ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

Weatherford®

COMPANY	WESTERN OPERATING CO.
WELL	HASLETT 2-30
FIELD	GOULD
PROVINCE/COUNTY	HAMILTON
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2288' FNL & 1780' FWL NW SE SE NW

SEC	TWP	RGE	Other Services
30	25S	41W	MDN/MPD MML

API Number 15-075-20871
Permit Number

Permanent Datum GL, Elevation 3583.00 feet
Log Measured From KB
Drilling Measured From KB @ 11 FEET

Elevations:	feet
KB	3594.00
DF	3592.00
GL	3583.00

Date	20-JUL-2013			
Run Number	ONE			
Service Order	3541024			
Depth Driller	5550.00	feet		
Depth Logger	5548.00	feet		
First Reading	5545.00	feet		
Last Reading	838.00	feet		
Casing Driller	838.00	feet		
Casing Logger	838.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEM			
Density / Viscosity	9.40 lb/USg	54.00 CP		
PH / Fluid Loss	10.00	8.80 ml/30Min		
Sample Source	PIT			
Rm @ Measured Temp	0.50 @ 95.0	ohm-m		
Rmf @ Measured Temp	0.40 @ 95.0	ohm-m		
Rmc @ Measured Temp	0.60 @ 95.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.37 @126.0	ohm-m		
Time Since Circulation	5 HRS			
Max Recorded Temp	126.00	deg F		
Equipment / Base	13379	KANSAS		
Recorded By	D. COLE			
Witnessed By	A. GARNER			
JOB #	LB 13-207			

Last Edited: 20-JUL-2013 10:33

BOREHOLE RECORD

Bit Size inches	Depth From feet	Depth To feet
7.875	838.00	5550.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	838.00	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.
- 2.65 G/CC SANDSTONE 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 2300 FEET: 1280 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 2300 FEET: 740 CU. FT.

- ANNULAR HOLE VOLUME WITH 10.0 INCH CASING FROM TD TO 2000 FEET: 145 CU. FT.

- RIG: MURFIN #21

- ENGINEER: D. COLE

- OPERATOR(S): J. LAPOINT AND D. CANADAY.

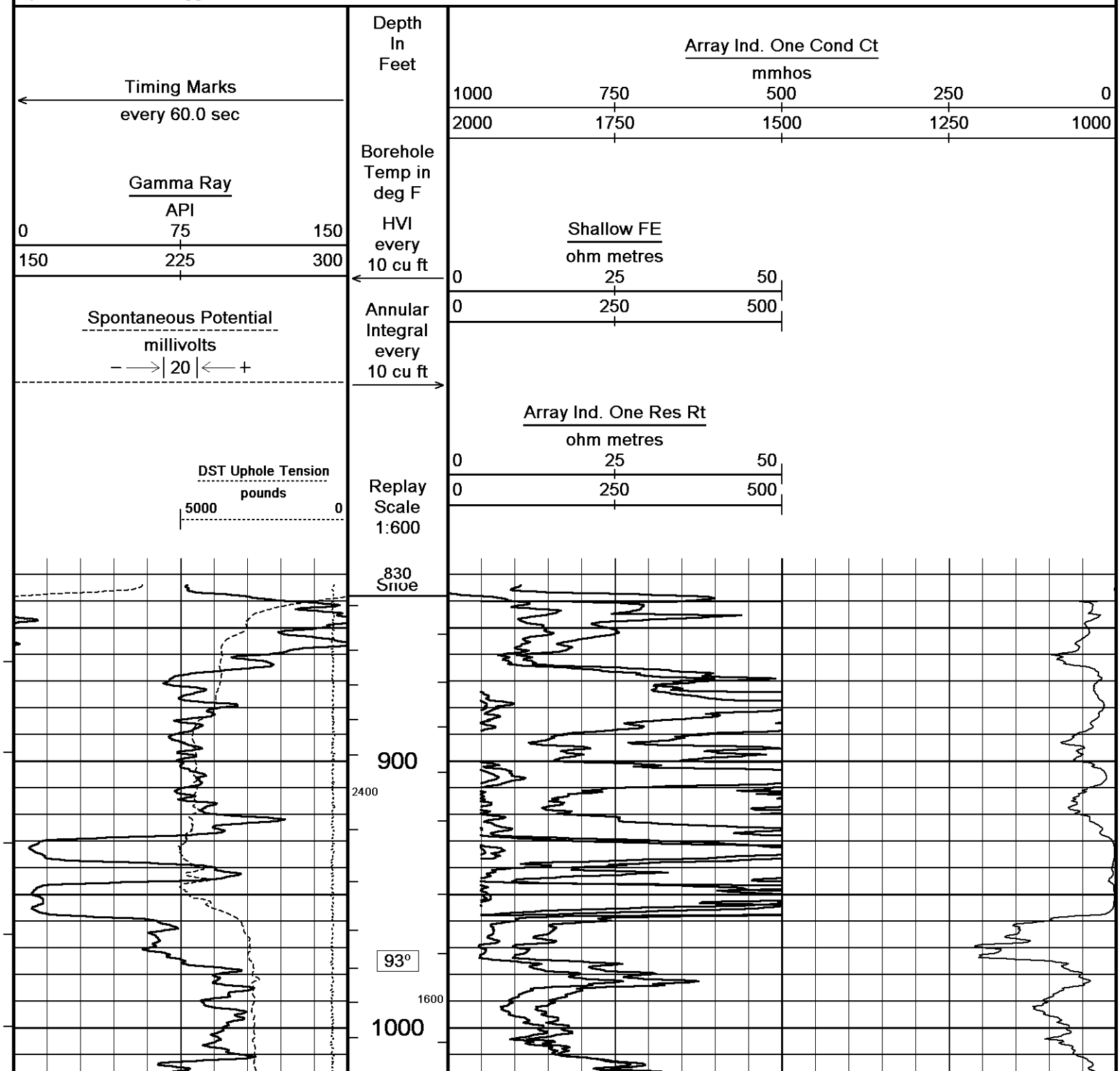
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs,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

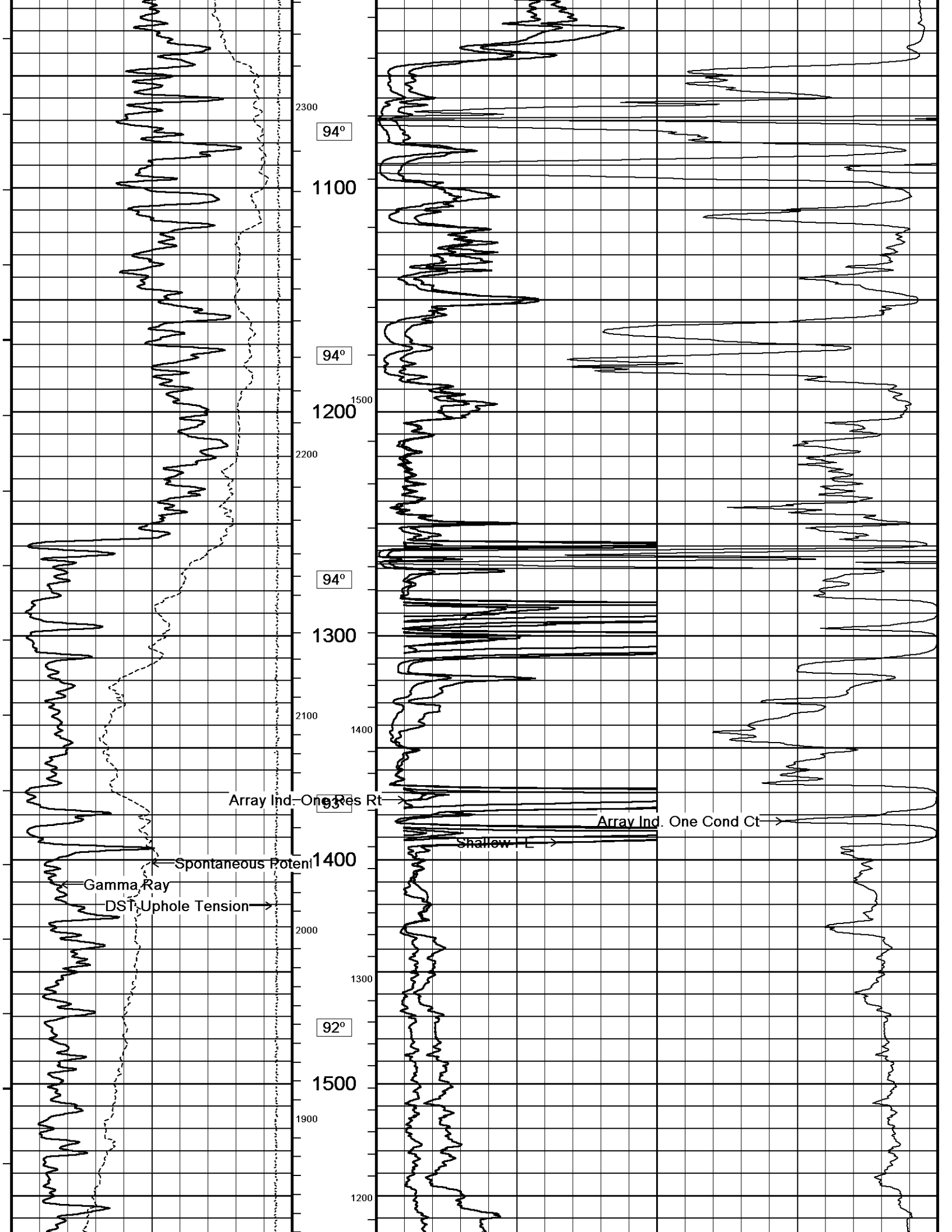
2 INCH MAIN

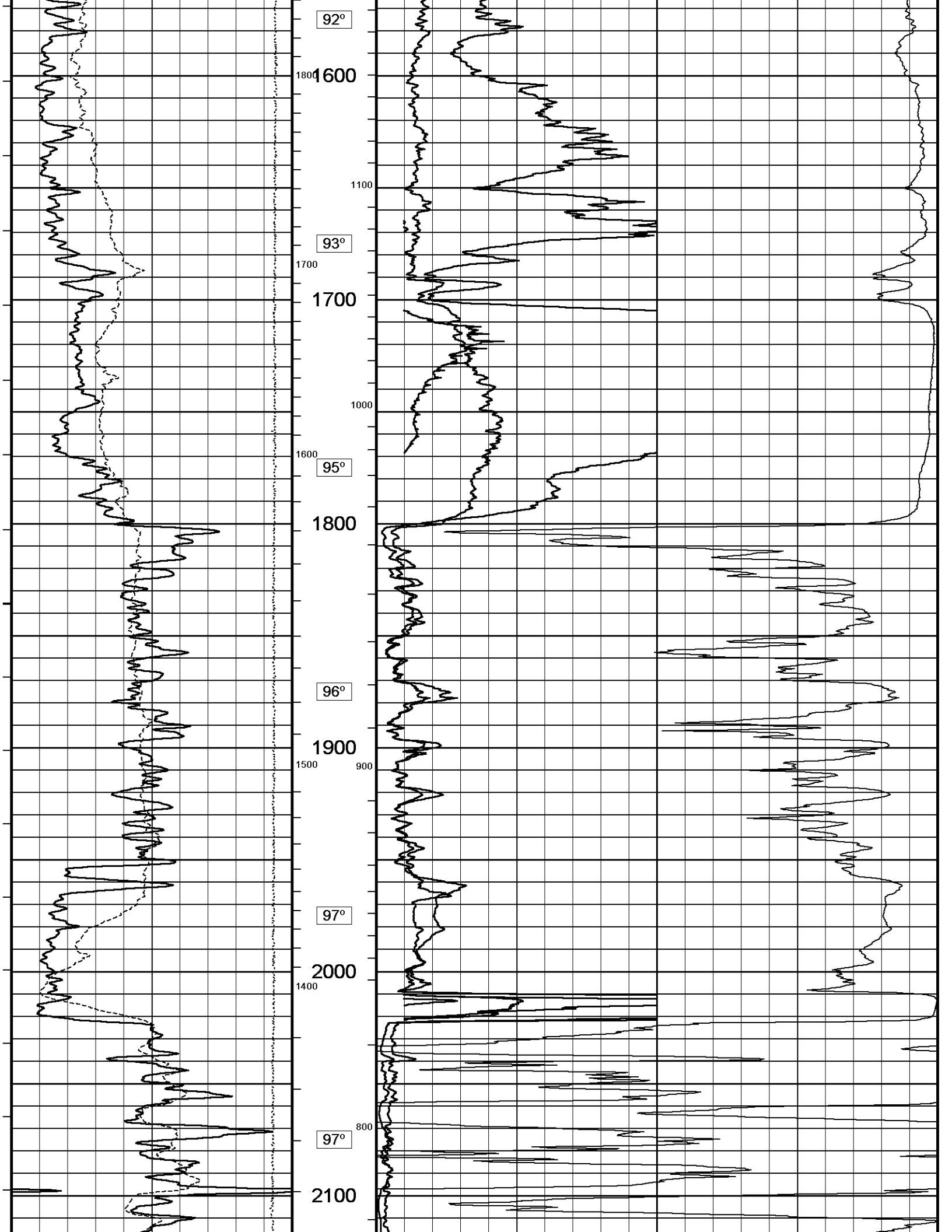
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59

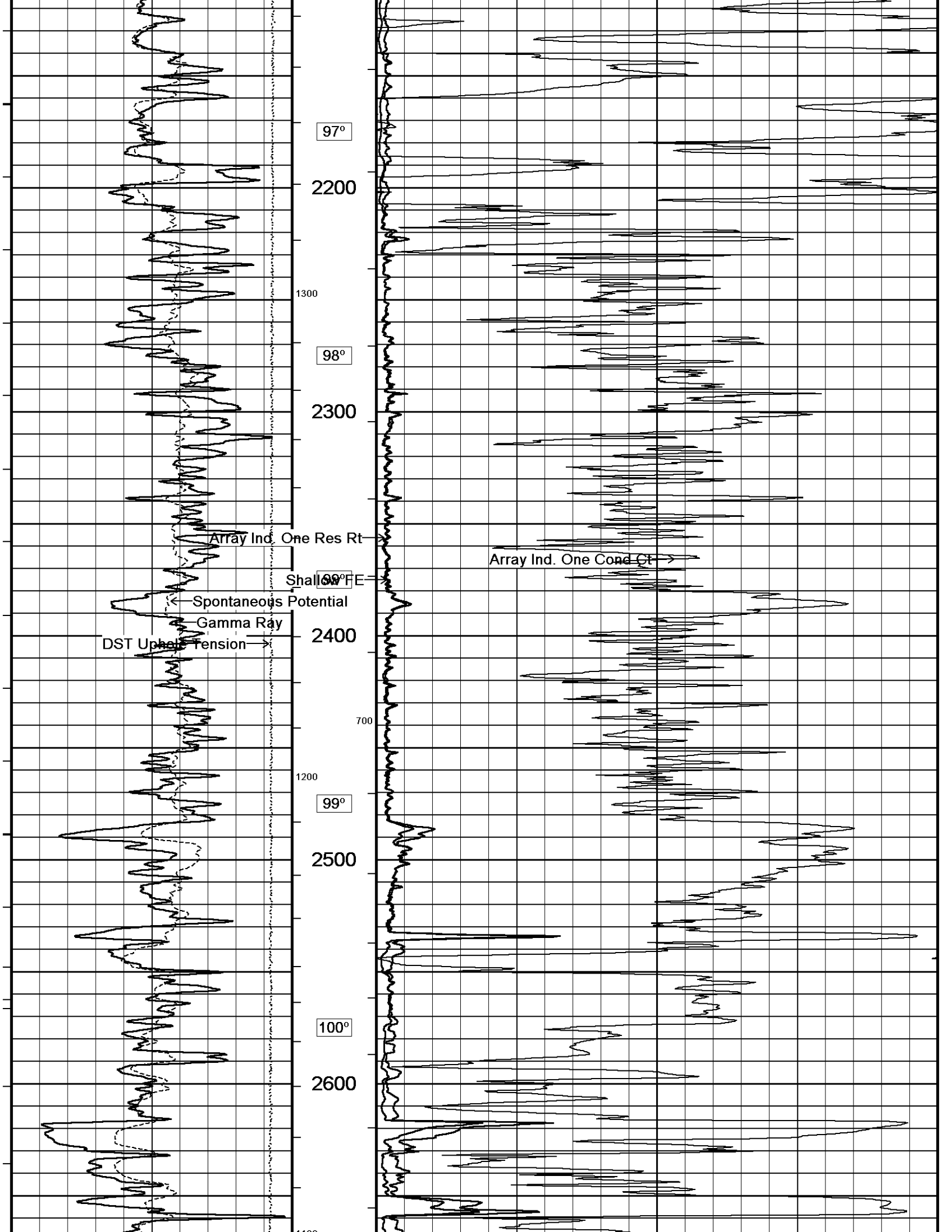
Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta — Recorded on 20-JUL-2013 11:20

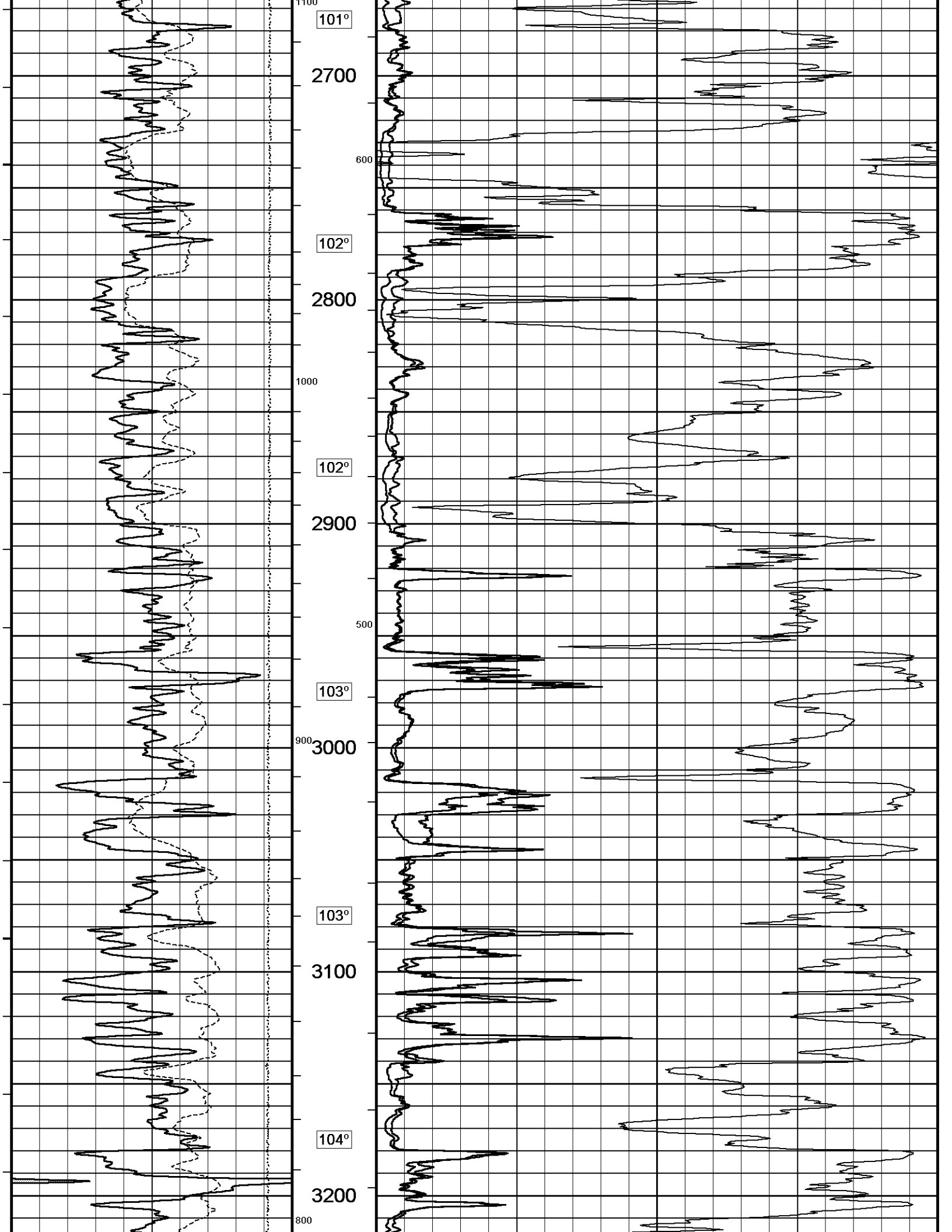
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

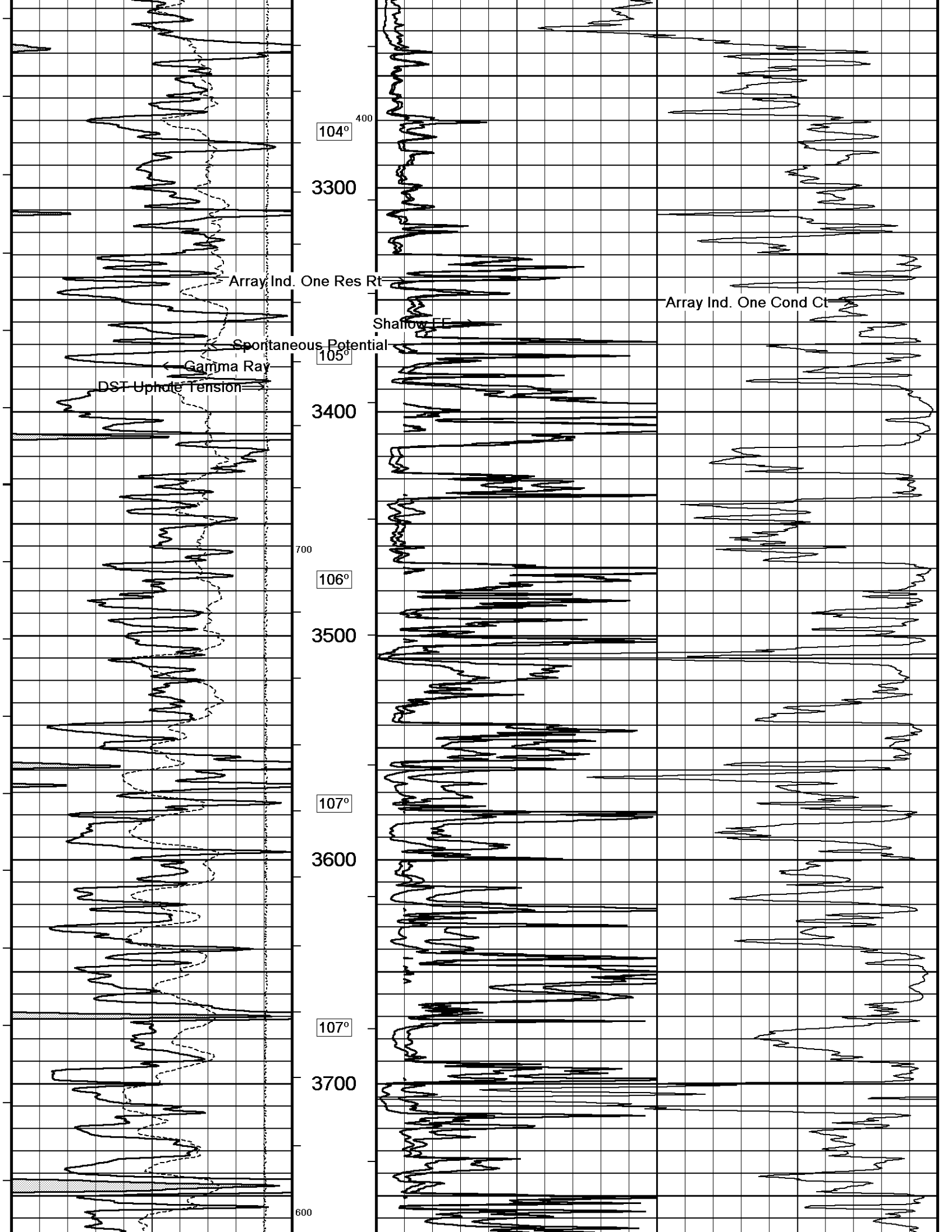


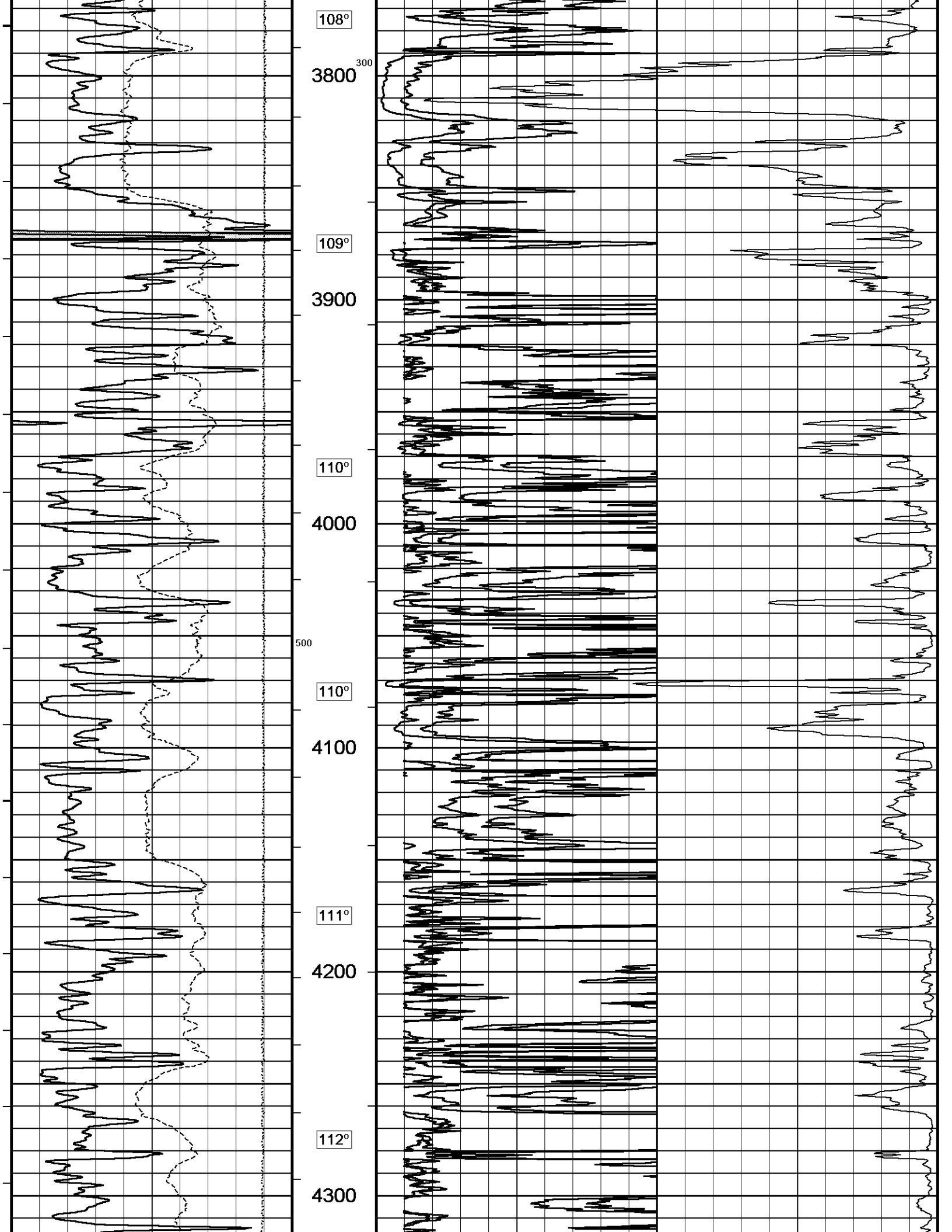

2300
94°
1100
94°
1200
1500
2200
94°
1300
2100
1400
Array Ind. One Res Rt
93°
Array Ind. One Cond Ct
Shallow I L
Spontaneous Potent
1400
Gamma Ray
DST Uphole Tension
2000
1300
92°
1500
1900
1200


92º
1800
1600
1100
93º
1700
1700
1000
1600
95º
1800
96º
1900
1500
900
97º
2000
1400
800
97º
2100


97°
2200
1300
98°
2300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
99°
Spontaneous Potential
Gamma Ray
2400
DST Uphole Tension
700
1200
99°
2500
100°
2600


1100
101º
2700
600
102º
2800
1000
102º
2900
500
103º
900
3000
103º
3100
104º
3200
800


400
104°
3300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow EE
Spontaneous Potential
105°
Gamma Ray
DST Uphole Tension
3400
700
106°
3500
107°
3600
107°
3700
600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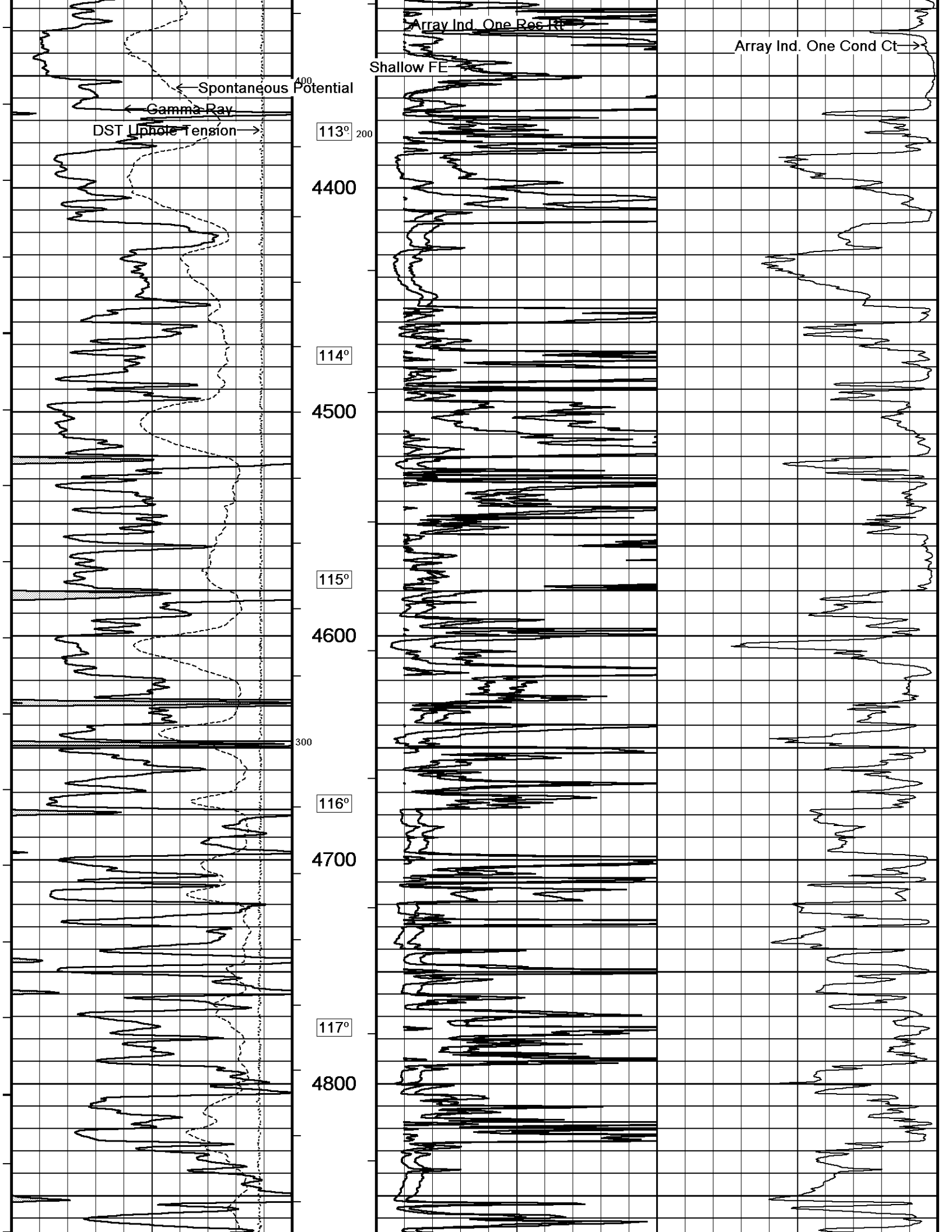
3800
300
109º
3900
110º
4000
500
110º
4100
111º
4200
112º
4300


Array Ind. One Rec Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
400
200
300
113°
114°
115°
116°
117°
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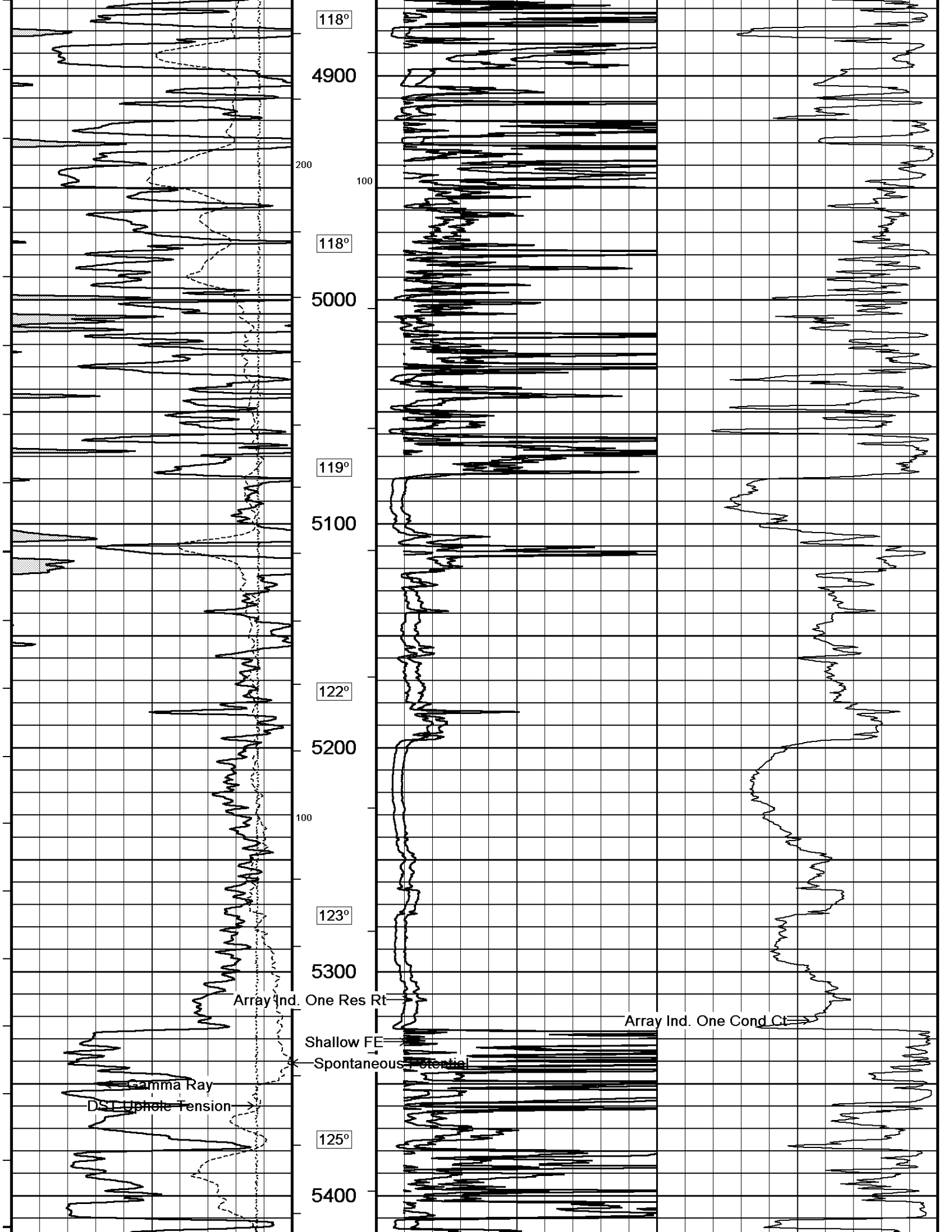
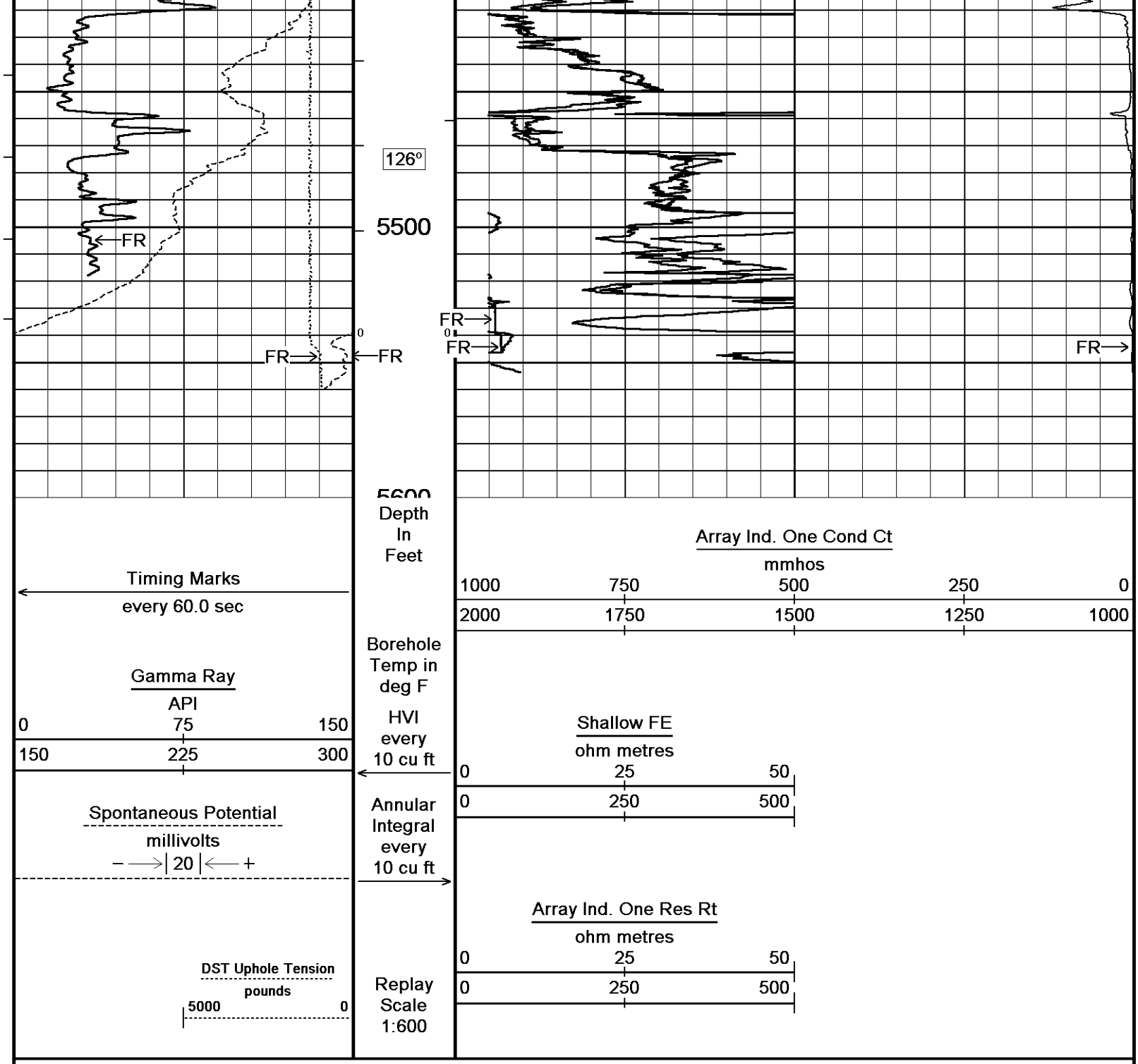
4500
4600
4700
4800


118°
4900
200
100
118°
5000
119°
5100
122°
5200
100
123°
5300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
125°
5400

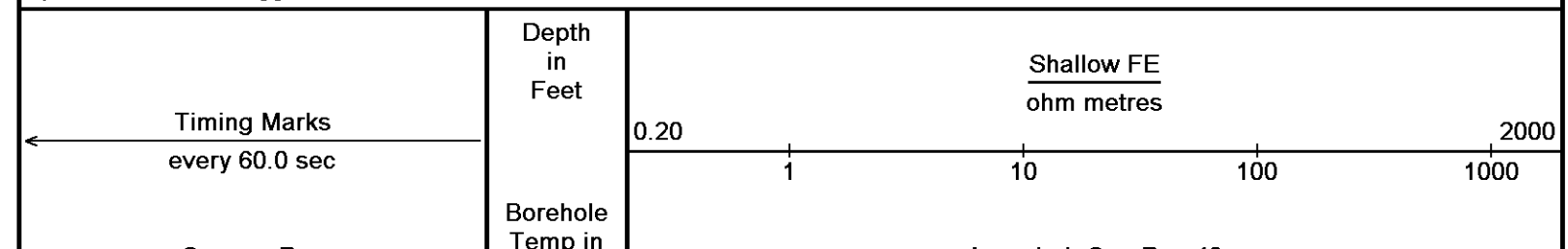


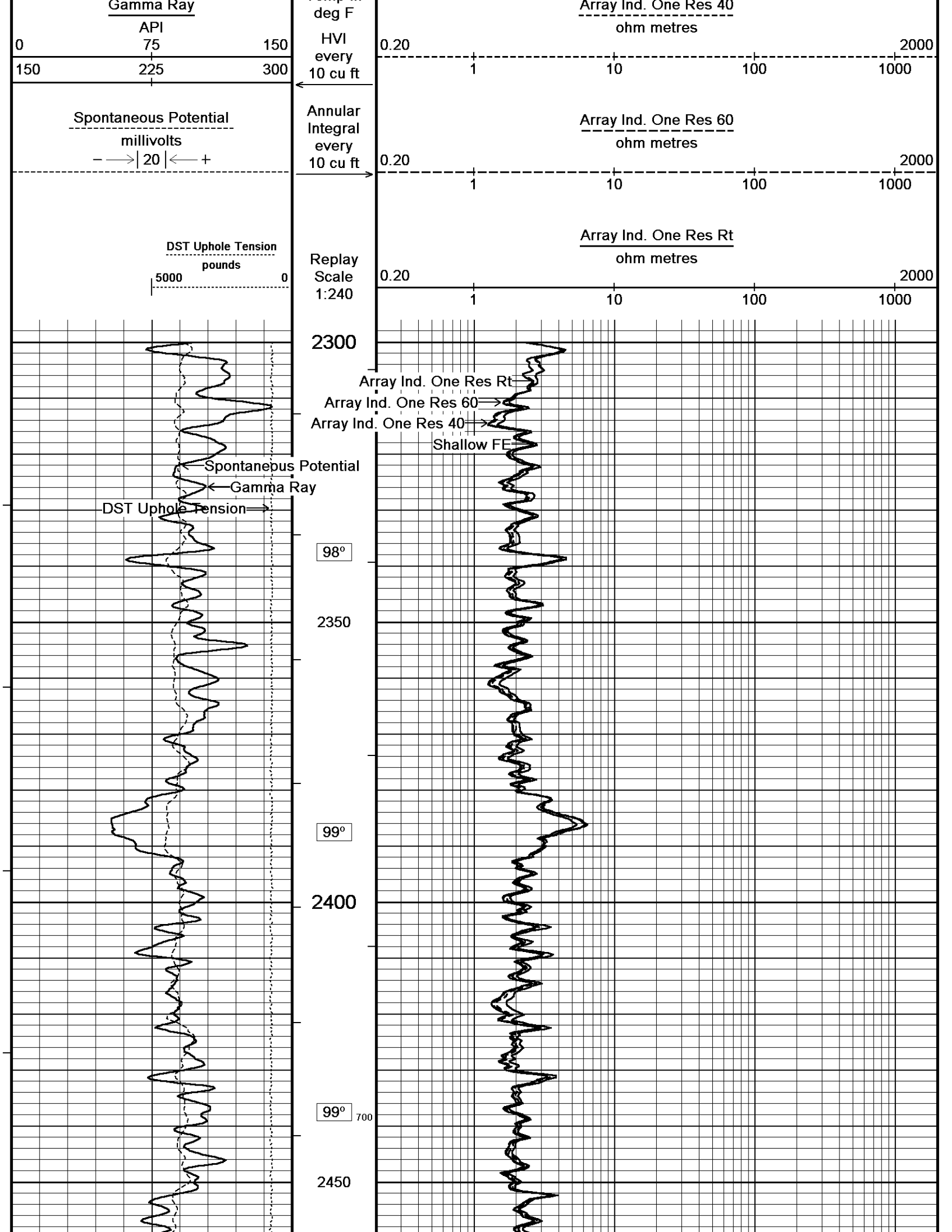
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 20-JUL-2013 13:59
Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta
Recorded on 20-JUL-2013 11:20
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

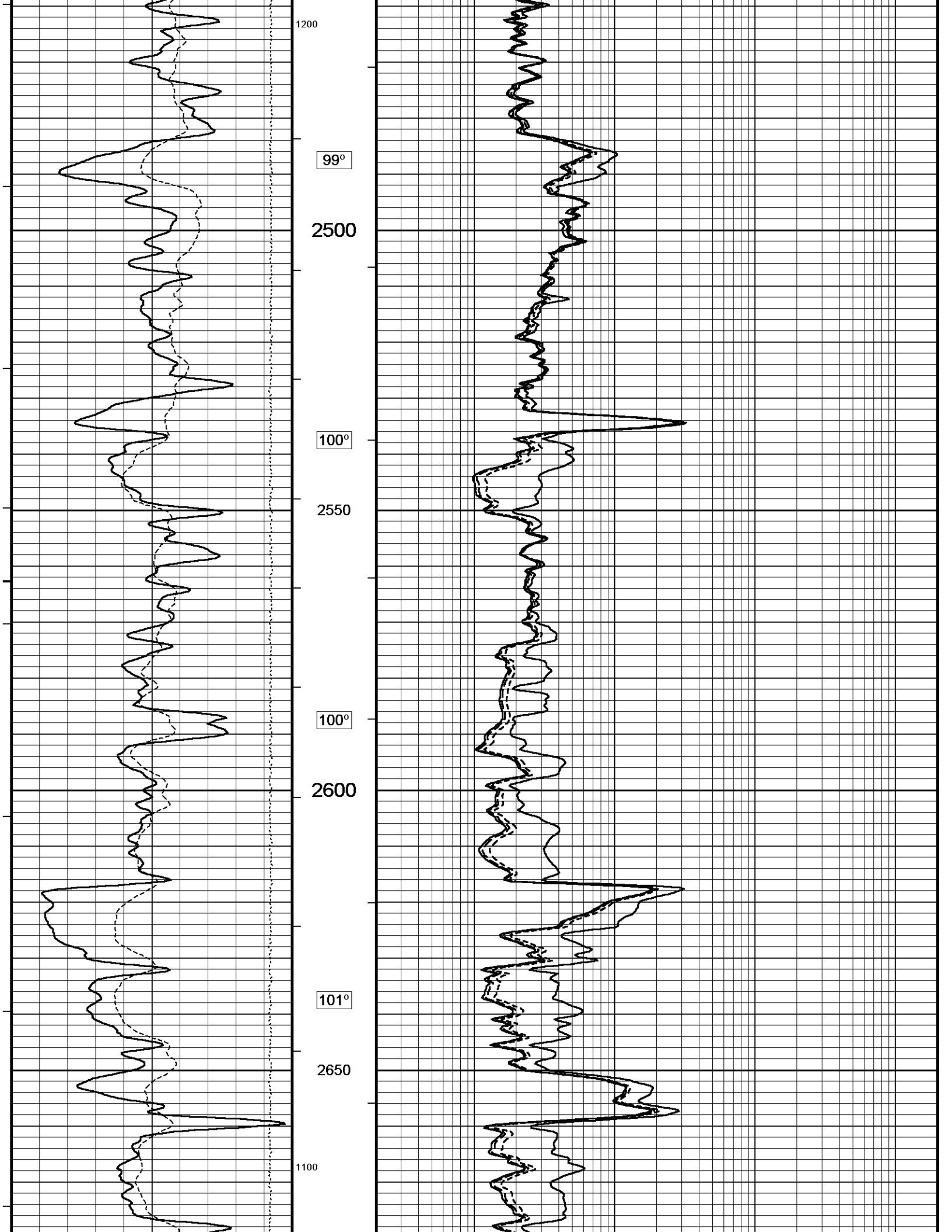
2 INCH MAIN

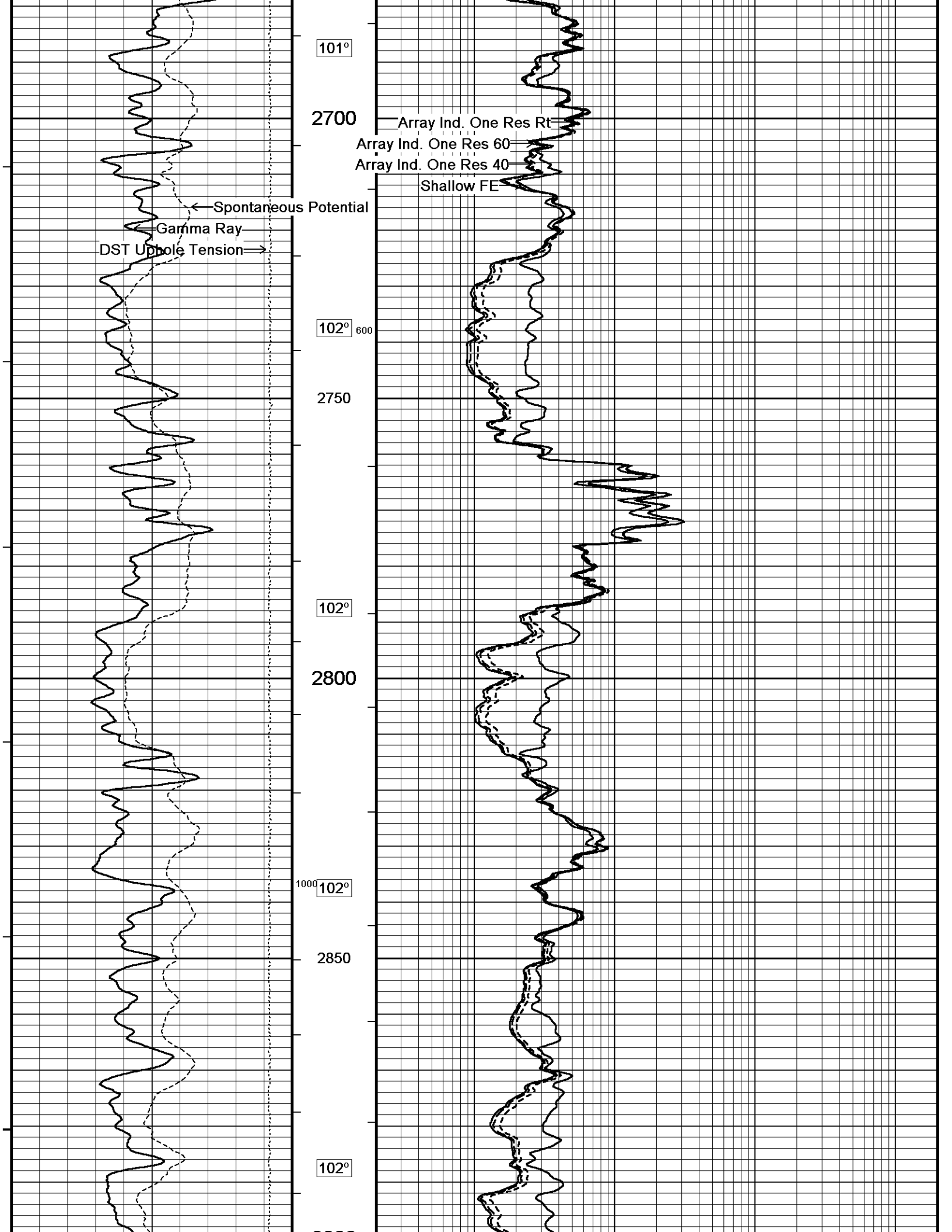
5 INCH MAIN

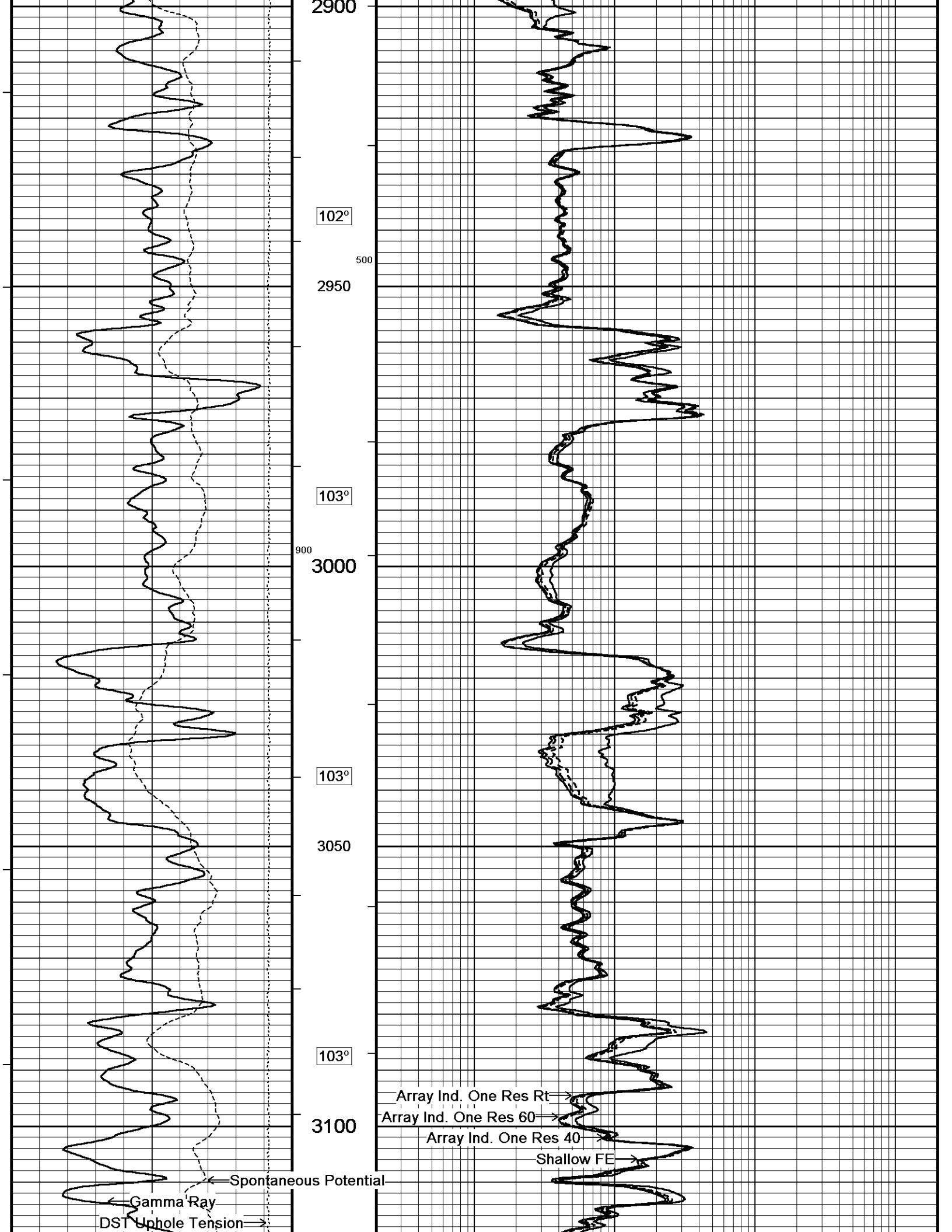
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 20-JUL-2013 13:59
Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta
Recorded on 20-JUL-2013 11:20
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

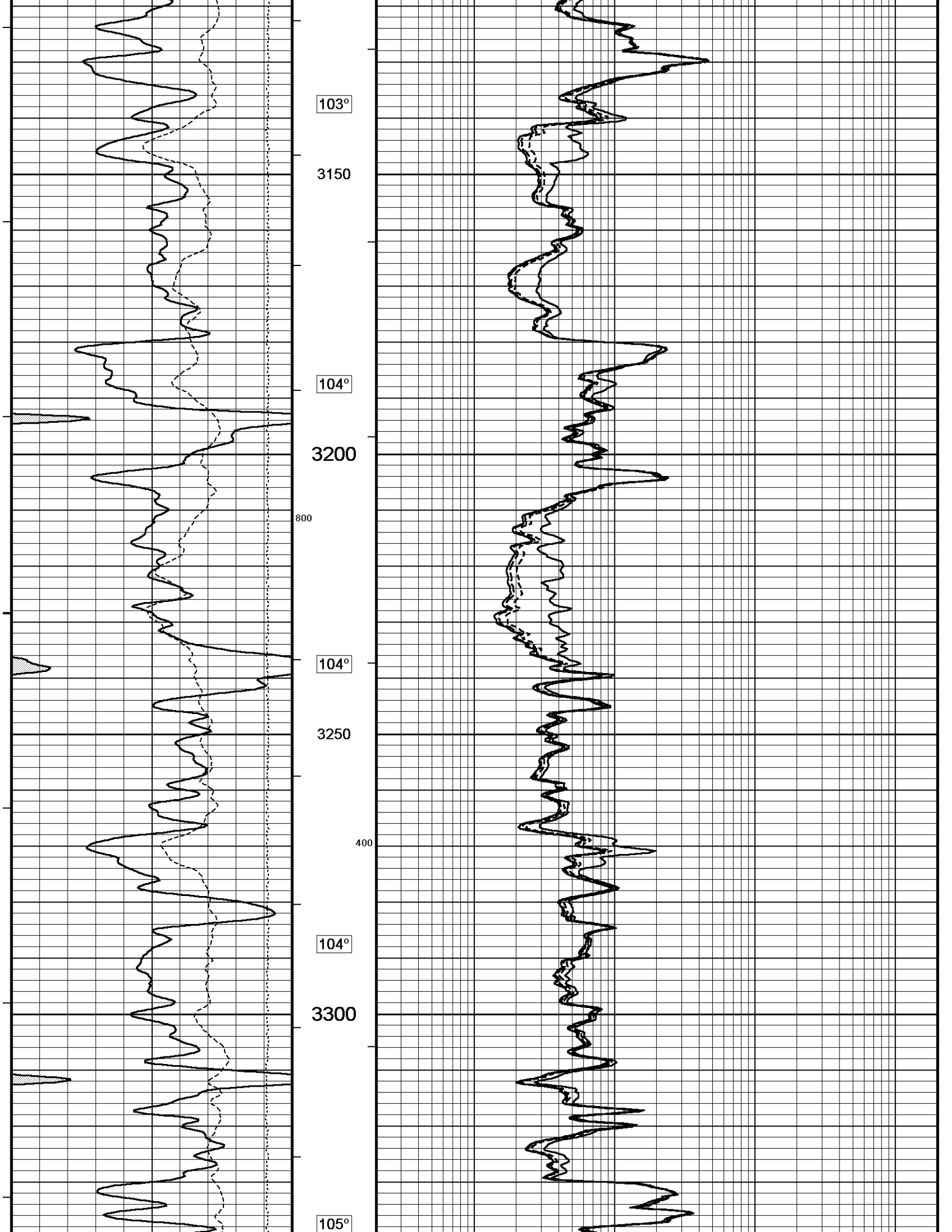


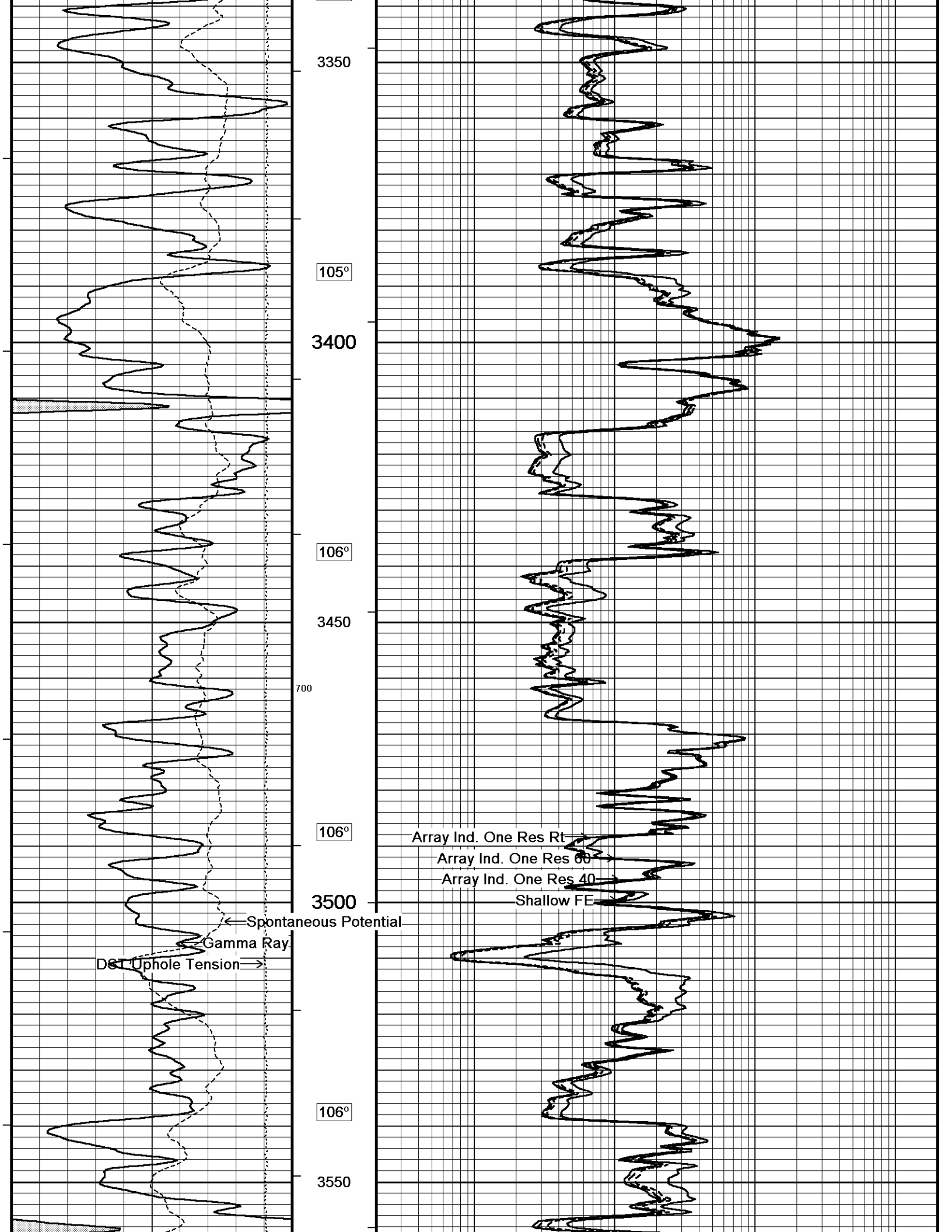

Gamma Ray
API
0
75
150
150
225
300
Temp rt
deg F
HVI
every
10 cu ft
Annular
Integral
every
10 cu ft
Replay
Scale
1:240
Array Ind. One Res 40
ohm metres
0.20
2000
1
10
100
1000
Array Ind. One Res 60
ohm metres
0.20
2000
1
10
100
1000
Array Ind. One Res Rt
ohm metres
0.20
2000
1
10
100
1000
Spontaneous Potential
millivolts
− 20 +
DST Uphole Tension
pounds
5000
0
2300
2350
2400
2450
98°
99°
99°
700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

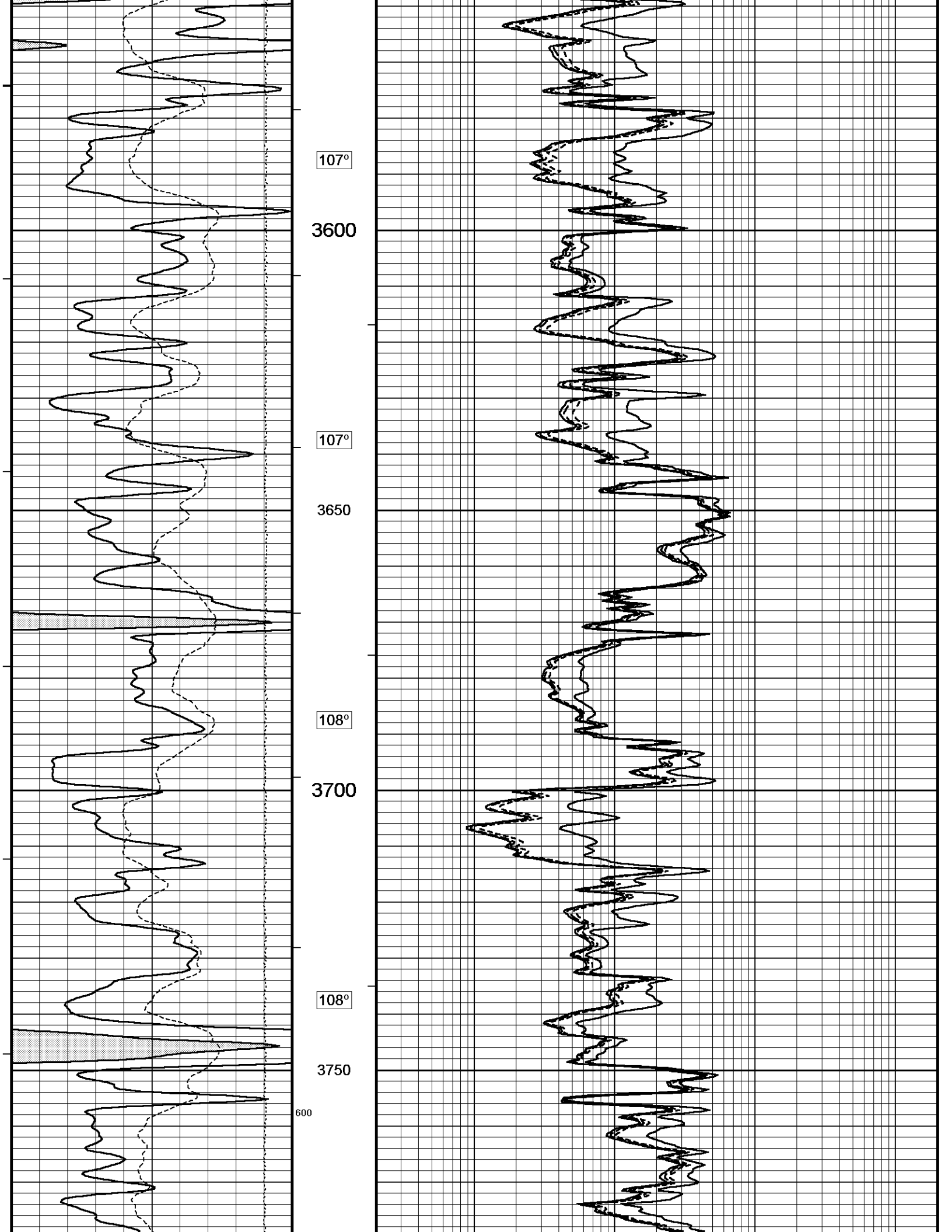

1200
99°
2500
100°
2550
100°
2600
101°
2650
1100

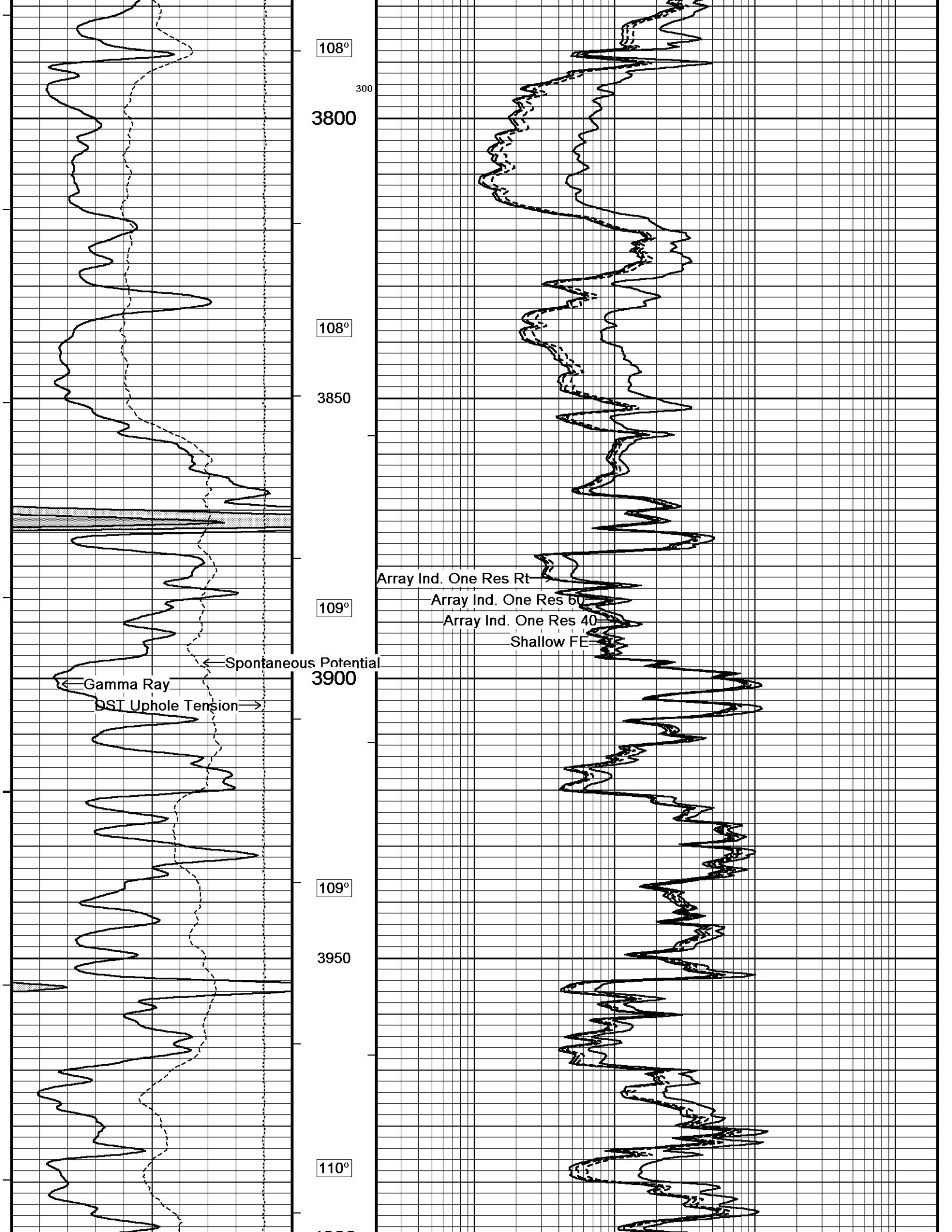

101°
2700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
102°
600
2750
102°
2800
1000
102°
2850
102°

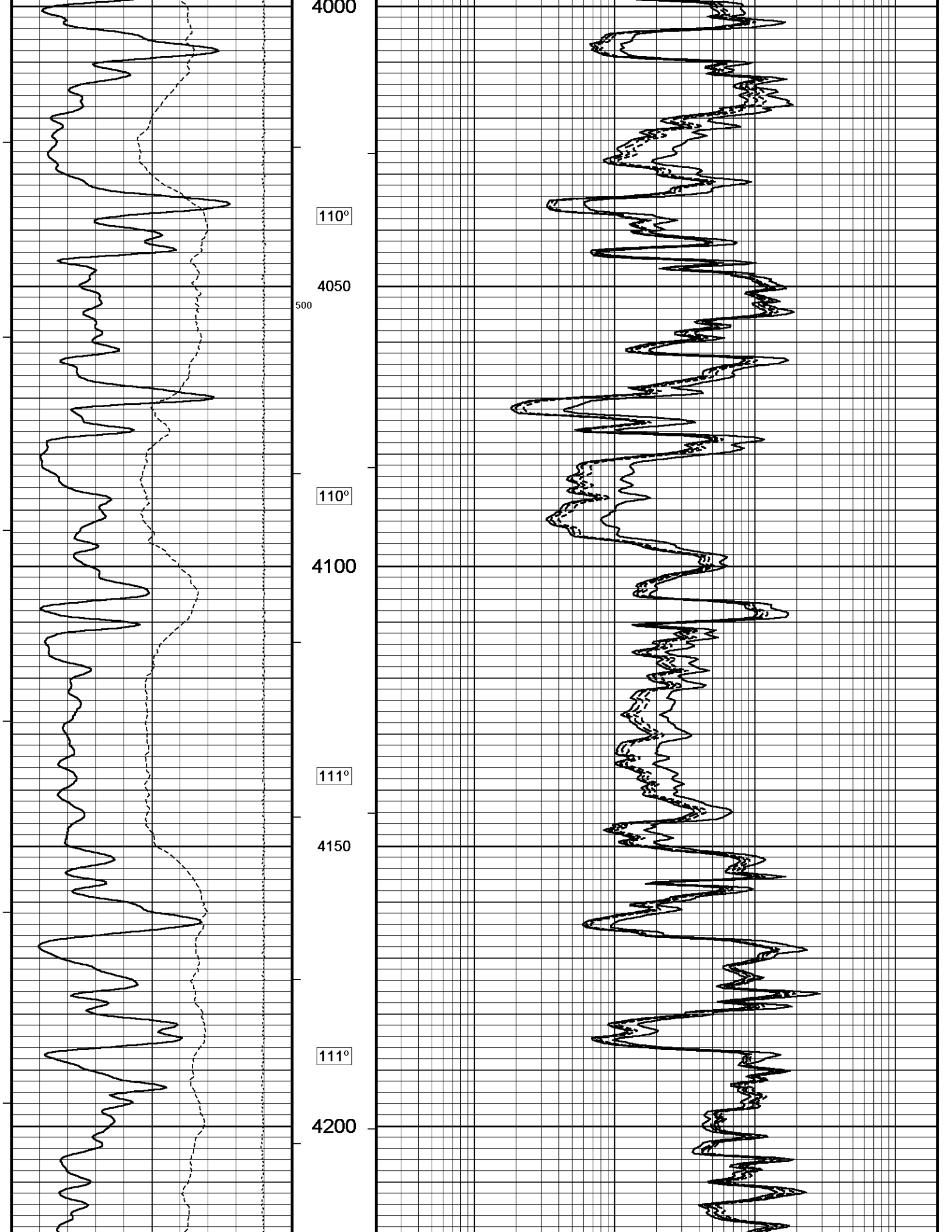

2900
102°
500
2950
103°
900
3000
103°
3050
103°
3100
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

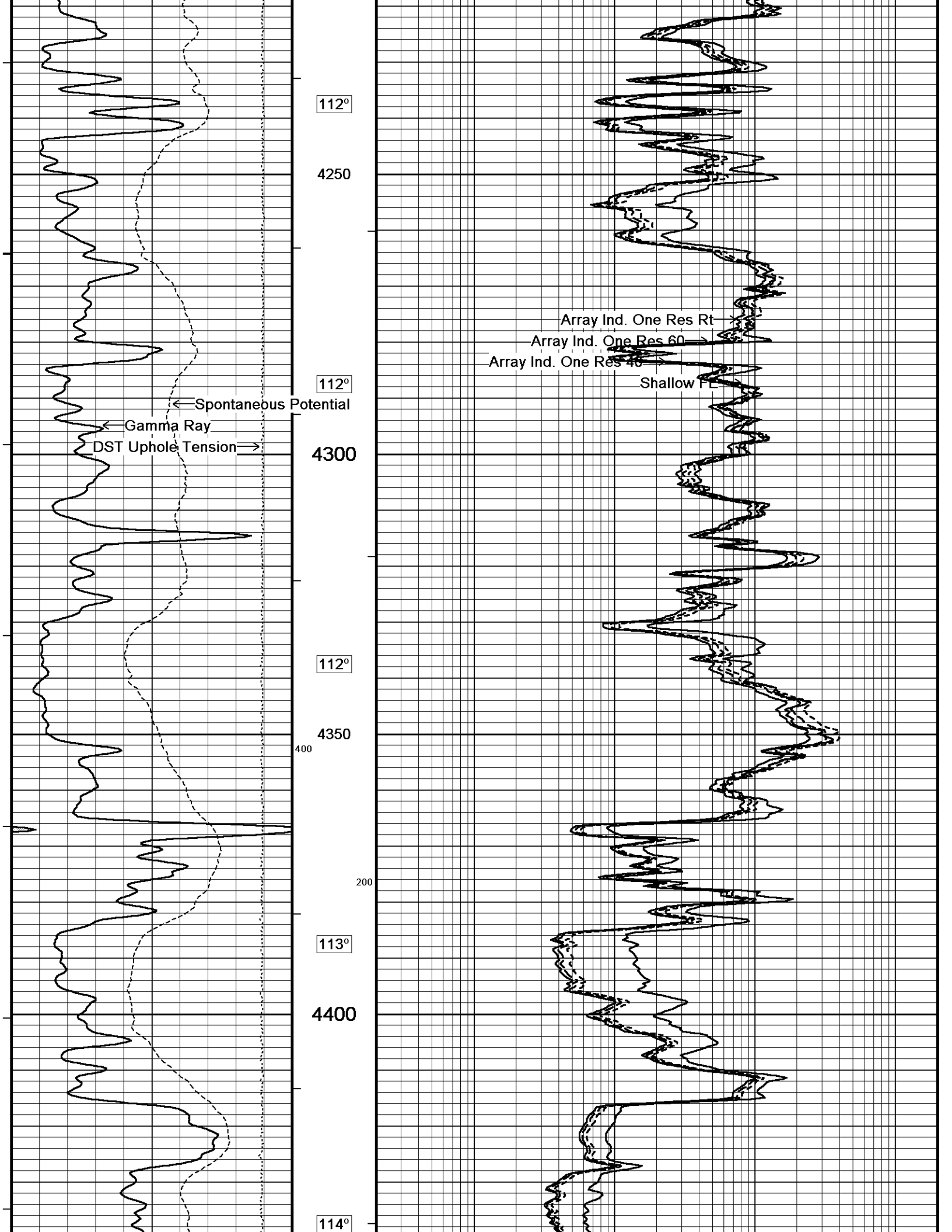

103°
3150
104°
3200
800
104°
3250
400
104°
3300
105°

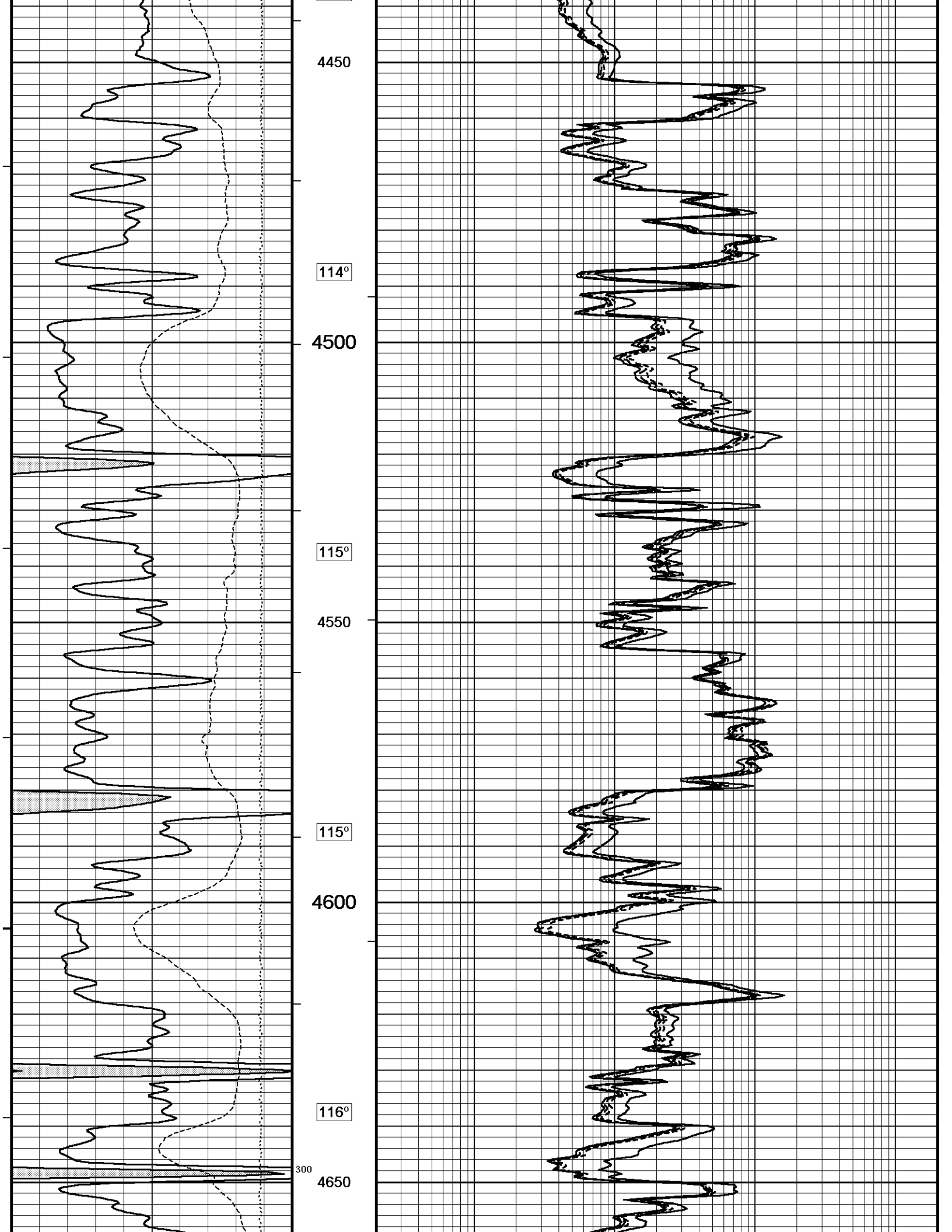

3350
105°
3400
106°
3450
700
106°
3500
Spontaneous Potential
Gamma Ray
DST Uphole Tension
106°
3550
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

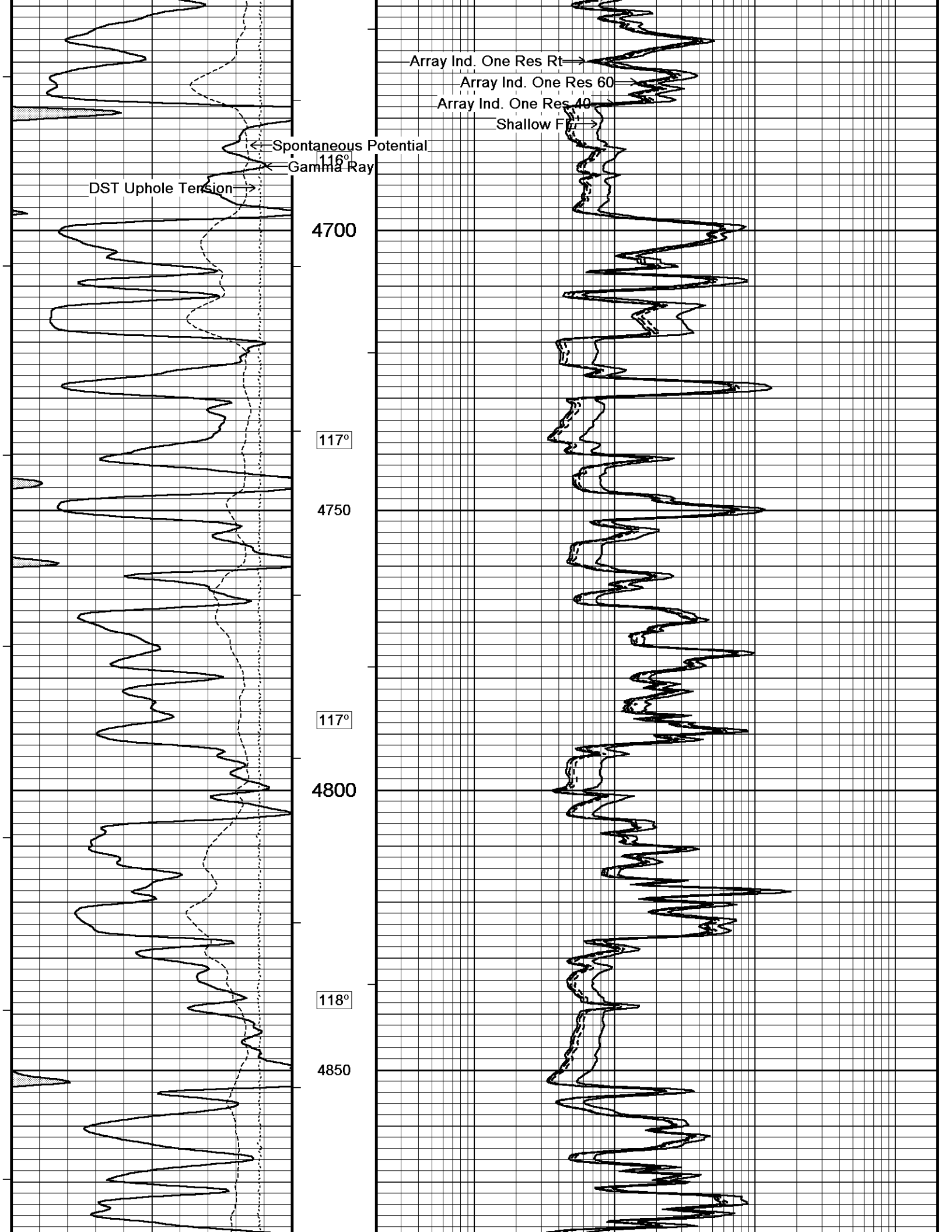

107°
3600
107°
3650
108°
3700
108°
3750
600

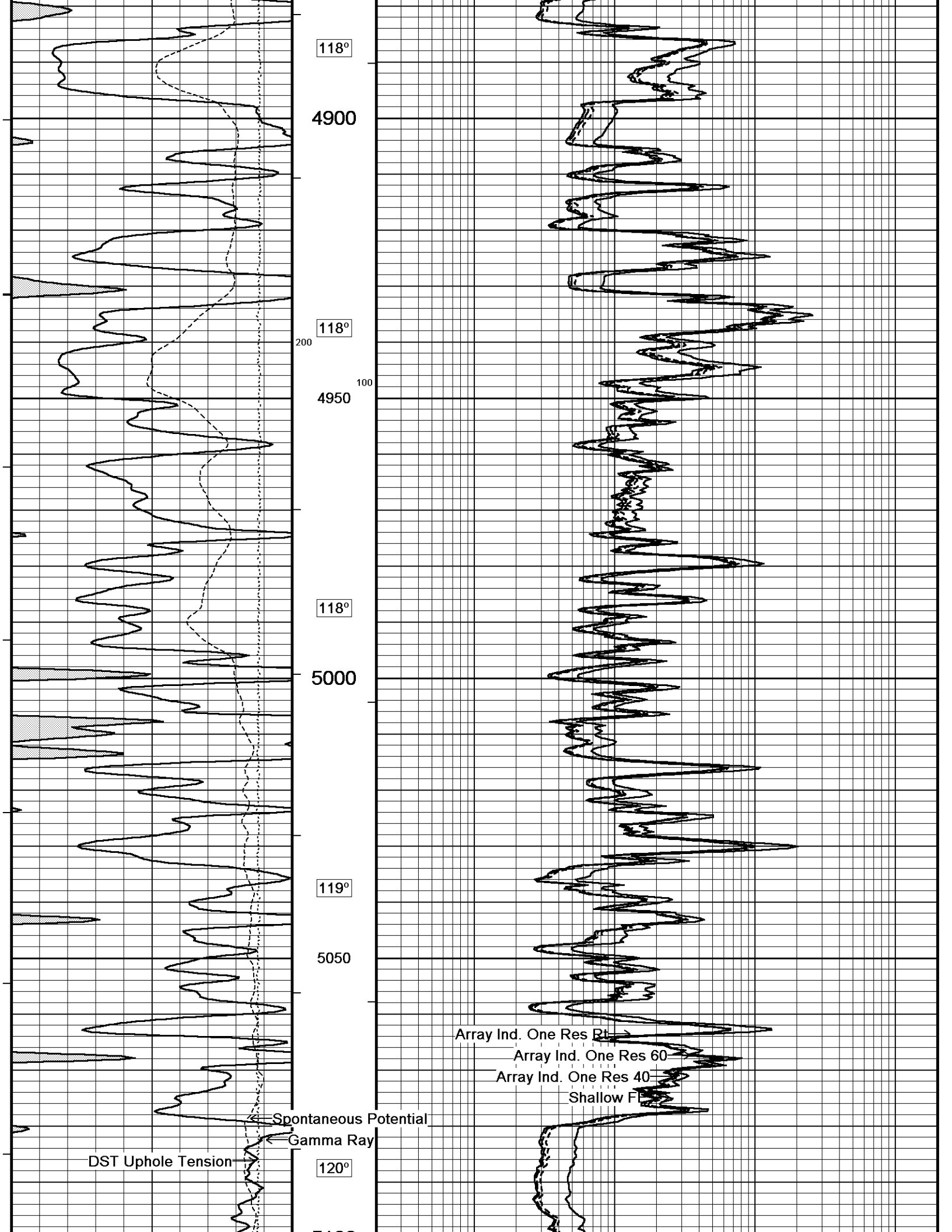

108°
300
3800
108°
3850
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
109°
Spontaneous Potential
3900
Gamma Ray
DST Uphole Tension
109°
3950
110°

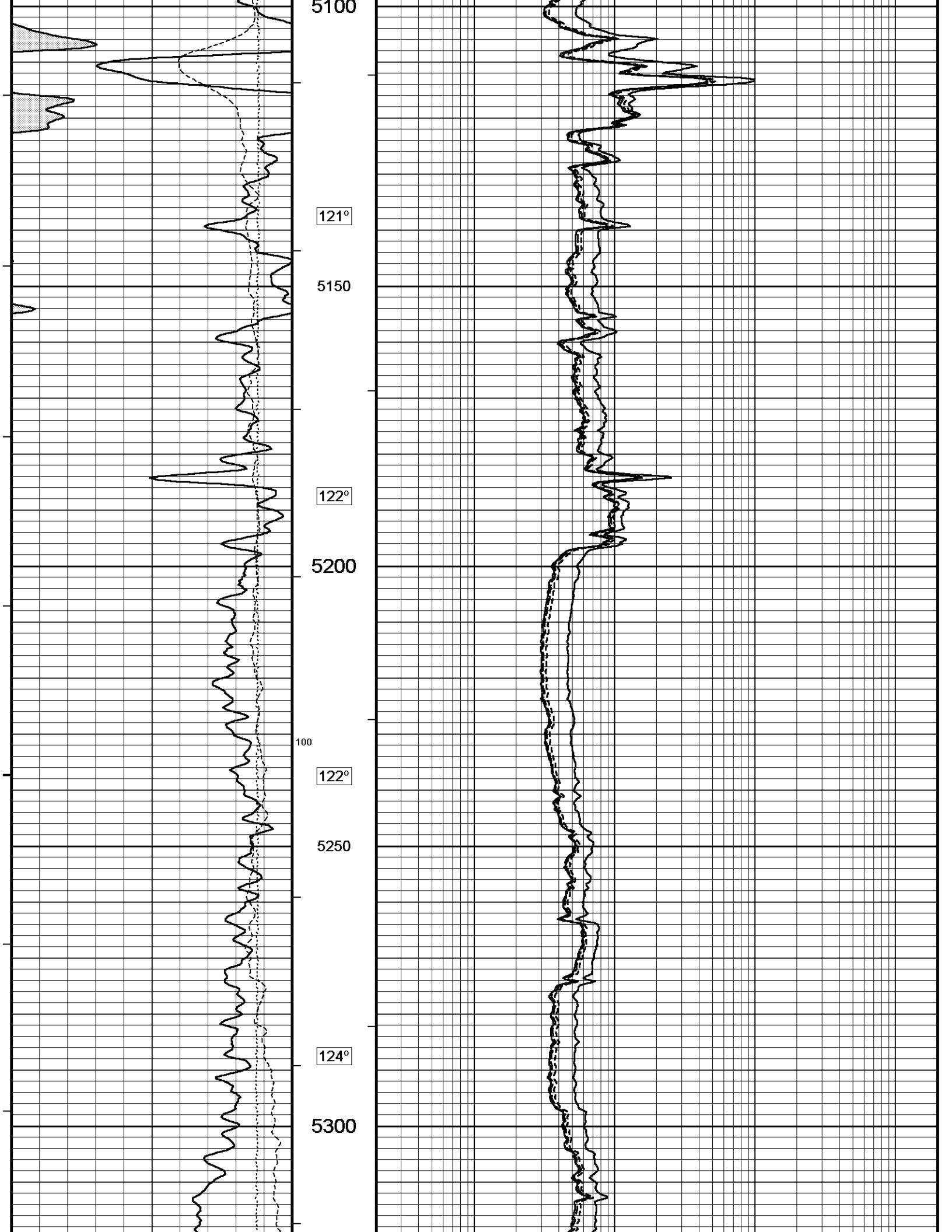

4000
110°
4050
500
110°
4100
111°
4150
111°
4200

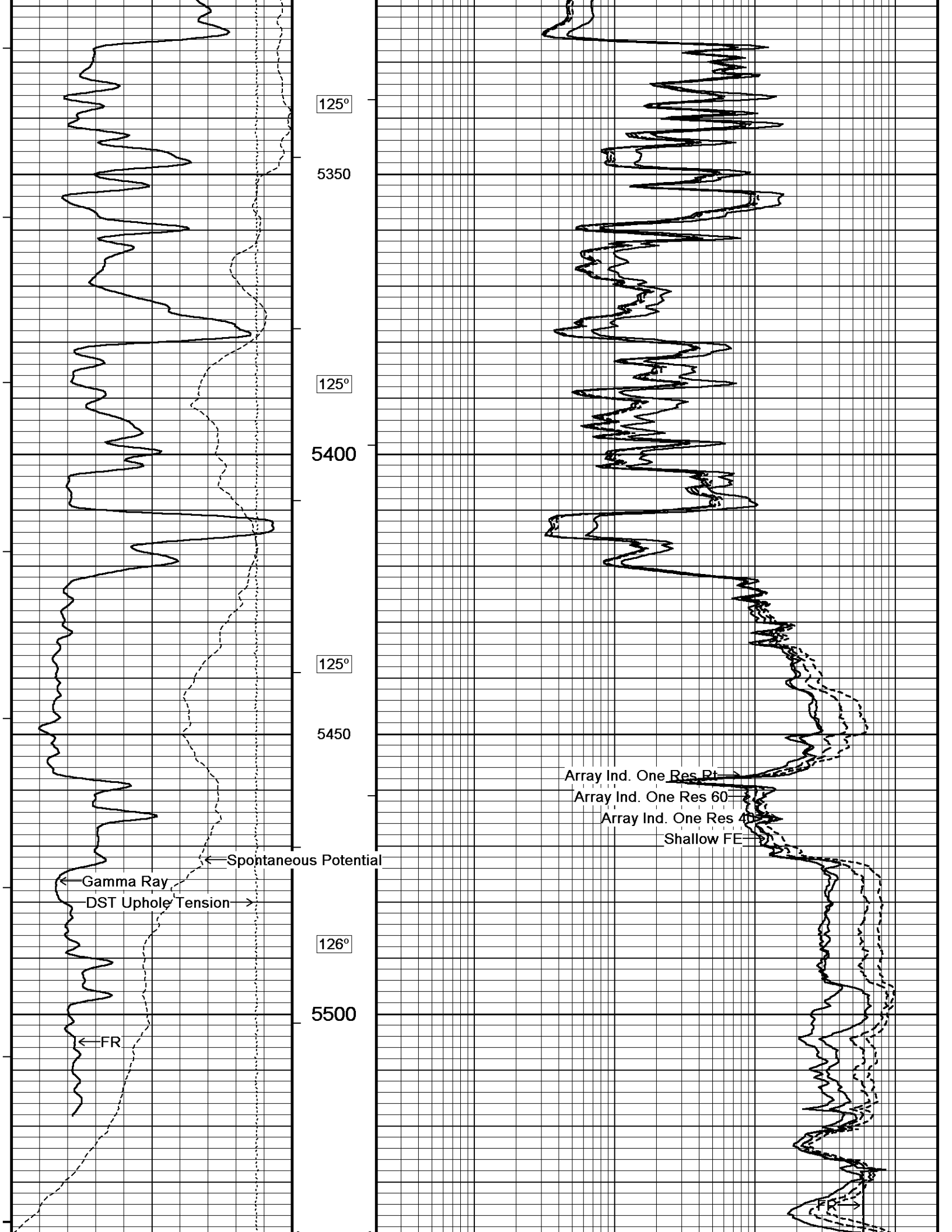

112°
4250
112°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
4300
112°
4350
400
200
113°
4400
114°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

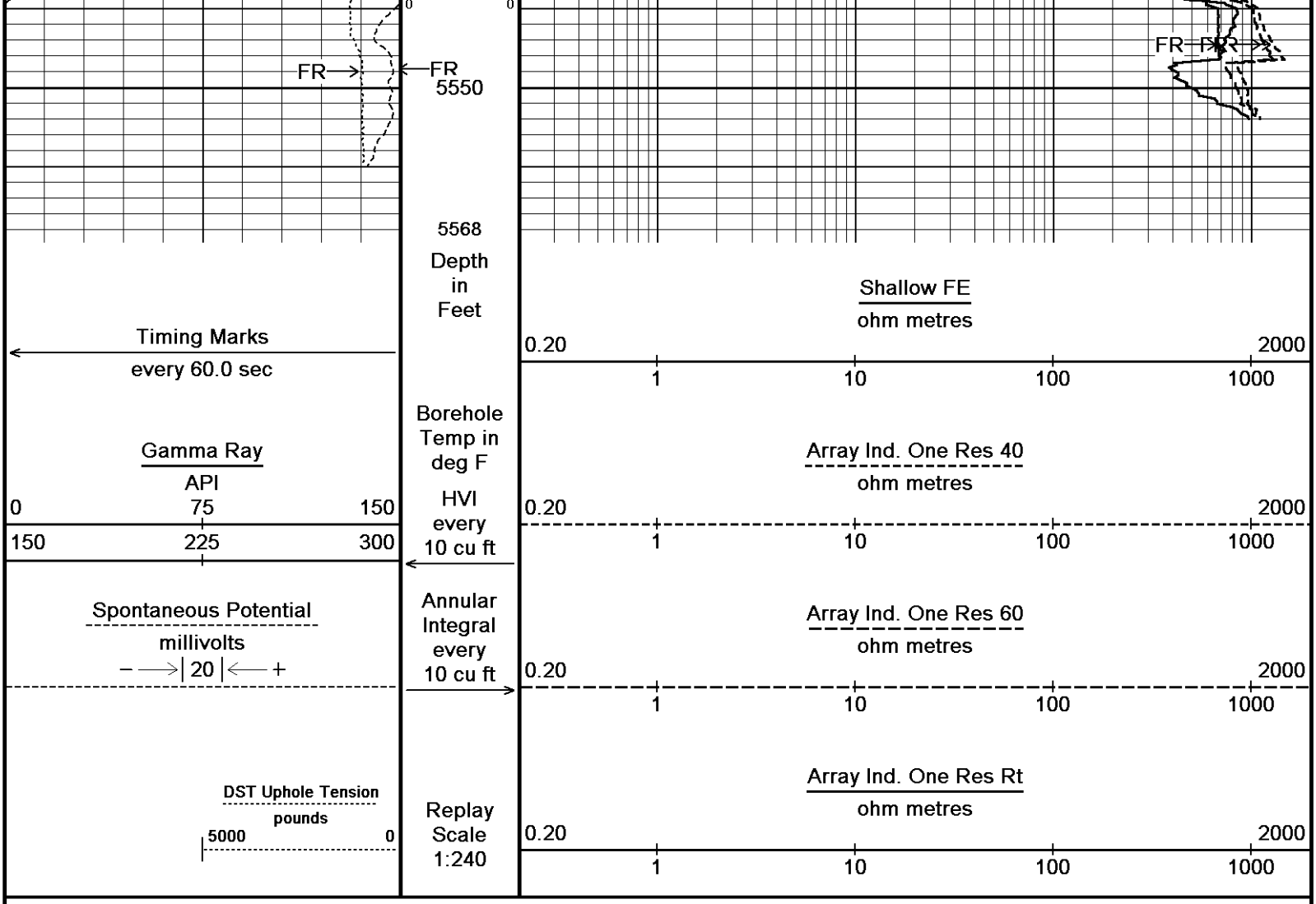

4450
114°
4500
115°
4550
115°
4600
116°
300
4650


Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Foc
Spontaneous Potential
Gamma Ray
DST Uphole Tension
116°
4700
117°
4750
117°
4800
118°
4850


118°
4900
118°
200
100
4950
118°
5000
119°
5050
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow F
Spontaneous Potential
Gamma Ray
DST Uphole Tension
120°


5100
121°
5150
122°
5200
100
122°
5250
124°
5300


125°
5350
125°
5400
125°
5450
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
126°
5500
FR
FR



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59

Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta — Recorded on 20-JUL-2013 11:20

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

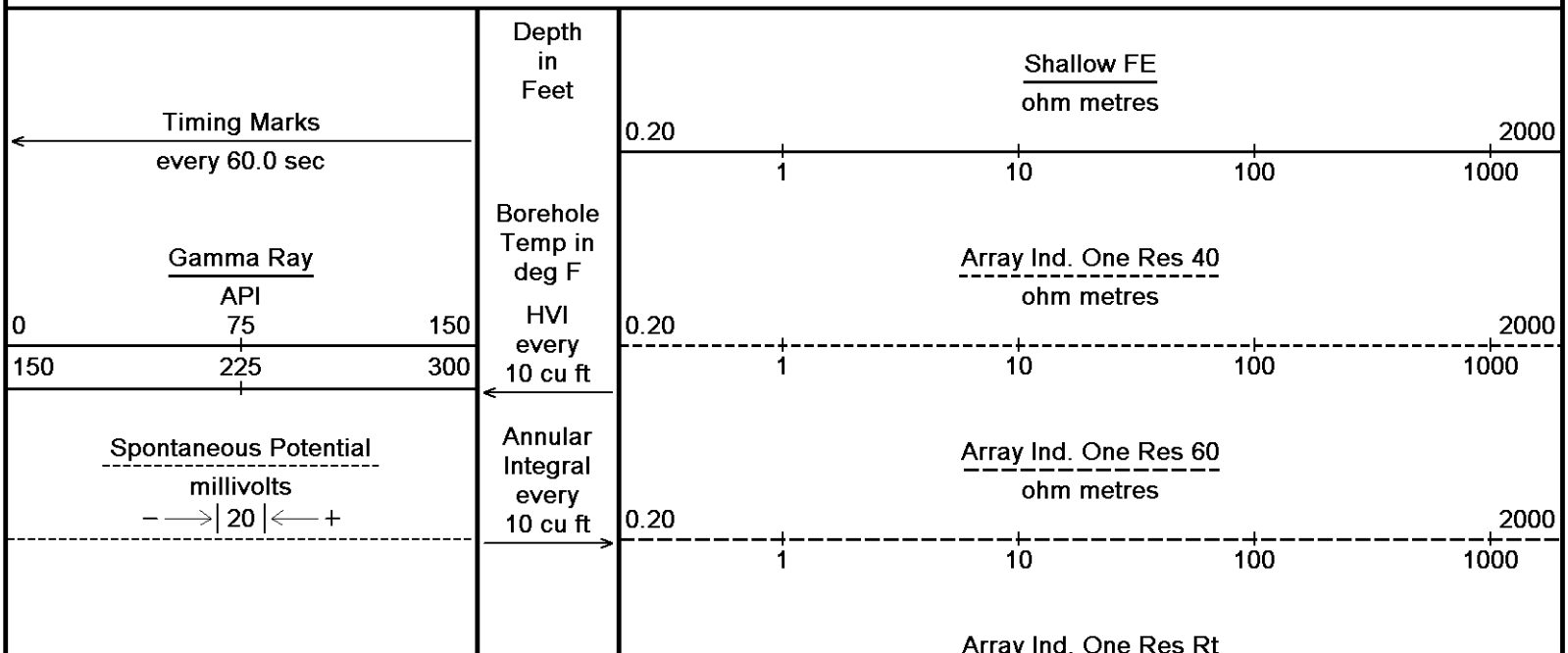
5 INCH MAIN

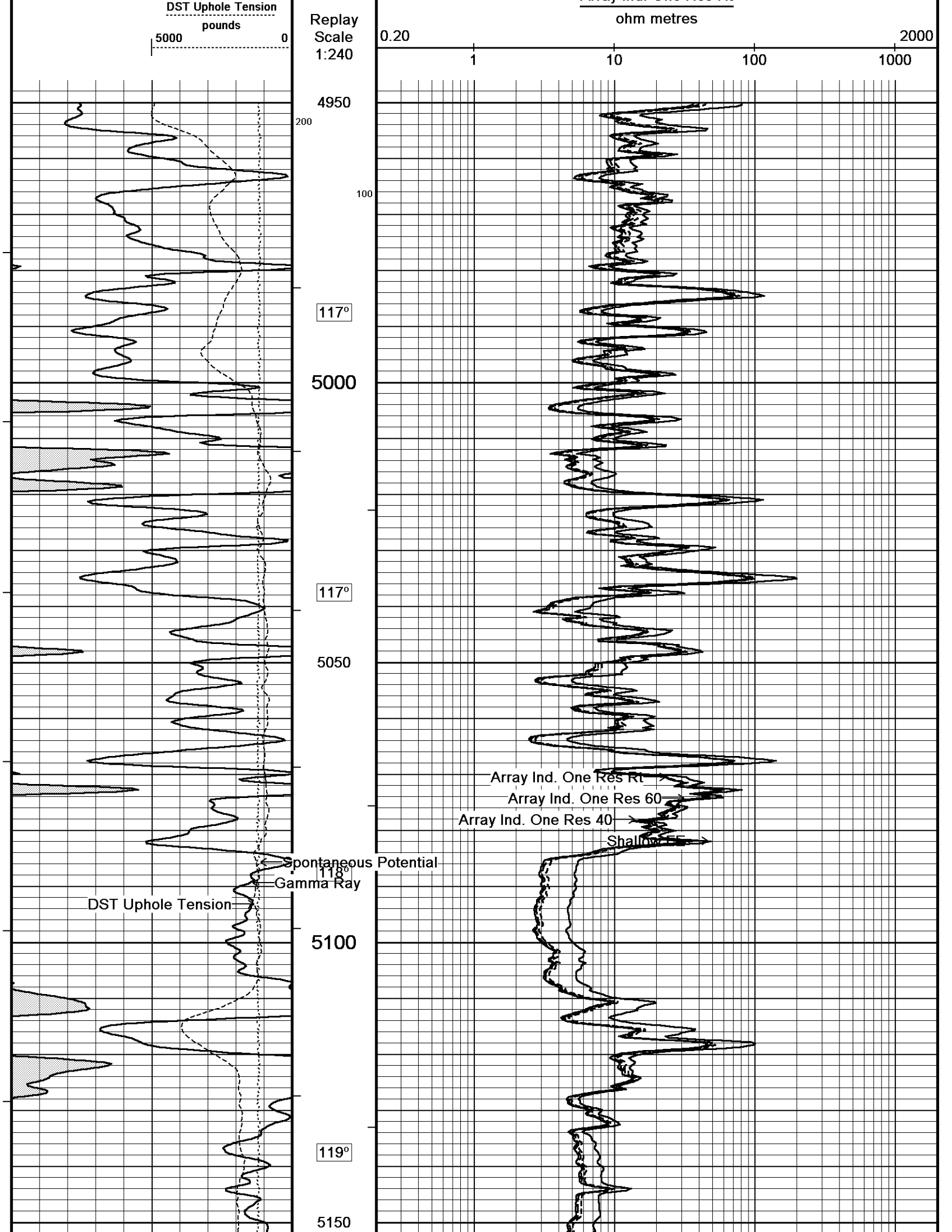
REPEAT SECTION

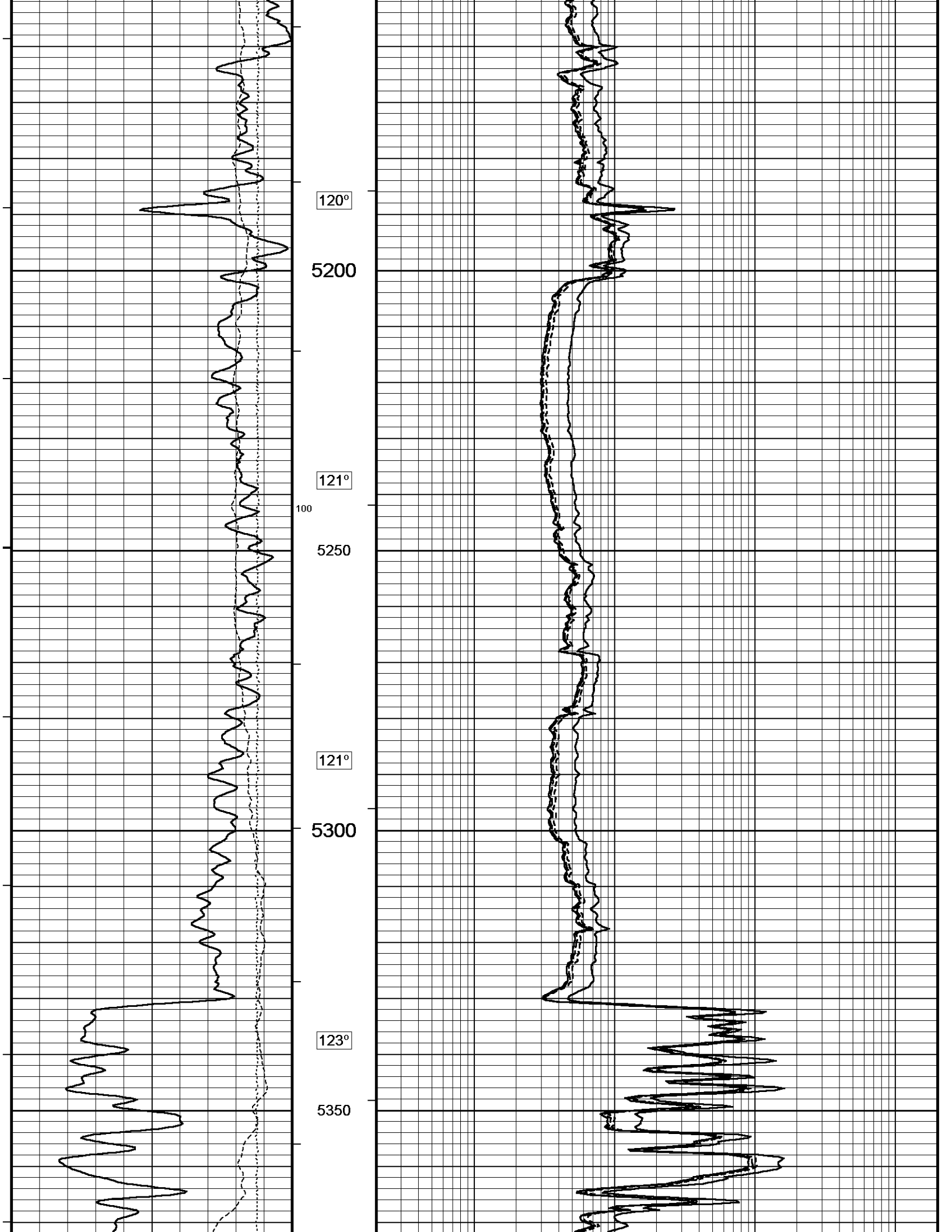
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59

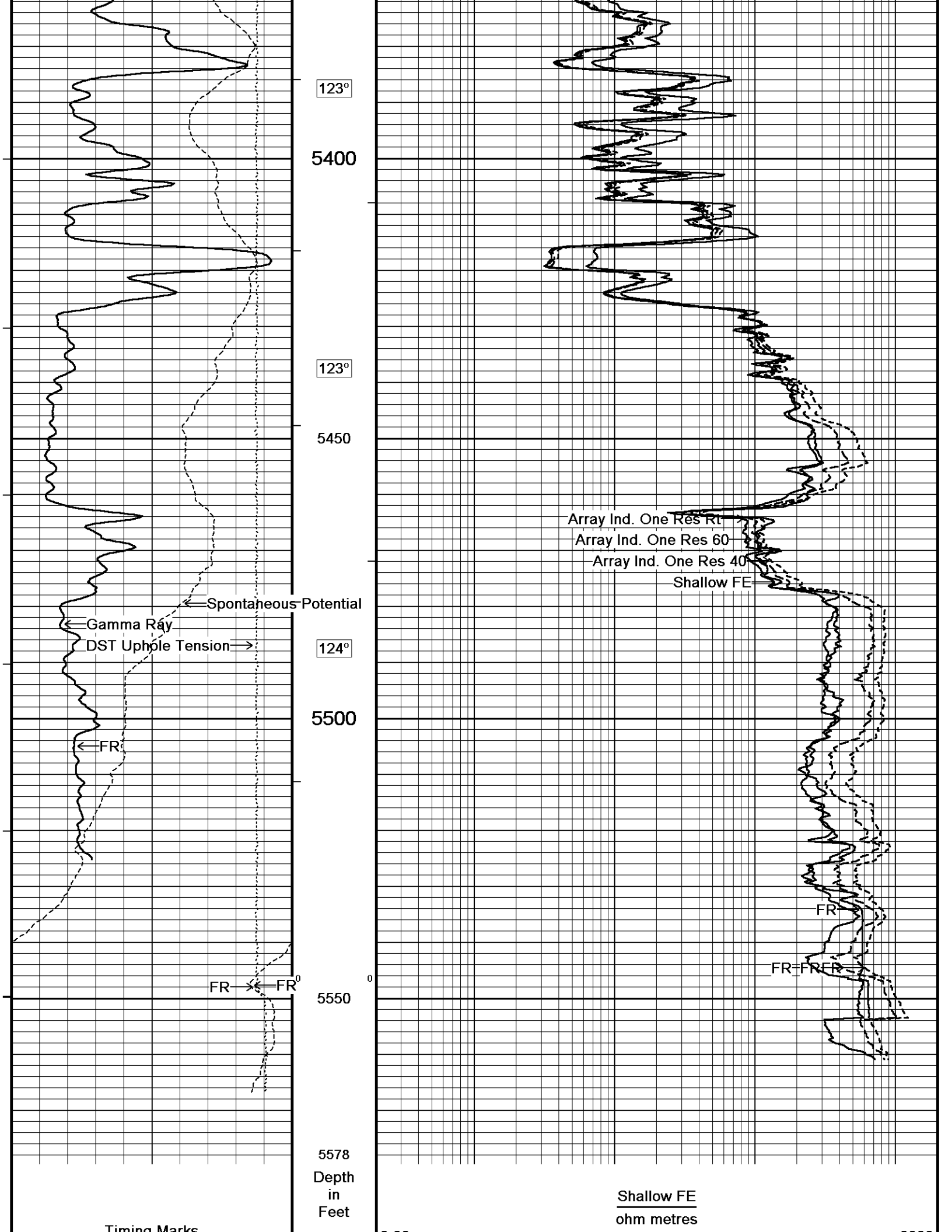
Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 REPEAT.dta — Recorded on 20-JUL-2013 10:43

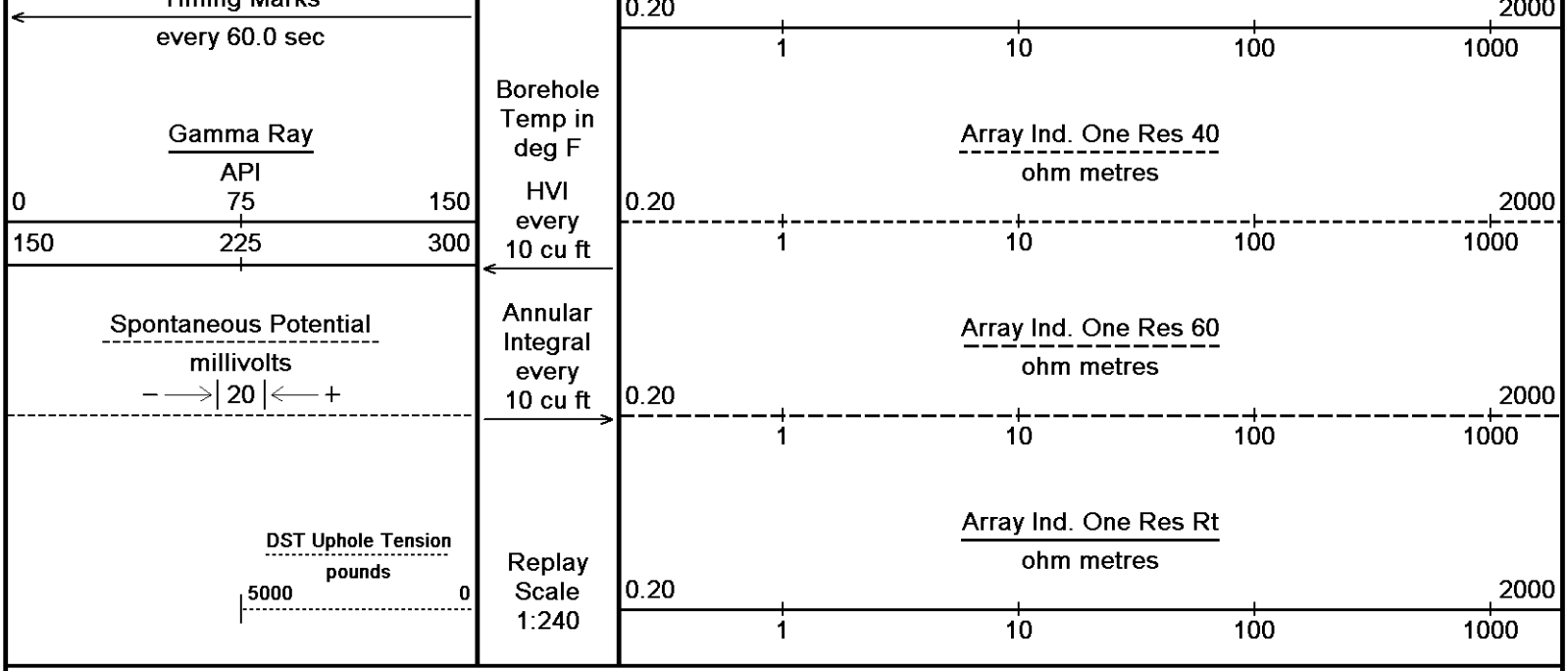
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583




DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
ohm metres
0.20
2000
1
10
100
1000
4950
200
100
117°
5000
117°
5050
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow LL
Spontaneous Potential
118°
Gamma Ray
DST Uphole Tension
5100
119°
5150


120°
5200
121°
100
5250
121°
5300
123°
5350


123°
5400
123°
5450
Spontaneous Potential
Gamma Ray
DST Uphole Tension
124°
5500
FR
FR
FR
5550
5578
Depth
in
Feet
Timing Marks
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
FR
FR
FR
0
Shallow FE
ohm metres



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59

Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 REPEAT.dta — Recorded on 20-JUL-2013 10:43

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 REPEAT.dta

General Constants All 000

Last Edited on 20-JUL-2013,10:29

General Parameters		
Mud Resistivity	0.500	ohm-metres
Mud Resistivity Temperature	95.000	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	MML Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 12-JUN-2013,14:22

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

High Resolution Temperature Constants MCG-C 208

Last Edited on 16-JUL-2013,06:07

Pre-filter Length	11

Gamma Calibration MCG-C 208

Field Calibration on 19-JUL-2013 16:10

	Measured	Calibrated (API)
Background	69	47
Calibrator (Gross)	1135	772
Calibrator (Net)	1066	725

Gamma Constants MCG-C 208

Last Edited on 20-JUL-2013,08:56

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	%

FE Calibration MFE-A.A 55

Base Calibration on 15-JUL-2013 11:29
Field Check on 19-JUL-2013 15:49

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	951.2	126.8
Base Check		281.5
Field Check		281.6

FE Constants MFE-A.A 55

Last Edited on 20-JUL-2013,08:57

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 178

Base Calibration on 29-APR-2013,09:40
Field Check on 19-JUL-2013 15:47

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.6	484.7	9.3	966.2
2	6.2	391.4	7.6	821.4
3	4.0	264.5	5.2	566.0
4	2.3	135.1	2.6	279.2

Array Temperature 77.0 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			13.4	3764.7
2			29.9	3468.2
3			27.4	3014.7
4			18.8	2065.3
Deep			16.0	1995.6
Medium			40.3	3956.0
Shallow			45.9	5083.8

Array Temperature 92.8 Deg F

Induction Constants MAI-A.A 178

Last Edited on 20-JUL-2013,08:57

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 59

Base Calibration on 15-JUL-2013 17:42
Field Calibration on 19-JUL-2013 15:55

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15286	3.99
2	23942	5.98
3	32512	7.97
4	40768	9.86
5	49984	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.89	7.97

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 REPEAT.dta

CBH-C, Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.24 in

Compact Comms Gamma
MCG-C 208 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-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

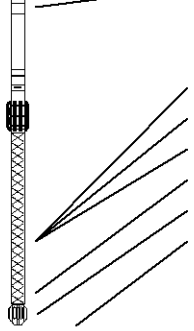
Compact Focussed Electric

42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
34.24 ft	MLTC - MML Caliper
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE

MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.55 ft Weight: 407.9 lb



COMPANY	WESTERN OPERATING CO.
WELL	HASLETT 2-30
FIELD	GOULD
PROVINCE/COUNTY	HAMILTON
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3594.00	feet	First Reading	5545.00	feet
Elevation Drill Floor	3592.00	feet	Depth Driller	5550.00	feet
Elevation Ground Level	3583.00	feet	Depth Logger	5548.00	feet

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SHALLOW FOCUSED
ELECTRIC LOG

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COMPANY	WESTERN OPERATING CO.
WELL	HASLETT 2-30
FIELD	GOULD
PROVINCE/COUNTY	HAMILTON
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2288' FNL & 1780' FWL NW SE SE NW

SEC	TWP	RGE	Other Services
30	26S	41W	MIDNMPD

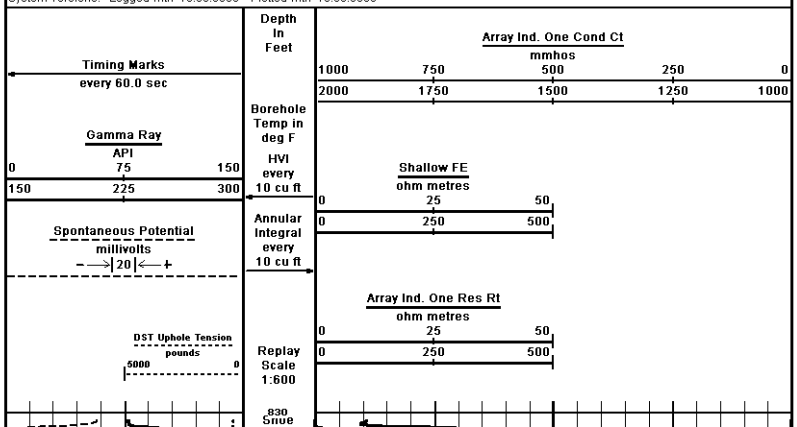
API Number 15-075-20871
Permit Number MML

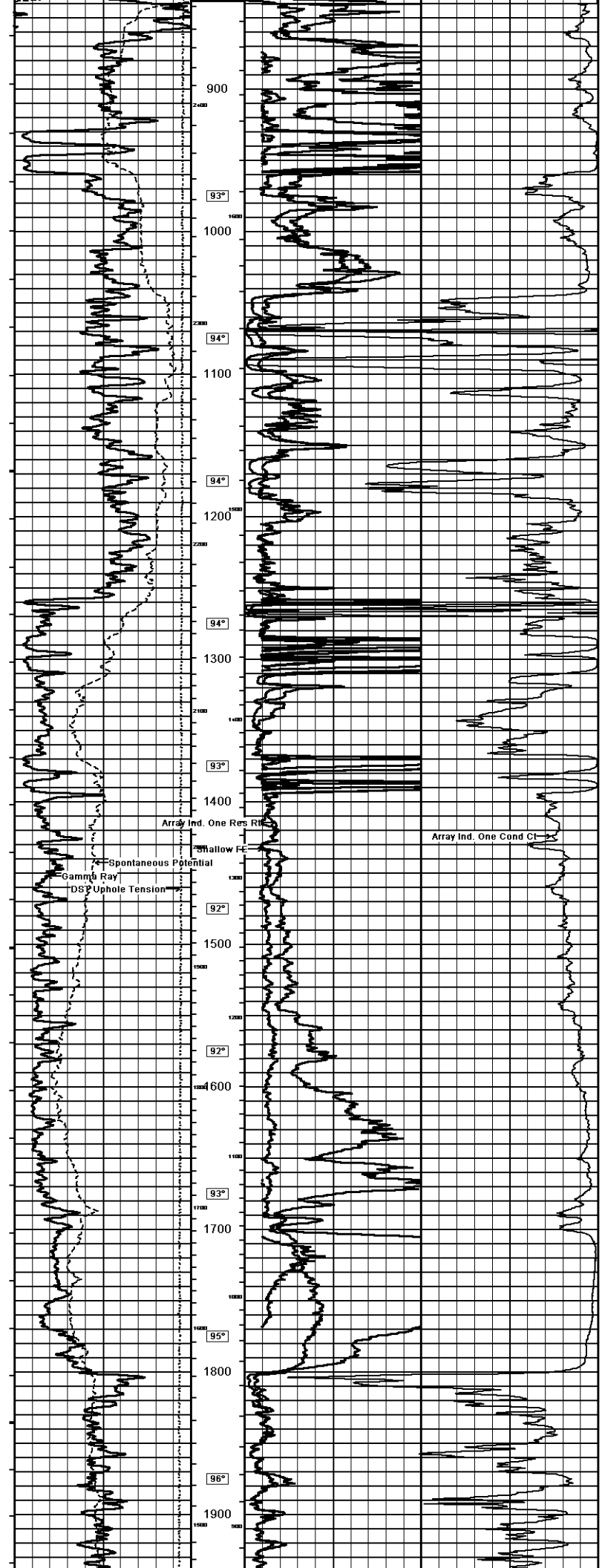
Permanent Datum GL Elevation 3583.00 feet	
Log Measured From KB	
Drilling Measured From KB @ 11 FEET	
Date	20-JUL-2013
Run Number	ONE
Service Order	3541024
Depth Driller	5550.00 feet
Depth Logger	5548.00 feet
First Reading	5545.00 feet
Last Reading	838.00 feet
Casing Driller	838.00 feet
Casing Logger	838.00 feet
Bit Size	7.875 inches
Hole Fluid Type	CHEM
Density / Viscosity	9.40 lbs/Usg 54.00 CP
PH / Fluid Loss	10.00 8.80 ml/30Min
Sample Source	PIT
Rm @ Measured Temp	0.50 @ 95.0 ohm-m
Rmf @ Measured Temp	0.40 @ 95.0 ohm-m
Rmc @ Measured Temp	0.60 @ 95.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.37 @126.0 ohm-m
Time Since Circulation	5 HRS
Max Recorded Temp	126.00 deg F
Equipment / Base	13379 KANSAS
Recorded By	D. COLE
Witnessed By	A. GARNER
LOG #	LB13-207

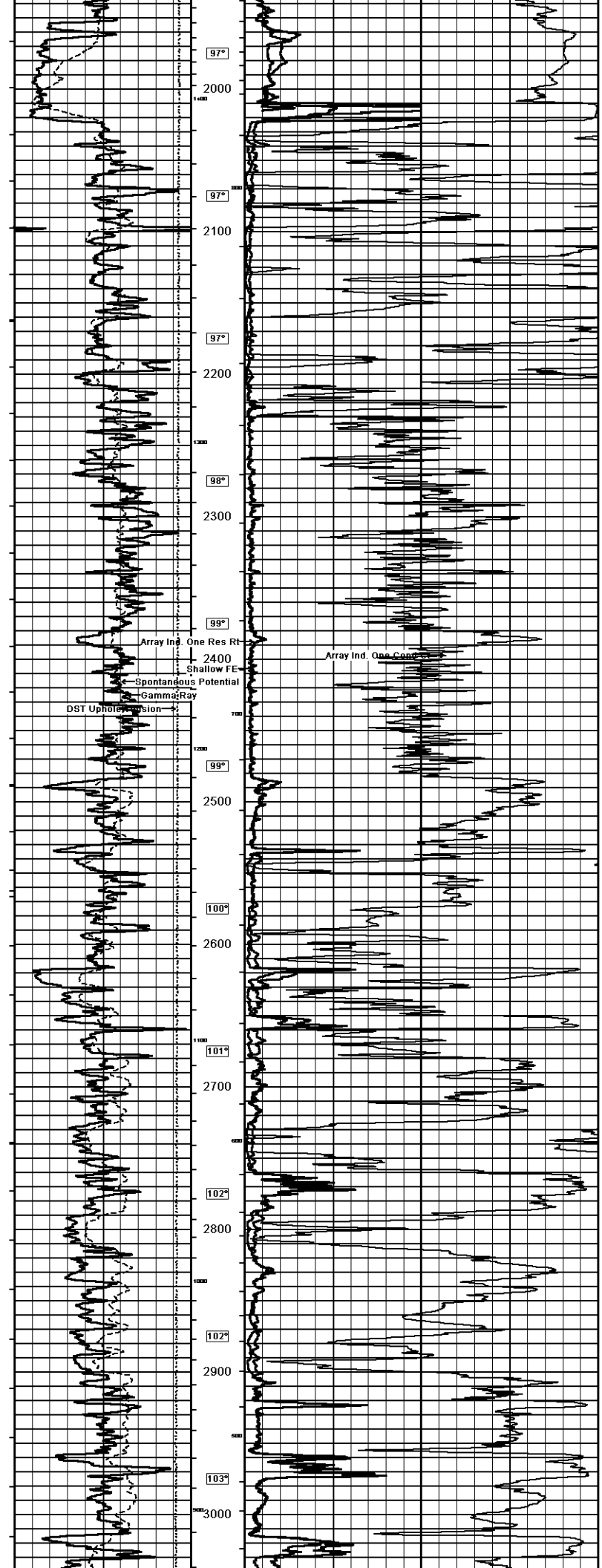
Elevations: feet
KB 3594.00
DF 3592.00
GL 3583.00

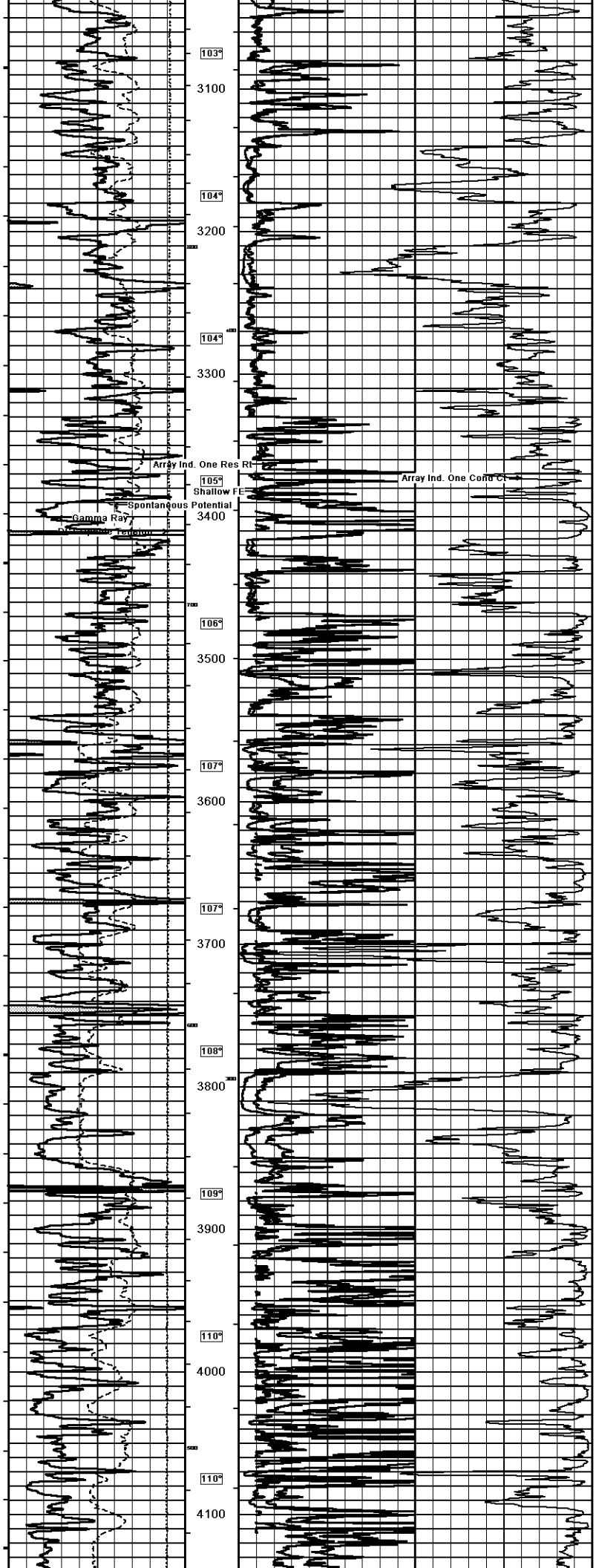
1 INCH MAIN

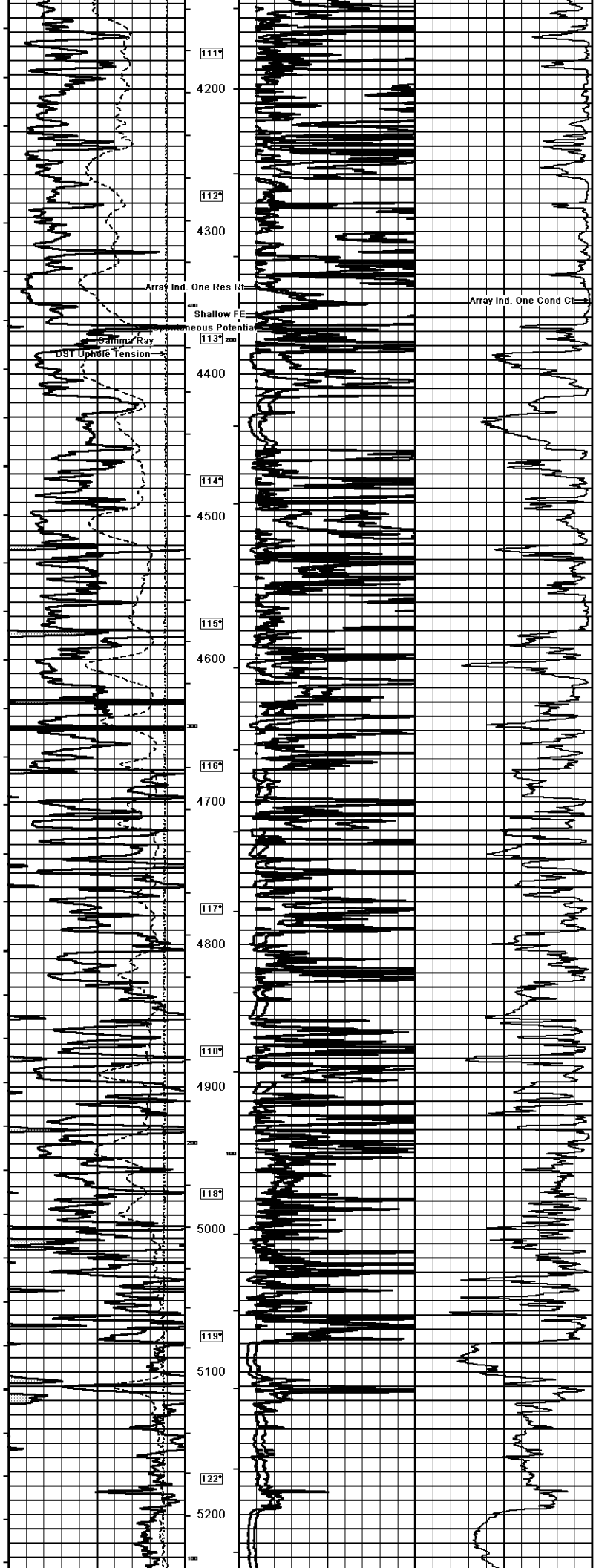
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59
Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta — Recorded on 20-JUL-2013 11:20
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

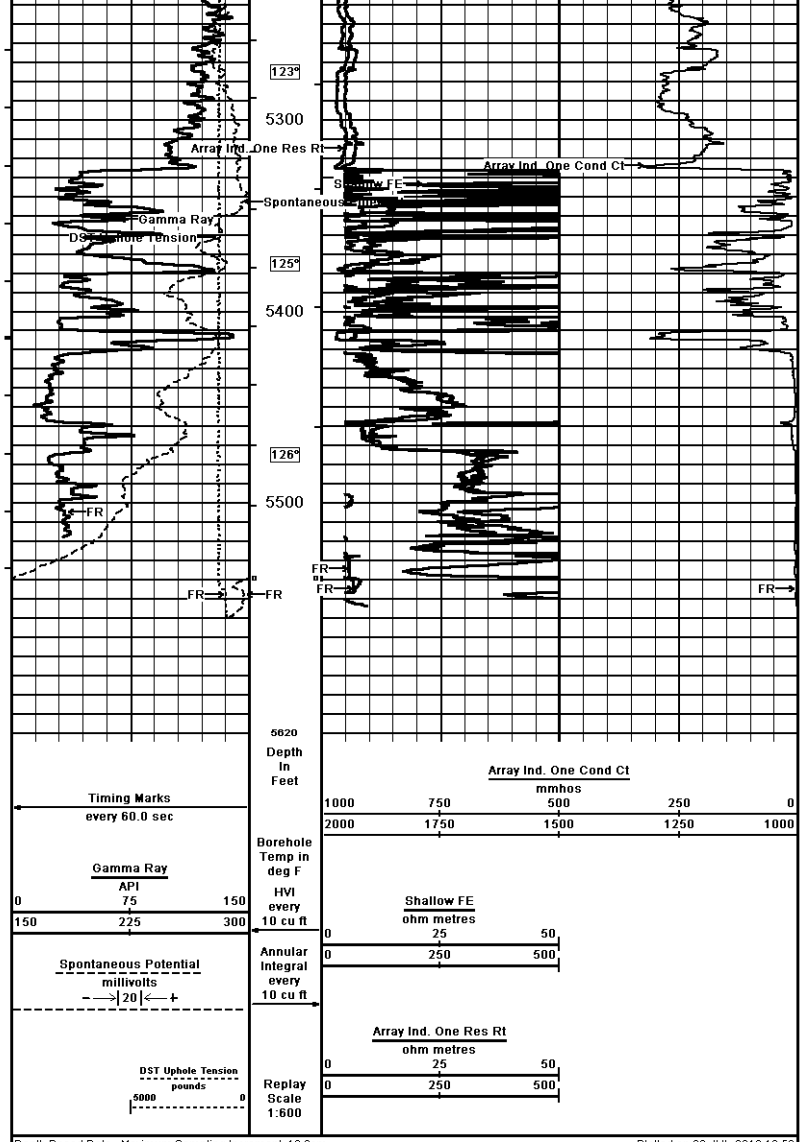



900
93°
1000
94°
1100
94°
1200
94°
1300
93°
1400
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow Fe
Spontaneous Potential
Gamma Ray
DSI Uphole Tension
92°
1500
92°
1600
93°
1700
95°
1800
96°
1900


97°
2000
97°
2100
97°
2200
98°
2300
99°
Array Ind. One Res Rt
2400
Array Ind. One Cond
Shallow FE
Spontaneous Potential
Gamma Ray
DST Upholeension
99°
2500
100°
2600
101°
2700
102°
2800
102°
2900
103°
3000


103°
3100
104°
3200
104°
3300
Array Ind. One Res Rt
105°
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
3400
106°
3500
107°
3600
107°
3700
108°
3800
109°
3900
110°
4000
110°
4100


111°
4200
112°
4300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
113°
DST Upside Tension
4400
114°
4500
115°
4600
116°
4700
117°
4800
118°
4900
118°
5000
119°
5100
122°
5200



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JUL-2013 13:59

Filename: C:\Minimus 13.05.9583\Logs\Western Haslett 2-30\Western Haslett 2-30 MAIN.dta — Recorded on 20-JUL-2013 11:20

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

1 INCH MAIN

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WELL	HASLETT 2-30
FIELD	GOULD
PROVINCE/COUNTY	HAMILTON
COUNTRY/STATE	U.S.A. / KANSAS

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