



Weatherford[®]

**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY	SHAKESPEARE OIL CO., INC.		
WELL	ZANOBIJA #1-21		
FIELD	WILDCAT		
PROVINCE/COUNTY	LOGAN		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	2285' FSL & 1420' FWL		
SEC	TWP	RGE	Other Services
21	15S	33W	MPD/MDN
API Number	15-109-21141		MSS
Permit Number			
Permanent Datum GL, Elevation	2855 feet		
Log Measured From	KB		
Drilling Measured From	KB		
Date	27-NOV-2012		
Run Number	ONE		
Service Order	3537784		
Depth Driller	4600.00 feet		
Depth Logger	4601.00 feet		
First Reading	4598.00 feet		
Last Reading	222.00 feet		
Casing Driller	225.00 feet		
Casing Logger	222.00 inches		
Bit Size	7.875		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.10 lb/USg	52.00 CP	
PH / Fluid Loss	10.50	10.50	
Sample Source	MUDPIT		
Rm @ Measured Temp	0.72 @ 78.0	ohm-m	
Rmf @ Measured Temp	0.58 @ 78.0	ohm-m	
Rmc @ Measured Temp	0.86 @ 78.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.52 @ 110.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	110.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	ADAM SILL		
Witnessed By	TIM PRIEST		
JOB #	LB12-311		

Elevations:	feet
KB	2867.00
DF	2865.00
GL	2855.00

BOREHOLE RECORD

Last Edited: 27-NOV-2012 22:17

Bit Size inches	Depth From feet	Depth To feet
7.875	225.00	4600.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	225.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.04.8492.
- MCG, MML, MDN, MPD, MFE, MSS, MAI RAN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS USED ON MSS.
 - 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.
- ANNULAR HOLE VOLUME WITH 4.5 INCH CASING FROM TD TO 3600 FT: 280 CU. FT.
- SERVICE ORDER # 3537784.

- RIG: H-D DRILLING #2.

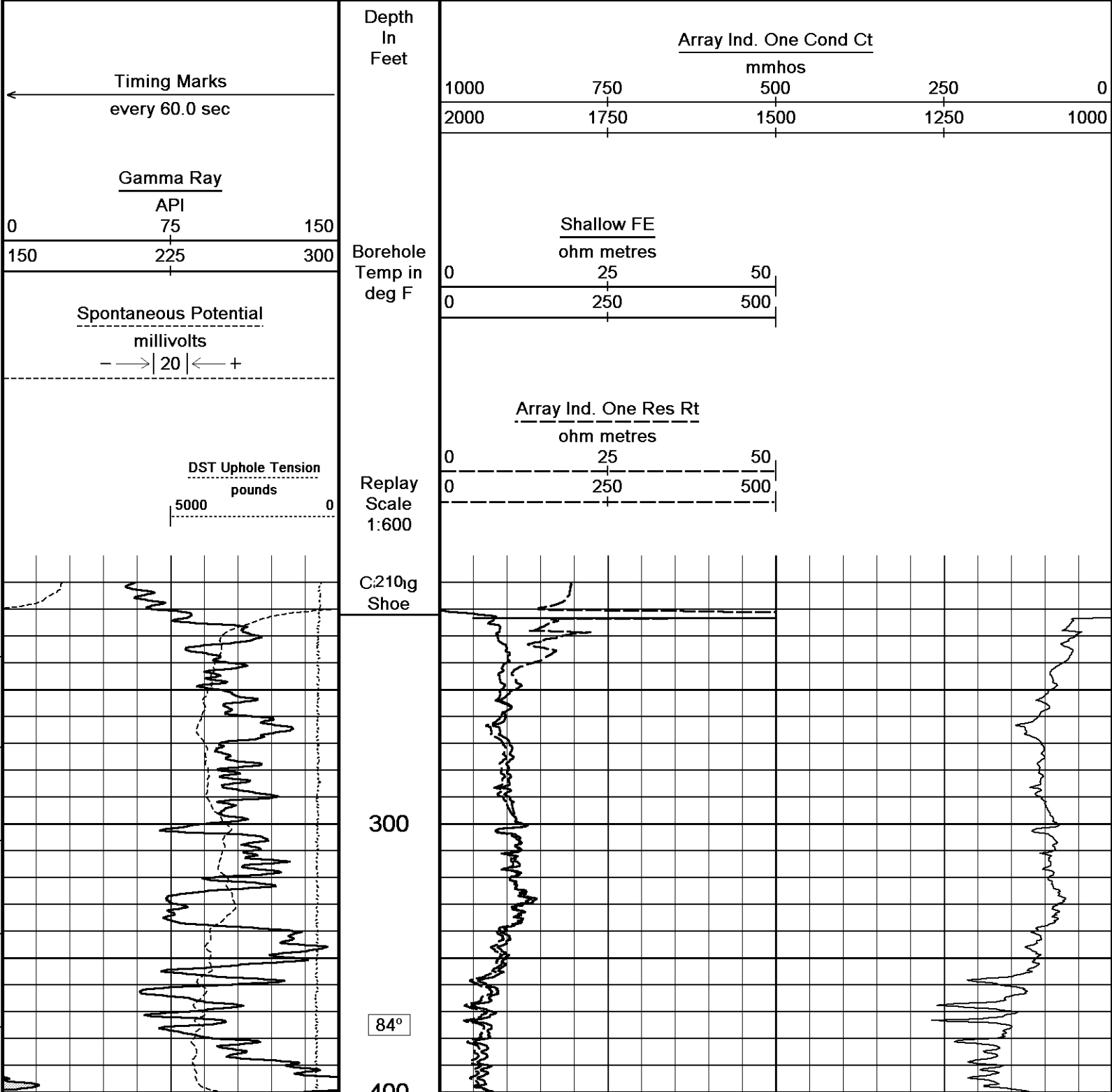
- ENGINEER: A. SILL.

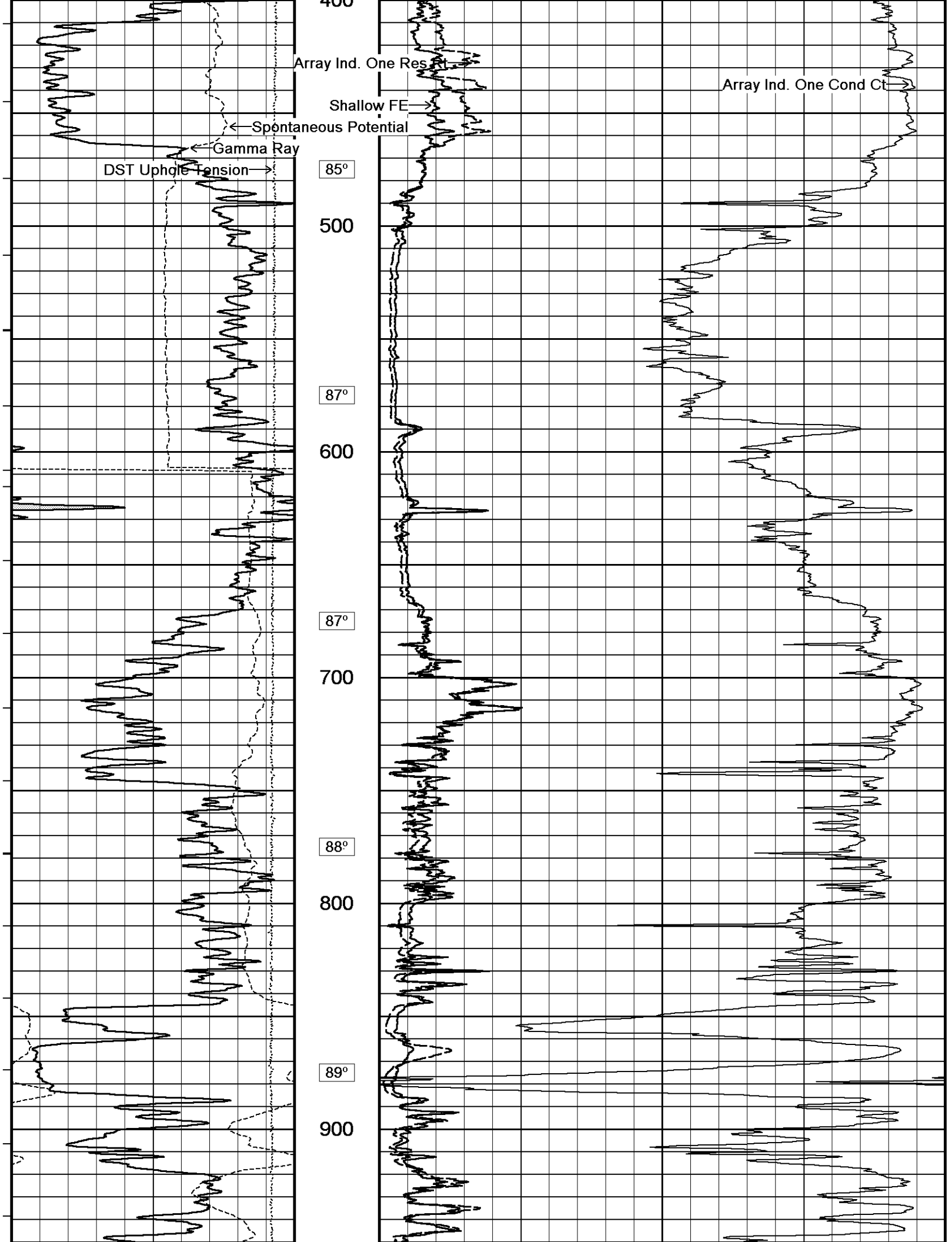
- OPERATOR(S): N. ADAME, R. VENEGAS.

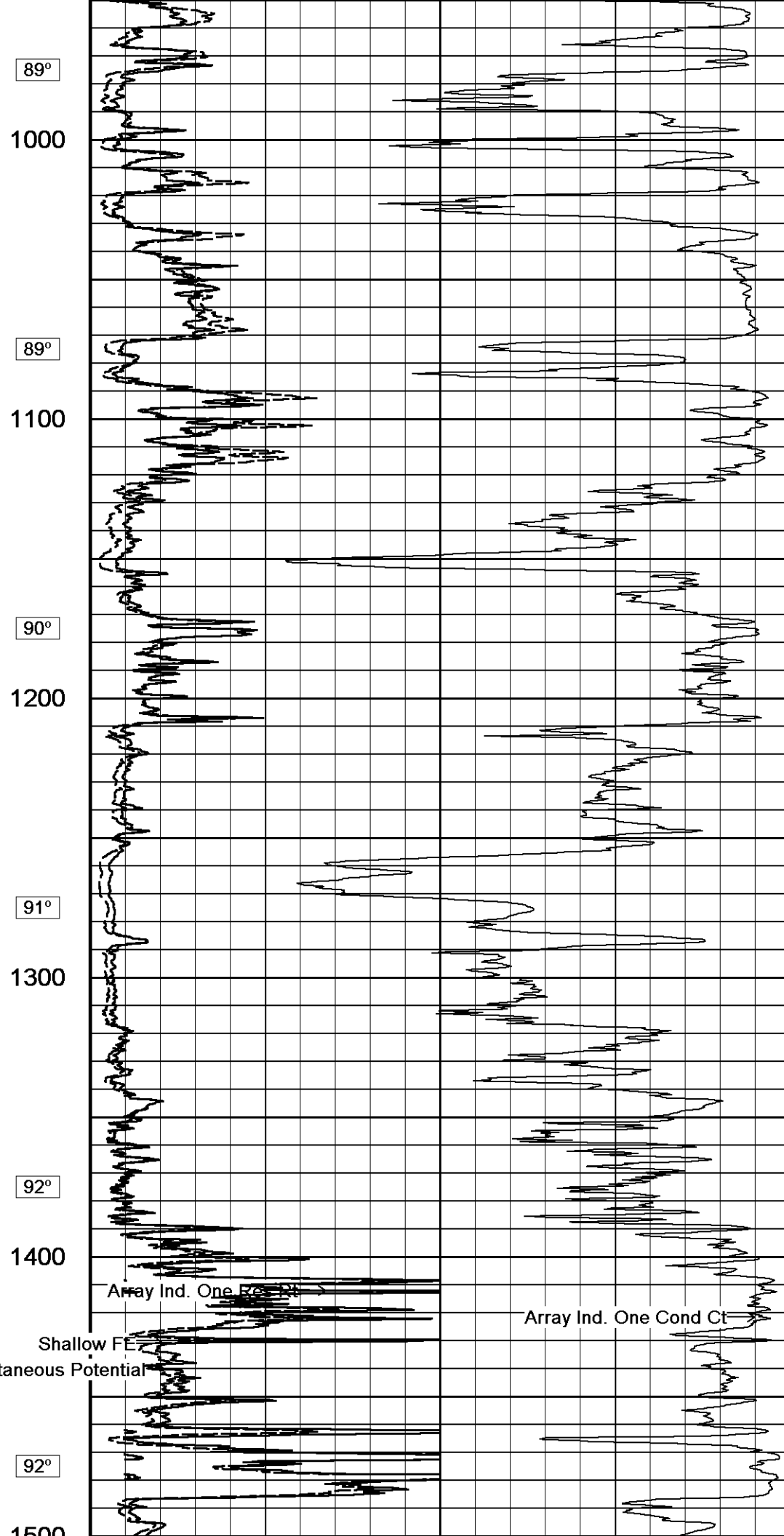
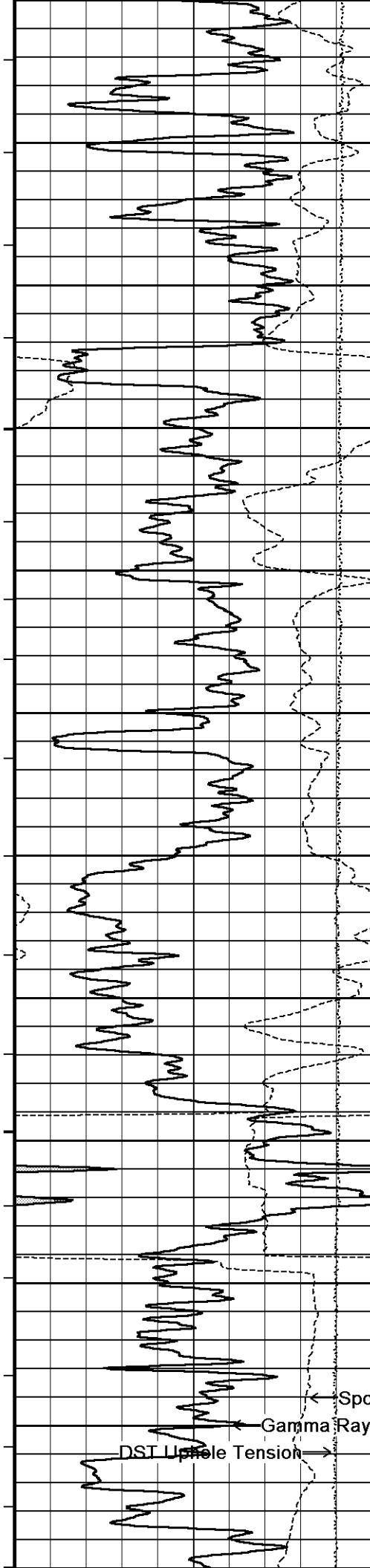
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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 28-NOV-2012 05:48
Filename: C:\Minimus 13.04.8492\Data\Shakespeare O...\Shakespeare Oil Co. Zanobia #1-21_Main.dta Recorded on 28-NOV-2012 02:51
System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492







89°

1000

89°

1100

90°

1200

91°

1300

92°

1400

92°

1500

Array Ind. One Po 12%

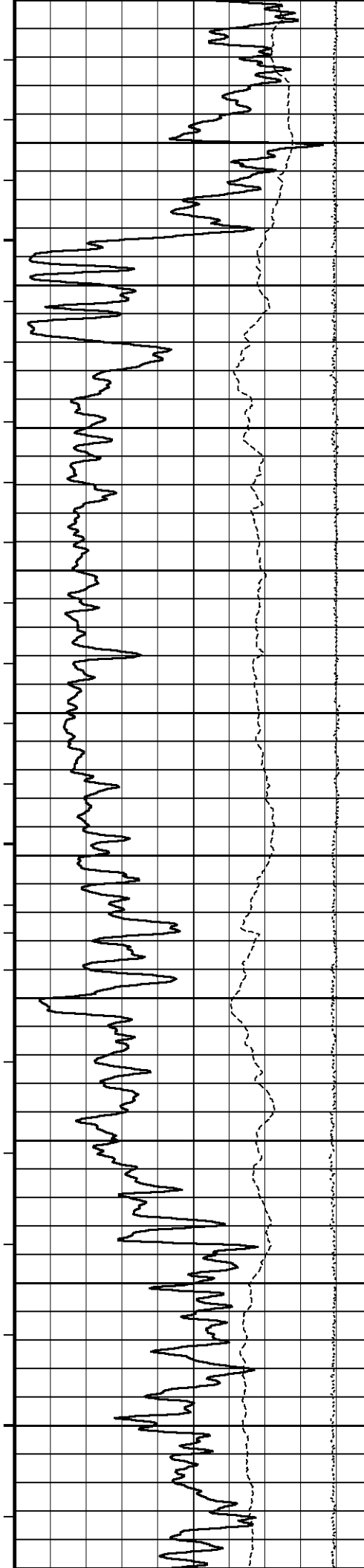
Array Ind. One Cond Ct

Shallow FE

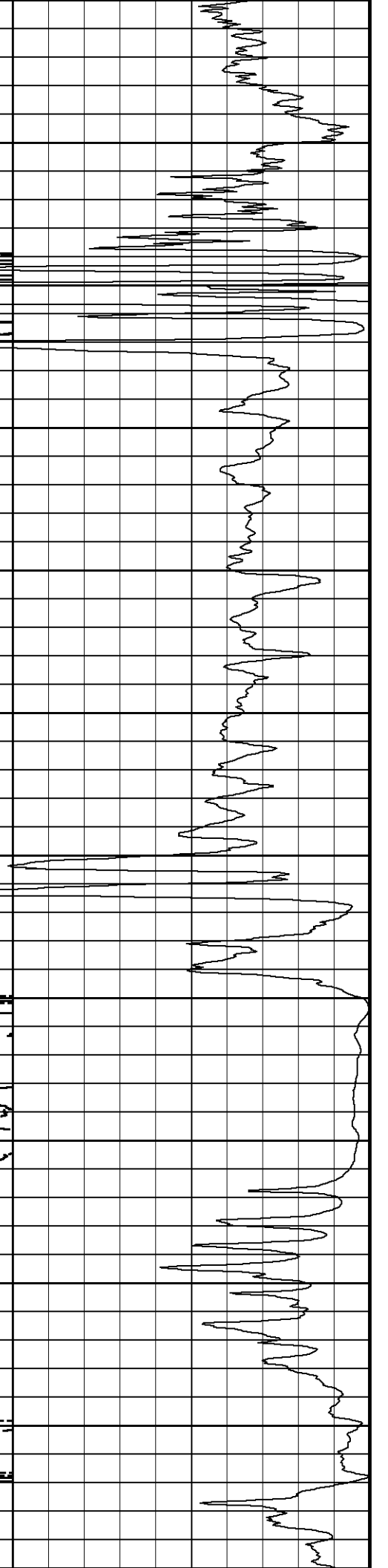
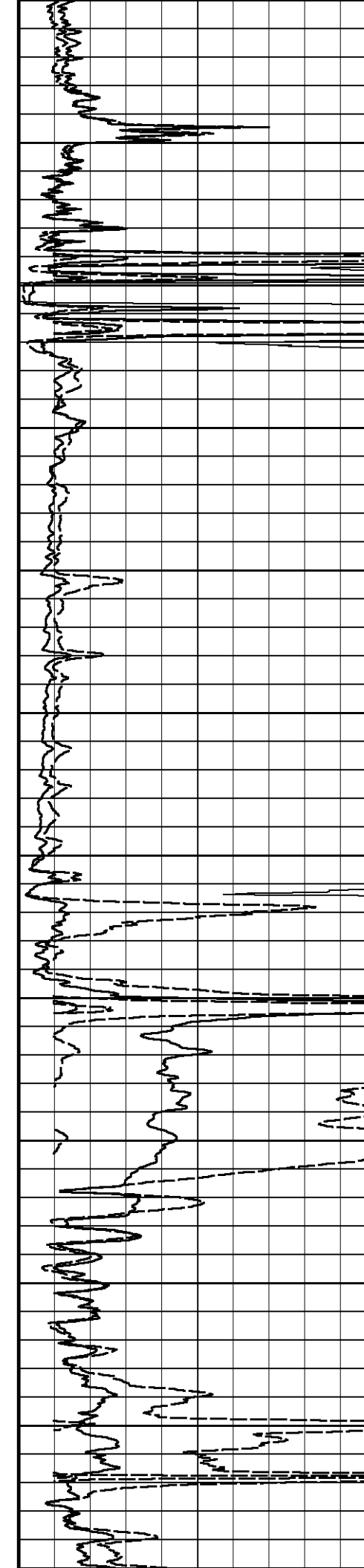
← Spontaneous Potential

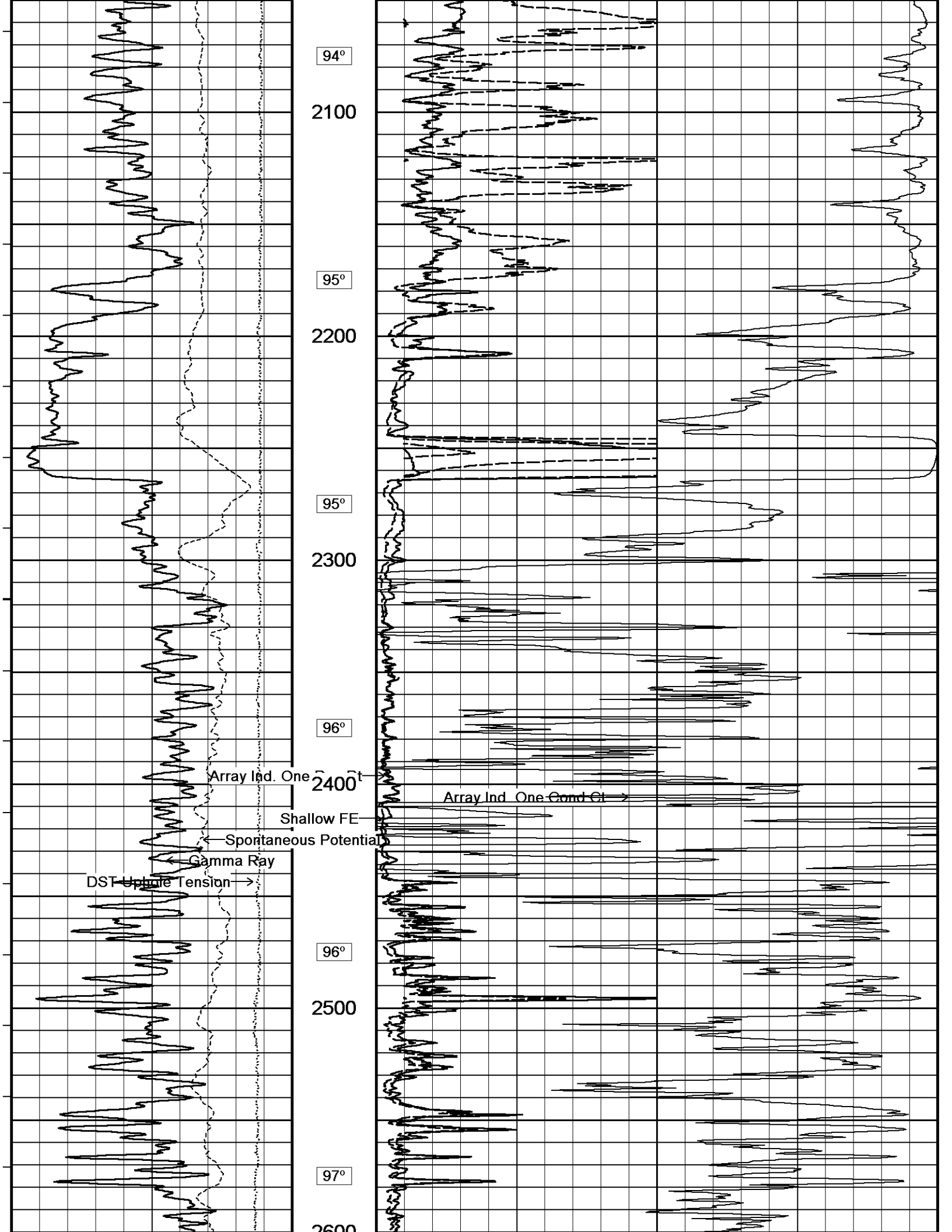
← Gamma Ray

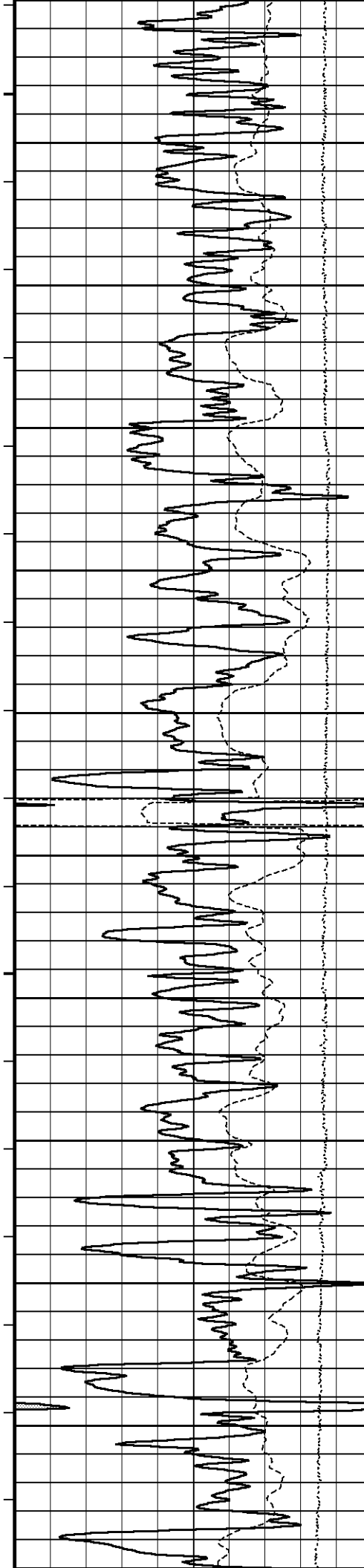
DST Upole Tension →



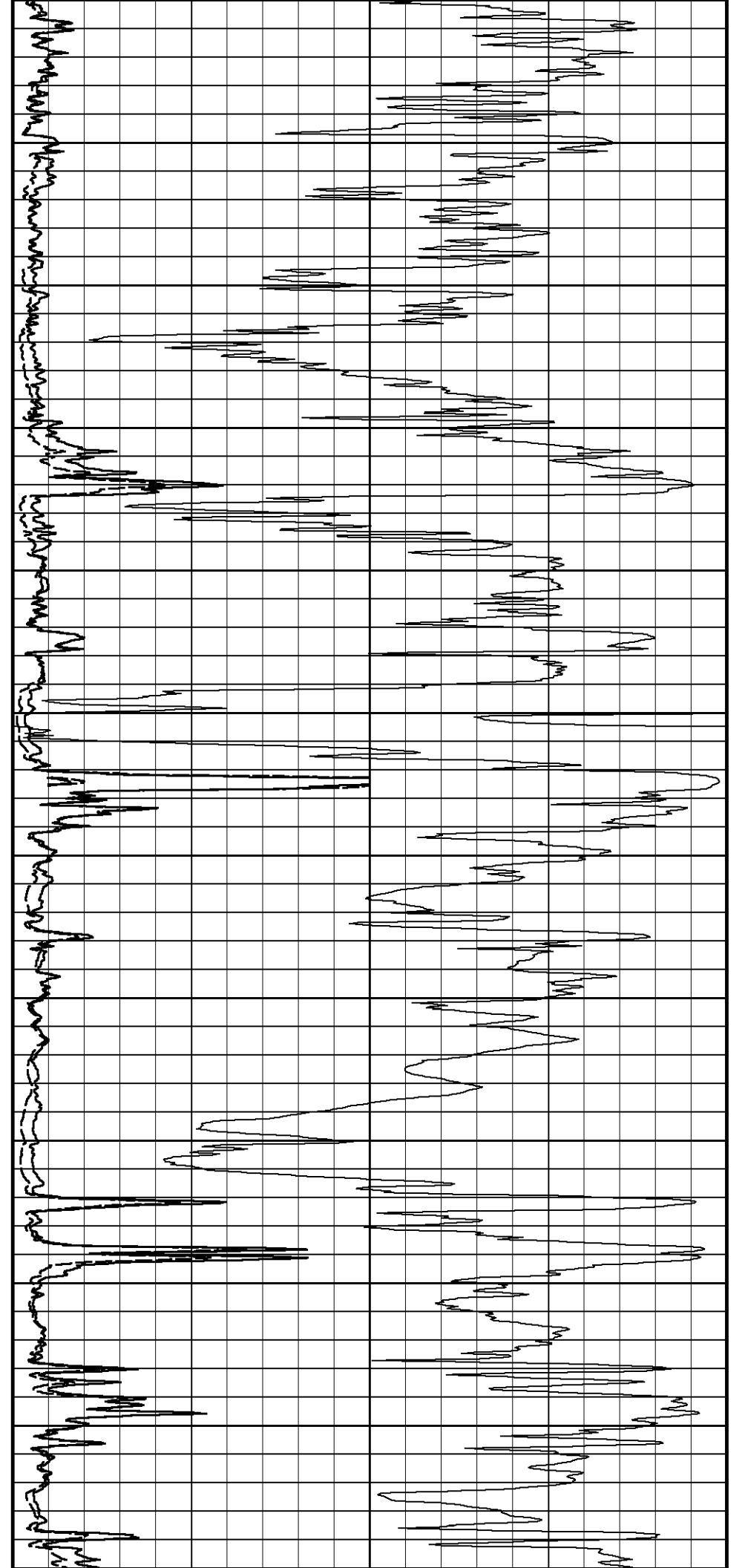
1500
93°
1600
93°
1700
93°
1800
93°
1900
94°
2000

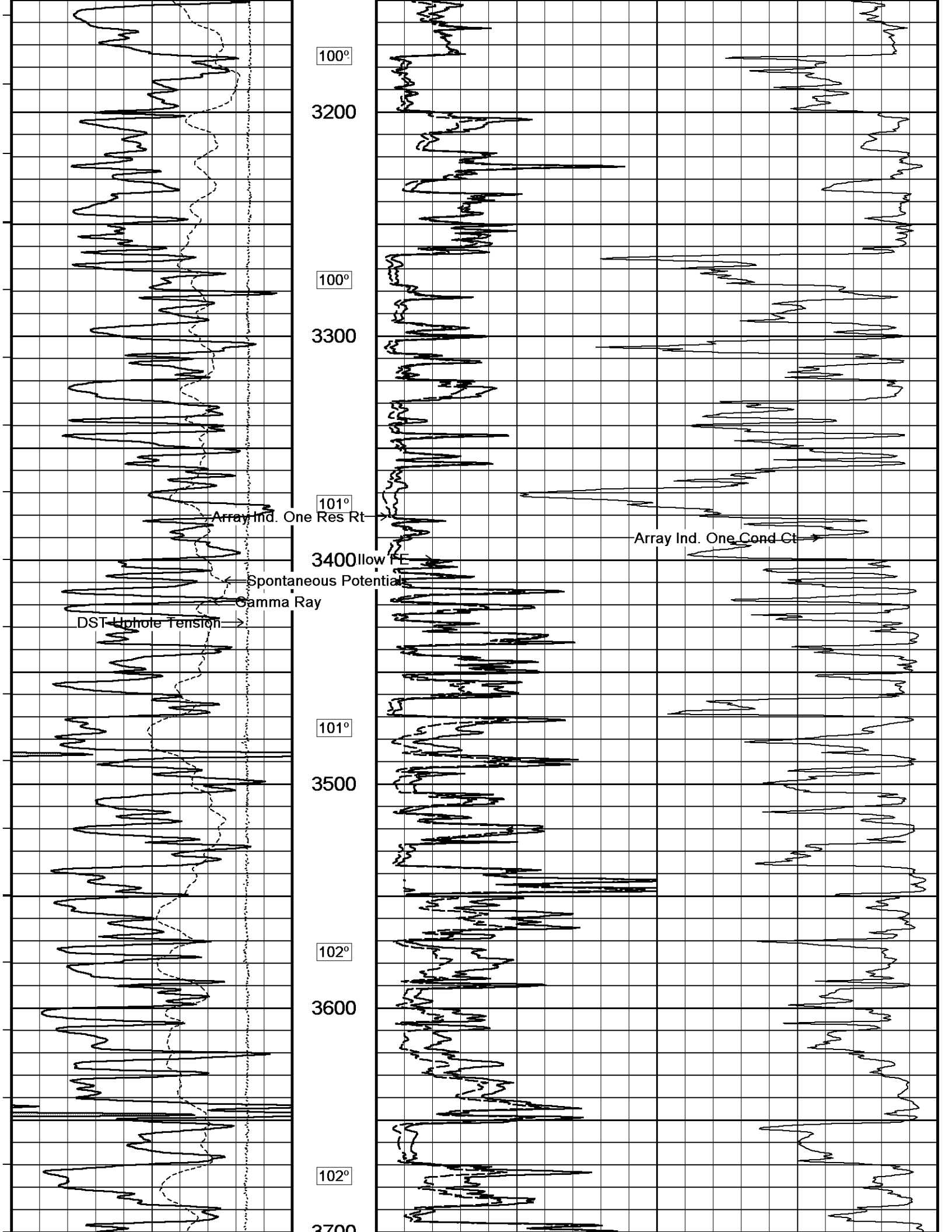


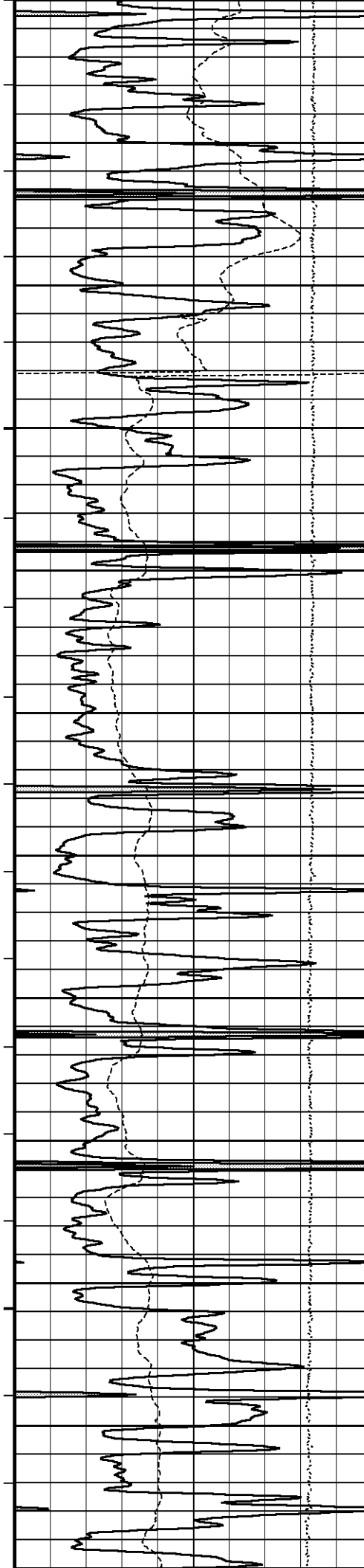




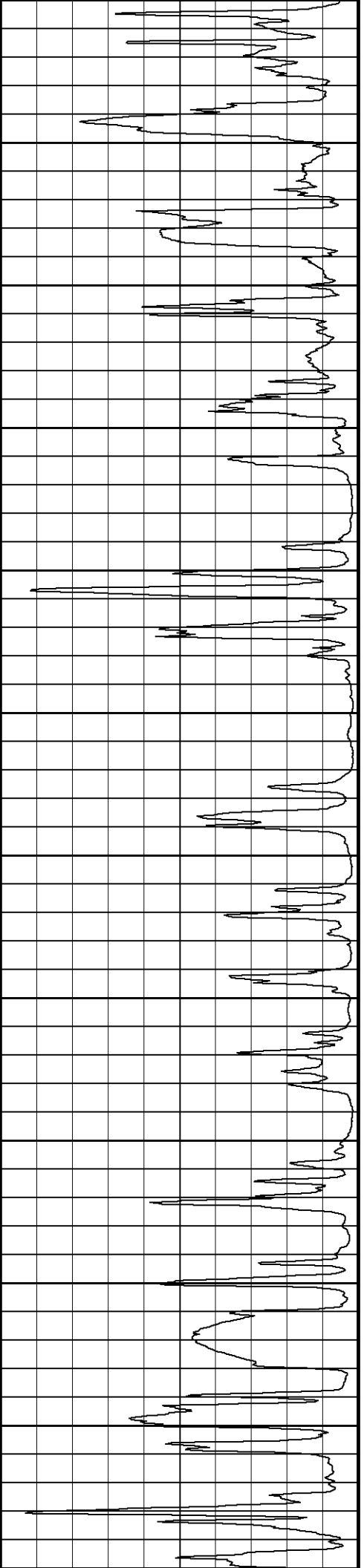
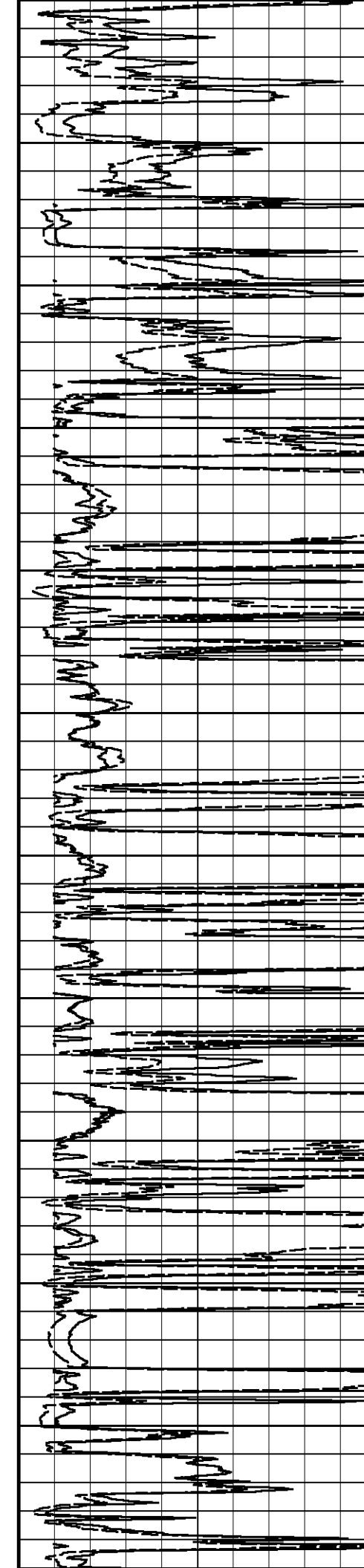
2600
97°
2700
97°
2800
98°
2900
99°
3000
99°
3100

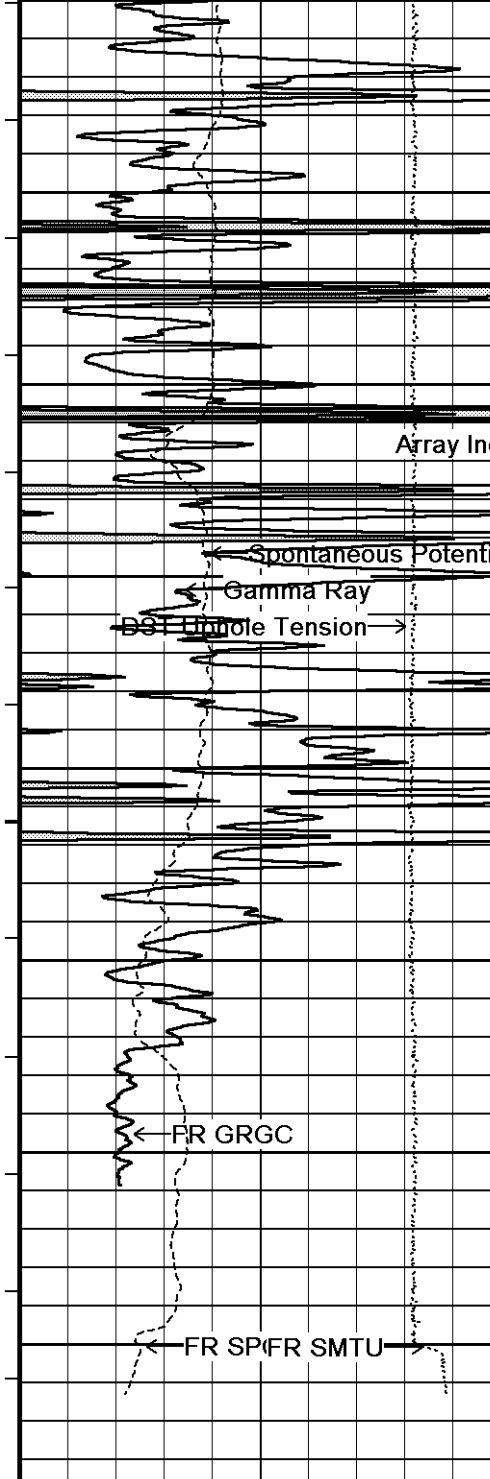




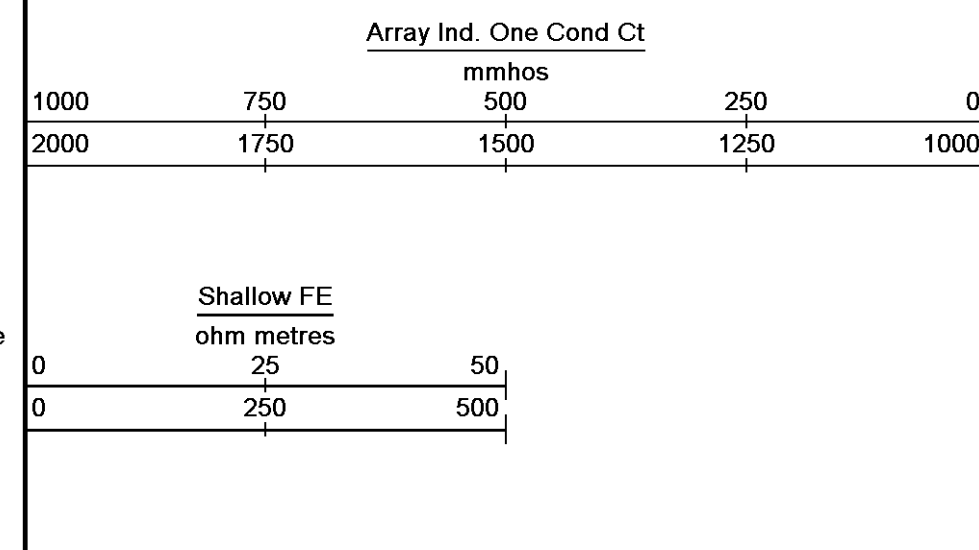
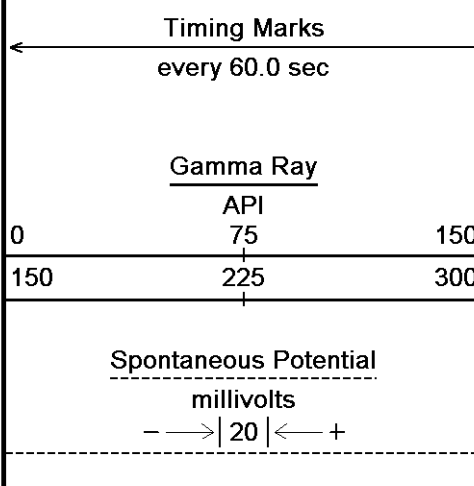
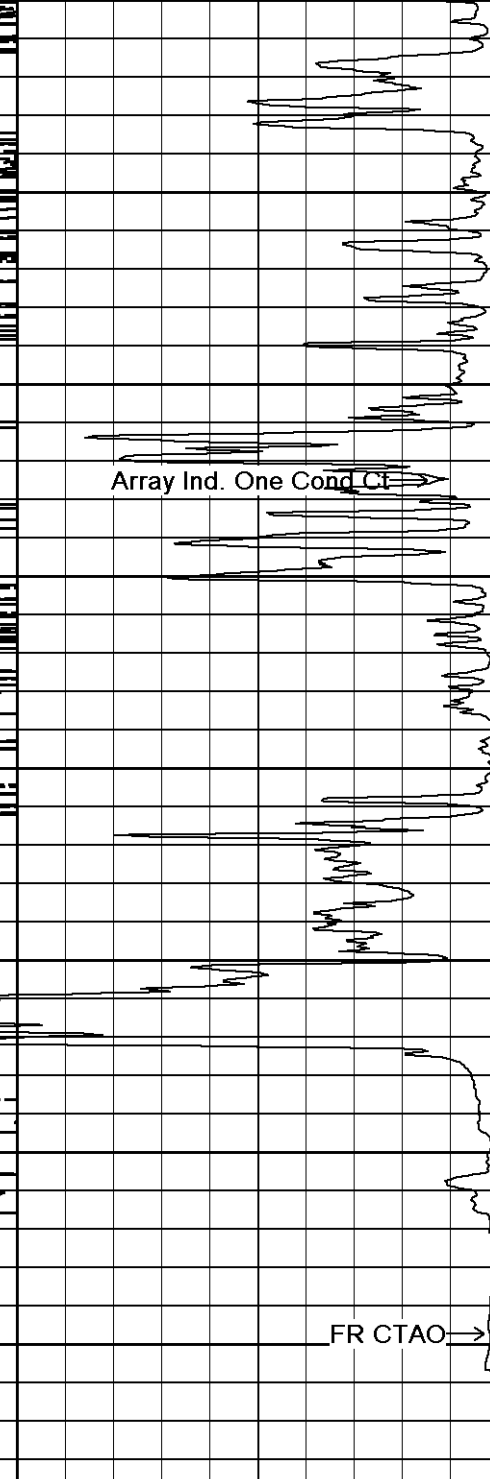
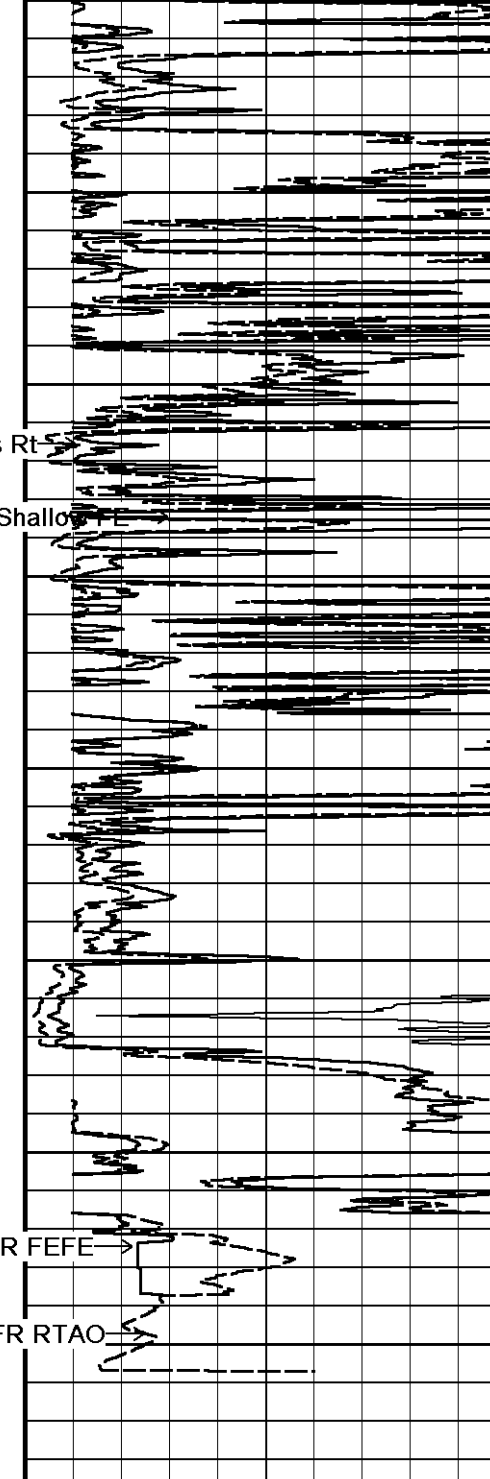


3700
103°
3800
103°
3900
104°
4000
105°
4100
105°
4200

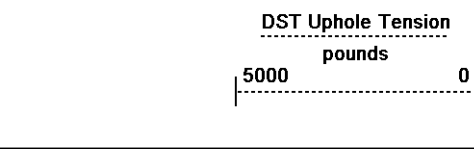




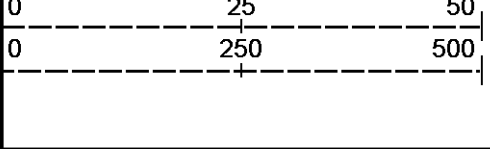
107°
 4300
 108°
 4400
 110°
 4500
 4600
 4630
 Depth In Feet



Borehole Temp in deg F



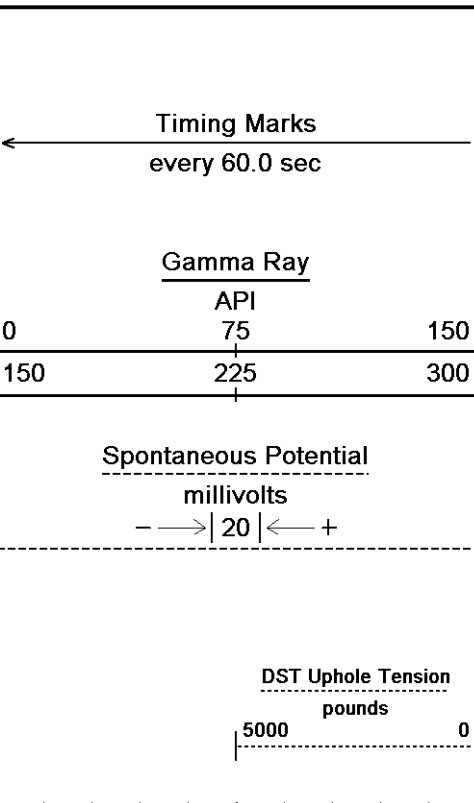
Replay
Scale
1:600



Depth Based Data - Maximum Sampling Increment 10.0cm
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↑ 2 INCH MAIN ↑

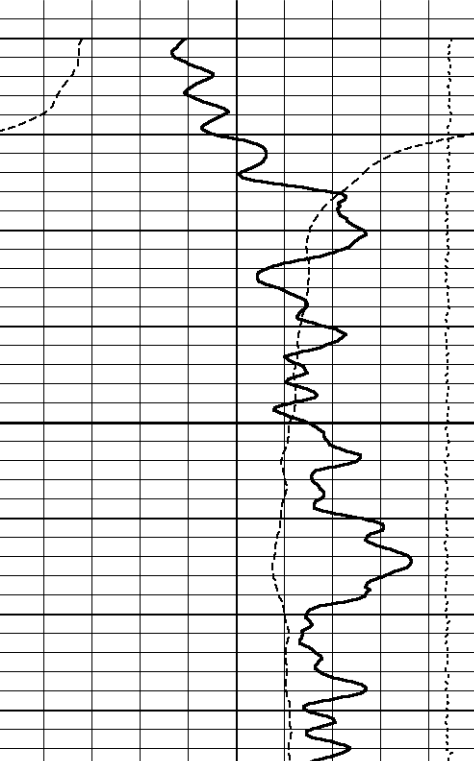
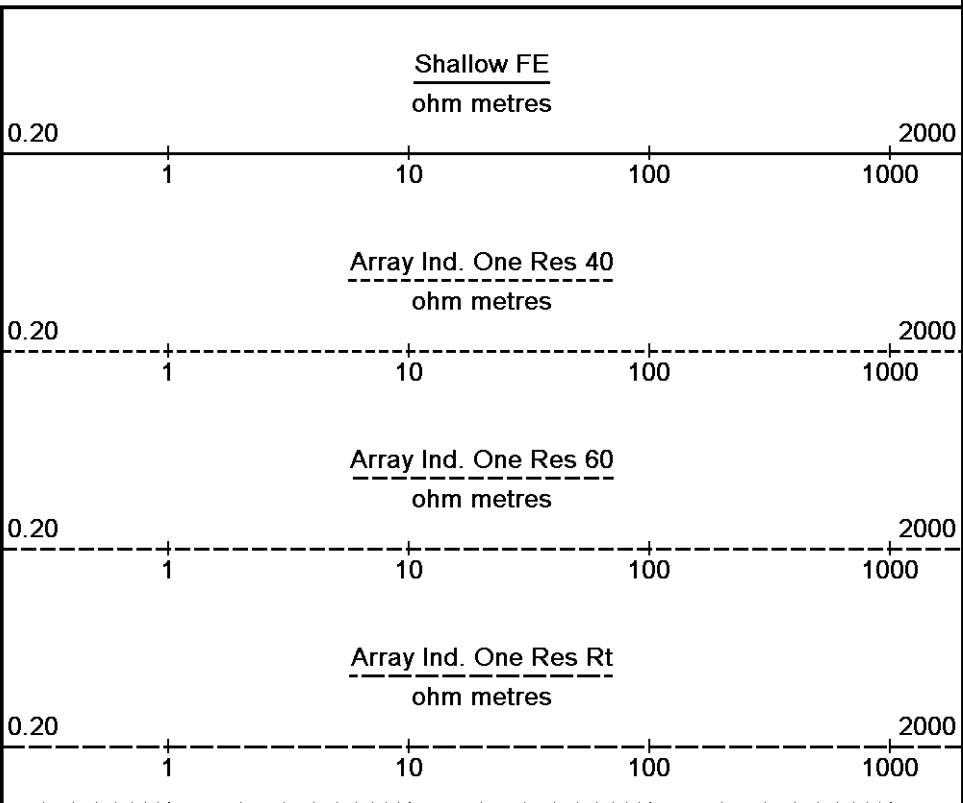
↓
 Depth Based Data - Maximum Sampling Increment 10.0cm
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Depth
In
Feet

Borehole
Temp in
deg F

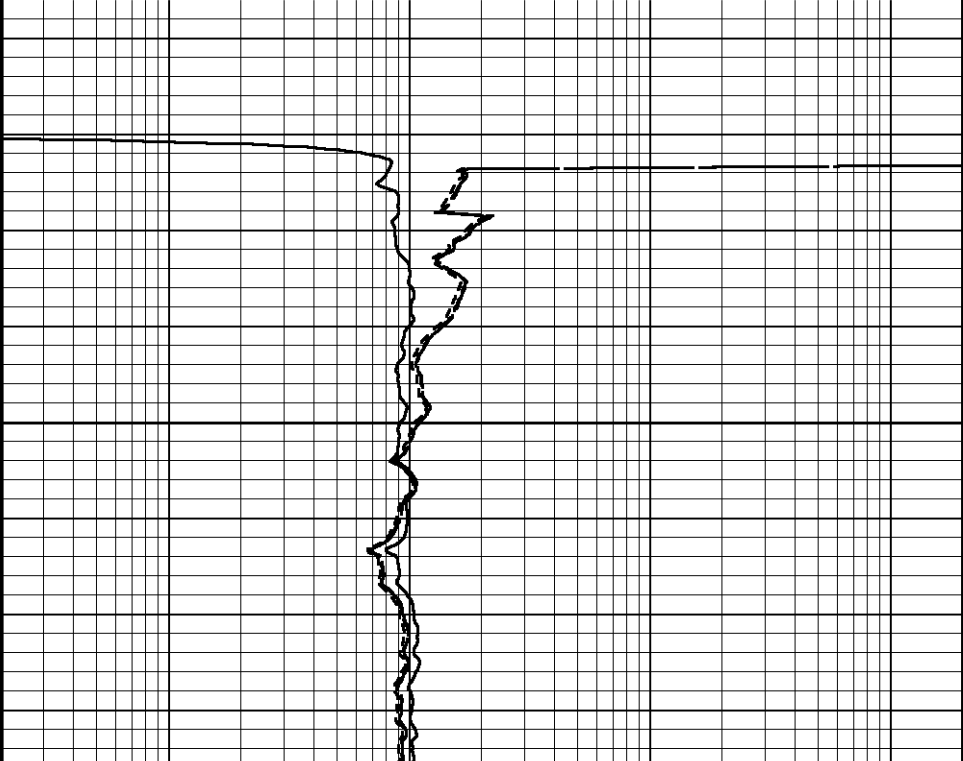
Replay
Scale
1:240

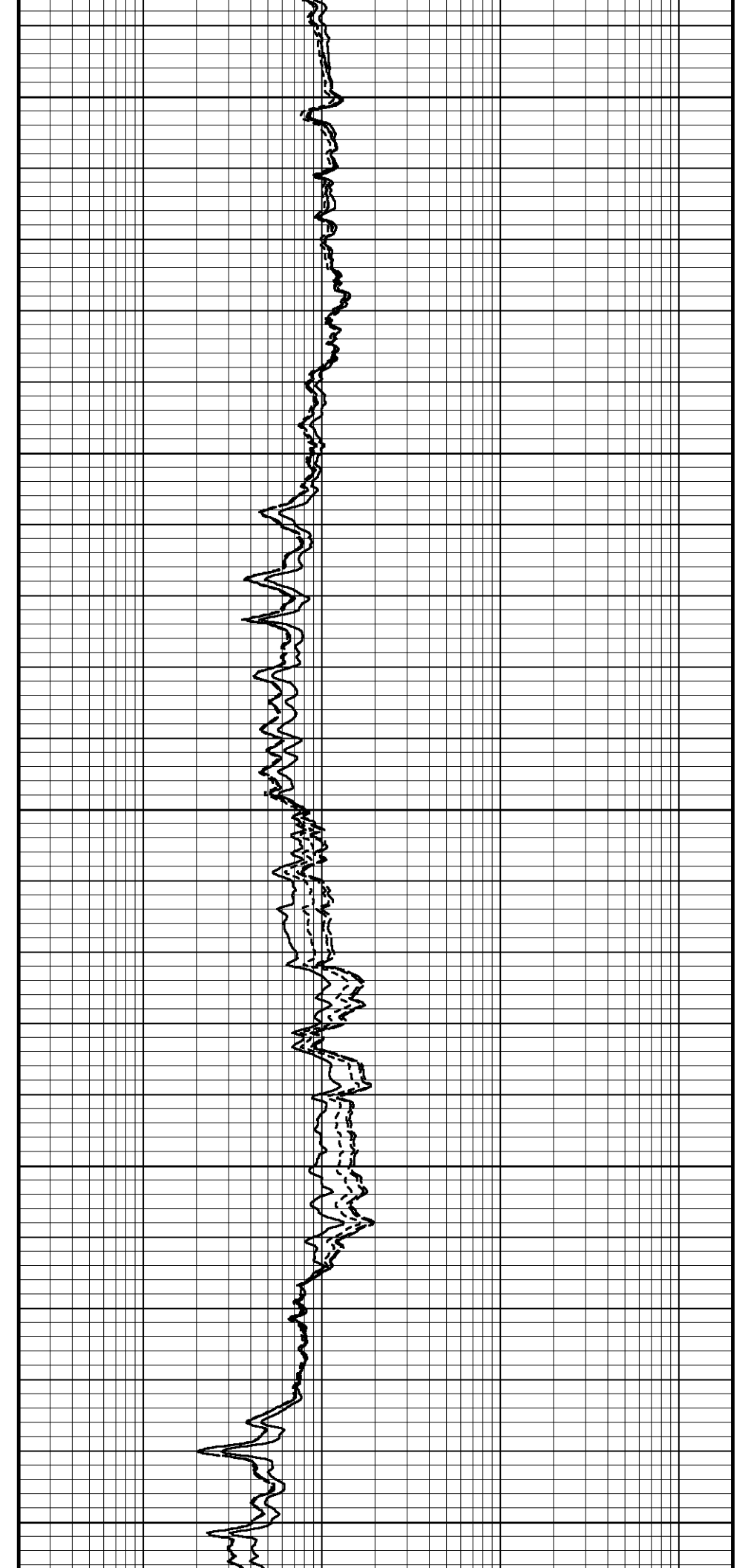
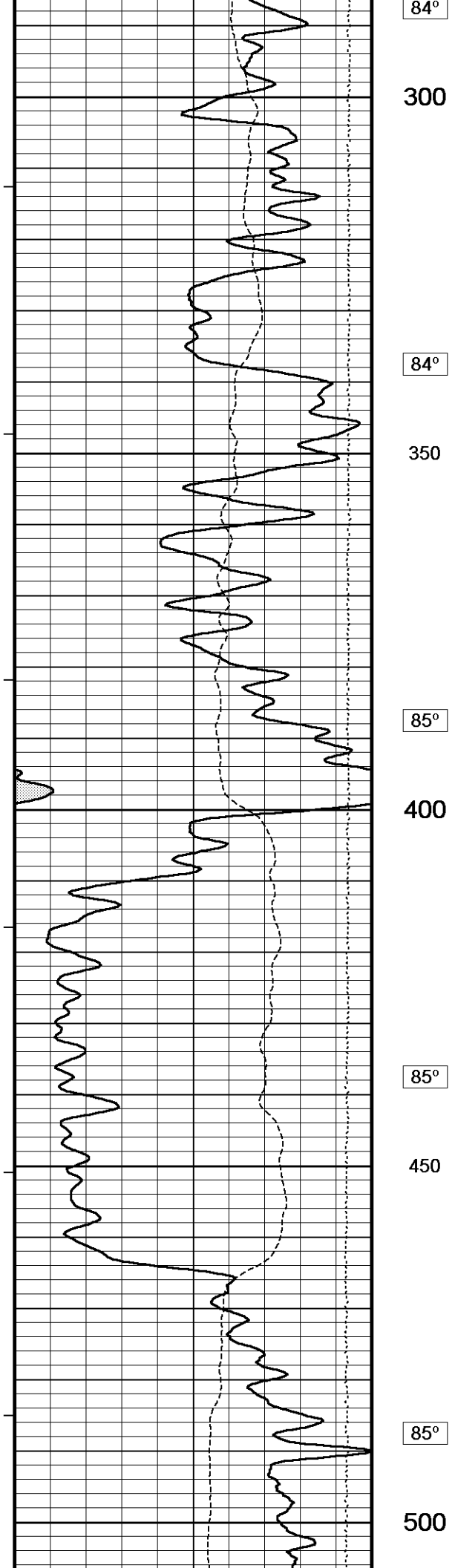


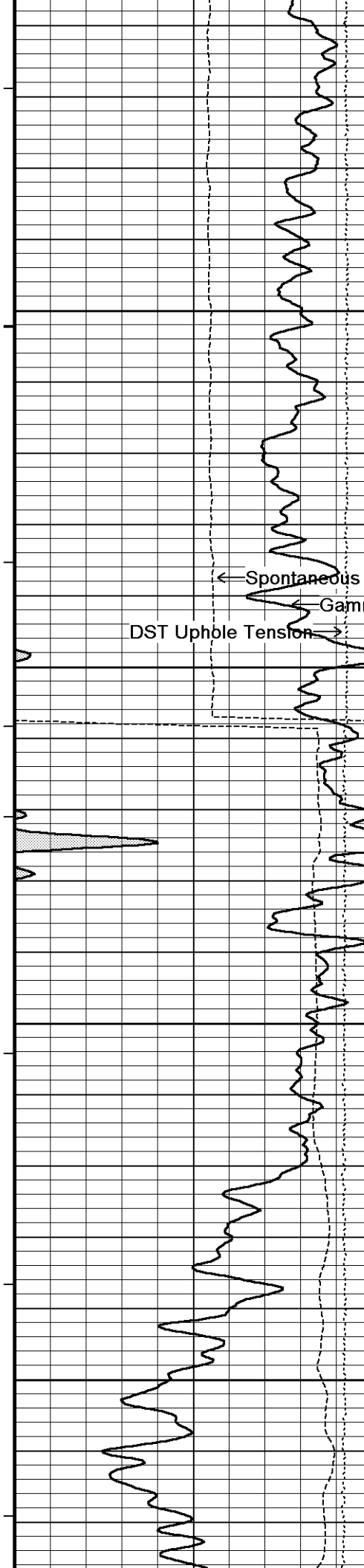
208

Casing
Shoe

250







86°

550

Array Ind. One Res Rt →

Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow FE →

← Spontaneous Potential

← Gamma Ray

← DST Uphole Tension

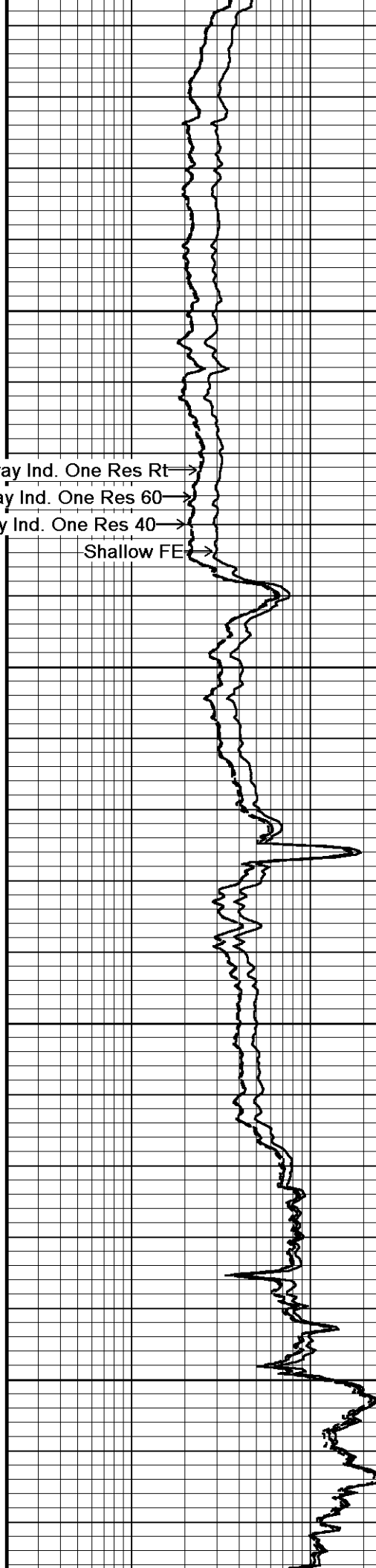
600

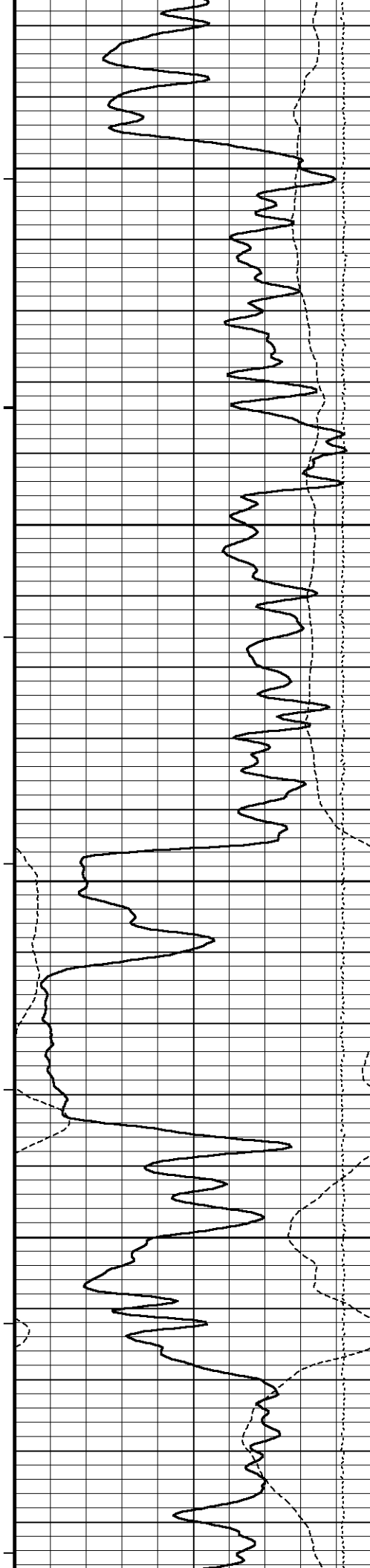
87°

650

88°

700





88°

750

88°

800

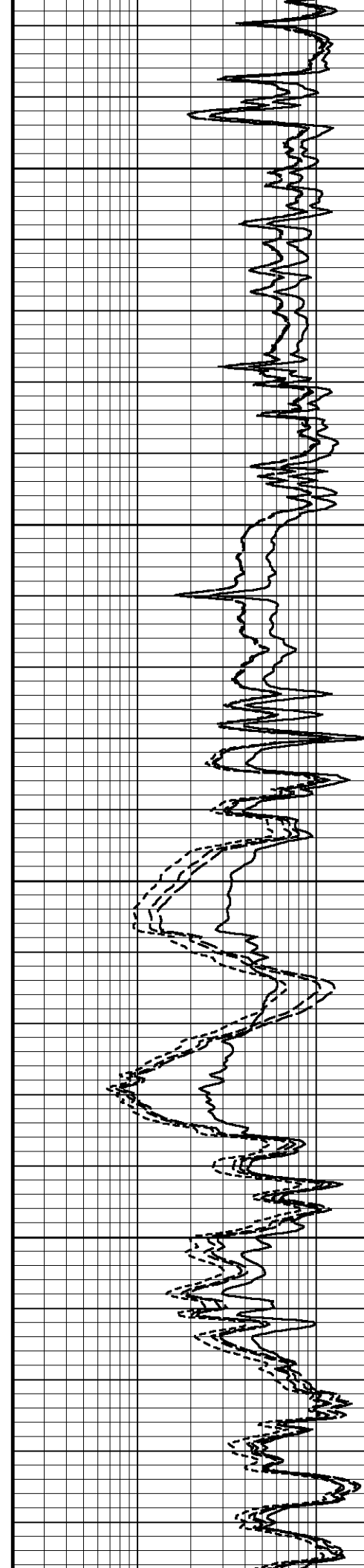
89°

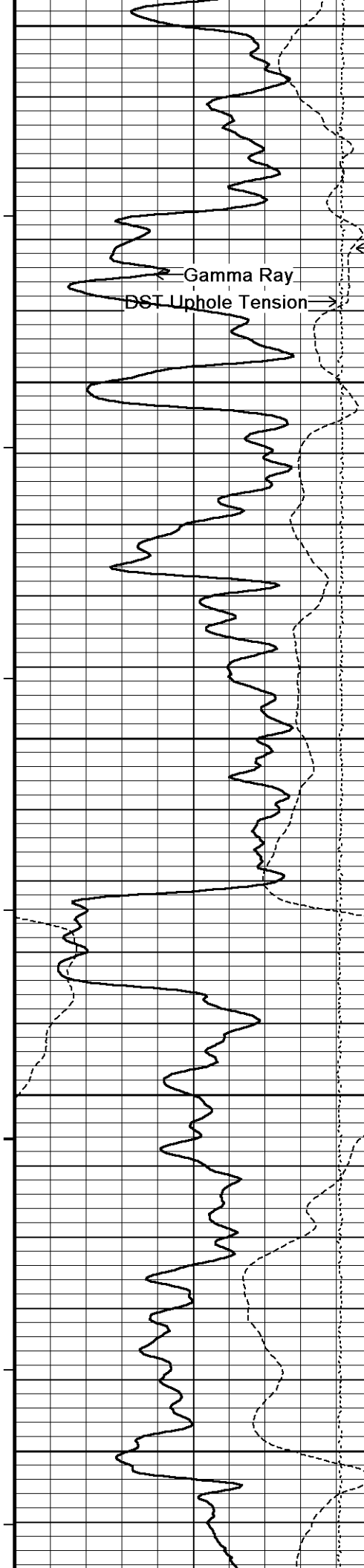
850

89°

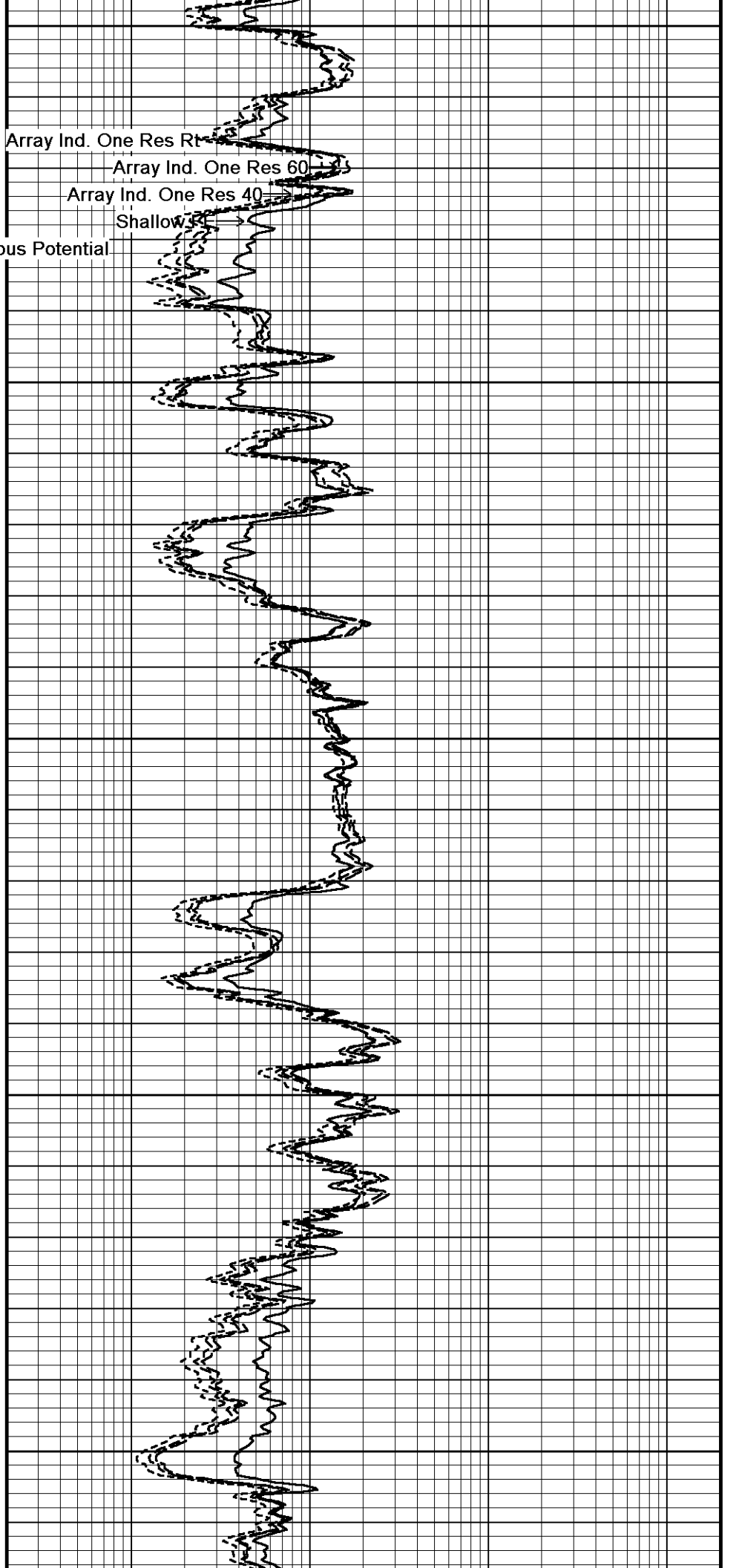
900

89°



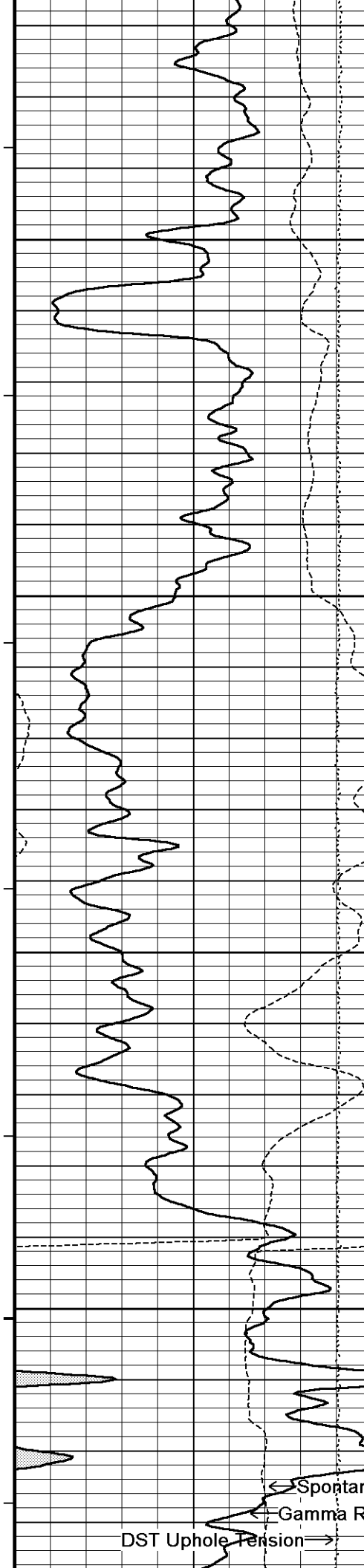


950
89°
1000
89°
1050
89°
1100
90°
1150



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

← Spontaneous Potential



90°

1200

91°

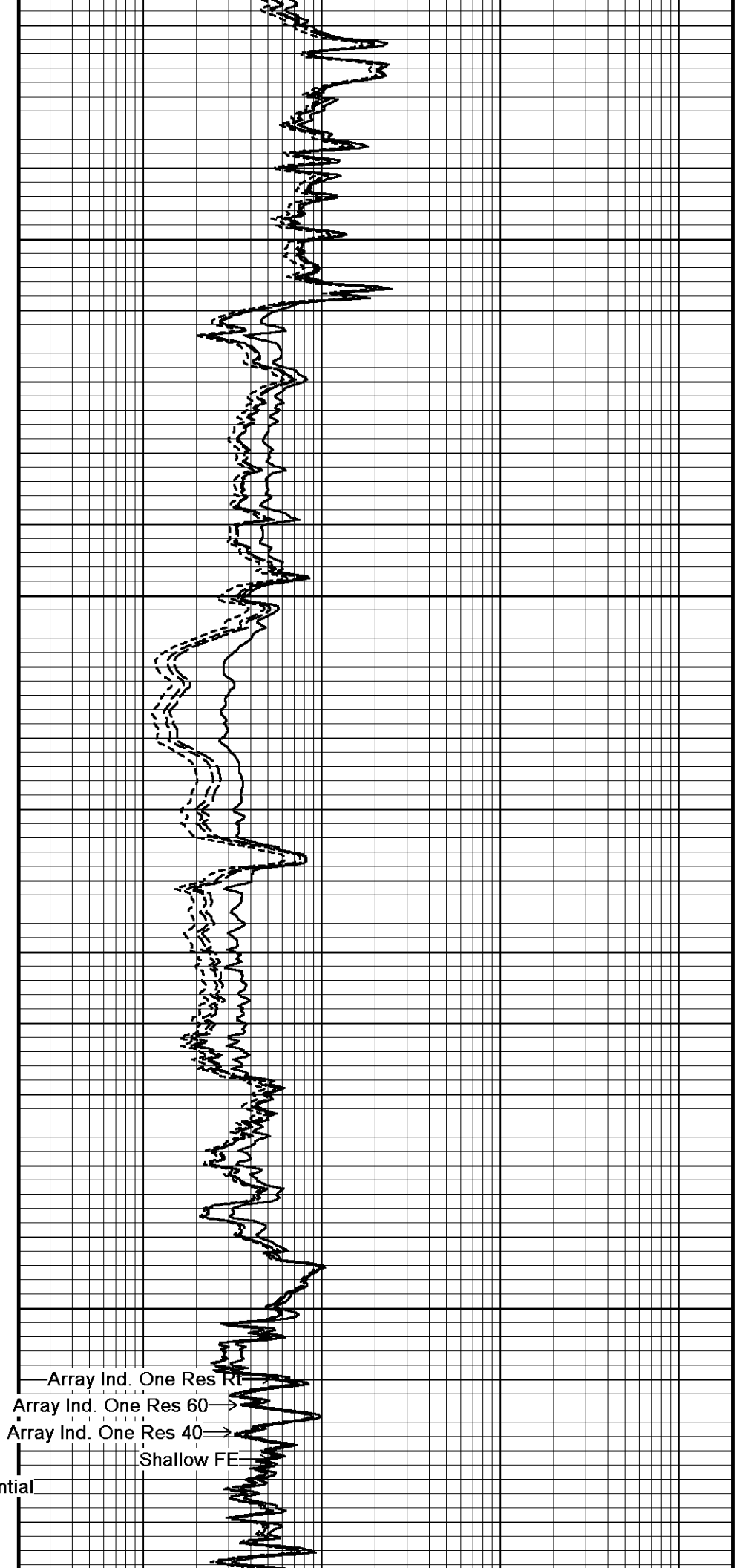
1250

91°

1300

92°

1350



Array Ind. One Res Rt

Array Ind. One Res 60

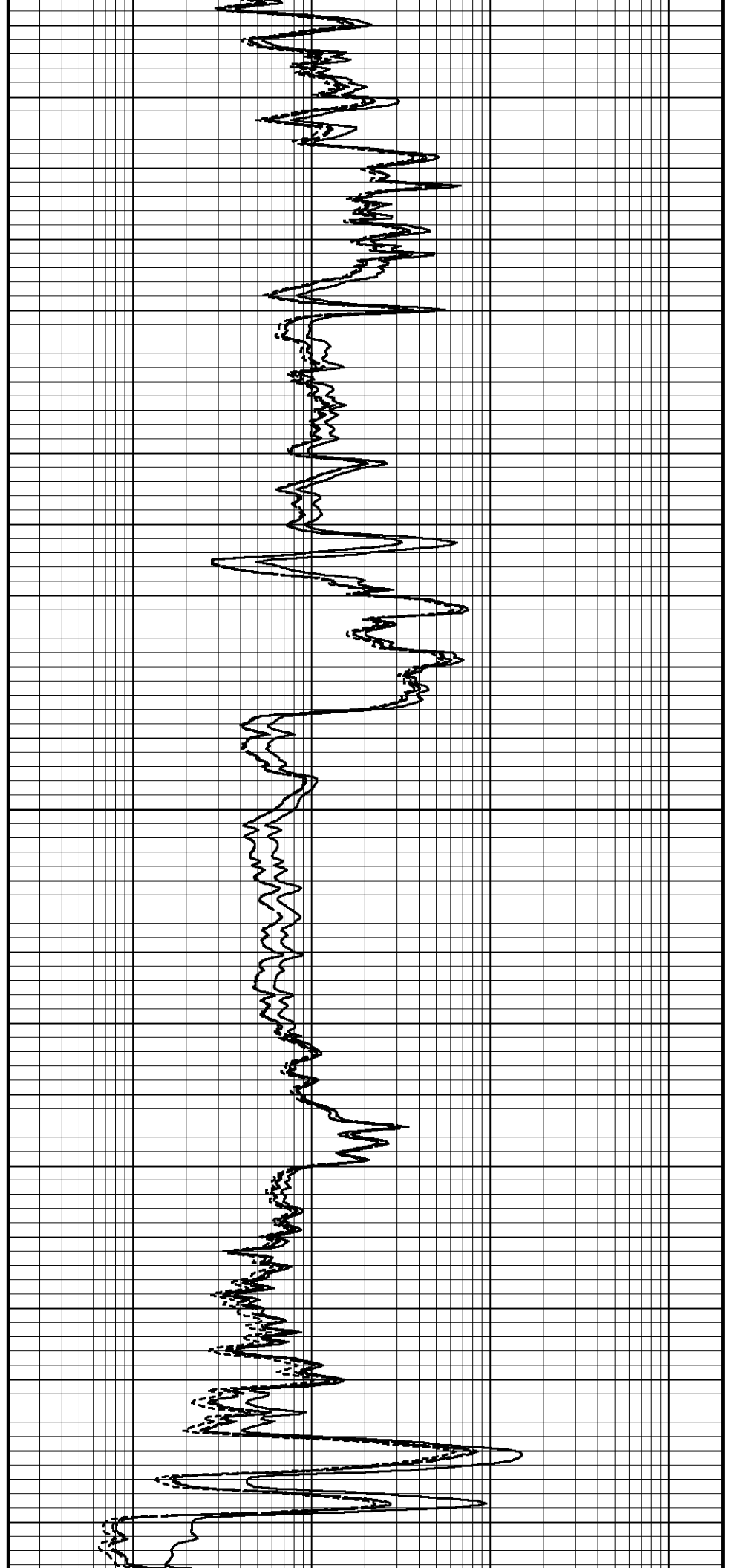
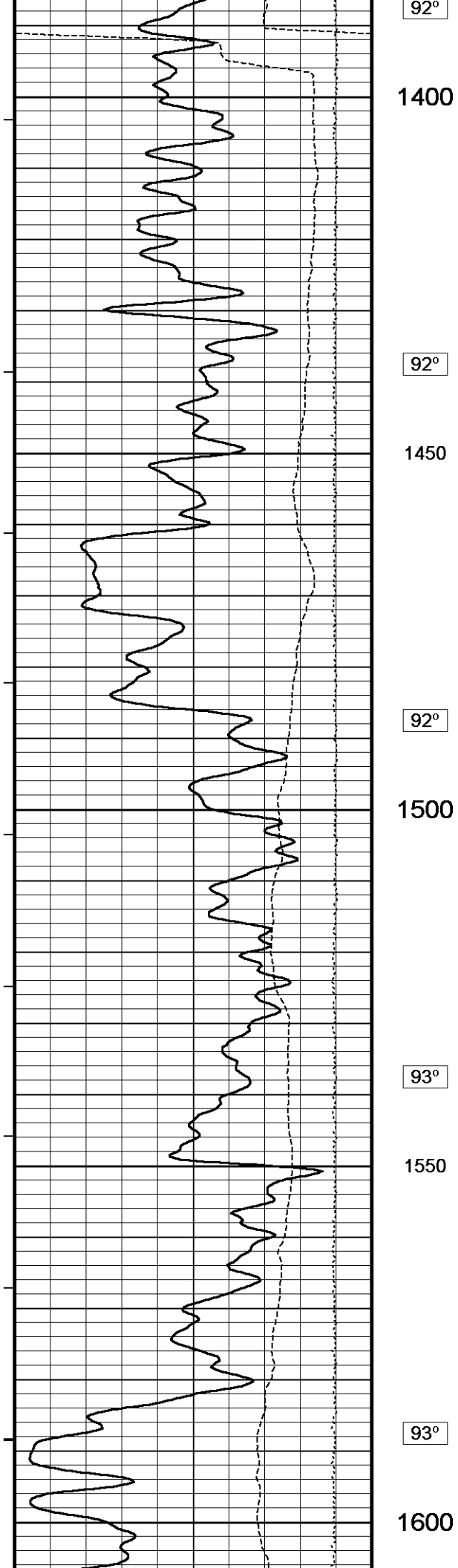
Array Ind. One Res 40

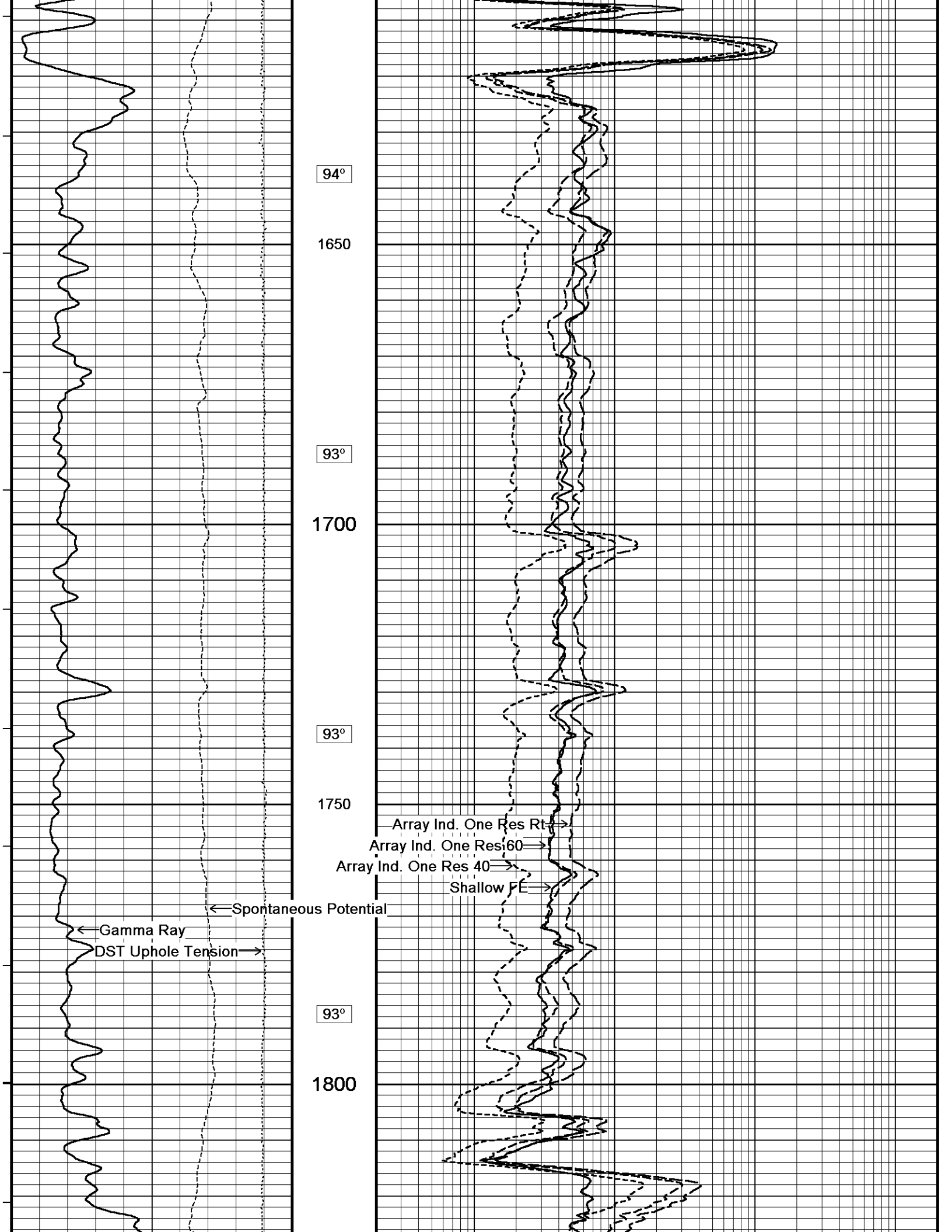
Shallow FE

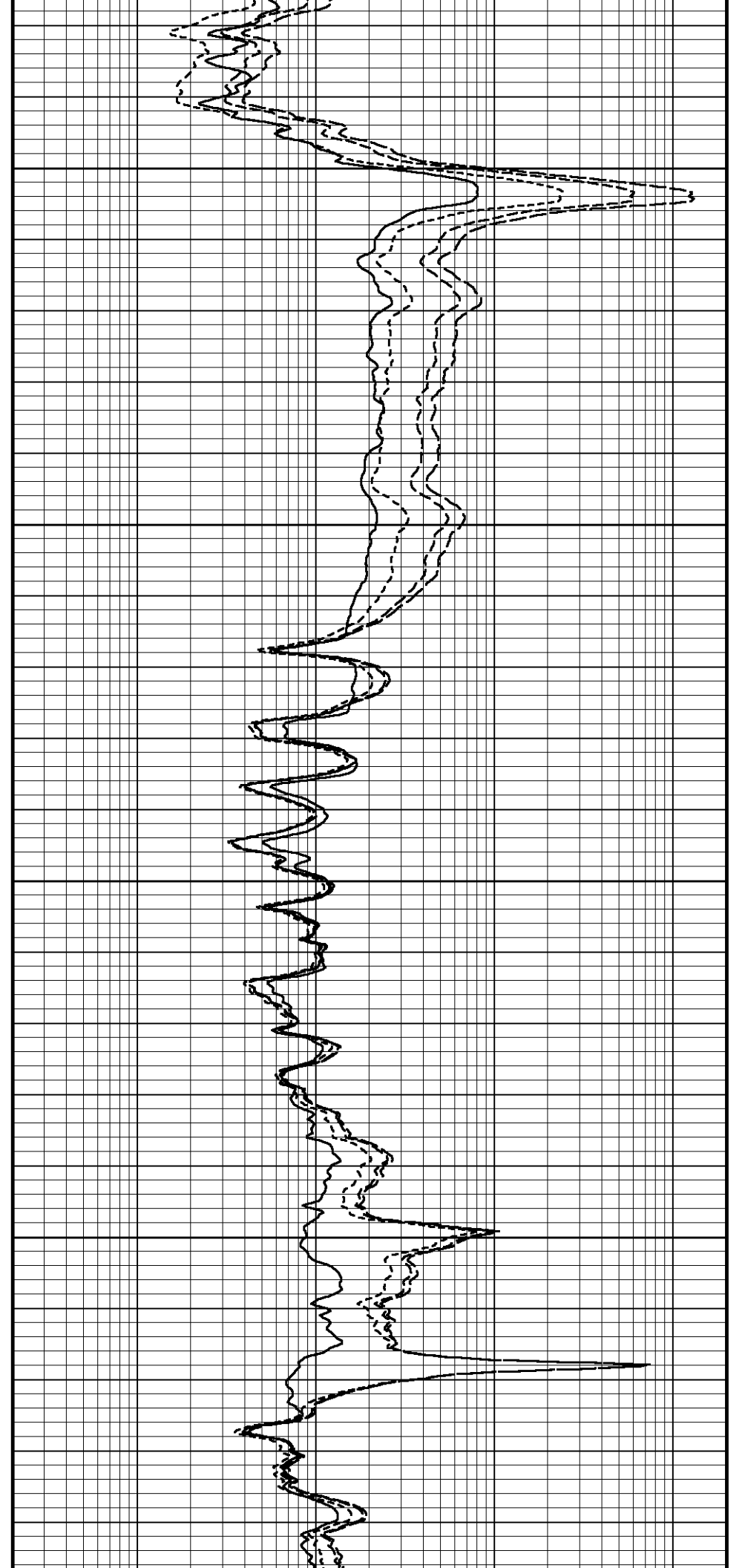
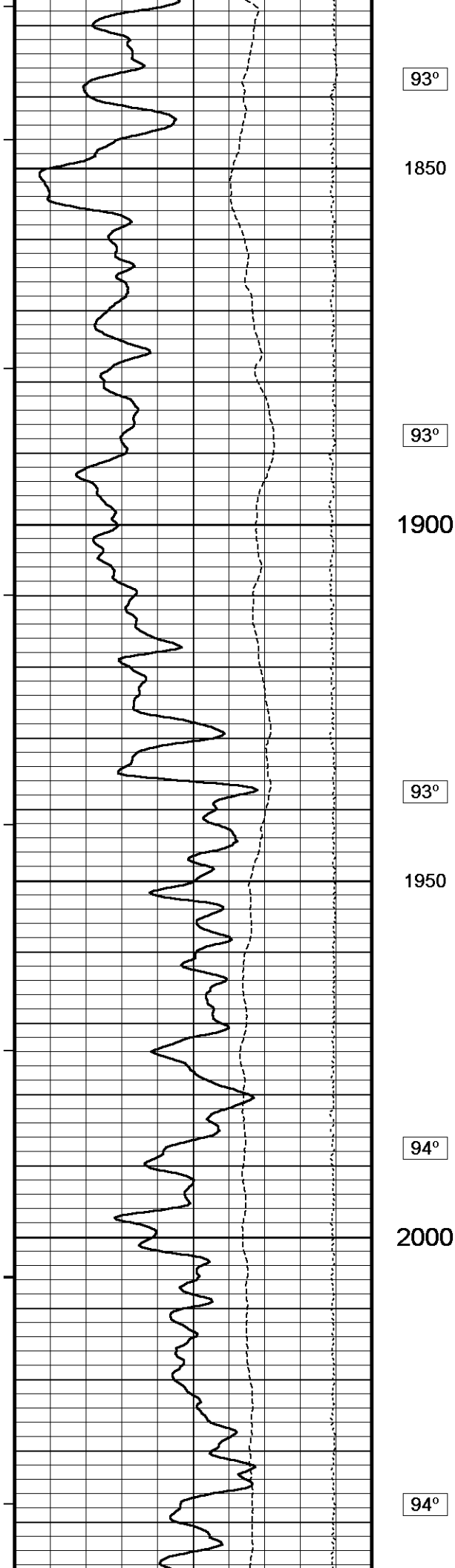
Spontaneous Potential

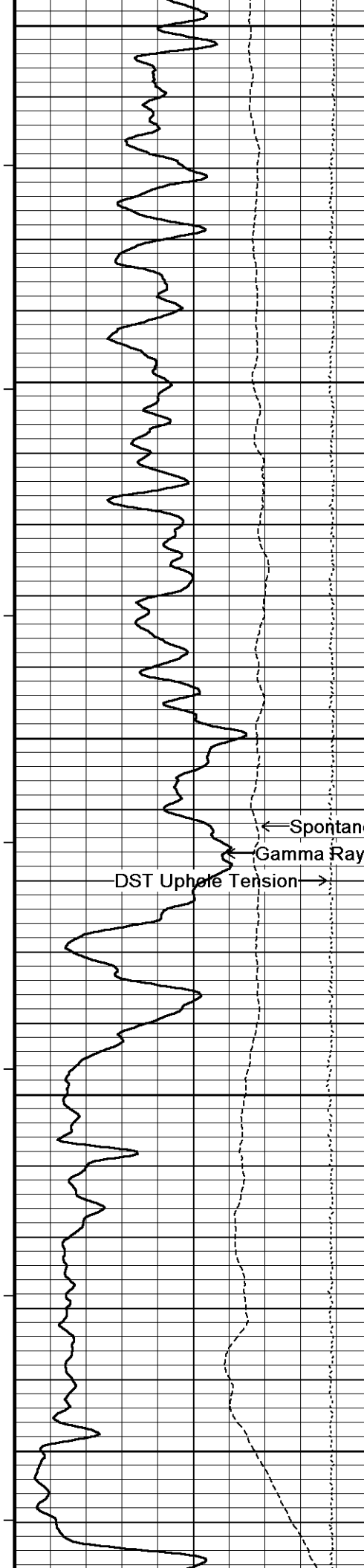
Gamma Ray

DST Uphole Tension

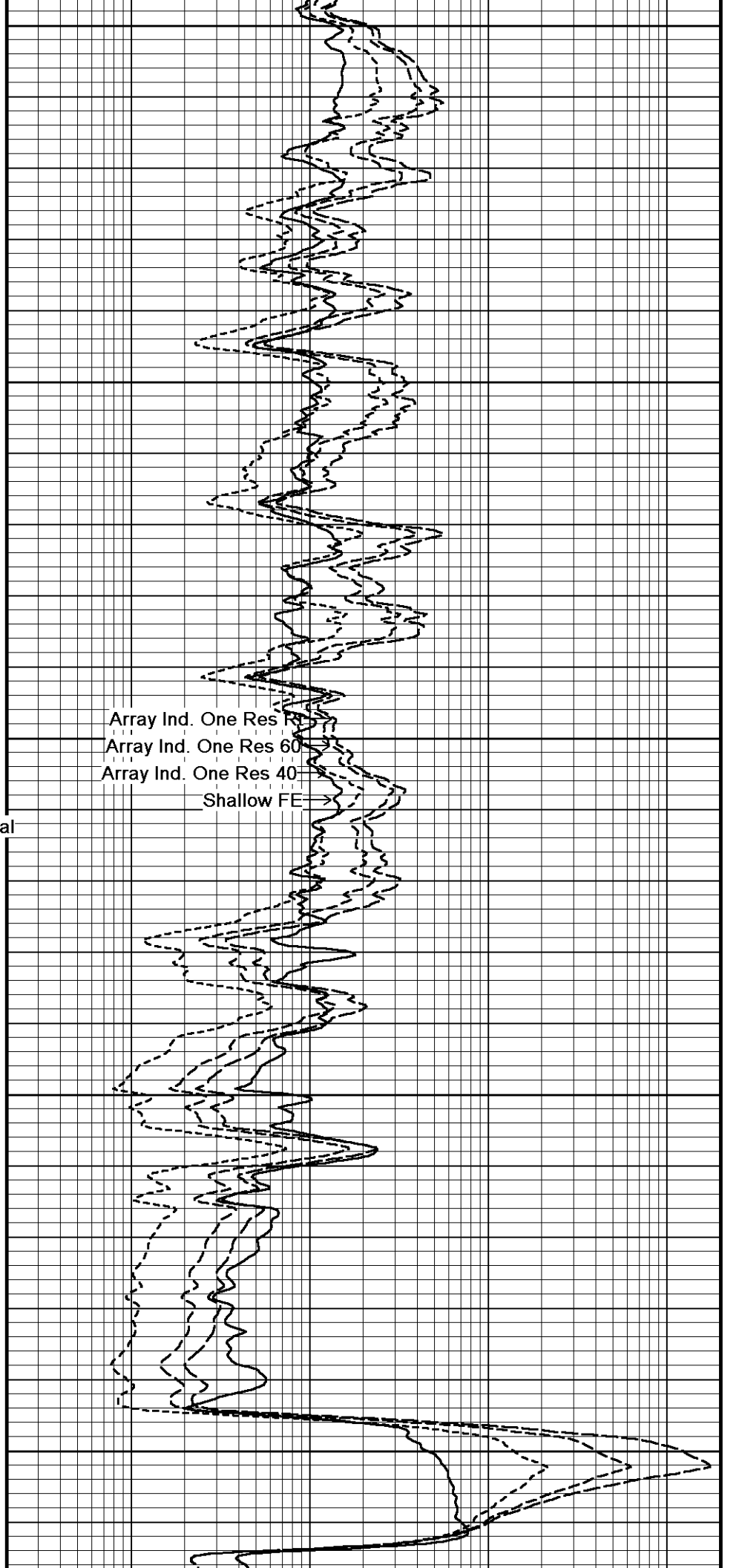




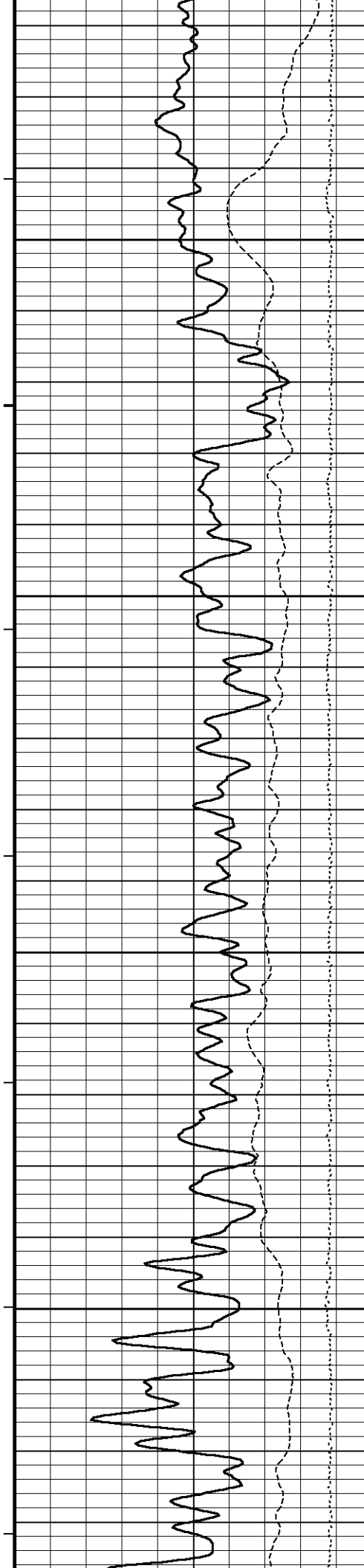




2050
95°
2100
95°
2150
Spontaneous Potential
Gamma Ray
DST Uphole Tension
95°
2200
95°
2250



Array Ind. One Res 60
Array Ind. One Res 40
Array Ind. One Res 30
Shallow FE



95°

2300

96°

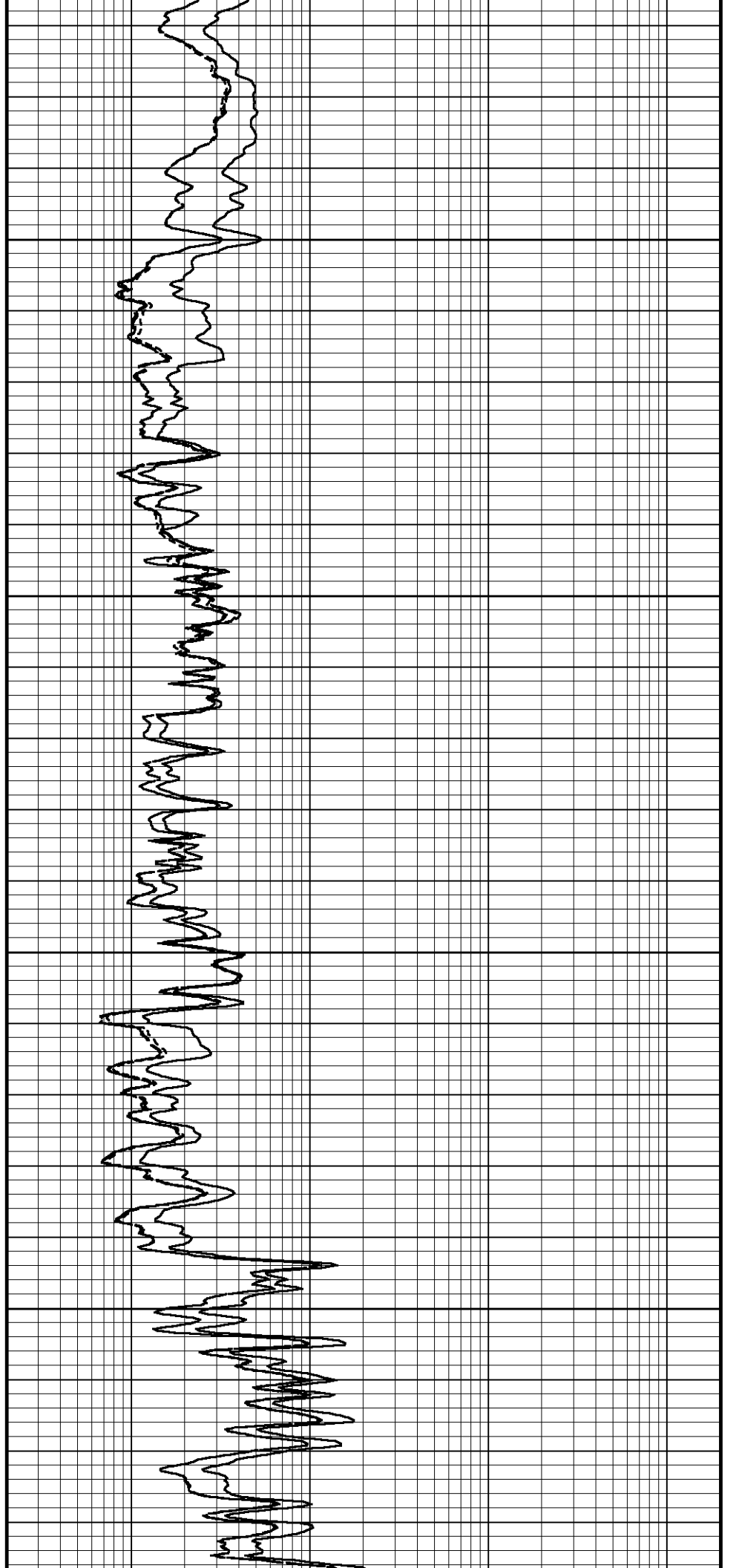
2350

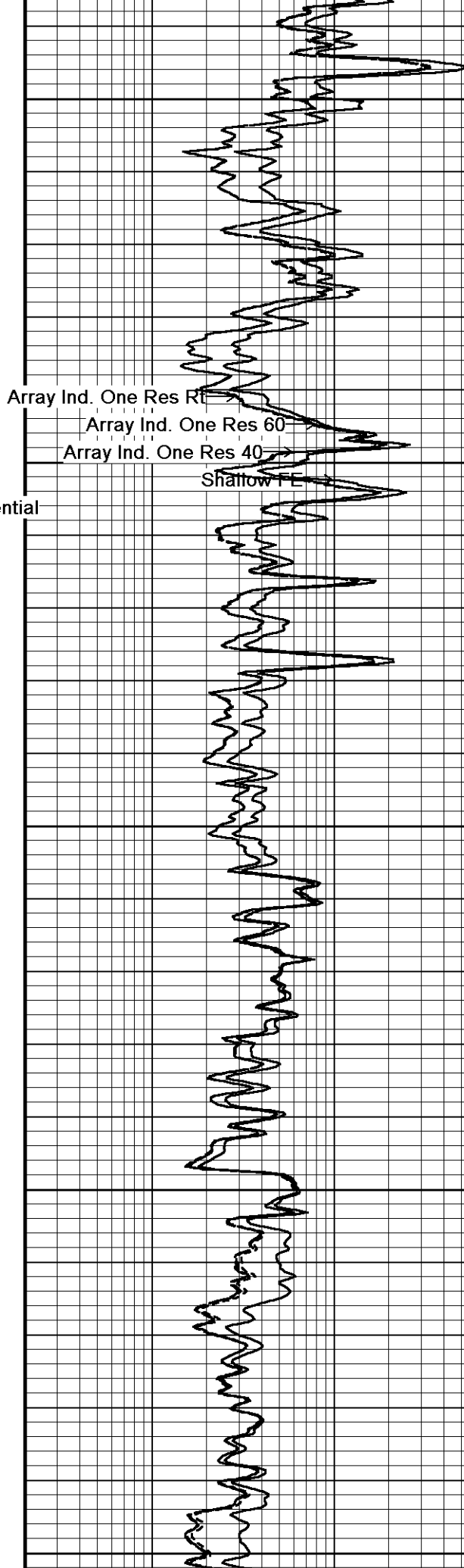
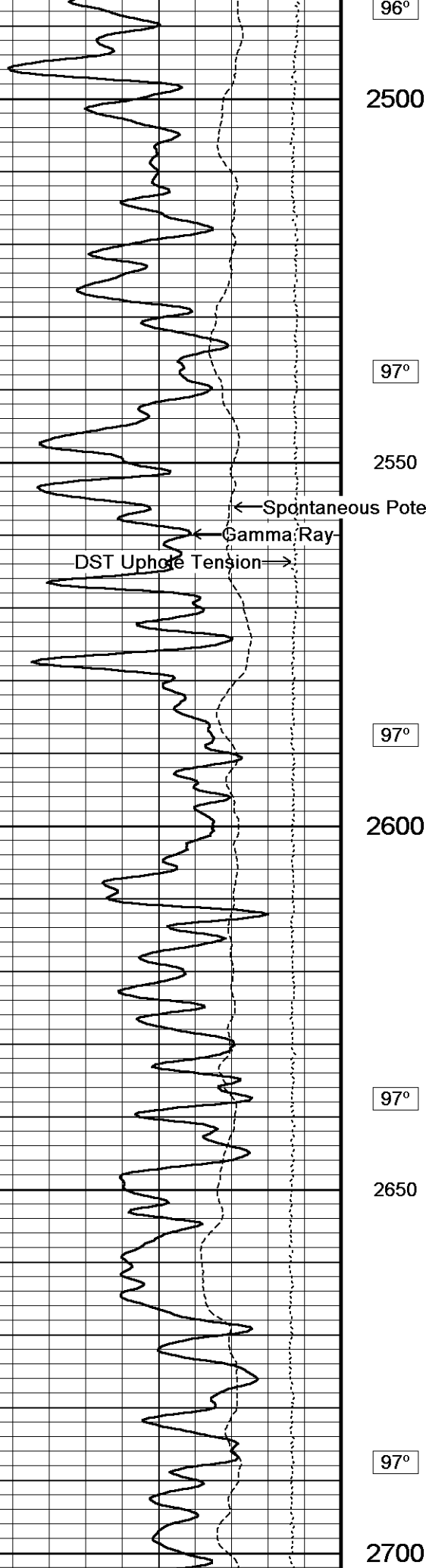
96°

2400

96°

2450

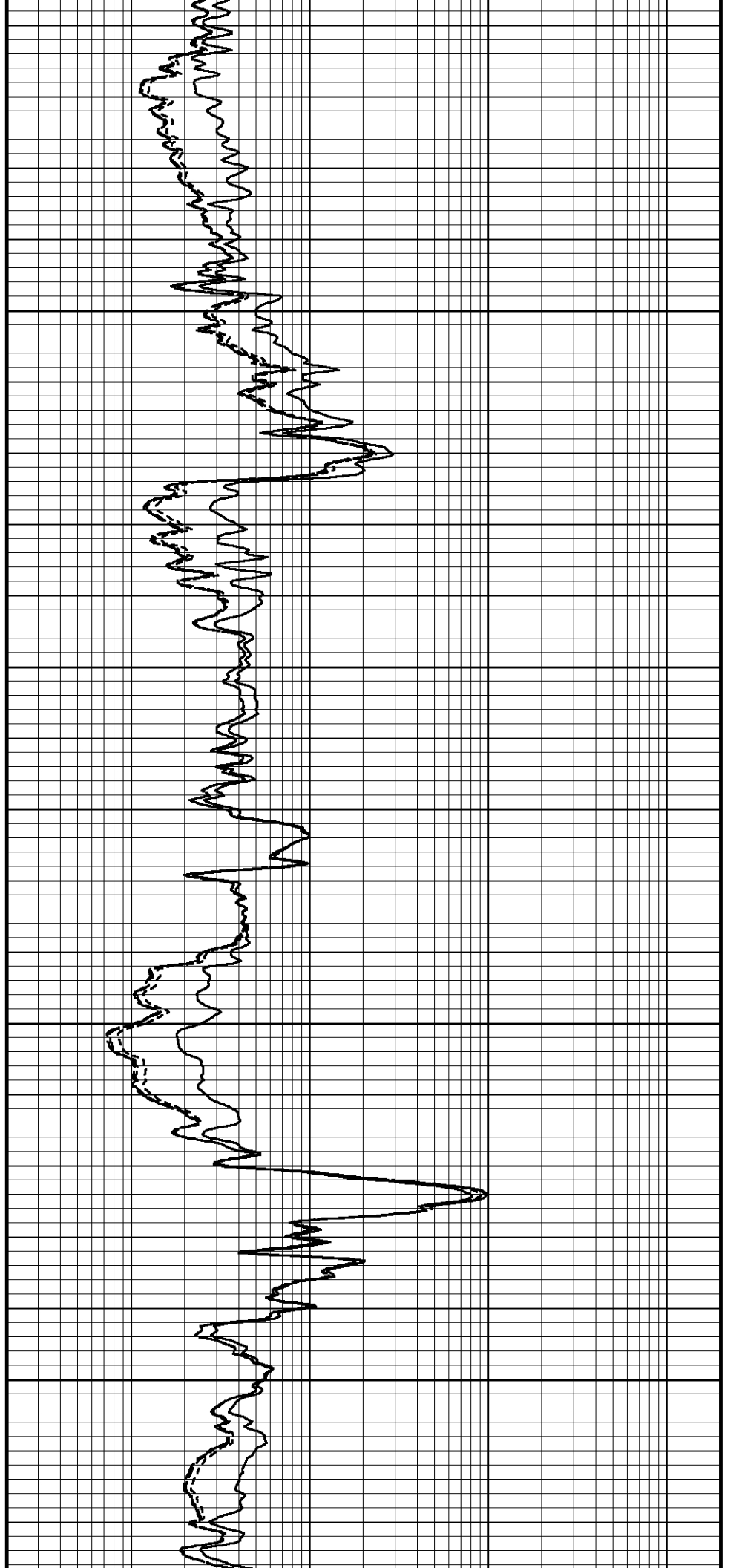
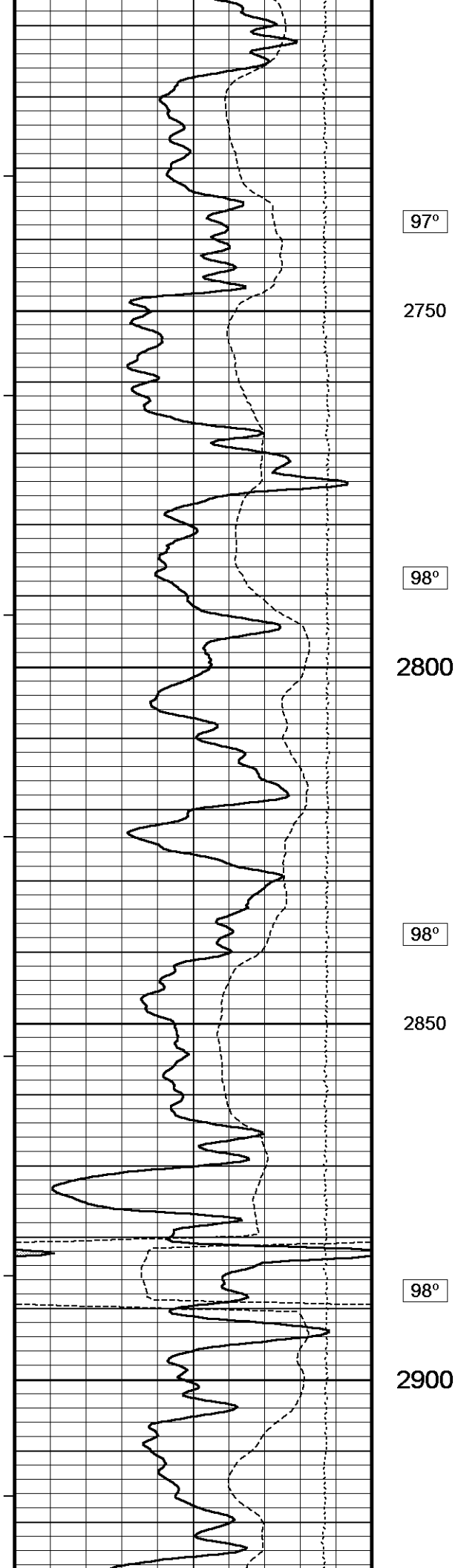


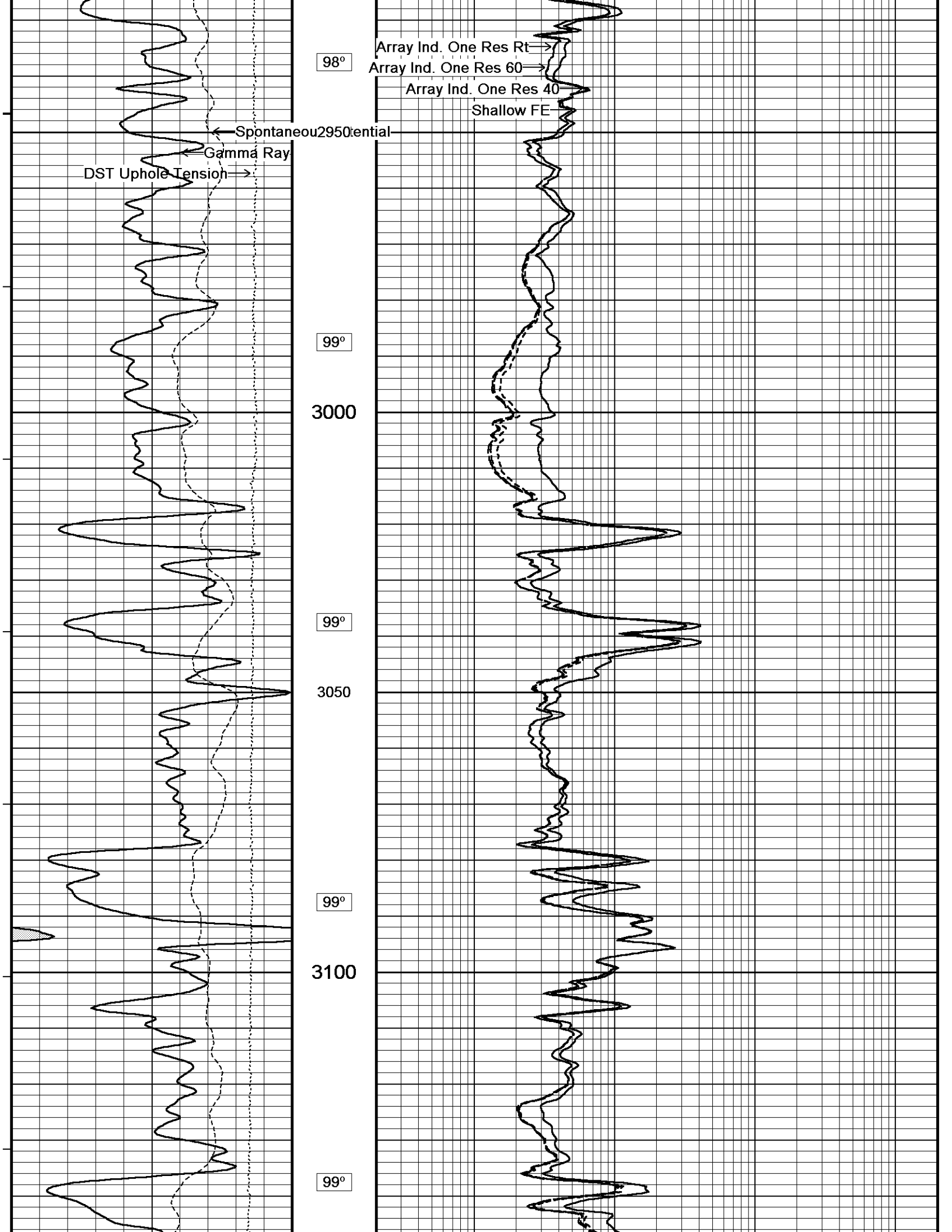


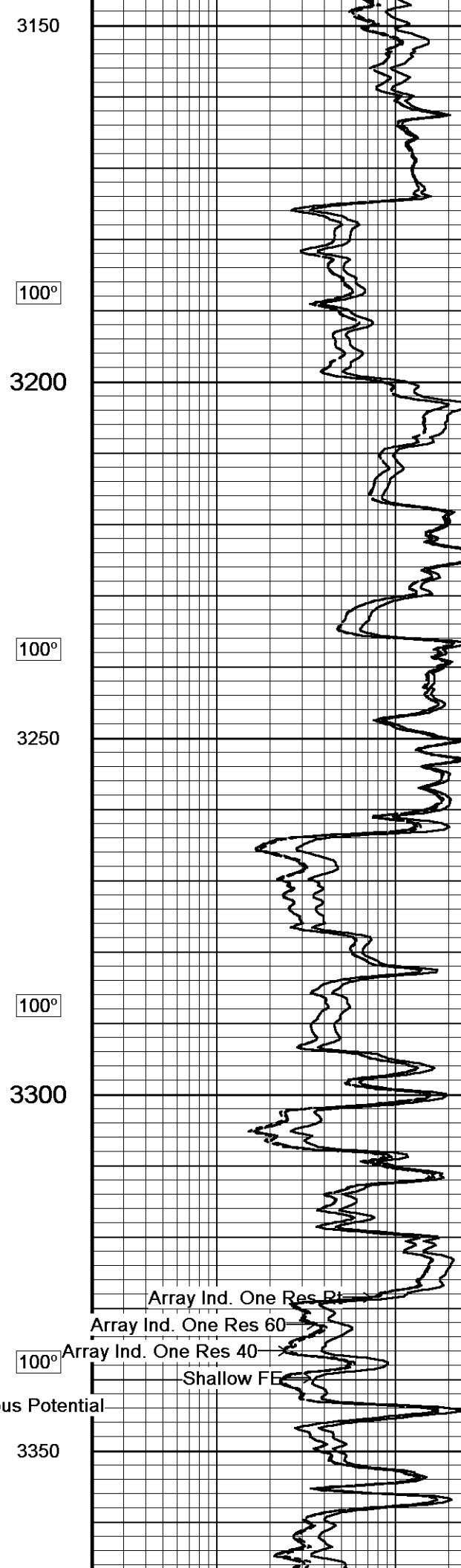
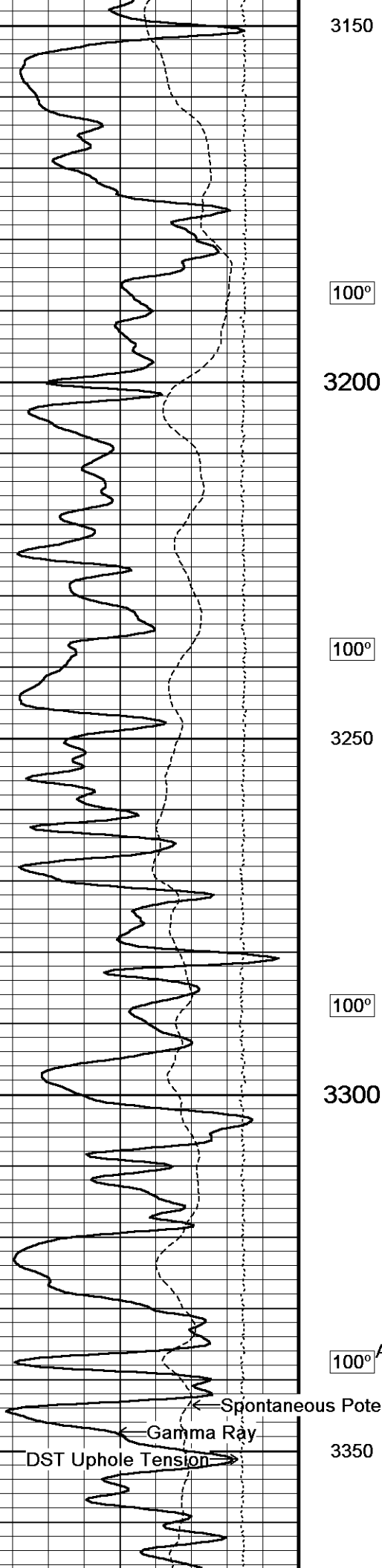
96°
2500
97°
2550
97°
2600
97°
2650
97°
2700

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

← Spontaneous Potential
← Gamma Ray
DST Uphole Tension →







3150

100°

3200

100°

3250

100°

3300

Array Ind. One Res Pt

Array Ind. One Res 60

100° Array Ind. One Res 40

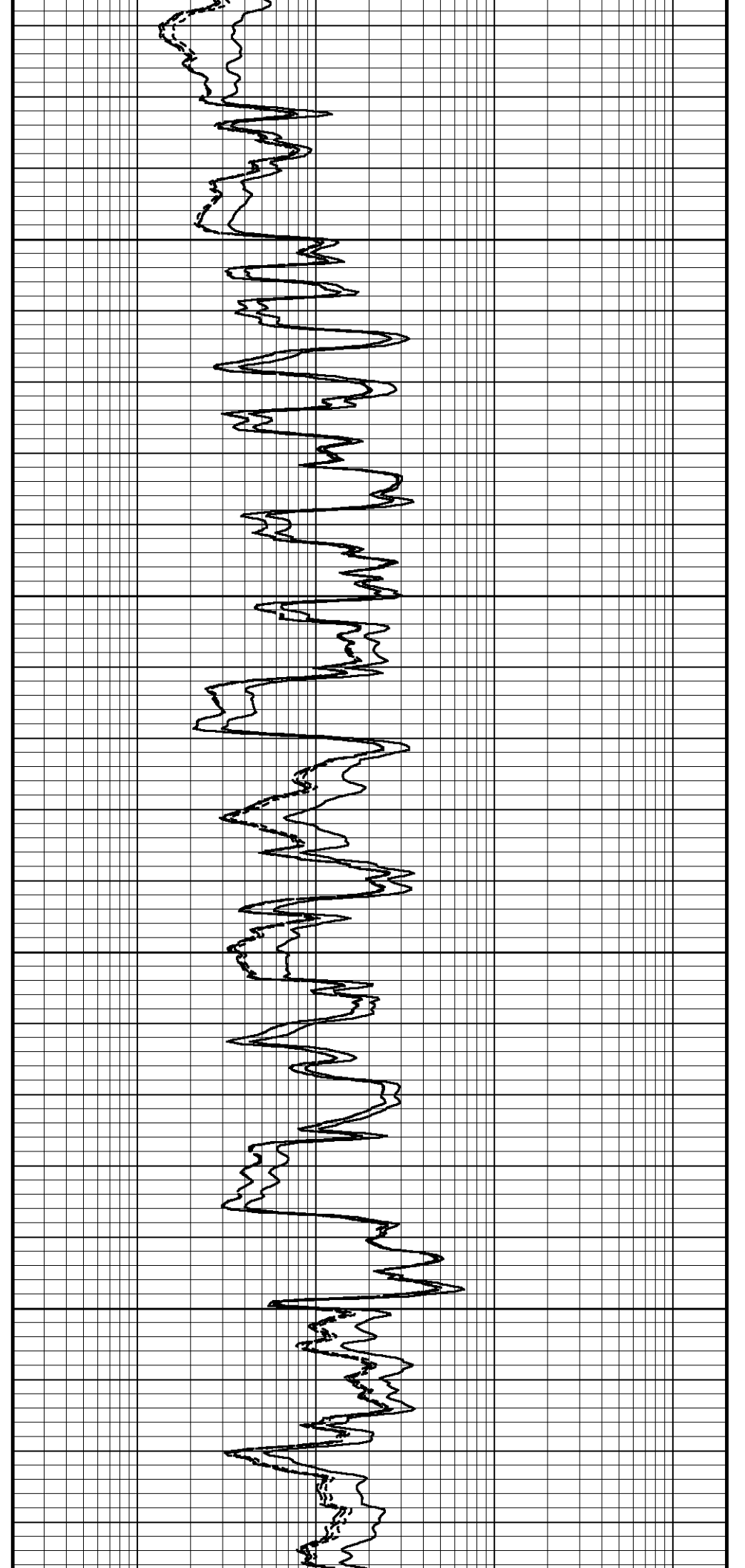
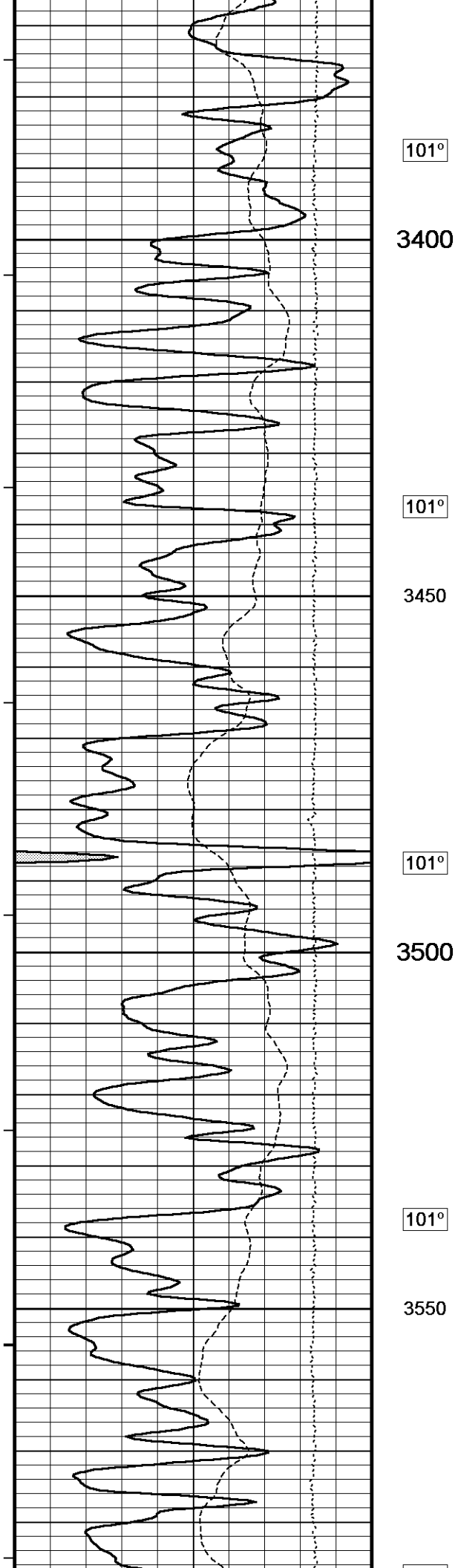
Shallow FE

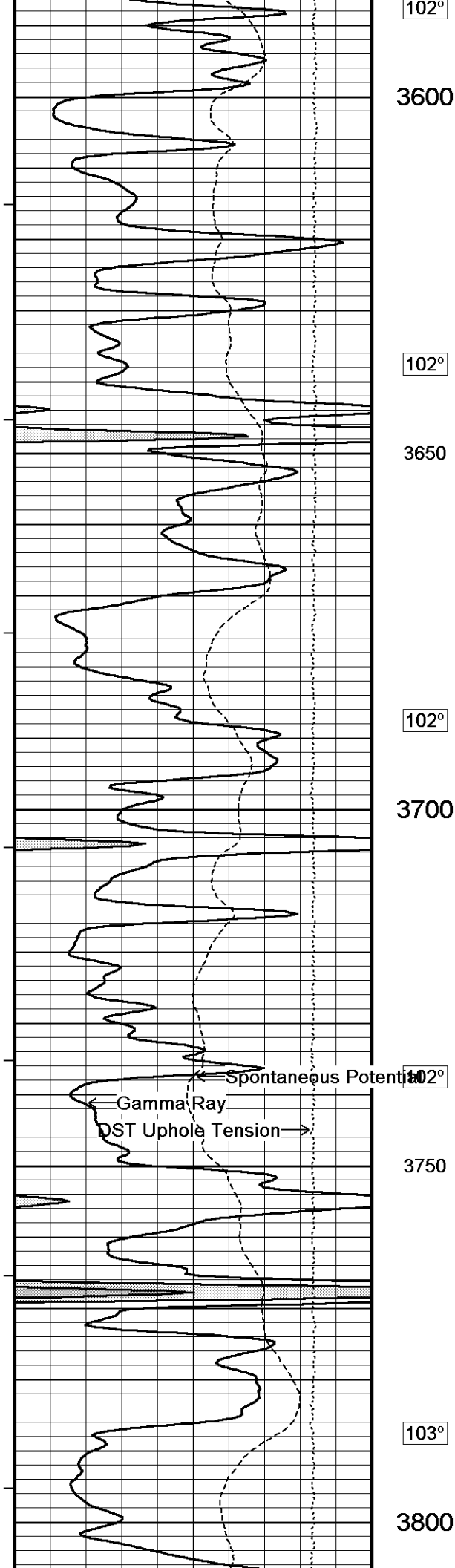
← Spontaneous Potential

← Gamma Ray

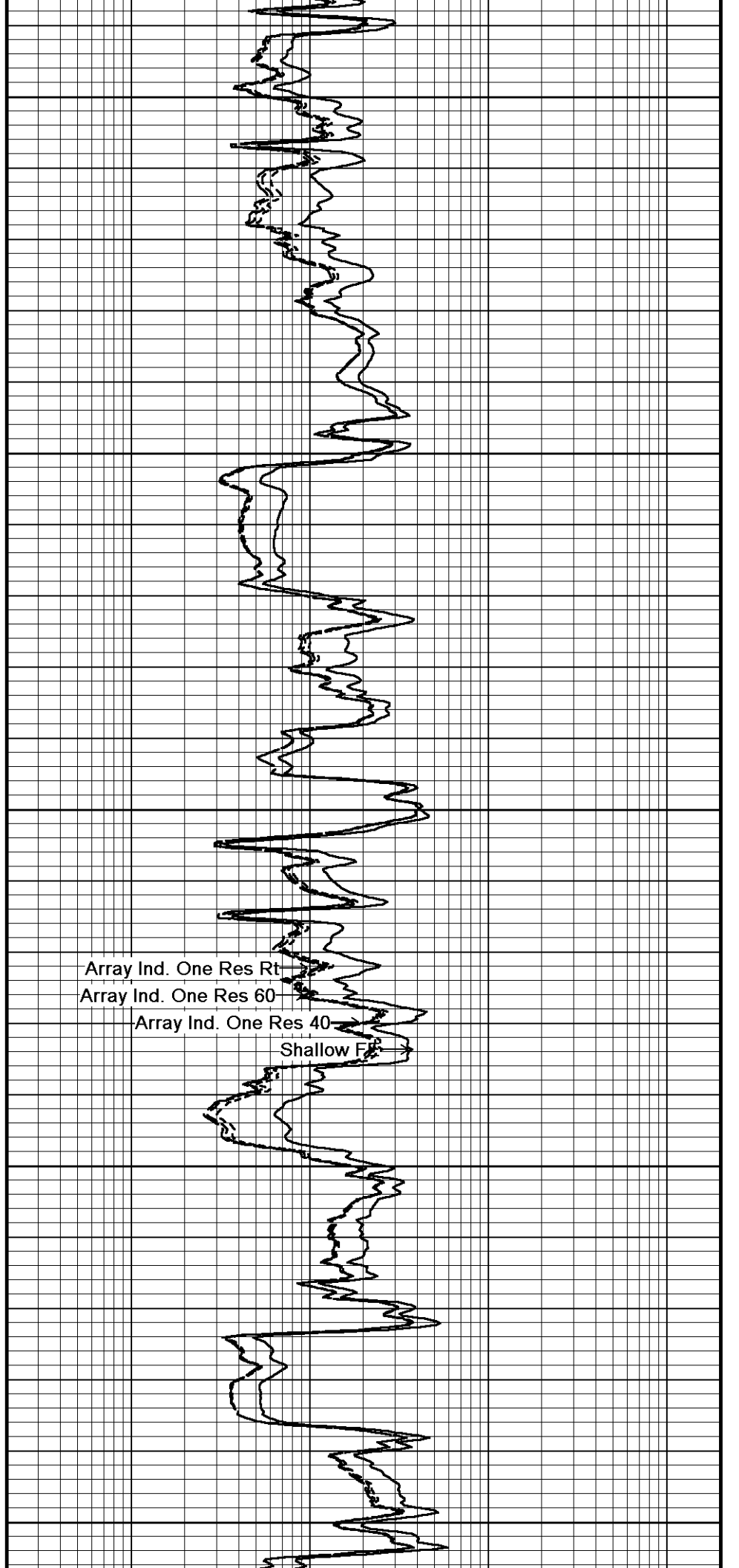
→ DST Uphole Tension

3350

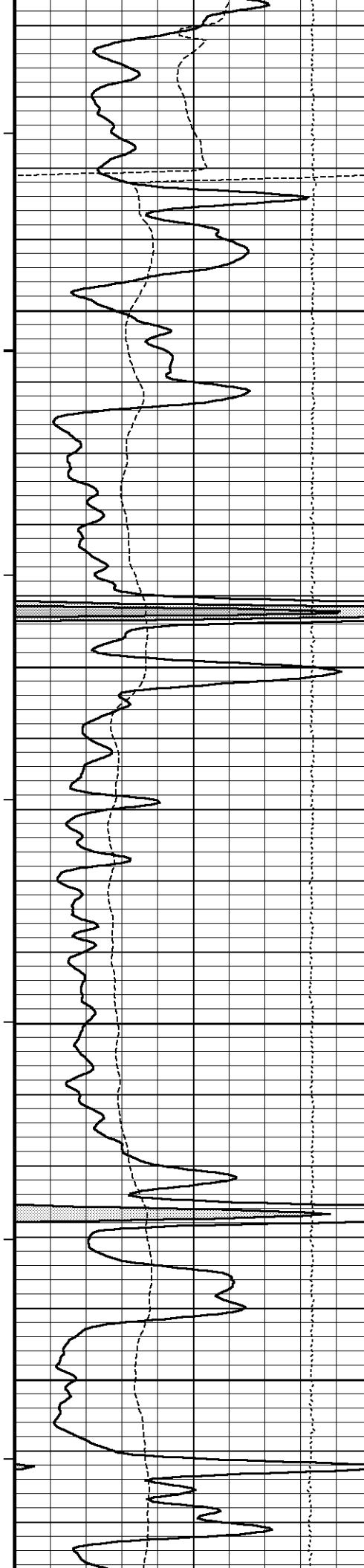




102°
3600
102°
3650
102°
3700
102°
3750
103°
3800



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



103°

3850

104°

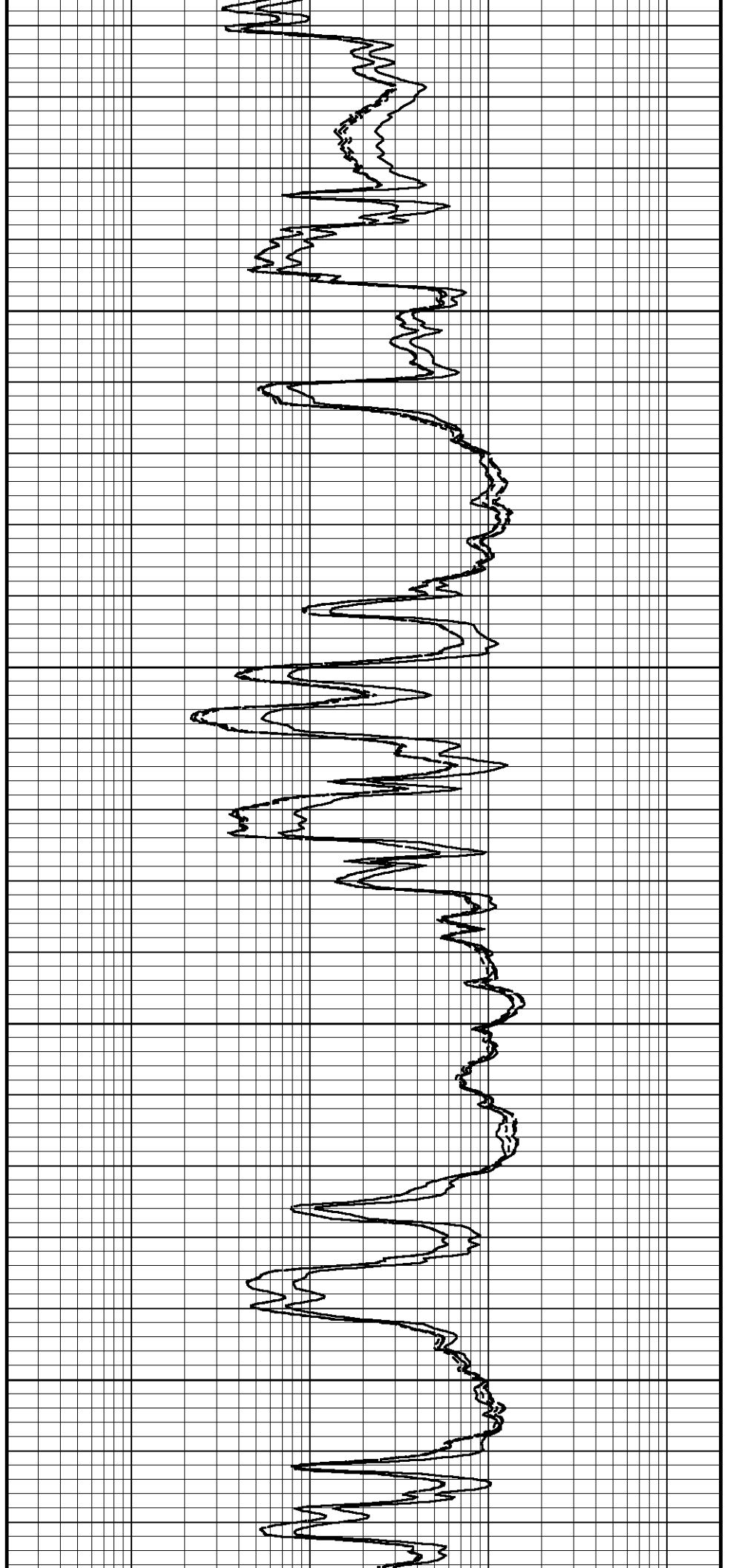
3900

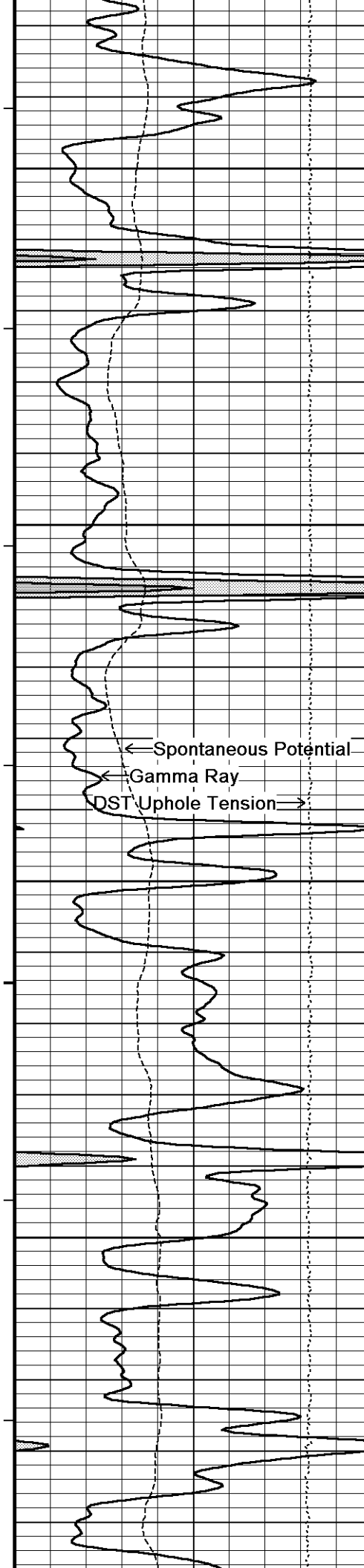
104°

3950

104°

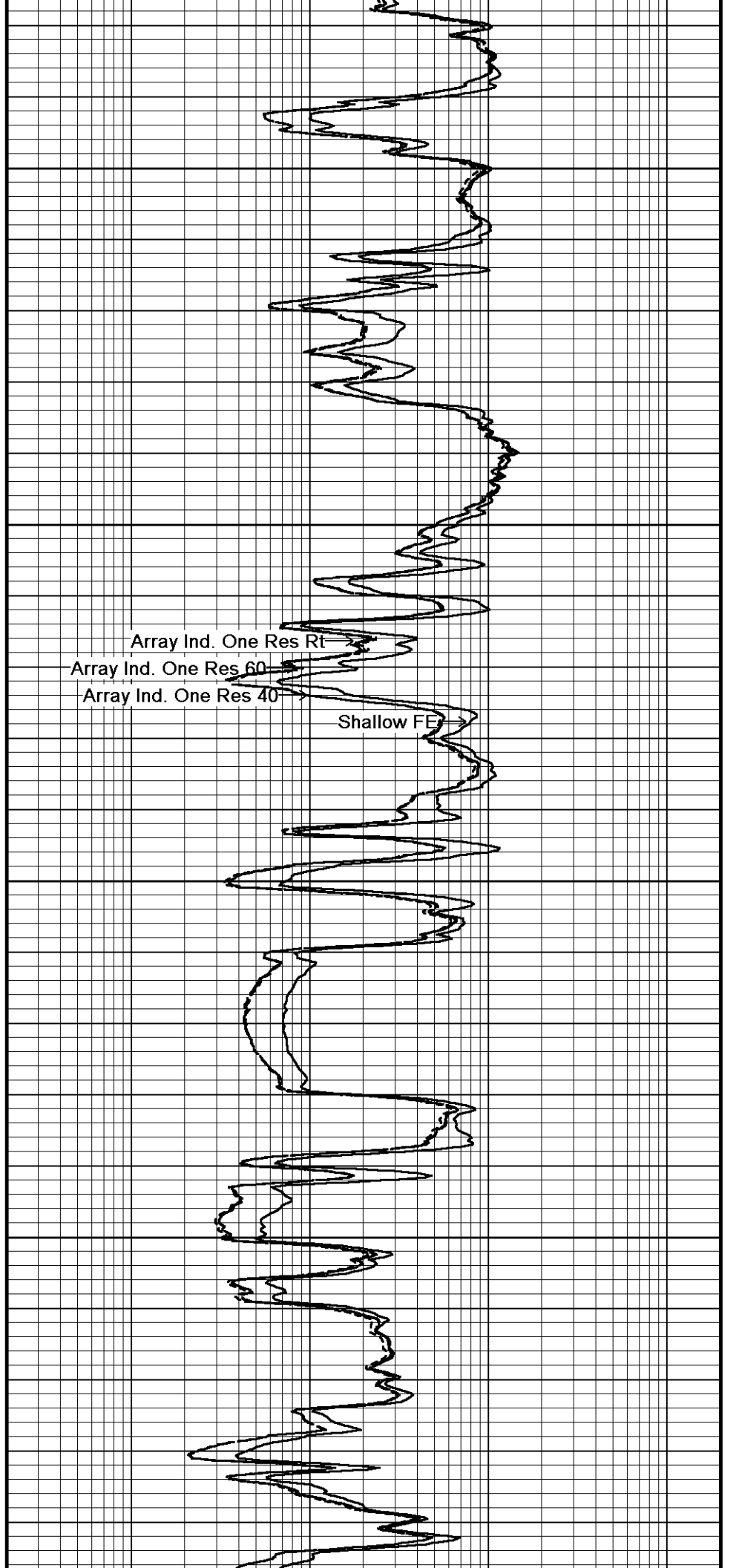
4000



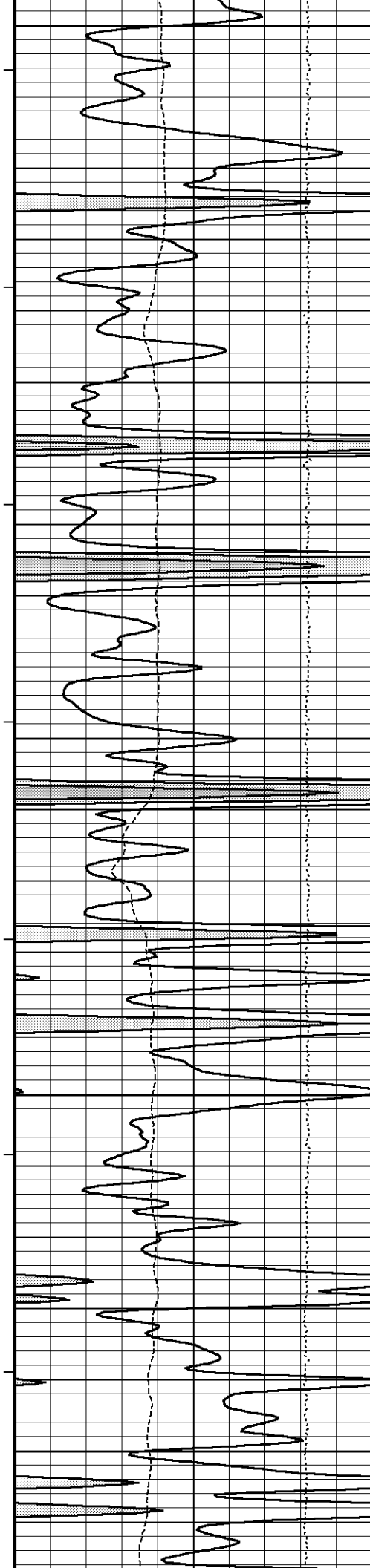


104°
4050
105°
4100
105°
4150
105°
4200
106°

← Spontaneous Potential
← Gamma Ray
DST Uphole Tension →



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



4250

107°

4300

107°

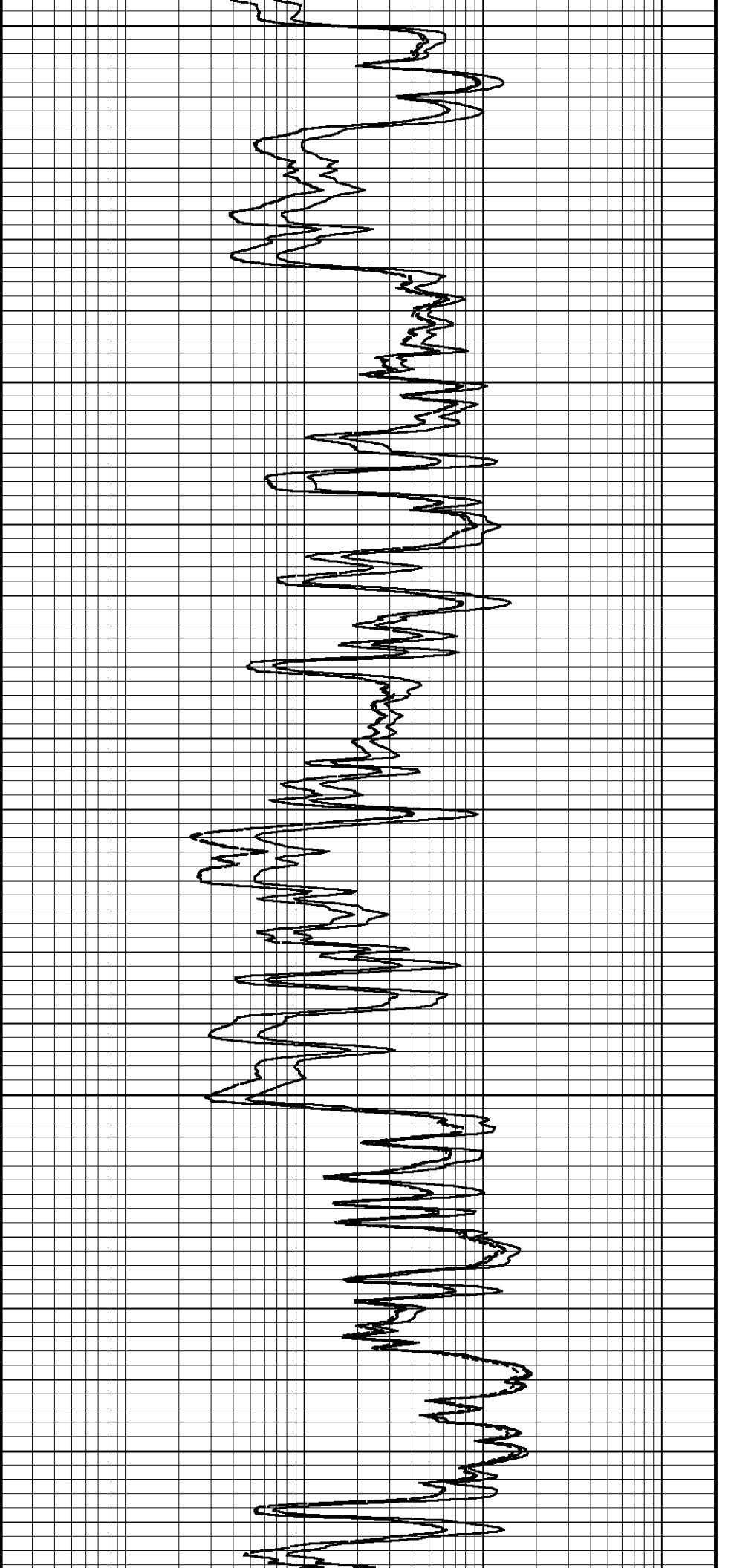
4350

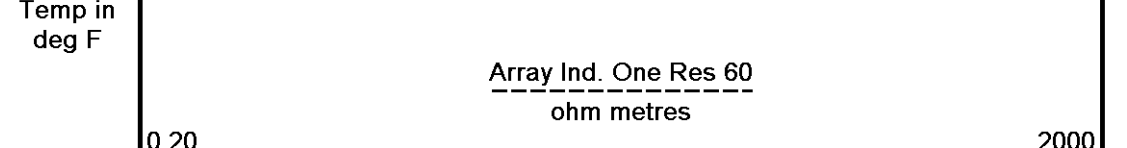
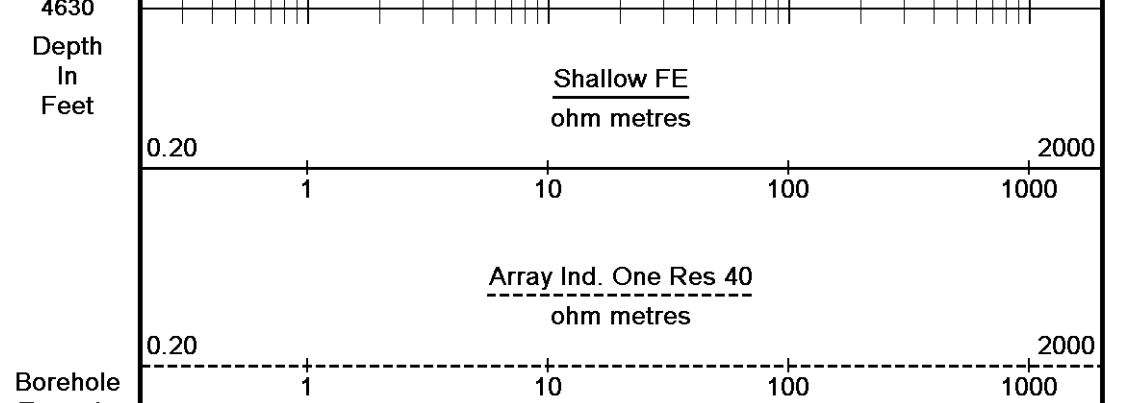
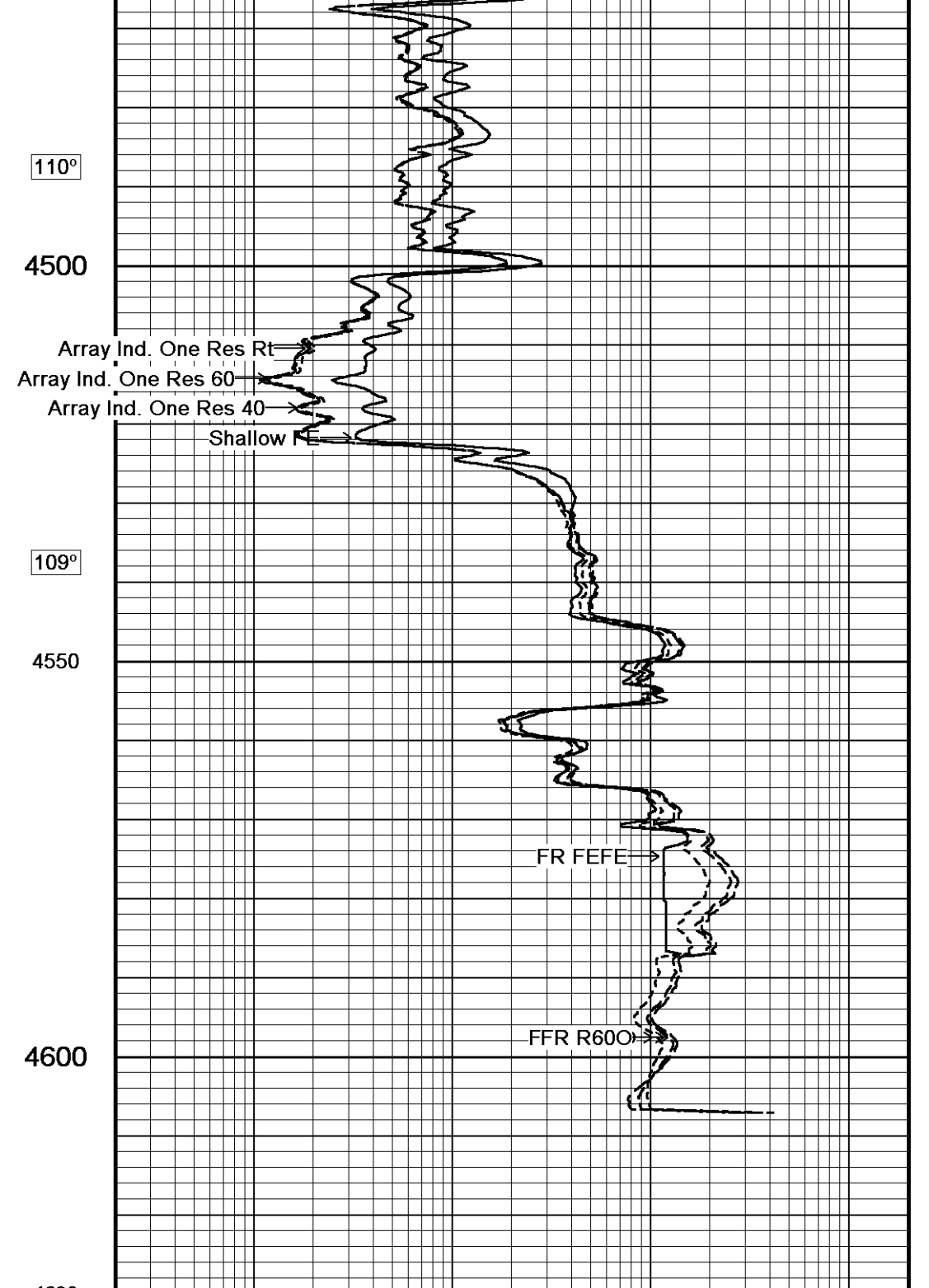
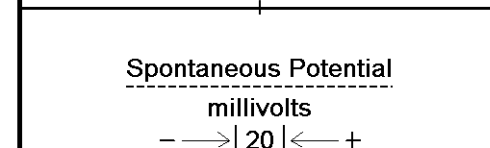
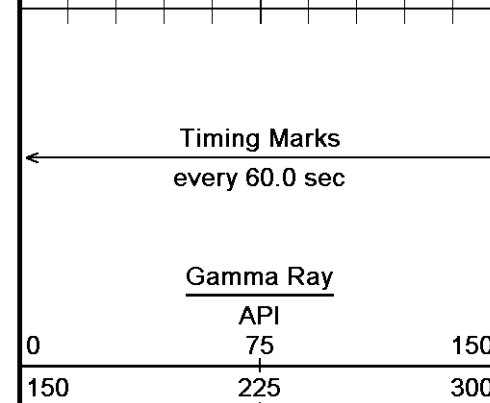
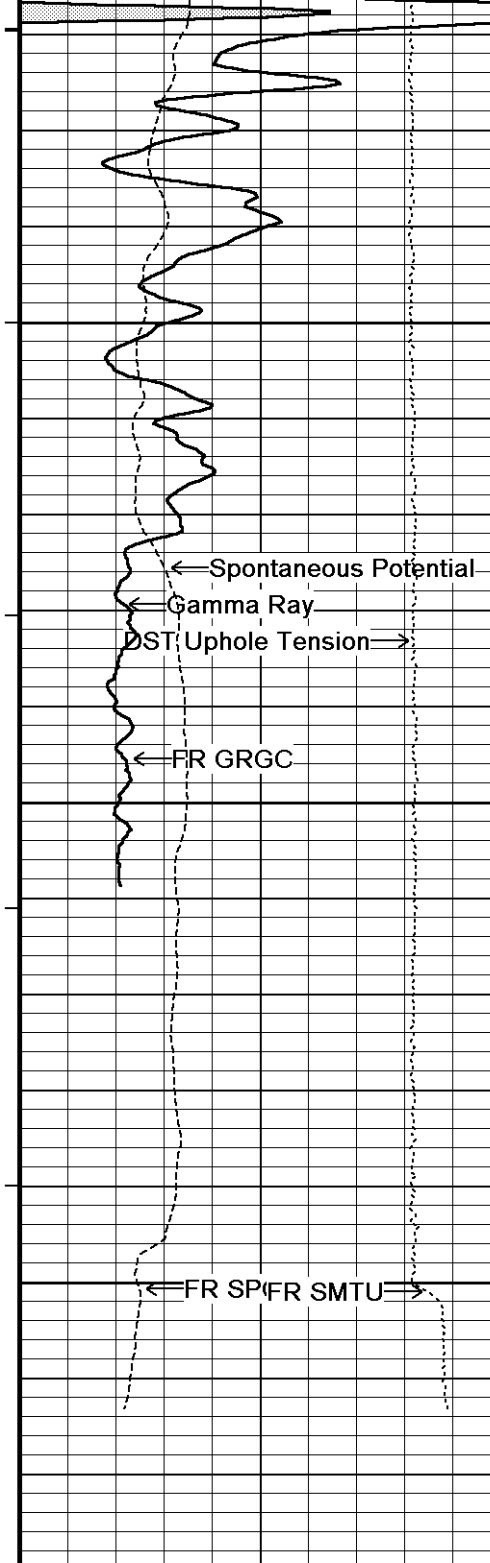
108°

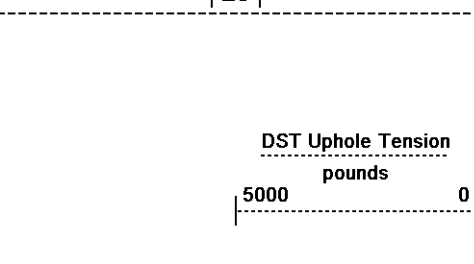
4400

109°

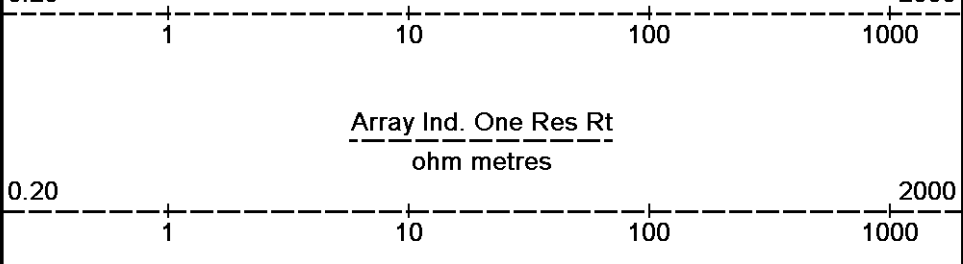
4450







Replay
Scale
1:240

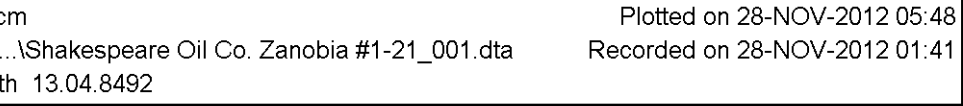


Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 28-NOV-2012 05:48
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil...\Shakespeare Oil Co. Zanobia #1-21_Main.dta
 Recorded on 28-NOV-2012 02:51
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

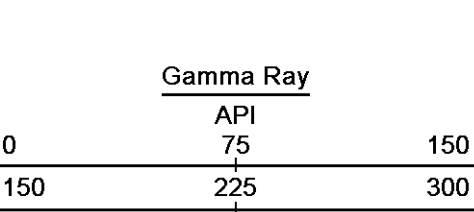


Depth Based Data - Maximum Sampling Increment 2.5cm
 Plotted on 28-NOV-2012 05:48
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil...\Shakespeare Oil Co. Zanobia #1-21_001.dta
 Recorded on 28-NOV-2012 01:41
 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

Replay
Scale
1:120

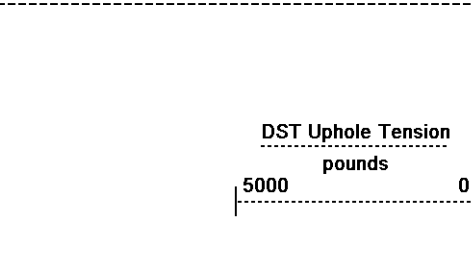


Timing Marks
every 60.0 sec



Spontaneous Potential
millivolts

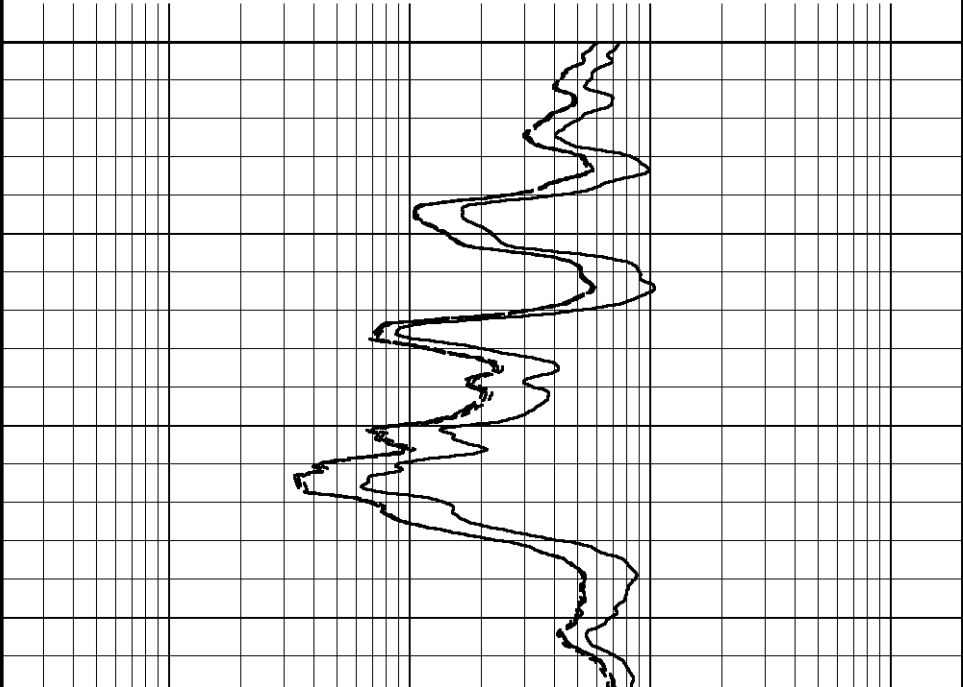
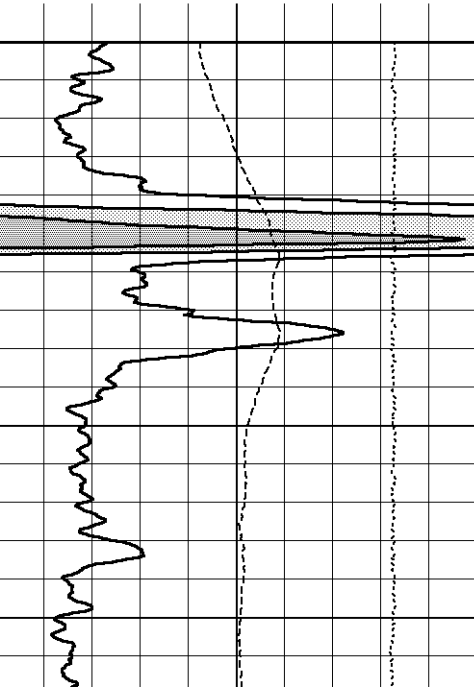
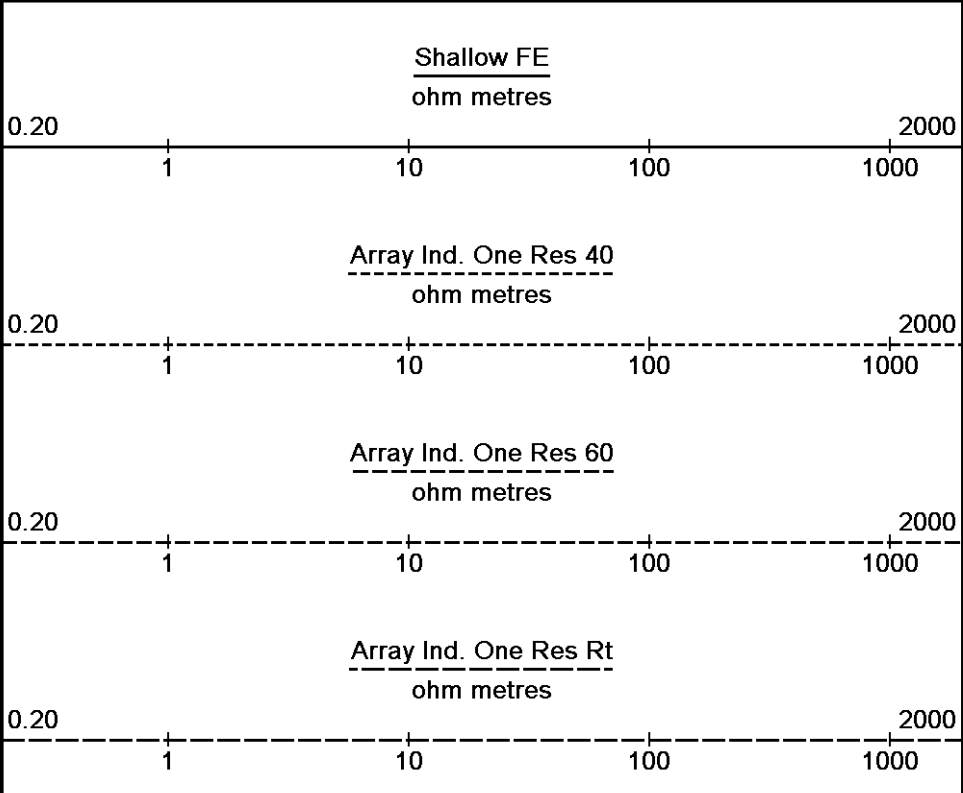
--> | 20 | <-- +

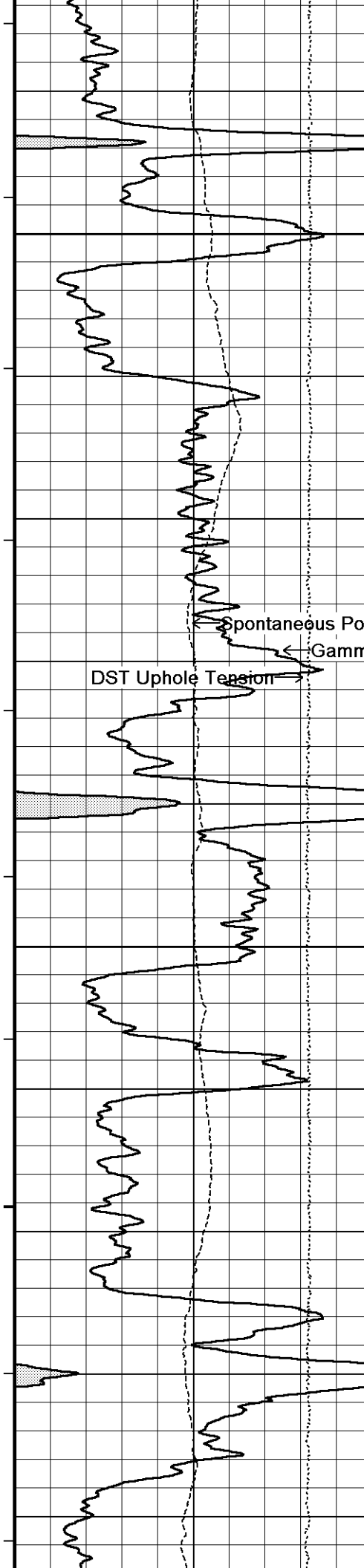


Depth
in
Feet

Borehole
Temp in
deg F

4100





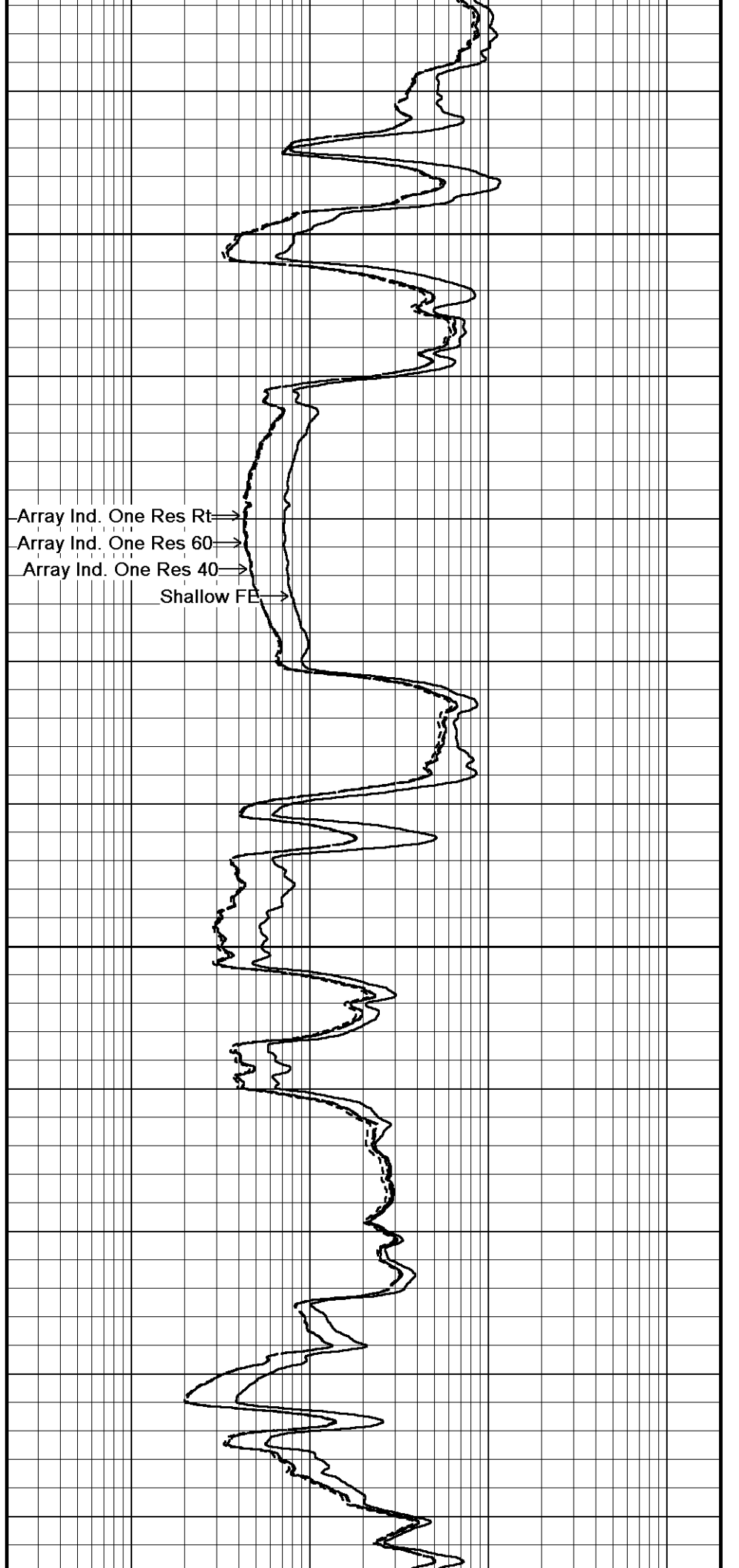
104°

4150

105°

4200

105°

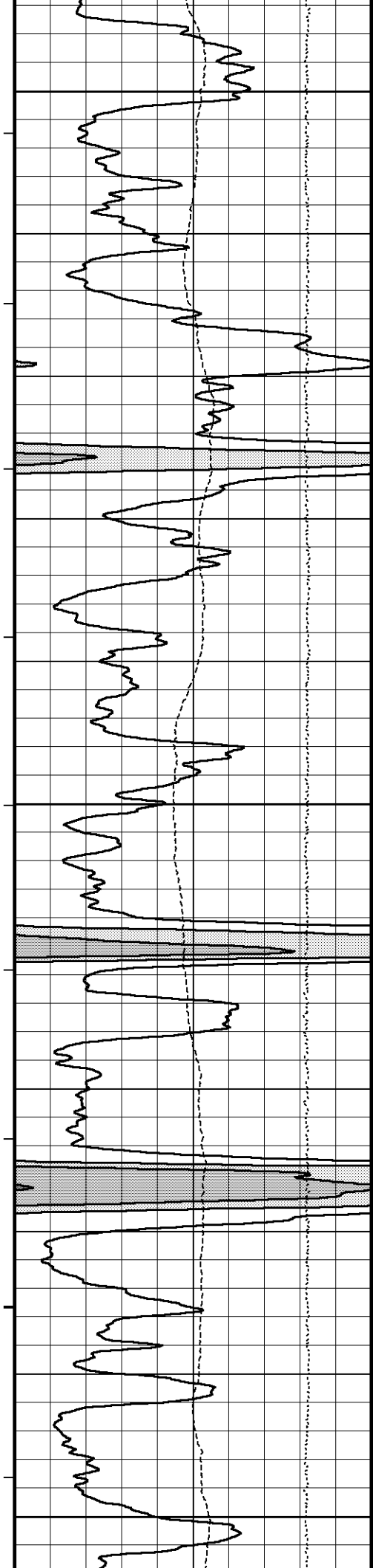


Array Ind. One Res Rt →

Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow FE →



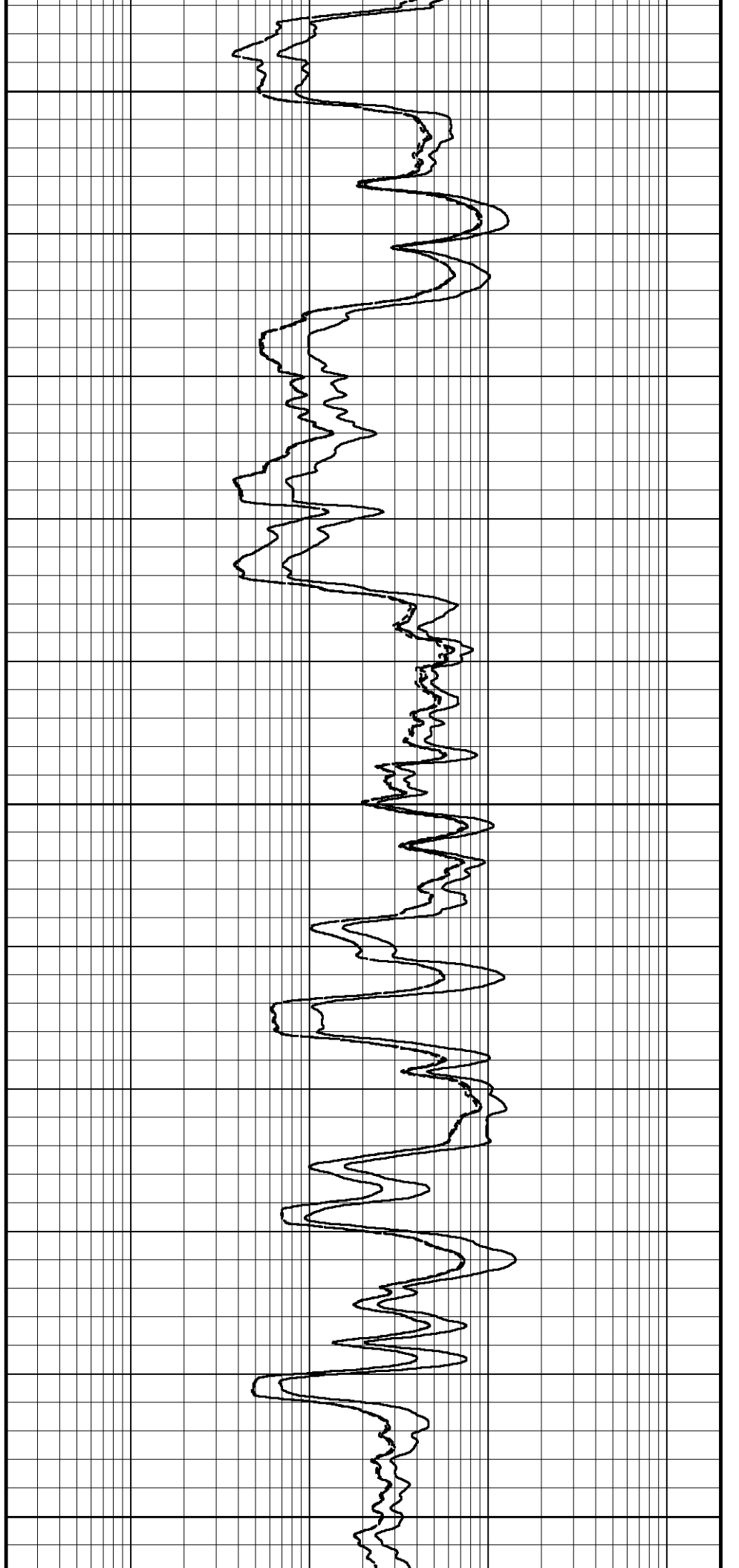
4250

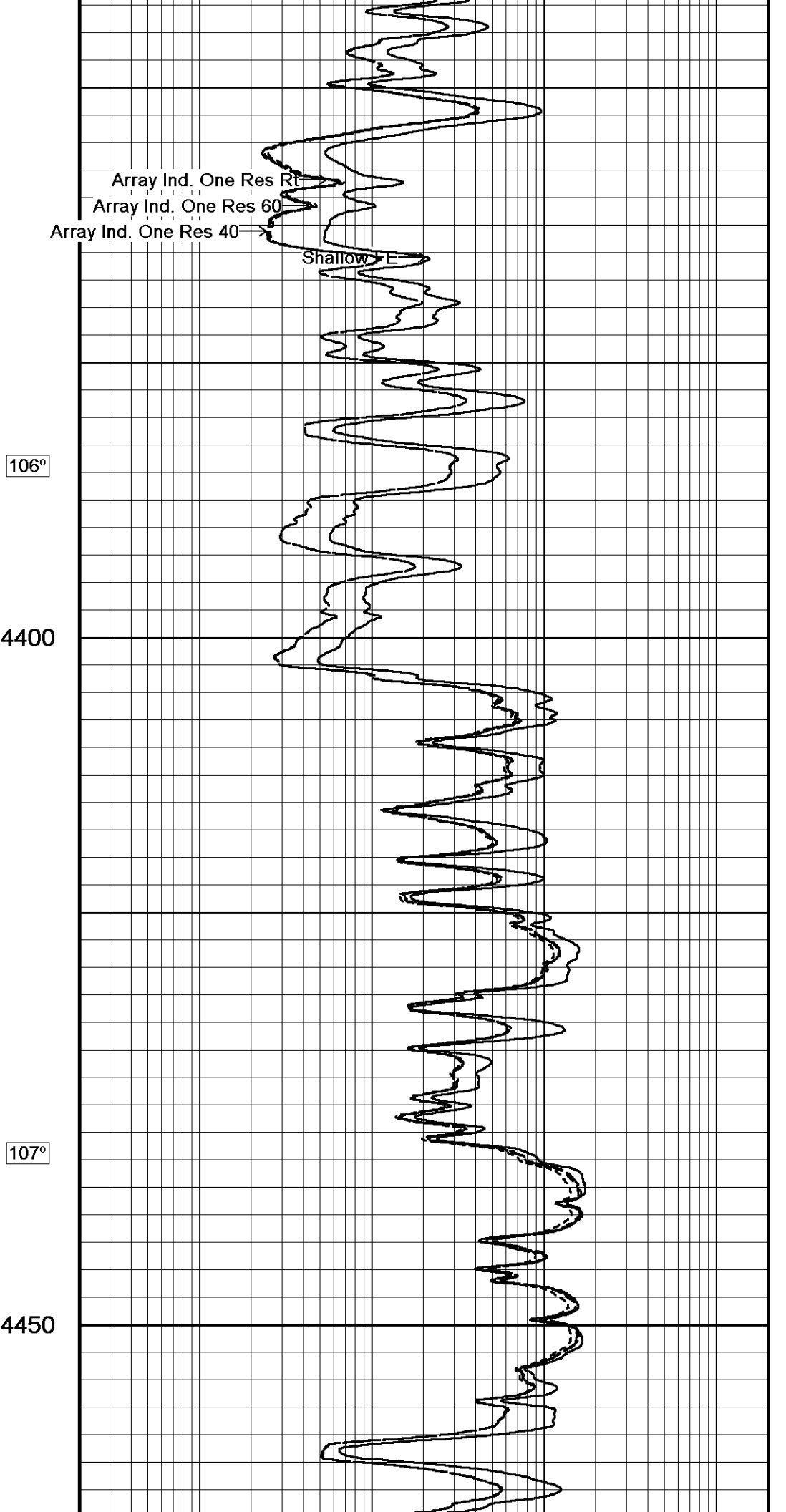
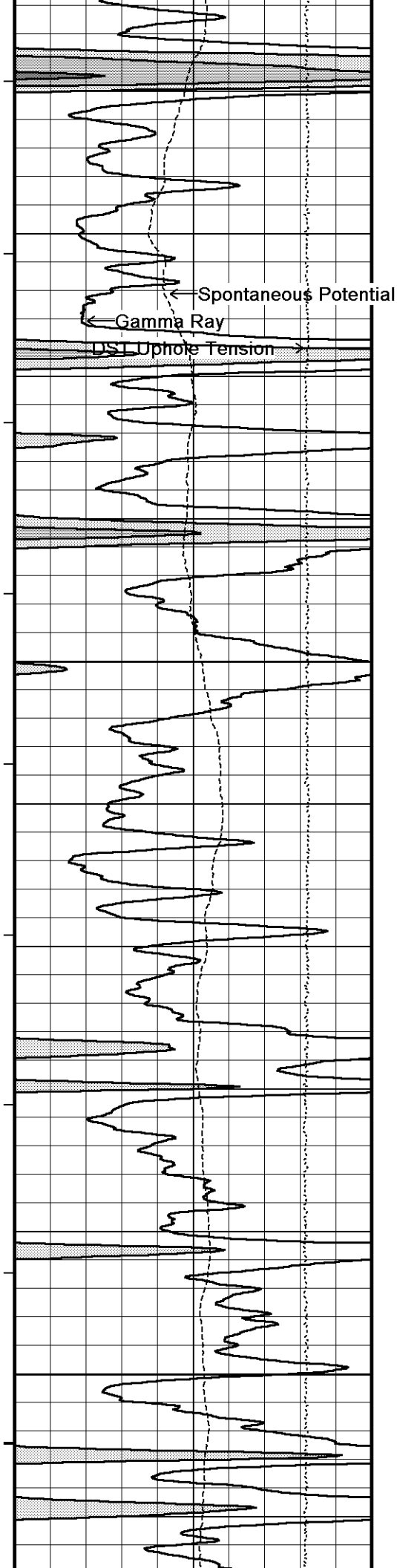
106°

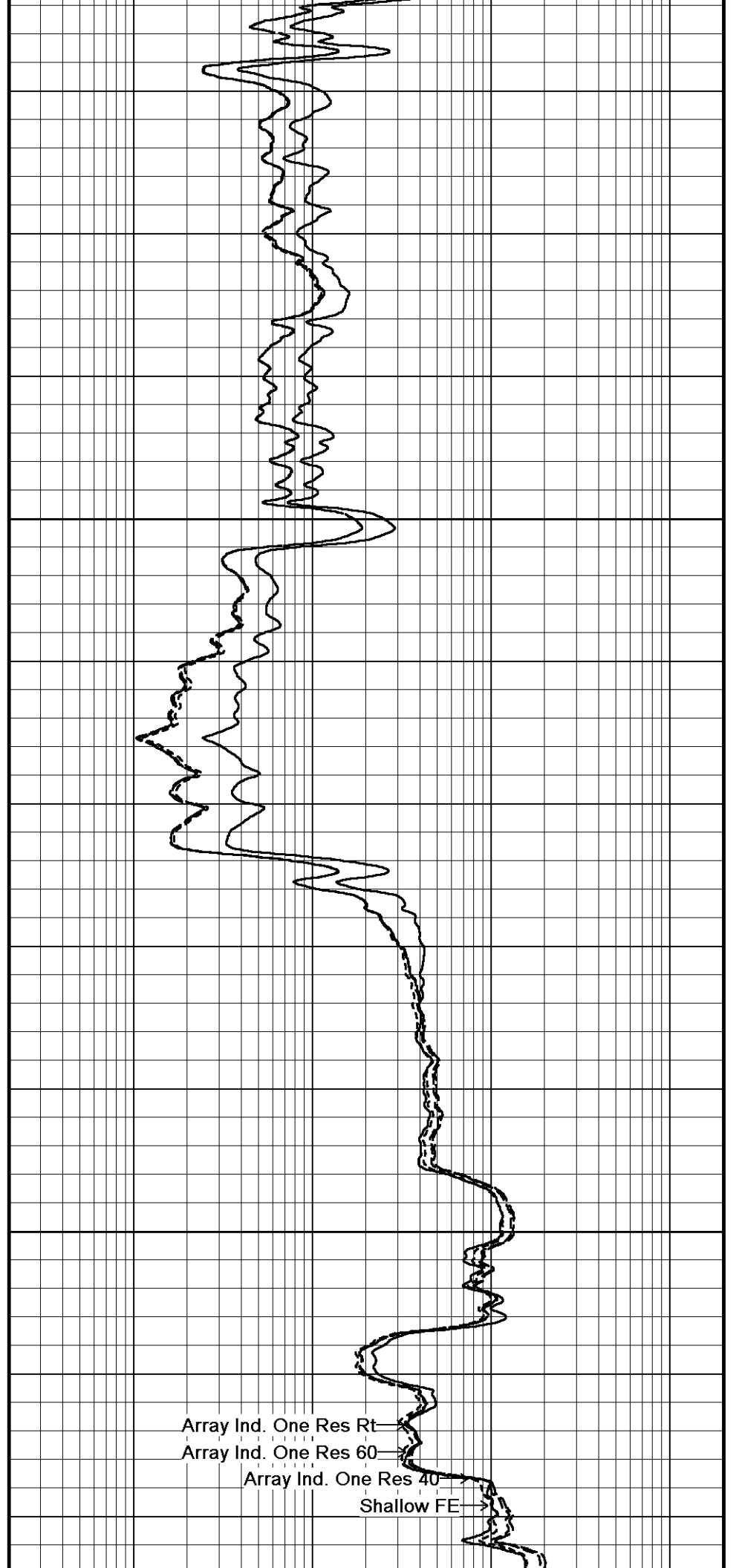
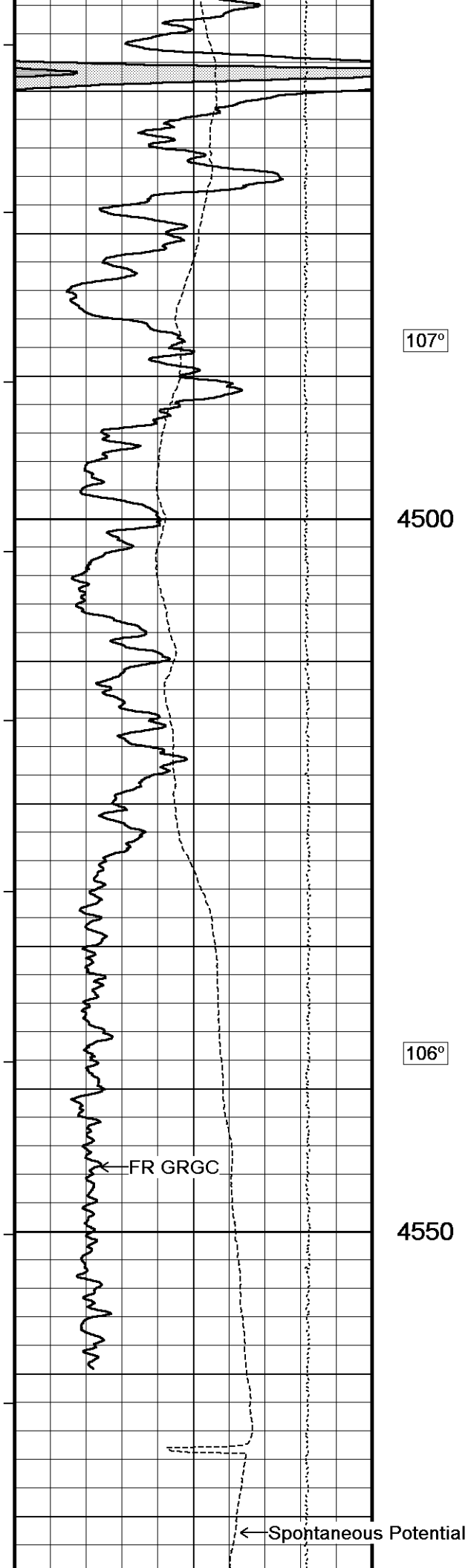
4300

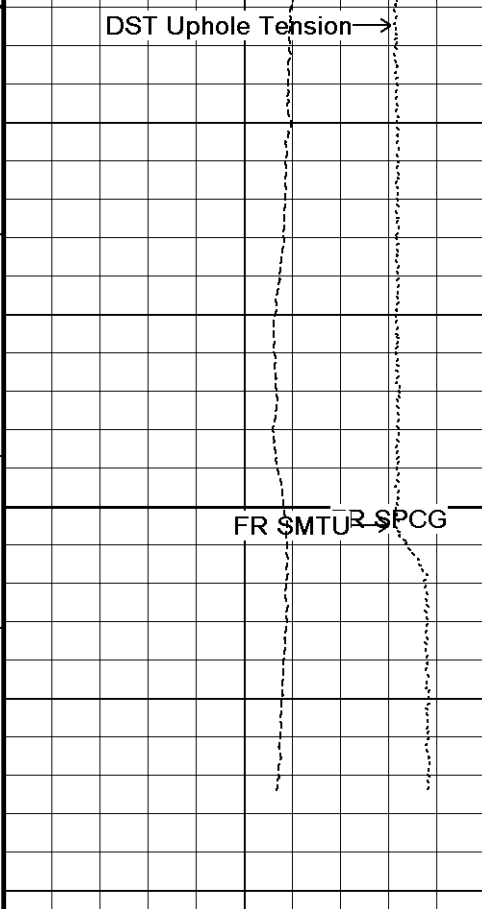
106°

4350









4600

4620
Depth
in
Feet

← Timing Marks
every 60.0 sec

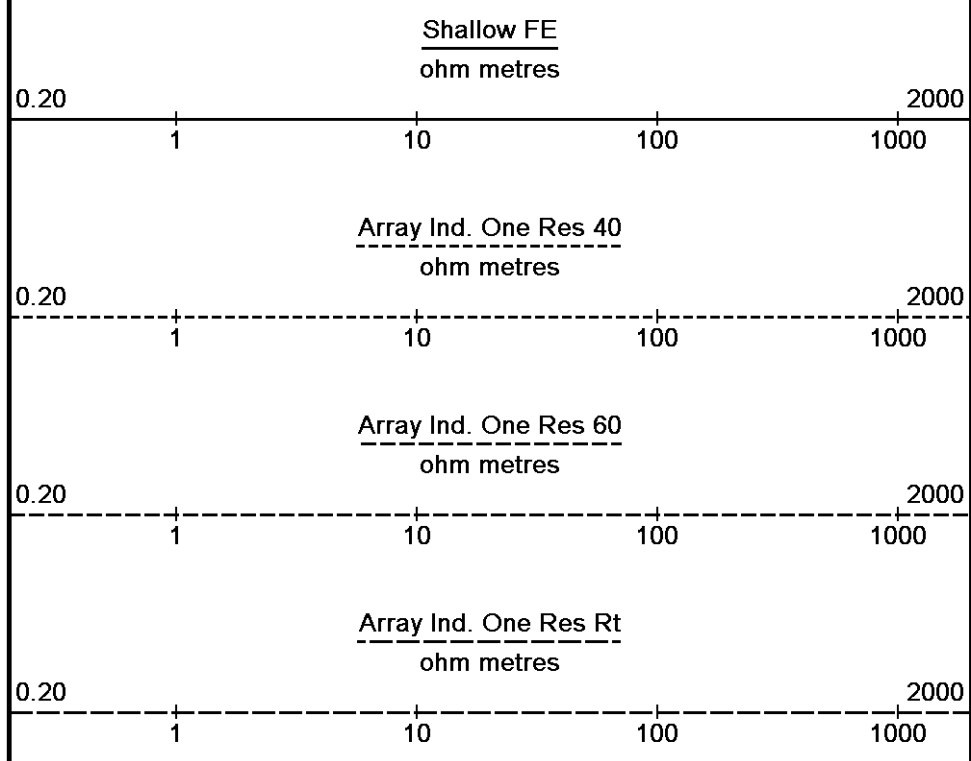
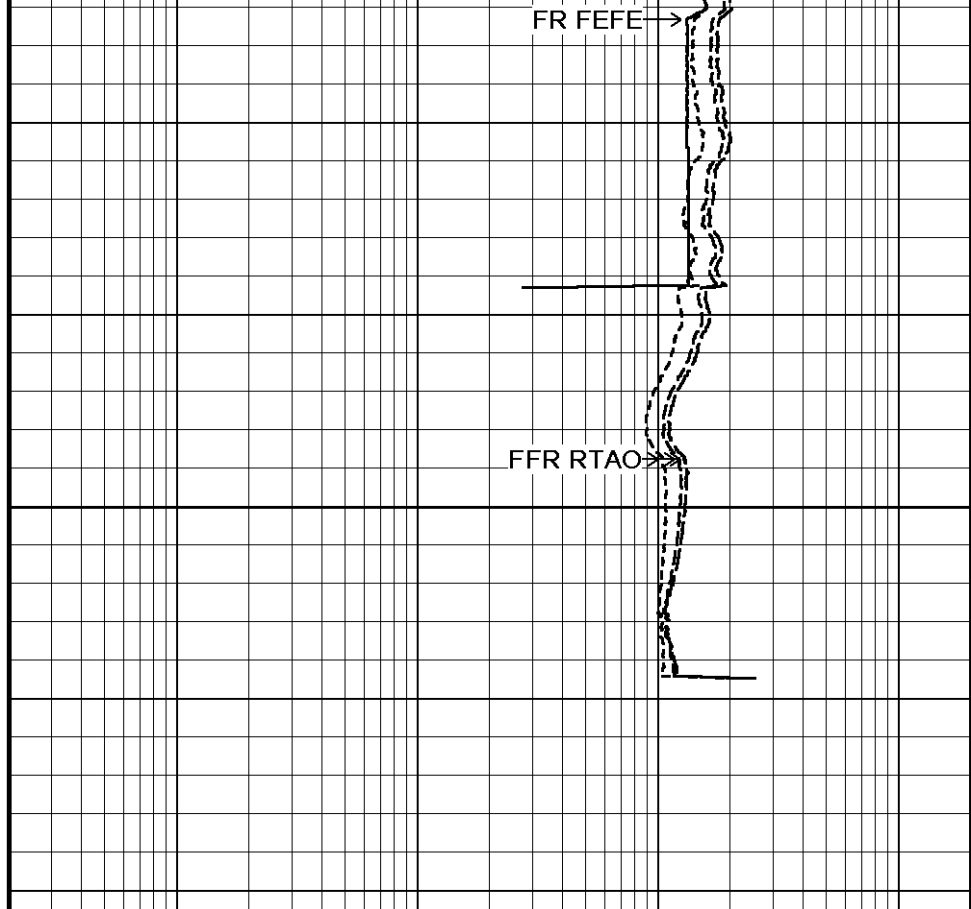
Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
- - -> | 20 | < - +

DST Uphole Tension
pounds
5000 0

Borehole
Temp in
deg F

Replay
Scale
1:120

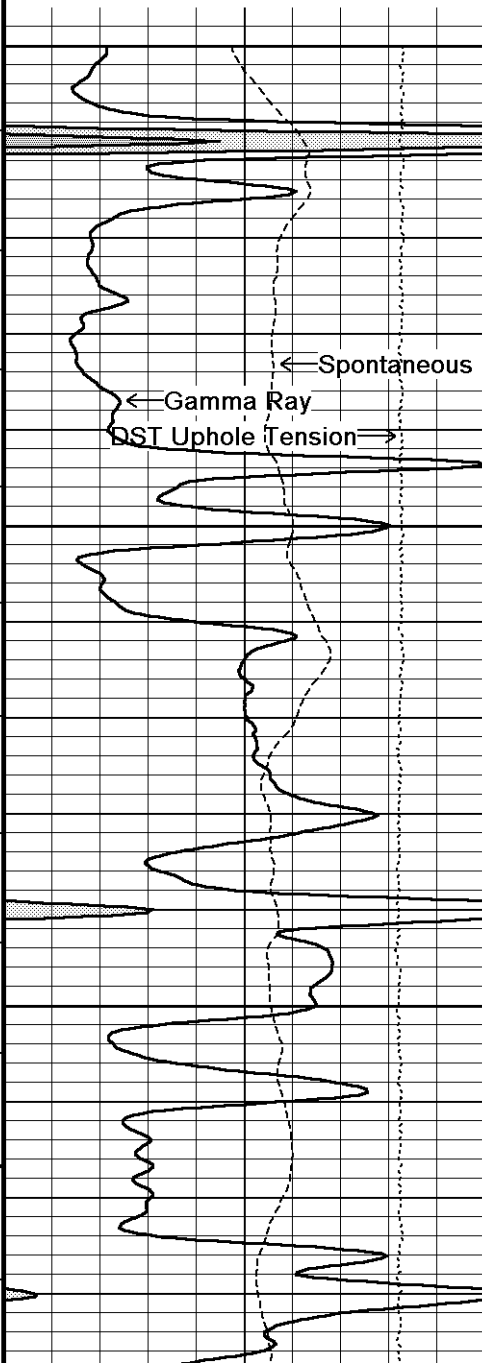
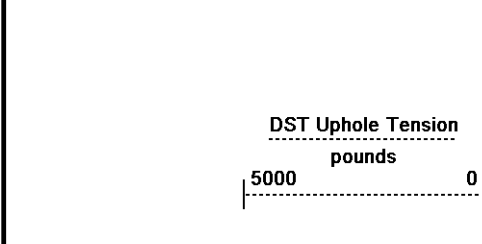
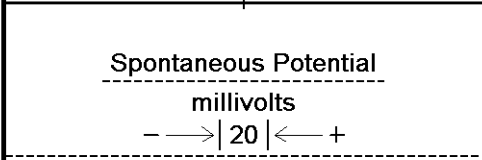
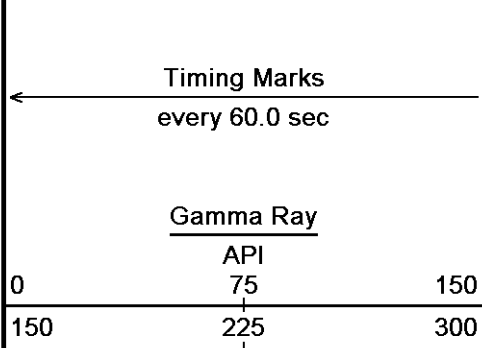


Depth Based Data - Maximum Sampling Increment 2.5cm
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil...\Shakespeare Oil Co. Zanobia #1-21_001.dta
 System Versions: Logged with 13.04.8492 Plotted with 13.04.8492
 Plotted on 28-NOV-2012 05:48
 Recorded on 28-NOV-2012 01:41



↓
 Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil...\Shakespeare Oil Co. Zanobia #1-21_002.dta
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492
 Plotted on 28-NOV-2012 05:48
 Recorded on 28-NOV-2012 01:41

Depth



in Feet

Borehole Temp in deg F

Replay Scale 1:240

4100

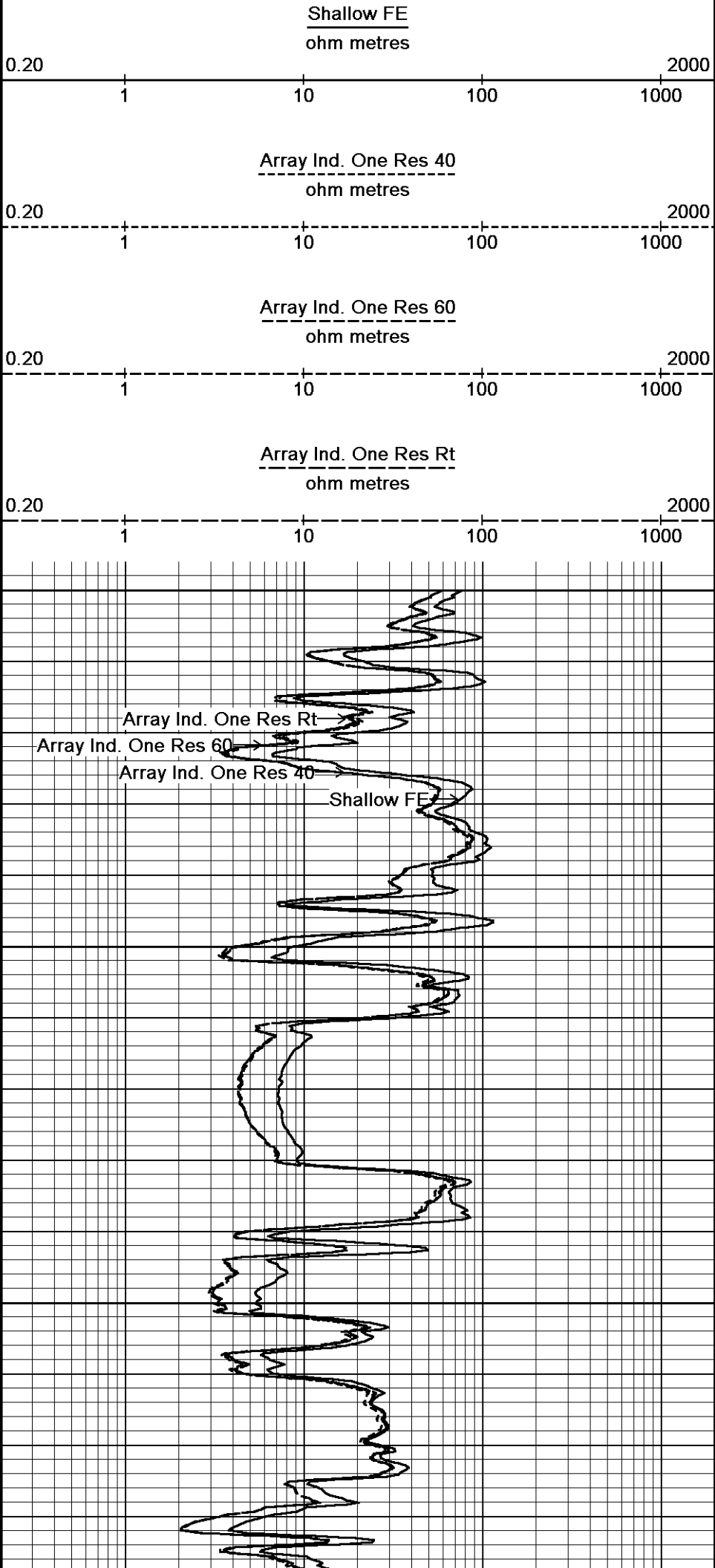
4150

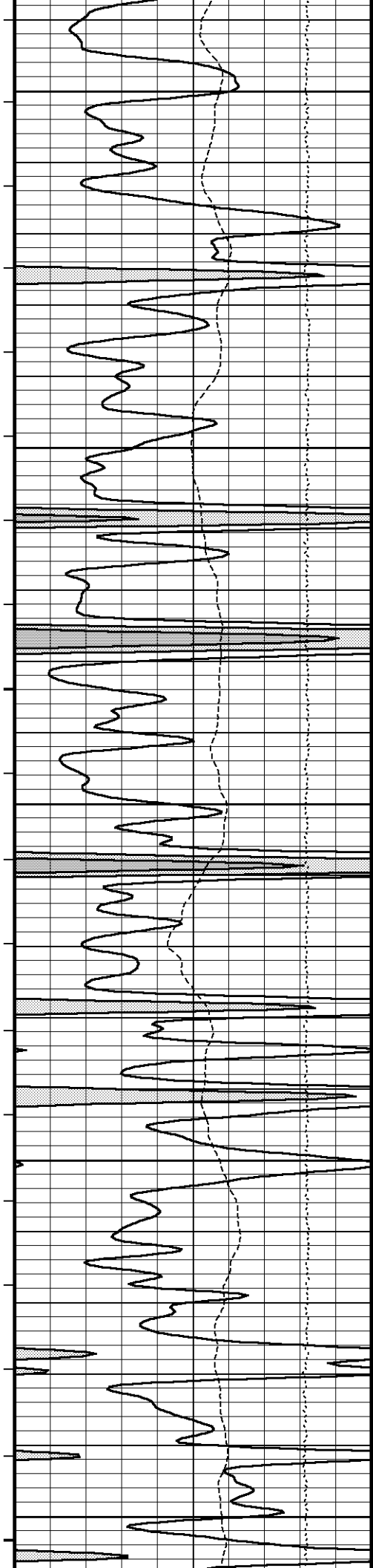
104°

105°

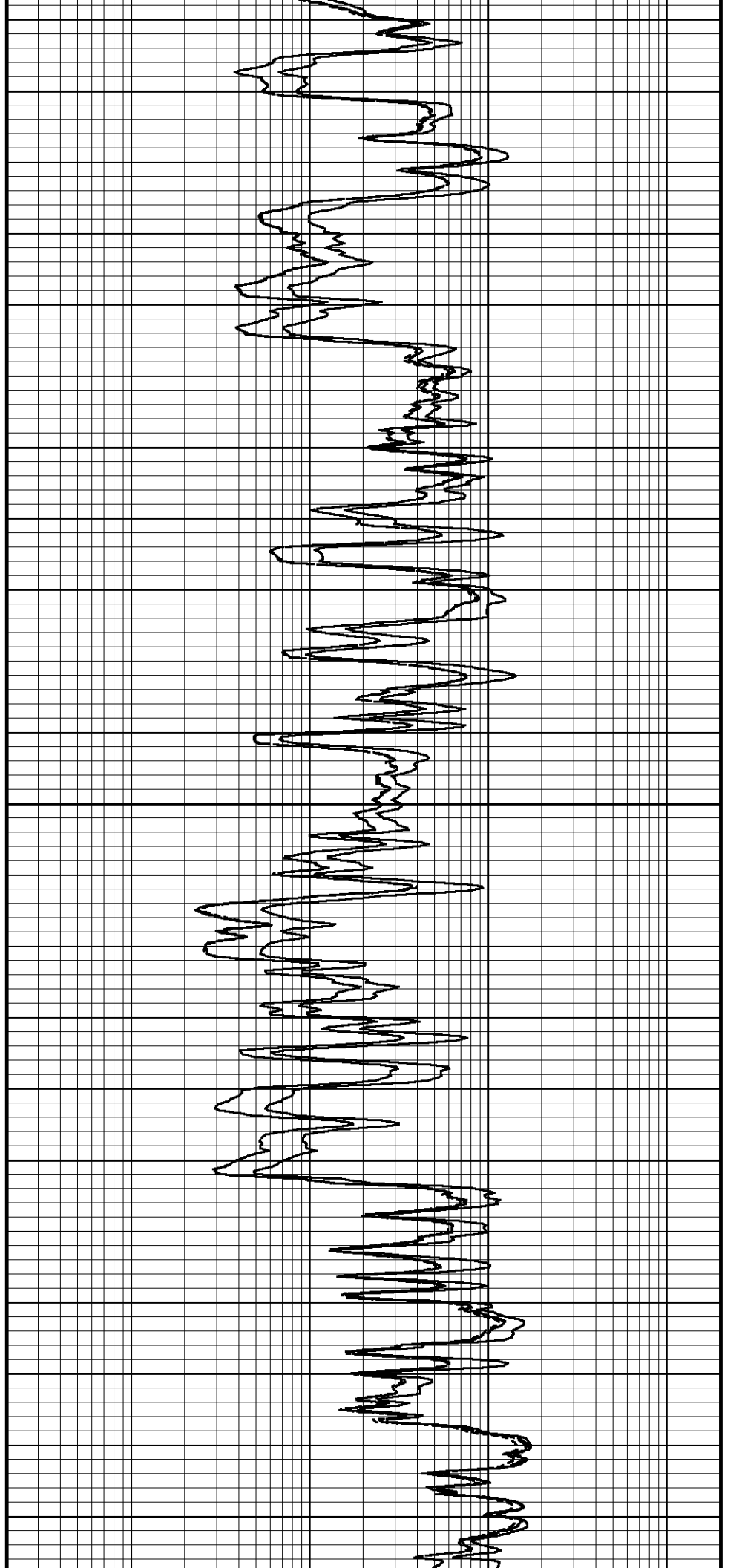
4200

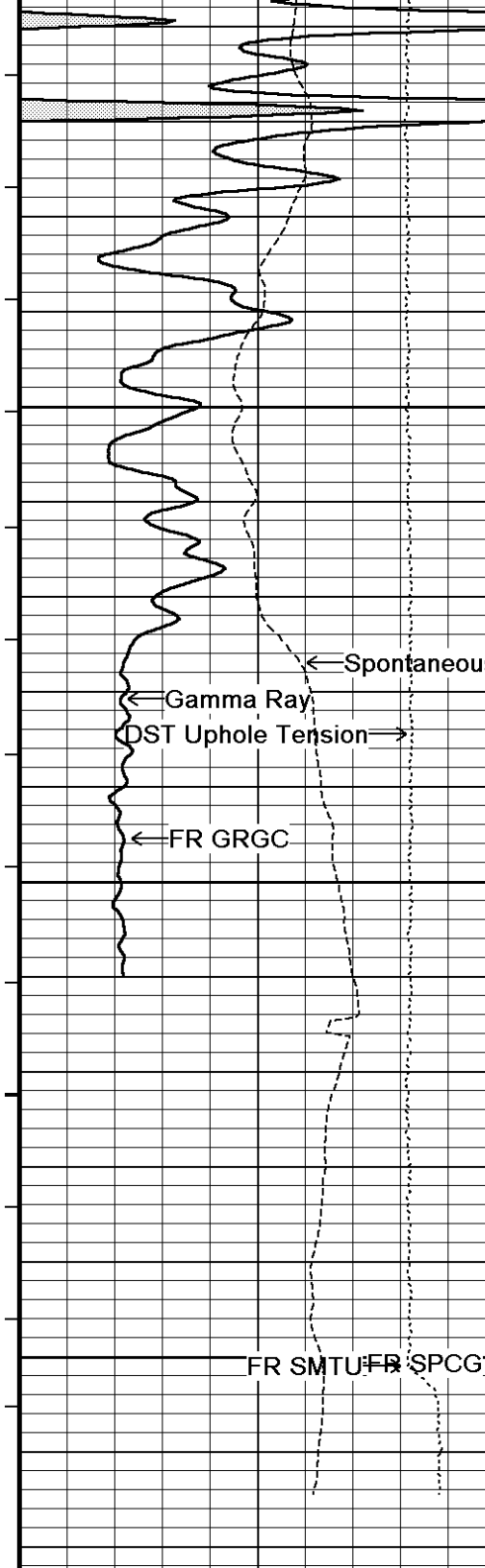
105°





105°
4250
106°
4300
106°
4350
106°
4400
107°
4450





107°

4500

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

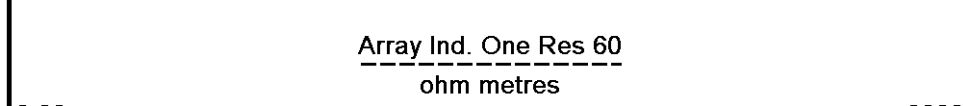
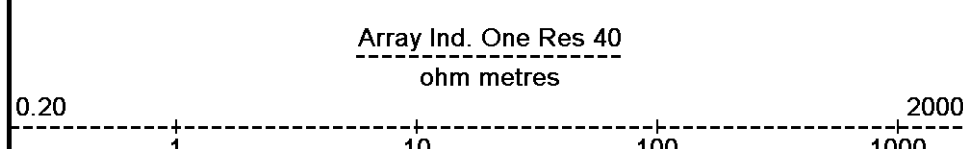
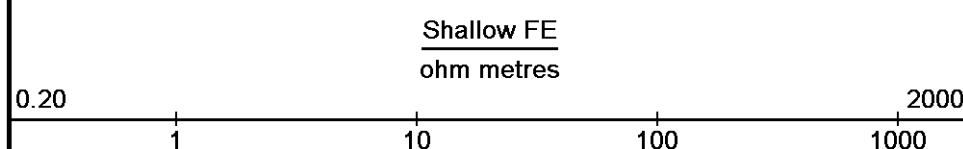
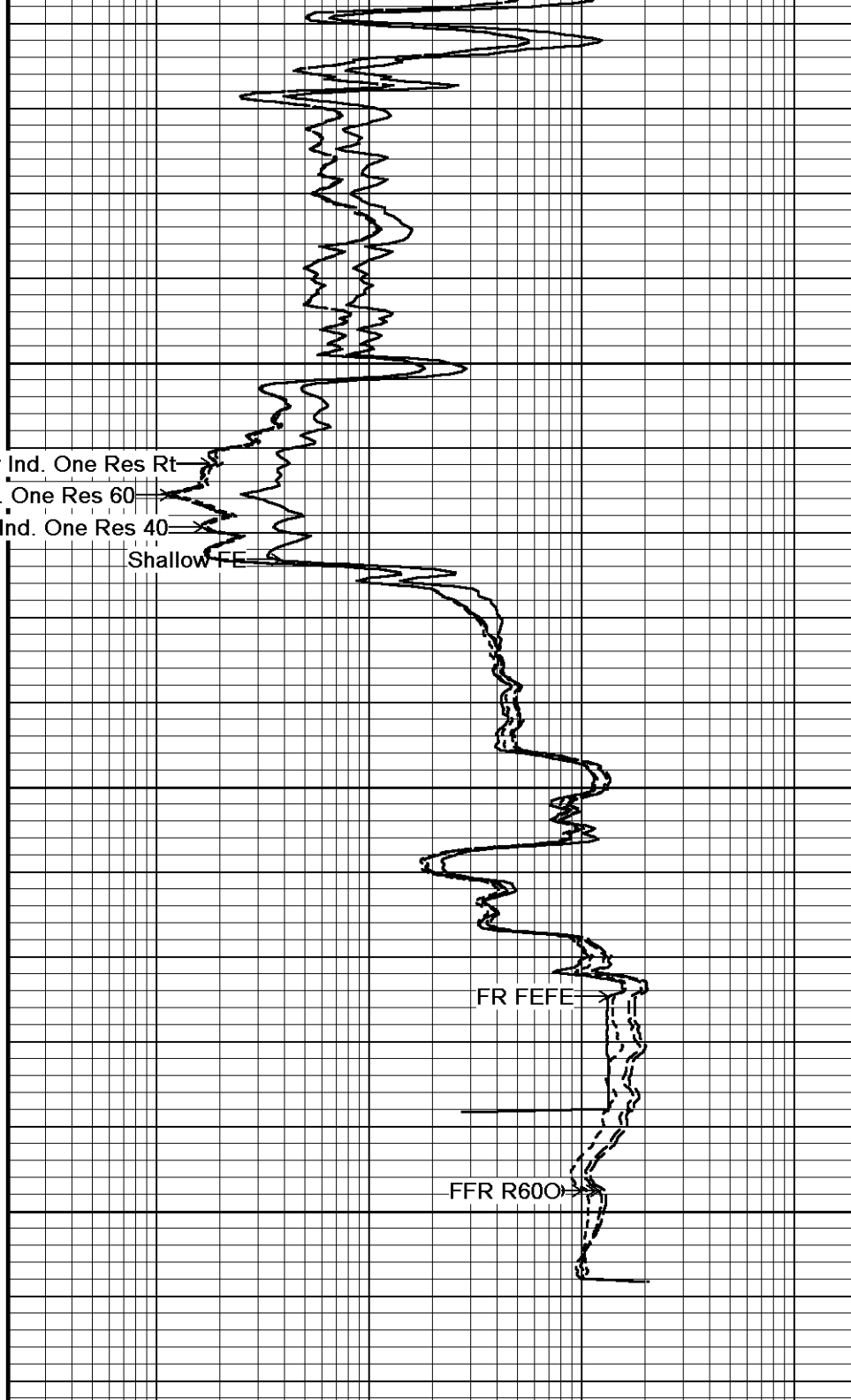
106°

4550

4600

4622
 Depth
 in
 Feet

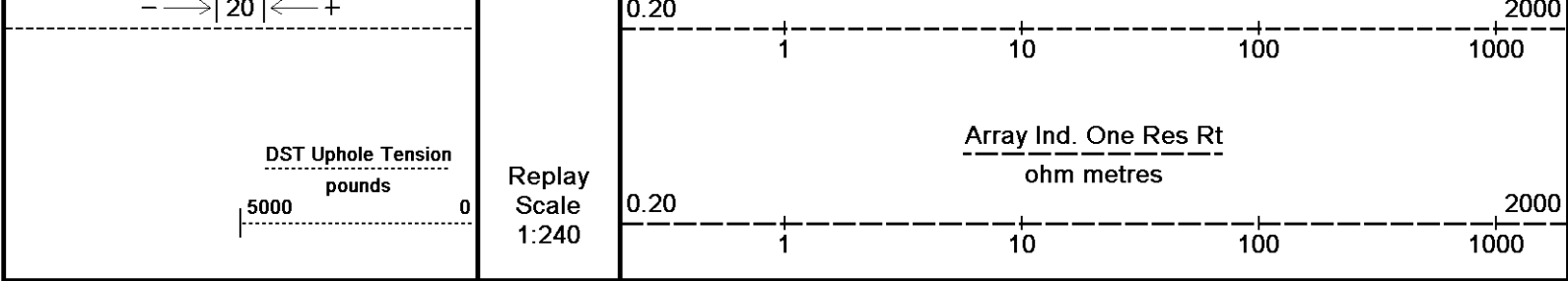
Borehole
 Temp in
 deg F



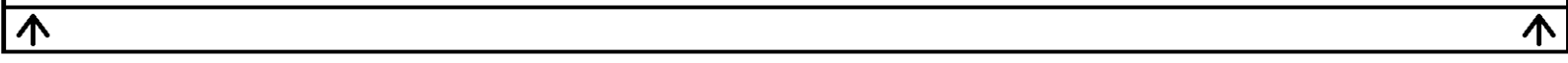
Timing Marks
 every 60.0 sec

Gamma Ray
 API
 0 75 150
 150 225 300

Spontaneous Potential
 millivolts



Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 28-NOV-2012 05:48
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil Co.\Shakespeare Oil Co. Zanobia #1-21_002.dta
 Recorded on 28-NOV-2012 01:41
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492



BEFORE SURVEY CALIBRATION
 C:\Minimus 13.04.8492\Data\Shakespeare Oil Co. Zanobia #1-21\Shakespeare Oil Co. Zanobia #1-21_002.dta

General Constants All 000 Last Edited on 27-NOV-2012,22:25

General Parameters		
Mud Resistivity	0.720	ohm-metres
Mud Resistivity Temperature	78.000	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. Four Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	

High Resolution Temperature Calibration MCG-D.K 442 Field Calibration on 08-NOV-2012,09:48

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 442 Last Edited on 08-NOV-2012,09:48

Pre-filter Length	11
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Gamma Calibration MCG-D.K 442 Field Calibration on 27-NOV-2012 16:06

	Measured	Calibrated (API)
Background	70	47
Calibrator (Gross)	1147	772
Calibrator (Net)	1077	725

Gamma Constants MCG-D.K 442 Last Edited on 27-NOV-2012,22:19

Gamma Calibrator Number	GRC38	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

FE Calibration MFE-B.J 353 Base Calibration on 08-NOV-2012 09:26
Field Check on 27-NOV-2012 15:42

Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.6	126.8

Base Check 281.0

Field Check 281.0

FE Constants MFE-B.J 353

Last Edited on 27-NOV-2012,22:18

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 167

Base Calibration on 14-NOV-2012,09:21

Field Check on 27-NOV-2012 15:40

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			12.3	3840.9
2			29.2	3479.5
3			28.9	3055.5
4			19.6	2083.1
Deep			18.4	2050.4
Medium			41.9	3994.9
Shallow			42.4	5058.1

Array Temperature 65.7 Deg F

Induction Constants MAI-A.A 167

Last Edited on 27-NOV-2012,22:18

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 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	

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Shakespeare Oil Co. Zanobia #1-21\Shakespeare Oil Co. Zanobia #1-21_002.dta

Compact Comms Gamma
MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 16 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

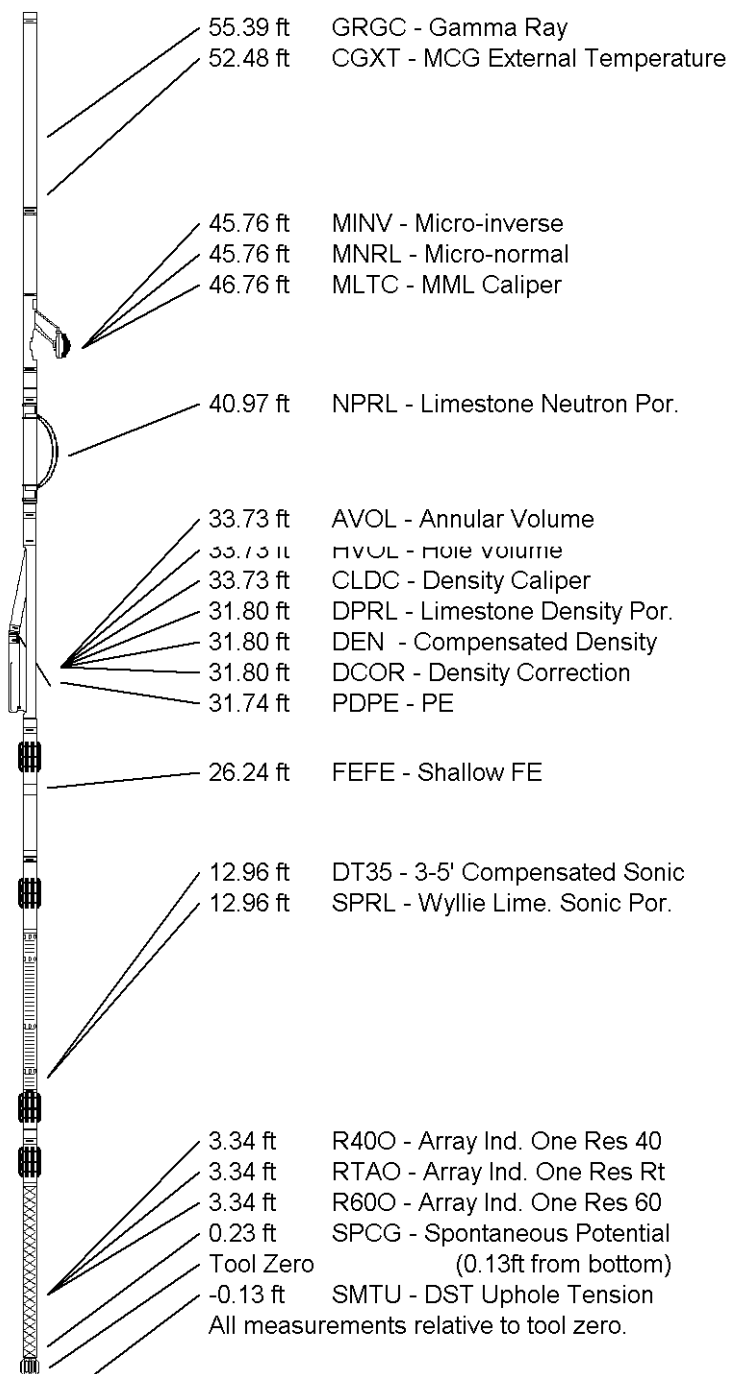
Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focused Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 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: 60.68 ft Weight: 456.4 lb



COMPANY	SHAKESPEARE OIL CO., INC.
WELL	ZANOBI A #1-21
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2867.00	feet	First Reading	4598.00	feet
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Elevation Drill Floor 2865.00 feet
 Elevation Ground Level 2855.00 feet

Depth Driller 4600.00 feet
 Depth Logger 4601.00 feet

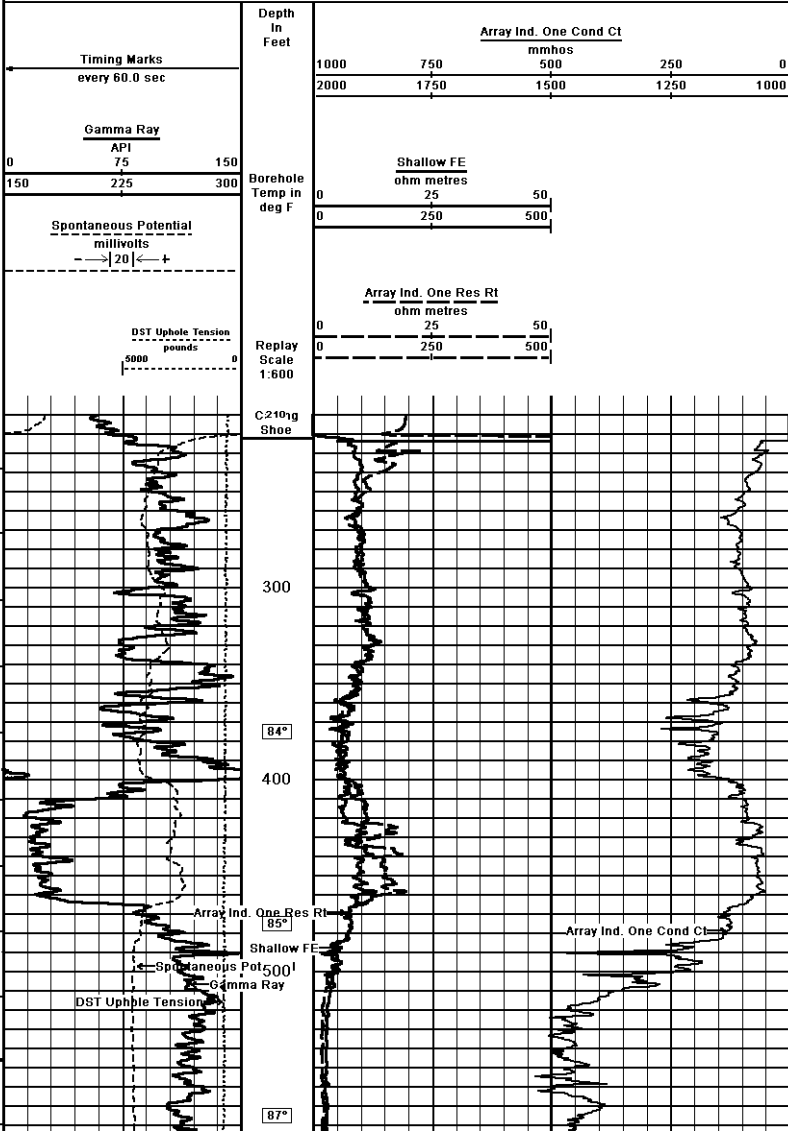


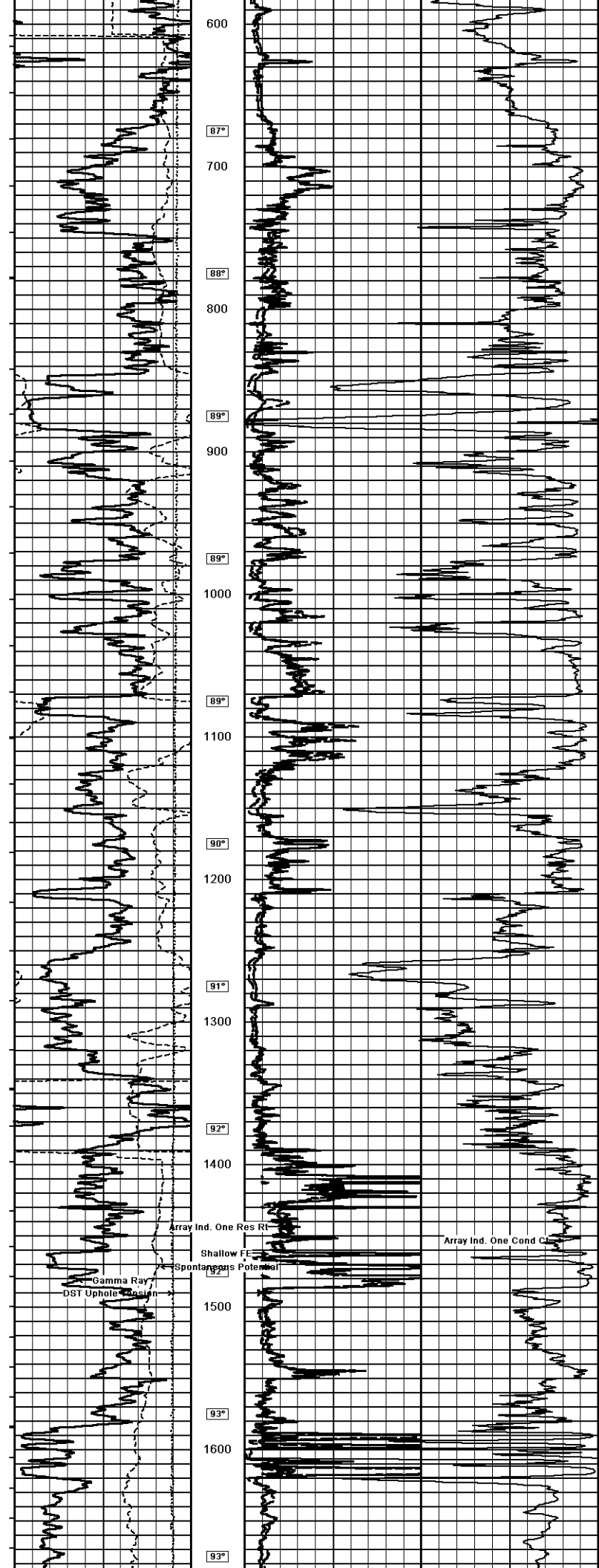
Weatherford[®]

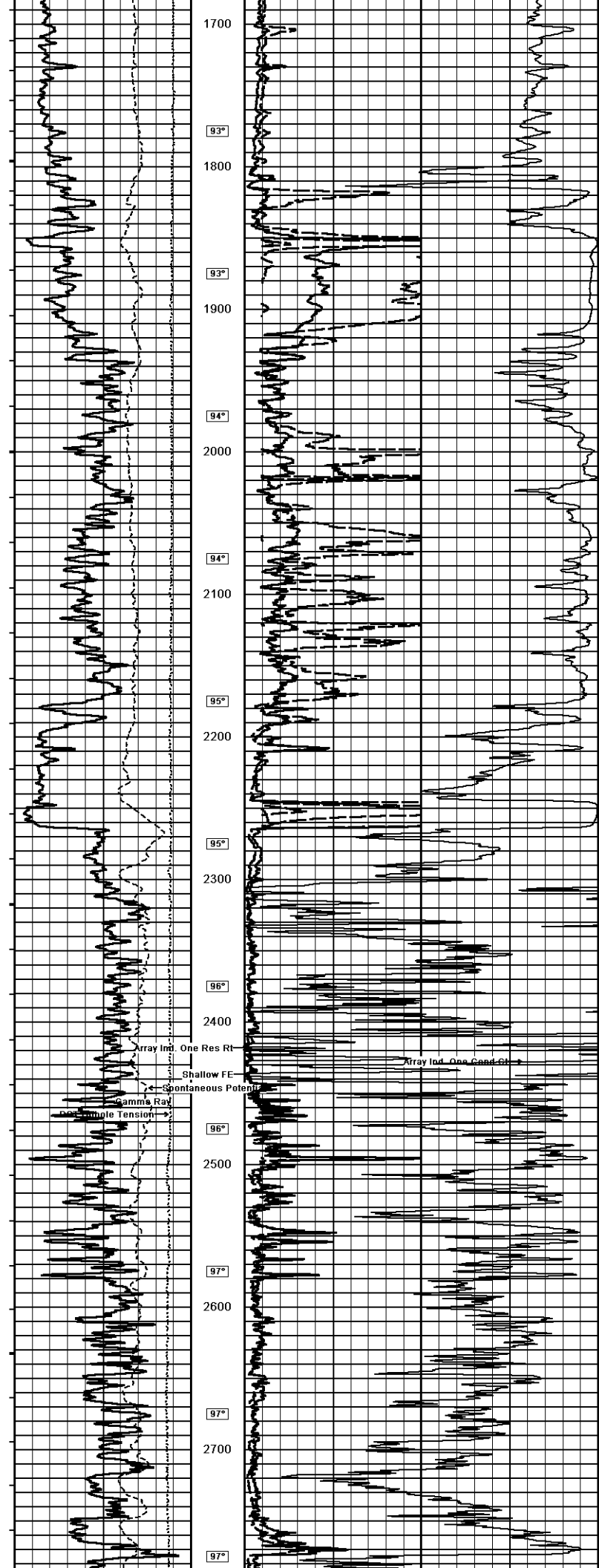
**ARRAY INDUCTION
 SHALLOW FOCUSED
 ELECTRIC LOG**

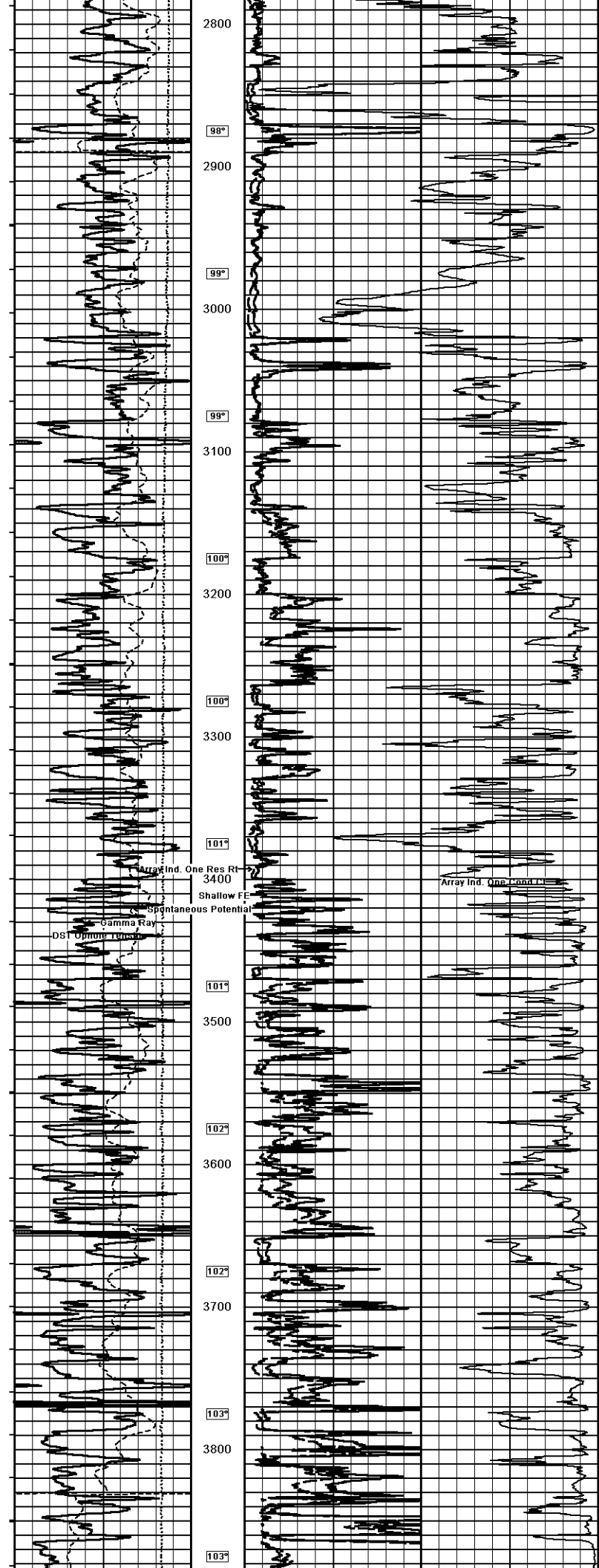
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY: SHAKESPEARE OIL CO., INC. WELL: ZANOBIA #1-21 FIELD: WILDCAI PROVINCE/COUNTY: LOGAN COUNTRY/STATE: U.S.A. / KANSAS LOCATION: 2285' FSL & 1420' FWL SEC: 21 TWP: 15S RGE: 33W Other Services: MML SR Number: 15-109-21141 MMS Serial Number: 15-109-21141 Permanent Datum SL Elevation: 2855.98ft Log Measured From KB Drilling Measured From KB Date: 27-NOV-2012 Run Number: ONE Service Order: 3597784 Depth Driller: 4600.00 feet Depth Logger: 4601.00 feet First Reading: 4598.00 feet Last Reading: 222.00 feet Casing Driller: 225.00 feet Casing Logger: 222.00 feet Bit Size: 7.875 inches Hole Fluid Type: CHEMICAL INU/Sg Density/Viscosity: 9.10 IDU/Sg 52.00 CP PH/Turbid Loss: 10.50 ML/DFIT Sample Source: ML/DFIT Rm @ Measured Temp: 0.72 @ 73.0 ohm-m Rm @ Measured Temp: 0.58 @ 78.0 ohm-m Rm @ Measured Temp: 0.88 @ 78.0 ohm-m Source Rm/ Rnc: CALC Rm @ BHT: 0.52 @ 110.0 ohm-m Time since Circulation: 4 HOURS Max Recorded Temp: 110.00 deg F Equipment/Case: 1.3086 LB Recorded By: ACDM.SIL Missed By: TIM.PREST JOB #: LRT-2-311			
Log Measured From KB	2865.00	Log Measured From KB	2855.00

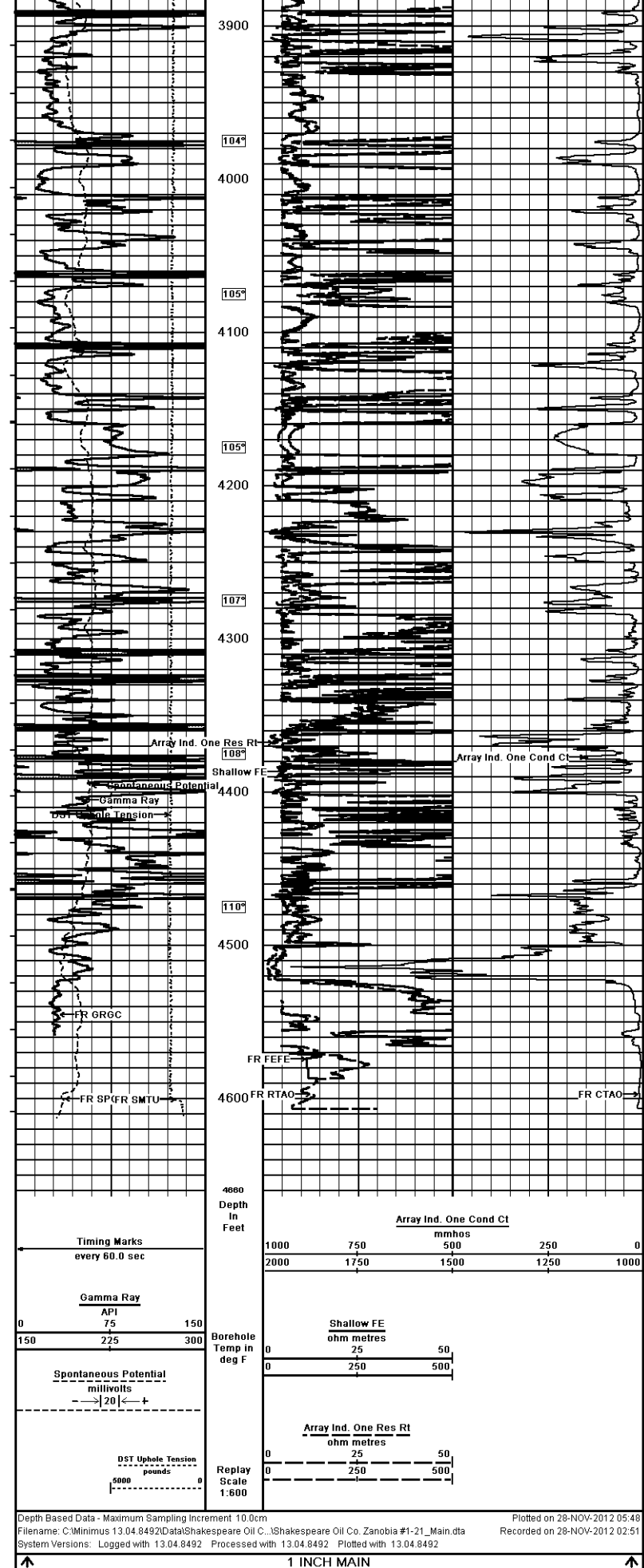
1 INCH MAIN
 Depth Based Data - Maximum Sampling Increment: 10.0cm
 Plotted on 28-NOV-2012 05:48
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil Co. \Shakespeare Oil Co. Zanobia #1-21_Main.dta
 Recorded on 28-NOV-2012 02:51
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492











Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 13.04.8492\Data\Shakespeare Oil Co. \Shakespeare Oil Co. Zanolbia #1-21_Main.dta
 System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492
 Recorded on 28-NOV-2012 02:51

COMPANY SHAKESPEARE OIL CO., INC.
 WELL ZANOBIA #1-21
 FIELD WILDCAT
 PROVINCE/COUNTY LOGAN
 COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2867.00	feet	First Reading	4598.00	feet
Elevation Drill Floor	2865.00	feet	Depth Driller	4600.00	feet
Elevation Ground Level	2855.00	feet	Depth Logger	4601.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG