Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	CHOLLA PRODUCTION, LLC.
WELL	R&R DUMLER #1-21
FIELD	WILDCAT
PROVINCE/COUNTY	HODGEMAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1110' FSL & 655' FWL

SEC 21	TWP 21S	RGE 26W	Other Services
Latitude			MPD/MDN MML
Longitude			MSS
API Number	15-083-21939		

Permanent Datum GL, Elevation 2469 feet
Log Measured From KB, 5.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	2474.00
DF	2472.00
GL	2469.00

Date	25-JUL-2017			
Run Number	ONE			
Service Order	4558-188222573			
Depth Driller	4920.00	feet		
Depth Logger	4919.00	feet		
First Reading	4916.00	feet		
Last Reading	261.00	feet		
Casing Driller	261.00	feet		
Casing Logger	261.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.50 lb/USg		48.00 CP	
PH / Fluid Loss	10.50		8.00 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.77 @ 75.0	ohm-m		
Rmf @ Measured Temp	0.62 @ 75.0	ohm-m		
Rmc @ Measured Temp	0.92 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.49 @119.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	119.00	deg F		
Equipment / Base	13096		LIB	
Recorded By	ADAM SILL			
Witnessed By	CLAYTON ERICKSON			

BOREHOLE RECORD

Last Edited: 25-JUL-2017 18:58

Bit Size inches	Depth From feet	Depth To feet
7.875	261.00	4920.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	261.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 17.01.7206.

- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN 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.

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2110 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3200 FEET: 348 CU.FT.

- RIG: WW DRILLING #8.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR, C. BAKER.

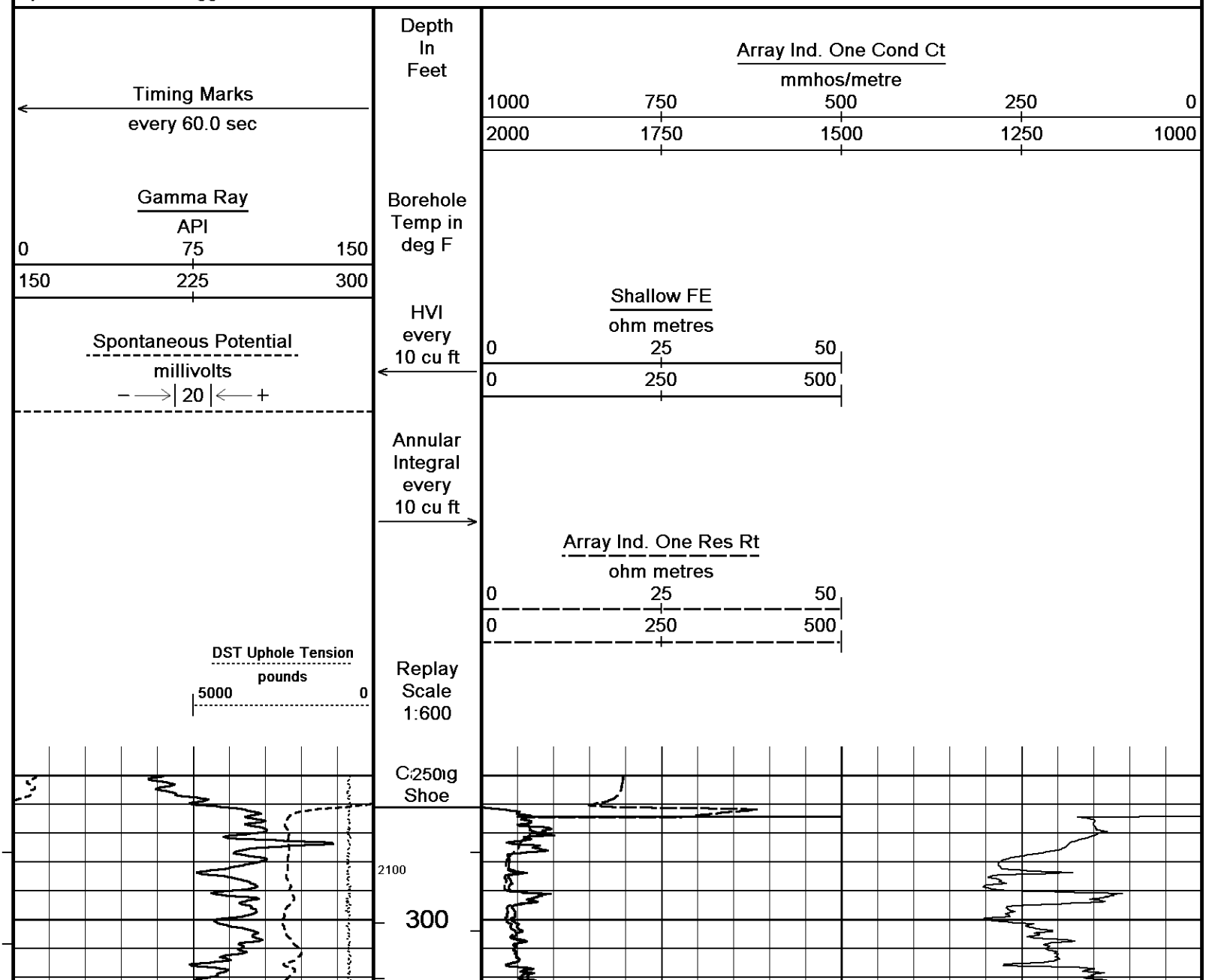
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will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

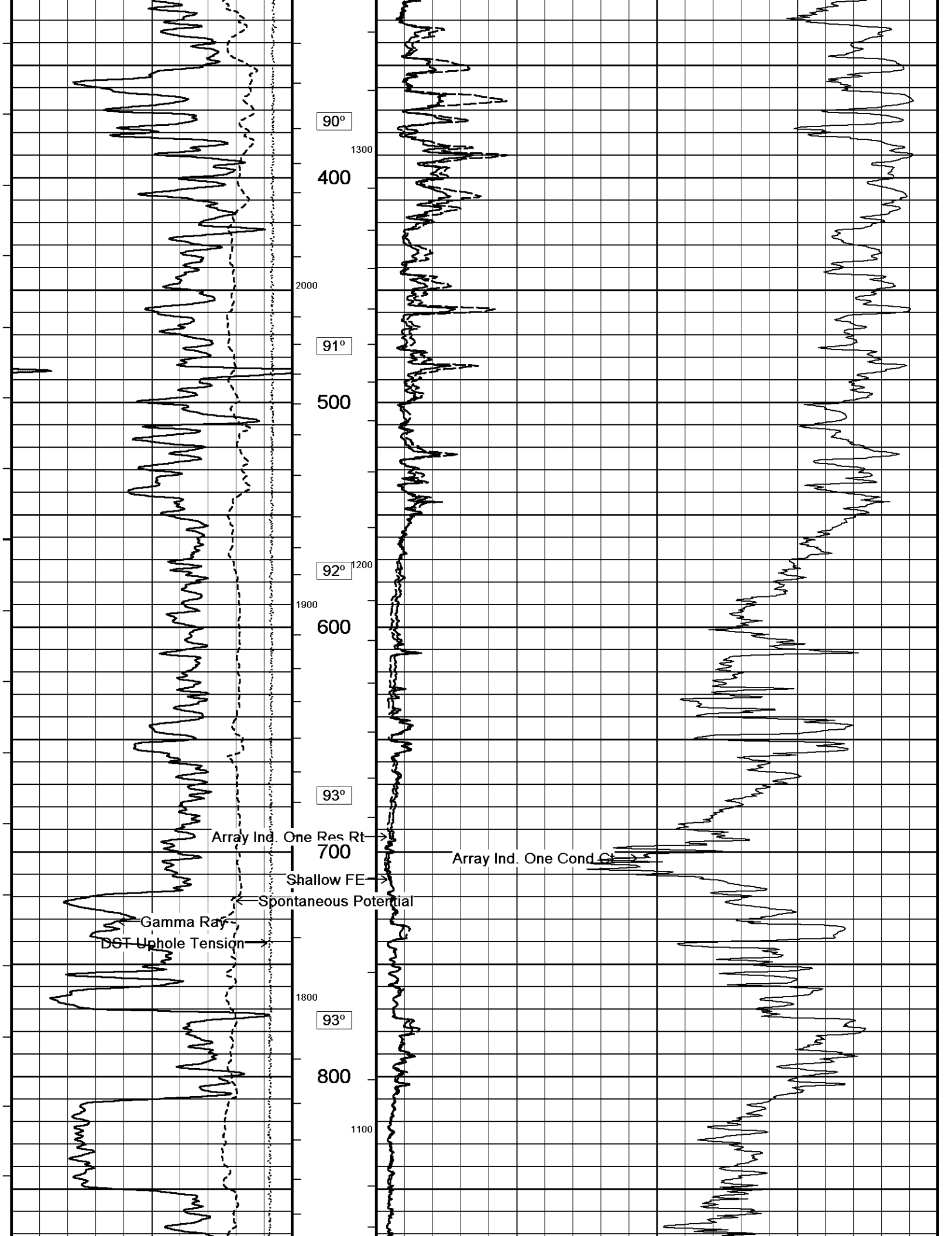
2 INCH MAIN

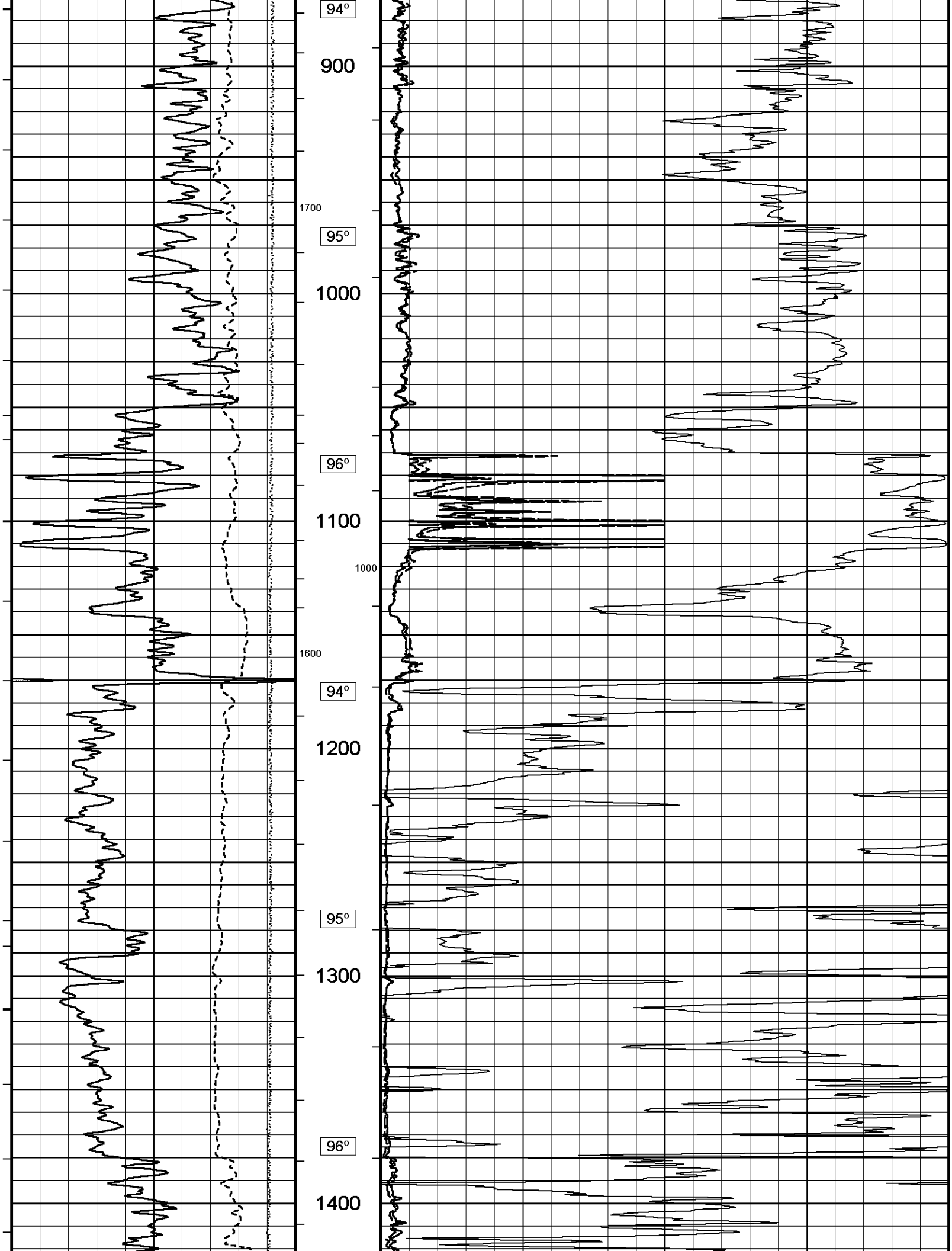
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 26-JUL-2017 00:41

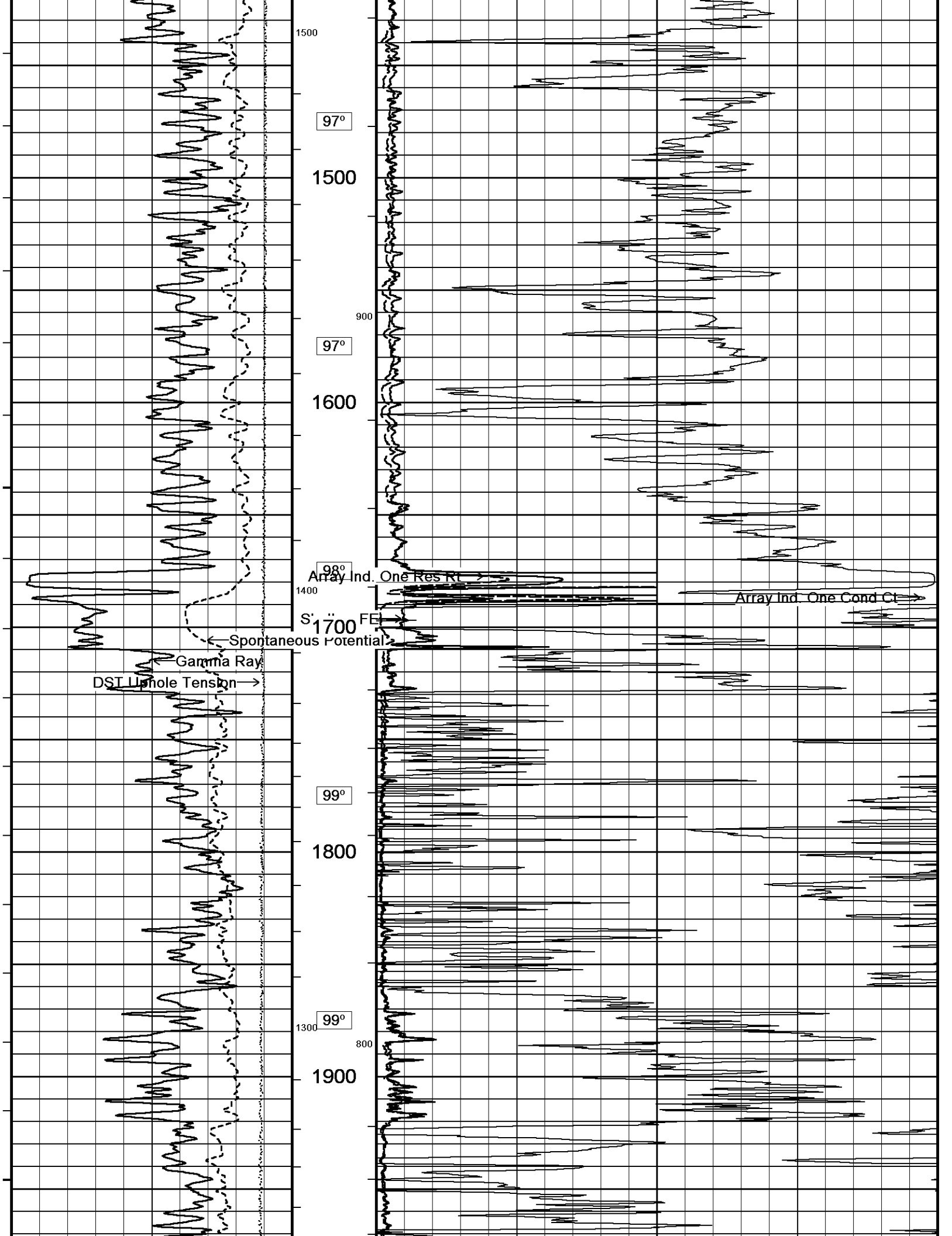
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta — Recorded on 25-JUL-2017 21:11

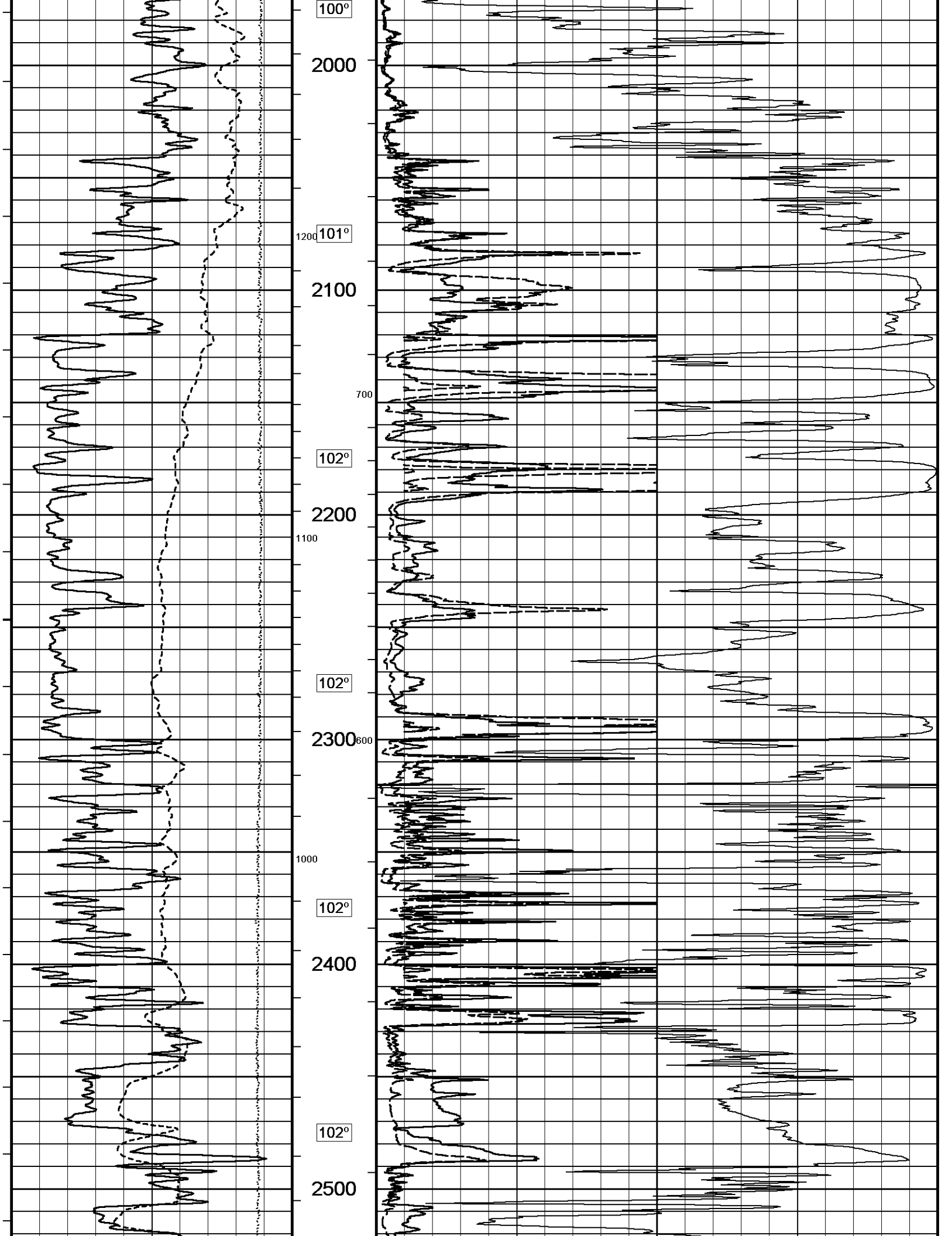
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206




90°
1300
400
2000
91°
500
92°
1200
1900
600
93°
Array Ind. One Res Rt
700
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
1800
93°
800
1100


94°
900
1700
95°
1000
96°
1100
1000
1600
94°
1200
95°
1300
96°
1400


1500
97°
1500
900
97°
1600
98°
1400
1700
99°
1800
1300
99°
800
1900
Array Ind. One Res Rt
Array Ind. One Cond Ct
FEI
Spontaneous Potential
Gamma Ray
DSI Uphole Tension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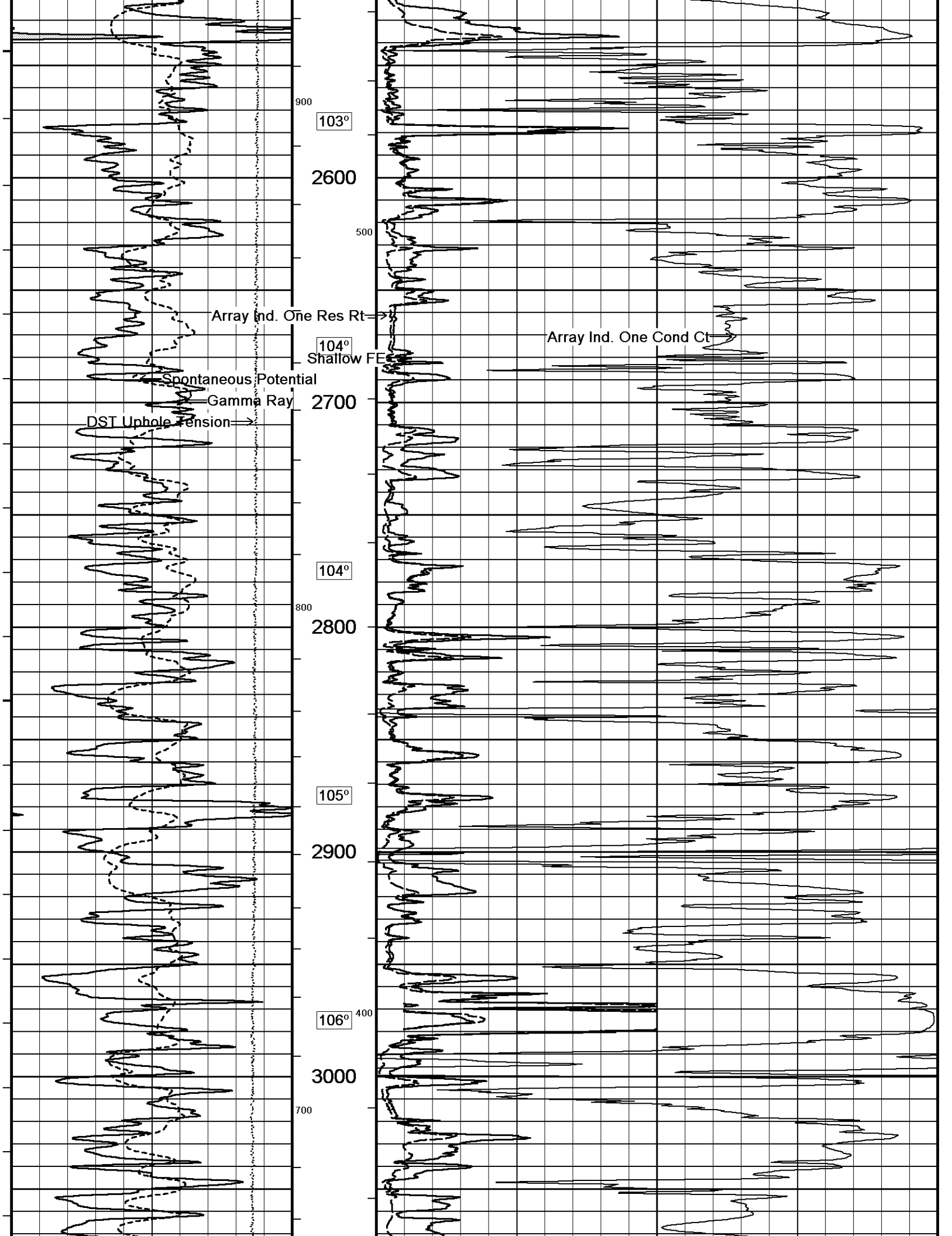
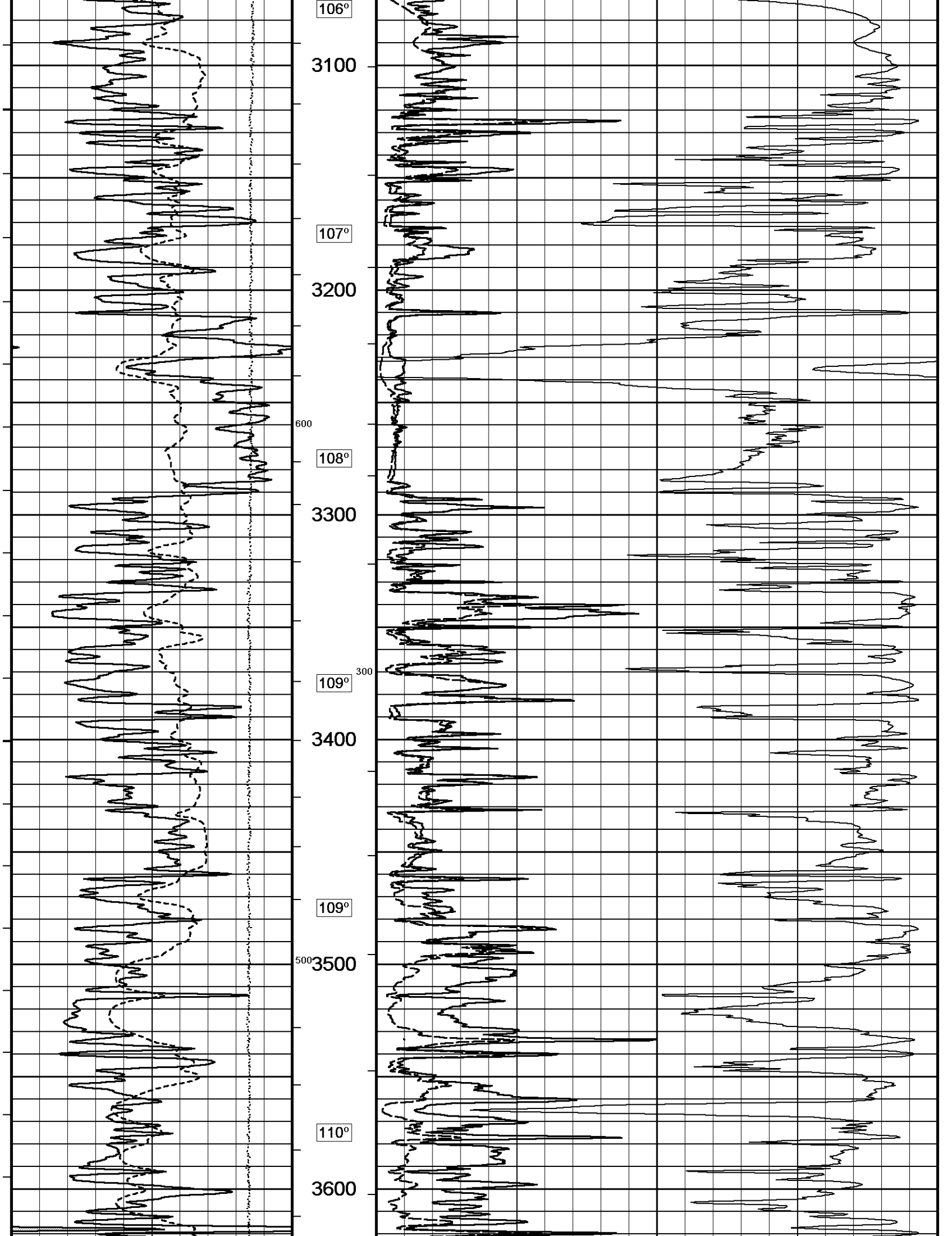
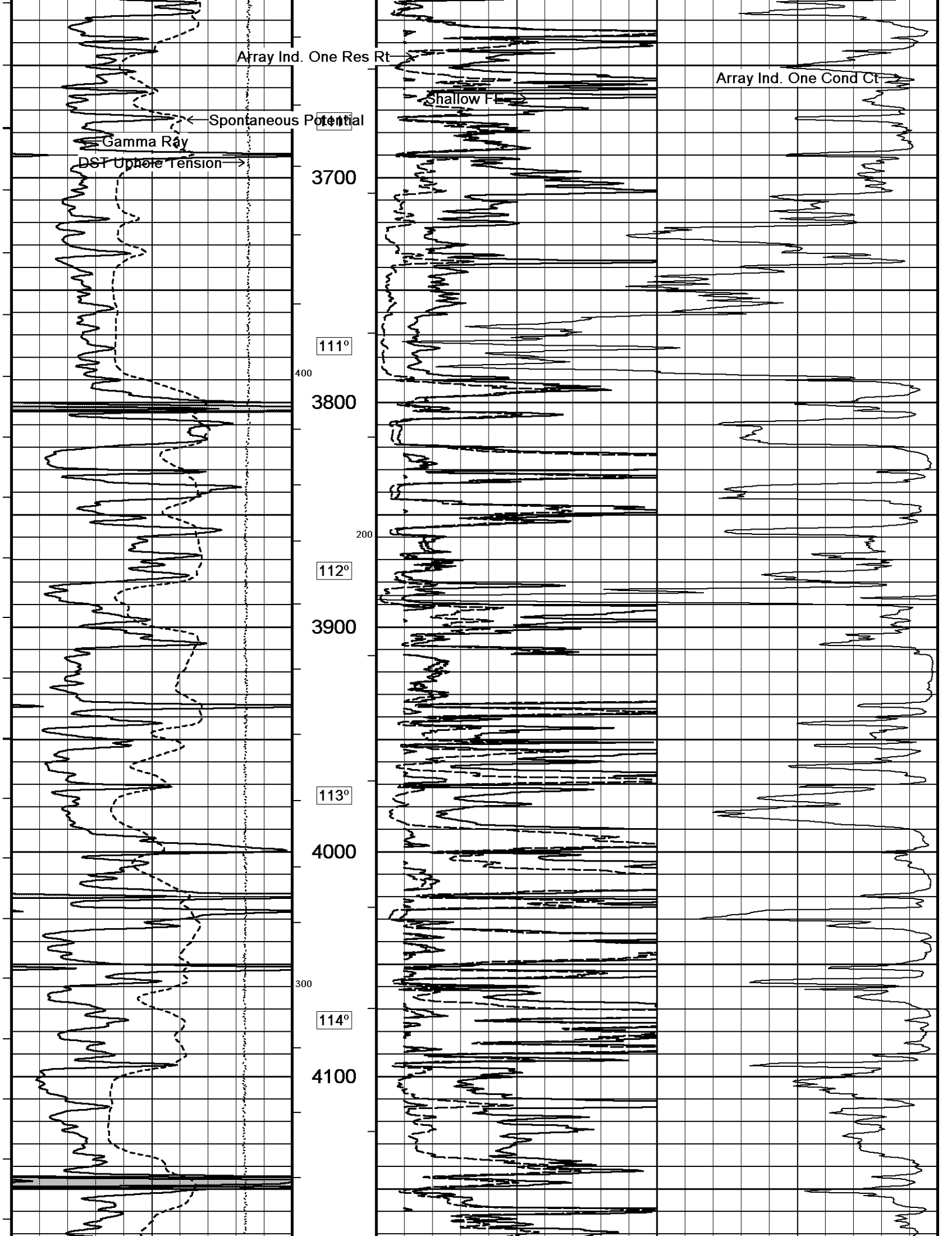
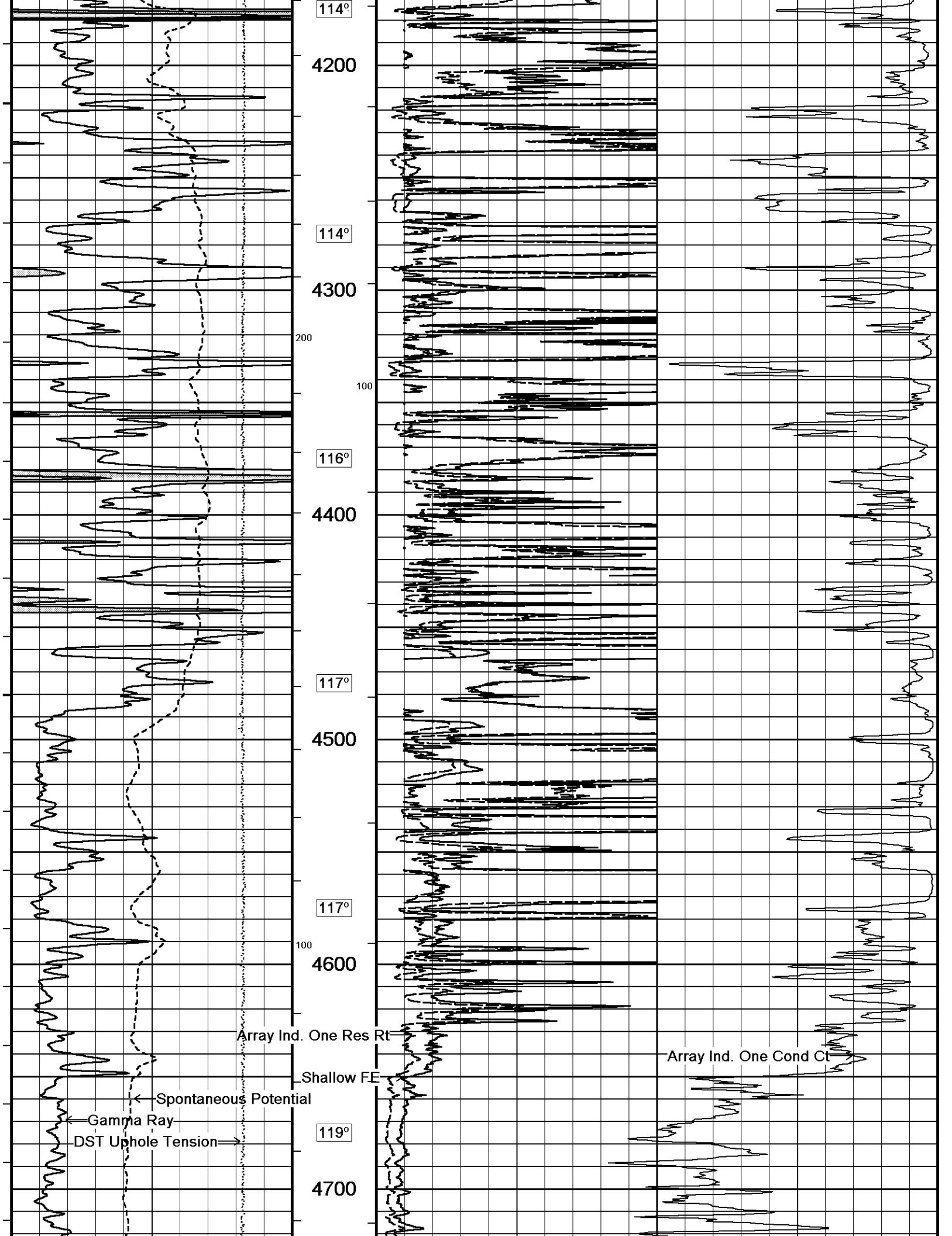
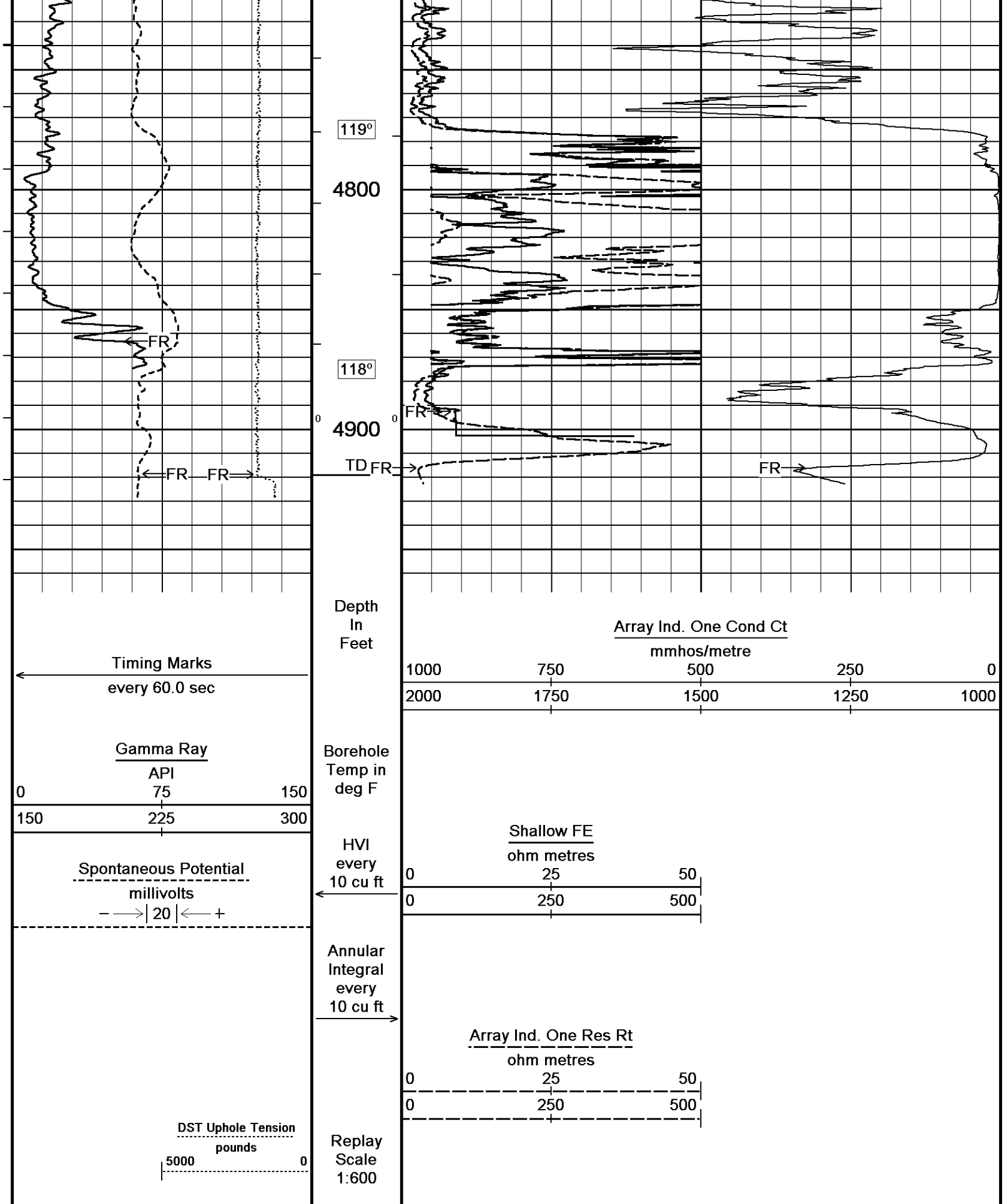
2000
1200
101°
2100
700
102°
2200
1100
102°
2300
600
1000
102°
2400
102°
2500


900
103°
2600
500
Array Ind. One Res Rt
Array Ind. One Cond Ct
104°
Shallow FE
Spontaneous Potential
Gamma Ray
2700
DST Uphole Tension
104°
800
2800
105°
2900
106°
400
3000
700


106°
3100
107°
3200
600
108°
3300
300
109°
3400
109°
500
3500
110°
3600


Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FL
Spontaneous Potential
Gamma Ray
DST Uphole Tension
110°
111°
112°
113°
114°
3700
3800
3900
4000
4100
400
200
300


114°
4200
114°
4300
200
100
116°
4400
117°
4500
117°
100
4600
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
119°
4700
Array Ind. One Cond Ct



Timing Marks
every 60.0 sec

Depth
In
Feet

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

Gamma Ray
API
0 75 150
150 225 300

Borehole
Temp in
deg F

Shallow FE
ohm metres
0 25 50
0 250 500

HVI
every
10 cu ft

Spontaneous Potential
millivolts
– 20 +

Annular
Integral
every
10 cu ft

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

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:600

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta
Recorded on 25-JUL-2017 21:11
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

2 INCH MAIN

5 INCH MAIN - ANHYDRITE

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
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Recorded on 25-JUL-2017 21:11
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Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
– 20 +

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Shallow FE
ohm metres
0.20 1 10 100 1000 2000

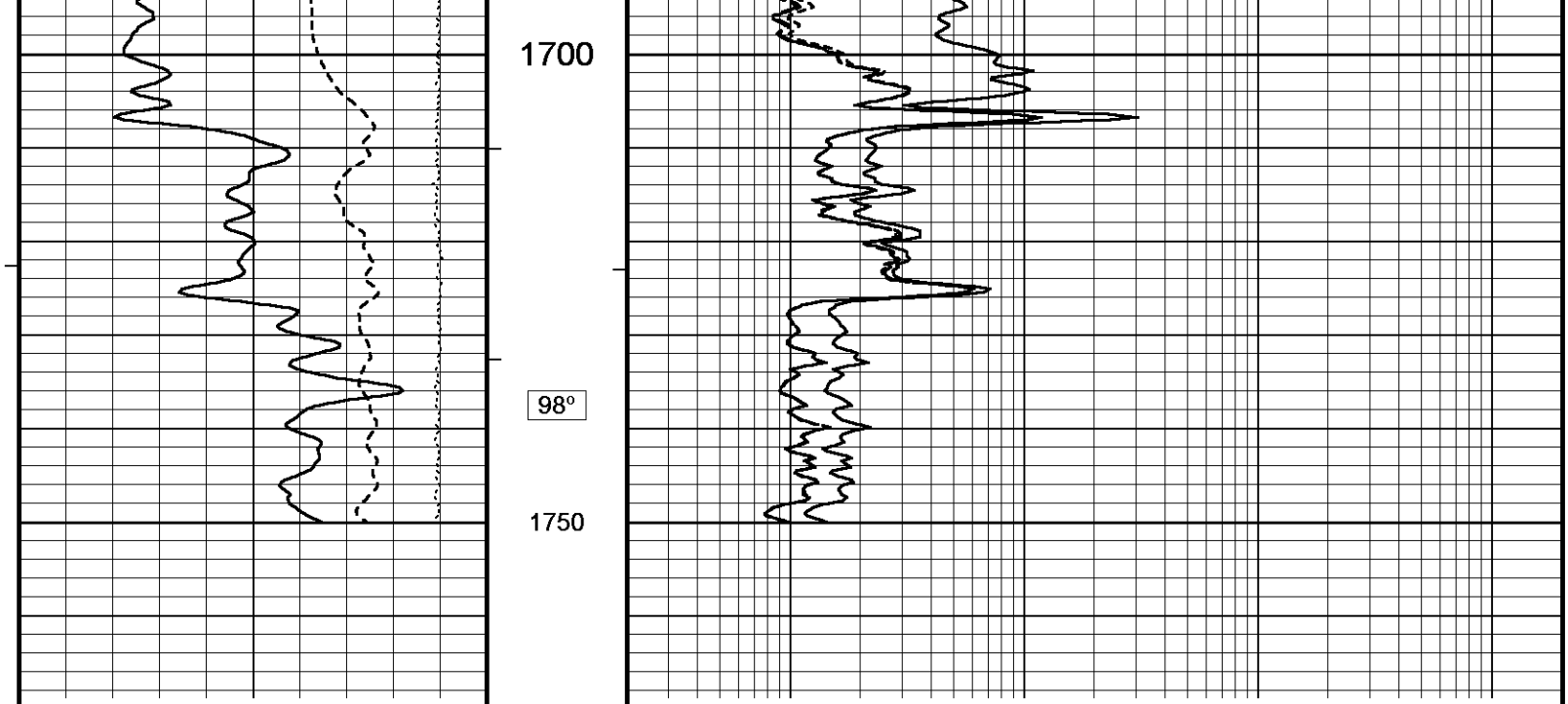
Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000

1600
97°
1650
98°

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension



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

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Shallow FE
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta
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5 INCH MAIN - ANHYDRITE

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
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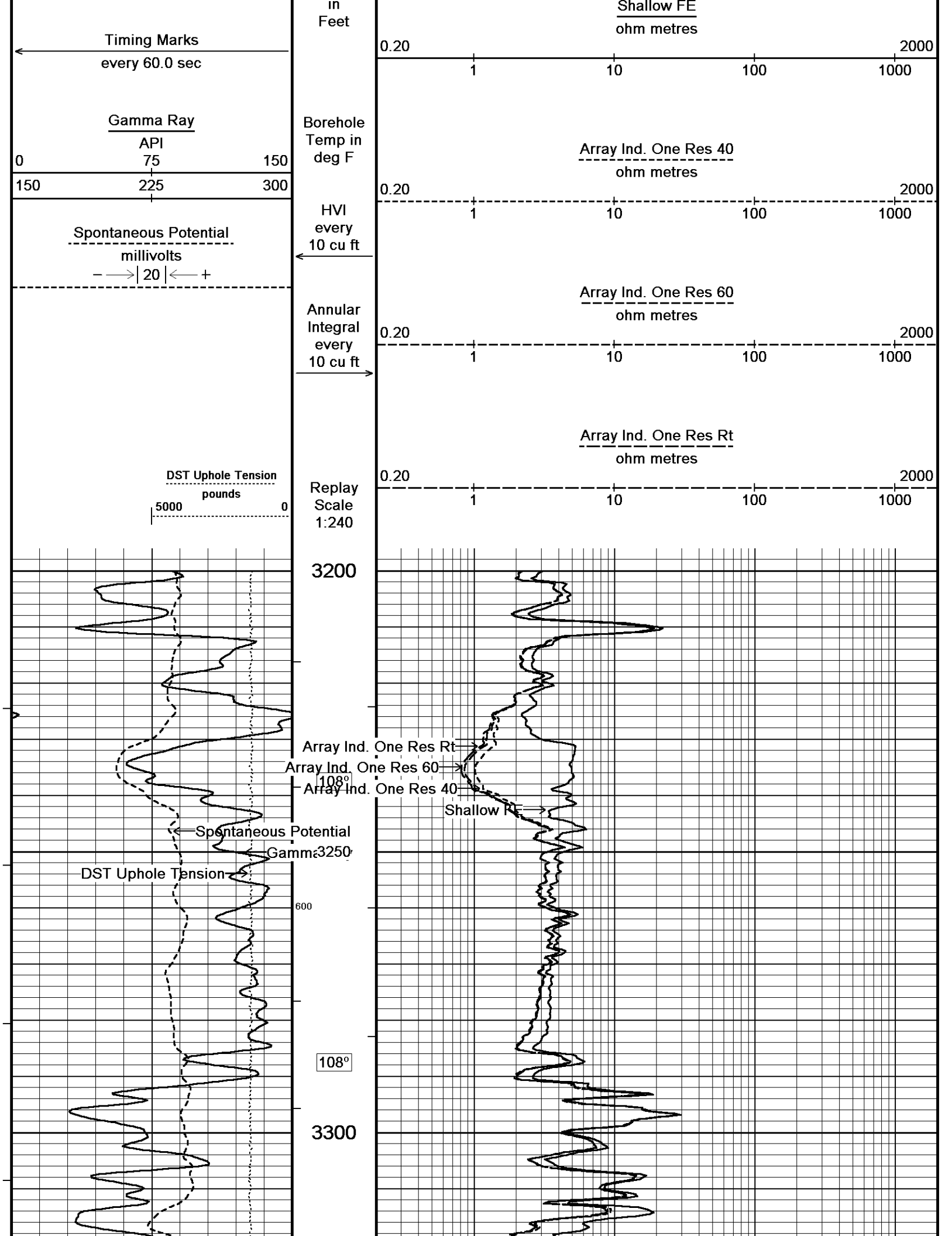
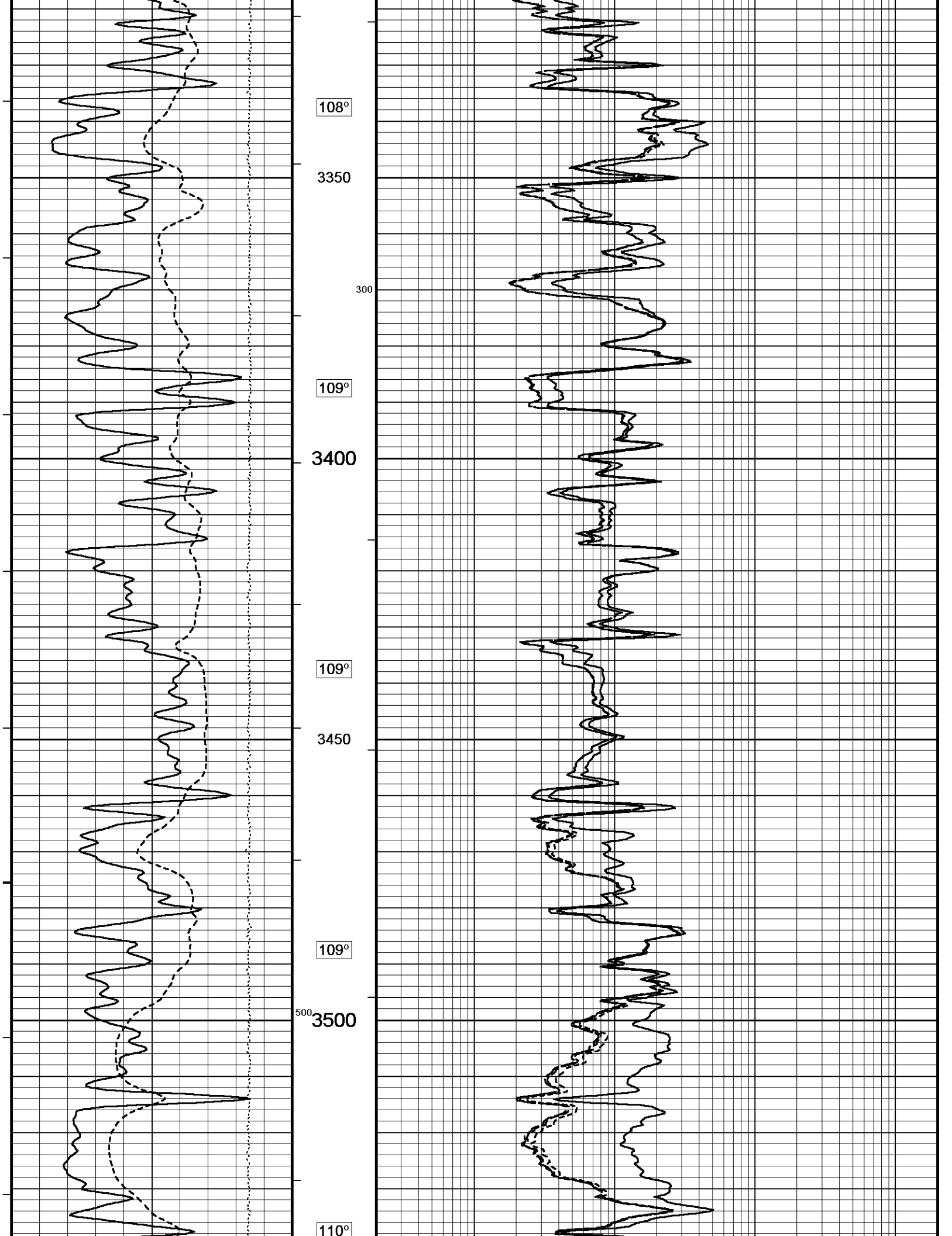
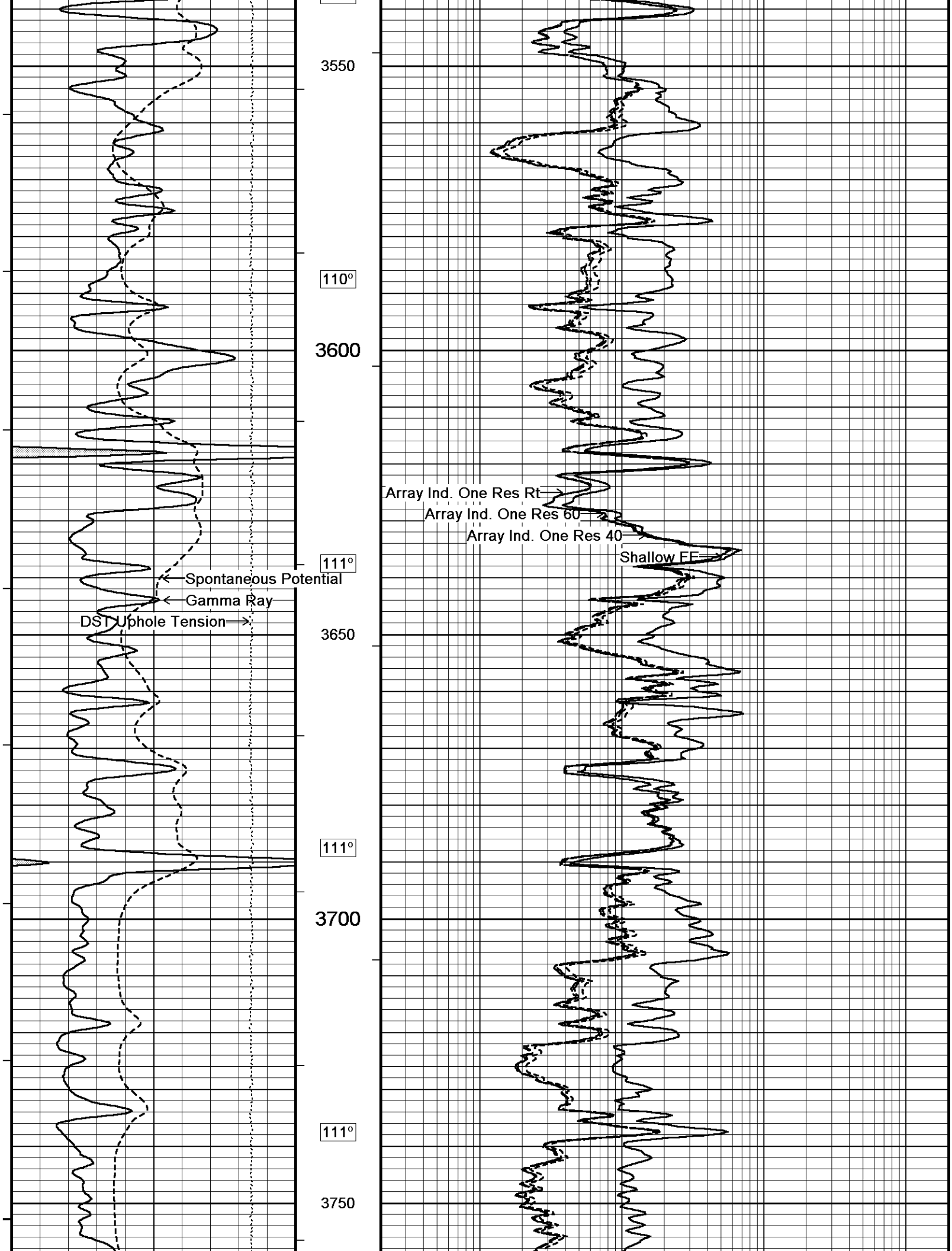
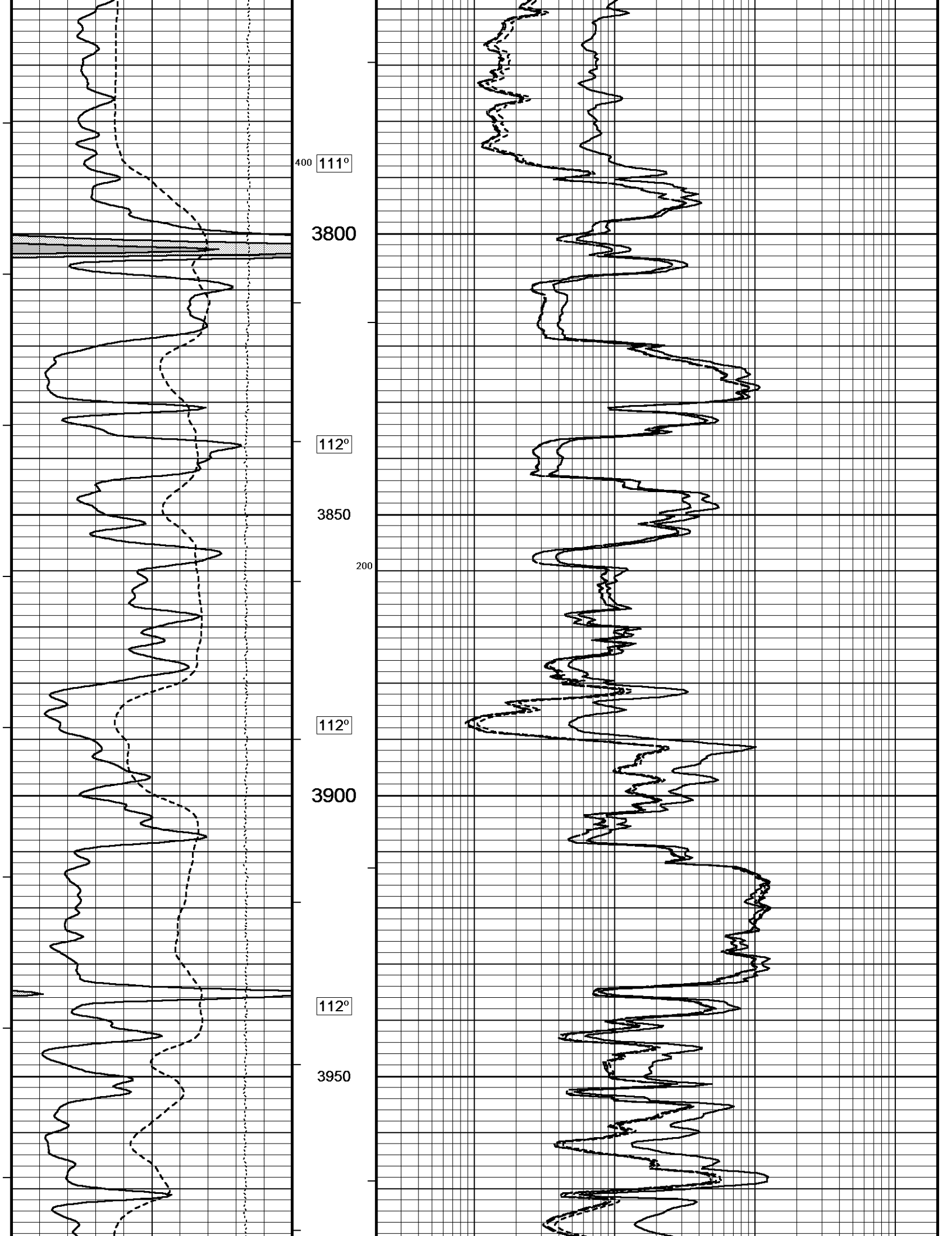
Recorded on 25-JUL-2017 21:11
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

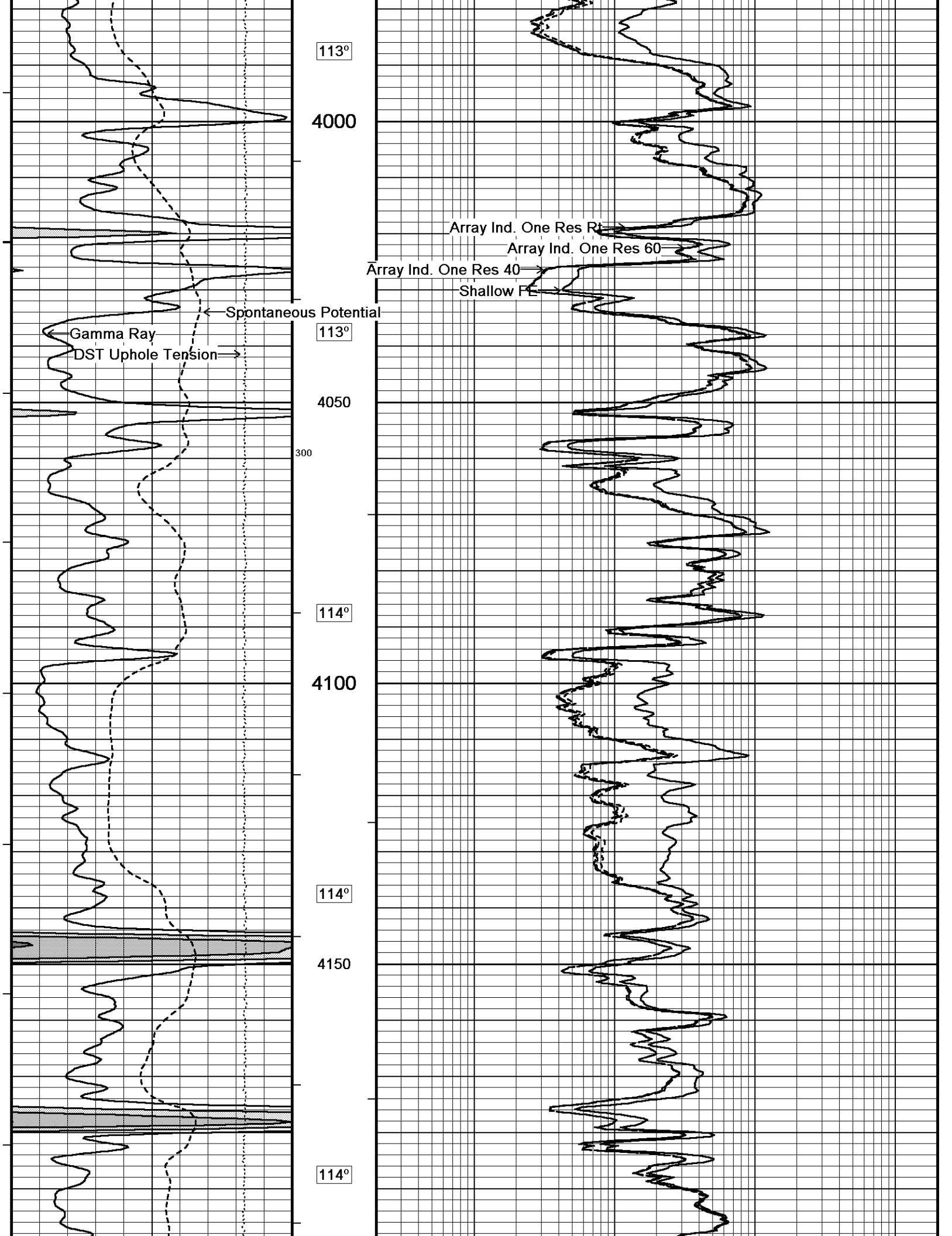
Depth

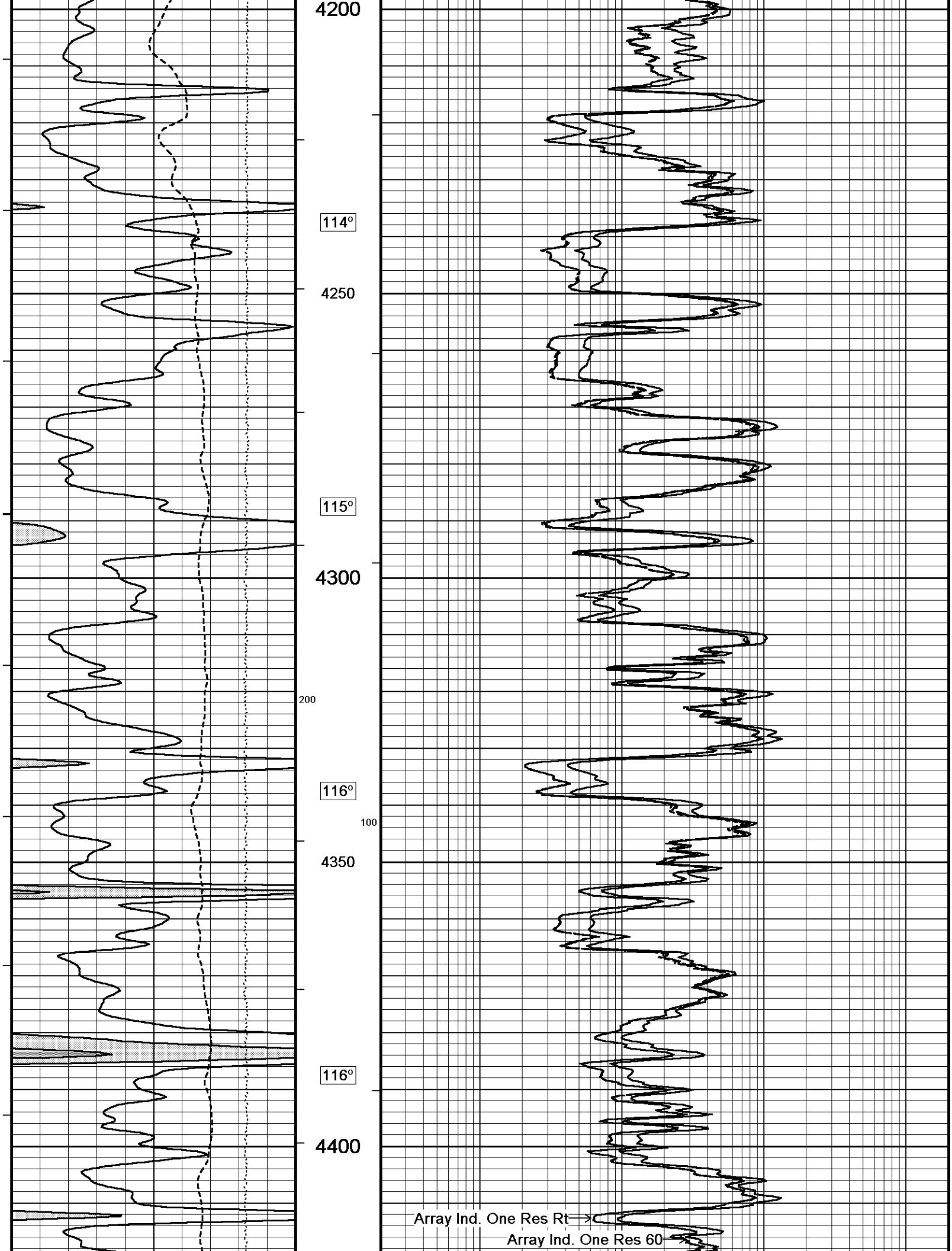

in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
20
Borehole
Temp in
deg F
HVI
every
10 cu ft
Annular
Integral
every
10 cu ft
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
Shallow FE
ohm metres
0.20
2000
1
10
100
1000
Array Ind. One Res 40
ohm metres
Array Ind. One Res 60
ohm metres
Array Ind. One Res Rt
ohm metres
3200
3250
3300
600
108°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma
DST Uphole Tension

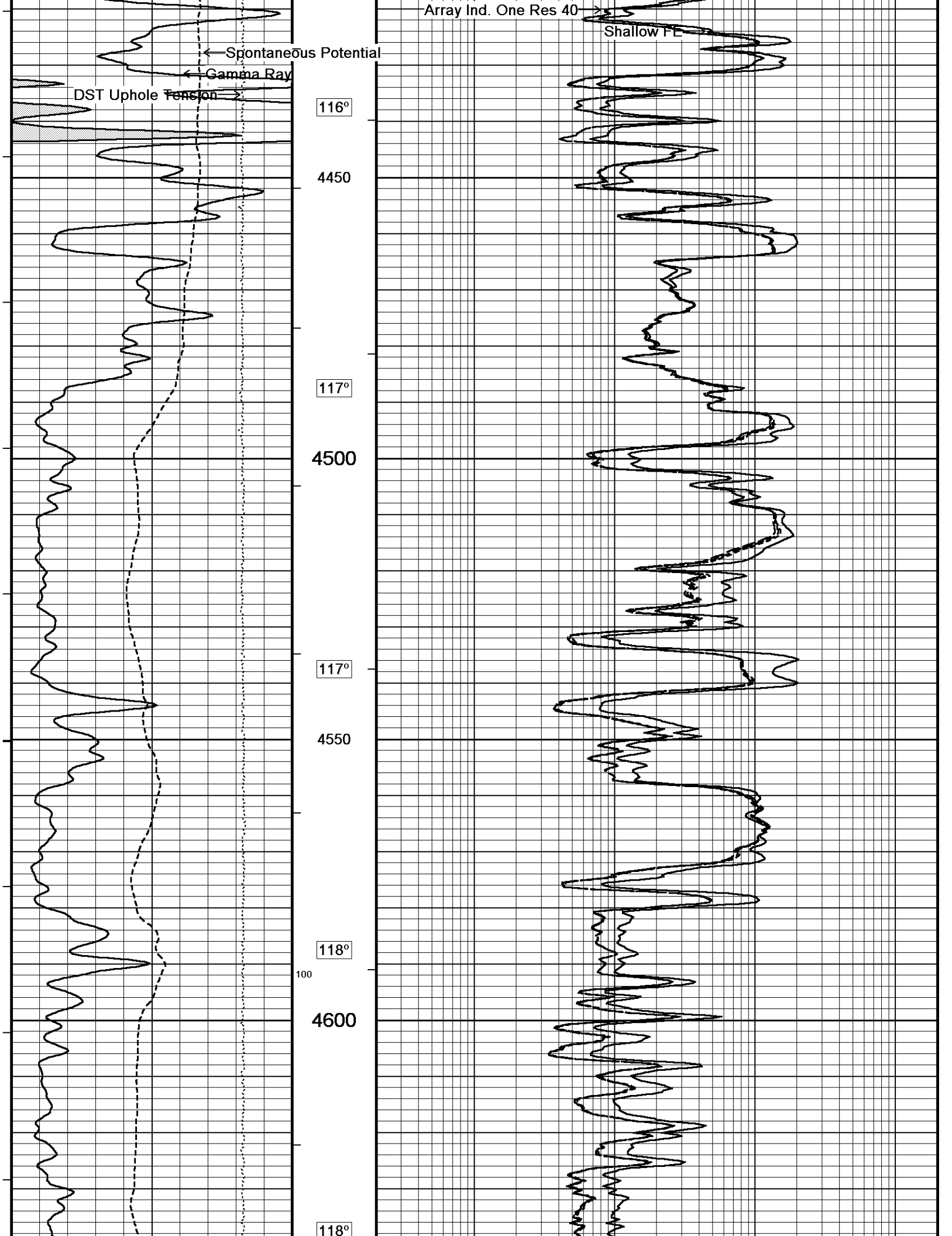

108°
3350
300
109°
3400
109°
3450
109°
500
3500
110°

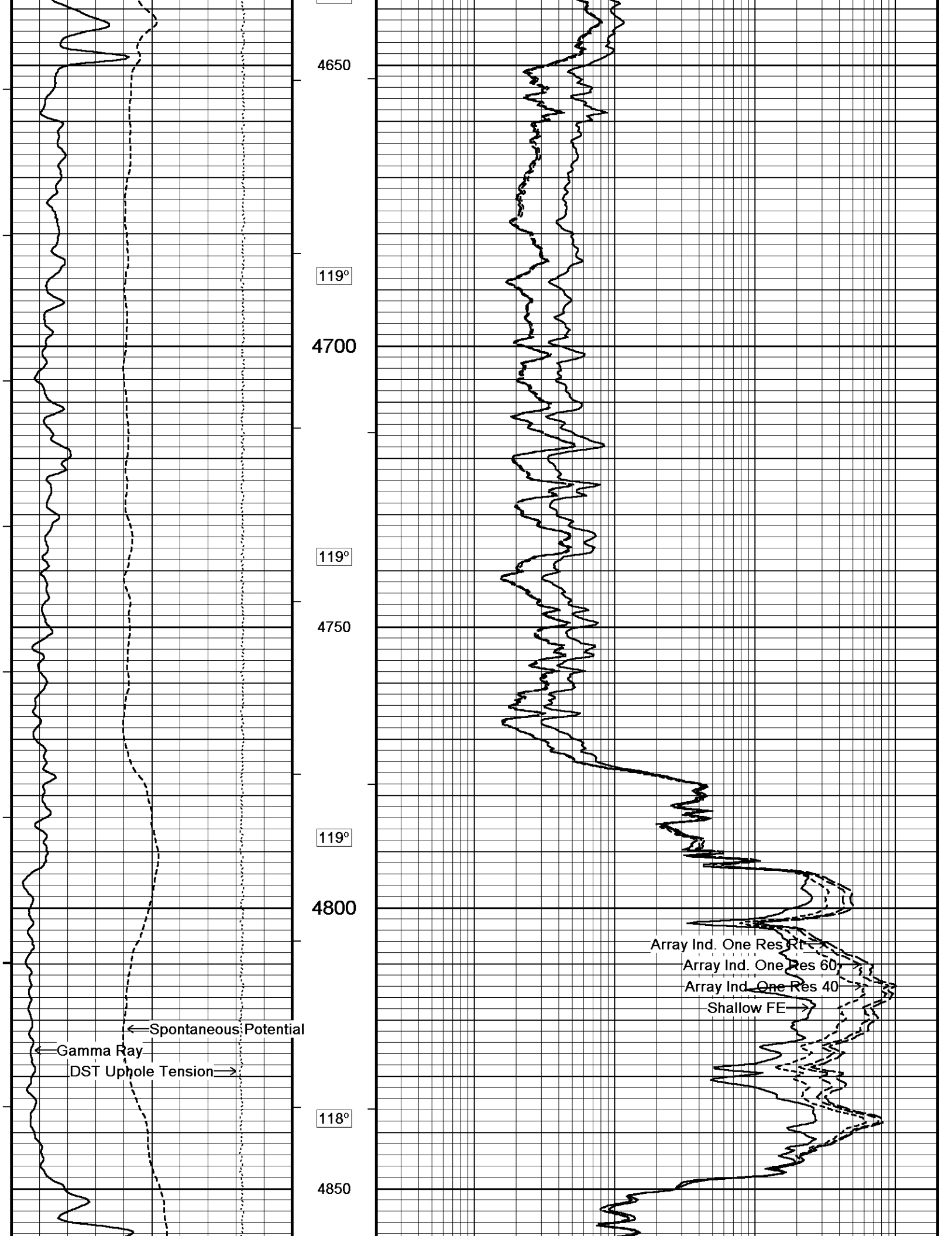

3550
110°
3600
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FF
111°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3650
111°
3700
111°
3750

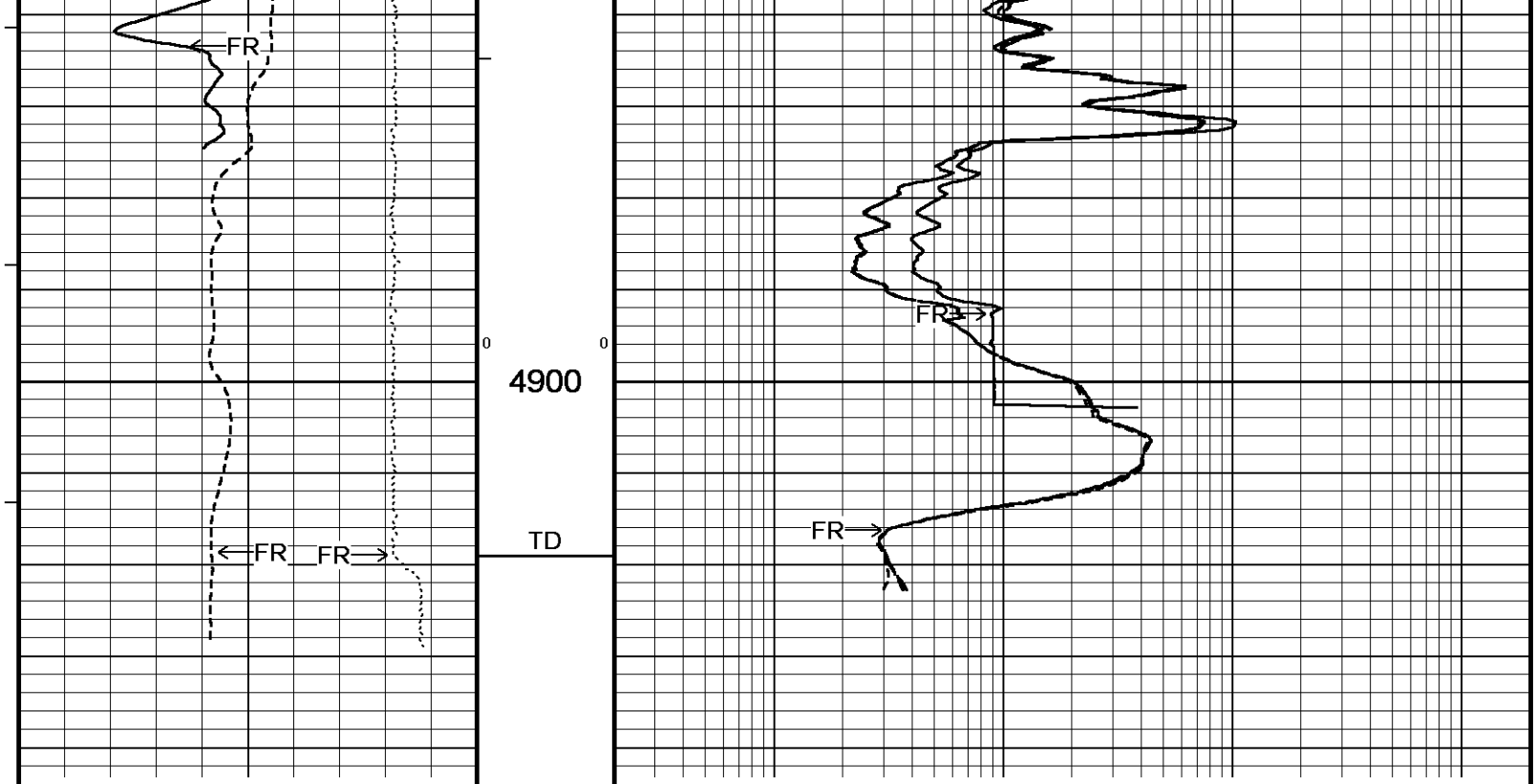

400
111°
3800
112°
3850
200
112°
3900
112°
3950


113°
4000
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
113°
4050
300
114°
4100
114°
4150
114°


4200
114°
4250
115°
4300
200
116°
100
4350
116°
4400
Array Ind. One Res Rt
Array Ind. One Res 60


Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
116°
4450
117°
4500
117°
4550
118°
100
4600
118°


4650
119°
4700
119°
4750
119°
4800
118°
4850
⟵Spontaneous Potential
⟵Gamma Ray
DST Uphole Tension⟶
Array Ind. One Res Rt⟶
Array Ind. One Res 60⟶
Array Ind. One Res 40⟶
Shallow FE⟶



Timing Marks
every 60.0 sec

Depth
in
Feet

Shallow FE
ohm metres
0.20 1 10 100 1000 2000

Gamma Ray
API
0 75 150
150 225 300

Borehole
Temp in
deg F

Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

HVI
every
10 cu ft

Spontaneous Potential
millivolts
− → | 20 | ← +

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Annular
Integral
every
10 cu ft

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta
Recorded on 25-JUL-2017 21:11
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

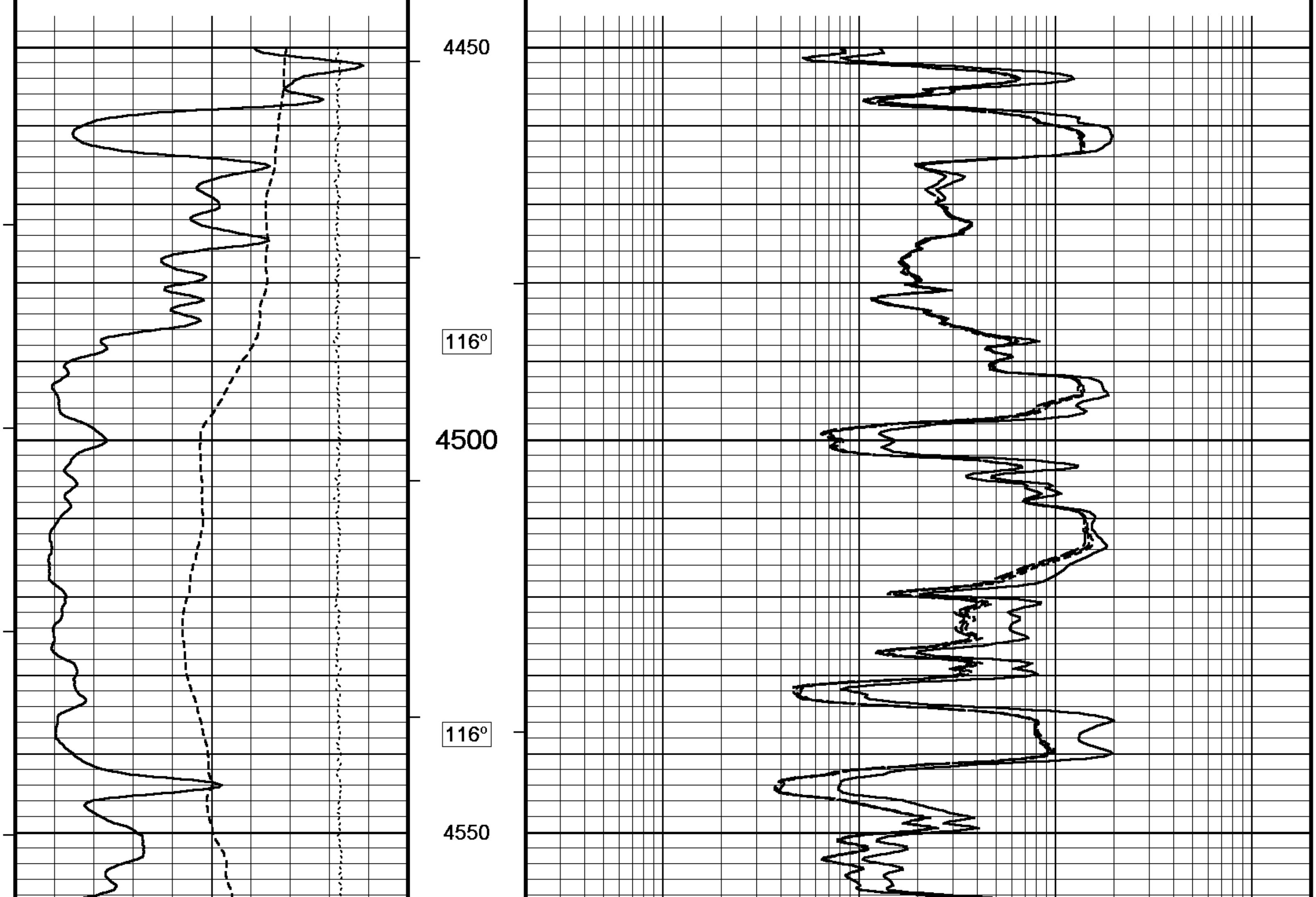
↑ 5 INCH MAIN ↑

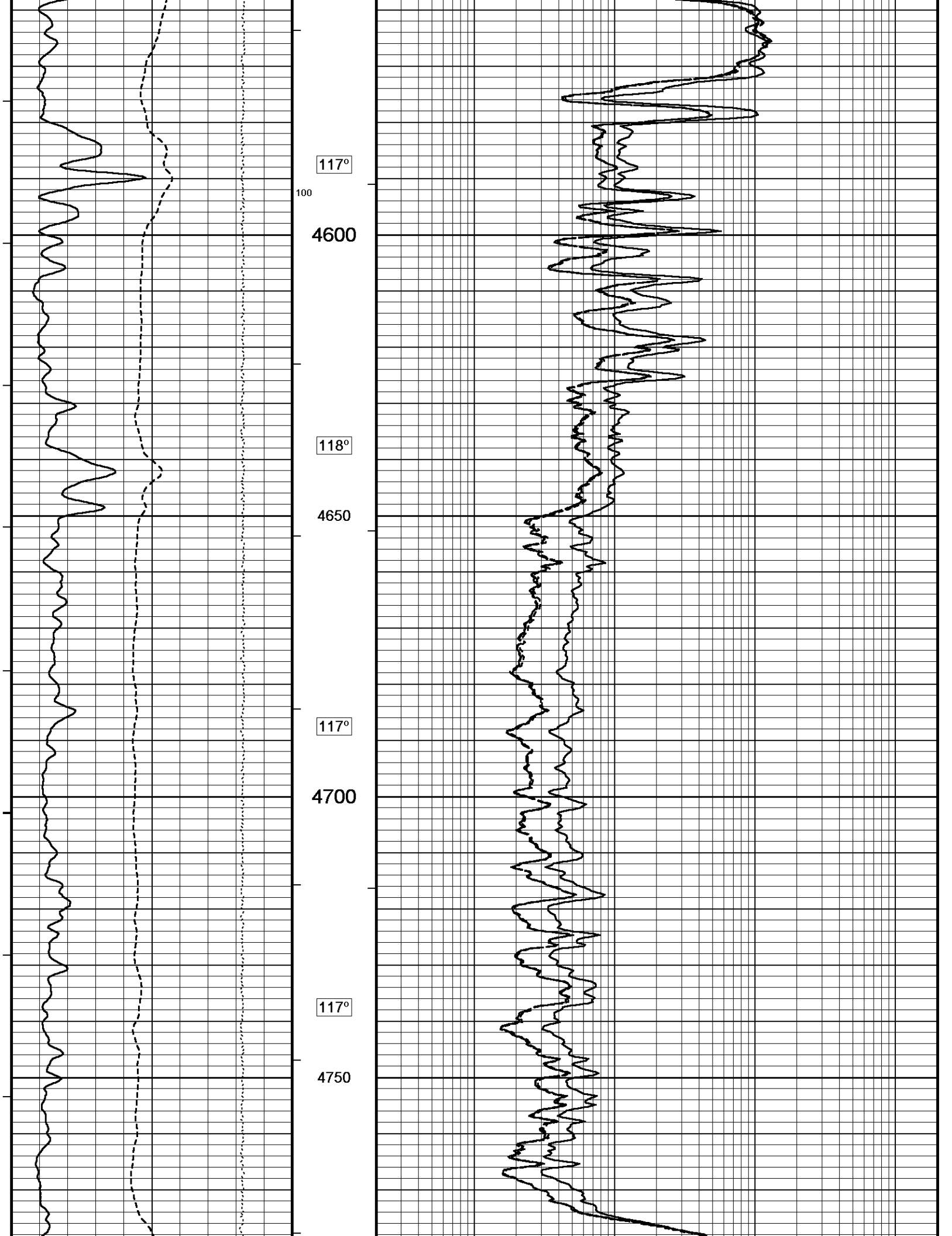
↓ REPEAT SECTION ↓

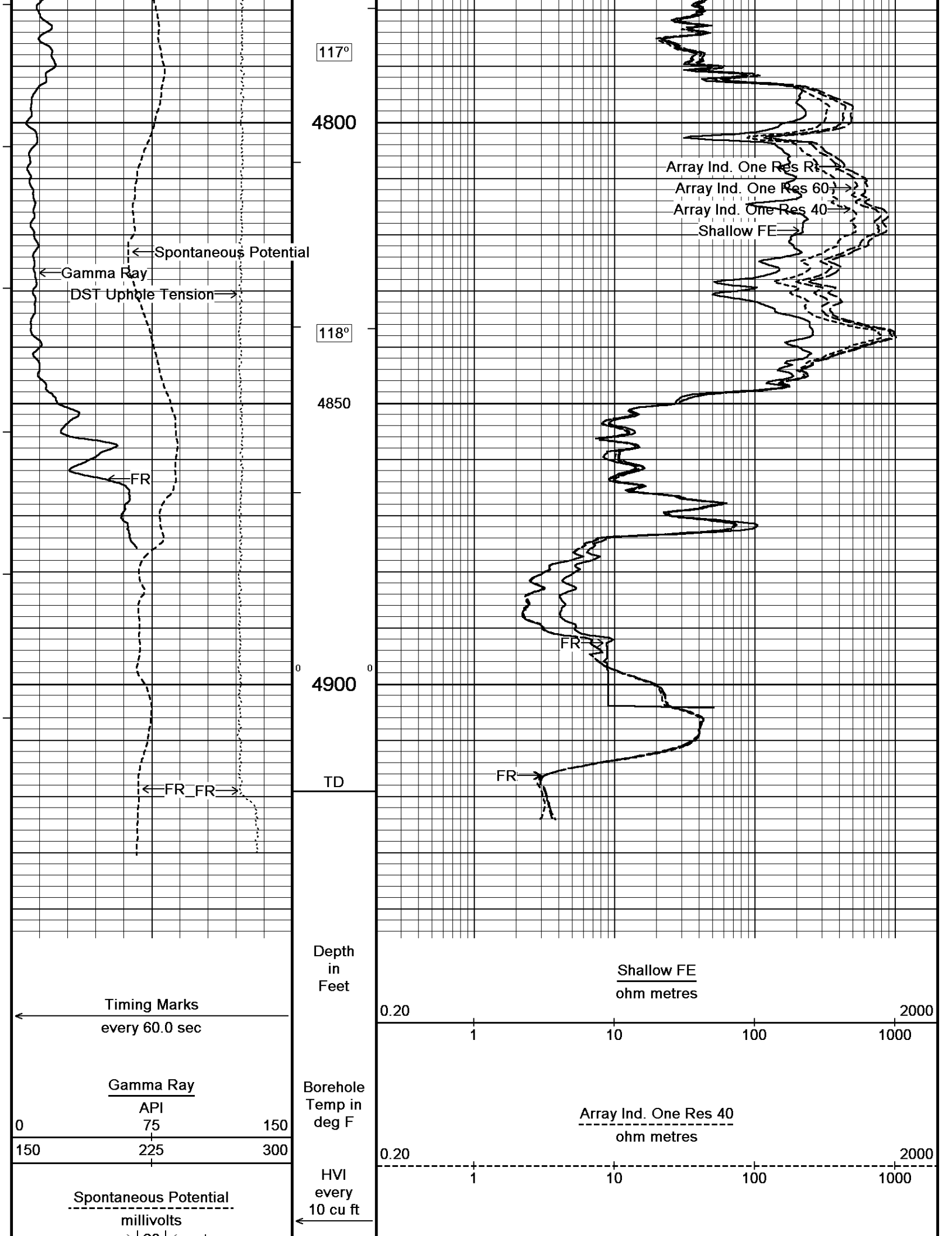
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_001.dta
Recorded on 25-JUL-2017 20:37

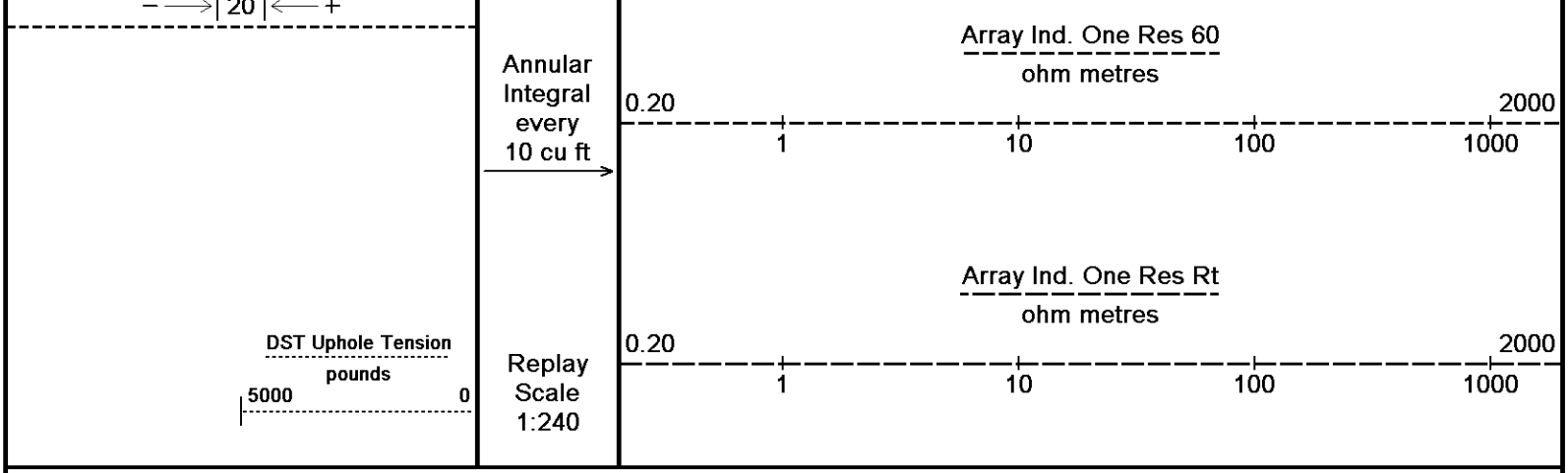
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

Left track	Depth track	Resistivity track
Timing Marks, every 60.0 sec	Depth in Feet	Shallow FE, ohm metres, 0.20 – 2000 (1, 10, 100, 1000)
Gamma Ray, API, 0 – 75 – 150; 150 – 225 – 300	Borehole Temp in deg F	Array Ind. One Res 40, ohm metres, 0.20 – 2000 (1, 10, 100, 1000)
Spontaneous Potential, millivolts, − ⟶| 20 |⟵ +	HVI every 10 cu ft	Array Ind. One Res 60, ohm metres, 0.20 – 2000 (1, 10, 100, 1000)
DST Uphole Tension, pounds, 5000 – 0	Annular Integral every 10 cu ft	Array Ind. One Res Rt, ohm metres, 0.20 – 2000 (1, 10, 100, 1000)
	Replay Scale 1:240	




117°
100
4600
118°
4650
117°
4700
117°
4750


117°
4800
118°
4850
4900
TD
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR FR
Array Ind. One Res RT
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
FR
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
Borehole Temp in deg F
HVI every 10 cu ft
Shallow FE
ohm metres
0.20
1
10
100
1000
2000
Array Ind. One Res 40
ohm metres
0.20
1
10
100
1000
2000



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_001.dta — Recorded on 25-JUL-2017 20:37
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_001.dta

General Constants All 000

Last Edited on 25-JUL-2017,20:06

General Parameters		
Mud Resistivity	0.770	ohm-metres
Mud Resistivity Temperature	75.000	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	None	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 21-JUL-2017 22:14

Reading No	Measured	Calibrated (lbs)
1	14039.09	0.00
2	14869.52	481.00

Gamma Calibration MCG-C 84

Field Calibration on 24-JUL-2017 07:22

	Measured	Calibrated (API)
Background	107	74
Calibrator (Gross)	771	530
Calibrator (Net)	664	456

Gamma Calibration Tolerances MCG-C 84

Ratio 1.456 (1.40 – 1.475 – 1.55) Counts/API

Gamma Constants MCG-C 84

Last Edited on 25-JUL-2017,19:02

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.14	gm/cc

Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-C 84

Field Calibration on 03-JUL-2017,10:23

	Measured	Calibrated (mV)
Reference 1	104.4	100.1
Reference 2	-95.8	-100.1

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 03-JUL-2017,10:23

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

High Resolution Temperature Constants MCG-C 84

Last Edited on 09-SEP-2014,02:23

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 21-JUL-2017,09:26
Field Check on 25-JUL-2017 19:55

Base Calibration

Channel	Measured Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Calibrated (ohm-m) Resistor 2
Micro Normal	10.0	49.7	5.1	25.6
Micro Inverse	10.0	50.1	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.9	77.9
Micro Inverse	51.0	51.0

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Normal Res. 2	49.7	-5% 50.0 +5% ohm
Micro Inverse Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	50.1	-5% 50.0 +5% ohm
Micro Normal Base Check	77.9	-2% 77.69 +2%	ohm-m			
Micro Inverse Base Check	51.0	-2% 50.89 +2%	ohm-m			
Micro Normal Field Check	77.9	-2% 77.9 +2%	ohm-m			
Micro Inverse Field Check	51.0	-2% 51.0 +2%	ohm-m			

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 25-JUL-2017,19:54

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	N/A	inches

Caliper Calibration MML-A 7

Base Calibration on 21-JUL-2017,09:17
Field Calibration on 25-JUL-2017 19:53

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13752	5.98
2	16863	7.97
3	19899	9.86
4	23808	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.08	8.10

Caliper Calibration Tolerances MML-A 7

Short Arm Field Cal.	8.08	7.90 8.10 8.30	in

Neutron Calibration MDN-A,B 114

Base Calibration on 21-JUL-2017,14:44

Field Check on 24-JUL-2017 07:26

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3156	98	3714	110
Ratio	32.298		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2073	3042
Ratio	0.682	

Field Check

	Calibrated (cps)	
	2103	3042
Ratio	0.691	

Neutron Calibration Tolerances MDN-A.B 114

		-5%	33	+5%
Ratio	32.298			

		0.65	0.7	0.75
Base Check	0.682			

		0.662	0.682	0.702
Field Check	0.691			

Neutron Constants MDN-A.B 114

Last Edited on 25-JUL-2017,19:02

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Modified Ratio	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 352

Base Calibration on 21-JUL-2017,09:08
Field Check on 25-JUL-2017 19:38

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	966.4	126.8
Base Check		280.6
Field Check		280.2

FE Calibration Tolerances MFE-B.J 352

		-3%	980.0	+3%	
Reference 2	966.4				ohm

		-2%	277.0	+2%	
Base Check	280.6				ohm-m

		-2%	280.6	+2%	
Field Check	280.2				ohm-m

FE Constants MFE-B.J 352

Last Edited on 25-JUL-2017,19:37

Running Mode	No Sleeve
MFE K Factor	0.1268

Borehole Correction Constants

Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-A.A 55

Last Edited on 25-JUL-2017,19:01

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
Waveform Discriminator Filter	N/A	
Semblance Window Width	N/A	micro-sec
Sonic Despiker	N/A	N/A

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 03-JUL-2017,10:17

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length	11

Induction Calibration MAI-A.A 111

Base Calibration on 21-JUL-2017,10:20
Field Check on 25-JUL-2017 19:49

Base Calibration

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2
Array Temperature		23.0	Deg F	

Test Loop Calibration Verified

Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	13.7	3869.0	16.4	3871.1	
2	30.1	3523.0	32.4	3524.7	
3	29.2	3017.0	31.2	3018.2	
4	19.2	2055.4	20.5	2056.1	
Deep	17.8	1959.3	19.2	1960.0	
Medium	43.1	3970.5	45.7	3972.2	
Shallow	44.9	5225.2	48.2	5227.9	
Array Temperature		95.2		97.0	Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6	13.0 17.0 21.0	mmho/m	High Conductivity 1	473.6	430.0 475.0 520.0	mmho/m
Low Conductivity 2	6.4	4.5 6.0 7.5	mmho/m	High Conductivity 2	385.9	345.0 385.0 425.0	mmho/m
Low Conductivity 3	3.2	1.0 3.5 6.0	mmho/m	High Conductivity 3	264.0	240.0 260.0 280.0	mmho/m
Low Conductivity 4	2.1	0.0 2.0 4.0	mmho/m	High Conductivity 4	135.5	120.0 135.0 150.0	mmho/m
Background Vx 1	0.0	-110.0 -32.5 45.0	mmho/m	Phase Check Loop 1	0.0	-2.0 0.0 2.0	%
Background Vx 2	0.0	-35.0 20.0 75.0	mmho/m	Phase Check Loop 2	0.0	-2.0 0.0 2.0	%
Background Vx 3	0.0	-60.0 2.5 65.0	mmho/m	Phase Check Loop 3	0.0	-2.0 0.0 2.0	%
Background Vx 4	0.0	-50.0 -17.5 15.0	mmho/m	Phase Check Loop 4	0.0	-2.0 0.0 2.0	%

Induction Constants MAI-A.A 111

Last Edited on 25-JUL-2017,20:06

Induction Model	RtAP-WBM	
Borehole Correction Constants		
Tool Centred	No	
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
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
Rm Source	Global Value: Temperature Corrected	
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

Symmetrised Receiver Gains		
Receiver 1	1.00	
Receiver 2	1.00	
Receiver 3	1.00	
Receiver 4	1.00	

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	

Photo Density Calibration MPD-C.A 216

Base Calibration on 21-JUL-2017,11:29
Field Check on 25-JUL-2017 19:37

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1034	1215		
Reference 1	51875	24845	59556	30836
Reference 2	20527	2316	24941	2541
Field Check at Base	1033.8	1215.4		
Field Check	1026.3	1216.8		

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	189	925		
Reference 1	21486	51702	0.419	0.371
Reference 2	5928	20410	0.295	0.272
Field Check at Base	189.2	924.8		
Field Check	186.9	927.3		

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.61	-5% 2.52 +5%	Far Density Ratio	21.48	-5% 21.00 +5%
PE Calibration	0.116	0.089 0.110 0.131			
Near Den. Field Check	1026.3	-3% 1033.8 +3%	Far Den. Field Check	1216.8	-3% 1215.4 +3%
PE WS Field Check	186.9	-6% 189.2 +6%	PE WH Field Check	927.3	-6% 924.8 +6%

Density Constants MPD-C.A 216

Last Edited on 25-JUL-2017,19:49

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	1.14	gm/cc
Mud Density Type		
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	
Precision Enhanced Density Processing	Not Applied	

Matrix Density (gm/cc) Depth (ft)

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

Caliper Calibration MPD-C.A 216

Base Calibration on 21-JUL-2017,11:21
Field Calibration on 25-JUL-2017 19:52

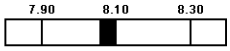
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18416	3.99
2	28544	5.98
3	38624	7.97
4	48448	9.86
5	59555	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.05	8.10

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 8.05 

in

DOWNHOLE EQUIPMENT

C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_001.dta

Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

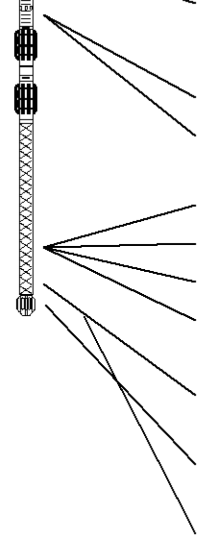
Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

55.39 ft	GRGC - MCG Gamma Ray
52.48 ft	CGXT - MCG External Temperature
46.76 ft	MLTC - MML Caliper
45.76 ft	MINV - Micro-inverse
45.76 ft	MNRL - Micro-normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.07 ft Weight: 480.6 lb



15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
2.58 ft	R40O - Array Ind. One Res 40
2.58 ft	R60O - Array Ind. One Res 60
2.58 ft	CTAO - Array Ind. One Cond Ct
2.58 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	CHOLLA PRODUCTION, LLC.
WELL	R&R DUMLER #1-21
FIELD	WILDCAT
PROVINCE/COUNTY	HODGEMAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2474	feet	First Reading	4916.00	feet
Elevation Drill Floor	2472	feet	Depth Driller	4920.00	feet
Elevation Ground Level	2469	feet	Depth Logger	4919.00	feet

Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY	CHOLLA PRODUCTION, LLC.
WELL	R&R DUMLER #1-21
FIELD	WILDCAT
PROVINCE/COUNTY	HODGEMAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1110' FSL & 655' FWL

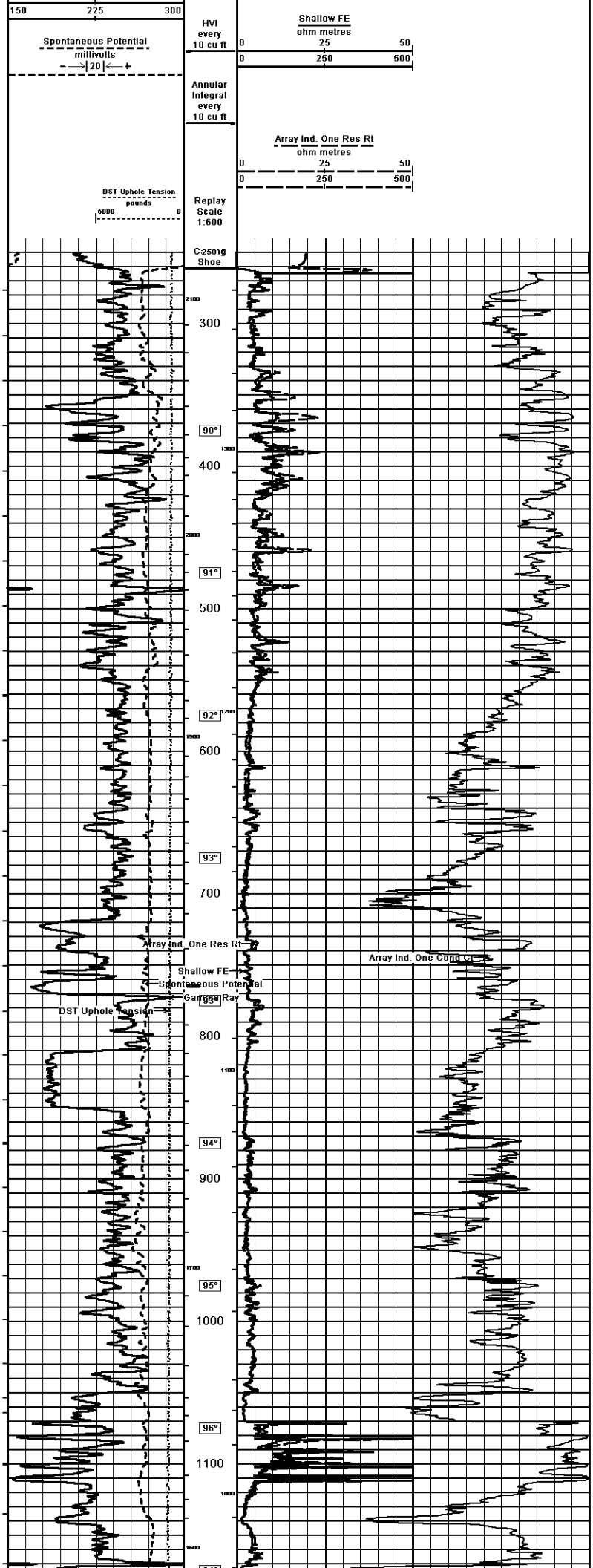
SEC 21	TWP 21S	RGE 26W	Other Services: MPD/MDN, MSS, MML
Latitude			
Longitude			
API Number	15-083-21939		
Permanent Datum GL, Elevation 2469 feet			Elevations: feet
Log Measured From KB, 5.00 feet above Permanent Datum			KB 2474.00
Drilling Measured From KB			DF 2472.00
			GL 2469.00

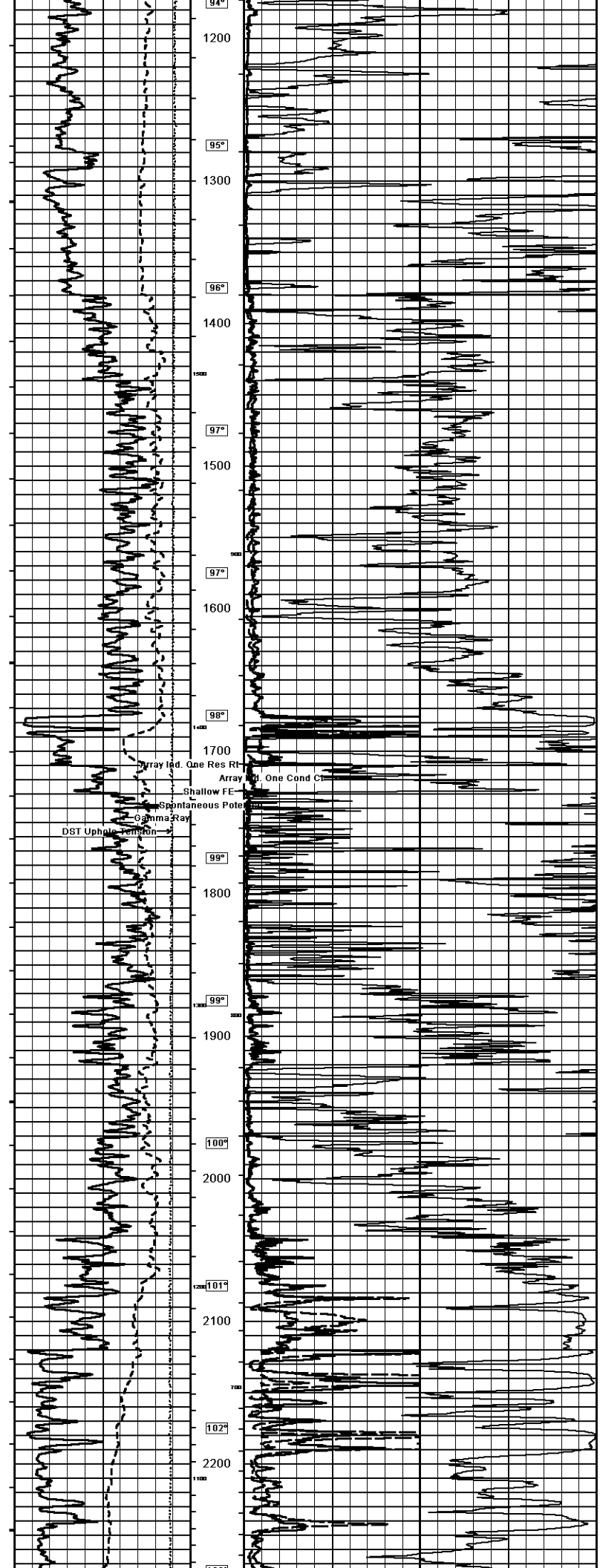
Date	25-JUL-2017	
Run Number	ONE	
Service Order	4568-18822573	
Depth Driller	4920.00	feet
Depth Logger	4919.00	feet
First Reading	4916.00	feet
Last Reading	261.00	feet
Casing Driller	261.00	feet
Casing Logger	261.00	feet
Bit Size	7.875	inches
Hole Fluid Type	CHEMICAL	
Density / Viscosity	9.50 lb/USg	48.00 CP
PH / Fluid Loss	10.50	8.00 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	0.77 @ 75.0	ohm-m
Rmf @ Measured Temp	0.62 @ 75.0	ohm-m
Rmc @ Measured Temp	0.92 @ 75.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.49 @ 119.0	ohm-m
Time Since Circulation	5 HOURS	
Max Recorded Temp	119.00	deg F
Equipment / Base	13096	LIB
Recorded By	ADAM SILL	
Witnessed By	CLAYTON ERICKSON	

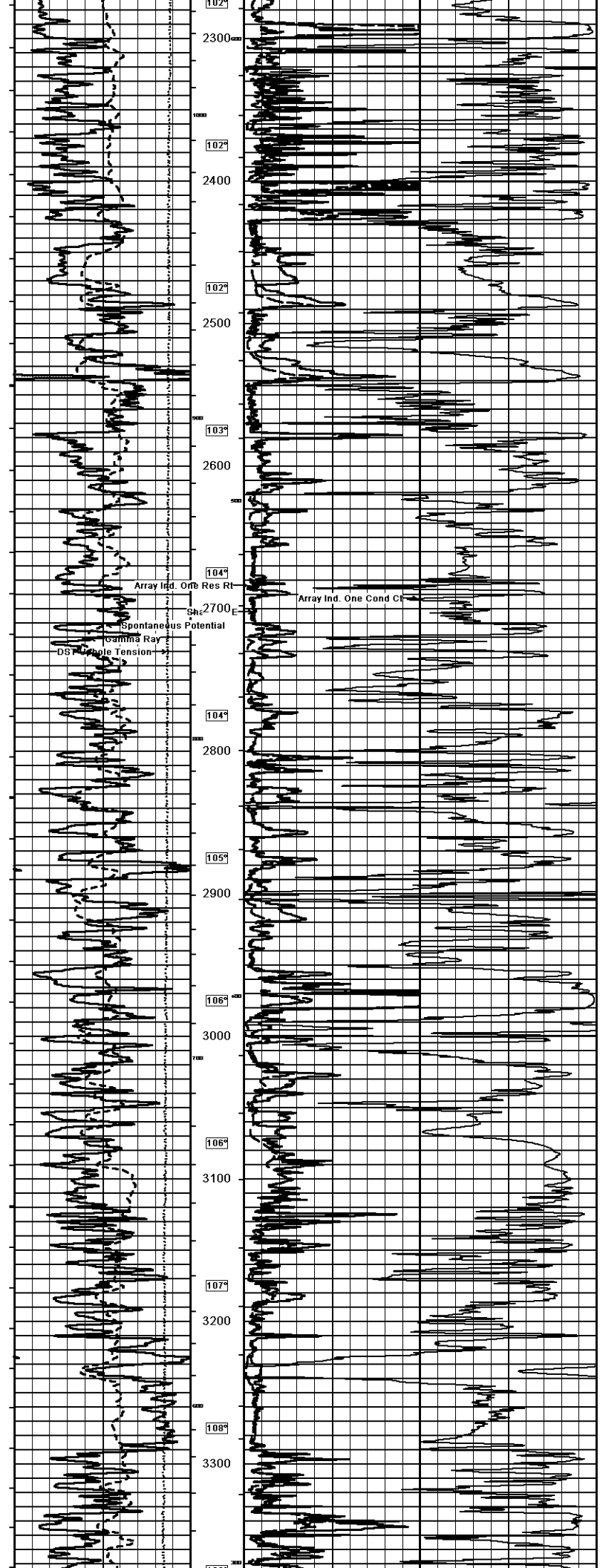
1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta — Recorded on 25-JUL-2017 21:11
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

Timing Marks every 60.0 sec; Gamma Ray API 0 – 75 – 150	Depth In Feet; Borehole Temp in deg F	Array Ind. One Cond Ct mmhos/metre 1000 – 750 – 500 – 250 – 0; 2000 – 1750 – 1500 – 1250 – 1000


150
225
300
Spontaneous Potential
millivolts
20
HVI
every
10 cu ft
Shallow FE
ohm metres
0
25
50
0
250
500
Annular
Integral
every
10 cu ft
Array Ind. One Res Rt
ohm metres
0
25
50
0
250
500
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:600
C2501g
Shoe
300
90°
400
91°
500
92°
600
93°
700
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Cond Ct
800
94°
900
95°
1000
96°
1100


94°
1200
95°
1300
96°
1400
97°
1500
97°
1600
98°
1700
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
99°
1800
99°
1900
100°
2000
101°
2100
102°
2200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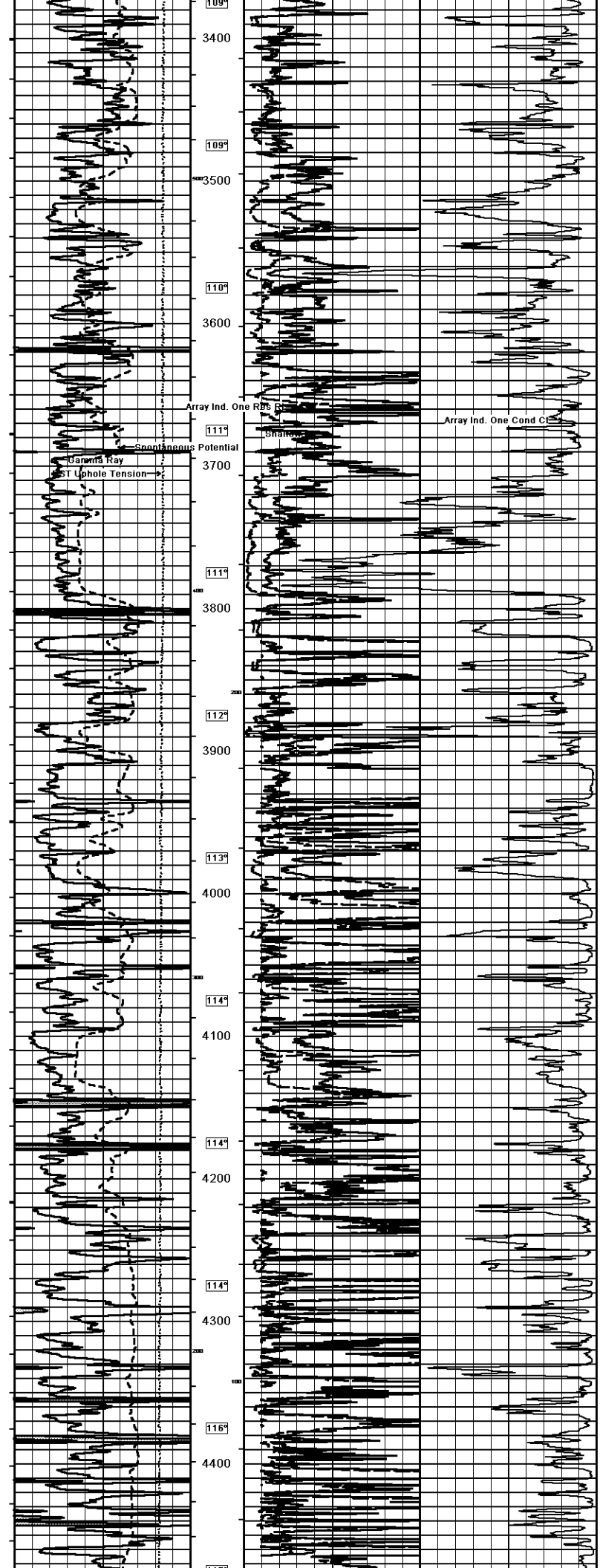
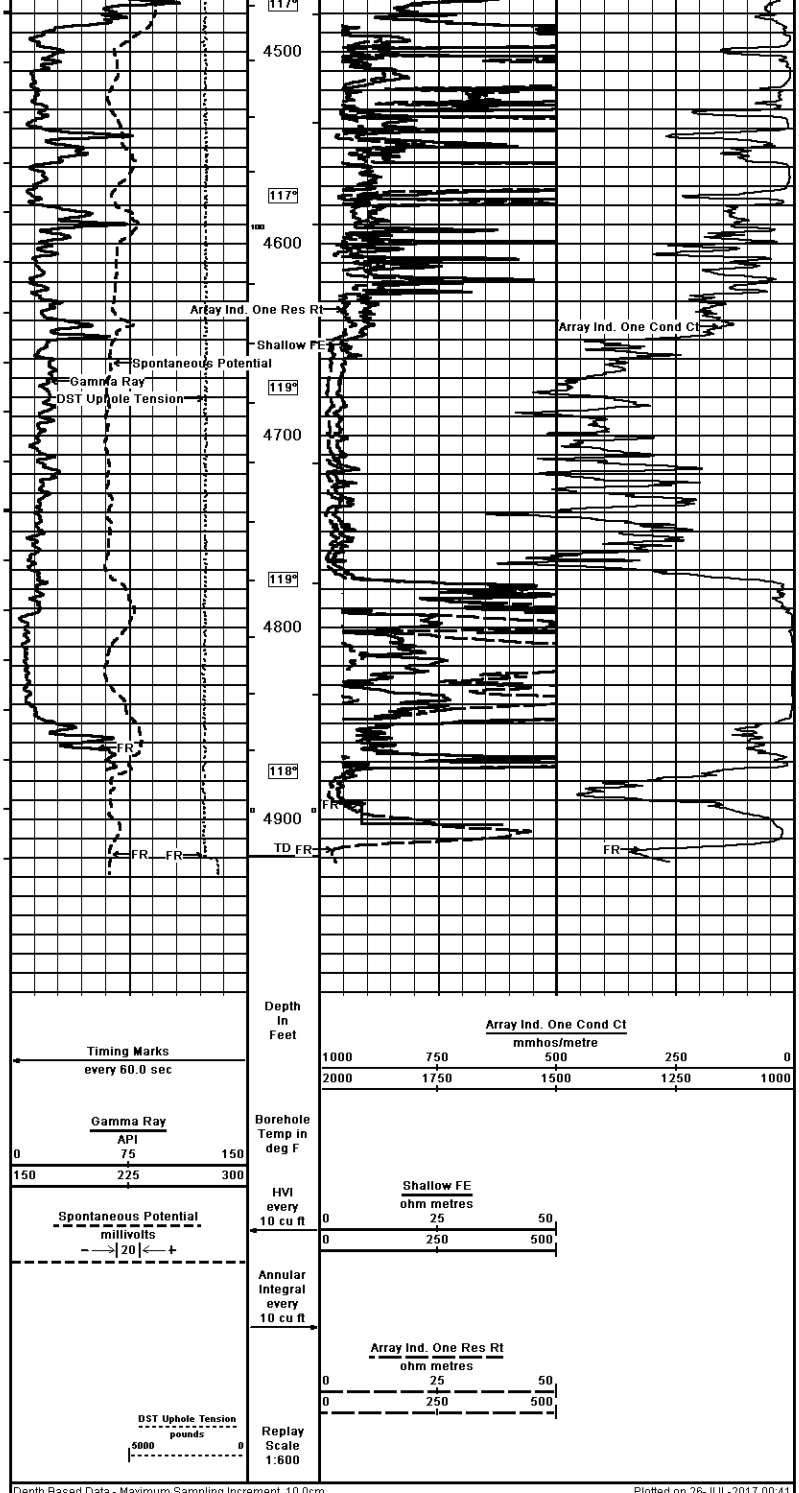
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Cable Tension


3400
3500
3600
3700
3800
3900
4000
4100
4200
4300
4400
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
ST Uphole Tension



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 26-JUL-2017 00:41
Filename: C:\Minimus 17.01.7206\Data\Cholla R&R Dumler #1-21\Cholla R&R Dumler #1-21_002.dta — Recorded on 25-JUL-2017 21:11
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

1 INCH MAIN

COMPANY	CHOLLA PRODUCTION, LLC.
WELL	R&R DUMLER #1-21
FIELD	WILDCAT
PROVINCE/COUNTY	HODGEMAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2474	feet	First Reading	4916.00	feet
Elevation Drill Floor	2472	feet	Depth Driller	4920.00	feet
Elevation Ground Level	2469	feet	Depth Logger	4919.00	feet

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG