



**Weatherford**<sup>®</sup>

**ARRAY INDUCTION  
SHALLOW FOCUSED  
ELECTRIC LOG**

COMPANY	O'BRIEN RESOURCES, LLC.		
WELL	PECK 1 #2		
FIELD	WILDCAT		
PROVINCE/COUNTY LANE	U.S.A. / KANSAS		
COUNTRY/STATE	2455' FNL & 2072' FWL		
LOCATION	U.S.A. / KANSAS		
SEC 1	TWP 18S	RGE 29W	Other Services
Latitude			MPD/MDN
Longitude			MML
API Number	15-101-222495		
Permanent Datum GL, Elevation	2748 feet		
Log Measured From	KB		
Drilling Measured From	KB		
Date	08-MAR-2014		
Run Number	ONE		
Service Order	4558-81483267		
Depth Driller	4665.00	feet	Elevations: 2755.00
Depth Logger	4668.00	feet	KB 2753.00
First Reading	4665.00	feet	DF 2748.00
Last Reading	266.00	feet	GL 2748.00
Casing Driller	265.00	feet	
Casing Logger	266.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.30 lb/USg	48.00 CP	
PH / Fluid Loss	10.00	6.80 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.28 @ 76.0	ohm-m	
Rmf @ Measured Temp	1.02 @ 76.0	ohm-m	
Rmc @ Measured Temp	1.54 @ 76.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.88 @ 111.0	ohm-m	
Time Since Circulation	3 HOURS		
Max Recorded Temp	111.00	deg F	
Equipment / Base	13244	LIB	
Recorded By	ADAM SILL		
Witnessed By	KURT TALBOTT		
JOB #	LB14-066		

**BOREHOLE RECORD**

Last Edited: 08-MAR-2014 14:35

Bit Size inches	Depth From feet	Depth To feet
7.875	265.00	4665.00

**CASING RECORD**

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	265.00	24.00

**REMARKS**

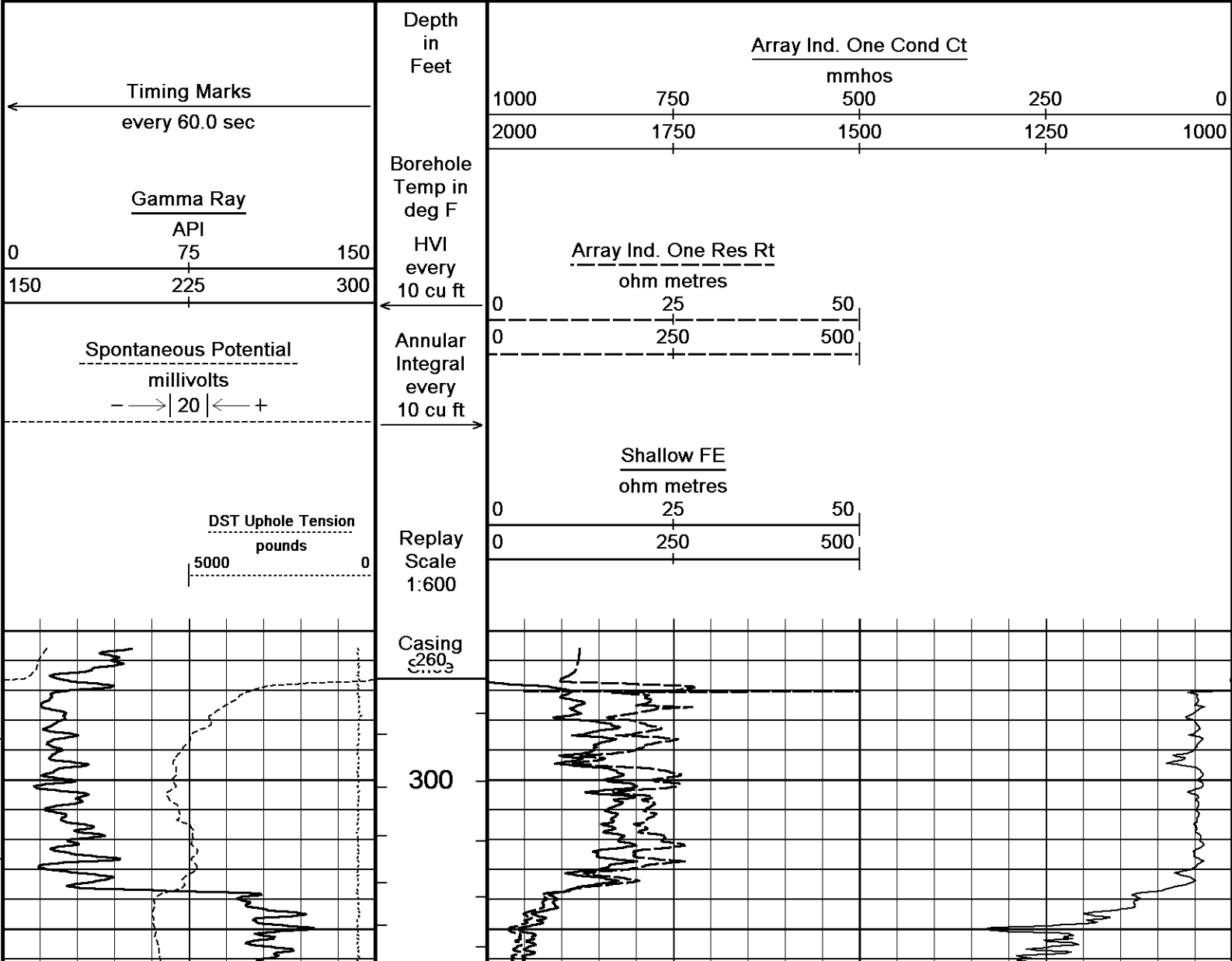
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  - 0.5 INCH STANDOFF USED ON MFE.
  - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2074 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 3600 FEET: 302 CU.FT.
- RIG: MAVERICK DRILLING 102

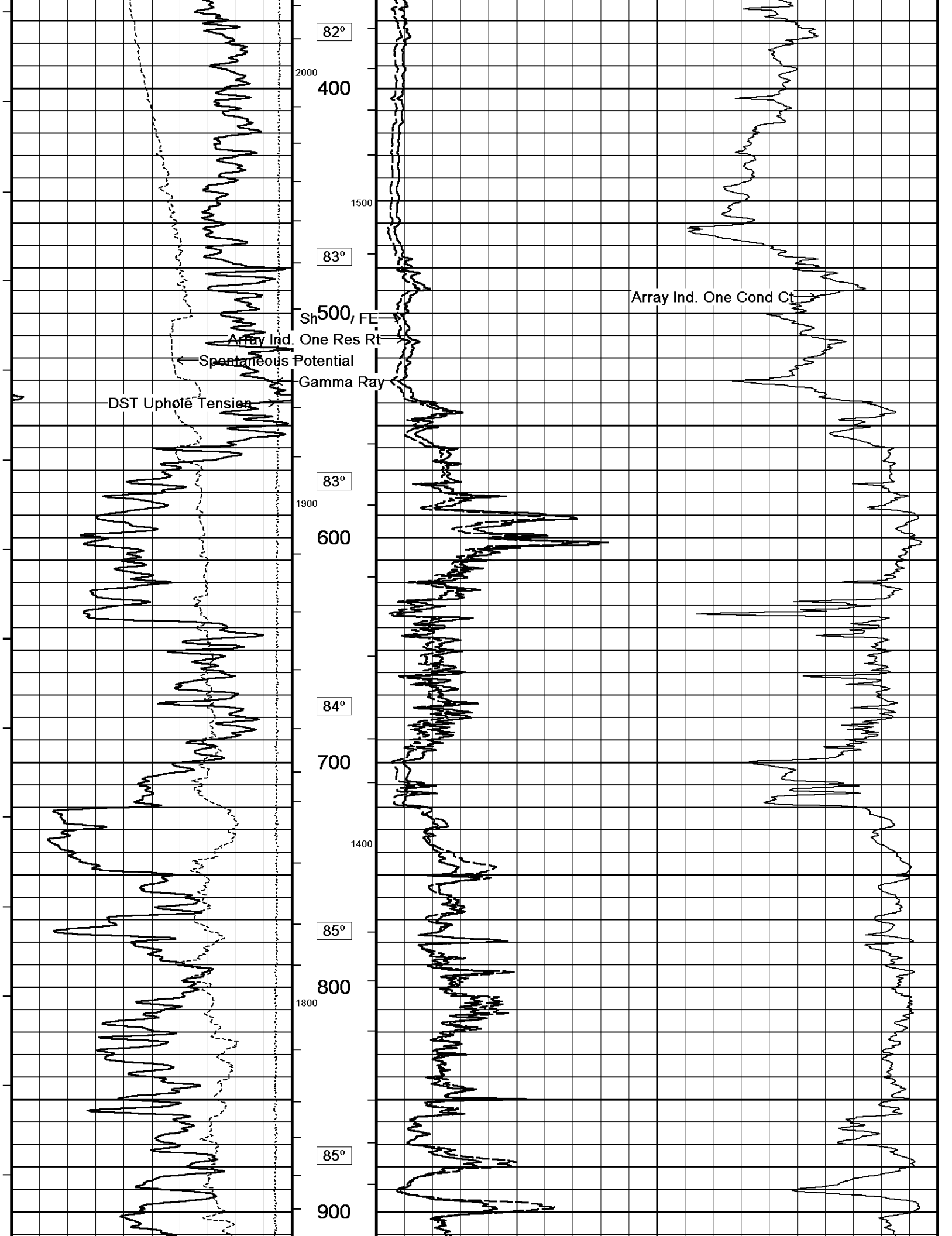
- ENGINEER: A. SILL.
- JUNIOR FIELD ENGINEER: J. RANDLE.
- OPERATOR: J. LaPOINT.

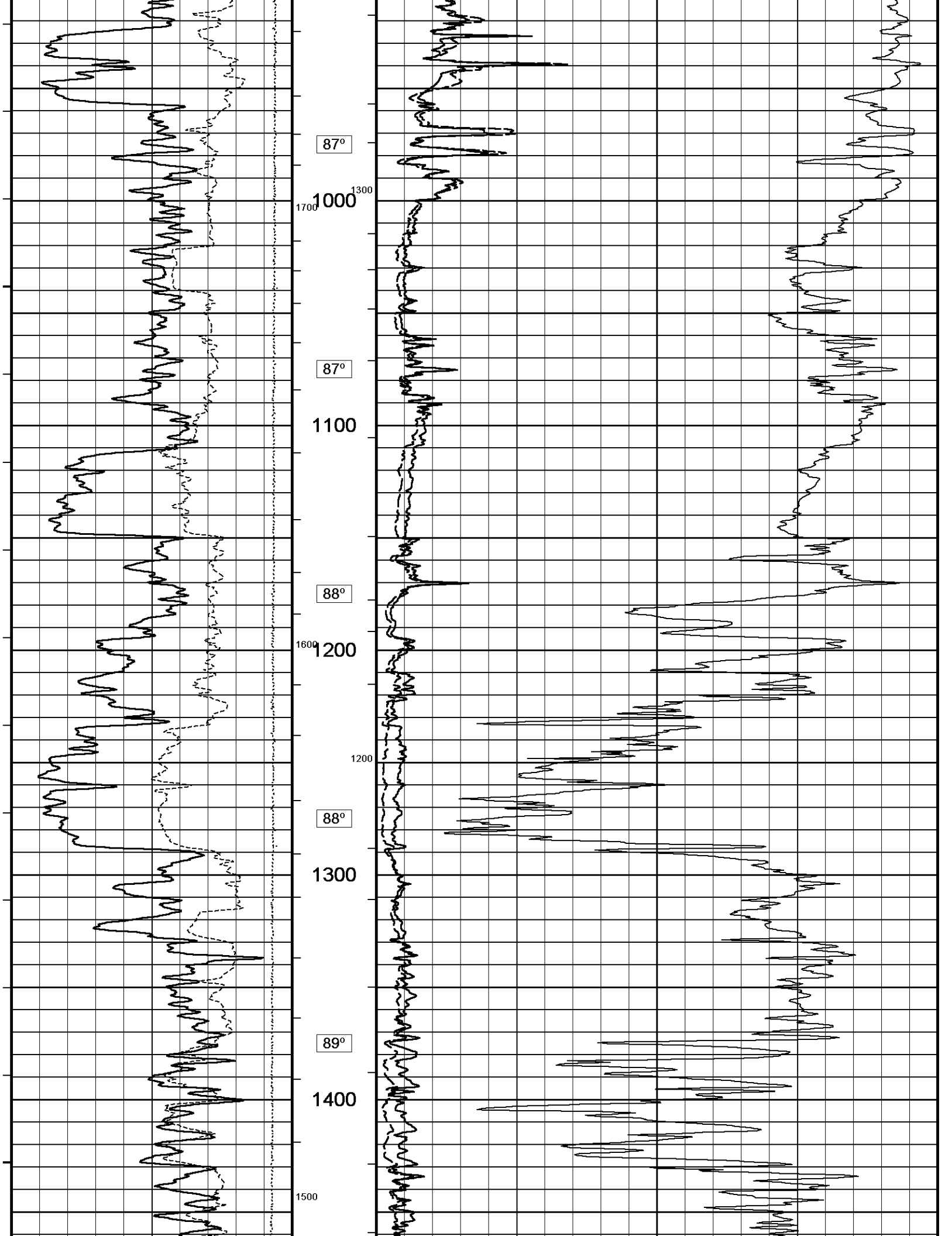
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will 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.

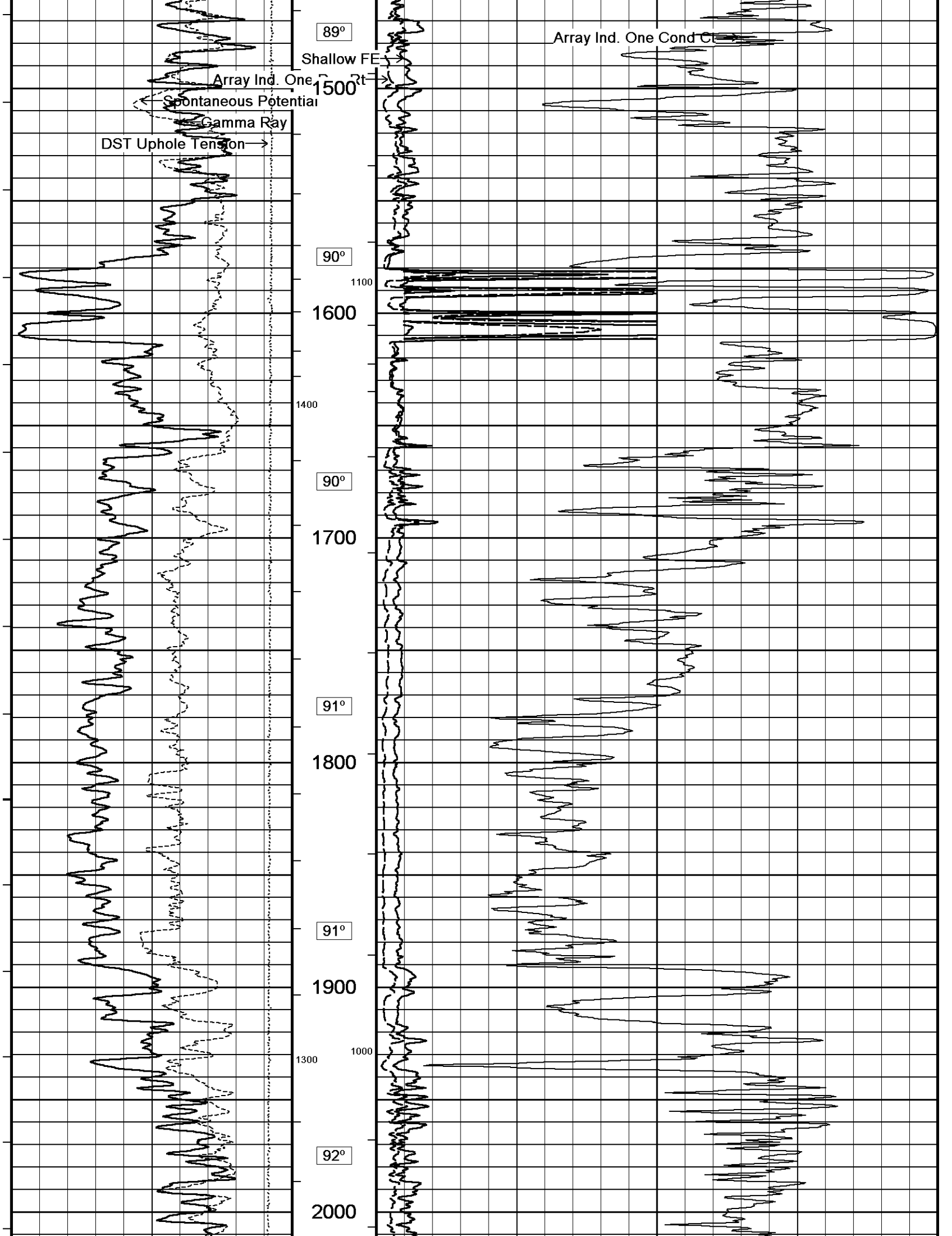
**2 INCH MAIN**

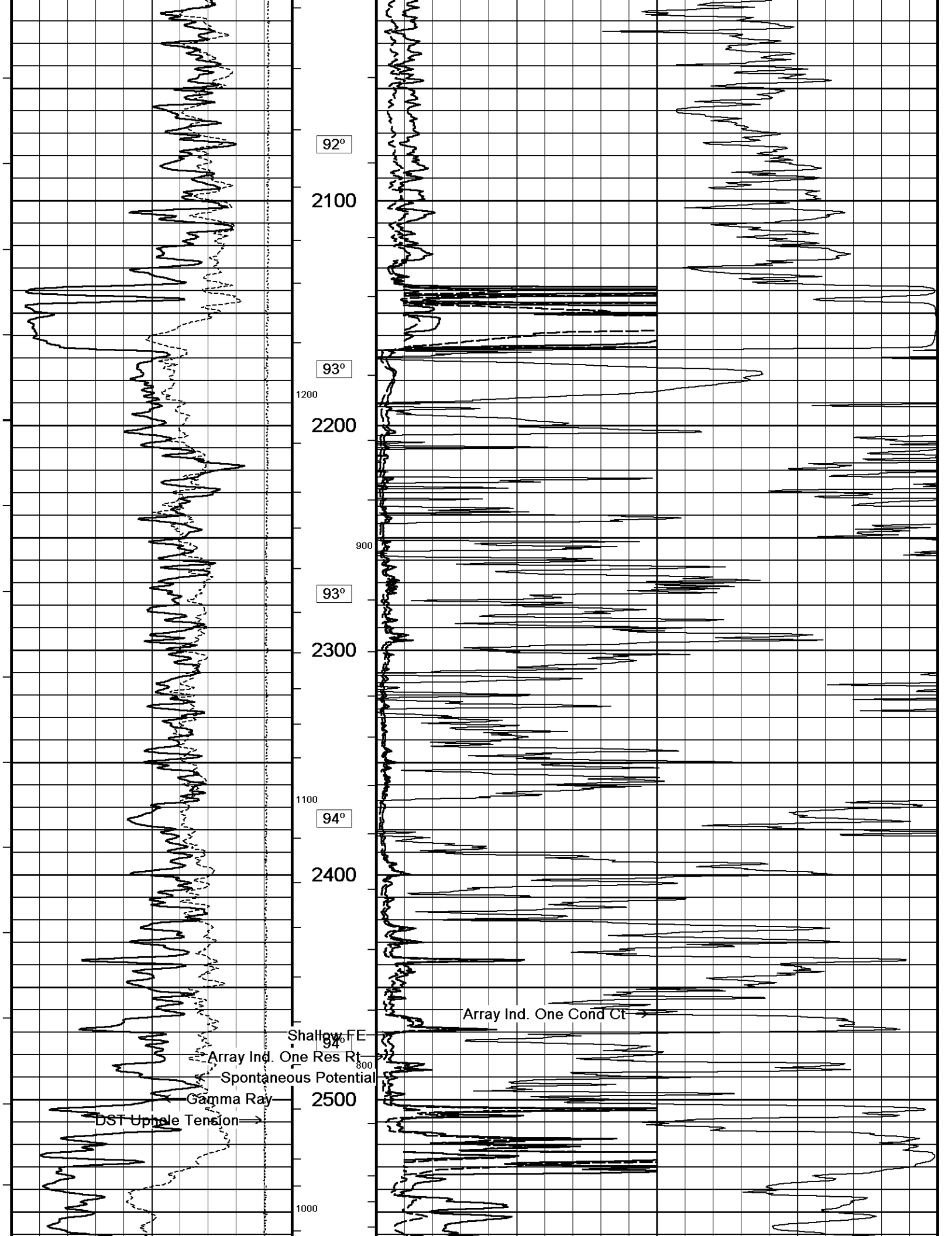
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 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

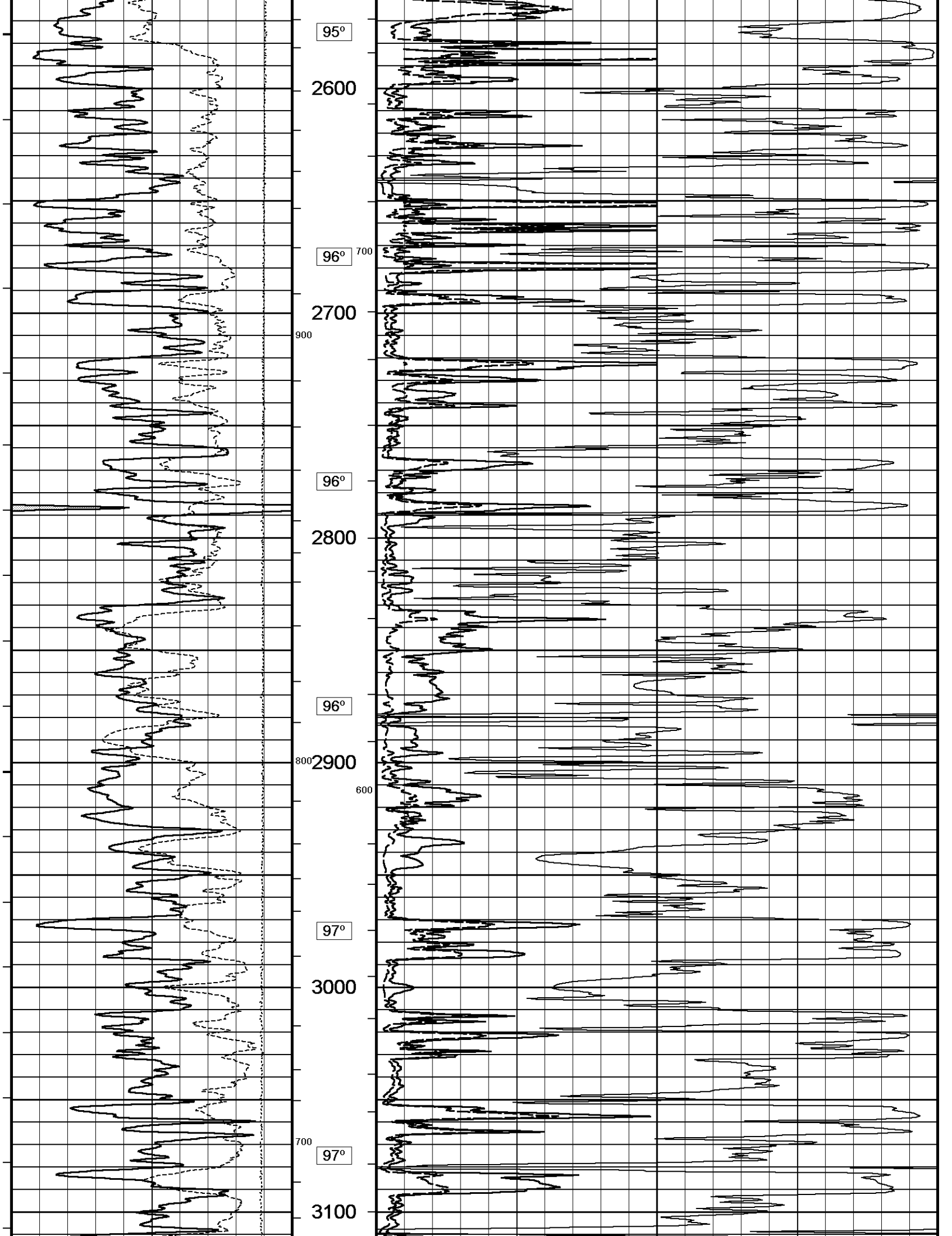


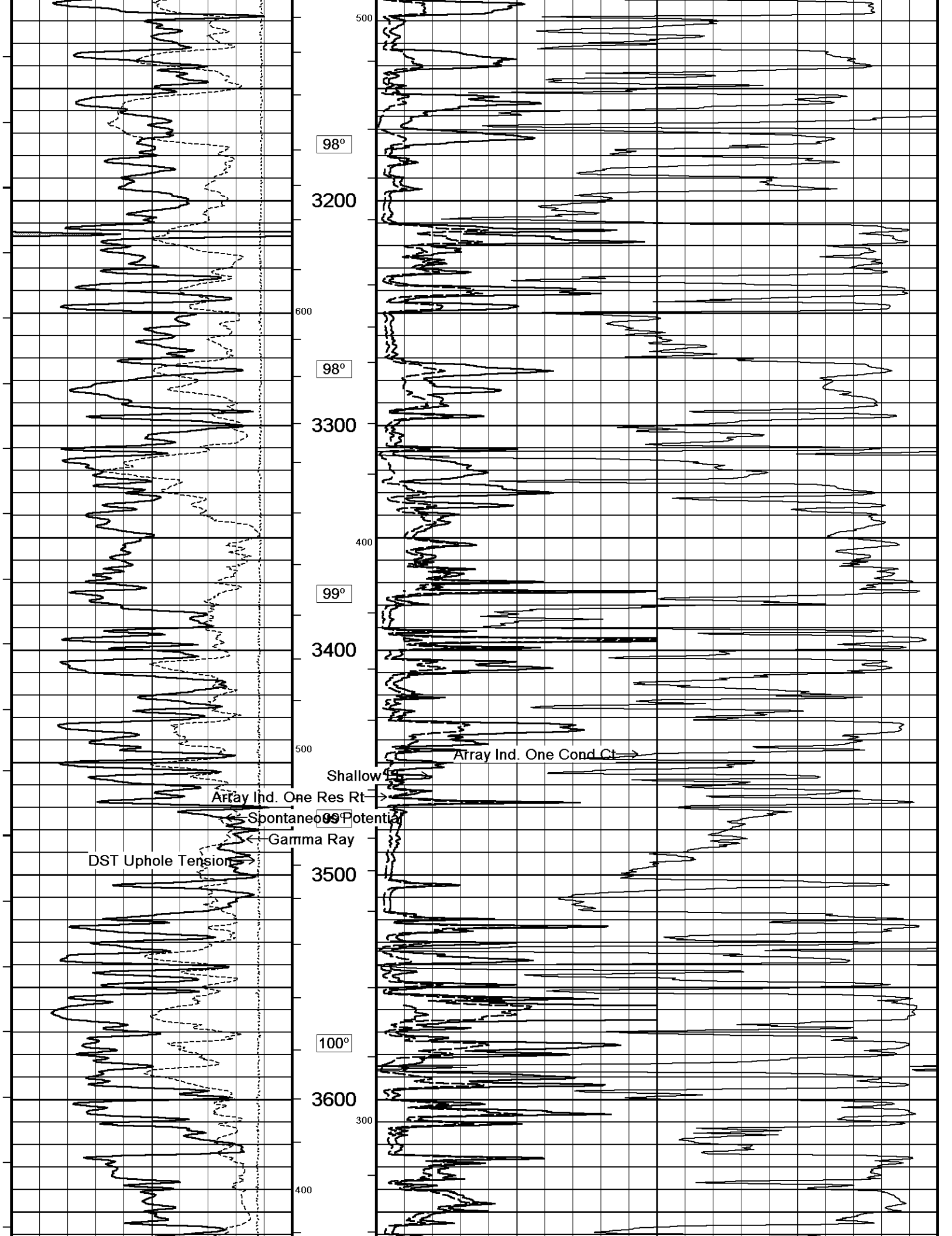


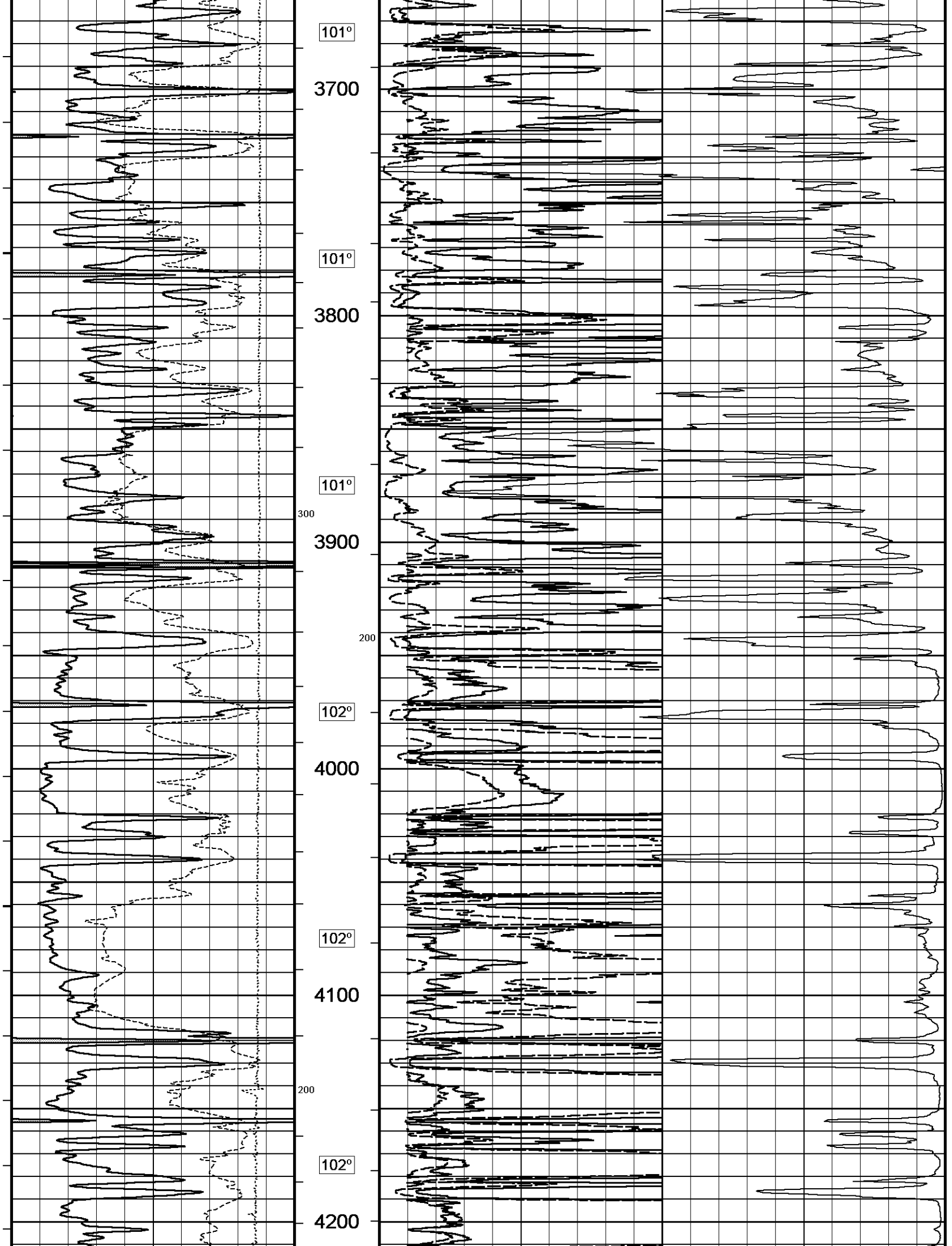


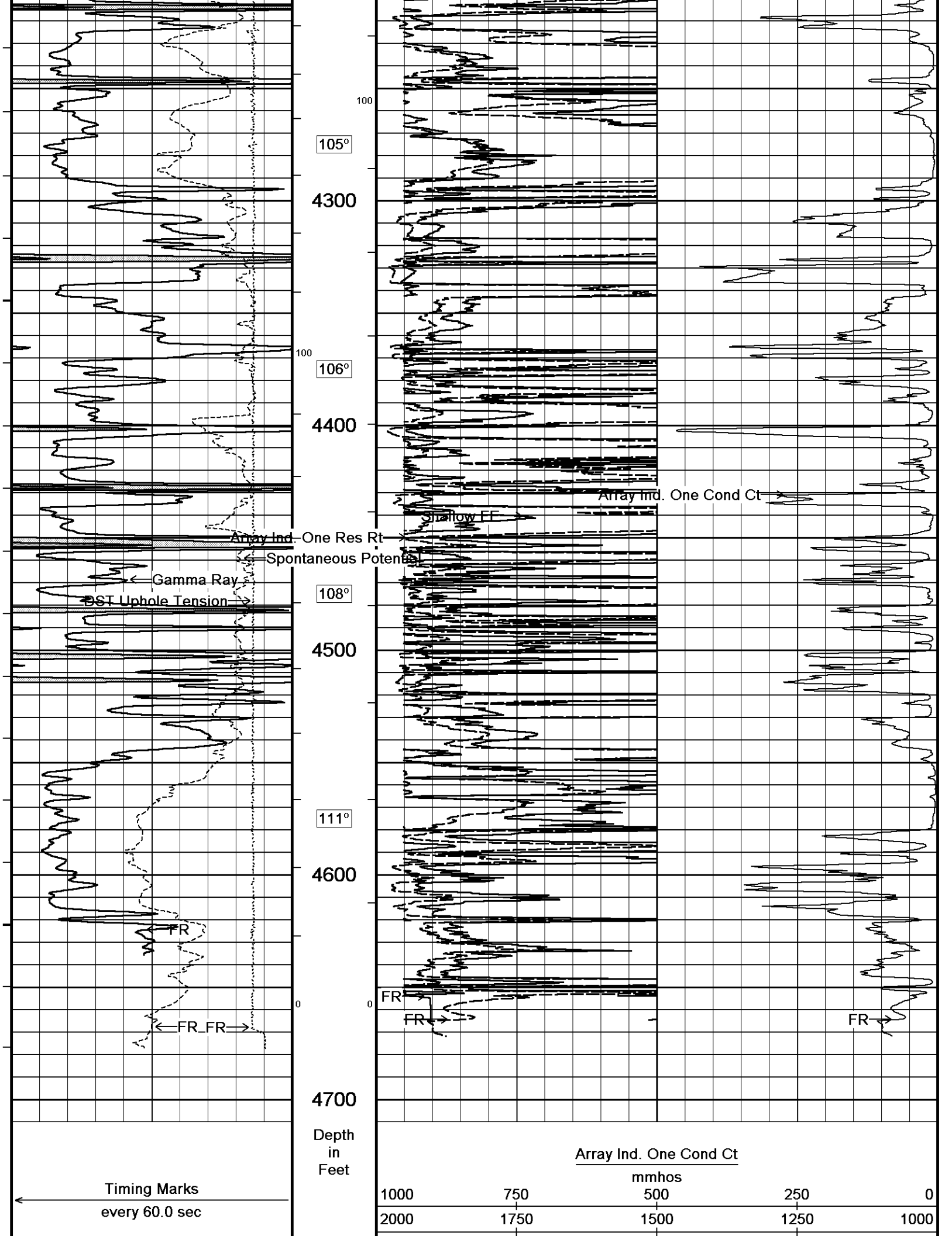


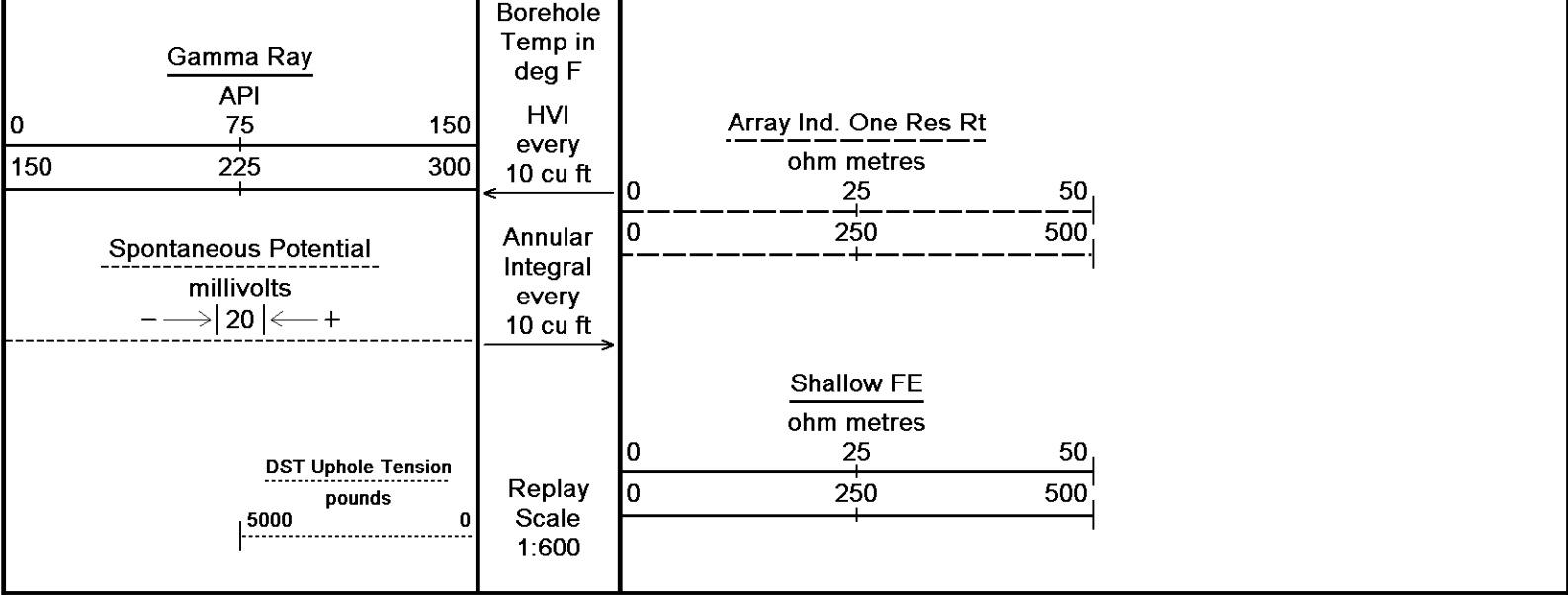










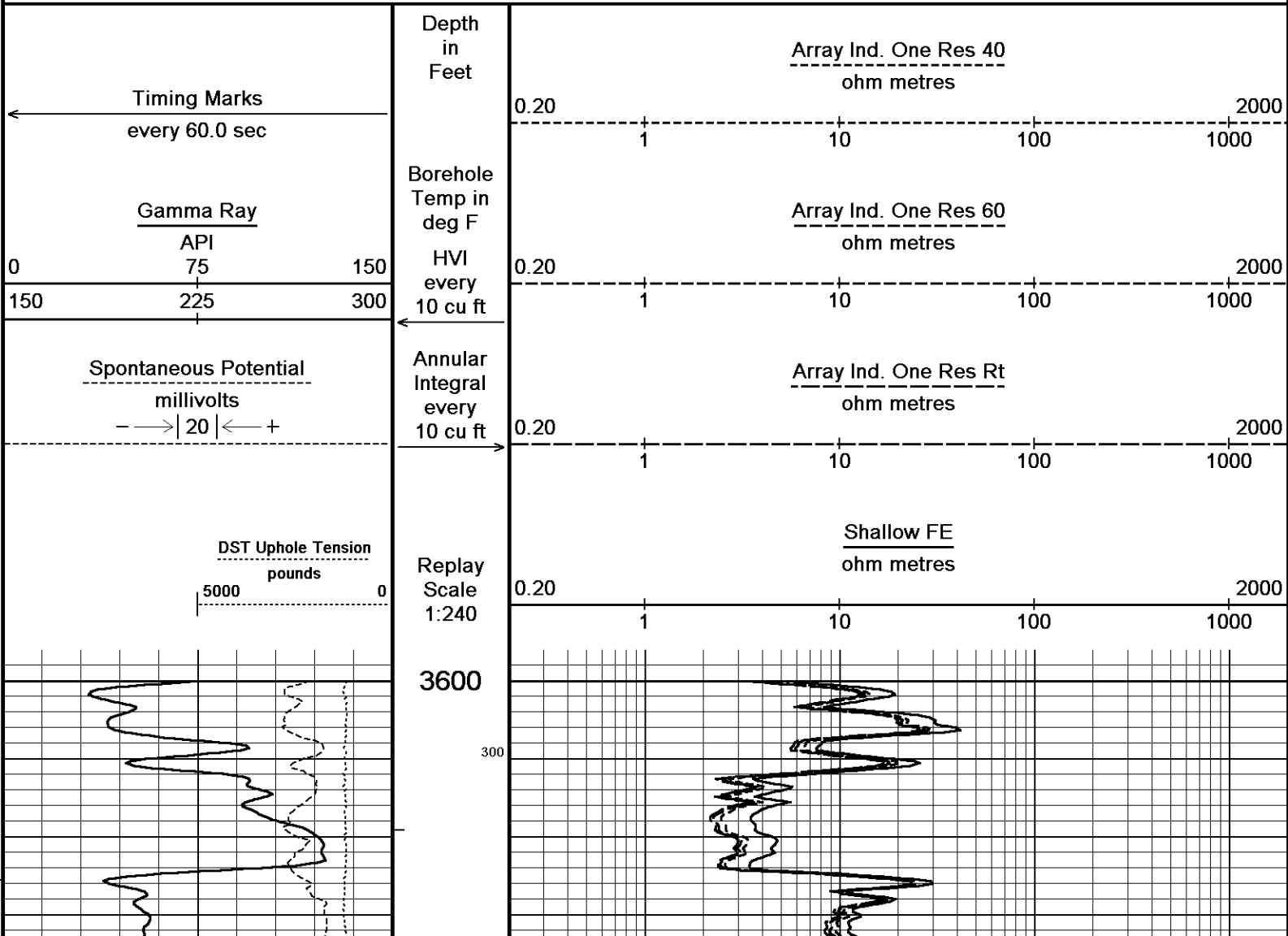


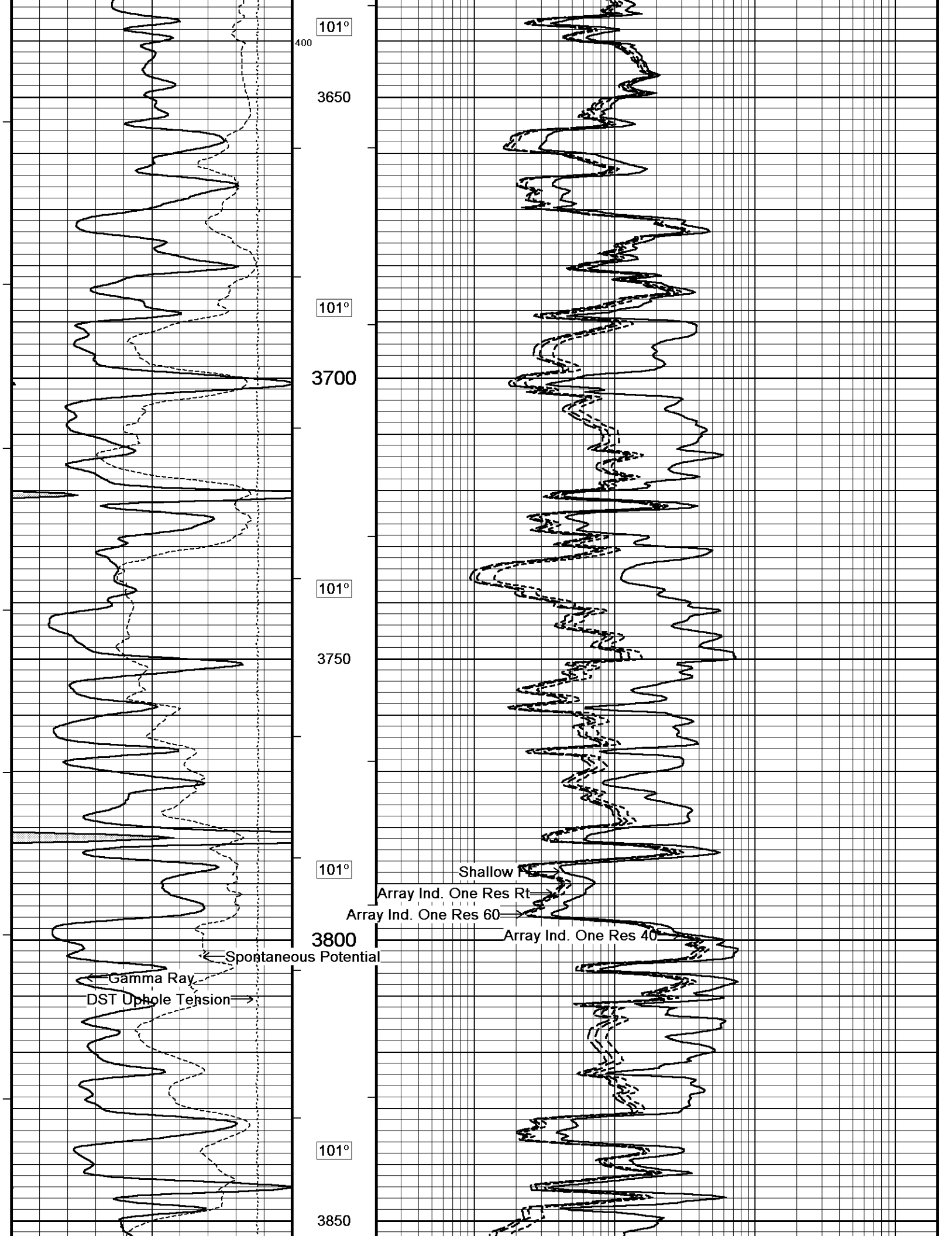
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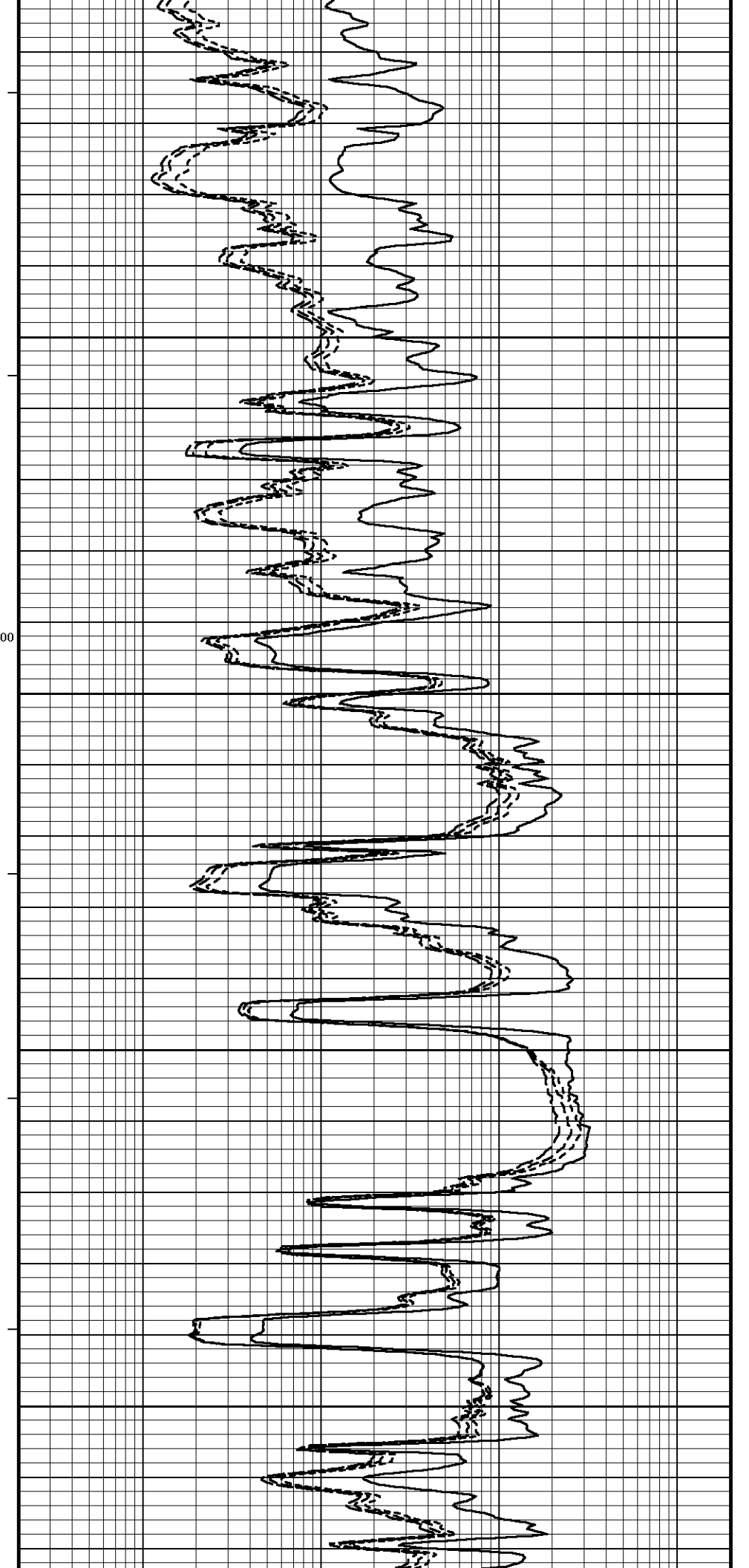
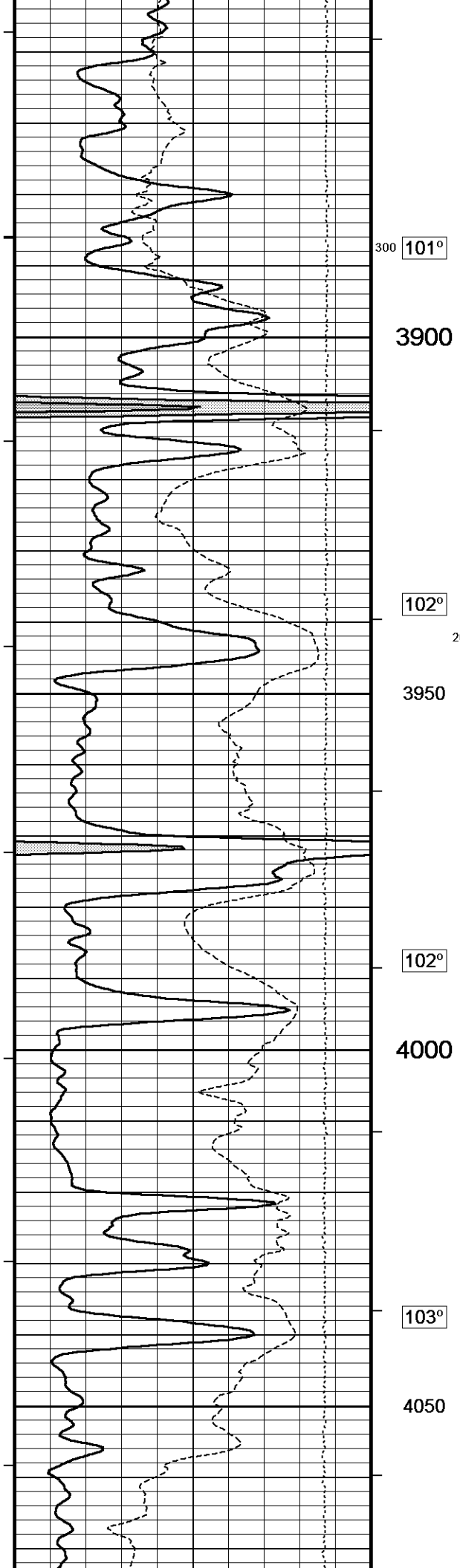
↑ **2 INCH MAIN** ↑

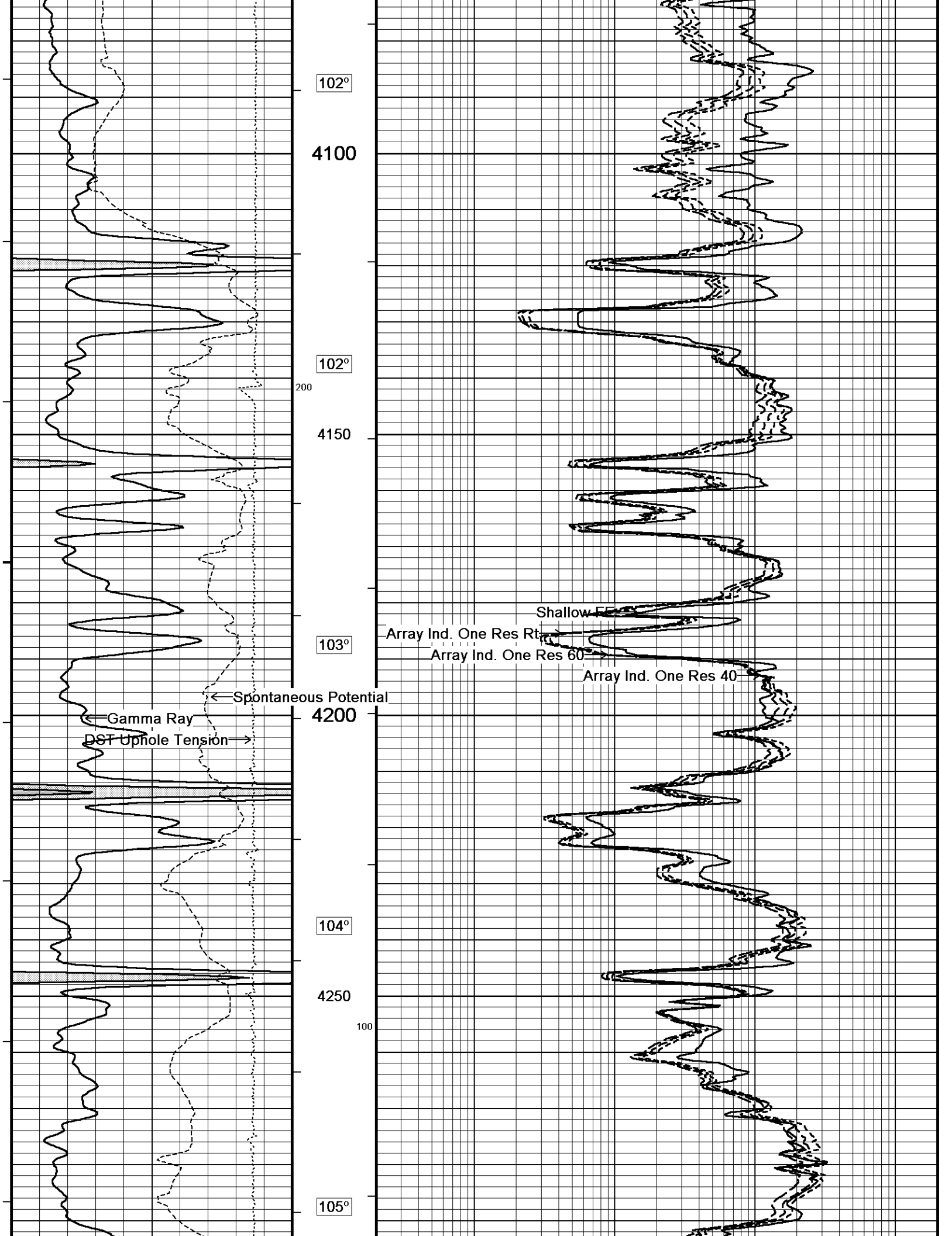
↓ **5 INCH MAIN** ↓

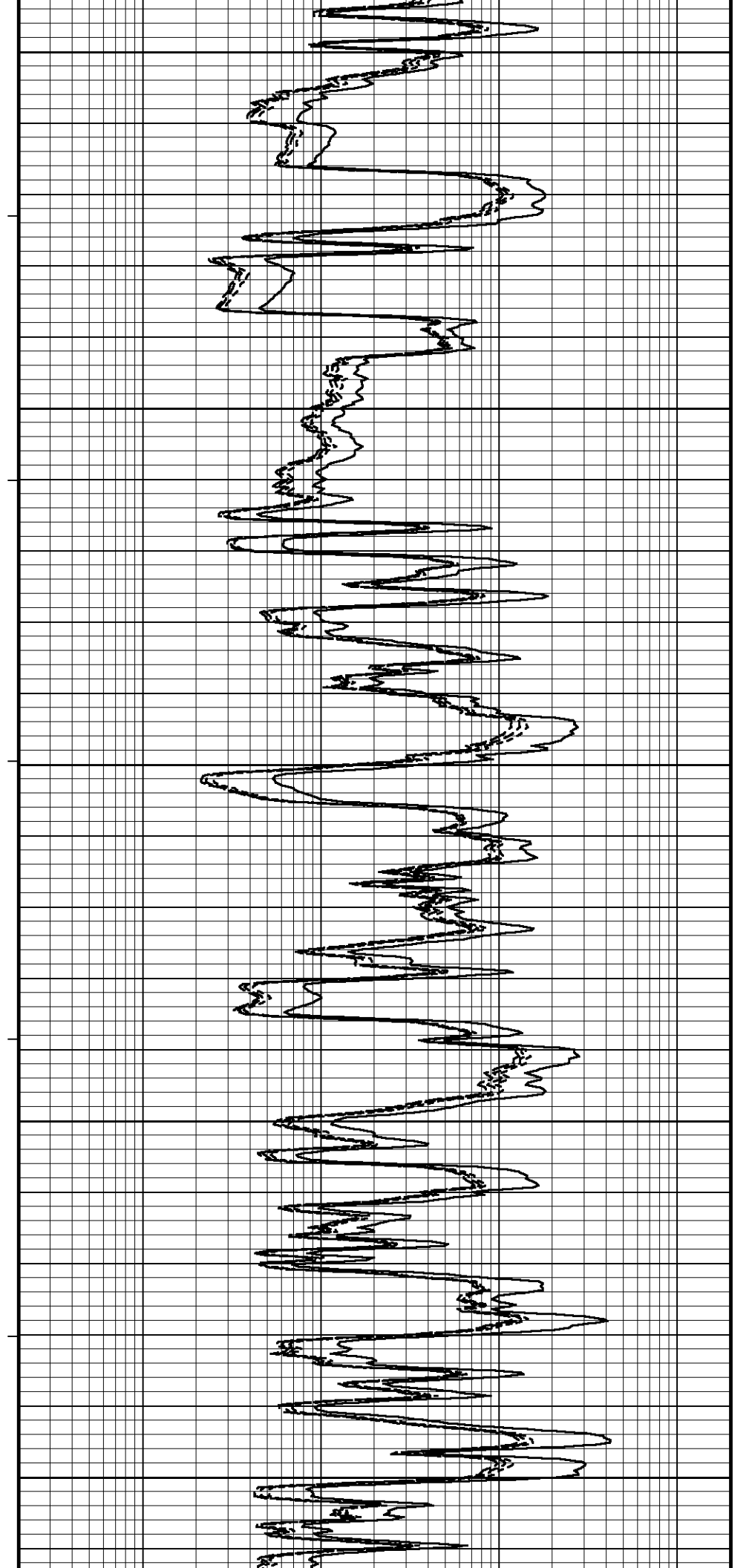
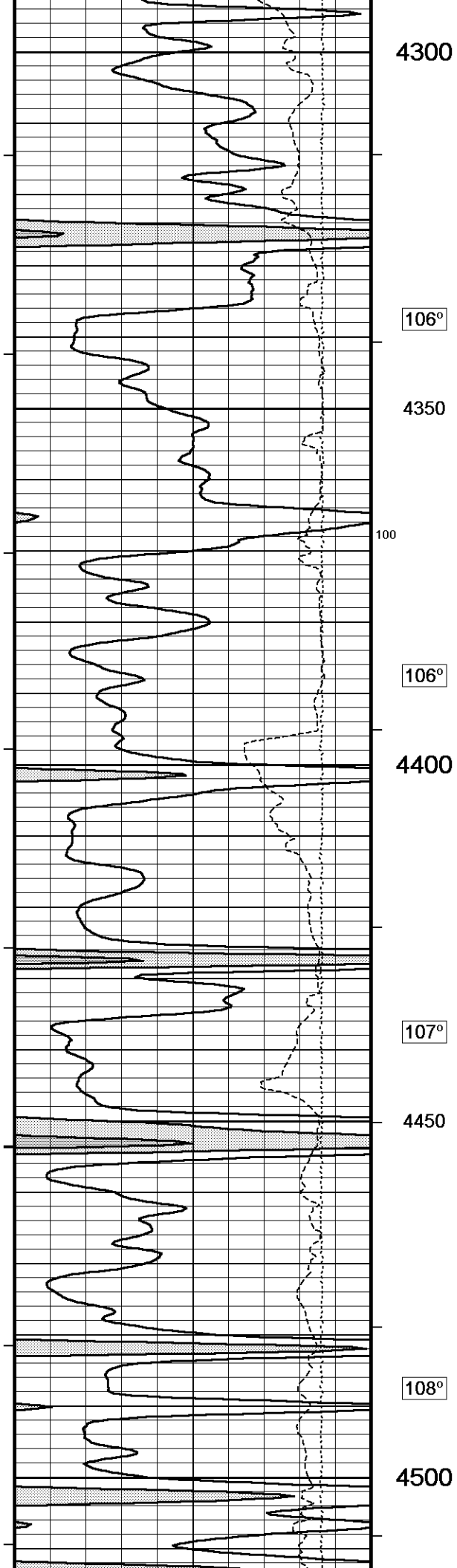
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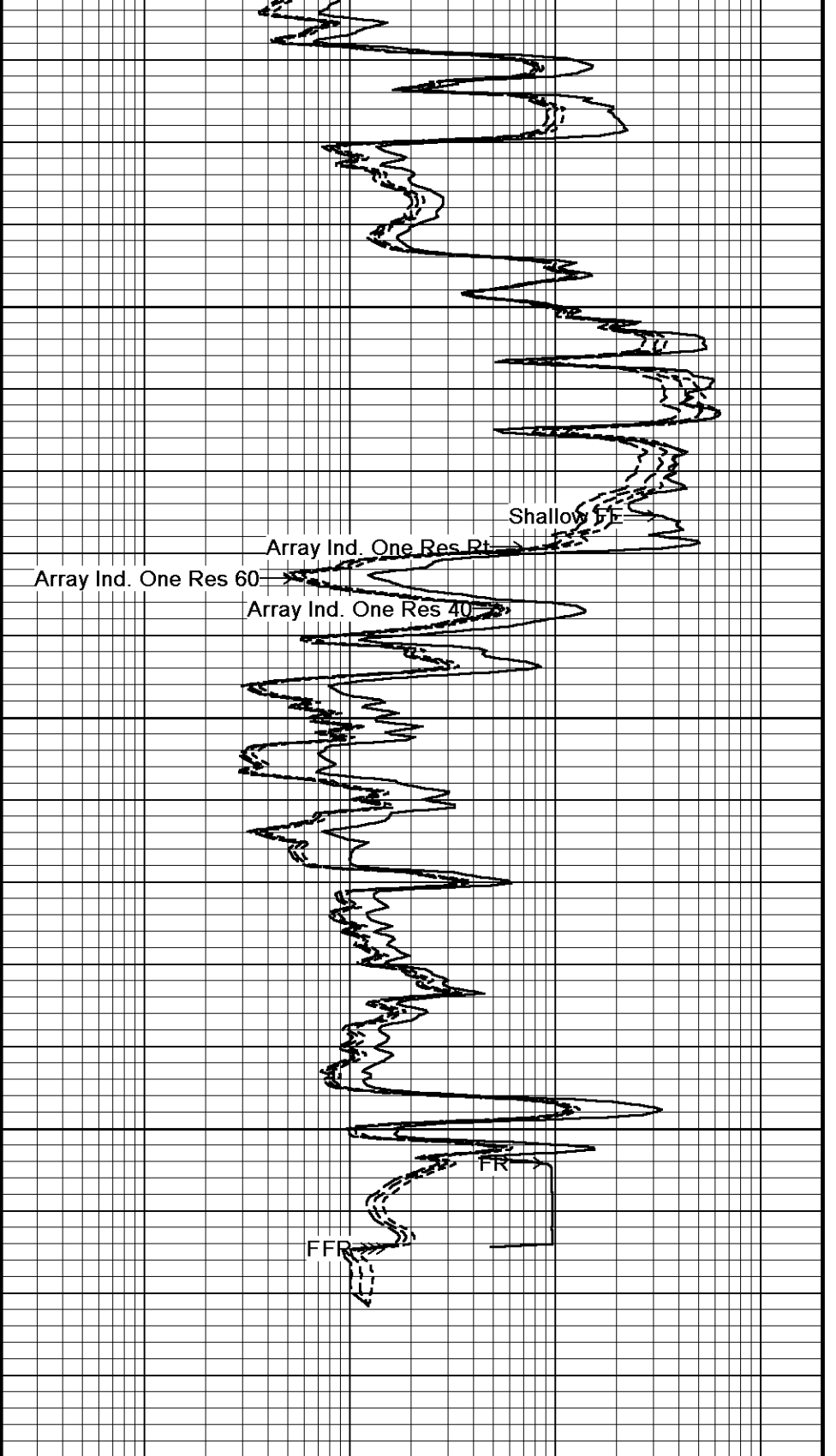
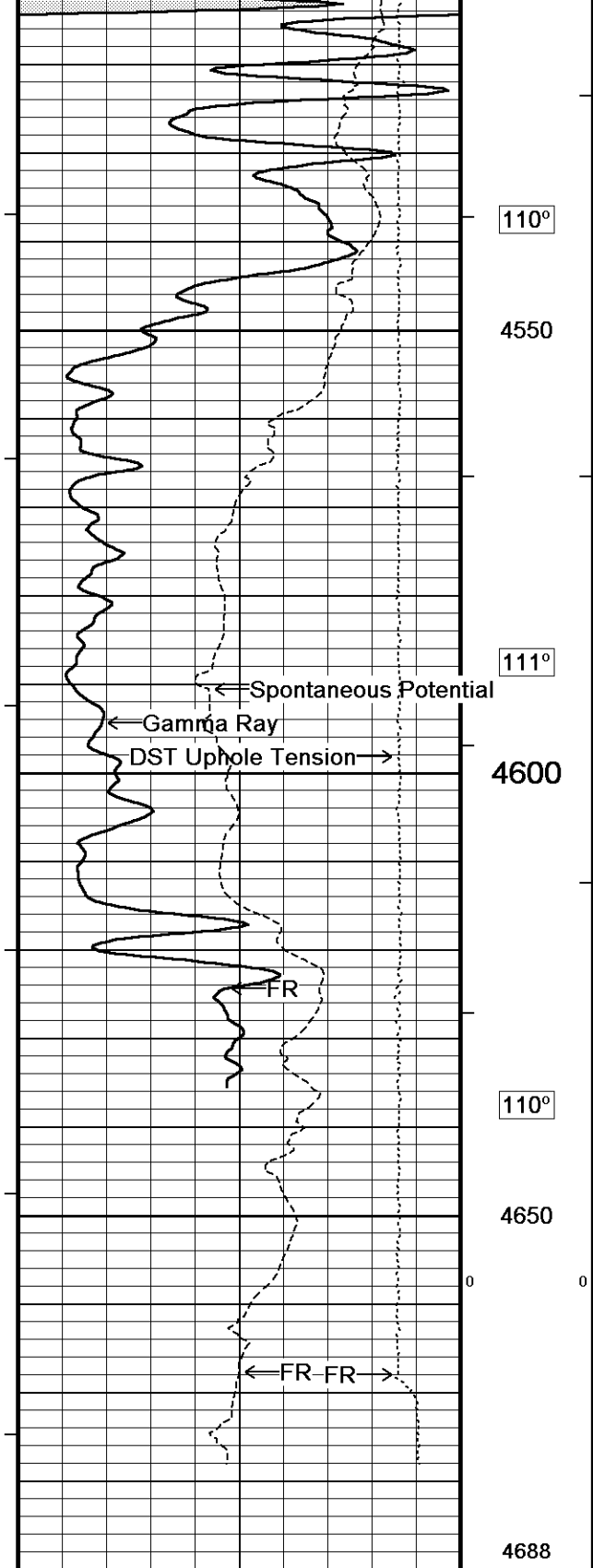












110°

4550

111°

4600

110°

4650

4688

Depth in Feet

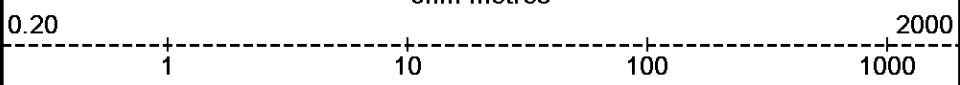
Borehole Temp in deg F  
HVI every 10 cu ft

Timing Marks every 60.0 sec

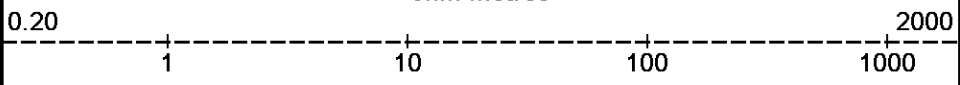
Gamma Ray

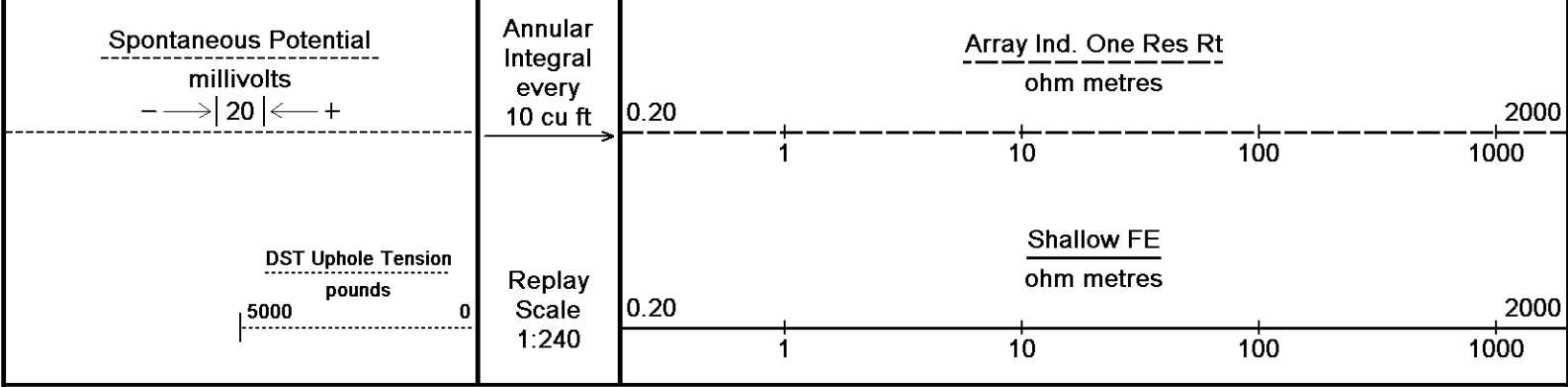
0	75	150
150	225	300

Array Ind. One Res 40 ohm metres



Array Ind. One Res 60 ohm metres



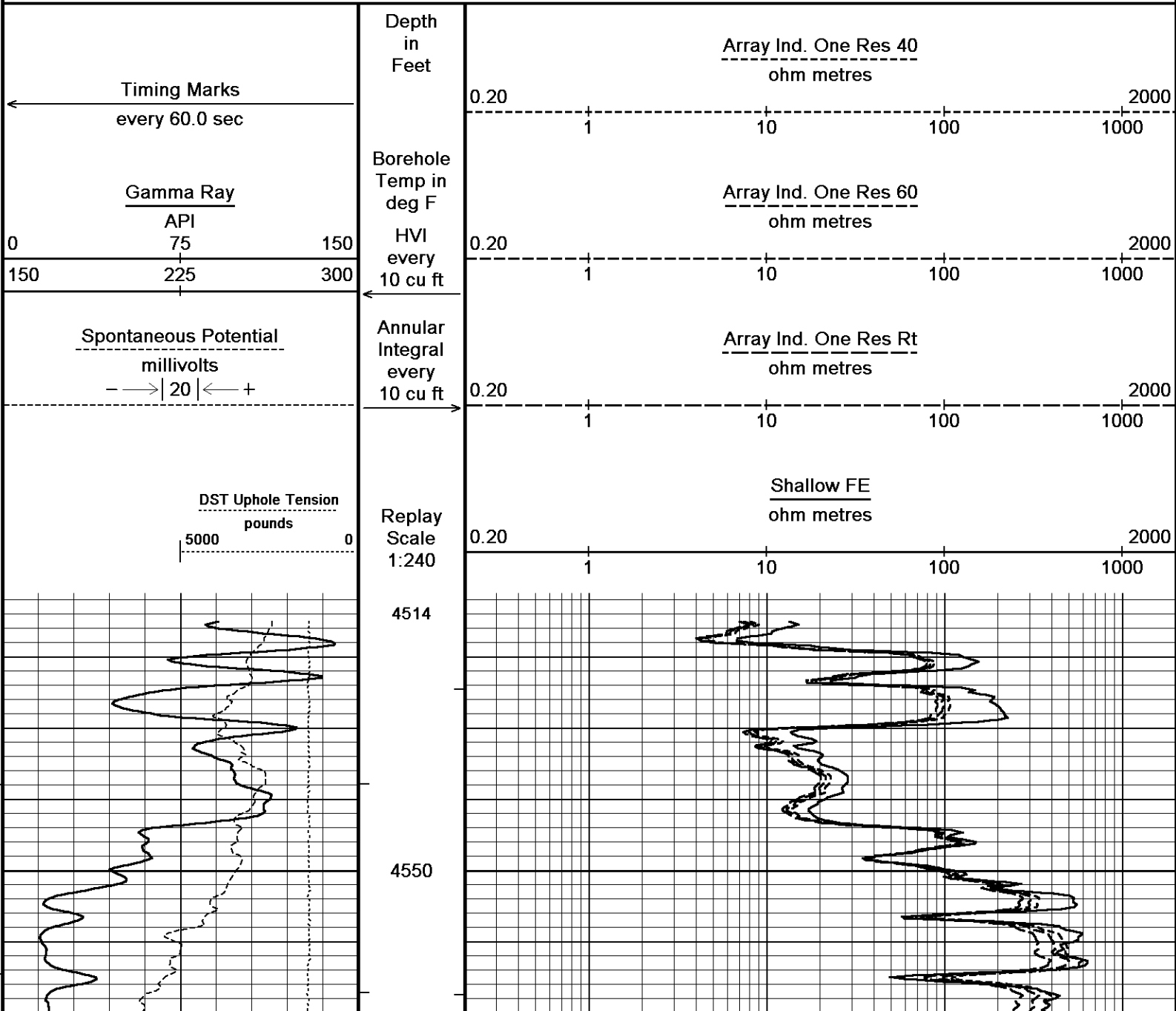


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 08-MAR-2014 20:28  
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 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 08-MAR-2014 20:28  
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BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\O'BRIEN PECK 1 #2\O'BRIEN PECK 1 #2\_003.dta

General Constants All 000

Last Edited on 08-MAR-2014,16:32

General Parameters

Mud Resistivity	1.280	ohm-metres
Mud Resistivity Temperature	76.000	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	Density Caliper	

Rwa Parameters

Porosity used	Base Density Porosity
Resistivity used	Array Ind. One 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 27-FEB-2014 09:36

Reading No	Measured	Calibrated (lbs)
1	15338.18	0.00
2	15806.32	400.00

Gamma Calibration MCG-C 150

Field Calibration on 08-MAR-2014 10:58

	Measured	Calibrated (API)
Background	71	48
Calibrator (Gross)	1145	773
Calibrator (Net)	1074	725

Gamma Constants MCG-C 150

Last Edited on 08-MAR-2014,14:57

Gamma Calibrator Number	GRC038	
Mud Density	1.12	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-C 150

Field Calibration on 08-MAR-2014,10:58

	Measured	Calibrated (mV)
Reference 1	100.2	98.8
Reference 2	-97.4	-99.0

High Resolution Temperature Calibration MCG-C 150

Field Calibration on 08-MAR-2014,10:59

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

High Resolution Temperature Constants MCG-C 150

Last Edited on 08-MAR-2014,10:59

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

Base Calibration on 23-JAN-2014 16:52

Field Calibration on 08-MAR-2014 10:44

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13431	5.98
2	16626	7.97

3	19813	9.86
4	23733	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 24-FEB-2014 11:45  
Field Check on 08-MAR-2014 10:45

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	9.9	49.5	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	93.9	93.9
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-B.J 387

Base Calibration on 21-JAN-2014 13:56  
Field Check on 08-MAR-2014 11:03

Base Calibration

Ratio	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2848	86	3714	110
	32.942		33.764	

Field Calibrator at Base	Calibrated (cps)
	1737 2564
Ratio	0.677

Field Check	Calibrated (cps)
	1718 2552
Ratio	0.673

Neutron Constants MDN-B.J 387

Last Edited on 08-MAR-2014,14:56

Neutron Source Id	P58125B		
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-A.A 55

Base Calibration on 21-JAN-2014 15:20  
Field Check on 08-MAR-2014 10:35

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	951.8	126.8
Base Check		281.4

Base Check

281.4

Field Check

281.5

## FE Constants MFE-A.A 55

Last Edited on 08-MAR-2014,14:55

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 5

Base Calibration on 21-JAN-2014,09:50

Field Check on 08-MAR-2014 10:33

## Base Calibration

## Test Loop Calibration

## Measured

## Calibrated (mmho/m)

Channel	Low	High	Low	High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature	71.1	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			14.2	3864.1
2			31.7	3592.9
3			29.8	2973.5
4			20.8	2127.9
Deep			18.4	1913.8
Medium			43.1	3863.9
Shallow			47.1	5375.4

Array Temperature	55.8	Deg F
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## Induction Constants MAI-A.A 5

Last Edited on 08-MAR-2014,14:55

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 5

Field Calibration on 21-JAN-2014,15:43

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

High Resolution Temperature Constants MAI-A.A 5

Last Edited on 21-JAN-2014,15:42

Pre-filter Length 11

Photo Density Calibration MPD-B 64

Base Calibration on 21-JAN-2014 13:19  
Field Check on 08-MAR-2014 10:42

Density Calibration		Measured		Calibrated (sdu)	
Base Calibration		Near	Far	Near	Far
Background		1151	1332		
Reference 1		54413	28212	59556	30836
Reference 2		21794	2569	24941	2541
Field Check at Base					
		1151.0	1331.7		
Field Check					
		1148.5	1330.6		
PE Calibration		Measured		Calibrated	
Base Calibration		WS	WH	Ratio	Ratio
Background		207	1021		
Reference 1		20693	54218	0.385	0.371
Reference 2		5952	21660	0.278	0.272
Field Check at Base					
		206.5	1020.6		
Field Check					
		207.0	1020.9		

Density Constants MPD-B 64

Last Edited on 08-MAR-2014,14:56

Density Source Id	P50557B	
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	

Caliper Calibration MPD-B 64

Base Calibration on 13-FEB-2014 15:49  
Field Calibration on 08-MAR-2014 10:37

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16976	3.99
2	26016	5.98
3	34528	7.97
4	42943	9.86
5	52224	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.95	7.97

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\O'BRIEN PECK 1 #2\O'BRIEN PECK 1 #2\_003.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-C 150 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-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper  
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focused Electric  
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction  
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 51.18 ft Weight: 407.9 lb



43.50 ft GRGC - Gamma Ray  
40.59 ft CGXT - MCG External Temperature

33.24 ft MINV - MMR MicroLog Inverse  
33.24 ft MNRL - MMR MicroLog Normal

28.45 ft NPRL - Limestone Neutron Por.

21.21 ft CLDC - Density Caliper  
21.21 ft AVOL - Annular Volume  
21.21 ft HVOL - Hole Volume  
19.28 ft DPRL - Limestone Density Por.  
19.28 ft DEN - Compensated Density  
19.28 ft DCOR - Density Correction  
19.22 ft PDPE - PE

13.72 ft FEFE - Shallow FE

3.34 ft R400 - Array Ind. One Res 40  
3.34 ft R600 - Array Ind. One Res 60  
3.34 ft RTAO - Array Ind. One Res Rt

0.23 ft SPCG - Spontaneous Potential  
Tool Zero (0.13ft from bottom)  
-0.13 ft SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	O'BRIEN RESOURCES, LLC.
WELL	PECK 1 #2
FIELD	WILDCAT
PROVINCE/COUNTY	LANE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2755.00	feet	First Reading	4665.00	feet
Elevation Drill Floor	2753.00	feet	Depth Driller	4665.00	feet
Elevation Ground Level	2748.00	feet	Depth Logger	4668.00	feet



# Weatherford®

## ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG



### ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

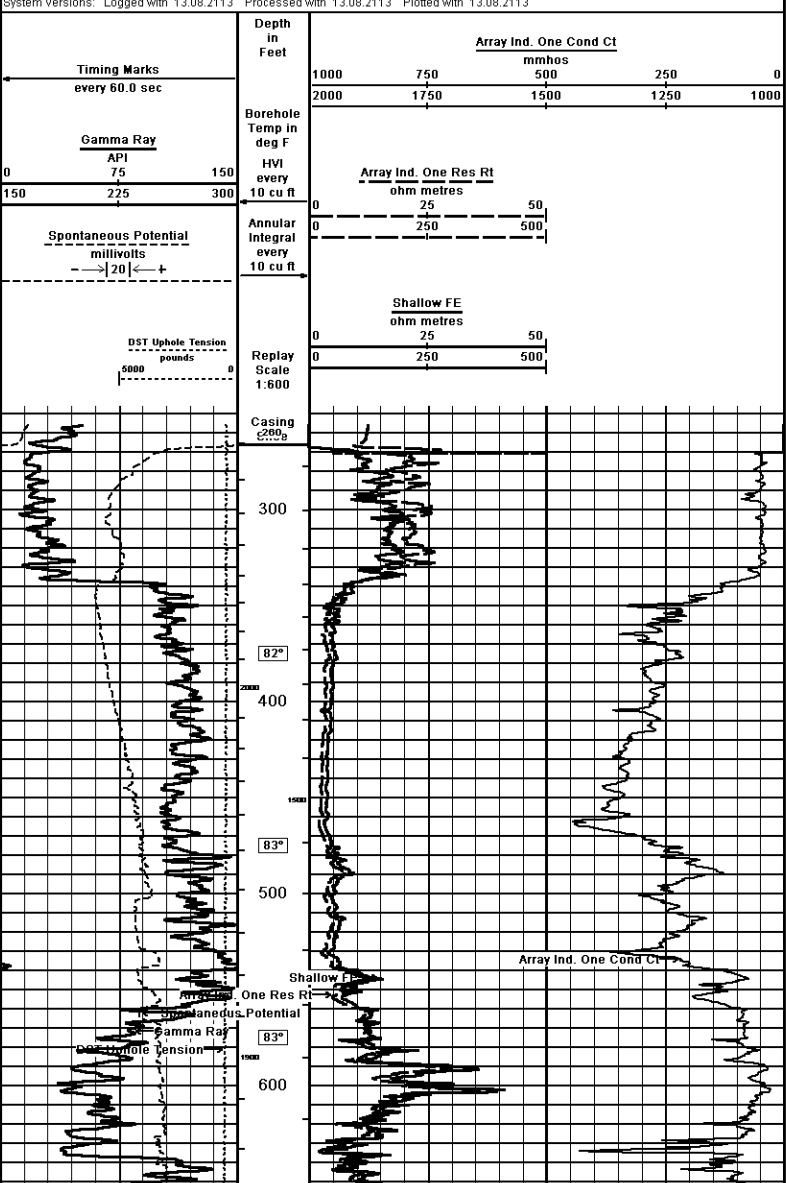
COMPANY	ORBRIEN RESOURCES, LLC.
WELL	PECK 1 #2
FIELD	WILDCAT
PROVINCE/COUNTY	LANE
COUNTY/STATE	U.S.A. / KANSAS
LOCATION	2455' ENL & 2072' FWL
SEC - 1	TWP 18S RGE 29W T19N S42E
Latitude	37.0000
Longitude	-101.2295
Permanent Datum G.L. Elevation	2748.00
Log Measured From KB	2753.00
Drilling Measured From KB	2748.00
Date	08-MAR-2014
Run Number	ONE
Service Order	4558-81493267
Depth Driller	4865.00
Depth Logger	4865.00
First Reading	4865.00
Last Reading	285.00
Casing Logger	285.00
Bit Size	7.875
Hole Fluid Type	CHEMICAL
Density/Viscosity	9.30 Ind/Sg 48.00 CP
pH/Fundus	10.00
Sample Source	FLOWLINE
Rm @ Measured Temp	1.28 @ 76.0 ohm-m
Rm @ Measured Temp	1.02 @ 76.0 ohm-m
Rm @ Measured Temp	1.54 @ 76.0 ohm-m
Source Rm / Rm	CALC
Rm @ BHT	0.88 @ 111.0 ohm-m
Time Since Circulation	3 HOURS
Max Recorded Temp	111.00 deg F
Equipment/Case	13224 LIB
Recorded By	ADAM SILL
Witnessed By	KURT TALBOTT
LOG #	LB14-006

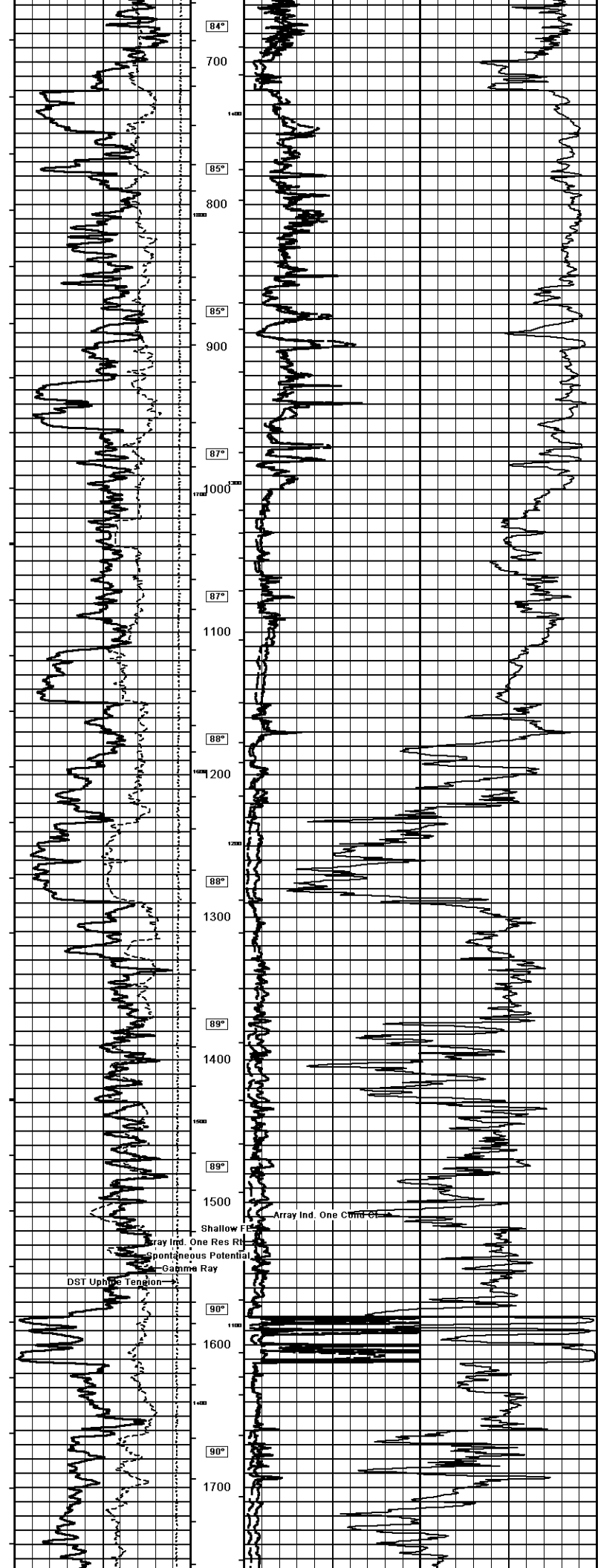
1 INCH MAIN

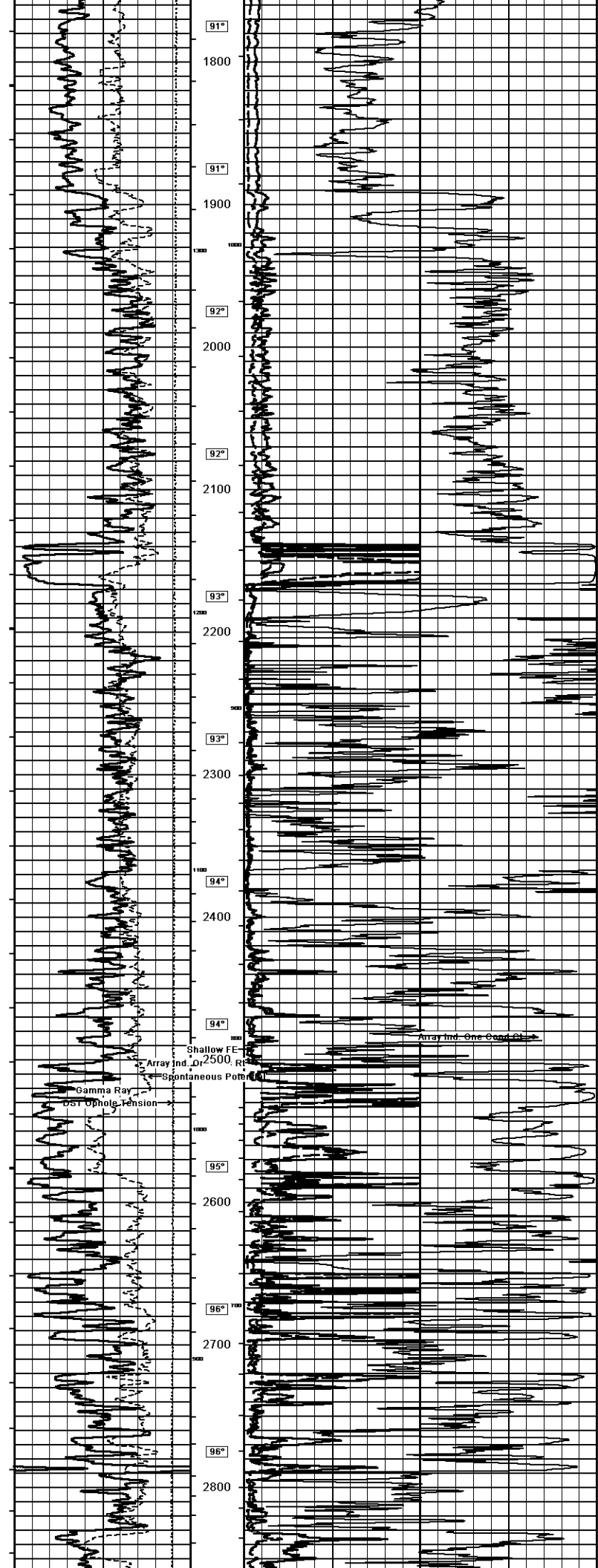
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 08-MAR-2014 20:28

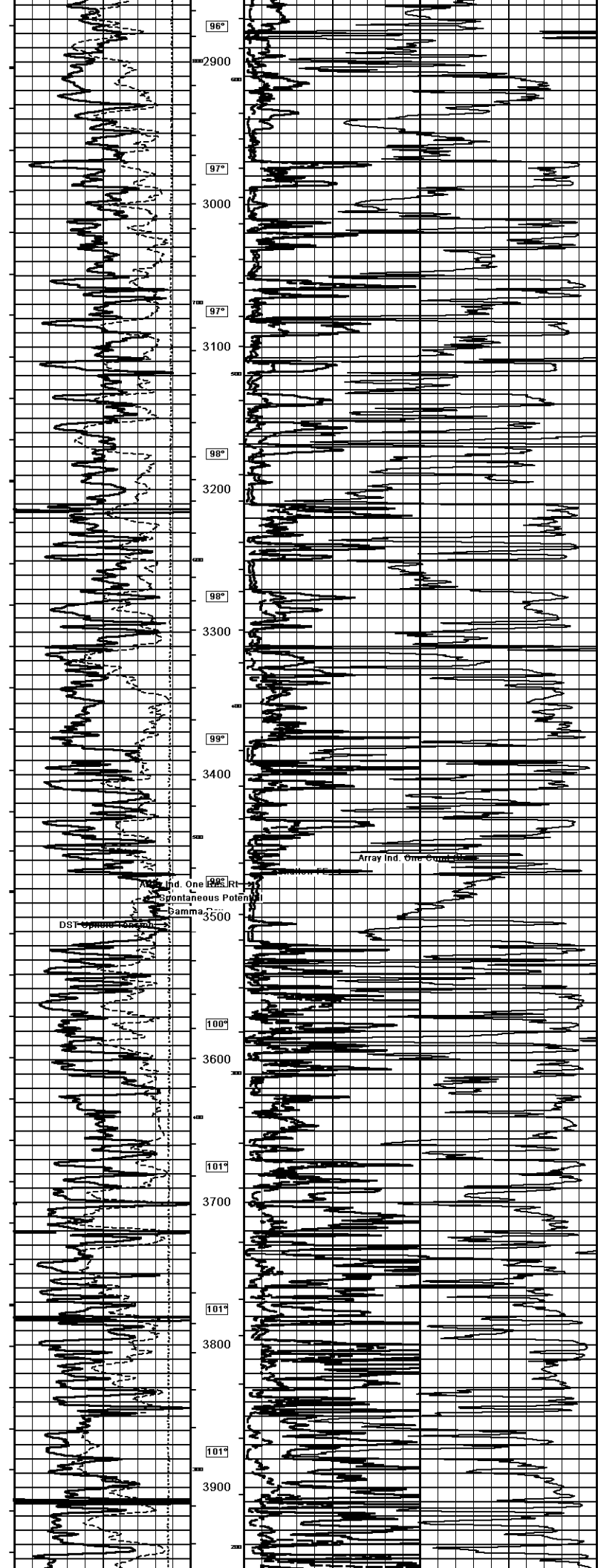
Filename: C:\Minimus 13.08.2113\Logs\ORBRIEN PECK 1 #2\ORBRIEN PECK 1 #2\_003.dta Recorded on 08-MAR-2014 16:42

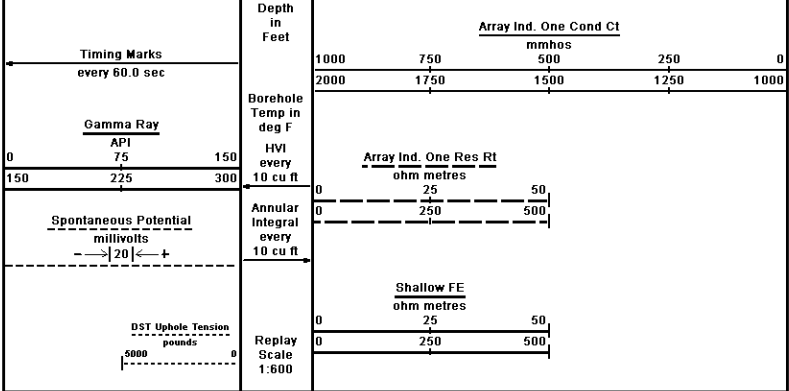
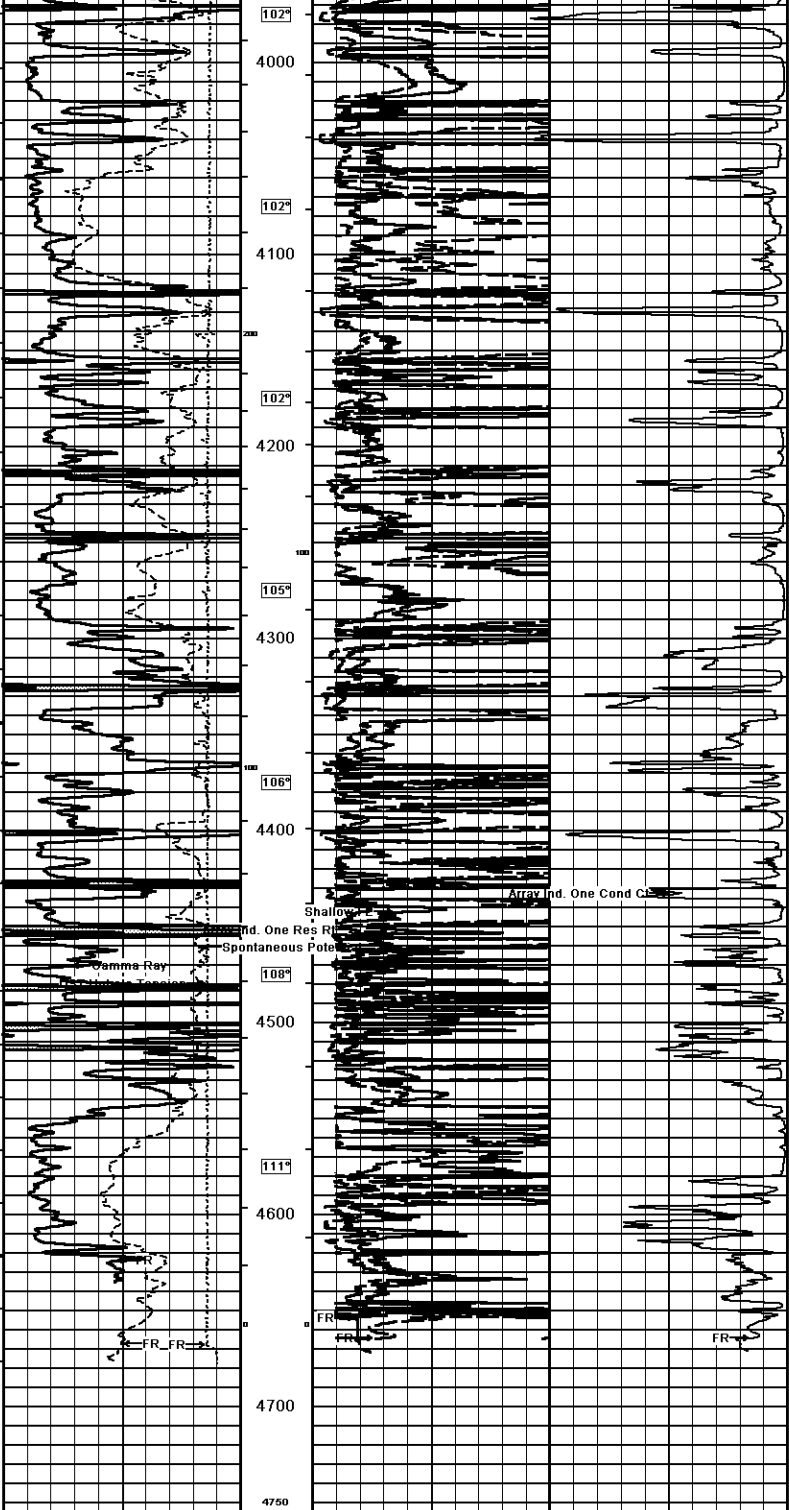
System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113












Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 08-MAR-2014 20:28  
 Filename: C:\Minimus 13.08.2113\Logs\O'BRIEN PECK 1 #2\O'BRIEN PECK 1 #2\_003.dta  
 Recorded on 08-MAR-2014 16:42  
 System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

1 INCH MAIN

COMPANY O'BRIEN RESOURCES, LLC.  
 WELL PECK 1 #2  
 FIELD WILDCAT

PROVINCE/COUNTY		LANE			
COUNTRY/STATE		U.S.A. / KANSAS			
Elevation Kelly Bushing	2755.00	feet	First Reading	4665.00	feet
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	ARRAY INDUCTION
	SHALLOW FOCUSED
	ELECTRIC LOG