Schlumberger

Company: **Vecta Oil & Gas Ltd**

Well: **Quandary 23−26**
Field: **Wildcat**
County: **Cheyenne** State: **Colorado**

Platform Express
Array Induction
Linear Correlation

County: Cheyenne
Field: Wildcat
Location: NESW Sec. 26, T12S, R46W
Well: Quandary 23−26
Company: Vecta Oil & Gas Ltd

LOCATION

NESW Sec. 26, T12S, R46W
SHL: 2014' FSL X 2490' FWL
Lat/Long: 38.97516 N / 102.52924 W

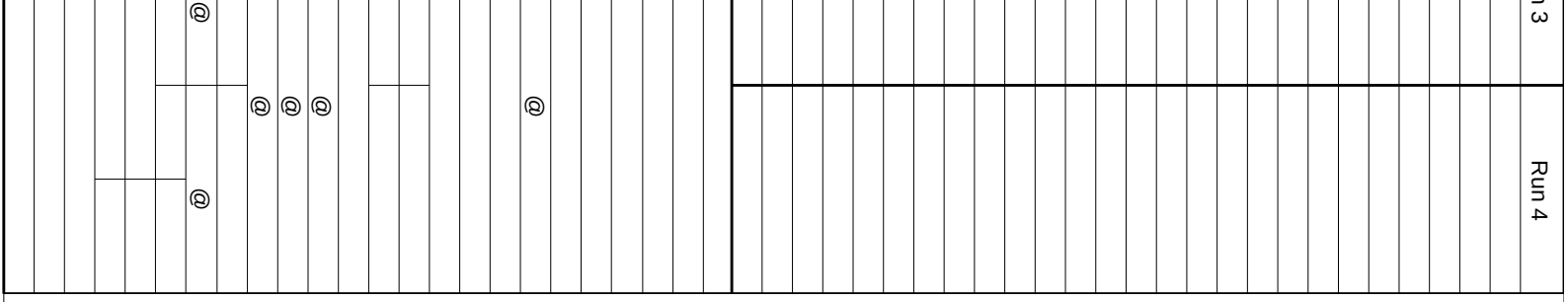
Elev.: K.B. 4573.00 ft
G.L. 4562.00 ft
D.F. 4572.00 ft

Permanent Datum: Ground Level Elev.: 4562.00 ft
Log Measured From: Kelly Bushing 9.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

| API Serial No. | Section | Township | Range |
|---|---|---|---|
| 05−017−07711−0000 | 26 | 12S | 46W |

| | Run 1 | Run 2 | Run |
|---|---|---|---|
| Logging Date | 20−Mar−2012 | | |
| Run Number | 1 | | |
| Depth Driller | 5910 ft | | |
| Schlumberger Depth | 5907 ft | | |
| Bottom Log Interval | 5899 ft | | |
| Top Log Interval | 435 ft | | |
| Casing Driller Size @ Depth | 8.625 in @ 438 ft | @ | @ |
| Casing Schlumberger | 435 ft | | |
| Bit Size | 7.875 in | | |
| Type Fluid In Hole | Gel and Chemical | | |
| MUD Density / Viscosity | 8.9 lbm/gal / 69 s | | |
| MUD Fluid Loss / PH | 6.8 cm3 / 10 | | |
| MUD Source Of Sample | Flowline | | |
| RM @ Measured Temperature | 0.720 ohm.m @ 125 degF | @ | @ |
| RMF @ Measured Temperature | 0.576 ohm.m @ 125 degF | @ | @ |
| RMC @ Measured Temperature | 0.864 ohm.m @ 125 degF | @ | @ |
| Source RMF / RMC | Calculated / Calculated | | |
| RM @ MRT / RMF @ MRT | 0.625 @ 145 / 0.500 @ 145 | @ / @ | @ / @ |
| Maximum Recorded Temperatures | 145 degF | | |
| Circulation Stopped Time | 20−Mar−2012 0:00 | | |
| Logger On Bottom Time | 20−Mar−2012 6:30 | | |
| Unit Number / Location | 2135 / Ft. Morgan, CO | | |
| Recorded By | Tim Hoffman | | |
| Witnessed By | Mike Dodge | | |

| | Run 1 | Run 2 | Run |
|---|---|---|---|
| Logging Date | | | |
| Run Number | | | |
| Depth Driller | | | |
| Schlumberger Depth | | | |
| Bottom Log Interval | | | |
| Top Log Interval | | | |
| Casing Driller Size @ Depth | @ | | |
| Casing Schlumberger | | | |
| Bit Size | | | |
| Type Fluid In Hole | | | |
| MUD Density / Viscosity | | | |
| MUD Fluid Loss / PH | | | |
| MUD Source Of Sample | | | |
| RM @ Measured Temperature | @ | | |
| RMF @ Measured Temperature | @ | | |
| RMC @ Measured Temperature | @ | | |
| Source RMF / RMC | | | |
| RM @ MRT / RMF @ MRT | @ / @ | | |
| Maximum Recorded Temperatures | | | |
| Circulation Stopped Time | | | |
| Logger On Bottom Time | | | |
| Unit Number / Location | | | |
| Recorded By | | | |
| Witnessed By | | | |




# DEPTH SUMMARY LISTING

Date Created: 20−MAR−2012 6:36:01

## Depth System Equipment

| Depth Measuring Device | | Tension Device | | Logging Cable | |
|---|---|---|---|---|---|
| Type: | IDW−B | Type: | CMTD−B/A | Type: | 7−46A |
| Serial Number: | 2933 | Serial Number: | 1919 | Serial Number: | 710065 |
| Calibration Date: | 30−NOV−2011 | Calibration Date: | 14−MAR−201 | Length: | 24000 FT |
| Calibrator Serial Number: | 33 | Calibrator Serial Number: | 100513 | | |
| Calibration Cable Type: | 7−46P | Number of Calibration Points: | 10 | Conveyance Method: | Wireline |
| Wheel Correction 1: | −7 | Calibration RMS: | 24 | Rig Type: | LAND |
| Wheel Correction 2: | −5 | Calibration Peak Error: | 52 | | |

## Depth Control Parameters

| | |
|---|---|
| Log Sequence: | First Log In the Well |
| Rig Up Length At Surface: | 0.00 FT |
| Rig Up Length At Bottom: | 0.00 FT |
| Rig Up Length Correction: | 0.00 FT |
| Stretch Correction: | 3.00 FT |
| Tool Zero Check At Surface: | 0.00 FT |

## Depth Control Remarks

1. All Schlumberger Depth Control Procedures Followed
2. IDW used as primary depth control device, Z−Chart used for secondary depth control
3.
4.
5.
6.



| OTHER SERVICES1 | OTHER SERVICES2 |
|---|---|
| OS1: MSIP | OS1: |
| OS2: FMI | OS2: |
| OS3: | OS3: |
| OS4: | OS4: |
| OS5: | OS5: |
| REMARKS: RUN NUMBER 1 | REMARKS: RUN NUMBER 2 |
| This is the first run in hole | |
| | |
| Toolstring run as per tool sketch | |
| | |
| Matrix: Sandstone (2.65 g/cc) run over the repeat pass | |
| Limestone (2.71 g/cc) run over a second repeat pass and the main pass | |

Rig: Black Gold 69

Crew: Derrick Hunter, Matt Roche

| RUN 1 | | |
|---|---|---|
| SERVICE ORDER #: | BFN8−00‘61 | |
| PROGRAM VERSION: | 19C0−187 | |
| FLUID LEVEL: | 300 ft | |
| LOGGED INTERVAL | START | STOP |
| | | |
| | | |
| | | |
| | | |
| | | |

| RUN 2 | | |
|---|---|---|
| SERVICE ORDER #: | | |
| PROGRAM VERSION: | | |
| FLUID LEVEL: | | |
| LOGGED INTERVAL | START | STOP |
| | | |
| | | |
| | | |
| | | |
| | | |

# EQUIPMENT DESCRIPTION

## RUN 1

### SURFACE EQUIPMENT

WITM (EDTS)−A

### DOWNHOLE EQUIPMENT

LEH−QT
LEH−QT

MDSB_EDTC
Mud Tempe — 78.7

EDTC−B
EDTH−B
EDTC−B
EDTG−A/B

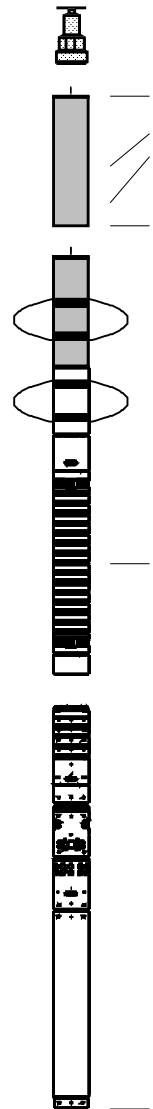
CTEM — 75.2
Gamma Ray — 73.3
EFTB DIAG
TelStatus
EDTCB Ele — 72.2

MAPC−B
MAPC−BA
ECH−SF
MAMS−BA

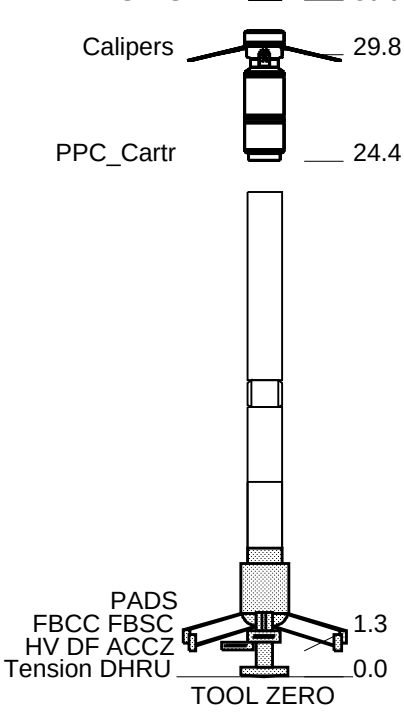
MAMS−PS — 56.8

MAXS−B
MASS−BA
MAXS−BA

MAXS−PS — 30.9




## RUN 2




MAXIMUM STRING DIAMETER 5.00 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Schlumberger

# MAIN LINEAR RESISTIVITY 2" = 100’

MAXIS Field Log

## Output DLIS Files

| | | | | | | |
|---|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 | 5928.0 FT | 338.5 FT |

## Integrated Hole/Cement Volume Summary

**Hole Volume = 2350.66 F3**

**Cement Volume = 1447.82 F3 (assuming 5.50 IN casing O.D.)**

**Computed from 5907.0 FT to 435.0 FT using data channel(s) HCAL**

## OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

**PIP SUMMARY**

**Integrated Cement Volume Major Pip Every 100 F3**
**Integrated Cement Volume Minor Pip Every 10 F3**
**Integrated Hole Volume Major Pip Every 100 F3**
**Integrated Hole Volume Minor Pip Every 10 F3**

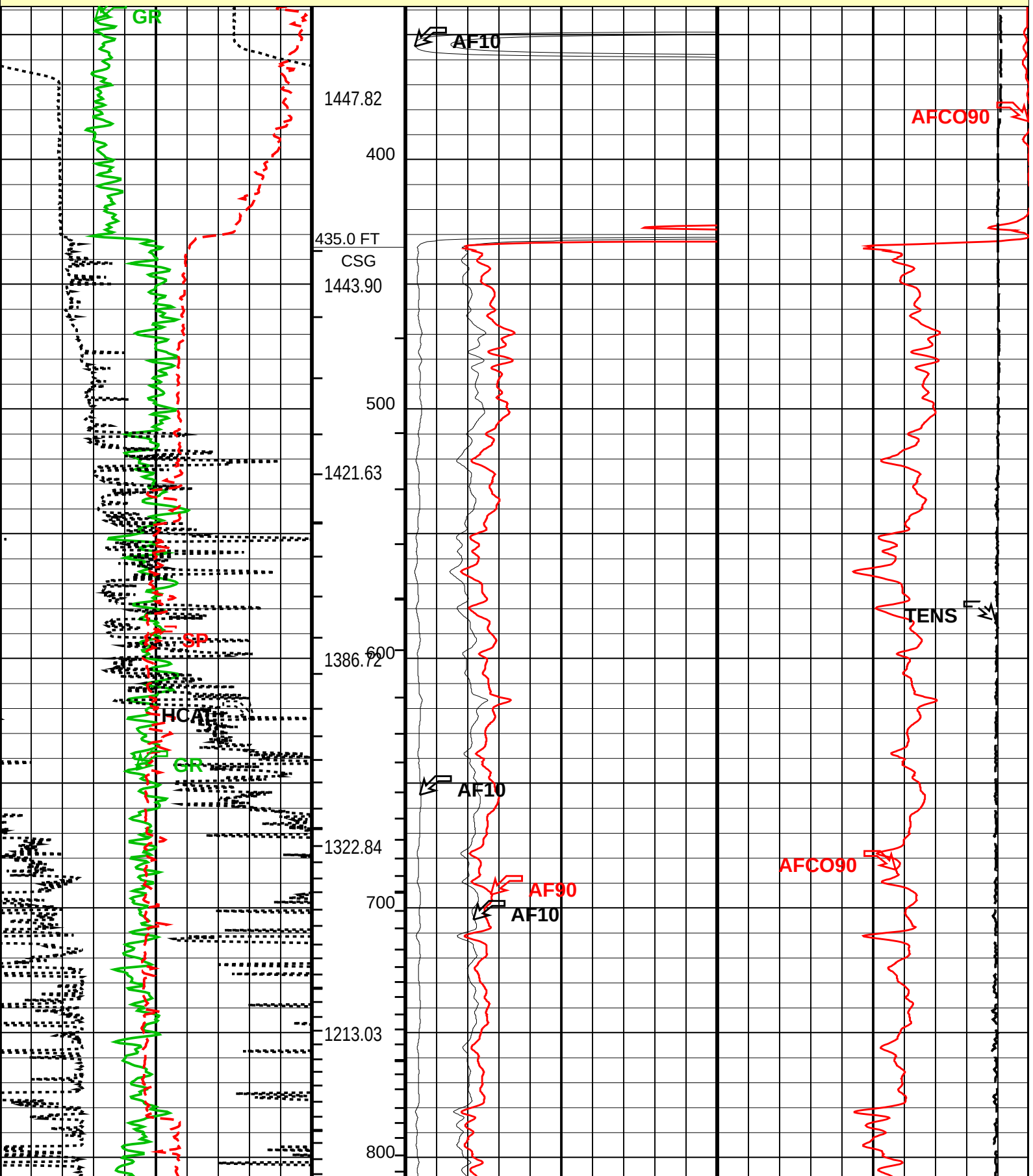
| SP (SP) | | |
|---|---|---|
| −160 | (MV) | 40 |

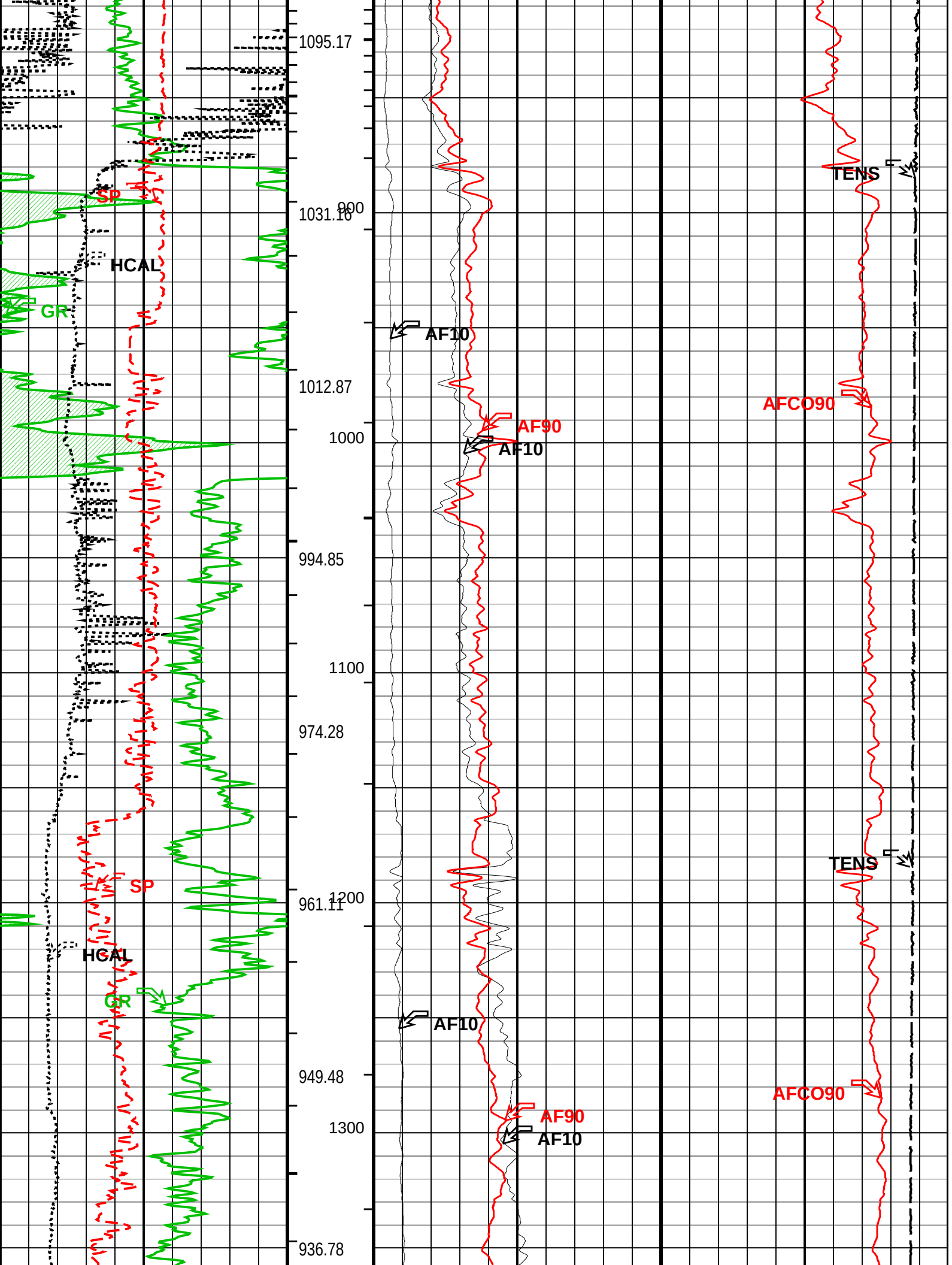
| Caliper (HCAL) | | |
|---|---|---|
| 6 | (IN) | 16 |

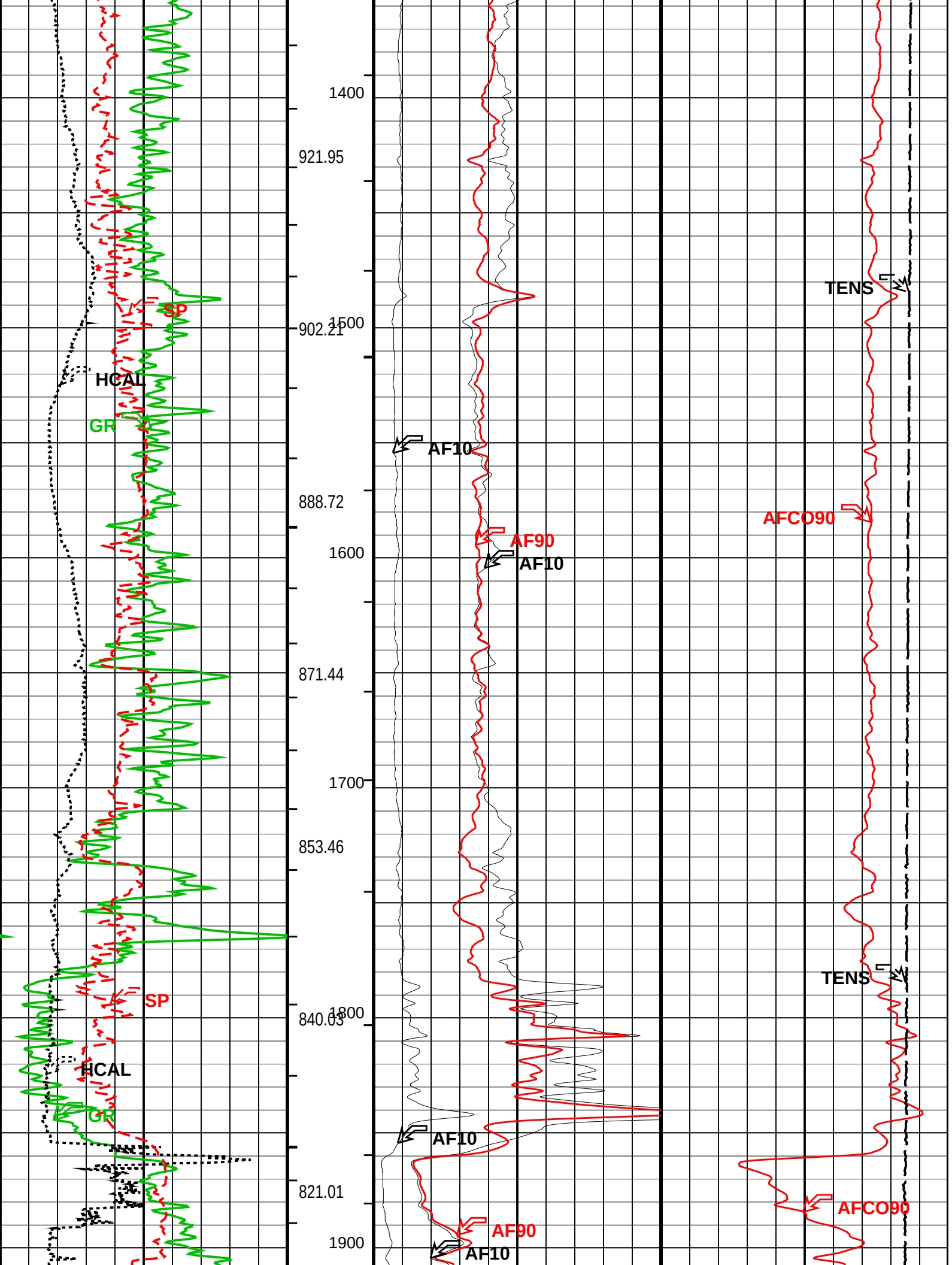
| AIT 10 Inch Investigation (AF10) | | |
|---|---|---|
| 0 | (OHMM) | 50 |

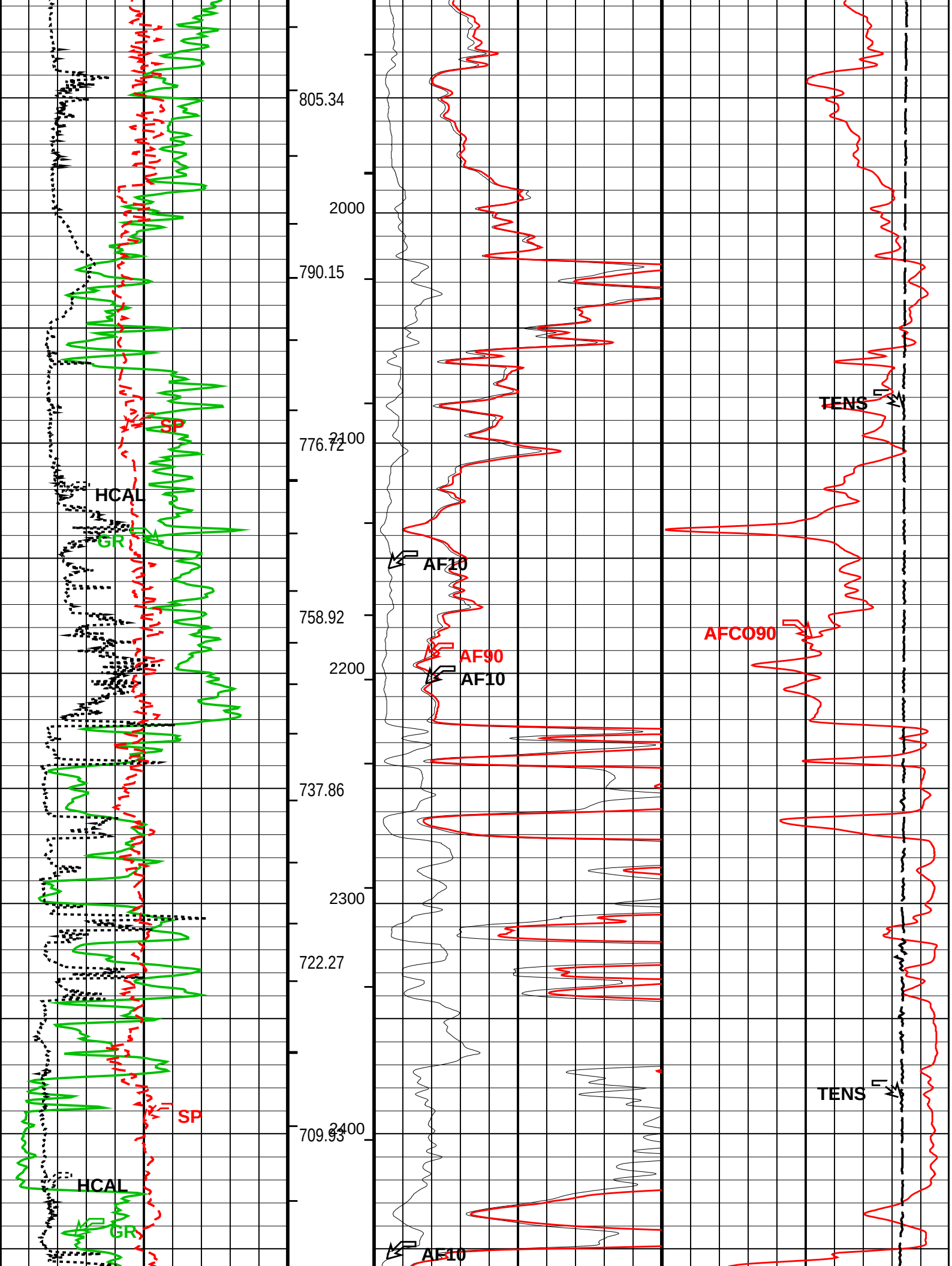
| 6 (IN) 16 | | 0 (OHMM) 50 | |
|---|---|---|---|
| Gamma Ray (GR)<br>0 (GAPI) 200 | | AIT 90 Inch Investigation (AF90)<br>0 (OHMM) 10 | Tension (TENS)<br>10000 (LBF) 0 |
| Gamma Ray Backup | Cement Volume (ICV) (F3) | AIT 10 Inch Investigation (AF10)<br>0 (OHMM) 10 | AIT 90 Inch Investigation Conductivity (AFCO90)<br>1000 (MM/M) 0 |

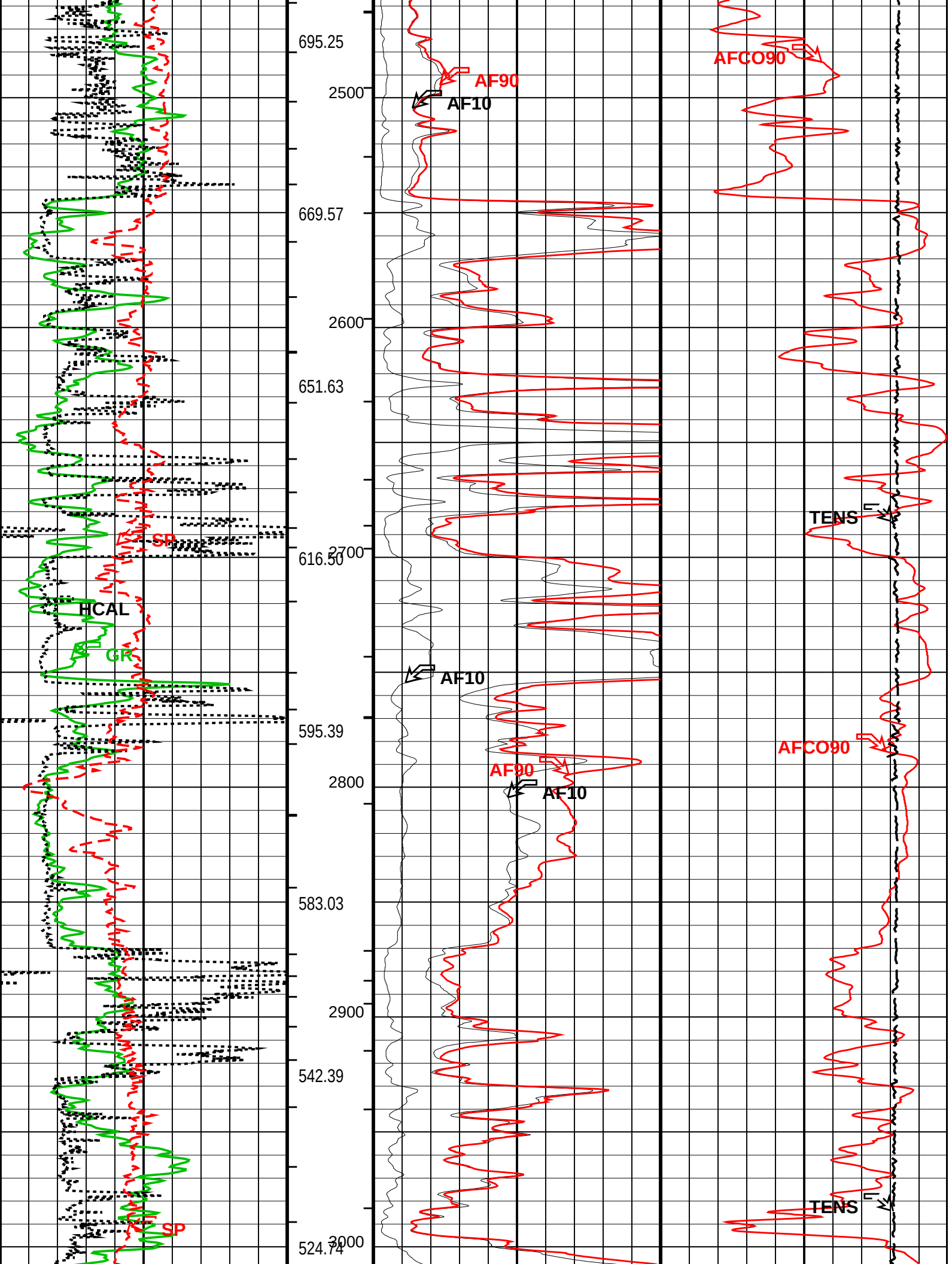
MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

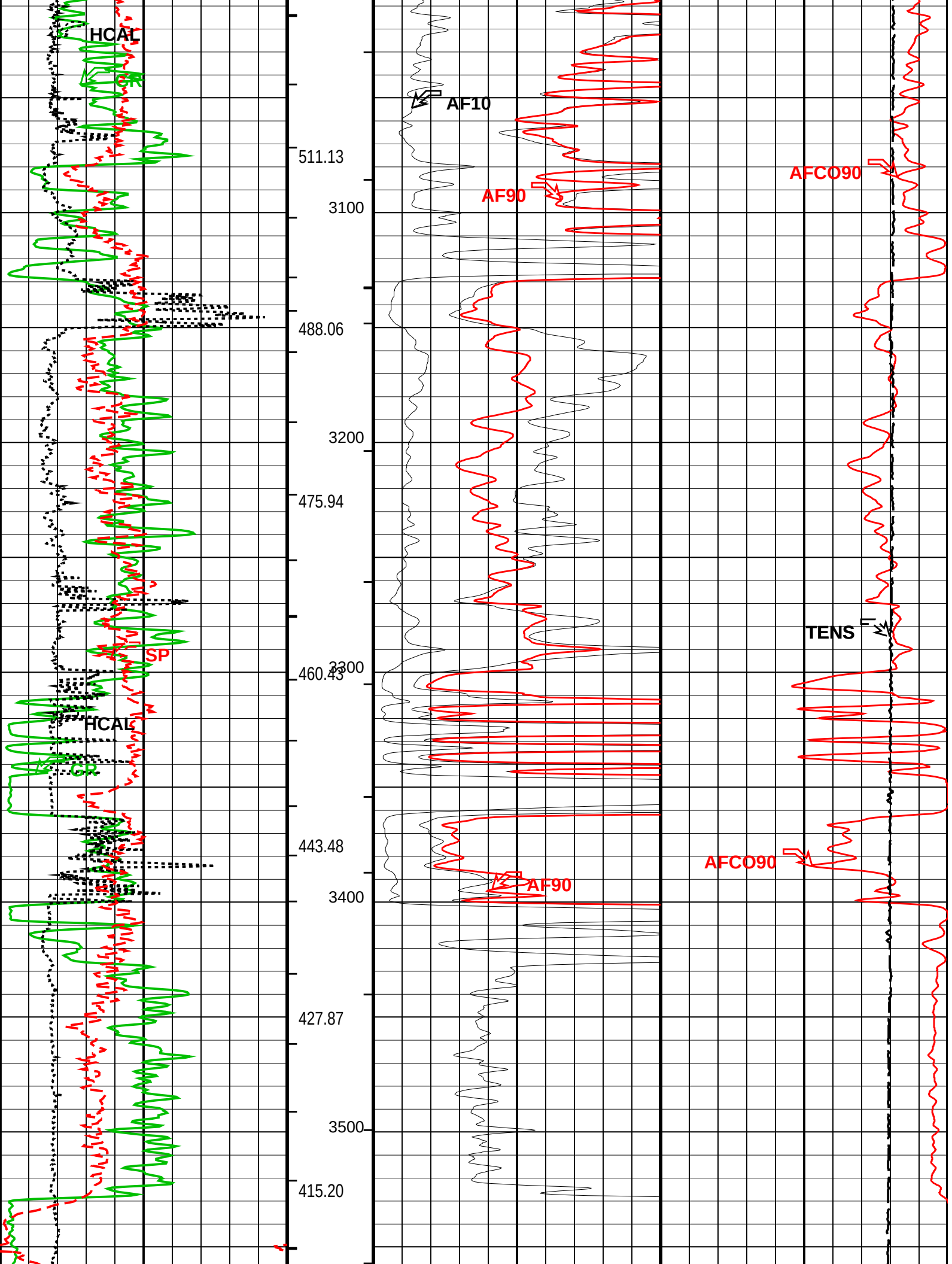



1095.17
1031.16
900
1012.87
1000
994.85
1100
974.28
961.11
1200
949.48
1300
936.78
SP
HCAL
GR
AF10
AF90
AF10
TENS
AFCO90
SP
HCAL
GR
AF10
AF90
AF10
TENS
AFCO90


1400
921.95
1500
902.21
1600
888.72
1700
871.44
1800
853.46
1900
840.03
2000
821.01
SP
HCAL
GR
SP
HCAL
GR
AF10
AF90
AF10
AF10
AF90
AF10
TENS
AFCO90
TENS
AFCO90


805.34
2000
790.15
2100
776.72
758.92
2200
737.86
2300
722.27
2400
709.93
SP
HCAL
GR
AF10
AF90
AF10
AFCO90
TENS
SP
HCAL
GR
AF10
TENS


695.25
2500
669.57
2600
651.63
2700
616.50
595.39
2800
583.03
2900
542.39
3000
524.74
SP
HCAL
GR
SP
AF10
AF90
AF10
AF10
AF90
AF10
AFCO90
TENS
AFCO90
TENS


HCAL
GR
SP
HCAL
GR
AF10
AF90
AF90
AFCO90
AFCO90
TENS
511.13
3100
488.06
3200
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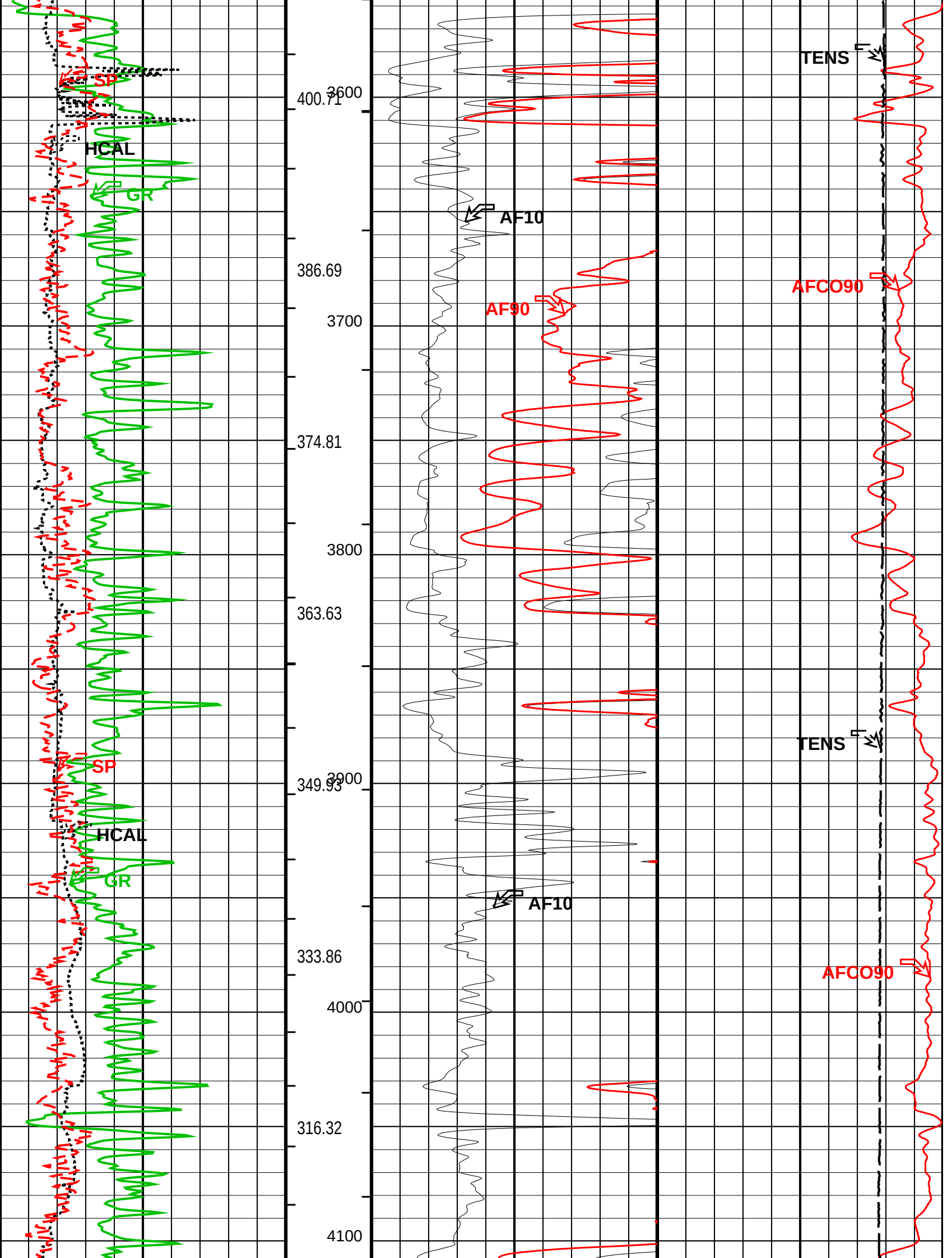
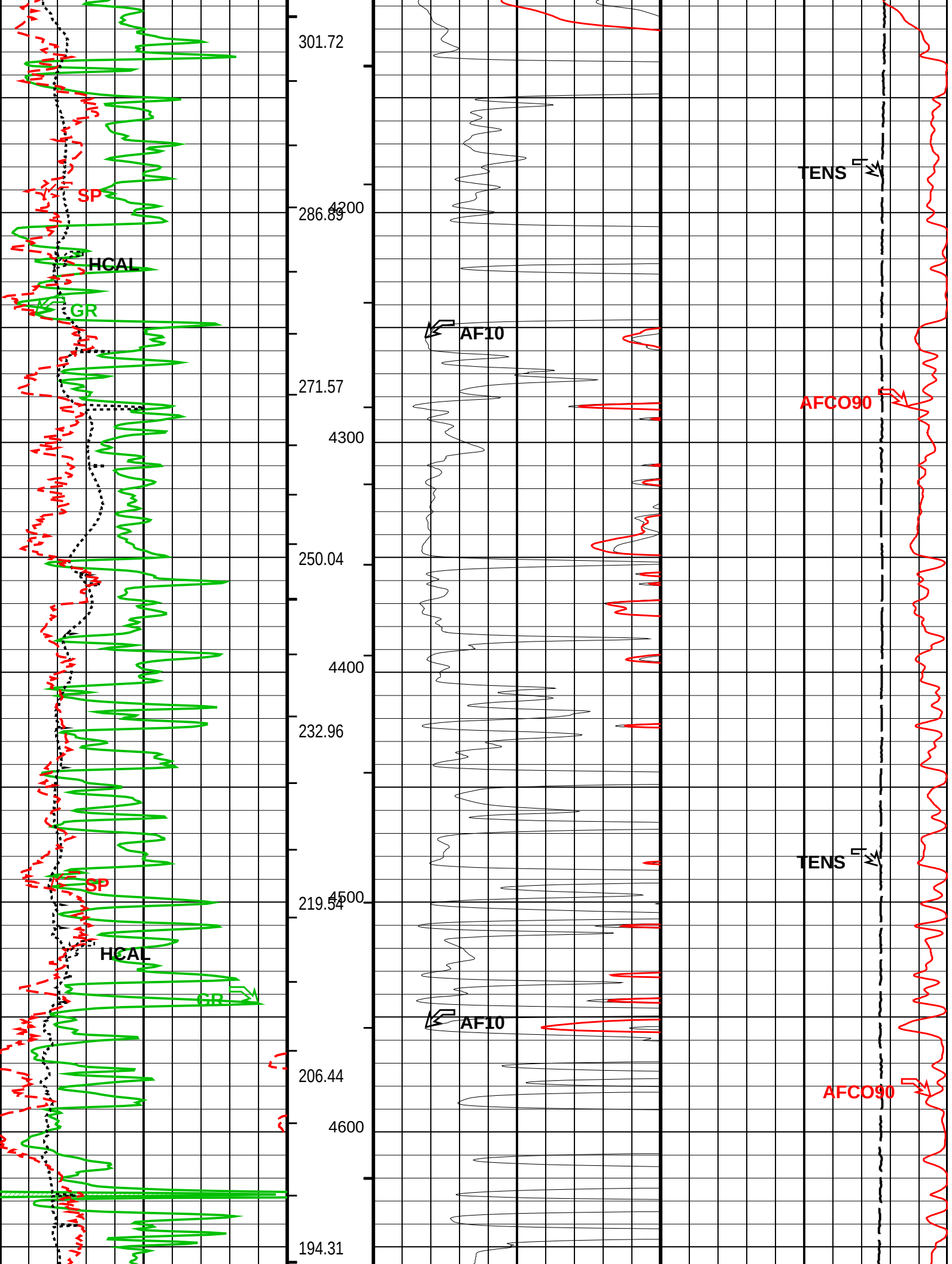
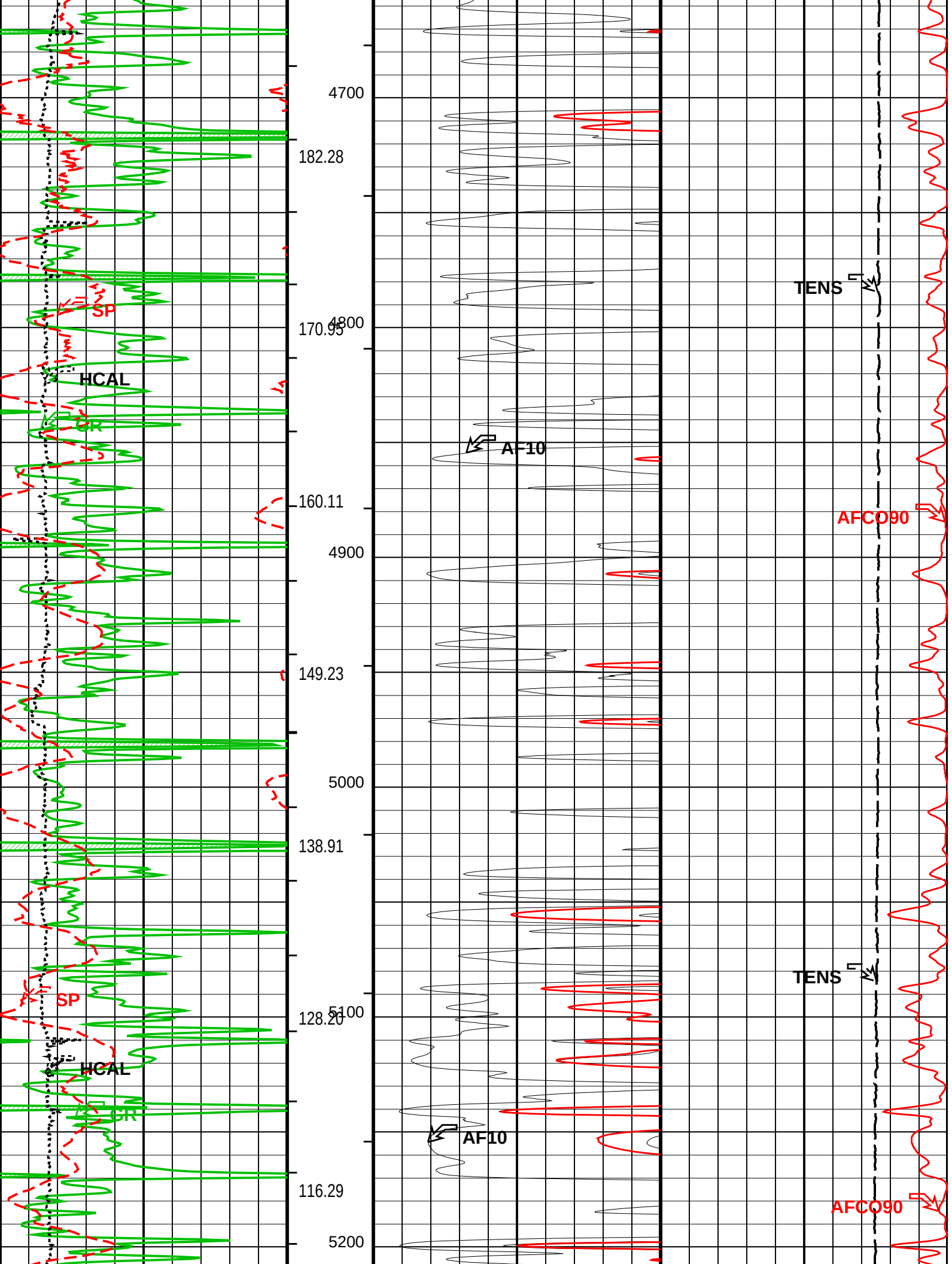
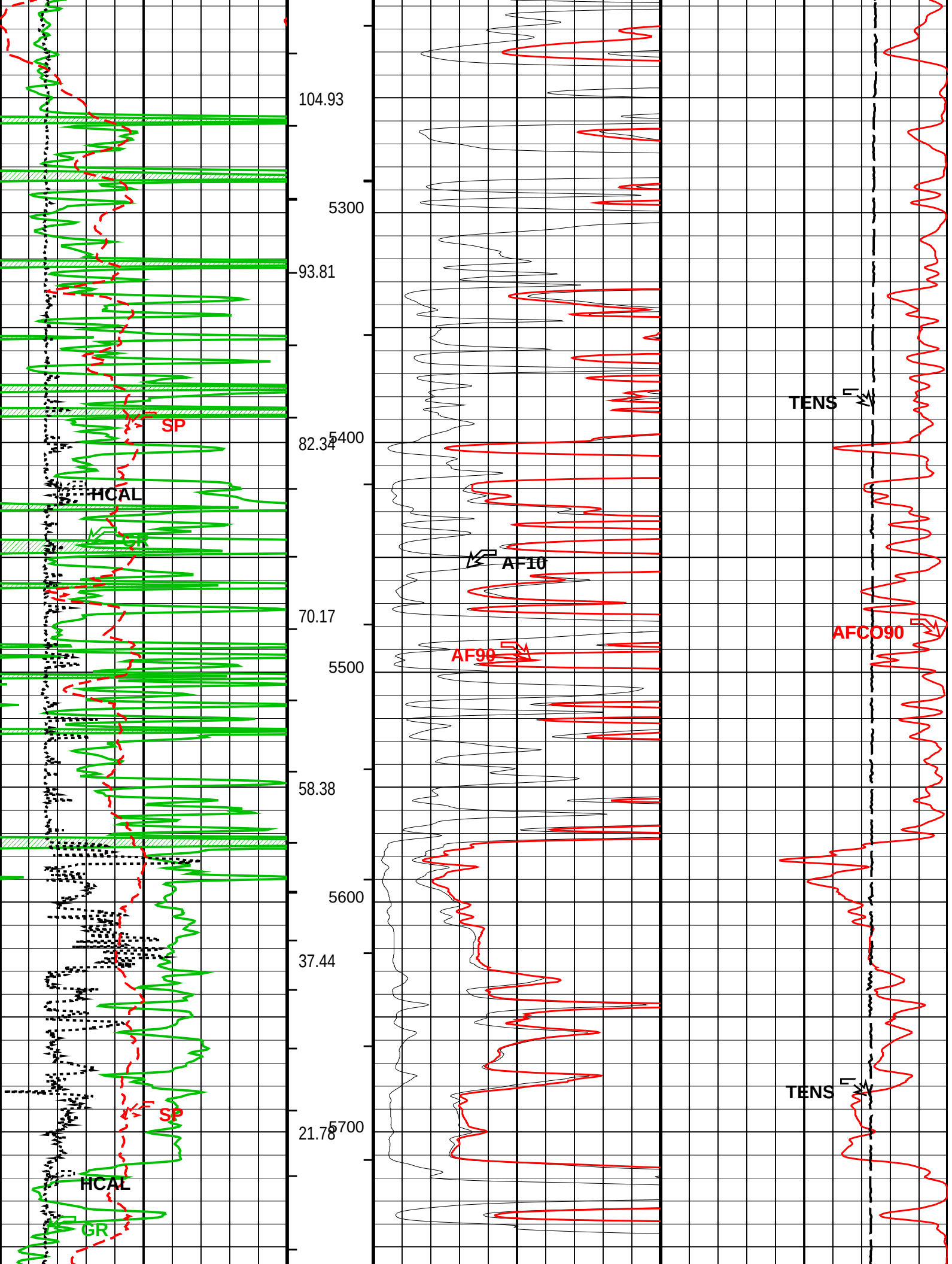
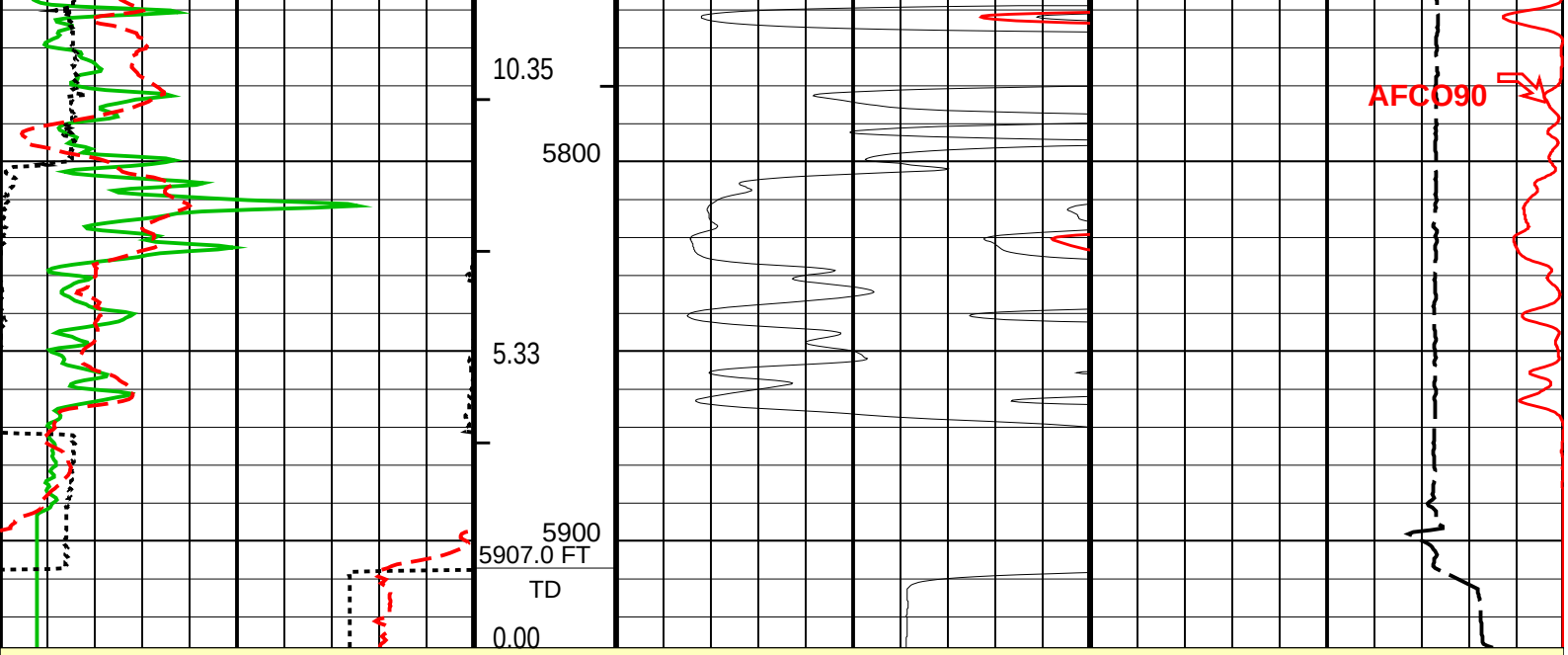
3300
460.43
443.48
3400
427.87
3500
415.20


SP
HCAL
GR
400.71
3600
AF10
386.69
AF90
3700
374.81
3800
363.63
TENS
AFCO90
SP
HCAL
GR
349.93
3900
AF10
333.86
4000
316.32
AFCO90
4100


301.72
SP
286.89
4200
HCAL
GR
AF10
TENS
271.57
AFCO90
4300
250.04
4400
232.96
SP
219.54
4500
HCAL
GR
AF10
TENS
206.44
AFCO90
4600
194.31


4700
182.28
4800
170.95
160.11
4900
149.23
5000
138.91
5100
128.20
116.29
5200
SP
HCAL
GR
AF10
TENS
AFCO90
SP
HCAL
GR
AF10
TENS
AFCO90


104.93
5300
93.81
SP
82.34
5400
HCAL
GR
AF10
70.17
AF90
5500
AFCO90
58.38
5600
37.44
SP
21.78
5700
HCAL
GR
TENS
TENS




**MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

| | | | |
|---|---|---|---|
| Gamma Ray Backup | Cement Volume (ICV) (F3) | AIT 10 Inch Investigation (AF10) 0 (OHMM) 10 | AIT 90 Inch Investigation Conductivity (AFCO90) 1000 (MM/M) 0 |
| Gamma Ray (GR) 0 (GAPI) 200 | | AIT 90 Inch Investigation (AF90) 0 (OHMM) 10 | Tension (TENS) 10000 (LBF) 0 |
| Caliper (HCAL) 6 (IN) 16 | | AIT 10 Inch Investigation (AF10) 0 (OHMM) 50 | |
| SP (SP) −160 (MV) 40 | | | |

**PIP SUMMARY**

- Integrated Cement Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Hole Volume Minor Pip Every 10 F3

## Parameters

| DLIS Name | Description | Value | |
|---|---|---|---|
| | AIT−M: Array Induction Tool − M | | |
| ABHM | Array Induction Borehole Correction Mode | 2_ComputeStandoff | |
| ABHV | Array Induction Borehole Correction Code Version Number | 900 | |
| ABLM | Array Induction Basic Logs Mode | 6_One_Two_and_Four | |
| ABLV | Array Induction Basic Logs Code Version Number | 223 | |
| ACDE | Array Induction Casing Detection Enable | No | |
| ACEN | Array Induction Tool Centering Flag (in Borehole) | Eccentered | |
| ACSED | Array Induction Casing Shoe Estimated Depth | −50000 | FT |
| AETP | Array Induction Enable Sonde Error Temp&Pres Corr | Yes | |
| AFRSV | Array Induction Response Set Version for Four ft Resolution | 41.70.24.20 | |
| AIGS | Array Induction Select Akima Interpolation Gating | On | |
| AMRF | Array Induction Mud Resistivity Factor | 1 | |
| AORSV | Array Induction Response Set Version for One ft Resolution | 41.70.24.20 | |
| ARFV | Array Induction Radial Profiling Code Version Number | 701 | |
| ARPV | Array Induction Radial Parametrization Code Version Number | 232 | |
| ASTA | Array Induction Tool Standoff | 1 | IN |
| ATRSV | Array Induction Response Set Version for Two ft Resolution | 41.70.24.20 | |
| ATSE | Array Induction Temperature Selection(Sonde Error Correction) | Internal | |
| AULV | Array Induction User Level Control | Normal | |
| AZRSV | Array Induction Response Set Version for Z Resolution | 00.10.25.00 | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |

| | | | |
|---|---|---|---|
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| SPNV | SP Next Value | 0 | MV |
| | HILTH−FTB: High resolution Integrated Logging Tool−DTS | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| | FEQL: Formation Evaluation Quick Look | | |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| | HOLEV: Integrated Hole/Cement Volume | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FCD | Future Casing (Outer) Diameter | 5.5 | IN |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| HVCS | Integrated Hole Volume Caliper Selection | AUTOMATIC | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| | PERT: Preliminary Evaluation − Real Time | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| | System and Miscellaneous | | |
| BS | Bit Size | 7.875 | IN |
| DFD | Drilling Fluid Density | 8.90 | LB/G |
| DORL | Depth Offset for Repeat Analysis | 0.0 | FT |
| FLEV | Fluid Level | 300.00 | FT |
| MST | Mud Sample Temperature | 125.00 | DEGF |
| TD | Total Depth | 5907 | FT |

**Format: ERES_S2** **Vertical Scale: 2" per 100'** **Graphics File Created: 20−Mar−2012 06:47**

## OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

## Output DLIS Files

| | | | | |
|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 |

Schlumberger

# MAIN RESISTIVITY 5" = 100'

MAXIS Field Log

## Output DLIS Files

| | | | | | | |
|---|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 | 5928.0 FT | 338.5 FT |

## Integrated Hole/Cement Volume Summary

**Hole Volume = 2350.66 F3**

**Cement Volume = 1447.82 F3 (assuming 5.50 IN casing O.D.)**

Computed from 5907.0 FT to 435.0 FT using data channel(s) HCAL

# OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

**PIP SUMMARY**

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3
- Time Mark Every 60 S

Tension (TENS)
10000 (LBF) 0

AIT 90 Inch Investigation (AT90)
0.2 (OHMM) 2000

SP (SP)
−160 (MV) 40

AIT 60 Inch Investigation (AT60)
0.2 (OHMM) 2000

Caliper (HCAL)
6 (IN) 16

Stuck Stretch (STIT)
0 (F) 50

AIT 30 Inch Investigation (AT30)
0.2 (OHMM) 2000

Gamma Ray (GR)
0 (GAPI) 200

Tool/Tot. Drag

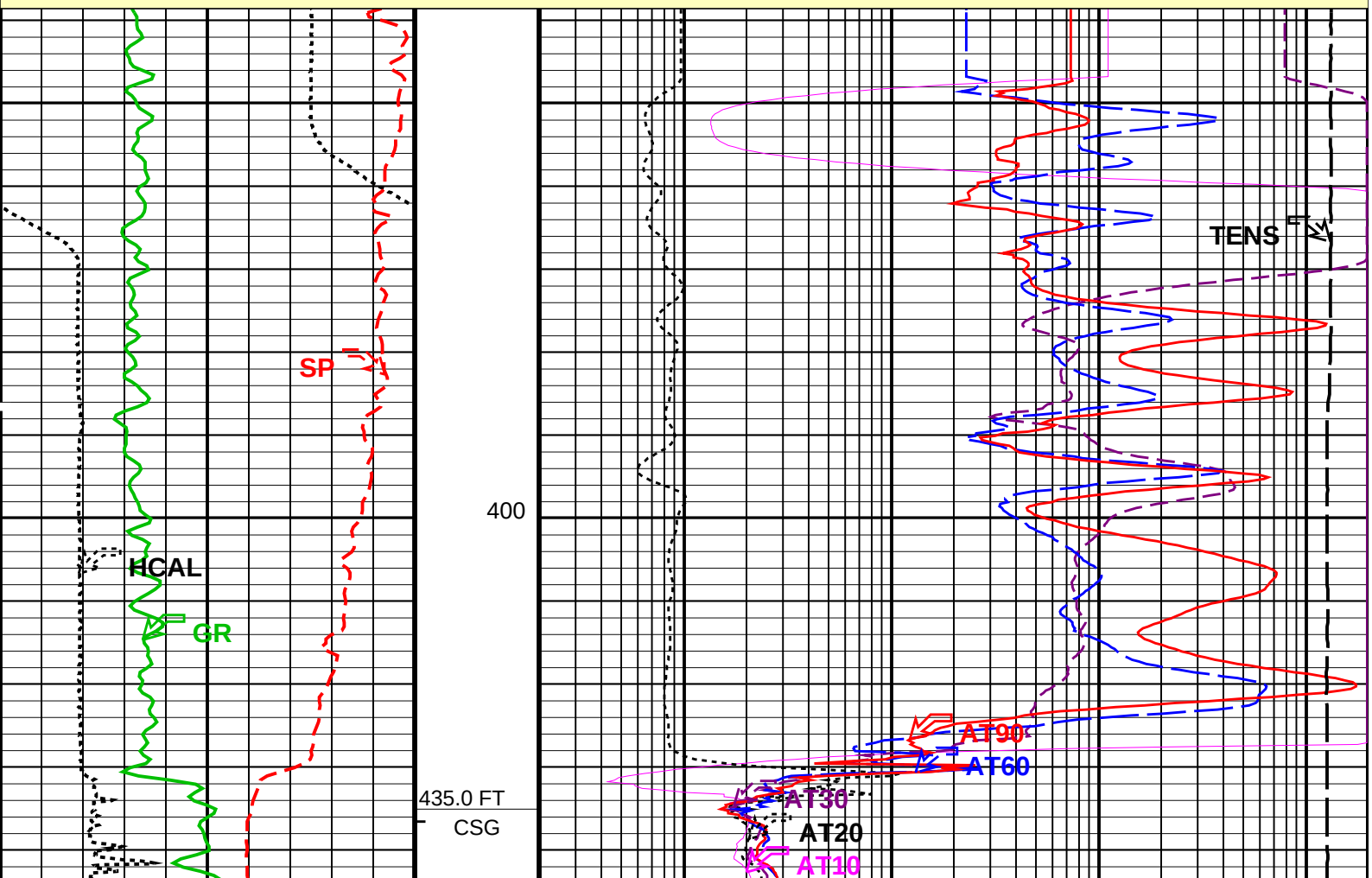
AIT 20 Inch Investigation (AT20)
0.2 (OHMM) 2000

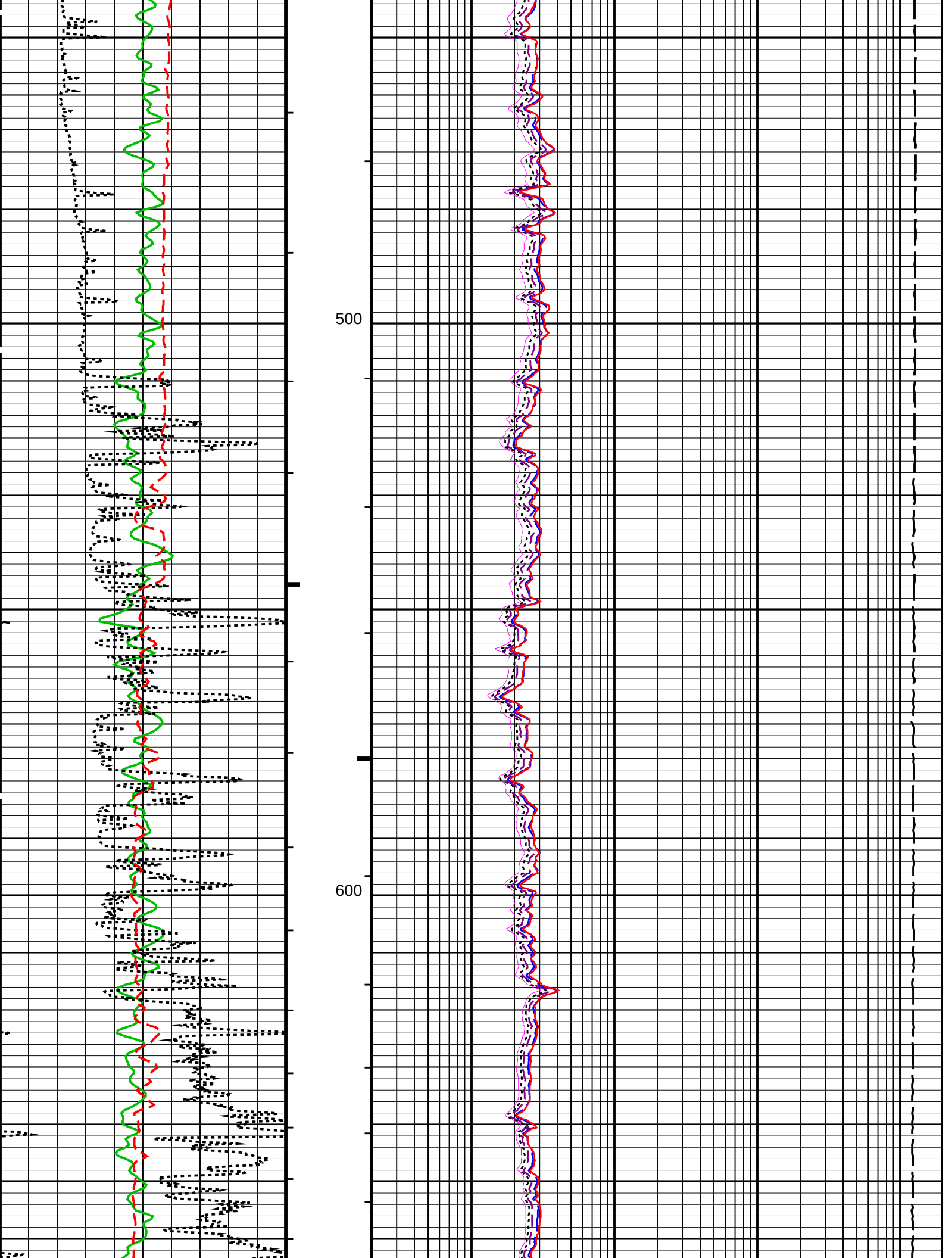
Gamma Ray Backup

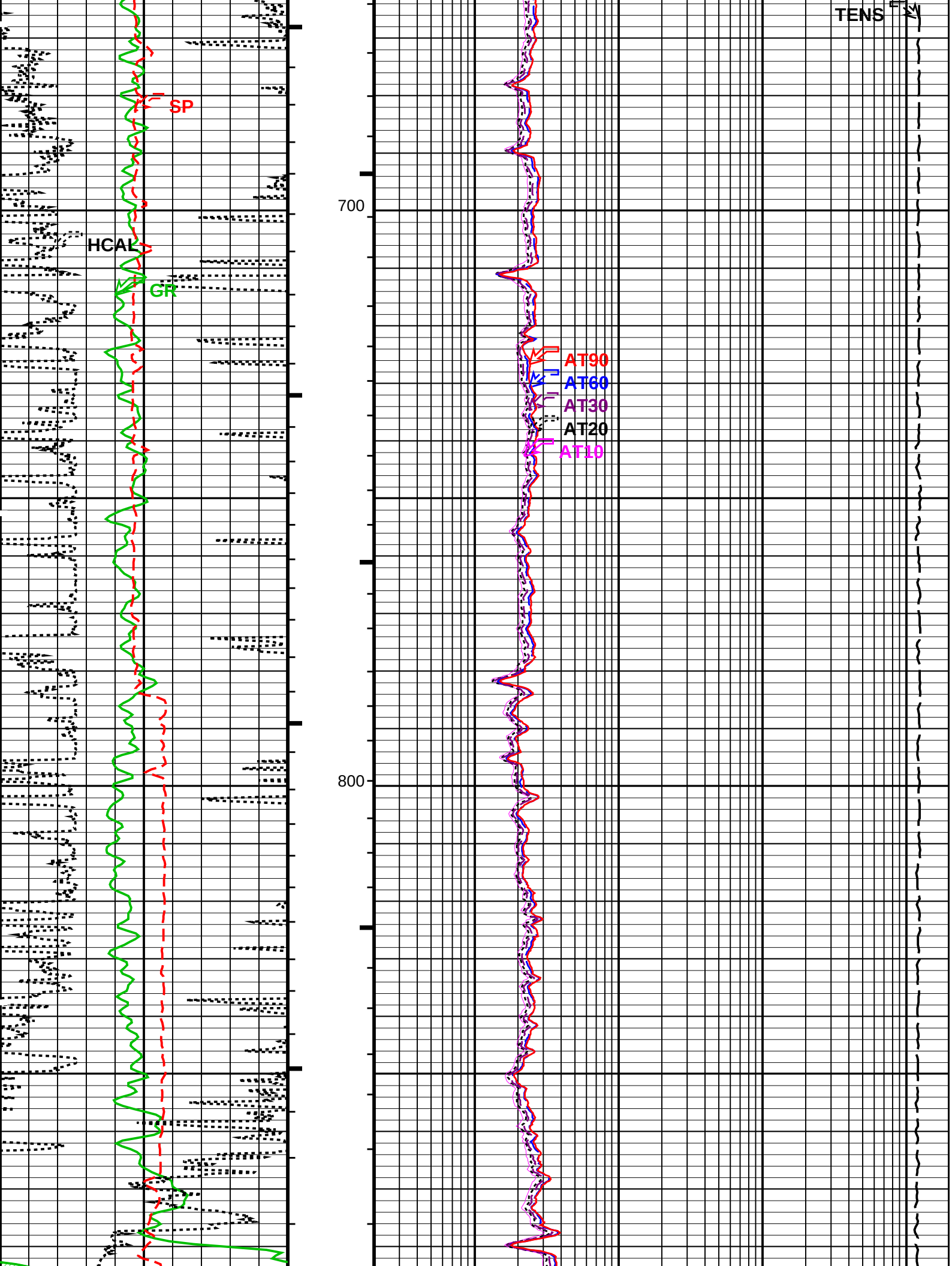
Cable Drag

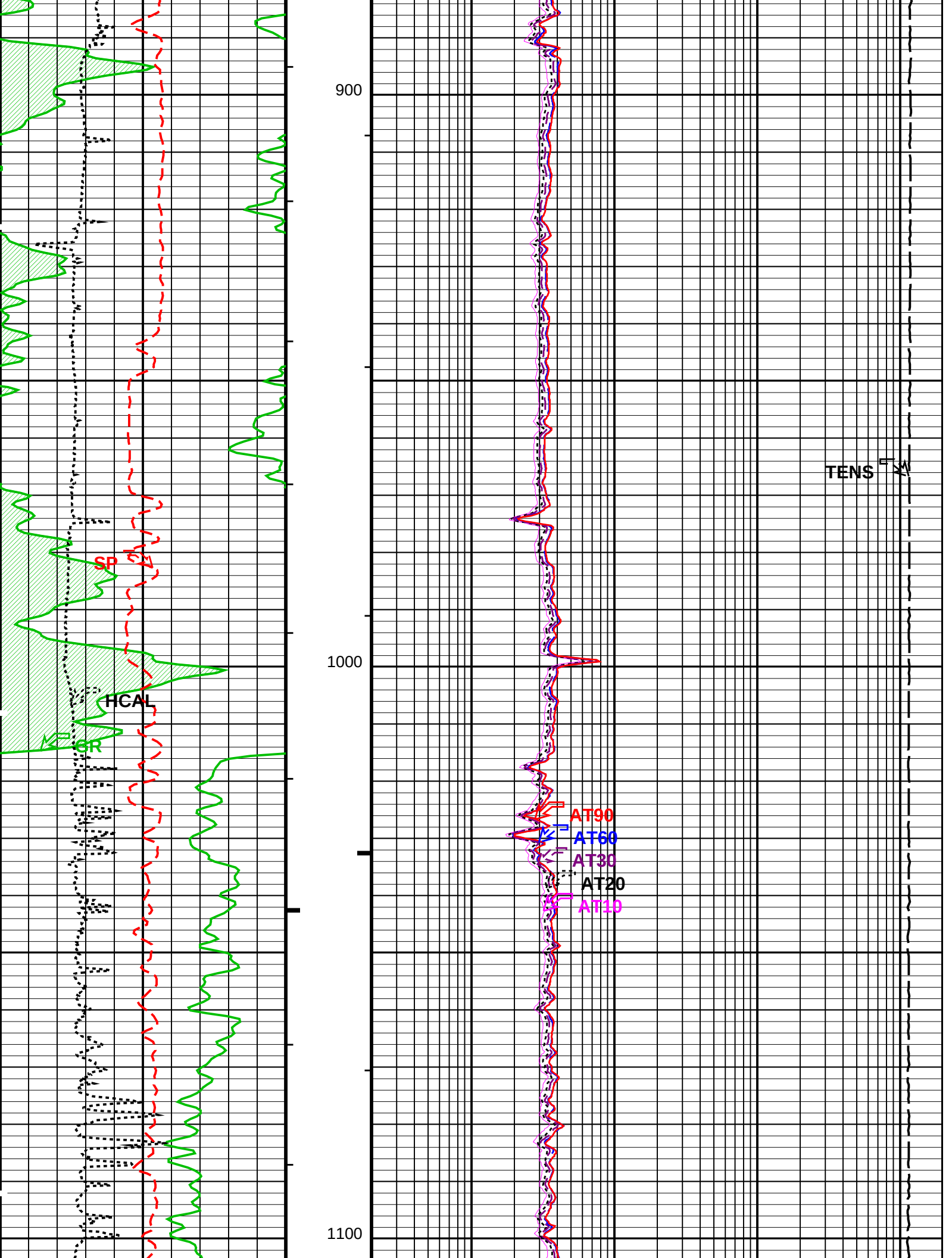
AIT 10 Inch Investigation (AT10)
0.2 (OHMM) 2000

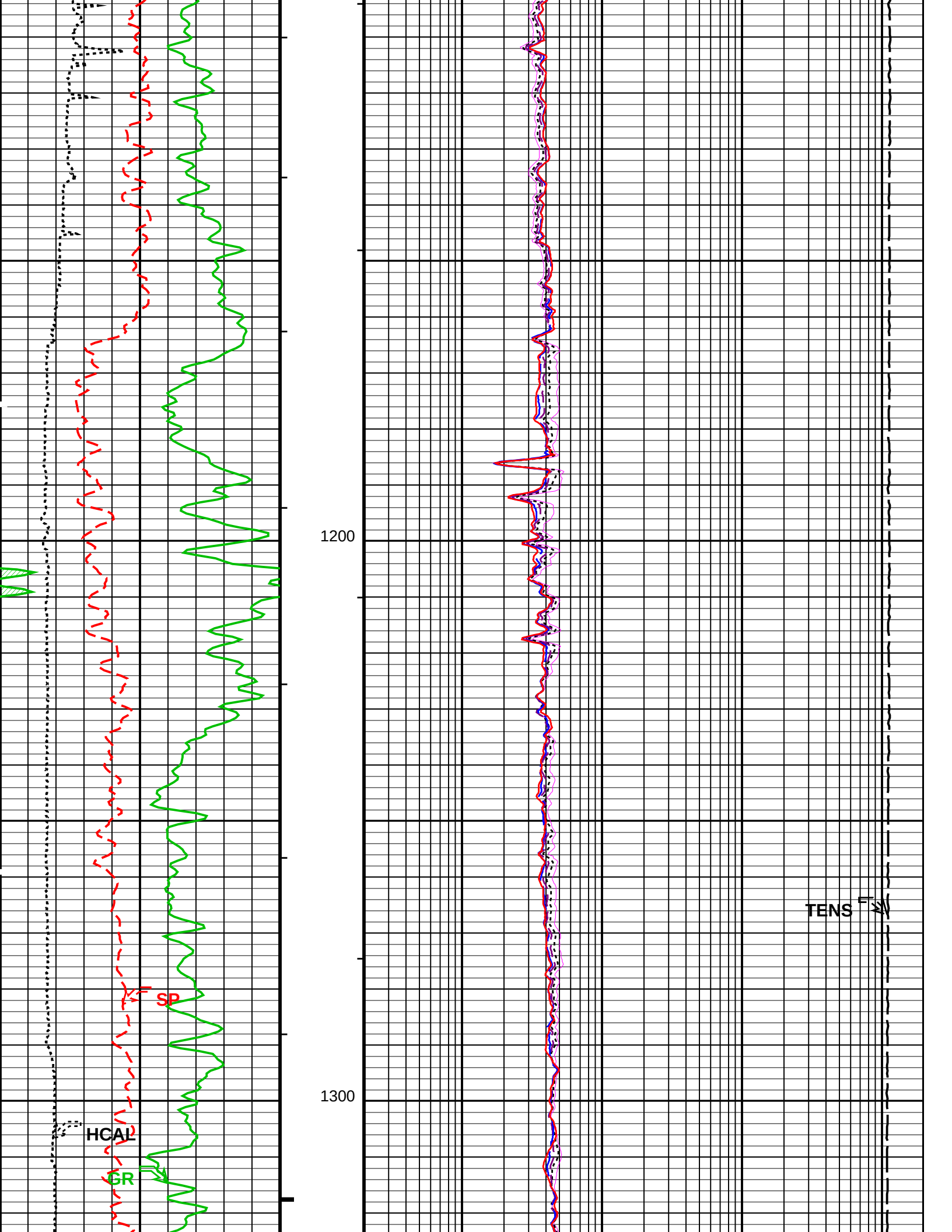
**MAIN PASS: *** PLATFORM EXPRESS − ARRAY INDUCTION ***

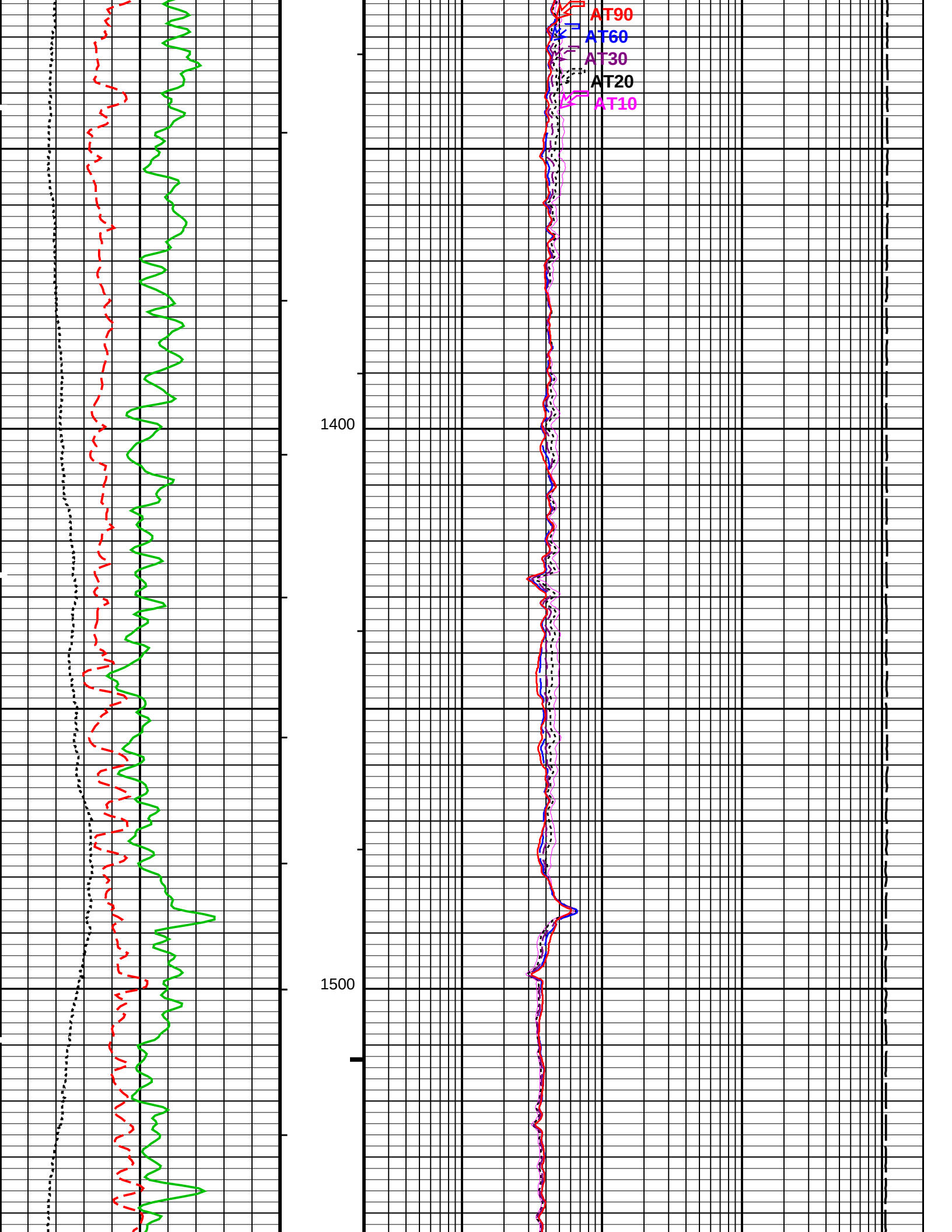


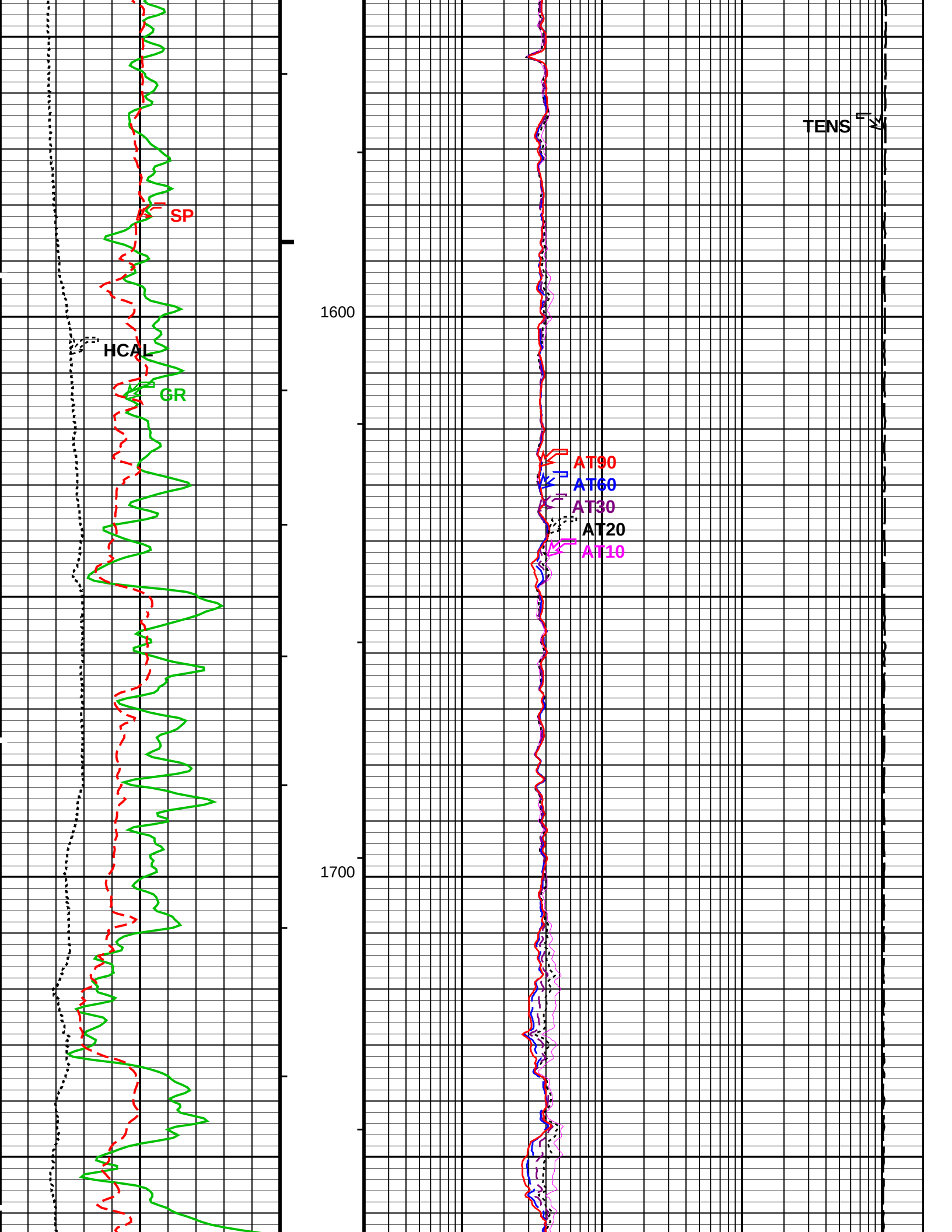

500
600

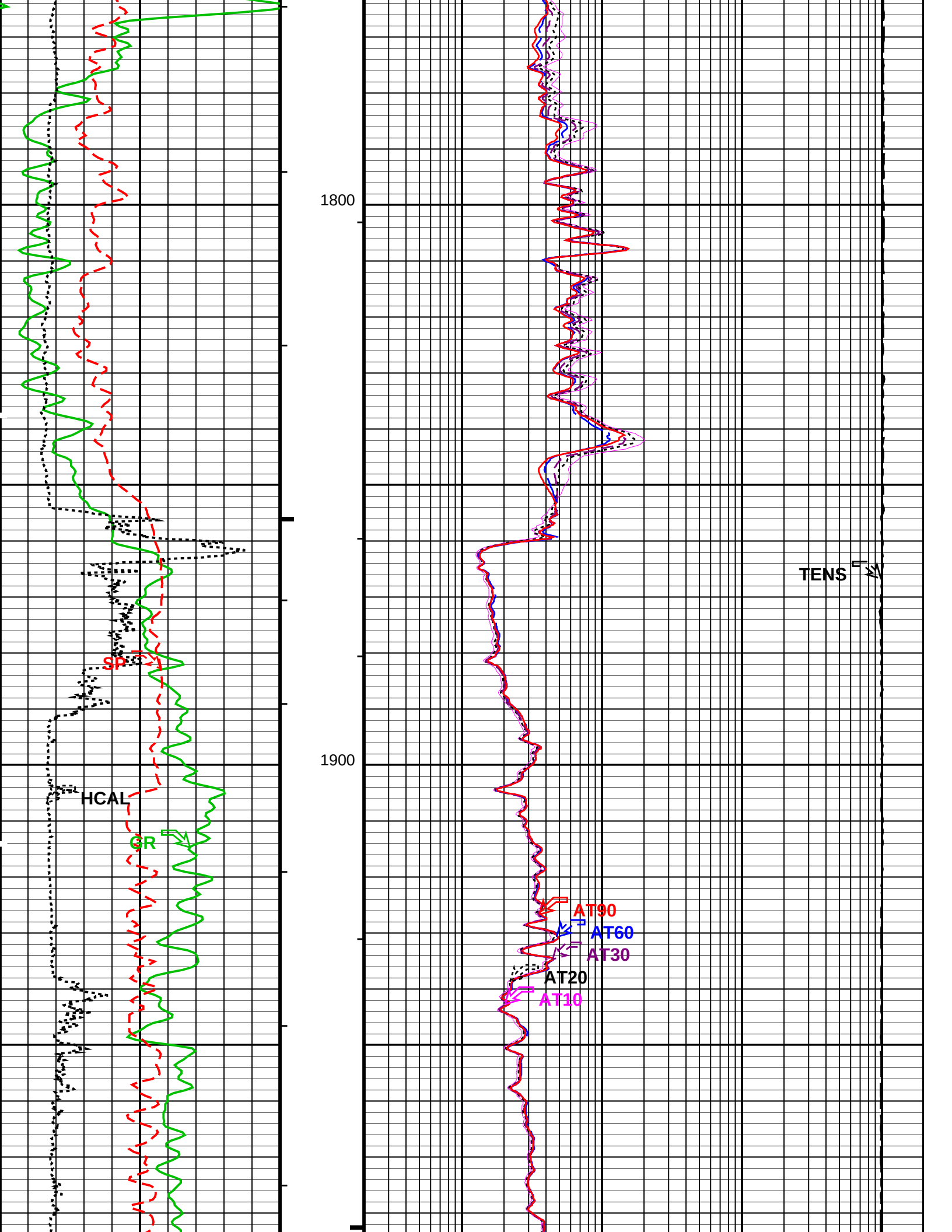

TENS
SP
HCAL
GR
700
AT90
AT60
AT30
AT20
AT10
800

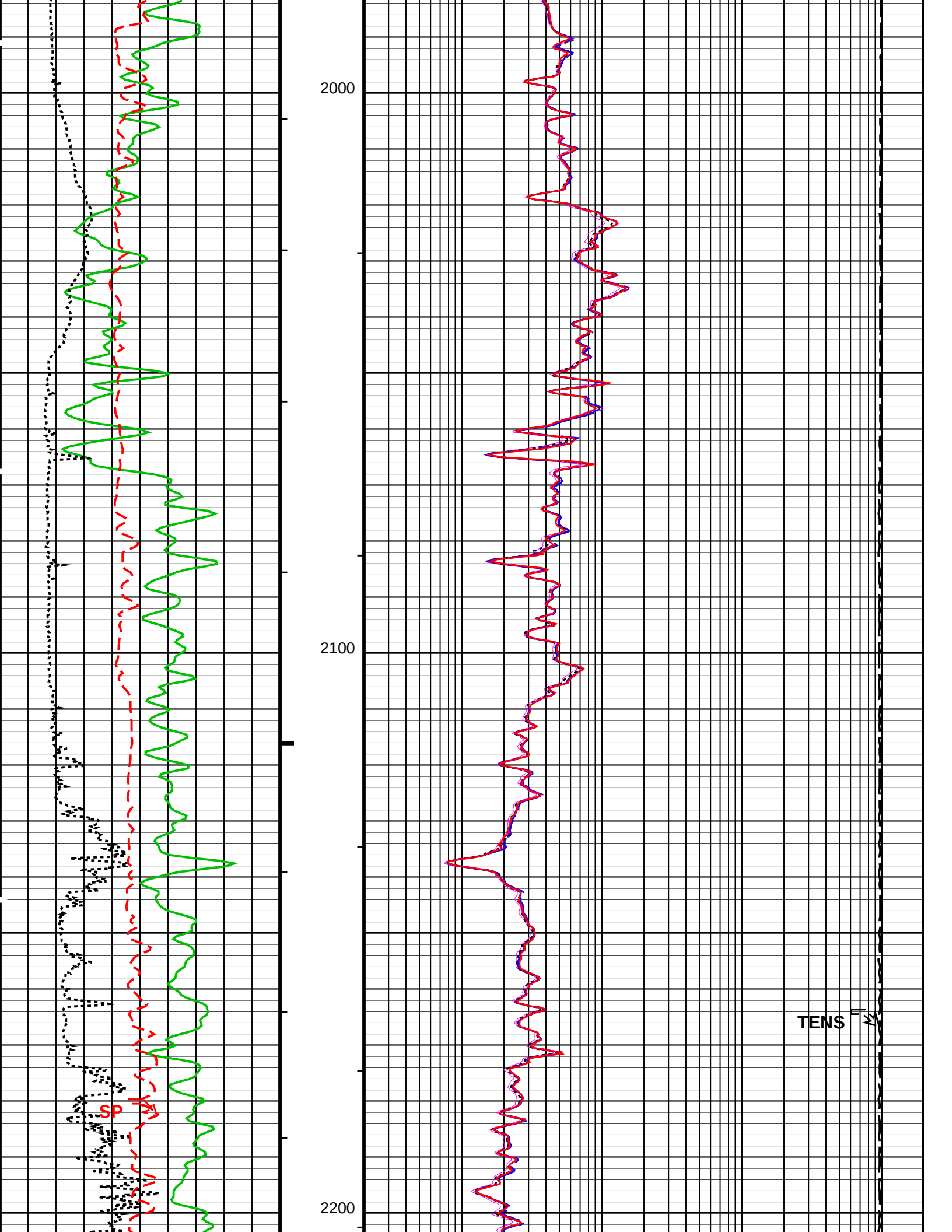

900
1000
1100
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

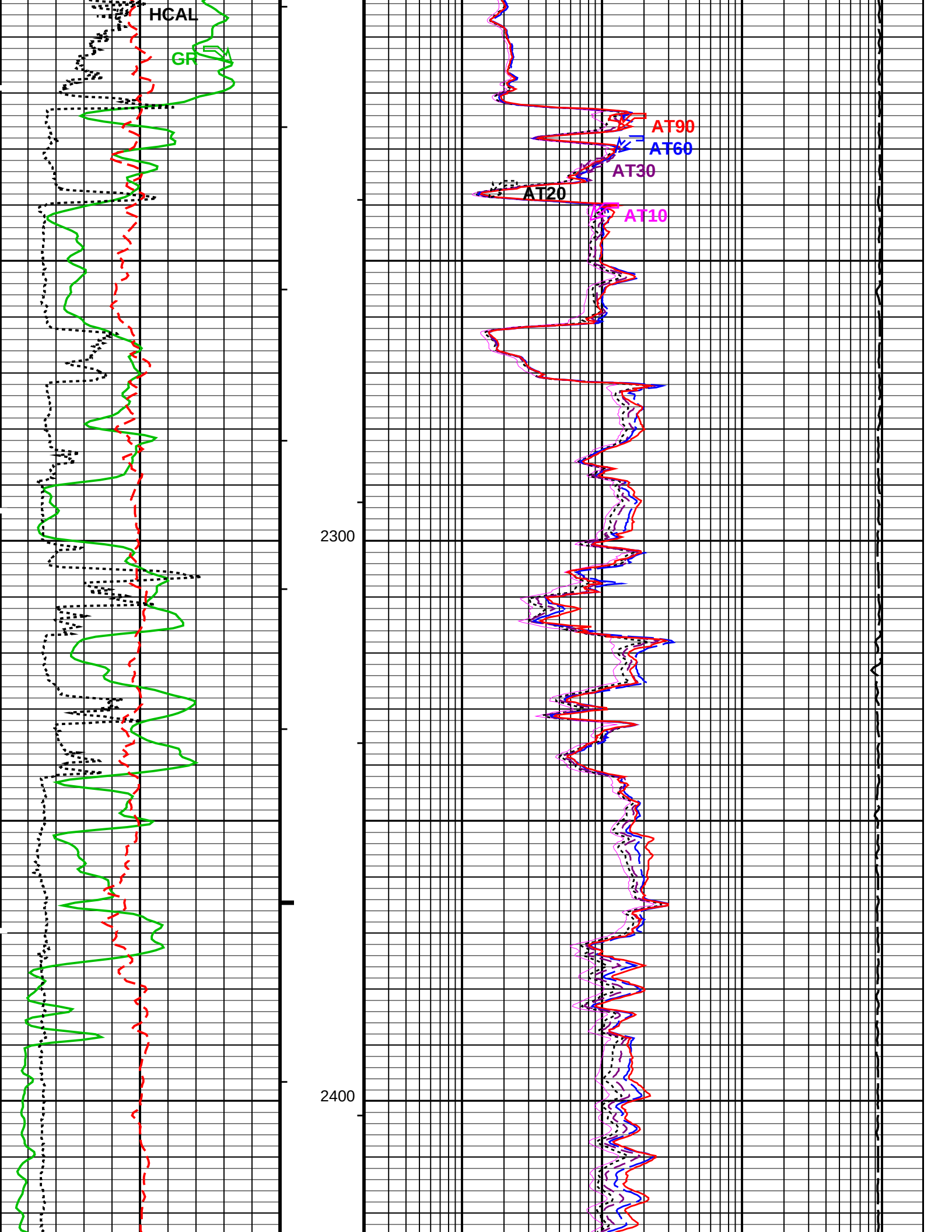

1200
1300
SP
HCAL
GR
TENS

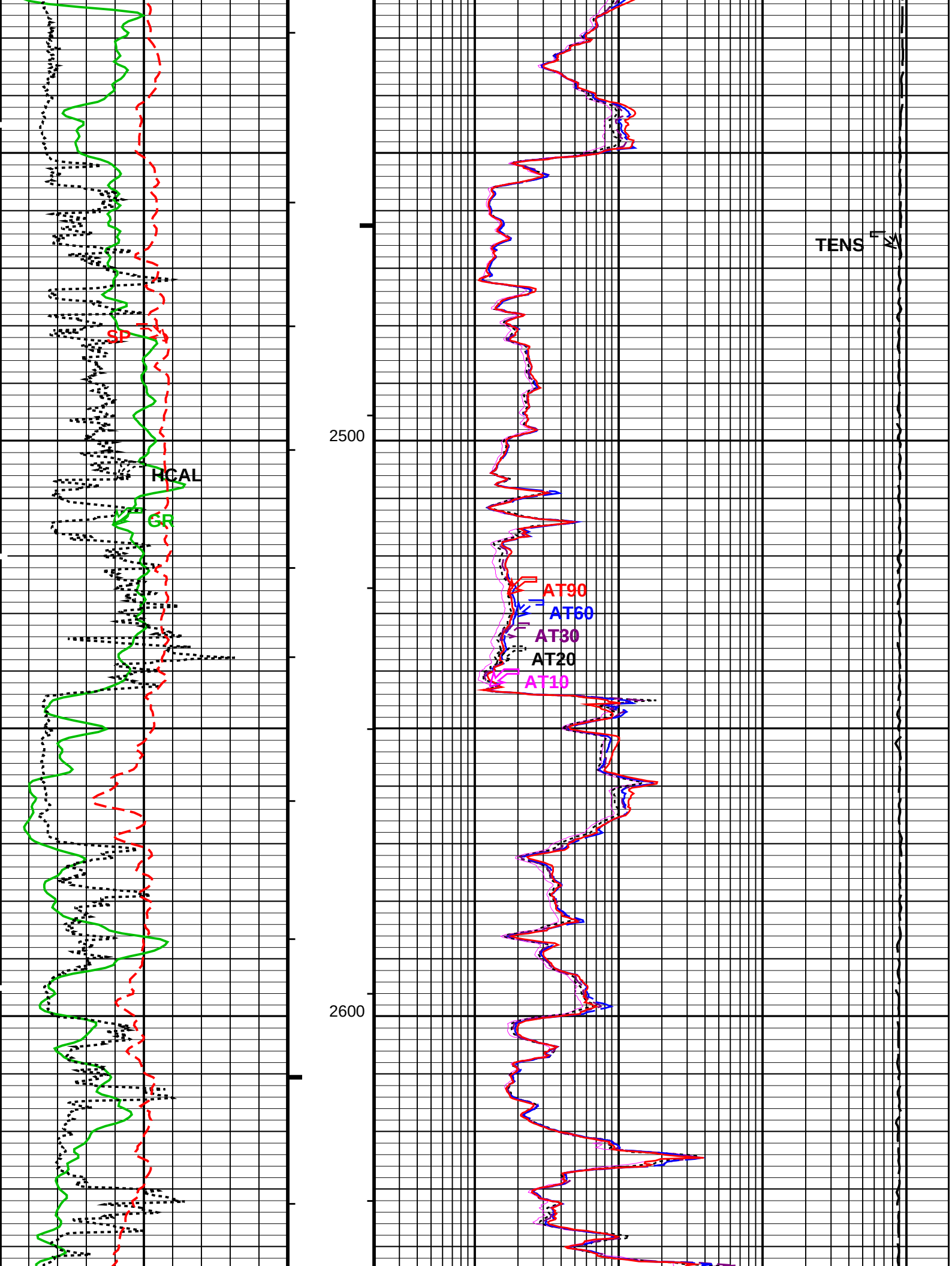

AT90
AT60
AT30
AT20
AT10
1400
1500

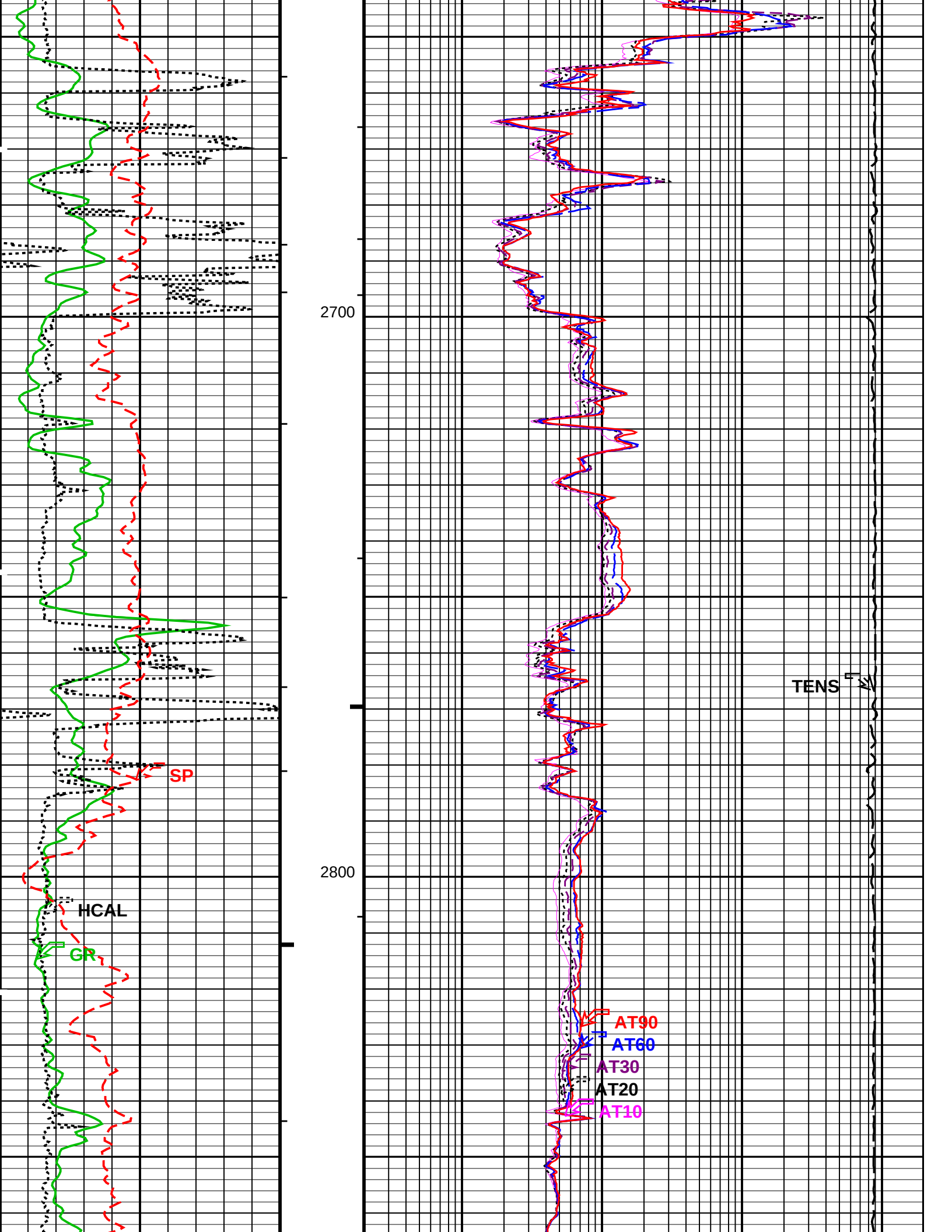

SP
HCAL
GR
1600
1700
TENS
AT90
AT60
AT30
AT20
AT10

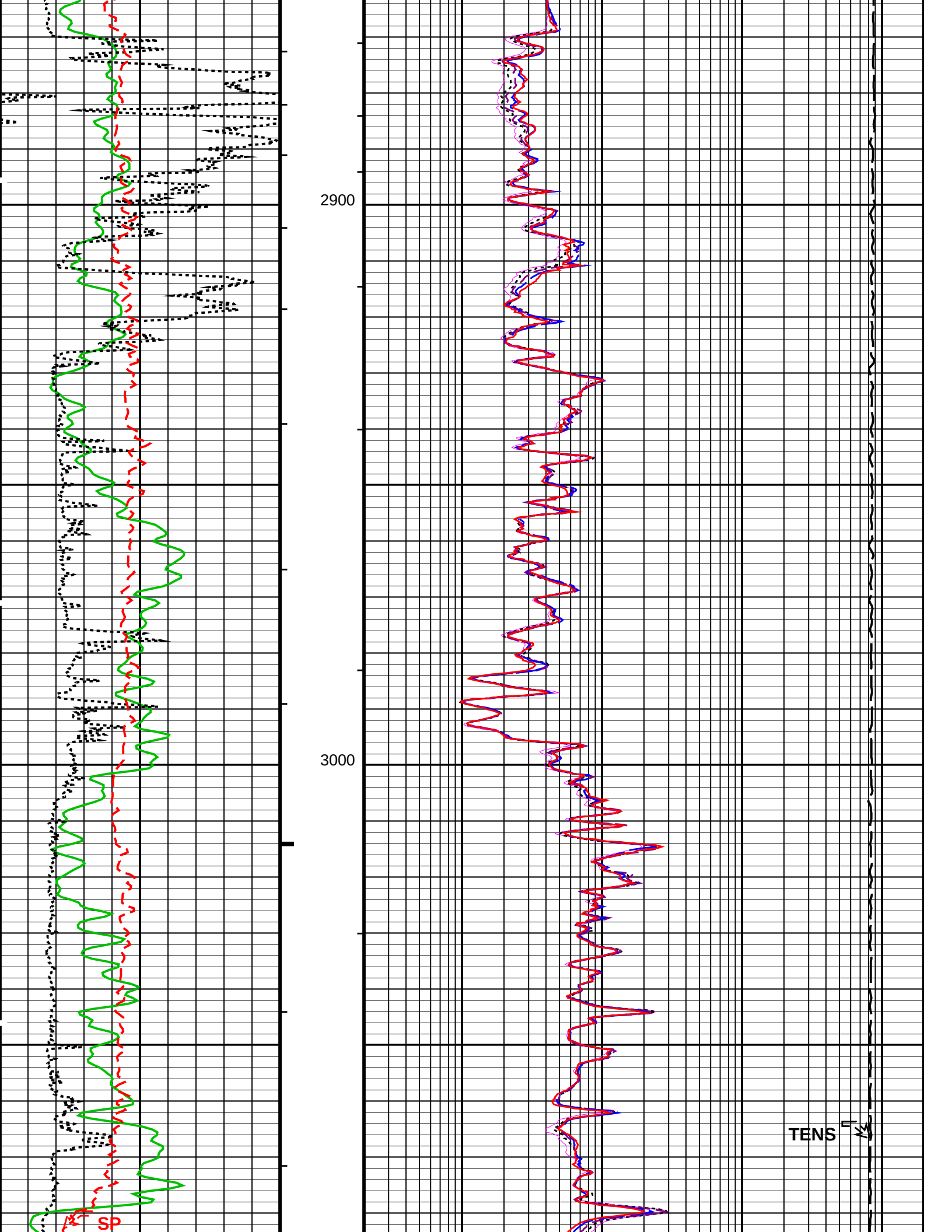

1800
1900
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

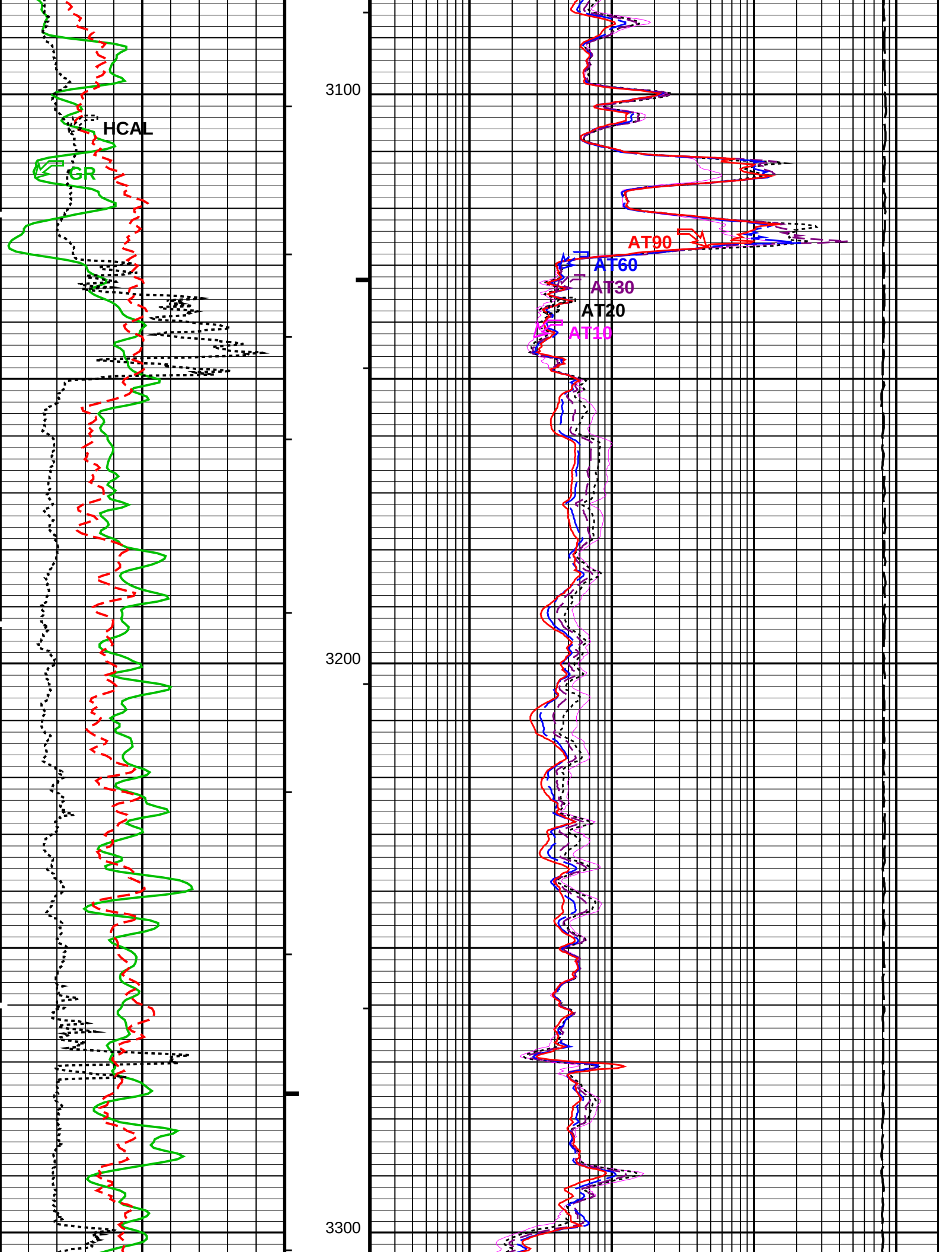

2000
2100
2200
SP
TENS

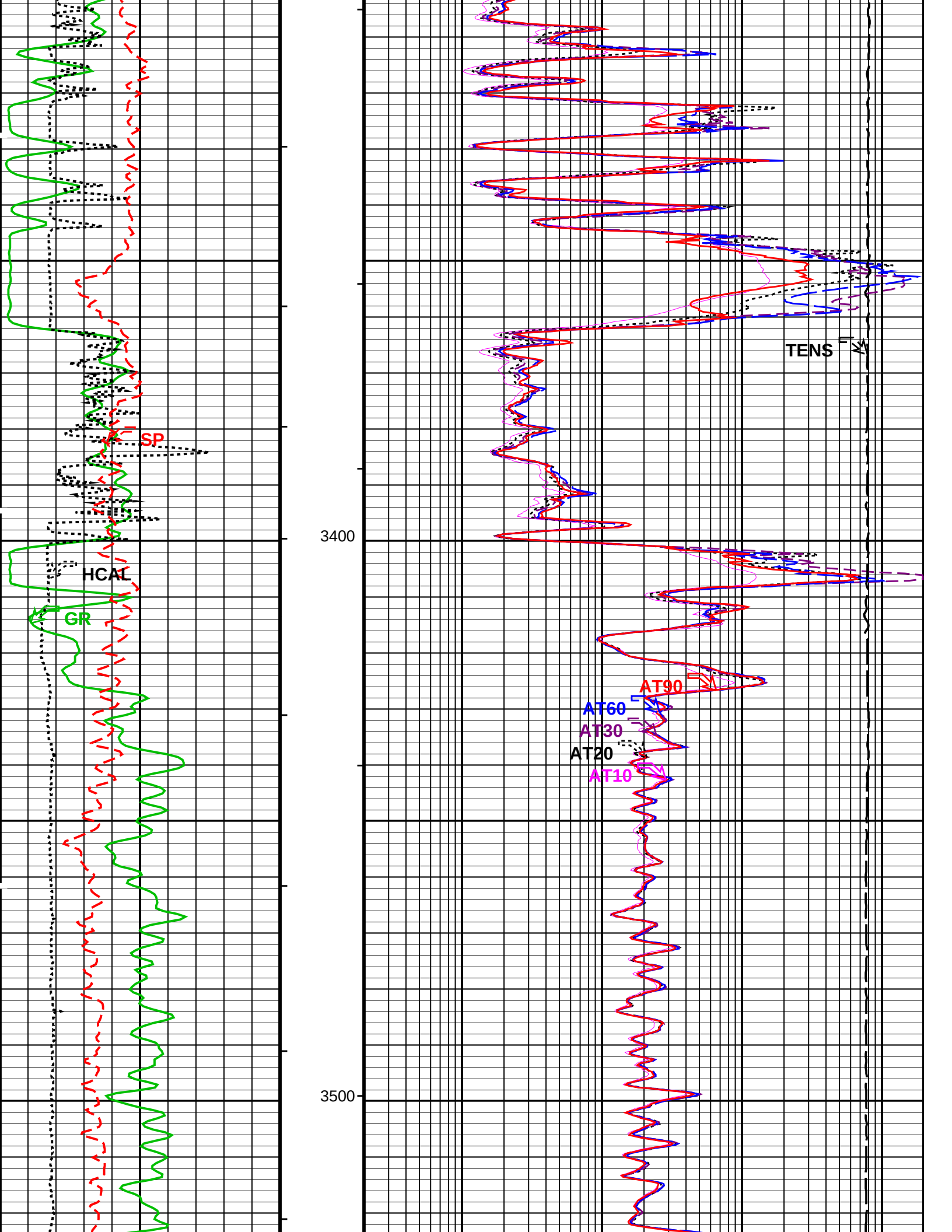

HCAL
GR
AT90
AT60
AT30
AT20
AT10
2300
2400

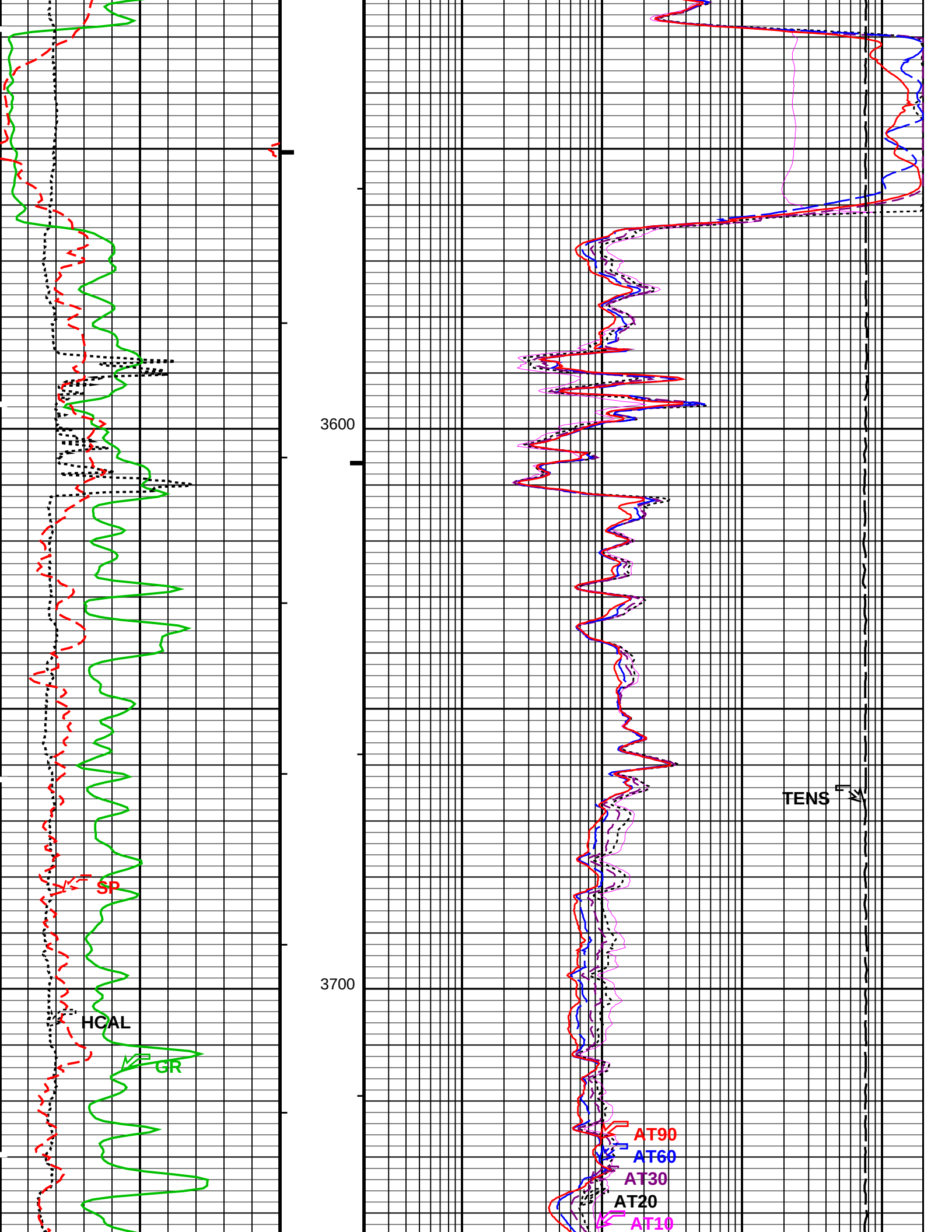

SP
RCAL
GR
2500
AT90
AT60
AT30
AT20
AT10
TENS
2600

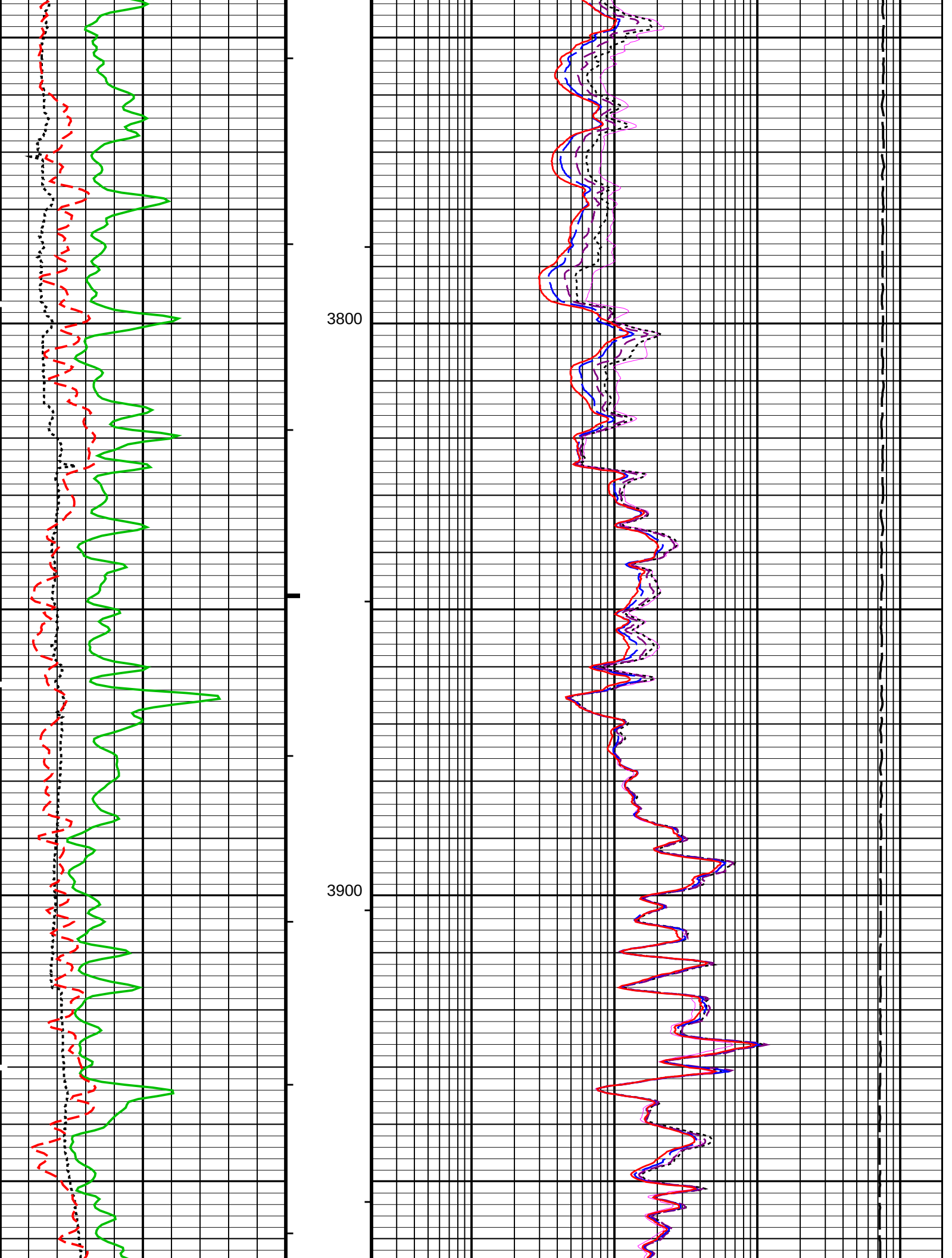

2700
2800
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

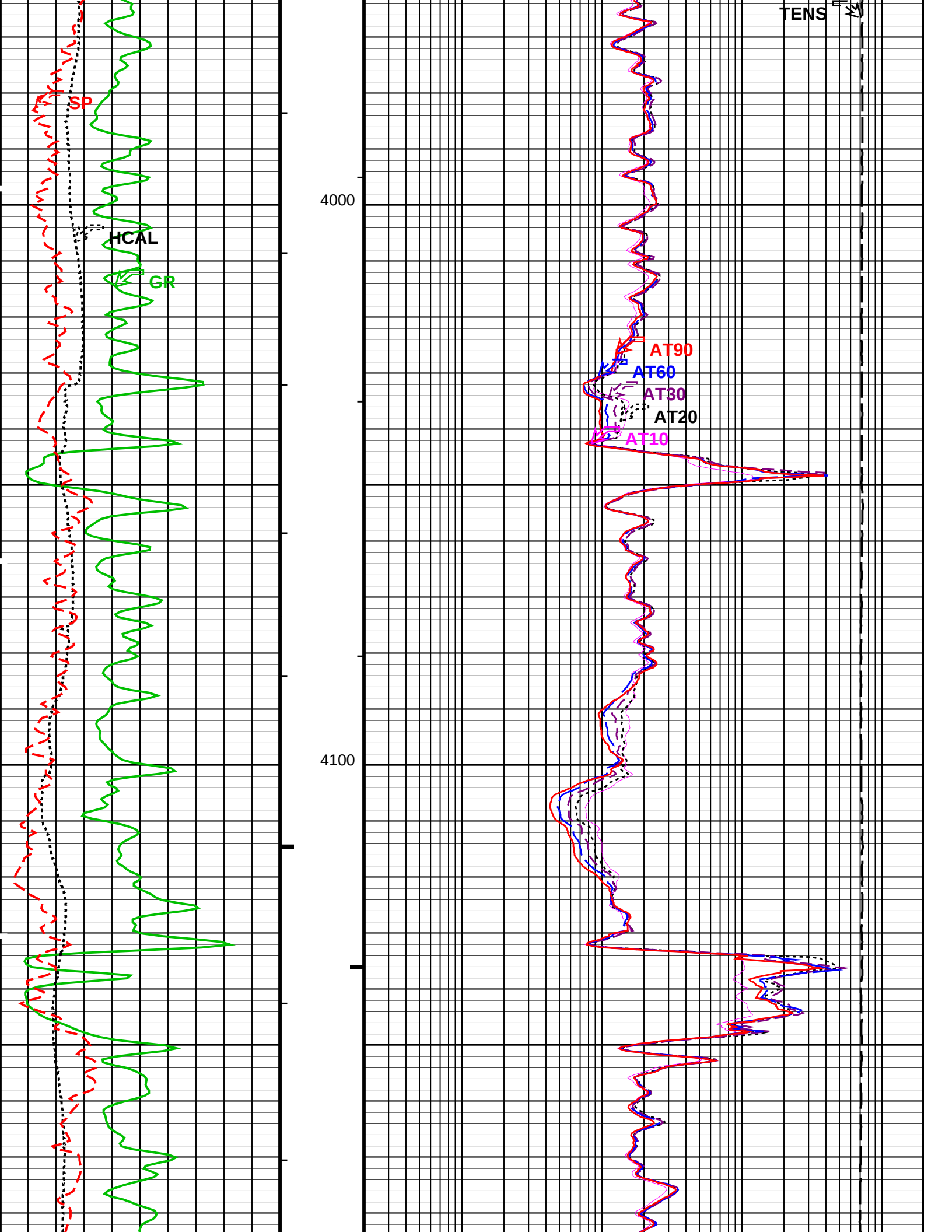

2900
3000
SP
TENS

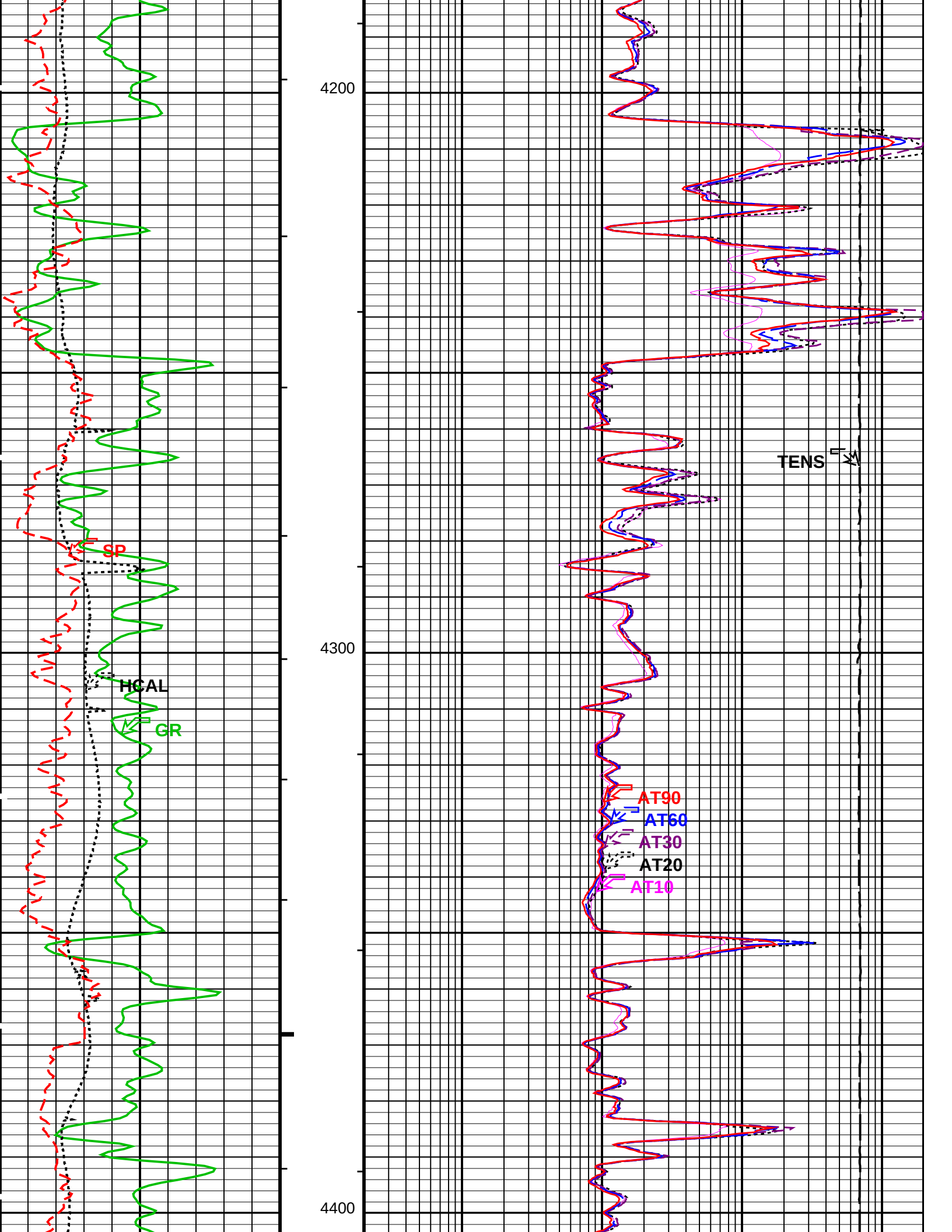

HCAL
GR
3100
AT90
AT60
AT30
AT20
AT10
3200
3300

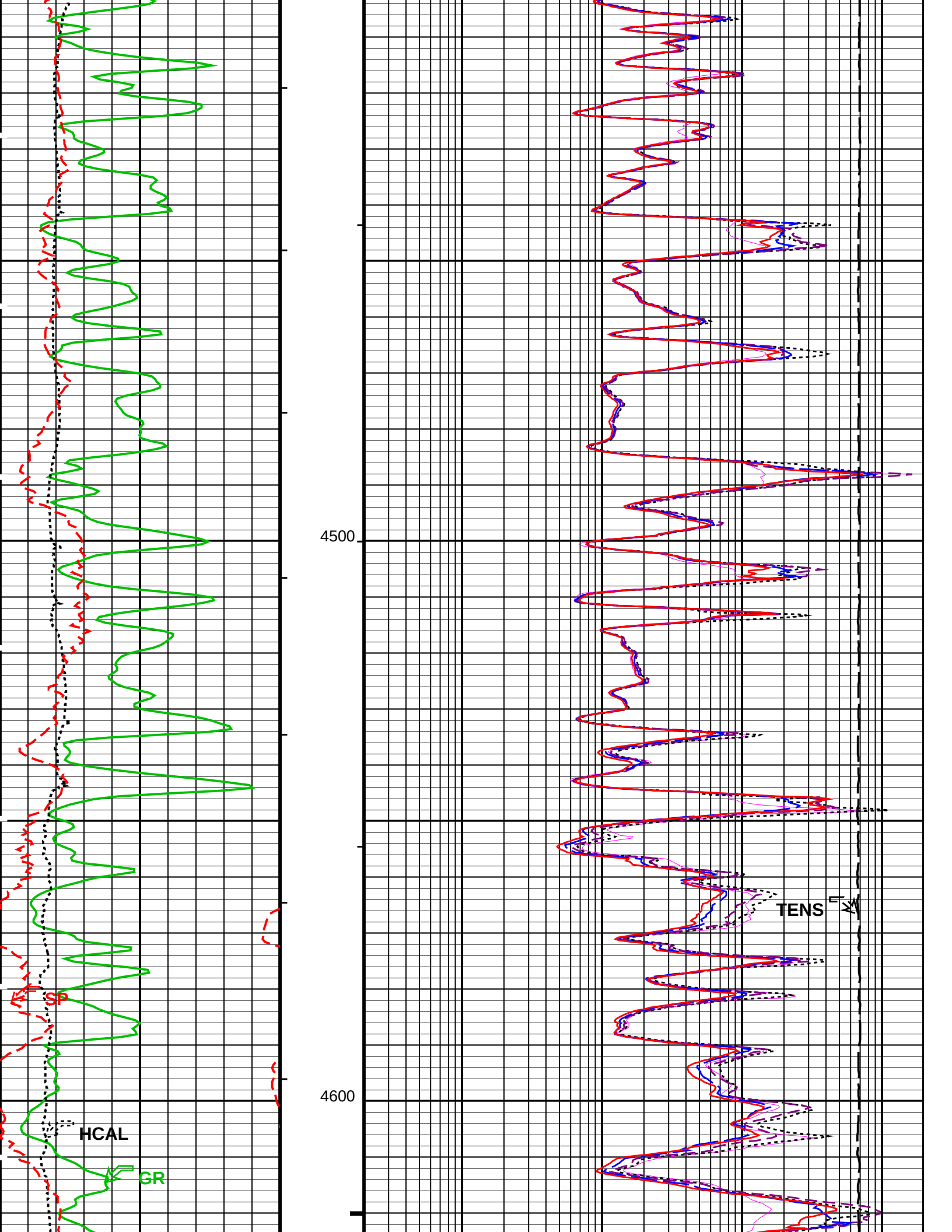

SP
HCAL
GR
3400
3500
TENS
AT90
AT60
AT30
AT20
AT10

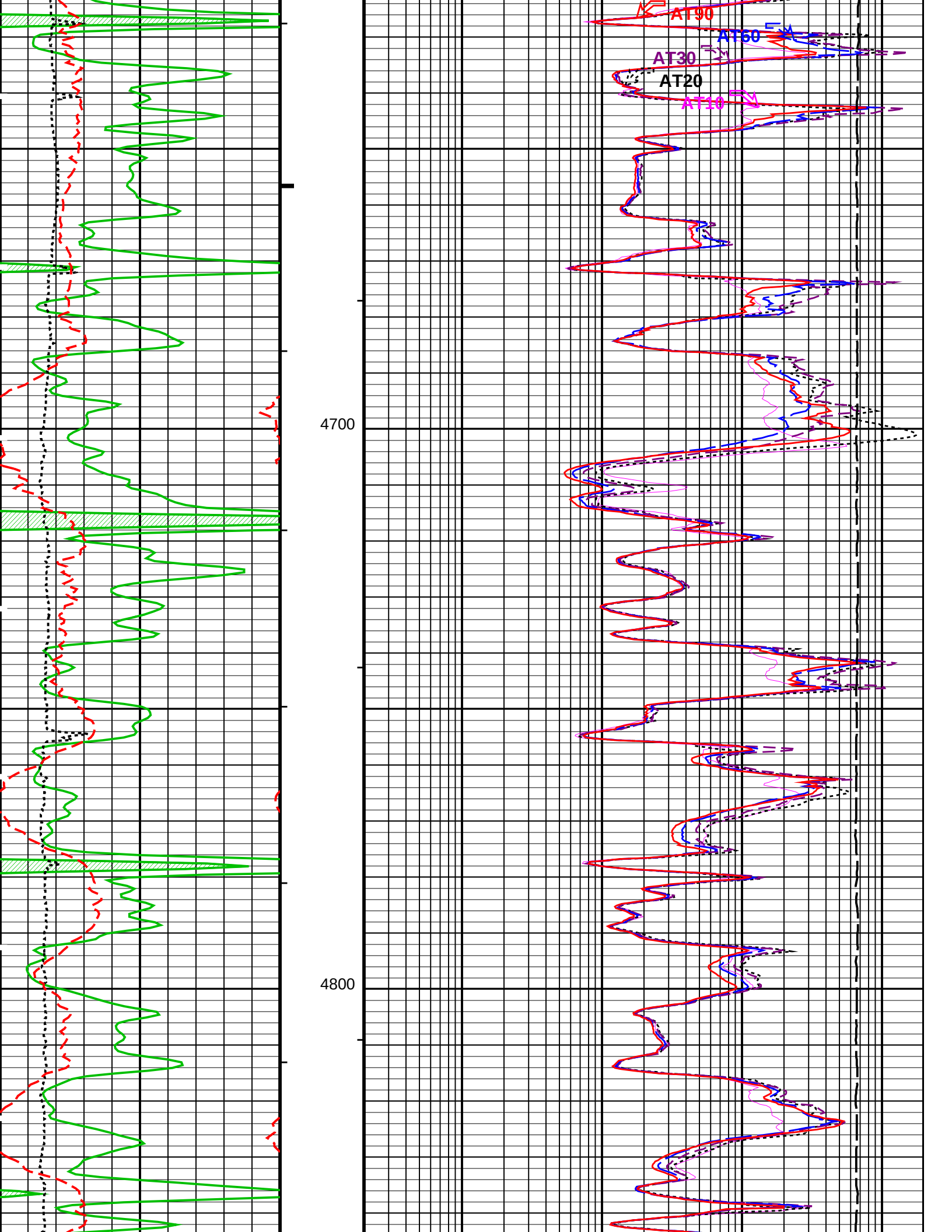

3600
3700
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

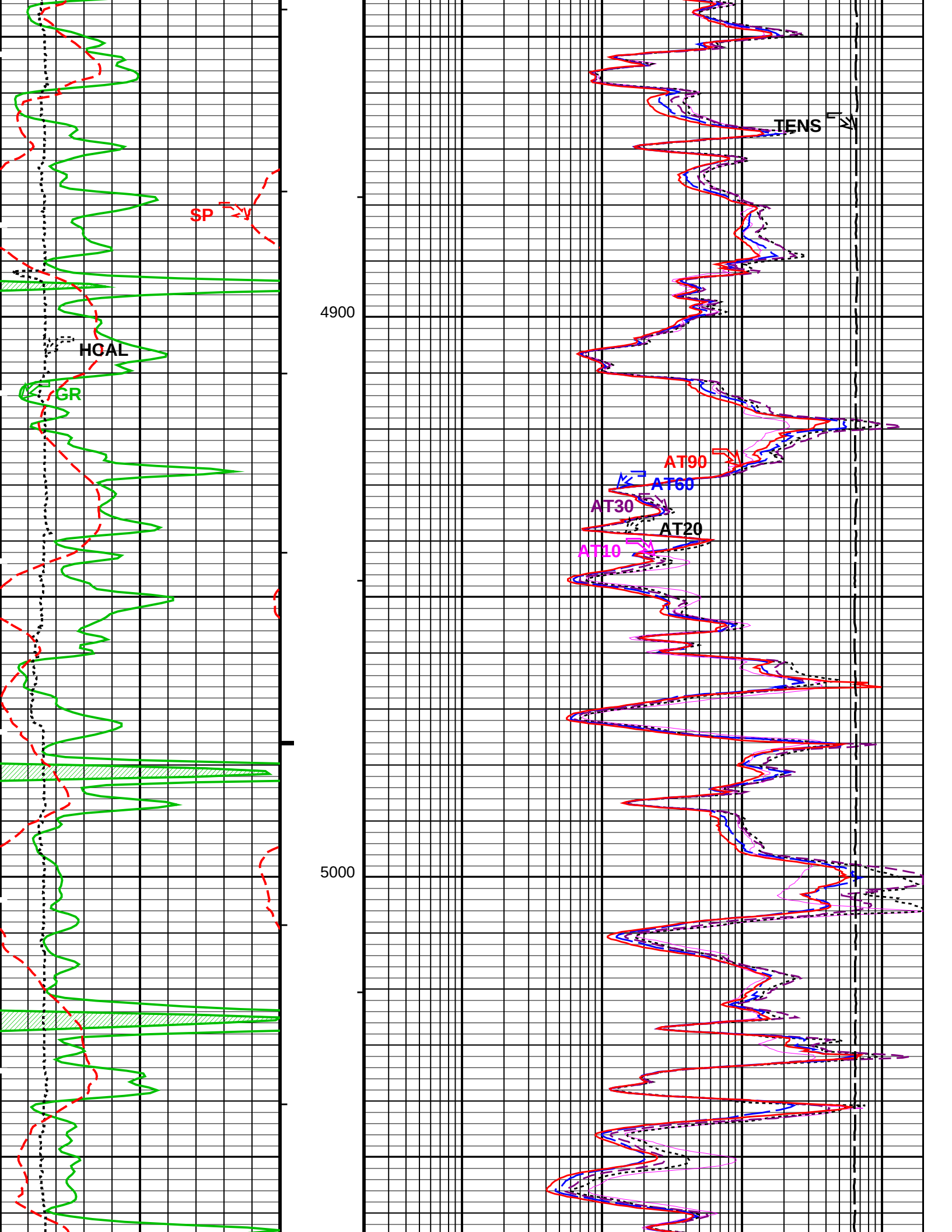

3800
3900

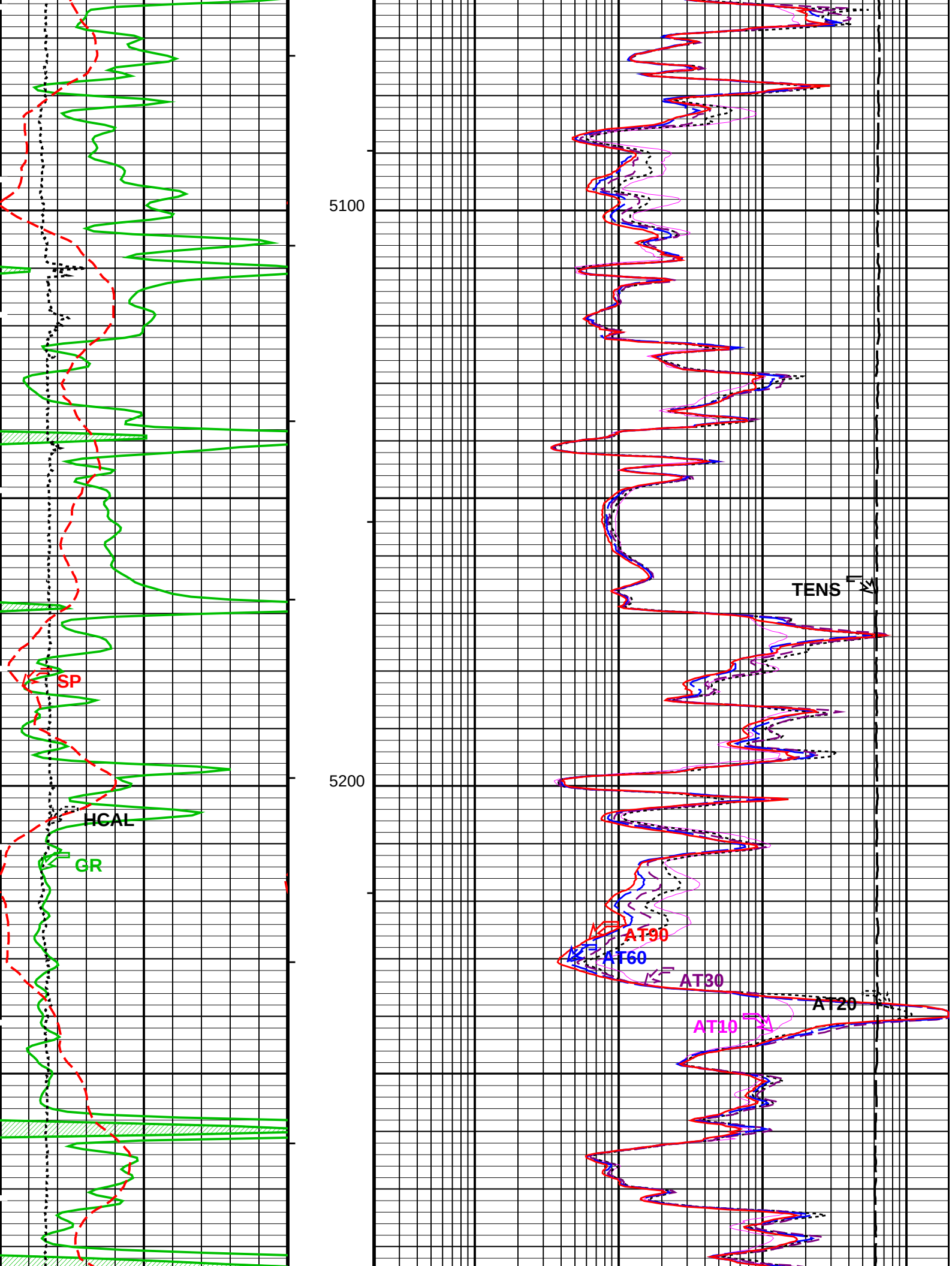

SP
HCAL
GR
4000
4100
TENS
AT90
AT60
AT30
AT20
AT10

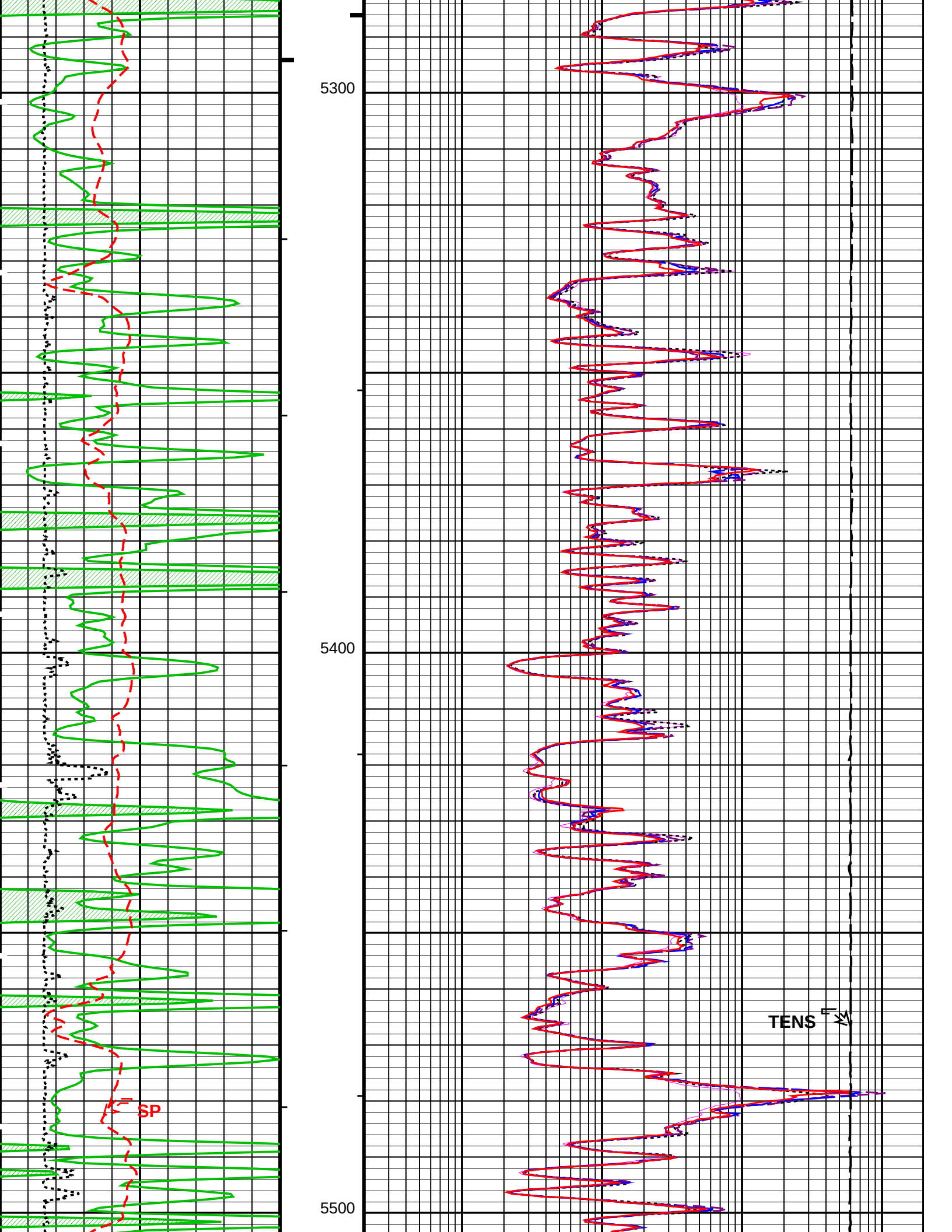

4200
4300
4400
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

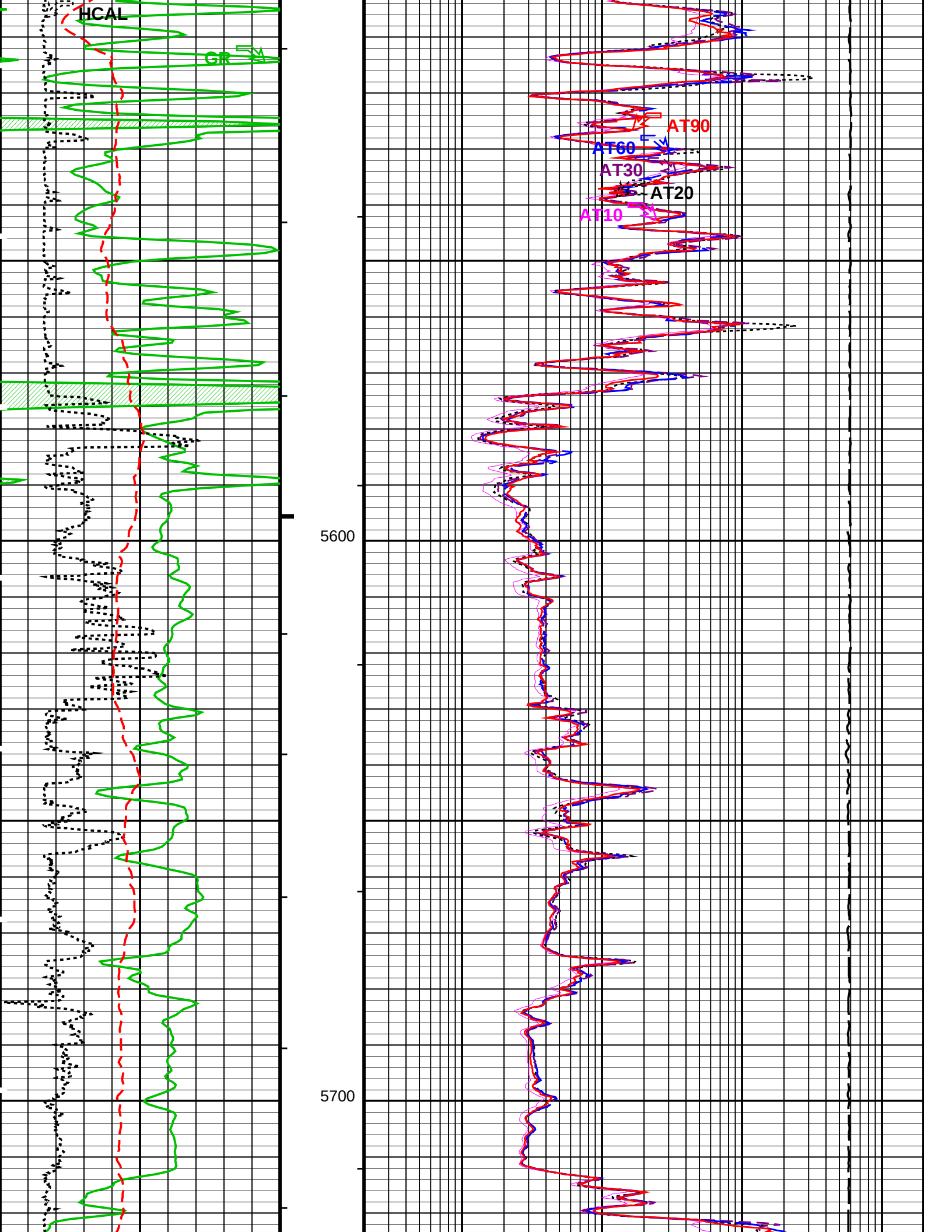

4500
4600
SP
HCAL
GR
TENS

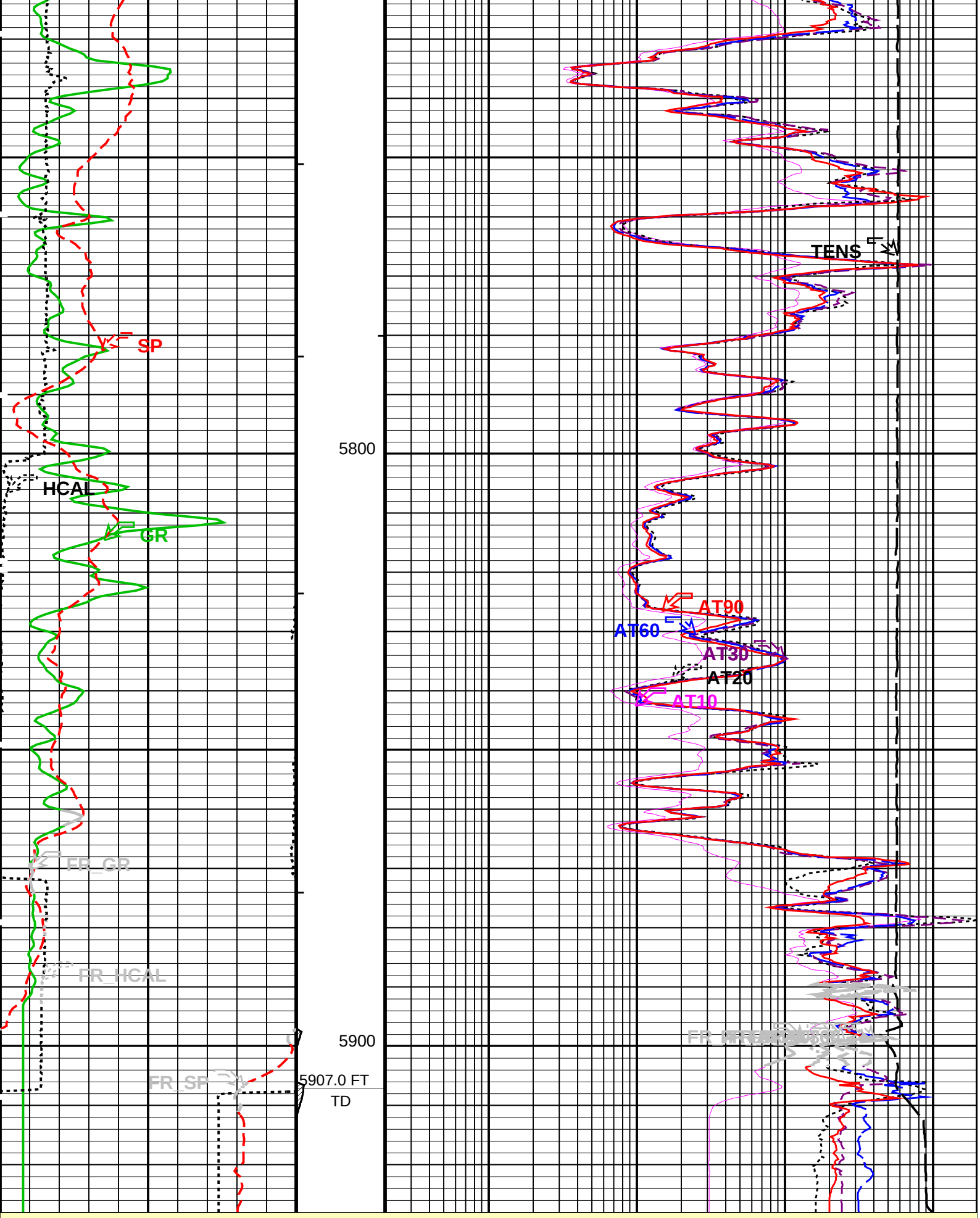

AT90
AT60
AT30
AT20
AT10
4700
4800


SP
HCAL
GR
4900
5000
TENS
AT90
AT60
AT30
AT20
AT10


5100
5200
SP
HCAL
GR
TENS
AT90
AT60
AT30
AT20
AT10

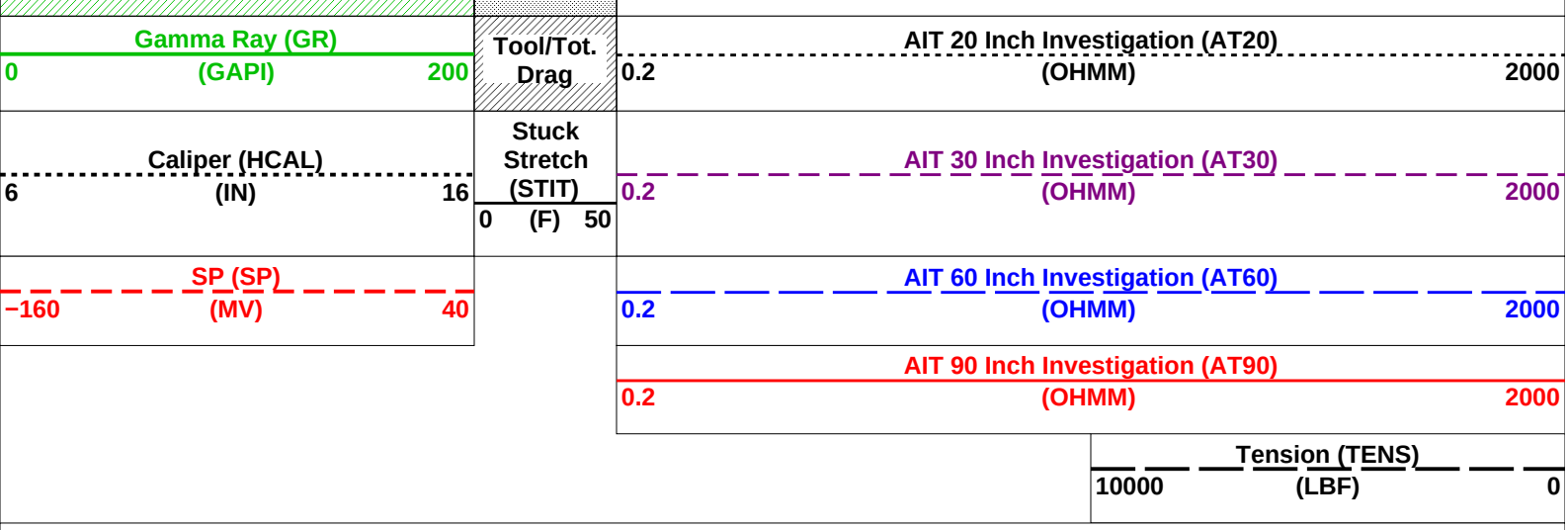

5300
5400
5500
SP
TENS


HCAL
GR
AT90
AT60
AT30
AT20
AT10
5600
5700




MAIN PASS: *** PLATFORM EXPRESS – ARRAY INDUCTION ***

| Gamma Ray Backup | Cable Drag | AIT 10 Inch Investigation (AT10) |
|---|---|---|
| | | 0.2 (OHMM) 2000 |




**PIP SUMMARY**

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

# Parameters

| DLIS Name | Description | Value | |
|---|---|---|---|
| | **AIT−M: Array Induction Tool − M** | | |
| ABHM | Array Induction Borehole Correction Mode | 2_ComputeStandoff | |
| ABHV | Array Induction Borehole Correction Code Version Number | 900 | |
| ABLM | Array Induction Basic Logs Mode | 6_One_Two_and_Four | |
| ABLV | Array Induction Basic Logs Code Version Number | 223 | |
| ACDE | Array Induction Casing Detection Enable | No | |
| ACEN | Array Induction Tool Centering Flag (in Borehole) | Eccentered | |
| ACSED | Array Induction Casing Shoe Estimated Depth | −50000 | FT |
| AETP | Array Induction Enable Sonde Error Temp&Pres Corr | Yes | |
| AFRSV | Array Induction Response Set Version for Four ft Resolution | 41.70.24.20 | |
| AIGS | Array Induction Select Akima Interpolation Gating | On | |
| AMRF | Array Induction Mud Resistivity Factor | 1 | |
| AORSV | Array Induction Response Set Version for One ft Resolution | 41.70.24.20 | |
| ARFV | Array Induction Radial Profiling Code Version Number | 701 | |
| ARPV | Array Induction Radial Parametrization Code Version Number | 232 | |
| ASTA | Array Induction Tool Standoff | 1 | IN |
| ATRSV | Array Induction Response Set Version for Two ft Resolution | 41.70.24.20 | |
| ATSE | Array Induction Temperature Selection(Sonde Error Correction) | Internal | |
| AULV | Array Induction User Level Control | Normal | |
| AZRSV | Array Induction Response Set Version for Z Resolution | 00.10.25.00 | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| SPNV | SP Next Value | 0 | MV |
| | **HILTH−FTB: High resolution Integrated Logging Tool−DTS** | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| | **FEQL: Formation Evaluation Quick Look** | | |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| | **HOLEV: Integrated Hole/Cement Volume** | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FCD | Future Casing (Outer) Diameter | 5.5 | IN |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |

| | | | |
|---|---|---|---|
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| HVCS | Integrated Hole Volume Caliper Selection | AUTOMATIC | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| PERT: Preliminary Evaluation − Real Time | | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| STI: Stuck Tool Indicator | | | |
| LBFR | Trigger for MAXIS First Reading Label | TDL | |
| STKT | STI Stuck Threshold | 2.5 | FT |
| TDD | Total Depth − Driller | 5910.00 | FT |
| TDL | Total Depth − Logger | 5907.00 | FT |
| System and Miscellaneous | | | |
| BS | Bit Size | 7.875 | IN |
| DFD | Drilling Fluid Density | 8.90 | LB/G |
| DORL | Depth Offset for Repeat Analysis | 0.0 | FT |
| FLEV | Fluid Level | 300.00 | FT |
| MST | Mud Sample Temperature | 125.00 | DEGF |
| TD | Total Depth | 5907 | FT |

Format: GRES  Vertical Scale: 5" per 100'  Graphics File Created: 20−Mar−2012 06:47

## OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

## Output DLIS Files

| | | | | | |
|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 | |

Schlumberger

# REPEAT ANALYSIS

MAXIS Field Log

## Input DLIS Files

| | | | | | | |
|---|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_009LUP | FN:8 | PRODUCER | 20−Mar−2012 06:25 | 5926.5 FT | 5413.5 FT |

## Output DLIS Files

| | | | | |
|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 |

## OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

**PIP SUMMARY**

Integrated Hole Volume Minor Pip Every 10 F3
Integrated Hole Volume Major Pip Every 100 F3
Integrated Cement Volume Minor Pip Every 10 F3
Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

| TENS_REP Curve (TENS_REP) | | |
|---|---|---|
| 10000 | (LBF) | 0 |

SP_REP Curve (SP_REP)
−160 (MV) 40

HCAL_REP Curve (HCAL_REP)
6 (IN) 16

GR1_REP Curve (GR_REP)
200 (GAPI) 400

GR_REP Curve (GR_REP)
0 (GAPI) 200

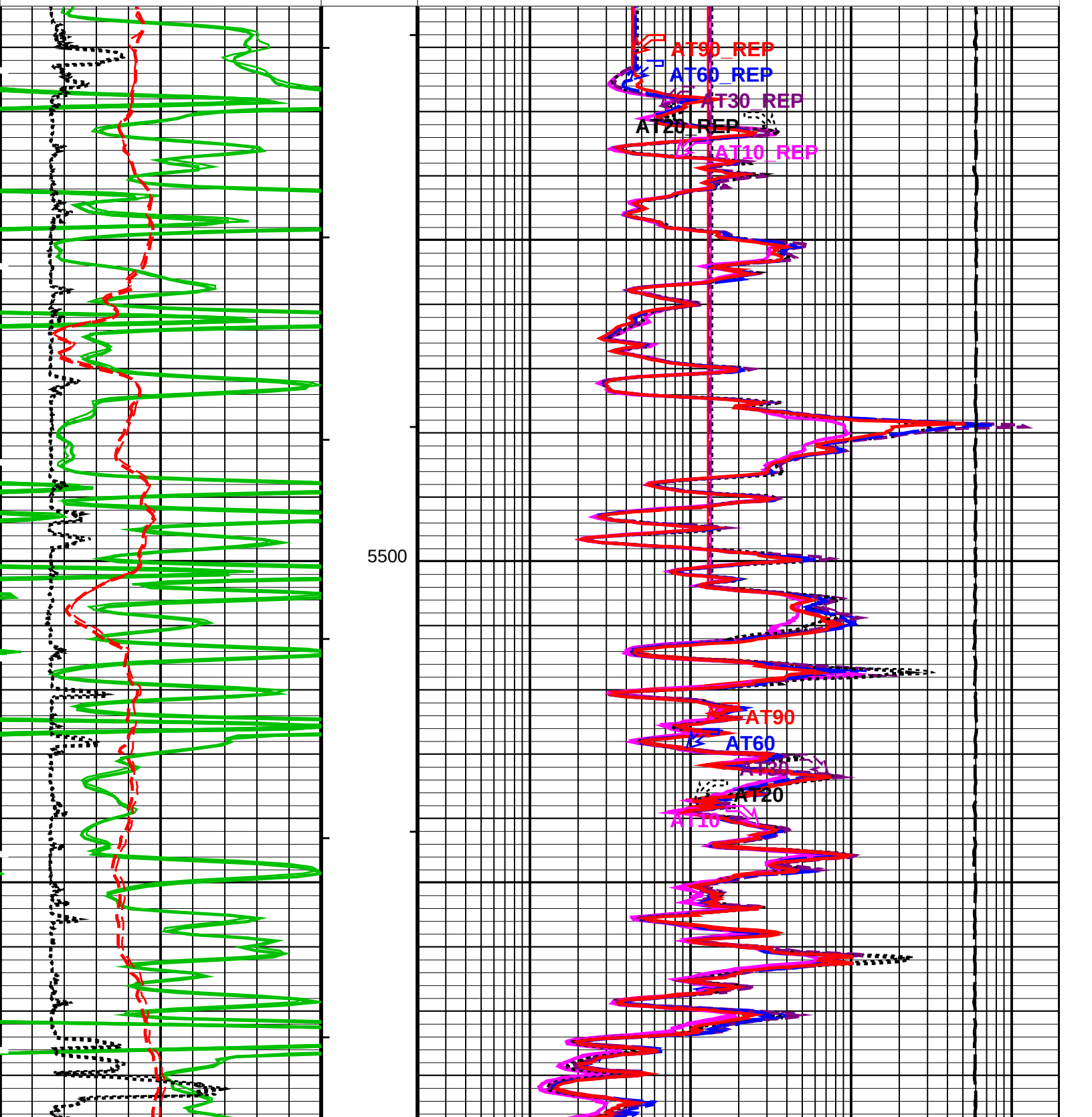
AT90_REP Curve (AT90_REP)
0.2 (OHMM) 2000

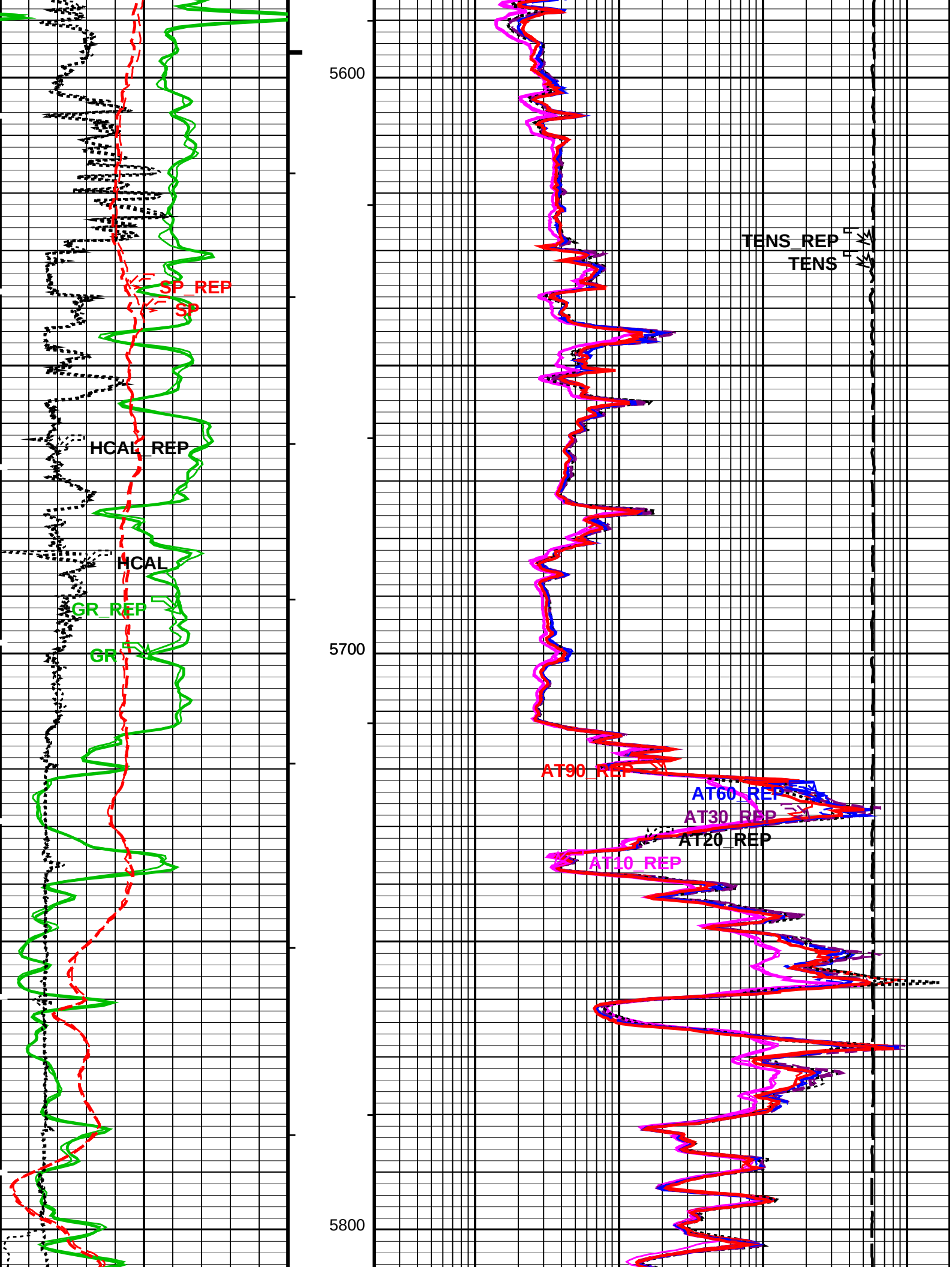
AT60_REP Curve (AT60_REP)
0.2 (OHMM) 2000

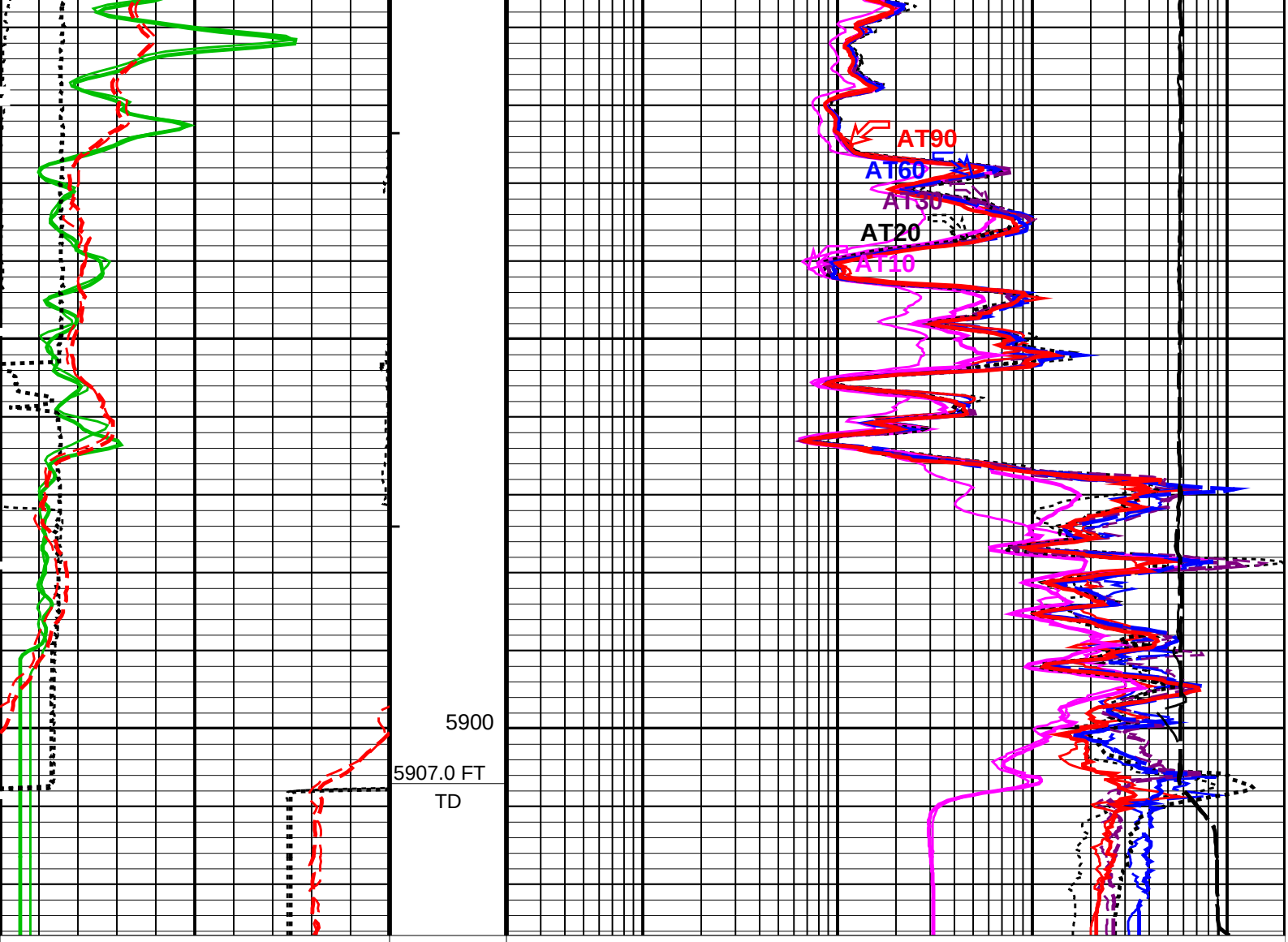
AT30_REP Curve (AT30_REP)
0.2 (OHMM) 2000

AT20_REP Curve (AT20_REP)
0.2 (OHMM) 2000

AT10_REP Curve (AT10_REP)
0.2 (OHMM) 2000




5600
5700
5800
SP_REP
SP
HCAL_REP
HCAL
GR_REP
GR
TENS_REP
TENS
AT90_REP
AT60_REP
AT30_REP
AT20_REP
AT10_REP




GR_REP Curve (GR_REP)
0 (GAPI) 200

GR1_REP Curve (GR_REP)
200 (GAPI) 400

HCAL_REP Curve (HCAL_REP)
6 (IN) 16

SP_REP Curve (SP_REP)
−160 (MV) 40

AT10_REP Curve (AT10_REP)
0.2 (OHMM) 2000

AT20_REP Curve (AT20_REP)
0.2 (OHMM) 2000

AT30_REP Curve (AT30_REP)
0.2 (OHMM) 2000

AT60_REP Curve (AT60_REP)
0.2 (OHMM) 2000

AT90_REP Curve (AT90_REP)
0.2 (OHMM) 2000

TENS_REP Curve (TENS_REP)
10000 (LBF) 0

**PIP SUMMARY**

Integrated Hole Volume Minor Pip Every 10 F3
Integrated Hole Volume Major Pip Every 100 F3
Integrated Cement Volume Minor Pip Every 10 F3
Integrated Cement Volume Major Pip Every 100 F3
Time Mark Every 60 S

## Parameters

| DLIS Name | Description | Value |
|---|---|---|
| | AIT−M: Array Induction Tool − M | |
| ABHM | Array Induction Borehole Correction Mode | 2_ComputeStandoff |
| ABHV | Array Induction Borehole Correction Code Version Number | 900 |

| | | | |
|---|---|---|---|
| ABLM | Array Induction Basic Logs Mode | 6_One_Two_and_Four | |
| ABLV | Array Induction Basic Logs Code Version Number | 223 | |
| ACDE | Array Induction Casing Detection Enable | No | |
| ACEN | Array Induction Tool Centering Flag (in Borehole) | Eccentered | |
| ACSED | Array Induction Casing Shoe Estimated Depth | −50000 | FT |
| AETP | Array Induction Enable Sonde Error Temp&Pres Corr | Yes | |
| AFRSV | Array Induction Response Set Version for Four ft Resolution | 41.70.24.20 | |
| AIGS | Array Induction Select Akima Interpolation Gating | On | |
| AMRF | Array Induction Mud Resistivity Factor | 1 | |
| AORSV | Array Induction Response Set Version for One ft Resolution | 41.70.24.20 | |
| ARFV | Array Induction Radial Profiling Code Version Number | 701 | |
| ARPV | Array Induction Radial Parametrization Code Version Number | 232 | |
| ASTA | Array Induction Tool Standoff | 1 | IN |
| ATRSV | Array Induction Response Set Version for Two ft Resolution | 41.70.24.20 | |
| ATSE | Array Induction Temperature Selection(Sonde Error Correction) | Internal | |
| AULV | Array Induction User Level Control | Normal | |
| AZRSV | Array Induction Response Set Version for Z Resolution | 00.10.25.00 | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| SPNV | SP Next Value | 0 | MV |
| HILTH−FTB: High resolution Integrated Logging Tool−DTS | | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| FEQL: Formation Evaluation Quick Look | | | |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| HOLEV: Integrated Hole/Cement Volume | | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FCD | Future Casing (Outer) Diameter | 5.5 | IN |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| HVCS | Integrated Hole Volume Caliper Selection | AUTOMATIC | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| PERT: Preliminary Evaluation − Real Time | | | |
| BHT | Bottom Hole Temperature (used in calculations) | 145 | DEGF |
| FEXP | Form Factor Exponent | 2 | |
| FNUM | Form Factor Numerator | 1 | |
| GCSE | Generalized Caliper Selection | HCAL | |
| GDEV | Average Angular Deviation of Borehole from Normal | 0 | DEG |
| GGRD | Geothermal Gradient | 0.01 | DF/F |
| GRSE | Generalized Mud Resistivity Selection | AITM_RESIST | |
| GTSE | Generalized Temperature Selection | HSTS_HTEM | |
| SHT | Surface Hole Temperature | 68 | DEGF |
| System and Miscellaneous | | | |
| BS | Bit Size | 7.875 | IN |
| DFD | Drilling Fluid Density | 8.90 | LB/G |
| DORL | Depth Offset for Repeat Analysis | 0.0 | FT |
| FLEV | Fluid Level | 300.00 | FT |
| MST | Mud Sample Temperature | 125.00 | DEGF |
| TD | Total Depth | 5907 | FT |

Format: GRES_REP  Vertical Scale: 5" per 100'  Graphics File Created: 20−Mar−2012 06:47

## OP System Version: 19C0−187

| | | | |
|---|---|---|---|
| AIT−M | 19C0−187 | HILTH−FTB | 19C0−187 |
| DTC−H | 19C0−187 | | |

## Input DLIS Files

| | | | | | | |
|---|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_009LUP | FN:8 | PRODUCER | 20−Mar−2012 06:25 | 5926.5 FT | 5413.5 FT |

## Output DLIS Files

| | | | | | | |
|---|---|---|---|---|---|---|
| DEFAULT | AIT_TLD_MCFL_CNL_016LUP | FN:15 | PRODUCER | 20−Mar−2012 06:47 | | |

Schlumberger

# BEFORE CALIBRATIONS

MAXIS Field Log

Calibration and Check Summary

| Measurement | Nominal | Master | Before | After | Change | Limit | Units |
|---|---|---|---|---|---|---|---|
| Array Induction Tool − M Wellsite Calibration − Electronics Calibration Check − Thru Cal Mag. & Phase | | | | | | | |
| Master: 26−Jan−2012 16:11 Before: 19−Mar−2012 10:05 | | | | | | | |
| Thru Cal Magnitude − 0 | 0 | 0.6131 | 0.6135 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 1 | 0 | 1.256 | 1.257 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 2 | 0 | 0.6230 | 0.6235 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 3 | 0 | 0.7038 | 0.7043 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 4 | 0 | 1.315 | 1.316 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 5 | 0 | 1.911 | 1.912 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 6 | 0 | 1.906 | 1.908 | N/A | N/A | N/A | V |
| Thru Cal Magnitude − 7 | 0 | 1.361 | 1.362 | N/A | N/A | N/A | V |
| Thru Cal Phase − 0 | 0 | 183.8 | 183.8 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 1 | 0 | 182.7 | 182.7 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 2 | 0 | 179.0 | 179.1 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 3 | 0 | 178.2 | 178.3 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 4 | 0 | 172.0 | 172.0 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 5 | 0 | 170.3 | 170.4 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 6 | 0 | 170.3 | 170.4 | N/A | N/A | N/A | DEG |
| Thru Cal Phase − 7 | 0 | 169.6 | 169.7 | N/A | N/A | N/A | DEG |
| Array Induction Tool − M Wellsite Calibration − Electronics Calibration Check − Auxiliary | | | | | | | |
| Master: 26−Jan−2012 16:11 Before: 19−Mar−2012 10:05 | | | | | | | |
| Array Induction SPA Plus | 991.0 | 991.5 | 991.6 | N/A | N/A | N/A | MV |
| Array Induction SPA Zero | 0 | −0.2500 | −0.2242 | N/A | N/A | N/A | MV |
| Array Induction Temperature Pl | 0.9170 | 0.9184 | 0.9184 | N/A | N/A | N/A | V |
| Array Induction Temperature Ze | 0 | −0.0002500 | −0.0002205 | N/A | N/A | N/A | V |
| Array Induction Tool − M Wellsite Calibration − Test Loop Gain Correction | | | | | | | |
| Master: 26−Jan−2012 16:11 | | | | | | | |
| Test Loop Gain Correctio − 0 | 0 | 1.014 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 1 | 0 | 1.016 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 2 | 0 | 1.014 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 3 | 0 | 1.012 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 4 | 0 | 0.9946 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 5 | 0 | 0.9890 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 6 | 0 | 0.9984 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 7 | 0 | 1.006 | N/A | N/A | N/A | N/A | V |
| Test Loop Gain Correctio − 0 | 0 | 0.4704 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 1 | 0 | 0.6871 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 2 | 0 | 0.1215 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 3 | 0 | −0.06941 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 4 | 0 | 0.1235 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 5 | 0 | −0.1023 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 6 | 0 | 0.2848 | N/A | N/A | N/A | N/A | DEG |
| Test Loop Gain Correctio − 7 | 0 | −0.005901 | N/A | N/A | N/A | N/A | DEG |
| Array Induction Tool − M Wellsite Calibration − Sonde Error Correction | | | | | | | |
| Master: 26−Jan−2012 16:11 | | | | | | | |
| R Sonde Error Correction − 0 | 0 | −93.39 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 1 | 0 | 158.2 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 2 | 0 | 116.5 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 3 | 0 | 63.04 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 4 | 0 | 27.36 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 5 | 0 | 13.24 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 6 | 0 | 9.876 | N/A | N/A | N/A | N/A | MM/M |
| R Sonde Error Correction − 7 | 0 | −1.618 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 0 | 0 | −7.309 | N/A | N/A | N/A | N/A | MM/M |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X Sonde Error Correction − 1 | 0 | −334.4 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 2 | 0 | 10.73 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 3 | 0 | −58.01 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 4 | 0 | −12.80 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 5 | 0 | −17.35 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 6 | 0 | −3.765 | N/A | N/A | N/A | N/A | MM/M |
| X Sonde Error Correction − 7 | 0 | 4.594 | N/A | N/A | N/A | N/A | MM/M |

Array Induction Tool − M Wellsite Calibration − Mud Gain Correction
Master: 26−Jan−2012 16:11

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Coarse − Mag, Real, Imag − 0 | 0 | 0.8718 | N/A | N/A | N/A | N/A | |
| Coarse − Mag, Real, Imag − 1 | 0 | 0.8718 | N/A | N/A | N/A | N/A | |
| Coarse − Mag, Real, Imag − 2 | 0 | 0.8718 | N/A | N/A | N/A | N/A | |
| Fine − Mag, Real, Imag − 0 | 0 | 0.8719 | N/A | N/A | N/A | N/A | |
| Fine − Mag, Real, Imag − 1 | 0 | 0.8719 | N/A | N/A | N/A | N/A | |
| Fine − Mag, Real, Imag − 2 | 0 | 0.8719 | N/A | N/A | N/A | N/A | |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Stab Measurement Summary
Before: 19−Mar−2012 10:07

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BS Window Ratio | 0.7555 | N/A | 0.7545 | N/A | N/A | N/A | |
| BS Window Sum | 25690 | N/A | 25690 | N/A | N/A | N/A | CPS |
| SS Window Ratio | 0.4900 | N/A | 0.4905 | N/A | N/A | N/A | |
| SS Window Sum | 11530 | N/A | 11520 | N/A | N/A | N/A | CPS |
| LS Window Ratio | 0.3016 | N/A | 0.2991 | N/A | N/A | N/A | |
| LS Window Sum | 1171 | N/A | 1169 | N/A | N/A | N/A | CPS |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Photo−multiplier High Voltages Calibrations
Before: 19−Mar−2012 10:07

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BS PM High Voltage (Command) | 1491 | N/A | 1491 | N/A | N/A | N/A | V |
| SS PM High Voltage (Command) | 1435 | N/A | 1443 | N/A | N/A | N/A | V |
| LS PM High Voltage (Command) | 1437 | N/A | 1437 | N/A | N/A | N/A | V |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Crystal Quality Resolutions Calibration
Before: 19−Mar−2012 10:07

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BS Crystal Resolution | 10.57 | N/A | 10.60 | N/A | N/A | N/A | % |
| SS Crystal Resolution | 9.903 | N/A | 9.786 | N/A | N/A | N/A | % |
| LS Crystal Resolution | 8.715 | N/A | 8.471 | N/A | N/A | N/A | % |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − MCFL Calibration
Before: 19−Mar−2012 10:08

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Raw B0 Resistivity | 3875 | N/A | 3878 | N/A | N/A | N/A | OHMM |
| Raw B1 Resistivity | 3830 | N/A | 3833 | N/A | N/A | N/A | OHMM |
| Raw B2 Resistivity | 3830 | N/A | 3843 | N/A | N/A | N/A | OHMM |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − HILT Caliper Calibration
Before: 19−Mar−2012 10:00

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| HILT Caliper Zero Measurement | 8.000 | N/A | 7.433 | N/A | N/A | N/A | IN |
| HILT Caliper Plus Measurement | 12.00 | N/A | 11.75 | N/A | N/A | N/A | IN |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Detector Calibration
Before: 19−Mar−2012 10:00

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Gamma Ray Background | 30.00 | N/A | 83.25 | N/A | N/A | N/A | GAPI |
| Gamma Ray (Jig − Bkgd) | 165.0 | N/A | 175.1 | N/A | N/A | 15.00 | GAPI |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Zero Measurement
Master: 7−Feb−2012 10:10 Before: 19−Mar−2012 10:01

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CNTC Background | 24.85 | 24.85 | 24.55 | N/A | N/A | 3.728 | CPS |
| CFTC Background | 27.19 | 27.19 | 28.76 | N/A | N/A | 4.079 | CPS |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Ratio Measurement
Master: 7−Feb−2012 10:10

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Thermal Near Corr. (Tank) | 5800 | 4826 | N/A | N/A | N/A | N/A | CPS |
| Thermal Far Corr. (Tank) | 2400 | 1970 | N/A | N/A | N/A | N/A | CPS |
| CNTC/CFTC (Tank) | 2.159 | 2.450 | N/A | N/A | N/A | N/A | |

High resolution Integrated Logging Tool−DTS Wellsite Calibration − Accelerometer Calibration
Before: 20−Mar−2012 5:29

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z−Axis Acceleration | 32.19 | N/A | 32.04 | N/A | N/A | N/A | F/S2 |

The GLS−VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT−B Water Temperature 68.0 DEGF.
Thermal Housing Size 3.380 IN.
NSR−F serial number 5069

Array Induction Tool − M / Equipment Identification

Primary Equipment:

| | | |
|---|---|---|
| Rm/SP Bottom Nose | AMRM − A | |
| Array Induction Sonde | AMIS − A | 39 |

Auxiliary Equipment:

Array Induction Tool − M Wellsite Calibration

Electronics Calibration Check − Thru Cal Mag. & Phase

| Idx | Phase | Value | Thru Cal Magnitude V | Nominal | Value | Thru Cal Phase DEG | Nominal |
|---|---|---|---|---|---|---|---|
| 0 | Master | 0.6131 | | 0.6100 | 183.8 | | 197.0 |
| | Before | 0.6135 | | | 183.8 | | |
| 1 | Master | 1.256 | | 1.270 | 182.7 | | 196.0 |
| | Before | 1.257 | | | 182.7 | | |
| 2 | Master | 0.6230 | | 0.6200 | 179.0 | | 192.0 |
| | Before | 0.6235 | | | 179.1 | | |
| 3 | Master | 0.7038 | | 0.7000 | 178.2 | | 191.0 |
| | Before | 0.7043 | | | 178.3 | | |
| 4 | Master | 1.315 | | 1.340 | 172.0 | | 185.0 |
| | Before | 1.316 | | | 172.0 | | |
| 5 | Master | 1.911 | | 1.960 | 170.3 | | 182.0 |
| | Before | 1.912 | | | 170.4 | | |
| 6 | Master | 1.906 | | 1.960 | 170.3 | | 181.0 |
| | **Before** | **1.908** | | | **170.4** | | |
| 7 | Master | 1.361 | | 1.410 | 169.6 | | 175.0 |
| | Before | 1.362 | | | 169.7 | | |
| | | 60.00 % (Minimum) | 140.0 % (Maximum) (Nominal) | | Nom −60.00 (Minimum) | Nom + 60.00 (Maximum) (Nominal) | |

Master: 26−Jan−2012 16:11 Before: 19−Mar−2012 10:05

Array Induction Tool − M Wellsite Calibration

Electronics Calibration Check − Auxiliary

| Phase | Array Induction SPA Plus MV | Value | Phase | Array Induction SPA Zero MV | Value |
|---|---|---|---|---|---|
| Master | | 991.5 | Master | | −0.2500 |
| Before | | 991.6 | Before | | −0.2242 |
| | 941.0 (Minimum) 991.0 (Nominal) 1040 (Maximum) | | | −50.00 (Minimum) 0 (Nominal) 50.00 (Maximum) | |

| Phase | Array Induction Temperature Plus V | Value | Phase | Array Induction Temperature Zero V | Value |
|---|---|---|---|---|---|
| Master | | 0.9184 | Master | | −0.0002500 |
| Before | | 0.9184 | Before | | −0.0002205 |
| | 0.8710 (Minimum) 0.9170 (Nominal) 0.9630 (Maximum) | | | −0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum) | |

Master: 26−Jan−2012 16:11 Before: 19−Mar−2012 10:05

Array Induction Tool − M Wellsite Calibration

Test Loop Gain Correction

| Idx | Value | Test Loop Gain Correction Magnitude V | Value | Test Loop Gain Correction Phase DEG |
|---|---|---|---|---|
| 0 | 1.014 | | 0.4704 | |
| | | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) | | −3.000 (Minimum) 0 (Nominal) 3.000 (Maximum) |
| 1 | 1.016 | | 0.6871 | |
| | | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) | | −3.000 (Minimum) 0 (Nominal) 3.000 (Maximum) |
| 2 | 1.014 | | 0.1215 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |
| 3 | 1.012 | | | | −0.06941 | | |
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |
| 4 | 0.9946 | | | | 0.1235 | | |
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |
| 5 | 0.9890 | | | | −0.1023 | | |
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |
| 6 | 0.9984 | | | | 0.2848 | | |
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |
| 7 | 1.006 | | | | −0.005901 | | |
| | 0.9500 (Minimum) | 1.000 (Nominal) | 1.050 (Maximum) | | −3.000 (Minimum) | 0 (Nominal) | 3.000 (Maximum) |

Master: 26−Jan−2012 16:11

Array Induction Tool − M Wellsite Calibration

Sonde Error Correction

| Idx | Value | R Sonde Error Correction MM/M | | | Value | X Sonde Error Correction MM/M | | |
|---|---|---|---|---|---|---|---|---|
| 0 | −93.39 | | | | −7.309 | | | |
| | | −231.0 (Minimum) | −56.00 (Nominal) | 119.0 (Maximum) | | −2250 (Minimum) | 0 (Nominal) | 2250 (Maximum) |
| 1 | 158.2 | | | | −334.4 | | | |
| | | 114.0 (Minimum) | 159.0 (Nominal) | 204.0 (Maximum) | | −625.0 (Minimum) | 0 (Nominal) | 625.0 (Maximum) |
| 2 | 116.5 | | | | 10.73 | | | |
| | | 66.00 (Minimum) | 111.0 (Nominal) | 156.0 (Maximum) | | −350.0 (Minimum) | 0 (Nominal) | 350.0 (Maximum) |
| 3 | 63.04 | | | | −58.01 | | | |
| | | 39.00 (Minimum) | 64.00 (Nominal) | 89.30 (Maximum) | | −250.0 (Minimum) | 0 (Nominal) | 250.0 (Maximum) |
| 4 | 27.36 | | | | −12.80 | | | |
| | | 15.00 (Minimum) | 25.00 (Nominal) | 35.00 (Maximum) | | −63.00 (Minimum) | 0 (Nominal) | 63.00 (Maximum) |
| 5 | 13.24 | | | | −17.35 | | | |
| | | 4.000 (Minimum) | 14.00 (Nominal) | 24.00 (Maximum) | | −50.00 (Minimum) | 0 (Nominal) | 50.00 (Maximum) |
| 6 | 9.876 | | | | −3.765 | | | |
| | | 5.000 (Minimum) | 10.00 (Nominal) | 15.00 (Maximum) | | −30.00 (Minimum) | 0 (Nominal) | 30.00 (Maximum) |
| 7 | −1.618 | | | | 4.594 | | | |
| | | −5.000 (Minimum) | 0 (Nominal) | 5.000 (Maximum) | | −30.00 (Minimum) | 0 (Nominal) | 30.00 (Maximum) |

Master: 26−Jan−2012 16:11

Array Induction Tool − M Wellsite Calibration

Mud Gain Correction

| Idx | Value | Coarse − Mag, Real, Imag | | | Value | Fine − Mag, Real, Imag | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.8718 | | | | 0.8719 | | | |
| | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) |
| 1 | 0.8718 | | | | 0.8719 | | | |
| | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) |
| 2 | 0.8718 | | | | 0.8719 | | | |
| | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) | | 0.8000 (Minimum) | 1.000 (Nominal) | 1.200 (Maximum) |

Master: 26−Jan−2012 16:11

High resolution Integrated Logging Tool−DTS / Equipment Identification

Primary Equipment:

| | | |
|---|---|---|
| HILT high−Resolution Mechanical Sonde | HRMS − H | |
| HILT Rxo Gamma−ray Device | HRGD − H | |
| HILT Micro Cylindrically Focused Log Dev | MCFL − H | |
| GR Logging Source | GLS − VJ | 5240 |
| HILT High Res. Control Cartridge | HRCC − H | |
| HILT Gamma−Ray Neutron Sonde−DTS | HGNS − H | |
| HGNS Gamma−Ray Device | HGR − | |
| HGNS Neutron Detector with Alpha Source | HCNT − H | |
| Auxiliary Equipment: | | |
| Neutron Calibration Tank | NCT − B | |
| Gamma Source Radioactive | GSR − U/Y | |
| HGNS Housing | HGNH − | |

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Stab Measurement Summary

| Phase | BS Window Ratio | Value | Phase | SS Window Ratio | Value | Phase | LS Window Ratio | Value |
|---|---|---|---|---|---|---|---|---|
| Before | | 0.7545 | Before | | 0.4905 | Before | | 0.2991 |
| 0.7177 (Minimum) | 0.7555 (Nominal) | 0.7933 (Maximum) | 0.4655 (Minimum) | 0.4900 (Nominal) | 0.5145 (Maximum) | 0.2865 (Minimum) | 0.3016 (Nominal) | 0.3167 (Maximum) |
| Phase | BS Window Sum CPS | Value | Phase | SS Window Sum CPS | Value | Phase | LS Window Sum CPS | Value |
| Before | | 25690 | Before | | 11520 | Before | | 1169 |
| 24410 (Minimum) | 25690 (Nominal) | 26970 (Maximum) | 10950 (Minimum) | 11530 (Nominal) | 12100 (Maximum) | 1113 (Minimum) | 1171 (Nominal) | 1230 (Maximum) |

Before: 19−Mar−2012 10:07

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Photo−multiplier High Voltages Calibrations

| Phase | BS PM High Voltage (Command) V | Value | Phase | SS PM High Voltage (Command) V | Value | Phase | LS PM High Voltage (Command) V | Value |
|---|---|---|---|---|---|---|---|---|
| Before | | 1491 | Before | | 1443 | Before | | 1437 |
| 1391 (Minimum) | 1491 (Nominal) | 1591 (Maximum) | 1335 (Minimum) | 1435 (Nominal) | 1535 (Maximum) | 1337 (Minimum) | 1437 (Nominal) | 1537 (Maximum) |

Before: 19−Mar−2012 10:07

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Crystal Quality Resolutions Calibration

| Phase | BS Crystal Resolution % | Value | Phase | SS Crystal Resolution % | Value | Phase | LS Crystal Resolution % | Value |
|---|---|---|---|---|---|---|---|---|
| Before | | 10.60 | Before | | 9.786 | Before | | 8.471 |
| 9.573 (Minimum) | 10.57 (Nominal) | 11.57 (Maximum) | 8.903 (Minimum) | 9.903 (Nominal) | 10.90 (Maximum) | 7.715 (Minimum) | 8.715 (Nominal) | 9.715 (Maximum) |

Before: 19−Mar−2012 10:07

High resolution Integrated Logging Tool−DTS Wellsite Calibration

MCFL Calibration

| Phase | Raw B0 Resistivity OHMM | Value | Phase | Raw B1 Resistivity OHMM | Value | Phase | Raw B2 Resistivity OHMM | Value |
|---|---|---|---|---|---|---|---|---|
| Before | | 3878 | Before | | 3833 | Before | | 3843 |
| 3565 (Minimum) | 3875 (Nominal) | 4185 (Maximum) | 3524 (Minimum) | 3830 (Nominal) | 4136 (Maximum) | 3524 (Minimum) | 3830 (Nominal) | 4136 (Maximum) |

Before: 19−Mar−2012 10:08

High resolution Integrated Logging Tool−DTS Wellsite Calibration

HILT Caliper Calibration

| Phase | HILT Caliper Zero Measurement IN | Value | Phase | HILT Caliper Plus Measurement IN | Value |
|---|---|---|---|---|---|
| Before | | 7.433 | Before | | 11.75 |
| 6.000 (Minimum) | 8.000 (Nominal) | 10.00 (Maximum) | 9.000 (Minimum) | 12.00 (Nominal) | 15.00 (Maximum) |

Before: 19−Mar−2012 10:00

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Detector Calibration

| Phase | Gamma Ray Background GAPI | Value | Phase | Gamma Ray (Jig − Bkgd) GAPI | Value |
|---|---|---|---|---|---|
| Before | | 83.25 | Before | | 175.1 |
| 0 (Minimum) | 30.00 (Nominal) | 120.0 (Maximum) | 157.1 (Minimum) | 165.0 (Nominal) | 206.3 (Maximum) |

Before: 19−Mar−2012 10:00

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Zero Measurement

| Phase | CNTC Background CPS | Value |
|---|---|---|
| Master | | 24.85 |
| Before | | 24.55 |
| | 5.000 (Minimum) 24.85 (Nominal) 40.00 (Maximum) | |

| Phase | CFTC Background CPS | Value |
|---|---|---|
| Master | | 27.19 |
| Before | | 28.76 |
| | 5.000 (Minimum) 27.19 (Nominal) 40.00 (Maximum) | |

Master: 7−Feb−2012 10:10 Before: 19−Mar−2012 10:01

High resolution Integrated Logging Tool−DTS Wellsite Calibration

Ratio Measurement

| Phase | Thermal Near Corr. (Tank) CPS | Value |
|---|---|---|
| Master | | 4826 |
| | 4700 (Minimum) 5800 (Nominal) 6900 (Maximum) | |

| Phase | Thermal Far Corr. (Tank) CPS | Value |
|---|---|---|
| Master | | 1970 |
| | 1900 (Minimum) 2400 (Nominal) 2900 (Maximum) | |

| Phase | CNTC/CFTC (Tank) | Value |
|---|---|---|
| Master | | 2.450 |
| | 2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum) | |

Master: 7−Feb−2012 10:10

High resolution Integrated Logging Tool−DTS
Wellsite Calibration

Accelerometer Calibration

| Phase | Z−Axis Acceleration F/S2 | Value |
|---|---|---|
| Before | | 32.04 |
| | 31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum) | |

Before: 20−Mar−2012 5:29

DTS Telemetry Tool / Equipment Identification

Primary Equipment:

| | |
|---|---|
| DTC−H Auxiliary Cartridge | DTCH − A |
| DTC−H Telemetry Cartridge | DTCH − A |

Auxiliary Equipment:

| | |
|---|---|
| DTCH Telemetry Cartridge Housing | ECH − KC |

Company: **Vecta Oil & Gas Ltd**

Schlumberger

Well: **Quandary 23−26**
Field: **Wildcat**
County: **Cheyenne**
State: **Colorado**

Platform Express
Array Induction
Linear Correlation