



Weatherford[®]

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY

SHAKESPEARE OIL COMPANY, INC.

WELL

OTTELEY #6-14

FIELD

CHALK BUTTES

PROVINCE/COUNTY LOGAN

COUNTRY/STATE U.S.A. / KANSAS

LOCATION 1920' FNL & 1600' FEL

SEC 14 TWP 14S RGE 32W

Other Services
MPD/MDN

Latitude

MML

Longitude

API Number 15-109-21305

Permanent Datum GL, Elevation 2809 feet

Log Measured From KB

Drilling Measured From KB @ 10 feet

Date 17-JUL-2014

ONE

Service Order 7577-92797338

Depth Driller 4530.00 feet

Depth Logger 4527.00 feet

First Reading 4524.00 feet

Last Reading 265.00 feet

Casing Driller 264.00 feet

Casing Logger 265.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.40 lb/USg 56.00 CP

PH / Fluid Loss 9.50 11.20 ml/30Min

Sample Source MUD PIT

Rm @ Measured Temp 0.72 @ 80.0 ohm-m

Rmf @ Measured Temp 0.58 @ 80.0 ohm-m

Rmc @ Measured Temp 0.86 @ 80.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.53 @ 110.0 ohm-m

Time Since Circulation 4 HOURS

Max Recorded Temp 110.00 deg F

Equipment / Base 13244 LIB

Recorded By JEFFREY RANDLE

Witnessed By TIM PRIEST

JOB # LB14-213

Elevations:
KB 2819.00
DF 2817.00
GL 2809.00

BOREHOLE RECORD

Last Edited: 17-JUL-2014 11:28

Bit Size
inches

Depth From
feet

Depth To
feet

7.875

264.00

4530.00

CASING RECORD

Type

Size
inches

Depth From
feet

Shoe Depth
feet

Weight
pounds/ft

SURFACE

8.625

0.00

264.00

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: 2065 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3600 FEET: 190 CU.FT.
- RIG: H-D DRILLING #2

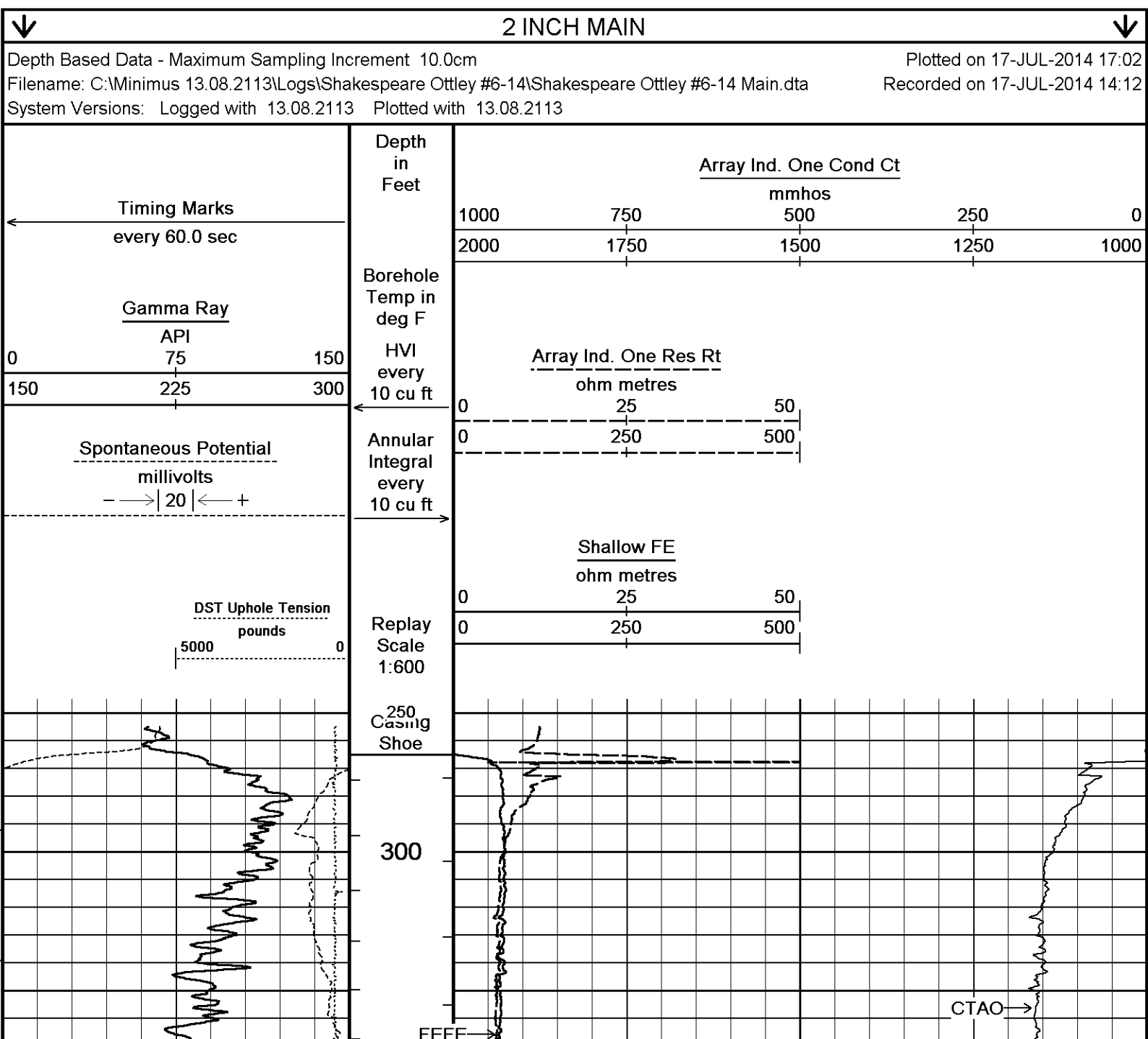
RIG: 11 D DRILLING #2:

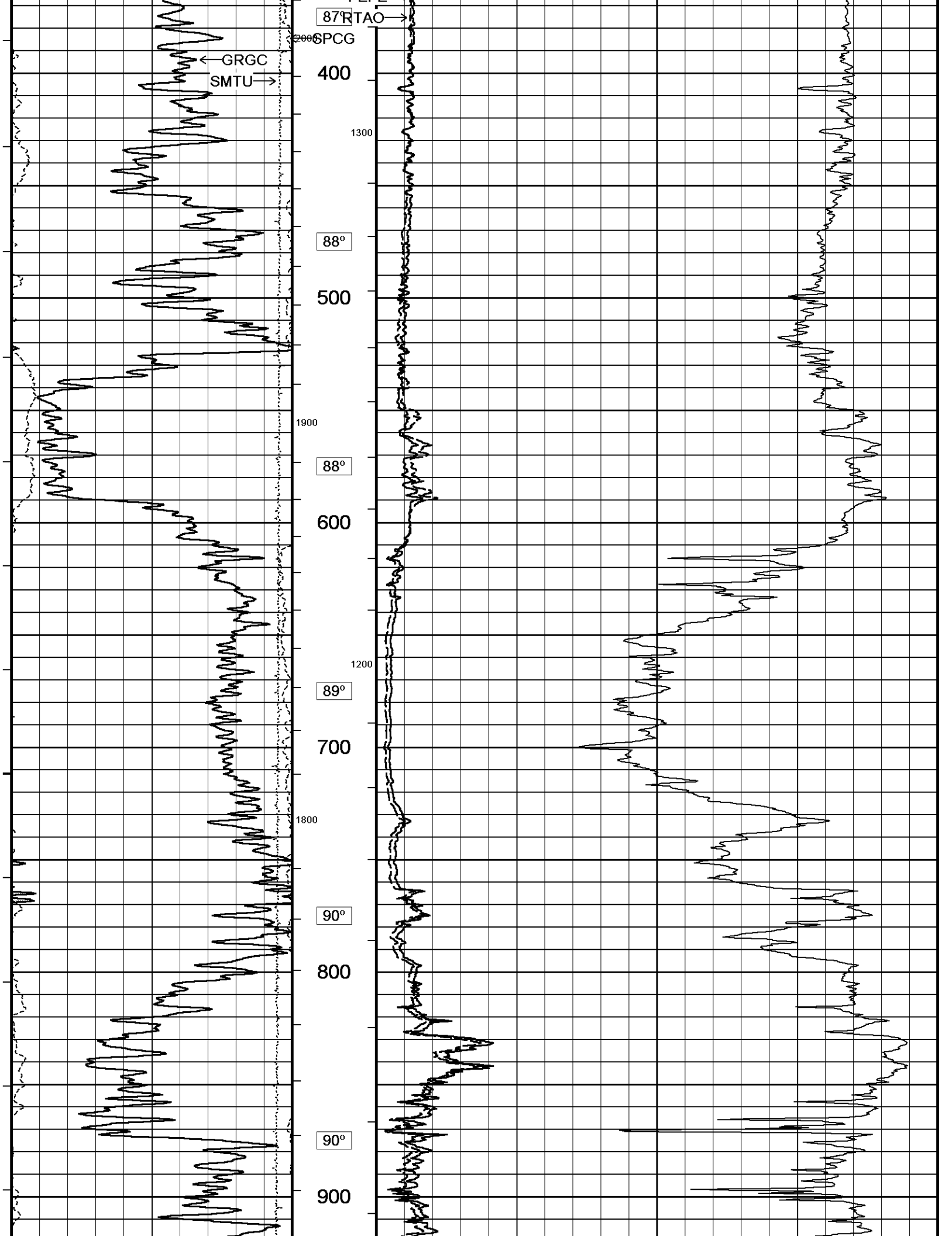
- ENGINEER: A. SILL.

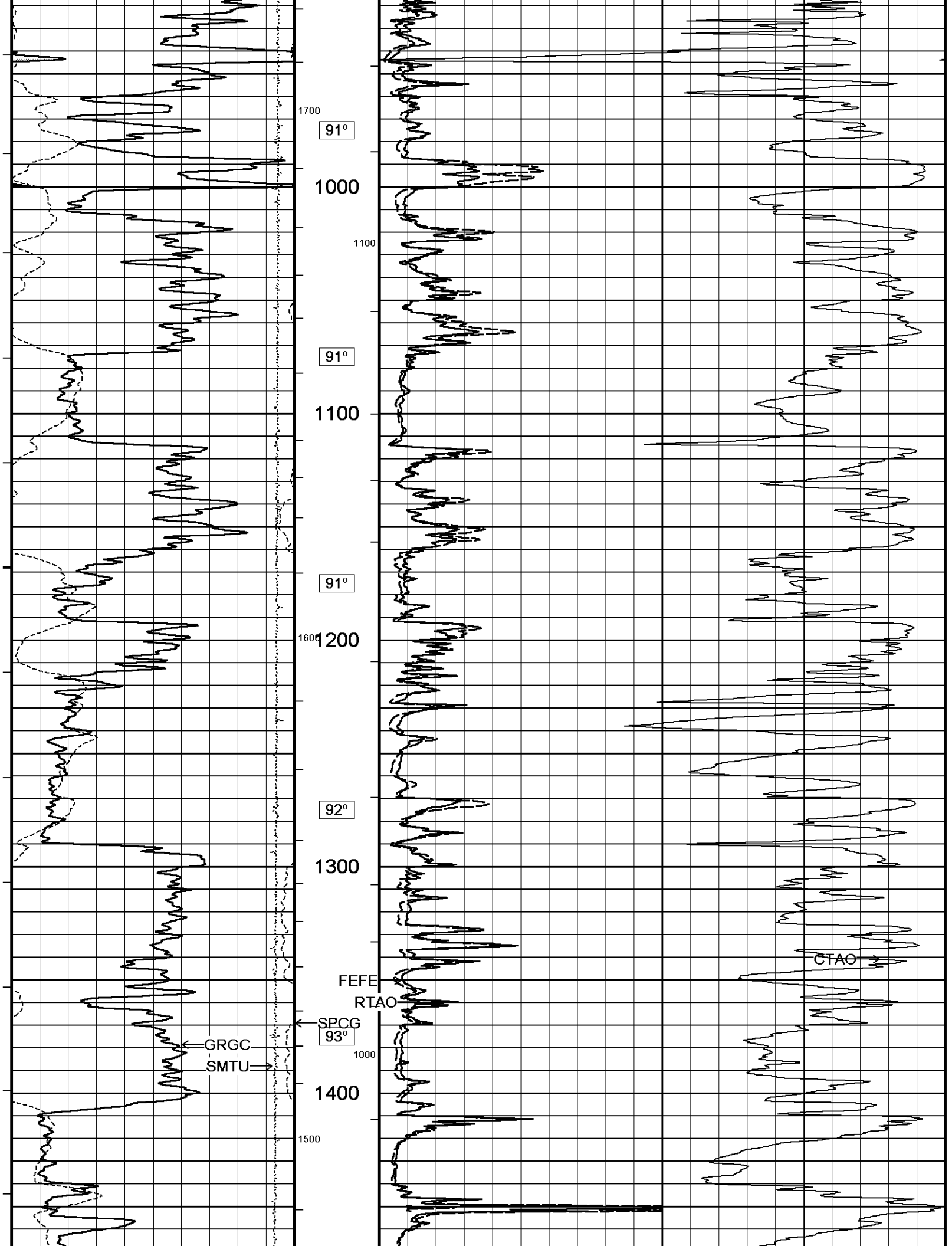
- OPERATOR: N. ADAME, J. DUNLAP.

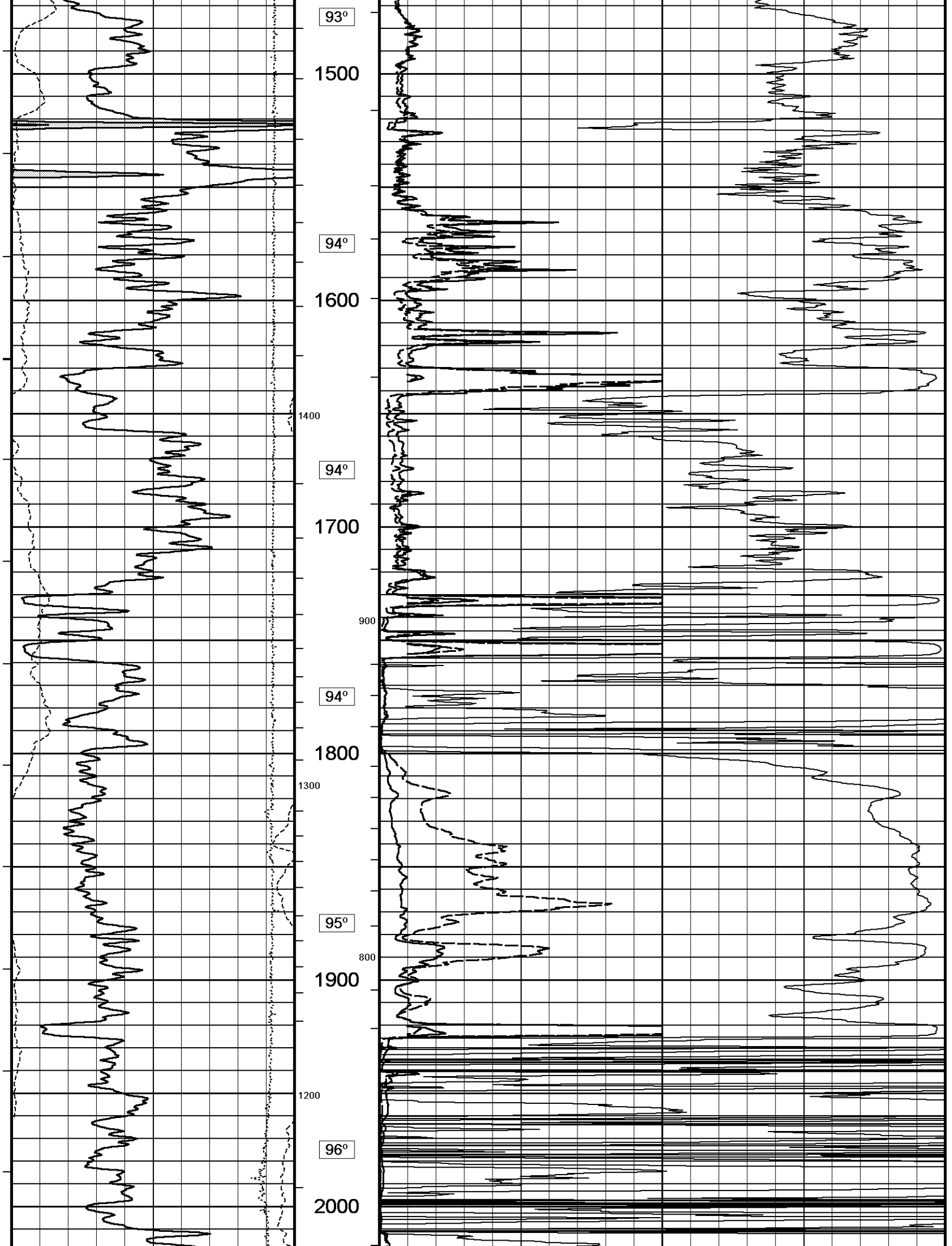
- JUNIOR FIELD ENGINEER: J. RANDLE.

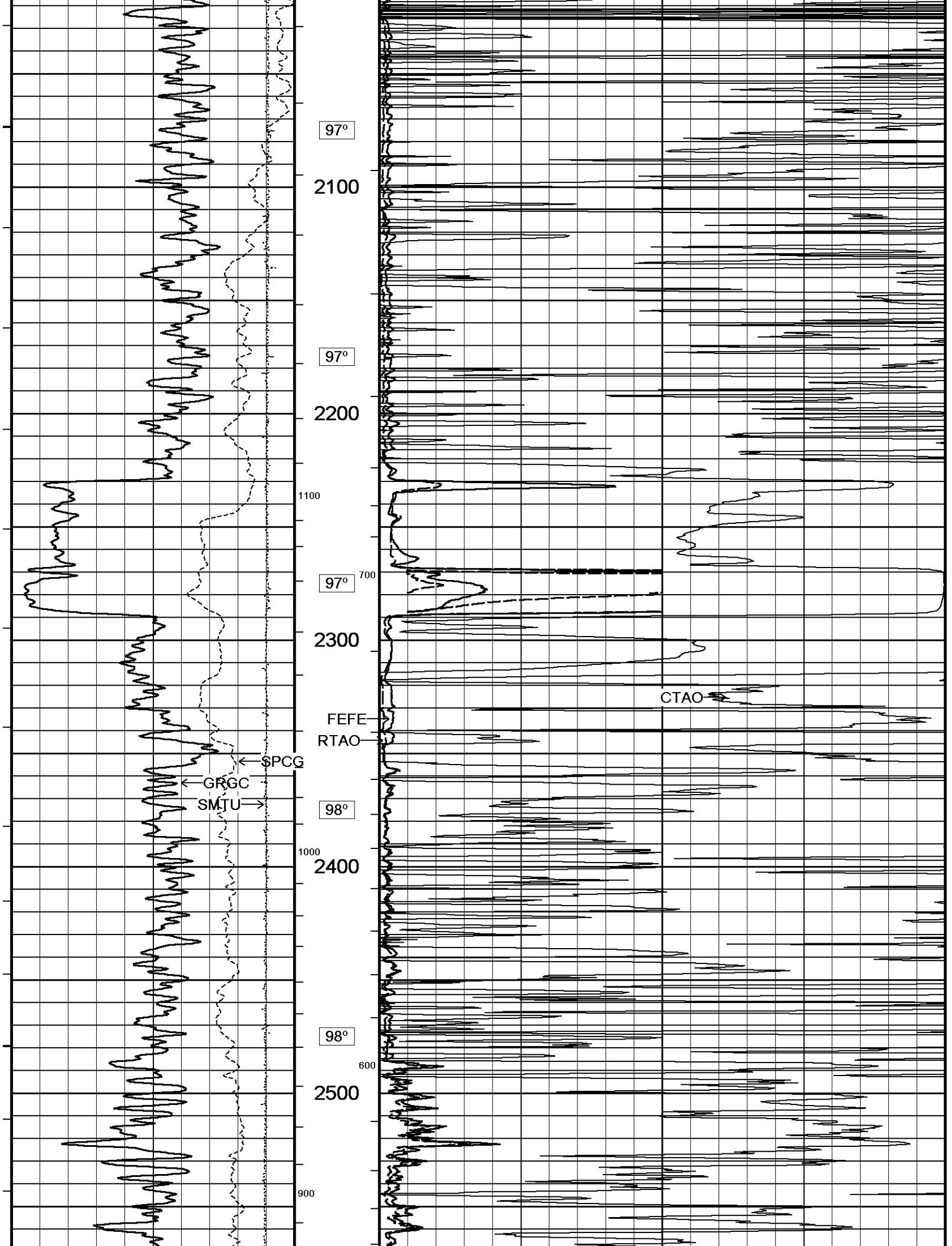
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

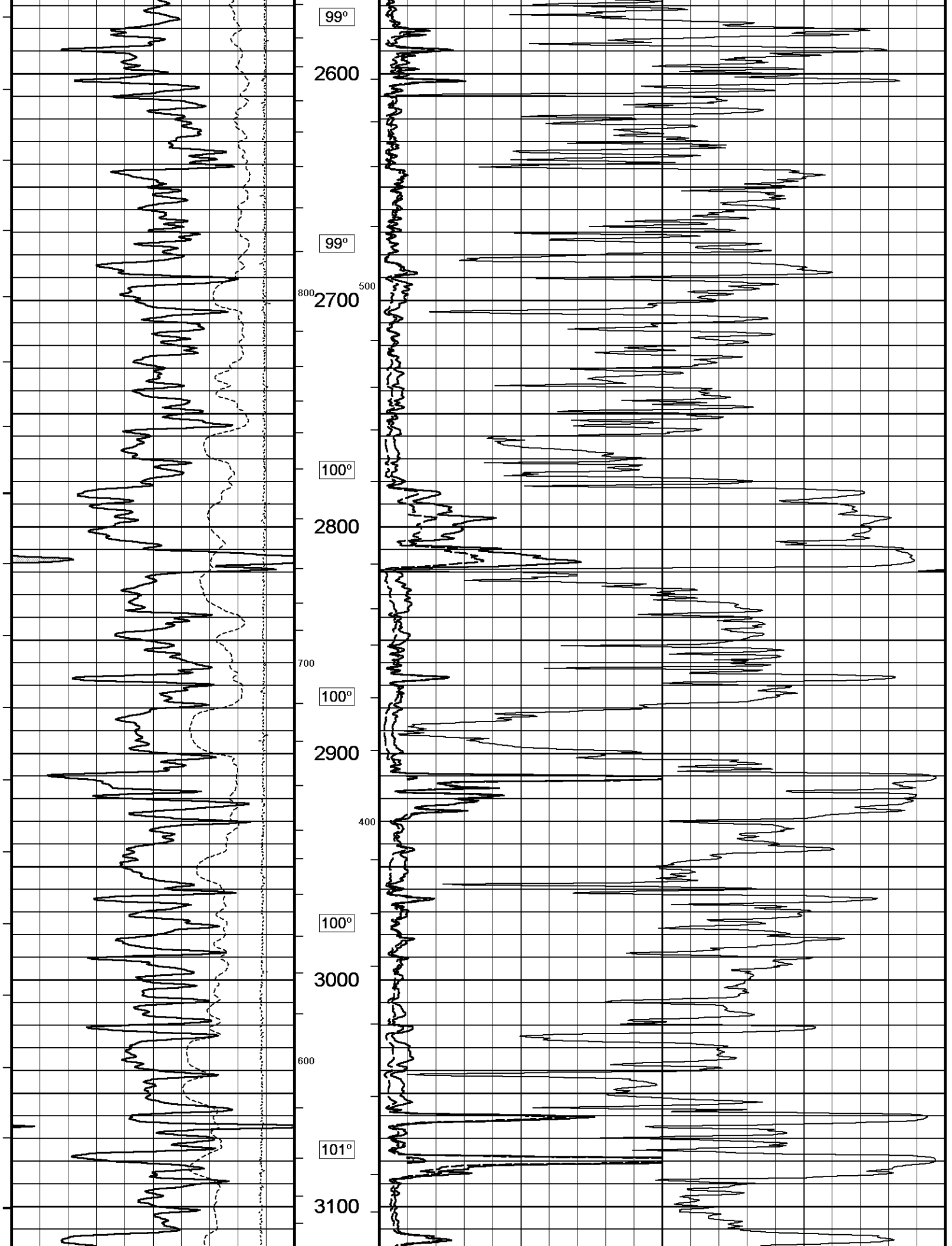


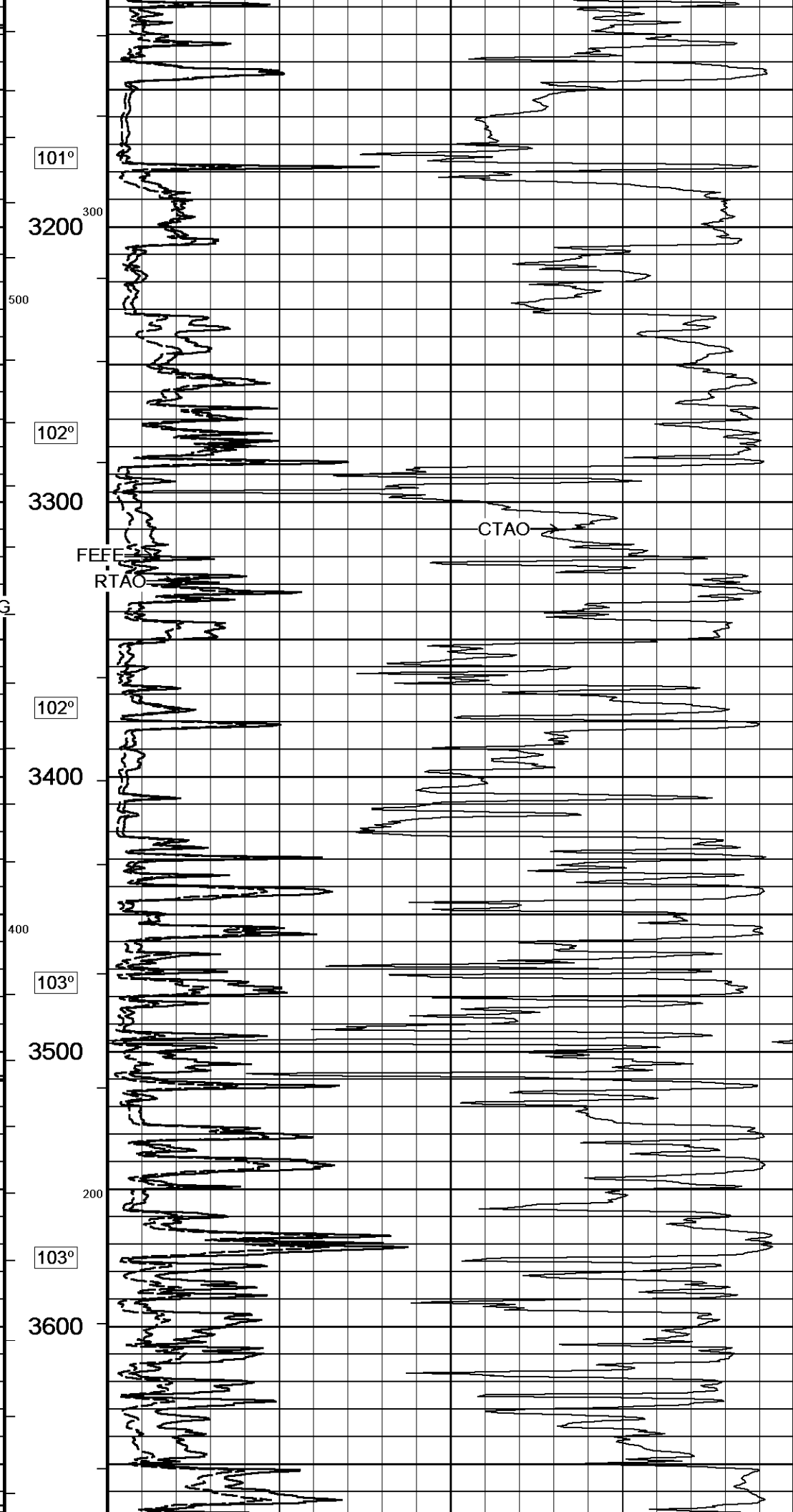
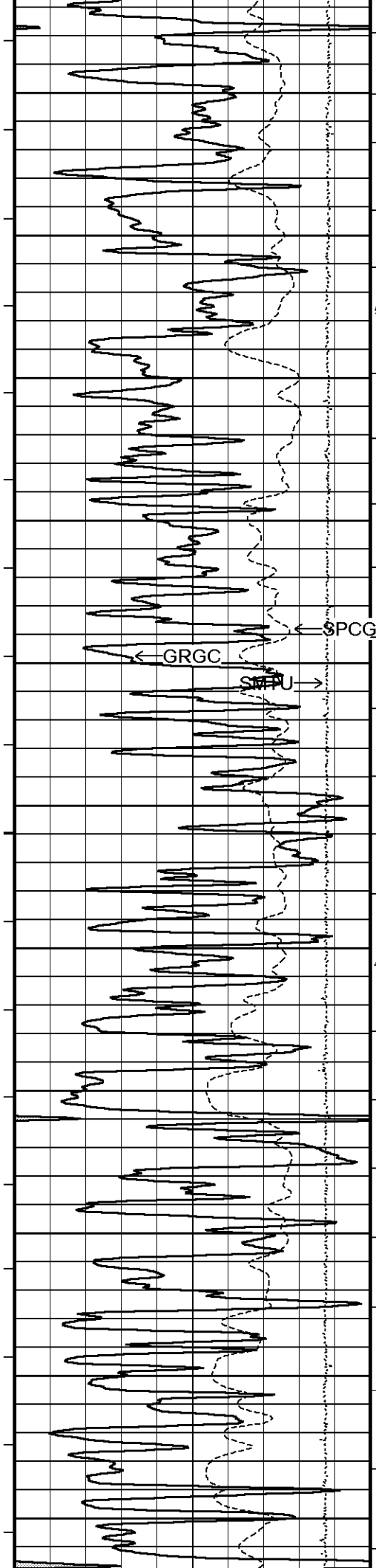


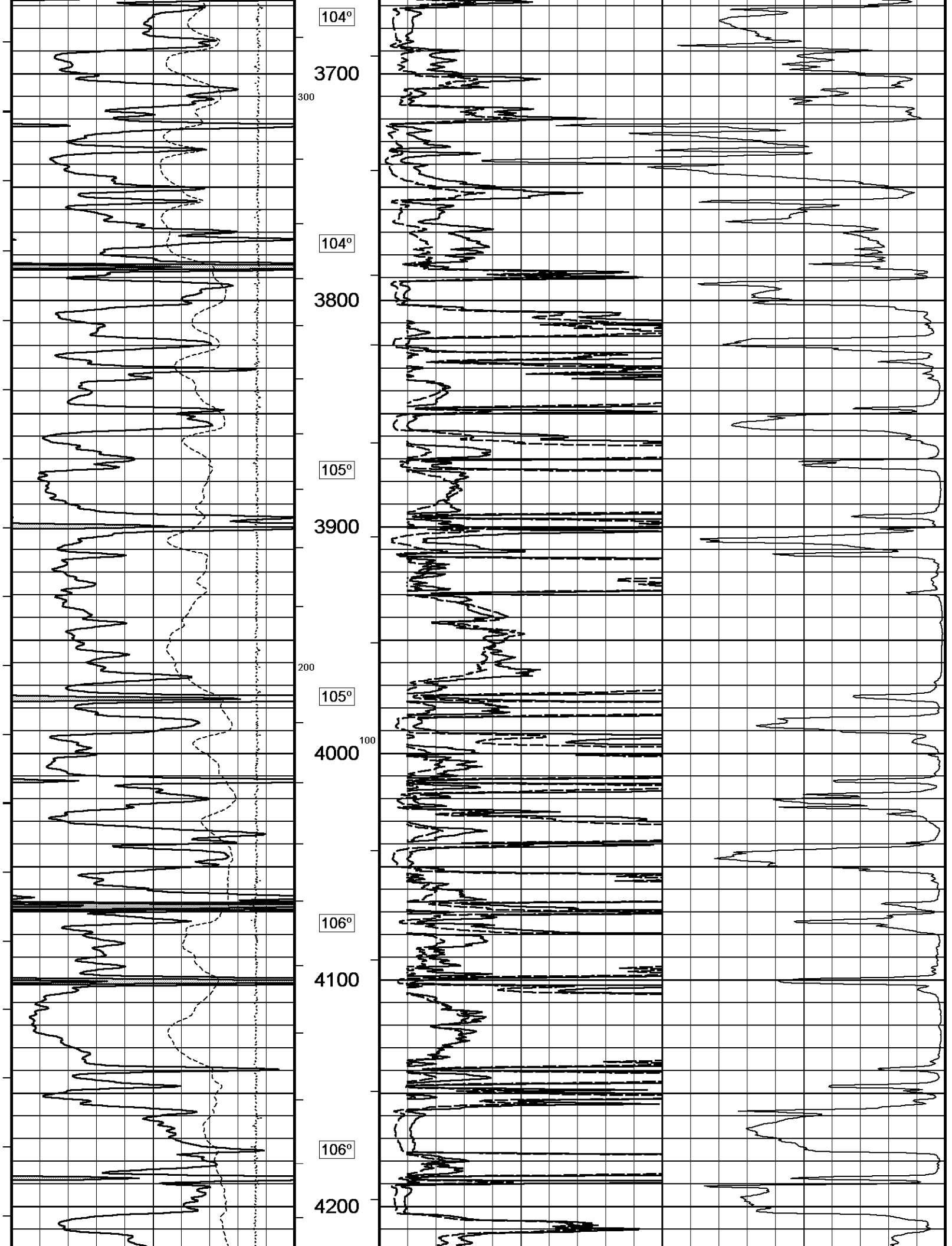


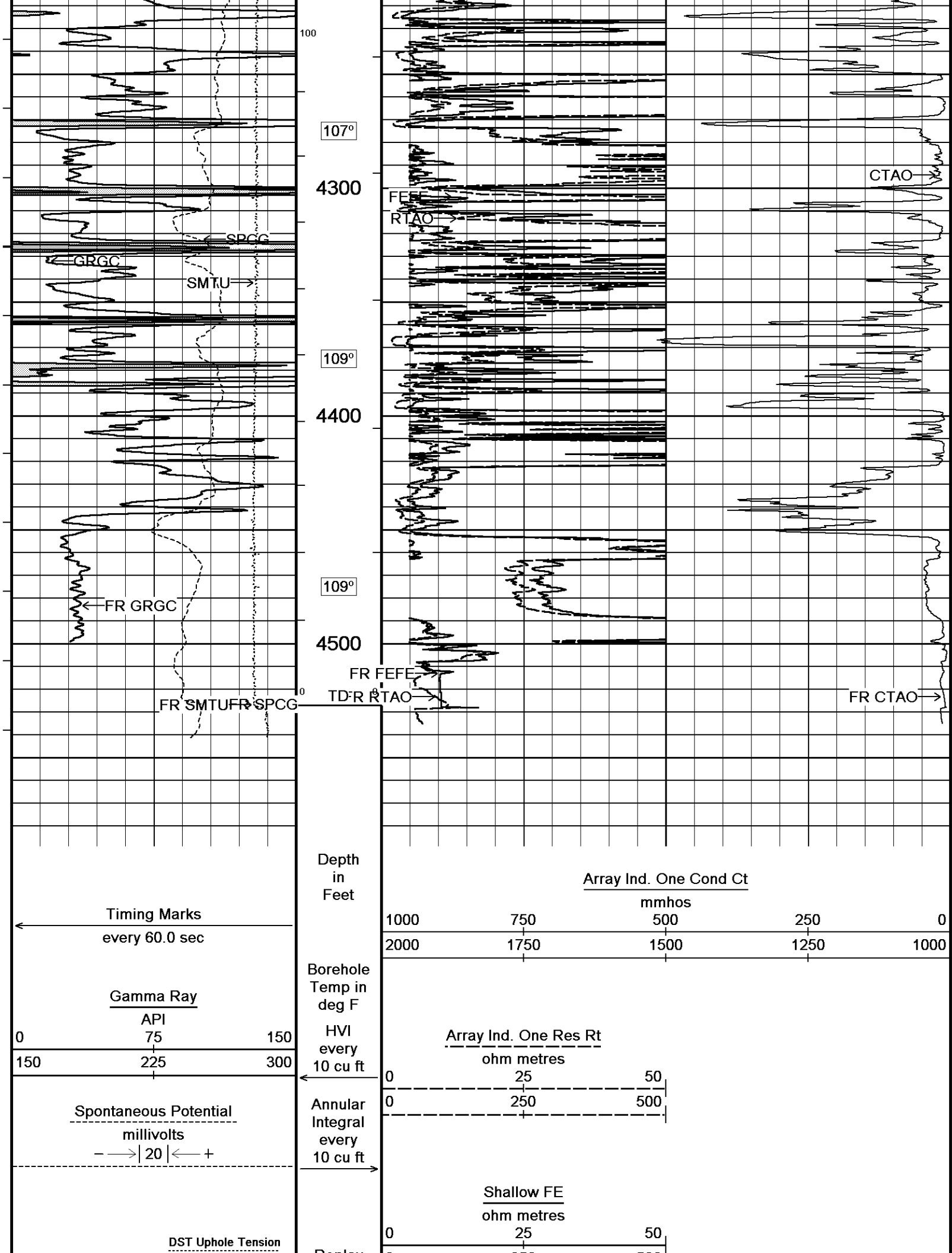


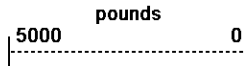




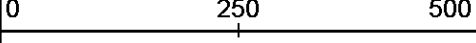








Replay
Scale
1:600



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 17-JUL-2014 17:02

Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta

Recorded on 17-JUL-2014 14:12

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113



2 INCH MAIN



5 INCH MAIN ANHYDRITE



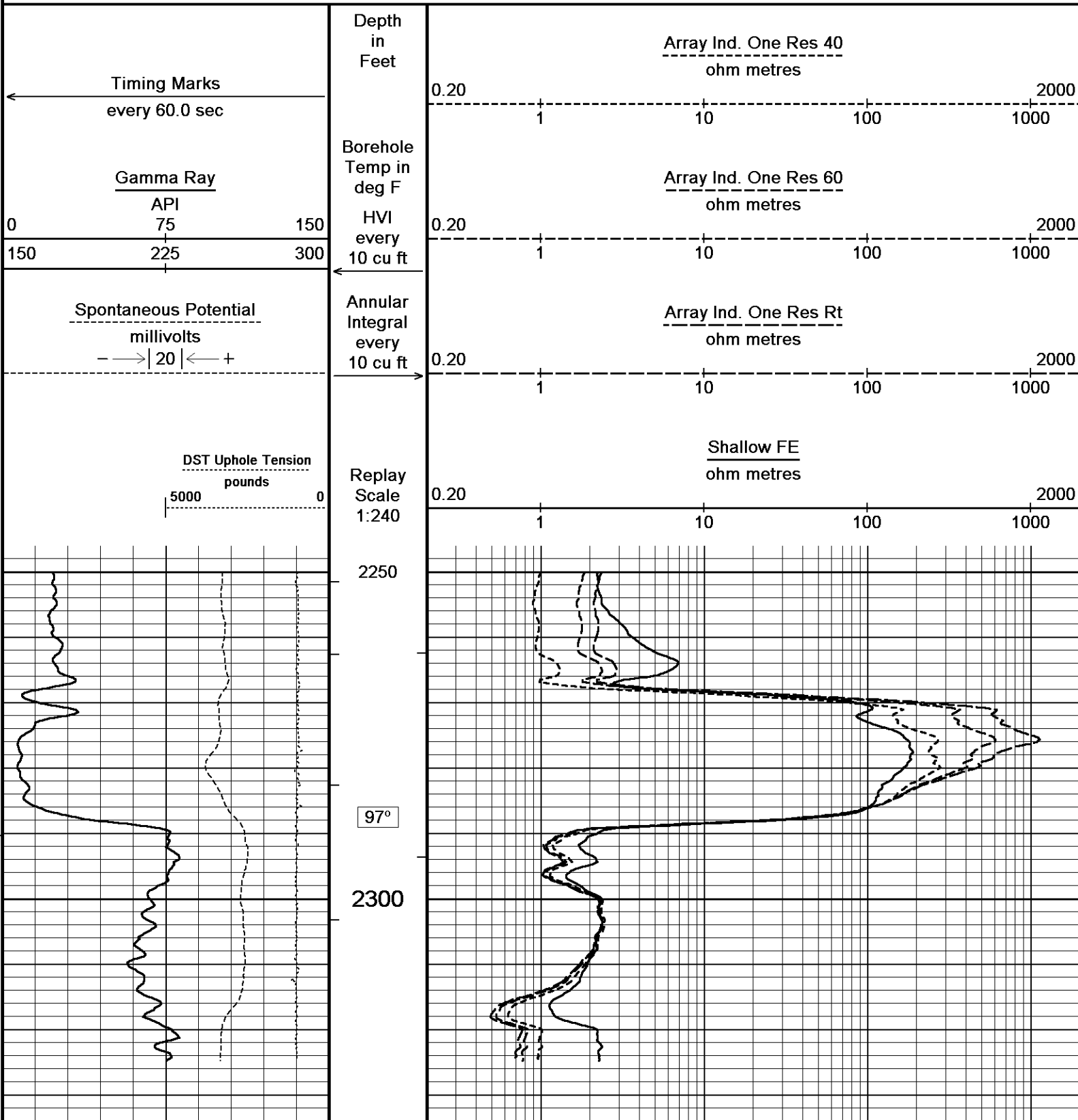
Depth Based Data - Maximum Sampling Increment 10.0cm

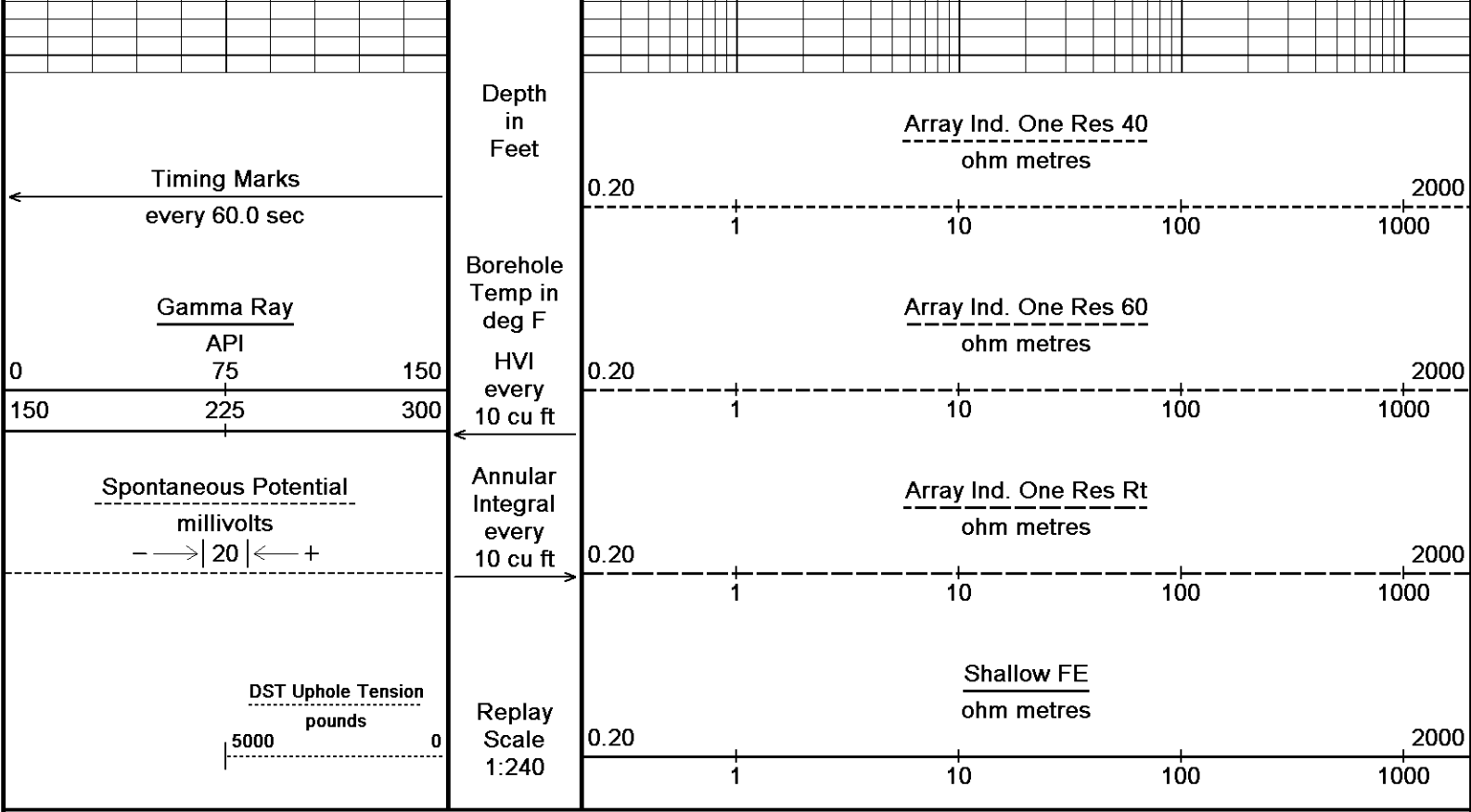
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↑

5 INCH MAIN ANHYDRITE

↑

↓

5 INCH MAIN

↓

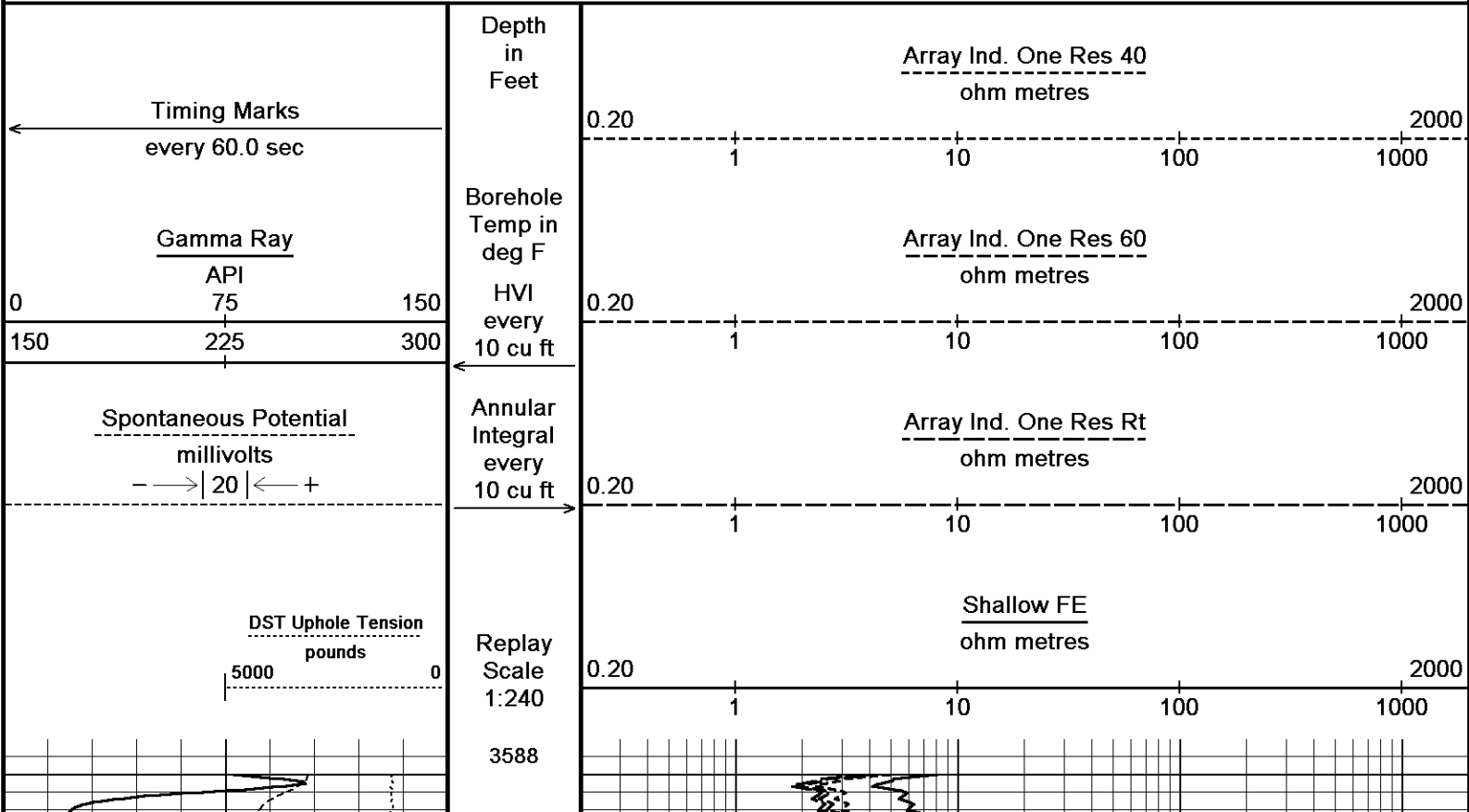
Depth Based Data - Maximum Sampling Increment 10.0cm

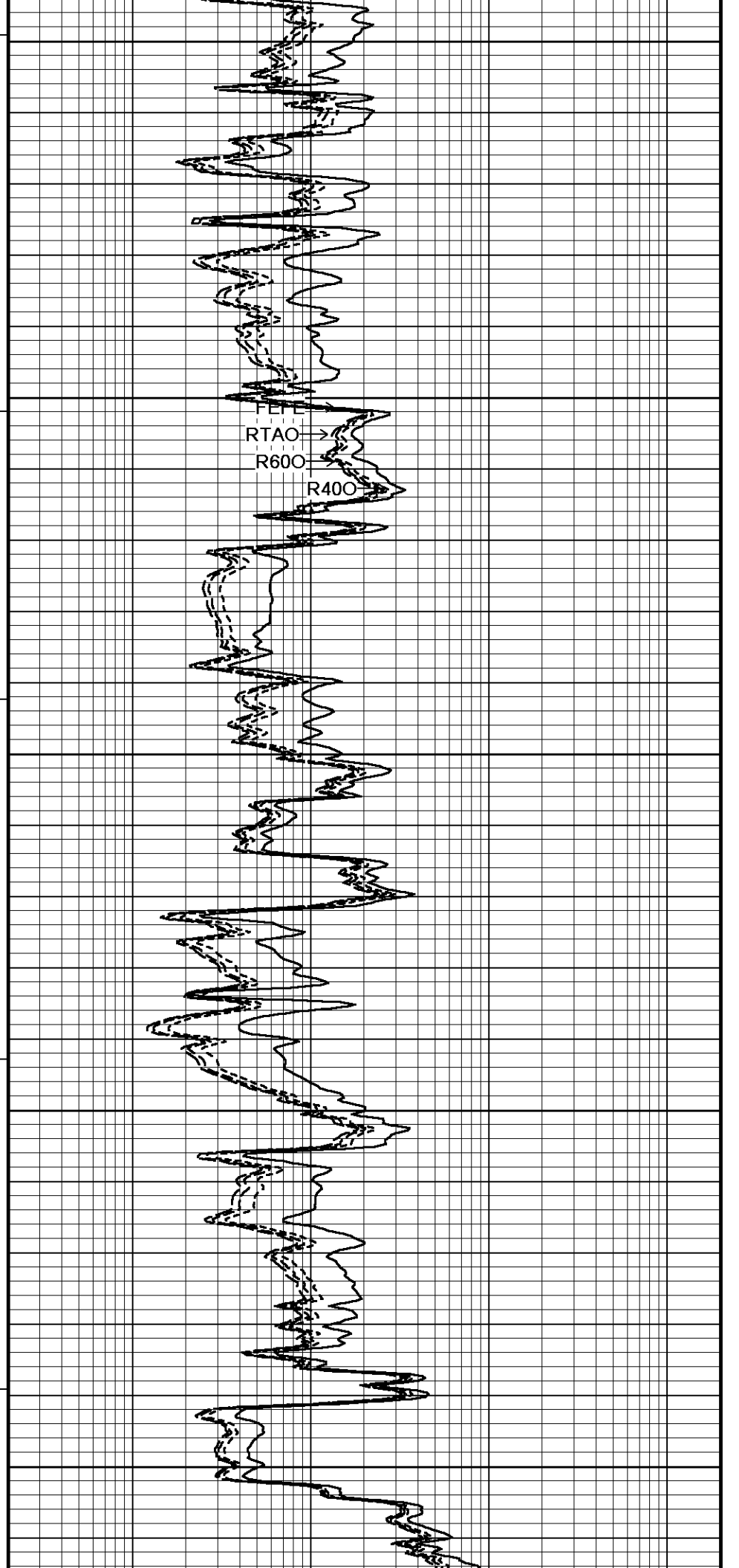
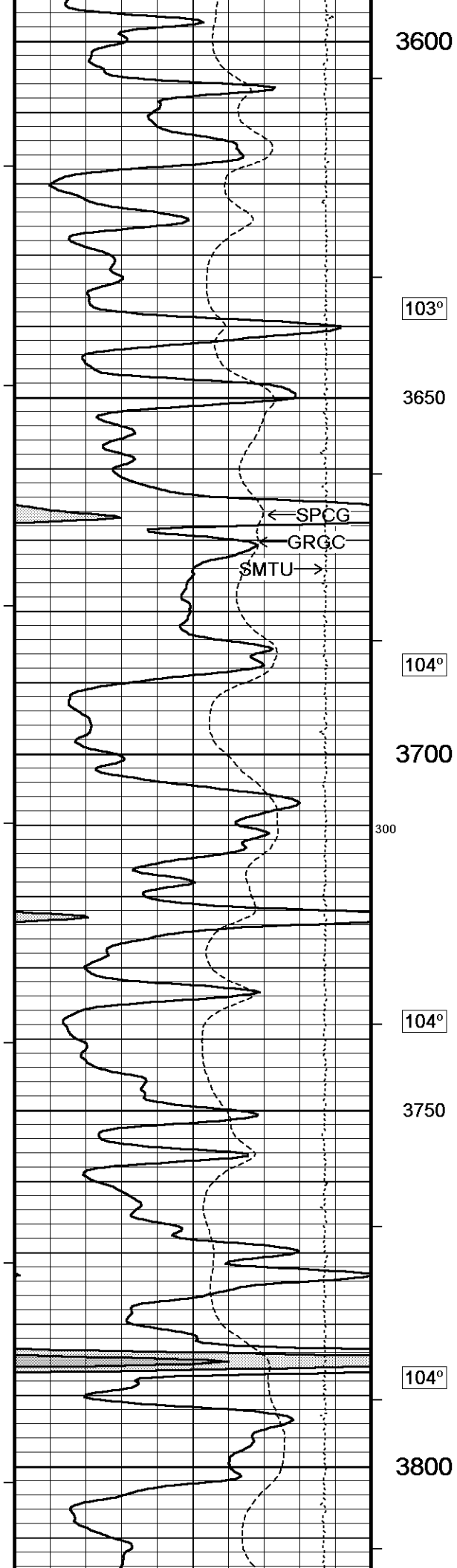
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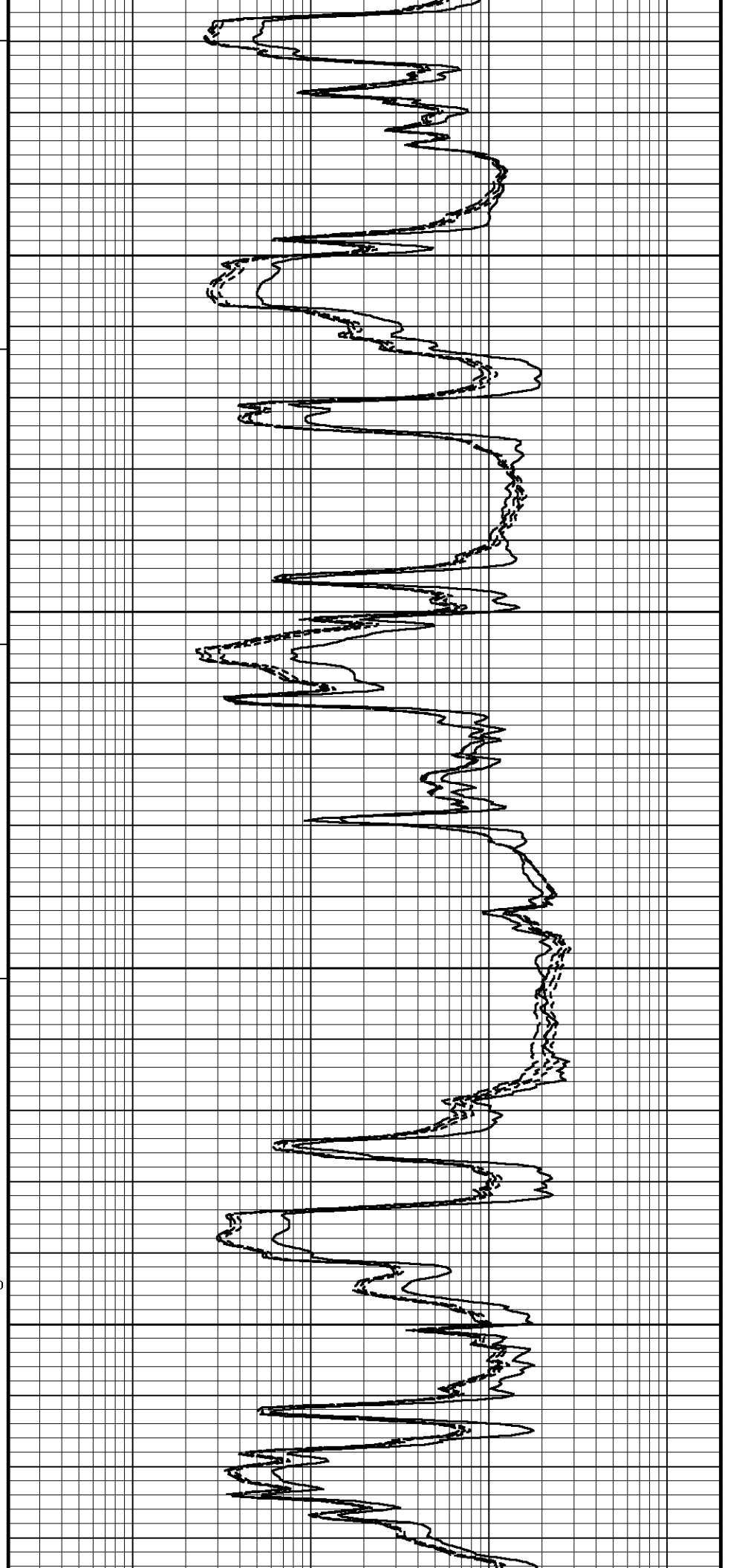
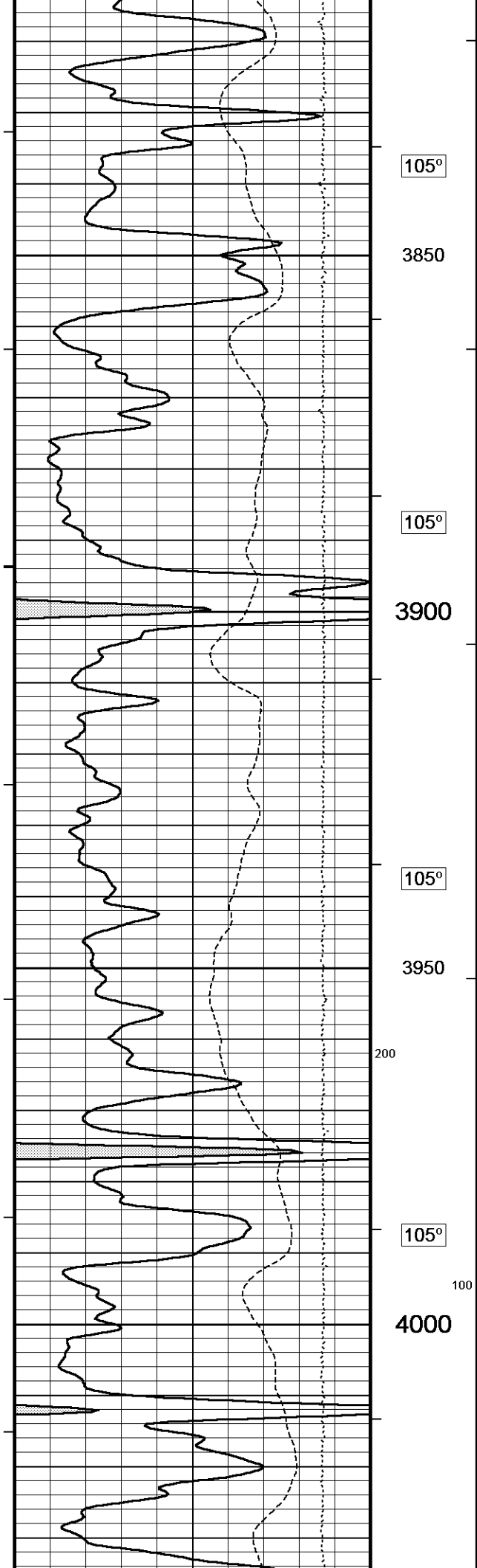
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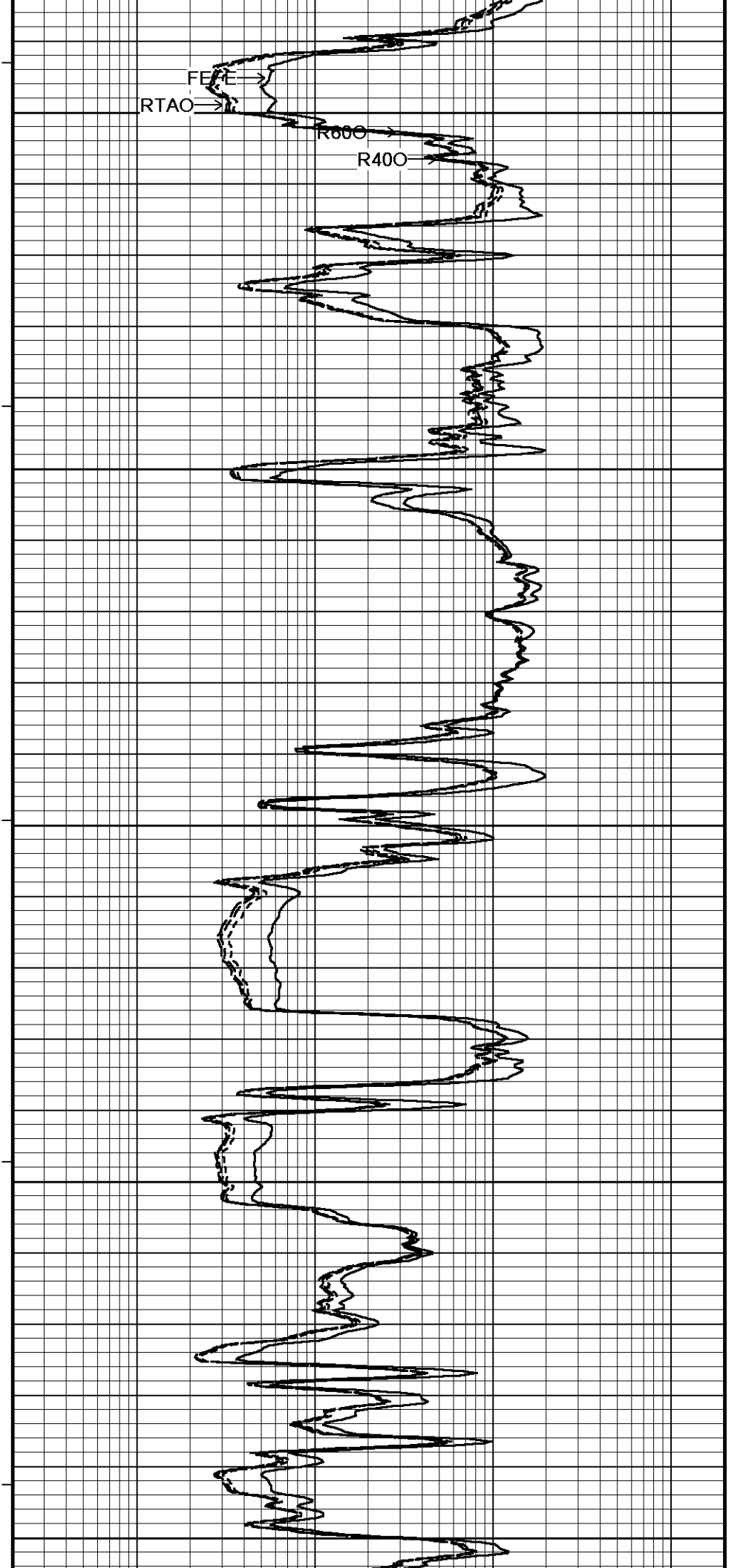
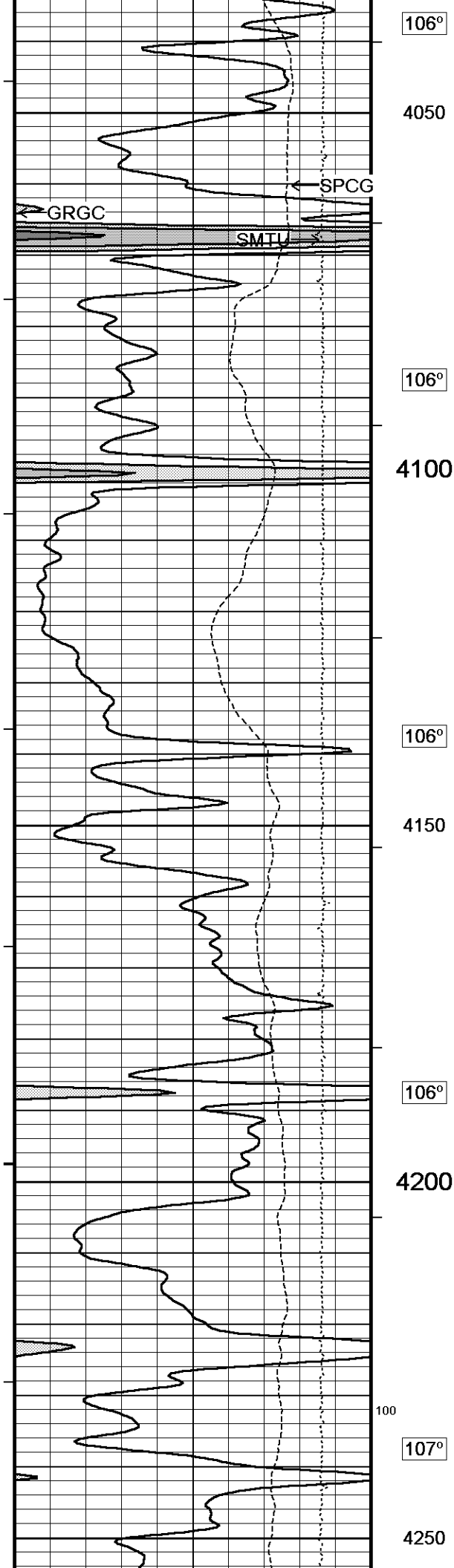
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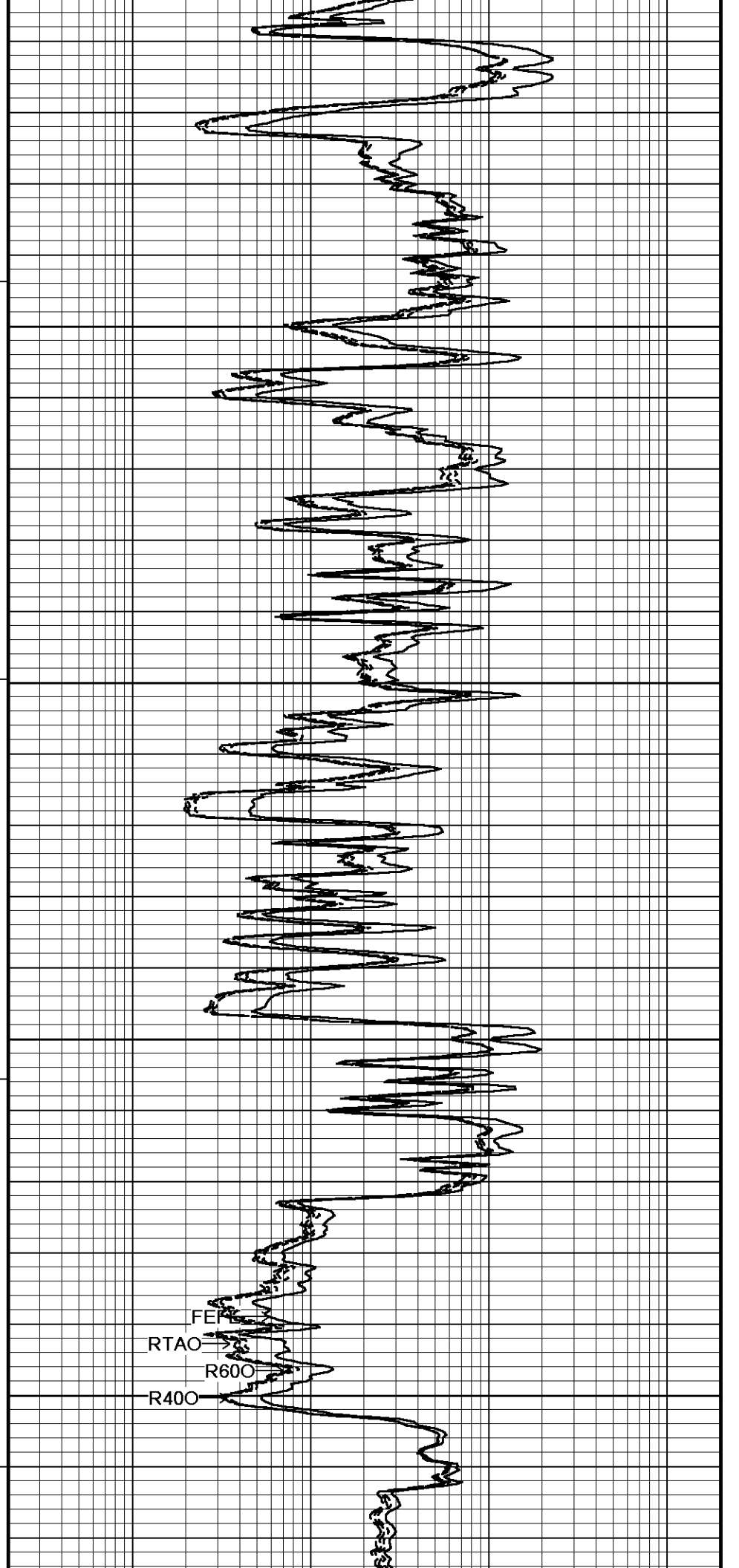
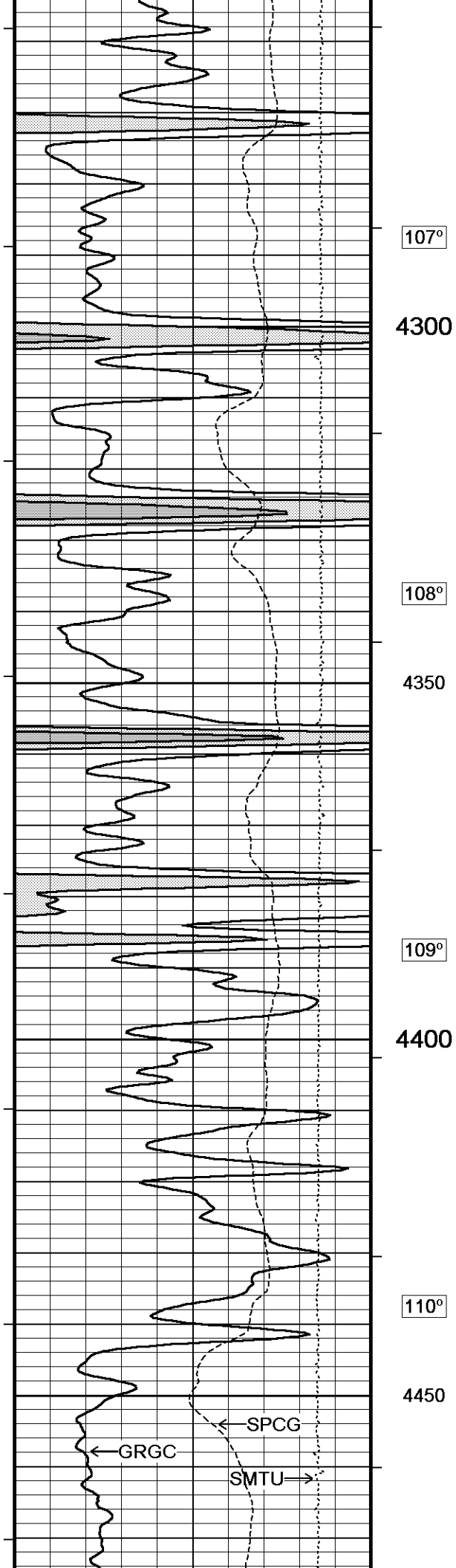
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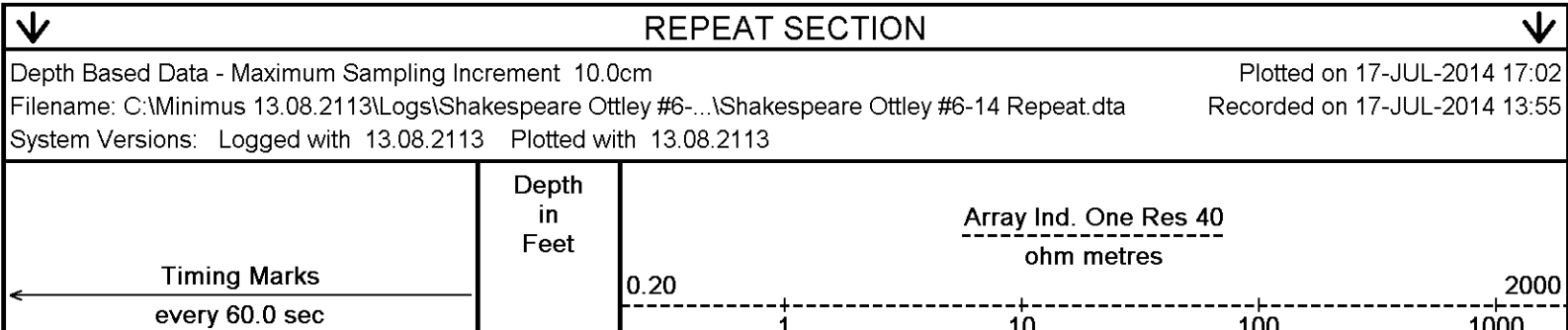
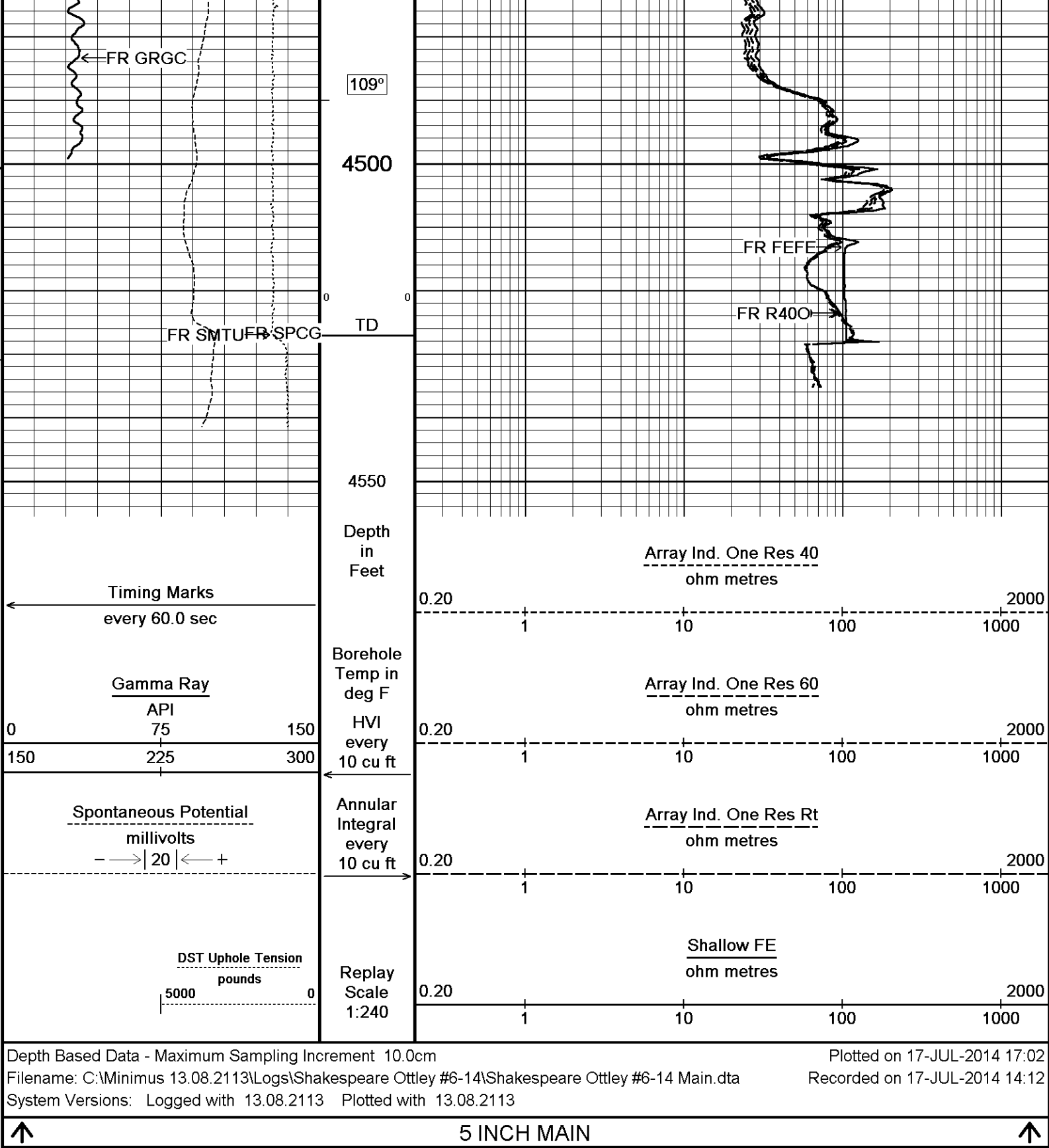


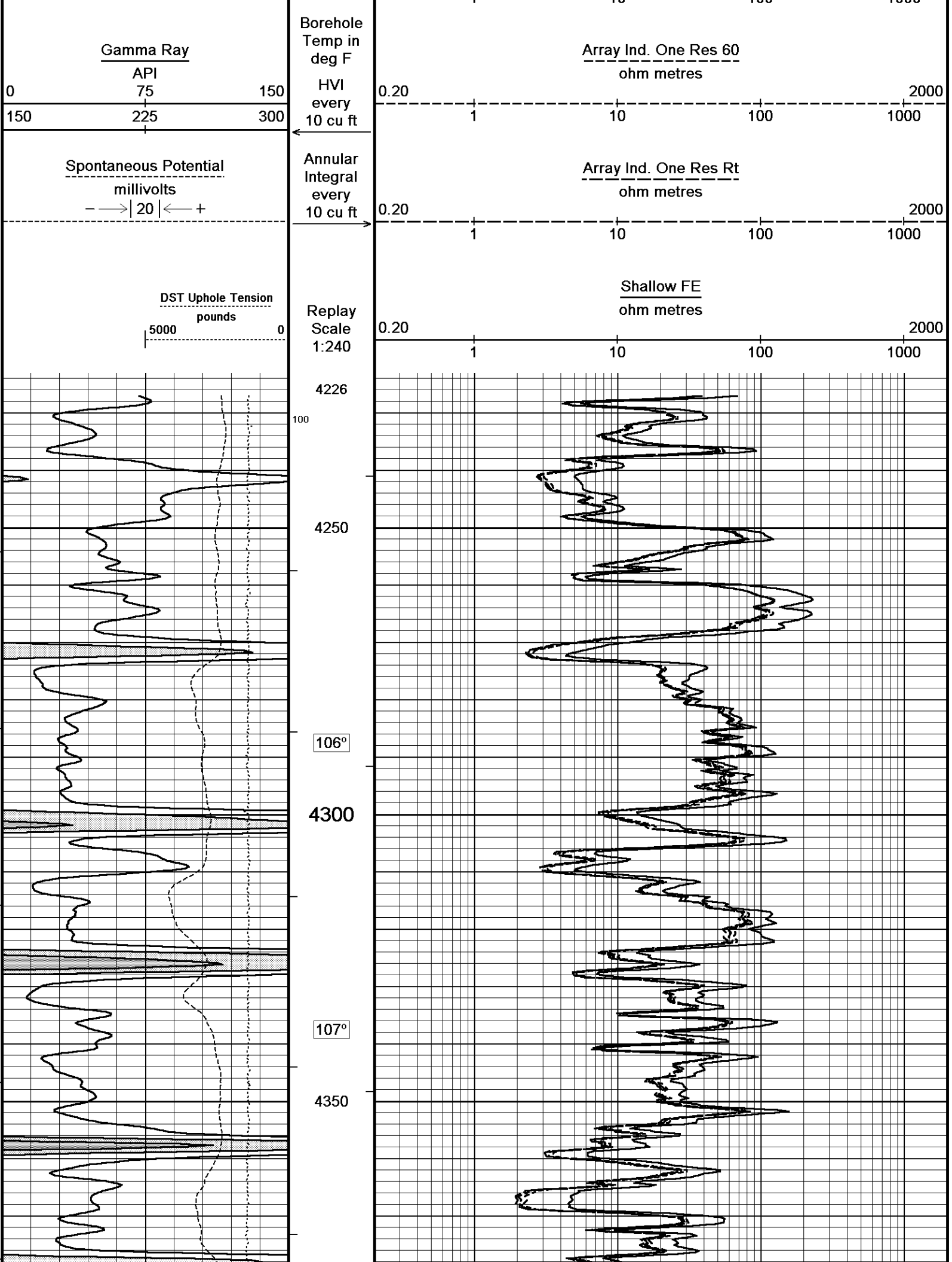


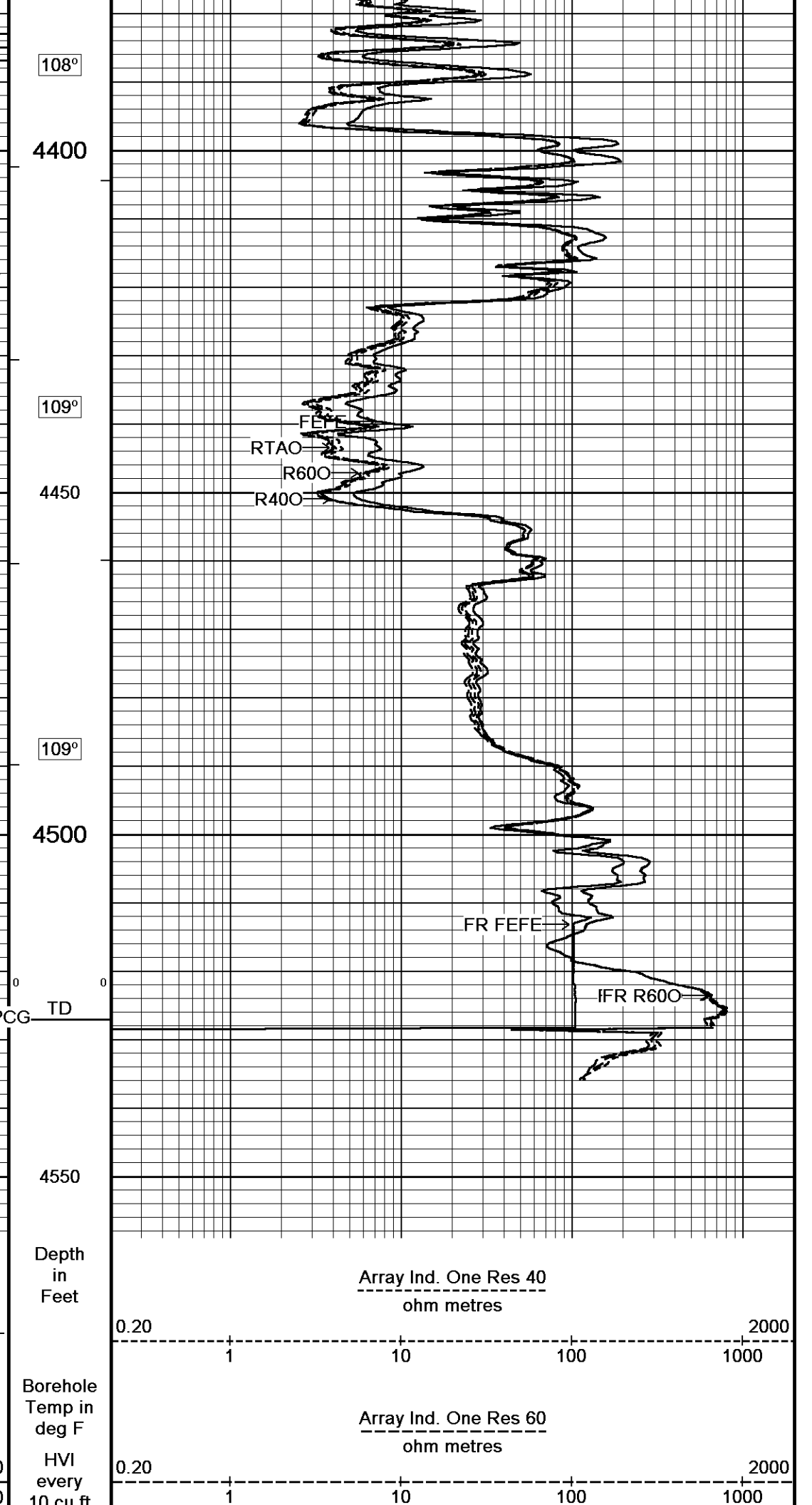
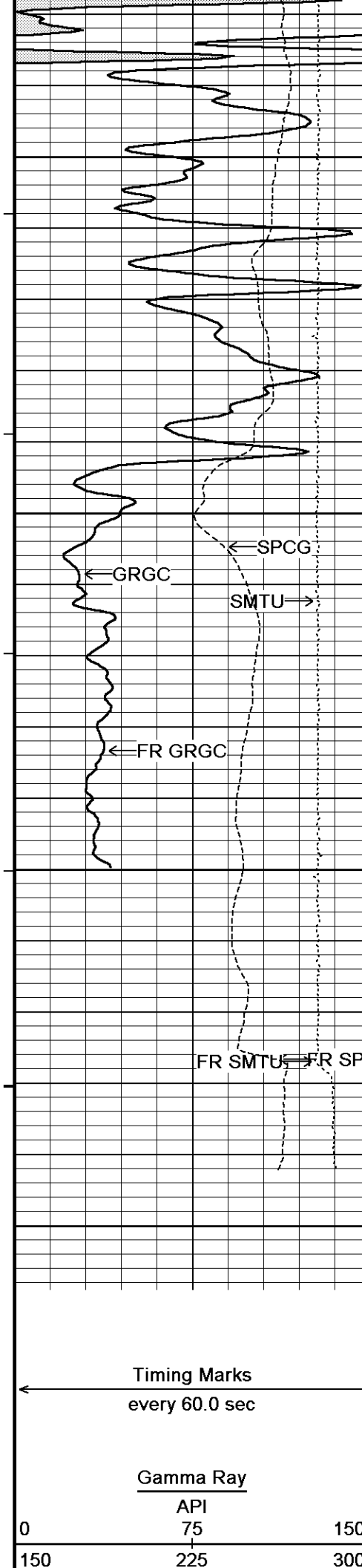


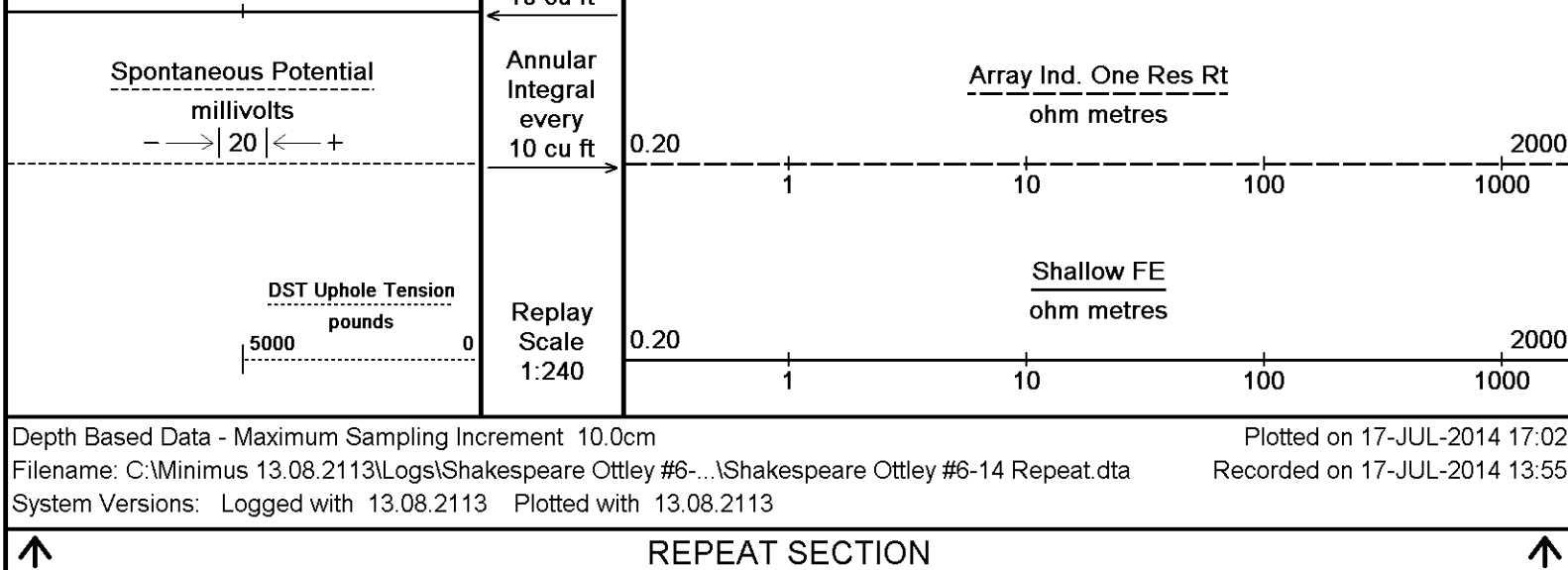












BEFORE SURVEY CALIBRATION			
C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.dta			
General Constants All 000		Last Edited on 17-JUL-2014,11:25	
General Parameters			
Mud Resistivity	0.720	ohm-metres	
Mud Resistivity Temperature	80.000	degrees F	
Water Level	0.000	feet	
Borehole Fluid Processing	Wet Hole		
Hole/Annular Volume and Differential Caliper Parameters			
HVOL Method	Single Caliper		
HVOL Caliper 1	Density Caliper		
HVOL Caliper 2	N/A		
Annular Volume Diameter	5.500	inches	
Caliper for Differential Caliper	Density Caliper		
Rwa Parameters			
Porosity used	Crossplot Porosity		
Resistivity used	Array Ind. 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 17-JUL-2014 13:03	
Reading No	Measured	Calibrated (lbs)	
1	14537.26	0.00	
2	15240.93	407.90	
Gamma Calibration MCG-D.K 442		Field Calibration on 13-JUL-2014 16:43	
	Measured	Calibrated (API)	
Background	69	46	
Calibrator (Gross)	1158	771	
Calibrator (Net)	1089	725	
Gamma Constants MCG-D.K 442		Last Edited on 17-JUL-2014,11:25	
Gamma Calibrator Number	GRC038		
Mud Density	1.13	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	
High Resolution Temperature Calibration MCG-D.K 442		Field Calibration on 10-MAY-2014,10:22	
	Measured	Calibrated (Deg F)	

Lower	Measured	Calibrated (deg F)	
Upper	50.00	50.00	
High Resolution Temperature Constants MCG-D.K 442		Last Edited on 10-MAY-2014,10:22	
Pre-filter Length	11		
SP Calibration MCG-D.K 442		Field Calibration on 06-JUL-2014 15:10	
	Measured	Calibrated (mV)	
Reference 1	99.0	99.0	
Reference 2	-98.7	-98.8	
Caliper Calibration MMR-C.A 248		Base Calibration on 20-JUN-2014 09:22 Field Calibration on 13-JUL-2014 16:30	
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	13560	5.98	
2	16725	7.97	
3	19859	9.86	
4	23840	11.92	
5	0	0.00	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	8.01	7.97	
Micro Normal and Micro Inverse Calibration MMR-C.A 248		Base Calibration on 20-JUN-2014 09:12 Field Check on 13-JUL-2014 16:31	
Base Calibration			
		Measured	Calibrated (ohm-m)
Channel	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 26-JUN-2014 11:21 Field Check on 13-JUL-2014 16:49	
Base Calibration			
		Measured	Calibrated (cps)
	Near	Far	Near Far
	2997	92	3714 110
Ratio	32.443		33.764
Field Calibrator at Base		Calibrated (cps)	
		1677	2452
Ratio	0.684		
Field Check		Calibrated (cps)	
		1684	2457
Ratio	0.682		
Neutron Constants MDN-B.J 387		Last Edited on 16-JUL-2014,03:38	
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 20-JUN-2014 09:41 Field Check on 13-JUL-2014 16:23	
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	950.7	126.8	
Base Check		281.7	
Field Check		281.7	

FE Constants MFE-A.A 55		Last Edited on 16-JUL-2014,03:38	
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 13-JUL-2014 16:22	
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		
Channel		Base Check (mmho/m)		Field Check (mmho/m)	
		Low	High	Low	High
1				15.9	3862.5
2				31.9	3589.9
3				29.8	2970.7
4				20.7	2125.6
Deep				18.5	1911.7
Medium				42.9	3860.1
Shallow				47.4	5371.3
Array Temperature				89.7	Deg F

Induction Constants MAI-A.A 5		Last Edited on 16-JUL-2014,03:41	
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 27-JUN-2014,14:12

Pre-filter Length	11
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Caliper Calibration MPD-D.A 480

Base Calibration on 26-JUN-2014 09:45

Field Calibration on 13-JUL-2014 16:24

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18085	3.99
2	28066	5.98
3	38193	7.97
4	47934	9.86
5	58962	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.96	7.97

Photo Density Calibration MPD-D.A 480

Base Calibration on 14-JUL-2014 16:16

Field Check on 14-JUL-2014 16:24

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1272	1466		
Reference 1	57253	26627	59556	30836
Reference 2	23358	2650	24941	2541

Field Check at Base

1271.6	1465.6
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Field Check

1268.7	1468.0
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PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	239	1138		
Reference 1	24028	57044	0.426	0.371
Reference 2	6966	23210	0.305	0.272

Field Check at Base

238.9 1137.7

Field Check

239.3 1131.3

Density Constants MPD-D.A 480

Last Edited on 17-JUL-2014,11:26

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	1.13	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	

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.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 442 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

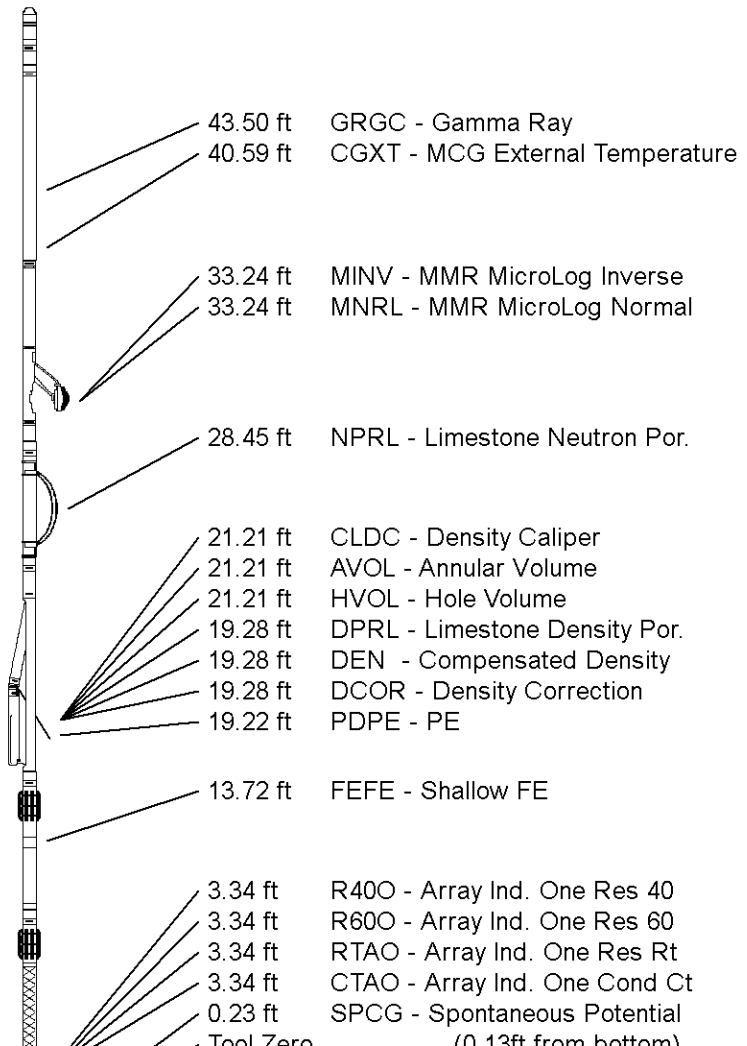
Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed 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



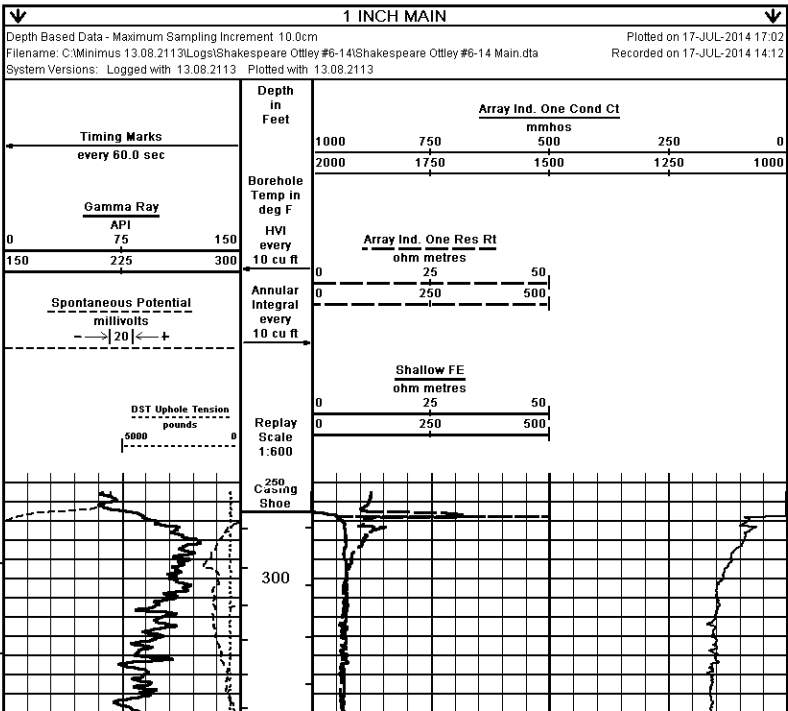
Tool Zero (0.13ft from bottom)
-0.13 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

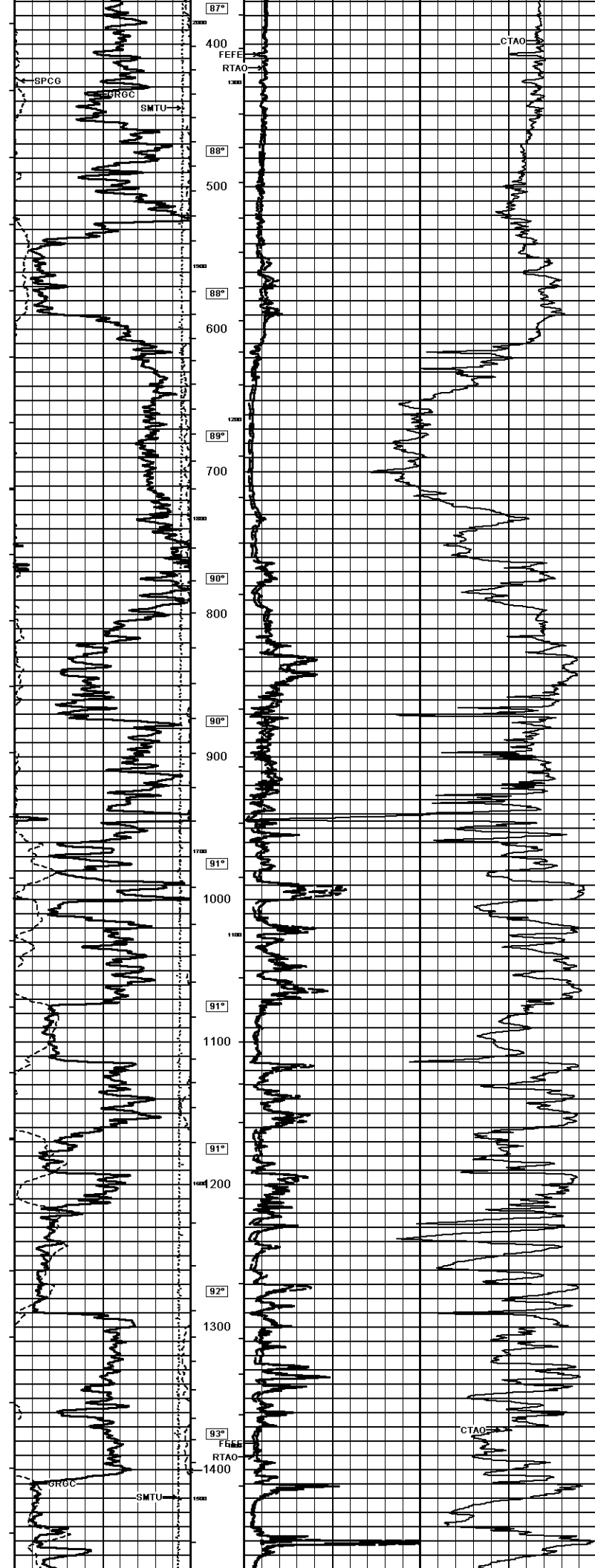
COMPANY	SHAKESPEARE OIL COMPANY, INC.				
WELL	OTTLEY #6-14				
FIELD	CHALK BUTTES				
PROVINCE/COUNTY	LOGAN				
COUNTRY/STATE	U.S.A. / KANSAS				
Elevation Kelly Bushing	2819.00	feet	First Reading	4524.00	feet
Elevation Drill Floor	2817.00	feet	Depth Driller	4530.00	feet
Elevation Ground Level	2809.00	feet	Depth Logger	4527.00	feet

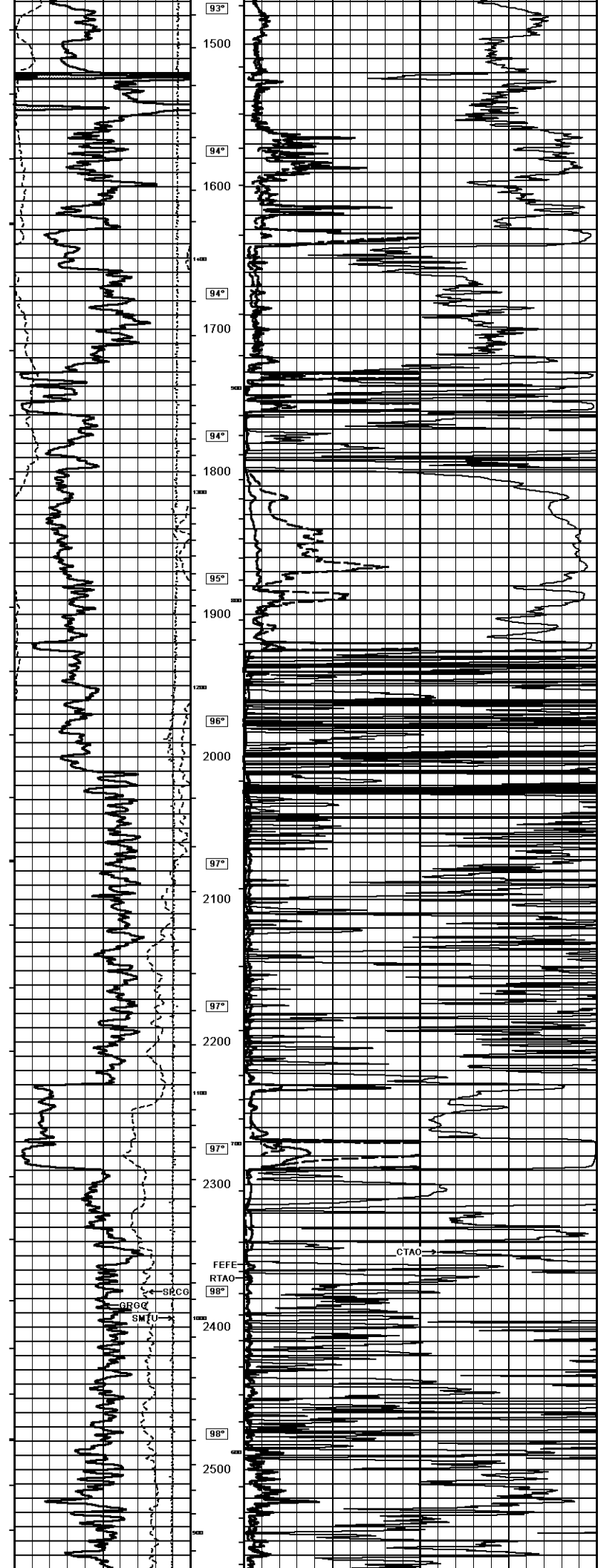


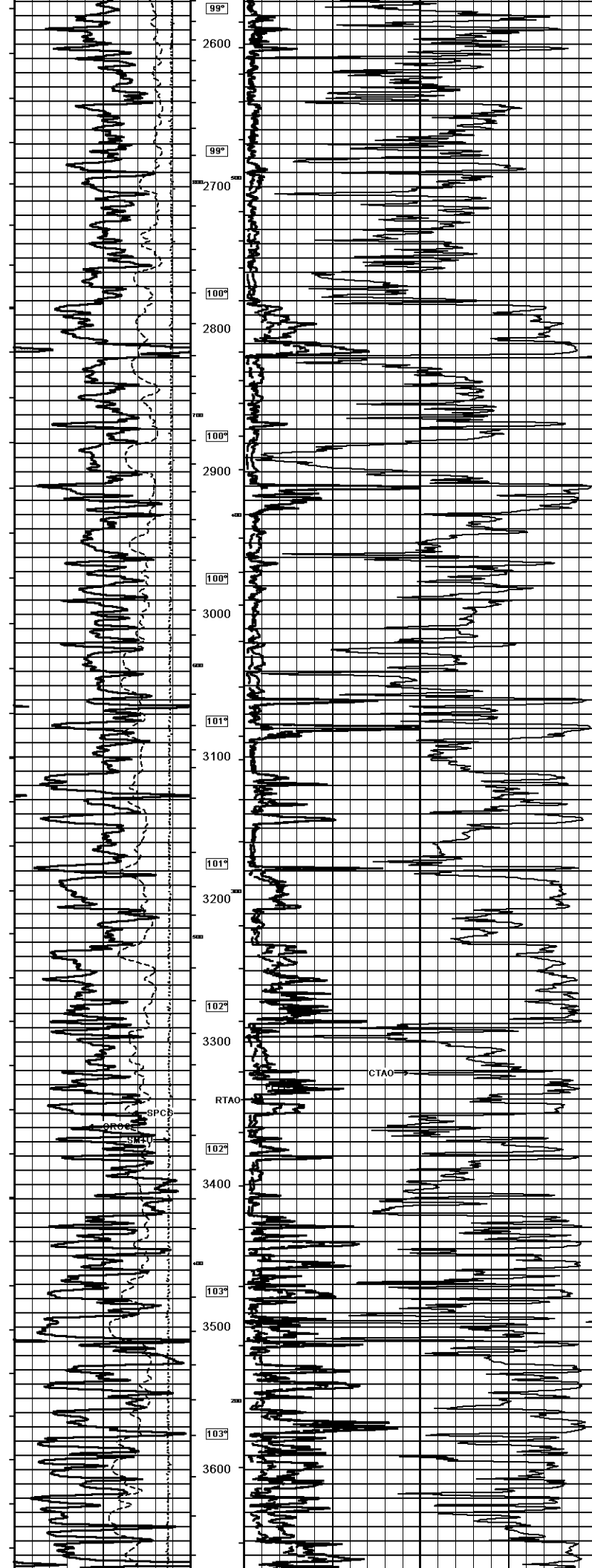
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

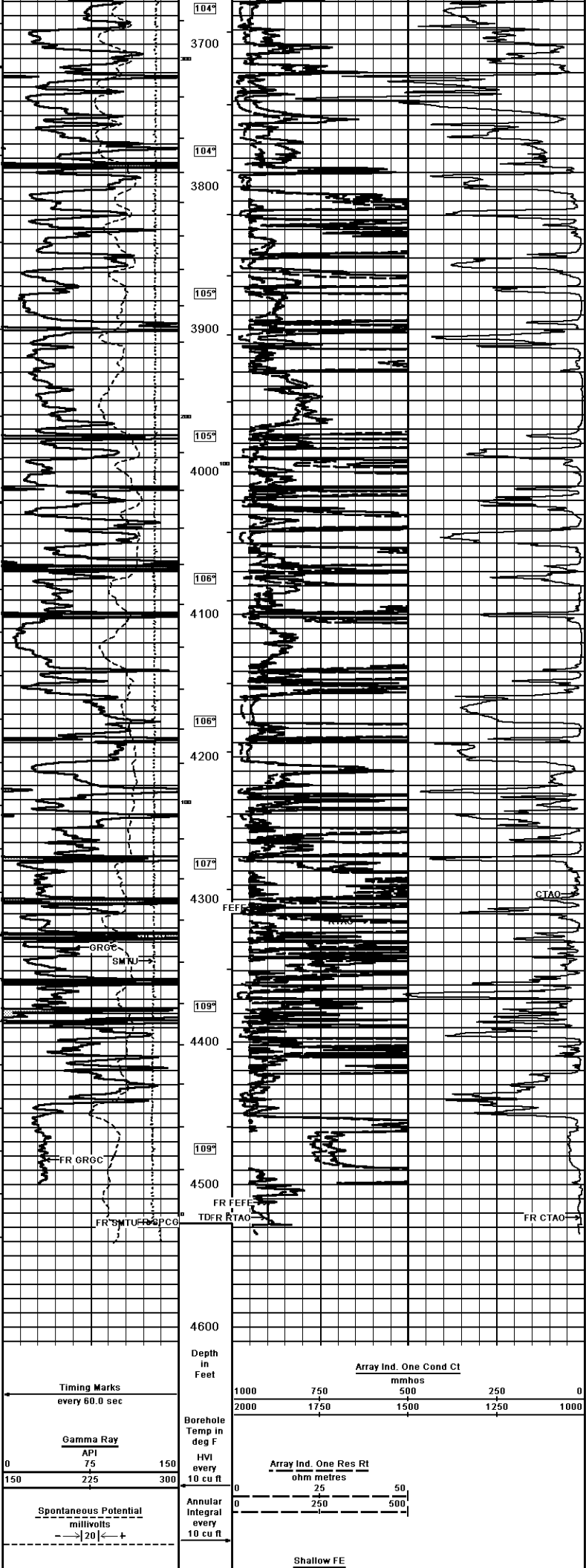
		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY SHAKESPEARE OIL COMPANY, INC.		WELL OTTLEY #6-14	
FIELD CHALK BUTTES		PROVINCE/COUNTY LOGAN	
COUNTRY/STATE U.S.A. / KANSAS		LOCATION 1920' ENL & 1600' FEL	
SEC. 14 TWP. 14S R.3E S.27W		MFL	
Log Date 15-08-21-2013		Log Number 15-08-21-2013	
Permanent Datum O.L. Elevation 2809 feet		Log Measured From KB	
Drilling Measured From KB @ 10 feet		Elevations: KB 2813.00 KF 2817.00 OL 2809.00	
Date 17-JUL-2014		Run Number ONE	
Service Order 7571-9279738		Depth Driller 4530.00 feet	
Depth Logger 4537.00 feet		First Reading 4524.00 feet	
Last Reading 265.00 feet		Casing Driller 264.00 feet	
Casing Logger 265.00 feet		Bit Size 7.875 inches	
Flow Fluid Type CHEMICAL		Flow Fluid Viscosity 9.40 cP	
PH / Fluid Loss 11.20 m3/min		Sample Source MUD PIT	
Rm @ Measured Temp 0.72 @ 80.0 ohm-m		Rm @ Measured Temp 0.58 @ 80.0 ohm-m	
Rm @ Measured Temp 0.88 @ 80.0 ohm-m		Rm @ Measured Temp 0.53 @ 80.0 ohm-m	
Rm @ BHT CALC		Rm @ BHT CALC	
Time Since Circulation 4 HOURS		Max Recorded Temp 110.00 deg F	
Equipment / Base 13244 LIB		Recorded By JEFFREY RANDEL	
Witnessed By TIM PRIEST		ADAM SILL	
JOB # 1B14-213			











Timing Marks
every 60.0 sec

Gamma Ray
API
75
150
150 225 300

Spontaneous Potential
millivolts
- - - - -
- - - - -

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Array Ind. One Cond Ct
mmhos
1000 750 500 250 0
2000 1750 1500 1250 1000

Array Ind. One Res Rt
ohm metres
0 25 50
0 250 500

Shallow FE

DST Uphole Tension

5000 pounds0

ohm metres

02550

Replay

Scale

1:600

0

250

500

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 17-JUL-2014 17:02

Filename: C:\Minimus 13.08.2113\Log\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta

Recorded on 17-JUL-2014 14:12

System Versions: Logged with 13.08.2113

Plotted with 13.08.2113

↑

1 INCH MAIN

↑

COMPANY

WELL

FIELD

PROVINCE/COUNTY

COUNTRY/STATE

SHAKESPEARE OIL COMPANY, INC.

OTTLEY #6-14

CHALK BUTTES

LOGAN

U.S.A. / KANSAS

Elevation Kelly Bushing

2819.00

feet

Elevation Drill Floor

2817.00

feet

Elevation Ground Level

2809.00

feet

First Reading

4524.00

feet

Depth Driller

4530.00

feet

Depth Logger

4527.00

feet

Weatherford

ARRAY INDUCTION

SHALLOW FOCUSED

ELECTRIC LOG