

# Schlumberger

Company: **Lamont Doherty**

Well: **Expedition 318 Site U1359D**

Field: **Wilkes Land**

Rig: **JOIDES Resolution** Country: **Antarctica**

|                         |                            |                           |                     |
|-------------------------|----------------------------|---------------------------|---------------------|
| Rig:                    | JOIDES Resolution          |                           |                     |
| Field:                  | Wilkes Land                |                           |                     |
| Location:               | Latitude: S 64.904 Deg     |                           |                     |
| Well:                   | Expedition 318 Site U1359D |                           |                     |
| Company:                | Lamont Doherty             |                           |                     |
| LOCATION                |                            | Latitude: S 64.904 Deg    | Elev.: K.B. 11.00 m |
|                         |                            | Longitude: E 143.9593 Deg | G.L. -3012.00 m     |
|                         |                            |                           | D.F. 11.00 m        |
| Permanent Datum:        | Mean Sea Level             | Elev.:                    | 0.00 m              |
| Log Measured From:      | Drill Floor                | 11.00 m above Perm. Datum |                     |
| Drilling Measured From: | Drill Floor                |                           |                     |
| API Serial No.          |                            |                           |                     |

| Logging Date                  | Run 1 | Run 2 | Run |
|-------------------------------|-------|-------|-----|
| 23-Feb-2010                   |       |       |     |
| Run Number                    |       |       |     |
| Depth Driller                 |       |       |     |
| Schlumberger Depth            |       |       |     |
| Bottom Log Interval           |       |       |     |
| Top Log Interval              |       |       |     |
| Casing Driller Size @ Depth   |       |       |     |
| Casing Schlumberger           |       |       |     |
| Bit Size                      |       |       |     |
| Type Fluid In Hole            |       |       |     |
| Density                       |       |       |     |
| Fluid Loss                    |       |       |     |
| Source Of Sample              |       |       |     |
| RM @ Measured Temperature     | @     |       |     |
| RMF @ Measured Temperature    | @     |       |     |
| RMC @ Measured Temperature    | @     |       |     |
| Source RMF                    |       |       |     |
| RM @ MRT                      | @     |       |     |
| RMF @ MRT                     |       | @     |     |
| Maximum Recorded Temperatures |       |       |     |
| Circulation Stopped           |       |       |     |
| Logger On Bottom              |       |       |     |
| Unit Number                   |       |       |     |
| Recorded By                   |       |       |     |
| Witnessed By                  |       |       |     |

|                               |                                  |
|-------------------------------|----------------------------------|
| Logging Date                  | 23-Feb-2010                      |
| Run Number                    | 1                                |
| Depth Driller                 | 3630 m                           |
| Schlumberger Depth            | 3626 m                           |
| Bottom Log Interval           | 2624 m                           |
| Top Log Interval              | 2970 m                           |
| Casing Driller Size @ Depth   | 0.000 in @ 3119.9 m              |
| Casing Schlumberger           | 3122 m                           |
| Bit Size                      | 9.875 in                         |
| Type Fluid In Hole            | Sepiolite Sea Water Gel + Barite |
| Density                       | 1.22 g/cm3                       |
| Fluid Loss                    |                                  |
| Source Of Sample              |                                  |
| RM @ Measured Temperature     | @                                |
| RMF @ Measured Temperature    | @                                |
| RMC @ Measured Temperature    | @                                |
| Source RMF                    |                                  |
| RM @ MRT                      | @ 12                             |
| RMF @ MRT                     | @ 12                             |
| Maximum Recorded Temperatures | 12 degC                          |
| Circulation Stopped           | Time                             |
| Logger On Bottom              | 23-Feb-2010 4:00                 |
| Unit Number                   | 625003                           |
| Recorded By                   | K. Swain                         |
| Witnessed By                  | T. Williams, A. Fehr             |

|                               |          |
|-------------------------------|----------|
| 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            |          |
| Density                       |          |
| Fluid Loss                    |          |
| Source Of Sample              |          |
| RM @ Measured Temperature     | @        |
| RMF @ Measured Temperature    | @        |
| RMC @ Measured Temperature    | @        |
| Source RMF                    |          |
| RM @ MRT                      | @        |
| RMF @ MRT                     |          |
| Maximum Recorded Temperatures |          |
| Circulation Stopped           | Time     |
| Logger On Bottom              | Time     |
| Unit Number                   | Location |
| Recorded By                   |          |
| Witnessed By                  |          |

**DISCLAIMER**  
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**OTHER SERVICES1**  
 OS1:  
 OS2: FMS/DSI  
 OS3: VSI  
 OS4:  
 OS5:

**OTHER SERVICES2**  
 OS1:  
 OS2:  
 OS3:  
 OS4:  
 OS5:

**REMARKS: RUN NUMBER 1**  
 Depths referenced from rig floor in mbrf.  
 Tools run slick without stand offs as per normal operation to fit inside pipe.  
 Logging is performed through drill pipe for open hole logging.  
 Rotary Coring Bit used for drilling. No flapper valve used.  
 Downlog used for repeat section/ or pass #2 at client request.  
 Downlog flipped and played back to get the depth display in same direction.  
 APS neutron activation of gamma ray near TD is noted on log. APS was turned on prior to getting to TD and caused the gamma ray count to be elevated in area above TD as noted.

**REMARKS: RUN NUMBER 2**

| RUN 1            |          |      |
|------------------|----------|------|
| SERVICE ORDER #: |          |      |
| PROGRAM VERSION: | 17C0-154 |      |
| FLUID LEVEL:     |          |      |
| LOGGED INTERVAL  | START    | STOP |
|                  |          |      |
|                  |          |      |
|                  |          |      |
|                  |          |      |

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




## EQUIPMENT DESCRIPTION

**RUN 1**

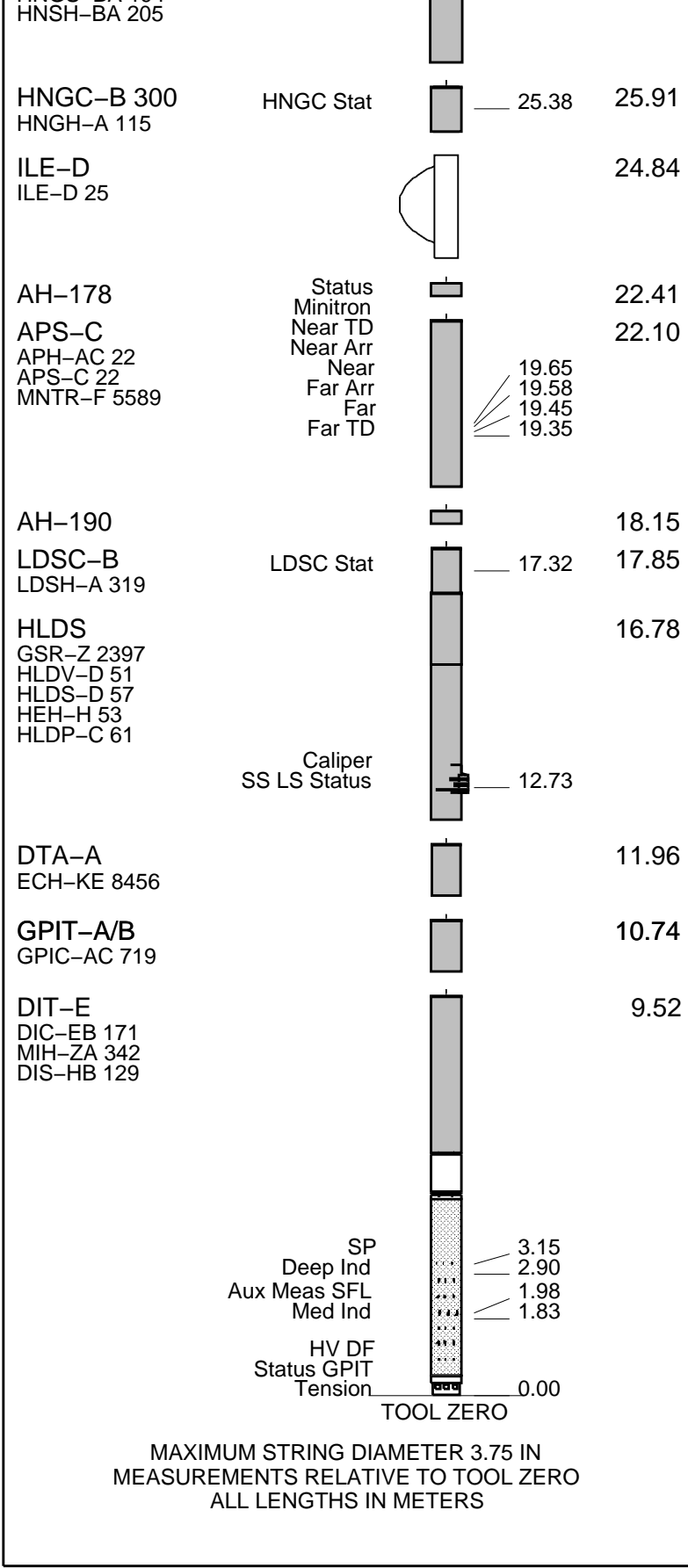
**SURFACE EQUIPMENT**

SFT-281 2  
 SFT-178 2  
 GSR-U 616008  
 WITM (DTS)-A

**DOWNHOLE EQUIPMENT**

|             |           |   |       |       |
|-------------|-----------|---|-------|-------|
| LEH-QT      |           |  |       | 30.21 |
| LEH-QT 1750 |           |   |       |       |
| DTC-H       | CTEM      |   | 29.04 |       |
| ECH-KC 9842 | TelStatus |  | 29.32 |       |
|             | ToolStatu |   | 28.41 |       |
| HNGS-BA 194 | Upper_1   |  | 27.71 | 28.41 |
| HNGS-BA 194 | Lower_2   |   | 27.50 |       |

**RUN 2**



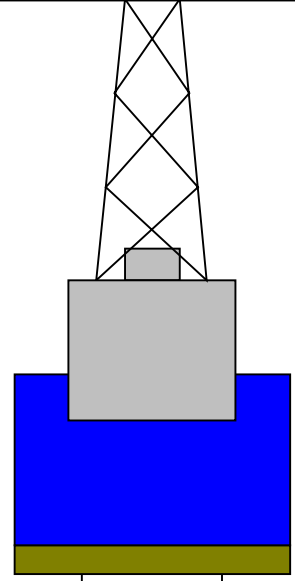
|                   |      |     |                |     |      |               |
|-------------------|------|-----|----------------|-----|------|---------------|
| Production String | (in) | (M) | Well Schematic | (M) | (in) | Casing String |
|                   | OD   | ID  |                | MD  | MD   |               |

Kelly Bushing Elevation  
Derrick Floor Elevation

11.0  
11.0

Mean Sea Level

0.0



3023 4.20

Sea Floor



3023 9.875

3119.9 3.80

Borehole Segment

Open Hole

3625.2

### Input DLIS Files

DEFAULT      PI\_LDL\_APS\_NGS\_010LUP      FN:13    PRODUCER    23-Feb-2010 03:58    3625.6 M      2970.1 M

### Output DLIS Files

DEFAULT      PI\_LDL\_APS\_NGS\_035PUP      FN:46    PRODUCER    06-Mar-2010 18:29    3625.6 M      2970.1 M

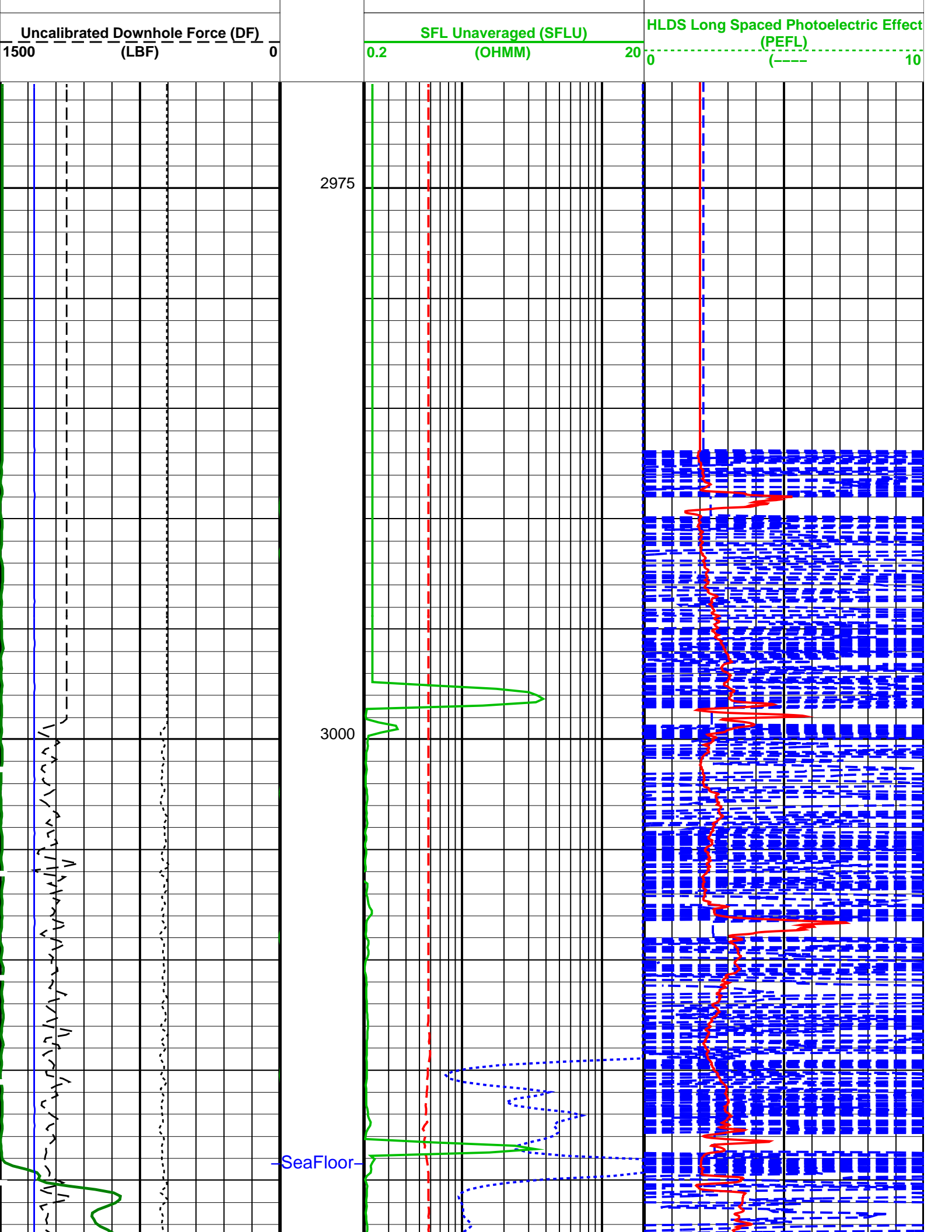
### OP System Version: 17C0-154

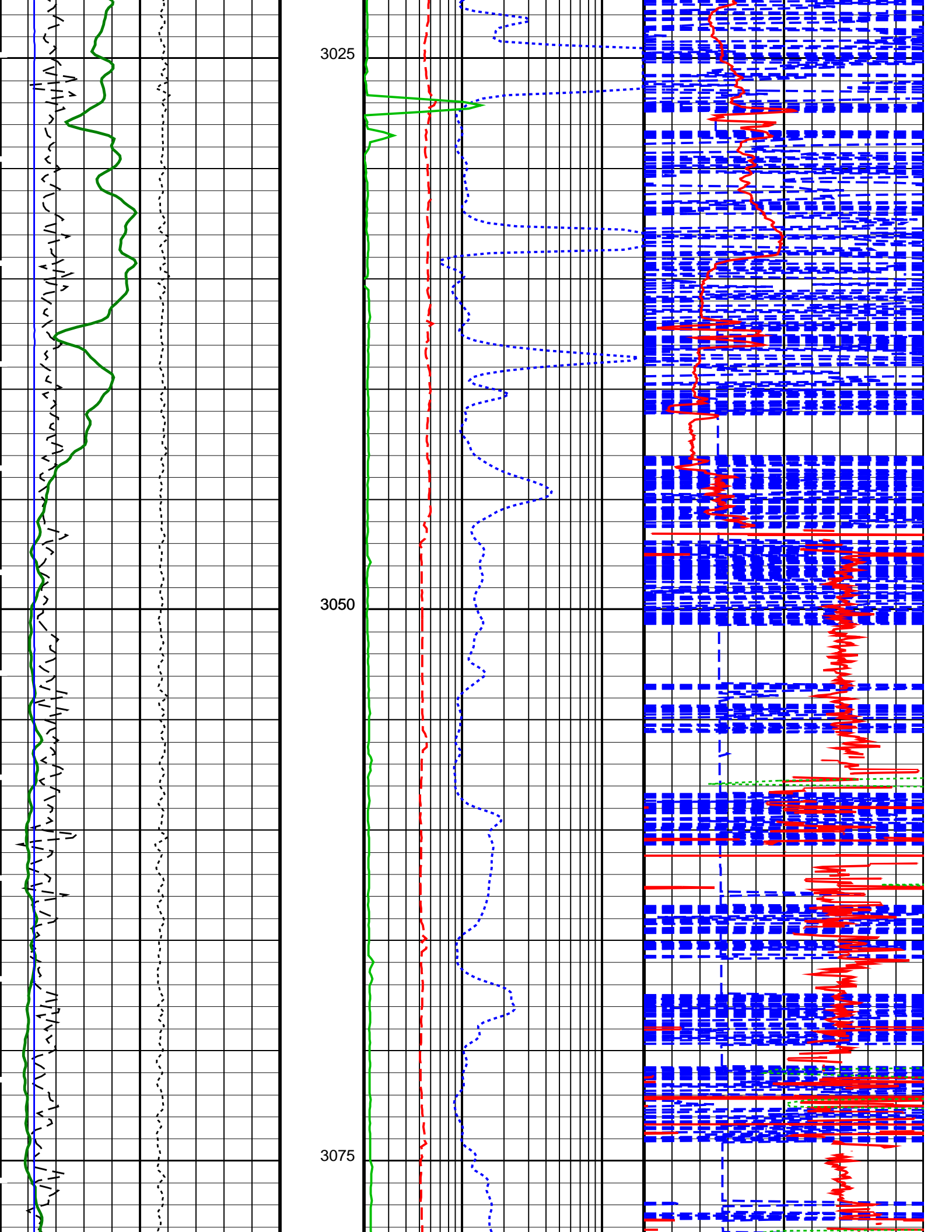
|        |          |          |                             |
|--------|----------|----------|-----------------------------|
| DIT-E  | 17C0-154 | GPIT-A/B | SRPC-3870_Q3_2009_OP17_V3_b |
| DTA-A  | 17C0-154 | HLDS     | 17C0-154                    |
| LDSC-B | 17C0-154 | APS-C    | 17C0-154                    |
| HNGC-B | 17C0-154 | HNGS-BA  | 17C0-154                    |
| DTC-H  | 17C0-154 |          |                             |

### PIP SUMMARY

Time Mark Every 60 S

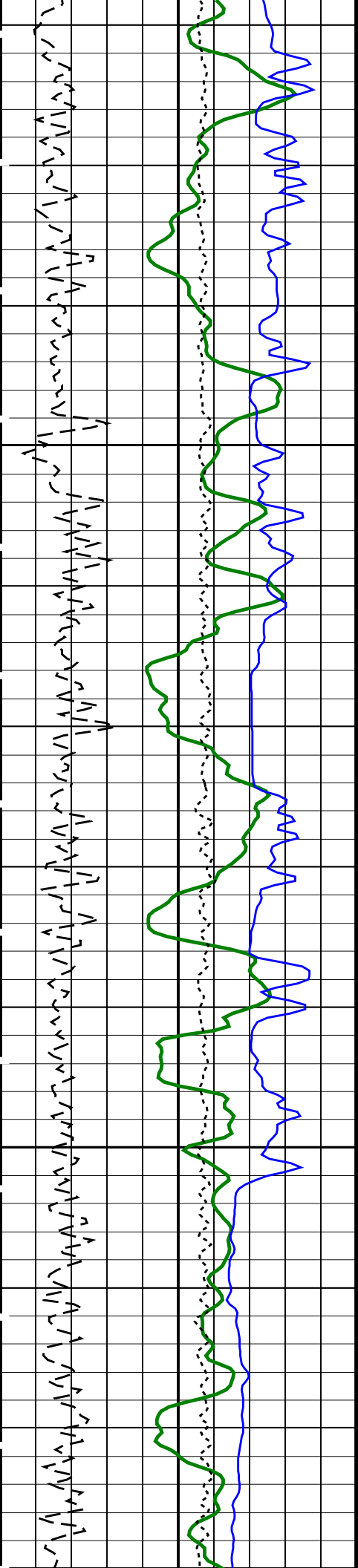
|   |  |   |   |
|---|--|---|---|
| <b>HNGS Spectroscopy Gamma Ray (HSGR)</b><br>0 (GAPI) 100 |  | Uplog #1  |   |
| Tension (TENS)<br>10000 (LBF) 0                           |  |   |   |
| <b>HLDS Caliper (LCAL)</b><br>0 (IN) 20                   |  | Medium Induction Phasor-processed Resistivity (IMPH)<br>0.2 (OHMM) 20 | HLDS HR Bulk Density (HROM)<br>0 (G/C3) 4                         |
|   |  | Deep Induction Phasor-processed Resistivity (IDPH)<br>0.2 (OHMM) 20   | APS HR Near/Far Corrected Limestone Porosity (HFLC)<br>100 (PU) 0 |





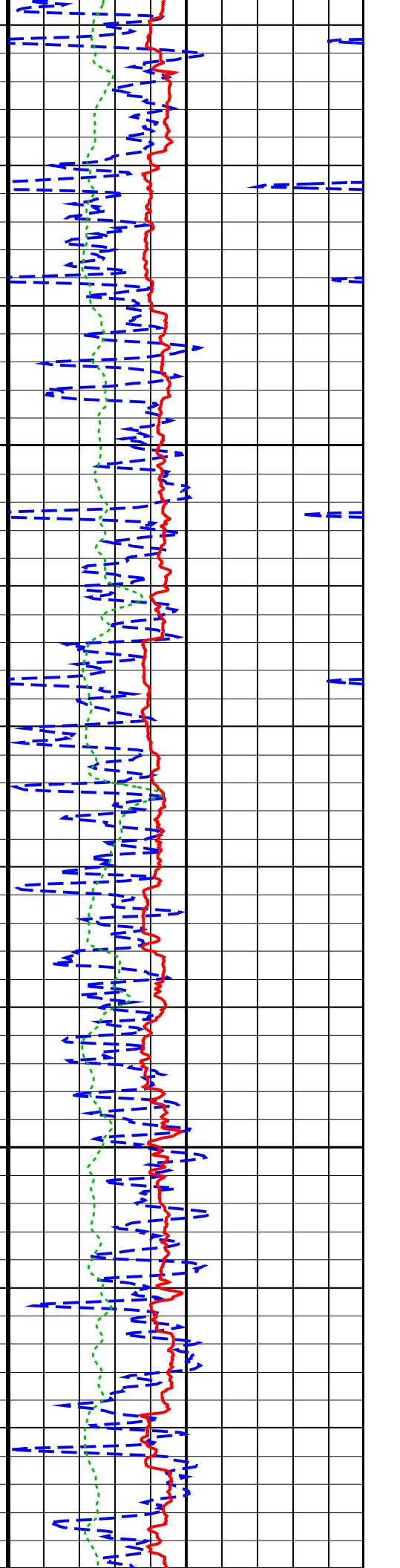
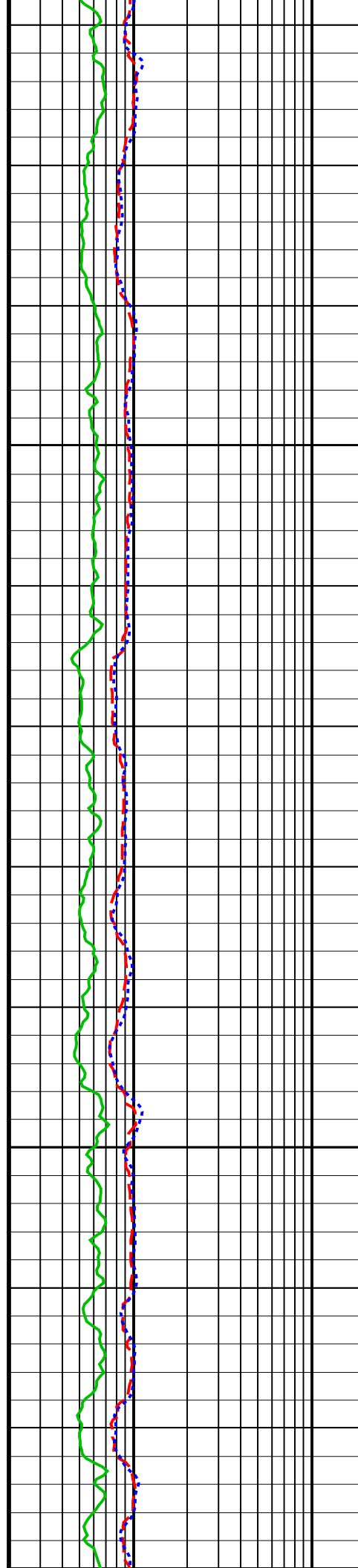


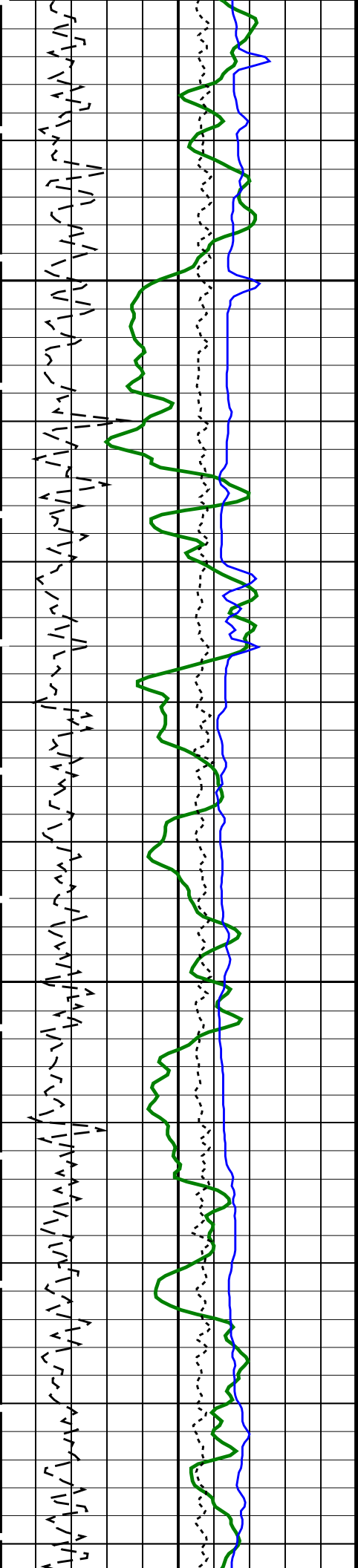




3150

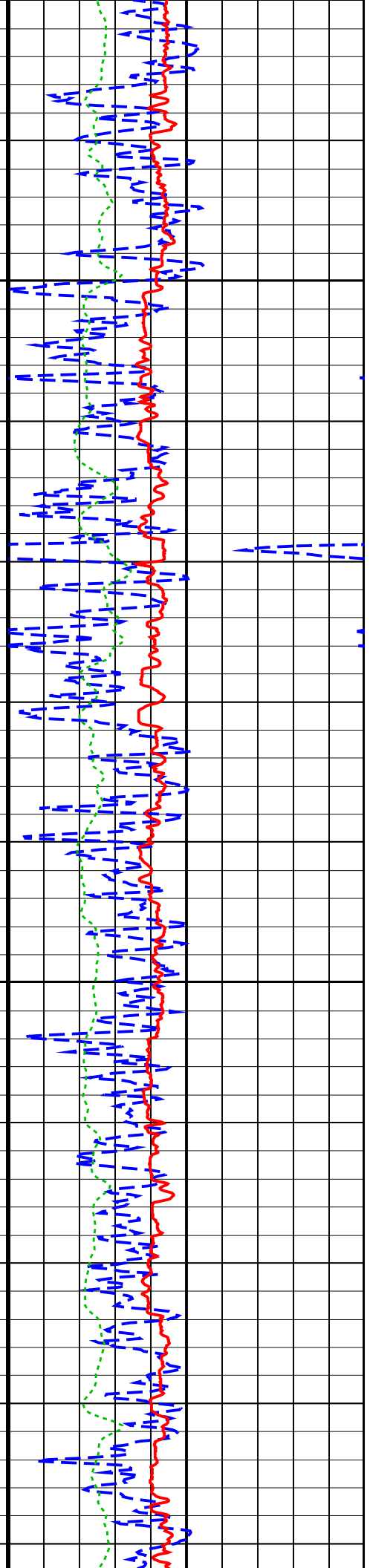
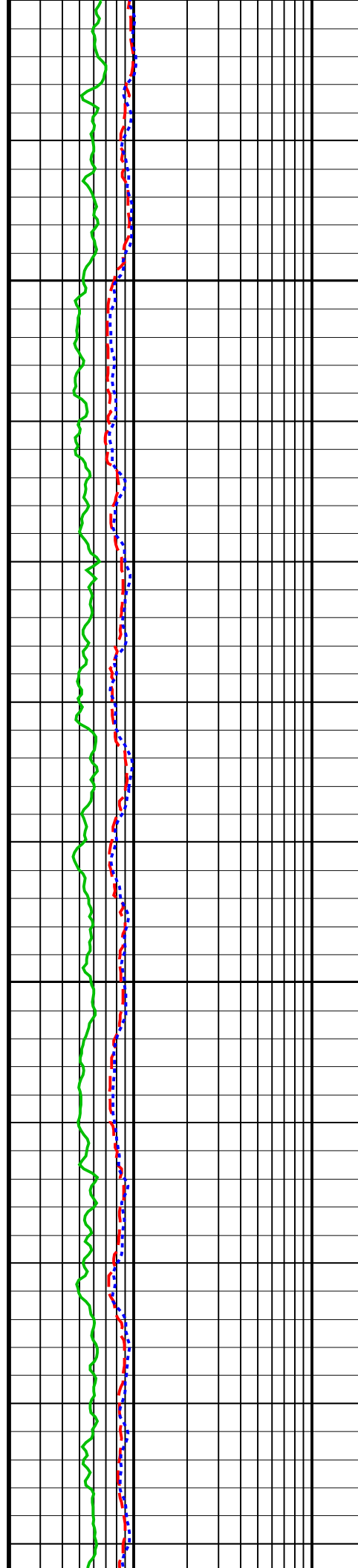
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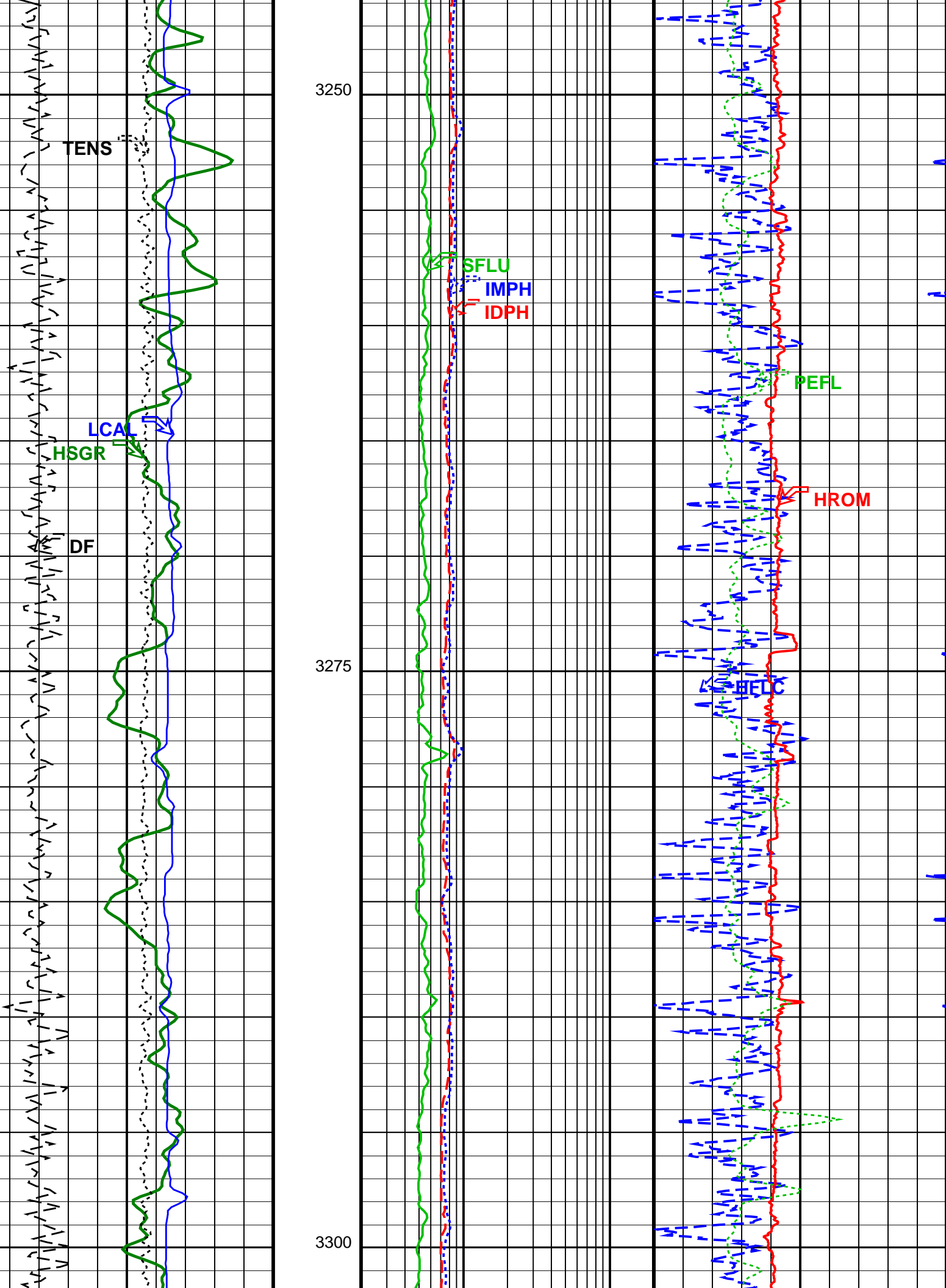


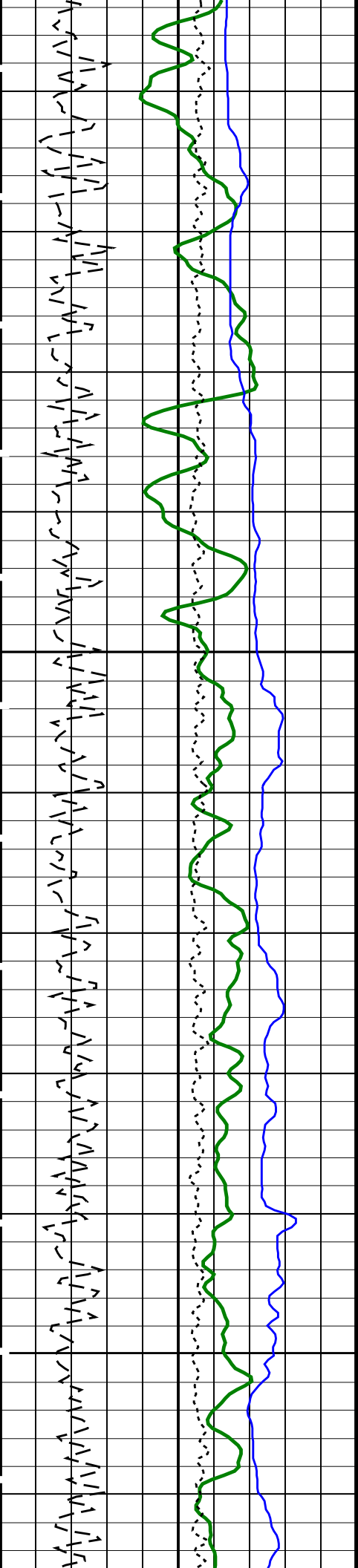


3200

3225

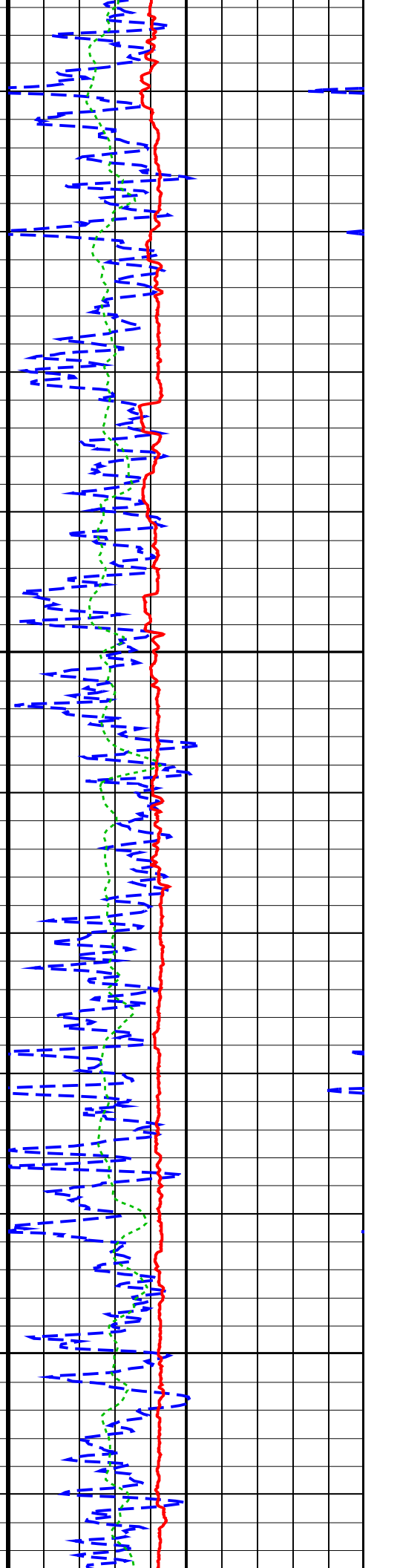
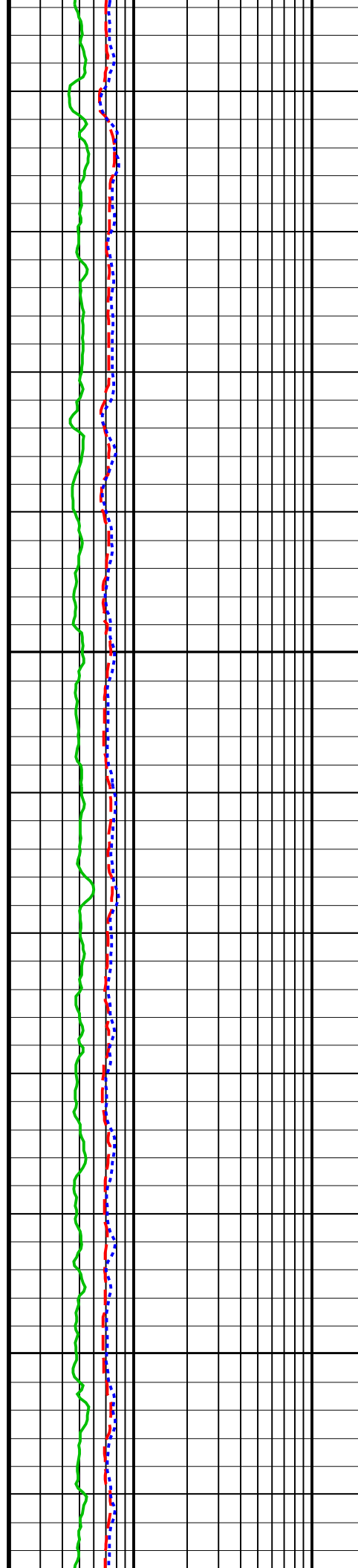


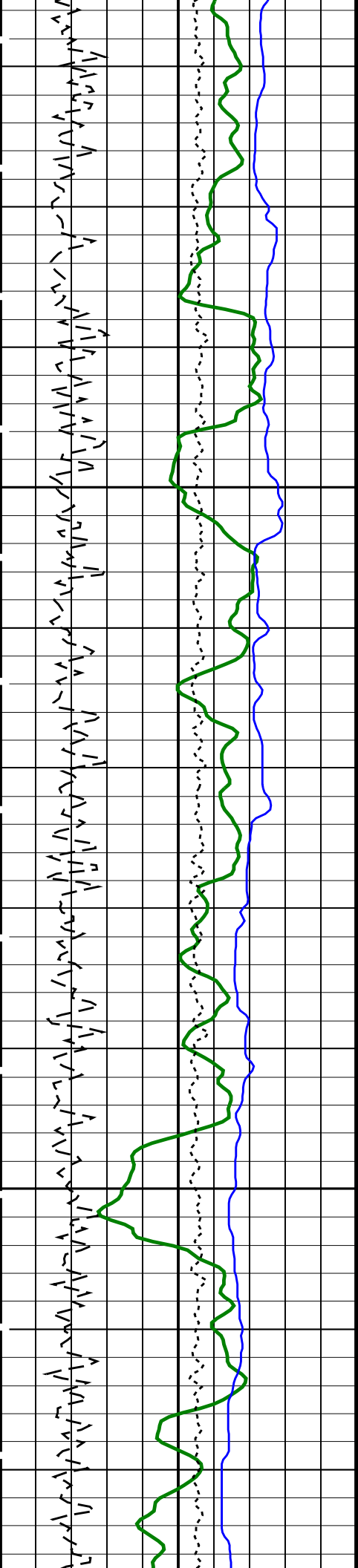




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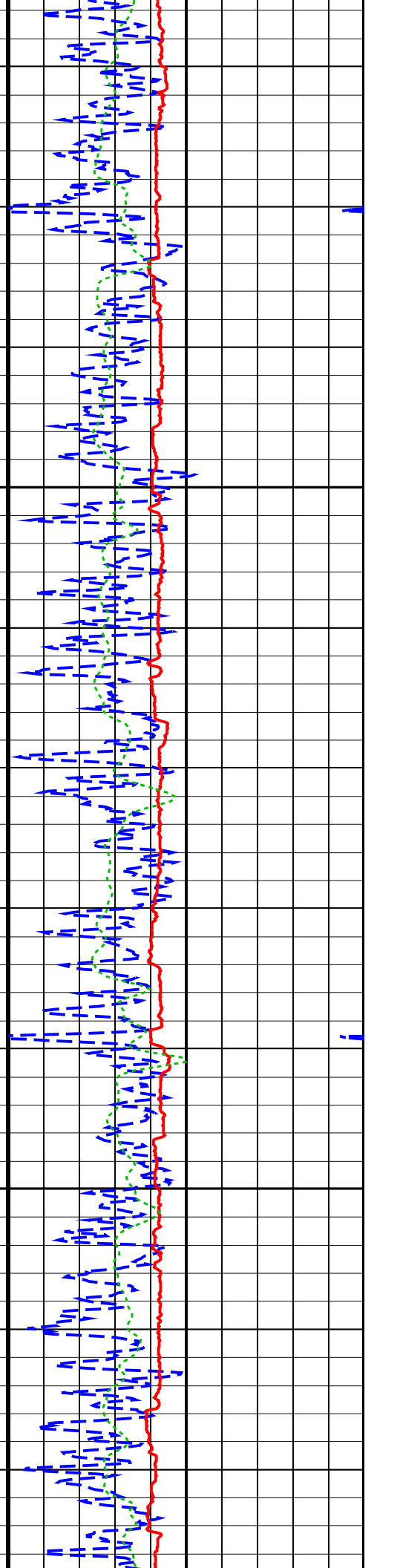
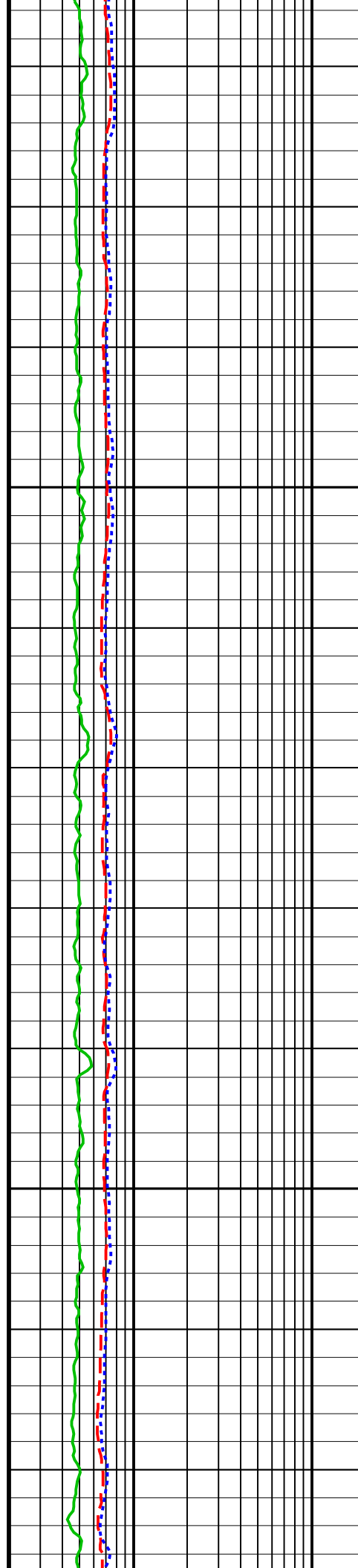
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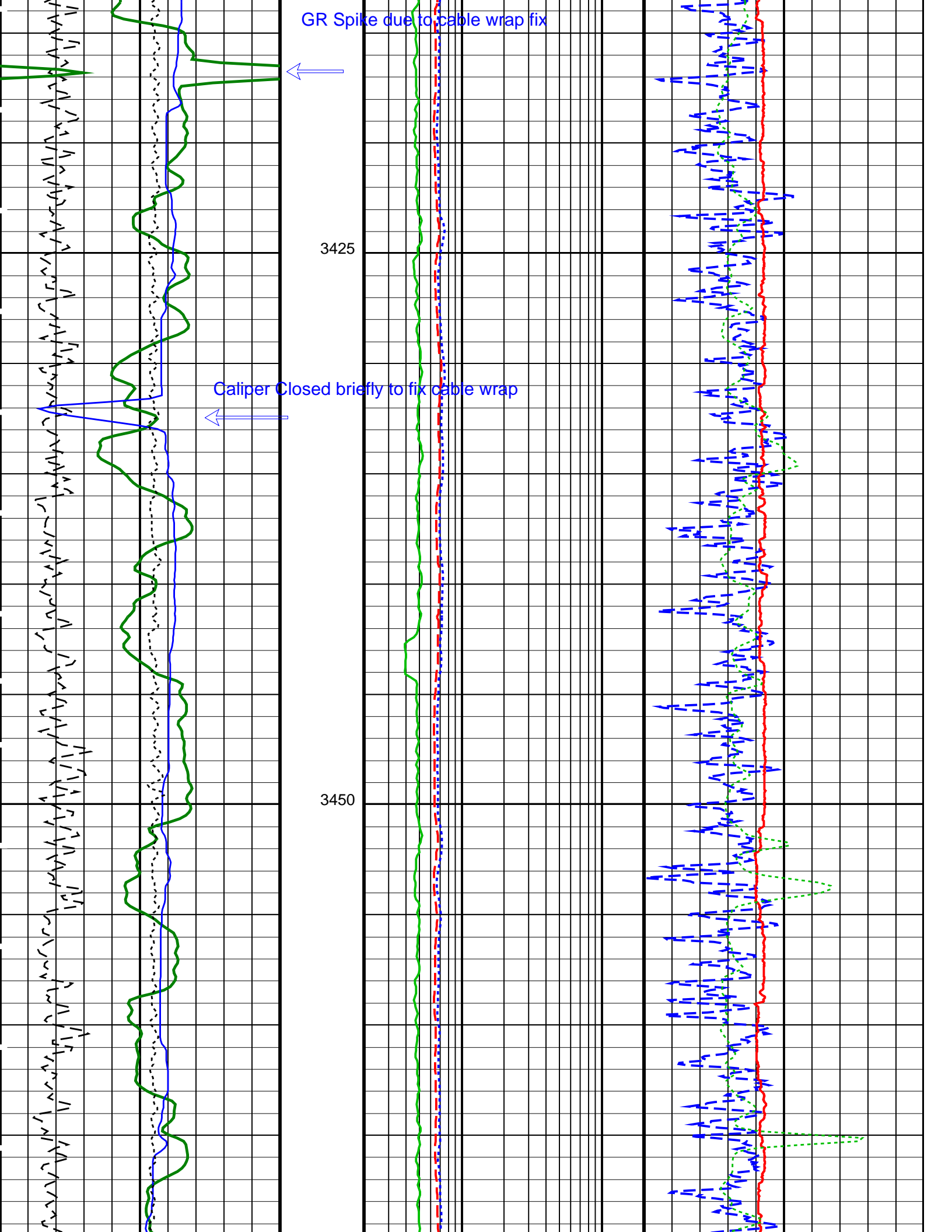


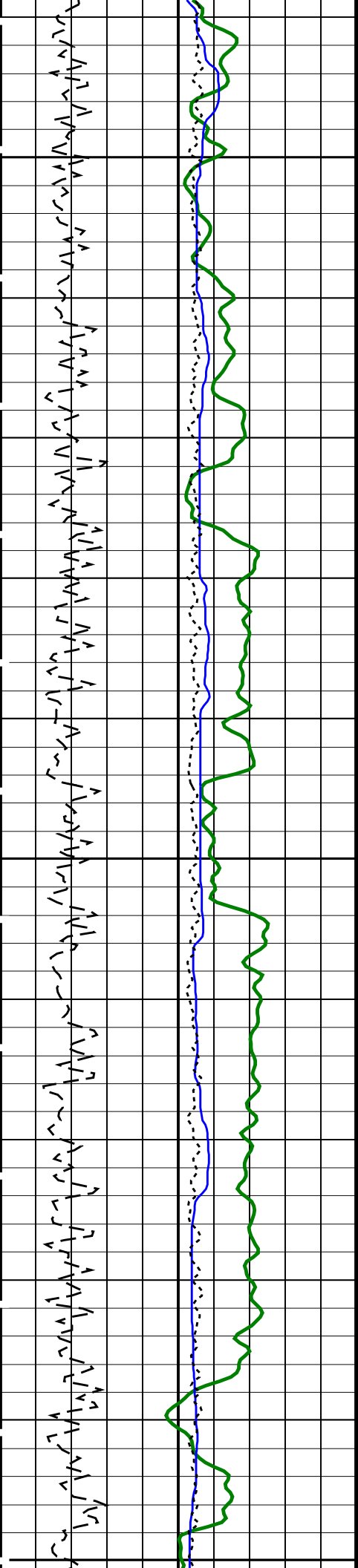


3375

3400



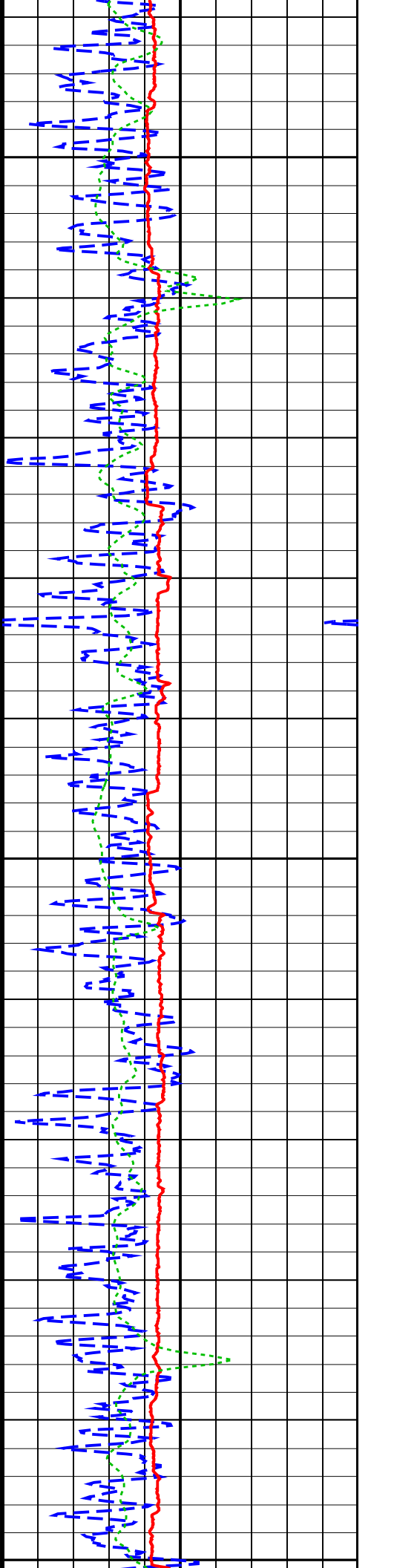
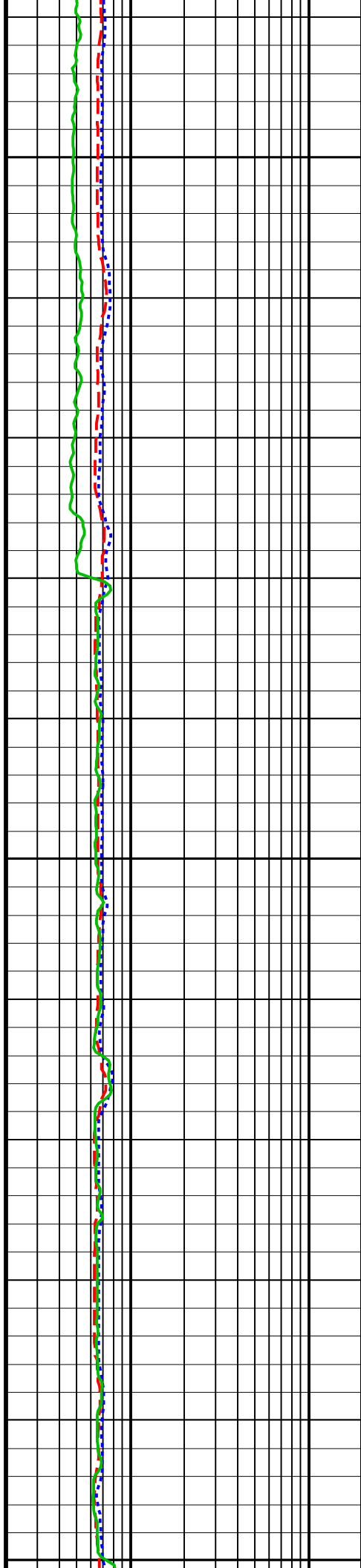


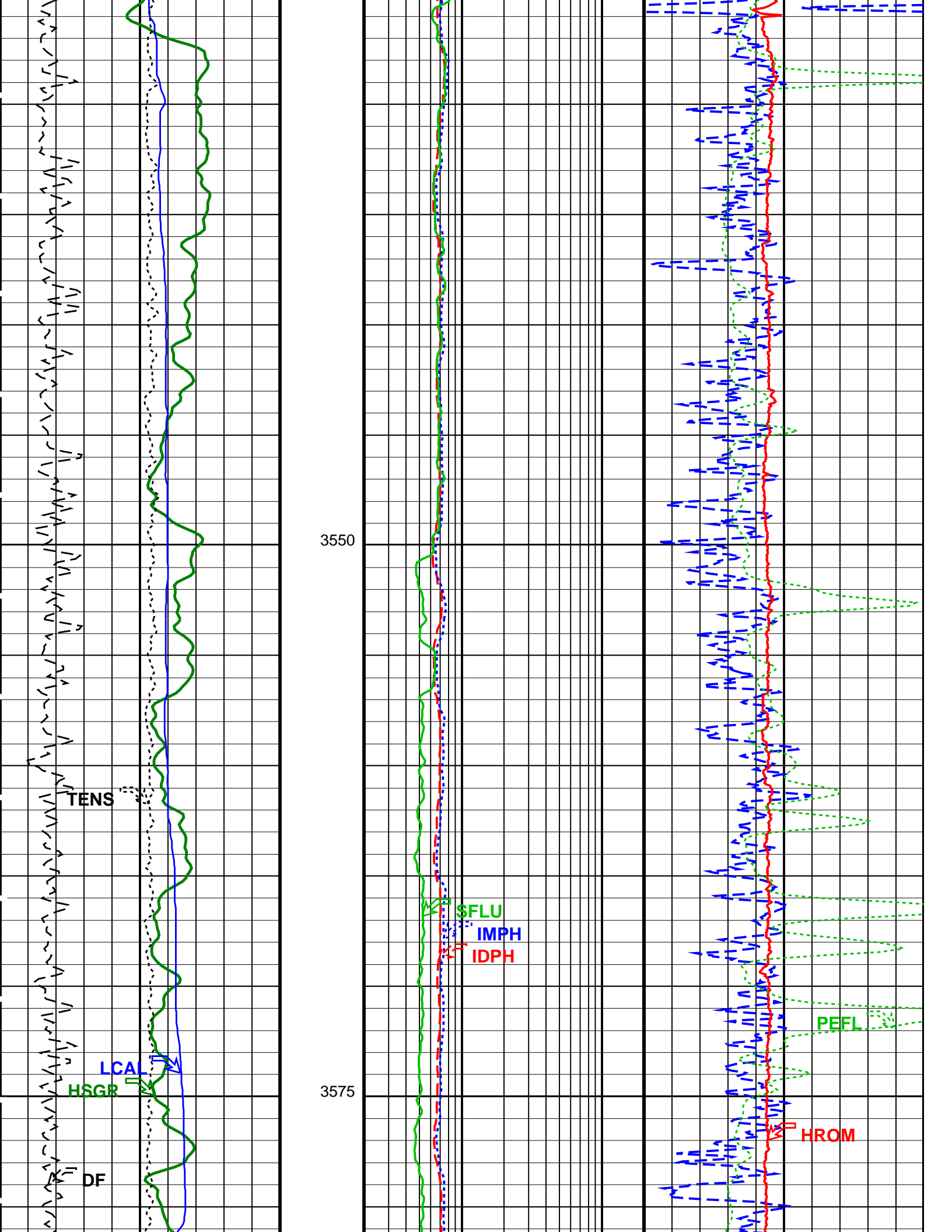


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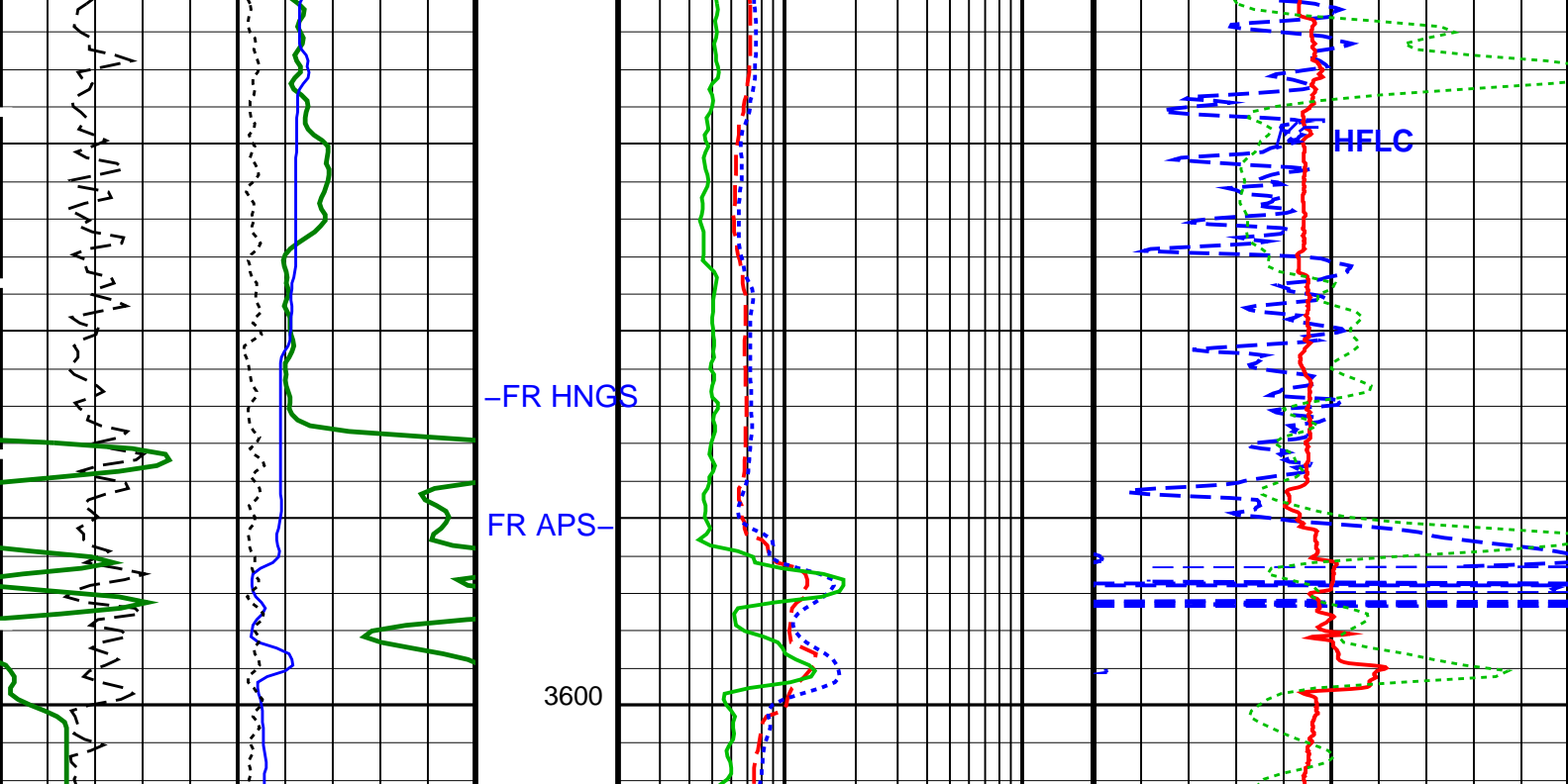
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3525

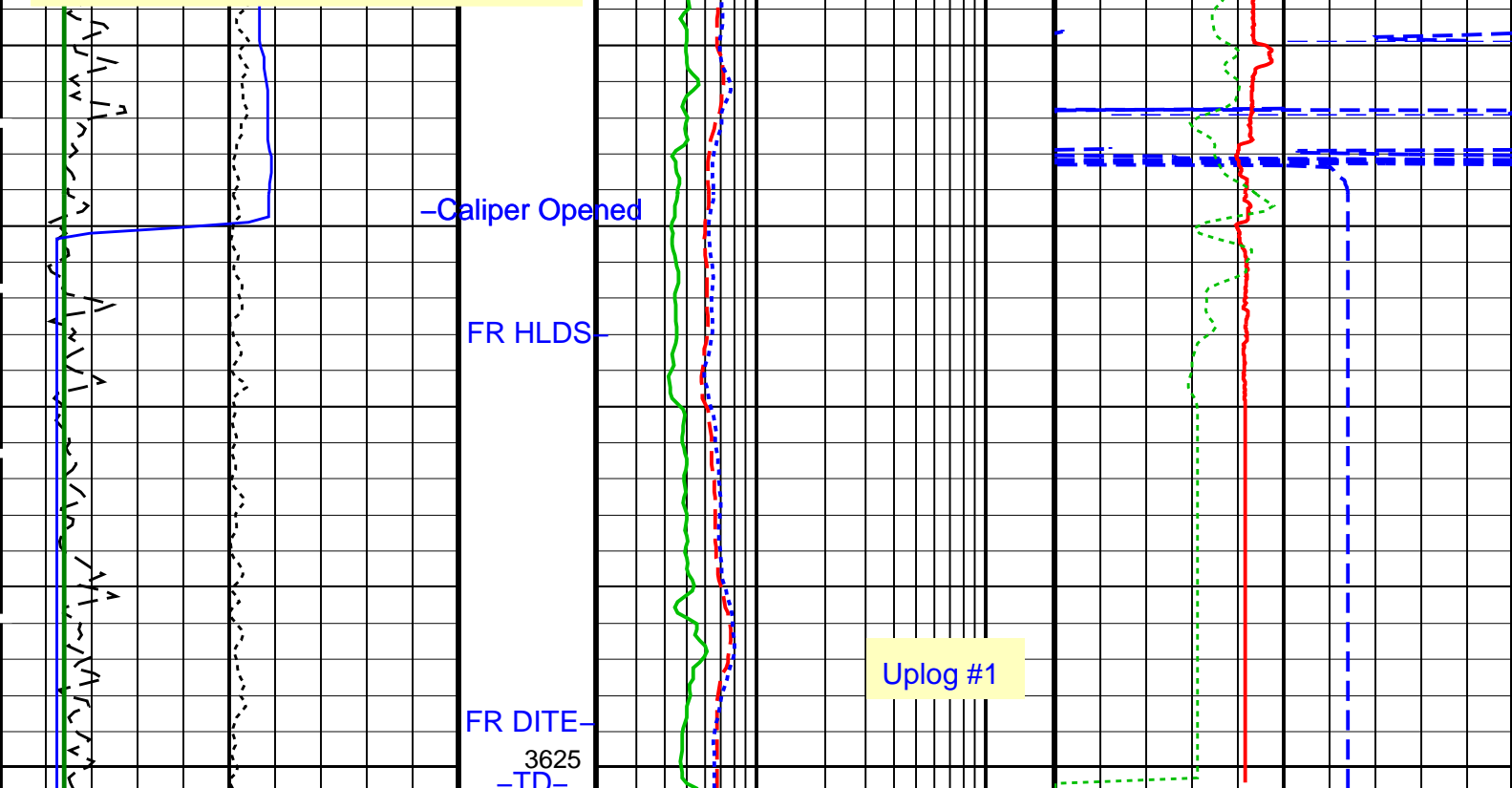




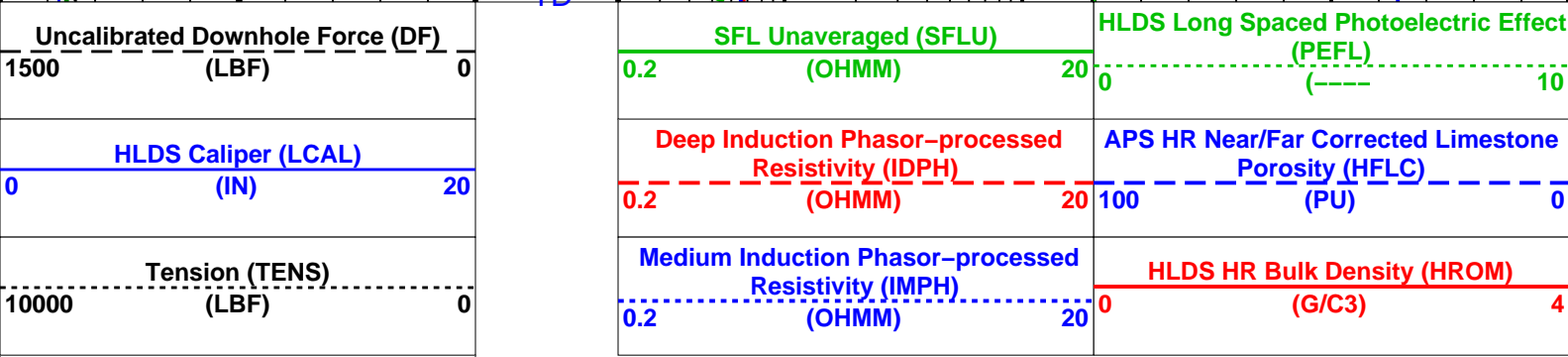




HNGS Activation due to APS to 3592 m



Uplog #1



## PIP SUMMARY

Time Mark Every 60 S

## Parameters

| DLIS Name                                     | Description   | Value               |      |
|---|---|---------------------|------|
| <b>DIT-E: Dual Induction - E</b>              |   |                     |      |
| BHS   | Borehole Status   | OPEN                |      |
| BHT   | Bottom Hole Temperature (used in calculations)                        | 15.5556             | DEGC |
| DGF2  | Deep 20 kHz Gain Factor   | 0.979119            |      |
| DPH2  | Deep 20 kHz Phase Shift   | 0.0159963           | DEG  |
| DRE2  | Deep Real 20 kHz Sonde Error Correction                               | 17.0457             | MM/M |
| DSR2  | Deep Sigma Reference (20 kHz)   | 1843                | MM/M |
| DXE2  | Deep Quad 20 kHz Sonde Error Correction                               | 136.154             | MM/M |
| GCSE  | Generalized Caliper Selection   | BS                  |      |
| GDEV  | Average Angular Deviation of Borehole from Normal                     | 0                   | DEG  |
| GGRD  | Geothermal Gradient   | 0.018227            | DC/M |
| GRSE  | Generalized Mud Resistivity Selection                                 | CHART_GEN 9         |      |
| GTSE  | Generalized Temperature Selection                                     | LINEAR_ESTIMATE     |      |
| IFRS  | DIT-E Induction Frequency Selector                                    | 20                  |      |
| IPHA  | DIT-E Phasor Processing Mode  | ALL                 |      |
| IPRO  | DIT-E Induction Processing Selector                                   | PHASOR              |      |
| ISSBAR  | Barite Mud Switch   | NOBARITE            |      |
| ITEN  | DIT-E Temperature Enable  | ENABLE              |      |
| MATR  | Rock Matrix for Neutron Porosity Corrections                          | LIMESTONE           |      |
| MGF2  | Medium 20 kHz Gain Factor   | 0.974788            |      |
| MPH2  | Medium 20 kHz Phase Shift   | -0.199528           | DEG  |
| MRE2  | Medium Real 20 kHz Sonde Error Correction                             | 11.3259             | MM/M |
| MSR2  | Medium Sigma Reference (20 kHz)                                       | 3250                | MM/M |
| MXE2  | Medium Quad 20 kHz Sonde Error Correction                             | 172.606             | MM/M |
| SBR   | Shoulder Bed Resistivity Factor                                       | 1                   | OHMM |
| SFCR  | SFL Channel Ratio   | 1000                |      |
| SFLE  | SFL Enable  | ENABLE              |      |
| SHT   | Surface Hole Temperature  | 3                   | DEGC |
| SPAЕ  | DIT-E SPARC Processing Enable   | ENABLE              |      |
| SPNV  | SP Next Value   | 0                   | MV   |
| <b>GPIT-A/B: General Purpose Inclinometer</b> |   |                     |      |
| ACPP  | Accelerometer PROM Presence   | PRESENT             |      |
| AFMO  | Accelerometer Filtering Mode  | MOVING_AVERAGE      |      |
| ART   | Accelerometer Reference Temperature                                   | 20                  | DEGC |
| GLM   | GPIT Logging Mode   | DIPM                |      |
| ICMO  | Inclinometry Computation Mode   | AUTOMATIC_SELECTION |      |
| MAPP  | Magnetometer PROM Presence  | PRESENT             |      |
| MDEC  | Magnetic Field Declination  | 82.7472             | DEG  |
| MRTE  | Magneto Reference Temperature   | 19                  | DEGC |
| TEMS  | GPIT Temperature Sensor Used  | BOTH                |      |
| U-GPOF  | Playback OLD VERSION GPIT FILE (BEFORE OP14 + SRPC-3098-FEB_2006_C) ? | NO                  |      |
| <b>HLDS: Hostile Litho-Density Sonde</b>      |   |                     |      |
| CLCL  | HLDS LS Control Loop Controller Mode                                  | AUTO_DEFAULT        |      |
| CLCS  | HLDS SS Control Loop Controller Mode                                  | AUTO_DEFAULT        |      |
| CLLS  | HLDS Mode Loop Long Spacing   | AUTO                |      |
| CLSS  | HLDS Mode Loop Short Spacing  | AUTO                |      |
| DHC   | Density Hole Correction   | BS                  |      |
| DPPM  | Density Porosity Processing Mode                                      | HIRS                |      |
| FD  | Fluid Density   | 1                   | G/C3 |
| LATC  | HLDS Activation Correction  | ON                  |      |
| LLDL  | HLDS LS Low Level Discriminator DAC                                   | 14000               |      |
| LLDS  | HLDS SS Low Level Discriminator DAC                                   | 14000               |      |
| LLML  | HLDS LS Low Level Discriminator Mode                                  | AUTO                |      |
| LLMS  | HLDS SS Low Level Discriminator Mode                                  | AUTO                |      |
| MDEN  | Matrix Density  | 2.71                | G/C3 |
| PHVL  | HLDS Long Spacing High Voltage Setting                                | 1000                | V    |
| PHVS  | HLDS Short Spacing High Voltage Setting                               | 1000                | V    |
| PSDL  | HLDS LS Pulse Shape Compensation DAC                                  | 30000               |      |
| PSDS  | HLDS SS Pulse Shape Compensation DAC                                  | 30000               |      |
| PSML  | HLDS LS Pulse Shape Compensation Mode                                 | AUTO                |      |
| PSMS  | HLDS SS Pulse Shape Compensation Mode                                 | AUTO                |      |
| <b>APS-C: Accelerator-Porosity Tool</b>       |   |                     |      |
| AASD  | APS Software Version  | 0                   |      |
| ADSO  | APS Thermal and Array Detectors High Voltage Setting                  | 1967.87             | V    |
| AFSD  | APS Array Detectors Data Source Switch                                | Both                |      |
| AHCS  | APS Far Detector High Voltage Setting                                 | 2098.2              | V    |
| AHCS  | APS Holesize Correction Source  | BS                  |      |
| AHSS  | APS Holesize Correction Switch  | ON                  |      |
| AMTY  | APS Environmental Corrections Mud Type                                | WaterBaseBarite     |      |
| ANSD  | APS Near Detector High Voltage Setting                                | 1738.17             | V    |
| ASOS  | APS Standoff Correction Switch  | ON                  |      |
| ATSS  | APS Temperature-Pressure-Salinity Correction Switch                   | ON                  |      |
| BHFL_APS                                      | APS TNPH Borehole Fluid Type  | WATER               |      |

|          |   |                 |      |
|----------|---|-----------------|------|
| BHS      | Borehole Status                                   | OPEN            |      |
| BHT      | Bottom Hole Temperature (used in calculations)    | 15.5556         | DEGC |
| BSCO_APS | APS TNPH Borehole Salinity Correction Option      | NO              |      |
| DPPM     | Density Porosity Processing Mode                  | HIRS            |      |
| DSCO_APS | APS TNPH Density Source                           | COMPUTED        |      |
| FSAL     | Formation Salinity                                | -50000          | PPM  |
| FSCO_APS | APS TNPH Formation Salinity Correction Option     | NO              |      |
| GCSE     | Generalized Caliper Selection                     | BS              |      |
| GDEV     | Average Angular Deviation of Borehole from Normal | 0               | DEG  |
| GGRD     | Geothermal Gradient                               | 0.018227        | DC/M |
| GRSE     | Generalized Mud Resistivity Selection             | CHART_GEN 9     |      |
| GTSE     | Generalized Temperature Selection                 | LINEAR_ESTIMATE |      |
| HSCO_APS | APS TNPH Hole Size Correction Option              | YES             |      |
| ISSBAR   | Barite Mud Switch                                 | NOBARITE        |      |
| MATR     | Rock Matrix for Neutron Porosity Corrections      | LIMESTONE       |      |
| MCCO_APS | APS TNPH Mud Cake Correction Option               | NO              |      |
| MCOR_APS | APS TNPH Mud Correction                           | NATU            |      |
| MWCO_APS | APS TNPH Mud Weight Correction Option             | YES             |      |
| NARC     | APS Near/Array Calibration Ratio                  | 1.06031         |      |
| NFRC     | APS Near/Far Calibration Ratio                    | 0.890147        |      |
| PTCO_APS | APS TNPH Pressure/Temperature Correction Option   | YES             |      |
| SHT      | Surface Hole Temperature                          | 3               | DEGC |
| TNCO_APS | APS TNPH Computation Option                       | NO              |      |

**HNGS-BA: Hostile Natural**

|        |  |                 |      |
|--------|--|-----------------|------|
| BAR1   | HNGS Detector 1 Barite Constant                        | 1               |      |
| BAR2   | HNGS Detector 2 Barite Constant                        | 1               |      |
| BHK    | HNGS Borehole Potassium Correction Concentration       | 0               |      |
| BHS    | Borehole Status  | OPEN            |      |
| BHT    | Bottom Hole Temperature (used in calculations)         | 15.5556         | DEGC |
| CSD1   | Inner Casing Outer Diameter                            | 0               | IN   |
| CSD2   | Outer Casing Outer Diameter                            | 0               | IN   |
| CSW1   | Inner Casing Weight                                    | 0               | LB/F |
| CSW2   | Outer Casing Weight                                    | 0               | LB/F |
| DBCC   | HNGS Barite Constant Correction Flag                   | NONE            |      |
| GCSE   | Generalized Caliper Selection                          | BS              |      |
| GDEV   | Average Angular Deviation of Borehole from Normal      | 0               | DEG  |
| GGRD   | Geothermal Gradient                                    | 0.018227        | DC/M |
| GRSE   | Generalized Mud Resistivity Selection                  | CHART_GEN 9     |      |
| GTSE   | Generalized Temperature Selection                      | LINEAR_ESTIMATE |      |
| H1P    | HNGS Detector 1 Allow/Disallow In Processing           | ALLOW           |      |
| H2P    | HNGS Detector 2 Allow/Disallow In Processing           | ALLOW           |      |
| HABK   | HNGS Borehole Potassium Running Average                | 0.00608072      |      |
| HALF   | HNGS Alpha Filter Length                               | 60              | IN   |
| HCRB   | HNGS Apply Borehole Potassium Correction               | NONE            |      |
| HMWM   | Mud Weighting Material                                 | BARI            |      |
| HNPE   | HNGS Processing Enable                                 | YES             |      |
| ISSBAR | Barite Mud Switch                                      | NOBARITE        |      |
| MATR   | Rock Matrix for Neutron Porosity Corrections           | LIMESTONE       |      |
| S1BI   | HNGS Detector 1 Calibration Bismuth Count Rate         | 1.3             | CPS  |
| S2BI   | HNGS Detector 2 Calibration Bismuth Count Rate         | 1.3             | CPS  |
| SGRC   | HNGS Standard Gamma-Ray Correction Flag                | YES             |      |
| SHT    | Surface Hole Temperature                               | 3               | DEGC |
| TPOS   | Tool Position  | ECCE            |      |
| VBA1   | HNGS Detector 1 Variable Barite Factor Running Average | 0.956891        |      |
| VBA2   | HNGS Detector 2 Variable Barite Factor Running Average | 0.947202        |      |

**System and Miscellaneous**

|          |  |                     |      |
|----------|--|---------------------|------|
| ALTDCHAN | Name of alternate depth channel          | SpeedCorrectedDepth |      |
| BS       | Bit Size                                 | 9.875               | IN   |
| BSAL     | Borehole Salinity                        | -50000.00           | PPM  |
| CSIZ     | Current Casing Size                      | 0.000               | IN   |
| CWEI     | Casing Weight                            | 0.00                | LB/F |
| DFD      | Drilling Fluid Density                   | 1.22                | G/C3 |
| DO       | Depth Offset for Playback                | 0.0                 | M    |
| FLEV     | Fluid Level                              | -50000.00           | M    |
| MST      | Mud Sample Temperature                   | -50000.00           | DEGC |
| PBVSADP  | Use alternate depth channel for playback | NO                  |      |
| PP       | Playback Processing                      | NORMAL              |      |
| RMFS     | Resistivity of Mud Filtrate Sample       | -50000.0000         | OHMM |
| RW       | Resistivity of Connate Water             | 1.0000              | OHMM |
| TD       | Total Depth                              | 3626                | M    |
| TDD      | Total Depth - Driller                    | 3630.00             | M    |
| TDL      | Total Depth - Logger                     | 3630.00             | M    |
| TWS      | Temperature of Connate Water Sample      | 37.78               | DEGC |

Format: TripleCombo    Vertical Scale: 1:200    Graphics File Created: 06-Mar-2010 18:29

**OP System Version: 17C0-154**

|        |          |          |                             |
|--------|----------|----------|-----------------------------|
| DIT-E  | 17C0-154 | GPIT-A/B | SRPC-3870_Q3_2009_OP17_V3_b |
| DTA-A  | 17C0-154 | HLDS     | 17C0-154                    |
| LDSC-B | 17C0-154 | APS-C    | 17C0-154                    |
| HNGC-B | 17C0-154 | HNGS-BA  | 17C0-154                    |
| DTC-H  | 17C0-154 |          |                             |

### Input DLIS Files

DEFAULT PI\_LDL\_APS\_NGS\_010LUP FN:13 PRODUCER 23-Feb-2010 03:58 3625.6 M 2970.1 M

### Output DLIS Files

DEFAULT PI\_LDL\_APS\_NGS\_035PUP FN:46 PRODUCER 06-Mar-2010 18:29

### Input DLIS Files

DEFAULT Flip\_PI\_LDL\_APS\_NGS\_033LUP PRODUCER 06-Mar-2010 18:19 3623.3 M 2990.1 M

### Output DLIS Files

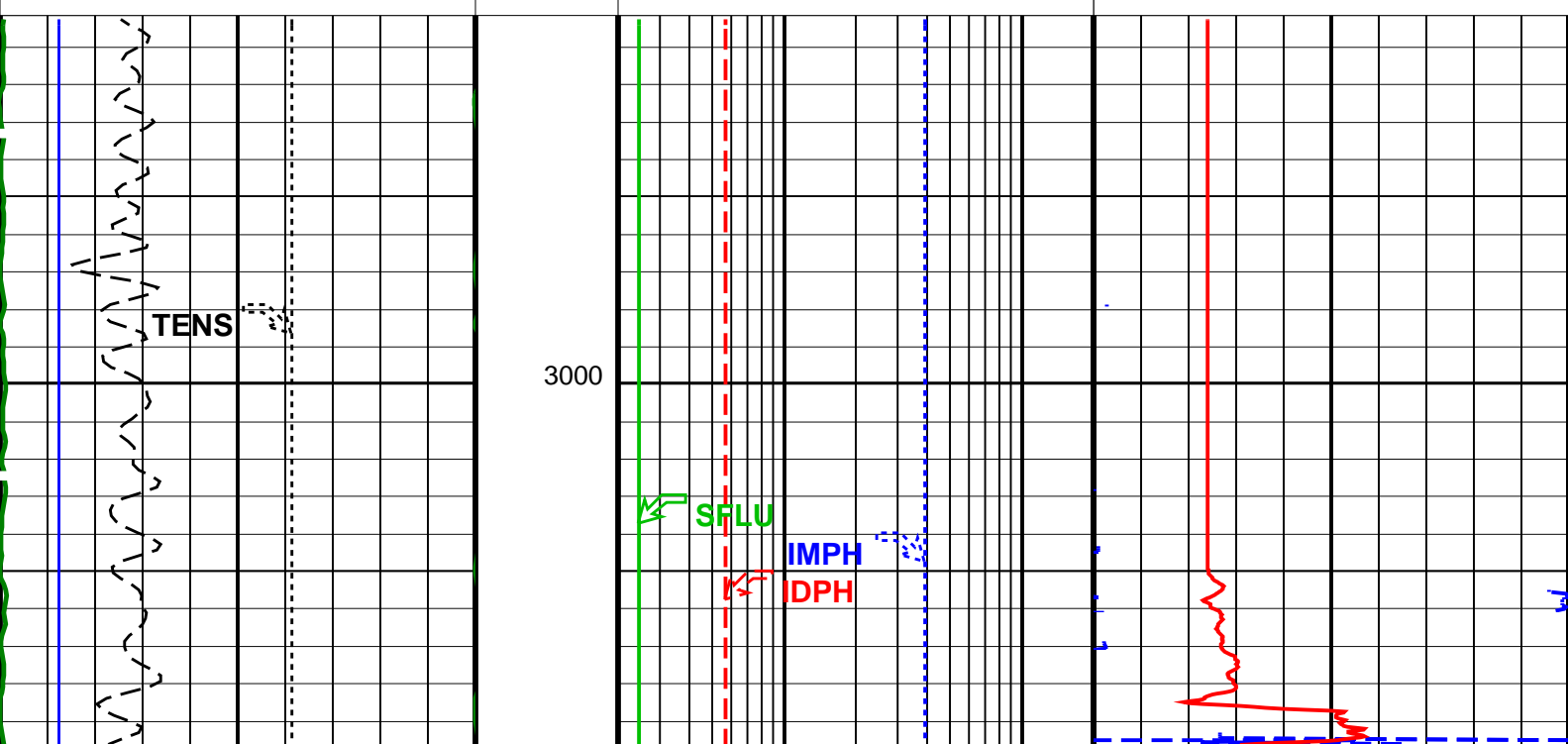
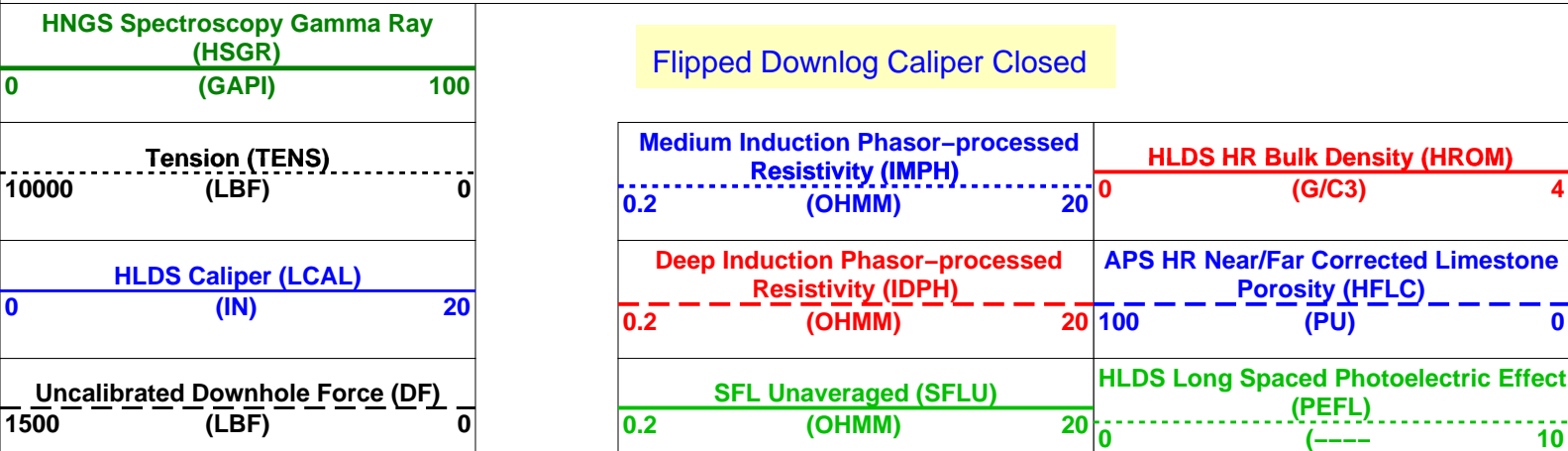
DEFAULT PI\_LDL\_APS\_NGS\_034PUP FN:45 PRODUCER 06-Mar-2010 18:28 3623.3 M 2990.1 M

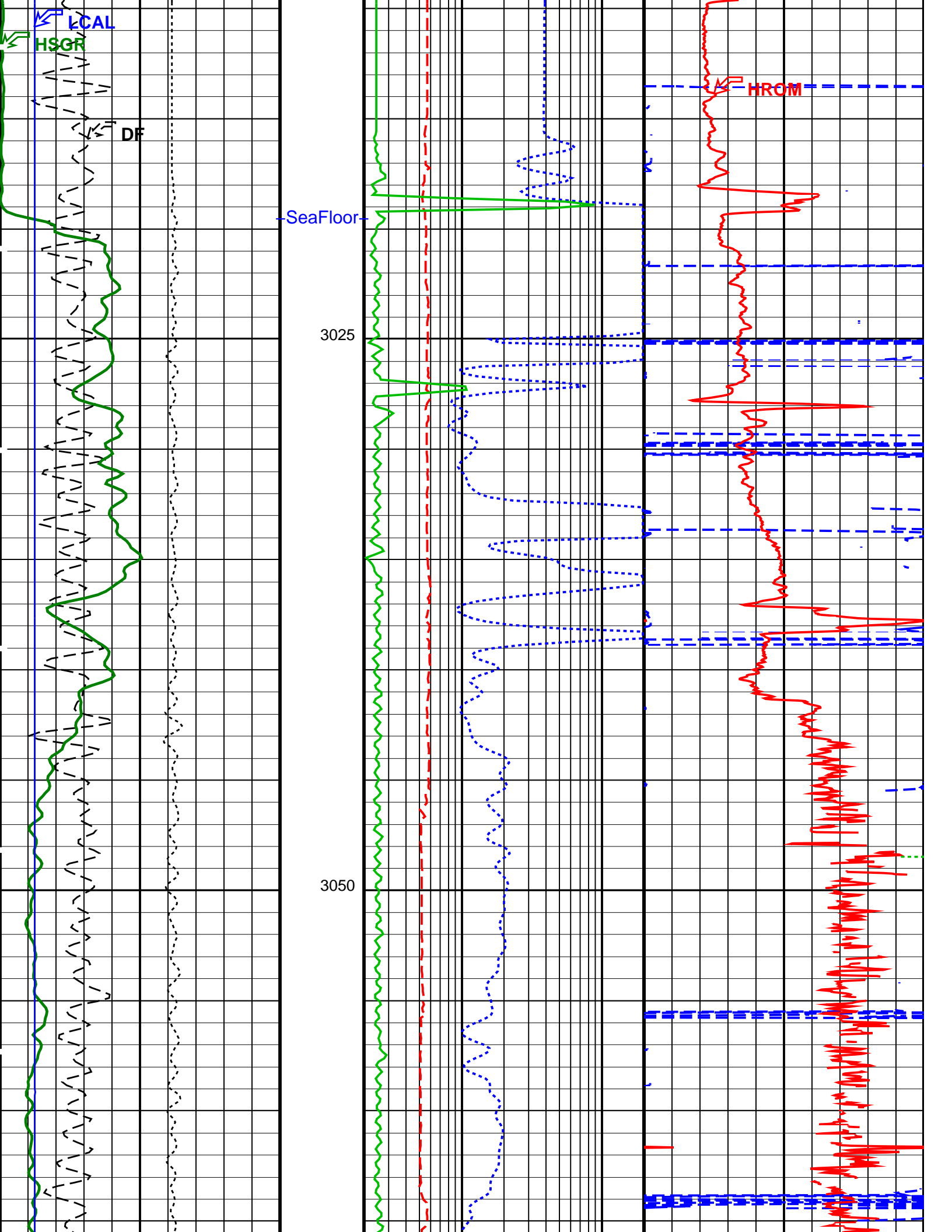
### OP System Version: 17C0-154

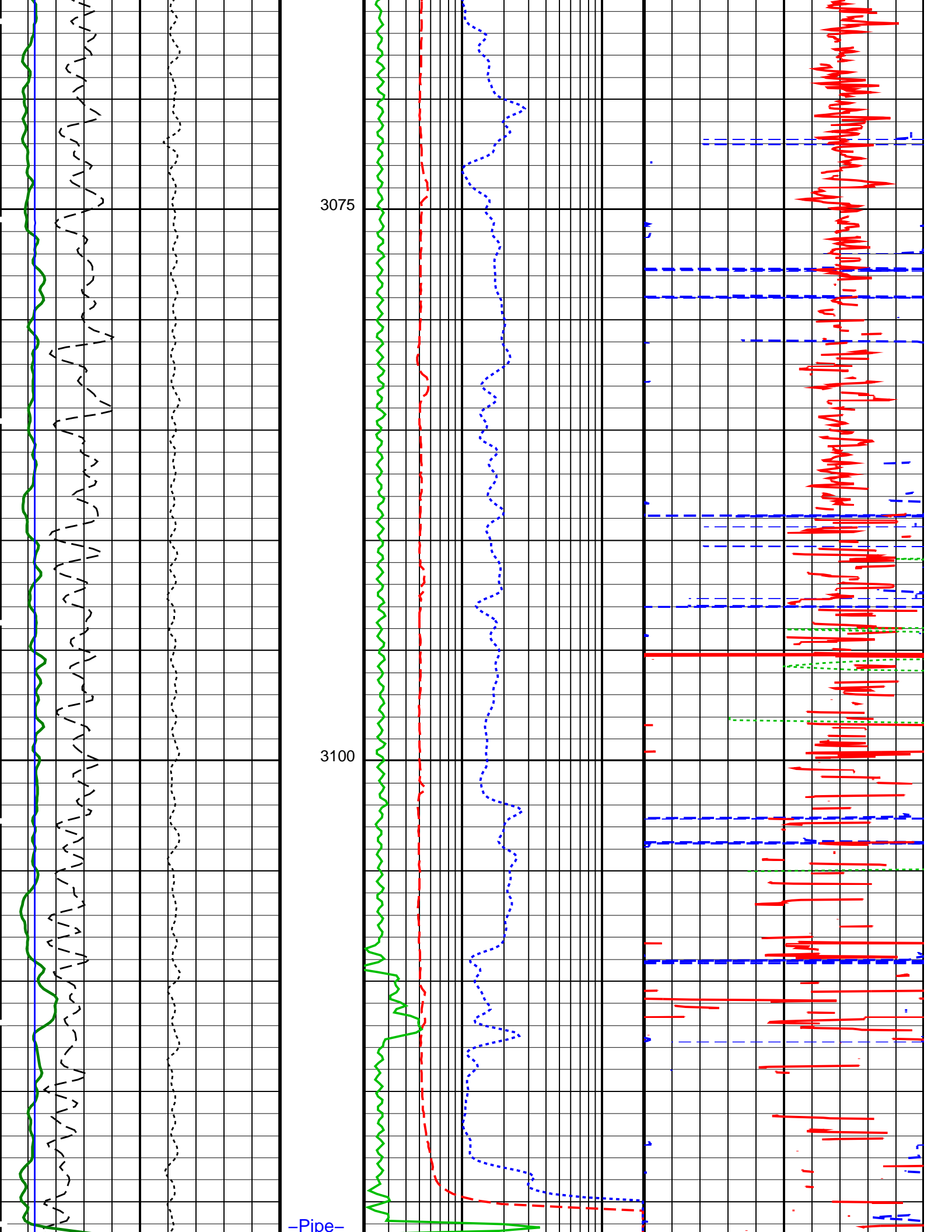
|        |          |          |                             |
|--------|----------|----------|-----------------------------|
| DIT-E  | 17C0-154 | GPIT-A/B | SRPC-3870_Q3_2009_OP17_V3_b |
| DTA-A  | 17C0-154 | HLDS     | 17C0-154                    |
| LDSC-B | 17C0-154 | APS-C    | 17C0-154                    |
| HNGC-B | 17C0-154 | HNGS-BA  | 17C0-154                    |
| DTC-H  | 17C0-154 |          |                             |

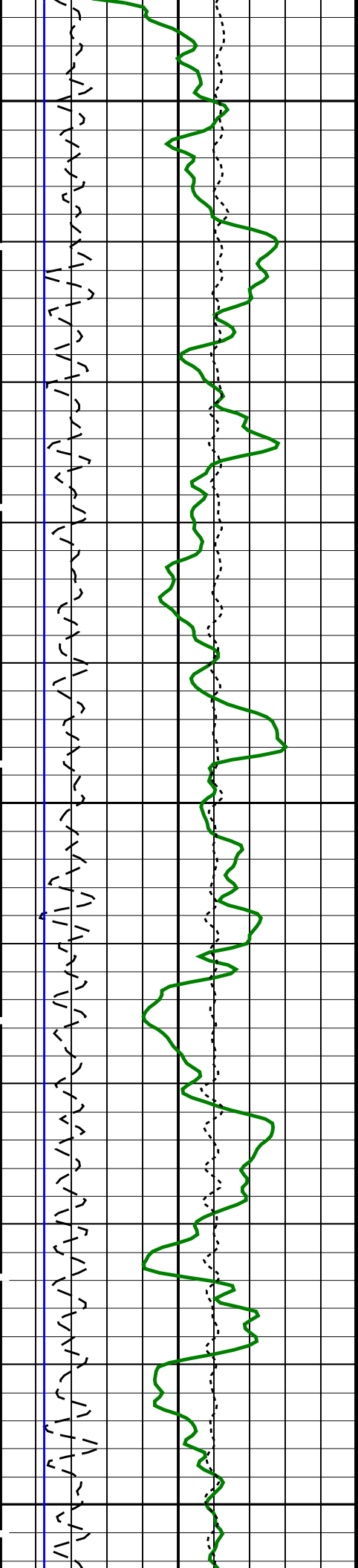
#### PIP SUMMARY

Time Mark Every 60 S





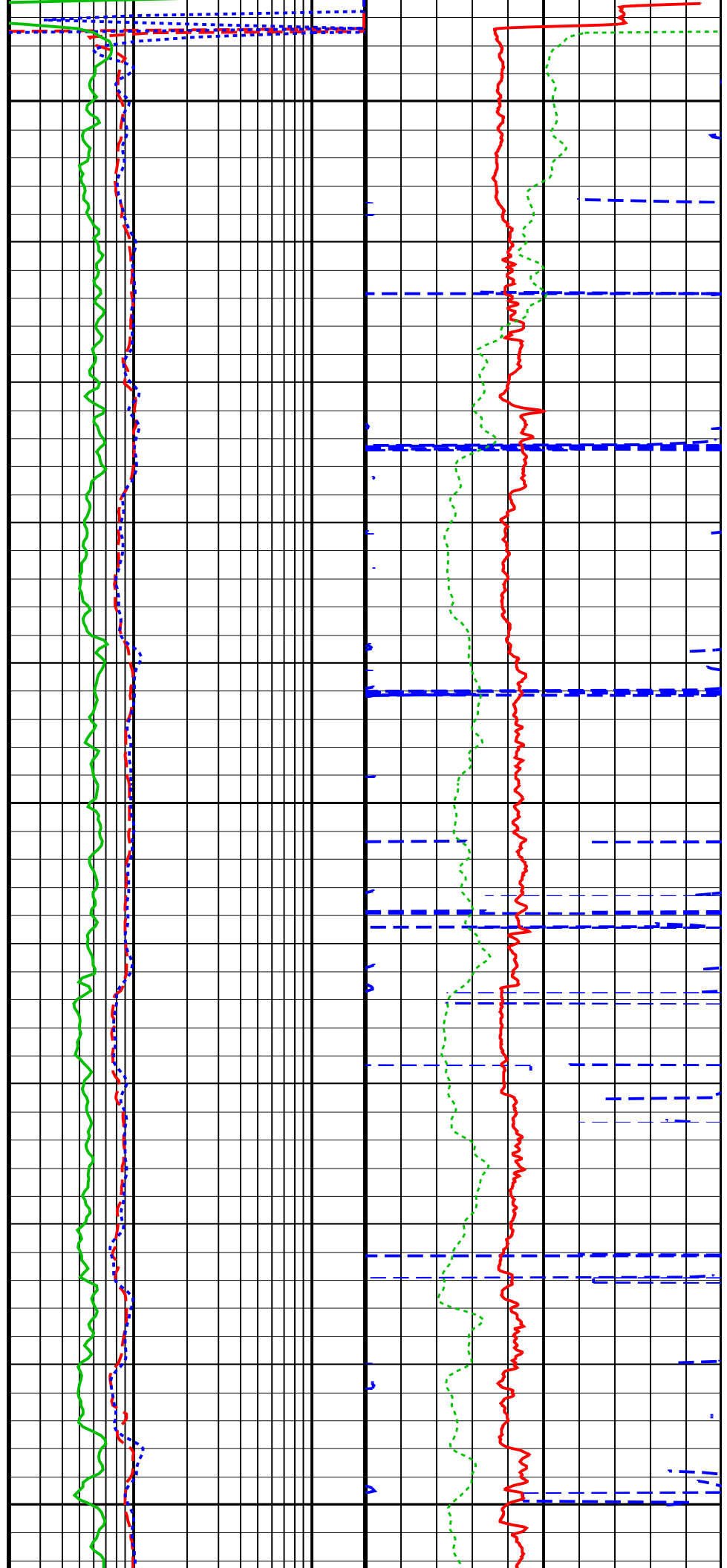


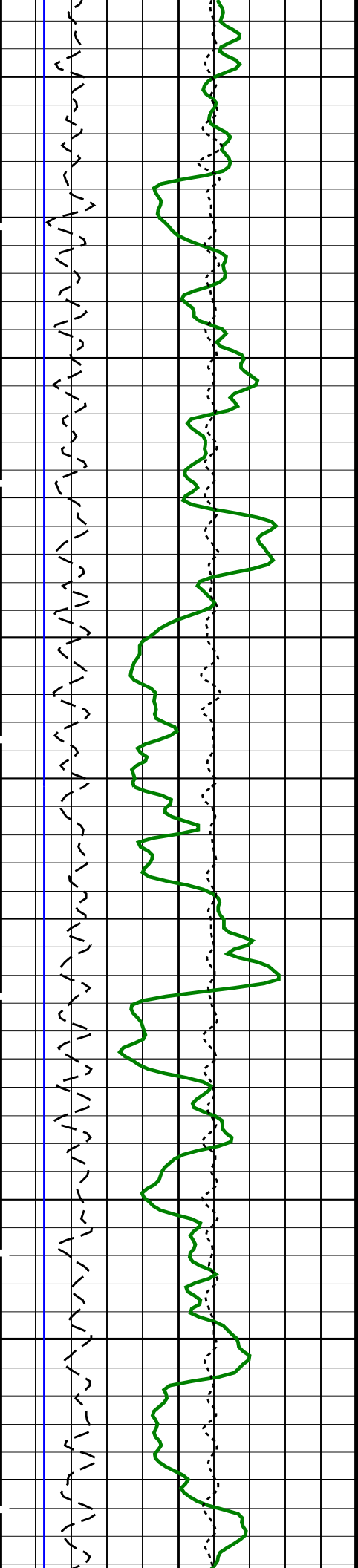


3125

3150

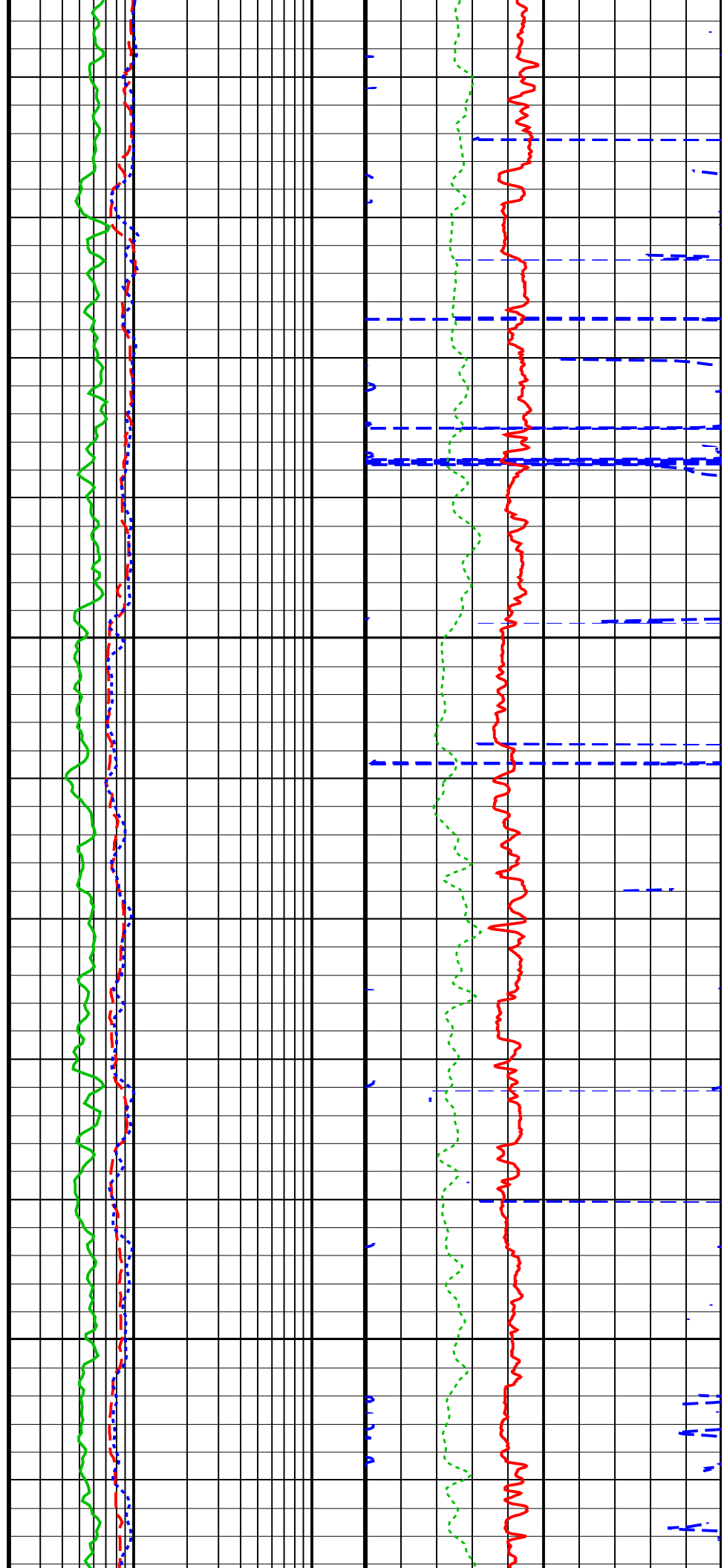
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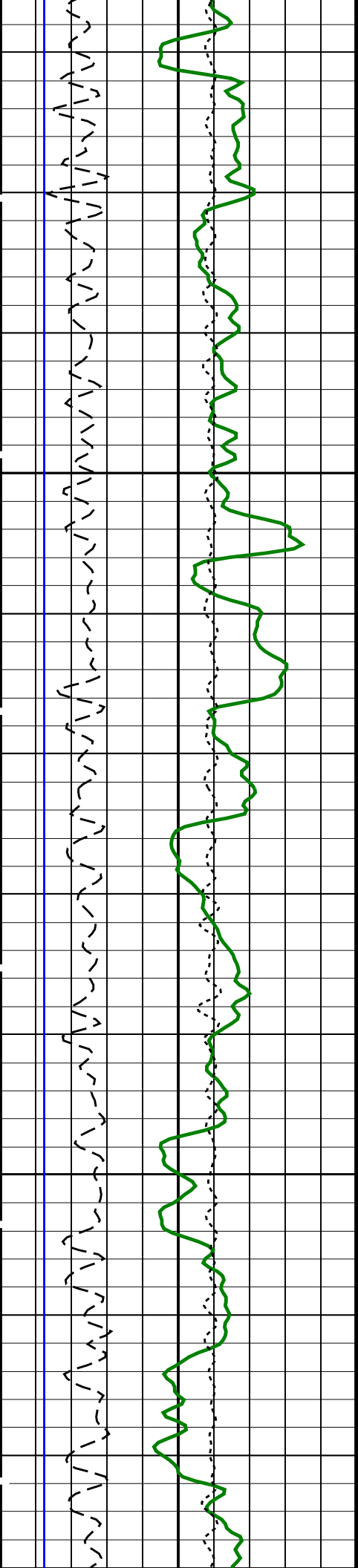


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3225

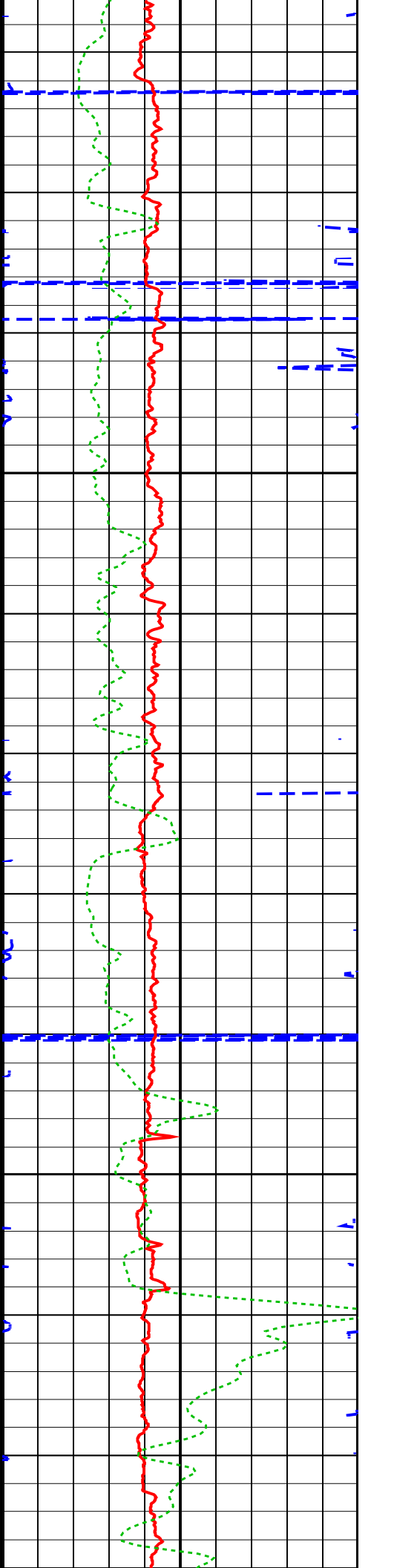
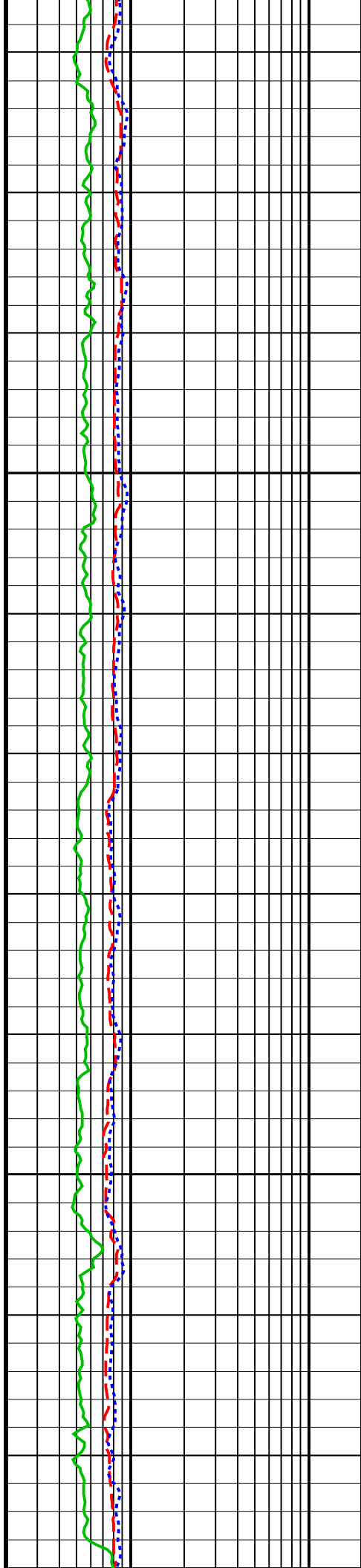


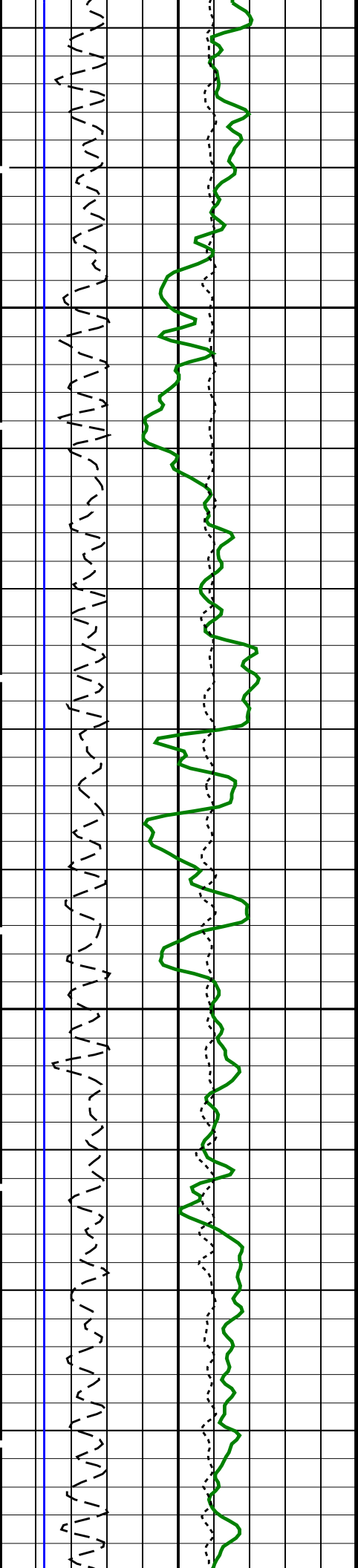




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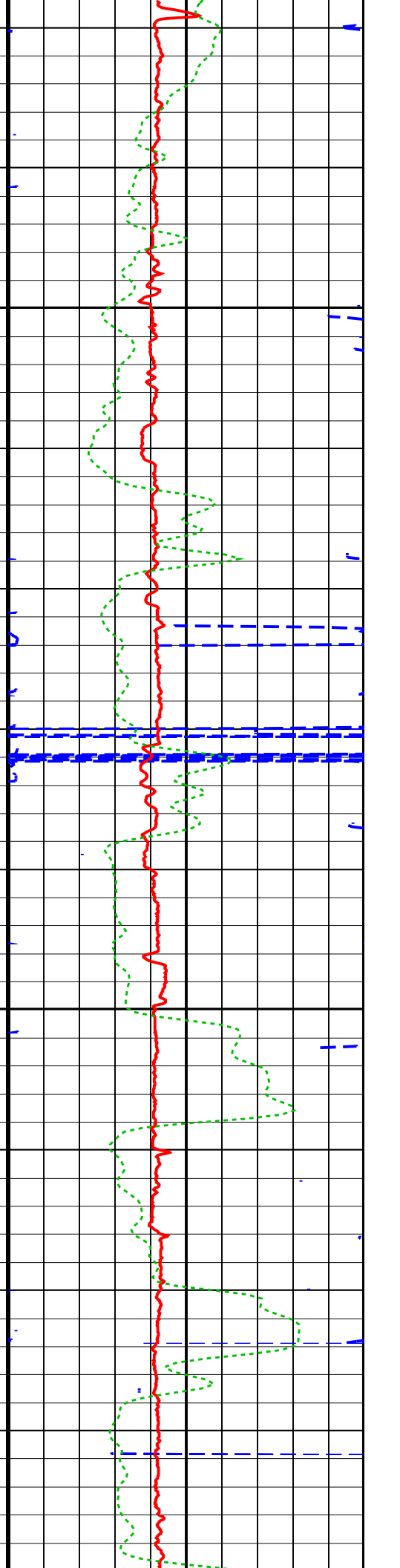
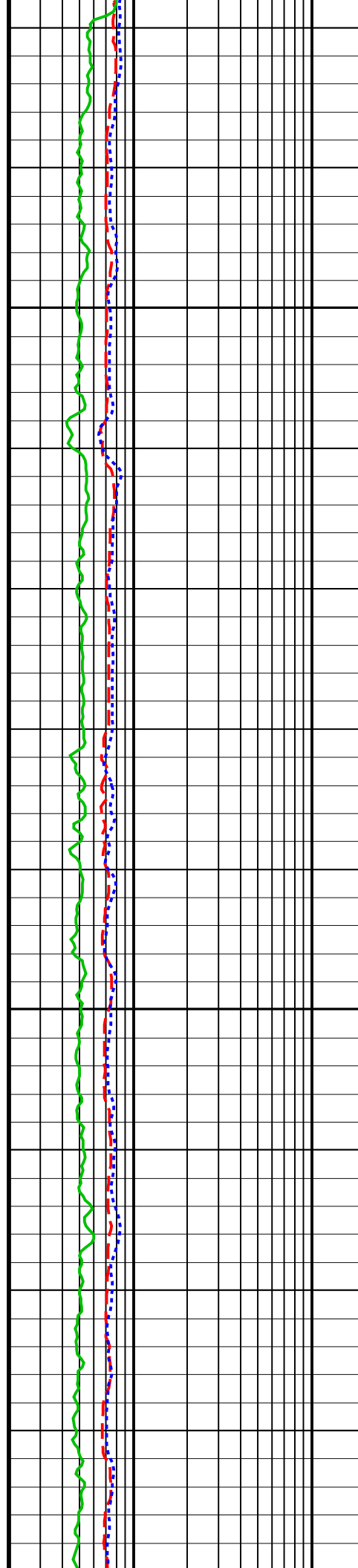
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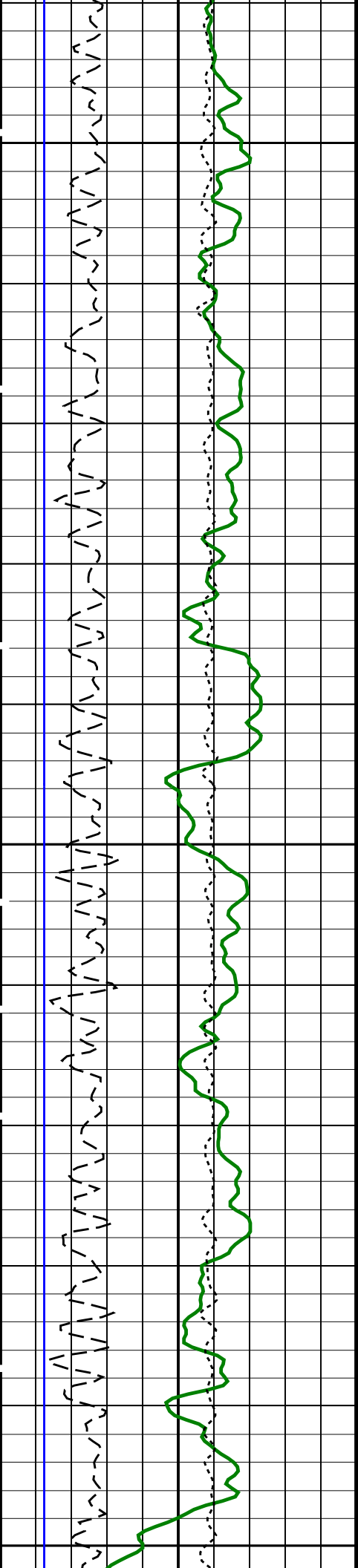




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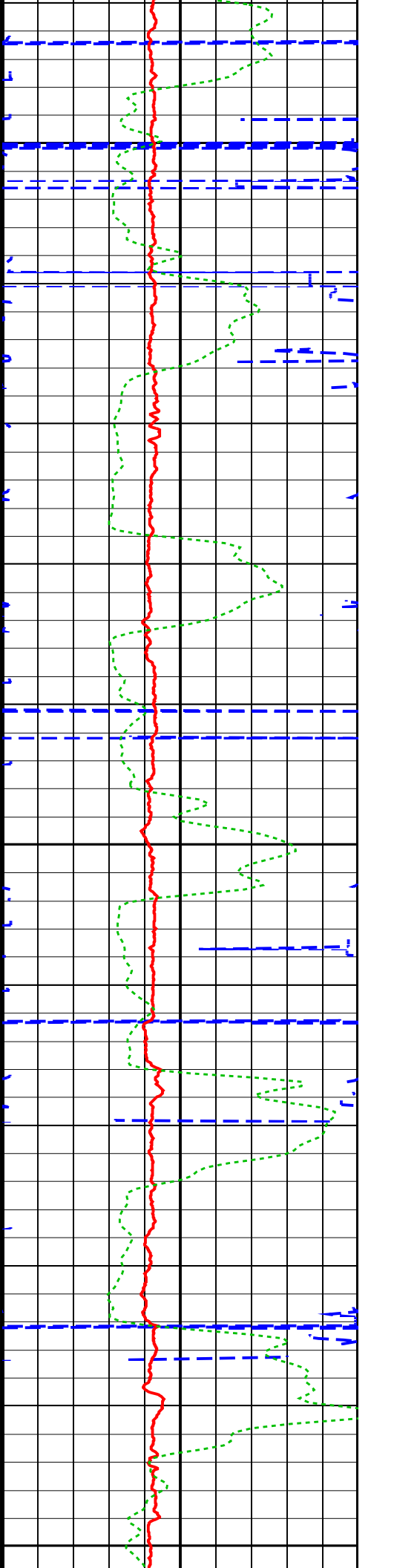
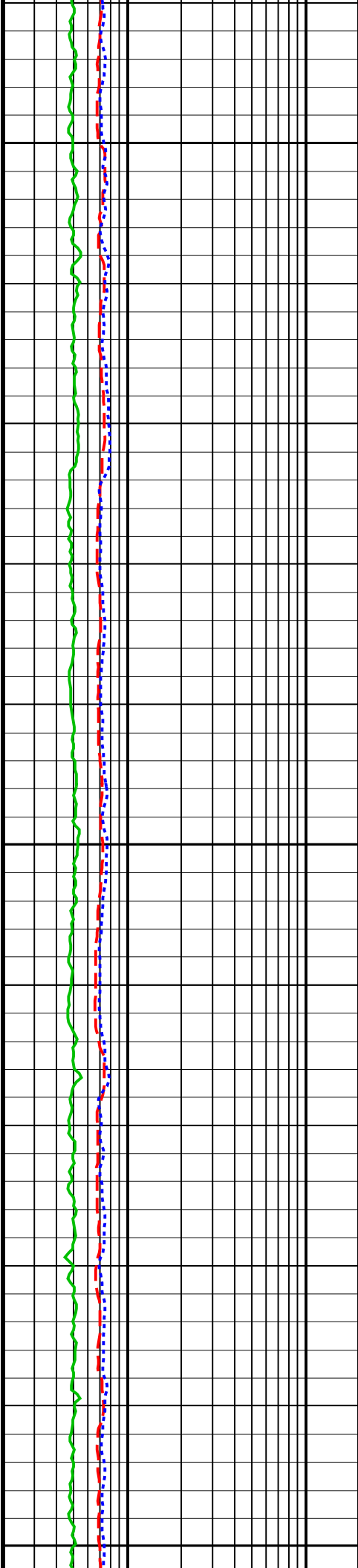


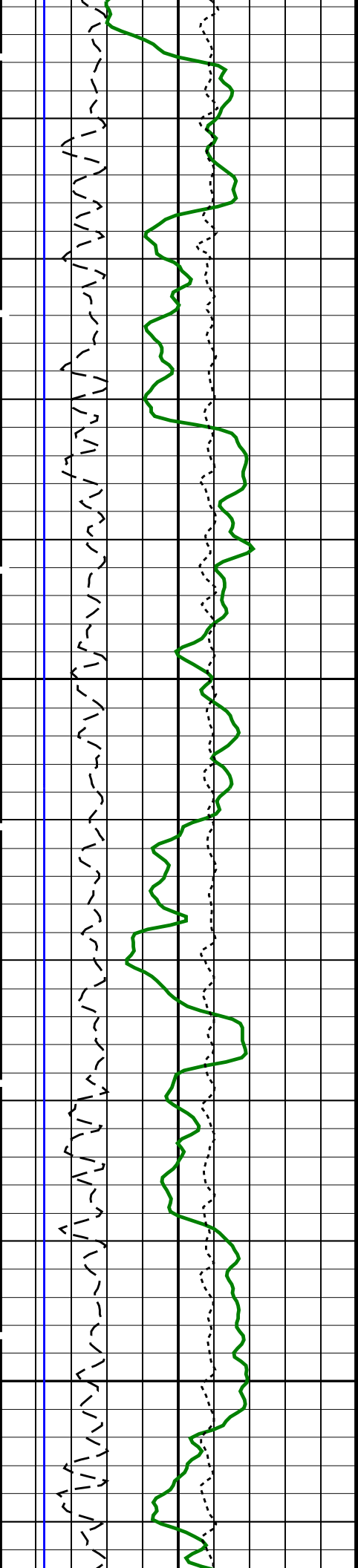


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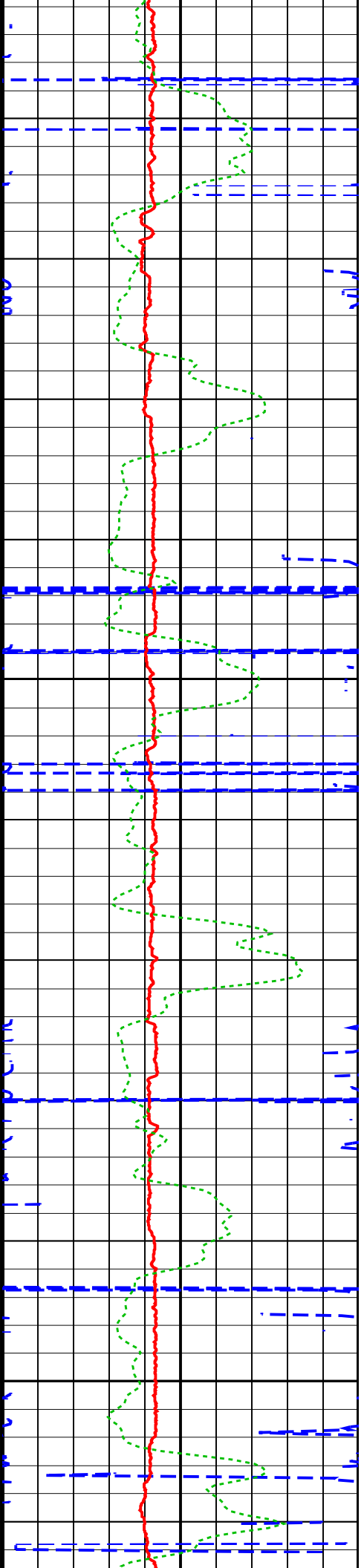
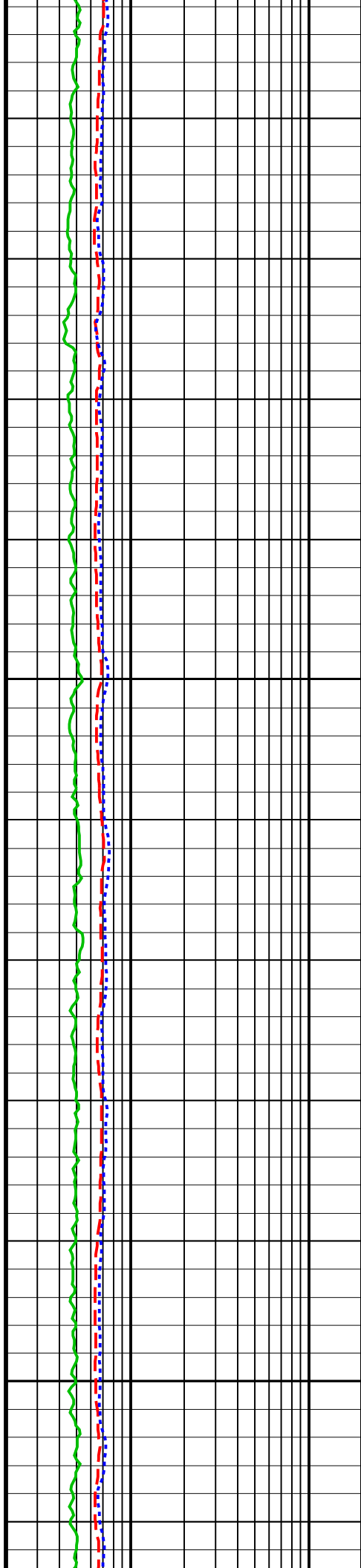
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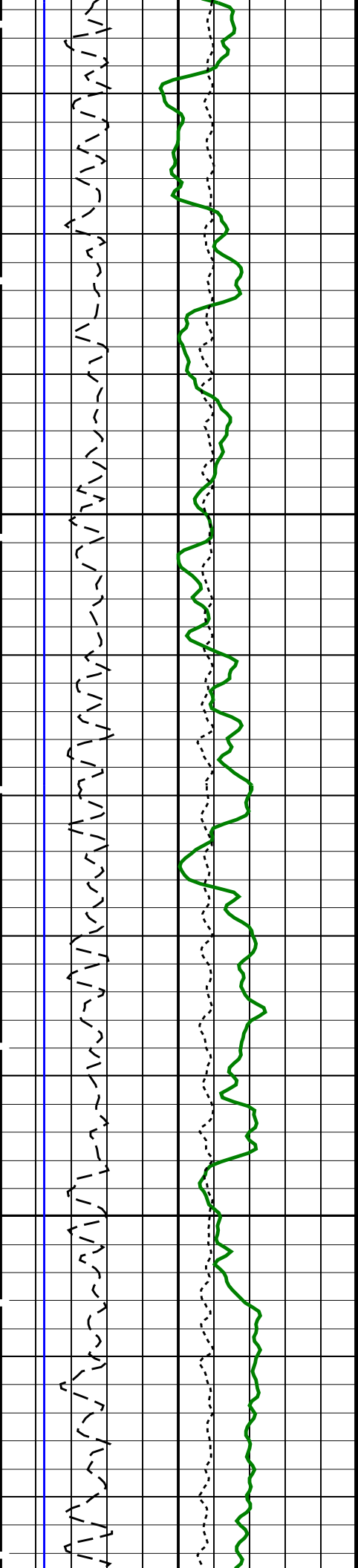




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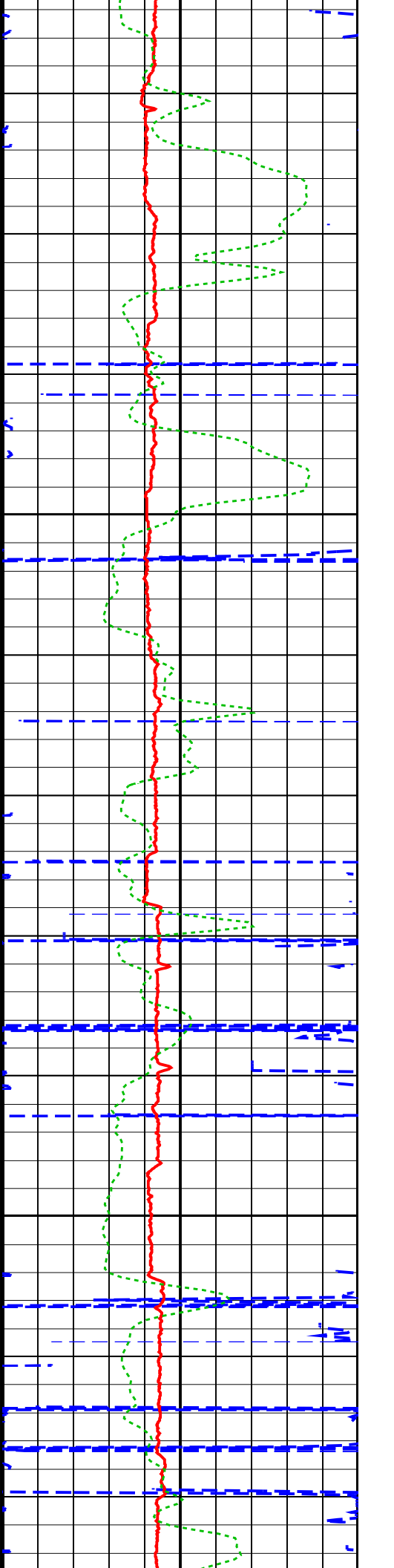
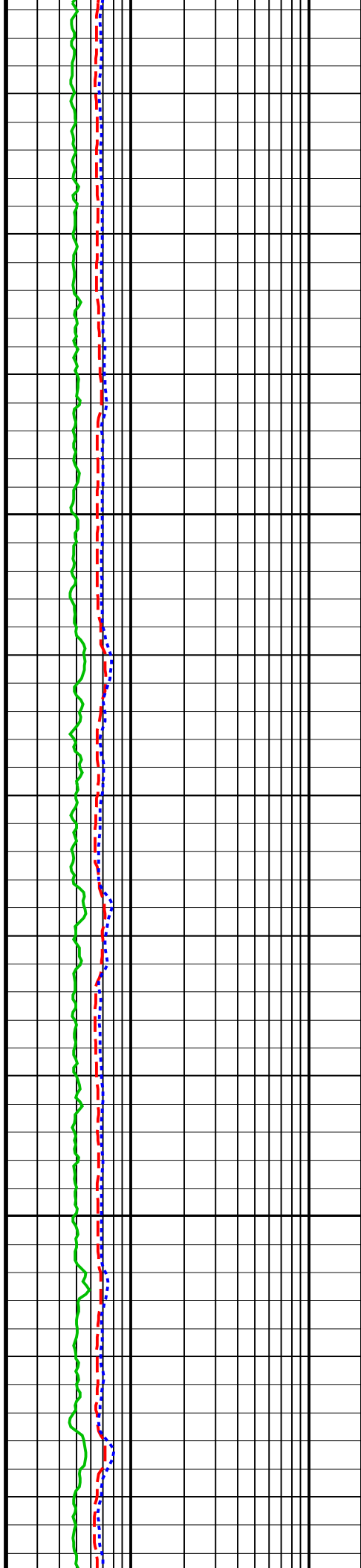
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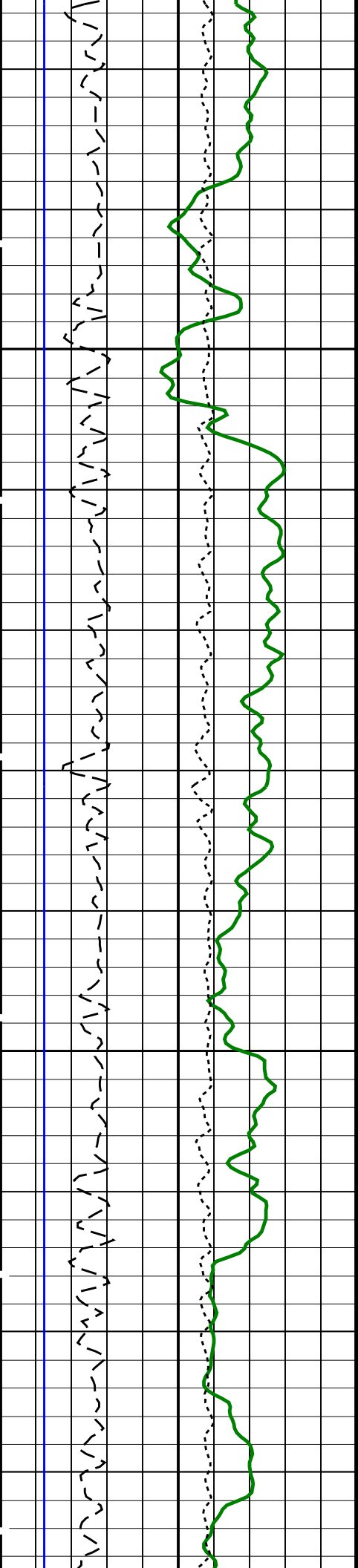




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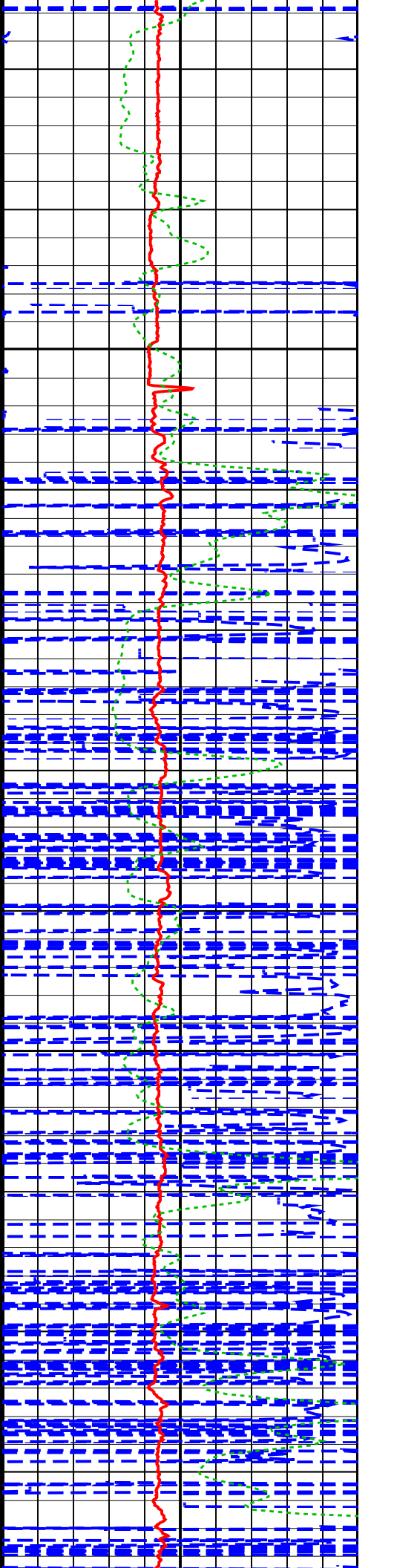
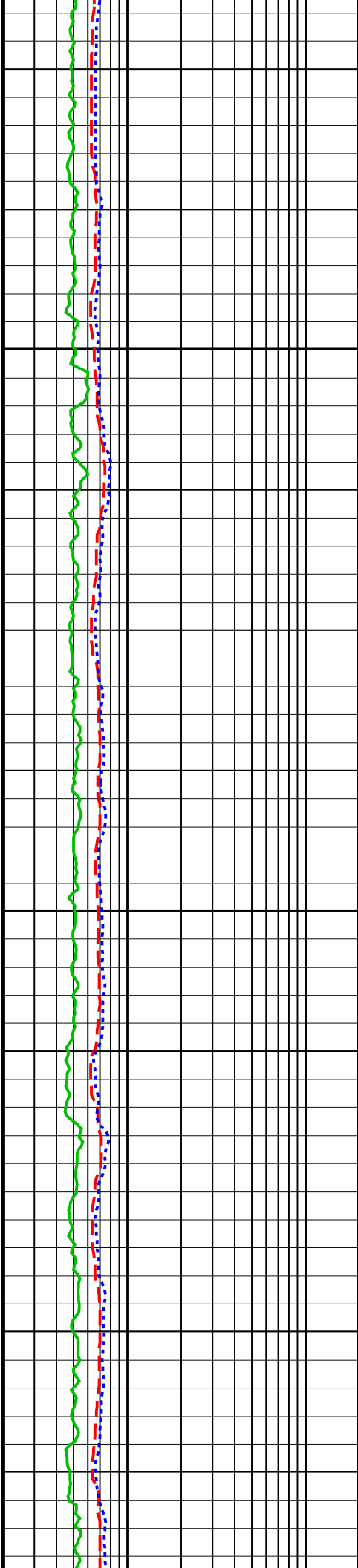
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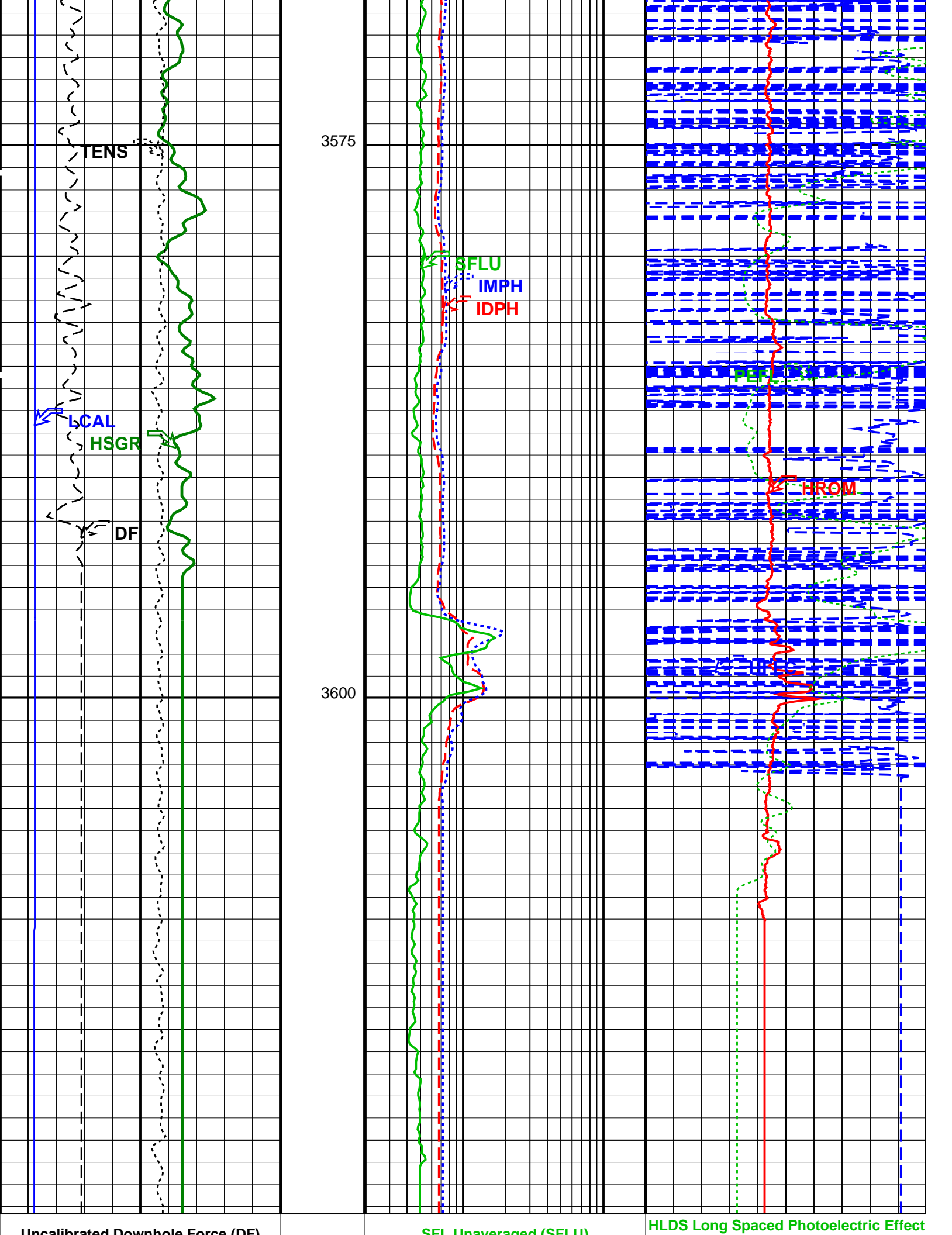




3525

3550





|                                    |       |  |     |        |    |   |     |        |    |
|------------------------------------|-------|--|-----|--------|----|---|-----|--------|----|
| Uncalibrated Downhole Force (LBF)  | 0     | SFL Unaveraged (SFLE)                                | 0.2 | (OHMM) | 20 | (PEFL)  | 0   | (---   | 10 |
| HLDS Caliper (LCAL)                | 0     | Deep Induction Phasor-processed Resistivity (IDPH)   | 0.2 | (OHMM) | 20 | APS HR Near/Far Corrected Limestone Porosity (HFLC) | 100 | (PU)   | 0  |
| Tension (TENS)                     | 10000 | Medium Induction Phasor-processed Resistivity (IMPH) | 0.2 | (OHMM) | 20 | HLDS HR Bulk Density (HROM)                         | 0   | (G/C3) | 4  |
| HNGS Spectroscopy Gamma Ray (HSGR) | 0     | Flipped Downlog Caliper Closed                       |     |        |    |   |     |        |    |
| (LBF)                              | 0     |  |     |        |    |   |     |        |    |
| (IN)                               | 20    |  |     |        |    |   |     |        |    |
| (LBF)                              | 0     |  |     |        |    |   |     |        |    |
| (GAPI)                             | 100   |  |     |        |    |   |     |        |    |

PIP SUMMARY

APS not generating neutrons for porosity

Time Mark Every 60 S

### Parameters

| DLIS Name                                       | Description   | Value               |      |
|---|---|---------------------|------|
| <b>DIT-E: Dual Induction - E</b>                |   |                     |      |
| BHS   | Borehole Status   | OPEN                |      |
| BHT   | Bottom Hole Temperature (used in calculations)                        | 15.5556             | DEGC |
| DGF2  | Deep 20 kHz Gain Factor   | 0.979119            |      |
| DPH2  | Deep 20 kHz Phase Shift   | 0.0159963           |      |
| DRE2  | Deep Real 20 kHz Sonde Error Correction                               | 17.0457             | DEG  |
| DSR2  | Deep Sigma Reference (20 kHz)   | 1843                | MM/M |
| DXE2  | Deep Quad 20 kHz Sonde Error Correction                               | 136.154             | MM/M |
| GCSE  | Generalized Caliper Selection   | BS                  |      |
| GDEV  | Average Angular Deviation of Borehole from Normal                     | 0                   | DEG  |
| GGRD  | Geothermal Gradient   | 0.018227            | DC/M |
| GRSE  | Generalized Mud Resistivity Selection                                 | CHART_GEN_9         |      |
| GTSE  | Generalized Temperature Selection                                     | LINEAR_ESTIMATE     |      |
| IFRS  | DIT-E Induction Frequency Selector                                    | 20                  |      |
| IPHA  | DIT-E Phasor Processing Mode  | ALL                 |      |
| IPRO  | DIT-E Induction Processing Selector                                   | PHASOR              |      |
| ISSBAR  | Barite Mud Switch   | NOBARITE            |      |
| ITEN  | DIT-E Temperature Enable  | ENABLE              |      |
| MATR  | Rock Matrix for Neutron Porosity Corrections                          | LIMESTONE           |      |
| MGF2  | Medium 20 kHz Gain Factor   | 0.974788            |      |
| MPH2  | Medium 20 kHz Phase Shift   | -0.199528           | DEG  |
| MRE2  | Medium Real 20 kHz Sonde Error Correction                             | 11.3259             | MM/M |
| MSR2  | Medium Sigma Reference (20 kHz)                                       | 3250                | MM/M |
| MXE2  | Medium Quad 20 kHz Sonde Error Correction                             | 172.606             | MM/M |
| SBR   | Shoulder Bed Resistivity Factor                                       | 1                   | OHMM |
| SFCR  | SFL Channel Ratio   | 1000                |      |
| SFLE  | SFL Enable  | ENABLE              |      |
| SHT   | Surface Hole Temperature  | 3                   | DEGC |
| SPAЕ  | DIT-E SPARC Processing Enable   | ENABLE              |      |
| SPNV  | SP Next Value   | 0                   | MV   |
| <b>GPIT-A/B: General Purpose Inclinerometer</b> |   |                     |      |
| ACPP  | Accelerometer PROM Presence   | PRESENT             |      |
| AFMO  | Accelerometer Filtering Mode  | MOVING_AVERAGE      |      |
| ART   | Accelerometer Reference Temperature                                   | 20                  | DEGC |
| GLM   | GPIT Logging Mode   | DIPM                |      |
| ICMO  | Inclinometry Computation Mode   | AUTOMATIC_SELECTION |      |
| MAPP  | Magnetometer PROM Presence  | PRESENT             |      |
| MDEC  | Magnetic Field Declination  | 82.7472             | DEG  |
| MRTE  | Magneto Reference Temperature   | 19                  | DEGC |
| TEMS  | GPIT Temperature Sensor Used  | BOTH                |      |
| U-GPOF  | Playback OLD VERSION GPIT FILE (BEFORE OP14 + SRPC-3098-FEB_2006_C) ? | NO                  |      |
| <b>HLDS: Hostile Litho-Density Sonde</b>        |   |                     |      |
| CLCL  | HLDS LS Control Loop Controller Mode                                  | AUTO_DEFAULT        |      |
| CLCS  | HLDS SS Control Loop Controller Mode                                  | AUTO_DEFAULT        |      |
| CLLS  | HLDS Mode Loop Long Spacing   | AUTO                |      |
| CLSS  | HLDS Mode Loop Short Spacing  | AUTO                |      |
| DHC   | Density Hole Correction   | BS                  |      |
| DPPM  | Density Porosity Processing Mode                                      | HIRS                |      |
| FD  | Fluid Density   | 1                   | G/C3 |
| LATC  | HLDS Activation Correction  | ON                  |      |
| LLDL  | HLDS LS Low Level Discriminator DAC                                   | 14000               |      |
| LLDS  | HLDS SS Low Level Discriminator DAC                                   | 14000               |      |
| LLML  | HLDS LS Low Level Discriminator Mode                                  | AUTO                |      |
| LLMS  | HLDS SS Low Level Discriminator Mode                                  | AUTO                |      |
| MDEN  | Matrix Density  | 2.71                | G/C3 |
| PHVL  | HLDS Long Spacing High Voltage Setting                                | 1000                | V    |
| PHVS  | HLDS Short Spacing High Voltage Setting                               | 1000                | V    |



|   |  |                     |      |
|---|--|---------------------|------|
| PSDL  | HLDS LS Pulse Shape Compensation DAC                   | 30000               |      |
| PSDS  | HLDS SS Pulse Shape Compensation DAC                   | 30000               |      |
| PSML  | HLDS LS Pulse Shape Compensation Mode                  | AUTO                |      |
| PSMS  | HLDS SS Pulse Shape Compensation Mode                  | AUTO                |      |
| <b>APS-C: Accelerator-Porosity Tool</b>         |  |                     |      |
|   | APS Software Version                                   | 0                   |      |
| AASD  | APS Thermal and Array Detectors High Voltage Setting   | 1967.87             | V    |
| ADSO  | APS Array Detectors Data Source Switch                 | Both                |      |
| AFSD  | APS Far Detector High Voltage Setting                  | 2098.2              | V    |
| AHCS  | APS Holesize Correction Source                         | BS                  |      |
| AHSS  | APS Holesize Correction Switch                         | ON                  |      |
| AMTY  | APS Environmental Corrections Mud Type                 | WaterBaseBarite     |      |
| ANSD  | APS Near Detector High Voltage Setting                 | 1738.17             | V    |
| ASOS  | APS Standoff Correction Switch                         | ON                  |      |
| ATSS  | APS Temperature-Pressure-Salinity Correction Switch    | ON                  |      |
| BHFL_APS  | APS TNPH Borehole Fluid Type                           | WATER               |      |
| BHS   | Borehole Status  | OPEN                |      |
| BHT   | Bottom Hole Temperature (used in calculations)         | 15.5556             | DEGC |
| BSCO_APS  | APS TNPH Borehole Salinity Correction Option           | NO                  |      |
| DPPM  | Density Porosity Processing Mode                       | HIRS                |      |
| DSCO_APS  | APS TNPH Density Source                                | COMPUTED            |      |
| FSAL  | Formation Salinity                                     | -50000              | PPM  |
| FSCO_APS  | APS TNPH Formation Salinity Correction Option          | NO                  |      |
| GCSE  | Generalized Caliper Selection                          | BS                  |      |
| GDEV  | Average Angular Deviation of Borehole from Normal      | 0                   | DEG  |
| GGRD  | Geothermal Gradient                                    | 0.018227            | DC/M |
| GRSE  | Generalized Mud Resistivity Selection                  | CHART_GEN_9         |      |
| GTSE  | Generalized Temperature Selection                      | LINEAR_ESTIMATE     |      |
| HSCO_APS  | APS TNPH Hole Size Correction Option                   | YES                 |      |
| ISSBAR  | Barite Mud Switch                                      | NOBARITE            |      |
| MATR  | Rock Matrix for Neutron Porosity Corrections           | LIMESTONE           |      |
| MCCO_APS  | APS TNPH Mud Cake Correction Option                    | NO                  |      |
| MCOR_APS  | APS TNPH Mud Correction                                | NATU                |      |
| MWCO_APS  | APS TNPH Mud Weight Correction Option                  | YES                 |      |
| NARC  | APS Near/Array Calibration Ratio                       | 1.06031             |      |
| NFRC  | APS Near/Far Calibration Ratio                         | 0.890147            |      |
| PTCO_APS  | APS TNPH Pressure/Temperature Correction Option        | YES                 |      |
| SHT   | Surface Hole Temperature                               | 3                   | DEGC |
| TNCO_APS  | APS TNPH Computation Option                            | NO                  |      |
| <b>HNGS-BA: Hostile Natural Gamma Ray Sonde</b> |  |                     |      |
| BAR1  | HNGS Detector 1 Barite Constant                        | 1                   |      |
| BAR2  | HNGS Detector 2 Barite Constant                        | 1                   |      |
| BHK   | HNGS Borehole Potassium Correction Concentration       | 0                   |      |
| BHS   | Borehole Status  | OPEN                |      |
| BHT   | Bottom Hole Temperature (used in calculations)         | 15.5556             | DEGC |
| CSD1  | Inner Casing Outer Diameter                            | 0                   | IN   |
| CSD2  | Outer Casing Outer Diameter                            | 0                   | IN   |
| CSW1  | Inner Casing Weight                                    | 0                   | LB/F |
| CSW2  | Outer Casing Weight                                    | 0                   | LB/F |
| DBCC  | HNGS Barite Constant Correction Flag                   | NONE                |      |
| GCSE  | Generalized Caliper Selection                          | BS                  |      |
| GDEV  | Average Angular Deviation of Borehole from Normal      | 0                   | DEG  |
| GGRD  | Geothermal Gradient                                    | 0.018227            | DC/M |
| GRSE  | Generalized Mud Resistivity Selection                  | CHART_GEN_9         |      |
| GTSE  | Generalized Temperature Selection                      | LINEAR_ESTIMATE     |      |
| H1P   | HNGS Detector 1 Allow/Disallow In Processing           | ALLOW               |      |
| H2P   | HNGS Detector 2 Allow/Disallow In Processing           | ALLOW               |      |
| HABK  | HNGS Borehole Potassium Running Average                | 0.00608072          |      |
| HALF  | HNGS Alpha Filter Length                               | 60                  | IN   |
| HCRB  | HNGS Apply Borehole Potassium Correction               | NONE                |      |
| HMWM  | Mud Weighting Material                                 | BARI                |      |
| HNPE  | HNGS Processing Enable                                 | YES                 |      |
| ISSBAR  | Barite Mud Switch                                      | NOBARITE            |      |
| MATR  | Rock Matrix for Neutron Porosity Corrections           | LIMESTONE           |      |
| S1BI  | HNGS Detector 1 Calibration Bismuth Count Rate         | 1.3                 | CPS  |
| S2BI  | HNGS Detector 2 Calibration Bismuth Count Rate         | 1.3                 | CPS  |
| SGRC  | HNGS Standard Gamma-Ray Correction Flag                | YES                 |      |
| SHT   | Surface Hole Temperature                               | 3                   | DEGC |
| TPOS  | Tool Position  | ECCE                |      |
| VBA1  | HNGS Detector 1 Variable Barite Factor Running Average | 0.956891            |      |
| VBA2  | HNGS Detector 2 Variable Barite Factor Running Average | 0.947202            |      |
| <b>System and Miscellaneous</b>                 |  |                     |      |
| ALTDPCHAN                                       | Name of alternate depth channel                        | SpeedCorrectedDepth |      |
| BS  | Bit Size   | 9.875               | IN   |
| BSAL  | Borehole Salinity                                      | -50000.00           | PPM  |
| CSIZ  | Current Casing Size                                    | 0.000               | IN   |
| CWEI  | Casing Weight  | 0.00                | LB/F |
| DFD   | Drilling Fluid Density                                 | 1.22                | G/C3 |
| DO  | Depth Offset for Playback                              | 0.0                 | M    |
| FLEV  | Fluid Level  | -50000.00           | M    |
| MST   | Mud Sample Temperature                                 | -50000.00           | DEGC |
| PBVSADP   | Use alternate depth channel for playback               | NO                  |      |
| PP  | Playback Processing                                    | NORMAL              |      |
| RMFS  | Resistivity of Mud Filtrate Sample                     | -50000.0000         | OHMM |
| RW  | Resistivity of Connate Water                           | 1.0000              | OHMM |

|     |                                     |         |      |
|-----|-------------------------------------|---------|------|
| TD  | Total Depth                         | 3626    | M    |
| TDD | Total Depth – Driller               | 3630.00 | M    |
| TDL | Total Depth – Logger                | 3630.00 | M    |
| TWS | Temperature of Connate Water Sample | 37.78   | DEGC |

Format: TripleCombo Vertical Scale: 1:200 Graphics File Created: 06-Mar-2010 18:28

## OP System Version: 17C0-154

|        |          |          |                             |
|--------|----------|----------|-----------------------------|
| DIT-E  | 17C0-154 | GPIT-A/B | SRPC-3870_Q3_2009_OP17_V3_b |
| DTA-A  | 17C0-154 | HLDS     | 17C0-154                    |
| LDSC-B | 17C0-154 | APS-C    | 17C0-154                    |
| HNGC-B | 17C0-154 | HNGS-BA  | 17C0-154                    |
| DTC-H  | 17C0-154 |          |                             |

### Input DLIS Files

|         |                            |          |                   |          |          |
|---------|----------------------------|----------|-------------------|----------|----------|
| DEFAULT | Flip_PI_LDL_APS_NGS_033LUP | PRODUCER | 06-Mar-2010 18:19 | 3623.3 M | 2990.1 M |
|---------|----------------------------|----------|-------------------|----------|----------|

### Output DLIS Files

|         |                       |       |          |                   |
|---------|-----------------------|-------|----------|-------------------|
| DEFAULT | PI_LDL_APS_NGS_034PUP | FN:45 | PRODUCER | 06-Mar-2010 18:28 |
|---------|-----------------------|-------|----------|-------------------|

#### Calibration and Check Summary

| Measurement  | Nominal | Master | Before | After | Change | Limit | Units |
|--|---------|--------|--------|-------|--------|-------|-------|
| General Purpose Inclinometer Wellsite Calibration – CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY |         |        |        |       |        |       |       |
| Before: 23-Feb-2010 0:21   |         |        |        |       |        |       |       |
| TEMPERATURE REFERENCE :  | N/A     | N/A    | 20     | N/A   | N/A    | N/A   | DEGC  |
| YEAR OF CALIBRATION :  | N/A     | N/A    | 92     | N/A   | N/A    | N/A   |       |
| MONTH OF CALIBRATION :   | N/A     | N/A    | 10     | N/A   | N/A    | N/A   |       |
| SERIAL NUMBER :  | N/A     | N/A    | 448    | N/A   | N/A    | N/A   |       |
| General Purpose Inclinometer Wellsite Calibration – CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY  |         |        |        |       |        |       |       |
| Before: 23-Feb-2010 0:22   |         |        |        |       |        |       |       |
| TEMPERATURE REFERENCE :  | N/A     | N/A    | 19     | N/A   | N/A    | N/A   | DEGC  |
| YEAR OF CALIBRATION :  | N/A     | N/A    | 99     | N/A   | N/A    | N/A   |       |
| MONTH OF CALIBRATION :   | N/A     | N/A    | 12     | N/A   | N/A    | N/A   |       |
| SERIAL NUMBER :  | N/A     | N/A    | 428    | N/A   | N/A    | N/A   |       |
| Hostile Litho-Density Sonde Wellsite Calibration – Background Measurement                              |         |        |        |       |        |       |       |
| Master: 1-Jan-2010 22:54 Before: 17-Jan-2010 0:16  |         |        |        |       |        |       |       |
| SS Cs Resolution Bkg   | 9.000   | 7.783  | 7.716  | N/A   | N/A    | 1.800 | %     |
| LS Cs Resolution Bkg   | 9.000   | 8.079  | 8.019  | N/A   | N/A    | 1.800 | %     |
| LSW1 Background  | 100.0   | 91.64  | 91.89  | N/A   | N/A    | 3.000 | CPS   |
| LSW2 Background  | 100.0   | 82.70  | 82.51  | N/A   | N/A    | 3.000 | CPS   |
| LSW3 Background  | 200.0   | 187.7  | 186.7  | N/A   | N/A    | 6.000 | CPS   |
| LSW4 Background  | 250.0   | 231.1  | 233.3  | N/A   | N/A    | 7.500 | CPS   |
| LSW5 Background  | 600.0   | 541.2  | 543.9  | N/A   | N/A    | 18.00 | CPS   |
| SSW1 Background  | 100.0   | 90.66  | 89.76  | N/A   | N/A    | 3.000 | CPS   |
| SSW2 Background  | 200.0   | 151.1  | 152.5  | N/A   | N/A    | 6.000 | CPS   |
| SSW3 Background  | 500.0   | 428.0  | 428.1  | N/A   | N/A    | 15.00 | CPS   |
| SSW4 Background  | 270.0   | 227.6  | 230.6  | N/A   | N/A    | 8.100 | CPS   |
| SSW5 Background  | 200.0   | 164.5  | 164.7  | N/A   | N/A    | 6.000 | CPS   |
| Hostile Litho-Density Sonde Wellsite Calibration – Aluminum Measurement                                |         |        |        |       |        |       |       |
| Master: 1-Jan-2010 22:54   |         |        |        |       |        |       |       |
| LSW1 Aluminum  | 600.0   | 567.9  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW2 Aluminum  | 900.0   | 809.6  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW3 Aluminum  | 1100    | 970.5  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW4 Aluminum  | 580.0   | 493.5  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW5 Aluminum  | 570.0   | 444.3  | N/A    | N/A   | N/A    | N/A   | CPS   |
| SSW1 Aluminum  | 2800    | 2502   | N/A    | N/A   | N/A    | N/A   | CPS   |
| SSW2 Aluminum  | 8000    | 6870   | N/A    | N/A   | N/A    | N/A   | CPS   |
| SSW3 Aluminum  | 11600   | 9624   | N/A    | N/A   | N/A    | N/A   | CPS   |
| SSW4 Aluminum  | 5000    | 3962   | N/A    | N/A   | N/A    | N/A   | CPS   |
| SSW5 Aluminum  | 660.0   | 476.3  | N/A    | N/A   | N/A    | N/A   | CPS   |
| Hostile Litho-Density Sonde Wellsite Calibration – Lithology Measurement                               |         |        |        |       |        |       |       |
| Master: 1-Jan-2010 22:54   |         |        |        |       |        |       |       |
| LSW1 Iron  | 400.0   | 389.4  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW2 Iron  | 730.0   | 659.2  | N/A    | N/A   | N/A    | N/A   | CPS   |
| LSW3 Iron  | 1280    | 887.4  | N/A    | N/A   | N/A    | N/A   | CPS   |



Accelerator-Porosity Tool – Detector Plateau Settings :

Near Detector Plateau Setting 1738 V  
 Far Detector Plateau Setting 2098 V  
 Array Detector Plateau Setting 1968 V

Dual Induction – E / Equipment Identification

Primary Equipment:

Dual Induction Sonde DIS – HB 129  
 Dual Induction Cartridge DIC – EB 171

Auxiliary Equipment:

Mass Isolated Housing MIH – ZA 342

Dual Induction – E Wellsite Calibration

Induction Electronics (10 kHz)

| Phase  | ID Elect Real Offset 10 kHz MM/M                 | Value | Phase  | ID Elect Real Gain 10 kHz                         | Value  | Phase  | ID Elect Phase 10 kHz DEG                         | Value |
|--------|--|-------|--------|---|--------|--------|---|-------|
| Before |  | 29.74 | Before |   | 0.9415 | Before |   | 9.141 |
|        | -267.4 (Minimum) 32.65 (Nominal) 332.6 (Maximum) |       |        | 0.7960 (Minimum) 0.9460 (Nominal) 1.124 (Maximum) |        |        | -0.5967 (Minimum) 9.403 (Nominal) 19.40 (Maximum) |       |
| Phase  | ID Elect Quad Offset 10 kHz MM/M                 | Value | Phase  | ID Elect Quad Gain 10 kHz                         | Value  | Phase  | IM Elect Phase 10 kHz DEG                         | Value |
| Before |  | 25.20 | Before |   | 0.9567 | Before |   | 8.957 |
|        | -278.5 (Minimum) 21.47 (Nominal) 321.5 (Maximum) |       |        | 0.8109 (Minimum) 0.9609 (Nominal) 1.145 (Maximum) |        |        | -0.7277 (Minimum) 9.272 (Nominal) 19.27 (Maximum) |       |
| Phase  | IM Elect Real Offset 10 kHz MM/M                 | Value | Phase  | IM Elect Real Gain 10 kHz                         | Value  |        |   |       |
| Before |  | 83.05 | Before |   | 0.9495 |        |   |       |
|        | -465.7 (Minimum) 84.34 (Nominal) 634.3 (Maximum) |       |        | 0.8034 (Minimum) 0.9534 (Nominal) 1.134 (Maximum) |        |        |   |       |
| Phase  | IM Elect Quad Offset 10 kHz MM/M                 | Value | Phase  | IM Elect Quad Gain 10 kHz                         | Value  |        |   |       |
| Before |  | 43.40 | Before |   | 0.9306 |        |   |       |
|        | -505.4 (Minimum) 44.57 (Nominal) 594.6 (Maximum) |       |        | 0.7864 (Minimum) 0.9364 (Nominal) 1.110 (Maximum) |        |        |   |       |

Before: 16-Jan-2010 19:20

Dual Induction – E Wellsite Calibration

Induction Electronics (20 kHz)

| Phase  | ID Elect Real Offset 20 kHz MM/M                 | Value | Phase  | ID Elect Real Gain 20 kHz                         | Value  | Phase  | ID Elect Phase 20 kHz DEG                        | Value |
|--------|--|-------|--------|---|--------|--------|--|-------|
| Before |  | 11.79 | Before |   | 0.9693 | Before |  | 3.979 |
|        | -112.1 (Minimum) 12.92 (Nominal) 137.9 (Maximum) |       |        | 0.8195 (Minimum) 0.9695 (Nominal) 1.157 (Maximum) |        |        | -10.06 (Minimum) 4.941 (Nominal) 19.94 (Maximum) |       |
| Phase  | ID Elect Quad Offset 20 kHz MM/M                 | Value | Phase  | ID Elect Quad Gain 20 kHz                         | Value  | Phase  | IM Elect Phase 20 kHz DEG                        | Value |
| Before |  | 10.24 | Before |   | 0.9876 | Before |  | 4.369 |
|        | -116.3 (Minimum) 8.664 (Nominal) 133.7 (Maximum) |       |        | 0.8375 (Minimum) 0.9875 (Nominal) 1.182 (Maximum) |        |        | -9.662 (Minimum) 5.338 (Nominal) 20.34 (Maximum) |       |
| Phase  | IM Elect Real Offset 20 kHz MM/M                 | Value | Phase  | IM Elect Real Gain 20 kHz                         | Value  |        |  |       |
| Before |  | 34.09 | Before |   | 0.9935 |        |  |       |
|        | -190.4 (Minimum) 34.62 (Nominal) 259.6 (Maximum) |       |        | 0.8410 (Minimum) 0.9910 (Nominal) 1.187 (Maximum) |        |        |  |       |
| Phase  | IM Elect Quad Offset 20 kHz MM/M                 | Value | Phase  | IM Elect Quad Gain 20 kHz                         | Value  |        |  |       |
| Before |  | 17.95 | Before |   | 0.9736 |        |  |       |
|        | -206.6 (Minimum) 18.45 (Nominal) 243.4 (Maximum) |       |        | 0.8231 (Minimum) 0.9731 (Nominal) 1.162 (Maximum) |        |        |  |       |

Before: 16-Jan-2010 19:21

Dual Induction – E Wellsite Calibration

Induction Electronics (40 kHz)

| Phase  | ID Elect Real Offset 40 kHz MM/M                 | Value | Phase  | ID Elect Real Gain 40 kHz                         | Value  | Phase  | ID Elect Phase 40 kHz DEG                        | Value |
|--------|--|-------|--------|---|--------|--------|--|-------|
| Before |  | 7.702 | Before |   | 0.9527 | Before |  | 14.16 |
|        | -76.50 (Minimum) 8.503 (Nominal) 93.50 (Maximum) |       |        | 0.8112 (Minimum) 0.9612 (Nominal) 1.145 (Maximum) |        |        | -3.044 (Minimum) 16.96 (Nominal) 36.96 (Maximum) |       |







**Accelerator-Porosity Tool / Equipment Identification**

**Primary Equipment:**

|                            |          |      |
|----------------------------|----------|------|
| Accelerator-Porosity Sonde | APS - C  | 22   |
| APS Minitron               | MNTR - F | 5589 |

**Auxiliary Equipment:**

|                                |           |    |
|--------------------------------|-----------|----|
| Accelerator-Porosity Housing   | APH - AC  | 22 |
| APS Calibration Water Tank     | SFT - 178 | 2  |
| APS Aluminum Calibrator Sleeve | SFT - 281 | 2  |

| Accelerator-Porosity Tool Wellsite Calibration |   |       |        |   |                           |        |   |       |  |
|--|---|-------|--------|---|---------------------------|--------|---|-------|--|
| Detector Background                            |   |       |        |   |                           |        |   |       |  |
| Phase  | Near Det Bkg Cntrate CPS                        | Value | Phase  | Far Det Bkg Cntrate CPS                         | Value                     | Phase  | Array-1 Det Bkg Cntrate CPS                     | Value |  |
| Master   |   | 33.05 | Master |   | 32.94                     | Master |   | 29.80 |  |
| Before   |   | 31.59 | Before |   | 33.93                     | Before |   | 29.78 |  |
|  | 1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum) |       |        | 1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum) |                           |        | 1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum) |       |  |
| Phase  | Array-2 Det Bkg Cntrate CPS                     | Value | Phase  | Array Therm Det Bkg Cntrate CPS                 | Value                     |        |   |       |  |
| Master   |   | 29.33 | Master |   | 32.63                     |        |   |       |  |
| Before   |   | 29.56 | Before |   | 34.21                     |        |   |       |  |
|  | 1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum) |       |        | 1.000 (Minimum) 30.00 (Nominal) 50.00 (Maximum) |                           |        |   |       |  |
| Master: 1-Jan-2010 22:21                       |   |       |        |   | Before: 16-Jan-2010 23:48 |        |   |       |  |

| Accelerator-Porosity Tool Wellsite Calibration |   |        |        |  |       |        |  |       |
|--|---|--------|--------|--|-------|--------|--|-------|
| Calibration Ratios                             |   |        |        |  |       |        |  |       |
| Phase  | Near/Far Calibration Ratio                        | Value  | Phase  | Near/Array Calibration Ratio                     | Value | Phase  | Near/Array Cal Ratio Up/Down                     | Value |
| Master   |   | 0.8901 | Master |  | 1.060 | Master |  | 1.006 |
|  | 0.8000 (Minimum) 0.9250 (Nominal) 1.050 (Maximum) |        |        | 0.9000 (Minimum) 1.030 (Nominal) 1.170 (Maximum) |       |        | 0.9700 (Minimum) 1.000 (Nominal) 1.030 (Maximum) |       |
| Master: 1-Jan-2010 22:21                       |   |        |        |  |       |        |  |       |

| Accelerator-Porosity Tool Wellsite Calibration |  |        |        |  |        |        |   |       |  |
|--|--|--------|--------|--|--------|--------|---|-------|--|
| Tank Check                                     |  |        |        |  |        |        |   |       |  |
| Phase  | Array-1 Standoff Porosity PU                     | Value  | Phase  | Array-2 Standoff Porosity PU                     | Value  | Phase  | Average Slowing Down Time US                    | Value |  |
| Master   |  | 11.67  | Master |  | 11.50  | Master |   | 5.851 |  |
|  | 9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)  |        |        | 9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)  |        |        | 5.500 (Minimum) 6.000 (Nominal) 6.250 (Maximum) |       |  |
| Phase  | Array-1 SDT Ratio Up/Down                        | Value  | Phase  | Array-2 SDT Ratio Up/Down                        | Value  | Phase  | Sigma Formation CU                              | Value |  |
| Master   |  | 0.9891 | Master |  | 0.9855 | Master |   | 27.54 |  |
|  | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) |        |        | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) |        |        | 20.00 (Minimum) 27.50 (Nominal) 35.00 (Maximum) |       |  |
| Master: 1-Jan-2010 22:21                       |  |        |        |  |        |        |   |       |  |

| Accelerator-Porosity Tool Master Calibration |   |        |        |  |       |        |  |       |
|--|---|--------|--------|--|-------|--------|--|-------|
| Detector Calibration                         |   |        |        |  |       |        |  |       |
| Phase  | Near/Far Calibration Ratio                        | Value  | Phase  | Near/Array Calibration Ratio                     | Value | Phase  | Near/Array Cal Ratio Up/Down                     | Value |
| Master                                       |   | 0.8901 | Master |  | 1.060 | Master |  | 1.006 |
|  | 0.8000 (Minimum) 0.9250 (Nominal) 1.050 (Maximum) |        |        | 0.9000 (Minimum) 1.030 (Nominal) 1.170 (Maximum) |       |        | 0.9700 (Minimum) 1.000 (Nominal) 1.030 (Maximum) |       |
| Master: 1-Jan-2010 22:21                     |   |        |        |  |       |        |  |       |

| Accelerator-Porosity Tool Master Calibration |  |        |        |  |        |        |   |       |  |
|--|--|--------|--------|--|--------|--------|---|-------|--|
| Tank Check                                   |  |        |        |  |        |        |   |       |  |
| Phase  | Array-1 Standoff Porosity PU                     | Value  | Phase  | Array-2 Standoff Porosity PU                     | Value  | Phase  | Average Slowing Down Time US                    | Value |  |
| Master                                       |  | 11.67  | Master |  | 11.50  | Master |   | 5.851 |  |
|  | 9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)  |        |        | 9.900 (Minimum) 11.75 (Nominal) 13.60 (Maximum)  |        |        | 5.500 (Minimum) 6.000 (Nominal) 6.250 (Maximum) |       |  |
| Phase  | Array-1 SDT Ratio Up/Down                        | Value  | Phase  | Array-2 SDT Ratio Up/Down                        | Value  | Phase  | Sigma Formation CU                              | Value |  |
| Master                                       |  | 0.9891 | Master |  | 0.9855 | Master |   | 27.54 |  |
|  | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) |        |        | 0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum) |        |        | 20.00 (Minimum) 27.50 (Nominal) 35.00 (Maximum) |       |  |



|                     |                    |                    |                     |                    |                    |                    |                    |                    |
|---------------------|--------------------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 0.9500<br>(Minimum) | 1.000<br>(Nominal) | 1.050<br>(Maximum) | 0.9500<br>(Minimum) | 1.000<br>(Nominal) | 1.050<br>(Maximum) | 20.00<br>(Minimum) | 27.50<br>(Nominal) | 35.00<br>(Maximum) |
|---------------------|--------------------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|

Master: 1-Jan-2010 22:21

Hostile Natural Gamma Ray Cartridge - B / Equipment Identification

|                                      |          |     |
|--------------------------------------|----------|-----|
| Primary Equipment:<br>HNGC Cartridge | HNGC - B | 300 |
| Auxiliary Equipment:<br>HNGC Housing | HNGH - A | 115 |

Hostile Natural Gamma Ray Sonde / Equipment Identification

|  |                      |               |
|--|----------------------|---------------|
| Primary Equipment:<br>HNGS Sonde                                       | HNGS - BA            | 194           |
| Auxiliary Equipment:<br>HNGS Sonde Housing<br>Gamma Source Radioactive | HNSH - BA<br>GSR - U | 205<br>616008 |

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Detector 1 Check

| Phase  | Na 511 Peak Loc    | Value              | Phase              | Na 511 Peak Res %  | Value              | Phase              | High Voltage V      | Value              |                    |
|--------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| Master |                    | 39.63              | Master             |                    | 15.18              | Master             |                     | 1161               |                    |
| Before |                    | 39.63              | Before             |                    | 14.78              | Before             |                     | 1177               |                    |
|        | 37.50<br>(Minimum) | 40.00<br>(Nominal) | 43.50<br>(Maximum) | 12.00<br>(Minimum) | 15.50<br>(Nominal) | 19.00<br>(Maximum) | 900.0<br>(Minimum)  | 1150<br>(Nominal)  | 1600<br>(Maximum)  |
| Phase  | Na 1785 Peak Loc   | Value              | Phase              | Na 1785 Peak Res % | Value              | Phase              | Temperature DEGC    | Value              |                    |
| Master |                    | 142.1              | Master             |                    | 8.816              | Master             |                     | 22.69              |                    |
| Before |                    | 142.4              | Before             |                    | 10.01              | Before             |                     | 14.92              |                    |
|        | 135.0<br>(Minimum) | 142.6<br>(Nominal) | 150.3<br>(Maximum) | 7.000<br>(Minimum) | 8.500<br>(Nominal) | 11.00<br>(Maximum) | -28.89<br>(Minimum) | 15.50<br>(Nominal) | 60.00<br>(Maximum) |
| Phase  | Na Count Rate CPS  | Value              |                    |                    |                    |                    |                     |                    |                    |
| Master |                    | 33.90              |                    |                    |                    |                    |                     |                    |                    |
| Before |                    | 33.64              |                    |                    |                    |                    |                     |                    |                    |
|        | 10.00<br>(Minimum) | 45.00<br>(Nominal) | 100.0<br>(Maximum) |                    |                    |                    |                     |                    |                    |

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Before: 16-Jan-2010 20:44

Hostile Natural Gamma Ray Sonde Wellsite Calibration



Detector 2 Check




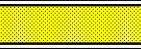

| Phase  | Na 511 Peak Loc    | Value              | Phase              | Na 511 Peak Res %  | Value              | Phase              | High Voltage V      | Value              |                    |
|--------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| Master |                    | 39.69              | Master             |                    | 15.48              | Master             |                     | 1095               |                    |
| Before |                    | 39.65              | Before             |                    | 14.73              | Before             |                     | 1081               |                    |
|        | 37.50<br>(Minimum) | 40.00<br>(Nominal) | 43.50<br>(Maximum) | 12.00<br>(Minimum) | 15.50<br>(Nominal) | 19.00<br>(Maximum) | 900.0<br>(Minimum)  | 1150<br>(Nominal)  | 1600<br>(Maximum)  |
| Phase  | Na 1785 Peak Loc   | Value              | Phase              | Na 1785 Peak Res % | Value              | Phase              | Temperature DEGC    | Value              |                    |
| Master |                    | 142.2              | Master             |                    | 8.546              | Master             |                     | 23.40              |                    |
| Before |                    | 141.8              | Before             |                    | 8.949              | Before             |                     | 15.62              |                    |
|        | 135.0<br>(Minimum) | 142.6<br>(Nominal) | 150.3<br>(Maximum) | 7.000<br>(Minimum) | 8.500<br>(Nominal) | 11.00<br>(Maximum) | -28.89<br>(Minimum) | 15.50<br>(Nominal) | 60.00<br>(Maximum) |
| Phase  | Na Count Rate CPS  | Value              |                    |                    |                    |                    |                     |                    |                    |
| Master |                    | 33.69              |                    |                    |                    |                    |                     |                    |                    |
| Before |                    | 33.51              |                    |                    |                    |                    |                     |                    |                    |
|        | 10.00<br>(Minimum) | 45.00<br>(Nominal) | 100.0<br>(Maximum) |                    |                    |                    |                     |                    |                    |






Master: 1-Jan-2010 19:23

Before: 16-Jan-2010 20:44

|  |
|--|
| Hostile Natural Gamma Ray Sonde Wellsite Calibration |
| Ratio Of Detector 1 To Detector 2                    |

| Phase                     | Coincidence Count Rate Ratio   | Value |
|---------------------------|--|-------|
| Master                    |   | 1.006 |
| Before                    |  | 1.005 |
|                           | 0.9500 (Minimum)      1.000 (Nominal)      1.050 (Maximum)                       |       |
| Master: 1-Jan-2010 19:23  |  |       |
| Before: 16-Jan-2010 20:44 |  |       |

| Hostile Natural Gamma Ray Sonde Master Calibration |   |       |        |   |       |        |   |       |
|--|---|-------|--------|---|-------|--------|---|-------|
| Detector 1 Calibration                             |   |       |        |   |       |        |   |       |
| Phase  | Na 511 Peak Set Point   | Value | Phase  | Th Peak Loc   | Value | Phase  | Th Peak Res %   | Value |
| Master   |  | 41.00 | Master |  | 210.4 | Master |  | 6.564 |
|  | 38.00 (Minimum)      40.00 (Nominal)      43.00 (Maximum)                         |       |        | 201.0 (Minimum)      209.6 (Nominal)      218.3 (Maximum)                         |       |        | 5.000 (Minimum)      7.000 (Nominal)      9.000 (Maximum)                           |       |
| Phase  | Background Count Rate CPS   | Value | Phase  | Gain Ratio  | Value |        |   |       |
| Master   |   | 18.85 | Master |  | 1.010 |        |   |       |
|  | 10.00 (Minimum)      142.5 (Nominal)      265.0 (Maximum)                         |       |        | 0.9400 (Minimum)      1.000 (Nominal)      1.060 (Maximum)                        |       |        |   |       |
| Master: 1-Jan-2010 19:02                           |   |       |        |   |       |        |   |       |

| Hostile Natural Gamma Ray Sonde Master Calibration |   |       |        |   |       |        |   |       |
|--|---|-------|--------|---|-------|--------|---|-------|
| Detector 2 Calibration                             |   |       |        |   |       |        |   |       |
| Phase  | Na 511 Peak Set Point   | Value | Phase  | Th Peak Loc   | Value | Phase  | Th Peak Res %   | Value |
| Master   |  | 41.00 | Master |  | 209.1 | Master |  | 6.559 |
|  | 38.00 (Minimum)      40.00 (Nominal)      43.00 (Maximum)                         |       |        | 201.0 (Minimum)      209.6 (Nominal)      218.3 (Maximum)                         |       |        | 5.000 (Minimum)      7.000 (Nominal)      9.000 (Maximum)                           |       |
| Phase  | Background Count Rate CPS   | Value | Phase  | Gain Ratio  | Value |        |   |       |
| Master   |   | 18.64 | Master |  | 1.002 |        |   |       |
|  | 10.00 (Minimum)      142.5 (Nominal)      265.0 (Maximum)                         |       |        | 0.9400 (Minimum)      1.000 (Nominal)      1.060 (Maximum)                        |       |        |   |       |
| Master: 1-Jan-2010 19:02                           |   |       |        |   |       |        |   |       |

| DTS Telemetry Tool / Equipment Identification |          |      |
|---|----------|------|
| Primary Equipment:                            |          |      |
| DTC-H Auxiliary Cartridge                     | DTCH - A | 8799 |
| DTC-H Telemetry Cartridge                     | DTCH - A | 8799 |
| Auxiliary Equipment:                          |          |      |
| DTCH Telemetry Cartridge Housing              | ECH - KC | 9842 |

Company: **Lamont Doherty**

**Schlumberger**

Well: **Expedition 318 Site U1359D**

Field: **Wilkes Land**

Rig: **JOIDES Resolution**

Country: **Antarctica**

Phasor Induction (DITE)  
 Hostile Litho Density (HLDS)  
 Neutron Porosity (APS) Gamma Ray (HNGS)