STEP energy services

# PHASED INDUCTION
# SHALLOW FOCUS SP LOG

| | |
|---|---|
| Company | MERIT ENERGY COMPANY |
| Well | CORA #1-16 |
| Field | WILDCAT |
| County | FINNEY |
| State | KANSAS |
| Country | USA |
| API No. | 15-055-22533-00-00 |

**File No** : TUL-70627
**Company** : MERIT ENERGY COMPANY
**Well** : CORA #1-16
**Field** : WILDCAT
**County** : FINNEY
**State** : KANSAS
**Country** : USA
**API No** : 15-055-22533-00-00

**Location :**
414' FWL & 2002' FNL
NW/4

**LSD :** **Sect :** 16 **Twp :** 24S **Rge :** 33W

| | | | | | |
|---|---|---|---|---|---|
| **Permanent Datum:** | GL | **Elevations:** | | **Services:** | |
| **Drilling Measured From:** | KB | **KB** | 2875.00 Ft | CNT | MST |
| **Log Measured From:** | KB | **DF** | 2874.00 Ft | LDT | PIT |
| **Above Permanent Datum:** | 12.00 Ft | **GL** | 2863.00 Ft | CST | |

| | | | | |
|---|---|---|---|---|
| **Date** | 02-28-2020 | | | |
| **Run Number** | 1 | | | |
| **Depth--Driller** | 5005.0 Ft | | | |
| **Depth--Logger** | 5004.0 Ft | | | |
| **First Reading** | 5003.0 Ft | | | |
| **Last Reading** | 1789.0 Ft | | | |
| **Casing--Driller** | 1789.0 Ft | | | |
| **Casing--Logger** | 1789.0 Ft | | | |
| **Bit Size** | 7.875 In | | | |
| **Casing Size** | 8.625 In | | | |
| **Hole Fluid Type** | CHEMICAL | | | |
| **Density** | 9.2 | | | |
| **Fluid Loss** | 6.0 | | | |
| **PH/Viscosity** | 10.5 | 65.0 | | |
| **Sample Source** | MEASURED | | | |
| **RM@Measured Temp.** | 1.500 @ 86 F | | | |
| **RMF@Measured Temp** | 1.280 @ 86 F | | | |
| **RMC@Measured Temp.** | 1.730 @ 86 F | | | |
| **Source RMF/RMC** | CALCULATED | CALCULATED | | |
| **RM@BHT** | 1.040 @ 128 F | | | |
| **Time Circulation Stopped** | 02-28-2020 17:00 | | | |
| **Max Recorded Temp.** | 128 F | | | |
| **Equipment/Base** | TRK137 | HAYS | | |
| **Recorded By** | B.BAILEY | | | |
| **Witnessed By** | R.GONZALES, A. GARNER | | | |



**Bitsize Intervals**

| Size (In) | Bottom (Ft) |
|---|---|
| 7.875 | 5005.00 |

**Casing Strings**

| Size (In) | Weight (Lbs) | Bottom (Ft) | Top (Ft) |
|---|---|---|---|
| 8.625 | 17.00 | 1789.00 | 0.00 |

| | |
|---|---|
| **Run Number** | 1 |
| **Date** | 02-28-2020 |
| **Date/Time On Bottom** | 02-28-2020 00:00 |
| **Depth to Fluid** | 0.0 Ft |
| **Salinity** | 0.000 |
| **RMF@BHT** | 0.880 @ 128 F |
| **RMC@BHT** | 1.280 @ 128 F |

**Run Number 1**

**Comments**

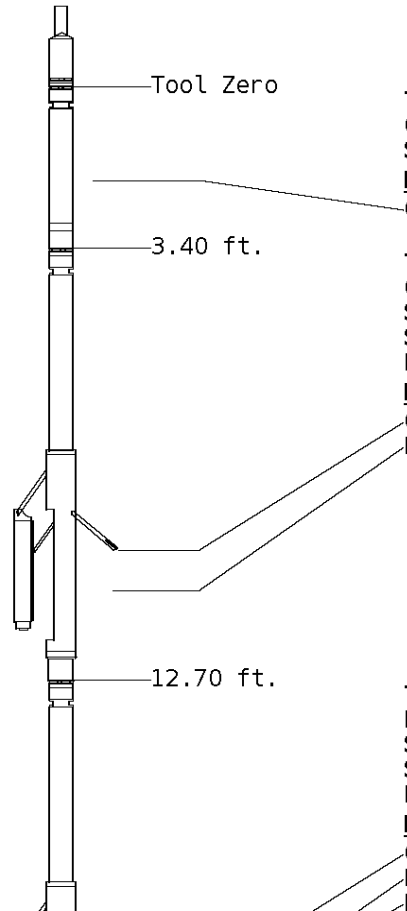
ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, CST, MLT AND PIT RUN IN COMBINATION
CALIPERS ORIENTED ON X-Y AXIS
2.71 G/CC USED TO CALCULATE POROSITY
ANNULAR HOLE VOLUME CALCULATED USING 5.5" PRODUCTION CASING
PHIN IS CALIPER CORRECTED

GRT: GRP
CNT: PHIN, CLCNIN,
LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN
CST: PORS, CDTF, TTIPF, TT2PF, TT3PF, TT4PF, ITT
MLT: NOR_RF, INV_RF, MSCLPIN
PIT: ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS:
D. RAGSDALE
J. VAUGHN
D.LEGLEITER
Z.AL SUDANI

# Tool String Schematic

**Total Tool Length** - 67.37 **ft.**
**Maximum Outside diameter** - 6.00 **in.**
**Net Weight in Air** - 1171.00 **lbs.**




**Tool:** GRT-B **Length:** 3.40 **ft.** **O.D.** 3.60 **in.**
Gamma Ray Controller
**Sonde ID** :GRT-BC-038

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| GRP | 2.00 | 2.00 | 65.37 |

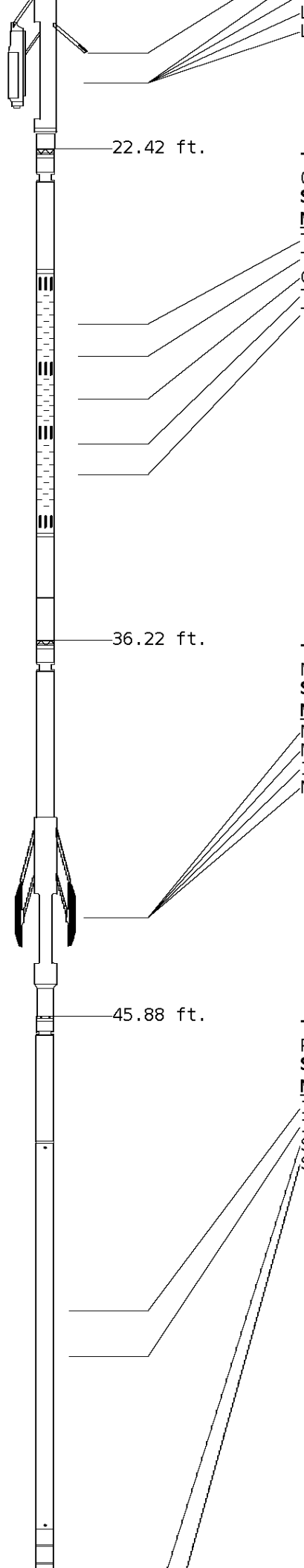
**Tool:** CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
**Sonde ID** :NDT-AF-411
**Source ID** :N-1104
**Pad ID** :CNP-AE-41

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| CLCN | 6.00 | 9.40 | 57.97 |
| PHIN | 6.80 | 10.20 | 57.17 |

**Tool:** LDT-DF **Length:** 9.72 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-F
**Sonde ID** :NDT-FA-404
**Source ID** :1637GW
**Pad ID** :LDP-DA-062

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| CLLD | 6.42 | 19.12 | 48.25 |
| PEL | 7.42 | 20.12 | 47.25 |
| PES | 7.82 | 20.52 | 46.85 |

| | | | |
|---|---|---|---|
| LDEN | 7.62 | 20.32 | 47.05 |
| LCOR | 7.62 | 20.32 | 47.05 |




**Tool:** CST-AD **Length:** 13.80 **ft.** **O.D.** 3.60 **in.**
Open Hole Sonic
**Sonde ID** :CST-AB-21

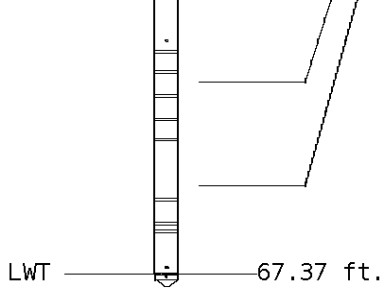
| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| TT1 | 4.80 | 27.22 | 40.15 |
| TT3 | 5.80 | 28.22 | 39.15 |
| CDT | 7.30 | 29.72 | 37.65 |
| TT4 | 8.80 | 31.22 | 36.15 |
| TT2 | 9.80 | 32.22 | 35.15 |

**Tool:** MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC,D)
**Sonde ID** :MST-DA-36

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| MSFL | 7.60 | 43.82 | 23.55 |
| MSCLP | 7.60 | 43.82 | 23.55 |
| INV | 7.60 | 43.82 | 23.55 |
| NOR | 7.60 | 43.82 | 23.55 |

**Tool:** PIT-CA **Length:** 21.49 **ft.** **O.D.** 3.62 **in.**
Phased Dual Induction w/ RM & D
**Sonde ID** :PIT-AC-043

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| ILD | 8.92 | 54.80 | 12.56 |
| ILM | 10.10 | 55.98 | 11.39 |
| SFLU | 17.49 | 63.37 | 4.00 |
| SP | 20.60 | 66.48 | 0.88 |




| | | | |
|---|---|---|---|
| **Well File:** | MERIT_CORA_1-16_FEB-28_QST | **Scale:** | 1:600 **Format:** DIL-600 |
| **Segment:** | V1.D1.S5 Reprocess MAIN | **Acquired:** | 2020-02/29 00:34 3.4.1-13972 |
| **Reference:** | 0 | **Processed:** | 2020-02/29 02:11 3.4.1-13972 |

**TENSION**
**LBS**
10000 — 0

**SPONTANEOUS POTENTIAL**
**mV**
→ | ←20

**GAMMA RAY**
**API UNITS**
150 — 300
0 — 150

**DEEP INDUCTION**
**OHMM**
0.0 — 500.0
0.0 — 50.0

**SHALLOW FOCUSED RESISTIVITY**
**OHMM**
0.0 — 500.0
0.0 — 50.0

**DEEP CONDUCTIVITY**
**MMHO**
2000 — 1000
1000 — 0

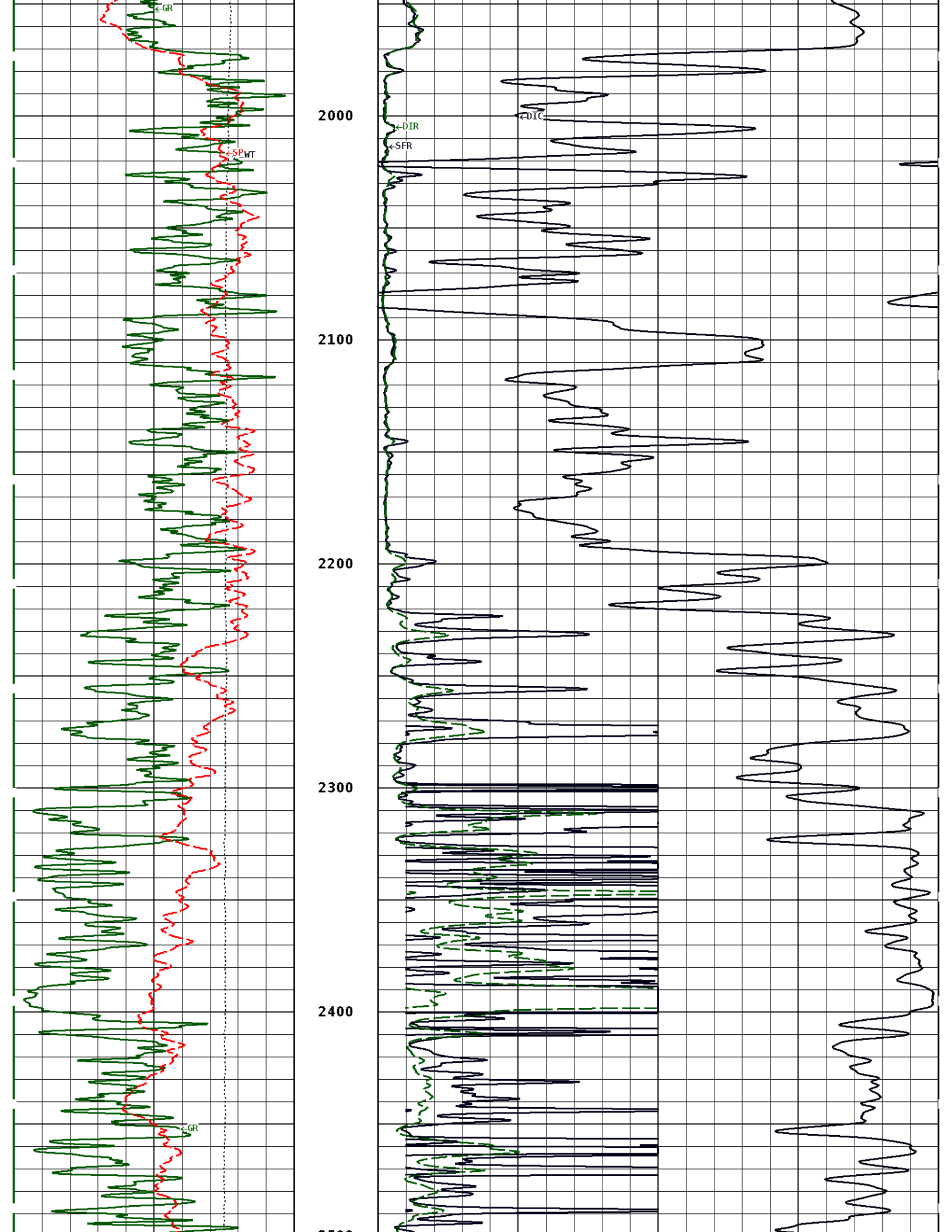
# 1:600 MAIN SECTION

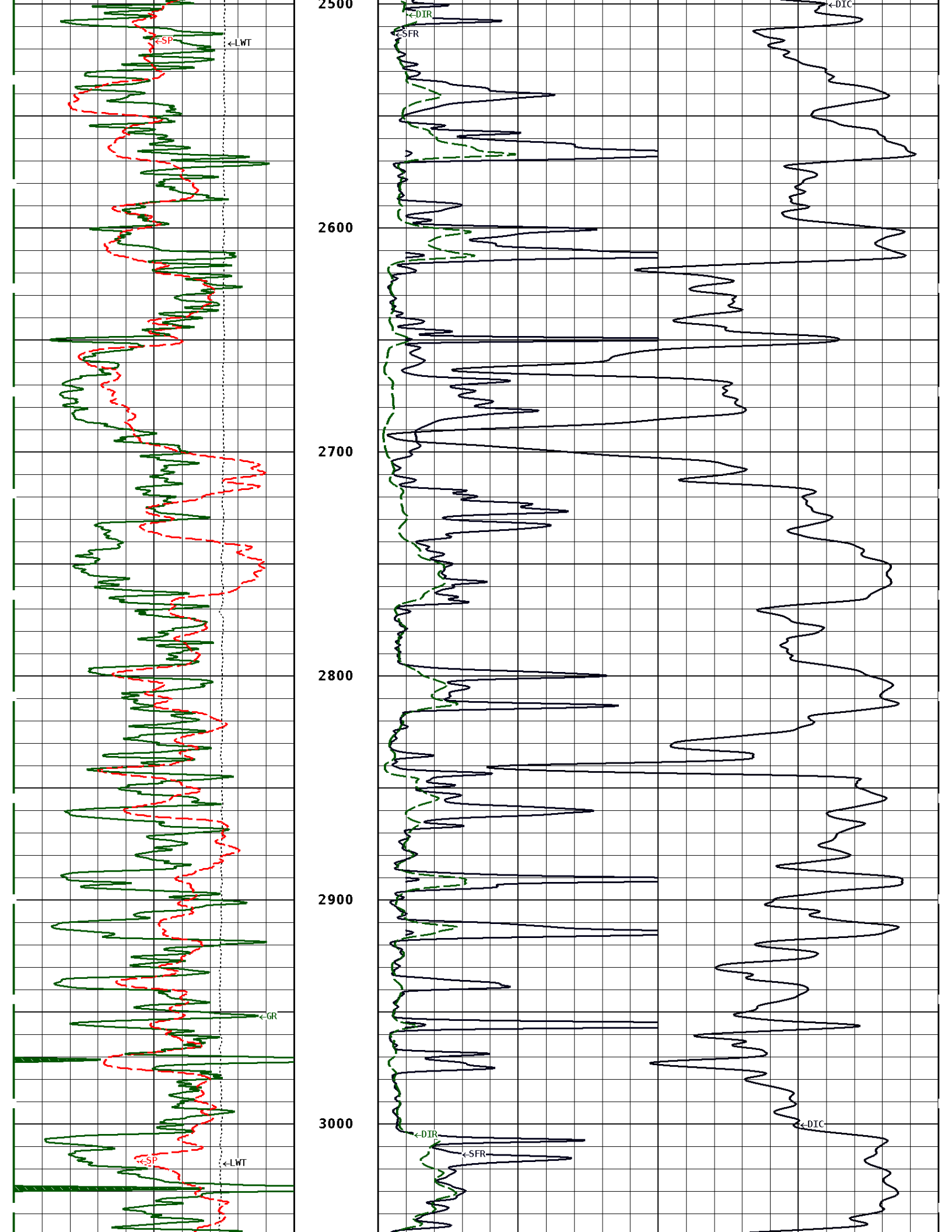
File #1.1.5

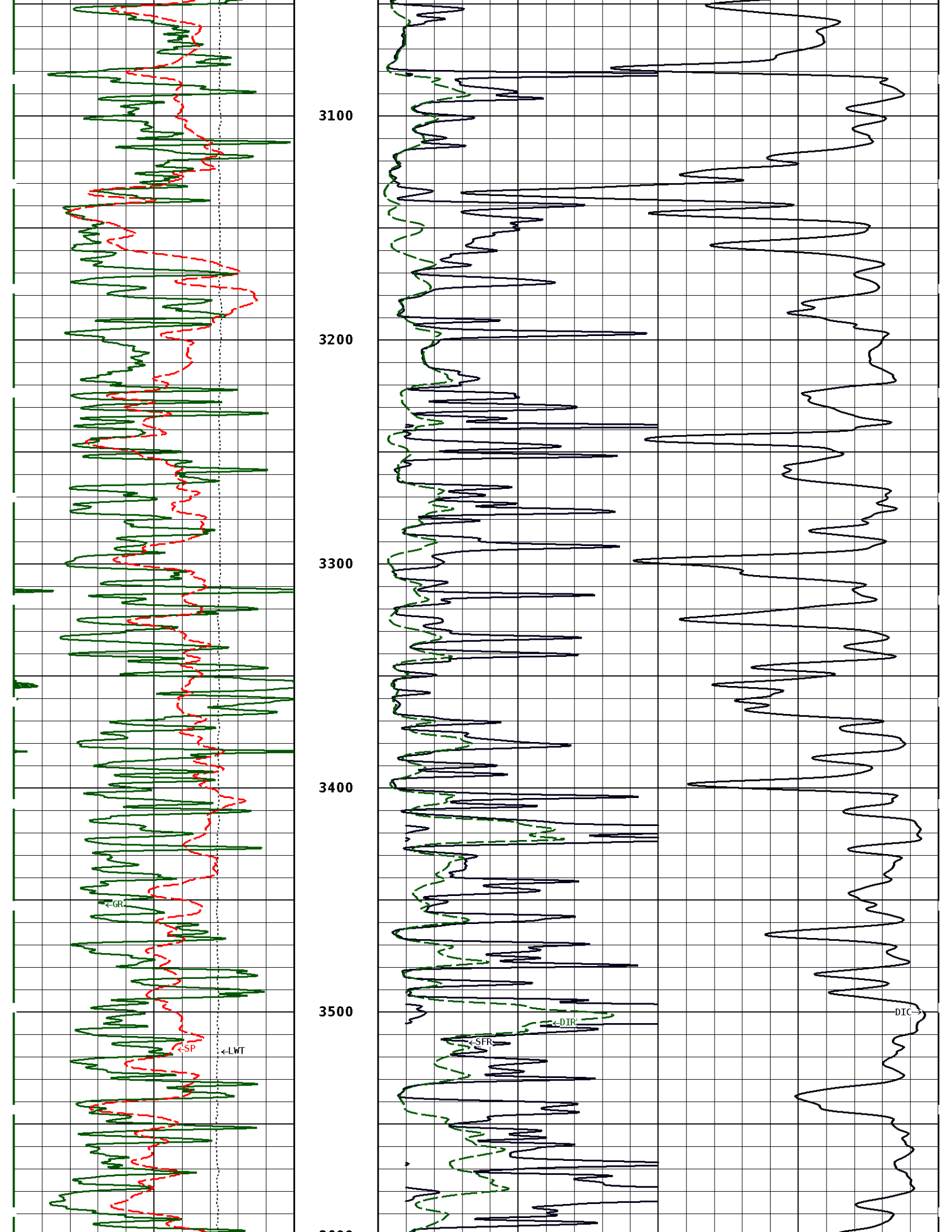
1700

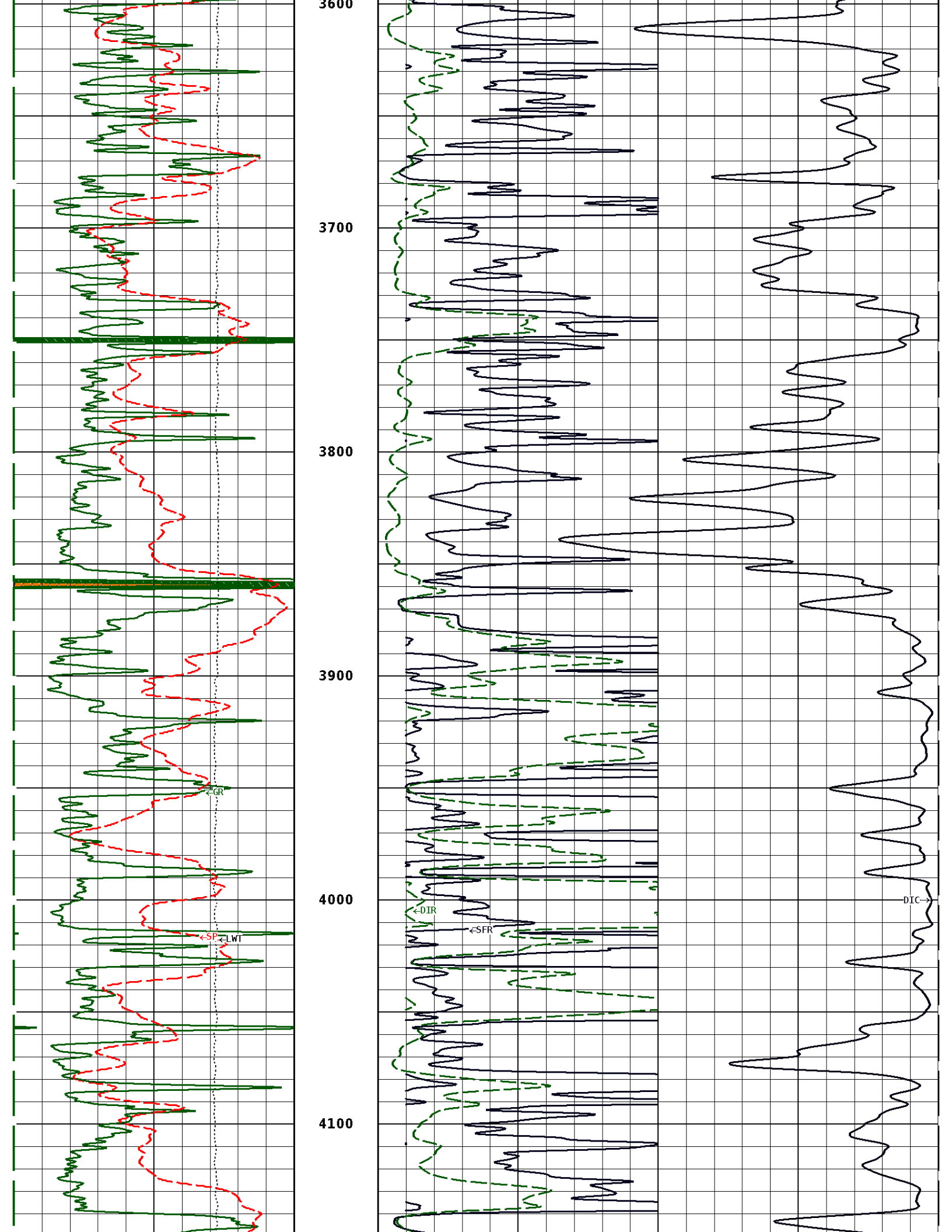
1800

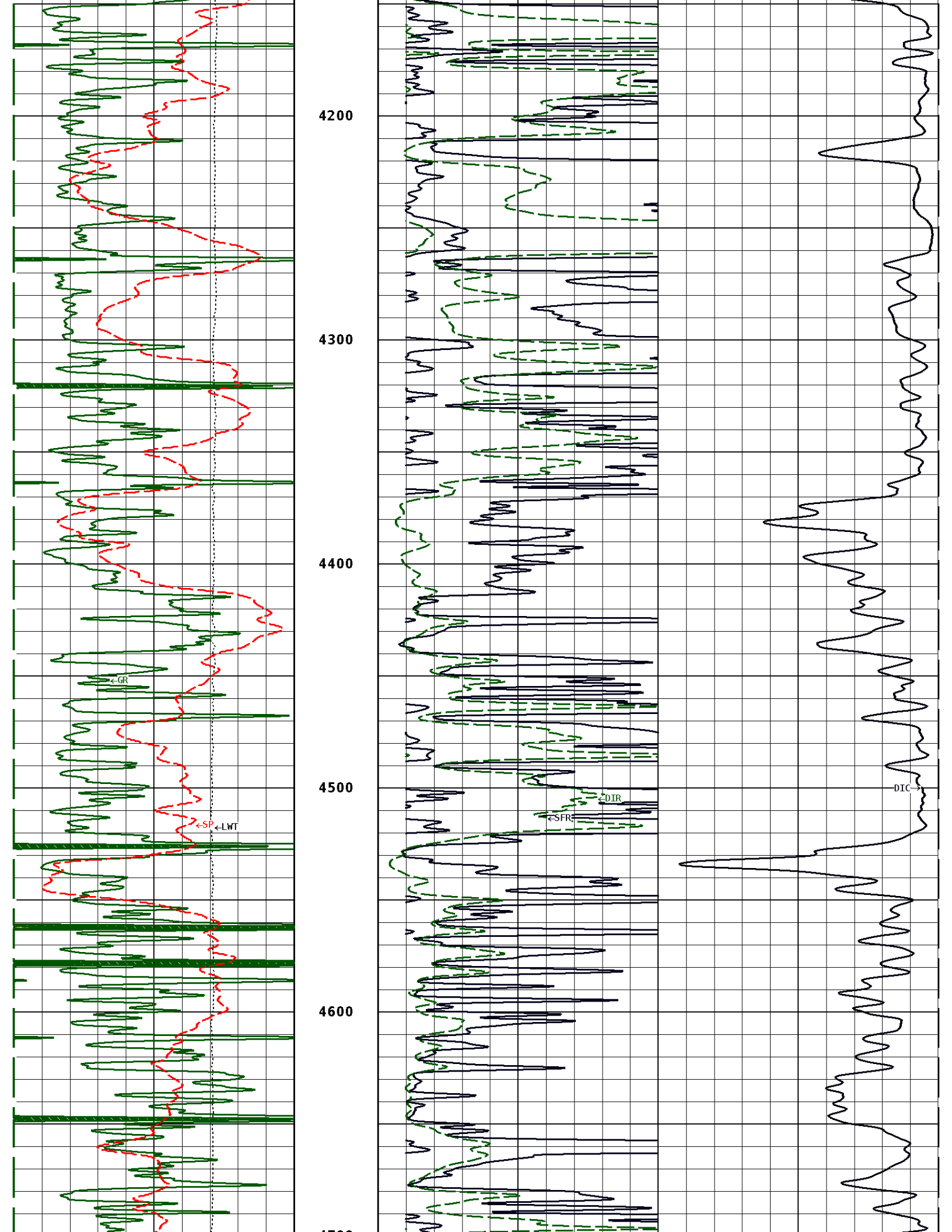
1900

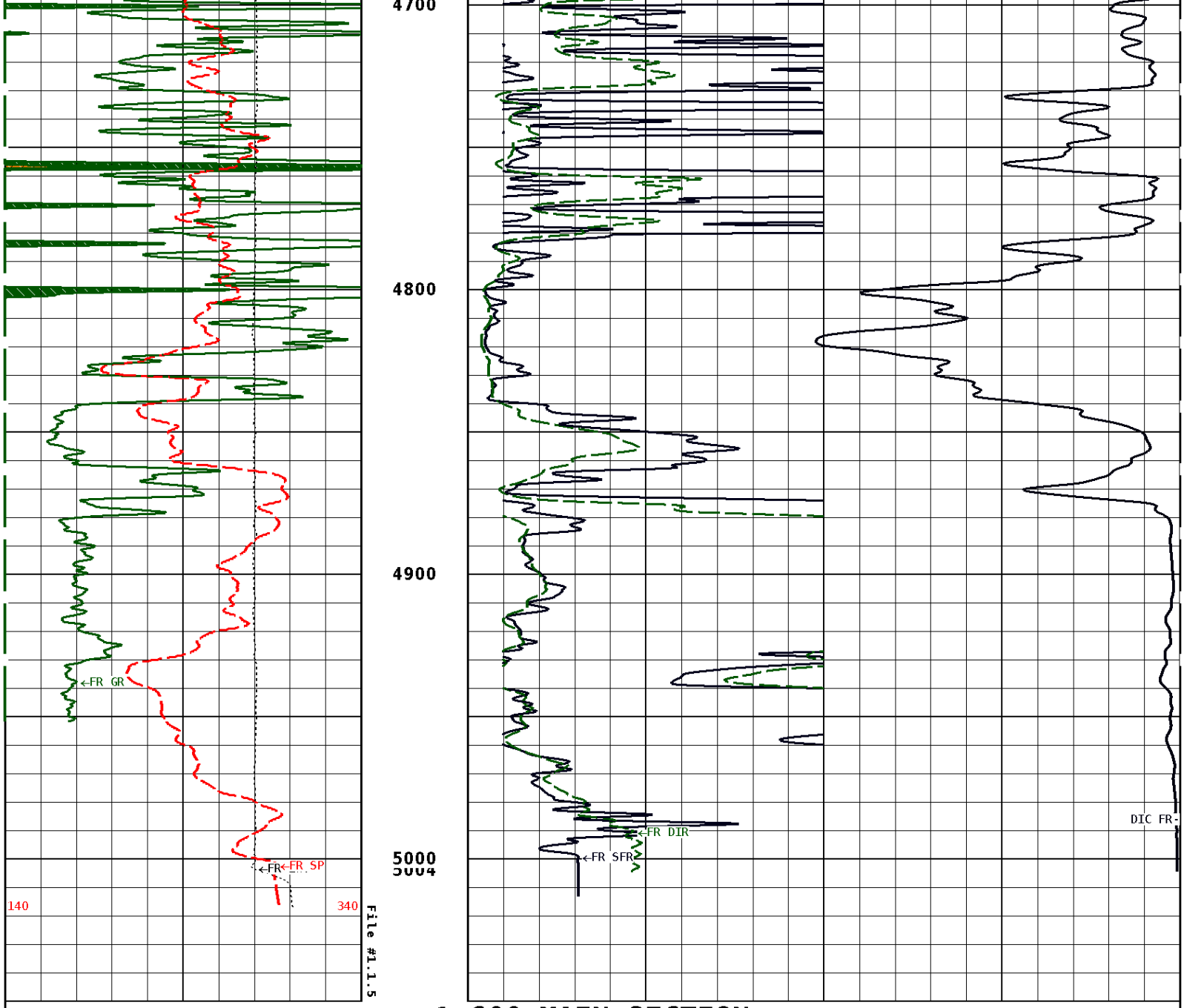

GR
SP
WT
DIR
SFR
DIC
GR
2000
2100
2200
2300
2400


2500
2600
2700
2800
2900
3000
SP
LWT
GR
DIR
SFR
DIC


3100
3200
3300
3400
3500
←GR
←SP
←LWT
←DIP
←SFR
DIC→


3600
3700
3800
3900
4000
4100
GR
SP
LWT
DIR
SFR
DIC


4200
4300
4400
4500
4600
←GR
←SP
←LWT
←DIR
←SFR
DIC→




1:600 MAIN SECTION

**GAMMA RAY**
**API UNITS**
150 300
0 150

**SPONTANEOUS POTENTIAL**
**mV**
→ ←20

**TENSION**
**LBS**
10000 0

**DEEP CONDUCTIVITY**
**MMHO**
2000 1000
1000 0

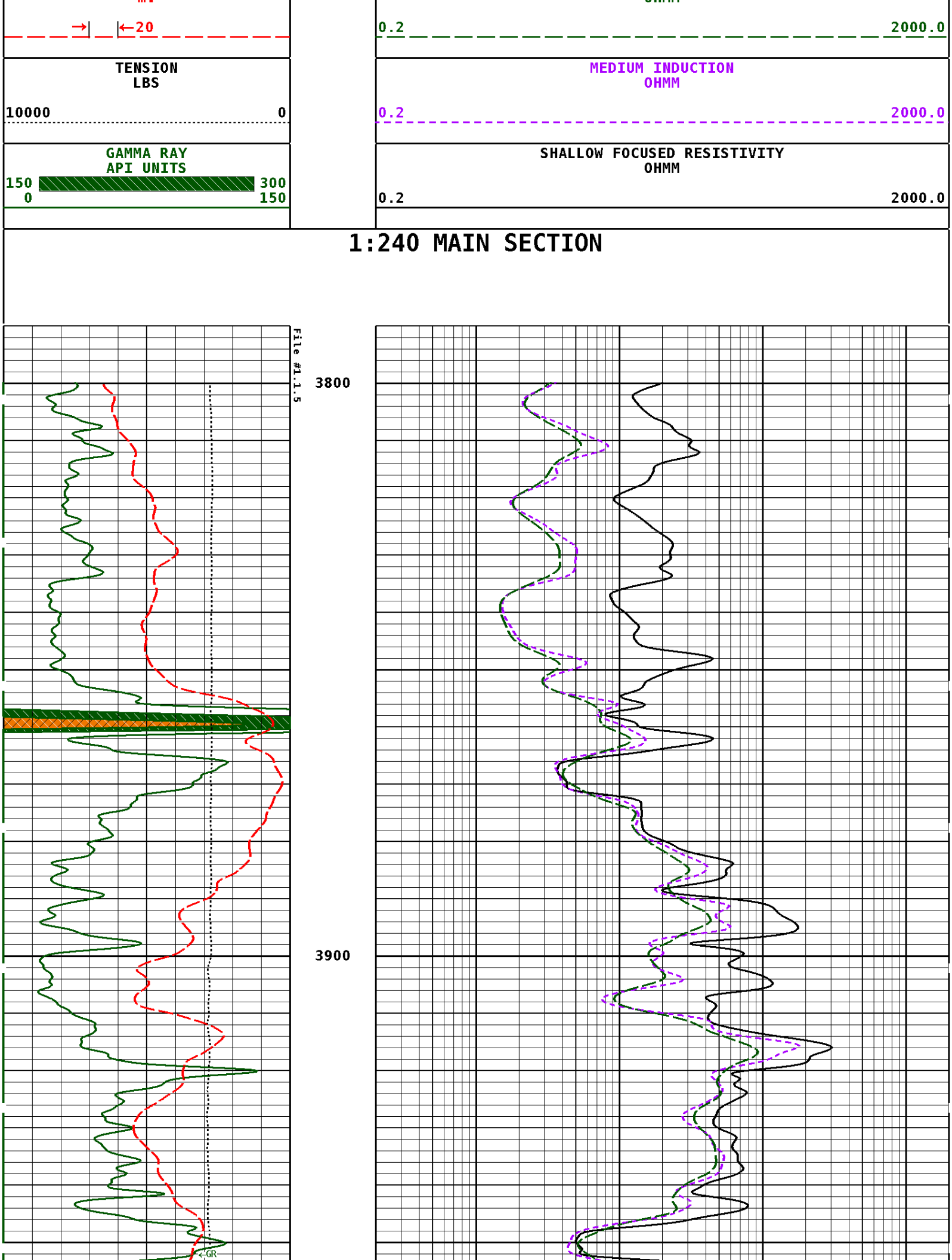
**SHALLOW FOCUSED RESISTIVITY**
**OHMM**
0.0 500.0
0.0 50.0

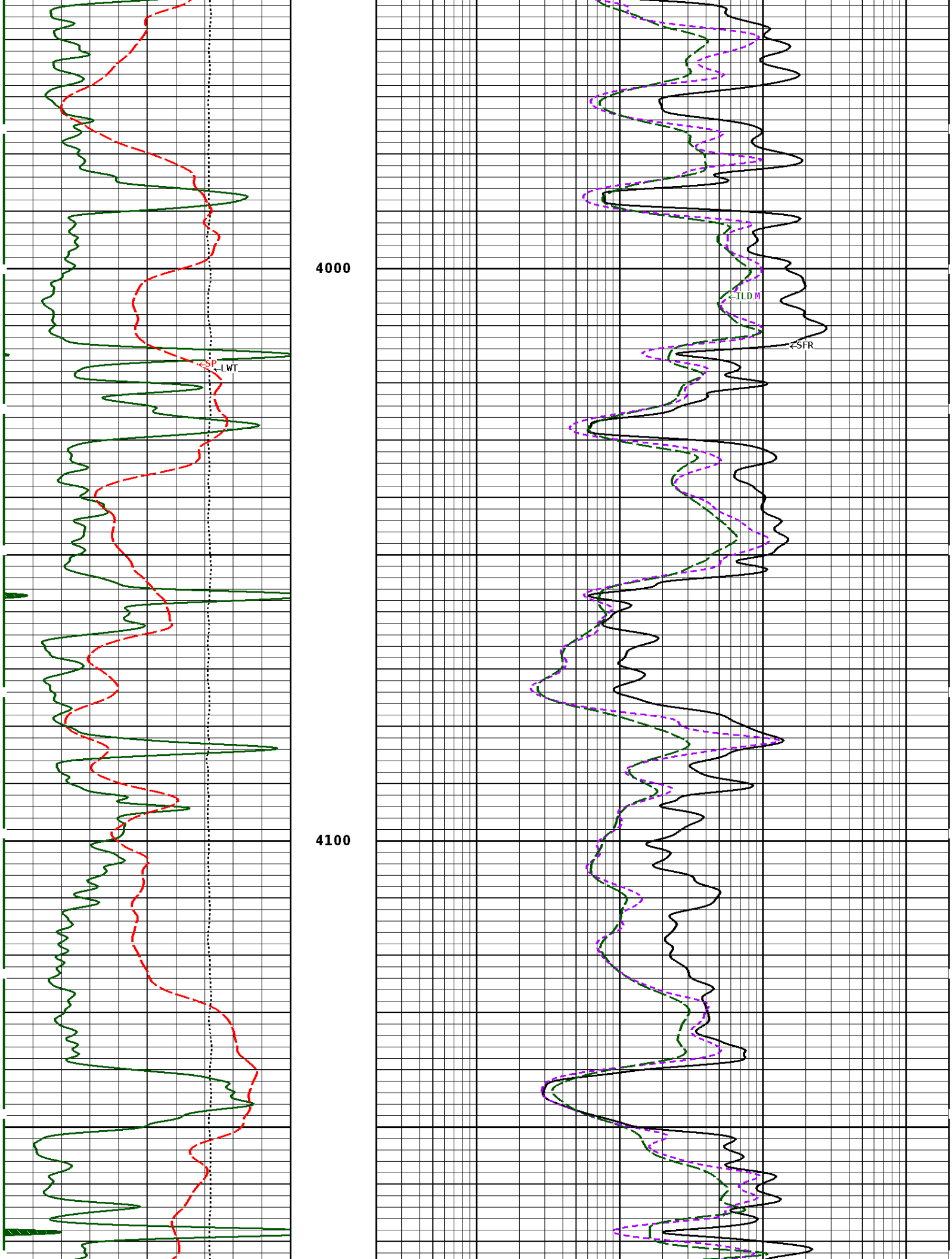
**DEEP INDUCTION**
**OHMM**
0.0 500.0
0.0 50.0

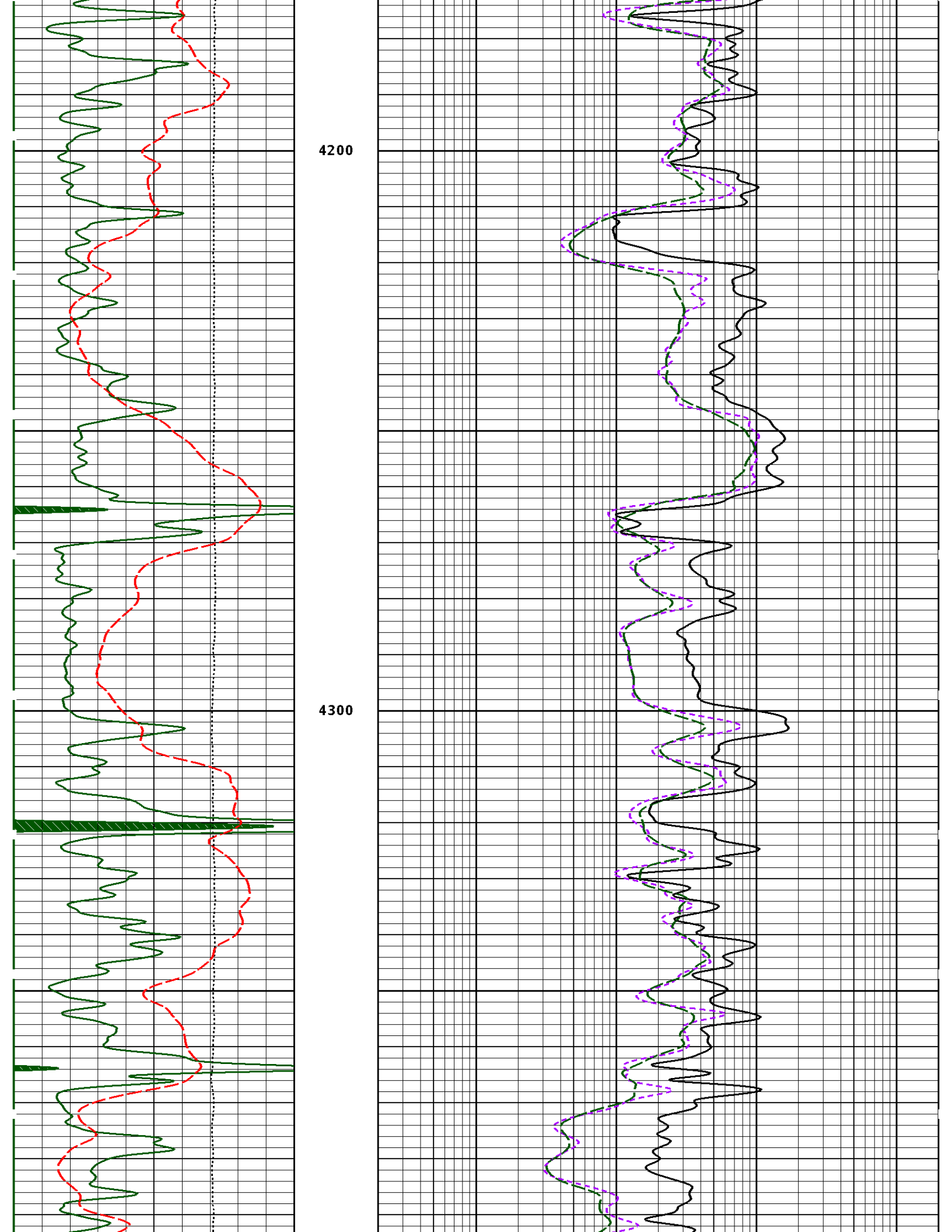
| | | | |
|---|---|---|---|
| **Well File:** | MERIT_CORA_1-16_FEB-28_QST | **Scale:** 1:240 | **Format:** DIL-240 |
| **Segment:** | V1.D1.S5 Reprocess MAIN | **Acquired:** | 2020-02/29 00:34 3.4.1-13972 |
| **Reference:** | 0 | **Processed:** | 2020-02/29 02:11 3.4.1-13972 |

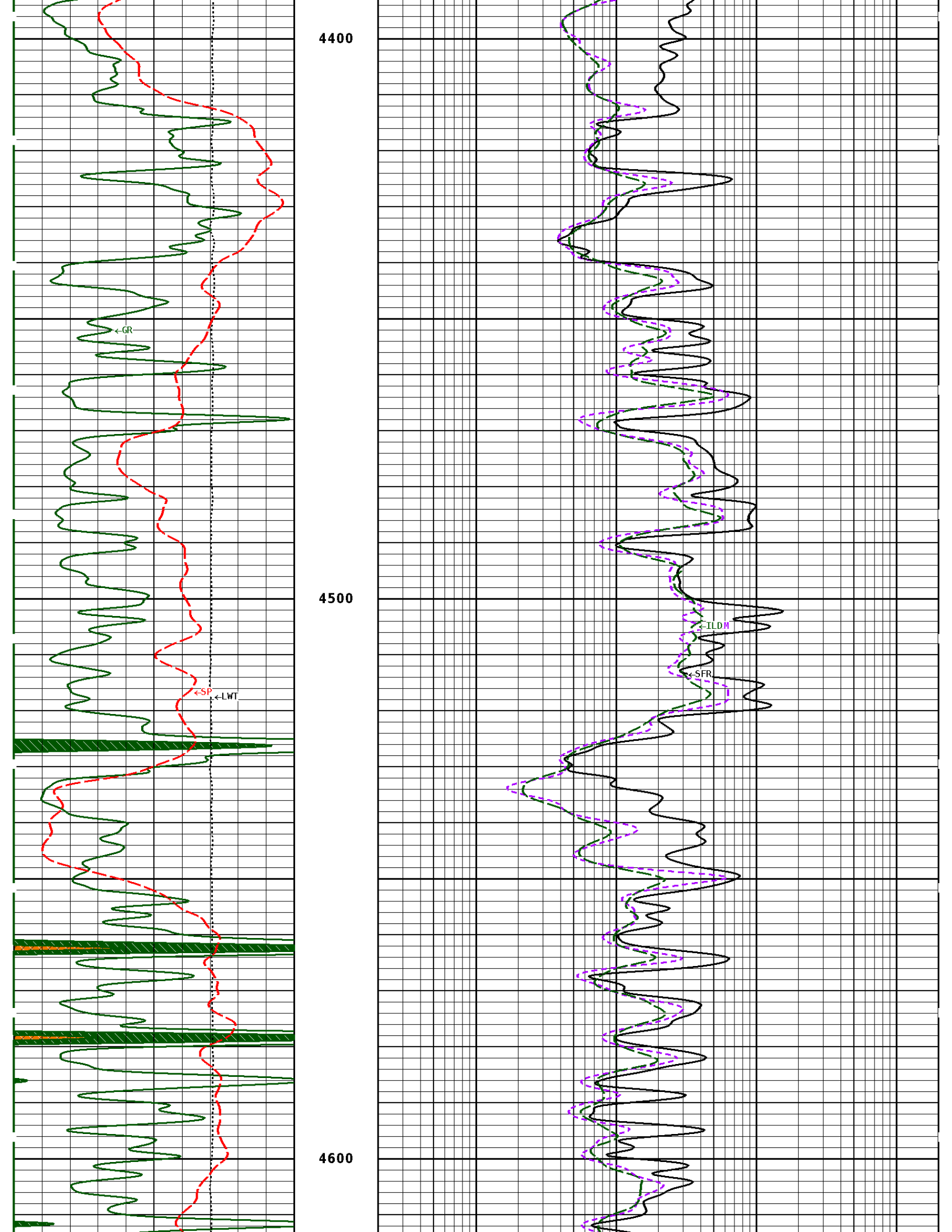
**SPONTANEOUS POTENTIAL**
**mV**

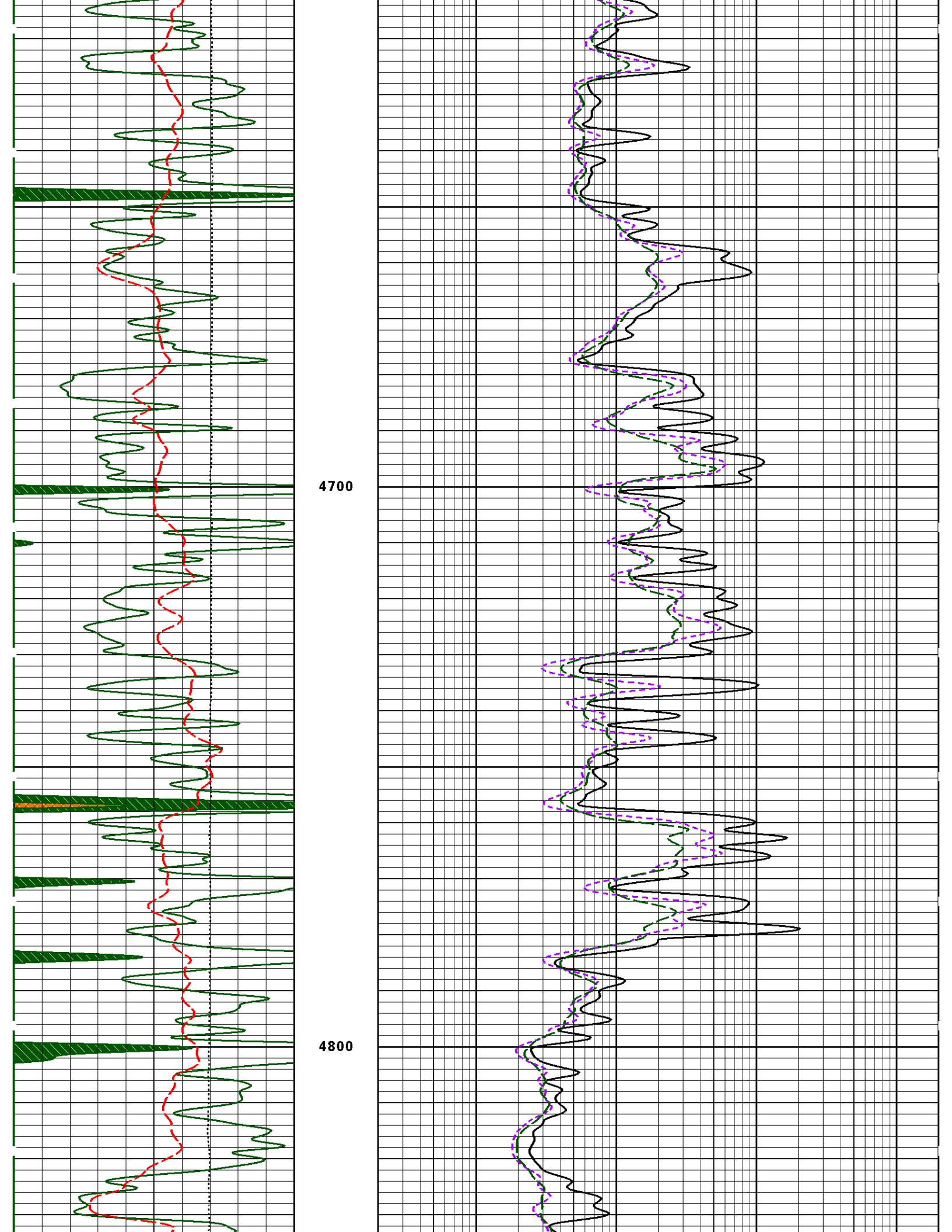
**DEEP INDUCTION**
**OHMM**

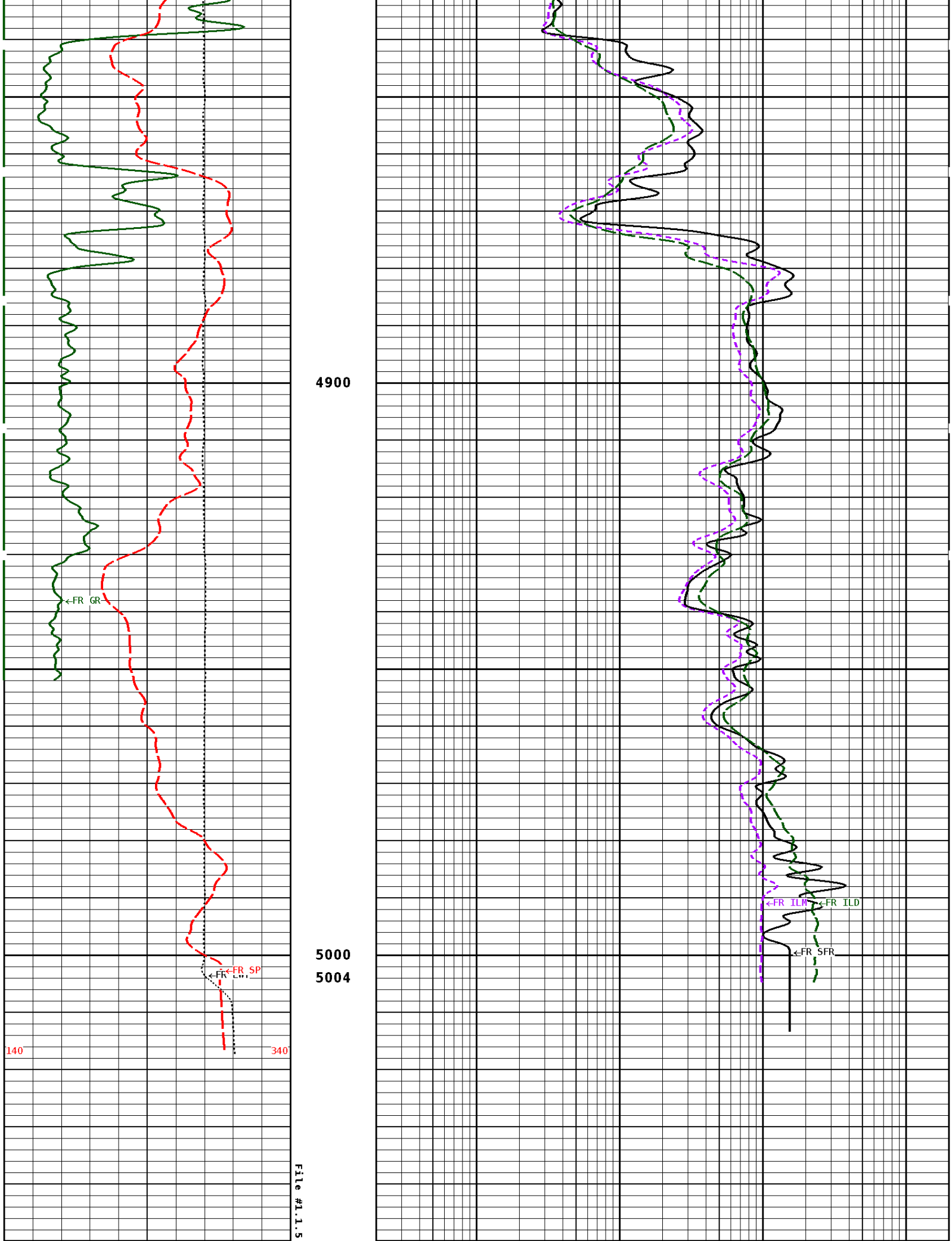

→ ←20
TENSION
LBS
10000
0
GAMMA RAY
API UNITS
150
0
300
150
0.2
2000.0
MEDIUM INDUCTION
OHMM
0.2
2000.0
SHALLOW FOCUSED RESISTIVITY
OHMM
0.2
2000.0
1:240 MAIN SECTION
File #1.1.5
3800
3900
←GR


4000
SP
LWT
ILD_M
SFR
4100


4200
4300


4400
GR
4500
SP
LWT
ILDM
SFR
4600


4700
4800




1:240 MAIN SECTION

1:240 MAIN SECTION

GAMMA RAY
API UNITS
150 300
0 150

TENSION
LBS
10000 0

SPONTANEOUS POTENTIAL
mV
→| |←20

SHALLOW FOCUSED RESISTIVITY
OHMM
0.2 2000.0

MEDIUM INDUCTION
OHMM
0.2 2000.0

DEEP INDUCTION
OHMM
0.2 2000.0

* Borehole Zone Factors *

Zone 1 99999.0 to 0.0 Feet

| | | |
|---|---|---|
| Drill Bit Size | 7.875 | in |
| Casing Diameter | 5.500 | in |
| BHT Depth | 5005.000 | ft |
| Borehole Temperature | 128.0 | degF |
| Temperature Gradient | 1.00 | DFHF |
| Resistivity Of Mud | 1.500 | ohmm |
| Resistivity Of Mud Temperature | 86.00 | degF |

**Well File:** MERIT_CORA_1-16_FEB-28_QST **Scale:** 1:240 **Format:** DIL-240
**Segment:** V1.D1.S3 Reprocess REPEAT **Acquired:** 2020-02/29 00:14 3.4.1-13972
**Reference:** 0 **Processed:** 2020-02/29 00:30 3.4.1-13972

SPONTANEOUS POTENTIAL
mV
→| |←20

DEEP INDUCTION
OHMM
0.2 2000.0

TENSION
LBS
10000 0

MEDIUM INDUCTION
OHMM
0.2 2000.0

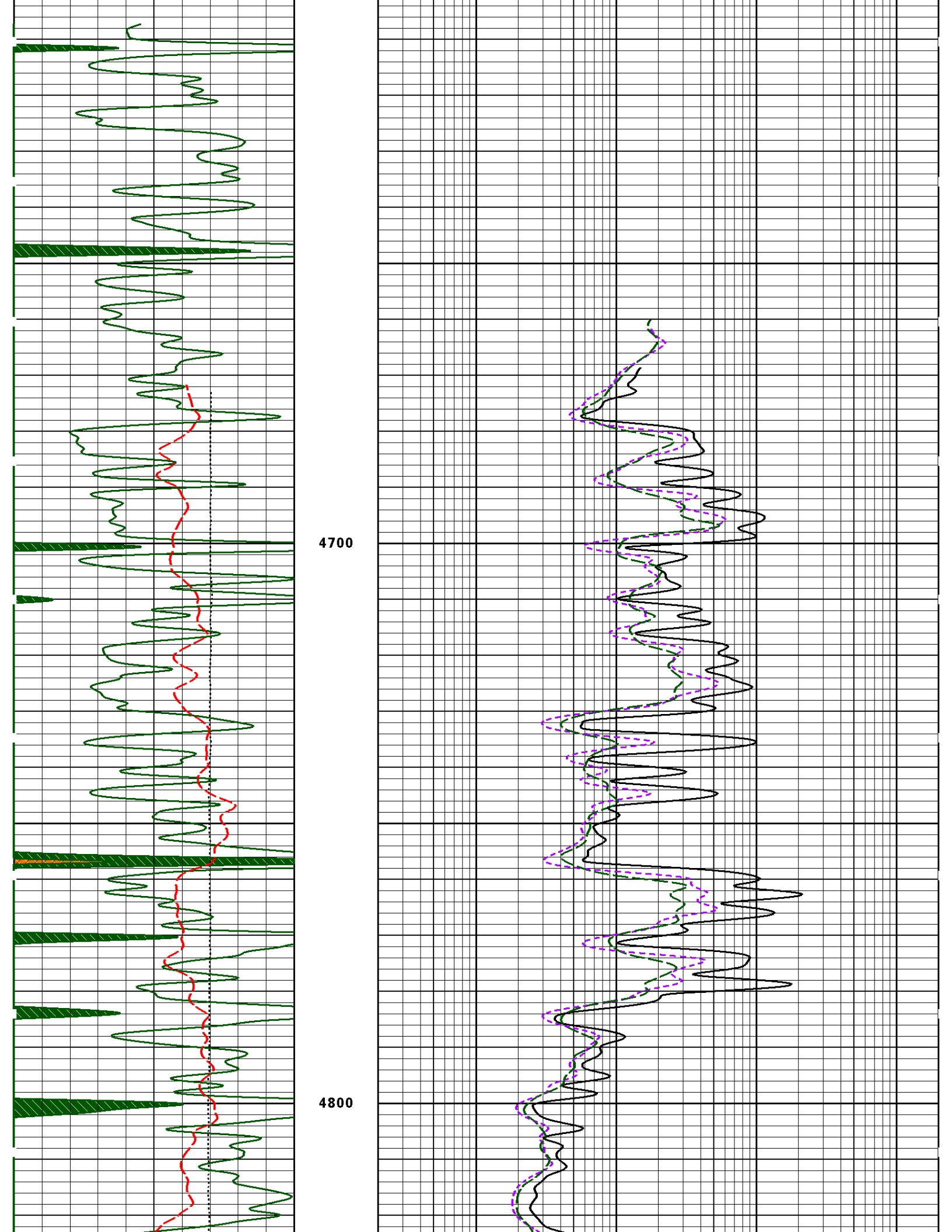
GAMMA RAY
API UNITS
150 300
0 150

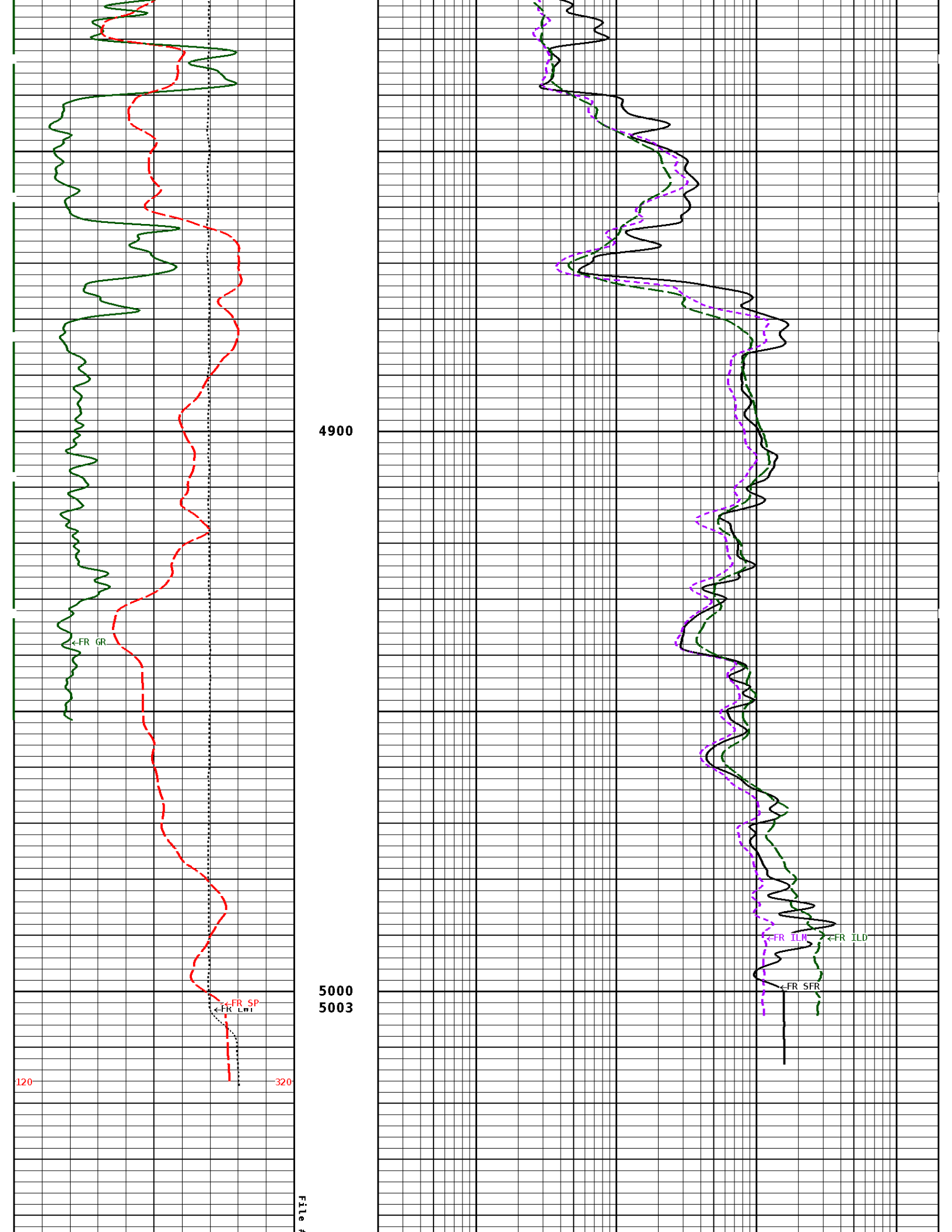
SHALLOW FOCUSED RESISTIVITY
OHMM
0.2 2000.0

1:240 REPEAT SECTION

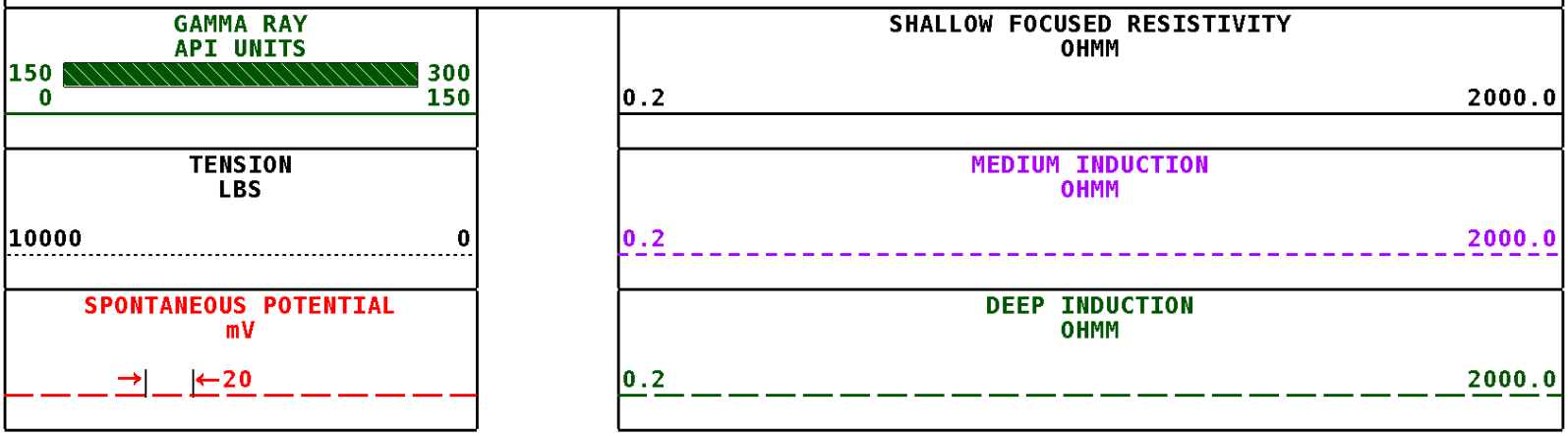
File #1.1.3

4600


4700
4800


4900
5000
5003
←FR GR
←FR SP
←FR LMI
120
320
←FR ILM
←FR ILD
←FR SFR

1:240 REPEAT SECTION




## * Borehole Zone Factors *

**Zone 1  99999.0  to  0.0  Feet**

| | | |
|---|---|---|
| Drill Bit Size | 7.875 | in |
| Casing Diameter | 5.500 | in |
| BHT Depth | 5005.000 | ft |
| Borehole Temperature | 128.0 | degF |
| Temperature Gradient | 1.00 | DFHF |
| Resistivity Of Mud | 1.500 | ohmm |
| Resistivity Of Mud Temperature | 86.00 | degF |

## * Calibration Summary *

### Shop Calibration
GRT-B

Performed : 24-JUN-2019  Time : 12:20
Sensor Suite : GR-GR5  ID : GRT-BC-038

| | Measured Background | Measured Jig | Units | Calibrated Jig | Units |
|---|---|---|---|---|---|
| GR | 36 | 266 | CPS | 160 | GRAPI |

### Shop Calibration
PIT-CA

Performed : 21-DEC-2019  Time : 21:46
Sensor Suite : P-IND-T  ID : PIT-AC-043

Medium

| | Measured R | Measured X | Calibrated R | Calibrated X | Units |
|---|---|---|---|---|---|
| Air | 131492 | 129685 | 0.0 | 0.0 | MMHOS |
| Zero | 131066 | 131062 | -18.1 | 59.6 | MMHOS |
| Reference | 244915 | 244454 | 4981.9 | 5059.6 | MMHOS |
| Loop | 130404 | 210498 | 3515.7 | 3611.2 | MMHOS |
| Sonde Error | | | -0.5 | -1.7 | MMHOS |
| Cond | | | 4981.9 | 5059.6 | MMHOS |

Deep

| | Measured R | Measured X | Calibrated R | Calibrated X | Units |
|---|---|---|---|---|---|
| Air | 131939 | 129230 | 0.0 | -0.0 | MMHOS |
| Zero | 131079 | 131067 | -15.6 | 35.3 | MMHOS |
| Reference | 220620 | 224092 | 1984.4 | 2035.3 | MMHOS |
| Loop | 129308 | 206166 | 1595.4 | 1712.8 | MMHOS |
| Sonde Error | | | -0.6 | -7.8 | MMHOS |
| Cond | | | 1984.4 | 2035.3 | MMHOS |

Temperature

| Measured Low | Measured High | Calibrated Low | Calibrated High | Units |
|---|---|---|---|---|
| 16980.0 | 56920.0 | 70.0 | 350.0 | DEGF |

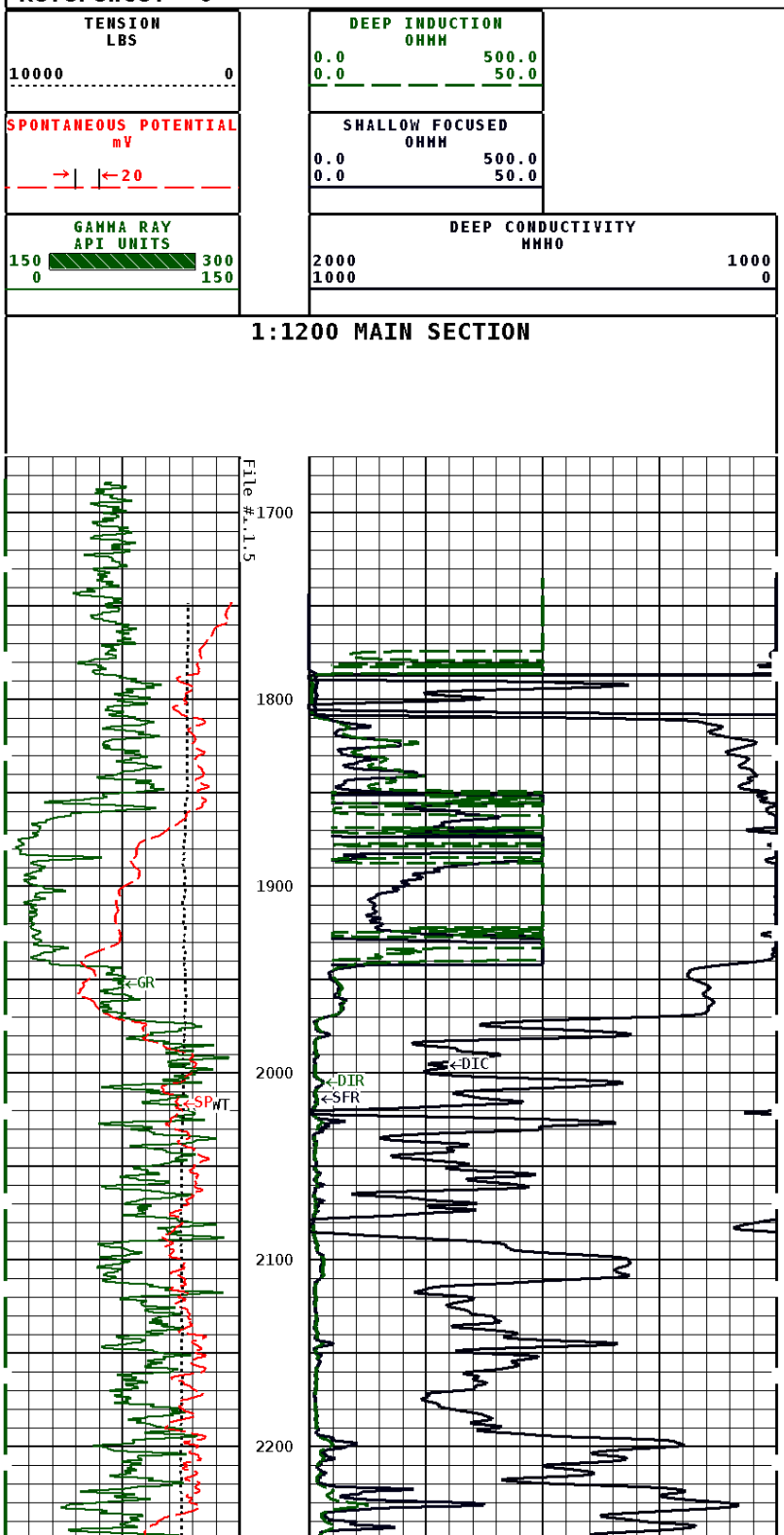
Performed : 21-DEC-2019  Time : 21:46
Sensor Suite : SFL  ID : PIT-AC-043

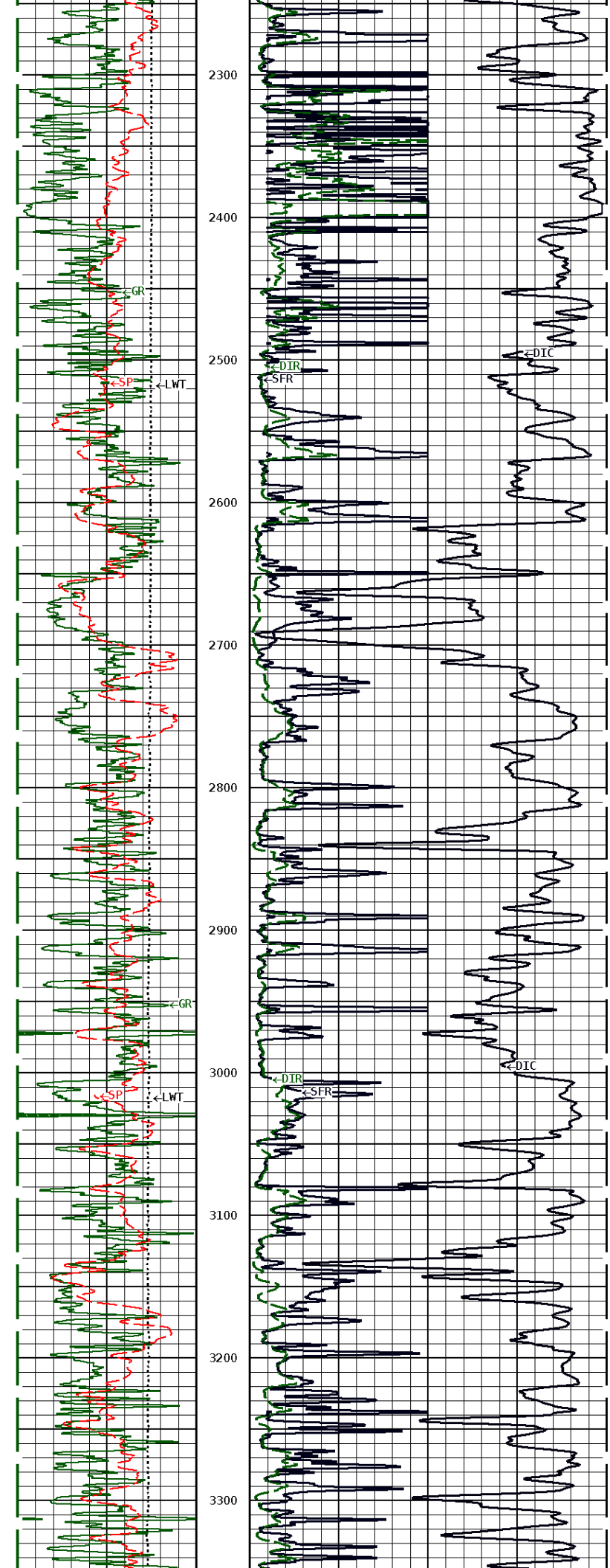
| | Internal | | | | |
|---|---|---|---|---|---|
| | Measured | | Calibrated | | |
| | Zero | Reference | Zero | Reference | Units |
| Im | 32732.6 | 48929.1 | 0.0 | 7028.0 | uA |
| Ib | 32768.6 | 49680.1 | 0.0 | 1750.0 | mA |
| MOM1 | 32722.0 | 56290.6 | 0.0 | 175.0 | mV |
| Equivalent SFL | | | | 43.97 | OHMM |

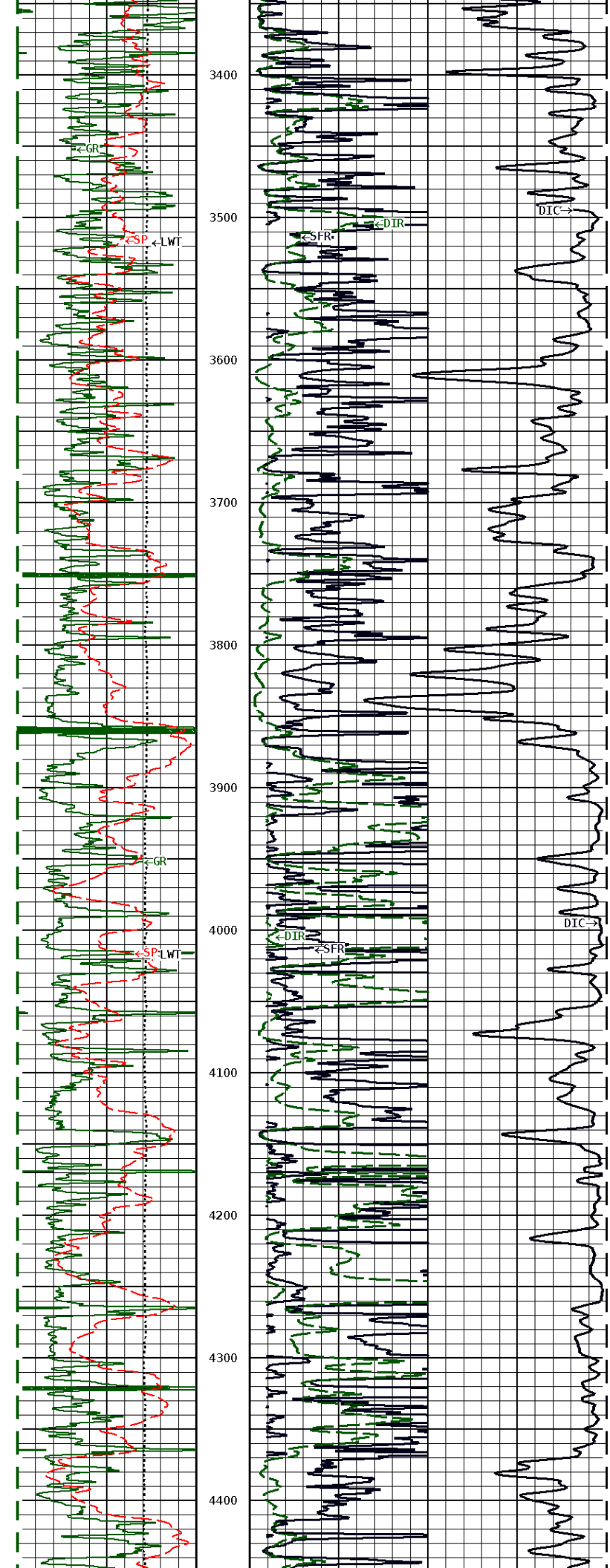
Performed : 21-DEC-2019 Time : 21:47
Sensor Suite : P-SP ID : PIT-AC-043

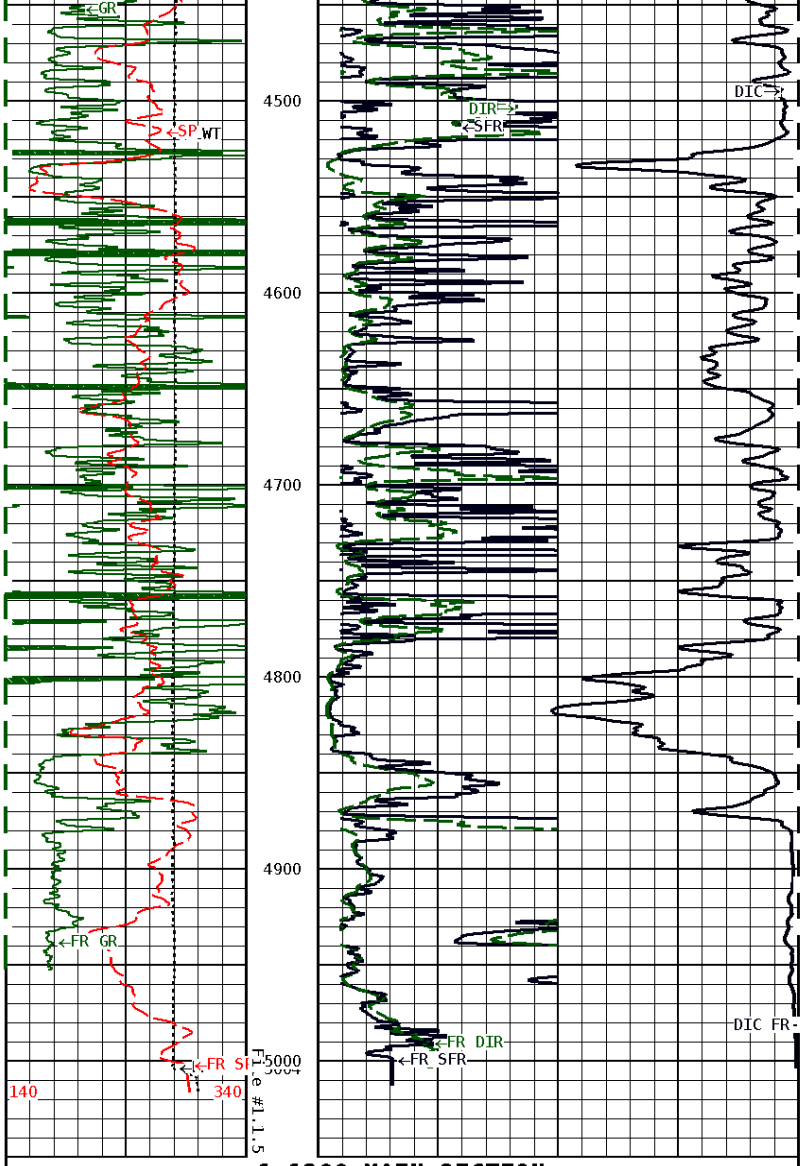
| | Internal | | | | |
|---|---|---|---|---|---|
| | Measured | | Calibrated | | |
| | Zero | Reference | Zero | Reference | Units |
| | 32774.5 | 58935.9 | 0.0 | 1000.0 | mV |

**Well File:** MERIT_CORA_1-16_FEB-28_QST **Scale:** 1:1200 **Format:** DIL1200
**Segment:** V1.D1.S5 Reprocess MAIN **Acquired:** 2020-02/29 00:34 3.4.1-13972
**Reference:** 0 **Processed:** 2020-02/29 02:11 3.4.1-13972




2300
2400
GR
2500
DIR
SFR
SP
LWT
DIC
2600
2700
2800
2900
GR
3000
DIR
SFR
SP
LWT
DIC
3100
3200
3300


3400
3500
3600
3700
3800
3900
4000
4100
4200
4300
4400
GR
SP
LWT
SFR
DIR
DIC




GAMMA RAY
API UNITS
150 300
0 150

DEEP CONDUCTIVITY
MMHO
2000 1000
1000 0

SPONTANEOUS POTENTIAL
mV
20

SHALLOW FOCUSED
OHMM
0.0 500.0
0.0 50.0

TENSION
LBS
10000 0

DEEP INDUCTION
OHMM
0.0 500.0
0.0 50.0

STEP energy services

| | |
|---|---|
| Company: | MERIT ENERGY COMPANY |
| Well: | CORA #1-16 |
| Location: | 414' FWL & 2002' FNL |
| Logged: | 02-28-2020 |
| K.B. Elev: | 2875.0 Ft |