



Weatherford[®]

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY	SHAKESPEARE OIL CO.		
WELL	CAMPBELL #3-17		
FIELD	WILDCAT		
PROVINCE/COUNTY	LOGAN		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	1855' FSL & 1726' FEL		
SEC	TWP	RGE	Other Services
17	13S	32W	MPD/MDN
API Number	15-109-21218		MML
Permit Number			
Permanent Datum G.L.,	Elevation 3029 feet		
Log Measured From	KB		
Drilling Measured From	K.B. @ 10 FEET		
Date	25-NOV-2013		Elevations: KB 3039.00 DF 3037.00 GL 3029.00
Run Number	ONE		
Service Order	3547649		
Depth Driller	4715.00 feet		
Depth Logger	4710.00 feet		
First Reading	4707.00 feet		
Last Reading	222.00 feet		
Casing Driller	227.00 feet		
Casing Logger	222.00 feet		
Bit Size	7.875 inches		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.10 lb/USg	44.00 CP	
PH / Fluid Loss	10.00	8.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.97 @ 81.0	ohm-m	
Rmf @ Measured Temp	0.77 @ 81.0	ohm-m	
Rmc @ Measured Temp	1.16 @ 81.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.77 @ 109.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	109.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	R.HOFFMAN		
Witnessed By	TIM PRIEST		
JOB #	LB13-335		

BOREHOLE RECORD			Last Edited: 25-NOV-2013 04:00
Bit Size inches	Depth From feet	Depth To feet	
7.875	227.00	4715.00	
CASING RECORD			
Type	Size inches	Depth From feet	Shoe Depth feet
SURFACE	8.625	0.00	227.00
			Weight pounds/ft
			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: 1871 CU. FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 248 CU. FT.

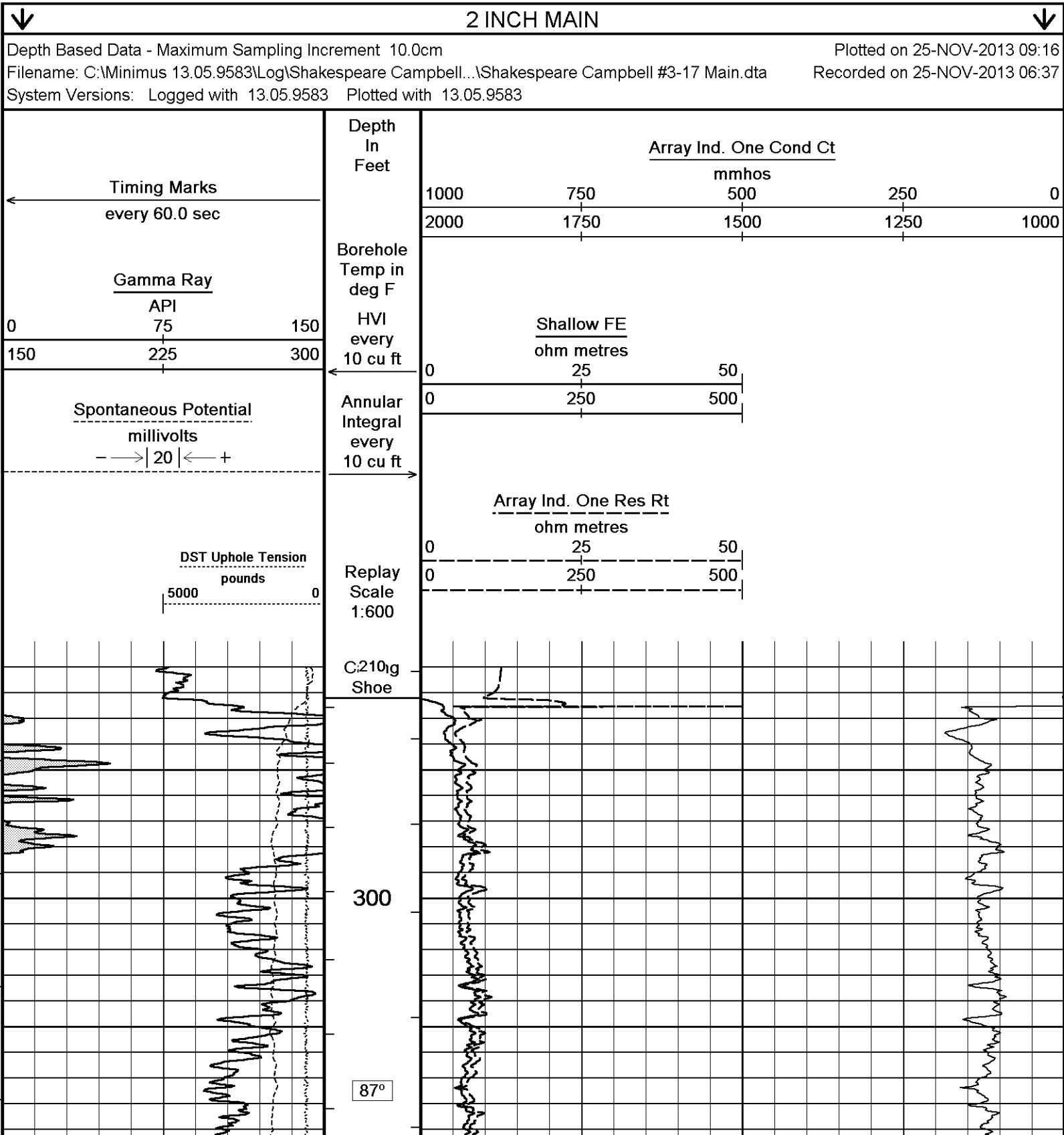
- SERVICE ORDER # 3547649

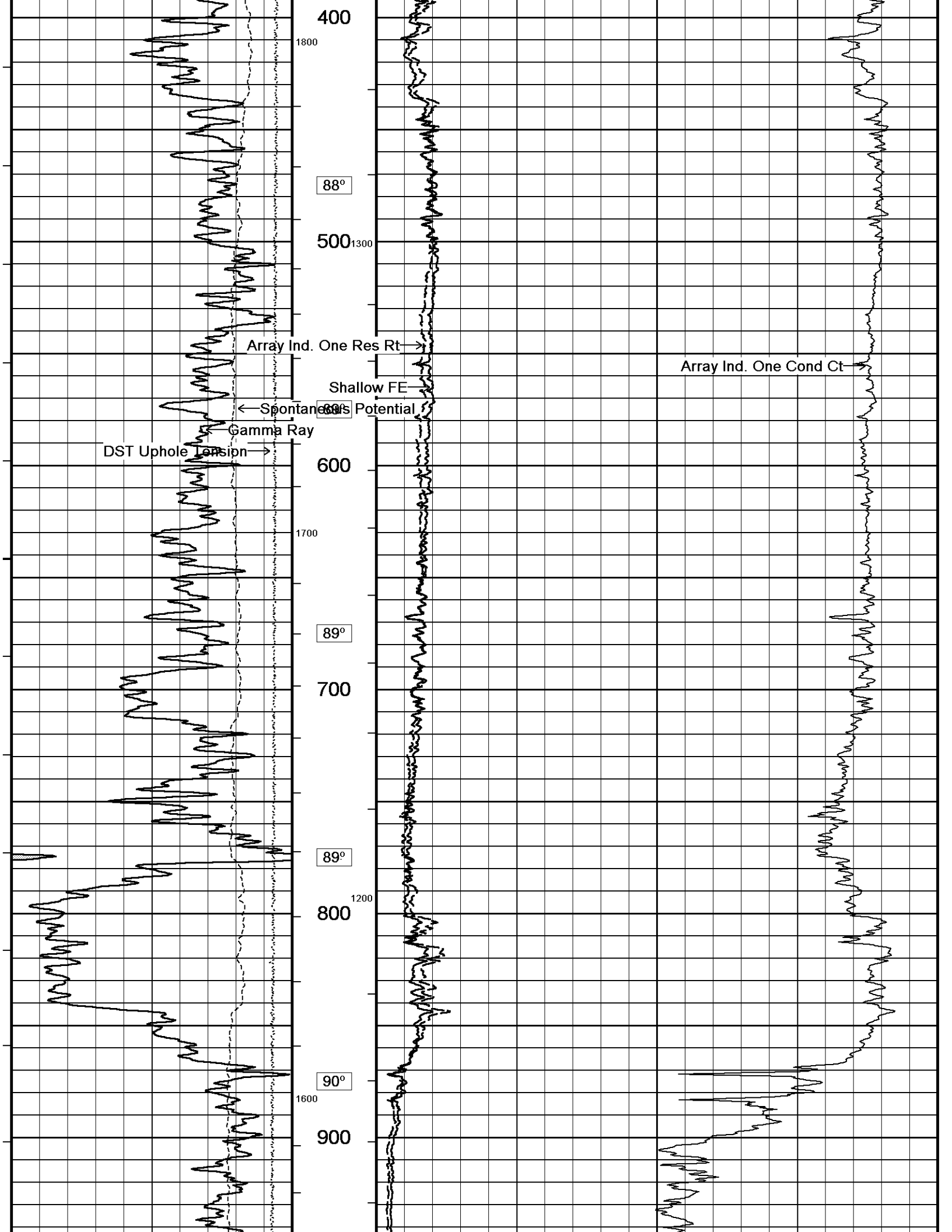
- RIG: HD DRILLING #2.

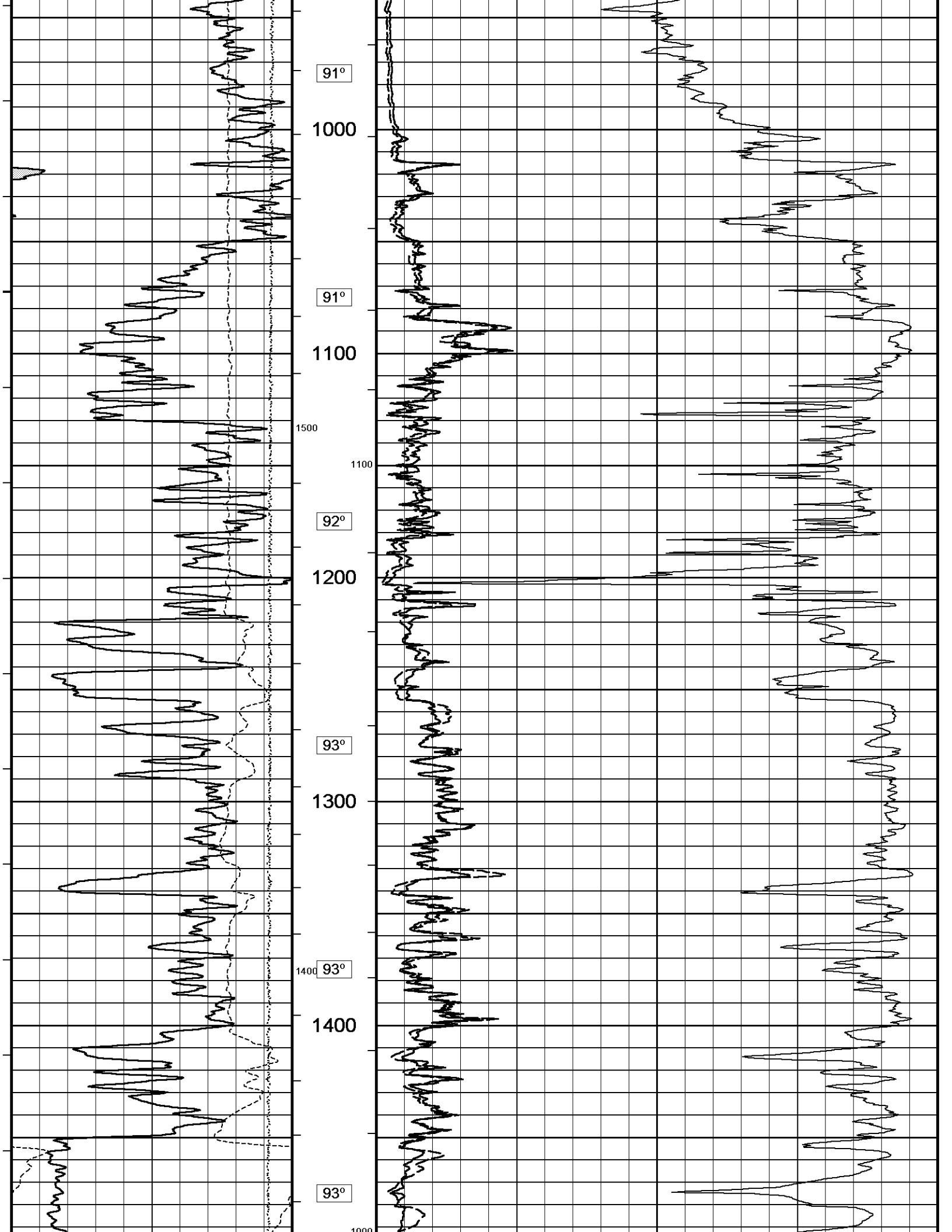
- ENGINEER: ROB HOFFMAN

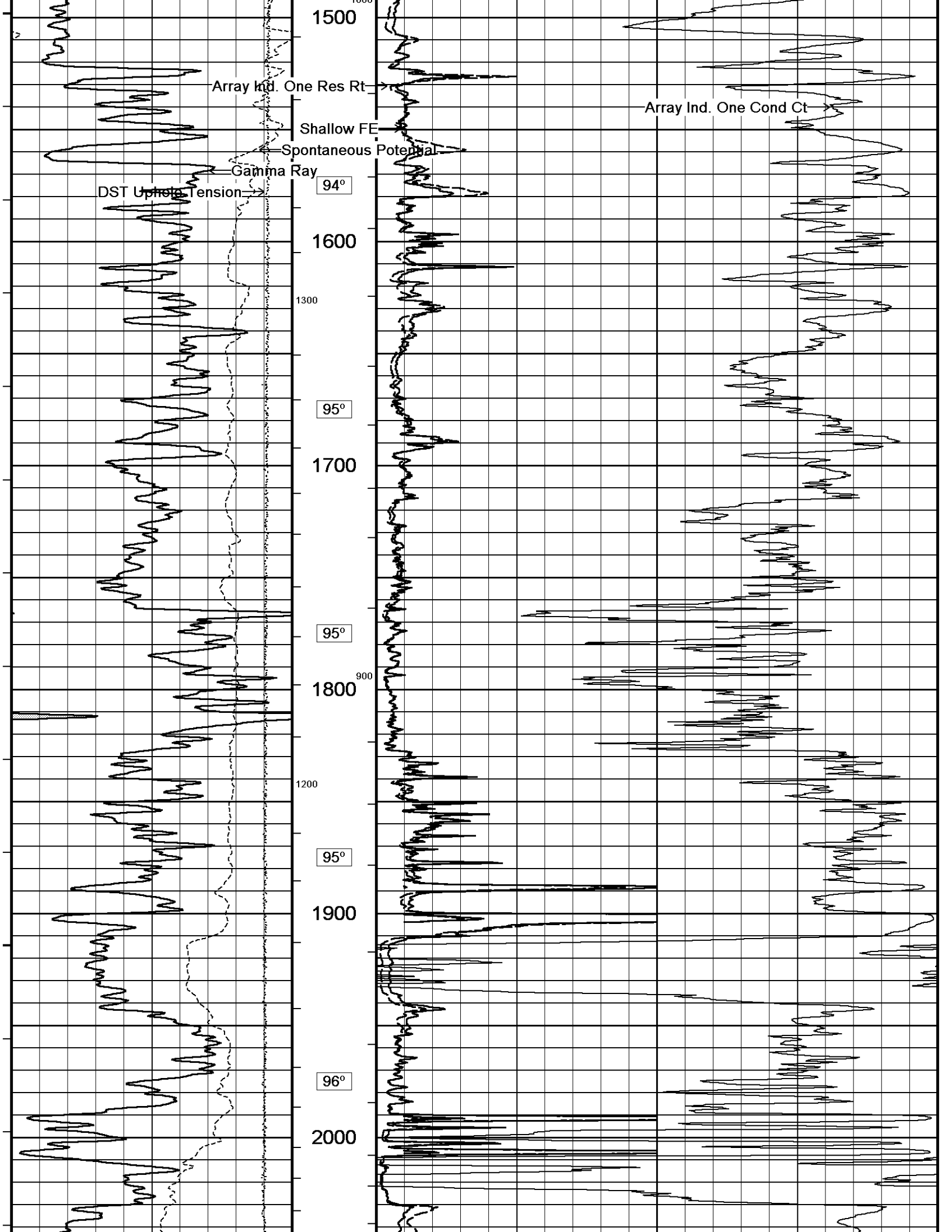
- OPERATOR(S): J. DUNLAP, S. MENDEZ

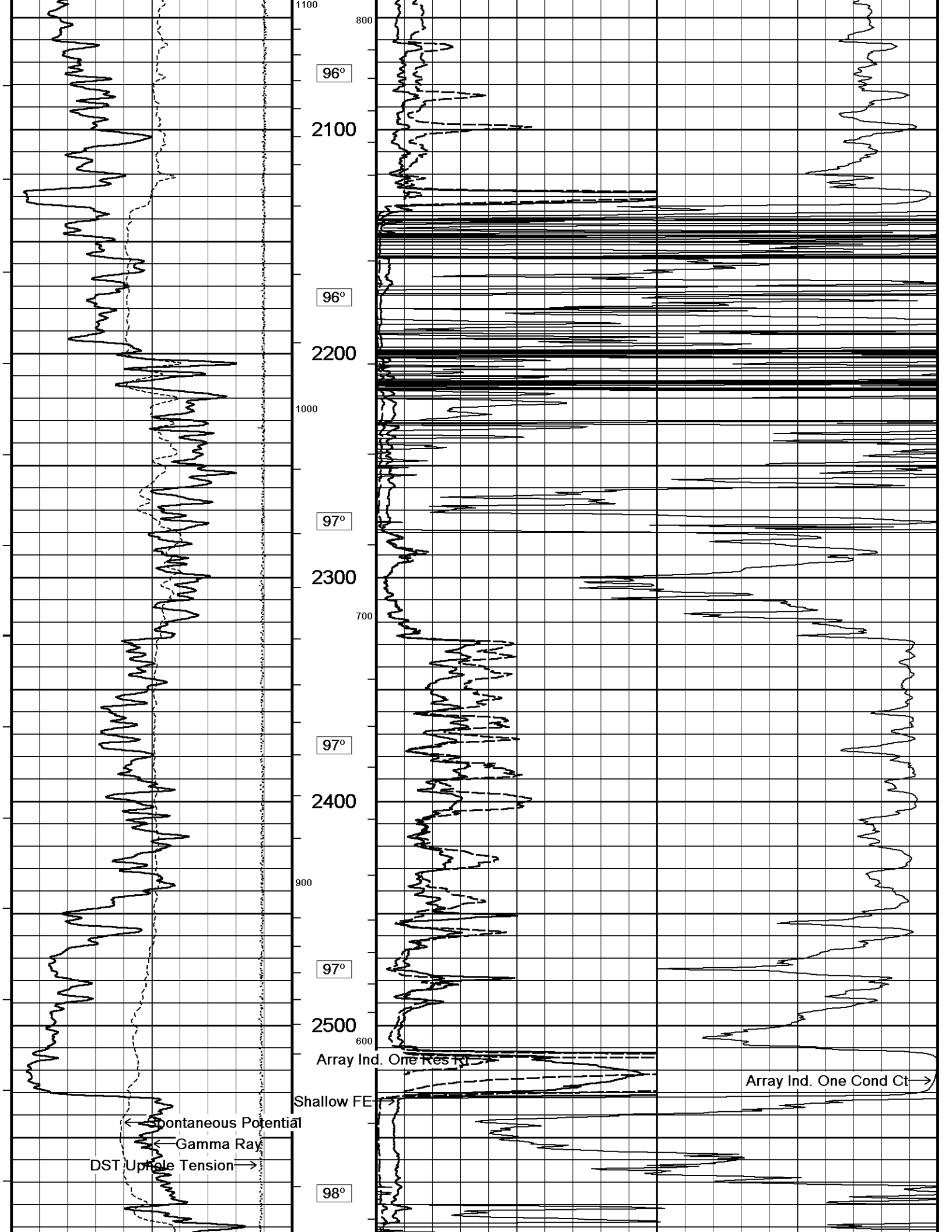
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.

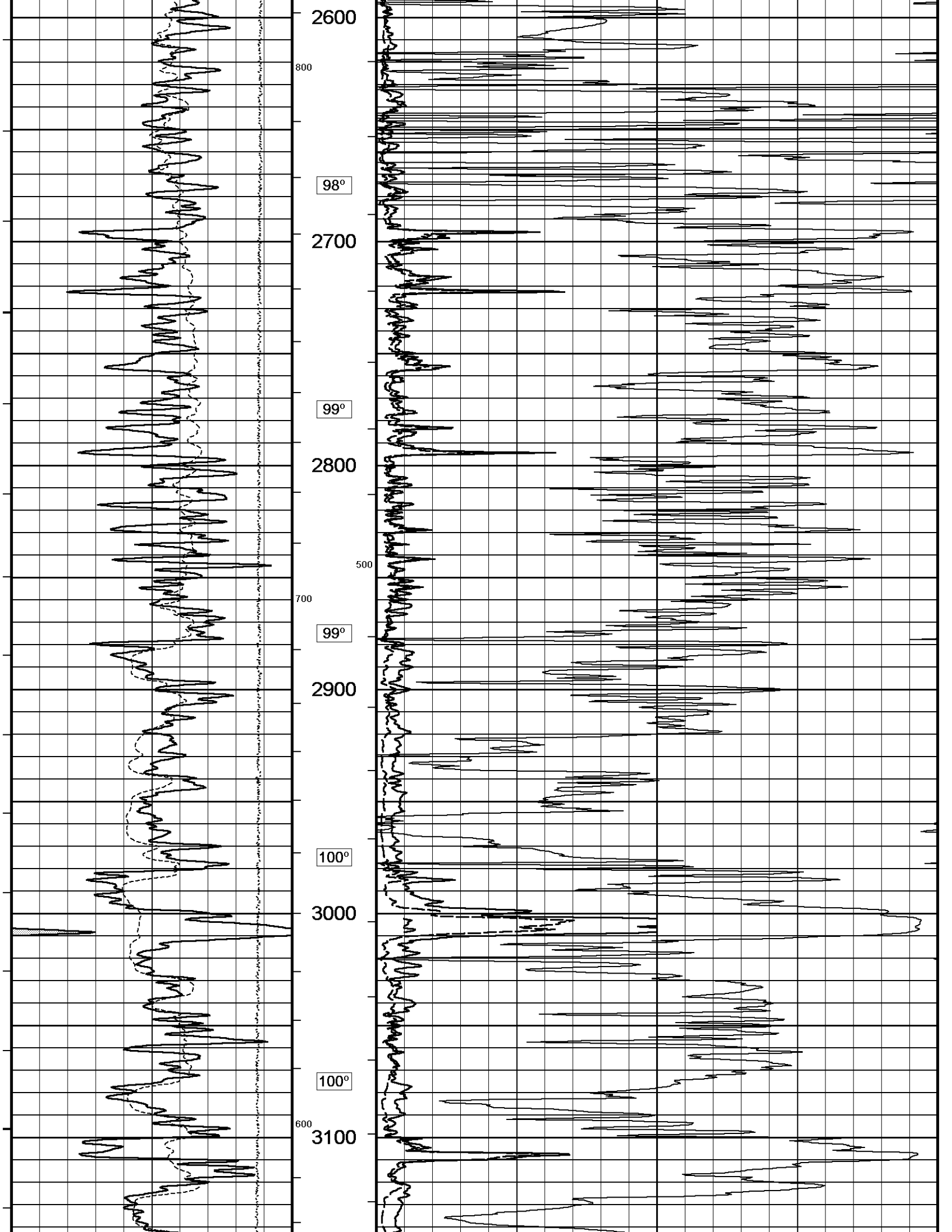


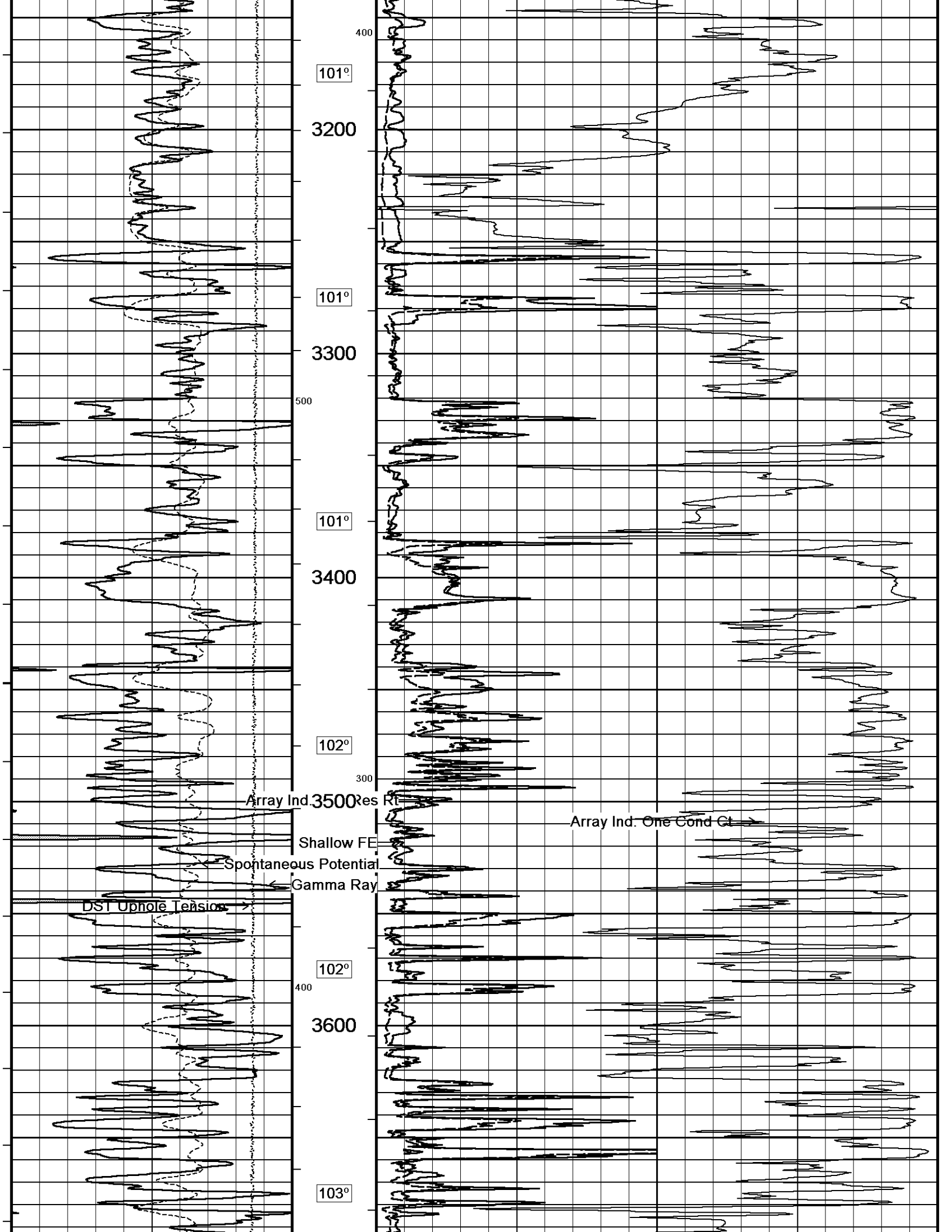


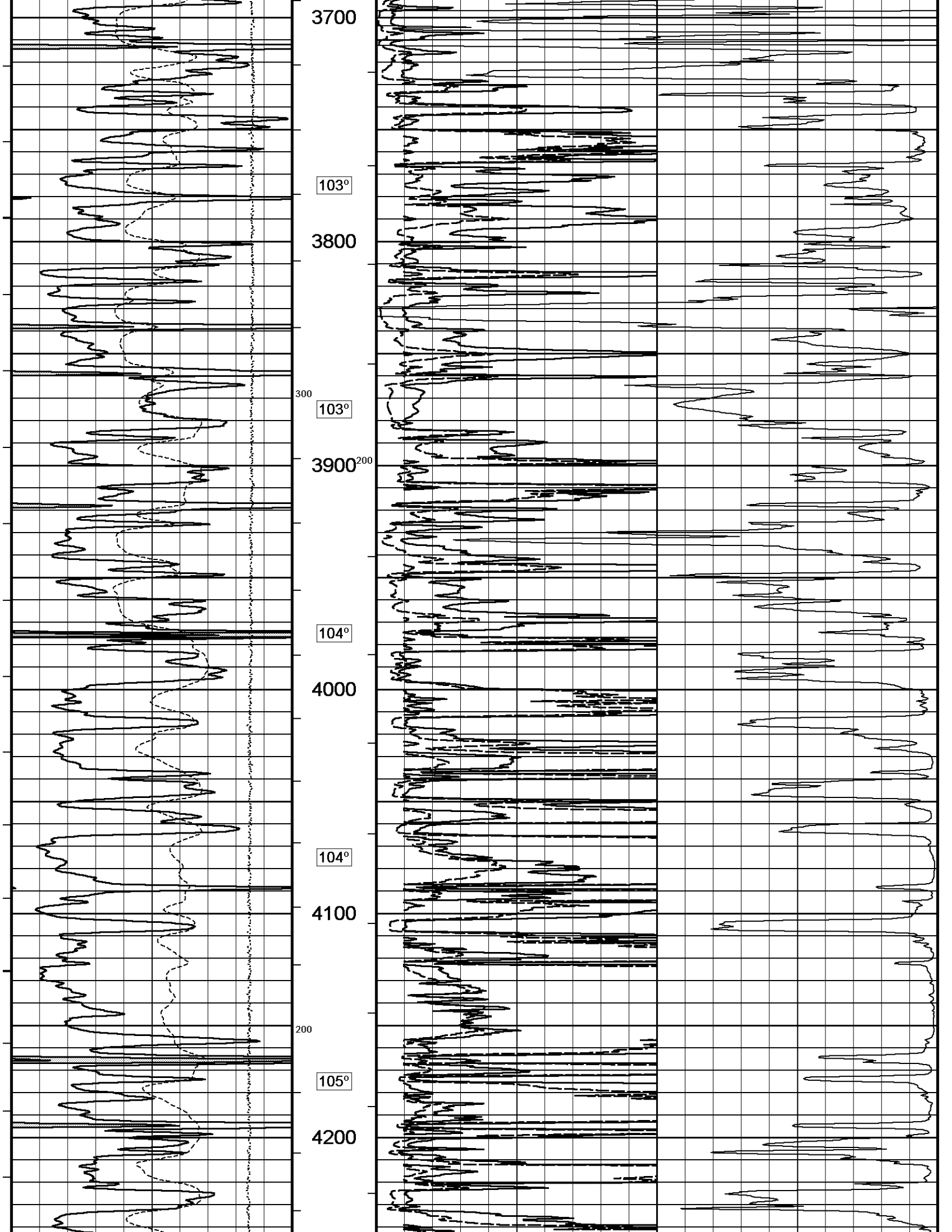


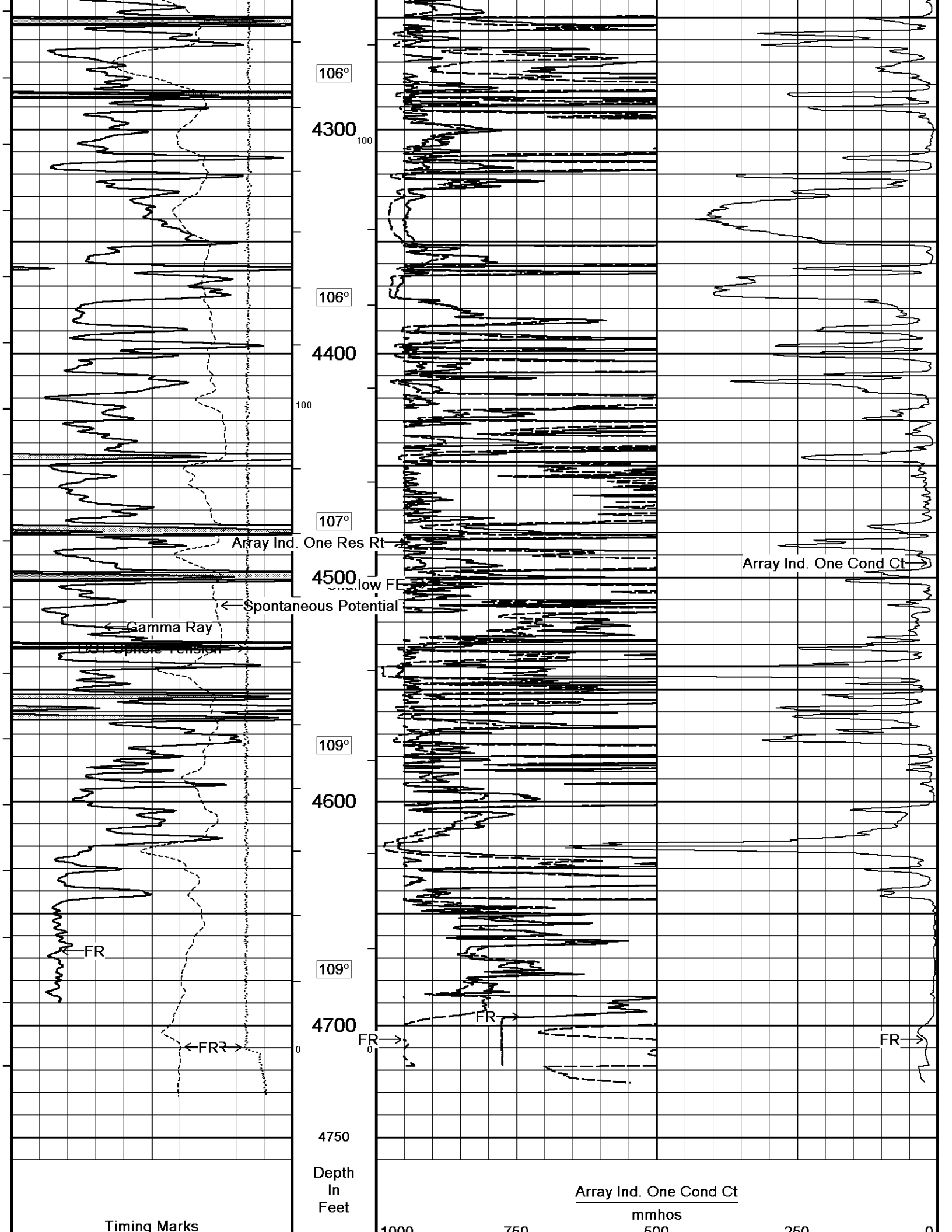


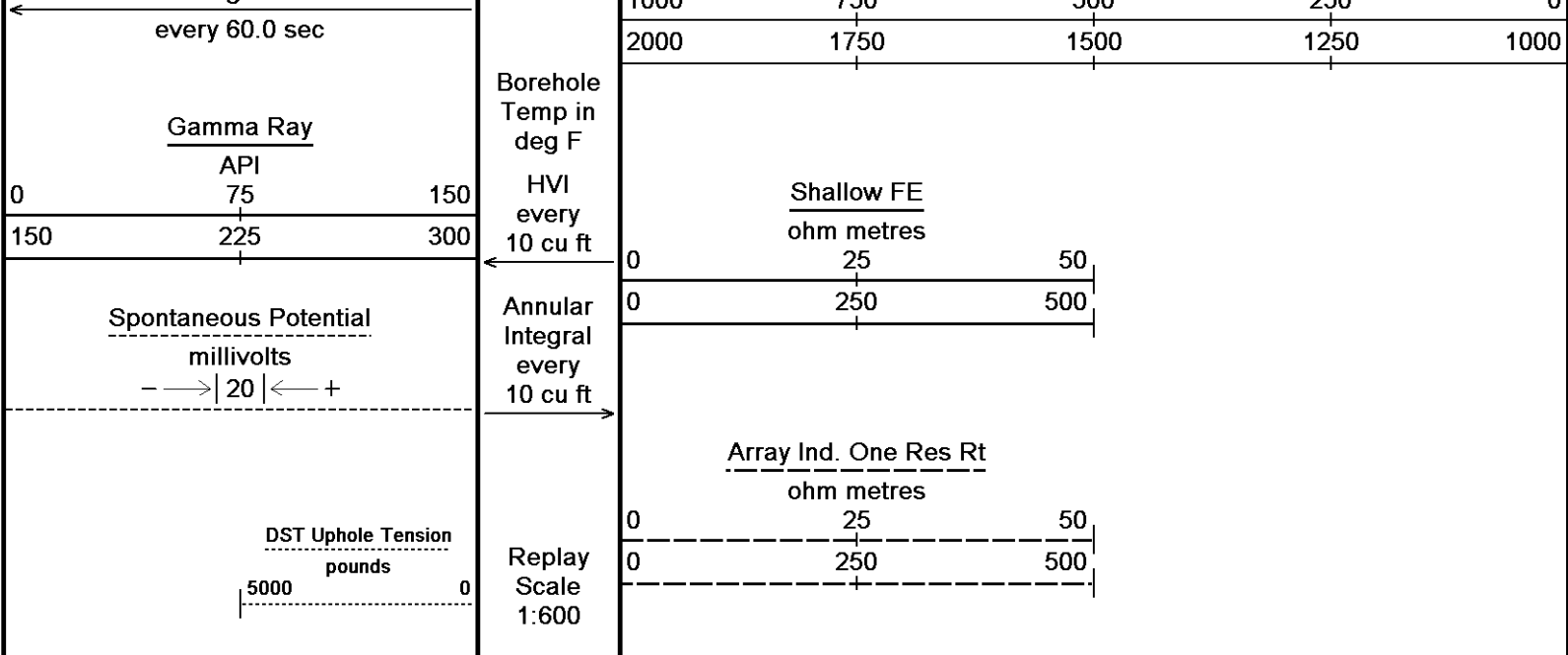








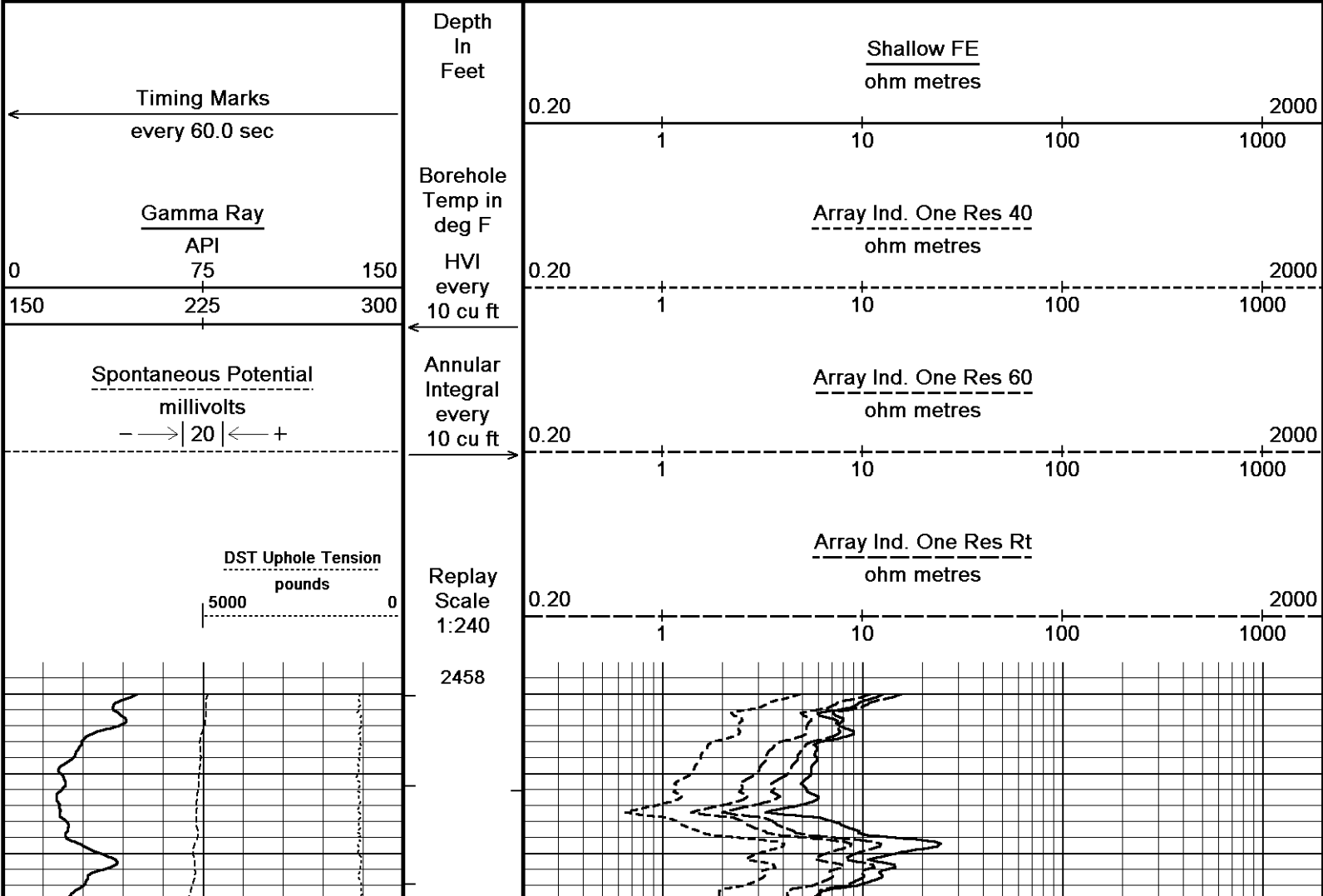


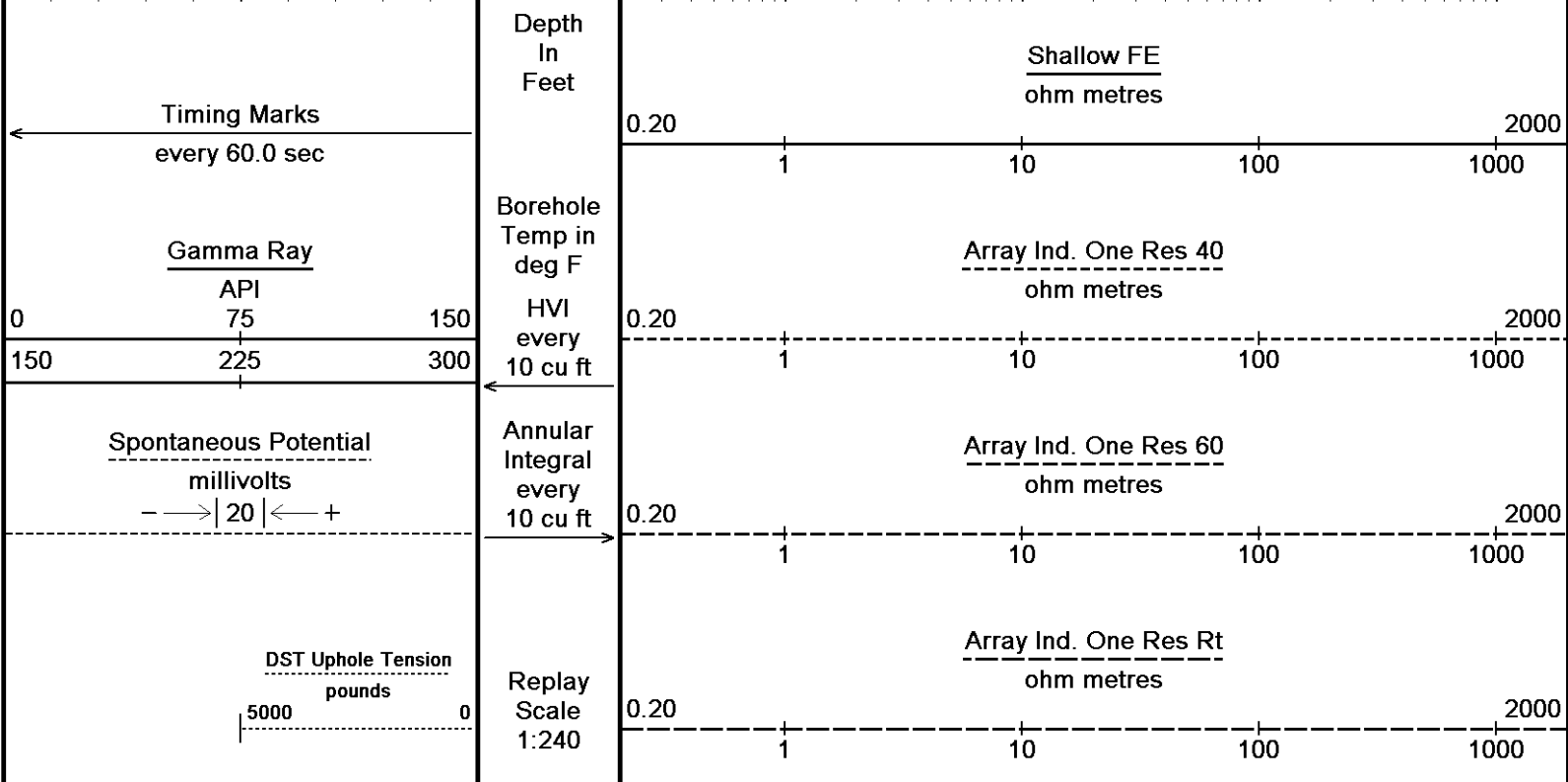
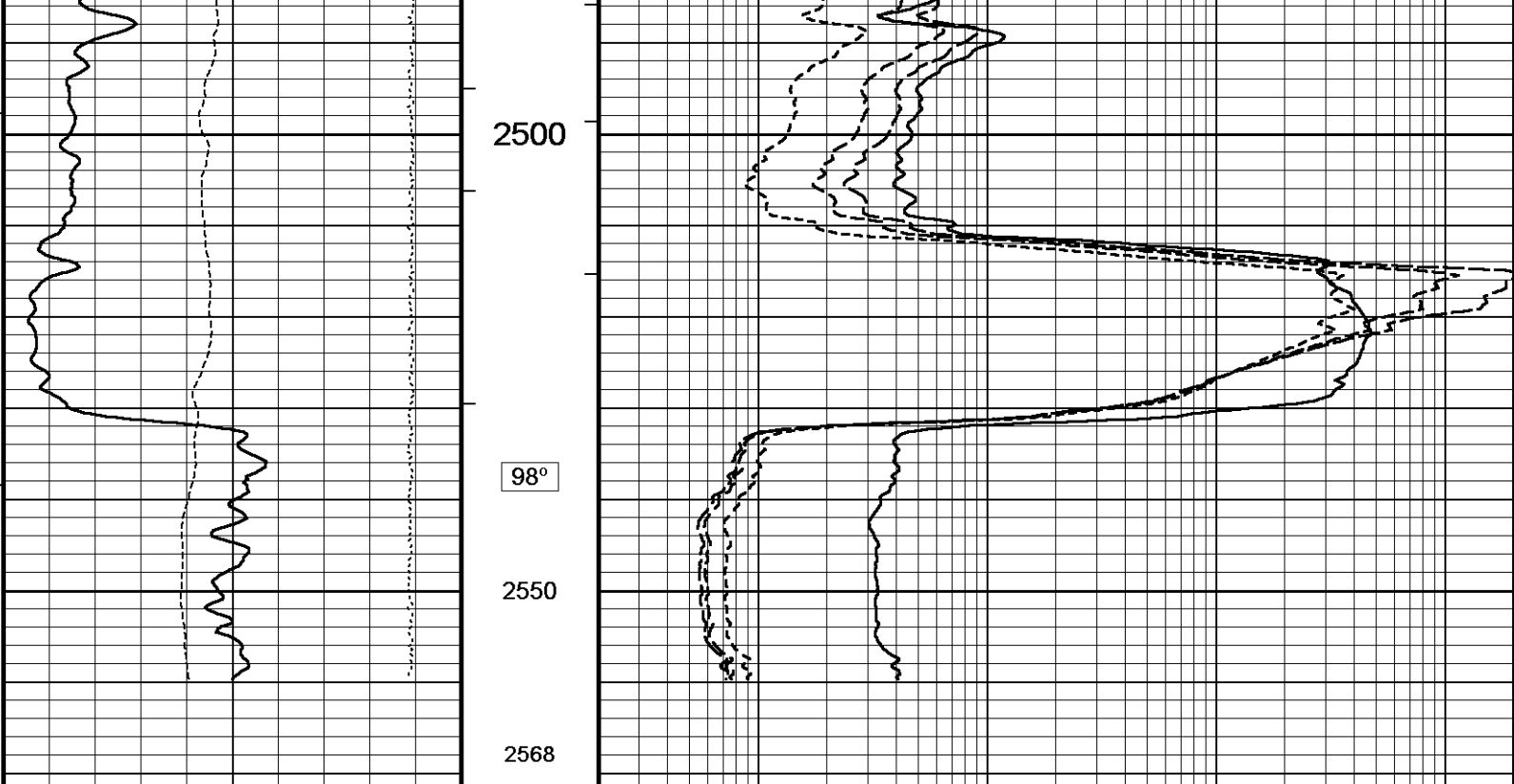


Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 25-NOV-2013 09:16
 Filename: C:\Minimus 13.05.9583\Log\Shakespeare Campbell...\Shakespeare Campbell #3-17 Main.dta
 Recorded on 25-NOV-2013 06:37
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

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Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 25-NOV-2013 09:16
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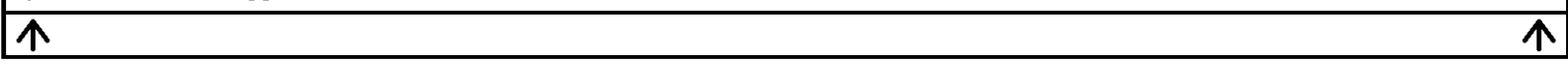




Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 25-NOV-2013 09:16

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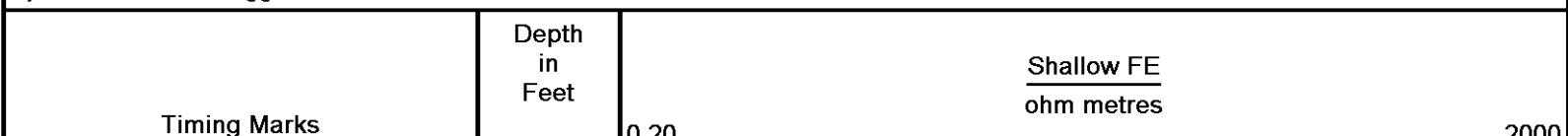


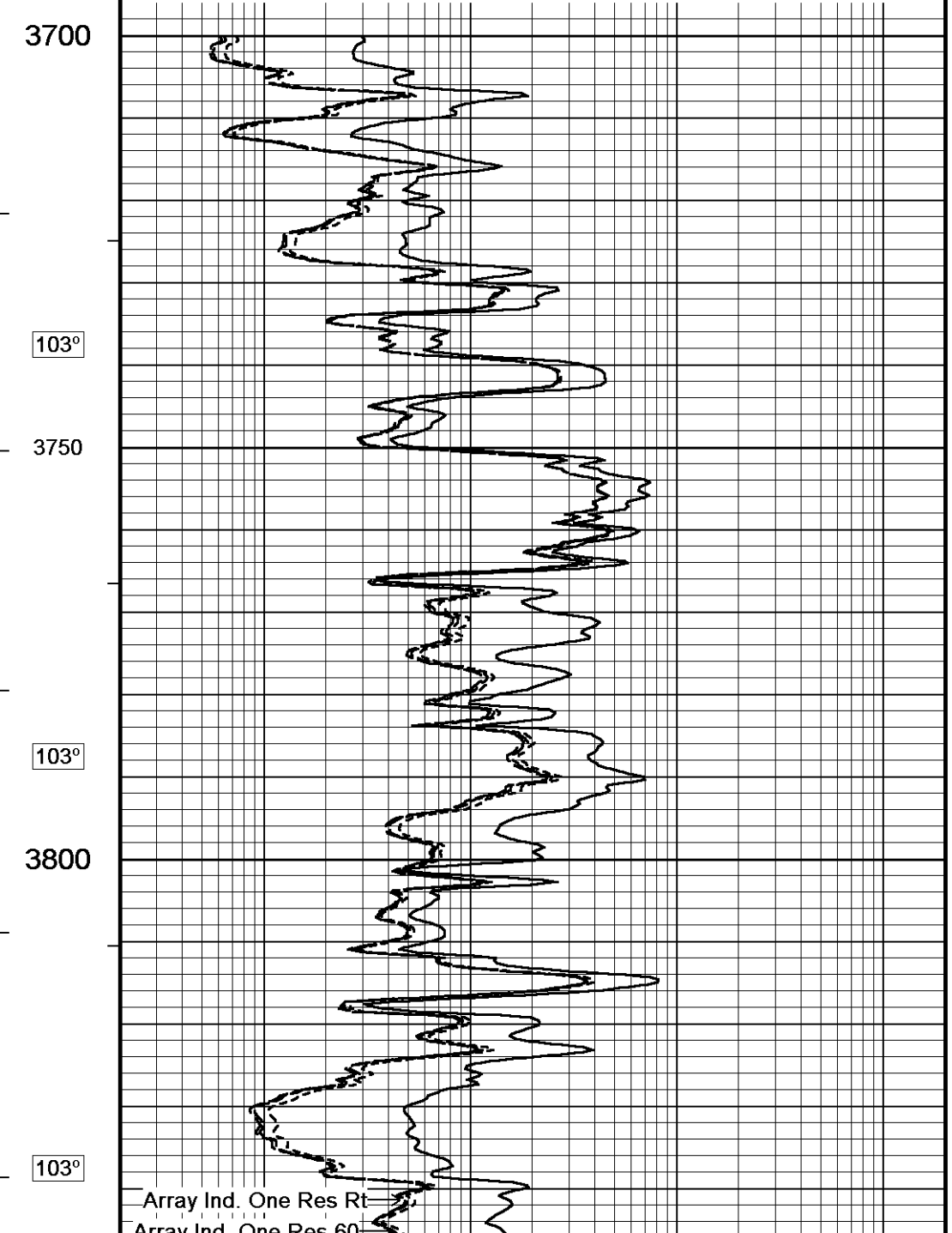
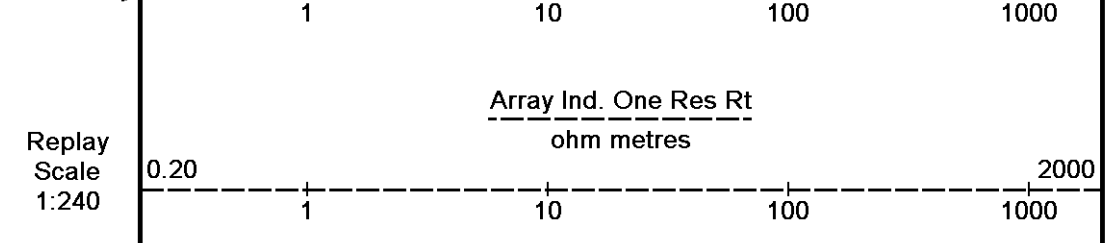
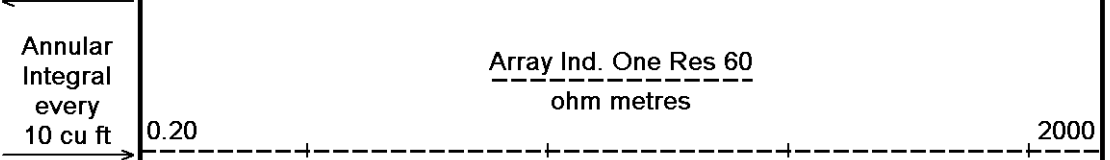
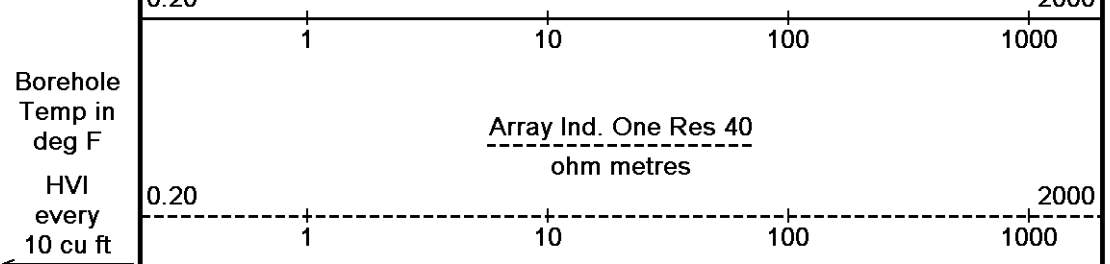
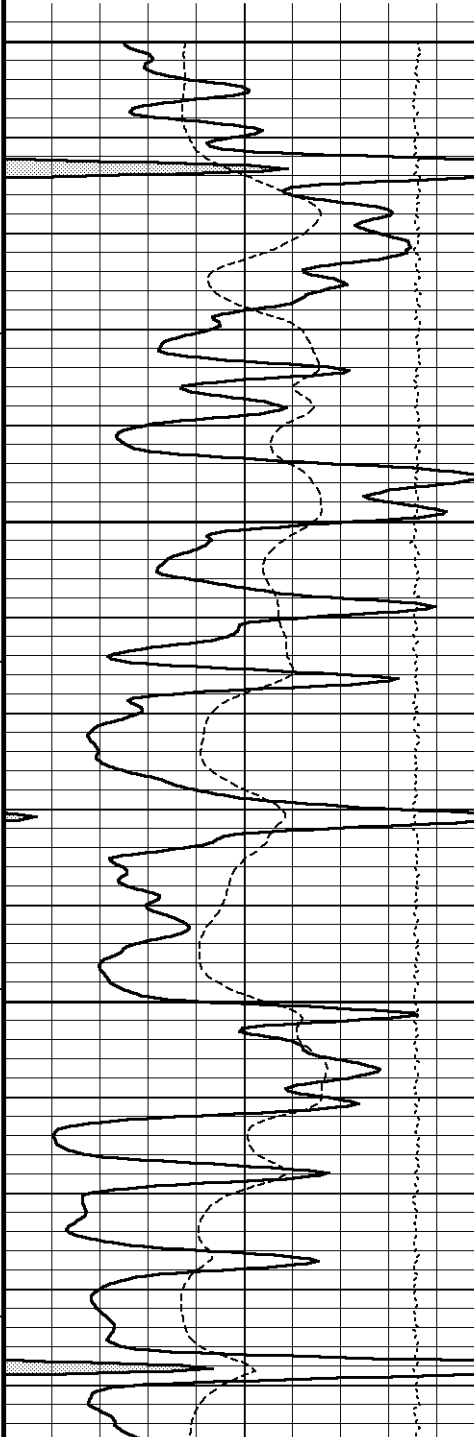
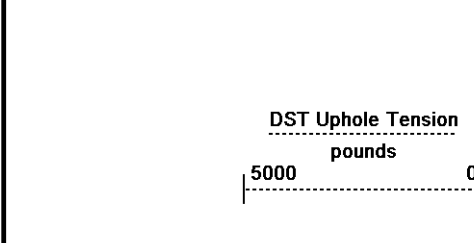
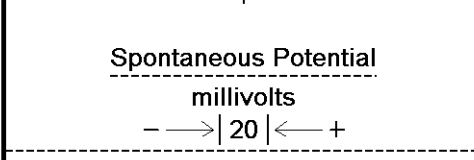
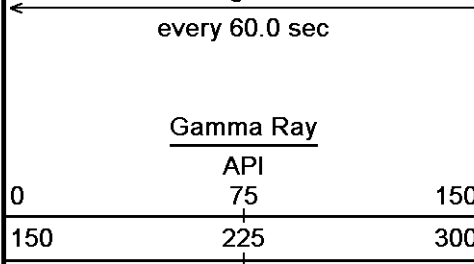
5 INCH MAIN

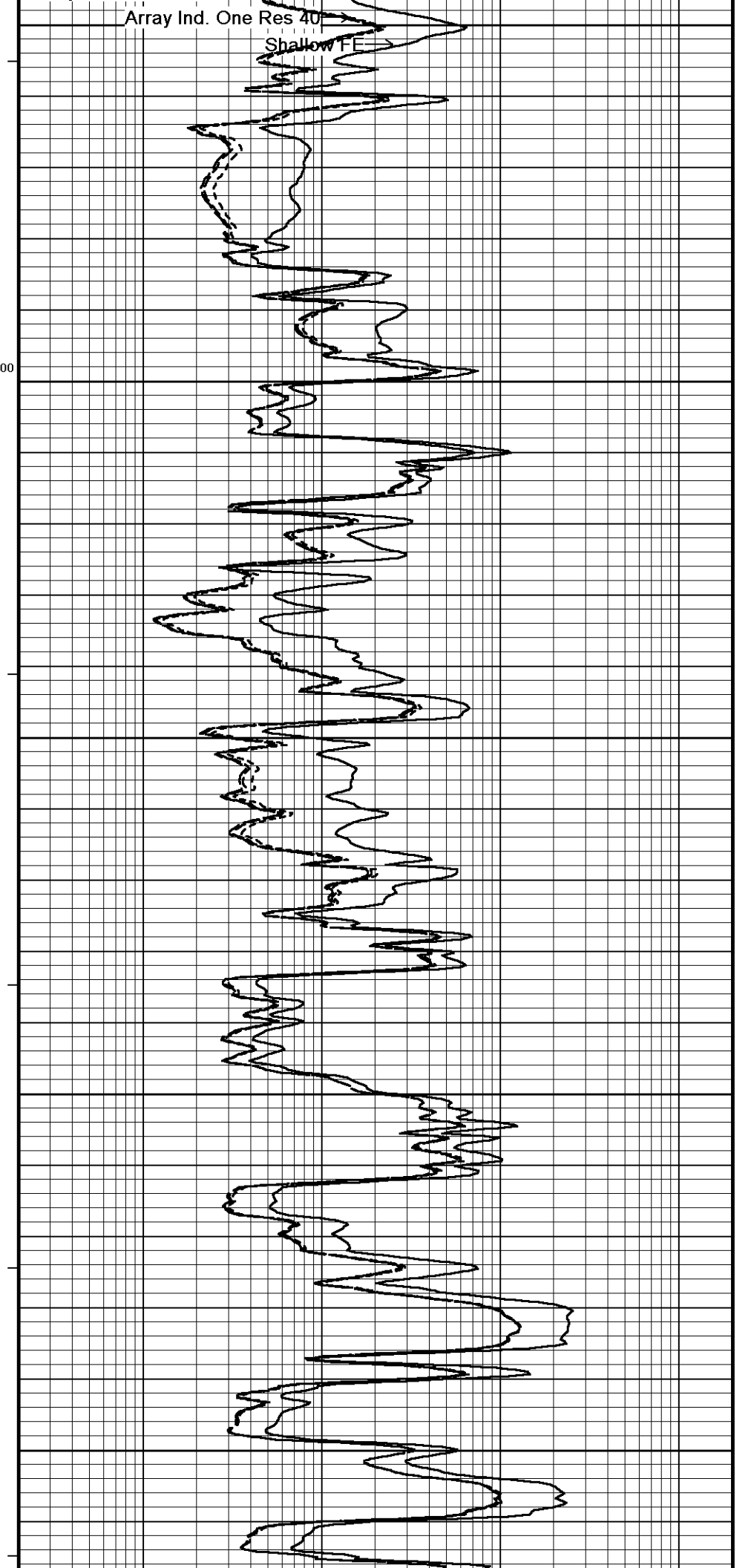
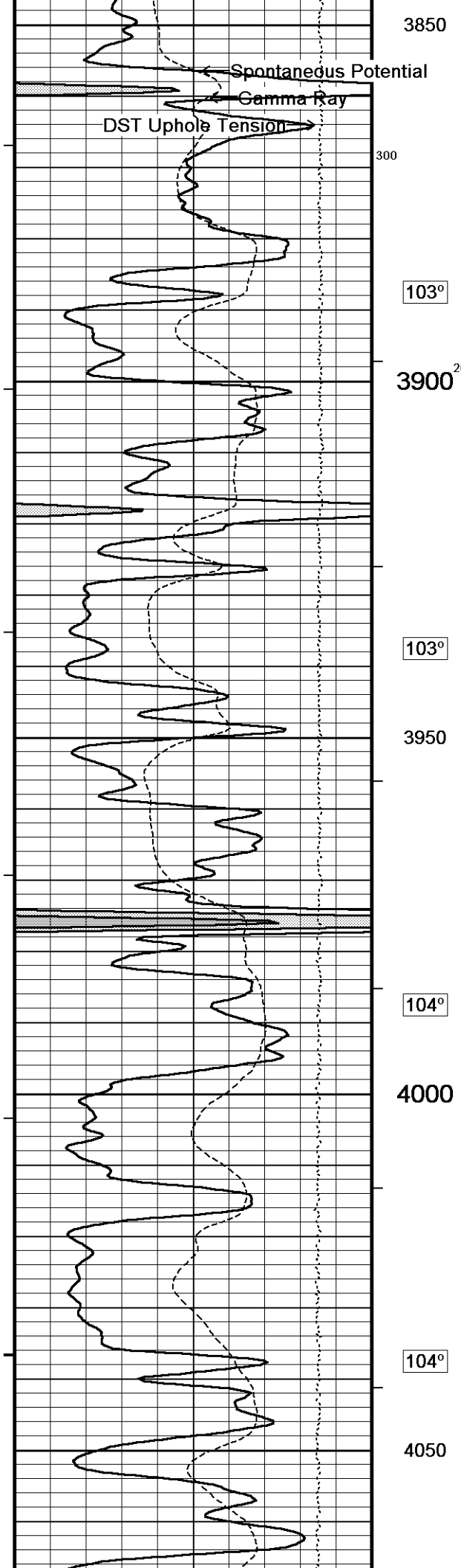
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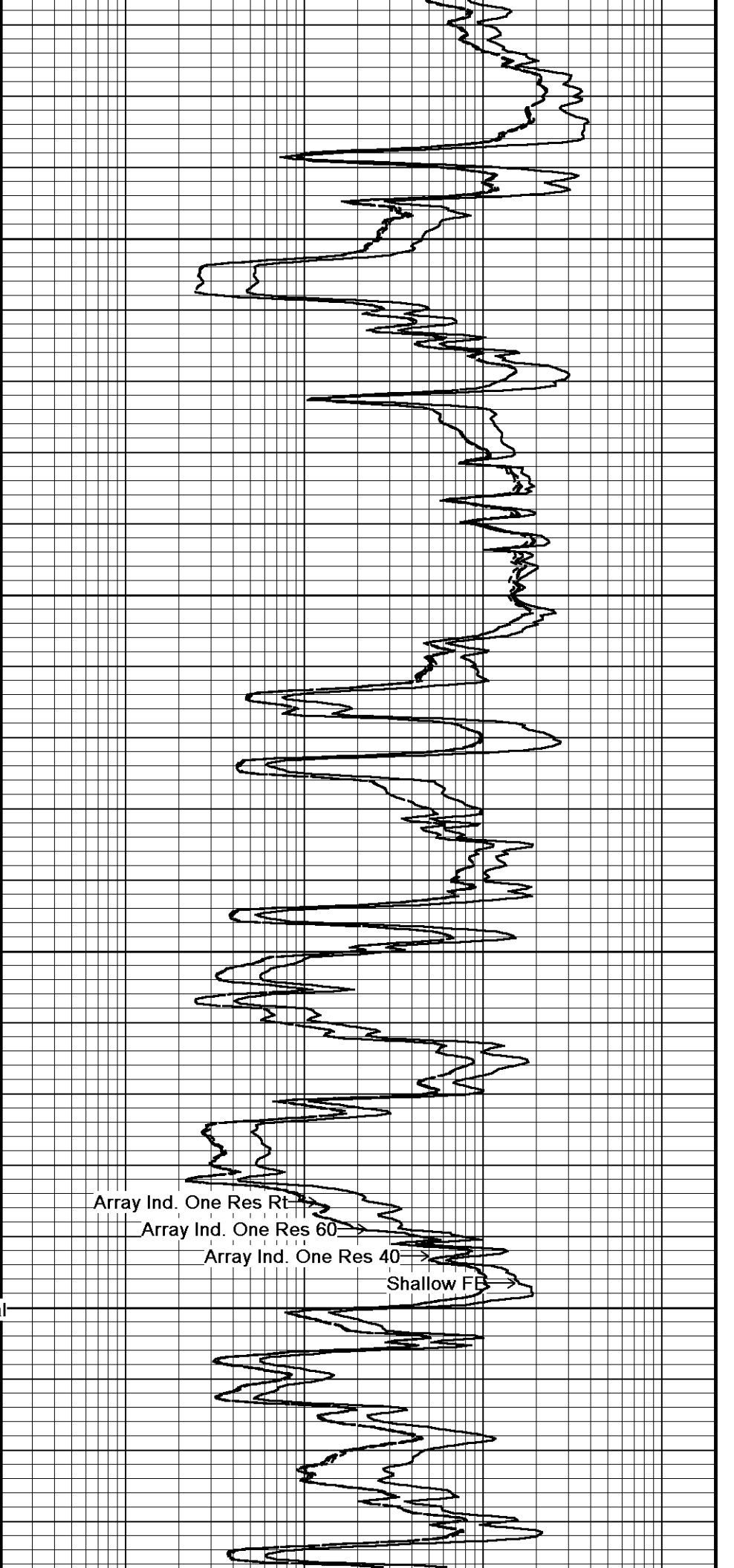
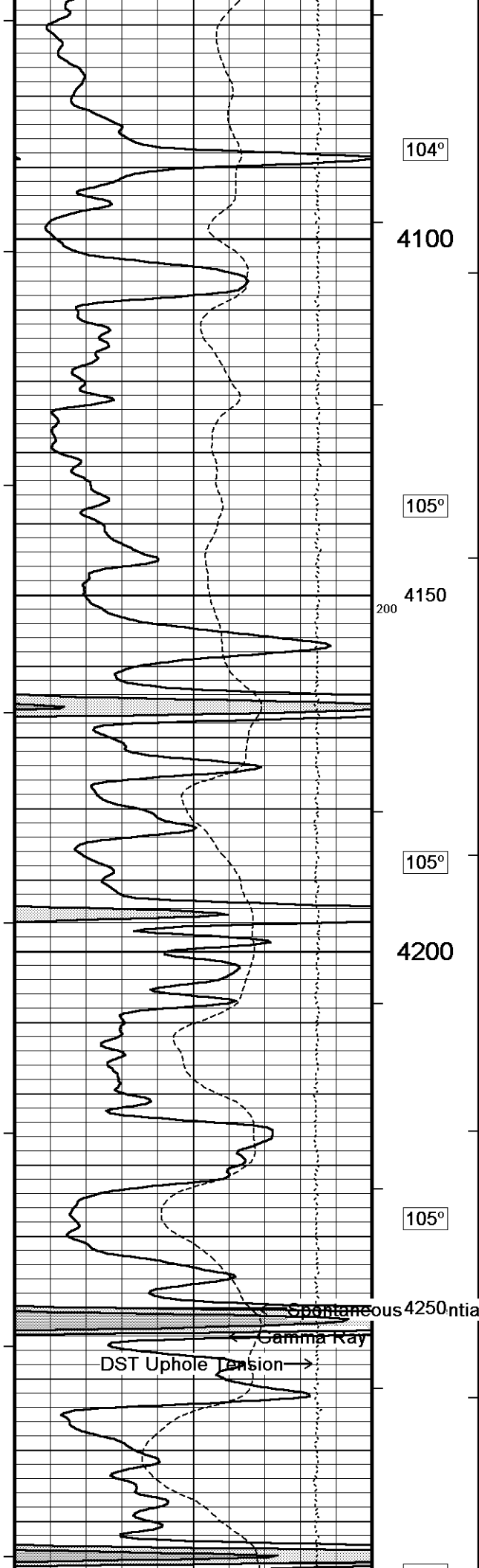
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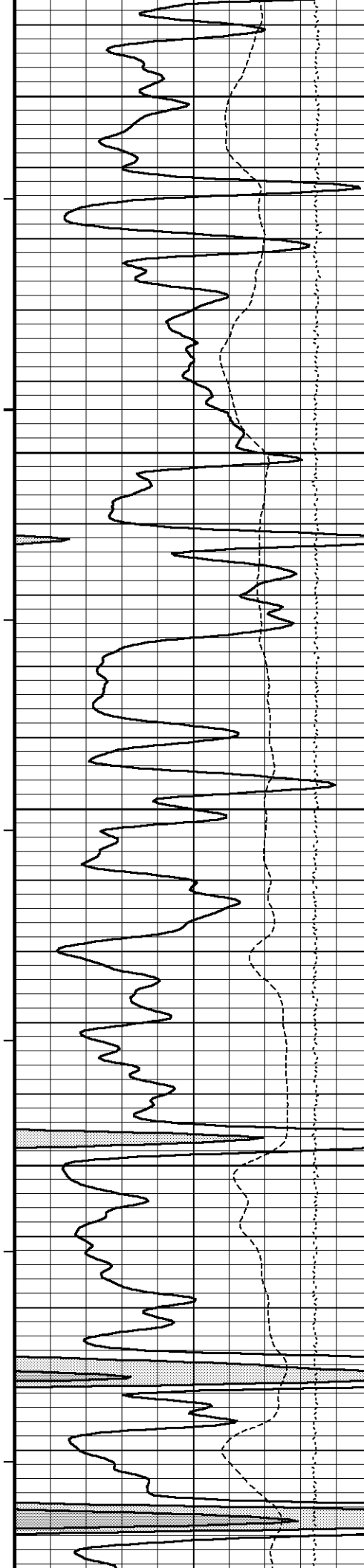
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583



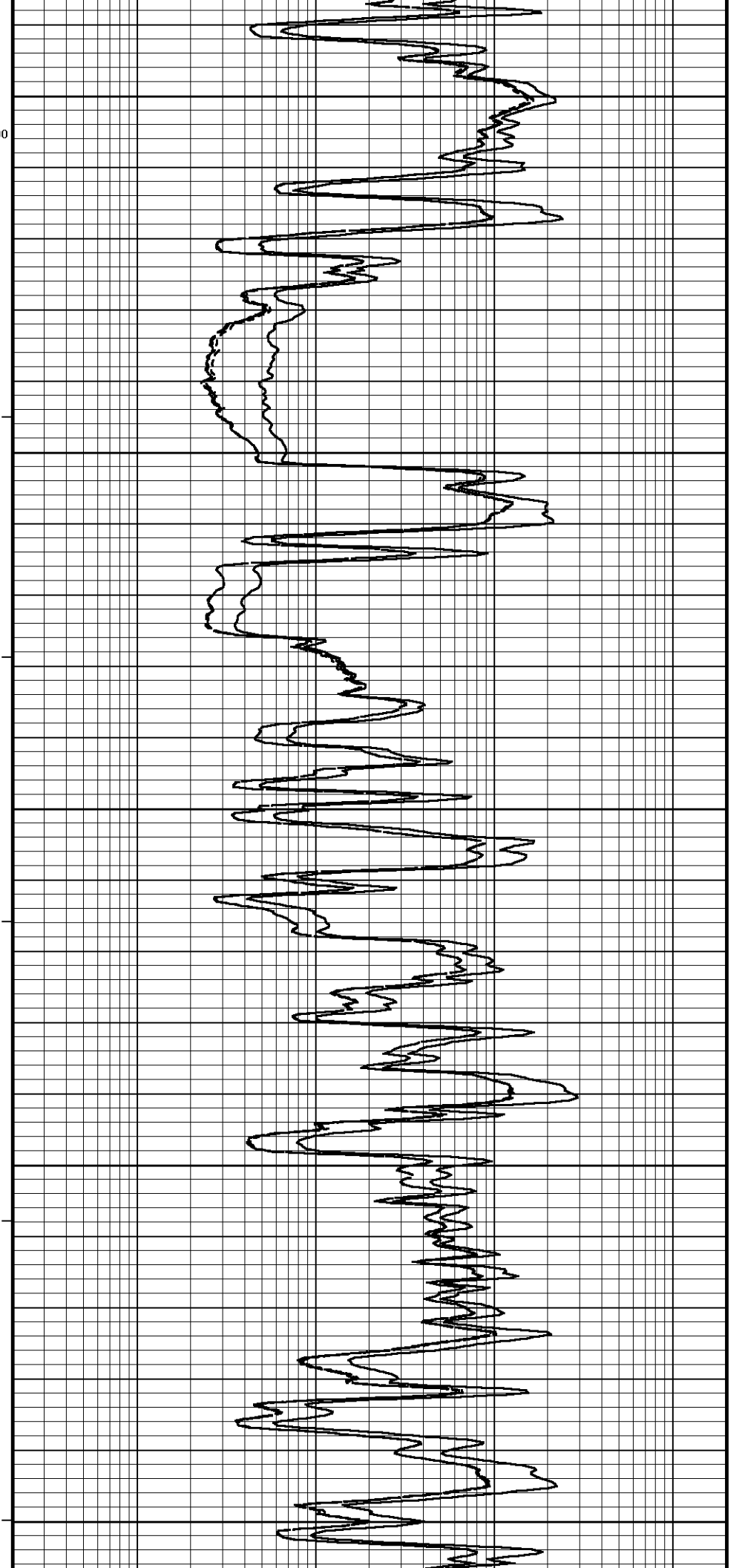


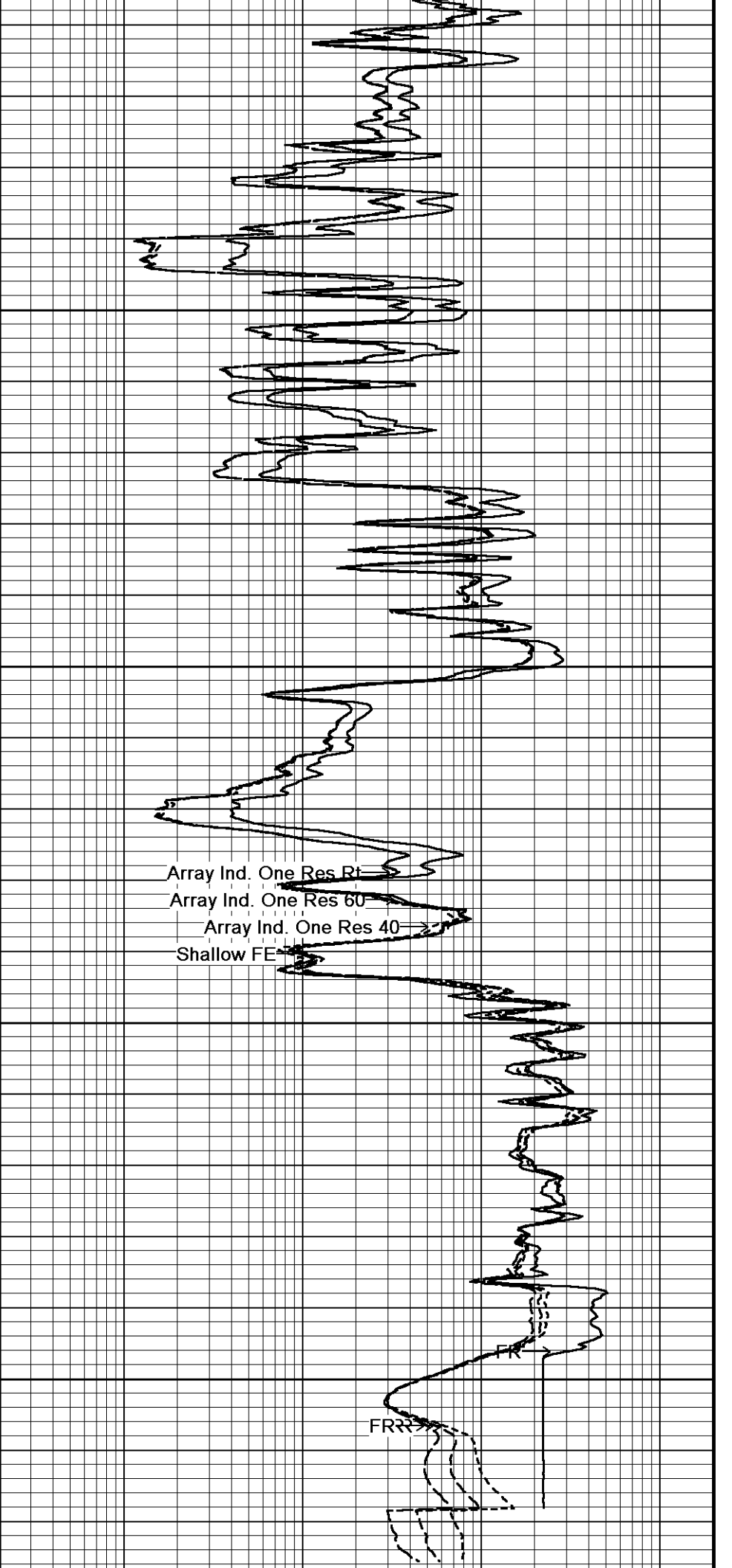
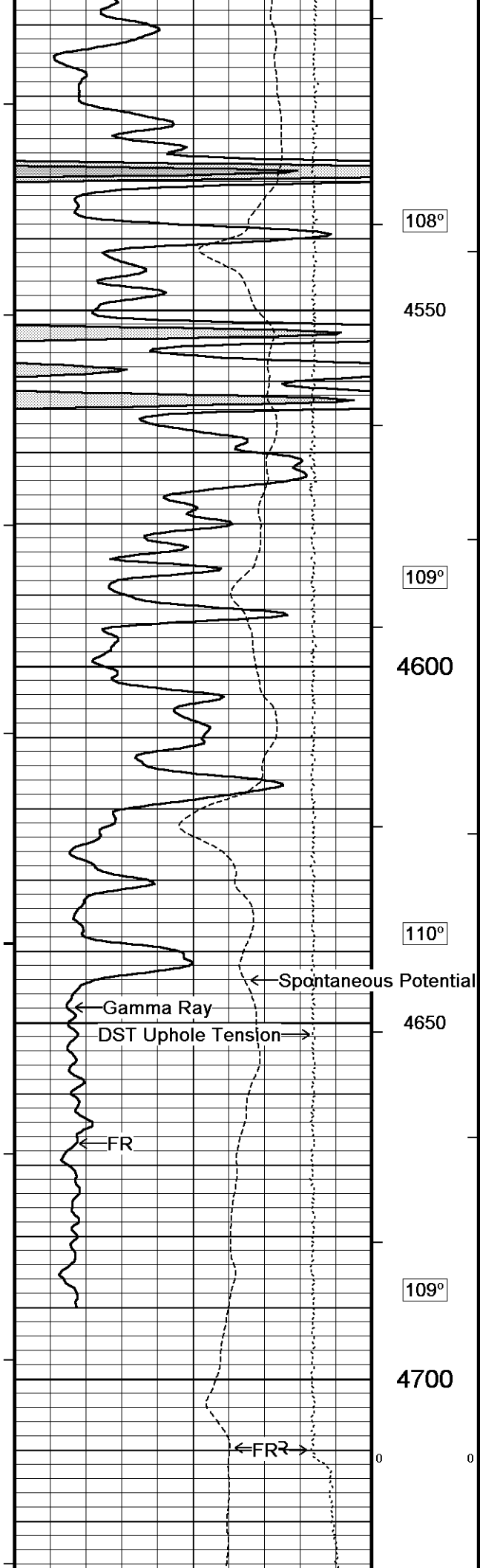


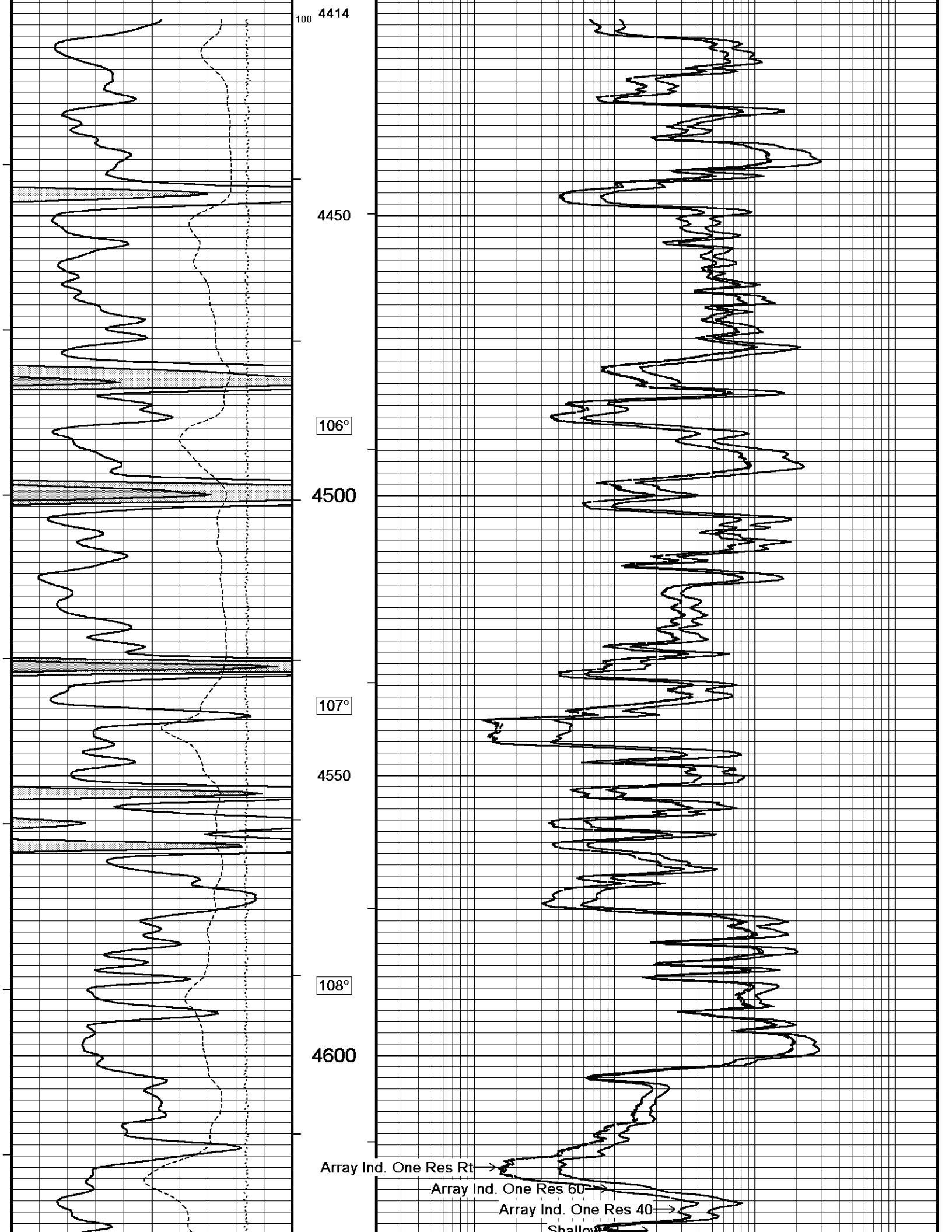


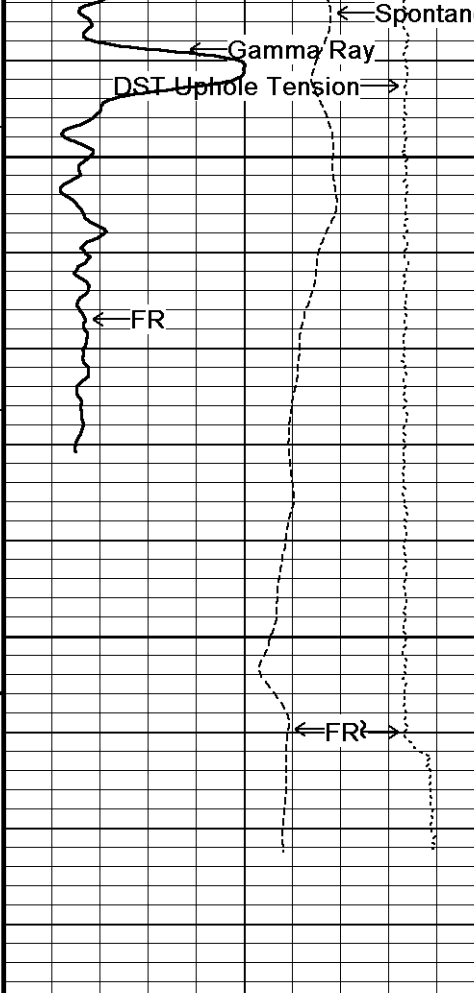


106°
4300
100
106°
4350
106°
4400
100
107°
4450
107°
4500









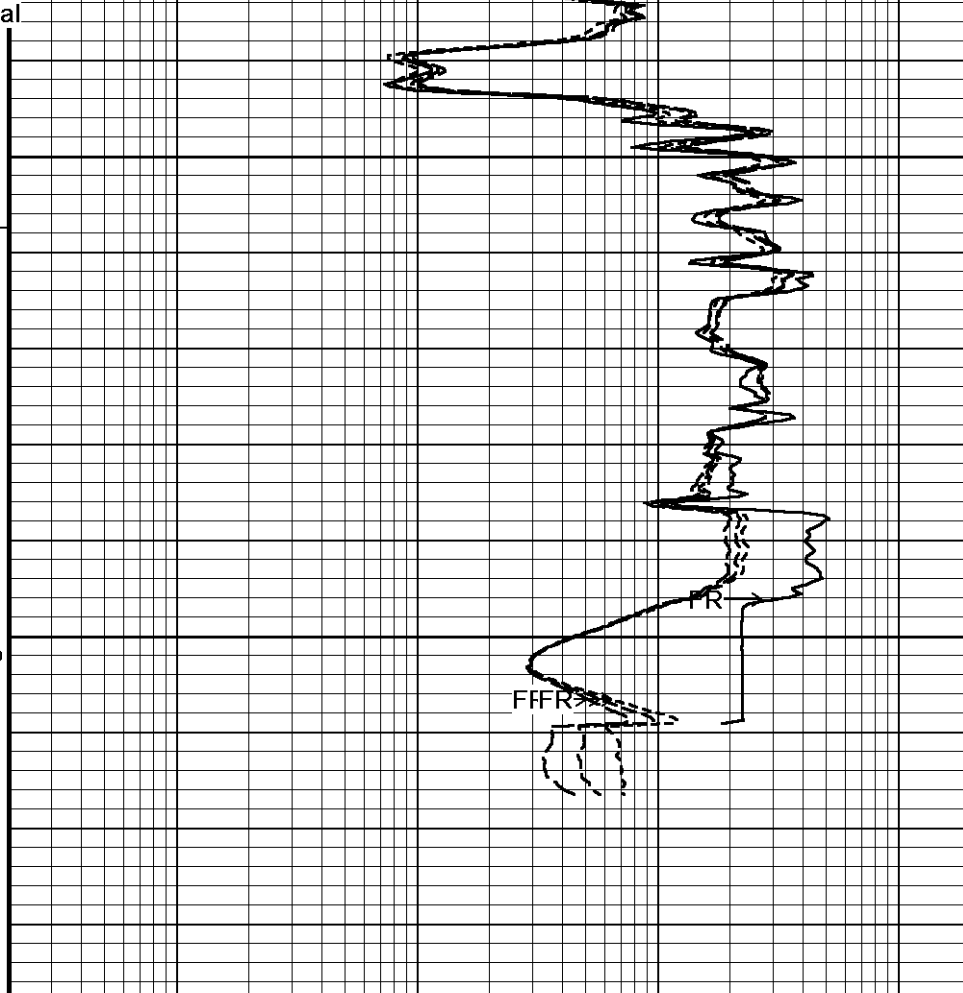
Spontaneous Potential
109°

Gamma Ray

DST Uphole Tension

FR

FR



Shallow FE

FR

FIFR

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

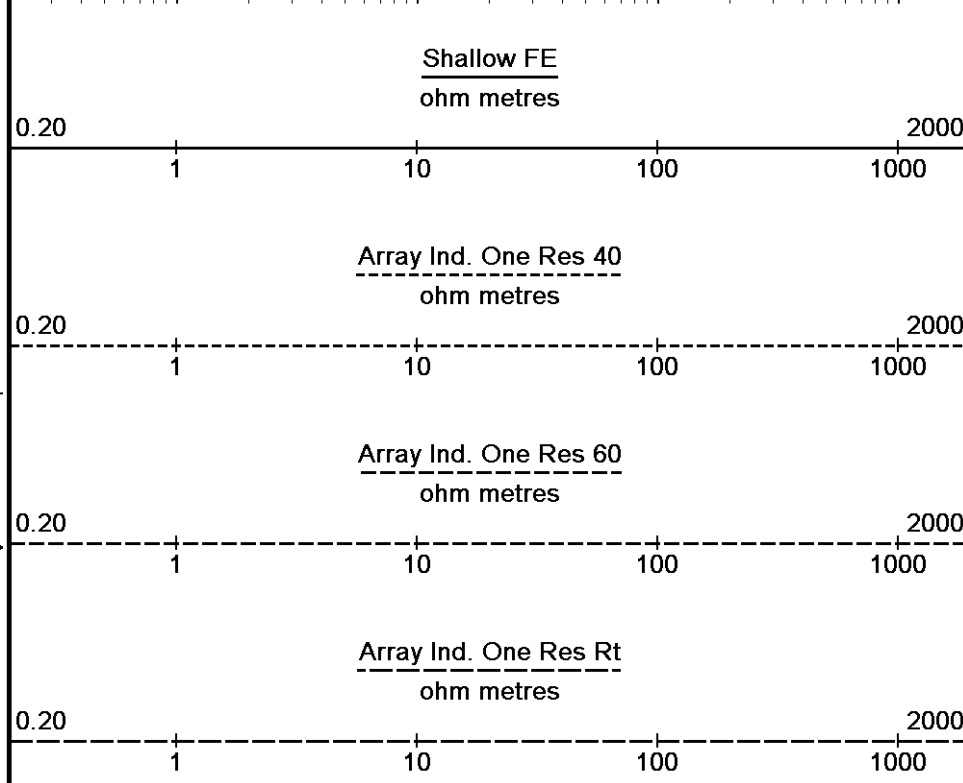
Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:600



Shallow FE
ohm metres

Array Ind. One Res 40
ohm metres

Array Ind. One Res 60
ohm metres

Array Ind. One Res Rt
ohm metres

Depth Based Data - Maximum Sampling Increment 10.0cm
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 Filename: C:\Minimus 13.05.9583\Log\Shakespeare Camp...Shakespeare Campbell #3-17 Repeat.dta
 Recorded on 25-NOV-2013 06:17
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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 Main.dta

General Parameters

Mud Resistivity	1.280	ohm-metres
Mud Resistivity Temperature	94.000	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	MML Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 25-NOV-2013 05:39

Reading No	Measured	Calibrated (lbs)
1	15665.91	0.00
2	16246.60	399.00

Gamma Calibration MCG-B 39

Field Calibration on 24-NOV-2013 13:13

	Measured	Calibrated (API)
Background	69	47
Calibrator (Gross)	1146	772
Calibrator (Net)	1077	725

Gamma Constants MCG-B 39

Last Edited on 25-NOV-2013,04:05

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	%

SP Calibration MCG-B 39

Field Calibration on 30-JUL-2013,09:41

	Measured	Calibrated (mV)
Reference 1	105.8	100.0
Reference 2	-94.3	-100.0

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 30-JUL-2013,09:41

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 30-JUL-2013,09:41

Pre-filter Length	11
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Caliper Calibration MML-A 3

Base Calibration on 23-NOV-2013 19:41

Field Calibration on 24-NOV-2013 13:02

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15082	5.98
2	18325	7.97
3	21622	9.86
4	25597	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)
5.98

Actual Caliper (in)
5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 23-NOV-2013 17:02
Field Check on 24-NOV-2013 13:00

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	78.3	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	63.0	63.0
Micro Inverse	48.3	48.3

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 24-NOV-2013,16:39

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 19-NOV-2013 15:33
Field Check on 24-NOV-2013 13:17

Base Calibration

Ratio	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3066	94	3714	110
	32.484		33.764	

Field Calibrator at Base

Ratio	Calibrated (cps)
	1680 2433
	0.691

Field Check

Ratio	Calibrated (cps)
	1679 2427
	0.677

Neutron Constants MDN-A.B 66

Last Edited on 24-NOV-2013,16:39

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 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 353

Base Calibration on 07-OCT-2013 09:02
Field Check on 24-NOV-2013 12:53

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.2	126.8
Base Check		281.0
Field Check		281.2

FE Constants MFE-B.J 353

Last Edited on 24-NOV-2013,16:39

Running Mode No Sleeve

Running Mode	RTS	0.1268	
MFE K Factor			
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 167

Base Calibration on 02-OCT-2013,14:21
Field Check on 24-NOV-2013 12:52

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			11.6	3841.5
2			29.3	3479.9
3			29.0	3055.8
4			19.8	2083.4
Deep			18.5	2050.6
Medium			42.2	3995.2
Shallow			42.5	5058.6

Array Temperature 50.4 Deg F

Induction Constants MAI-A.A 167

Last Edited on 24-NOV-2013,16:39

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	60.00	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	

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

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 15-SEP-2013,16:14

Pre-filter Length 11

Photo Density Calibration MPD-C.A 216

Base Calibration on 04-NOV-2013,14:26

Field Check on 24-NOV-2013 12:59

Density Calibration	Measured		Calibrated (sdu)	
Base Calibration	Near	Far	Near	Far
Reference 1	53102	19935	52888	19096
Reference 2	25779	2814	25270	2567

Field Check at Base

1121.7 1316.5

Field Check

1122.3 1321.1

PE Calibration

Base Calibration	WS	Measured	Ratio	Calibrated
		WH		Ratio
Background	205	1001		
Reference 1	18282	52929	0.348	0.309
Reference 2	7413	25647	0.292	0.273

Field Check at Base

204.5 1000.7

Field Check

202.5 1002.2

Density Constants MPD-C.A 216

Last Edited on 25-NOV-2013,04:04

Density Source Id	18235B
Nylon Calibrator Number	DNCE528
Aluminium Calibrator Number	DACD528
Density Shoe Profile	8 inch
Caliper Source for Processing	Density Caliper
PE Correction to Density	Not Applied
Mud Density	1.09 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 (m)
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

Caliper Calibration MPD-C.A 216

Base Calibration on 03-NOV-2013 23:03

Field Calibration on 24-NOV-2013 12:54

Base Calibration	Measured	Calibrator Size (in)
Reading No		
1	16494	4.01
2	26560	5.96
3	36690	7.98
4	46752	9.95
5	57360	11.91
6	N/A	N/A

Field Calibration

Measured Caliper (in)
5.96

Actual Caliper (in)
5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 Main.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-B 39 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

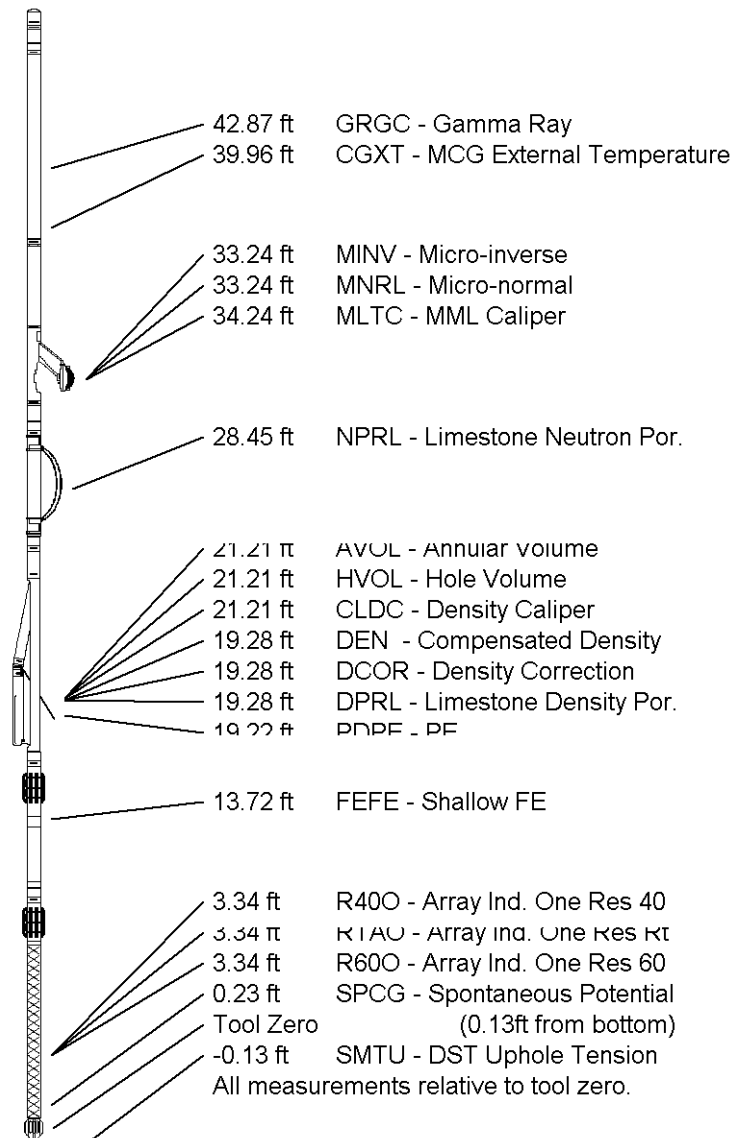
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focused 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 SHAKESPEARE OIL CO.
WELL CAMPBELL #3-17
FIELD WILDCAT
PROVINCE/COUNTY LOGAN
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	3039.00	feet	First Reading	4707.00	feet
Elevation Drill Floor	3037.00	feet	Depth Driller	4715.00	feet
Elevation Ground Level	3029.00	feet	Depth Logger	4710.00	feet



**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

Weatherford®

Weatherford

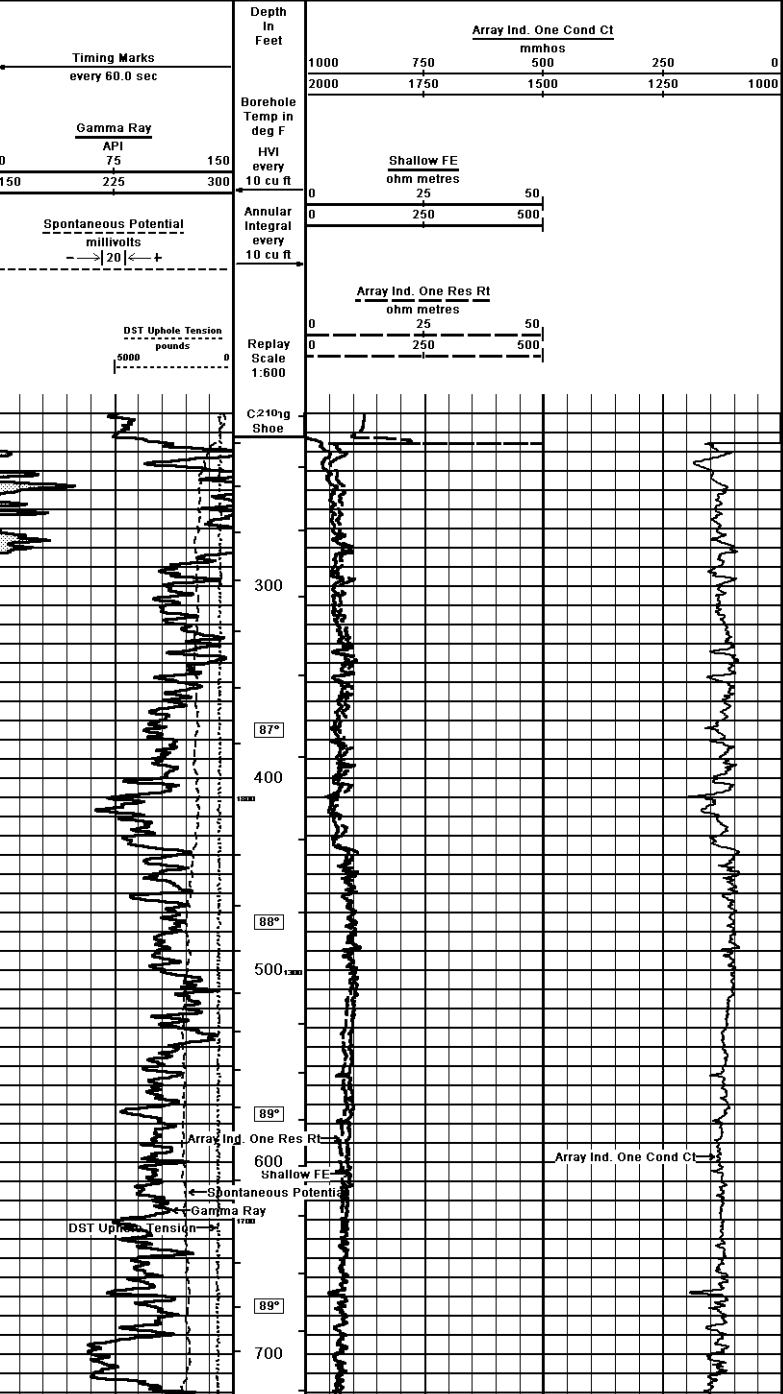
ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

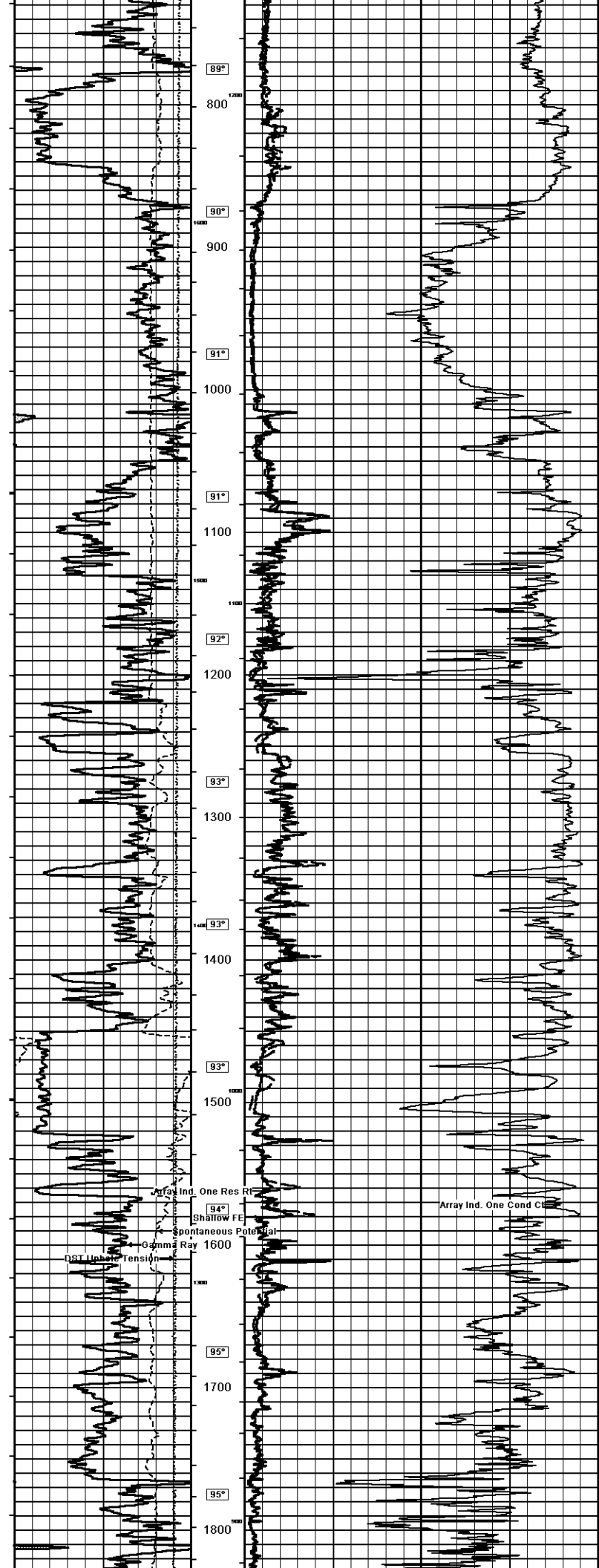
COMPANY: SHAKEPEARE OIL CO.
WELL: CAMPBELL #3-17
FIELD: WILDCAT
PROVINCE/COUNTY: LOGAN
COUNTRY/STATE: U.S.A. / KANSAS
LOCATION: 1855' FSL & 1728' FEL
SEC 17 **TWP 32N** **R3E** **OWASSEES**
17 **13S** **32W** **MPLONON**
17 **13S** **32W** **MPL**

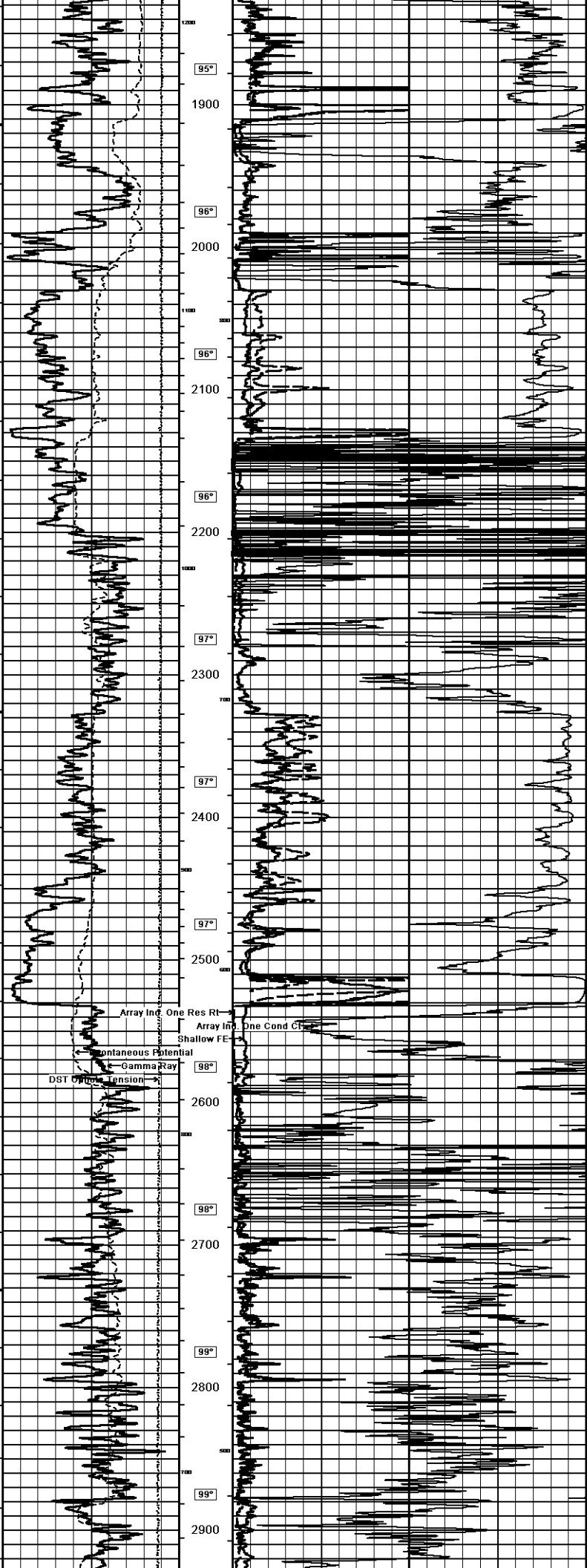
Run Number: 15-10821218
Permanent Datum: O.L., Elevation 3023 feet
Log Measured From: KB @ 10 FEET
Drilling Measured From: K-B @ 10 FEET
Date: 25-NOV-2013
Run Number: ONE
Service Order: 3447649
Depth Collar: 4715.00 feet
Depth Logger: 4710.00 feet
First Reading: 4707.00 feet
Last Reading: 227.00 feet
Casing Outer: 227.00 feet
Casing Logger: 227.00 feet
Bit Size: 7.875 inches
Flow Fluid Type: CHEMICAL
Density/Viscosity: 9.10 lbm/sg 44.00 CP
pH/Fund Loss: 11.00 ELOWLINE
Sample Source:
Rm @ Measured Temp: 0.97 @ 81.0 ohm-m
Rmt @ Measured Temp: 0.77 @ 81.0 ohm-m
Rmt @ Measured Temp: 1.16 @ 81.0 ohm-m
Source Rmt/Rmc: CALC CALC
Rm @ BHT: 0.77 @ 109.0 ohm-m
Time Since Circulation: 4 HOURS
Max Recorded Temp: 109.00 deg F
Equipment/Base: 13096 LIB
Recorded By: R.HOFFMAN
Reviewed By: TIM PRIEST
Checked By: TIM PRIEST
Job #: LRI-535

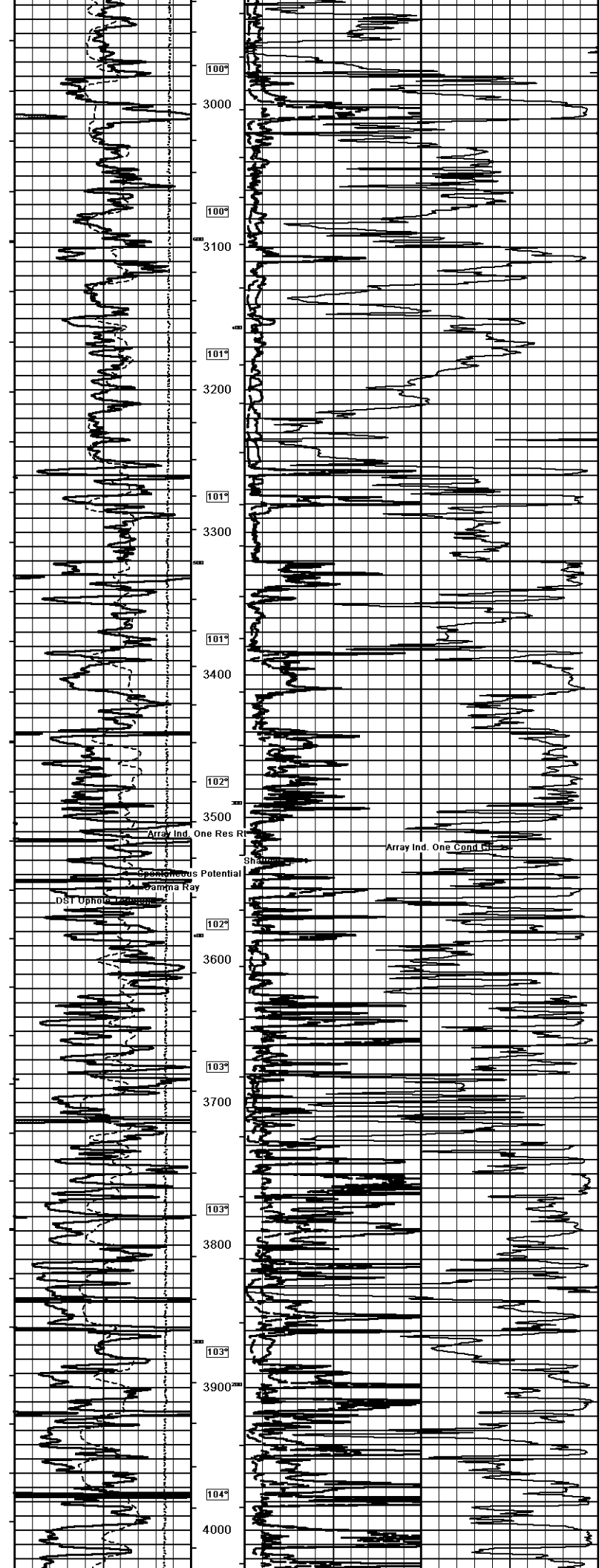
1 INCH MAIN

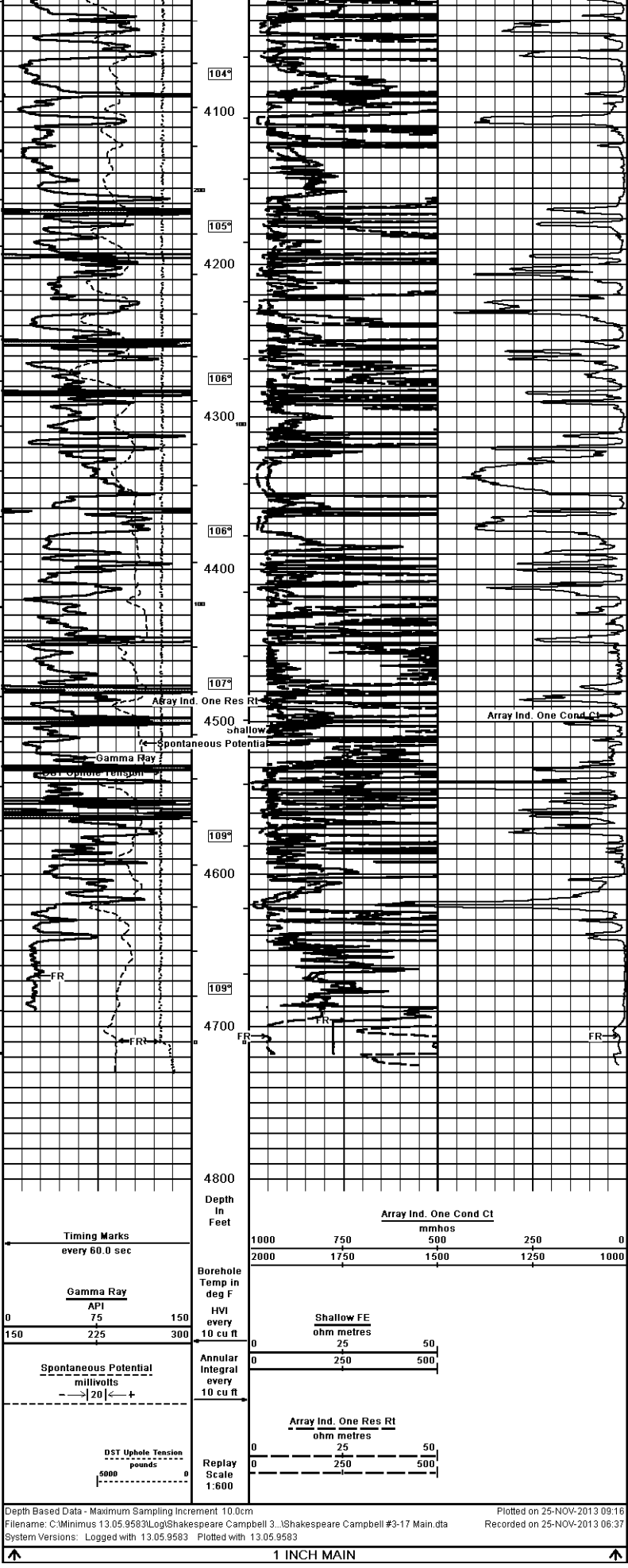
Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 25-NOV-2013 09:16
 Filename: C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3...Shakespeare Campbell #3-17 Main.dta
 Recorded on 25-NOV-2013 06:37
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583











COMPANY SHAKESPEARE OIL CO.
 WELL CAMPBELL #3-17
 FIELD WILDCAT
 PROVINCE/COUNTY LOGAN
 COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	3039.00	feet	First Reading	4707.00	feet
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ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG