# ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

Weatherford®

| | |
|---|---|
| COMPANY | SUEMAUR EXPLORATION & PRODUCTION, LLC. |
| WELL | KUEHN FAMILY TRUST #1-23 |
| FIELD | WILDCAT |
| PROVINCE/COUNTY | SHERIDAN |
| COUNTRY/STATE | U.S.A. / KANSAS |
| LOCATION | 2304' FNL & 582' FWL |

| | | |
|---|---|---|
| SEC 23 | TWP 6S | RGE 28W |
| Latitude | | |
| Longitude | | |
| API Number | 15-179-21415 | |

Other Services
MDN/MPD MML
MSS

Permanent Datum GL, Elevation 2707 feet
Log Measured From KB
Drilling Measured From KB @ 5 FEET

| Elevations: | feet |
|---|---|
| KB | 2712.00 |
| DF | 2710.00 |
| GL | 2707.00 |

| | | | | |
|---|---|---|---|---|
| Date | 24-FEB-2016 | | | |
| Run Number | ONE | | | |
| Service Order | 4558-143539587 | | | |
| Depth Driller | 4425.00 | feet | | |
| Depth Logger | 4427.00 | feet | | |
| First Reading | 4424.00 | feet | | |
| Last Reading | 261.00 | feet | | |
| Casing Driller | 262.00 | feet | | |
| Casing Logger | 261.00 | feet | | |
| Bit Size | 7.875 | inches | | |
| Hole Fluid Type | CHEMICAL | | | |
| Density / Viscosity | 9.00 lb/USg | | 57.00 CP | |
| PH / Fluid Loss | 11.50 | | 5.20 ml/30Min | |
| Sample Source | FLOWLINE | | | |
| Rm @ Measured Temp | 0.87 @ 75.0 | ohm-m | | |
| Rmf @ Measured Temp | 0.70 @ 75.0 | ohm-m | | |
| Rmc @ Measured Temp | 1.04 @ 75.0 | ohm-m | | |
| Source Rmf / Rmc | CALC | | CALC | |
| Rm @ BHT | 0.56 @116.0 | ohm-m | | |
| Time Since Circulation | 5 HOURS | | | |
| Max Recorded Temp | 116.00 | deg F | | |
| Equipment / Base | 13096 | | OKC | |
| Recorded By | ADAM SILL | | | |
| Witnessed By | ROCKY MILFORD | | | |

## BOREHOLE RECORD

Last Edited: 24-FEB-2016 21:59

| Bit Size inches | Depth From feet | Depth To feet |
|---|---|---|
| 7.875 | 262.00 | 4425.00 |

## CASING RECORD

| Type | Size inches | Depth From feet | Shoe Depth feet | Weight pounds/ft |
|---|---|---|---|---|
| SURFACE | 8.625 | 0.00 | 262.00 | 24.00 |

## REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.
- 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: 1512 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 829 CU.FT.

- RIG: MURFIN #7.

- ENGINEER: A. SILL.

- OPERATOR: J. LaPOINT.

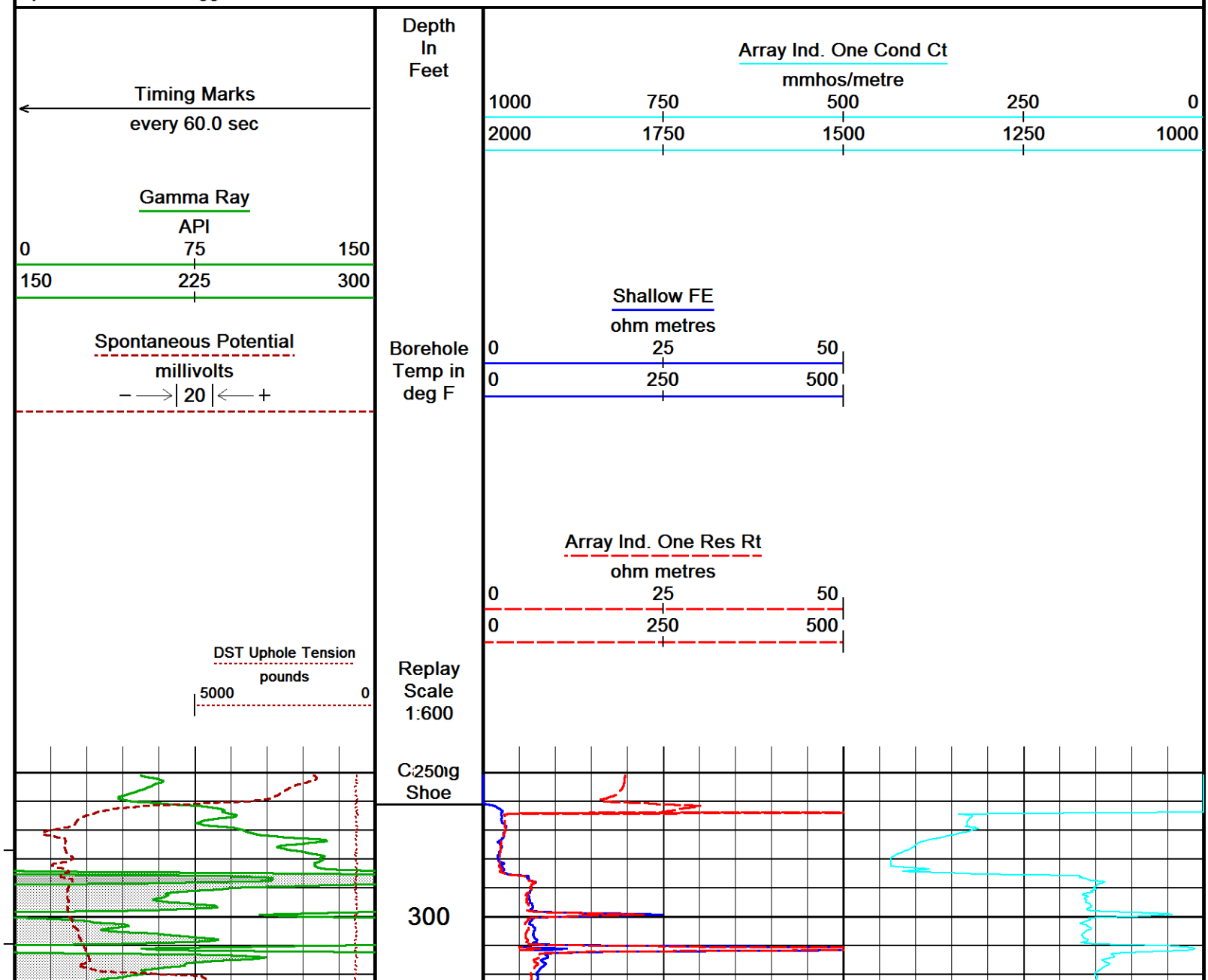
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

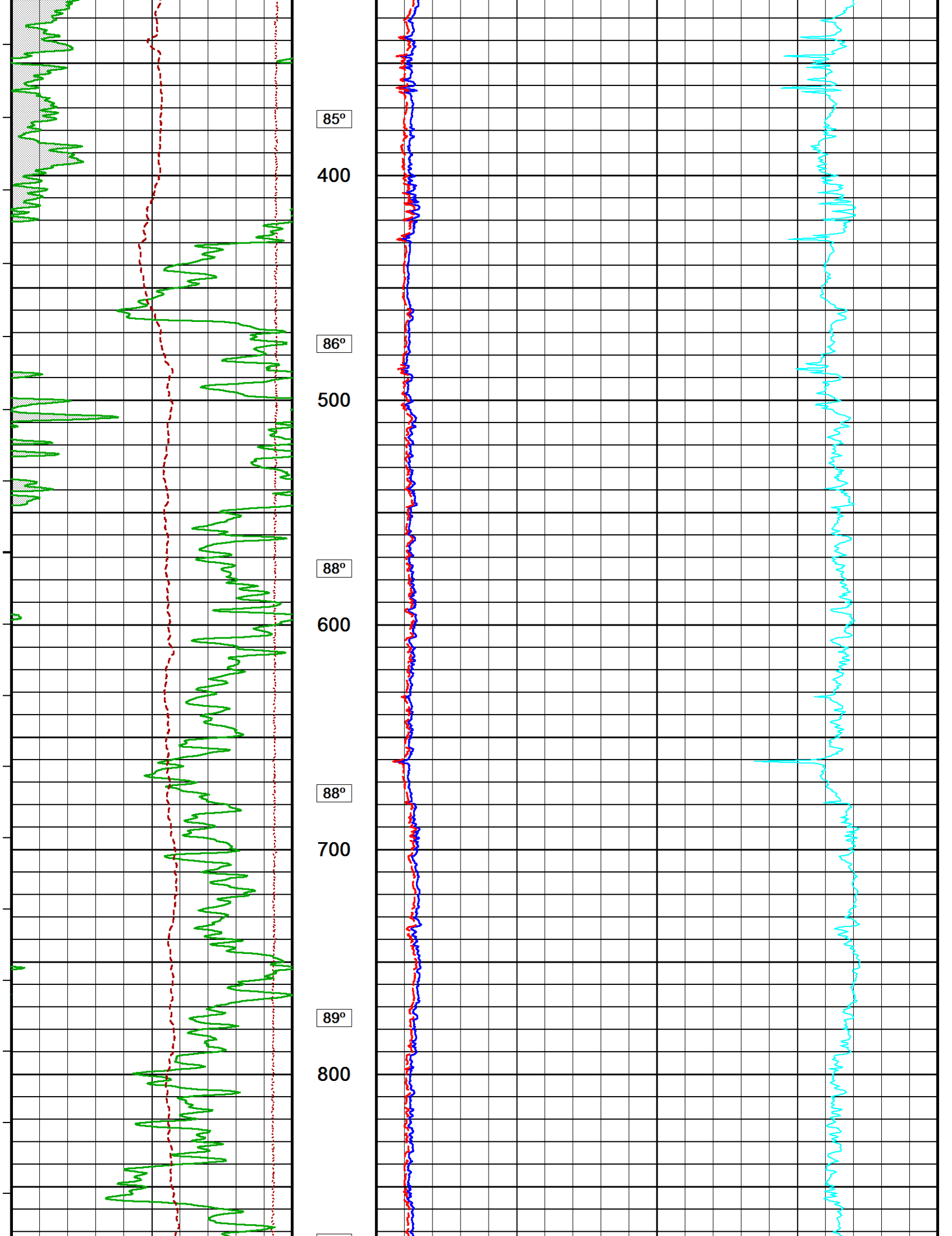
## 2 INCH MAIN

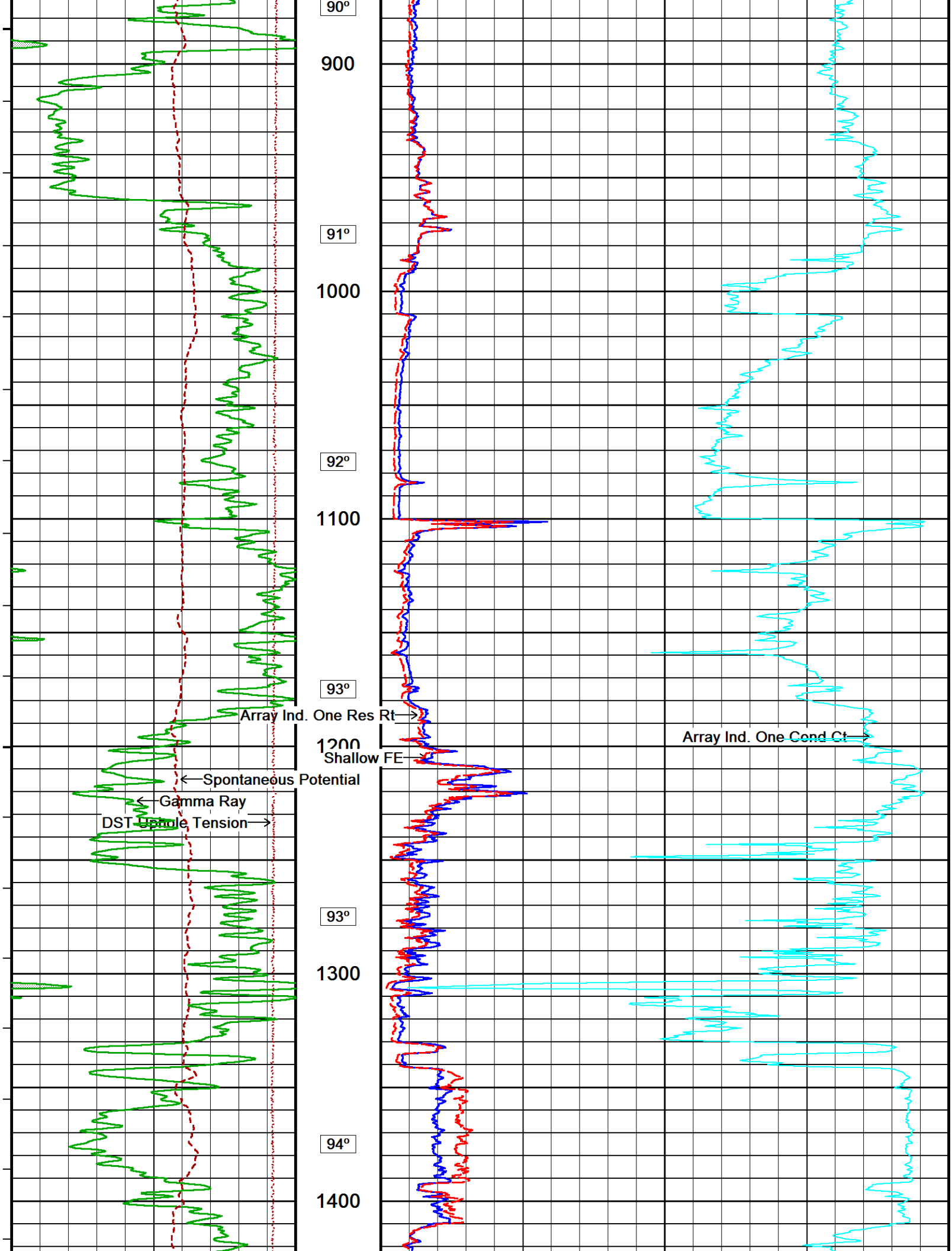
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 25-FEB-2016 04:35

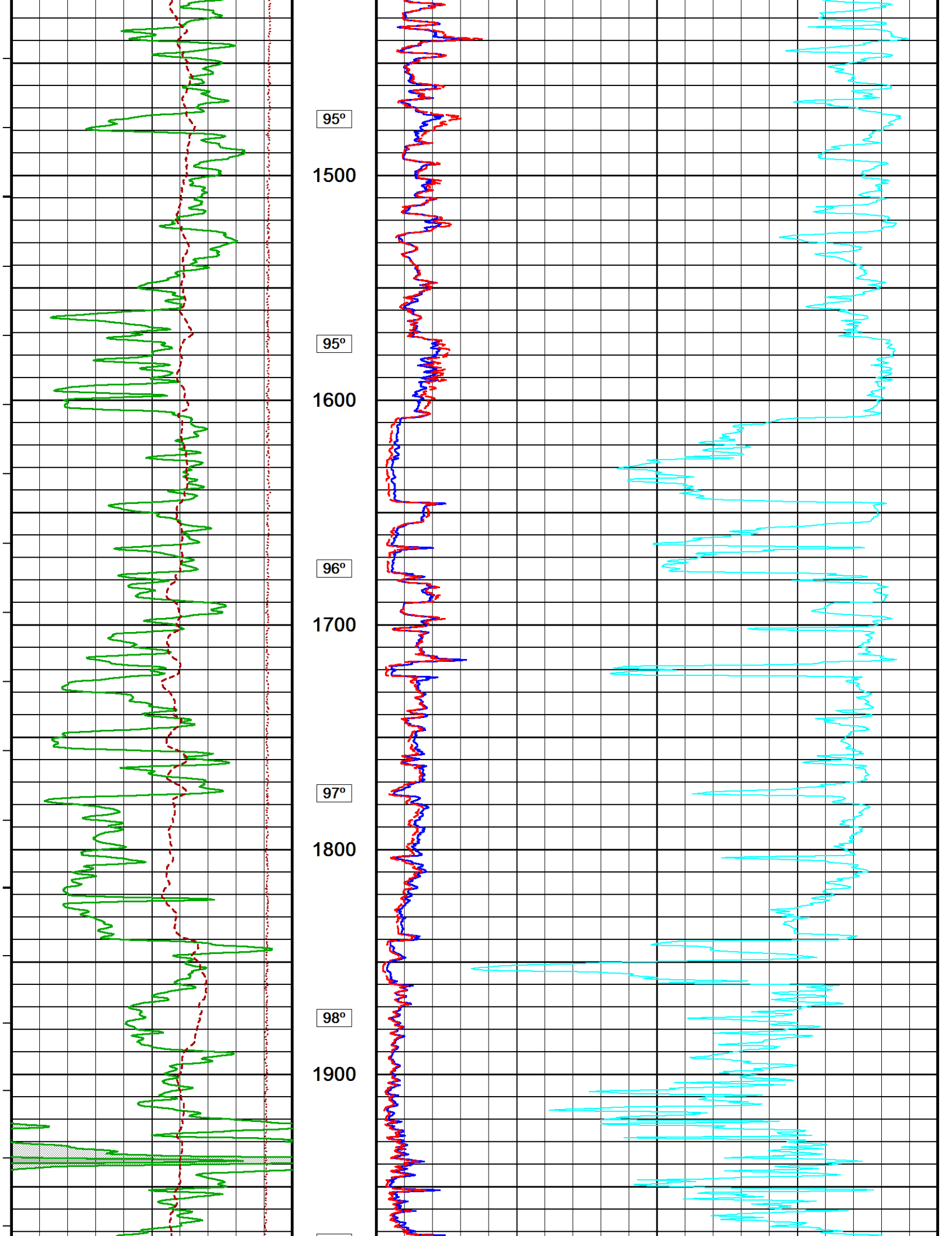
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_003.dta — Recorded on 25-FEB-2016 01:43

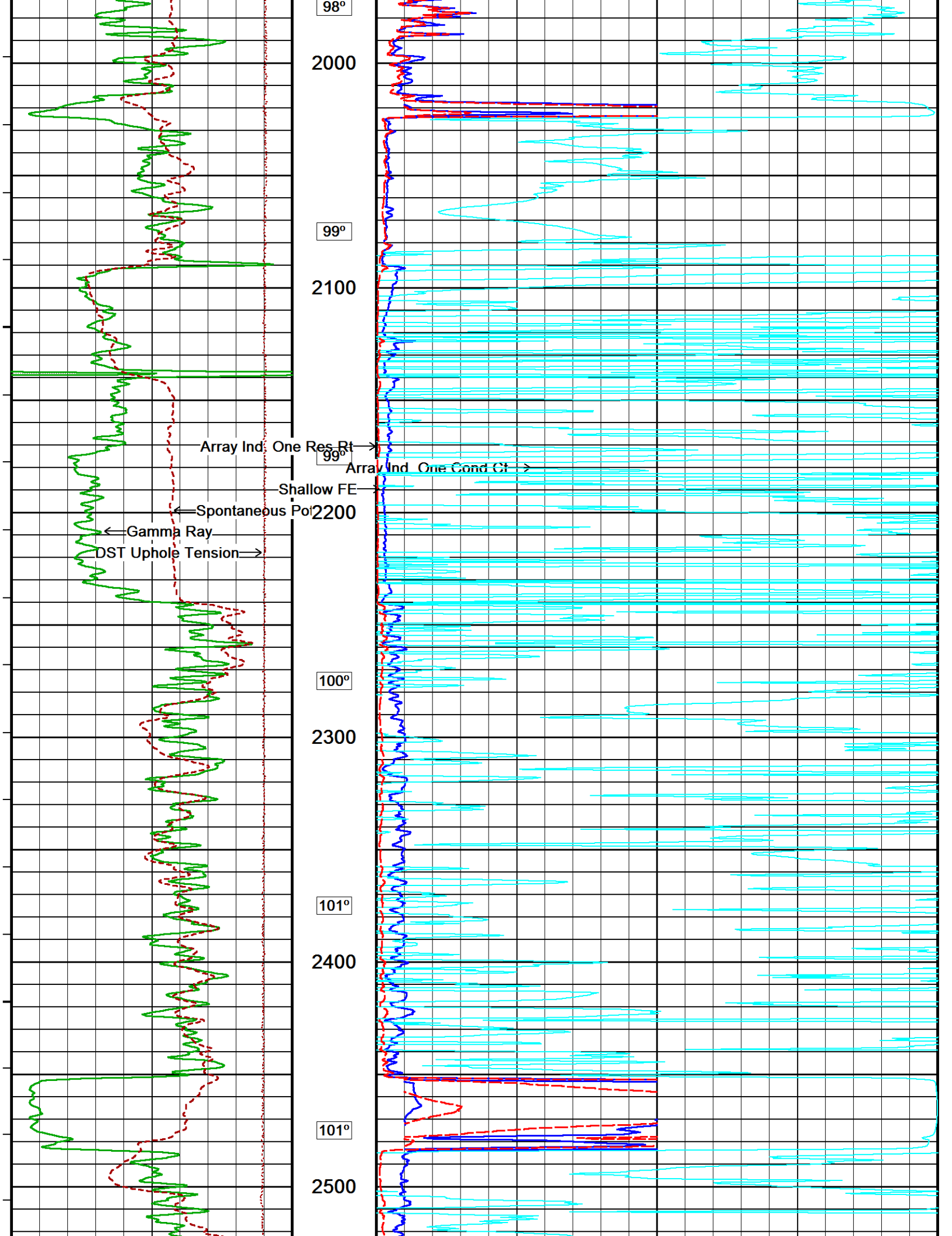
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

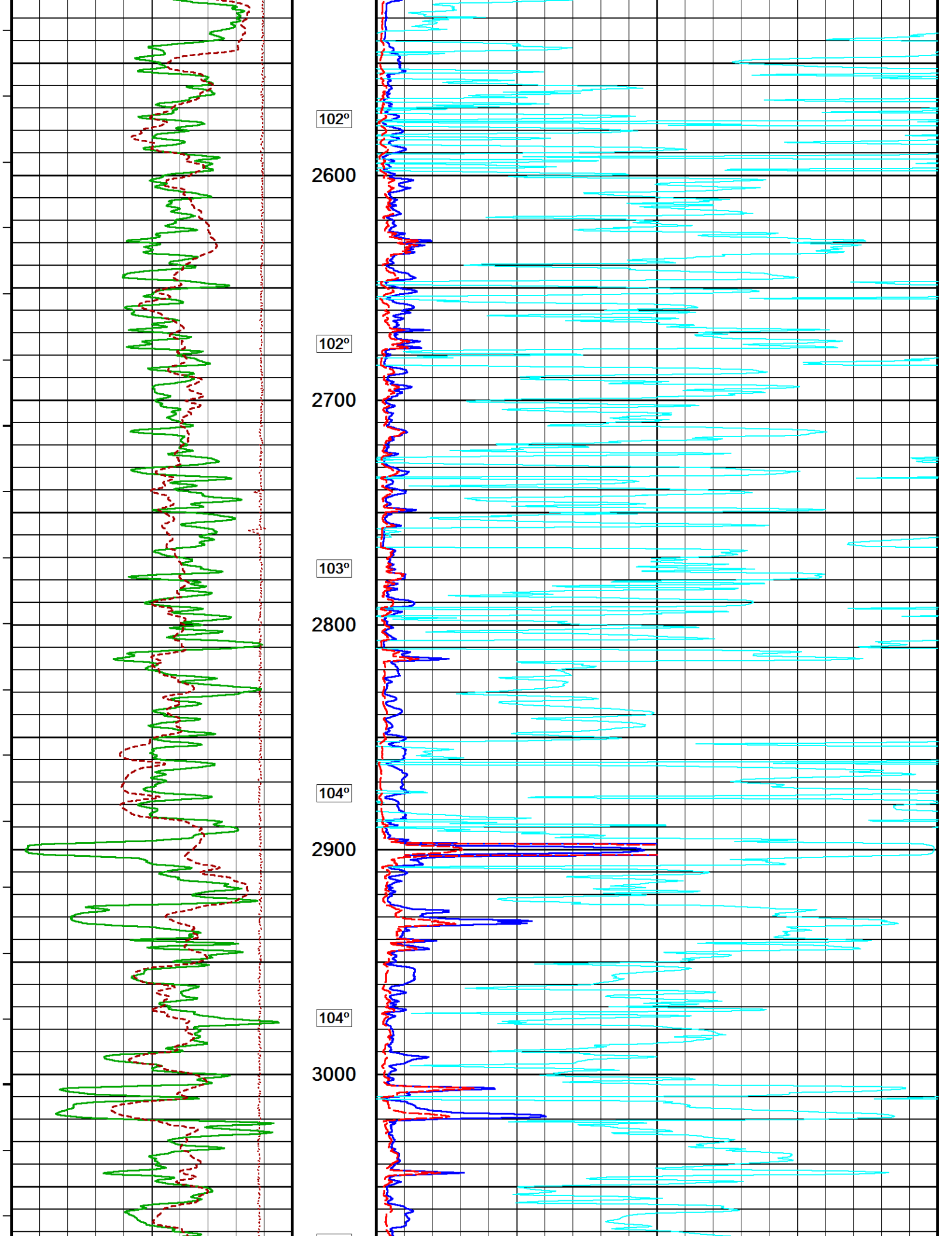


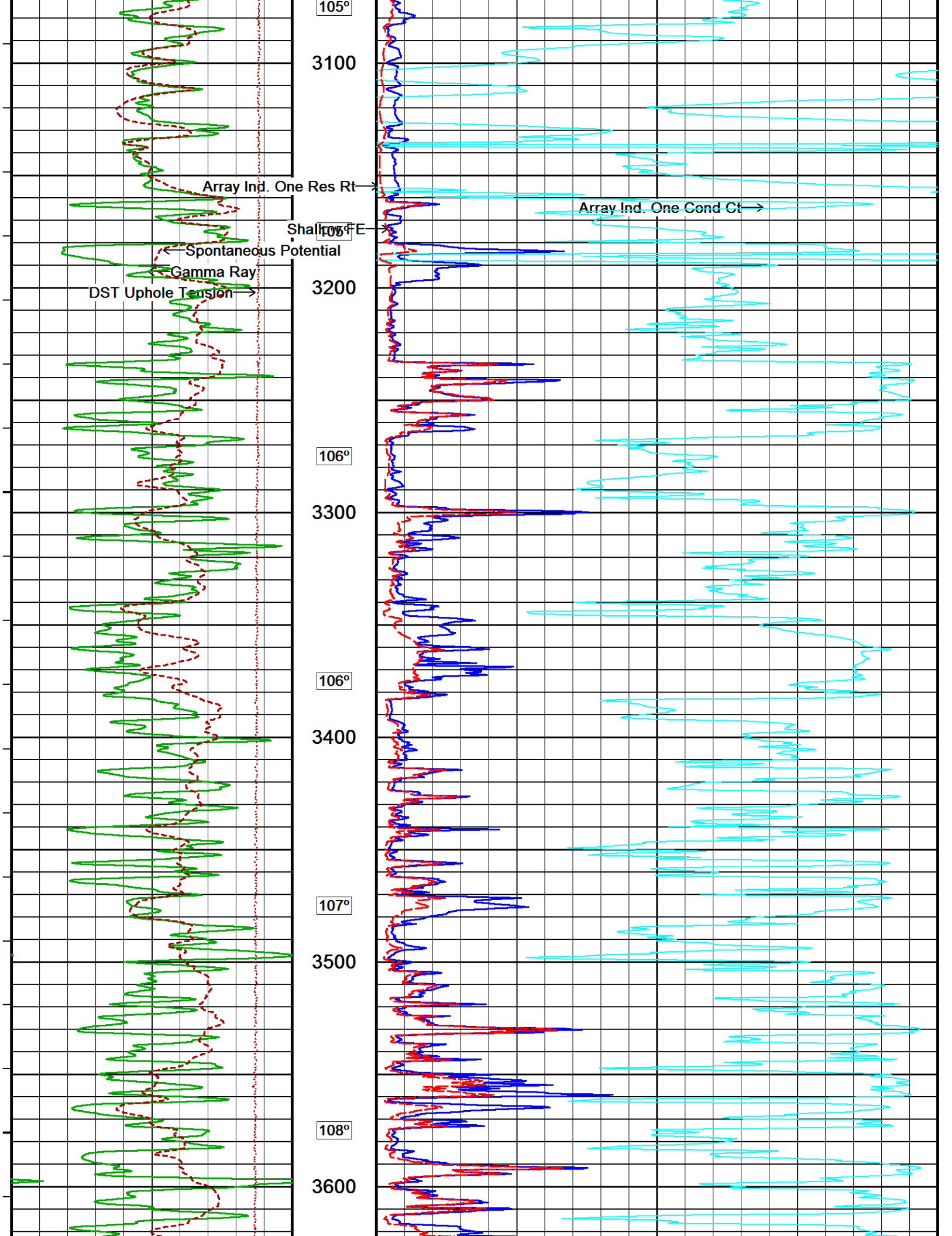

85°
400
86°
500
88°
600
88°
700
89°
800

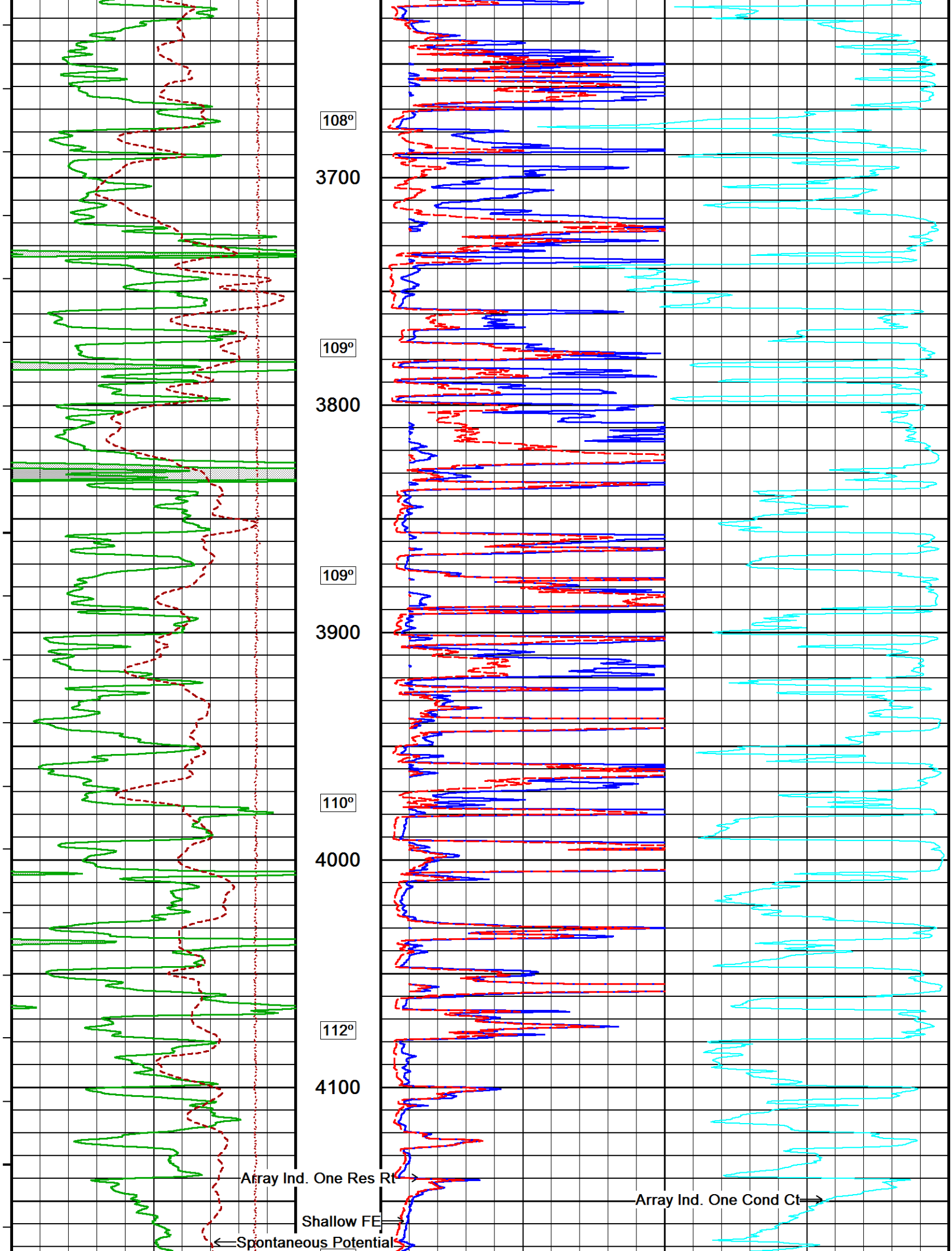

90°
900
91°
1000
92°
1100
93°
Array Ind. One Res Rt
1200
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Cond Ct
93°
1300
94°
1400

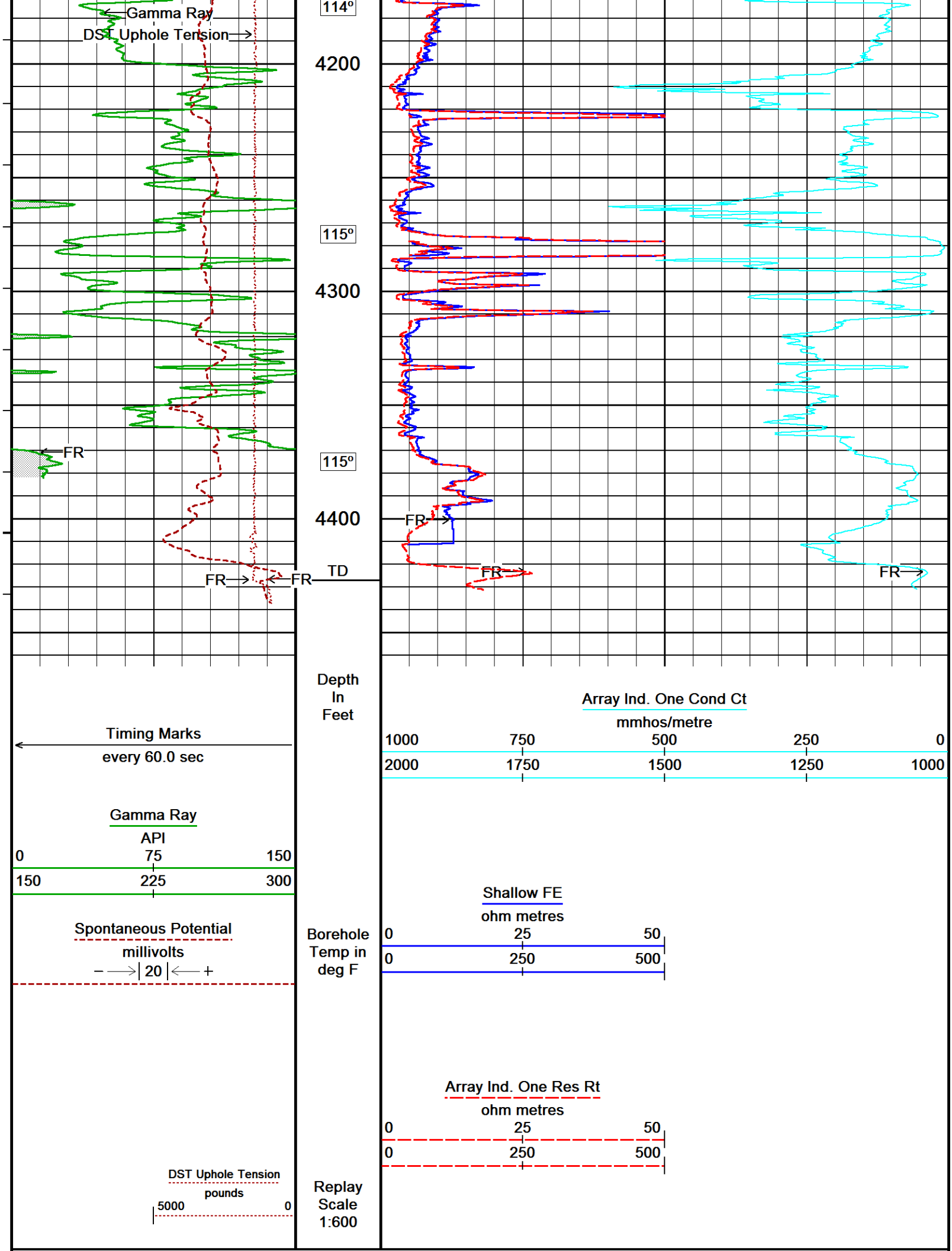

95°
1500
95°
1600
96°
1700
97°
1800
98°
1900


98°
2000
99°
2100
Array Ind. One Res Rt
99°
Array Ind. One Cond Ct
Shallow FE
Spontaneous Pot
2200
Gamma Ray
DST Uphole Tension
100°
2300
101°
2400
101°
2500


102°
2600
102°
2700
103°
2800
104°
2900
104°
3000


105°
3100
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3200
106°
3300
106°
3400
107°
3500
108°
3600


108°
3700
109°
3800
109°
3900
110°
4000
112°
4100
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
Array Ind. One Cond Ct


Gamma Ray
DST Uphole Tension
114°
4200
115°
4300
FR
115°
4400
FR
FR
FR
TD
FR
FR
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
1:600
Array Ind. One Cond Ct
mmhos/metre
1000
750
500
250
0
2000
1750
1500
1250
1000
Shallow FE
ohm metres
0
25
50
0
250
500
Array Ind. One Res Rt
ohm metres
0
25
50
0
250
500

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_003.dta
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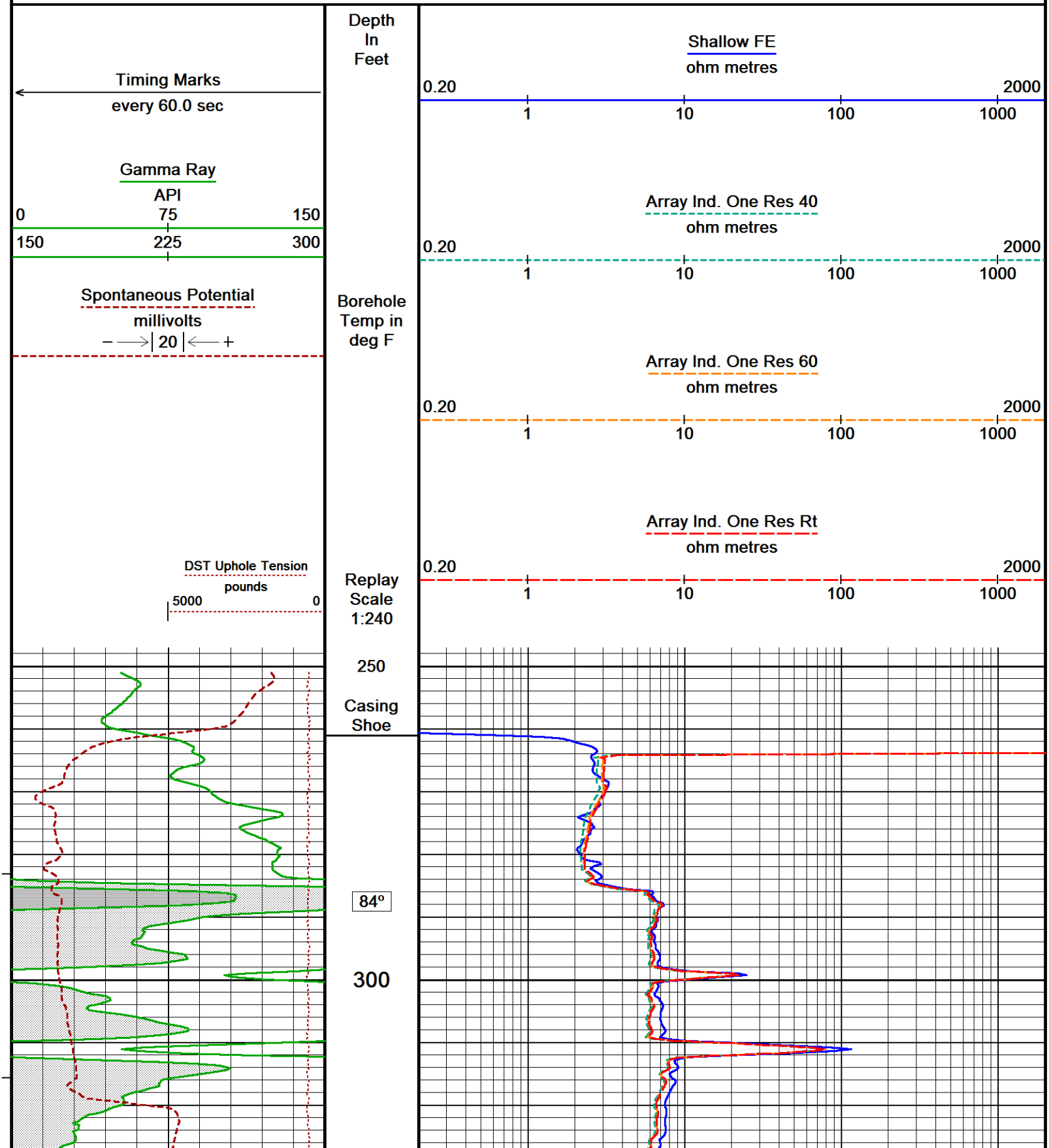
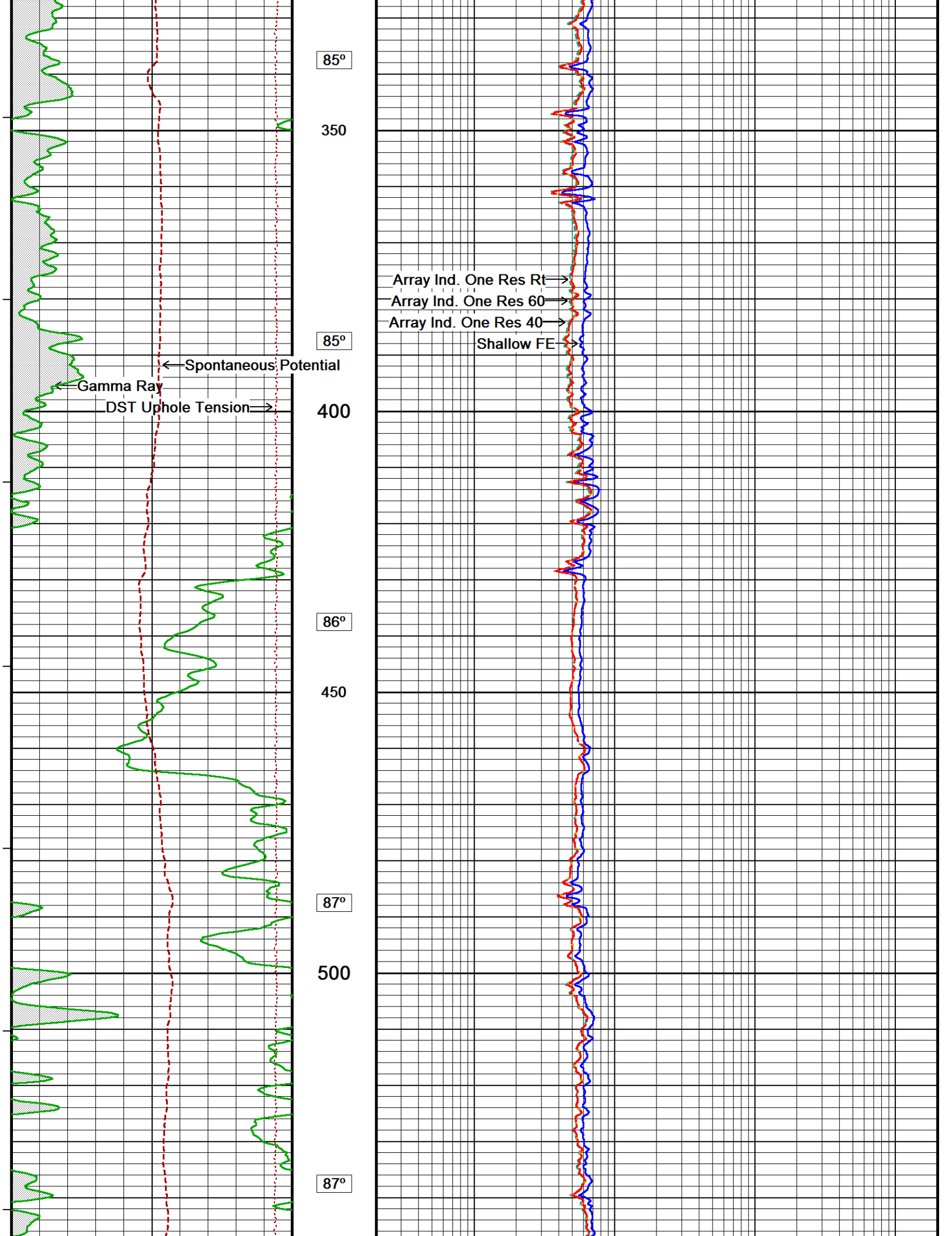
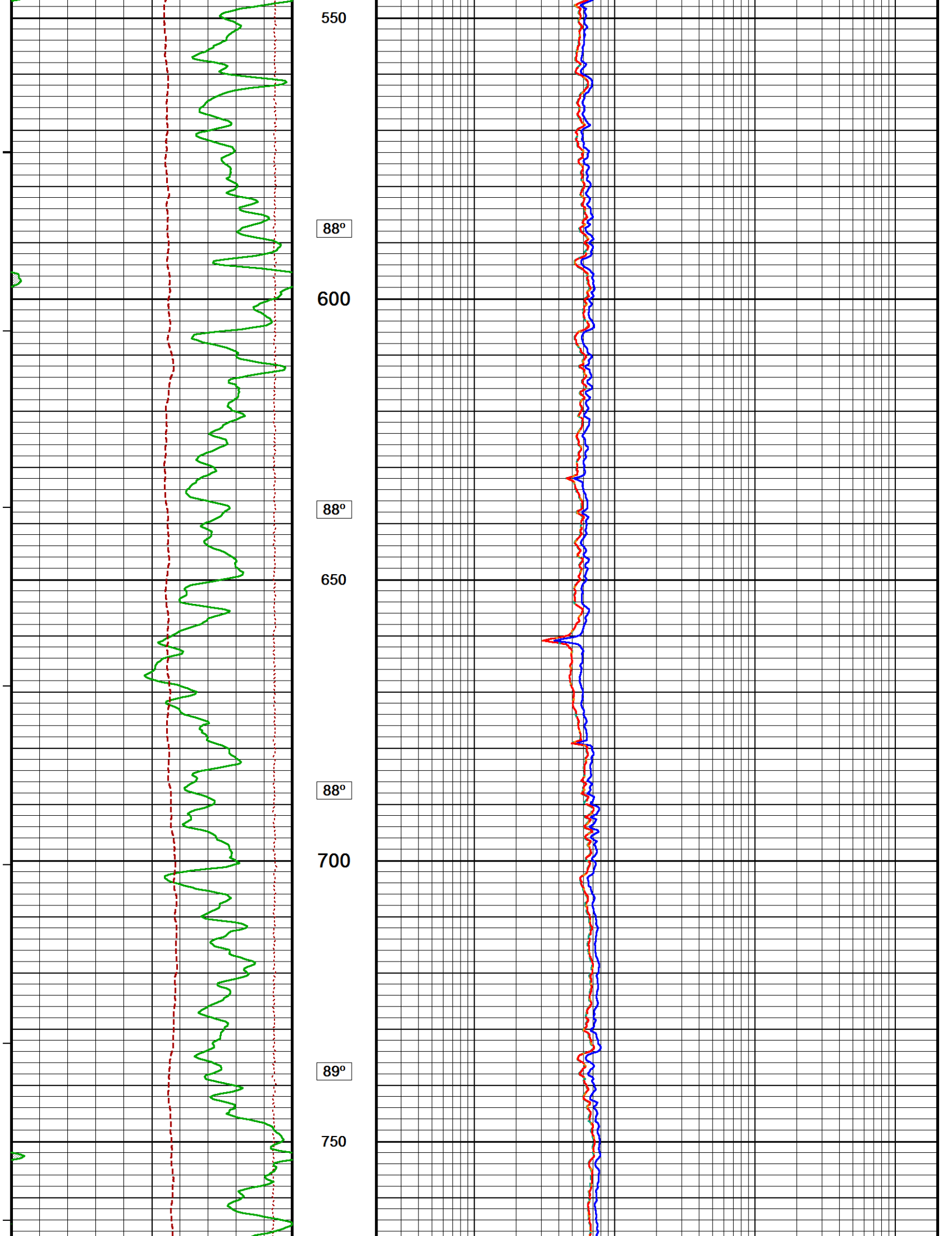
2 INCH MAIN

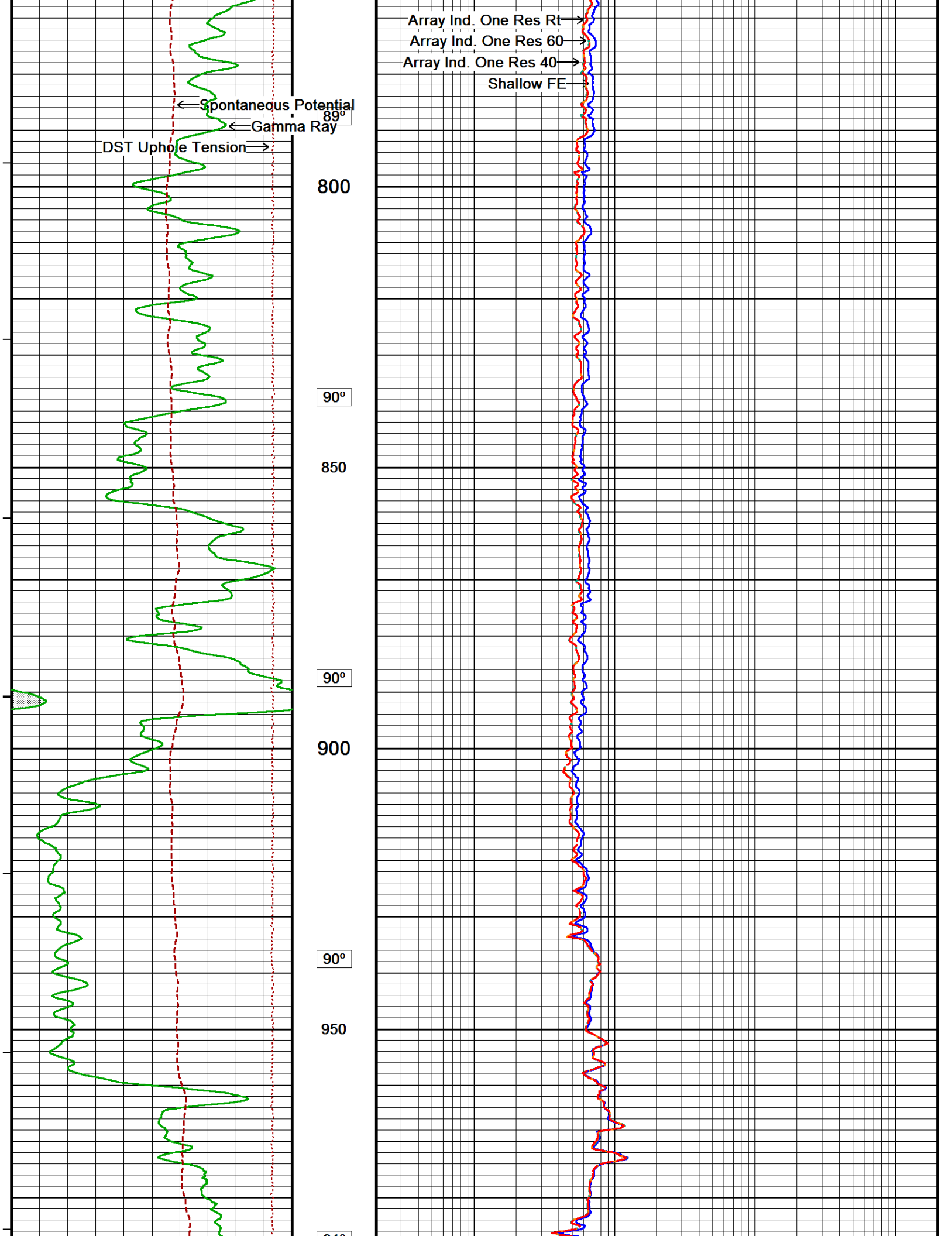
5 INCH MAIN

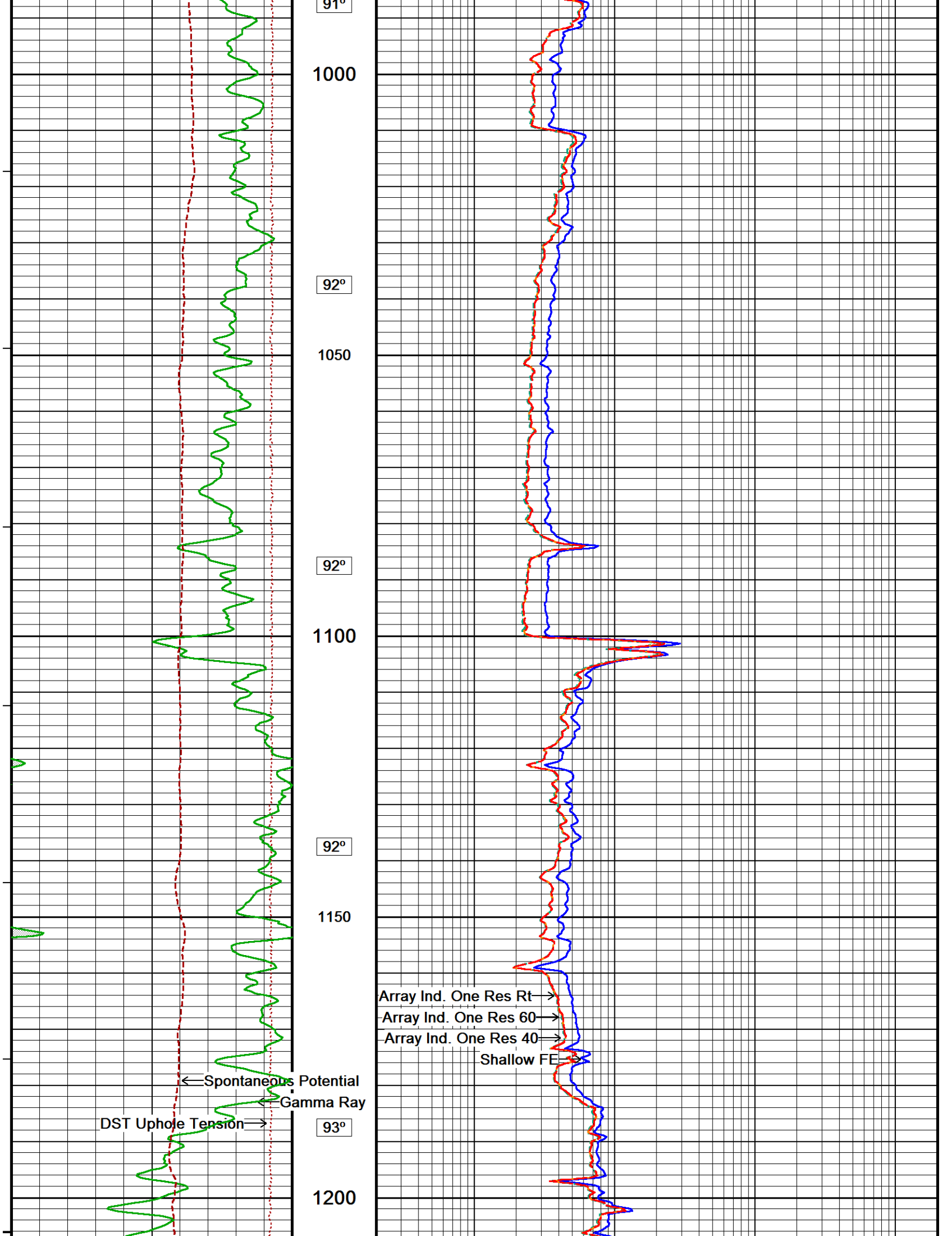
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_003.dta
Recorded on 25-FEB-2016 01:43
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

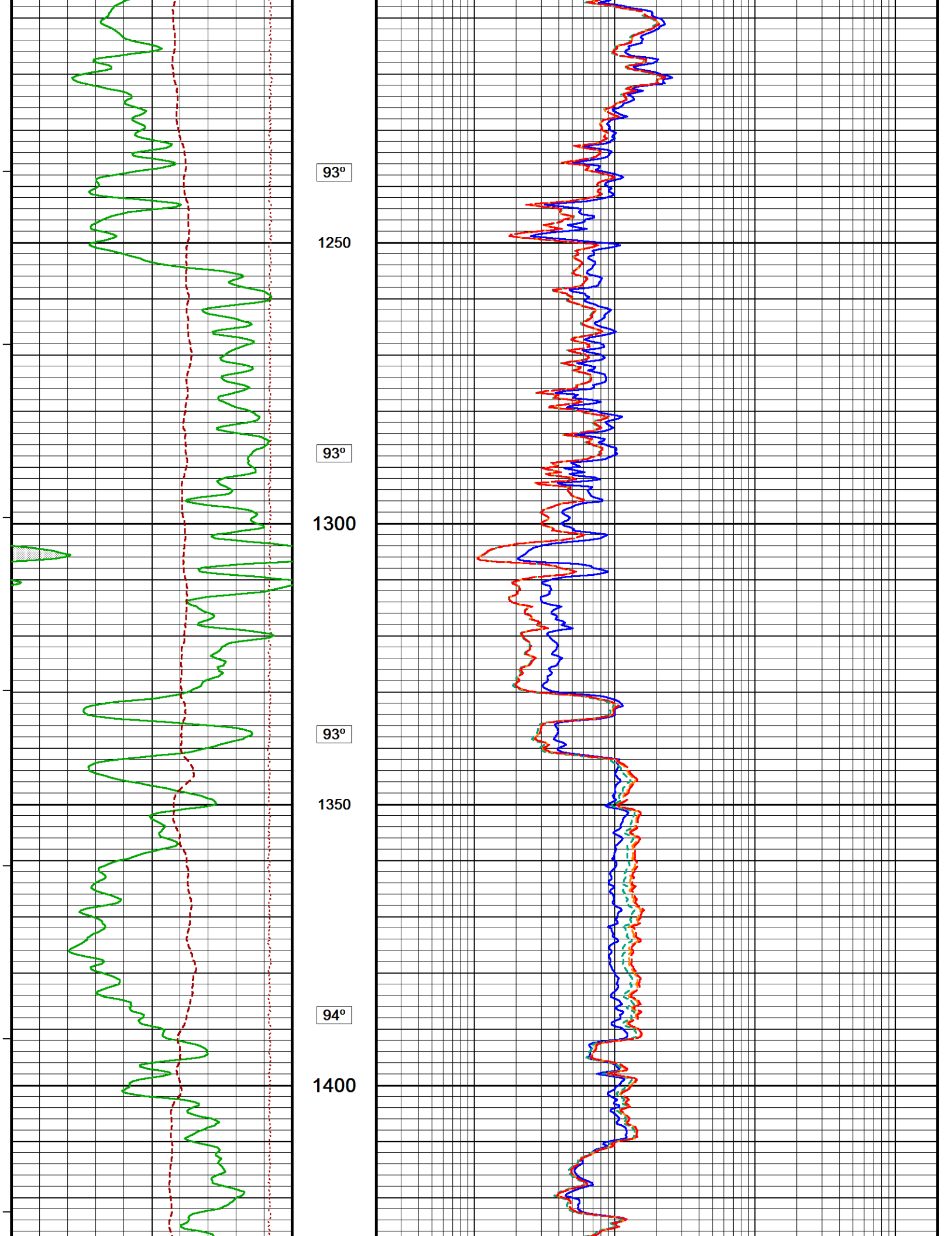


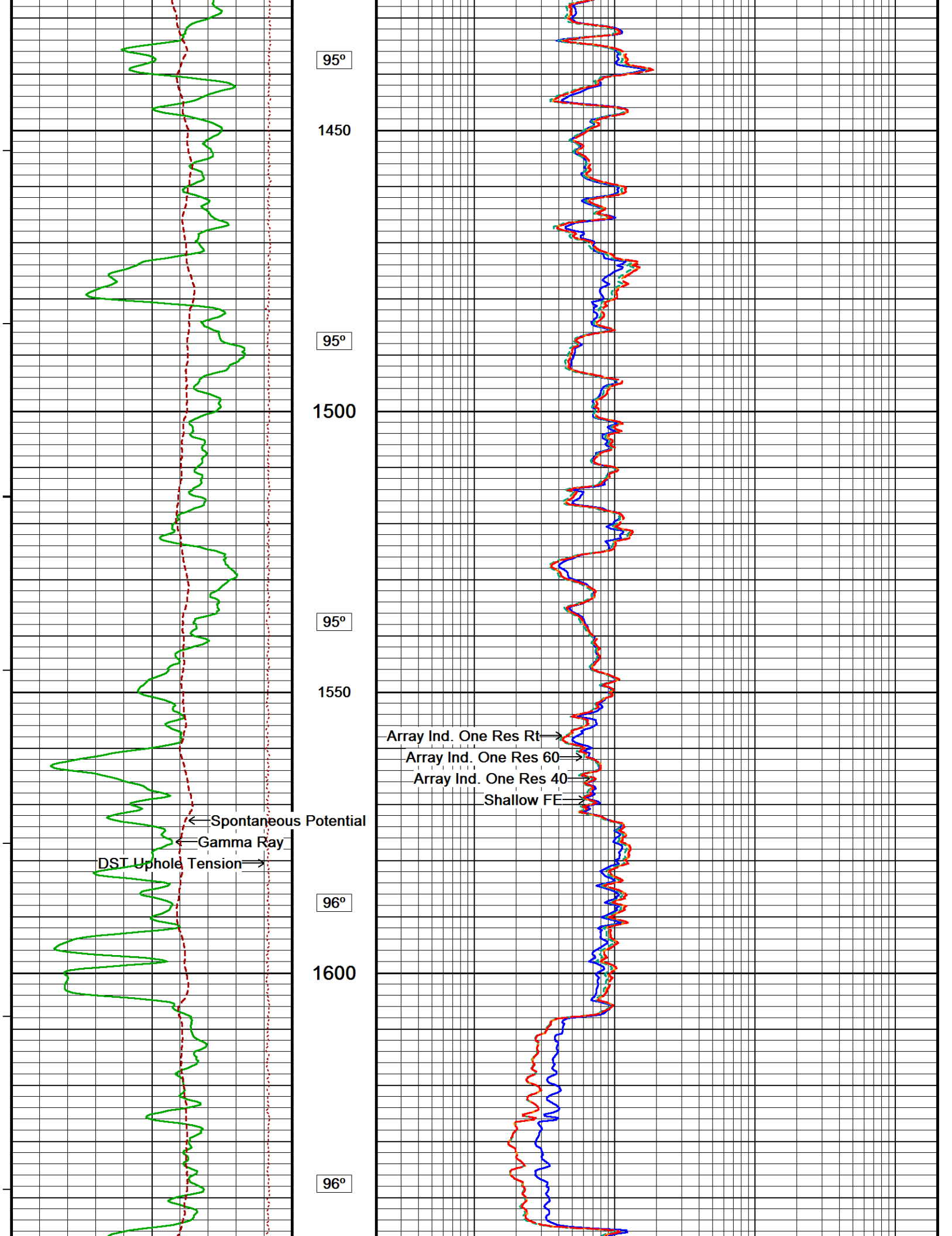

85°
350
85°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
400
86°
450
87°
500
87°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

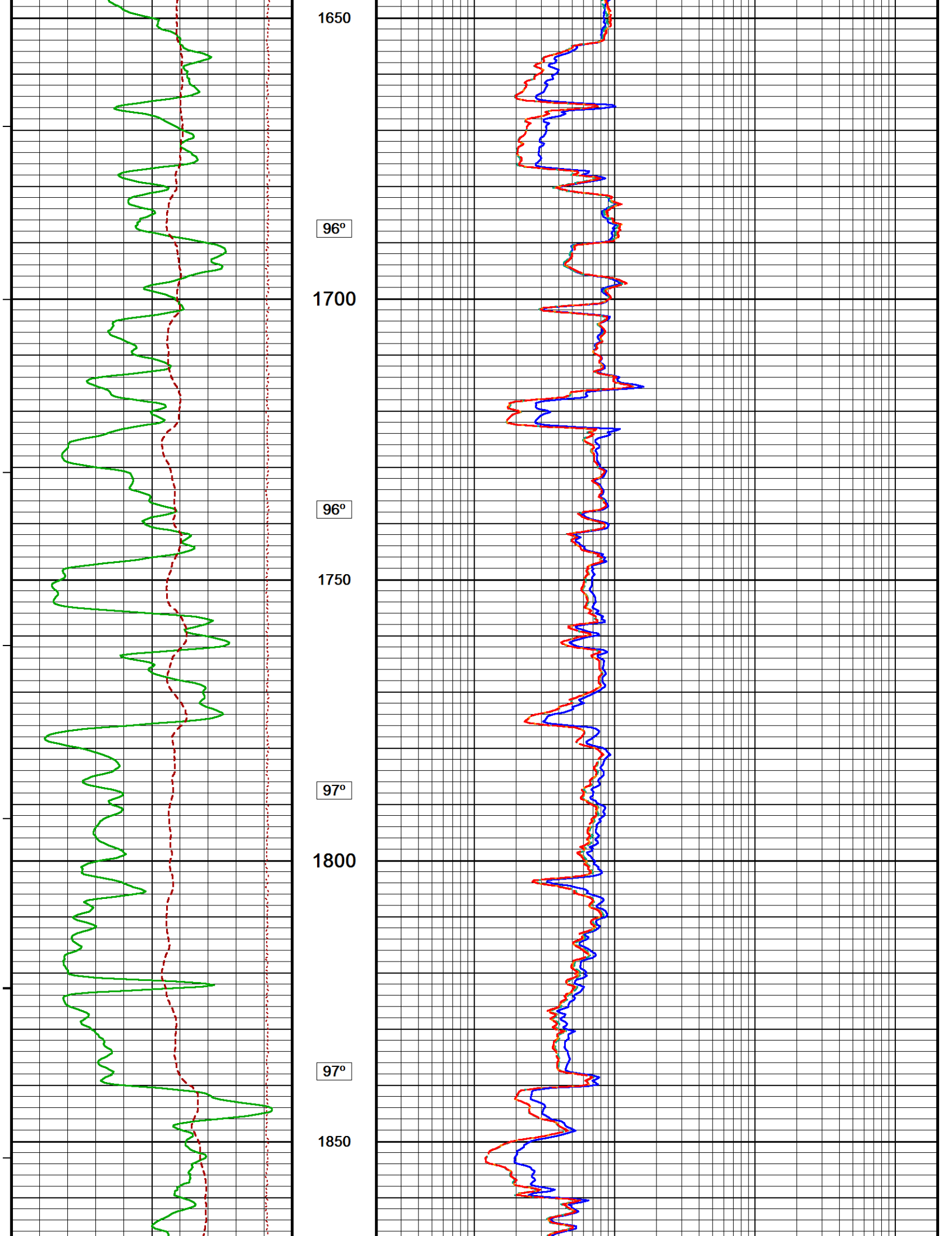

550
88°
600
88°
650
88°
700
89°
750

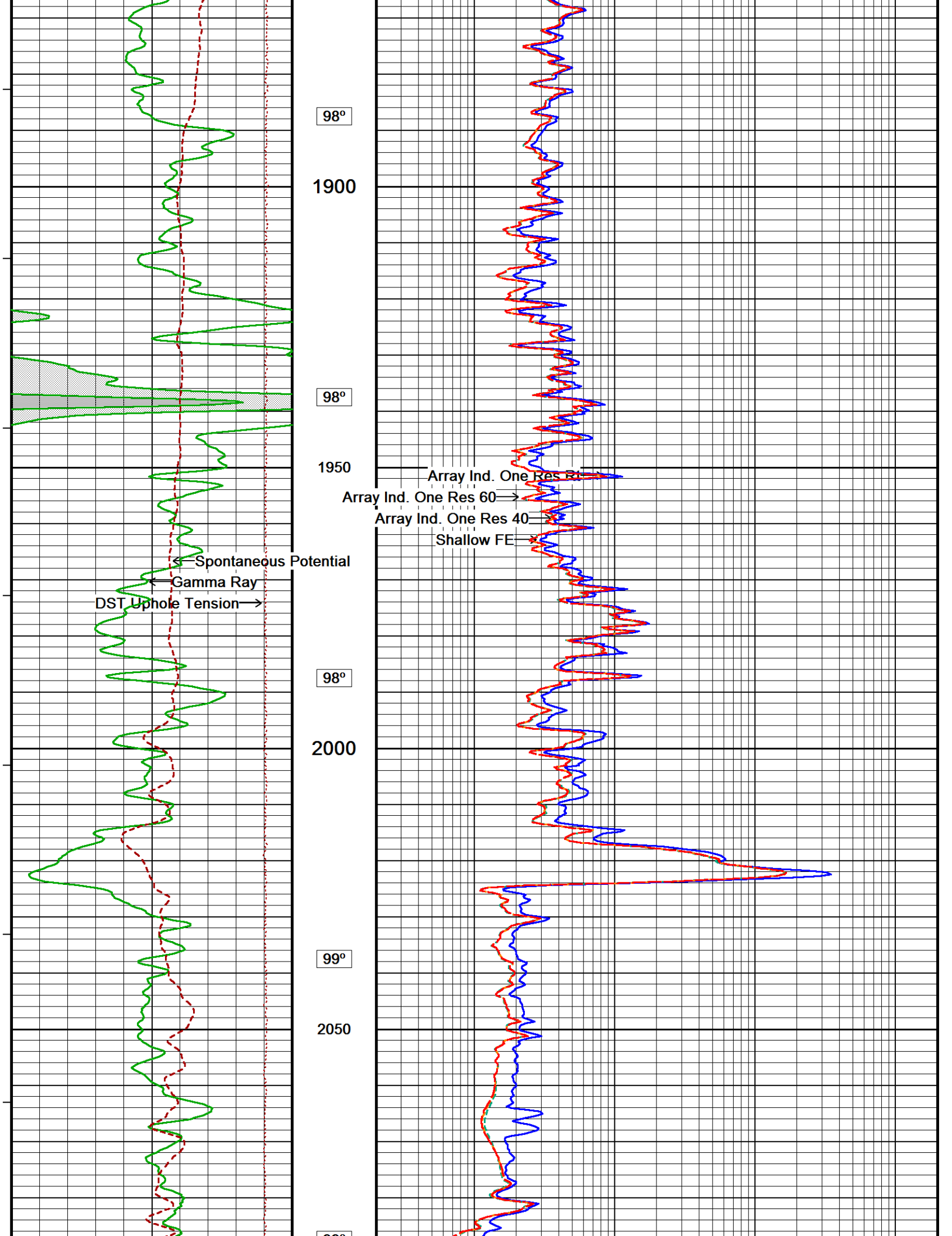

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
89°
800
90°
850
90°
900
90°
950

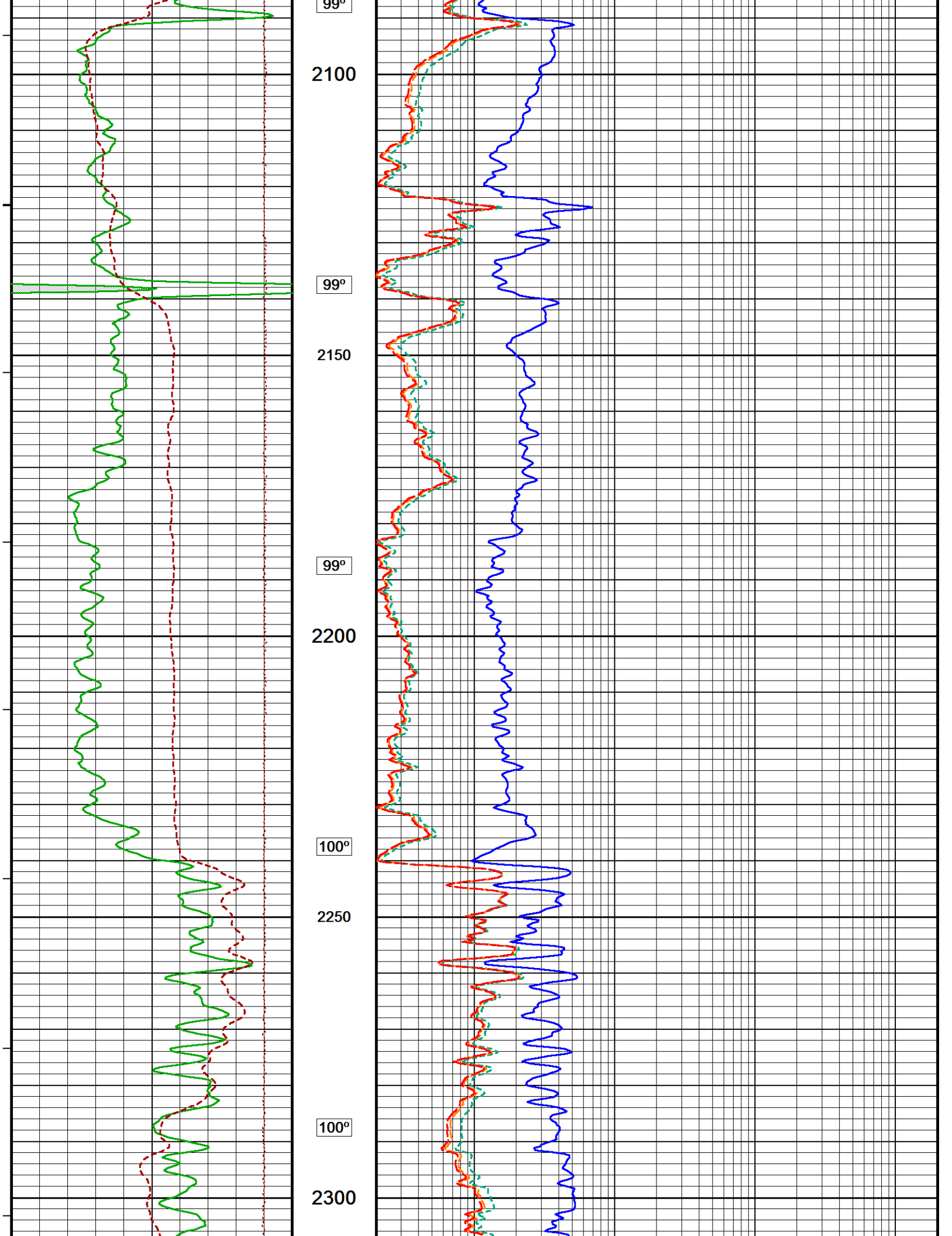

91°
1000
92°
1050
92°
1100
92°
1150
93°
1200
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

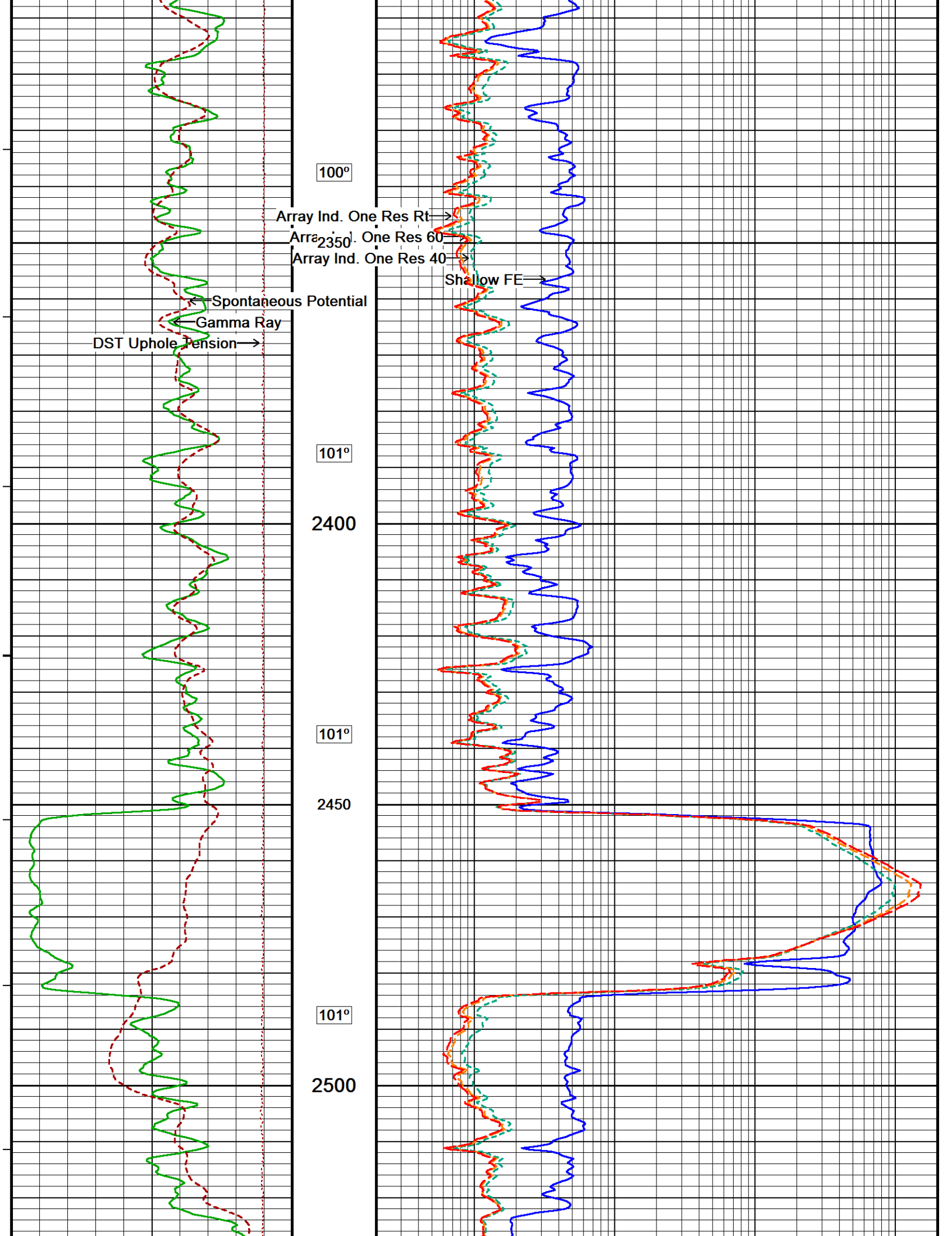

93°
1250
93°
1300
93°
1350
94°
1400

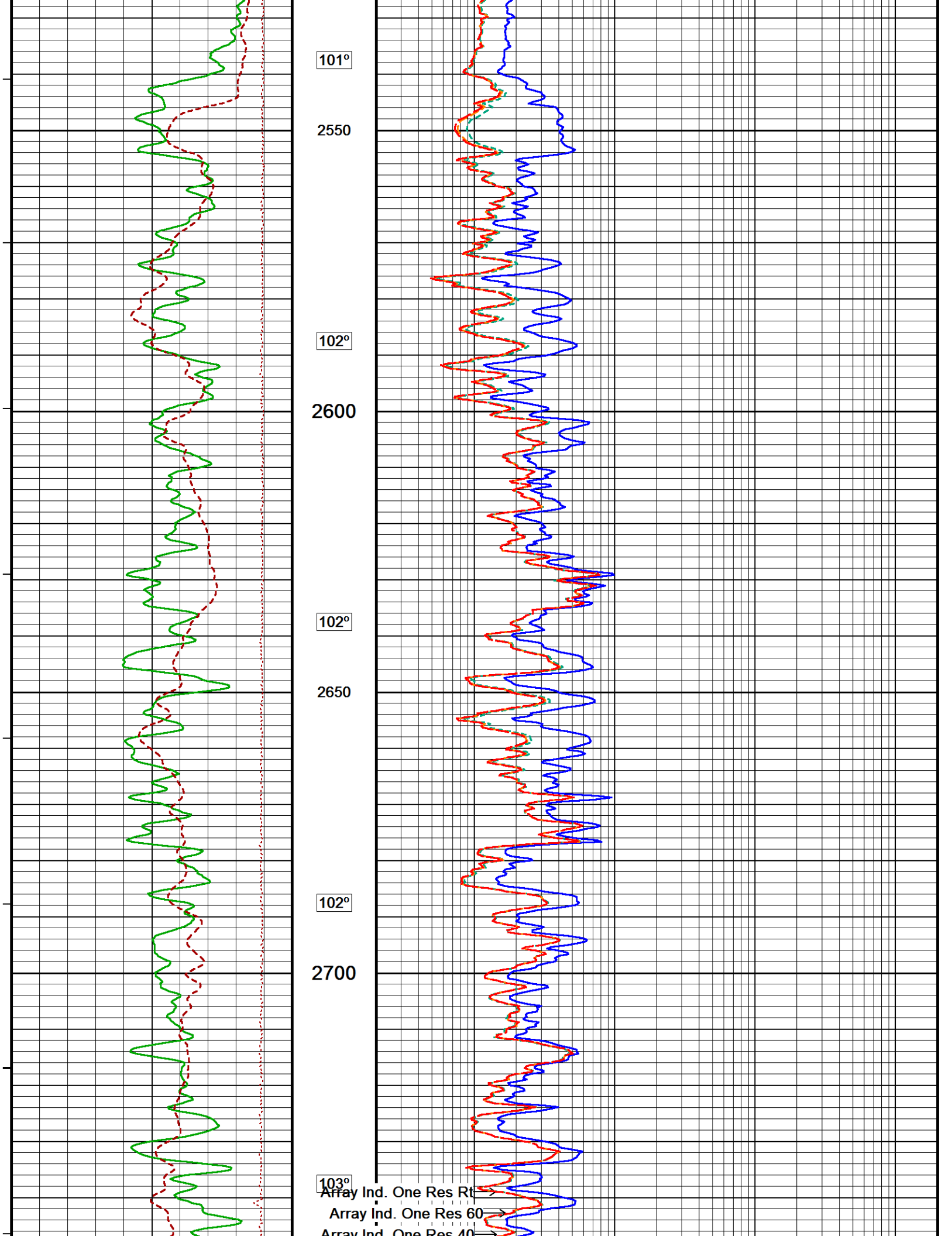

95°
1450
95°
1500
95°
1550
96°
1600
96°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

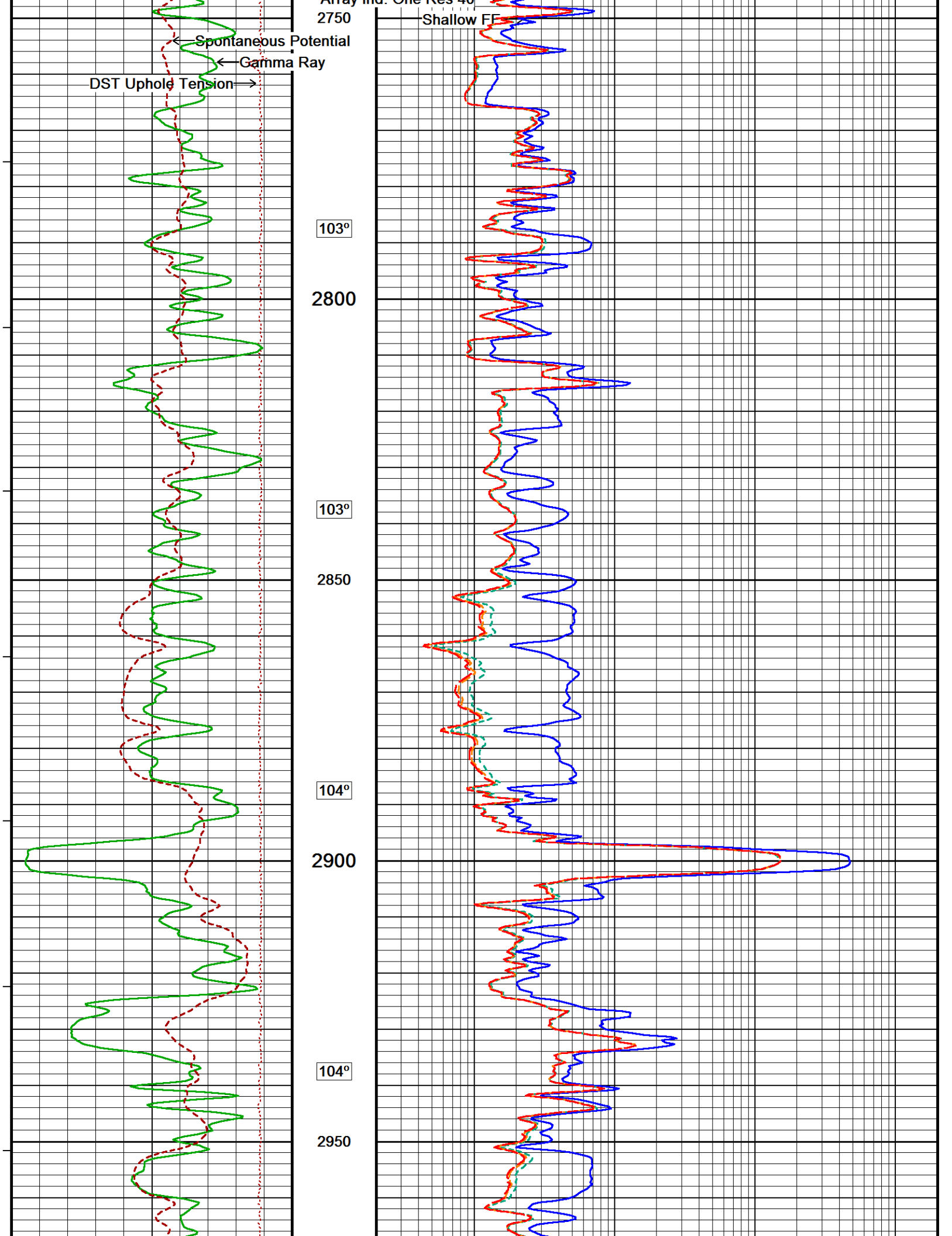

1650
96°
1700
96°
1750
97°
1800
97°
1850

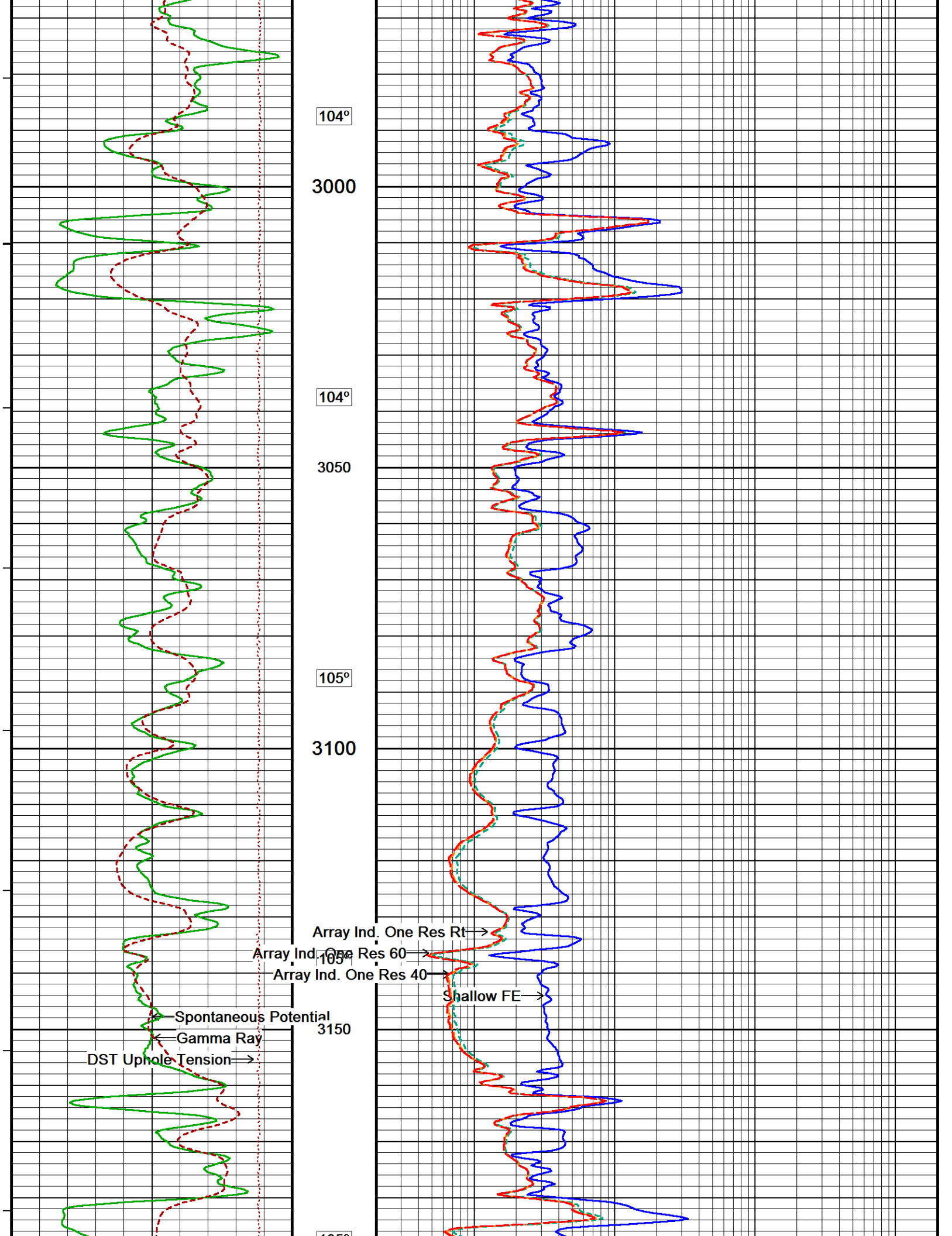

98°
1900
98°
1950
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
98°
2000
99°
2050

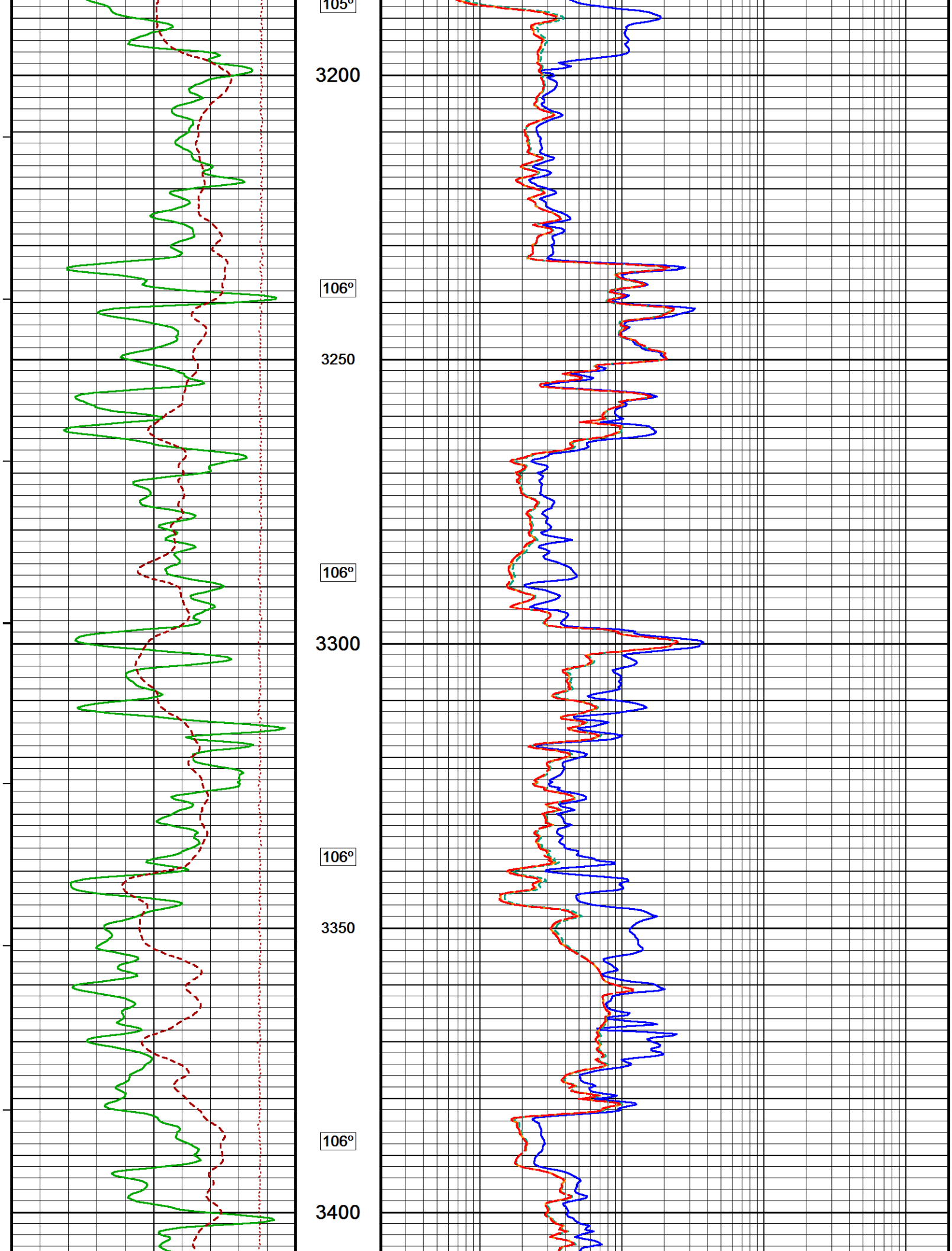

99°
2100
99°
2150
99°
2200
100°
2250
100°
2300

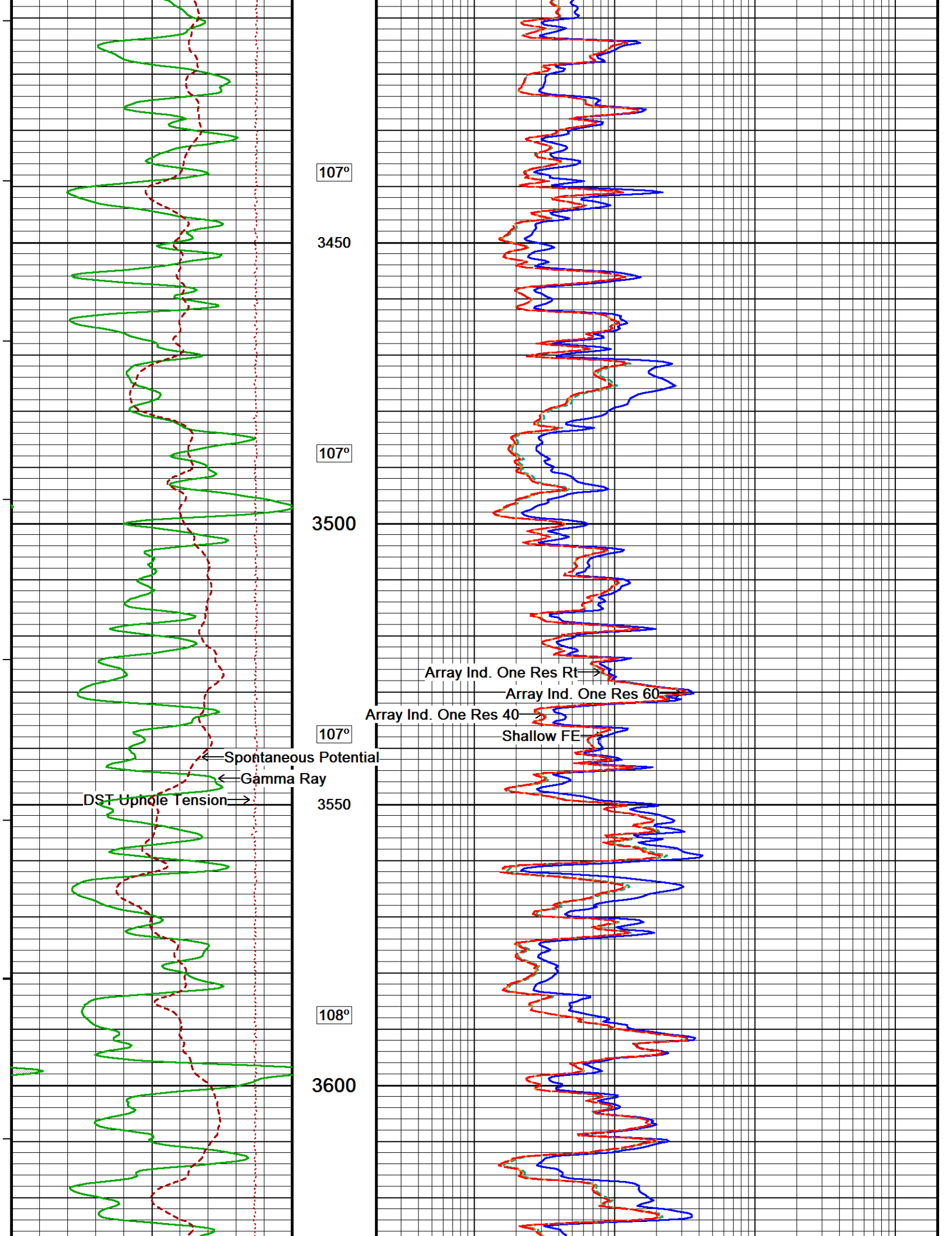

100°
Array Ind. One Res Rt
Array Ind. One Res 60
2350
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
101°
2400
101°
2450
101°
2500

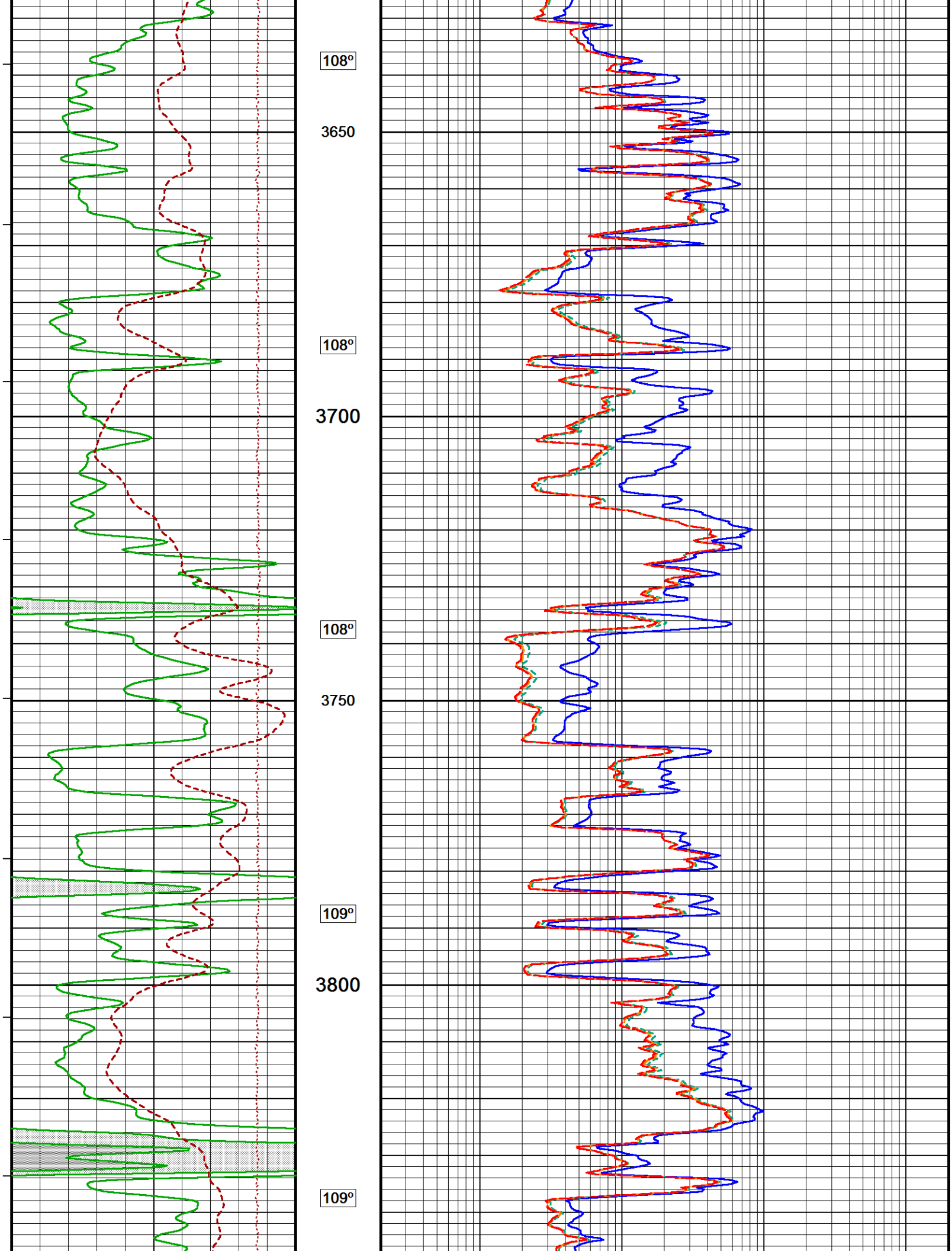

101°
2550
102°
2600
102°
2650
102°
2700
103°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40

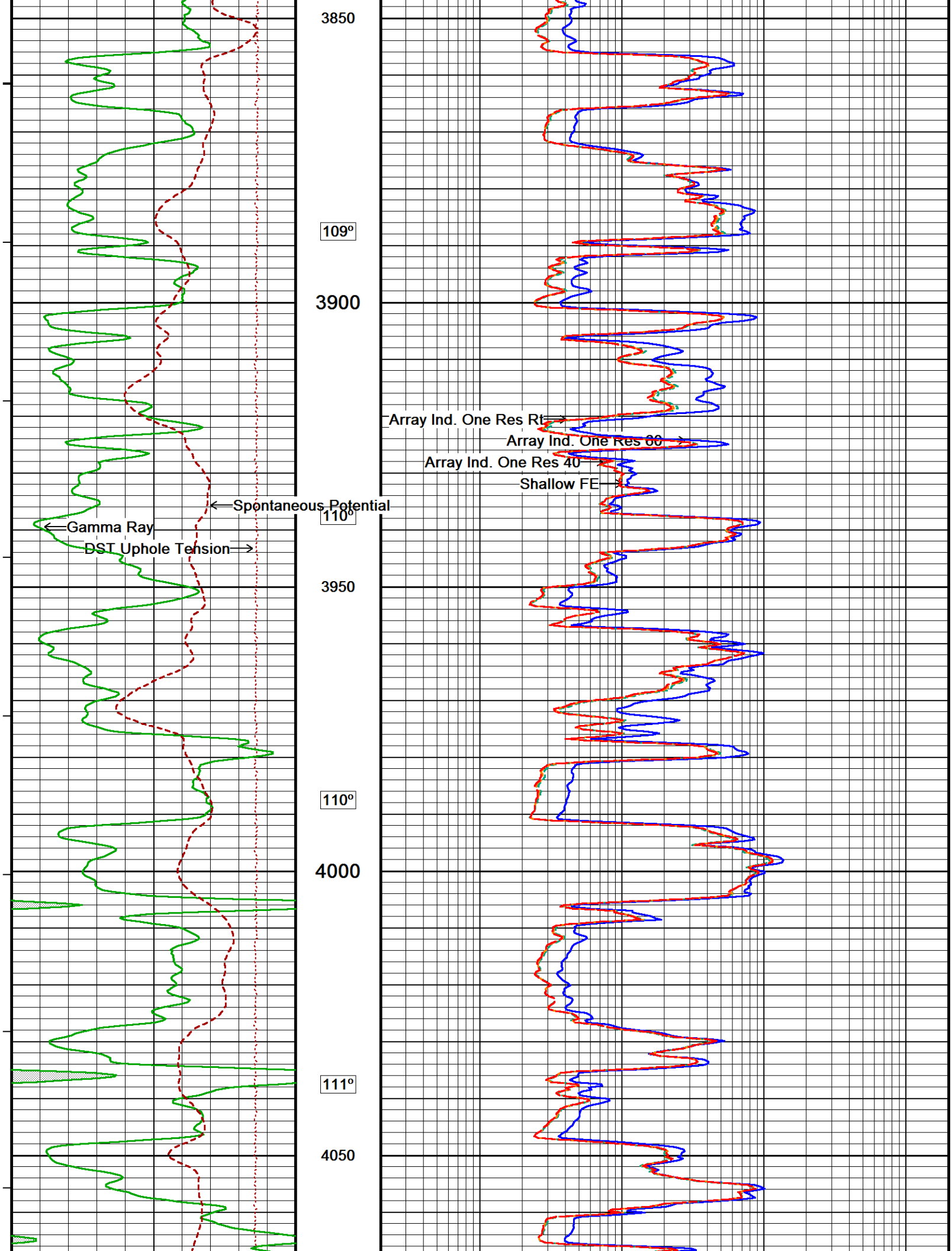

Array Ind. One Res 40
Shallow FE
2750
Spontaneous Potential
Gamma Ray
DST Uphole Tension
103°
2800
103°
2850
104°
2900
104°
2950

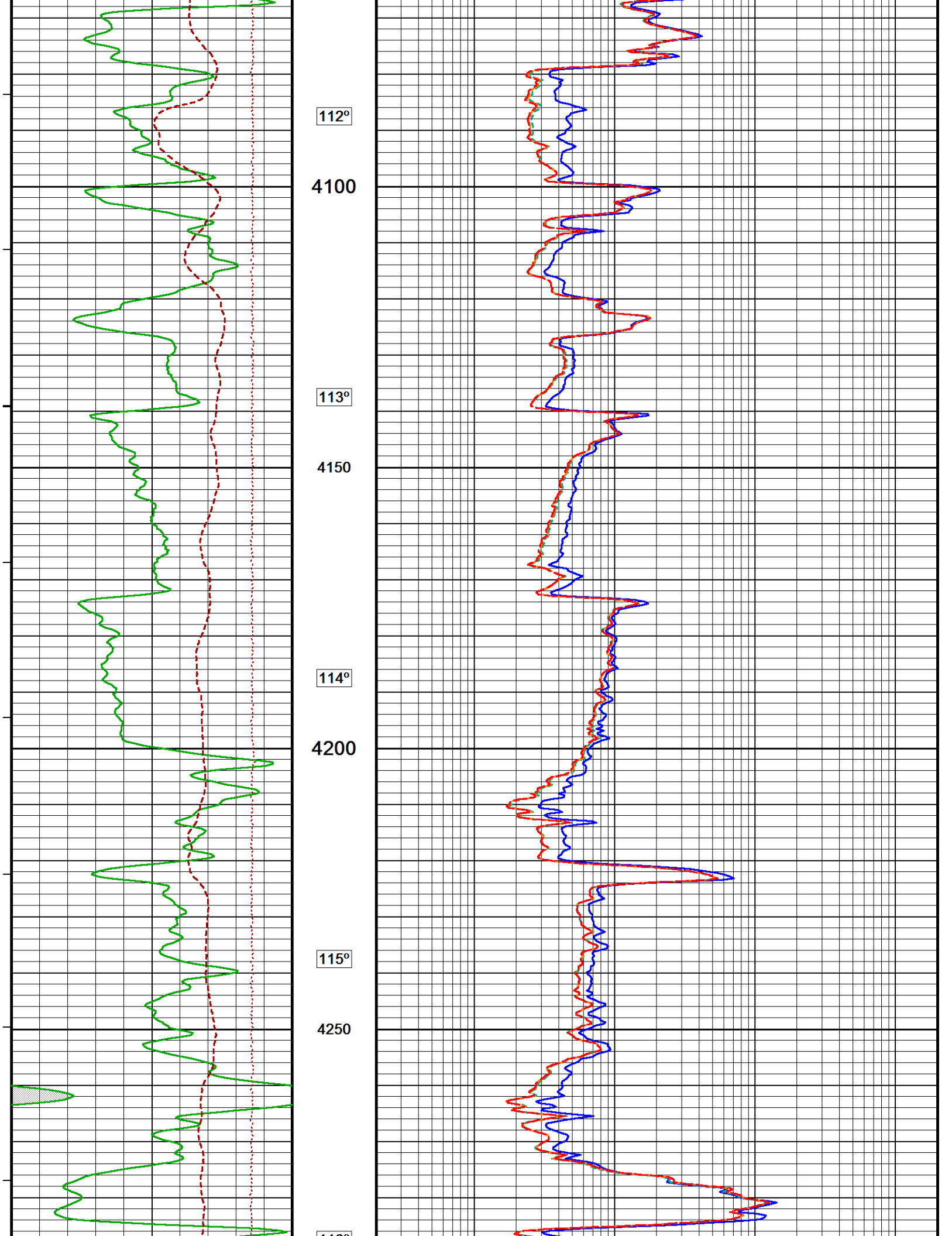

104°
3000
104°
3050
105°
3100
105°
3150
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

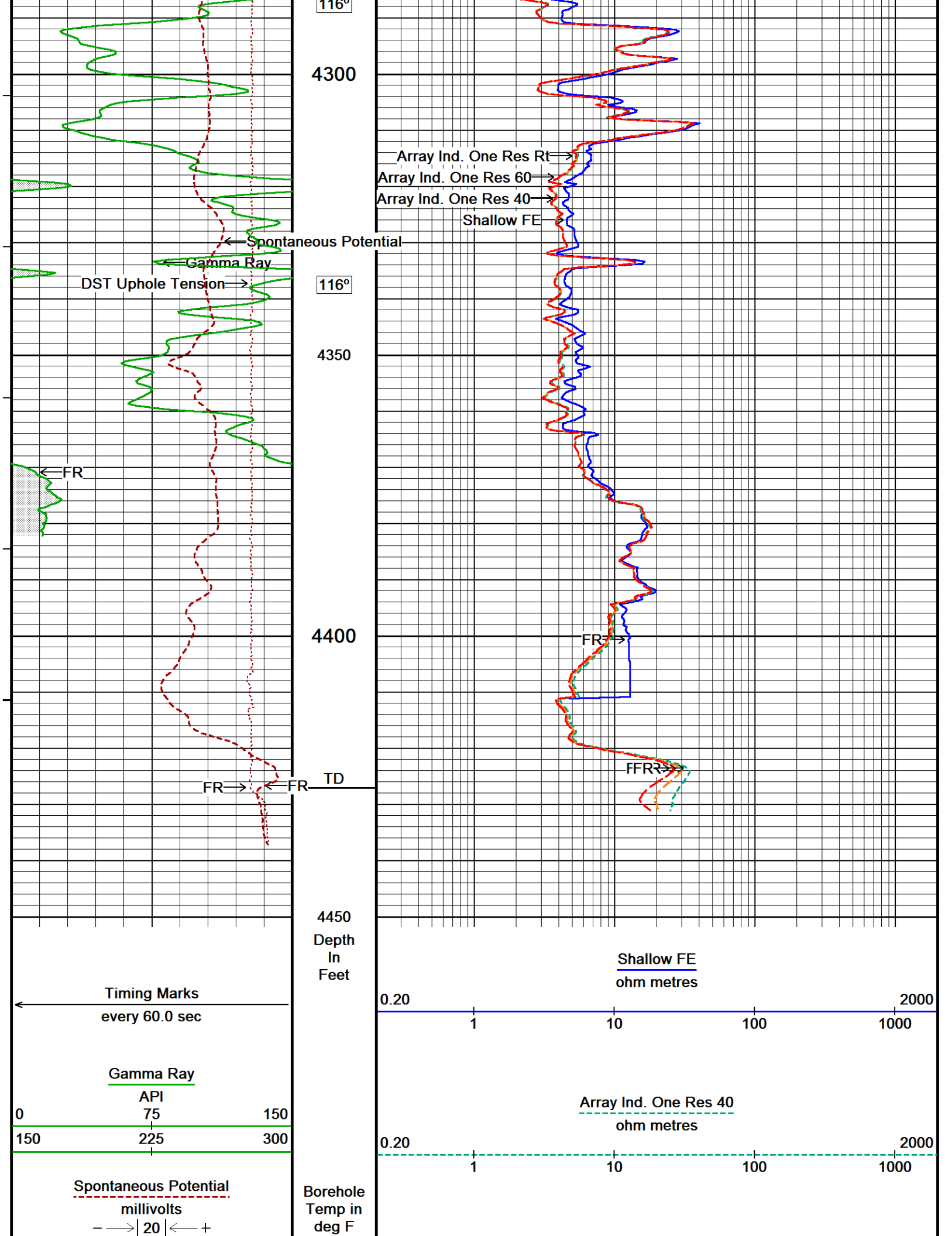

105°
3200
106°
3250
106°
3300
106°
3350
106°
3400


107º
3450
107º
3500
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
107º
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3550
108º
3600


108°
3650
108°
3700
108°
3750
109°
3800
109°


3850
109°
3900
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
110°
Gamma Ray
DST Uphole Tension
3950
110°
4000
111°
4050


112º
4100
113º
4150
114º
4200
115º
4250


116°
4300
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°
4350
FR
4400
FR
FFR
FR
FR
TD
4450
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
Shallow FE
ohm metres
0.20
2000
1
10
100
1000
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

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_003.dta — Recorded on 25-FEB-2016 01:43
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

5 INCH MAIN

## 10 INCH HIGH RESOLUTION

Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_001.dta — Recorded on 25-FEB-2016 00:12
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
– 20 +

Depth
in
Feet

Borehole
Temp in
deg F

Shallow FE
ohm metres
0.20 2000
1 10 100 1000

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

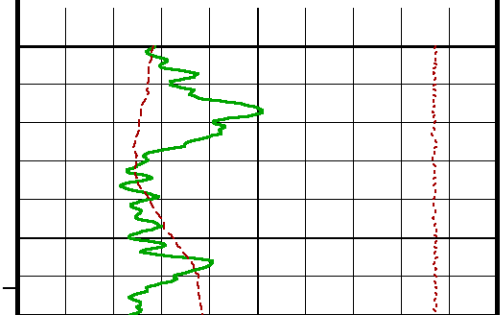
Array Ind. One Res 60
ohm metres
0.20 2000
1 10 100 1000

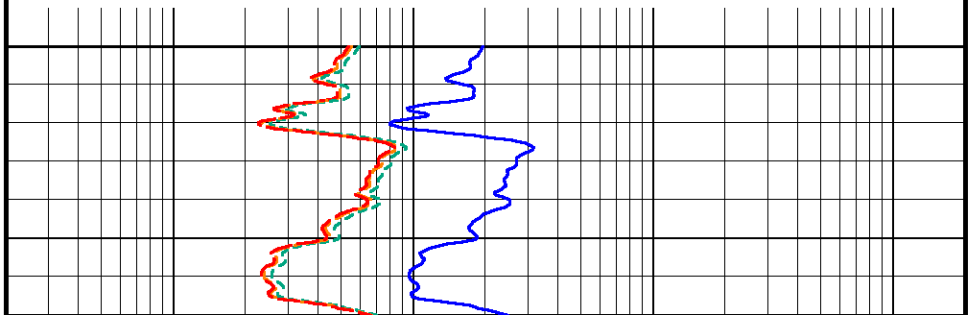
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

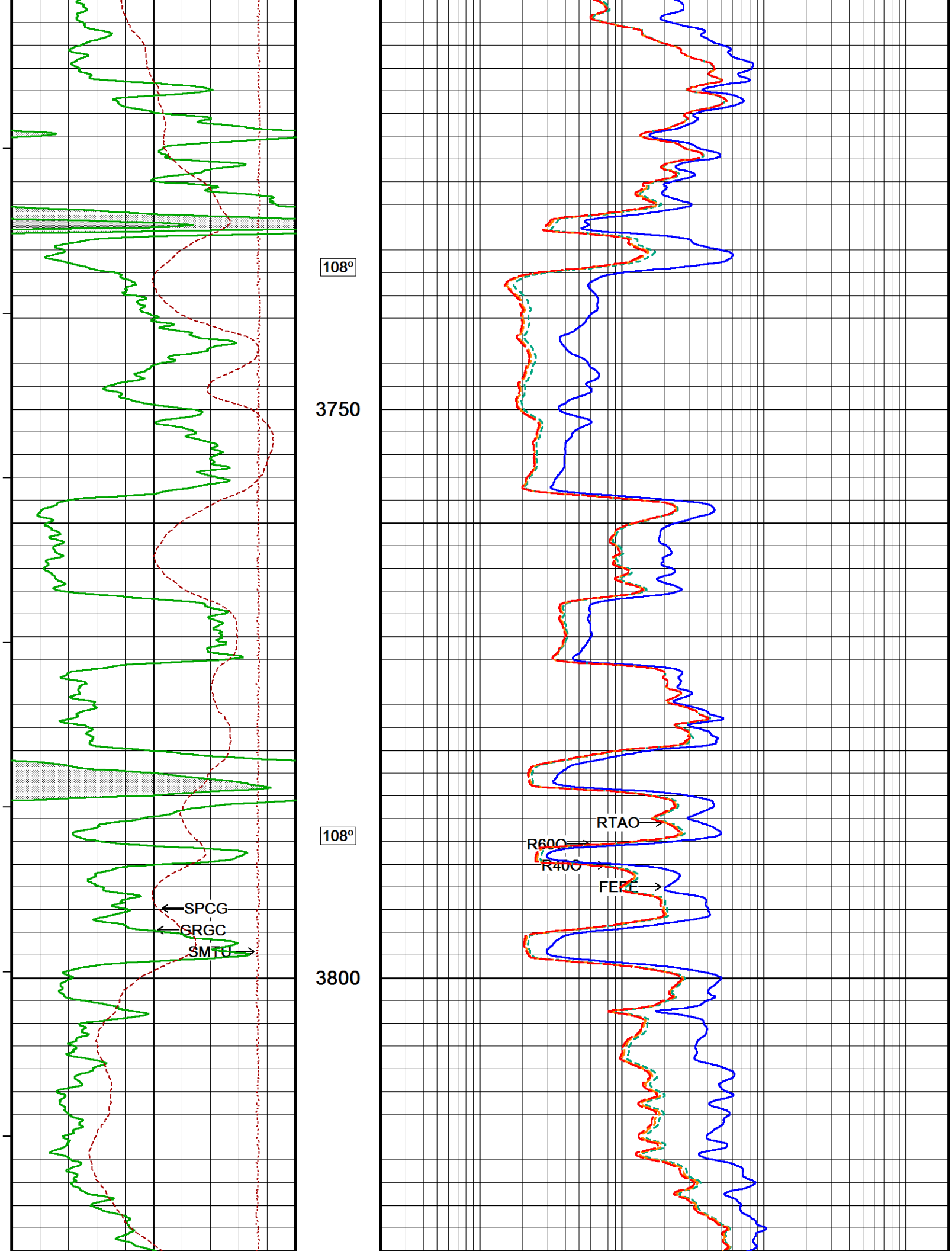
DST Uphole Tension
pounds
5000 0

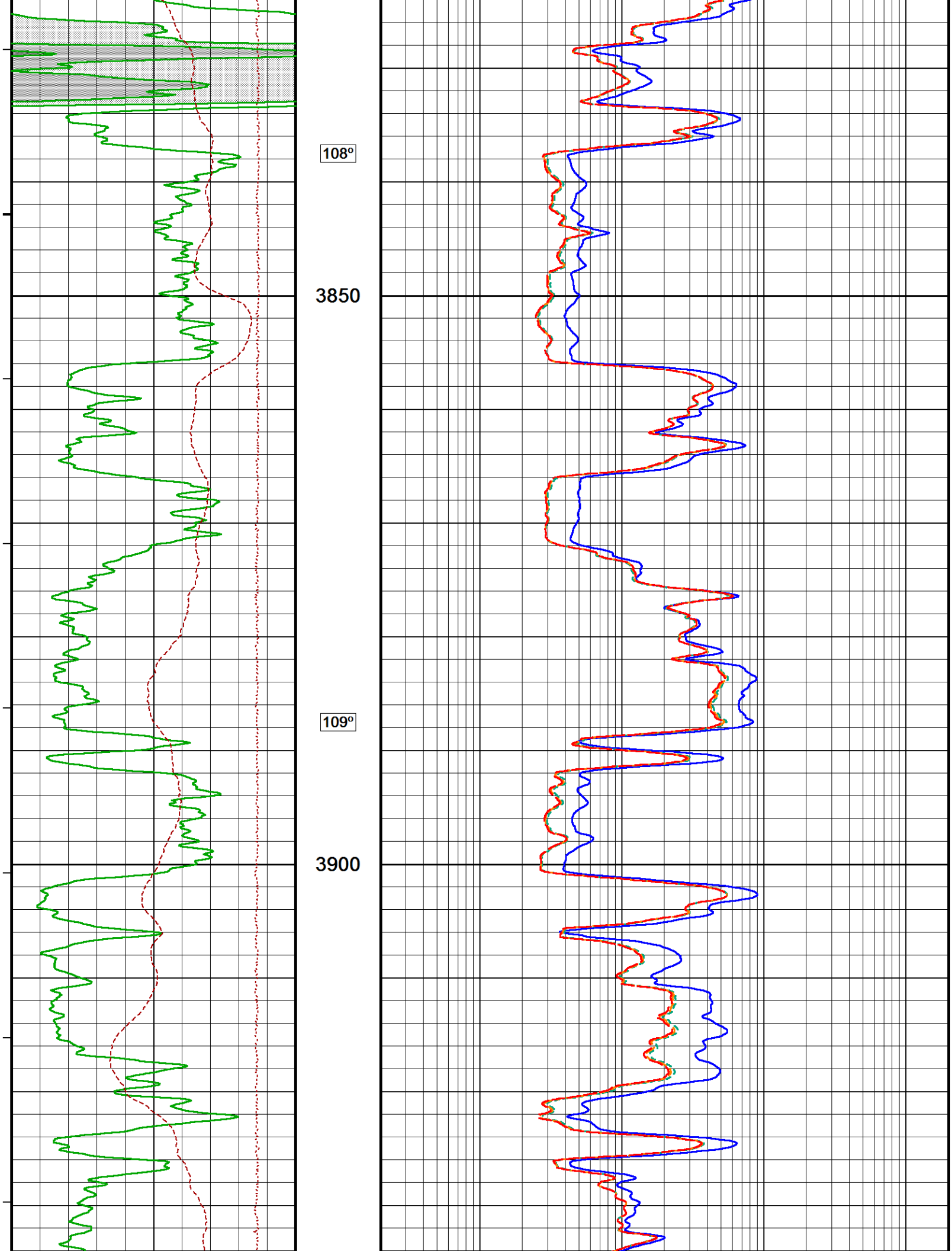
Replay
Scale
1:120

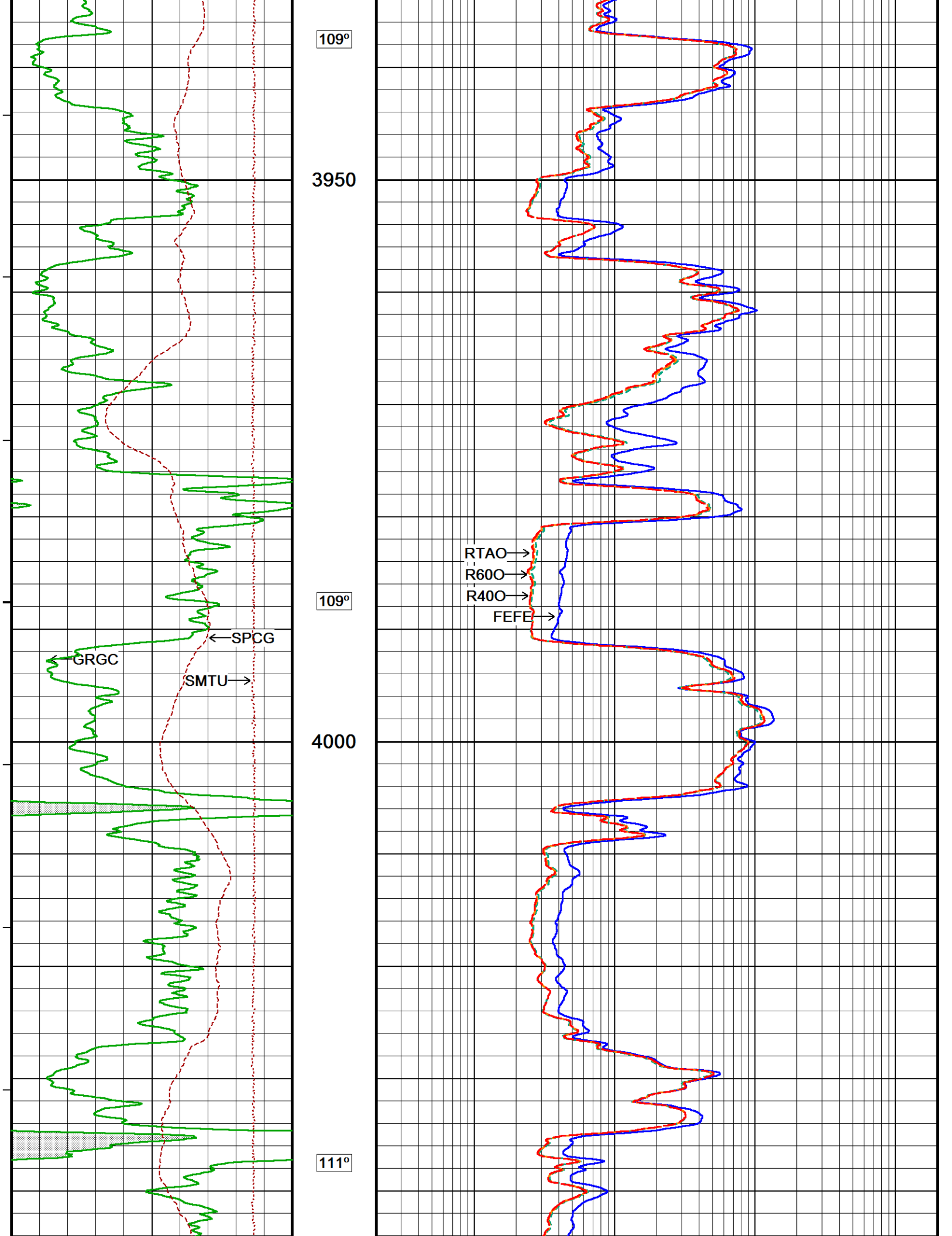
3700

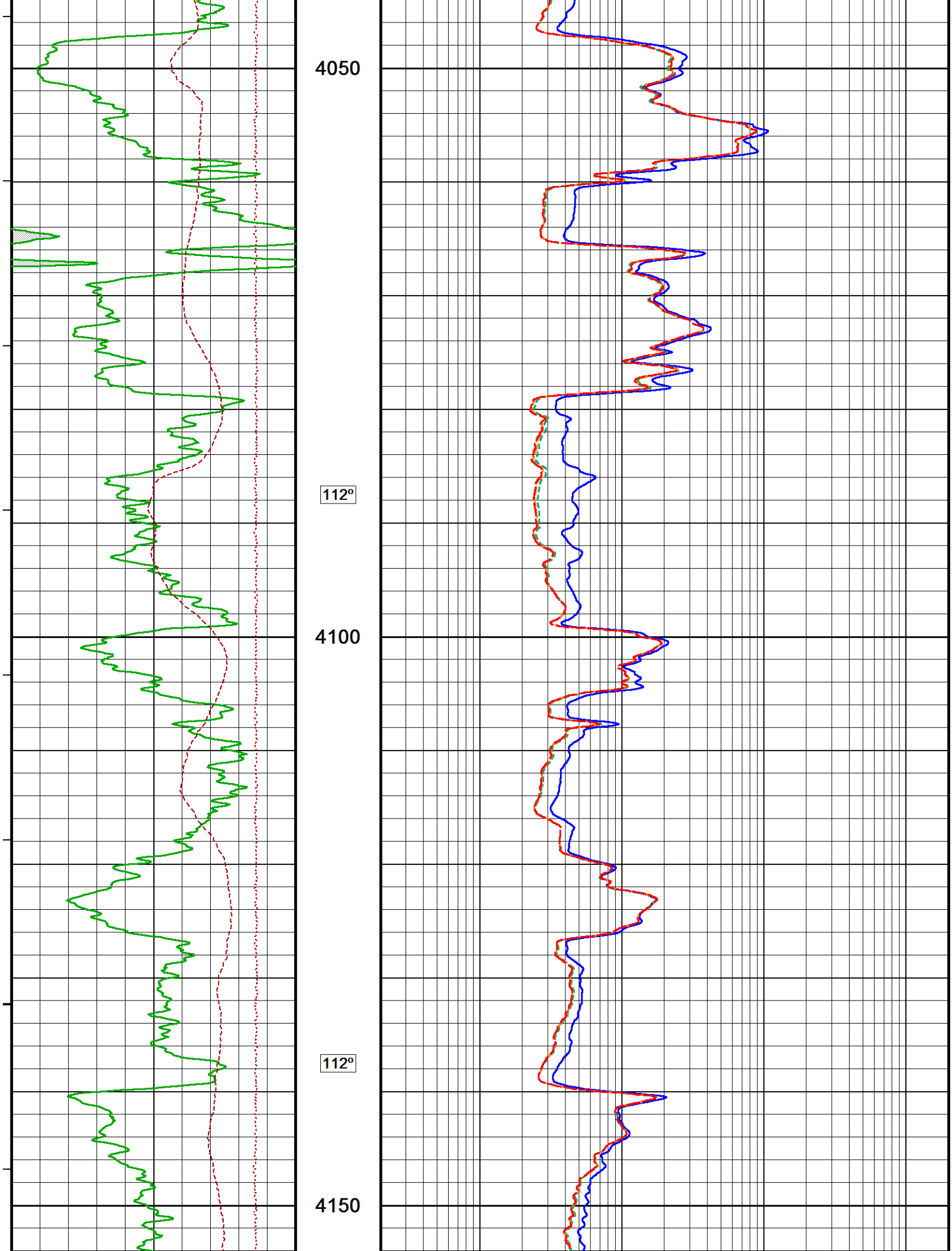


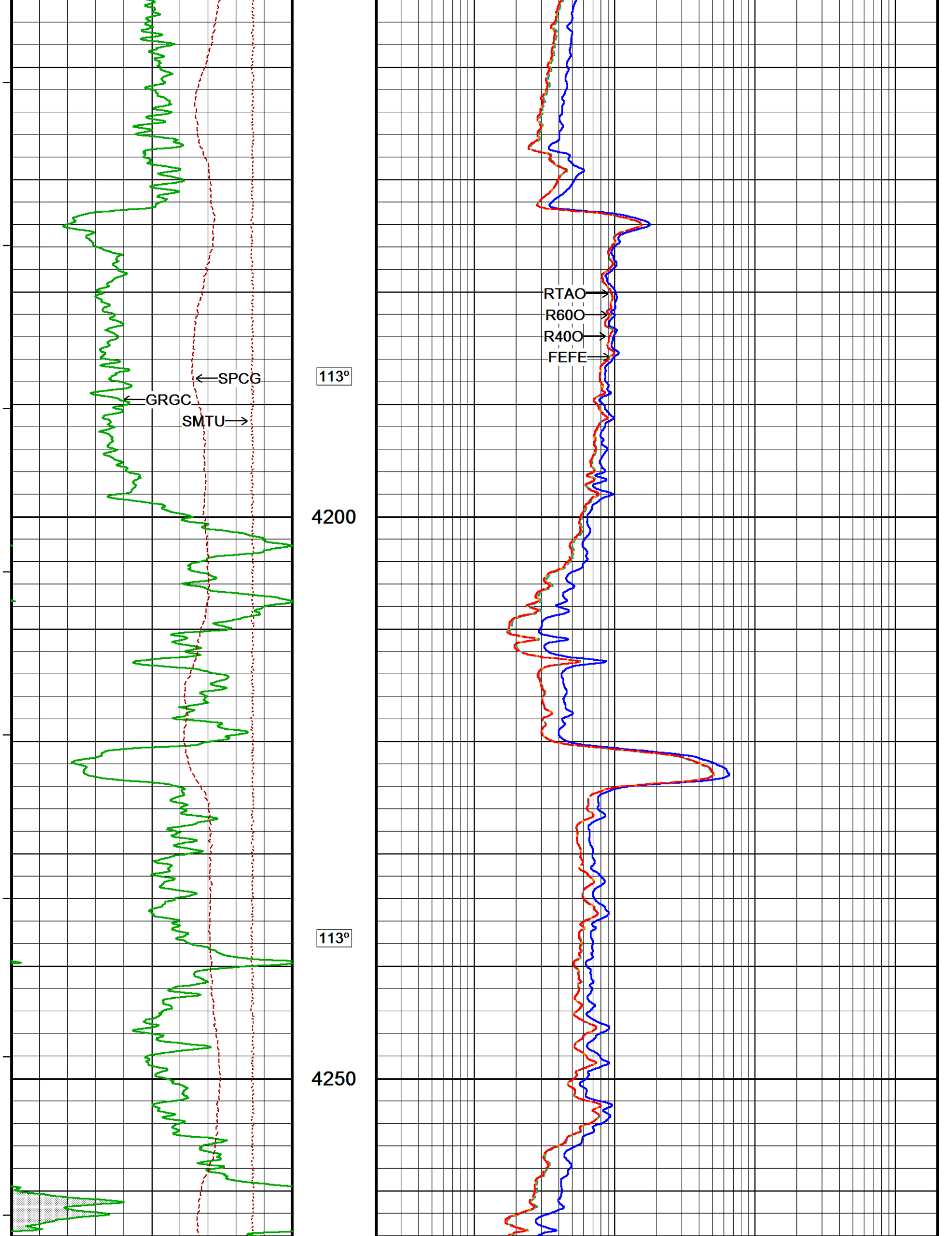


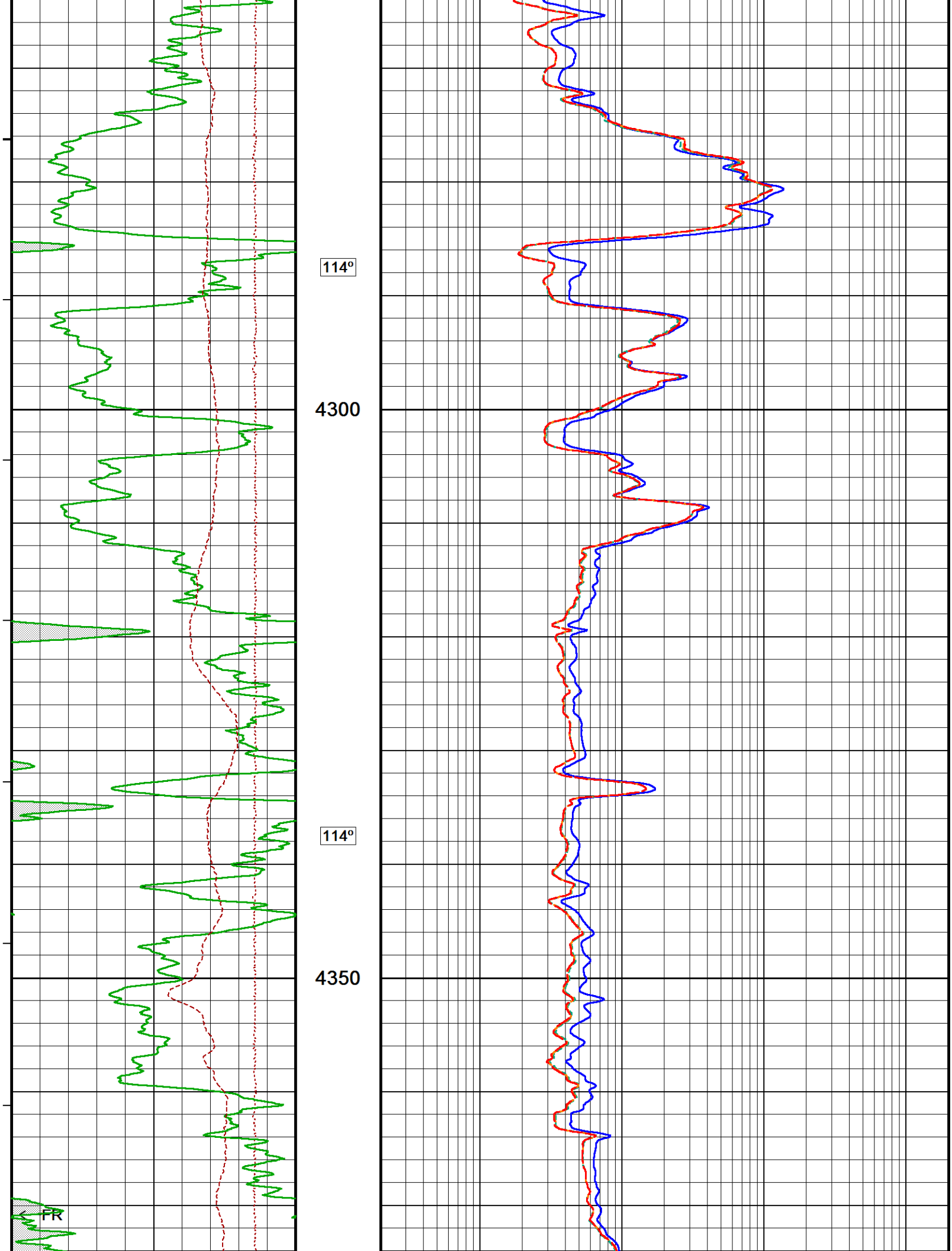

108°
3750
108°
SPCG
GRGC
SMTU
3800
RTAO
R60O
R40O
FEFE

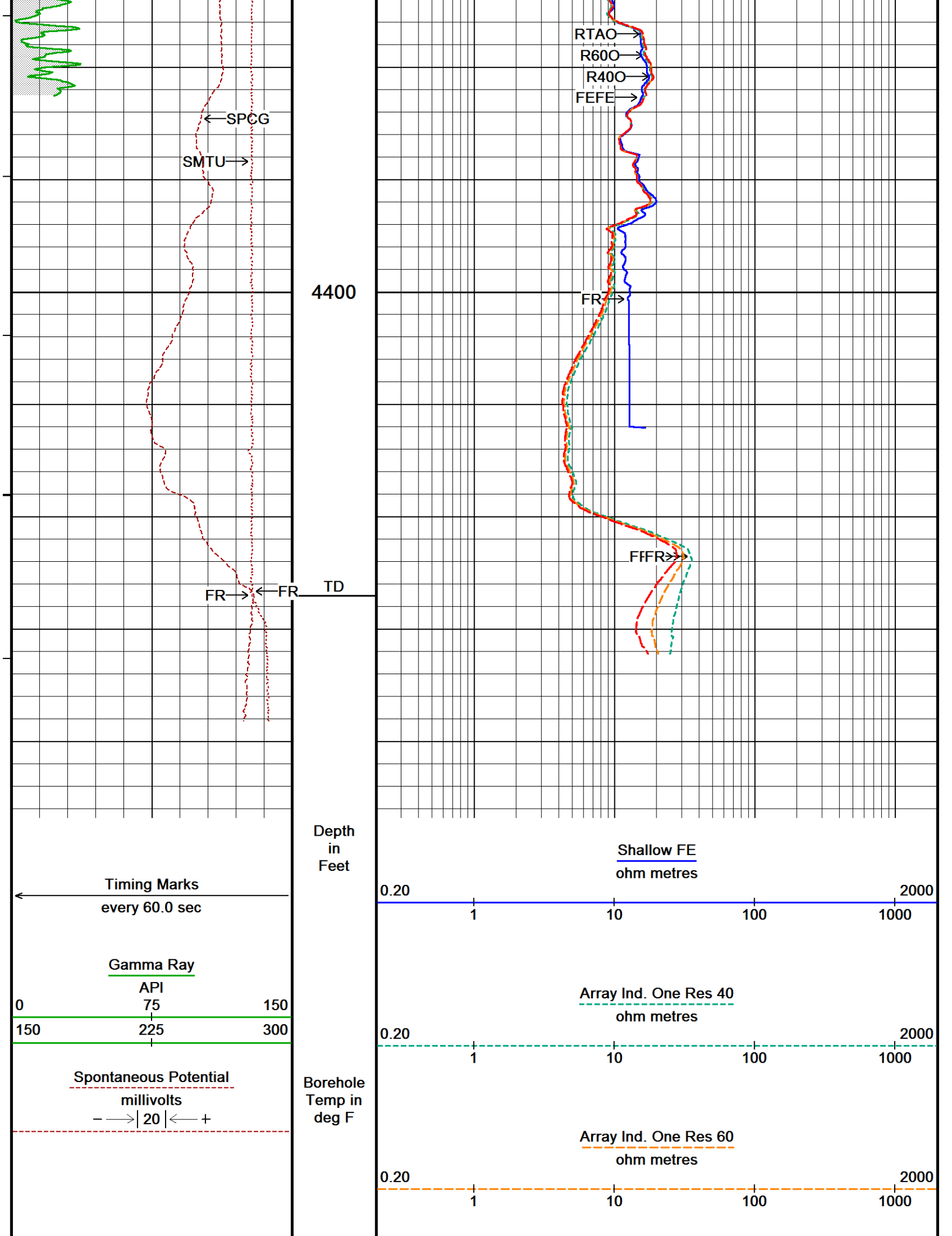

108º
3850
109º
3900


109°
3950
109°
4000
111°
SPCG
GRGC
SMTU
RTAO
R60O
R40O
FEFE


4050
112°
4100
112°
4150


SPCG
GRGC
SMTU
113°
4200
113°
4250
RTAO
R60O
R40O
FEFE


114°
4300
114°
4350
FR


SPCG
SMTU
FR
FR
TD
RTAO
R60O
R40O
FEFE
FR
FFFR
4400
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
Shallow FE
ohm metres
0.20
2000
1
10
100
1000
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

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:120

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

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_001.dta
Recorded on 25-FEB-2016 00:12
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

10 INCH HIGH RESOLUTION

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_002.dta
Recorded on 25-FEB-2016 00:12
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
– 20 +

Depth
in
Feet

Borehole
Temp in
deg F

Shallow FE
ohm metres
0.20 2000
1 10 100 1000

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

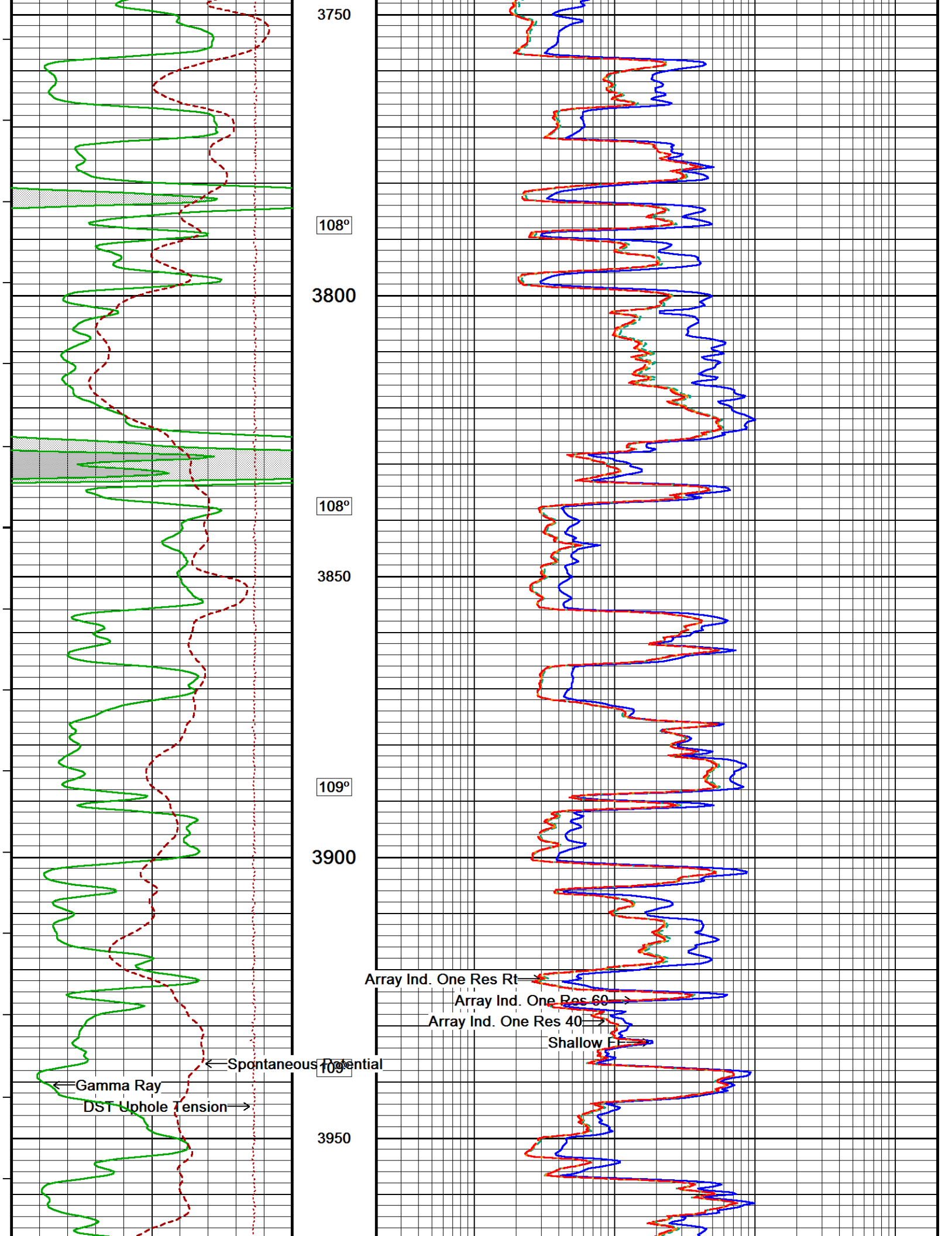
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

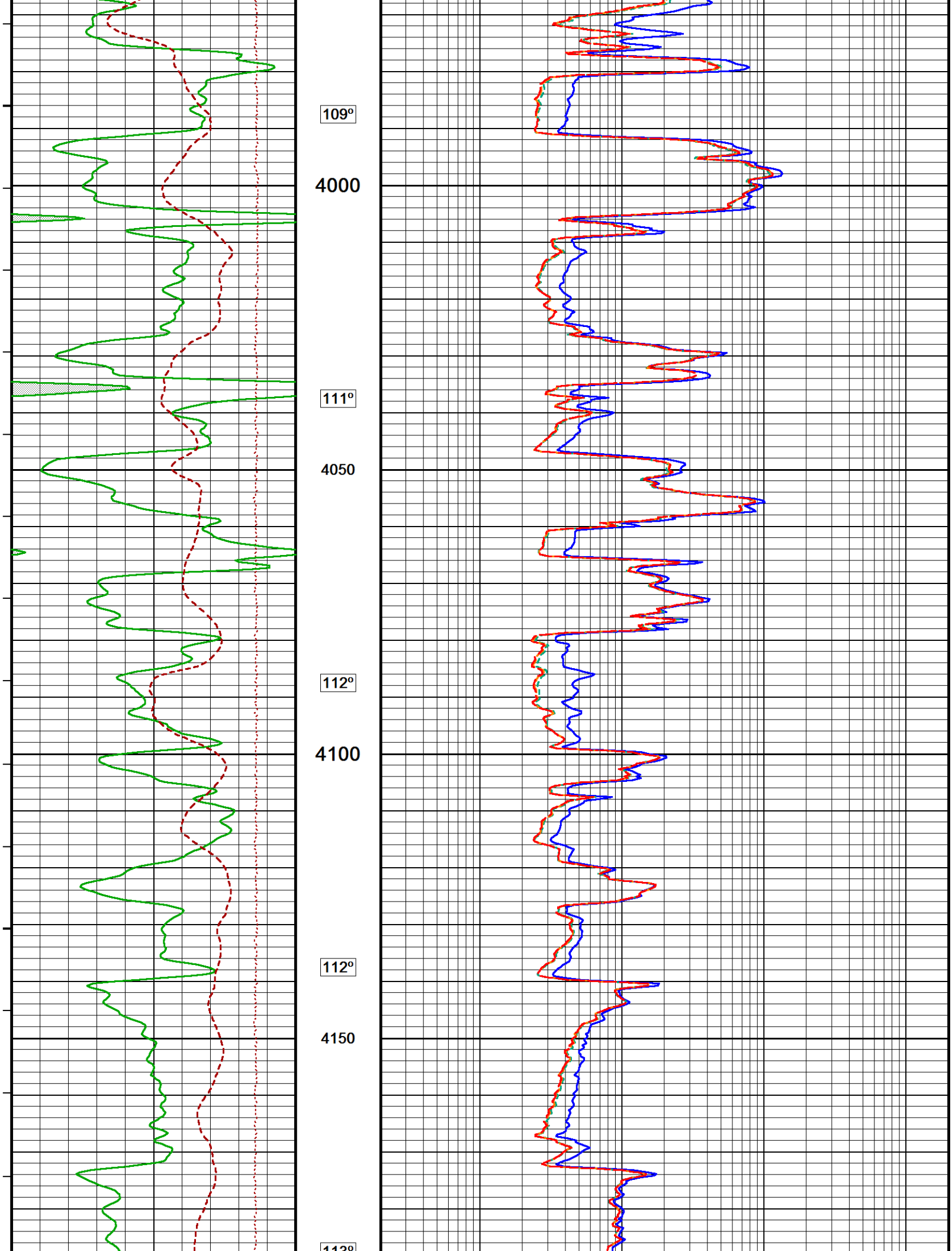
DST Uphole Tension
pounds
5000 0

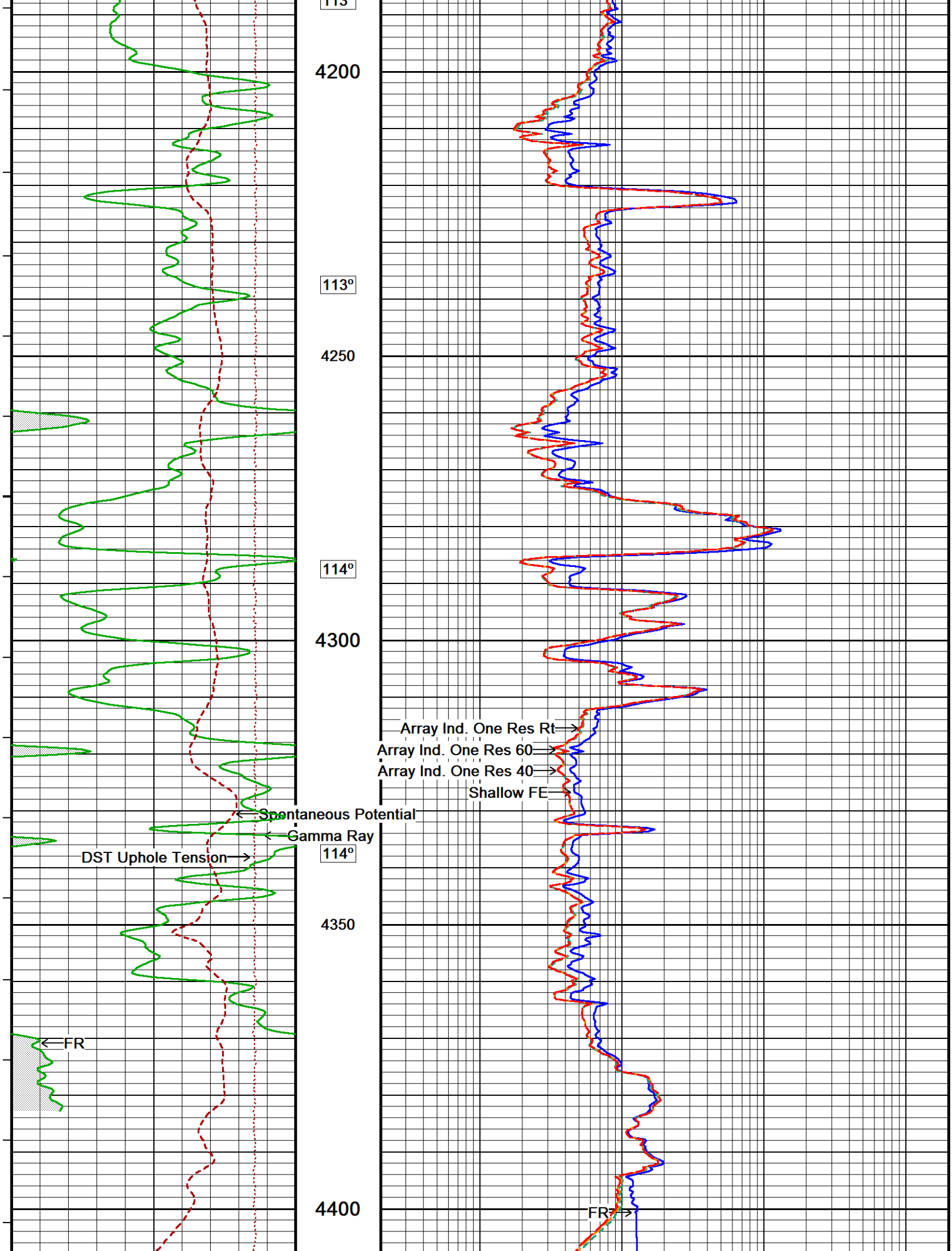
Replay
Scale
1:240

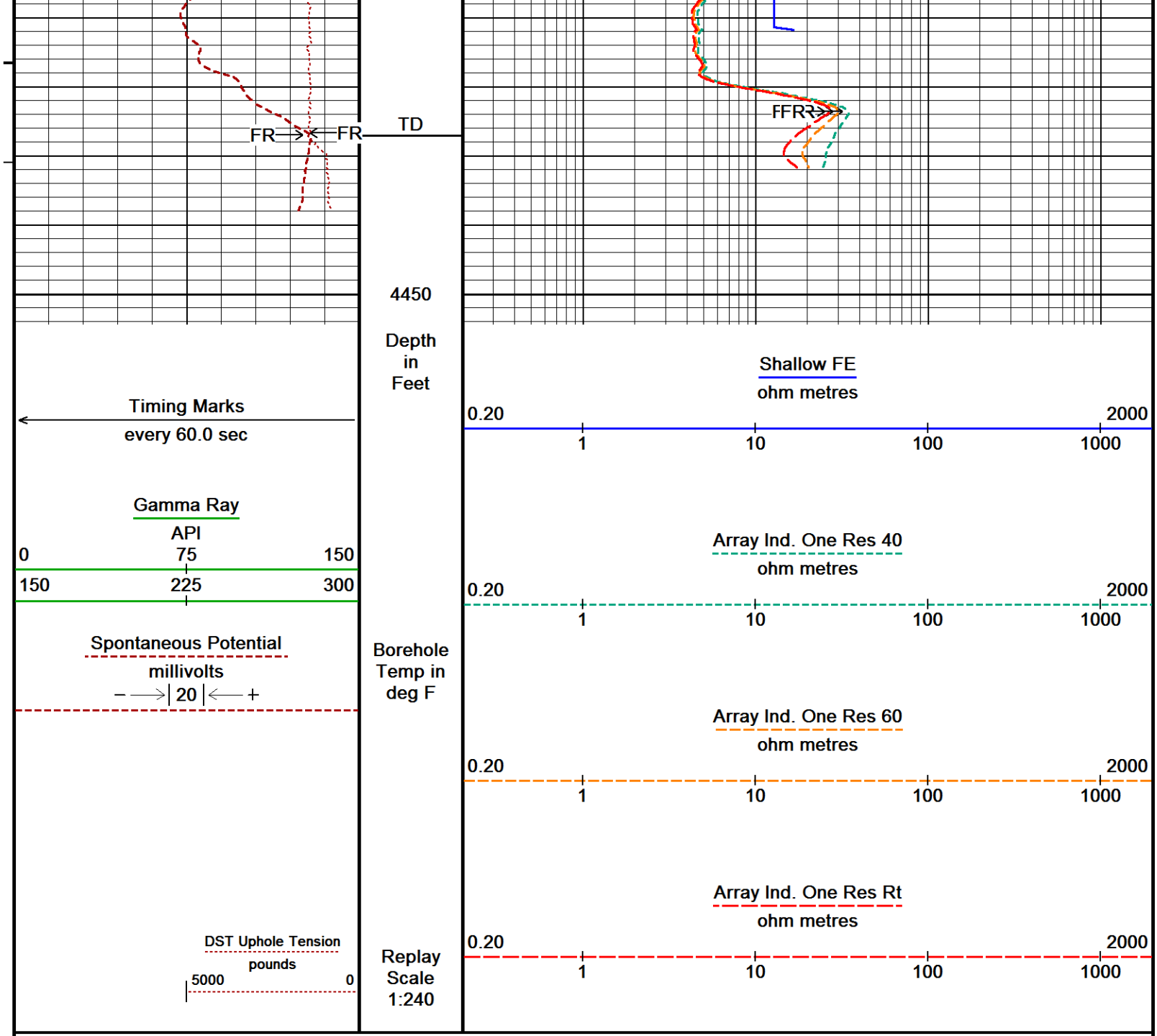
3700

108°


3750
108°
3800
108°
3850
109°
3900
109°
3950
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Ft
Spontaneous Potential
Gamma Ray
DST Uphole Tension


109°
4000
111°
4050
112°
4100
112°
4150


113
4200
113°
4250
114°
4300
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
4350
FR
4400
FR




Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-FEB-2016 04:35
Filename: C:\Minimus 15.03.5939\Logs\Suemaur Kuehn ...\Suemaur Kuehn Family Trust #1-23_002.dta
Recorded on 25-FEB-2016 00:12
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939

REPEAT SECTION

## BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\Suemaur Kuehn Family Trust #1-23\Suemaur Kuehn Family Trust #1-23_002.dta

General Constants All 000

Last Edited on 24-FEB-2016,23:29

| | | |
|---|---|---|
| **General Parameters** | | |
| Mud Resistivity | 0.870 | 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 | Deep Induction |
| 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 24-FEB-2016 23:03

| Reading No | Measured | Calibrated (lbs) |
|---|---|---|
| 1 | 10842.49 | 0.00 |
| 2 | 11417.86 | 481.00 |

## Gamma Calibration MCG-C 123

Field Calibration on 24-FEB-2016 15:06

| | Measured | Calibrated (API) |
|---|---|---|
| Background | 71 | 48 |
| Calibrator (Gross) | 747 | 504 |
| Calibrator (Net) | 676 | 456 |

## Gamma Calibration Tolerances MCG-C 123

| | | | |
|---|---|---|---|
| Ratio | 1.483 | 1.40 1.475 1.55 | Counts/API |

## Gamma Constants MCG-C 123

Last Edited on 24-FEB-2016,22:15

| | | |
|---|---|---|
| Gamma Calibrator Number | MCGGRCC141 | |
| GRC-M Calibrator Jig in Use? | NO | |
| Inactive Background Jig in Use? | NO | |
| Mud Density | 1.08 | gm/cc |
| Caliper Source for Processing | Density Caliper | |
| Tool Position | Eccentred | |
| Potassium Equivalence | Chloride | |
| K Mud Concentration | 0.00 | % |

## High Resolution Temperature Calibration MCG-C 123

Field Calibration on 31-OCT-2015,17:05

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

## High Resolution Temperature Constants MCG-C 123

Last Edited on 22-SEP-2015,11:43

| | |
|---|---|
| Pre-filter Length | 11 |

## SP Calibration MCG-C 123

Field Calibration on 02-NOV-2015 16:50

| | Measured | Calibrated (mV) |
|---|---|---|
| Reference 1 | 100.3 | 100.0 |
| Reference 2 | -100.1 | -99.9 |

## Micro Normal and Micro Inverse Calibration MMR-C.A 247

Base Calibration on 28-JAN-2016 15:04
Field Check on 24-FEB-2016 14:50

Base Calibration

| Channel | Measured Resistor 1 | Measured Resistor 2 | Calibrated (ohm-m) Resistor 1 | Calibrated (ohm-m) Resistor 2 |
|---|---|---|---|---|
| Micro Normal | 10.2 | 49.9 | 5.1 | 25.6 |
| Micro Inverse | 10.0 | 49.5 | 3.4 | 16.9 |

| Channel | Base Check (ohm-m) | Field Check (ohm-m) |
|---|---|---|
| Micro Normal | 93.5 | 93.5 |
| Micro Inverse | 62.2 | 62.2 |

## Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Micro Normal Res. 1 | 10.2 | -5% 10.0 +5% | ohm | Micro Normal Res. 2 | 49.9 | -5% 50.0 +5% | ohm |
| Micro Inverse Res. 1 | 10.0 | -5% 10.0 +5% | ohm | Micro Inverse Res. 2 | 49.5 | -5% 50.0 +5% | ohm |
| Micro Normal Base Check | 93.5 | -2% 93.13 +2% | ohm-m | | | | |

Micro Inverse Base Check 62.2 ohm-m

Micro Normal Field Check 93.5 (-2% / 93.5 / +2%) ohm-m

Micro Inverse Field Check 62.2 (-2% / 62.2 / +2%) ohm-m

## Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 20-OCT-2015,12:33

| | | |
|---|---|---|
| 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 |

## Caliper Calibration MMR-C.A 247

Base Calibration on 28-JAN-2016 14:54
Field Calibration on 24-FEB-2016 14:49

Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|---|---|---|
| 1 | 14598 | 5.98 |
| 2 | 17942 | 7.97 |
| 3 | 21198 | 9.86 |
| 4 | 25146 | 11.92 |
| 5 | 0 | 0.00 |
| 6 | N/A | N/A |

Field Calibration

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

## Caliper Calibration Tolerances MMR-C.A 247

Short Arm Field Cal. 7.96 (7.77 / 7.97 / 8.17) in

## Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration Resistivity Mode

## Neutron Calibration MDN-A.B 66

Base Calibration on 12-FEB-2016 22:05
Field Check on 24-FEB-2016 15:13

Base Calibration

| | Measured | | Calibrated (cps) | |
|---|---|---|---|---|
| | Near | Far | Near | Far |
| | 3097 | 96 | 3714 | 110 |
| Ratio | 32.423 | | 33.764 | |

Field Calibrator at Base

| | Calibrated (cps) | |
|---|---|---|
| | 2076 | 2984 |
| Ratio | 0.696 | |

Field Check

| | Calibrated (cps) | |
|---|---|---|
| | 2077 | 3013 |
| Ratio | 0.689 | |

## Neutron Calibration Tolerances MDN-A.B 66

Ratio 32.423 (-5% / 33 / +5%)

Base Check 0.696 (0.65 / 0.7 / 0.75)

Field Check 0.689 (0.676 / 0.696 / 0.716)

## Neutron Constants MDN-A.B 66

Last Edited on 24-FEB-2016,22:15

| | | |
|---|---|---|
| Neutron Source Id | P0204NN | |
| Neutron Jig Number | NJ5736 | |
| Air Hole Processing | Legacy | |
| 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 | |

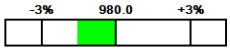
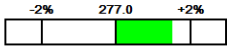
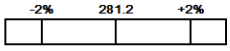
## FE Calibration MFE-B.J 352

Base Calibration on 09-NOV-2015 11:10
Field Check on 24-FEB-2016 14:37

Base Calibration

| | Measured | Calibrated (ohm-m) |
|---|---|---|
| Reference 1 | 0.0 | 0.0 |
| Reference 2 | 964.4 | 126.8 |
| Base Check | | 281.2 |
| Field Check | | 281.3 |

## FE Calibration Tolerances MFE-B.J 352

| | | | |
|---|---|---|---|
| Reference 2 | 964.4 |  | ohm |
| Base Check | 281.2 |  | ohm-m |
| Field Check | 281.3 |  | ohm-m |

## FE Constants MFE-B.J 352

Last Edited on 24-FEB-2016,22:15

| | | |
|---|---|---|
| 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 24-FEB-2016,22:14

| | | |
|---|---|---|
| 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 |
| 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 |
| 3' Waveform Filter | N/A | |
| 4' Waveform Filter | N/A | |
| 5' Waveform Filter | N/A | |
| 6' Waveform Filter | N/A | |
| Semblance Level | N/A | |
| Semblance Window Width | N/A | micro-sec |
| Sonic 1 Despiker | N/A | N/A |
| Sonic 2 Despiker | N/A | N/A |

## Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 24-FEB-2016 14:36

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 09-DEC-2015 11:03

| Channel | Base Check (mmho/m) | | Field Check (mmho/m) | | |
|---|---|---|---|---|---|
| | Low | High | Low | High | |
| 1 | 12.1 | 3873.0 | 11.7 | 3872.7 | |
| 2 | 29.8 | 3528.1 | 29.8 | 3527.5 | |
| 3 | 29.1 | 3021.3 | 29.1 | 3020.6 | |
| 4 | 19.1 | 2058.5 | 19.2 | 2057.8 | |
| Deep | 17.7 | 1962.1 | 17.7 | 1961.4 | |
| Medium | 43.1 | 3976.4 | 43.2 | 3975.7 | |
| Shallow | 44.4 | 5232.7 | 44.4 | 5232.3 | |
| Array Temperature | 65.8 | | 57.2 | | 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 24-FEB-2016,22:14

| | | | | | |
|---|---|---|---|---|---|
| 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 | | | |

## High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 24-NOV-2014,10:23

| | 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 |

## Photo Density Calibration MPD-B 104

Base Calibration on 12-FEB-2016 21:25
Field Check on 24-FEB-2016 14:47

Density Calibration

| Base Calibration | Measured | | Calibrated (sdu) | |
|---|---|---|---|---|
| | Near | Far | Near | Far |
| Background | 1155 | 1342 | | |
| Reference 1 | 49717 | 23901 | 59556 | 30836 |
| Reference 2 | 20125 | 2432 | 24941 | 2541 |
| Field Check at Base | 1154.8 | 1342.5 | | |
| Field Check | 1157.5 | 1342.2 | | |

PE Calibration

Base Calibration

| | WS | Measured WH | Ratio | Calibrated Ratio |
|---|---|---|---|---|
| Background | 211 | 1032 | | |
| Reference 1 | 20971 | 49542 | 0.428 | 0.371 |
| Reference 2 | 5830 | 19993 | 0.296 | 0.272 |

Field Check at Base

| WS | WH |
|---|---|
| 211.2 | 1031.6 |

Field Check

| WS | WH |
|---|---|
| 211.2 | 1033.3 |

## Photo Density Calibration Tolerances MPD-B 104

| | | -5% | | +5% |
|---|---|---|---|---|
| Near Density Ratio | 2.56 | | 2.52 | |
| PE Calibration | 0.123 | 0.089 | 0.110 | 0.131 |

| | | -5% | | +5% |
|---|---|---|---|---|
| Far Density Ratio | 20.70 | | 21.00 | |

| | | -3% | | +3% |
|---|---|---|---|---|
| Near Den. Field Check | 1157.5 | | 1154.8 | |
| PE WS Field Check | 211.2 | -6% | 211.2 | +6% |

| | | -3% | | +3% |
|---|---|---|---|---|
| Far Den. Field Check | 1342.2 | | 1342.5 | |
| PE WH Field Check | 1033.3 | -6% | 1031.6 | +6% |

## Density Constants MPD-B 104

Last Edited on 24-FEB-2016,22:15

| | | |
|---|---|---|
| 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 | 1.08 | 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 (m) |
|---|---|
| 2.71 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | |

## Caliper Calibration MPD-B 104

Base Calibration on 12-FEB-2016 20:54
Field Calibration on 24-FEB-2016 14:42

Base Calibration

| Reading No | Measured | Calibrator Size (in) |
|---|---|---|
| 1 | 13189 | 3.99 |
| 2 | 22005 | 5.98 |
| 3 | 30656 | 7.97 |
| 4 | 38848 | 9.86 |
| 5 | 47902 | 11.92 |
| 6 | N/A | N/A |

Field Calibration

| Measured Caliper (in) | Actual Caliper (in) |
|---|---|
| 7.91 | 7.97 |

## Caliper Calibration Tolerances MPD-B 104

| | | 7.77 | 7.97 | 8.17 | |
|---|---|---|---|---|---|
| Short Arm Field Cal. | 7.91 | | | | in |

## DOWNHOLE EQUIPMENT

Cablehead, 11 pin
CBH-CA 155 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-B 104 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

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

Total Length: 63.70 ft Weight: 480.6 lb

| | |
|---|---|
| 56.02 ft | GRGC - MCG Gamma Ray |
| 53.11 ft | CGXT - MCG External Temperature |
| 46.76 ft | MBTC - MMR Caliper |
| 45.76 ft | MINV - MMR MicroLog Inverse |
| 45.76 ft | MNRL - MMR MicroLog 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 |
| 12.96 ft | SPRL - Wyllie Lime. Sonic Por. |
| 12.96 ft | DT35 - 3-5' Compensated Sonic |
| 3.34 ft | R40O - Array Ind. One Res 40 |
| 3.34 ft | R60O - Array Ind. One Res 60 |
| 3.34 ft | CTAO - Array Ind. One Cond Ct |
| 3.34 ft | RTAO - Array Ind. One Res Rt |
| 0.23 ft | SPCG - Spontaneous Potential |
| Tool Zero | (0.13ft from bottom) |
| -0.13 ft | SMTU - DST Uphole Tension |

All measurements relative to tool zero.

| | |
|---|---|
| COMPANY | SUEMAUR EXPLORATION & PRODUCTION, LLC. |
| WELL | KUEHN FAMILY TRUST #1-23 |
| FIELD | WILDCAT |
| PROVINCE/COUNTY | SHERIDAN |
| COUNTRY/STATE | U.S.A. / KANSAS |

COUNTRY/STATE USA/ARKANSAS

| | | | | | |
|---|---|---|---|---|---|
| Elevation Kelly Bushing | 2712.00 | feet | First Reading | 4424.00 | feet |
| Elevation Drill Floor | 2710.00 | feet | Depth Driller | 4425.00 | feet |
| Elevation Ground Level | 2707.00 | feet | Depth Logger | 4427.00 | feet |

Weatherford®

# ARRAY INDUCTION
# SHALLOW FOCUSED
# ELECTRIC LOG