# STEP energy services

## PHASED INDUCTION

## SHALLOW FOCUS SP LOG

Company BEREXCO LLC
Well HINES UNIT #27X
Field FAIRPORT
County RUSSELL
State KANSAS
Country USA
API No. 15-167-24098-0000

**File No** : TUL-70413
**Company** : BEREXCO LLC
**Well** : HINES UNIT #27X
**Field** : FAIRPORT
**County** : RUSSELL
**State** : KANSAS
**Country** : USA
**API No** : 15-167-24098-0000

**Location :**
2010' FSL & 1320' FEL
S/2 N/2 N/2 SE

**LSD :** **Sect :** 17 **Twp :** 11S **Rge :** 15W

| | | | | | |
|---|---|---|---|---|---|
| **Permanent Datum:** | GL | **Elevations:** | | **Services:** | |
| **Drilling Measured From:** | KB | **KB** | 1876.00 Ft | CNT | PIT |
| **Log Measured From:** | KB | **DF** | 1875.00 Ft | LDT | |
| **Above Permanent Datum:** | 6.00 Ft | **GL** | 1870.00 Ft | MLT | |

| | | | | |
|---|---|---|---|---|
| **Date** | 12-11-2019 | | | |
| **Run Number** | 1 | | | |
| **Depth--Driller** | 3525.0 Ft | | | |
| **Depth--Logger** | 3524.0 Ft | | | |
| **First Reading** | 3524.0 Ft | | | |
| **Last Reading** | 265.0 Ft | | | |
| **Casing--Driller** | 265.0 Ft | | | |
| **Casing--Logger** | 265.0 Ft | | | |
| **Bit Size** | 7.875 In | | | |
| **Casing Size** | 8.625 In | | | |
| **Hole Fluid Type** | WBM | | | |
| **Density** | 9.0 | | | |
| **Fluid Loss** | 8.0 | | | |
| **PH/Viscosity** | 9.0 | 63.0 | | |
| **Sample Source** | MEASURED | | | |
| **RM@Measured Temp.** | 2.000 @ 50 F | | | |
| **RMF@Measured Temp** | 1.600 @ 50 F | | | |
| **RMC@Measured Temp.** | 2.400 @ 50 F | | | |
| **Source RMF/RMC** | CALCULATED | CALCULATED | | |
| **RM@BHT** | 0.960 @ 111 F | | | |
| **Time Circulation Stopped** | | | | |
| **Max Recorded Temp.** | 111 F | | | |
| **Equipment/Base** | 1022 | TULSA, OK | | |
| **Recorded By** | SHELDON TYLER | | | |
| **Witnessed By** | JERRY SMITH | | | |

The customer is hereby warned that by providing the log data herein, STEP Energy Services does not agree to provide any interpretation of log data, conversion of log data to physical rock parameters or recommendations; STEP Energy Services does not guarantee or warrant either expressly or impliedly, the accuracy of any interpretation of log data, conversion of log data to physical rock parameters or recommendations which may be given by STEP Energy Services personnel. Any interpretation, conversion or recommendation is not part of the consideration for the agreement between the parties and is not part of any part of the charge by STEP Energy Services for its services. Any user of the log data is warned that said user is not entitled to rely on intepretations, conversions or recommendations as aforesaid.

**Bitsize Intervals**

| Size (In) | Bottom (Ft) |
|---|---|
| 7.875 | 3525.00 |

**Casing Strings**

| Size (In) | Weight (Lbs) | Bottom (Ft) | Top (Ft) |
|---|---|---|---|
| 8.625 | 32.00 | 265.00 | 0.00 |

| Run Number | 1 | | |
|---|---|---|---|
| Date | 12-11-2019 | | |
| Date/Time On Bottom | | | |
| Depth to Fluid | 0.0 | Ft | |
| Salinity | 3800.000 | | |
| RMF@BHT | 0.770 @ 111 F | | |
| RMC@BHT | 1.150 @ 111 F | | |

**Run Number 1**

**Comments**

ALL PRESENTATIONS AS PER CUSTOMER REQUEST
GRT, CNT, LDT, 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

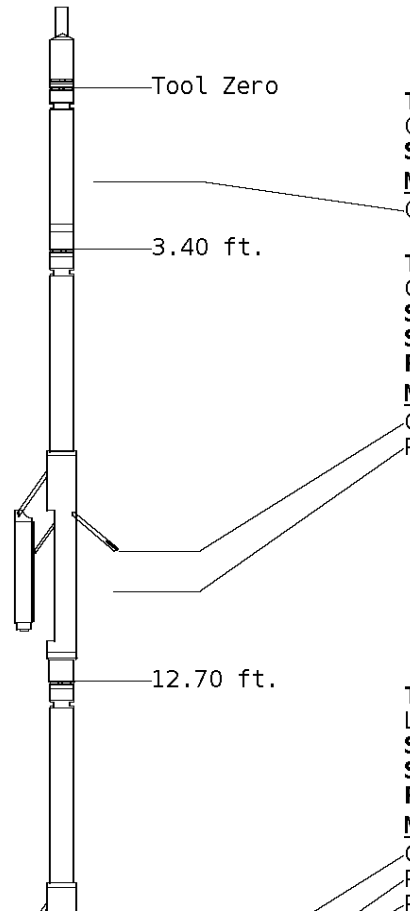
CUSTOMER REQUESTED REPEAT PULLED TO 3100'
CUSTOMER REQUESTED DETAIL PULLED TO 2300'

GRT: GRP, GRX
CNT: PHIN, CLCNIN, PHXN
LDT: PORL, LCORN, PECLN, LDENN, PORLLS, CLLDIN, PRXL, PECLX, LDENNX, LCORX
MLT: NOR_RF, INV_RF, MSCLPIN
PIT: ILD, ILM, SPU, SFLAEC, CIRD

OPERATORS:
B. BROWN
S.KEELEY

# Tool String Schematic

**Total Tool Length** - 53.15 **ft.**
**Maximum Outside diameter** - 6.00 **in.**
**Net Weight in Air** - 943.00 **lbs.**




**Tool:** GRT-B **Length:** 3.40 **ft.** **O.D.** 3.60 **in.**
Gamma Ray Controller
**Sonde ID** :GRT-BA-14

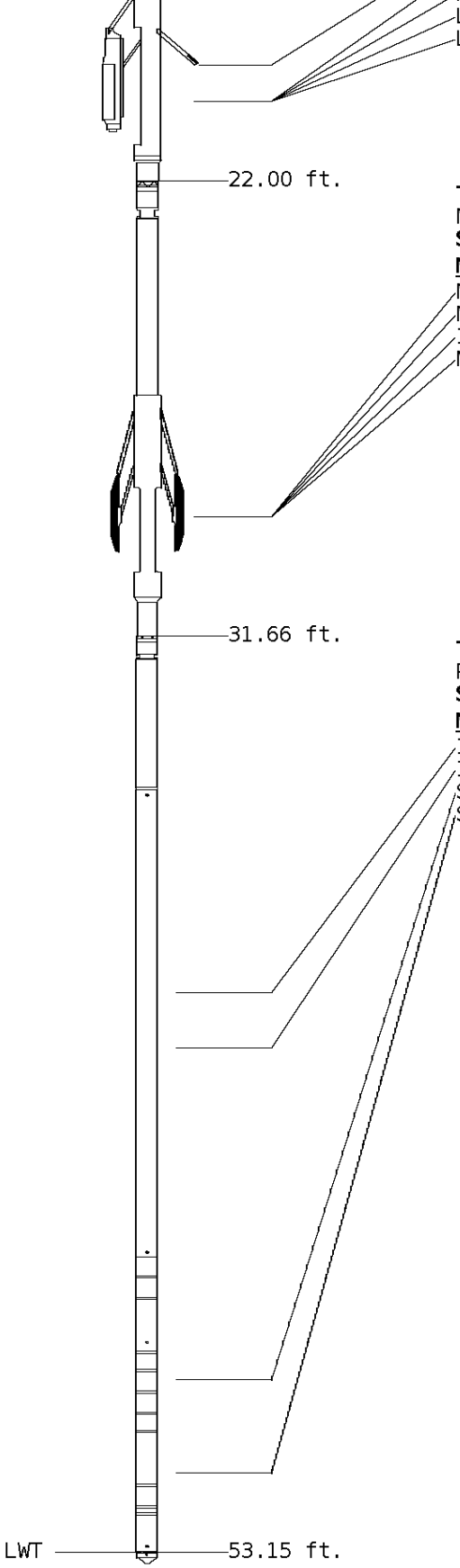
| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| GRP | 2.00 | 2.00 | 51.15 |

**Tool:** CNT-AA **Length:** 9.30 **ft.** **O.D.** 4.36 **in.**
Compensated Neutron A Pad on NDT-A
**Sonde ID** :NDT-BB-146
**Source ID** :N-1044
**Pad ID** :CNP-AA-115

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| CLCN | 6.00 | 9.40 | 43.75 |
| PHIN | 6.80 | 10.20 | 42.95 |

**Tool:** LDT-DA **Length:** 9.30 **ft.** **O.D.** 4.80 **in.**
Litho Density D Pad on NDT-A
**Sonde ID** :NDT-AE-003
**Source ID** :63558B
**Pad ID** :LDP-DA-50

| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| CLLD | 6.00 | 18.70 | 34.45 |
| PEL | 7.00 | 19.70 | 33.45 |
| PES | 7.40 | 20.10 | 33.05 |




| | | | |
|---|---|---|---|
| LDEN | 7.20 | 19.90 | 33.25 |
| LCOR | 7.20 | 19.90 | 33.25 |

**Tool:** MST-DA **Length:** 9.66 **ft.** **O.D.** 6.00 **in.**
Micro Spherically Focused (IC)
**Sonde ID** :MST-DA-024

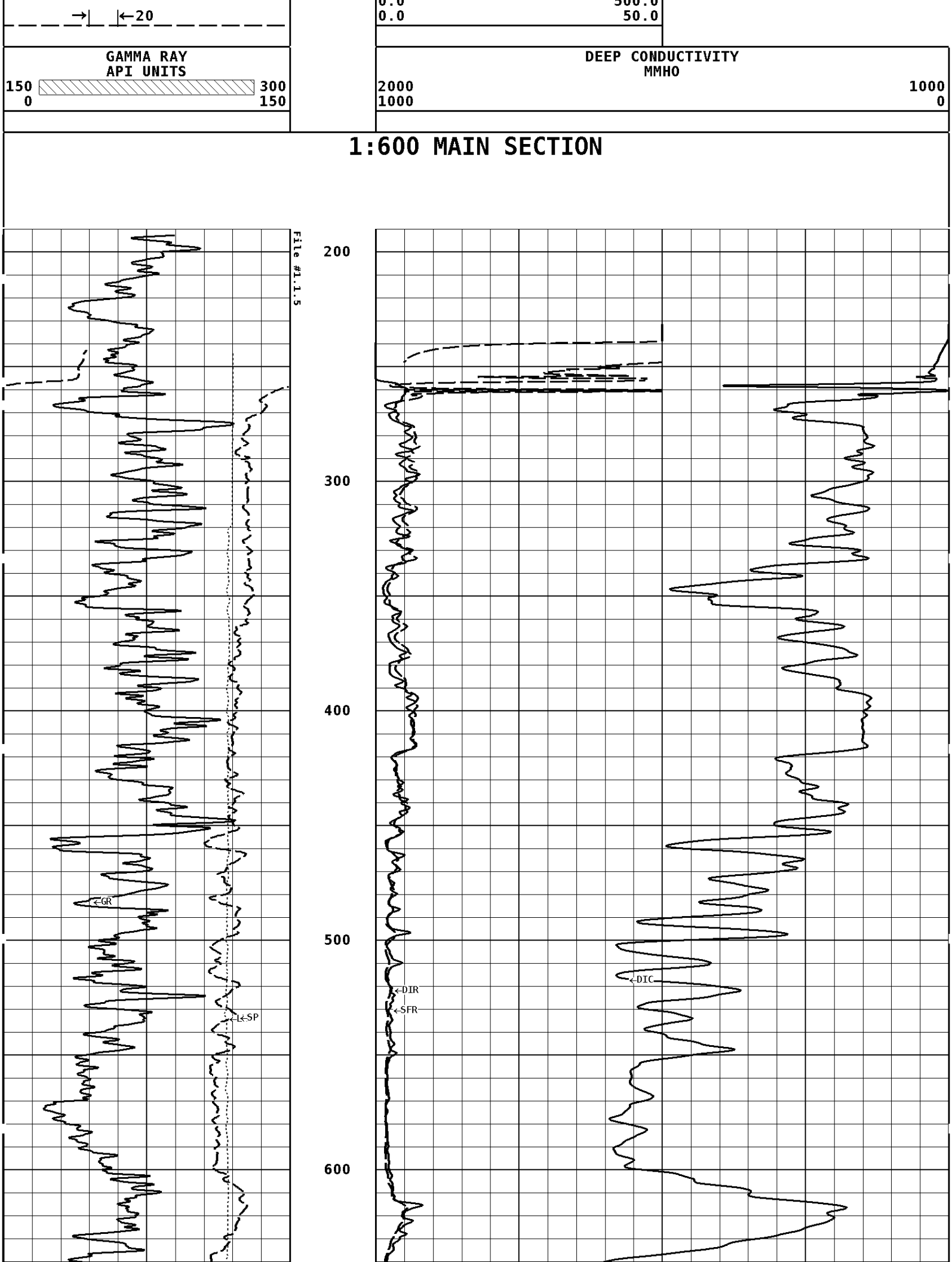
| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| MSFL | 7.60 | 29.60 | 23.55 |
| MSCLP | 7.60 | 29.60 | 23.55 |
| INV | 7.60 | 29.60 | 23.55 |
| NOR | 7.60 | 29.60 | 23.55 |

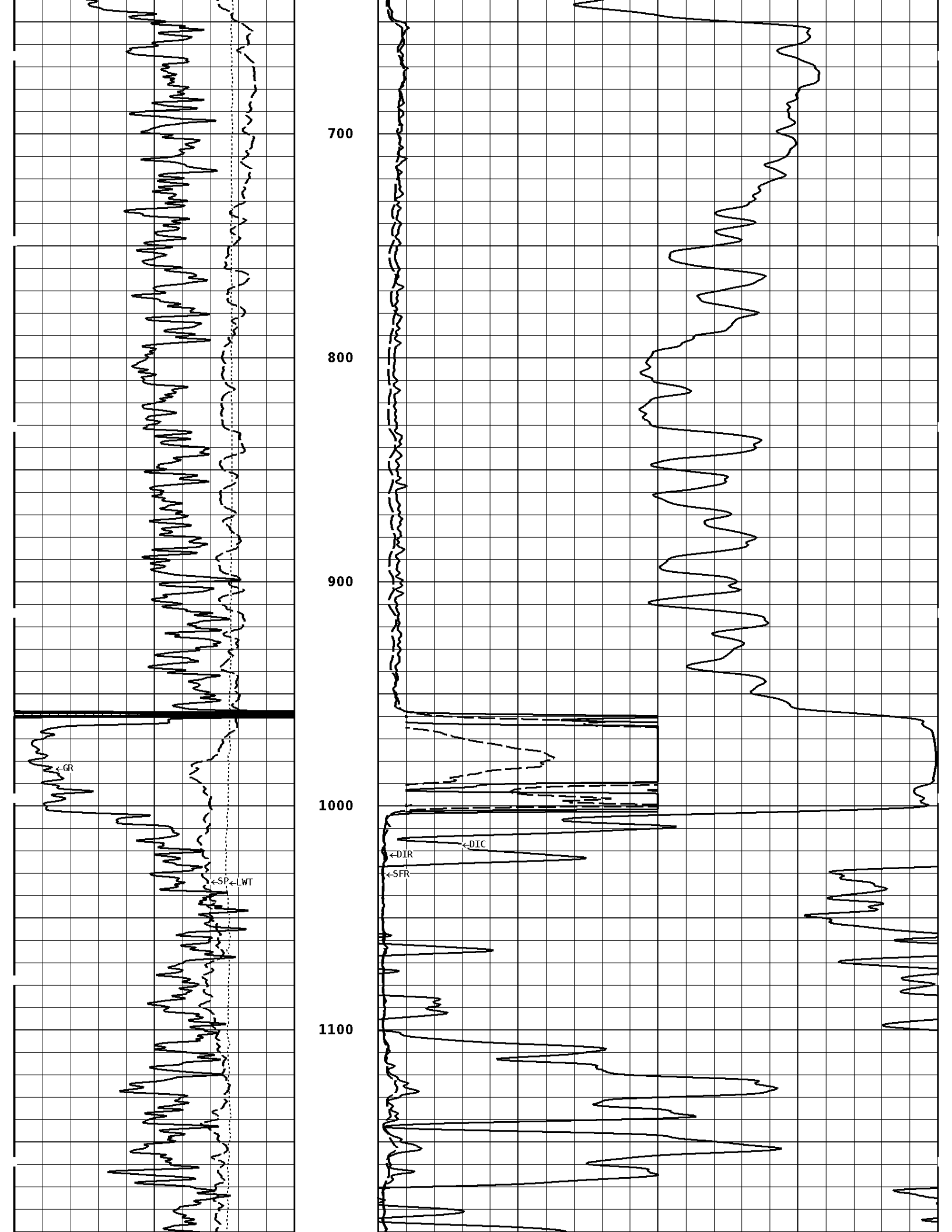
**Tool:** PIT-CA **Length:** 21.49 **ft.** **O.D.** 3.62 **in.**
Phased Dual Induction w/ RM & D
**Sonde ID** :PIT-CA-069

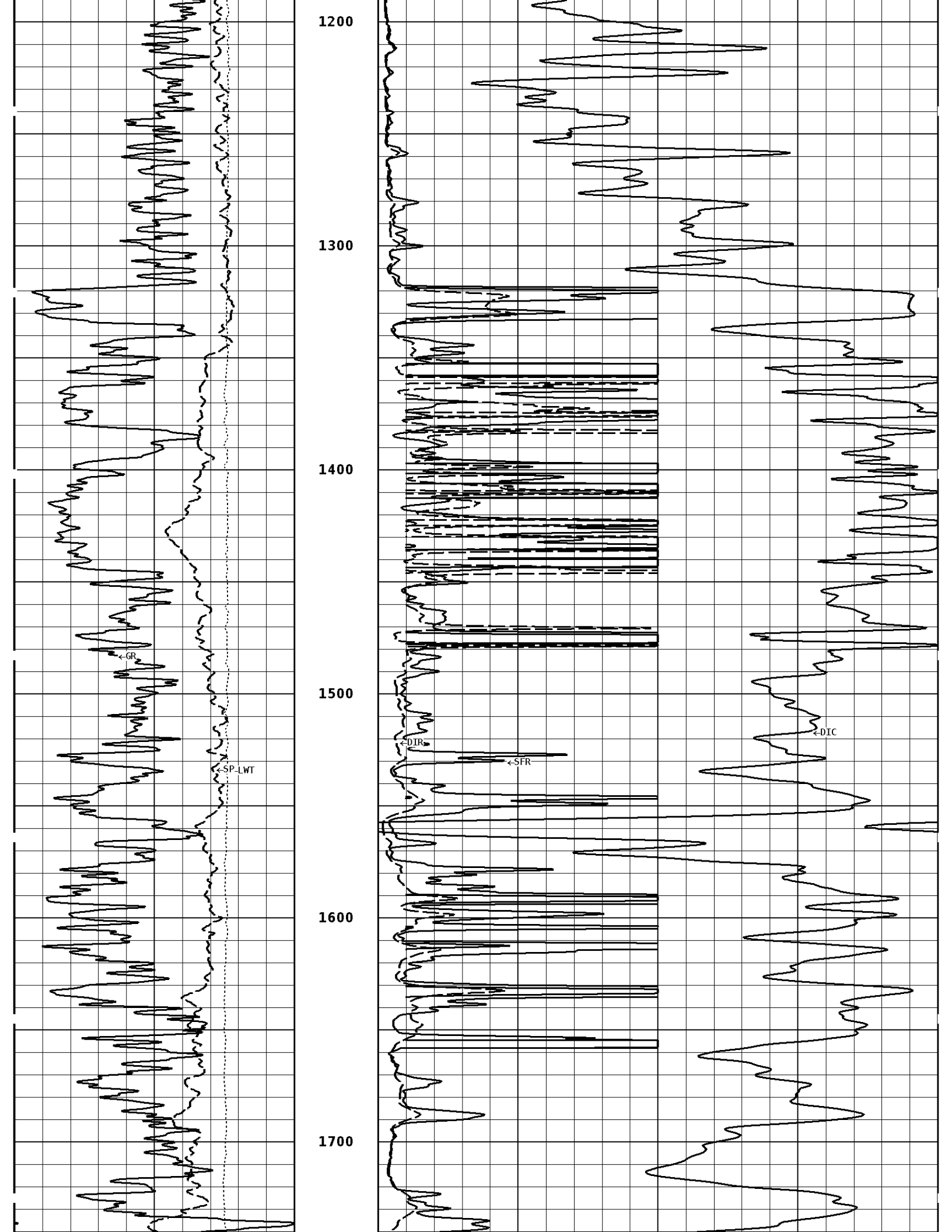
| Measure Point | Tool Offset | Stack Offset | Bottom Offset |
|---|---|---|---|
| ILD | 8.92 | 40.58 | 12.56 |
| ILM | 10.10 | 41.76 | 11.39 |
| SFLU | 17.49 | 49.15 | 4.00 |
| SP | 20.60 | 52.26 | 0.88 |

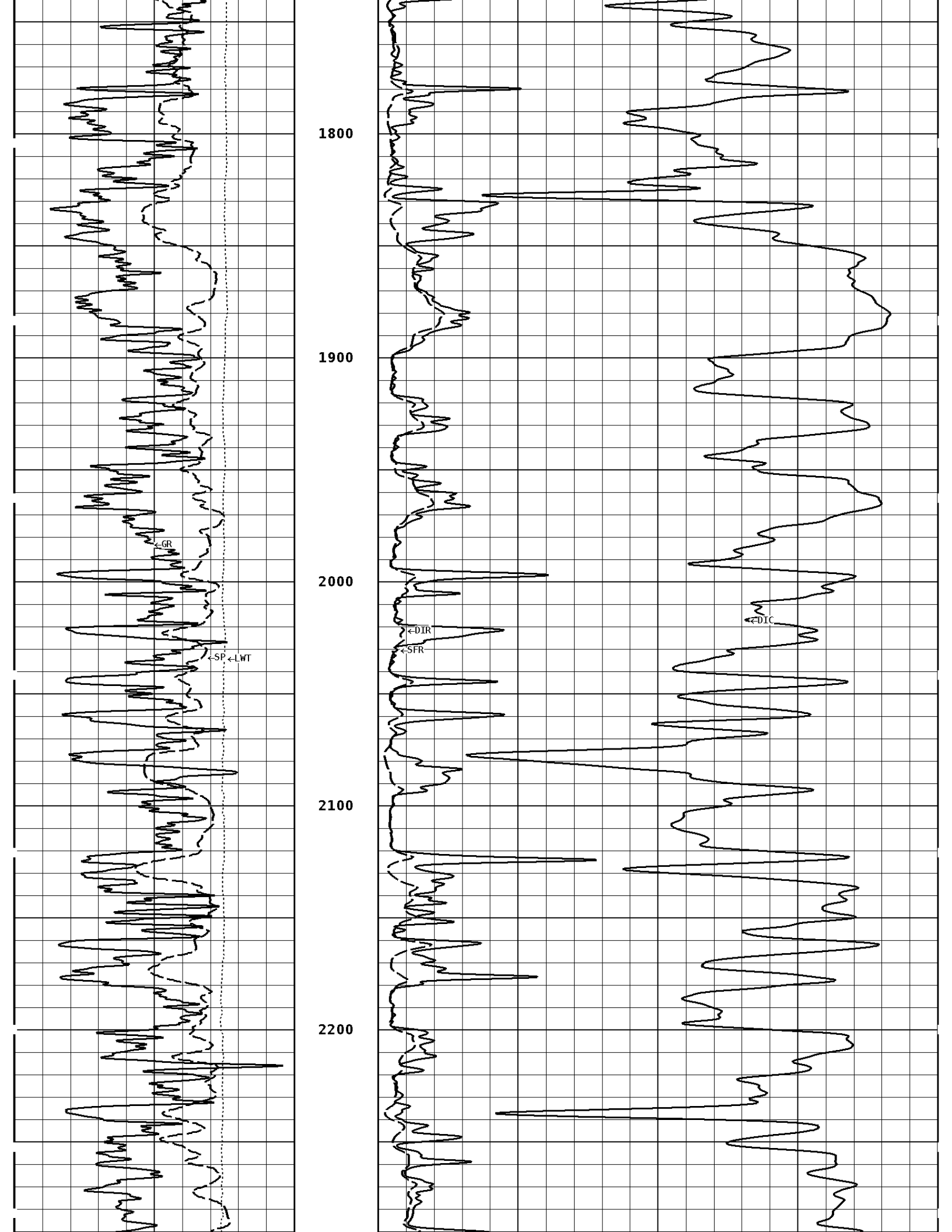
**Well File:** BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:600 **Format:** DIL-600
**Segment:** V1.D1.S5 Reprocess MAIN **Acquired:** 2019-12/12 01:40 3.4.1-13968
**Reference:** 0 **Processed:** 2019-12/12 02:53 3.4.1-13968

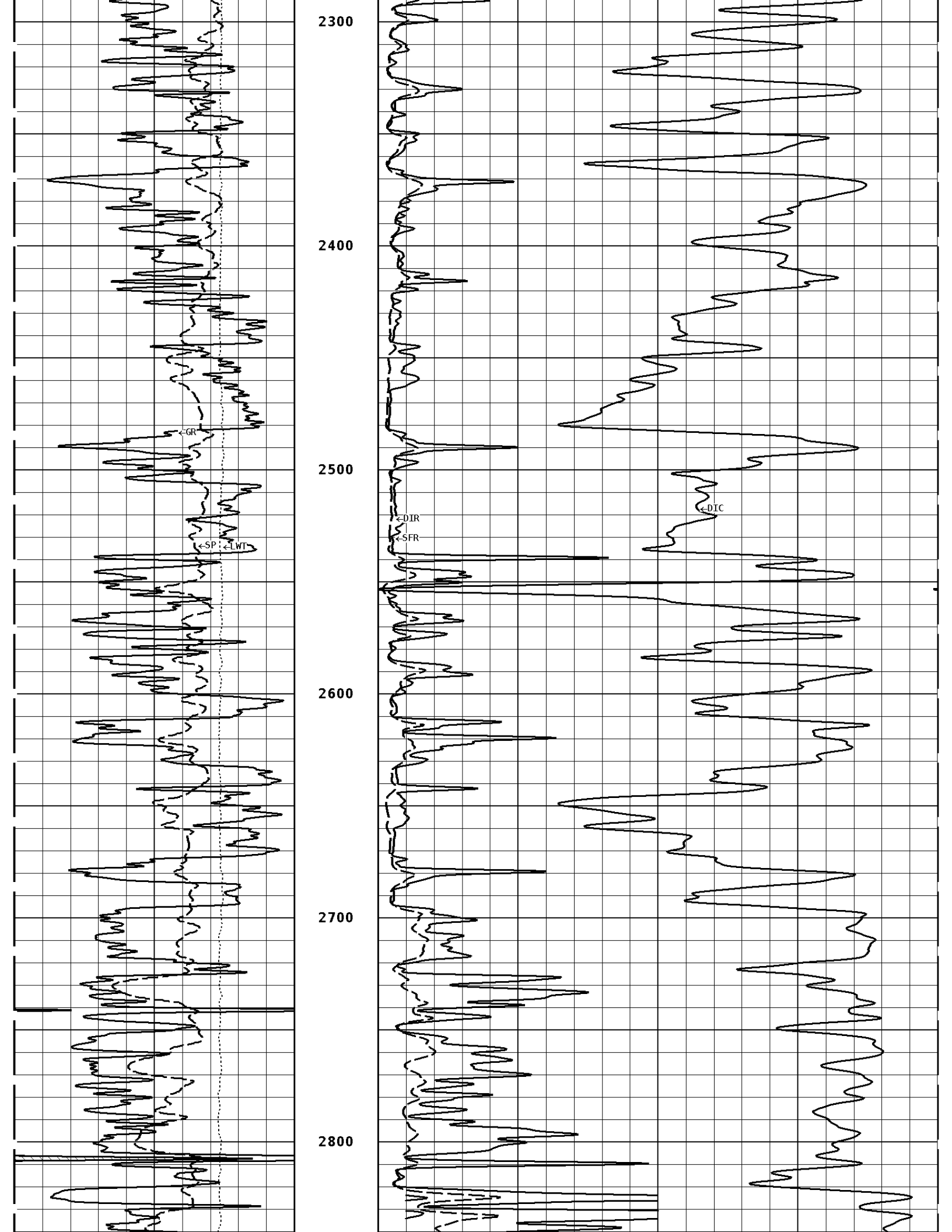
| TENSION LBS | | DEEP INDUCTION OHMM | |
|---|---|---|---|
| 10000 | 0 | 0.0 | 500.0 |
| | | 0.0 | 50.0 |
| **SPONTANEOUS POTENTIAL mV** | | **SHALLOW FOCUSED RESISTIVITY OHMM** | |
| | | 0.0 | 500.0 |

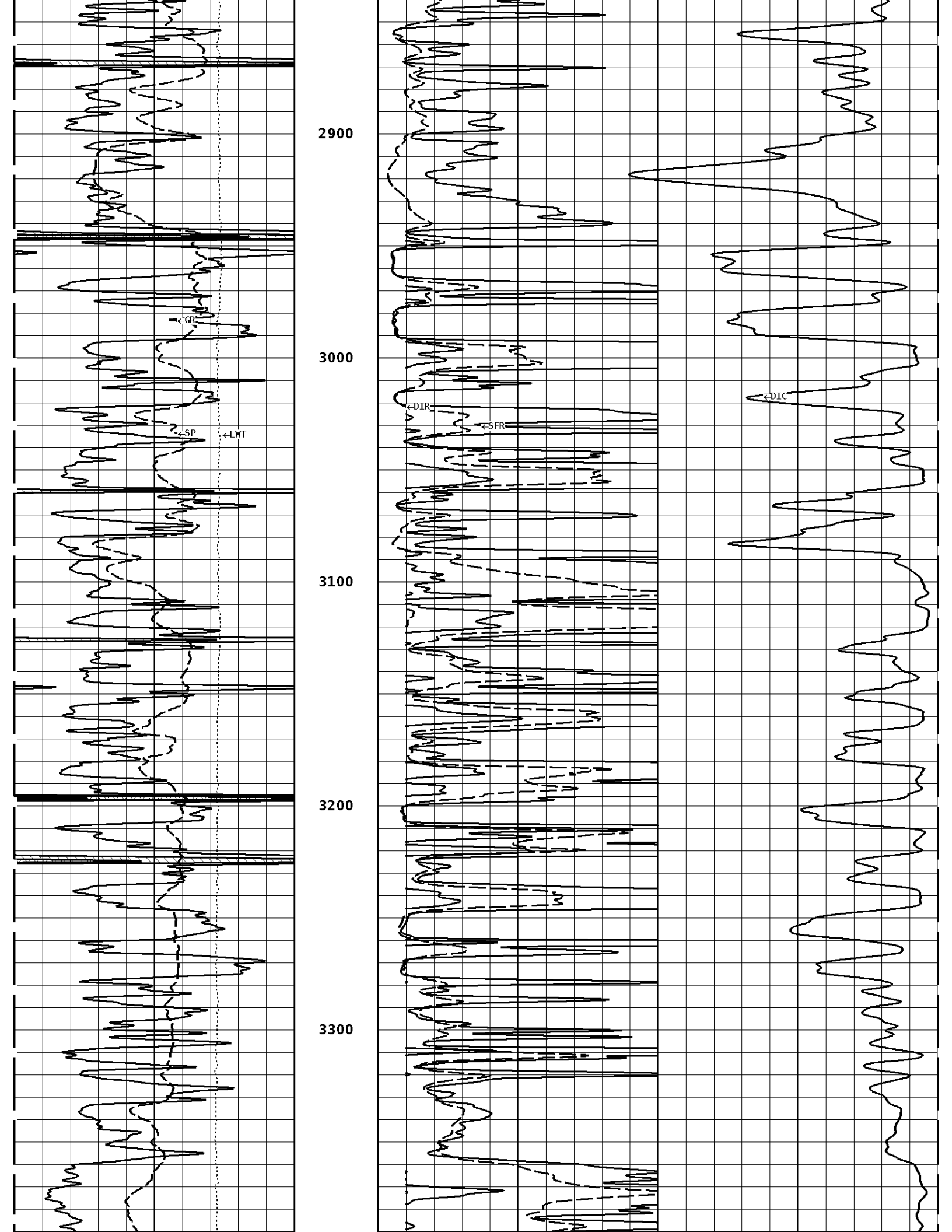

→ ←20
GAMMA RAY
API UNITS
150
0
300
150
0.0
500.0
0.0
50.0
DEEP CONDUCTIVITY
MMHO
2000
1000
1000
0
1:600 MAIN SECTION
File #1.1.5
200
300
400
500
600
←GR
←SP
←DIR
←SFR
←DIC

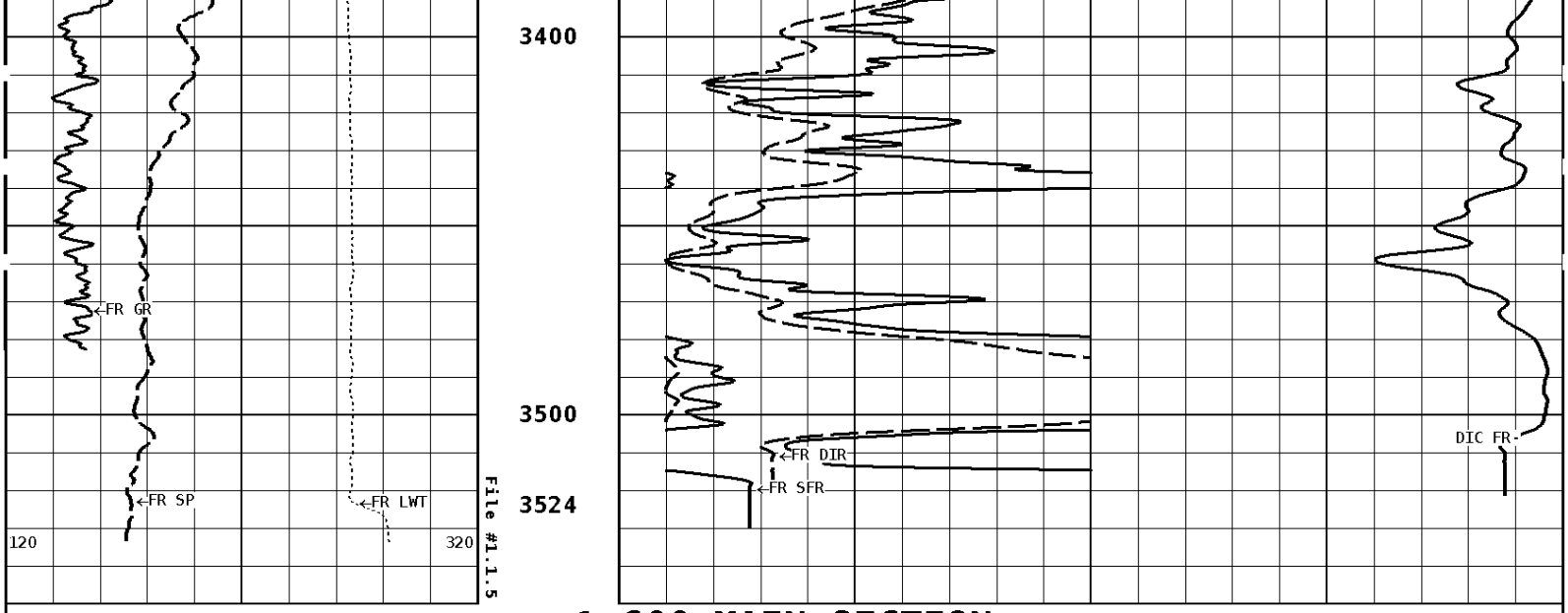

700
800
900
1000
1100
←GR
←SP
←LWT
←DIC
←DIR
←SFR


1200
1300
1400
1500
1600
1700
←GR
←SP_LWT
←DIR
←SFR
←DIC


1800
1900
2000
2100
2200
←GR
←SP
←LWT
←DIR
←SFR
←DIC


2300
2400
2500
2600
2700
2800
←GR
←SP
←LWT
←DIR
←SFR
←DIC


2900
3000
3100
3200
3300
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:** | BEREXCO_HINES_27X_DEC11_MSTK | **Scale:** | 1:240 **Format:** DIL-240 |
| **Segment:** | V1.D1.S5 Reprocess MAIN | **Acquired:** | 2019-12-12 01:40 3.4.1-13968 |
| **Reference:** | 0 | **Processed:** | 2019-12-12 02:53 3.4.1-13968 |

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

**TENSION**
**LBS**
10000 — 0

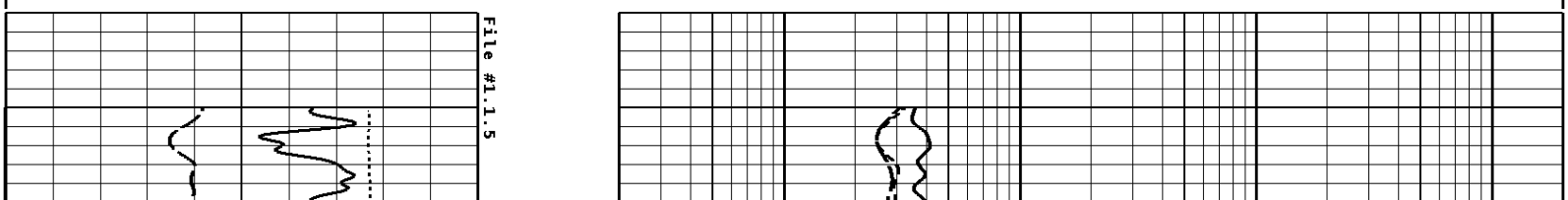
**GAMMA RAY**
**API UNITS**
150 — 300
0 — 150

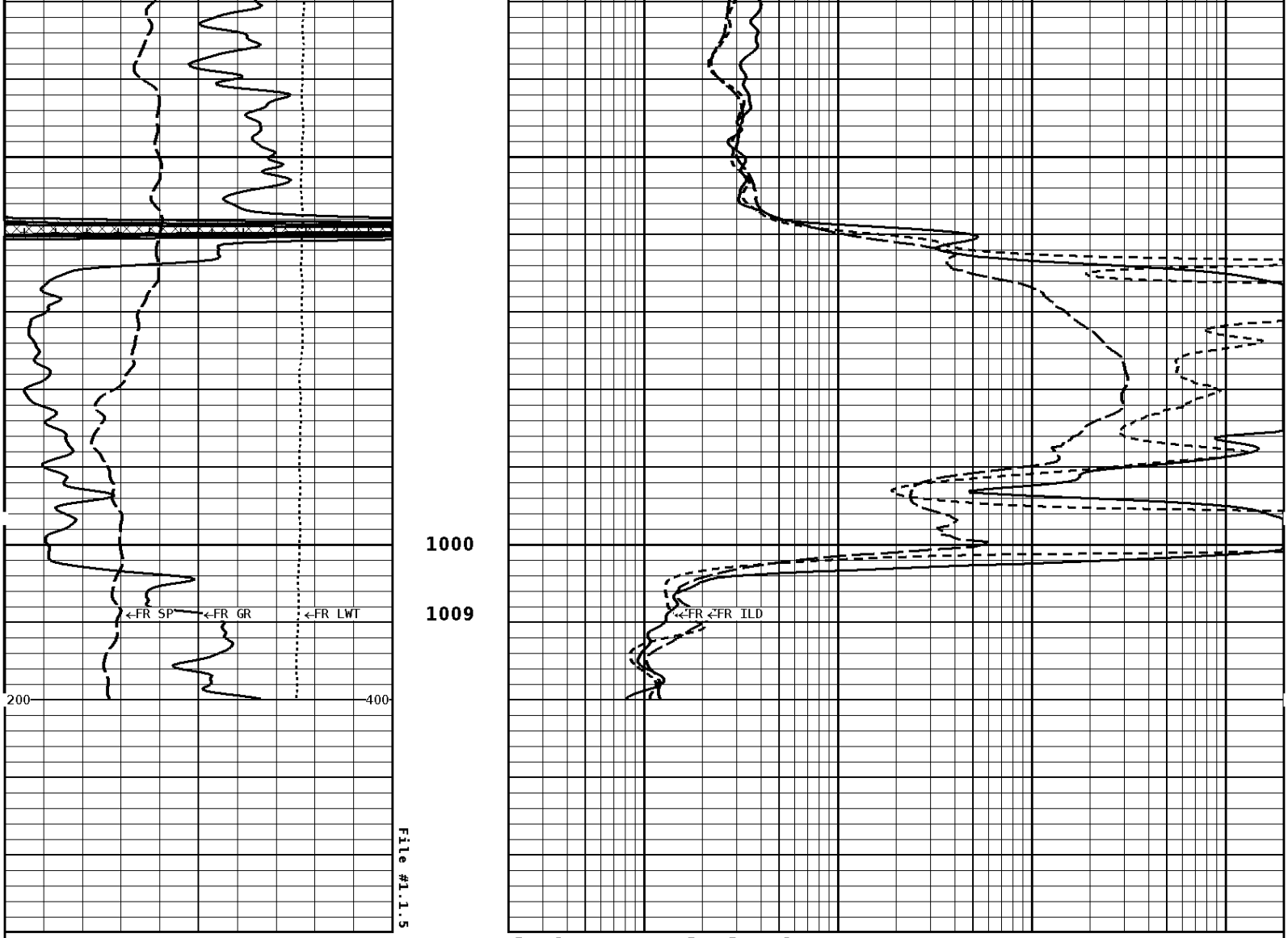
**DEEP INDUCTION**
**OHMM**
0.2 — 2000.0

**MEDIUM INDUCTION**
**OHMM**
0.2 — 2000.0

**SHALLOW FOCUSED RESISTIVITY**
**OHMM**
0.2 — 2000.0

## 1:240 MAIN SECTION






## 1:240 MAIN SECTION

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

**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 | 3525.000 | ft |
| Borehole Temperature | 111.0 | degF |
| Temperature Gradient | 1.00 | DFHF |
| Resistivity Of Mud | 2.000 | ohmm |
| Resistivity Of Mud Temperature | 50.00 | degF |

**Environmental Corrections**

| Environmental Corrections | |
|---|---|
| SHALLOW FOCUSED RESISTIVITY<br>**V1.D1.S5 SFLAEC** | Borehole Size |

| | | | |
|---|---|---|---|
| **Well File:** | BEREXCO_HINES_27X_DEC11_MSTK | **Scale:** | 1:240 **Format:** DIL-240 |
| **Segment:** | V1.D1.S5 Reprocess MAIN | **Acquired:** | 2019-12/12 01:40 3.4.1-13968 |
| **Reference:** | 0 | **Processed:** | 2019-12/12 02:53 3.4.1-13968 |

**RXO/RT**

-160 — 40

**SPONTANEOUS POTENTIAL**
**mV**

→| |←20

**TENSION**
**LBS**

10000 — 0

**GAMMA RAY**
**API UNITS**

150 — 300
0 — 150

**DEEP INDUCTION**
**OHMM**

0.2 — 2000.0

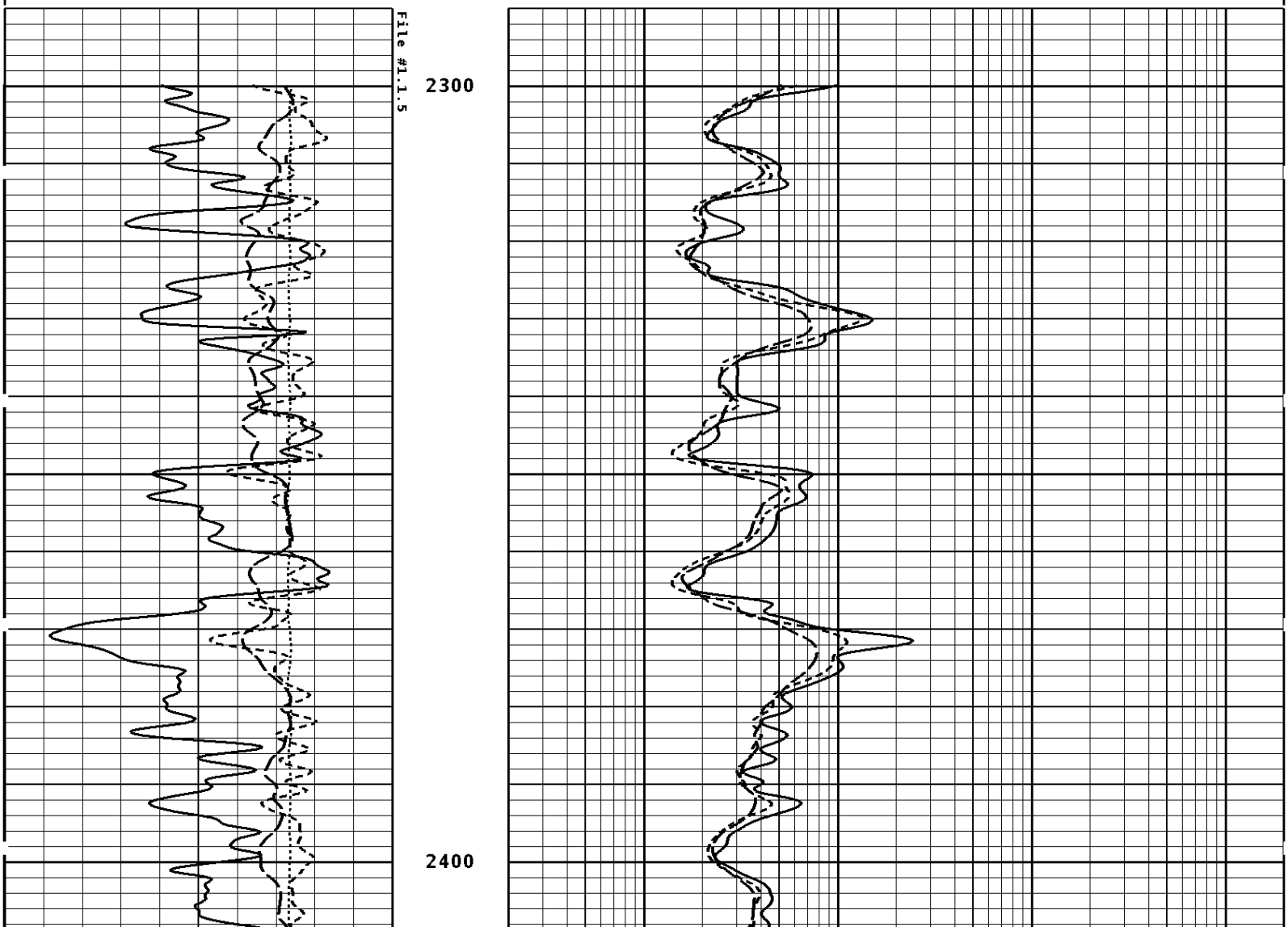
**MEDIUM INDUCTION**
**OHMM**

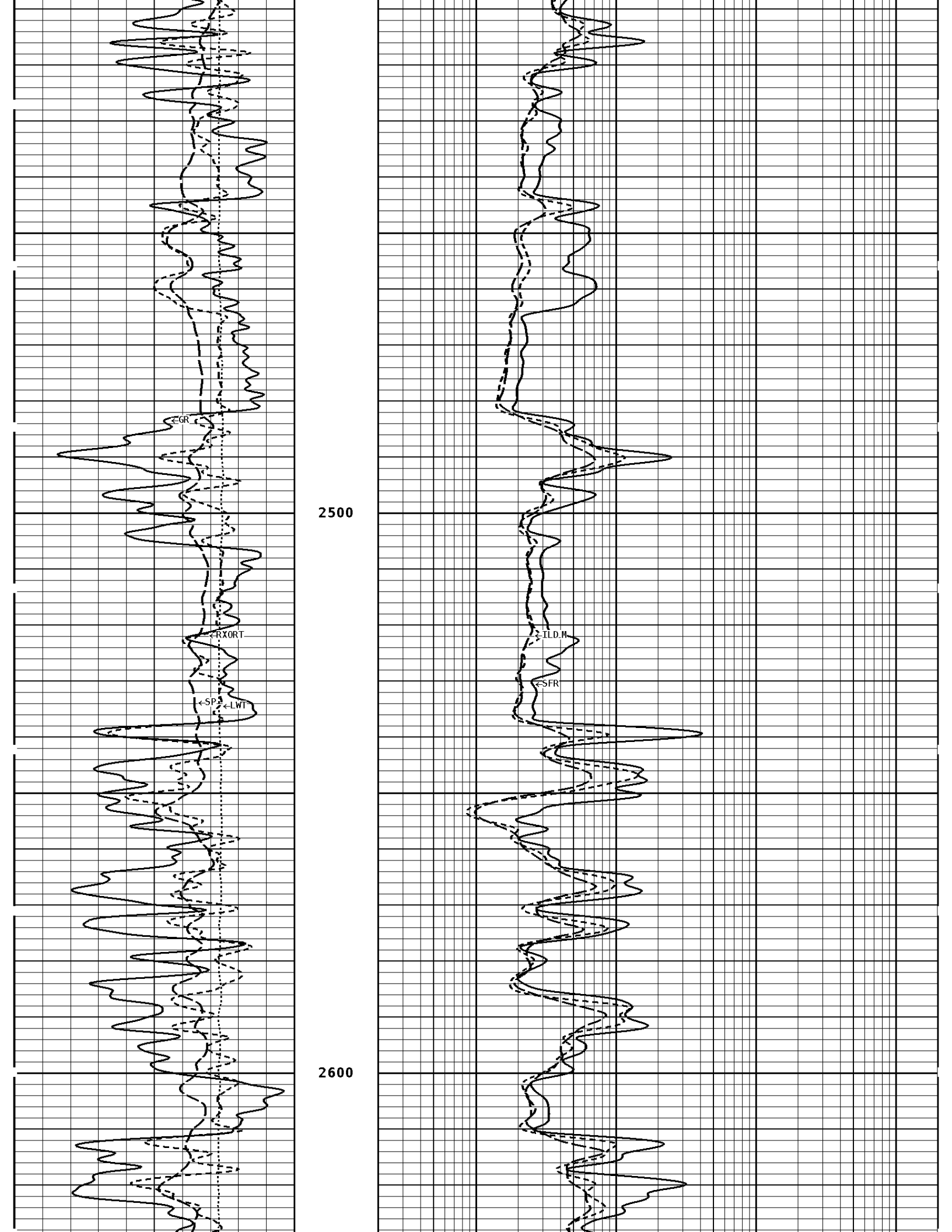
0.2 — 2000.0

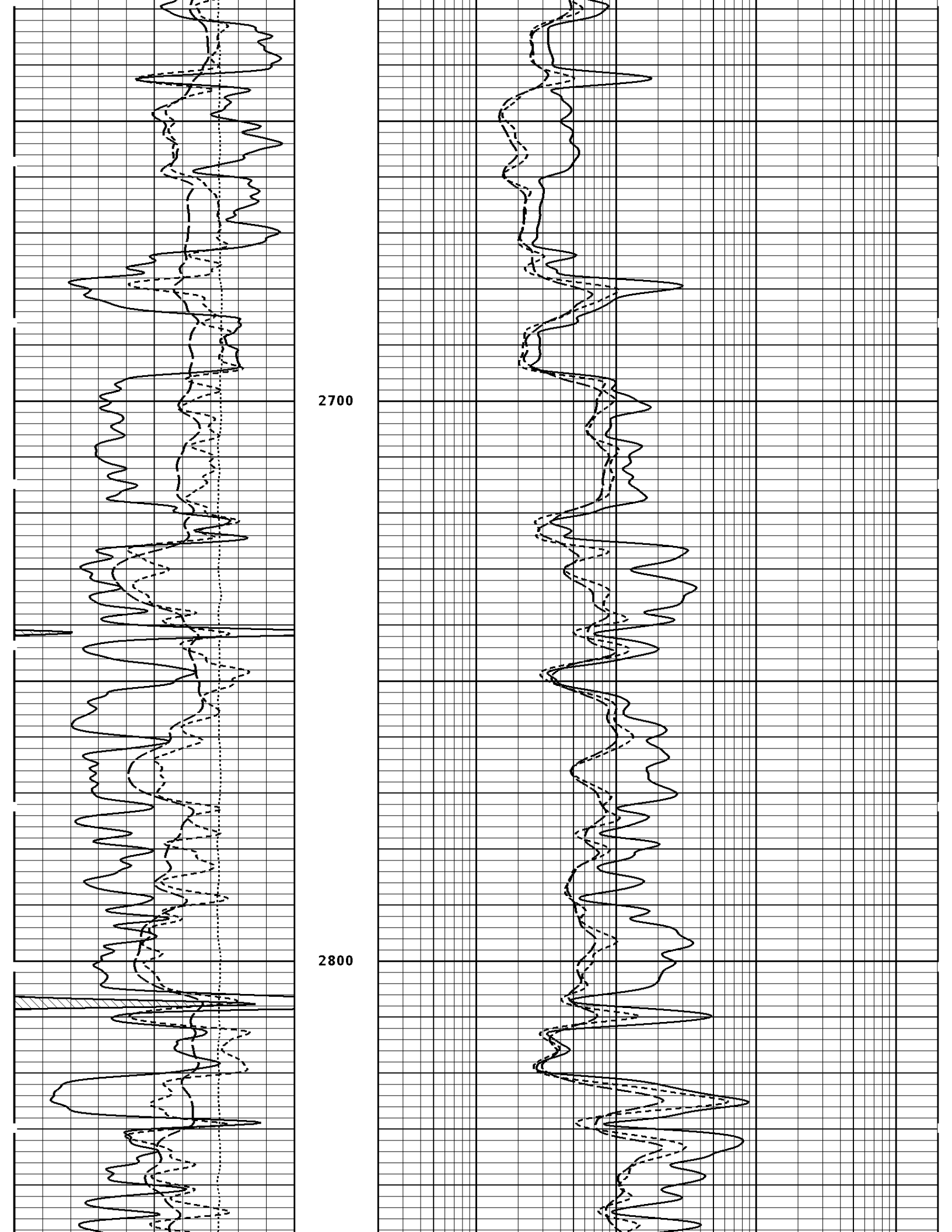
**SHALLOW FOCUSED RESISTIVITY**
**OHMM**

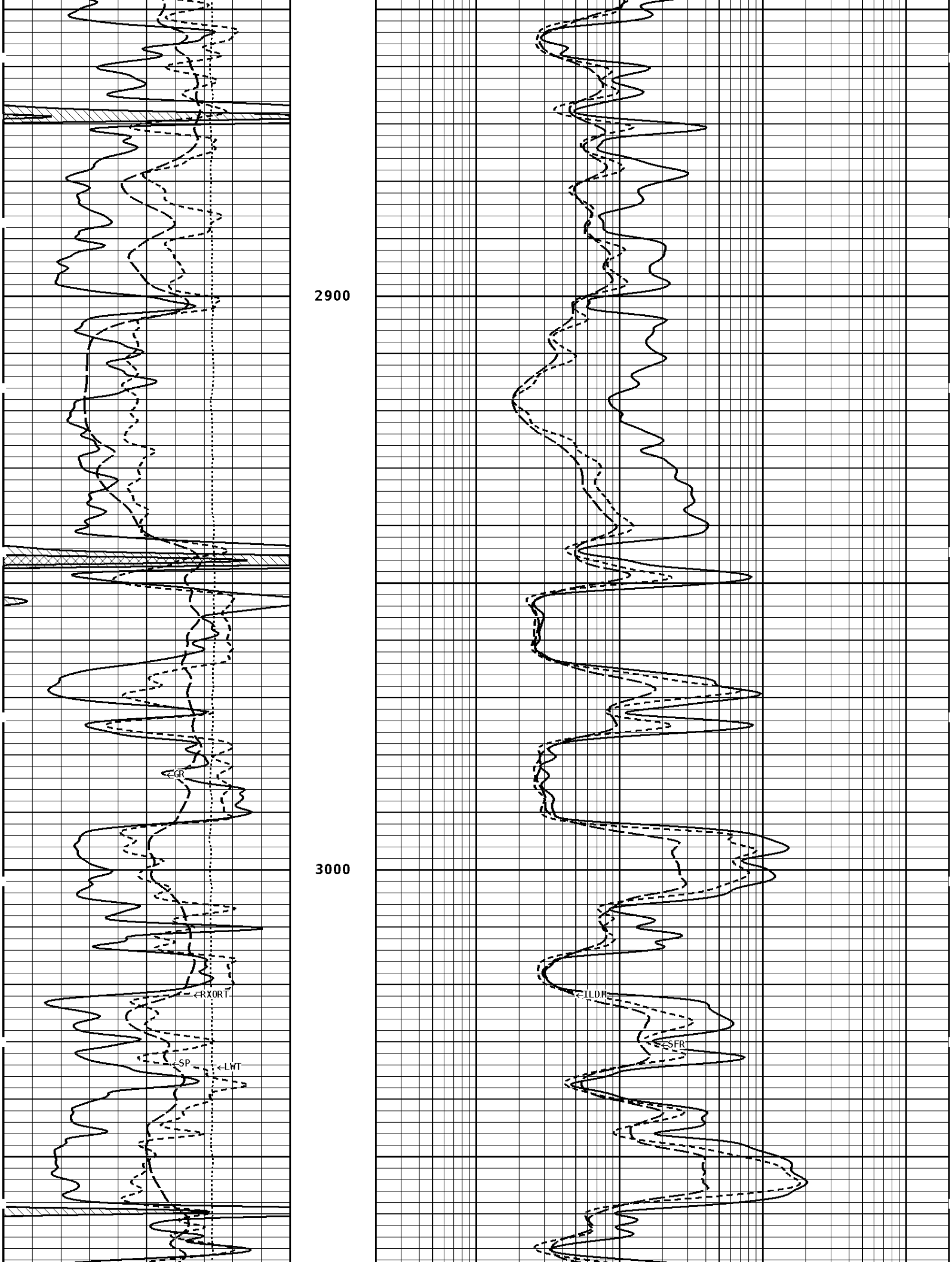
0.2 — 2000.0

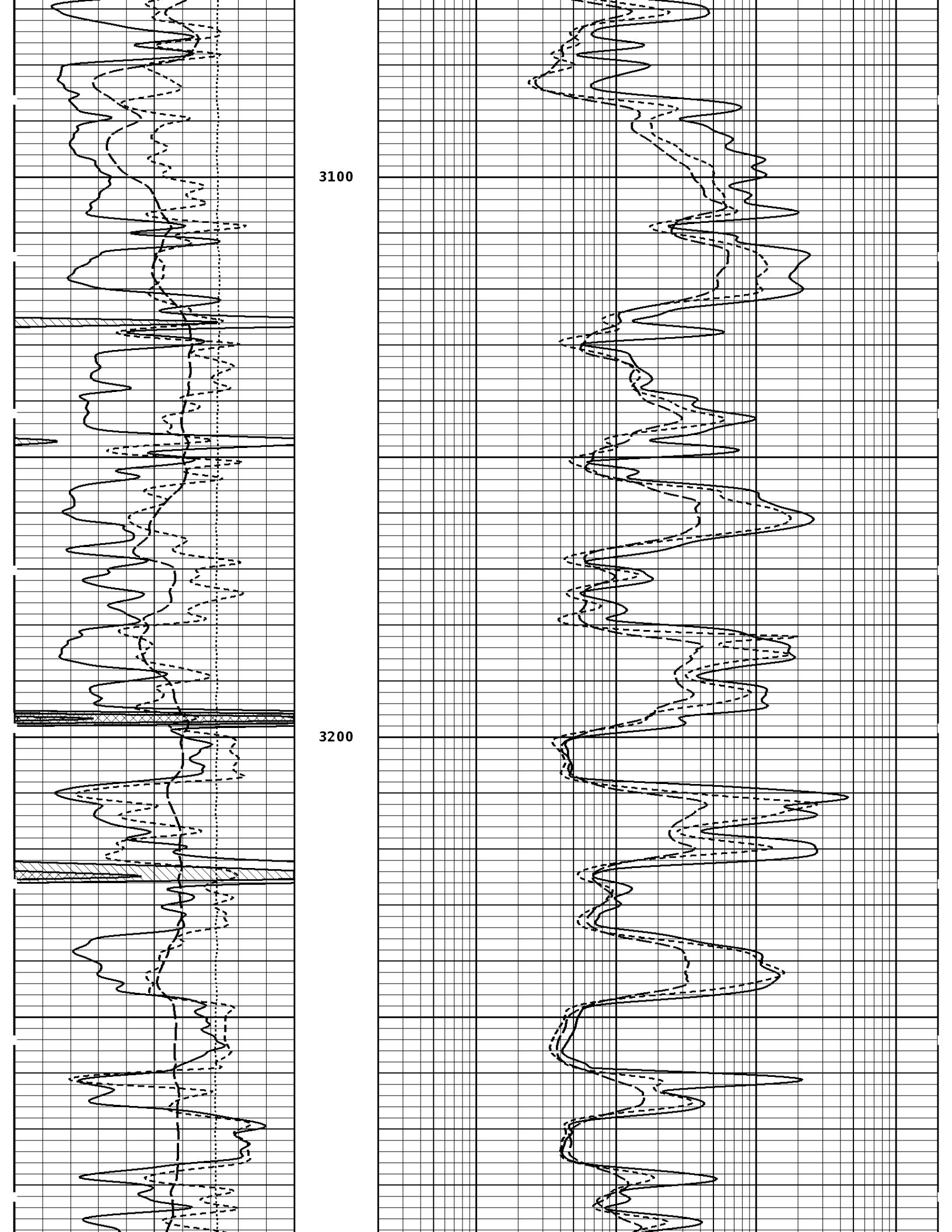
# 1:240 MAIN SECTION

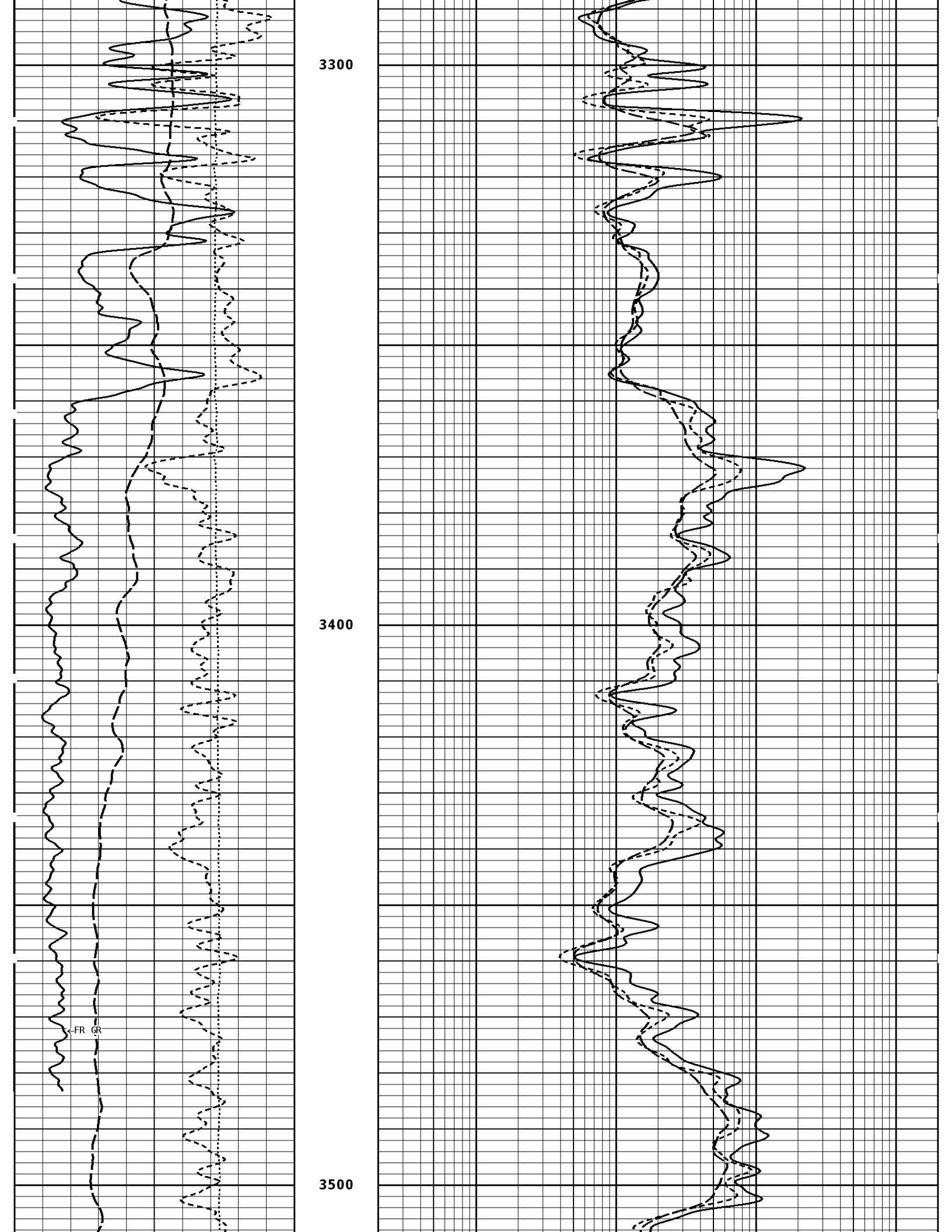


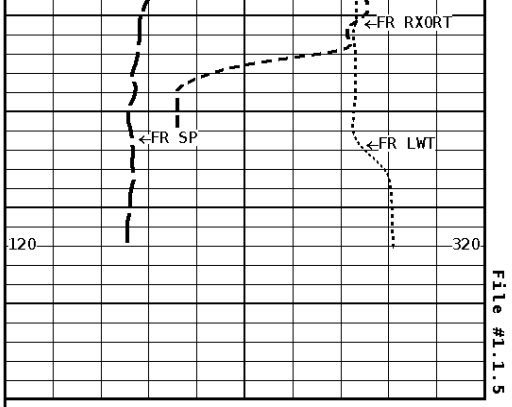

GR
RXORT
SP
LWT
ILD.M
SFR
2500
2600


2700
2800

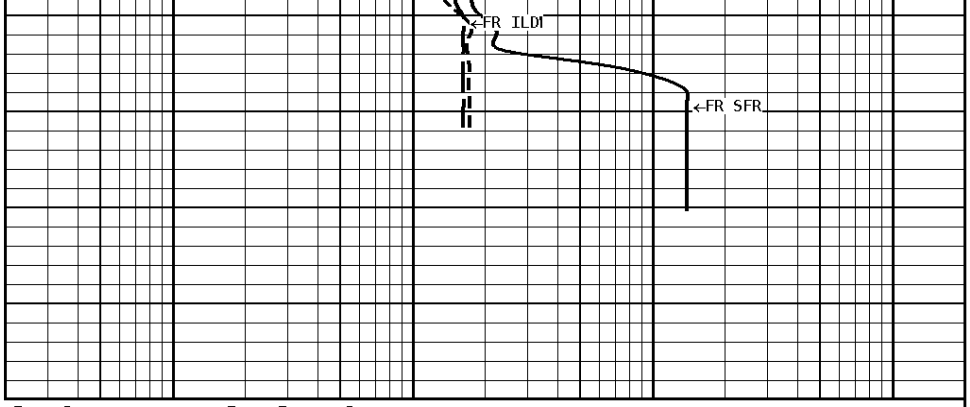

2900
3000
GR
RXORT
SP
LWT
ILDM
SFR


3100
3200


3300
3400
3500
←FR GR




3524




# 1:240 MAIN SECTION

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

**TENSION**
**LBS**
10000 — 0

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

**RXO/RT**
-160 — 40

**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 | 3525.000 | ft |
| Borehole Temperature | 111.0 | degF |
| Temperature Gradient | 1.00 | DFHF |
| Resistivity Of Mud | 2.000 | ohmm |
| Resistivity Of Mud Temperature | 50.00 | degF |

**Well File:** BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:240 **Format:** DIL-240
**Segment:** V1.D1.S3 Reprocess REPEAT **Acquired:** 2019-12-12 01:07 3.4.1-13968
**Reference:** 0 **Processed:** 2019-12-12 01:28 3.4.1-13968

**RXO/RT**
-160 — 40

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

**TENSION**
**LBS**
10000 — 0

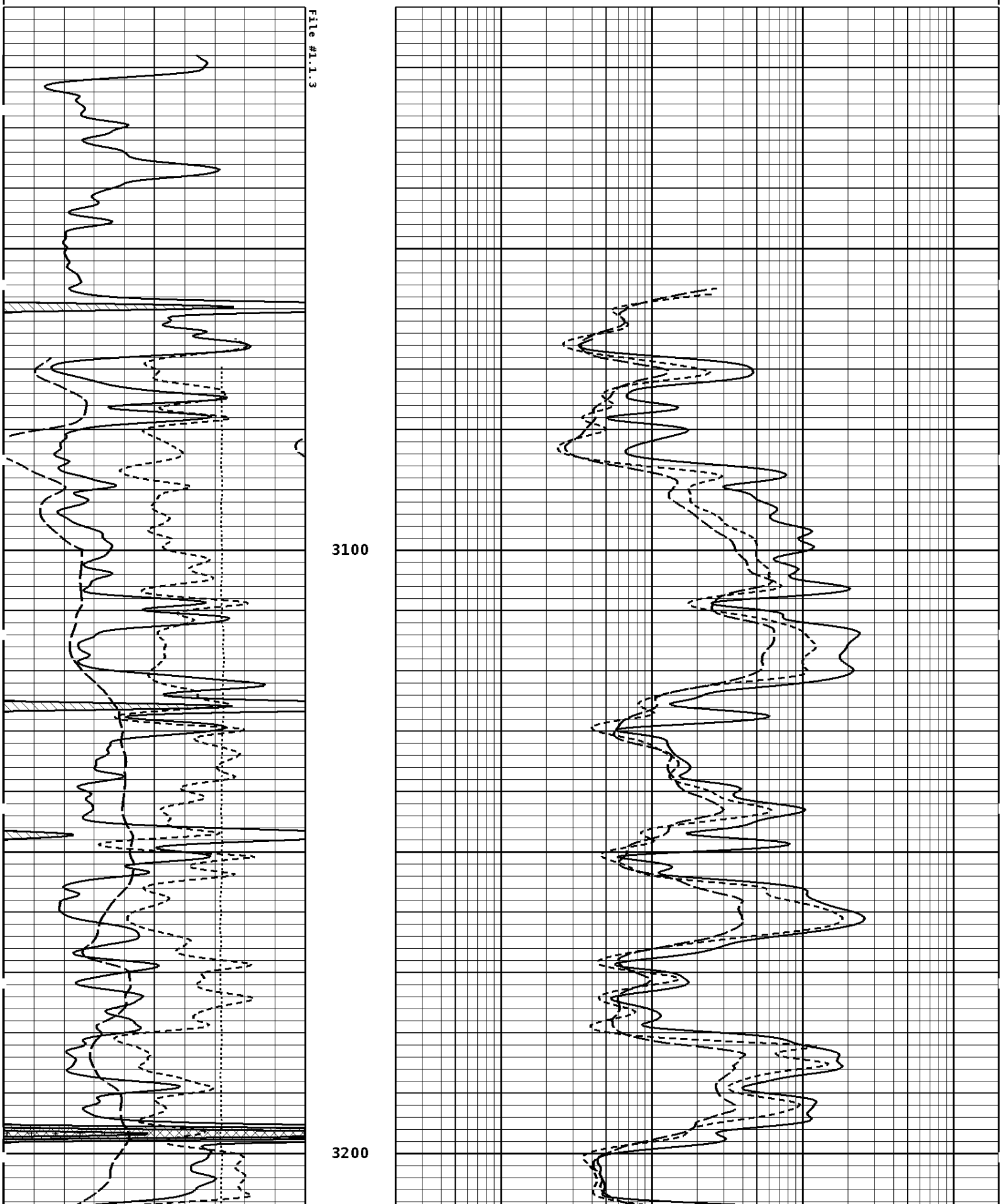
**GAMMA RAY**
**API UNITS**
150 — 300
0 — 150

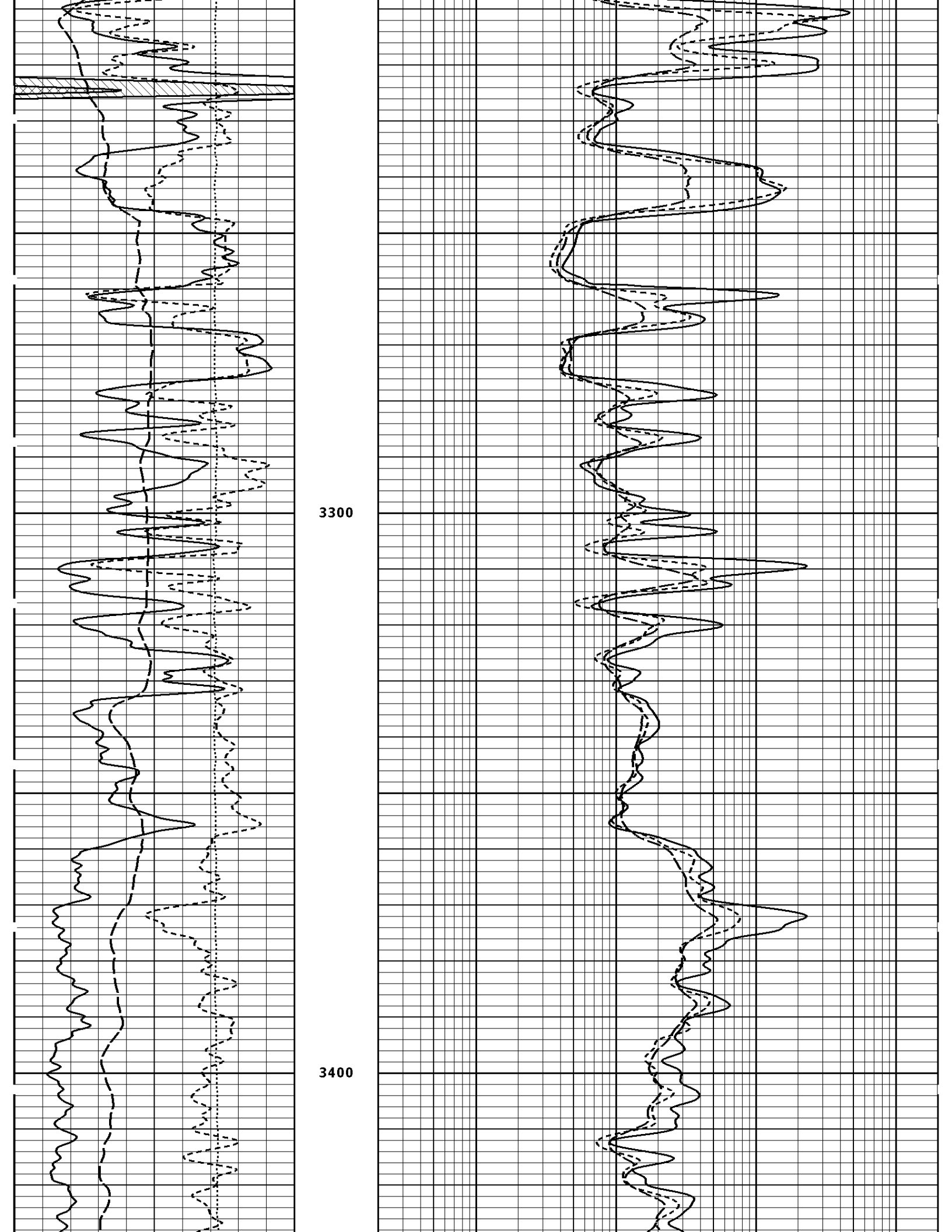
**DEEP INDUCTION**
**OHMM**
0.2 — 2000.0

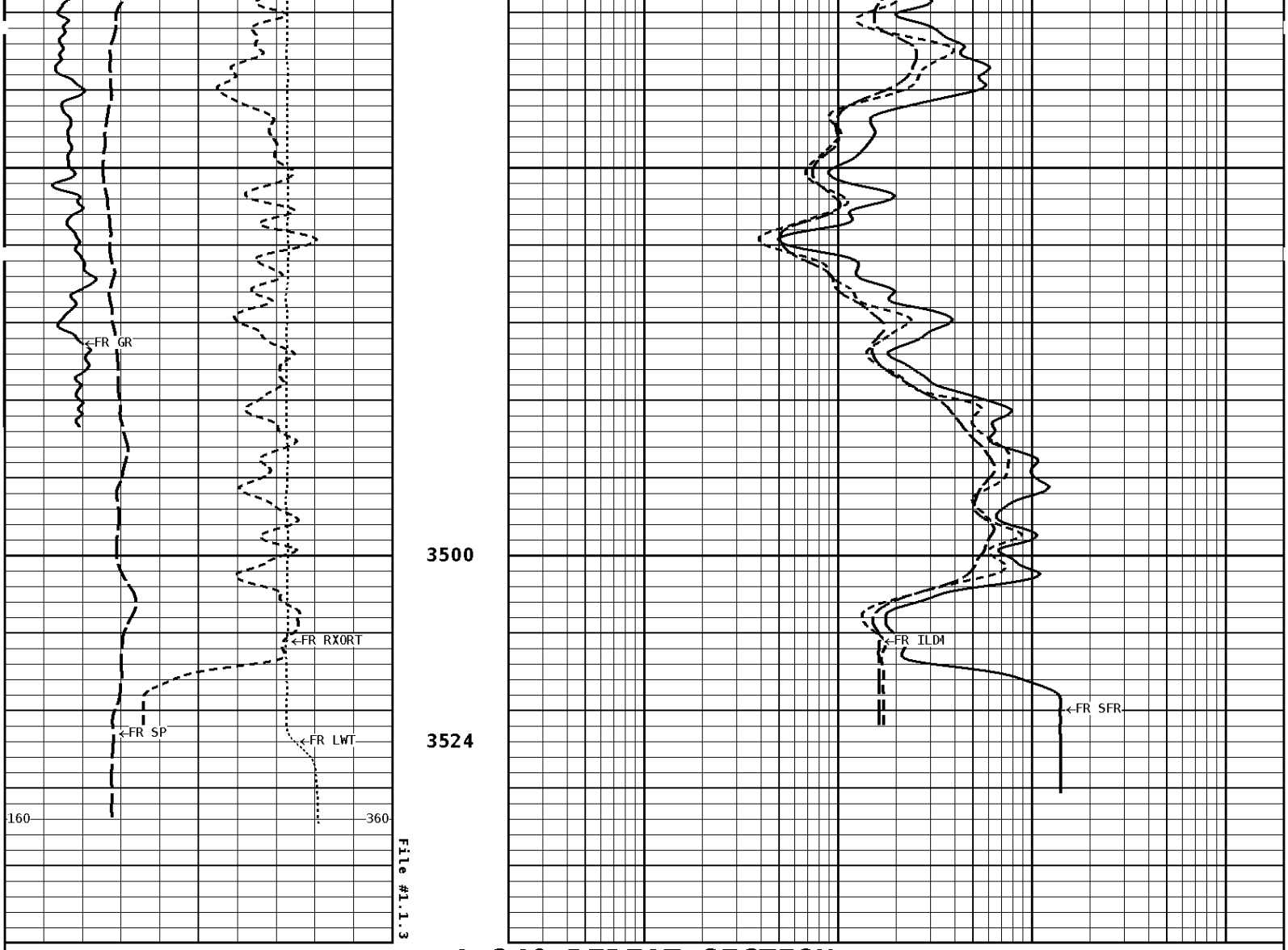
**MEDIUM INDUCTION**
**OHMM**
0.2 — 2000.0

**SHALLOW FOCUSED RESISTIVITY**
**OHMM**
0.2 — 2000.0

# 1:240 REPEAT SECTION




3300
3400




## 1:240 REPEAT SECTION

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

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

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

**RXO/RT**
-160 40

**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 | 3525.000 | ft |

| | | |
|---|---|---|
| Borehole Temperature | 111.0 | degF |
| Temperature Gradient | 1.00 | DFHF |
| Resistivity Of Mud | 2.000 | ohmm |
| Resistivity Of Mud Temperature | 50.00 | degF |

## * Calibration Summary *

### Shop Calibration
### GRT-B

Performed : 01-NOV-2019 Time : 10:40
Sensor Suite : GR-GR5 ID : GRT-BA-14

| | Measured Background | Measured Jig | Units | Calibrated Jig | Units |
|---|---|---|---|---|---|
| GR | 64 | 323 | CPS | 160 | GRAPI |

### Shop Calibration
### PIT-CA

Performed : 27-SEP-2019 Time : 13:20
Sensor Suite : P-IND-T ID : PIT-CA-069

Medium

| | Measured R | Measured X | Calibrated R | Calibrated X | Units |
|---|---|---|---|---|---|
| Air | 130176 | 131174 | 0.1 | 0.0 | MMHOS |
| Zero | 131068 | 131070 | 42.1 | -8.1 | MMHOS |
| Reference | 249686 | 249128 | 5042.1 | 4991.9 | MMHOS |
| Loop | 130809 | 217169 | 3668.9 | 3615.4 | MMHOS |
| Sonde Error | | | 0.7 | -8.2 | MMHOS |
| Cond | | | 5042.1 | 4991.9 | MMHOS |

Deep

| | Measured R | Measured X | Calibrated R | Calibrated X | Units |
|---|---|---|---|---|---|
| Air | 128272 | 132045 | -0.0 | -0.1 | MMHOS |
| Zero | 131066 | 131073 | 56.3 | -22.1 | MMHOS |
| Reference | 235111 | 234256 | 2056.3 | 1977.9 | MMHOS |
| Loop | 129176 | 221230 | 1746.0 | 1711.2 | MMHOS |
| Sonde Error | | | -0.7 | -5.8 | MMHOS |
| Cond | | | 2056.3 | 1977.9 | MMHOS |

Temperature

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

Performed : 27-SEP-2019 Time : 13:20
Sensor Suite : SFL ID : PIT-CA-069

Internal

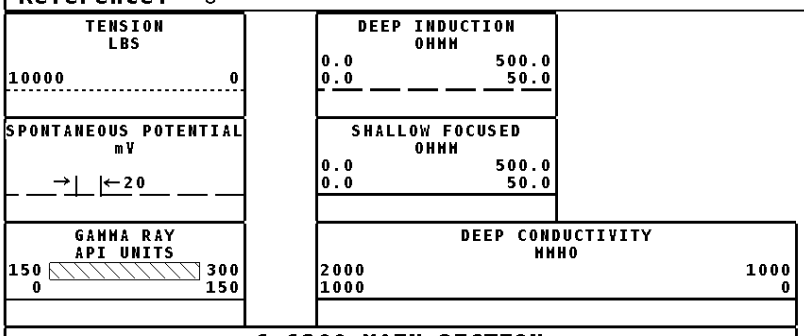
| | Measured Zero | Measured Reference | Calibrated Zero | Calibrated Reference | Units |
|---|---|---|---|---|---|
| Im | 32771.0 | 49574.9 | 0.0 | 7028.0 | uA |
| Ib | 32764.7 | 49879.2 | 0.0 | 1750.0 | mA |
| MOM1 | 32784.7 | 59428.5 | 0.0 | 175.0 | mV |
| Equivalent SFL | | | | 43.97 | OHMM |

Performed : 27-SEP-2019 Time : 13:21
Sensor Suite : P-SP ID : PIT-CA-069

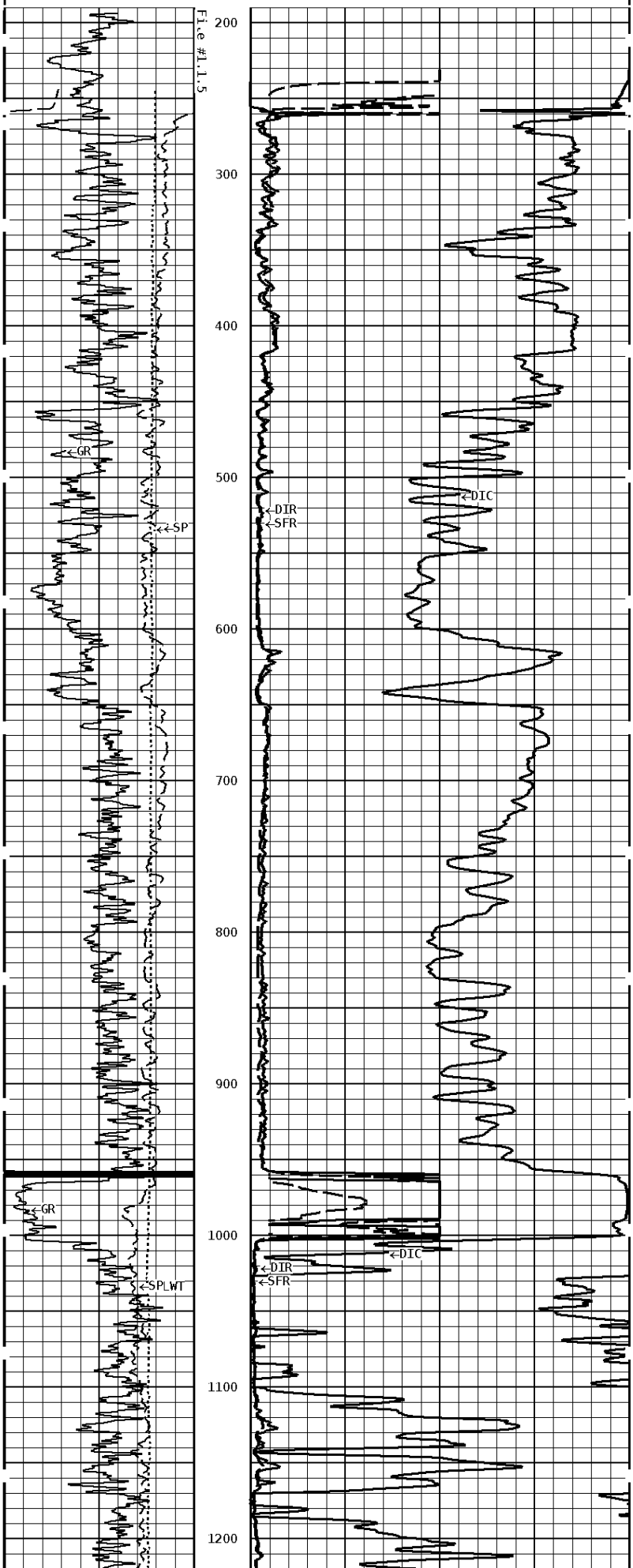
Internal

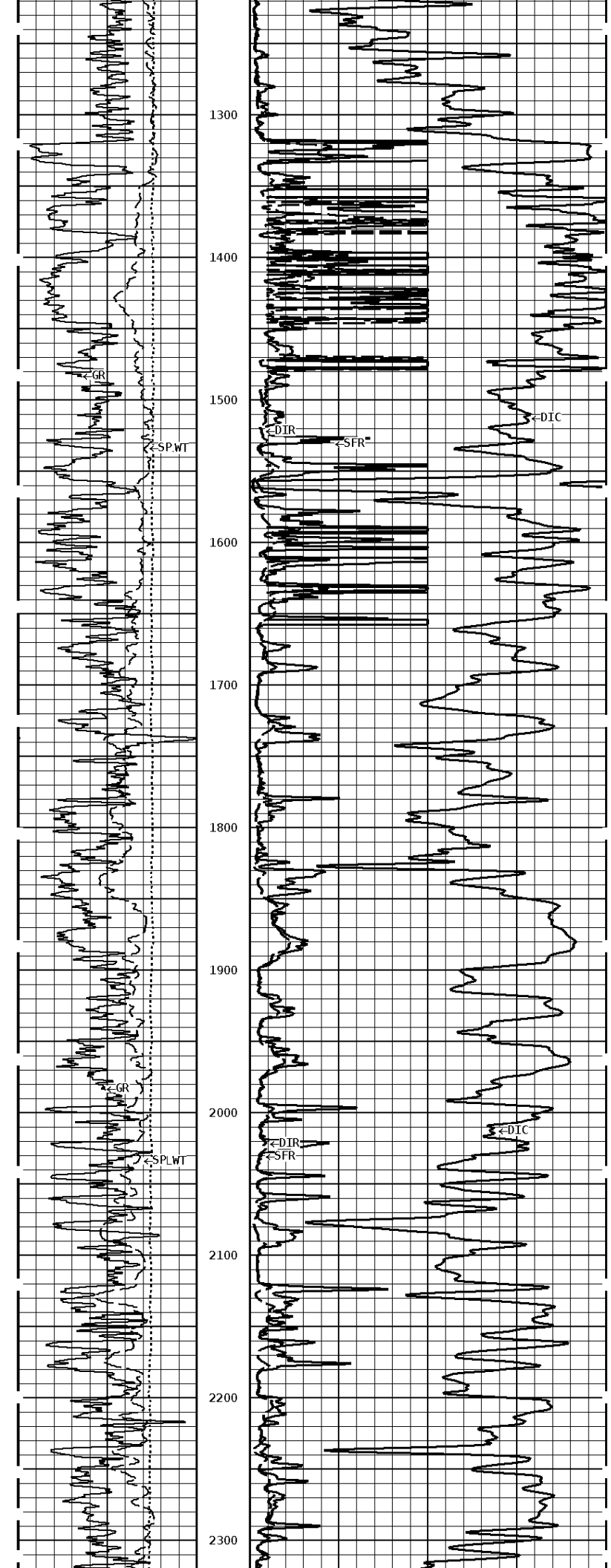
| Measured Zero | Measured Reference | Calibrated Zero | Calibrated Reference | Units |
|---|---|---|---|---|
| 32795.0 | 58829.0 | 0.0 | 1000.0 | mV |

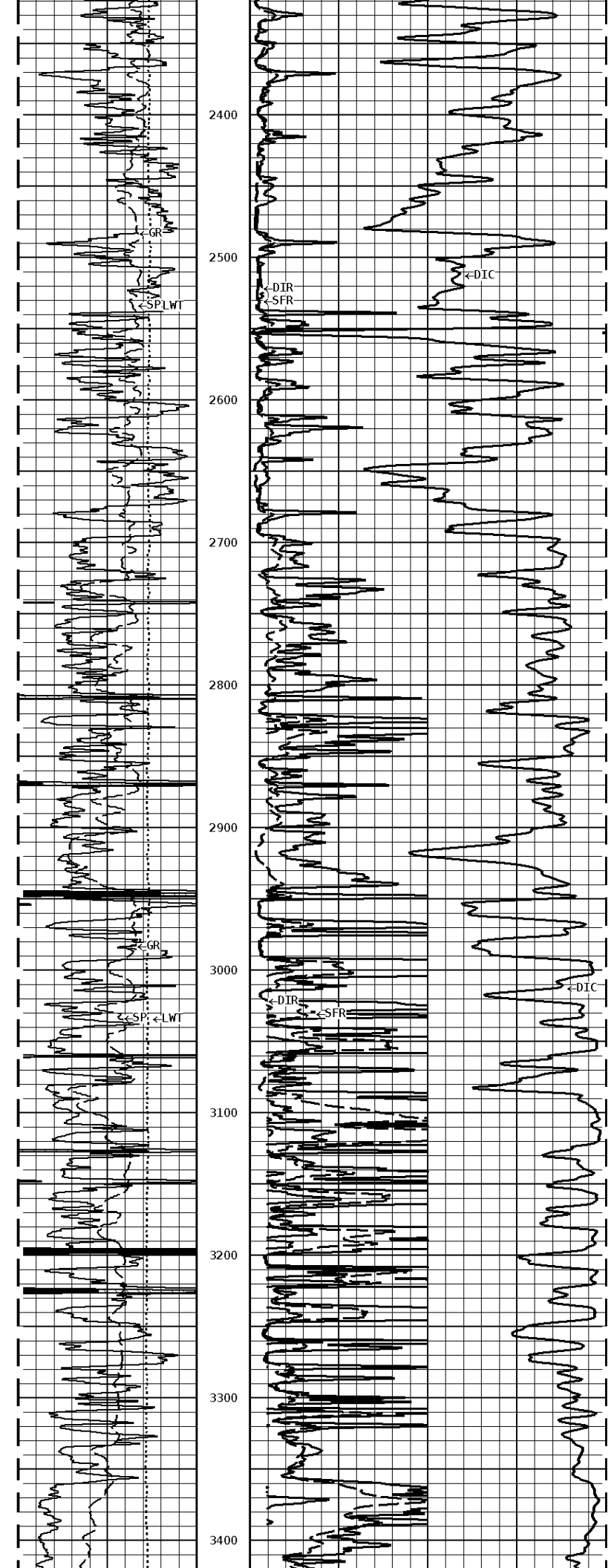
**Well File:** BEREXCO_HINES_27X_DEC11_MSTK **Scale:** 1:1200 **Format:** DIL1200
**Segment:** V1.D1.S5 Reprocess MAIN **Acquired:** 2019-12/12 01:40 3.4.1-13968
**Reference:** 0 **Processed:** 2019-12/12 02:53 3.4.1-13968

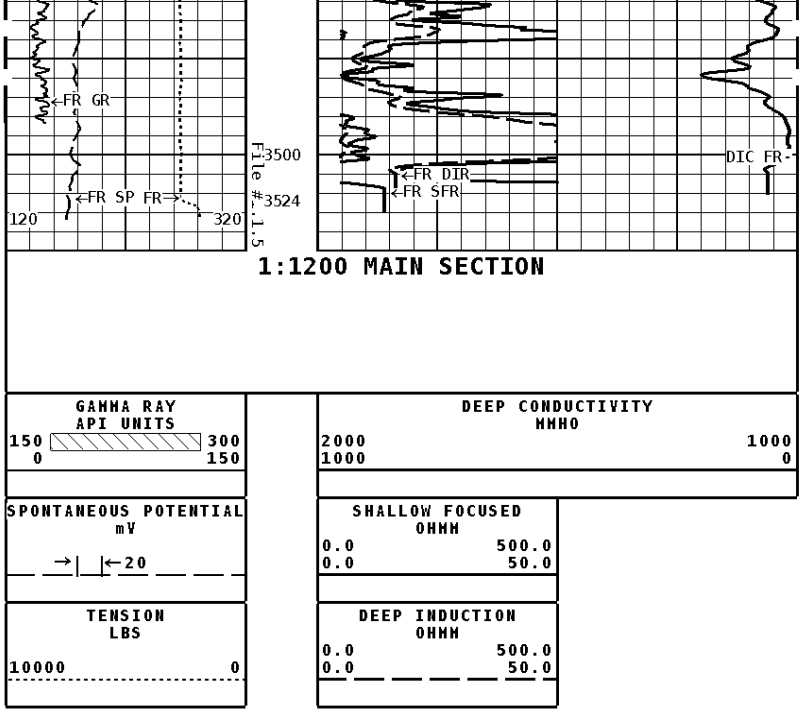


1:1200 MAIN SECTION




1300
1400
GR
1500
DIR
SFR
SP.WT
DIC
1600
1700
1800
1900
GR
2000
DIR
SFR
SP.WT
DIC
2100
2200
2300


2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
GR
DIR
SFR
SP
LWT
DIC




STEP energy services

| | |
|---|---|
| Company: | BEREXCO LLC |
| Well: | HINES UNIT #27X |
| Location: | 2010' FSL & 1320' FEL |
| Logged: | 12-11-2019 |
| K.B. Elev: | 1876.0 Ft |