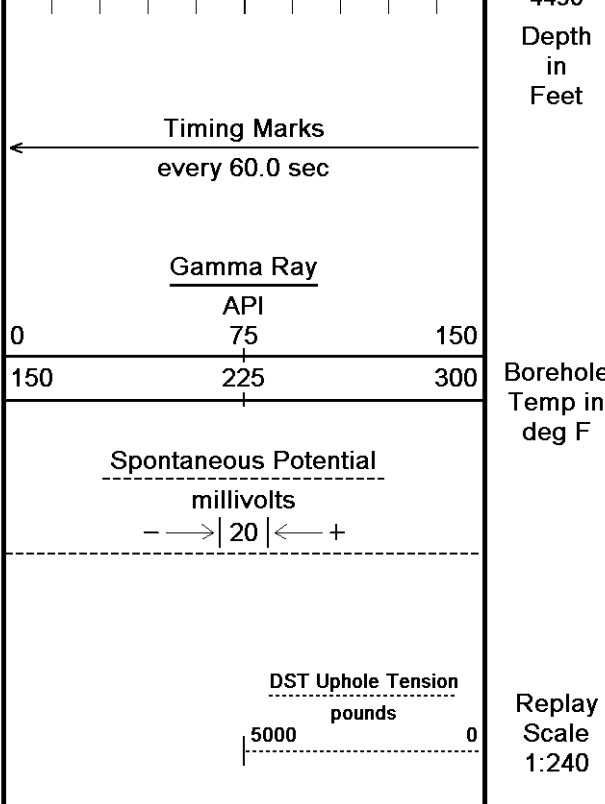
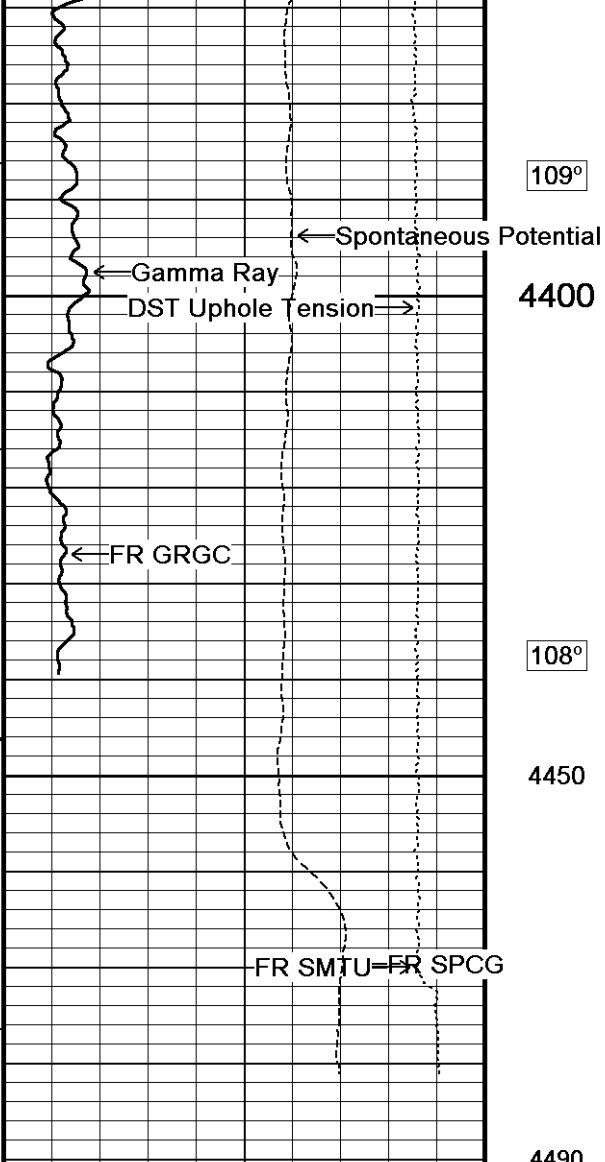
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 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492





4150
107°
4200
107°
4250
108°
4300
109°
4350





BEFORE SURVEY CALIBRATION

C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss 1-22\Grand Mesa Breit-Hoss 1-22_001.dta

General Constants All 000

Last Edited on 13-FEB-2013,19:59

General Parameters

Mud Resistivity	0.850	ohm-metres
Mud Resistivity Temperature	87.000	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	Crossplot Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 09-FEB-2013 07:52

Reading No	Measured	Calibrated (lbs)
1	15612.38	0.00
2	16153.00	384.00

High Resolution Temperature Calibration MCG-B 34

Field Calibration on 08-NOV-2012,10:05

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

High Resolution Temperature Constants MCG-B 34

Last Edited on 08-NOV-2012,10:04

Pre-filter Length	11
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SP Calibration MCG-B 34

Field Calibration on 08-NOV-2012 10:10

	Measured	Calibrated (mV)
Reference 1	107.1	100.0
Reference 2	-93.0	-100.0

Gamma Calibration MCG-B 34

Field Calibration on 11-FEB-2013 15:40

	Measured	Calibrated (API)
Background	67	46
Calibrator (Gross)	1123	771
Calibrator (Net)	1055	725

Gamma Constants MCG-B 34

Last Edited on 12-FEB-2013,03:33

Gamma Calibrator Number	GRC38	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Caliper Calibration MML-A 3

Base Calibration on 23-JAN-2013 09:15

Field Calibration on 11-FEB-2013 15:28

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14702	5.98
2	17956	7.97
3	21222	9.86
4	24713	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.04	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 23-JAN-2013 09:37
Field Check on 11-FEB-2013 15:30

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	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	62.9	62.9
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 12-FEB-2013,03:33

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

Neutron Calibration MDN-A.B 66

Base Calibration on 24-JAN-2013 15:42
Field Check on 11-FEB-2013 15:47

Base Calibration

Ratio	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2998	94	3714	110
	31.811		33.764	

Field Calibrator at Base

Ratio	Calibrated (cps)
	1692 2389
	0.708

Field Check

Ratio	Calibrated (cps)
	1682 2389
	0.695

Neutron Constants MDN-A.B 66

Last Edited on 13-FEB-2013,19:59

Neutron Source Id	P0204NN
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	None
Formation Pressure	N/A kpsi
Temperature Source	None
Temperature	N/A degrees F
Mud Salinity	0.00 kppm
Salinity Correction	Not Applied
Formation Fluid Salinity Source	None
Formation Fluid Salinity	N/A kppm
Barite Mud Correction	Not Applied

FE Calibration MFE-B.J 353

Base Calibration on 23-JAN-2013 09:00
Field Check on 11-FEB-2013 15:16

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.3	126.8

Base Check	281.1
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Field Check	281.1
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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

High Resolution Temperature Calibration MAI-A.A 167

Field Calibration on 14-NOV-2012,09:17

	Measured	Calibrated(Deg F)
Lower	1.00	33.80
Upper	11.00	51.80

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 16-DEC-2012,13:35

Pre-filter Length 11

Induction Calibration MAI-A.A 167

Base Calibration on 14-NOV-2012,09:21

Field Check on 11-FEB-2013 15:14

Base Calibration

Test Loop Calibration		Measured	Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			12.0	3841.9
2			29.3	3480.1
3			28.9	3056.0
4			19.7	2083.8
Deep			18.5	2051.0
Medium			42.1	3995.1
Shallow			42.5	5058.6

Array Temperature 57.2 Deg F

Induction Constants MAI-A.A 167

Last Edited on 13-FEB-2013,19:59

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	

Caliper Calibration MPD-B 64

Base Calibration on 11-FEB-2013 15:56
Field Calibration on 11-FEB-2013 15:58

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13724	3.99
2	22114	5.98
3	30659	7.97
4	39003	9.86
5	48418	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	5.97	5.98

Photo Density Calibration MPD-B 64

Base Calibration on 24-JAN-2013 11:06
Field Check on 11-FEB-2013 15:27

Density Calibration					
Base Calibration		Measured		Calibrated (sdu)	
		Near	Far	Near	Far
Reference 1	59480	32613	59556	30836	
Reference 2	24916	2887	24941	2541	
Field Check at Base					
	1175.4	1365.7			
Field Check					
	1173.0	1354.8			
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background	213	1048			
Reference 1	22414	59275	0.381	0.371	
Reference 2	6747	24782	0.275	0.272	
Field Check at Base					
	212.8	1048.1			
Field Check					
	213.5	1044.8			

Density Constants MPD-B 64

Last Edited on 14-FEB-2013,01:07

Density Source Id	18235B	
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	1.12	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	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss 1-22\Grand Mesa Breit-Hoss 1-22_001.dta

Compact Comms Gamma
MCG-B 34 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

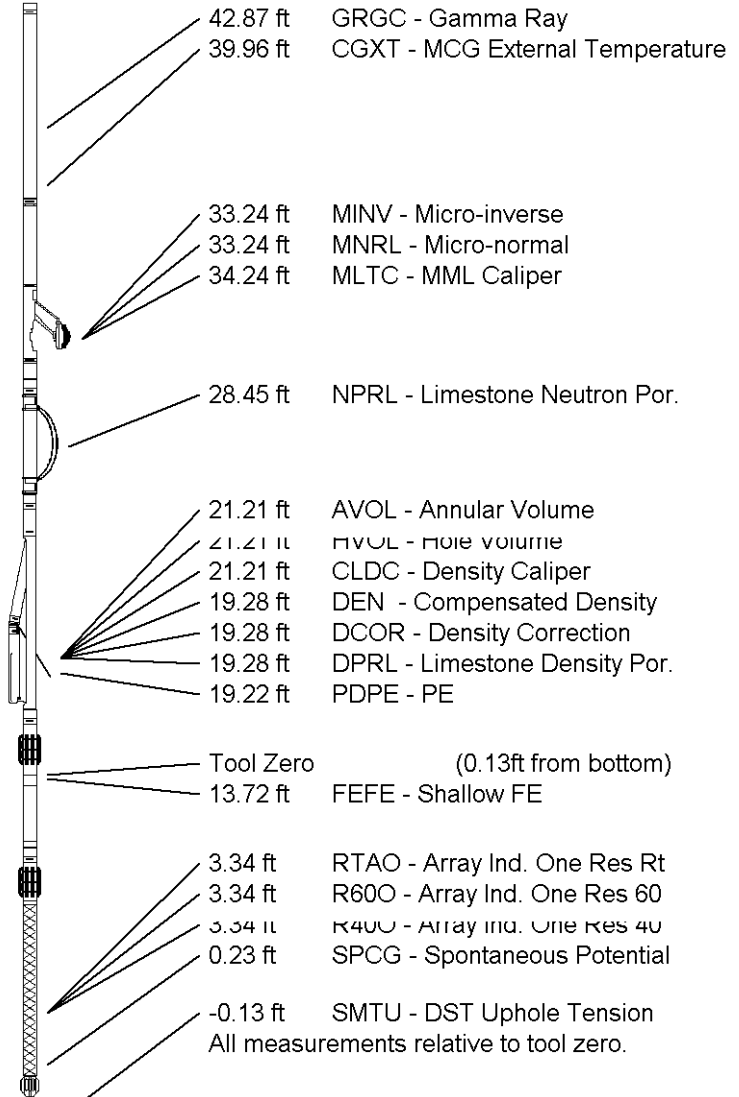
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

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

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: 48.16 ft Weight: 383.6 lb



COMPANY	GRAND MESA OPERATING COMPANY
WELL	BREIT-HOSS #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	NESS
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2239.00	feet	First Reading	4467.00	feet
Elevation Drill Floor	2238.00	feet	Depth Driller	4470.00	feet
Elevation Ground Level	2234.00	feet	Depth Logger	4470.00	feet



Weatherford®

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

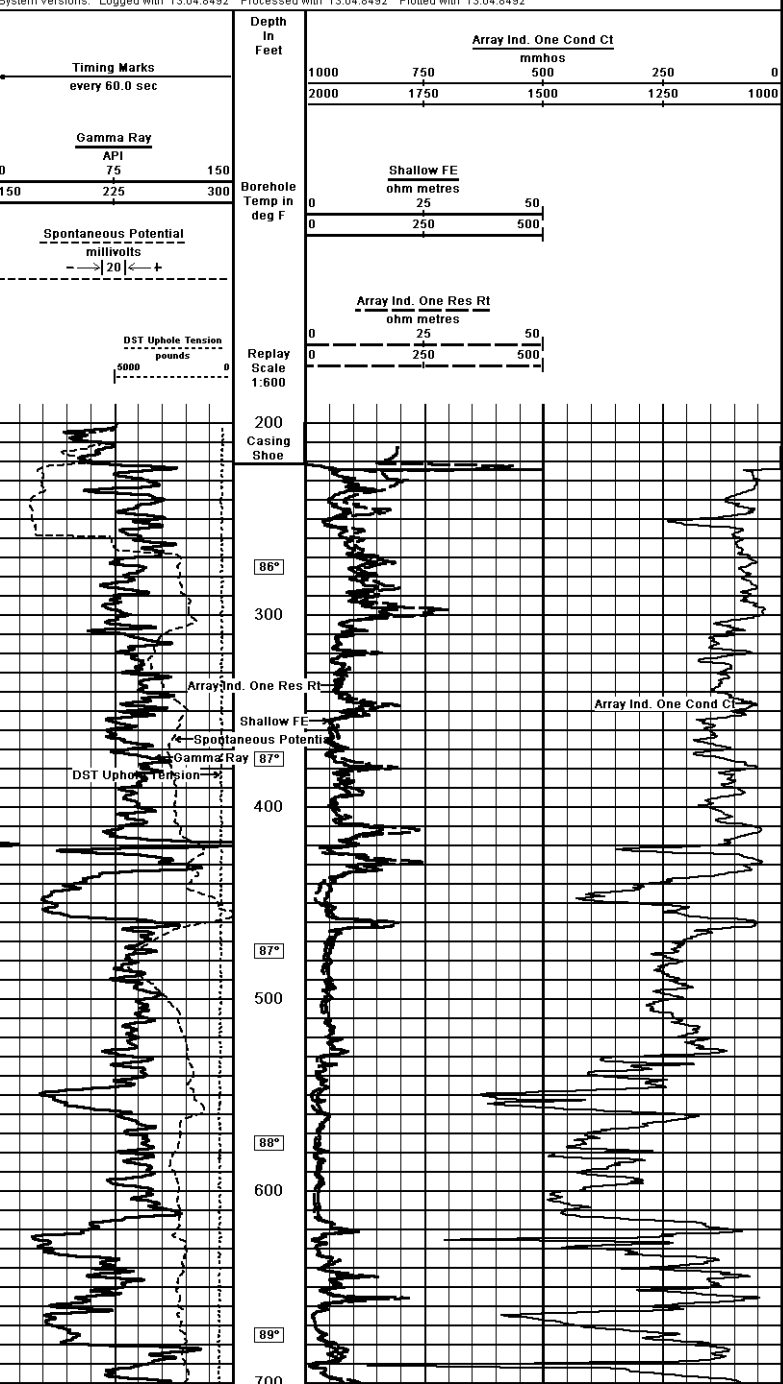
Weatherford
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

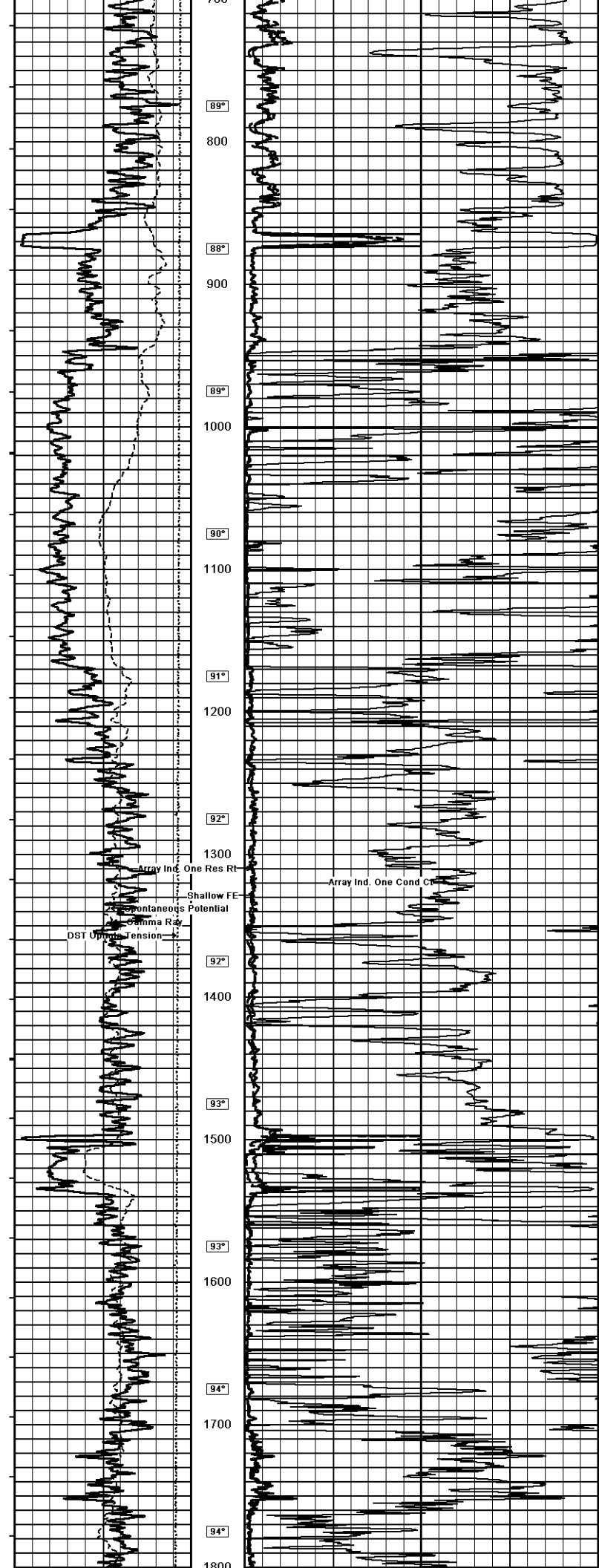
COMPANY: GRAND MESA OPERATING COMPANY
 WELL: BREIT-HOSS #1-22
 FIELD: WILDCAT
 PROVINCE/COUNTY: NESS
 COUNTRY/STATE: U.S.A. / KANSAS
 LOCATION: 118' FSL & 1952' FEL
 SW SE SW SE

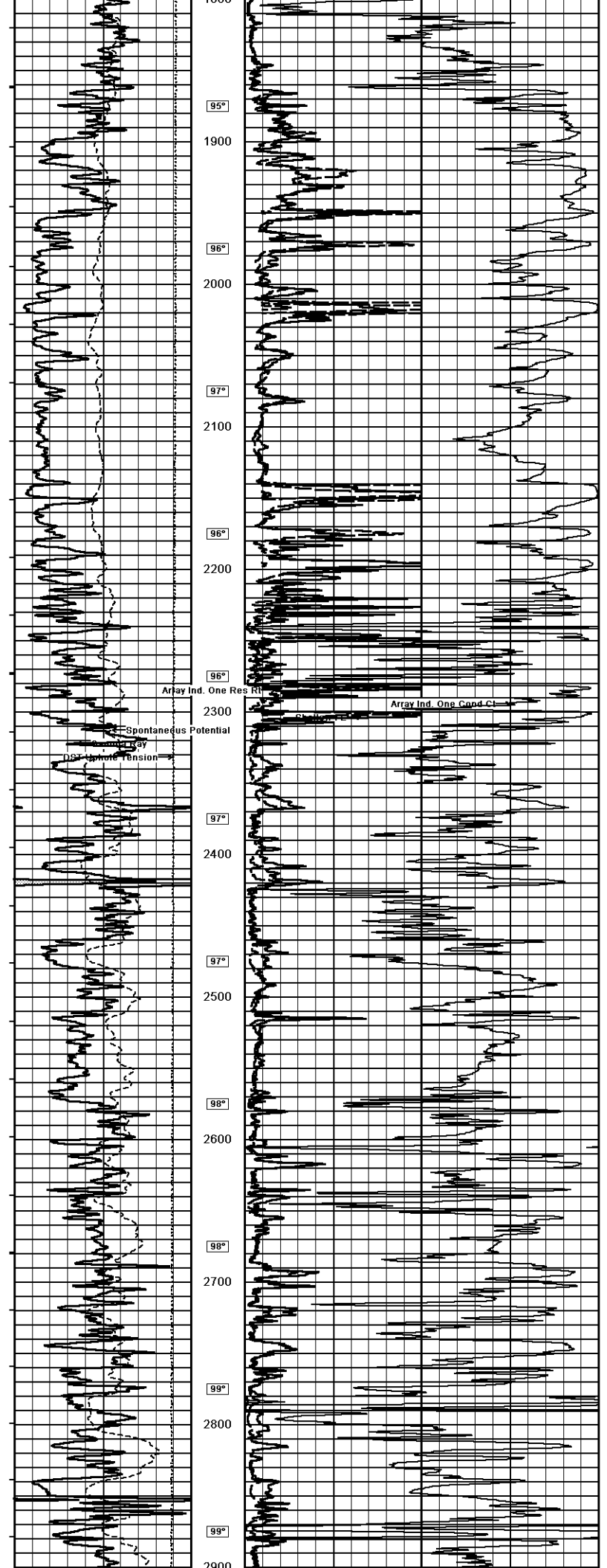
SEC: Type 22
 195
 123W
 154135-25330
 Job Number: 154135-25330
 Operator Services
 MFL/DOWNH
 MML

Permanent Datum Q.L., Elevation 2234 feet
 Log Measured From KB
 Drilling Measured From K.B.
 Date: 14-FEB-2013
 Run Number: ONE
 Service Order: 3238970
 Depth Driller: 4470.00 feet
 Depth Logger: 4467.00 feet
 First Reading: 221.00 feet
 Last Reading: 221.00 feet
 Casing Depth: 221.00 feet
 Bit Size: 7.875 inches
 Hole Fluid Type: CHEMICAL
 Density/Viscosity: 9.30 lbm/sg 48.00 lbm/sg
 PH/Fluid Loss: 10.50 10.50
 Sample Source: FLOWLINE
 Rim @ Measured Temp: 0.68 @ 87.0 ohm-m
 Rim @ Measured Temp: 0.68 @ 87.0 ohm-m
 Rim @ Measured Temp: 1.02 @ 87.0 ohm-m
 Source Rmtf/Rmc: CALC
 Rim @ BHT: 0.68 @ 89.0 ohm-m
 Time Since Circulation: 4 HOURS
 Max Recorded Temp: 109.00 deg F
 Equipment Base: 13006
 Logged by: LYNN SCOTT
 Recorded by: JOHN GUDSMITH
 Witnessed by: JOHN GUDSMITH
 JOB#: LB132405

1 INCH MAIN
 Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 14-FEB-2013 01:20
 Filename: C:\Minimus 13.04.8492\Data\Grand Mesa Breit-Hoss 1-22\Grand Mesa Breit-Hoss 1-22_002.dta
 Recorded on 13-FEB-2013 23:15
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492





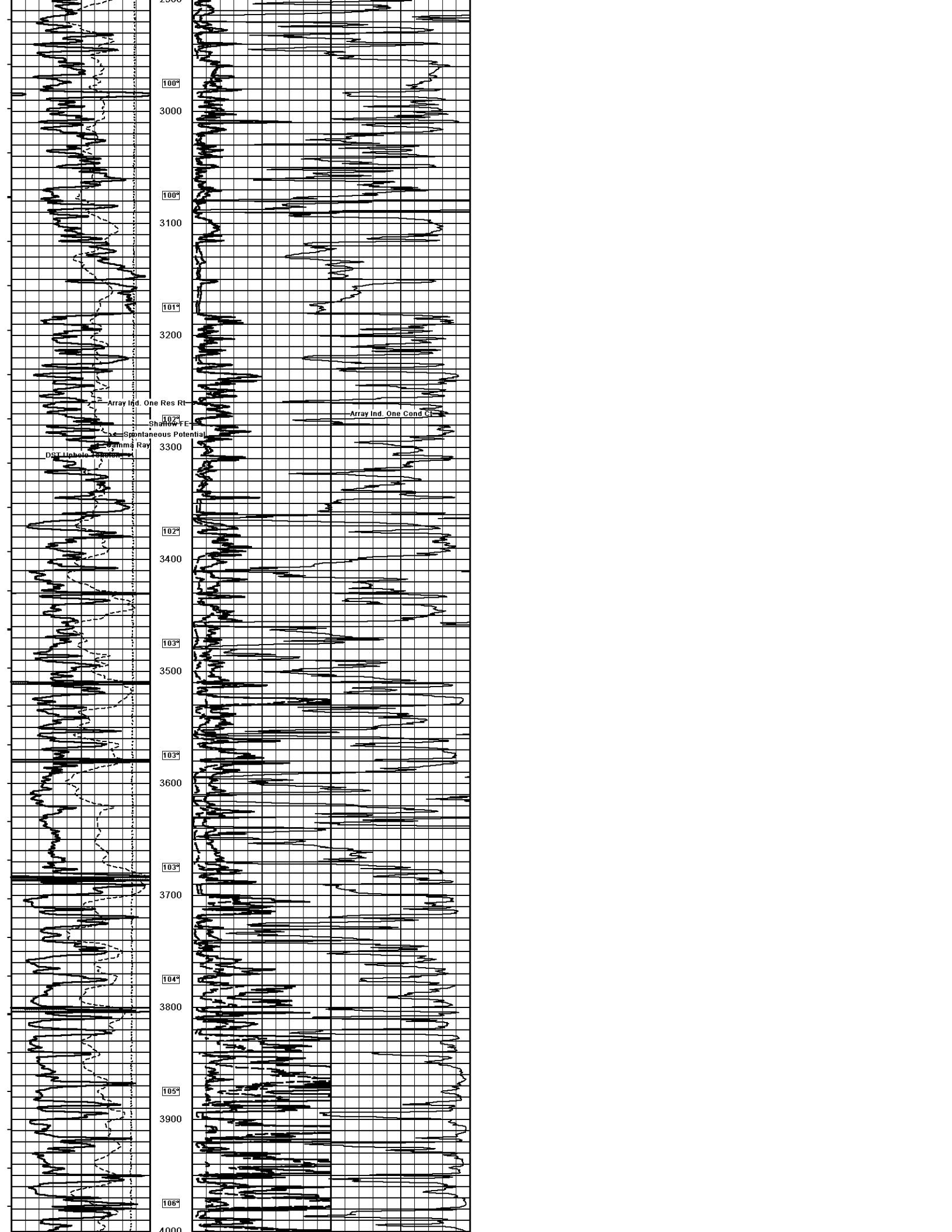


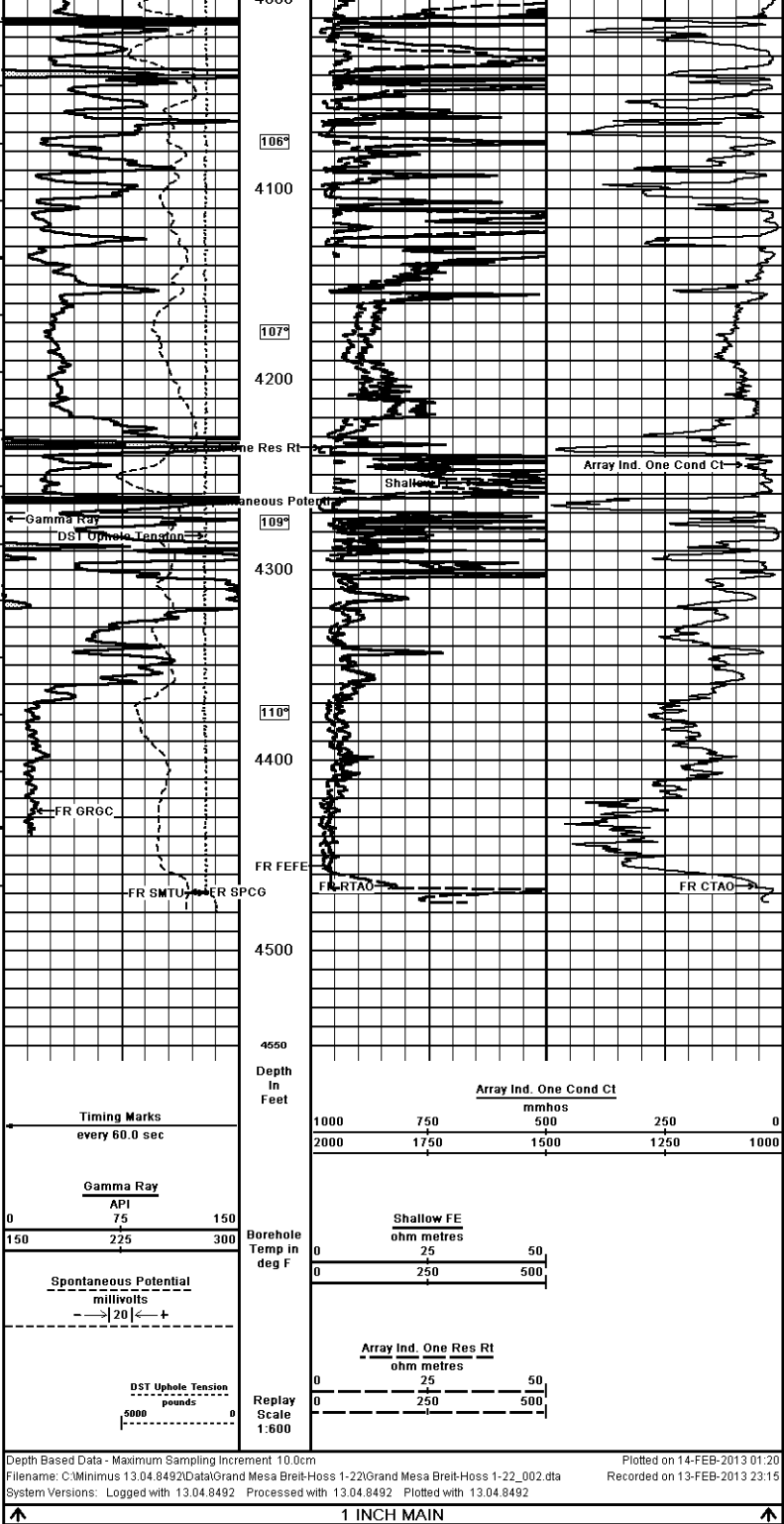
Array Ind. One Res Rt


Array Ind. One Cond Ct

Spontaneous Potential

DSI (pore tension)





COMPANY	GRAND MESA OPERATING COMPANY				
WELL	BREIT-HOSS #1-22				
FIELD	WILDCAT				
PROVINCE/COUNTY	NESS				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	2239.00	feet	First Reading	4467.00	feet
Elevation Drill Floor	2238.00	feet	Depth Driller	4470.00	feet
Elevation Ground Level	2234.00	feet	Depth Logger	4470.00	feet
 Weatherford					
ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG					