



Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY					M&M EXPLORATION, INC.				
WELL					Z-BAR 27-9				
FIELD					AETNA				
PROVINCE/COUNTY					BARBER				
COUNTRY/STATE					U.S.A. / KANSAS				
LOCATION					2000' FSL & 600' FEL SE/4				
SEC 27	TWP 33S	RGE 15W	Other Services			MML			
Latitude	Longitude			MPD/MDN					
API Number			15-007-24149						
Permanent Datum GL, Elevation 1798 feet									
Log Measured From KB									
Drilling Measured From KB									
Date	19-APR-2014								
Run Number	ONE								
Service Order	4558-85106879								
Depth Driller	5150.00					feet			
Depth Logger	5154.00					feet			
First Reading	5151.00					feet			
Last Reading	294.00					feet			
Casing Driller	294.00					feet			
Casing Logger	294.00					feet			
Bit Size	7.875					inches			
Hole Fluid Type	CHEMICAL								
Density / Viscosity	9.00 lb/USg		40.00 CP						
PH / Fluid Loss	10.00		9.80 cc/30min						
Sample Source	FLOWLINE								
Rm @ Measured Temp	0.67 @ 89.0					ohm-m			
Rmf @ Measured Temp	0.54 @ 89.0					ohm-m			
Rmc @ Measured Temp	0.80 @ 89.0					ohm-m			
Source Rmf / Rmc	CALC		CALC						
Rm @ BHT	0.52 @115.0					ohm-m			
Time Since Circulation	5 HOURS								
Max Recorded Temp	115.00					deg F			
Equipment / Base	13057		LIB						
Recorded By	ADAM SILL								
Witnessed By	BILL BUSCH								
JOB#	LB14-120								

BOREHOLE RECORD					Last Edited: 19-APR-2014 08:19
Bit Size inches		Depth From feet		Depth To feet	
7.875		294.00		5150.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	294.00	24.00	

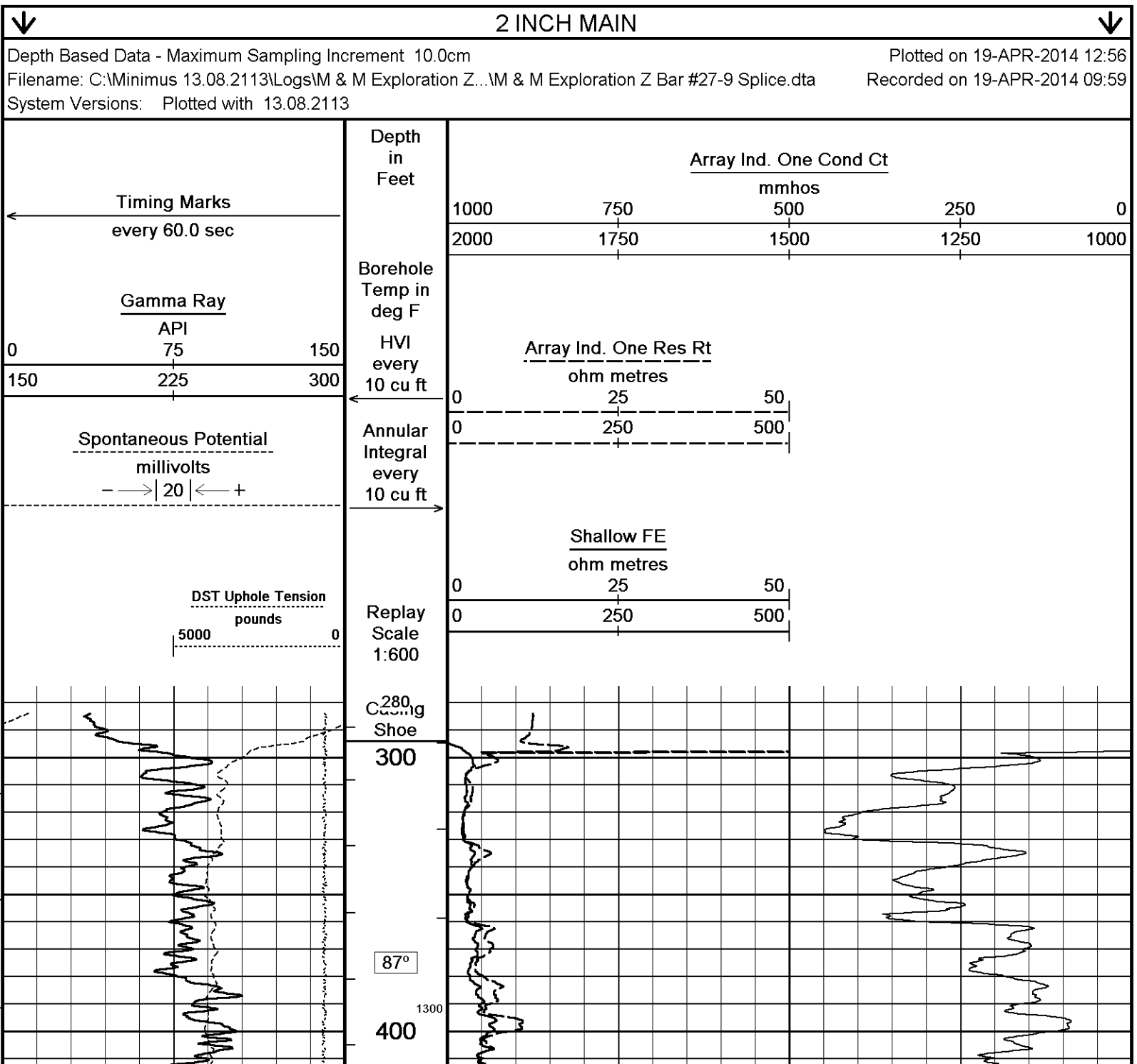
REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1868 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 4020 FEET: 245 CU.FT.
- RIG: HARDT #1

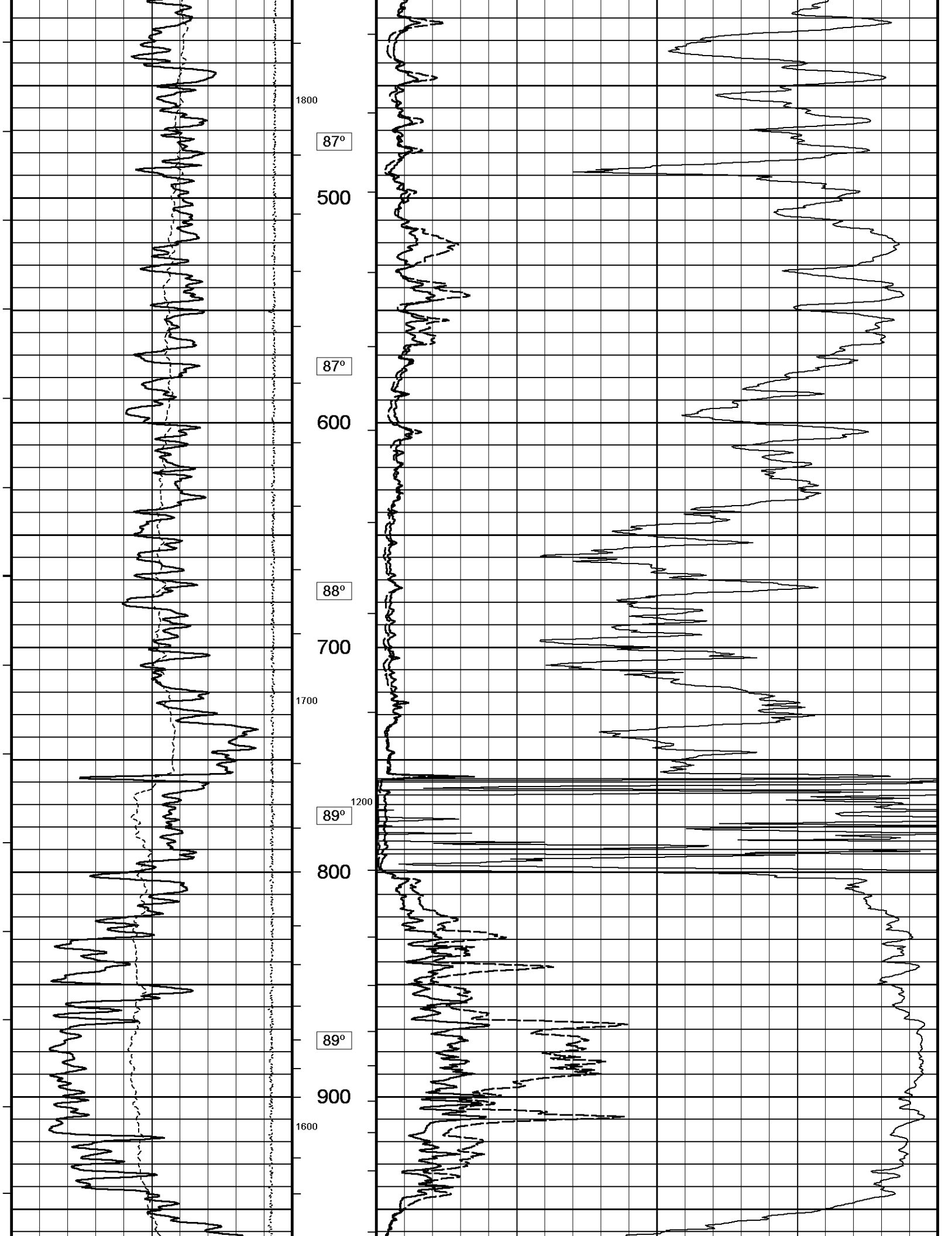
- RIG: HART 771

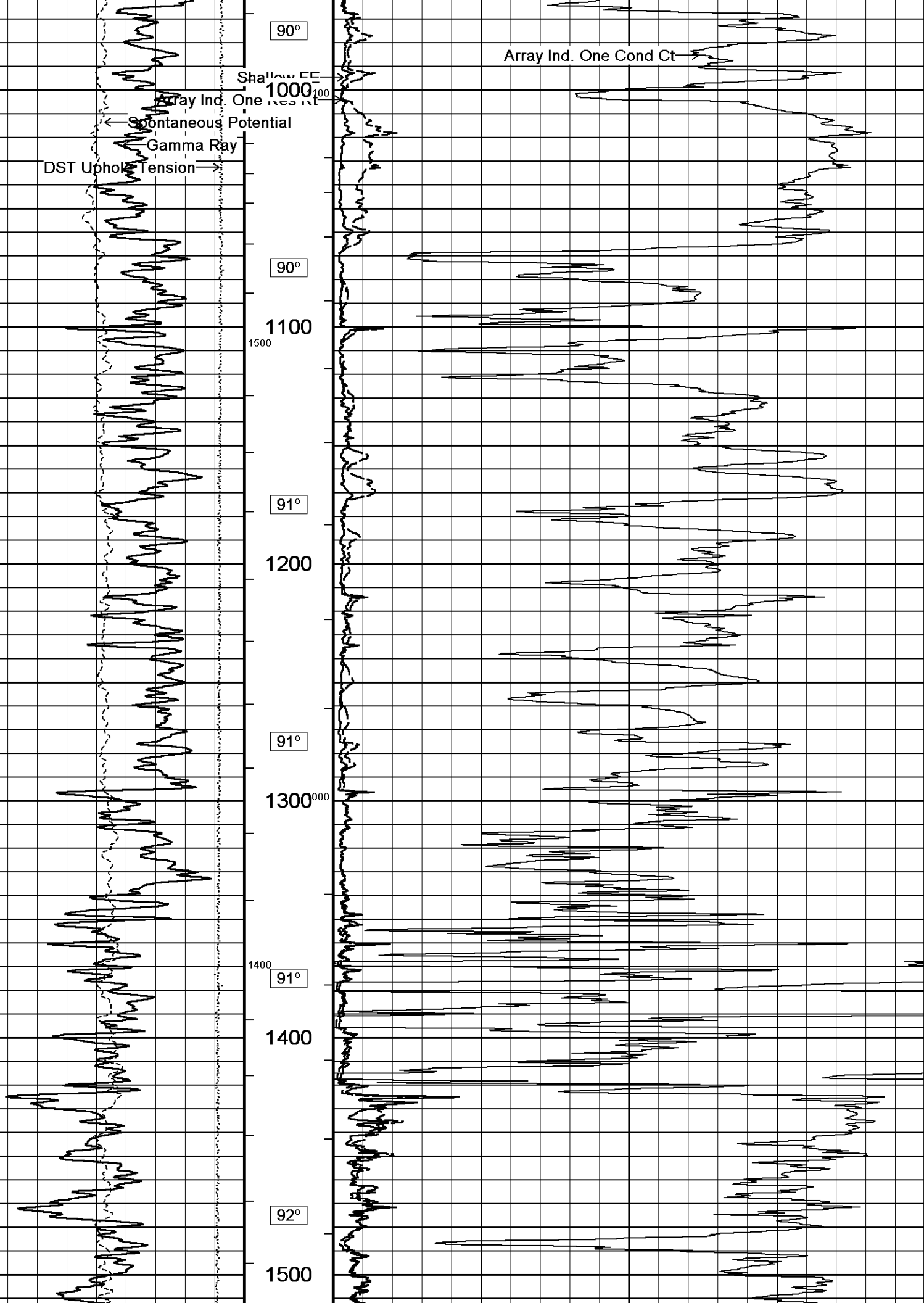
- ENGINEER: A. SILL

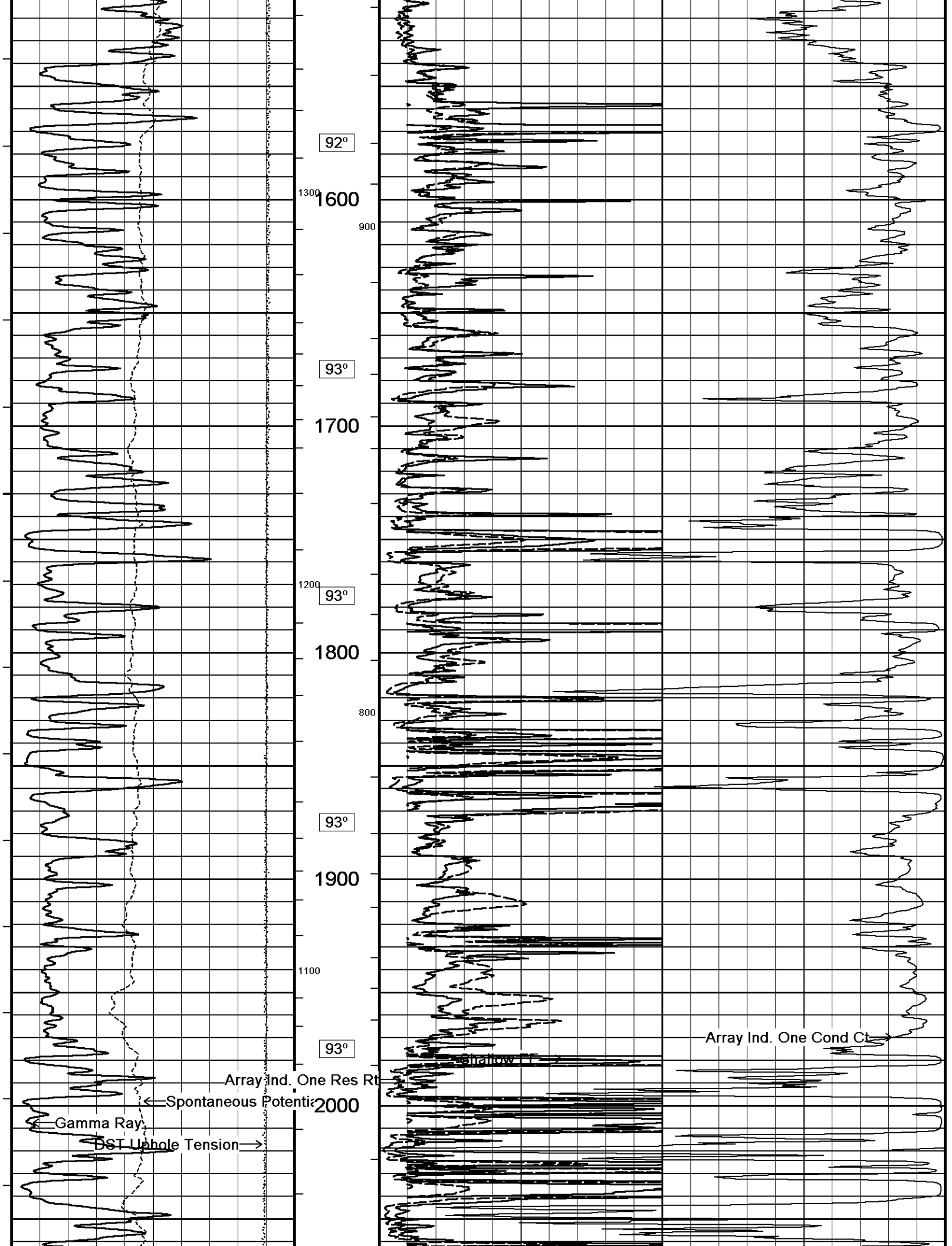
- OPERATOR(S): J. LaPOINT, N. ADAME

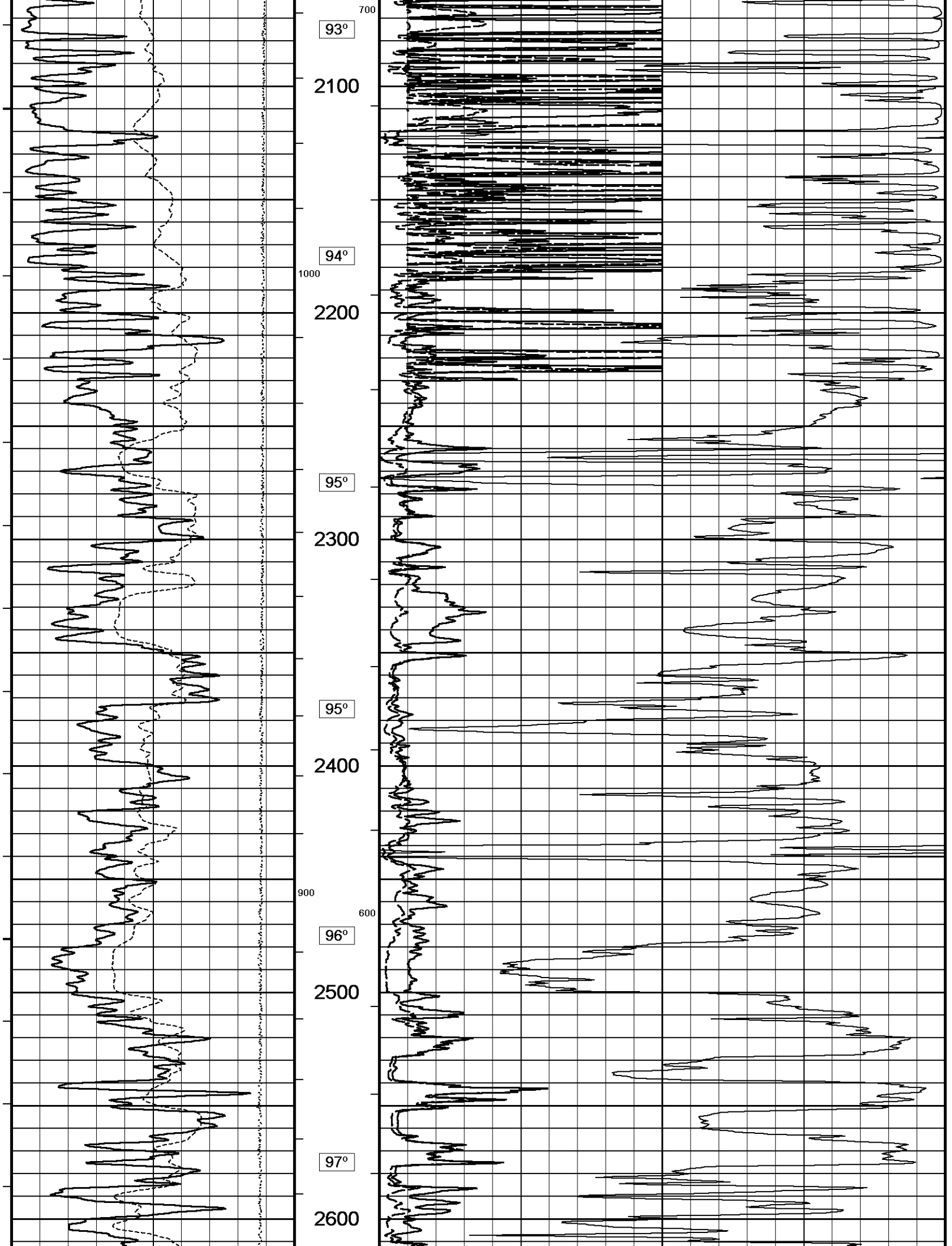
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

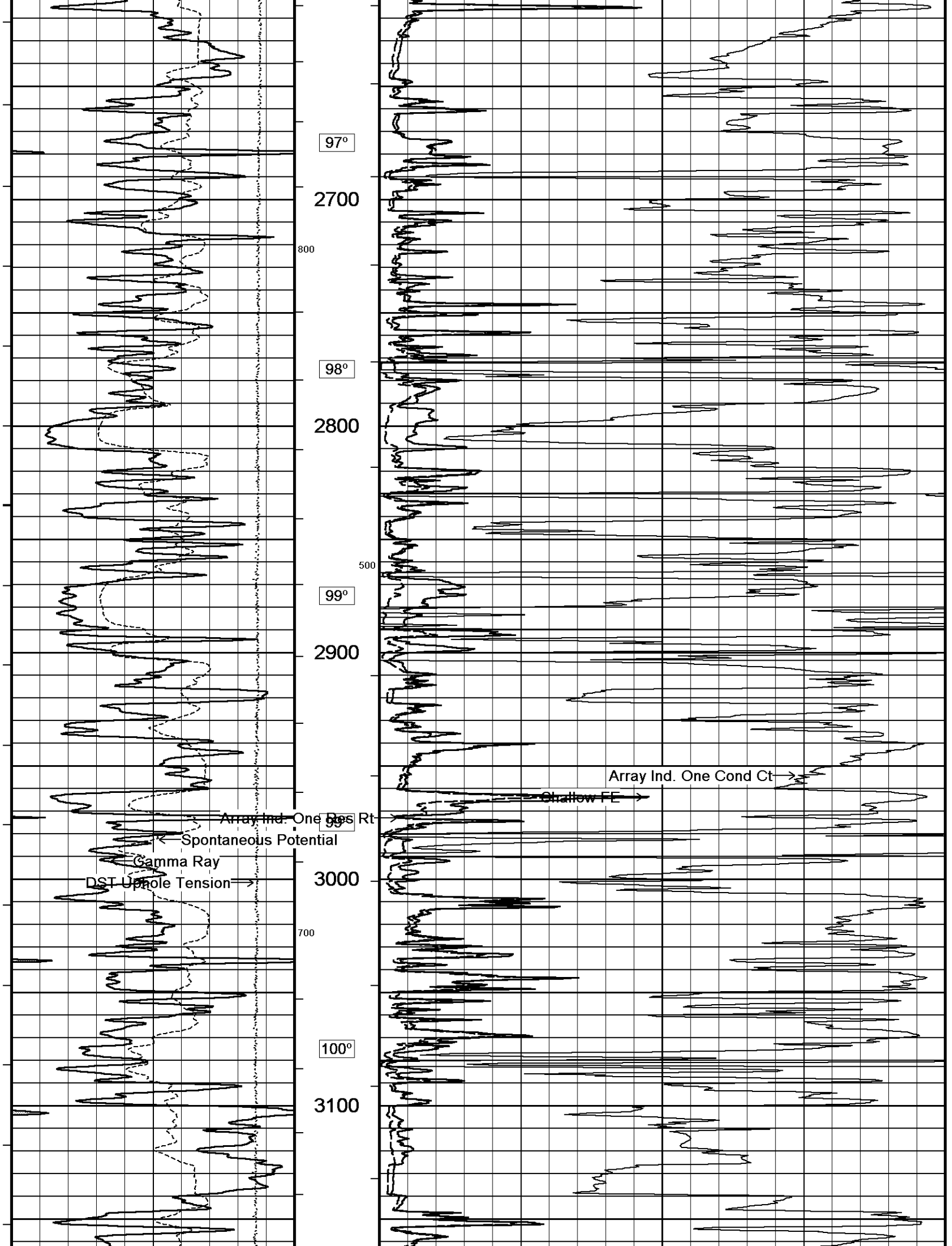


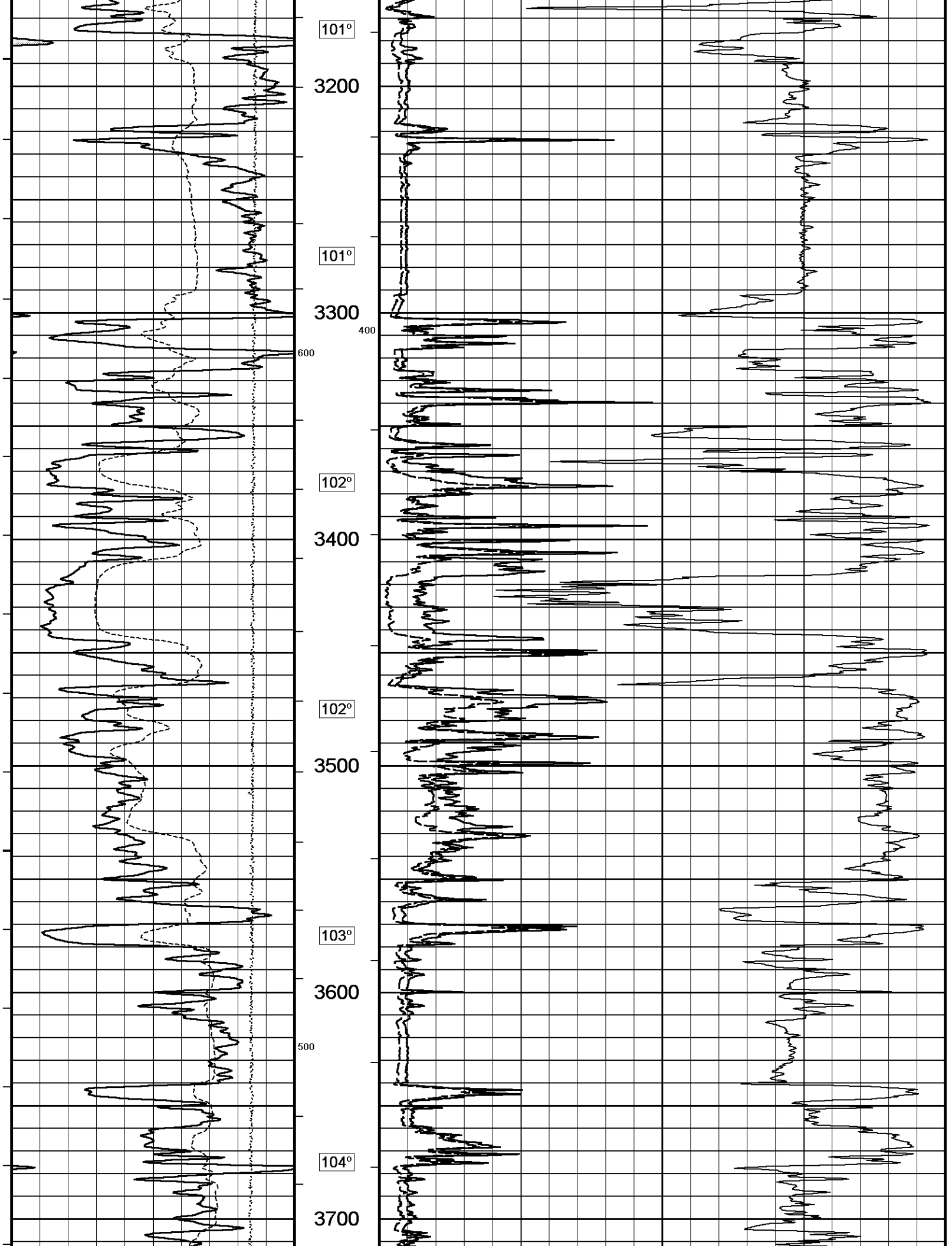


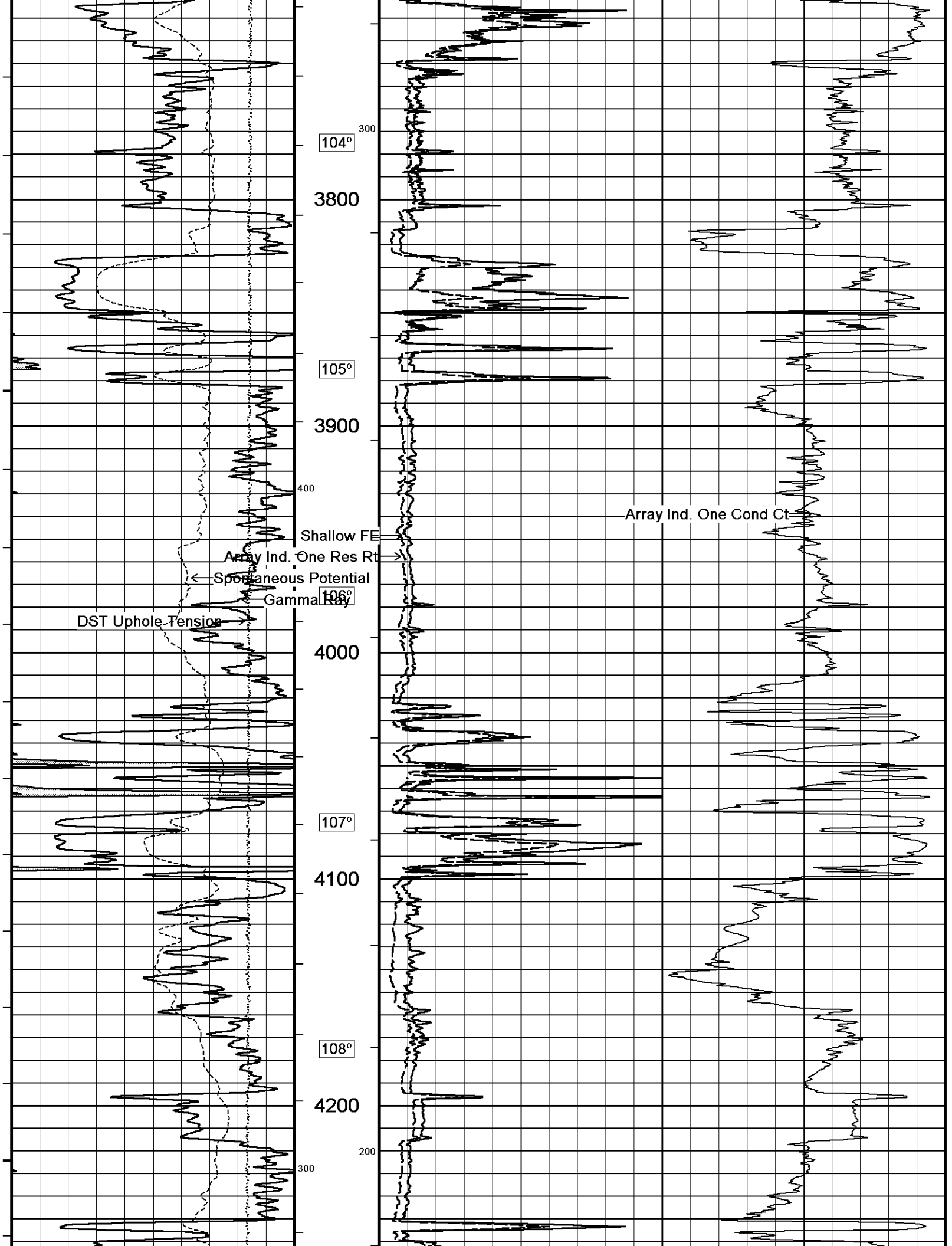


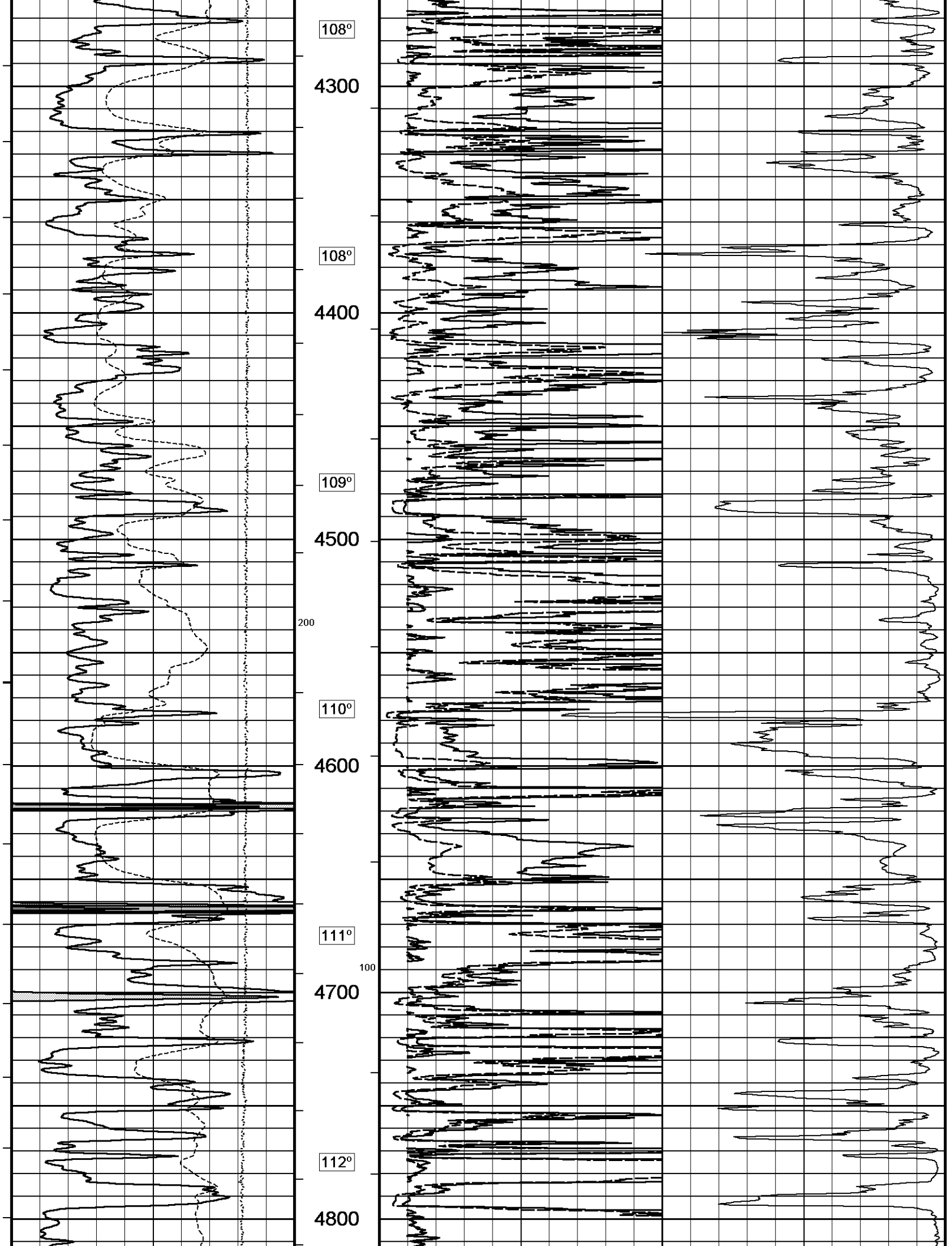


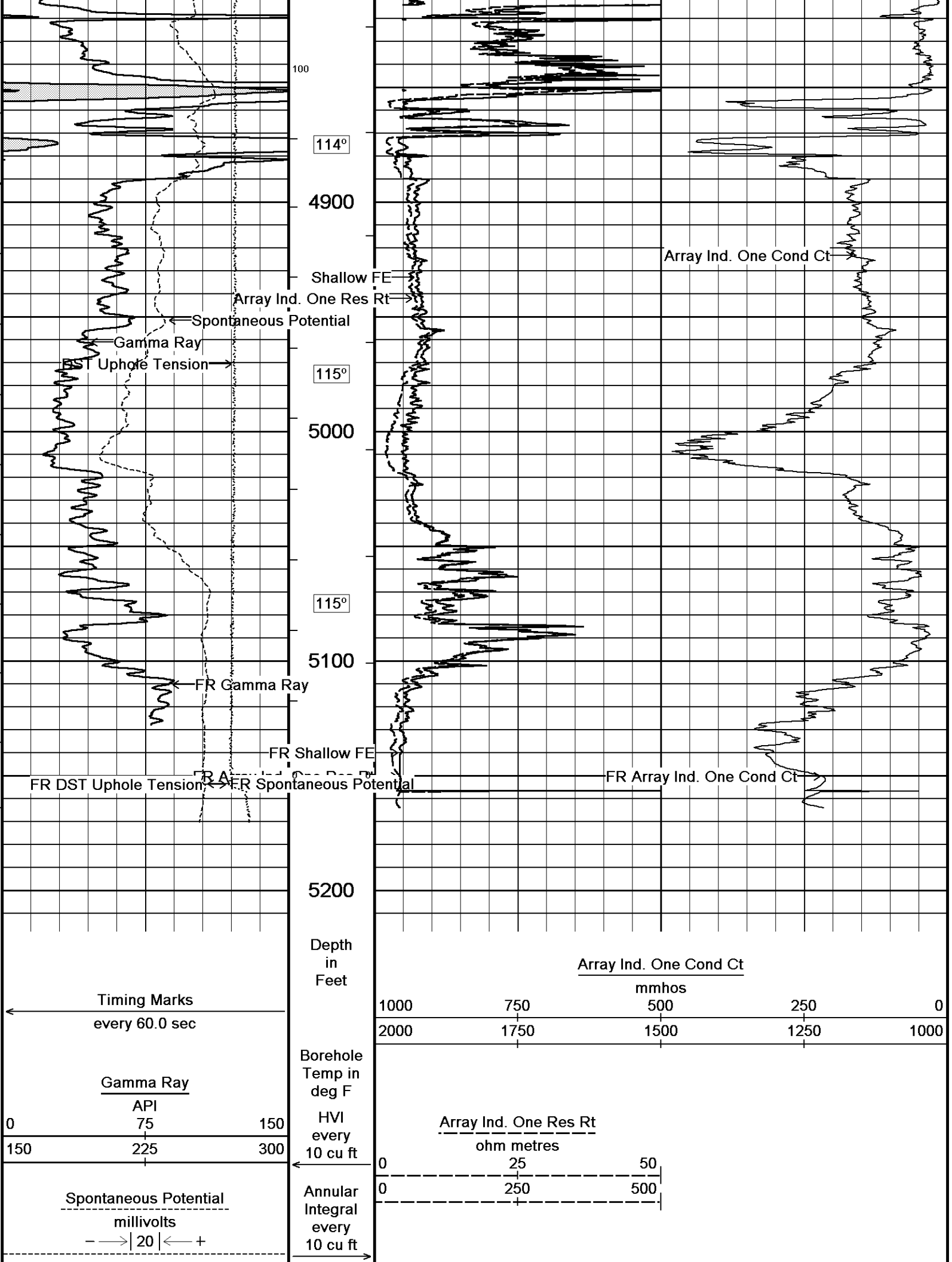


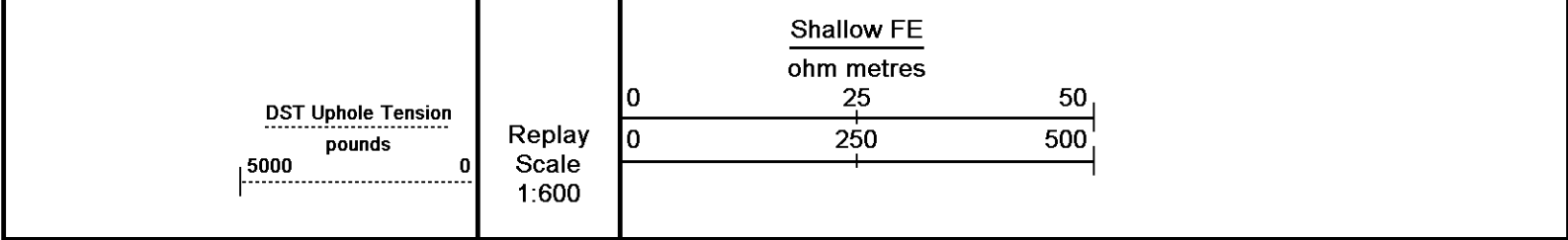












Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 19-APR-2014 12:56

Filename: C:\Minimus 13.08.2113\Logs\M & M Exploration Z...\M & M Exploration Z Bar #27-9 Splice.dta

Recorded on 19-APR-2014 09:59

System Versions: Plotted with 13.08.2113

↑

2 INCH MAIN

↑

↓

5 INCH MAIN

↓

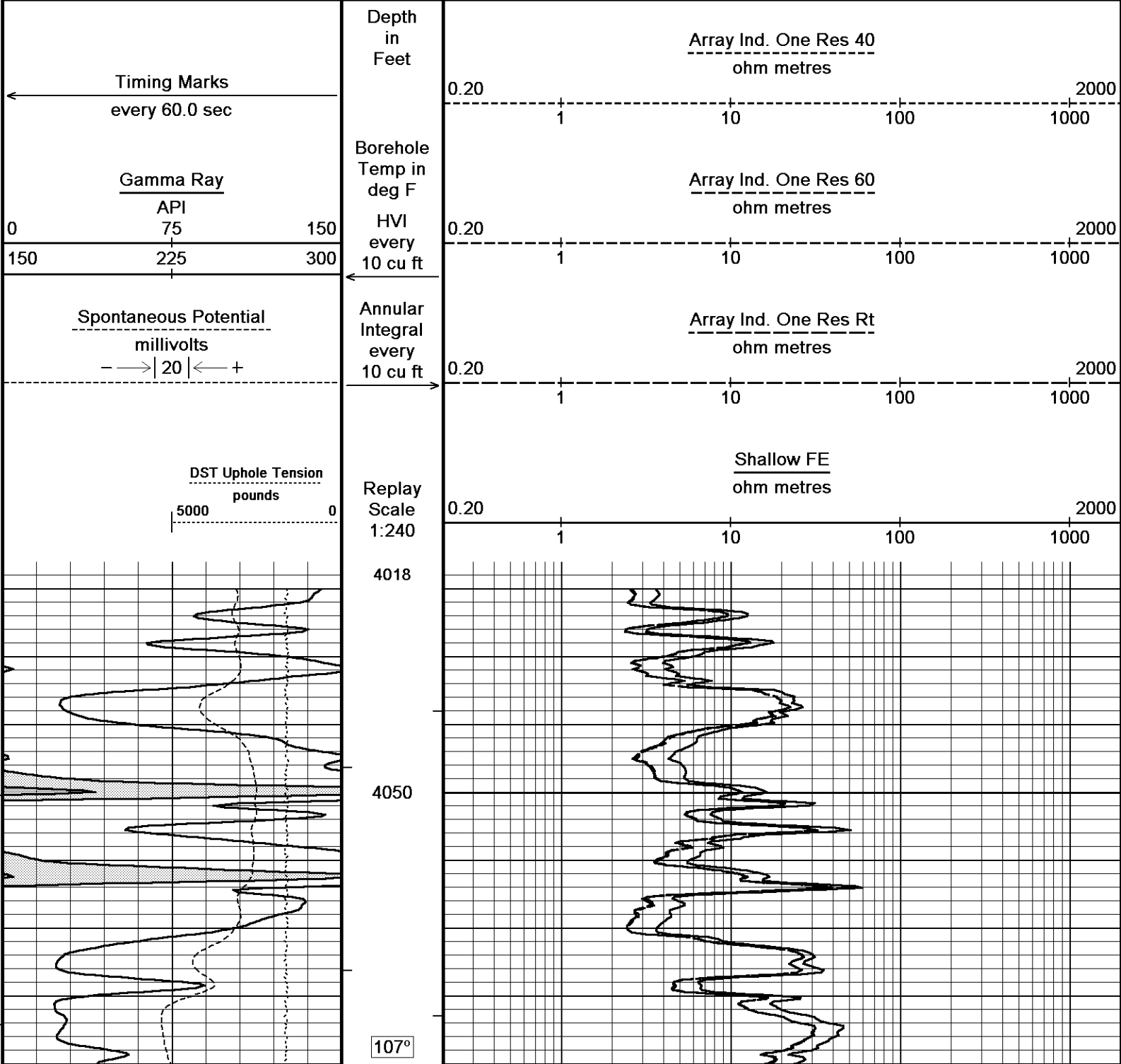
Depth Based Data - Maximum Sampling Increment 10.0cm

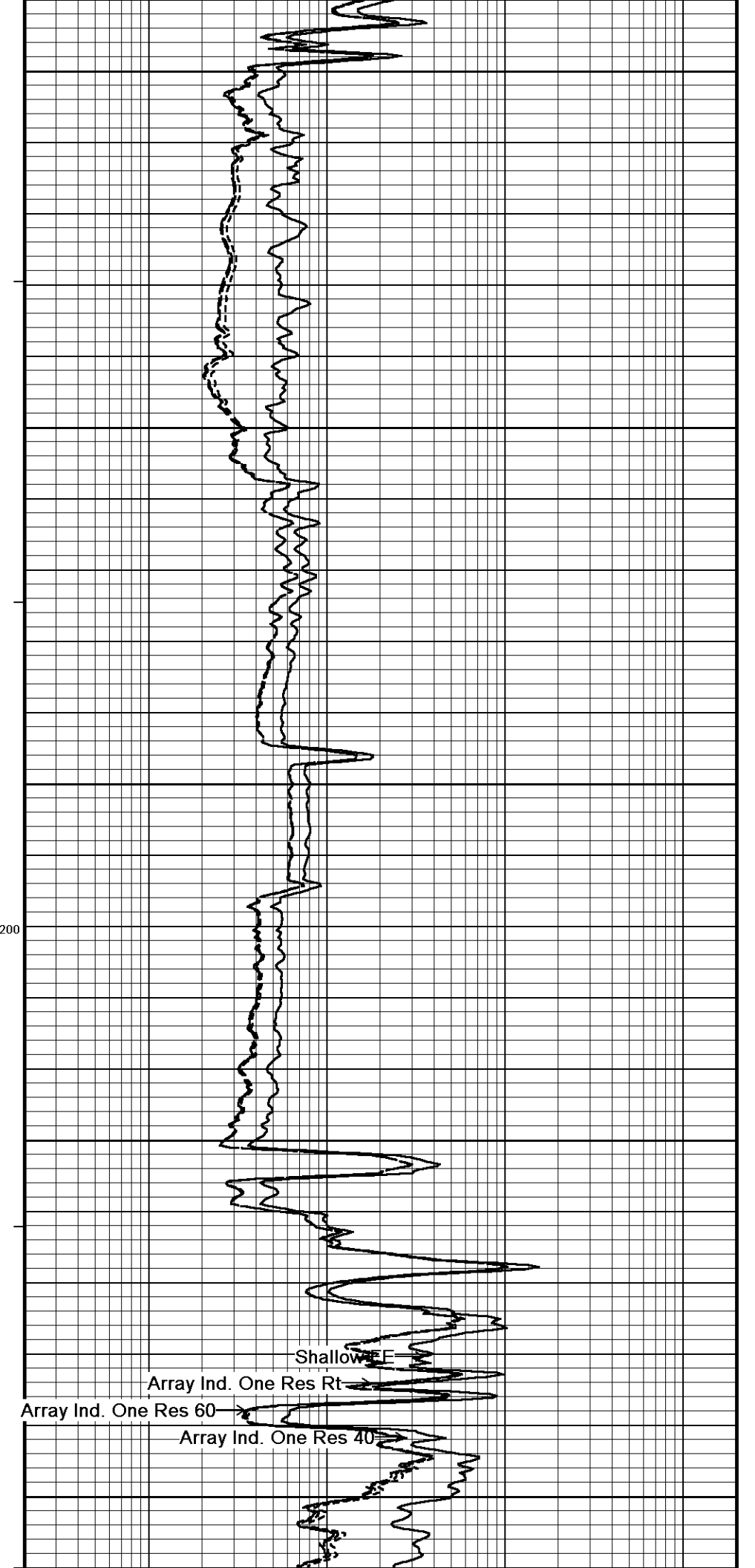
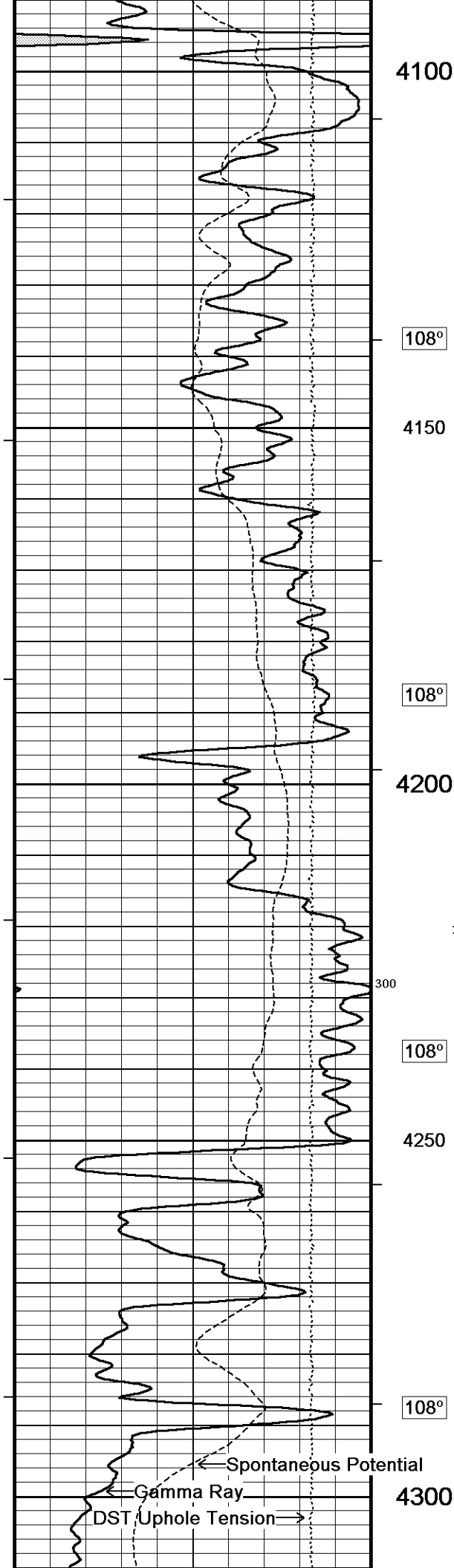
Plotted on 19-APR-2014 12:56

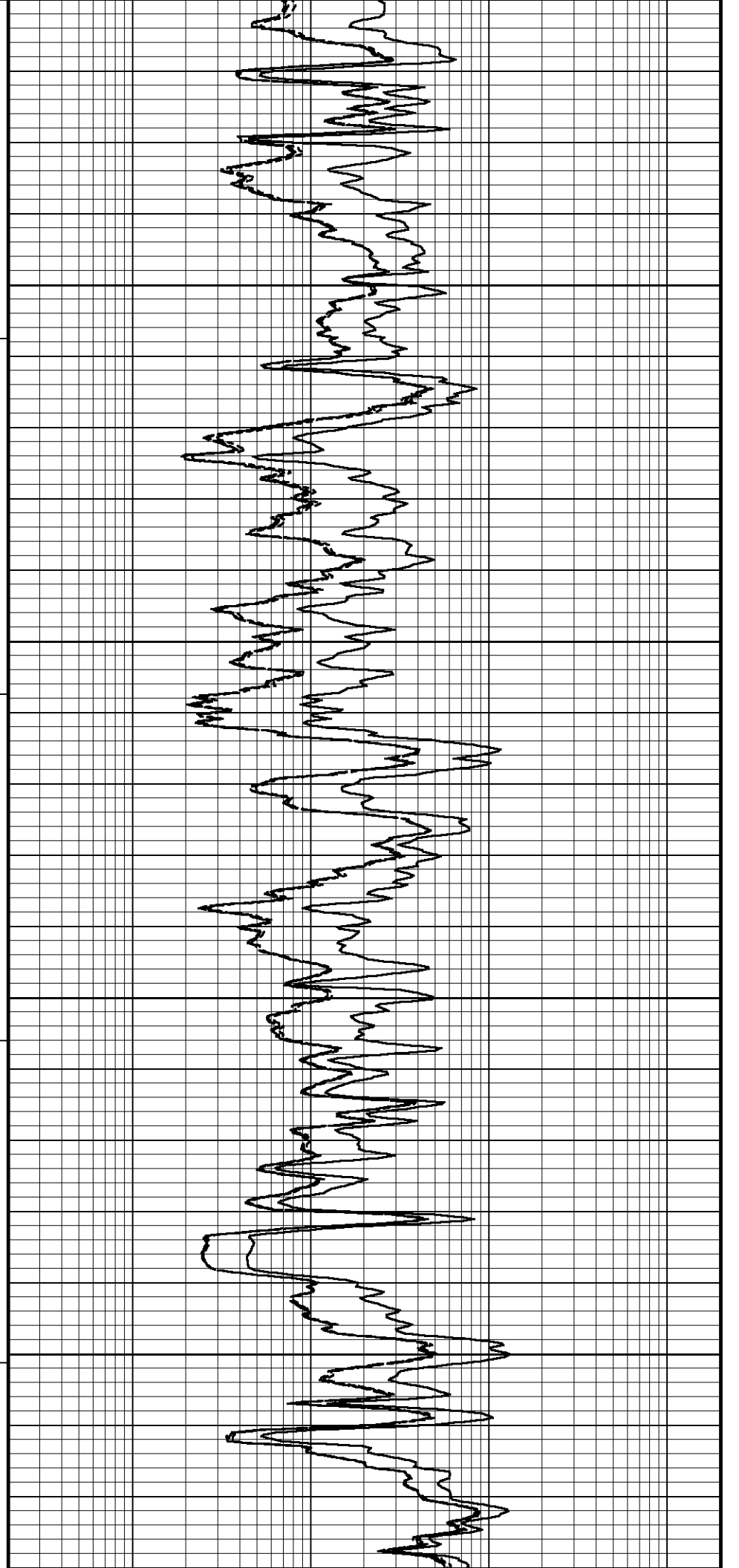
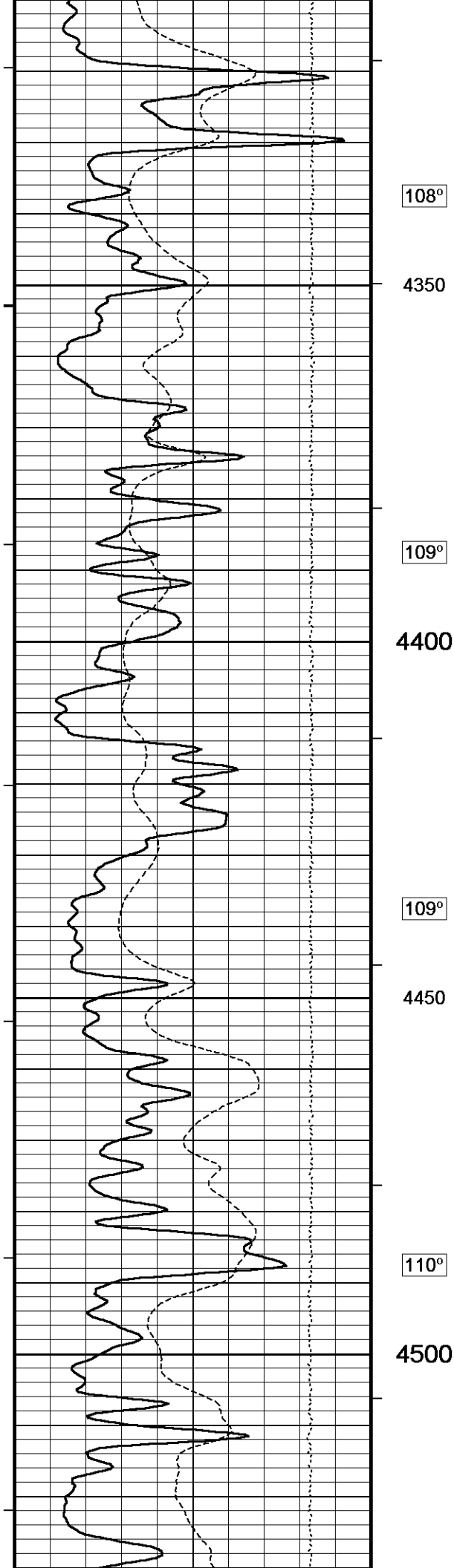
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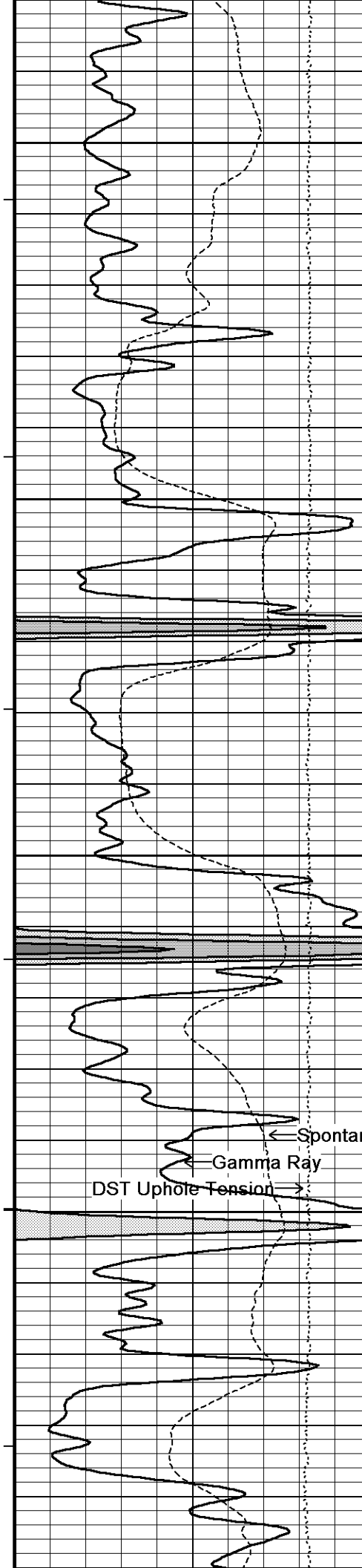
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System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

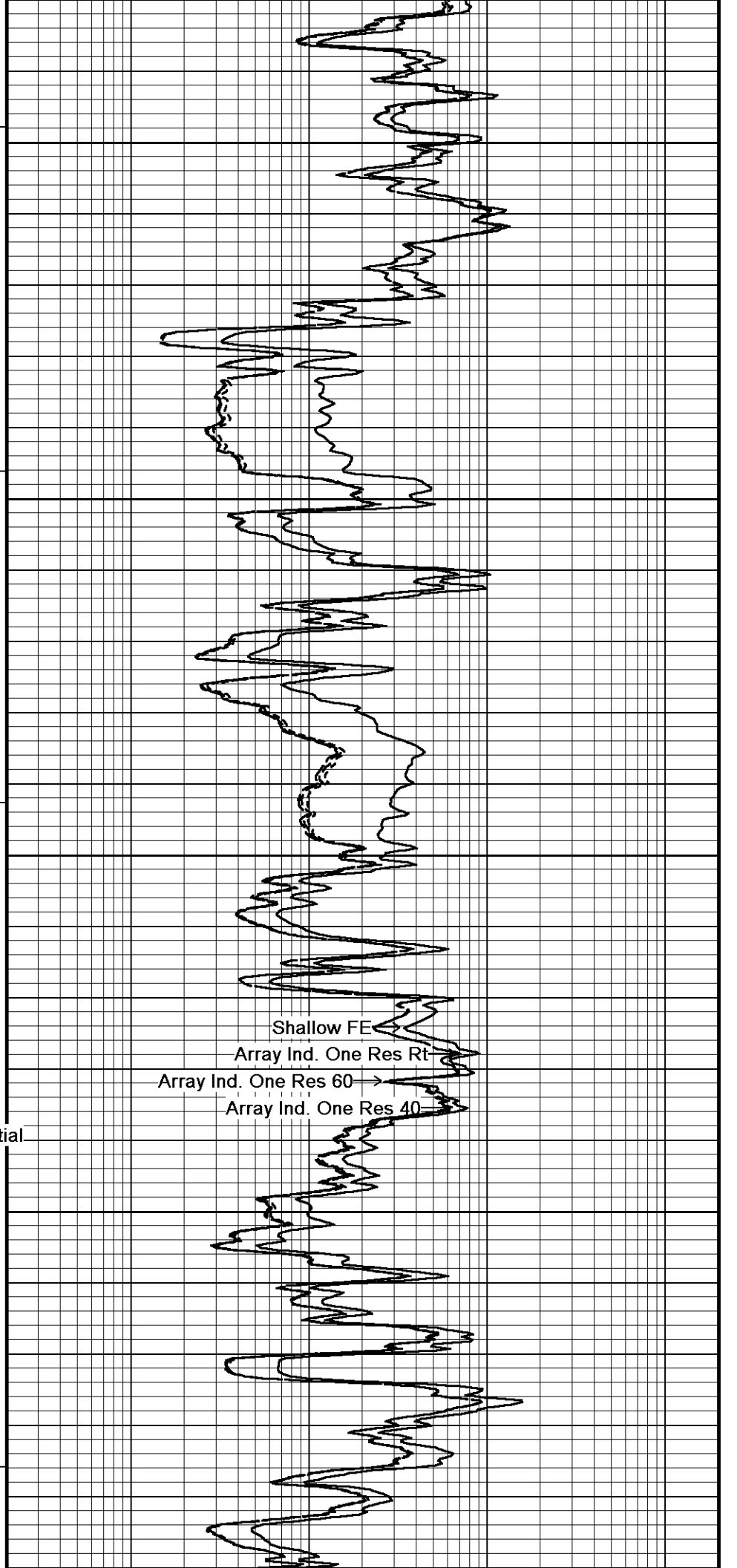




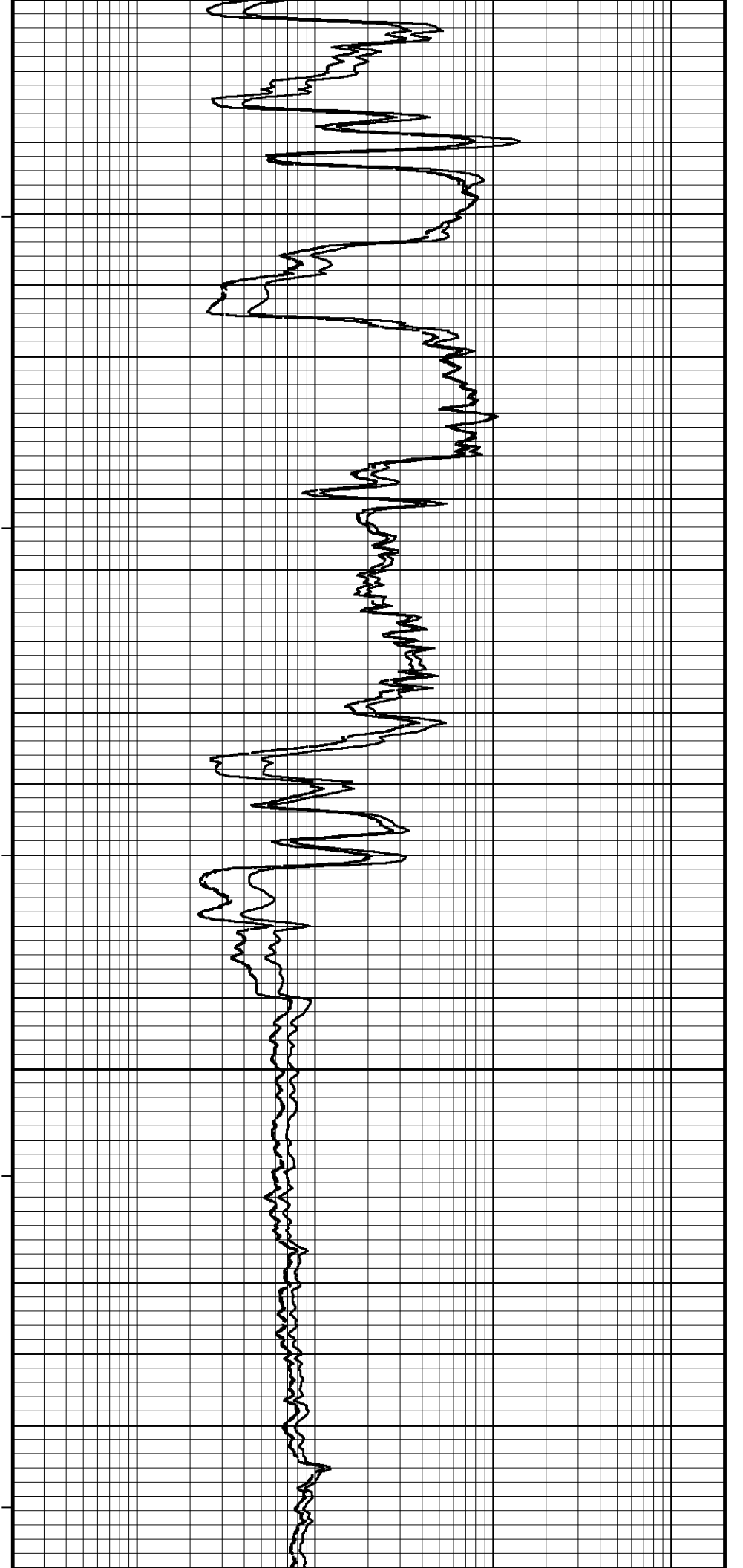
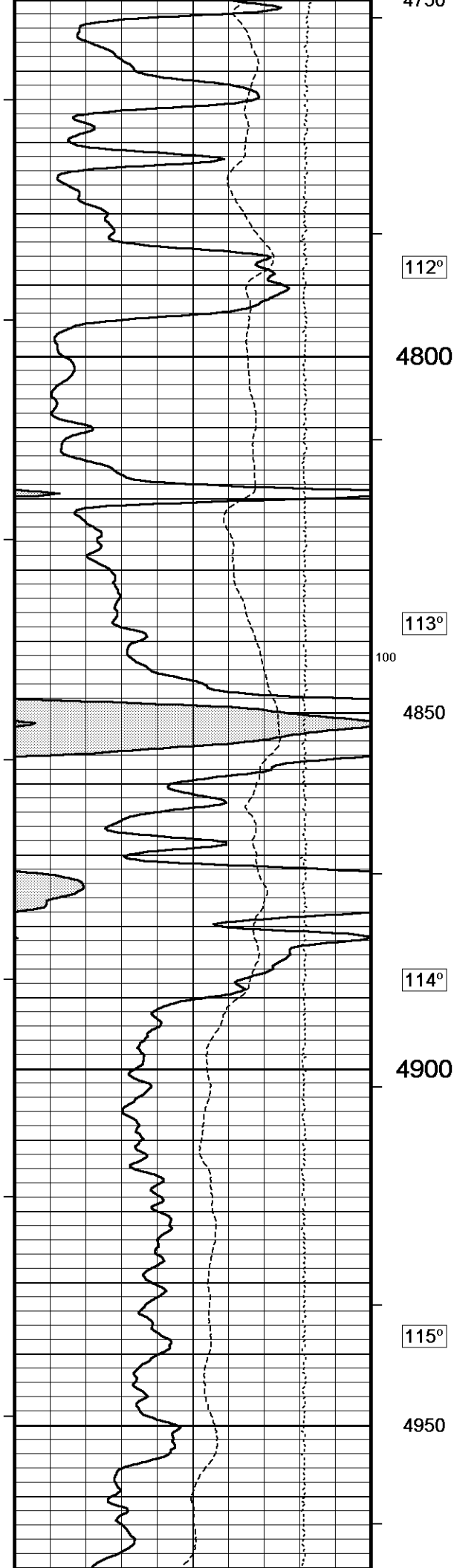


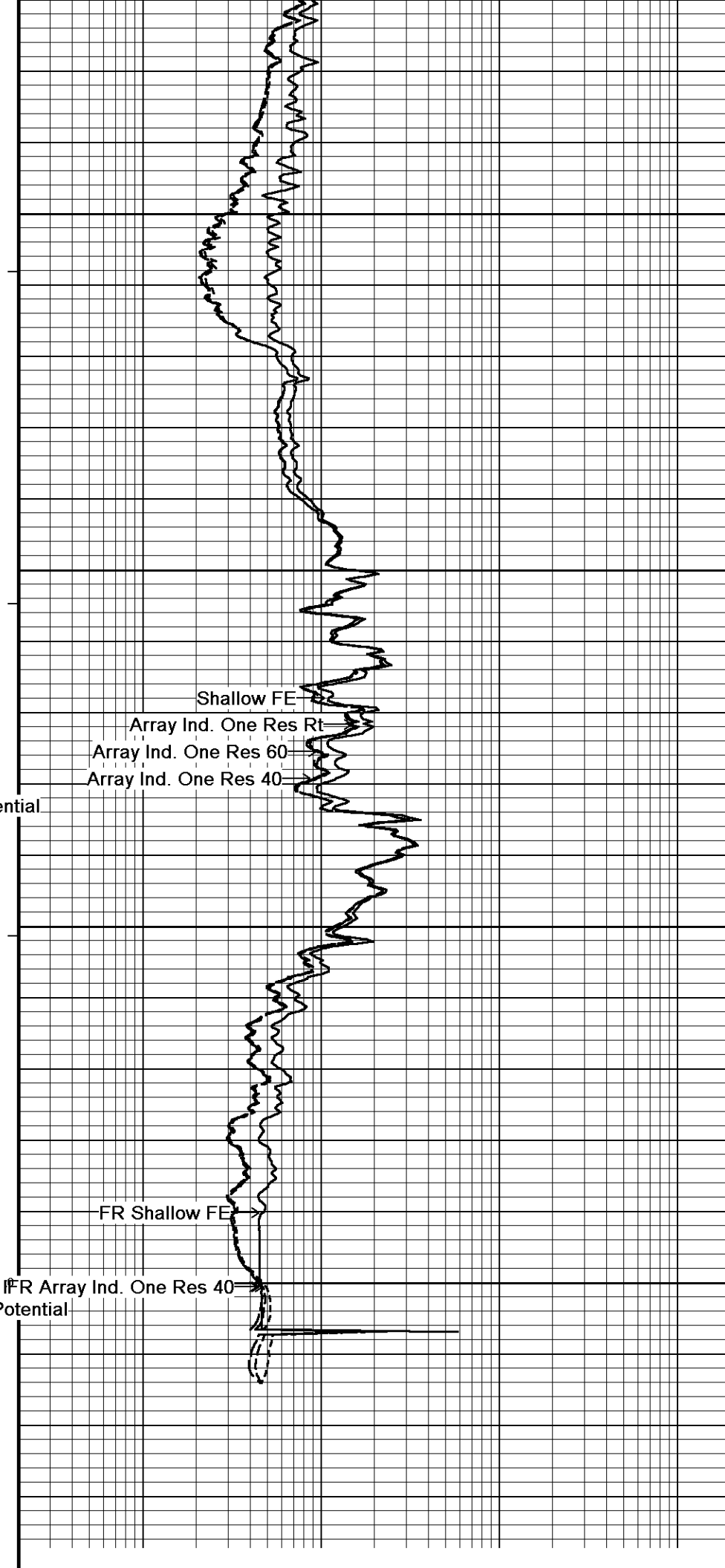
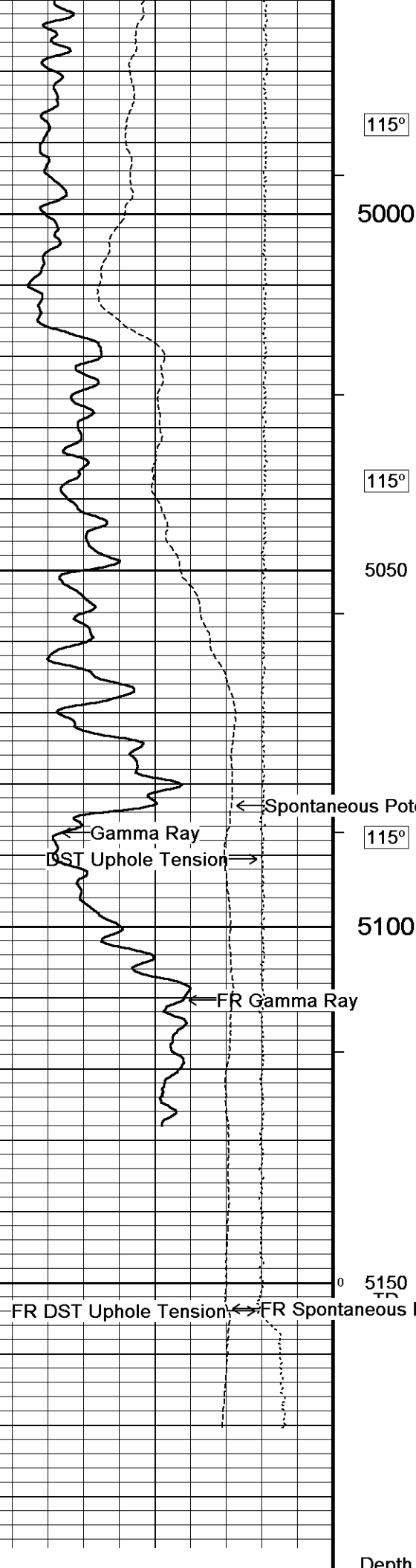


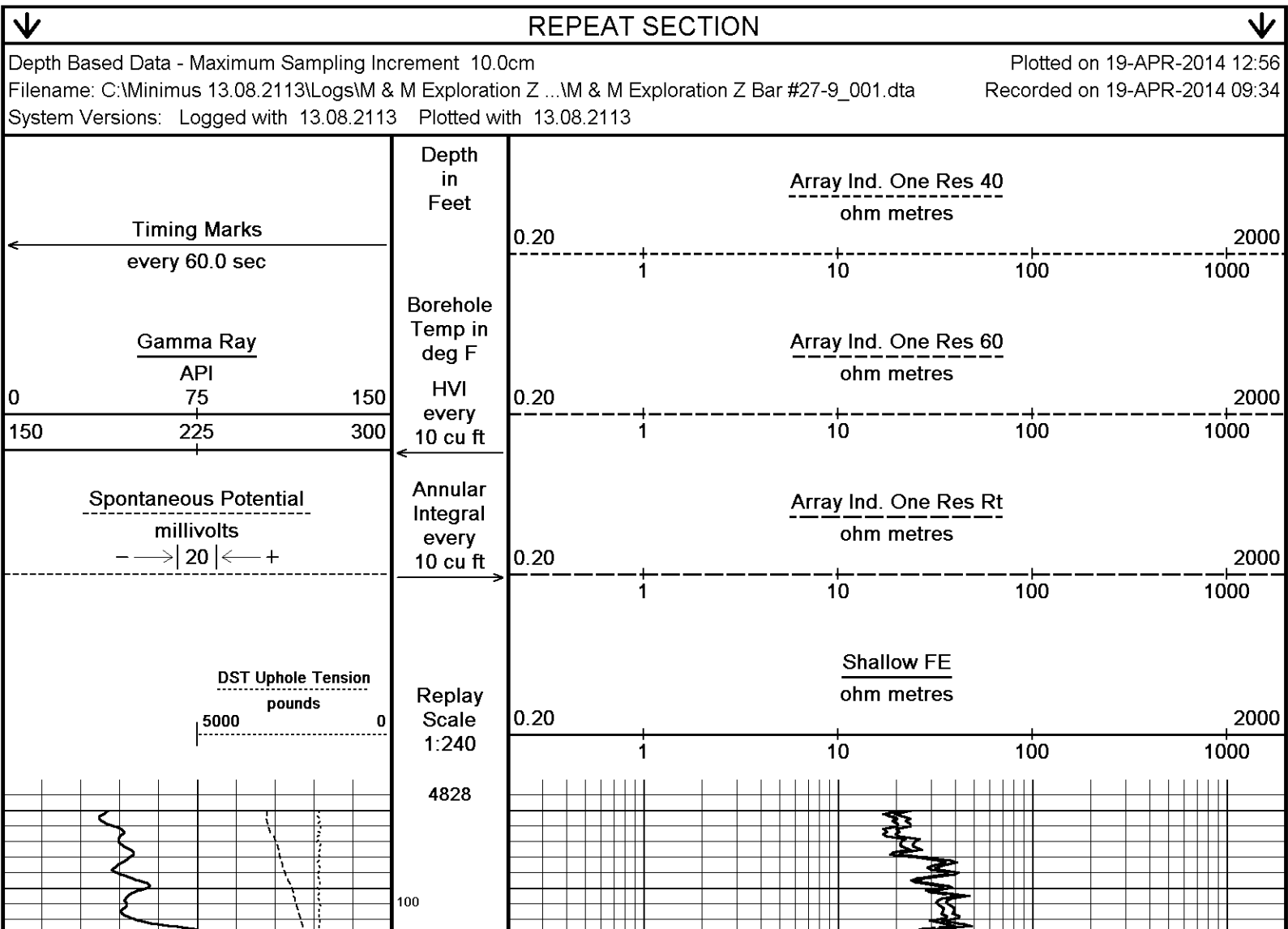
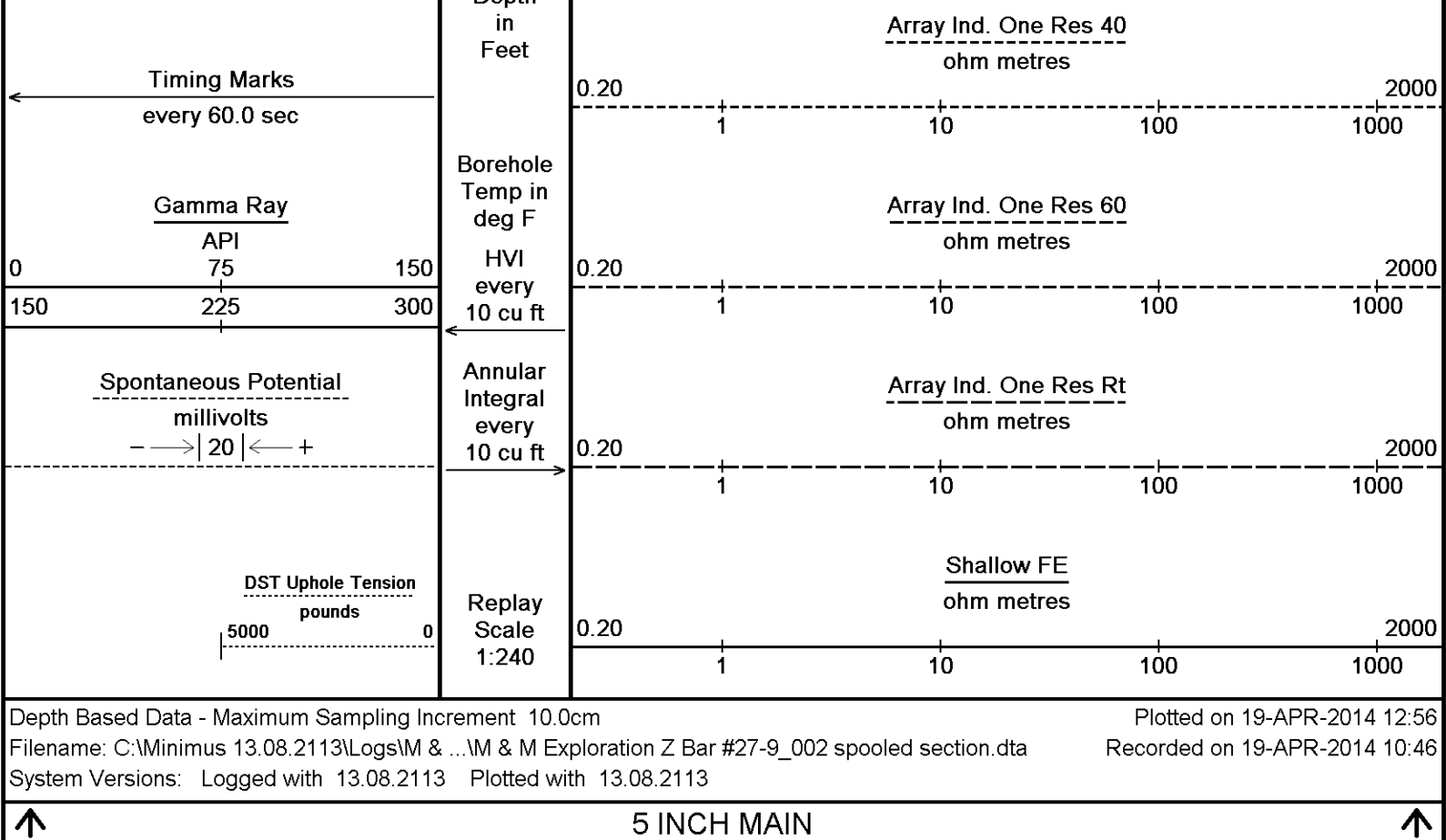
200 110°
4550
110°
4600
111°
4650
111°
4700
111°
4750

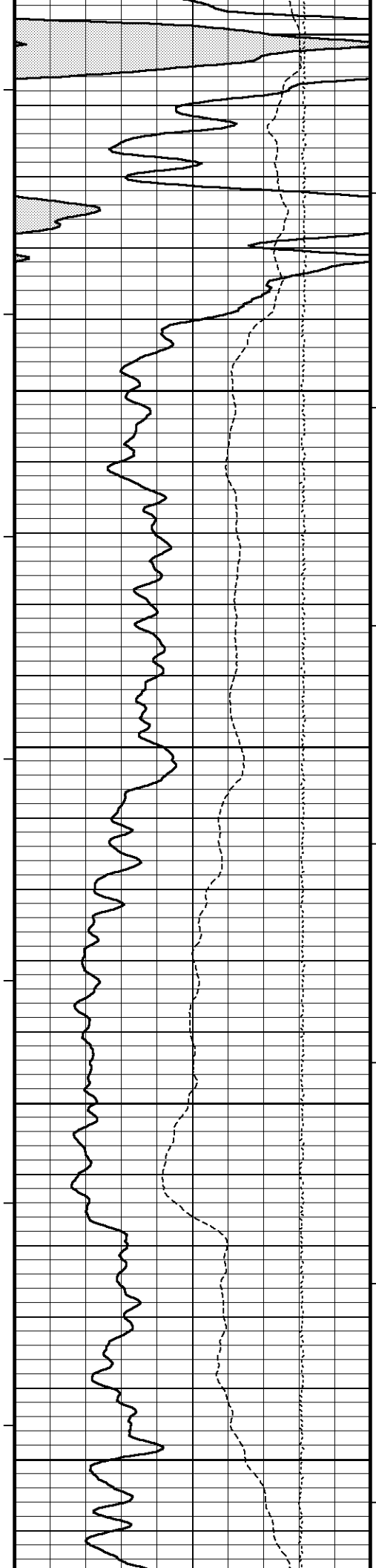


Shallow FE
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40









4850

113°

4900

114°

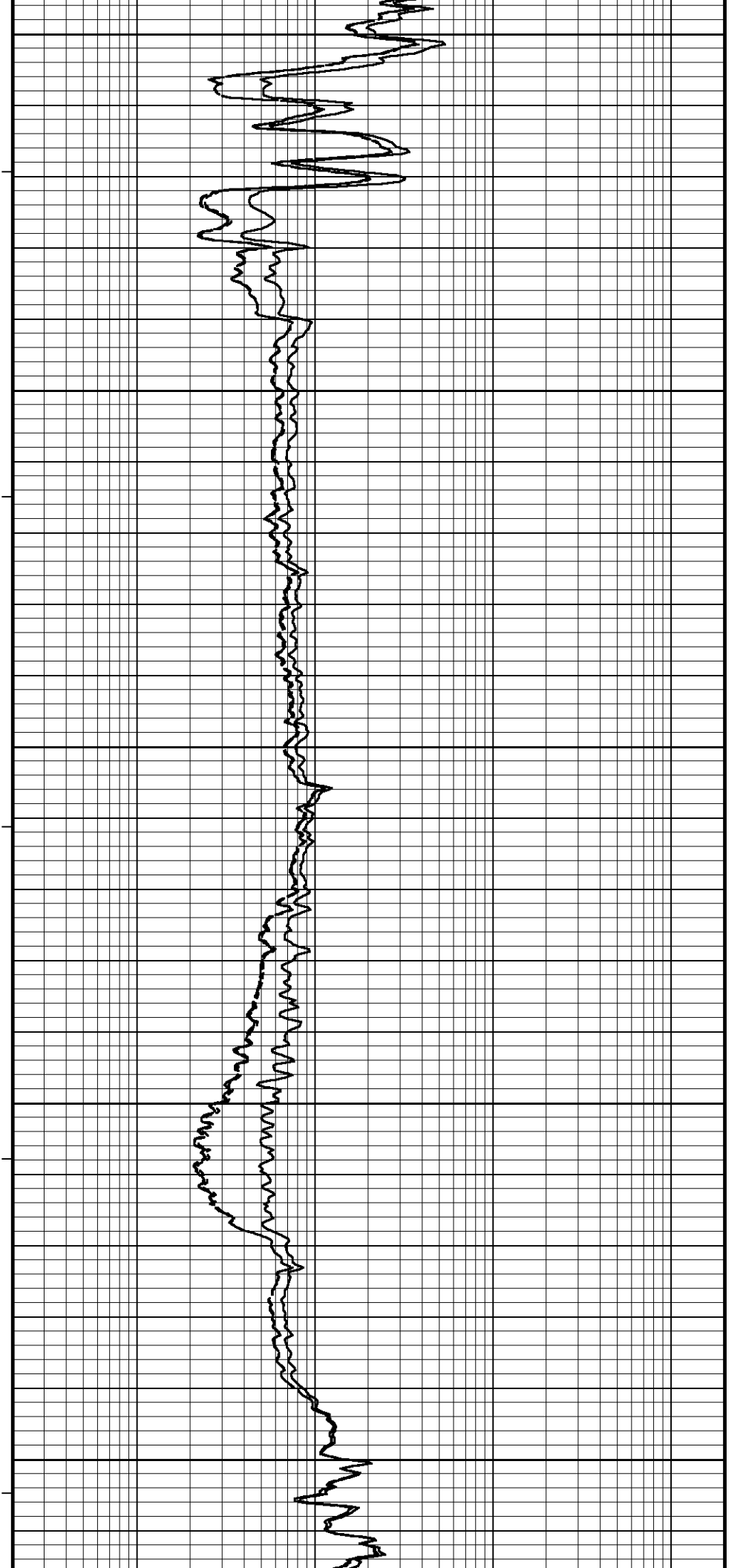
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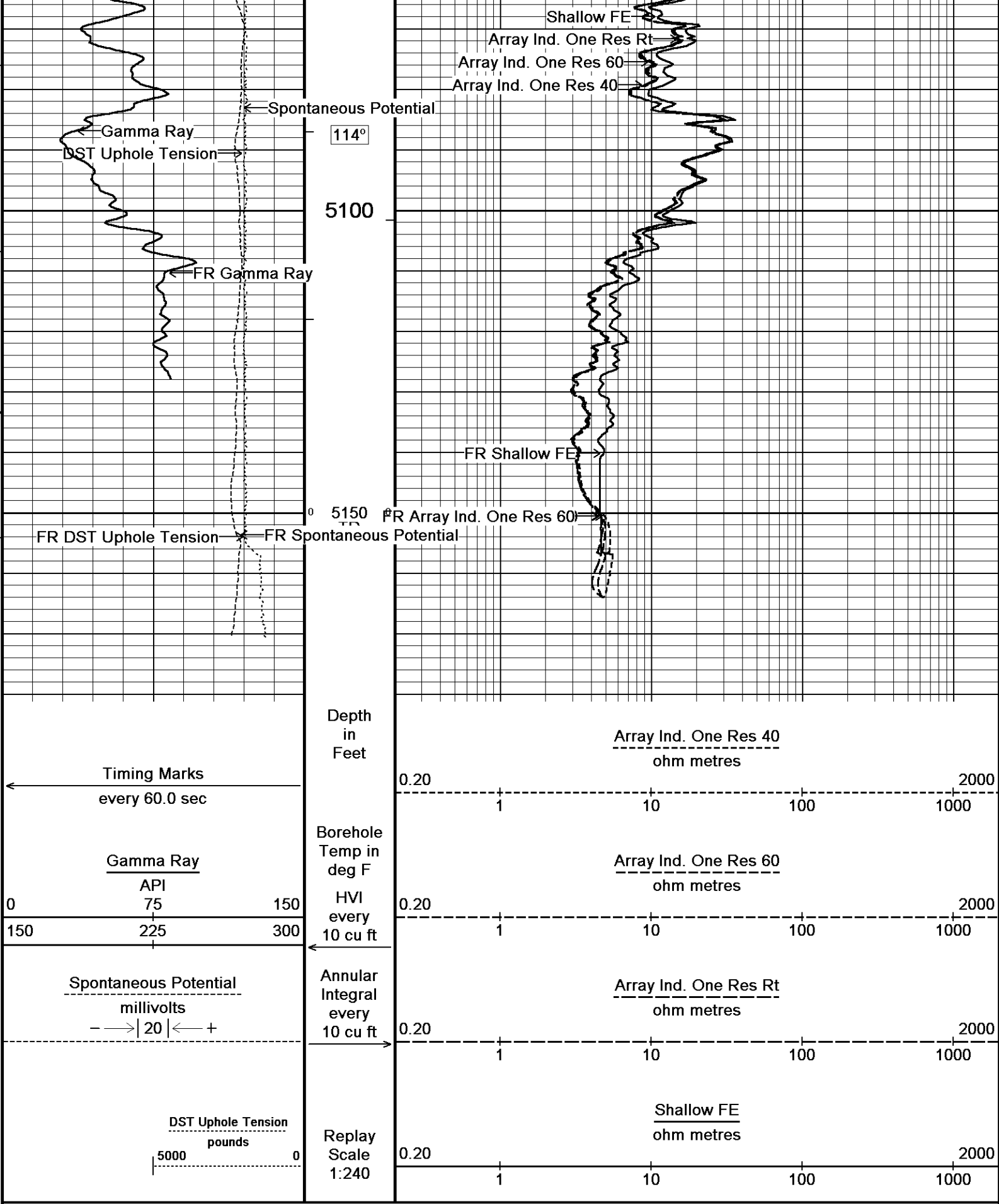
114°

5000

114°

5050





Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 19-APR-2014 12:56

Filename: C:\Minimus 13.08.2113\Logs\M & M Exploration Z ...M & M Exploration Z Bar #27-9_001.dta

Recorded on 19-APR-2014 09:34

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\M & M Exploration Z Bar #27-9\M & M Exploration Z Bar #27-9_001.dta

General Constants All 000

Last Edited on 19-APR-2014,09:14

General Parameters

Mud Resistivity	0.670	ohm-metres
Mud Resistivity Temperature	89.000	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	MMR 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

Down-hole Tension Calibration SMS 0

Field Calibration on 12-APR-2014 13:09

Reading No	Measured	Calibrated (lbs)
1	15639.80	0.00
2	16323.32	476.00

Gamma Calibration MCG-D.K 443

Field Calibration on 18-APR-2014 03:58

	Measured	Calibrated (API)
Background	71	47
Calibrator (Gross)	1166	772
Calibrator (Net)	1096	725

Gamma Constants MCG-D.K 443

Last Edited on 19-APR-2014,08:21

Gamma Calibrator Number	GRC38	
Mud Density	1.08	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-D.K 443

Field Calibration on 10-APR-2014 11:40

	Measured	Calibrated (mV)
Reference 1	102.2	100.0
Reference 2	-99.0	-100.0

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 05-MAR-2014,20:50

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

High Resolution Temperature Constants MCG-D.K 443

Last Edited on 05-MAR-2014,20:50

Pre-filter Length	11
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Caliper Calibration MMR-C.A 248

Base Calibration on 24-MAR-2014 11:12

Field Calibration on 18-APR-2014 04:19

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13253	5.96
2	16528	7.97
3	19726	9.95
4	23473	11.91
5	0	0.00

6	N/A	N/A
Field Calibration	Measured Caliper (in) 7.96	Actual Caliper (in) 7.97
Micro Normal and Micro Inverse Calibration MMR-C.A 248		Base Calibration on 24-MAR-2014 11:03 Field Check on 18-APR-2014 04:21
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-A.B 65		Base Calibration on 02-APR-2014 11:47 Field Check on 18-APR-2014 04:03
Base Calibration	Measured	Calibrated (cps)
	Near Far	Near Far
	2916 94	3714 110
Ratio	30.984	33.764
Field Calibrator at Base		Calibrated (cps)
		1762 2457
Ratio		0.717
Field Check		Calibrated (cps)
		1753 2453
Ratio		0.710
Neutron Constants MDN-A.B 65		Last Edited on 18-APR-2014,17:54
Neutron Source Id	PN-521	
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	N/A	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	N/A	kppm
Barite Mud Correction	Not Applied	
FE Calibration MFE-B.J 352		Base Calibration on 02-APR-2014 09:18 Field Check on 18-APR-2014 03:18
Base Calibration	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.7	126.8
Base Check		281.5
Field Check		281.6

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 158

Base Calibration on 03-APR-2014,15:01

Field Check on 18-APR-2014 03:17

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	17.2	475.3	9.3	966.2
2	6.1	381.2	7.6	821.4
3	3.8	265.2	5.2	566.0
4	2.7	132.2	2.6	279.2

Array Temperature	22.3	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			11.9	3814.3
2			29.9	3530.4
3			27.1	2981.2
4			18.0	2097.4
Deep			14.8	1943.5
Medium			40.8	3887.2
Shallow			47.1	5236.2

Array Temperature	58.7	Deg F
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Induction Constants MAI-A.A 158

Last Edited on 19-APR-2014,08:21

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 158		Field Calibration on 03-APR-2014,15:43
		Measured Calibrated(Deg F)
Lower		50.00 50.00
Upper		75.00 75.00
High Resolution Temperature Constants MAI-A.A 158		Last Edited on 03-APR-2014,15:43
Pre-filter Length		11
Photo Density Calibration MPD-D.A 481		Base Calibration on 02-APR-2014 11:04 Field Check on 18-APR-2014 04:18
Density Calibration		
Base Calibration		Measured Calibrated (sdu)
		Near Far Near Far
Background		1226 1442
Reference 1		46921 22694 59556 30836
Reference 2		19336 2468 24941 2541
Field Check at Base		1225.8 1442.4
Field Check		1228.1 1443.9
PE Calibration		
Base Calibration		Measured Calibrated
		WS WH Ratio Ratio
Background		233 1097
Reference 1		20771 46744 0.450 0.371
Reference 2		5890 19202 0.312 0.272
Field Check at Base		233.0 1096.7
Field Check		232.9 1098.5
Density Constants MPD-D.A 481		Last Edited on 19-APR-2014,08:21
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		1.08 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
Caliper Calibration MPD-D.A 481		Base Calibration on 02-APR-2014 11:11 Field Calibration on 18-APR-2014 04:14
Base Calibration		
Reading No		Measured Calibrator Size (in)
1		18335 3.99
2		28222 5.08

2	28333	5.98
3	38337	7.97
4	48197	9.86
5	59281	11.92
6	N/A	N/A

Field Calibration

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

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\M & M Exploration Z Bar #27-9\M & M Exploration Z Bar #27-9_001.dta

CBH-C, Cablehead, 11 pin

CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma

MCG-D.K 443 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-A.B 65 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

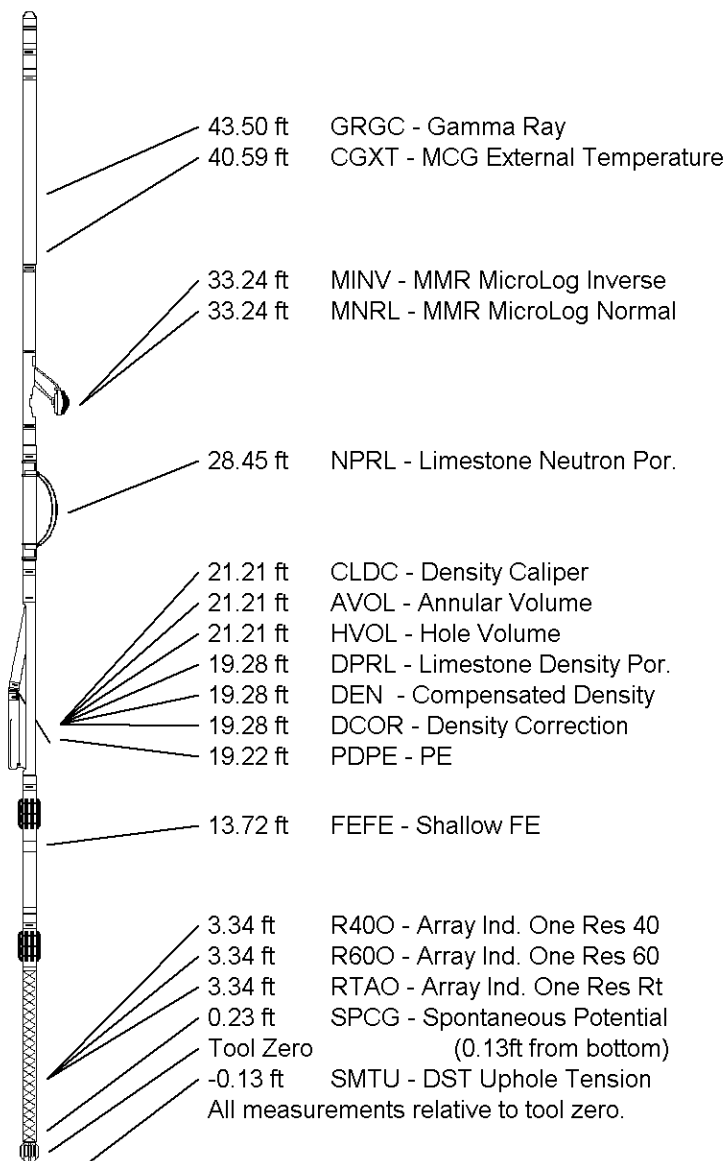
Compact Focussed Electric

MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction

MAI-A.A 158 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 51.18 ft Weight: 407.9 lb



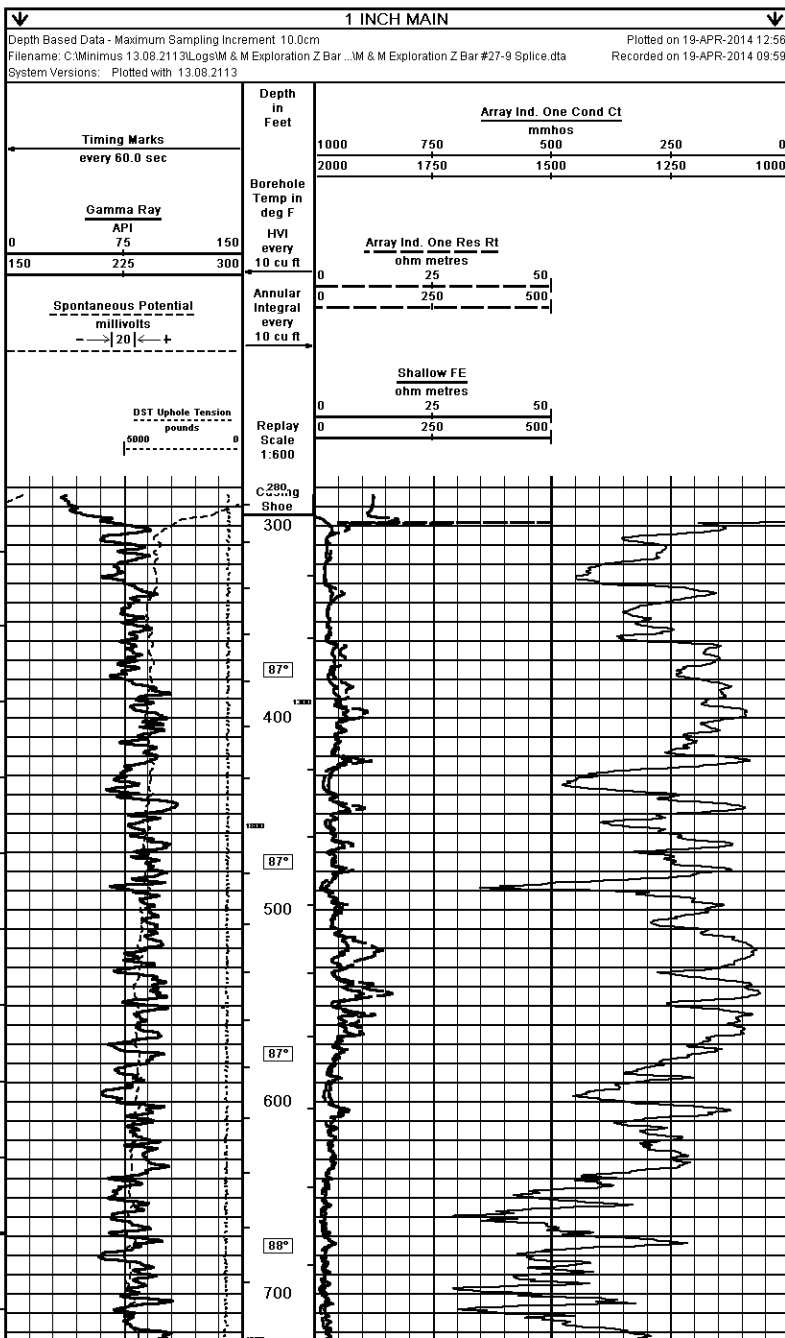
COMPANY	M&M EXPLORATION, INC.
WELL	Z-BAR 27-9
FIELD	AETNA
PROVINCE/COUNTY	BARBER
COUNTRY/STATE	U.S.A. / KANSAS

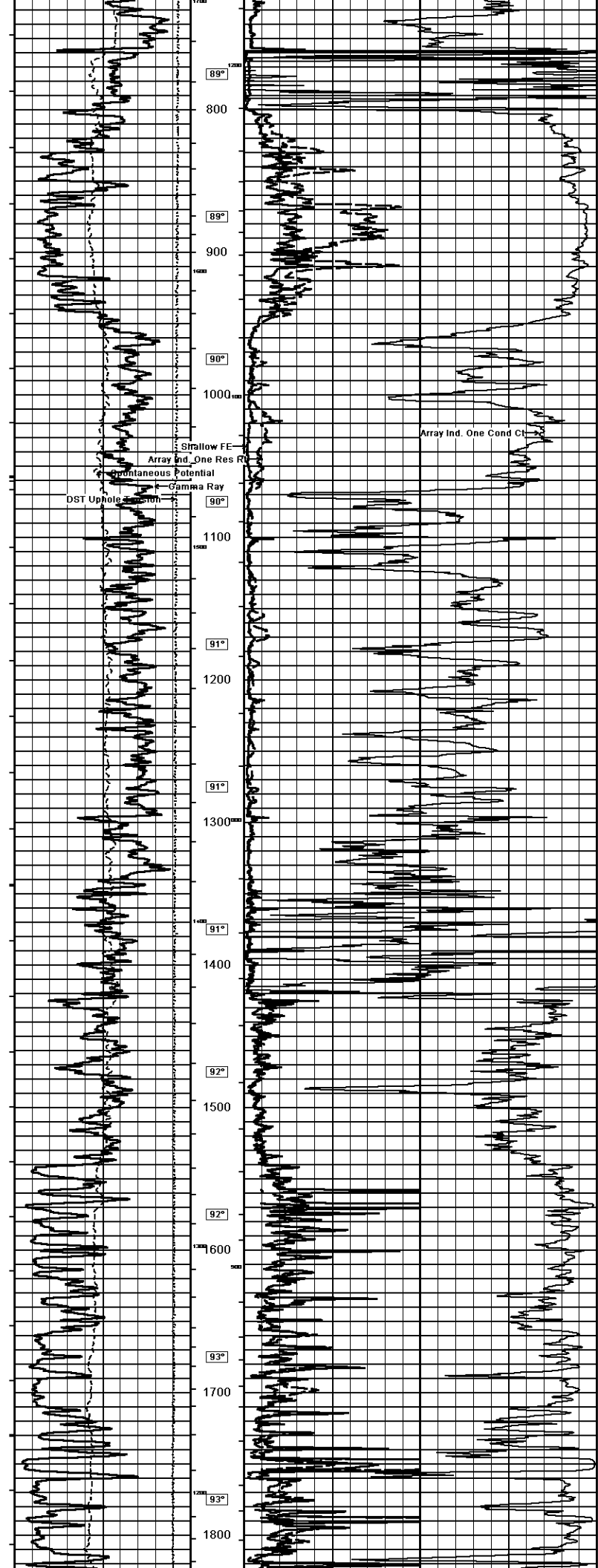
Elevation Kelly Bushing	1808.00	feet	First Reading	5151.00	feet
Elevation Drill Floor	1806.00	feet	Depth Driller	5150.00	feet
Elevation Ground Level	1798.00	feet	Depth Logger	5154.00	feet

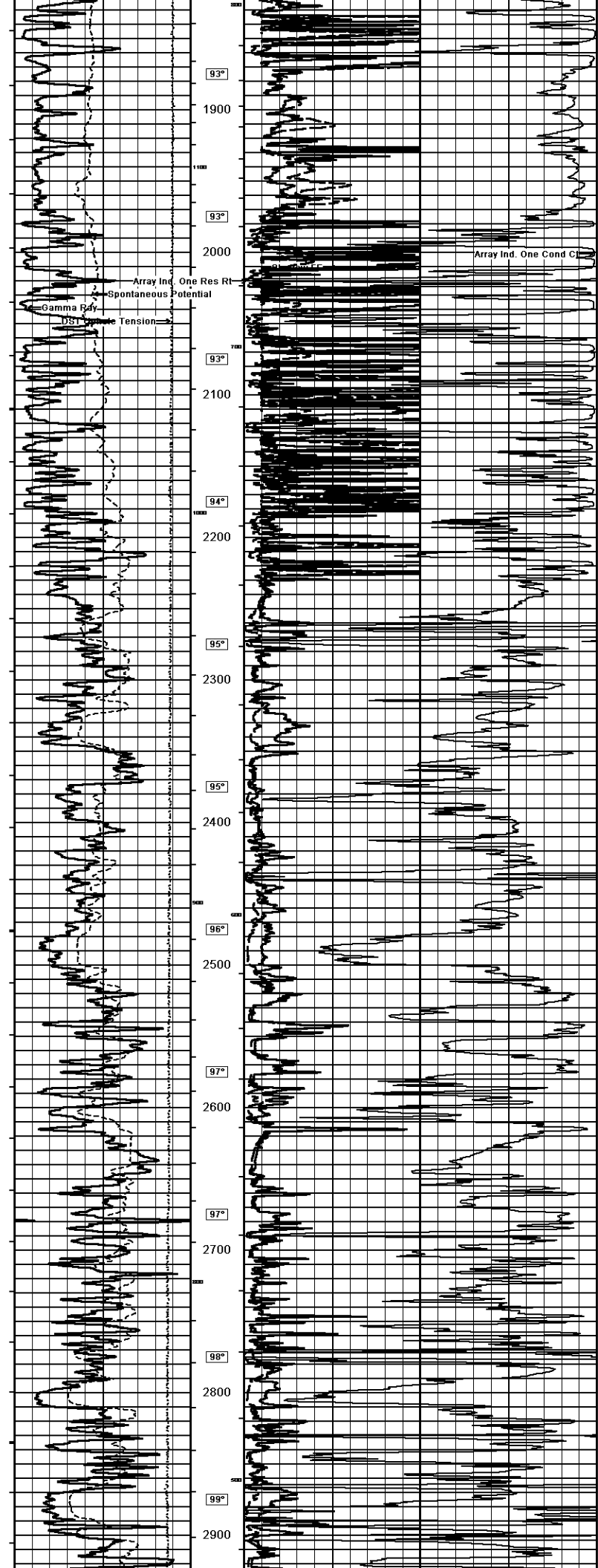


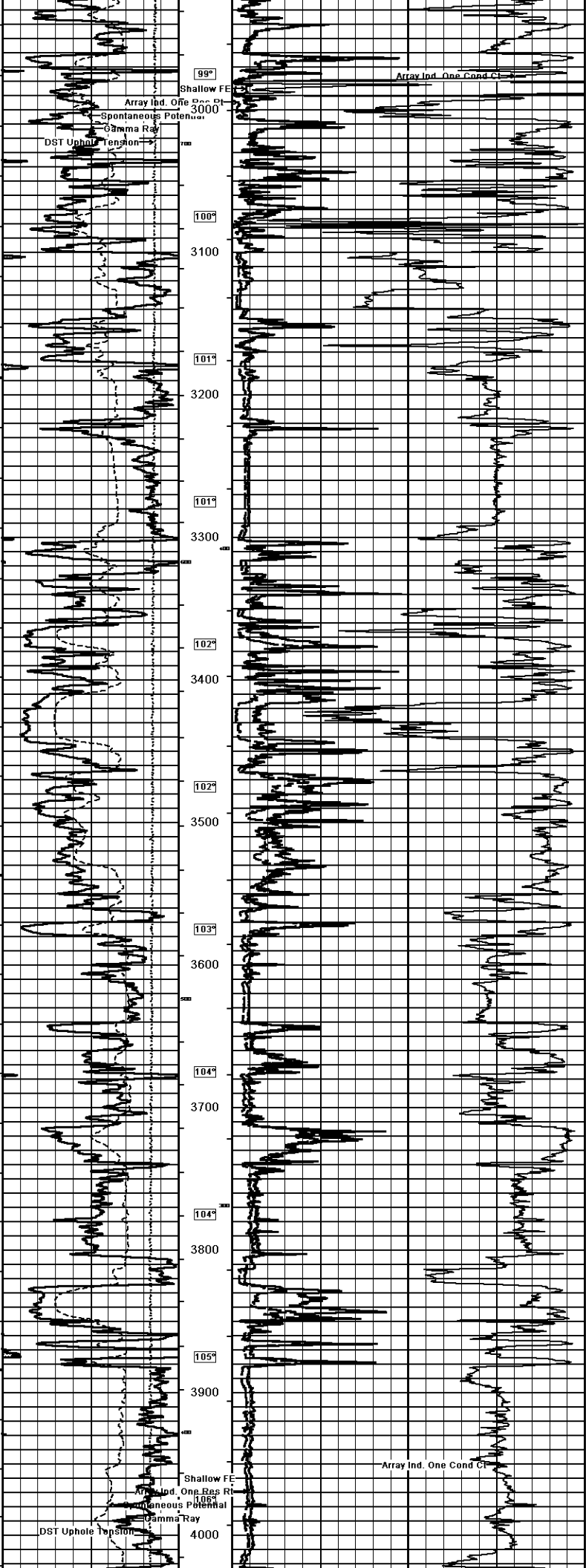
ARRAY INDUCTION

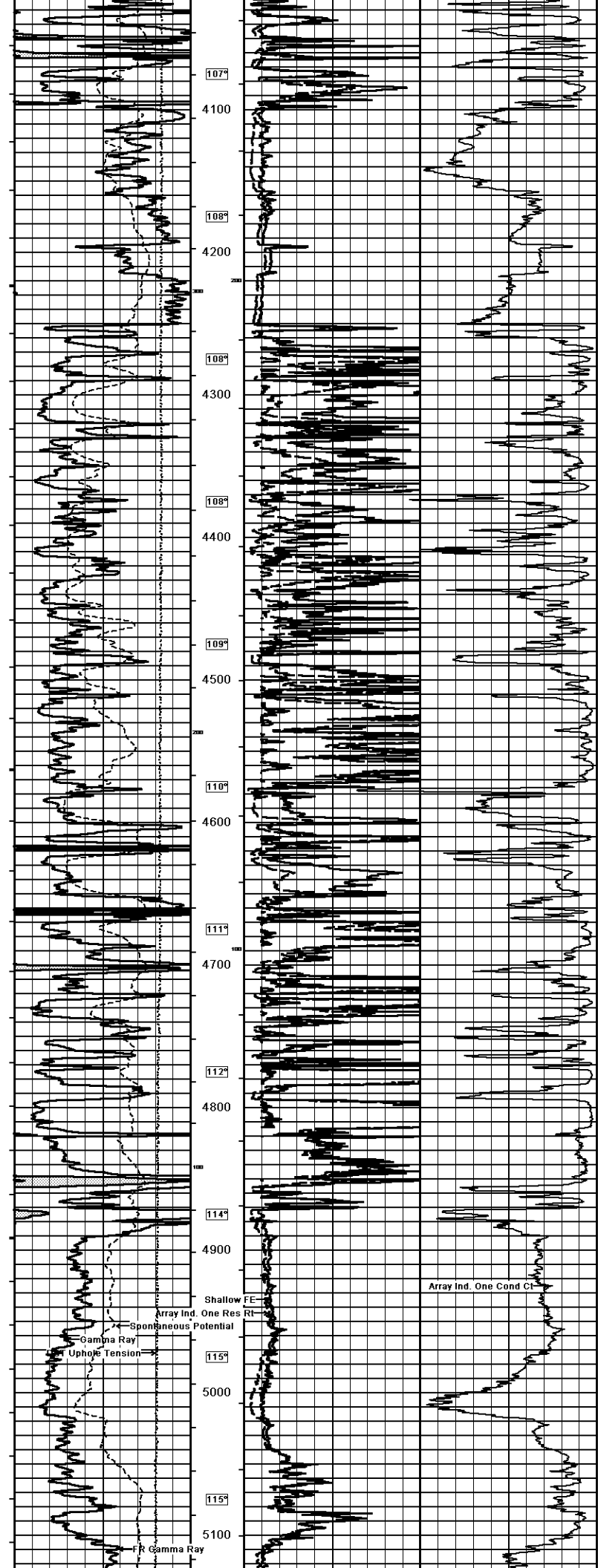
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY M&M EXPLORATION, INC.			
WELL Z-BAR 21-9			
FIELD AETNA			
PROVINCE/COUNTY BARBER			
COUNTRY/STATE U.S.A. / KANSAS			
LOCATION 2000. FSL & 600' FEL SEA			
SEC. 27 TWP. 33S RGE. 15W			
Log Date 19-APR-2014			
Log Number 15-007 24149			
Permanent Datum O.L. Elevation 1798 feet			
Log Measured From KB			
Drilling Measured From KB			
Run Number ONE			
Service Order 4558-85106879			
Depth Driller 5150.00 feet			
Depth Logger 5154.00 feet			
First Reading 5151.00 feet			
Last Reading 294.00 feet			
Casing Driller 294.00 feet			
Casing Logger 294.00 feet			
Bit Size 7.875 inches			
Hole Fluid Type CHEMICAL			
Density/Viscosity 9.00 lb/sq 40.00 CP			
PH/Fluid Loss 10.00 9.80 CF/20min			
Sample Source FLOWLINE			
Rm @ Measured Temp 0.87 @ 89.0 ohm-m			
Rm @ Measured Temp 0.84 @ 89.0 ohm-m			
Rm @ Measured Temp 0.80 @ 89.0 ohm-m			
Source Rm/ Rm CALC			
Rm @ BHT 0.52 @ 115.0 ohm-m			
Time Since Circulation 5 HOURS			
Max Recorded Temp 115.00 deg F			
Equipment/Base 13057			
Recorded By ADAM SILL			
Witnessed By BILL BUSCH			
JOB# 18714720			

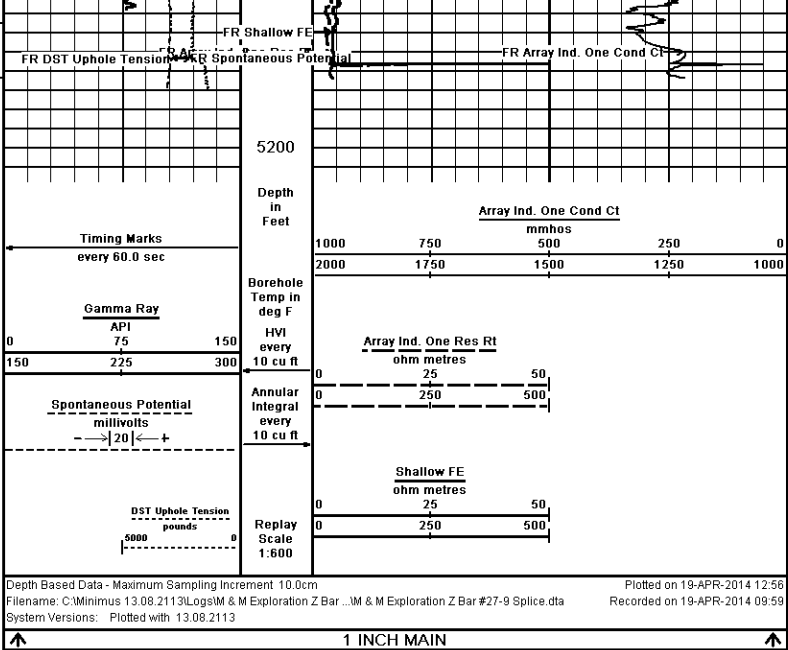












COMPANY				M&M EXPLORATION, INC.			
WELL				Z-BAR 27-9			
FIELD				AETNA			
PROVINCE/COUNTY				BARBER			
COUNTRY/STATE				U.S.A. / KANSAS			
Elevation Kelly Bushing	1808.00	feet		First Reading	5151.00	feet	
Elevation Drill Floor	1806.00	feet		Depth Driller	5150.00	feet	
Elevation Ground Level	1798.00	feet		Depth Logger	5154.00	feet	
				ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG			