



|   |  |
|---|--|
| FILE NO:<br>MD114447                                      | COMPANY<br>PICEANCE ENERGY LLC   |
| API NO:<br>05-077-10250                                   | WELL<br>PICEANCE FEDERAL 28-21E  |
|   | FIELD<br>VEGA  |
|   | COUNTY<br>MESA   |
|   | STATE<br>COLORADO  |
| Ver. 4.01   | LOCATION:<br>SHL: 1981' FSL & 2484' FWL<br>BHL: 113' FSL & 881' FEL<br>SEC 28 T9S R93W                           |
| FINAL PRINT   | OTHER SERVICES<br>BHP  |
| PERMANENT DATUM<br>LOG MEASURED FROM<br>DRILL. MEAS. FROM | GL<br>ELEVATION<br>7679 FT<br>22 FT<br>ABOVE P.D.<br>KB<br>ELEVATIONS:<br>KB 7701 FT<br>DF 7700 FT<br>GL 7679 FT |

|                        |            |                      |            |   |  |
|------------------------|------------|----------------------|------------|---|--|
| DATE                   |            | 14-OCT-2015          |            |   |  |
| RUN                    | TRIP       | 1                    | 1          |   |  |
| SERVICE ORDER          |            | 100135               |            |   |  |
| DEPTH DRILLER          |            | 8574 FT              |            |   |  |
| DEPTH LOGGER           |            | 8574 FT              |            |   |  |
| BOTTOM LOGGED INTERVAL |            | 8553 FT              |            |   |  |
| TOP LOGGED INTERVAL    |            | 1620 FT              |            |   |  |
| CASING DRILLER         |            | 8.625 IN @ 1658 FT   |            | @ |  |
| CASING LOGGER          |            | 1644 FT              |            |   |  |
| BIT SIZE               |            | 7.875 IN             |            |   |  |
| TYPE OF FLUID IN HOLE  |            | LSND                 |            |   |  |
| DENSITY                | VISCOSITY  | 10 LB/G              | 65 CP      |   |  |
| PH                     | FLUID LOSS | 8.5                  | 5.2 C3     |   |  |
| SOURCE OF SAMPLE       |            | MUD PIT              |            |   |  |
| RM AT MEAS. TEMP.      |            | 2.25 OHMM @ 95 DEGF  |            | @ |  |
| RMF AT MEAS. TEMP.     |            | 1.69 OHMM @ 95 DEGF  |            | @ |  |
| RMC AT MEAS. TEMP.     |            | 2.81 OHMM @ 95 DEGF  |            | @ |  |
| SOURCE OF RMF          | RMC        | CALCULATED           | CALCULATED |   |  |
| RM AT BHT              |            | 1.75 OHMM @ 190 DEGF |            | @ |  |
| TIME SINCE CIRCULATION |            | 5 HOURS              |            |   |  |
| MAX. RECORDED TEMP.    |            | 190 DEGF             |            |   |  |
| EQUIP. NO.             | LOCATION   | HL6713               | ODESSA, TX |   |  |
| RECORDED BY            |            | B HOAGLAND/S SAEED   |            |   |  |
| WITNESSED BY           |            | MATT SETTLES         |            |   |  |

IN MAKING INTERPRETATIONS OF LOGS OUR EMPLOYEES WILL GIVE THE CUSTOMER THE BENEFIT OF THEIR BEST JUDGEMENT. BUT SINCE ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS, WE CANNOT, AND WE DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION. WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COST, DAMAGES, OR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

| BOREHOLE RECORD |         |         |
|-----------------|---------|---------|
| BIT SIZE        | FROM    | TO      |
| 11 IN           | 0 FT    | 1668 FT |
| 7.875 IN        | 1668 FT | 8574 FT |

| CASING RECORD |         |       |      |         |
|---------------|---------|-------|------|---------|
| SIZE          | WEIGHT  | GRADE | FROM | TO      |
| 8.625 IN      | 24 LB/F | J-55  | 0 FT | 1668 FT |
| 4.5 IN        |         |       | 0 FT | 8574 FT |

REMARKS

RUN 1 TRIP 1: NACL: 1835 PPM  
CL: 1115 PPM

RHO MATRIX: 2.68 G/CC  
RHO FLUID: 1.00 G/CC

BOREHOLE & CEMENT VOLUME PRESENTED (TOTAL VOLUME LESS 4.5 CSG)  
1 SMALL TICK = 10 CU. FT.  
1 MEDIUM TICK = 100 CU. FT.  
1 LARGE TICK = 1000 CU. FT.

PORZC & CNC RECORDED ON A SANDSTONE MATRIX  
CNC IS CALIPER CORRECTED

CREW: J. ORONA, J. BECK

## EQUIPMENT DATA

| RUN | TRIP | TOOL      | SERIES NO. | SERIAL NO. | POSITION      |
|-----|------|-----------|------------|------------|---------------|
| 1   | 1    | TTRM      | 3981XB     | 12030561   | FREE          |
| 1   | 1    | CMRT      | 3514XB     | 10213244   | FREE          |
| 1   | 1    | DSL       | 1329XA     | Z177857    | DECENTRALIZED |
| 1   | 1    | CN        | 2446XA     | 10103362   | DECENTRALIZED |
| 1   | 1    | ZDL       | 2234XA     | 10195311   | PAD DEVICE    |
| 1   | 1    | KNUCKLE   | 3939XA     | 12949575   | FREE          |
| 1   | 1    | HDIL ELEC | 1515EA     | 10208946   | CENTRALIZED   |
| 1   | 1    | HDIL      | 1515MA     | 10326319   | CENTRALIZED   |

## INSTRUMENT CONFIGURATION

## CABLEHEAD

Diameter : 3.38"  
 Length : 5.50'  
 Weight : 24 lbs  
 Series : CABL338  
 Mnemonic : CBLH  
 Measure Point: 2.75': CABLEHEAD TOP  
 Tensile Str. : 120000 lbs

## TTRM SUB

Diameter : 3.63"  
 Length : 3.83'  
 Weight : 62 lbs  
 Series : 3981XA  
 Mnemonic : TTRM

## WTS COMMON REMOTE

Diameter : 3.63"  
 Length : 6.36'  
 Weight : 126 lbs  
 Series : 3514XB  
 Mnemonic : WTS  
 Tensile Str. : 78000 lbs  
 Compressive : 114000 lbs

## DIGITAL SPECTRALOG

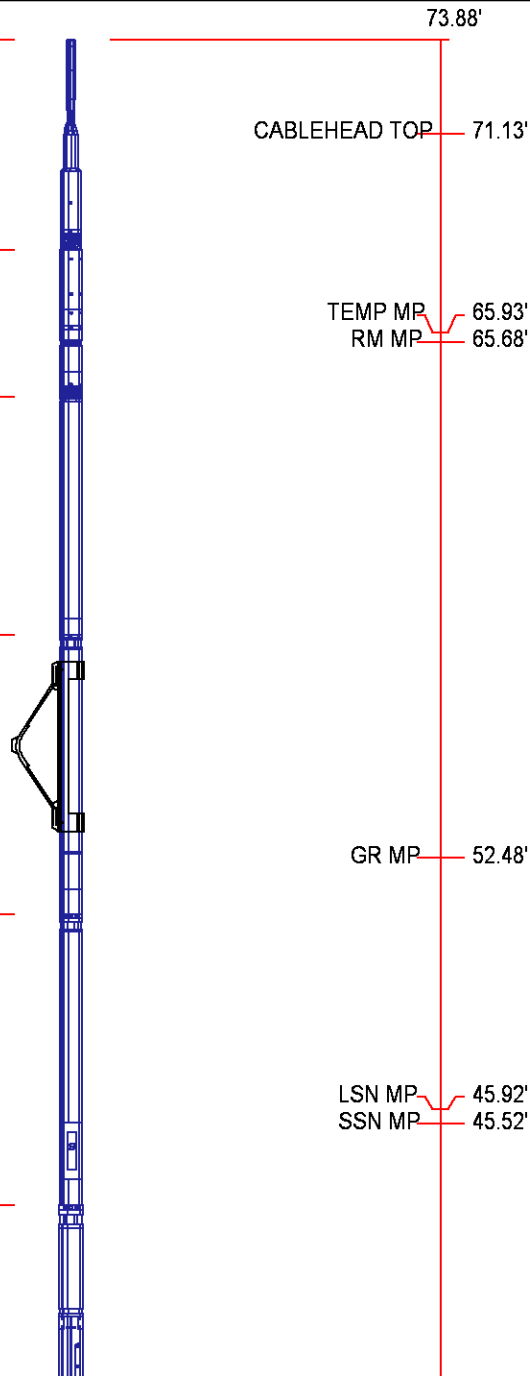
Diameter : 3.63"  
 Length : 7.31'  
 Weight : 130 lbs  
 Series : 1329XA  
 Mnemonic : DSL  
 Measure Point: 1.60': GR MP  
 Tensile Str. : 78000 lbs  
 Compressive : 85000 lbs

## COMPENSATED NEUTRON

Diameter : 3.63"  
 Length : 7.59'  
 Weight : 150 lbs  
 Series : 2446XA  
 Mnemonic : CN  
 Measure Point: 2.63': LSN MP  
 Measure Point: 2.24': SSN MP  
 Tensile Str. : 78000 lbs  
 Compressive : 78000 lbs

## Z-DENSILOG

Diameter : 4.88"  
 Length : 11.22'



Length : 11.22'  
Weight : 360 lbs  
Series : 2234XA  
Mnemonic : ZDL  
Measure Point: 3.19': CAL MP  
Measure Point: 2.47': LSD MP  
Measure Point: 2.07': SSD MP  
Tensile Str. : 78000 lbs  
Compressive : 74500 lbs

CAL MP 35.26'  
LSD MP 34.54'  
SSD MP 34.14'

#### KNUCKLE JOINT (DOUBLE)

Diameter : 3.38"  
Length : 4.65'  
Weight : 90 lbs  
Series : 3939XA  
Mnemonic : KNJT  
Tensile Str. : 32000 lbs

#### HIGH DEFINITION INDUCTION TOOL

Diameter : 3.62"  
Length : 27.13'  
Weight : 415 lbs  
Series : 1515XA  
Mnemonic : HDIL  
Measure Point: 13.91': SP MP  
Measure Point: 7.44': XMTR MP  
Tensile Str. : 36000 lbs  
Compressive : 1900 lbs

SP MP 14.19'

XMTR MP 7.72'

#### BULL PLUG 3 3/8

TOTAL LENGTH: 73.88'  
TOTAL WEIGHT: 1381 lbs  
MAX DIAMETER: 0'4.88"

0.00'

MAIN LOG 2"/100FT SCALE

PARAMETER AND FILTER SUMMARY REPORT

File: /dat1a/md11447/n87cb\_kb02.prm

LOGGING MODE: DEPTH

DIRECTION: UP

TOP DEPTH: 106.250 ft

BOTTOM DEPTH: 8586.000 ft

| SYMMETRIC FILTER |             |            |       |               |        |
|------------------|-------------|------------|-------|---------------|--------|
| MEASUREMENT TYPE | PARAMETER   | VALUE      | UNITS | INTERVAL (ft) |        |
| TTRM             | FILTER ( )  | medium (1) |       | TOP           | BOTTOM |
|                  | FILTER (.h) | medium (1) |       | "             | "      |
|                  | FILTER (.i) | medium (1) |       | "             | "      |
| Y AXIS CALIPER   | FILTER ( )  | medium (1) |       | "             | "      |
| TENSION          | FILTER ( )  | medium (1) |       | "             | "      |
| GR               | FILTER ( )  | medium (1) |       | "             | "      |
| CALIPER          | FILTER ( )  | medium (1) |       | "             | "      |
|                  | FILTER (.h) | medium (1) |       | "             | "      |
|                  | FILTER (.i) | medium (1) |       | "             | "      |
| SP-SPDH          | FILTER ( )  | medium (1) |       | "             | "      |

| BOREHOLE & CEMENT             |                           |                |              |               |          |
|-------------------------------|---------------------------|----------------|--------------|---------------|----------|
| MEASUREMENT TYPE              | PARAMETER                 | VALUE          | UNITS        | INTERVAL (ft) |          |
| BIT SIZE                      | BIT SIZE                  | 7.875          | in           | TOP           | BOTTOM   |
| MUD SAMPLE RESISTIVITY        | MUD SAMPLE TEMP           | 95.0           | degF         | "             | "        |
|                               | MUD SAMPLE RES            | 2.250          | ohm.m        | "             | "        |
| BOREHOLE TEMP from GRADIENT   | Known BH REF TEMP         | 190.0          | degF         | "             | "        |
|                               | at BH REF DEPTH           | 8574.0         | ft           | "             | "        |
|                               | with TEMP GRADIENT        | 0.700          | 0.01 degF/ft | "             | "        |
| BOREHOLE CORR DIAMETER SOURCE | CALIPER/FIXED DIA. (mbh*) | USE FIXED SIZE |              | TOP           | 1624.250 |
|                               |                           | USE CALIPER    |              | 1624.250      | BOTTOM   |
| BOREHOLE CORR DIAMETER        | FIXED DIAMETER (mbh*)     | 8.625          | in           | TOP           | 1636.250 |
|                               |                           | 7.875          | in           | 1636.250      | BOTTOM   |
| BH MUD RESISTIVITY SOURCE     | RMUD SOURCE (HDIL)        | TOOL MEASURED  |              | TOP           | BOTTOM   |

| HDIL PROCESSING              |                  |            |       |               |        |
|------------------------------|------------------|------------|-------|---------------|--------|
| MEASUREMENT TYPE             | PARAMETER        | VALUE      | UNITS | INTERVAL (ft) |        |
| HDIL TEMPERATURE CORRECTION  | TEMP CORR SOURCE | USE RXTEMP |       | TOP           | BOTTOM |
| ADAPTIVE BOREHOLE CORRECTION | ABC PROCESSING   | ON         |       | "             | "      |
|                              | ABC to CALCULATE | STANDOFF   |       | "             | "      |
|                              | STANDOFF         | 1.50       | in    | "             | "      |
|                              | TOOL POSITION    | ECCENTERED |       | "             | "      |
|                              | Rmud MULTIPLIER  | 1.000      |       | "             | "      |

| CURVE DESCRIPTION REPORT |                      |  |
|--------------------------|----------------------|--|
| CURVE NAME               | CREATION DATE        | CURVE DESCRIPTION                                |
| F1:GR                    | Oct 14 17:39:42 2015 | GAMMA RAY  |
| F1:M0C6                  | Oct 14 17:39:42 2015 | FOCUSED CONDUCTIVITY, 60-INCH DOI                |
| F1:M0R2                  | Oct 14 17:39:42 2015 | TRUE FOCUSED RESISTIVITY FOR HDIL, 20-INCH DOI   |
| F1:M0R6                  | Oct 14 17:39:42 2015 | TRUE FOCUSED RESISTIVITY FOR HDIL, 60-INCH DOI   |
| F1:SPDH                  | Oct 14 17:39:42 2015 | SPONTANEOUS POTENTIAL PROCESSED IN COMMON REMOTE |
| F1:TEN                   | Oct 14 17:39:42 2015 | DIFFERENTIAL TENSION                             |

| CURVE MEASURE POINT OFFSET |             |       |             |       |             |       |             |
|----------------------------|-------------|-------|-------------|-------|-------------|-------|-------------|
| CURVE                      | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) |
| GR                         | 55.00       | M0R2  | 10.75       | SPDH  | 16.75       |       |             |
| M0C6                       | 10.75       | M0R6  | 10.75       | TFN   | 0.00        |       |             |

Presentation : sys1:/dat1a/md11447/MAIN\_2.fvpdf [2"/100' Scale]

Plot Interval : 1620 - 8595 Feet

Data File 1 : F1 : sys1:/dat1a/md11447/MAIN.xtf

Created On : Oct 14 17:39:42 2015

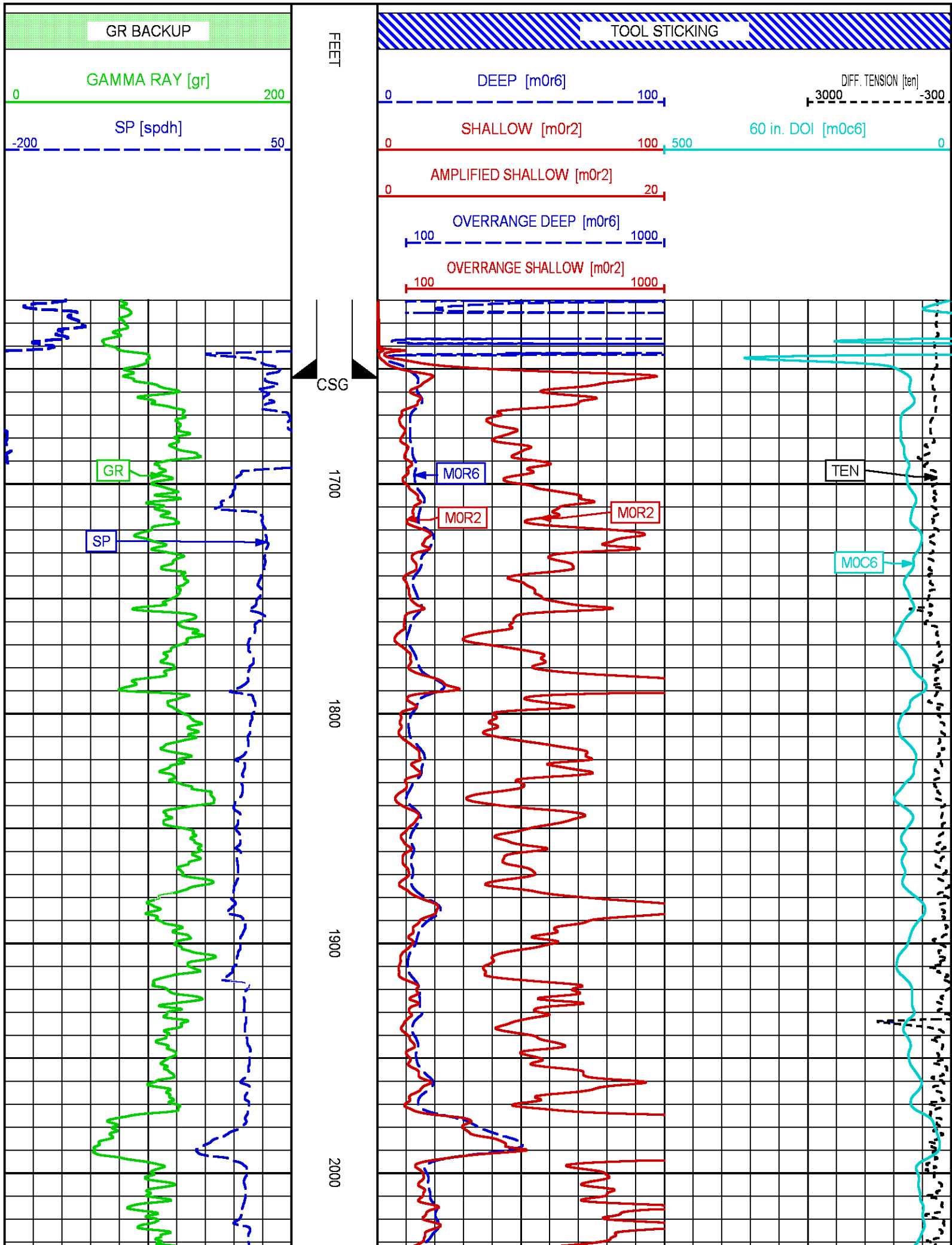
Company : PICEANCE ENERGY LLC

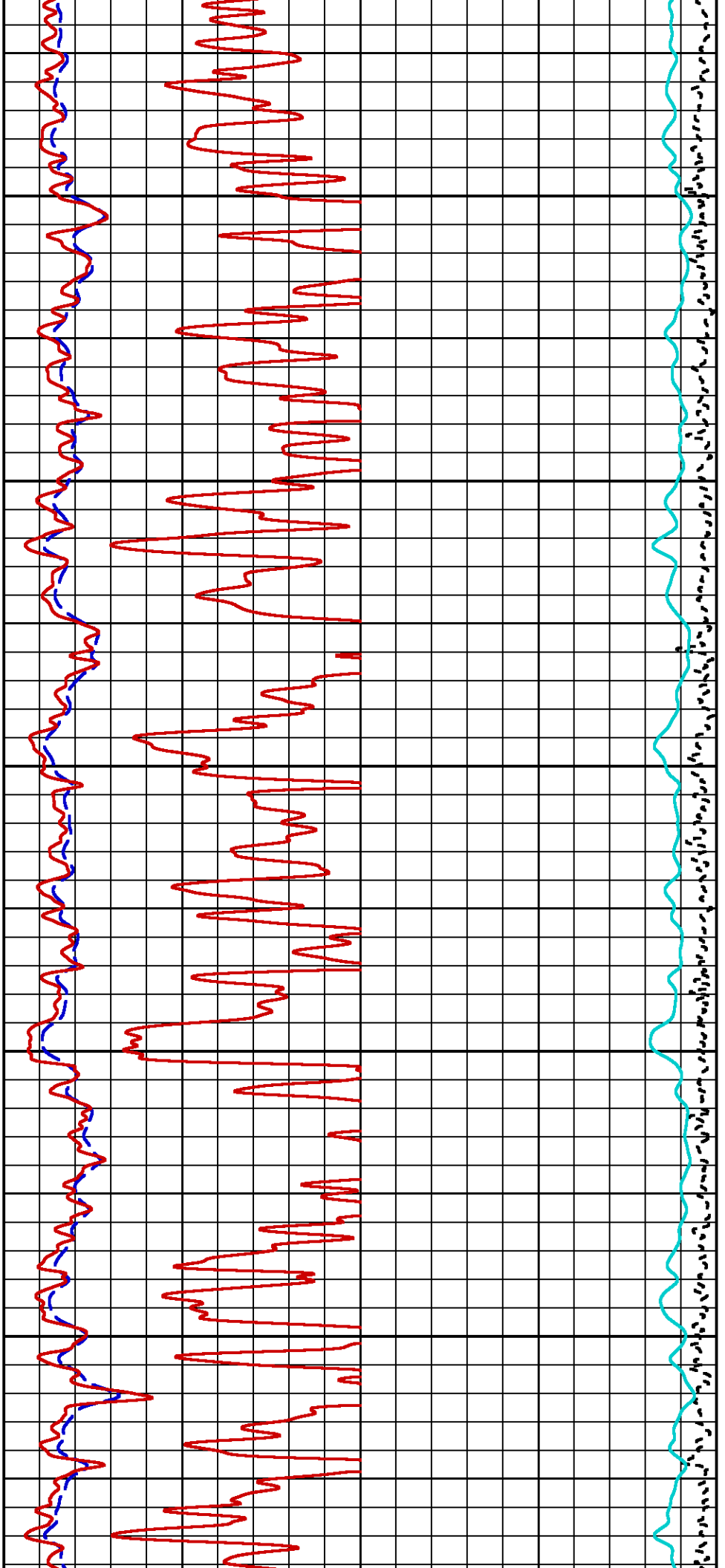
Well : FEDERAL 28-21E

Field : VEGA

File Interval : 1620 - 8595 Feet

OCT : n87cb kb





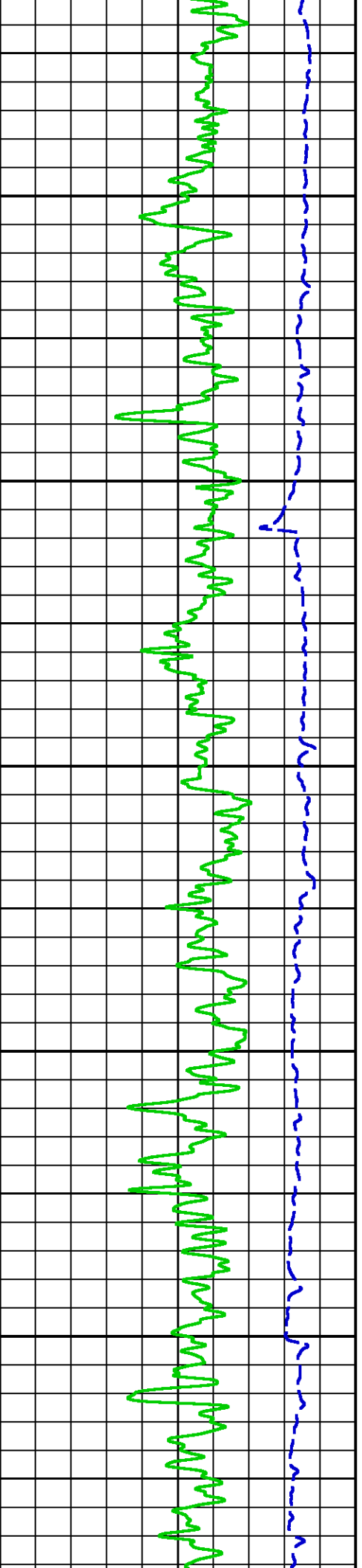
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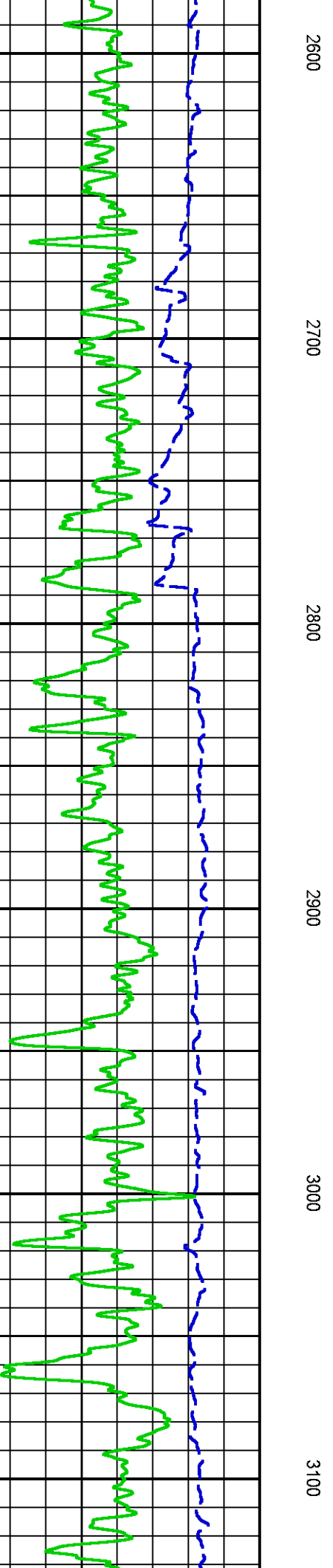
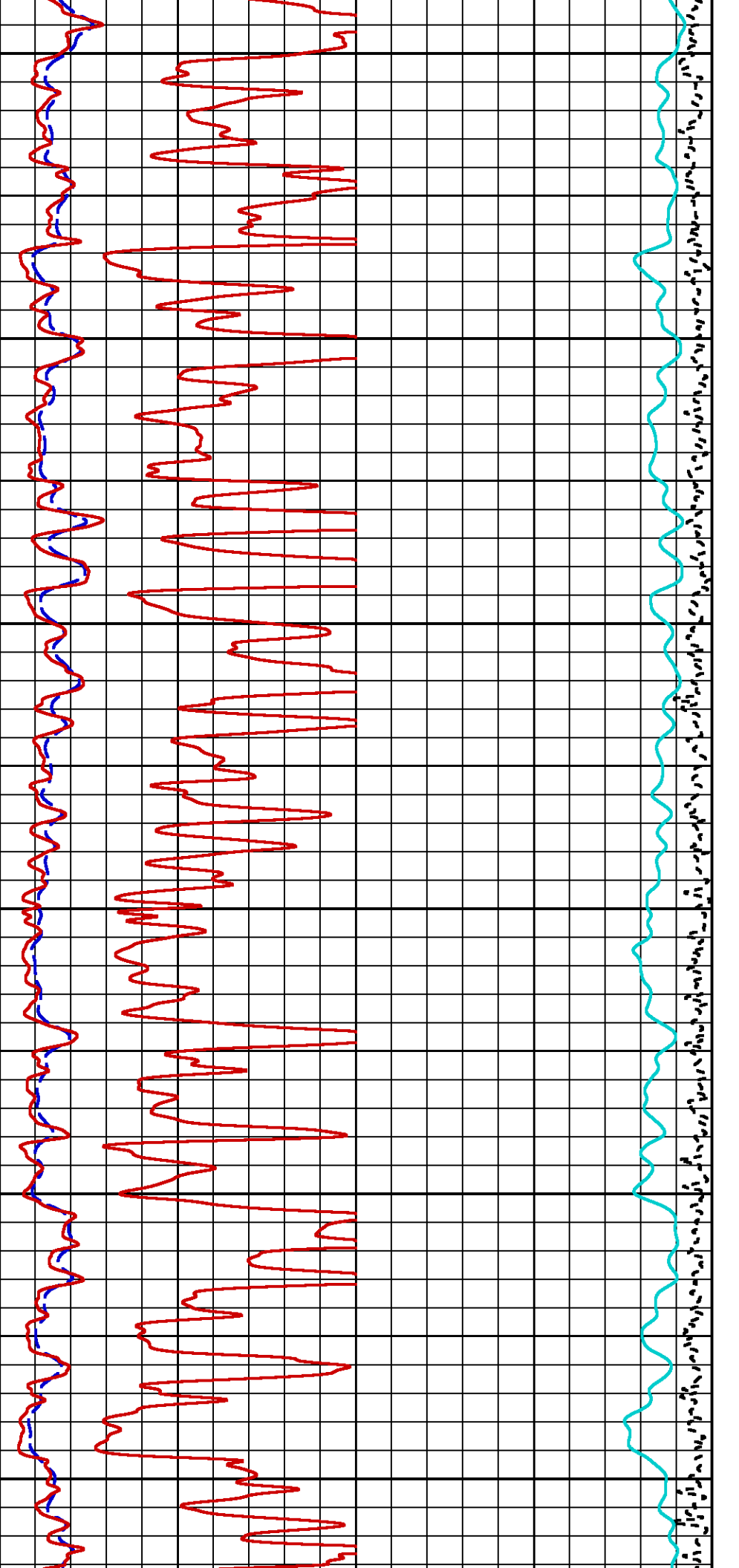
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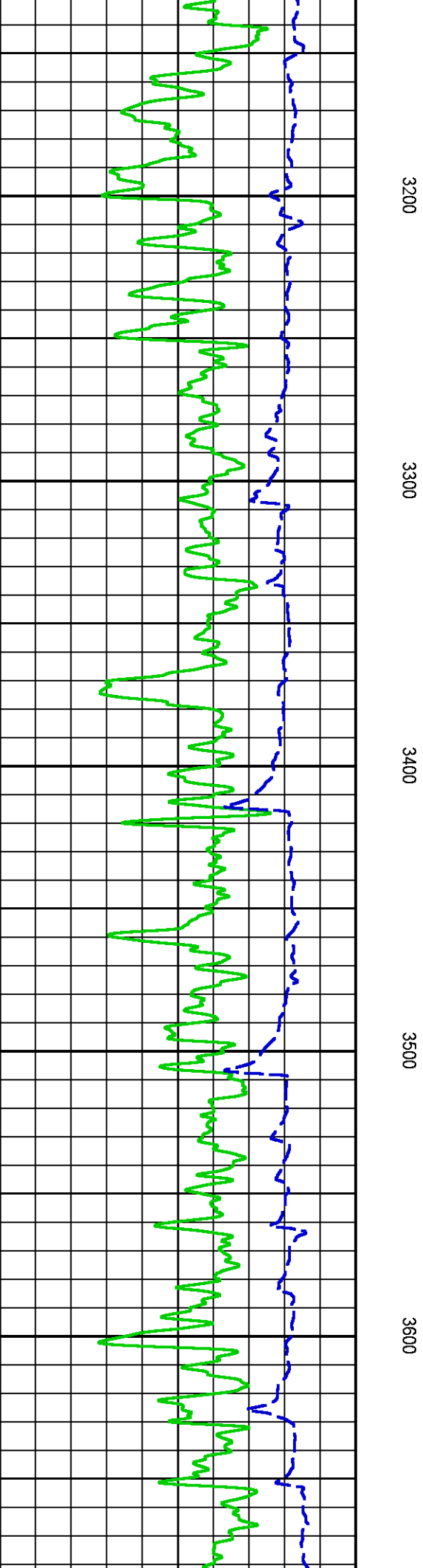
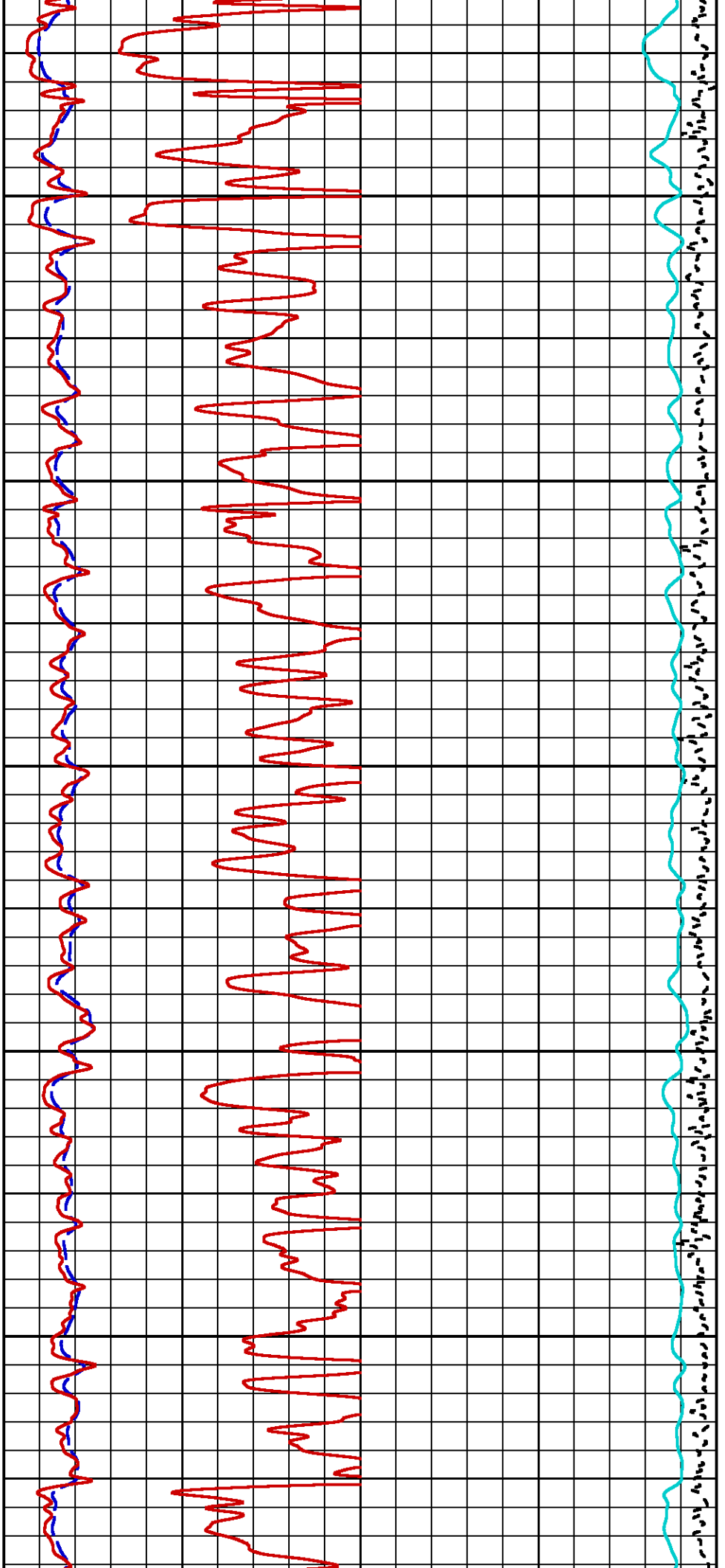
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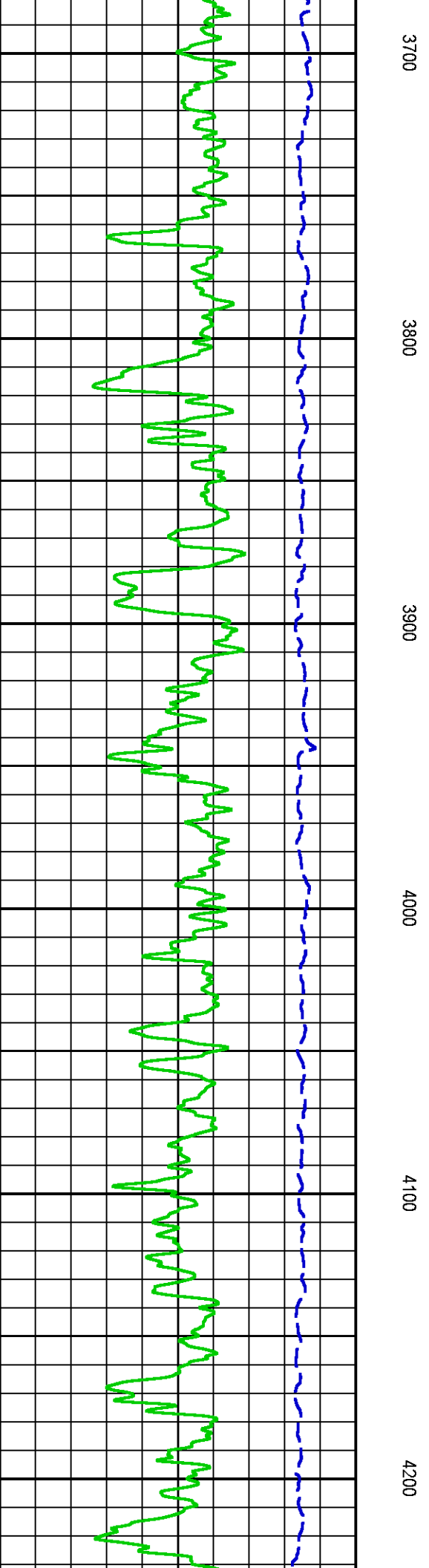
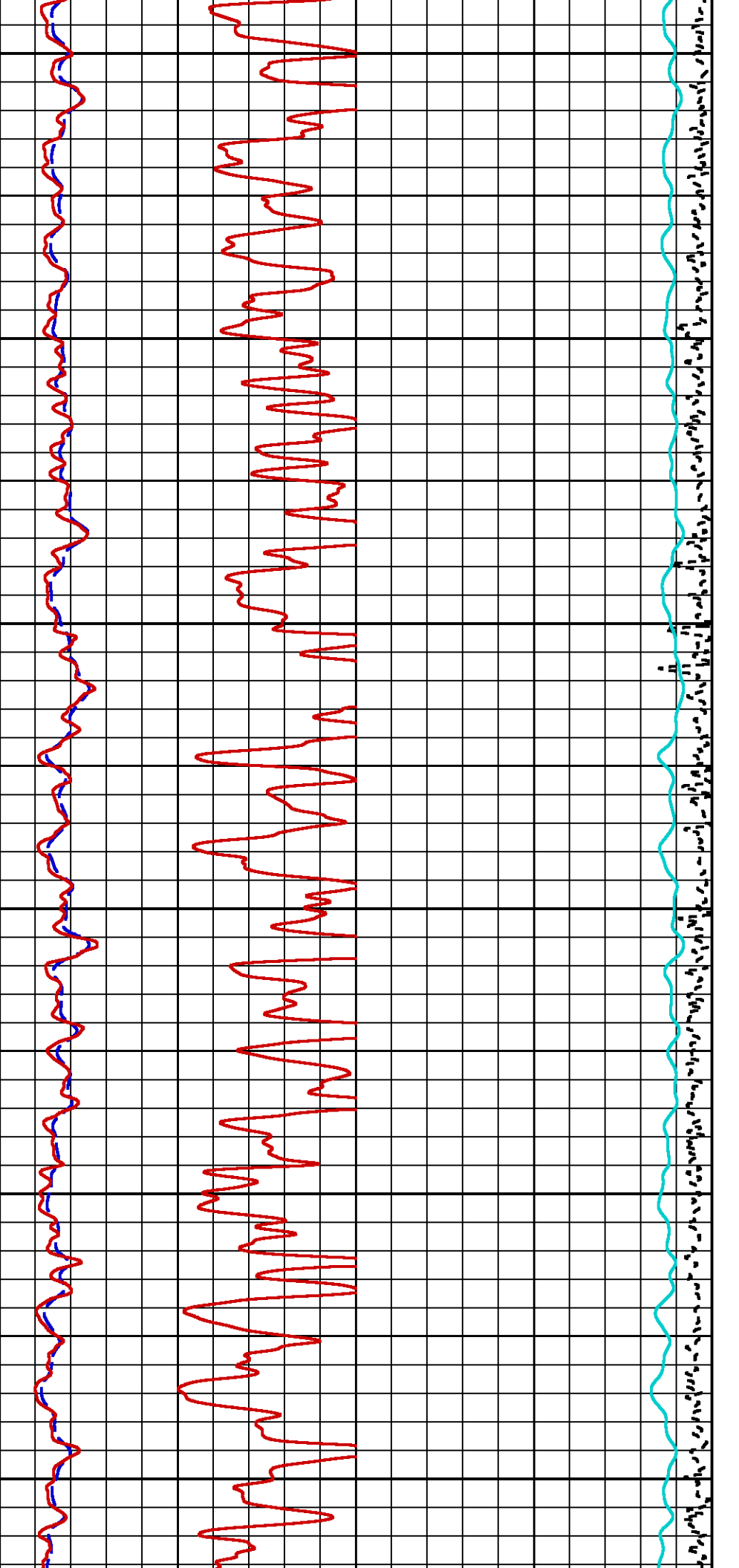
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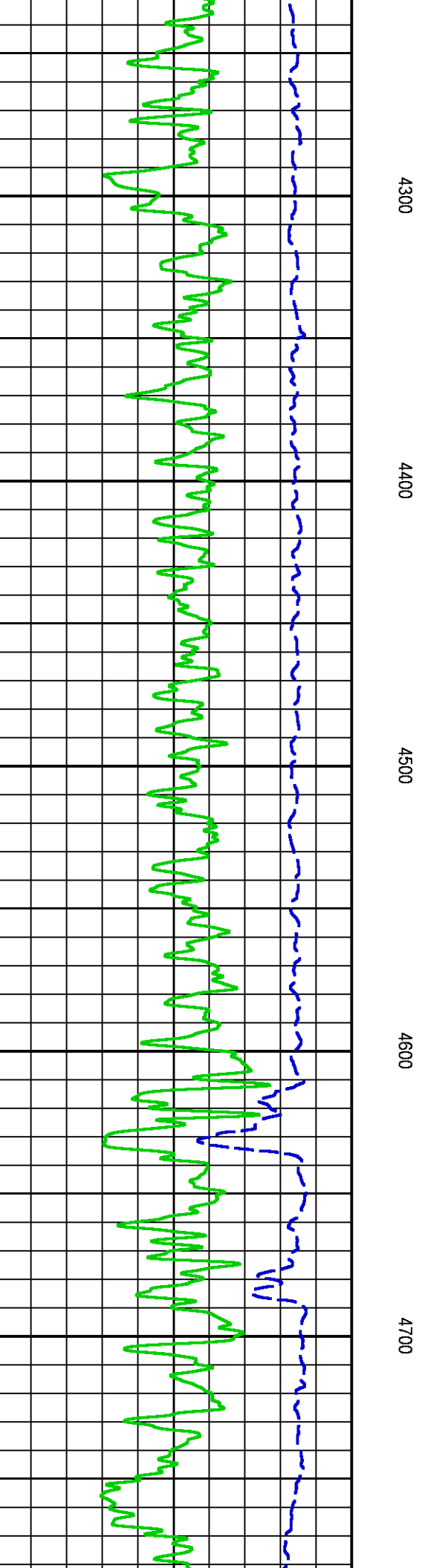
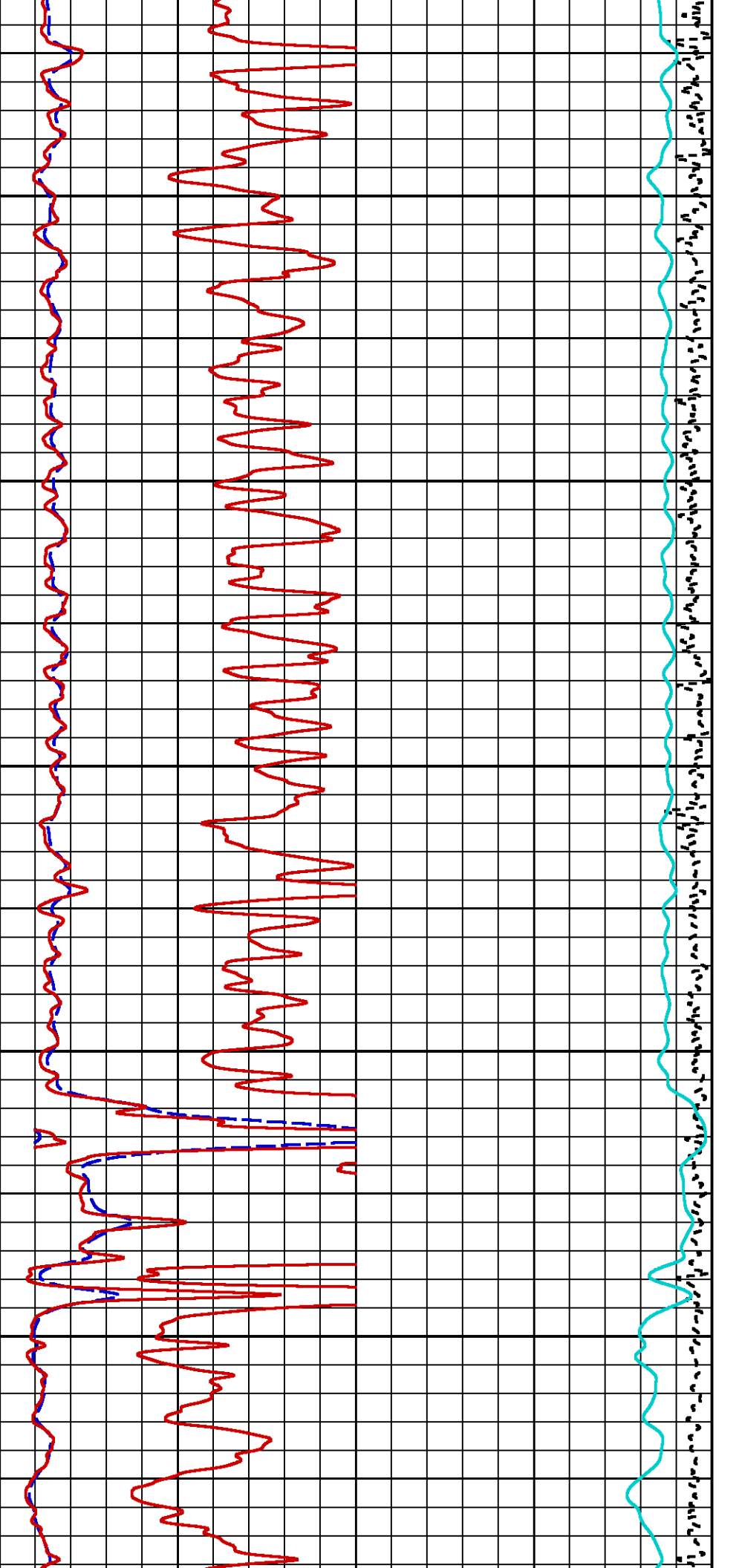


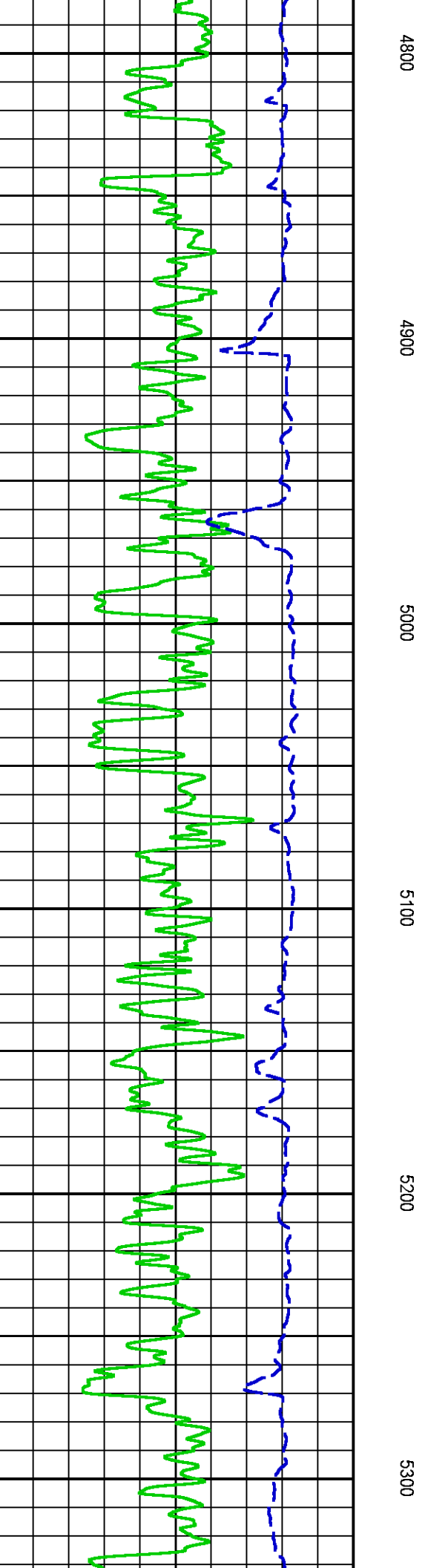
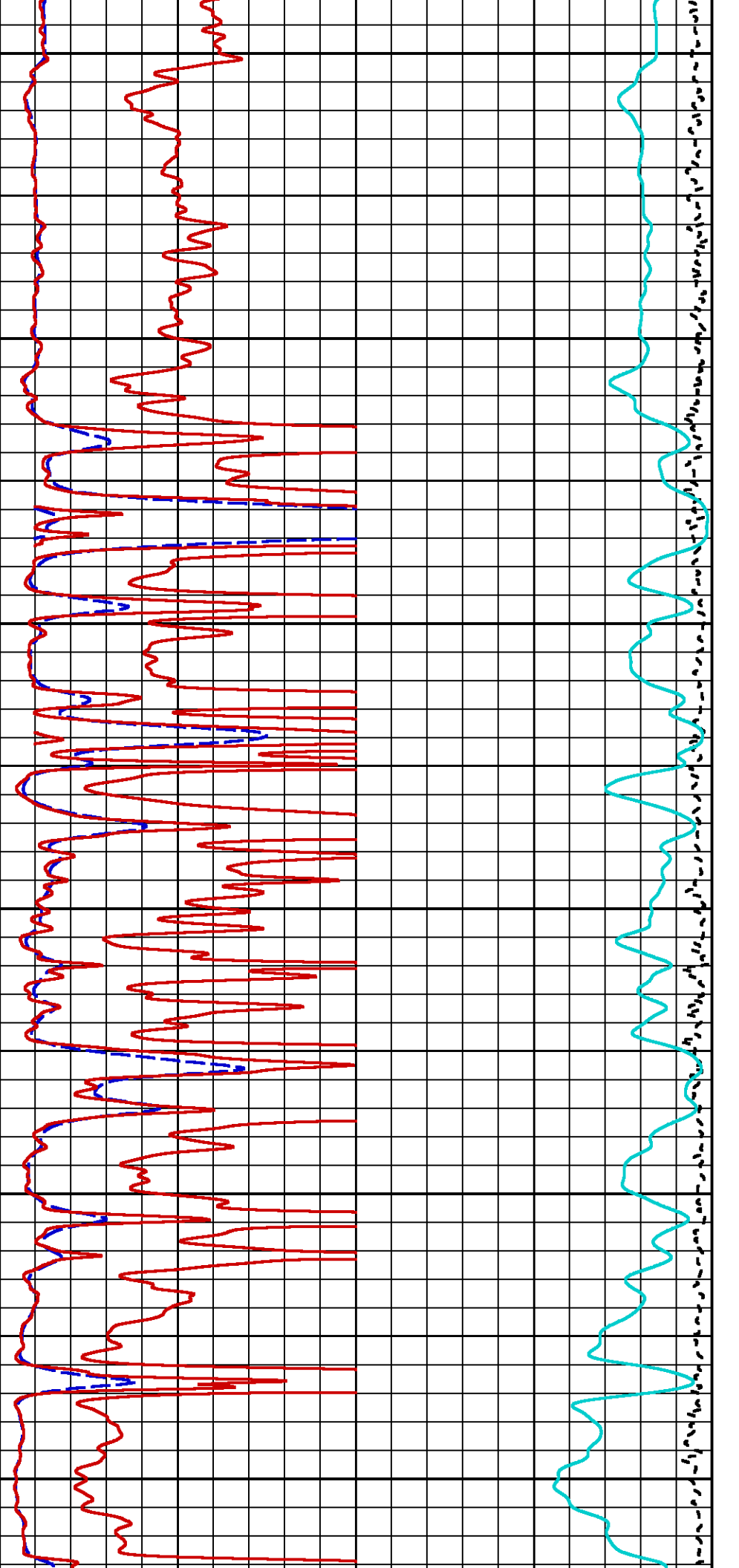


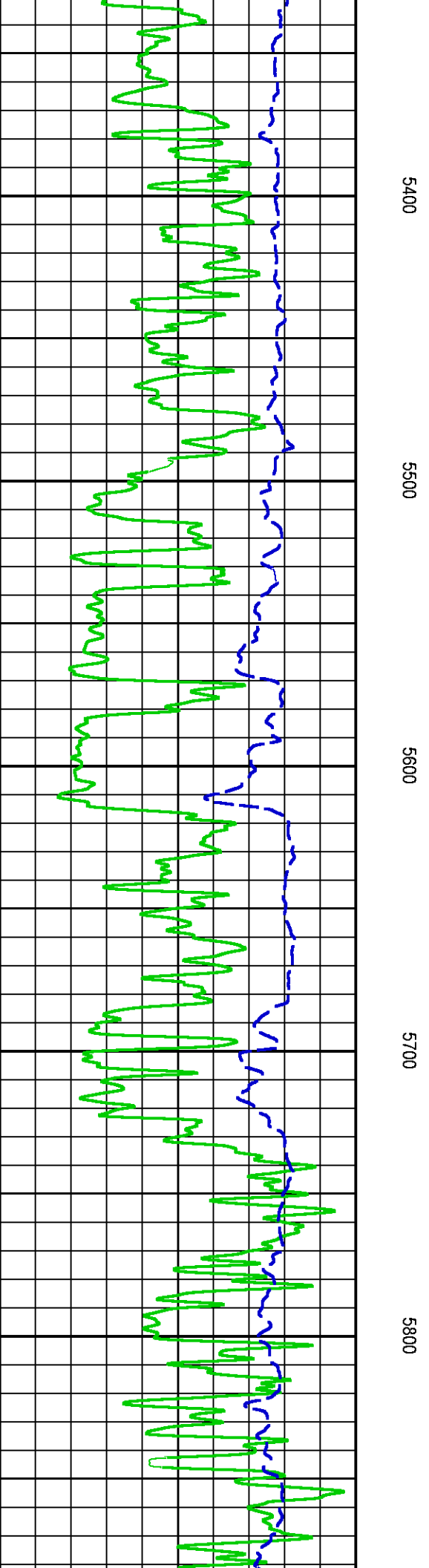
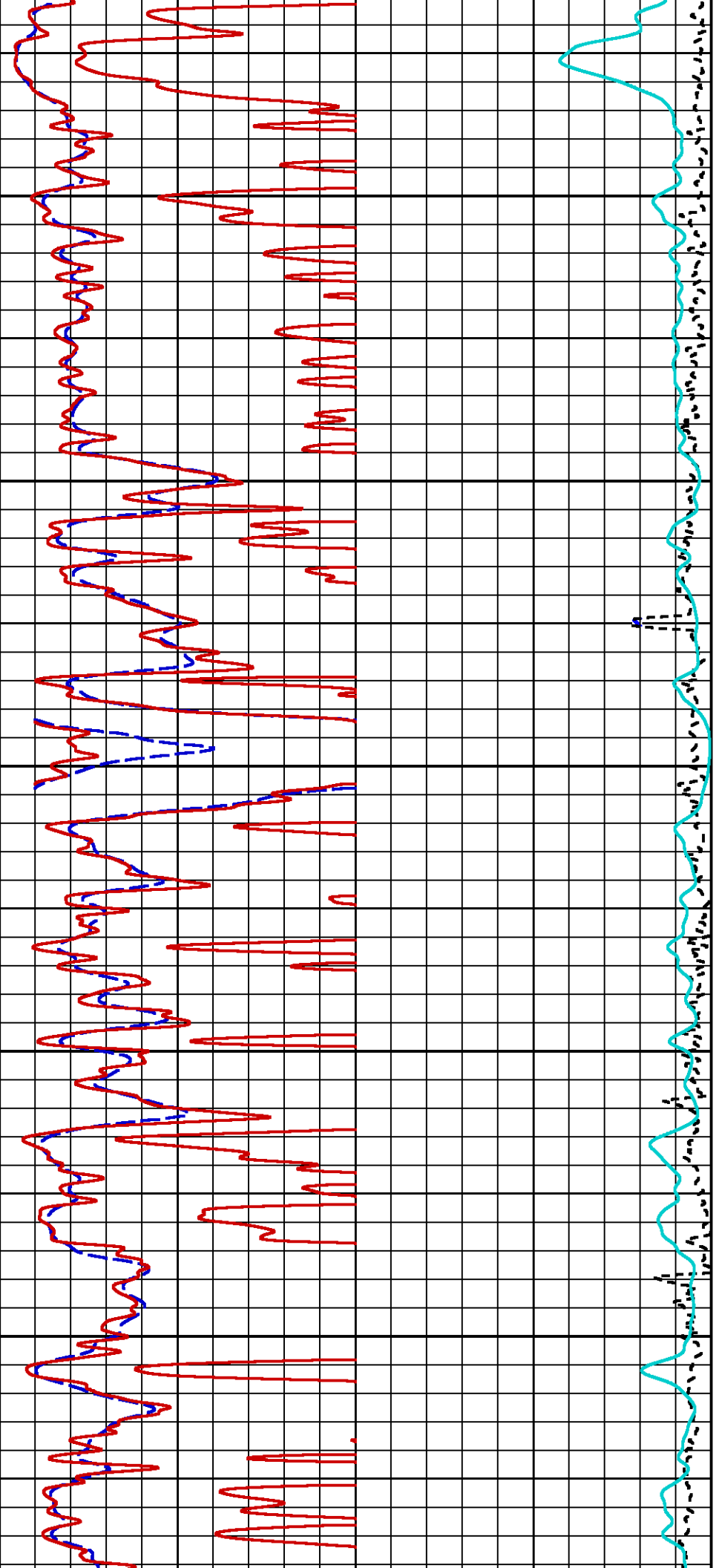


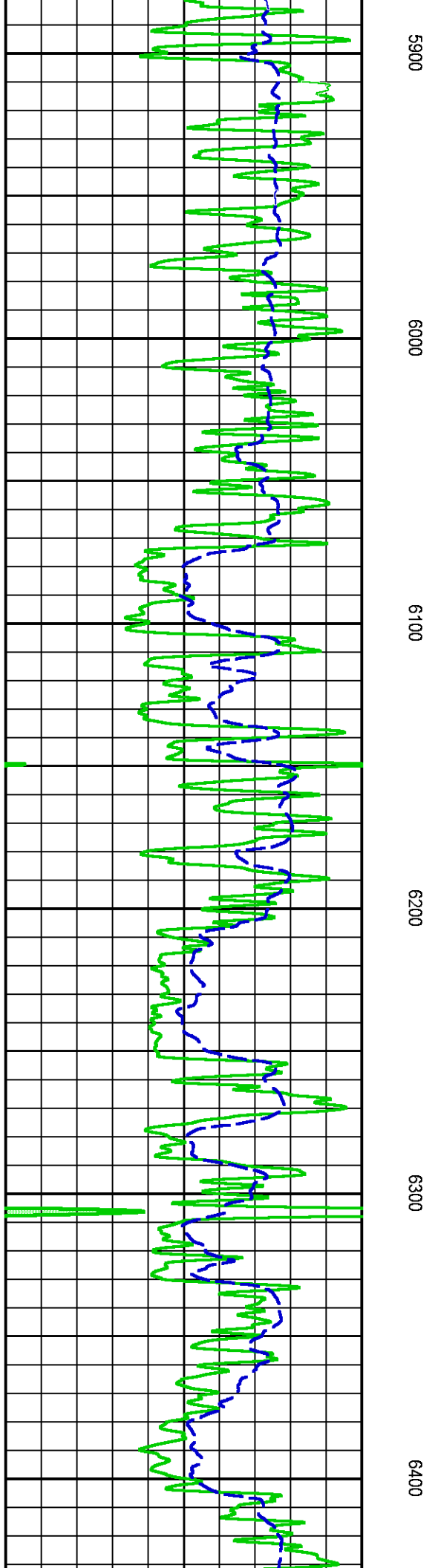
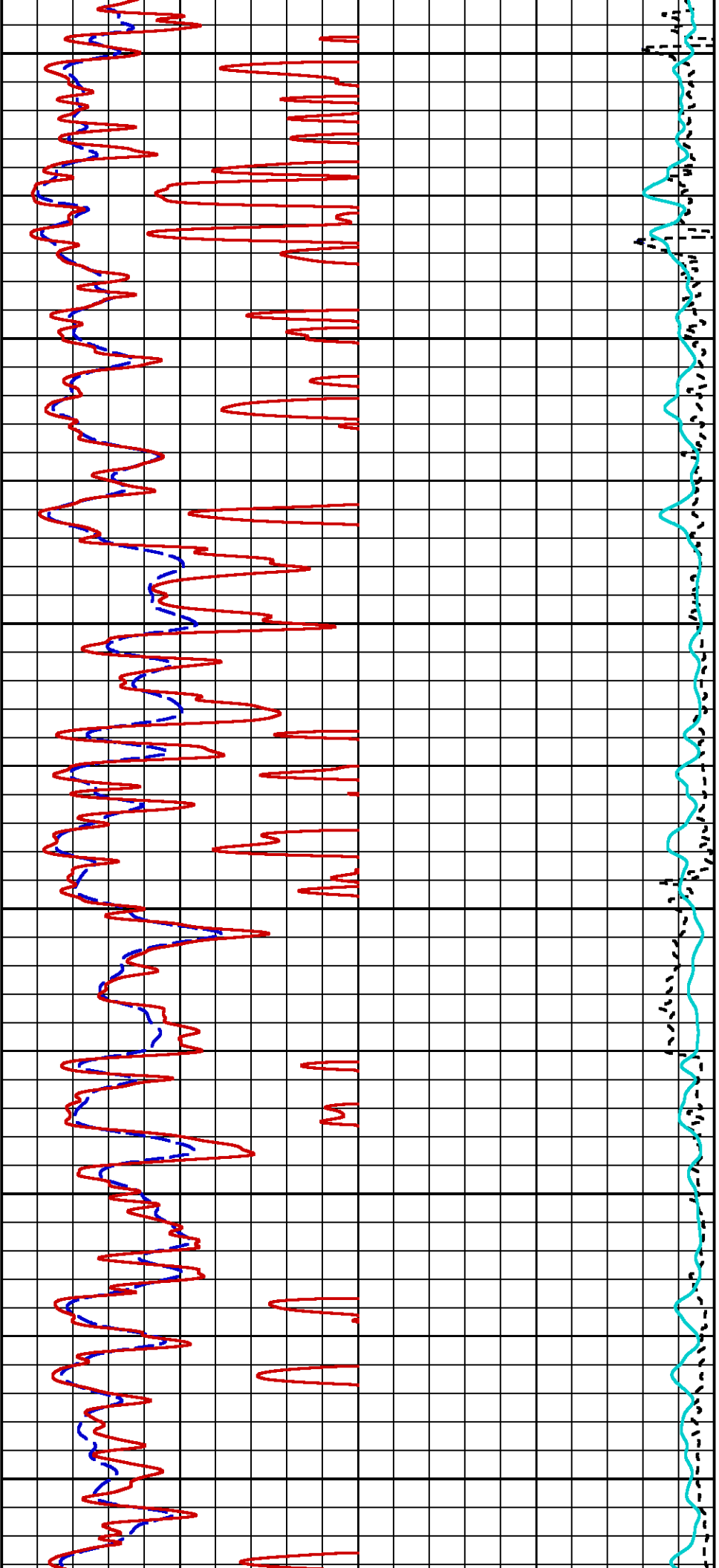


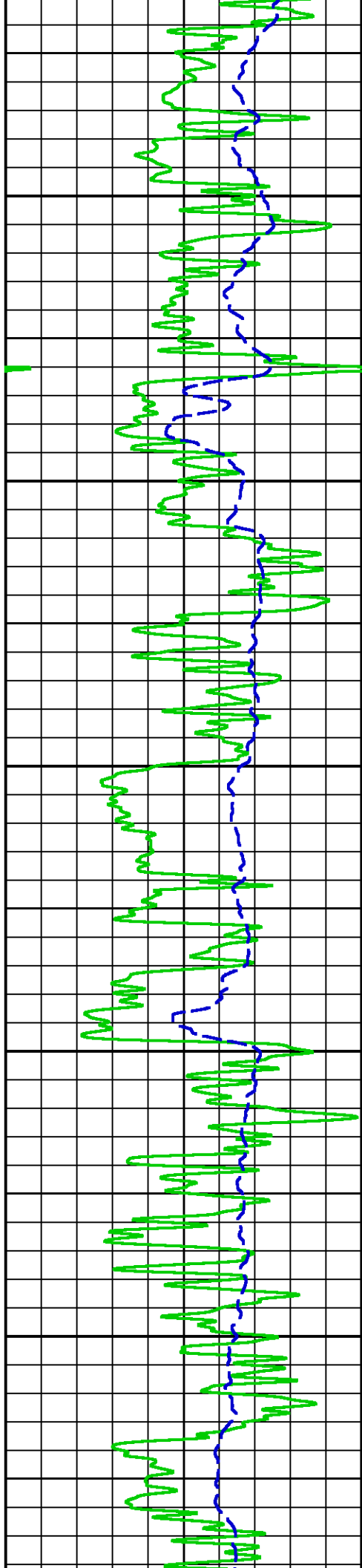












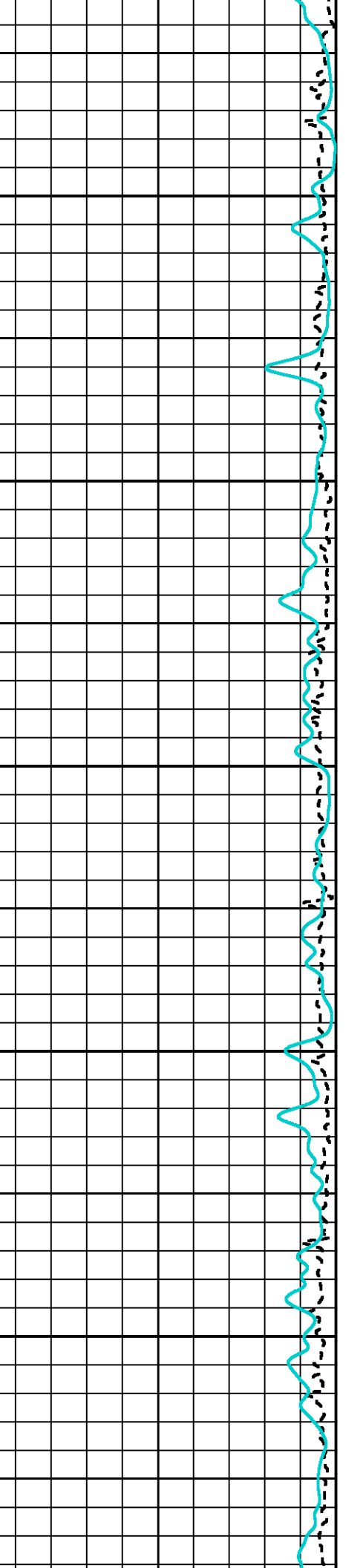
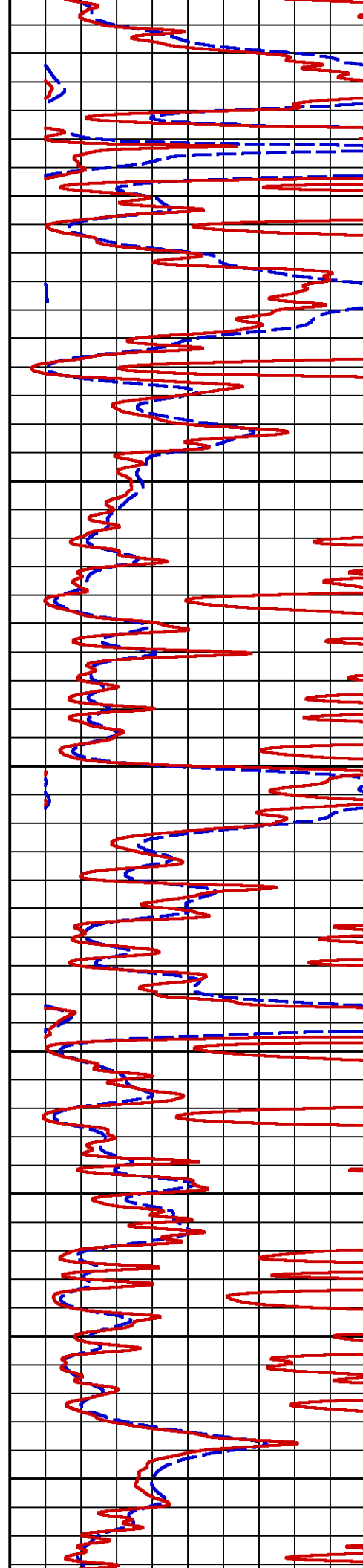
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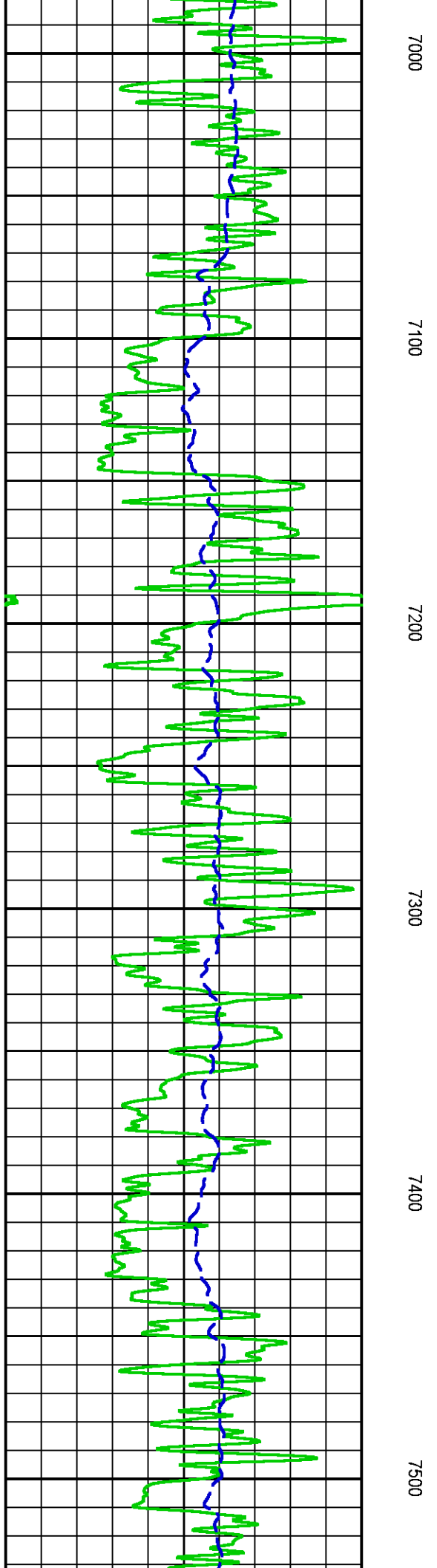
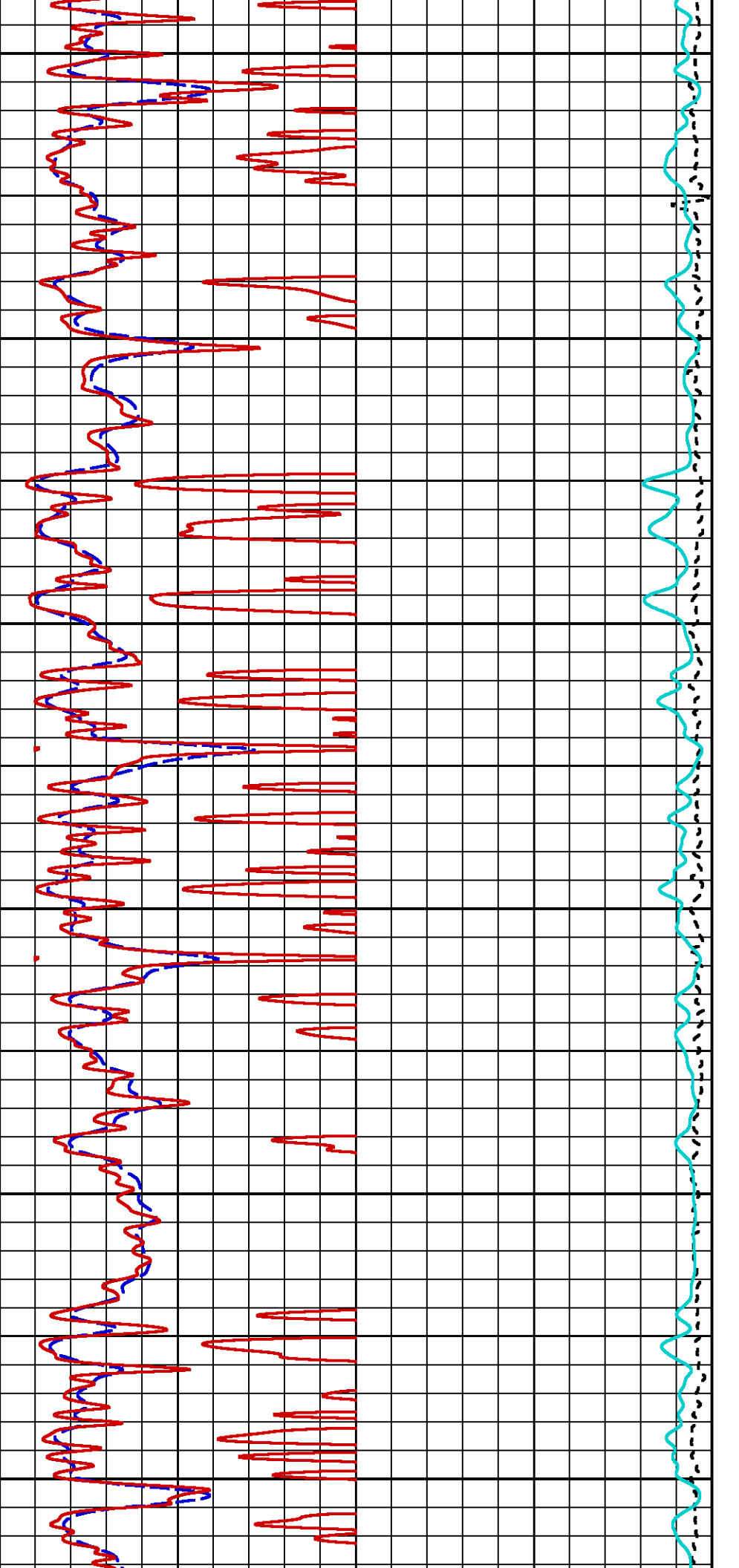
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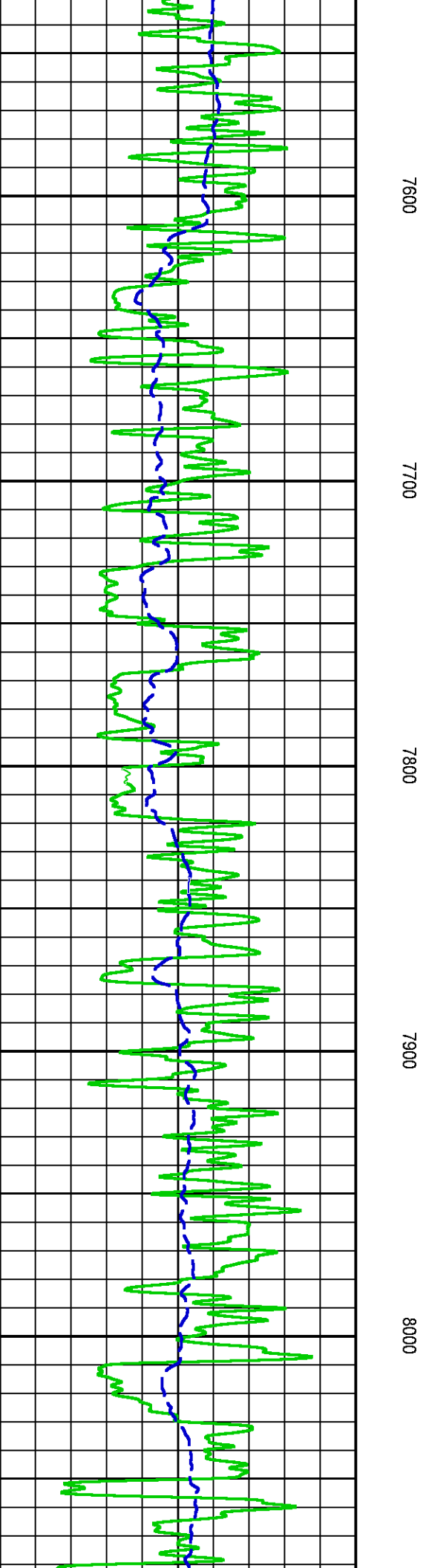
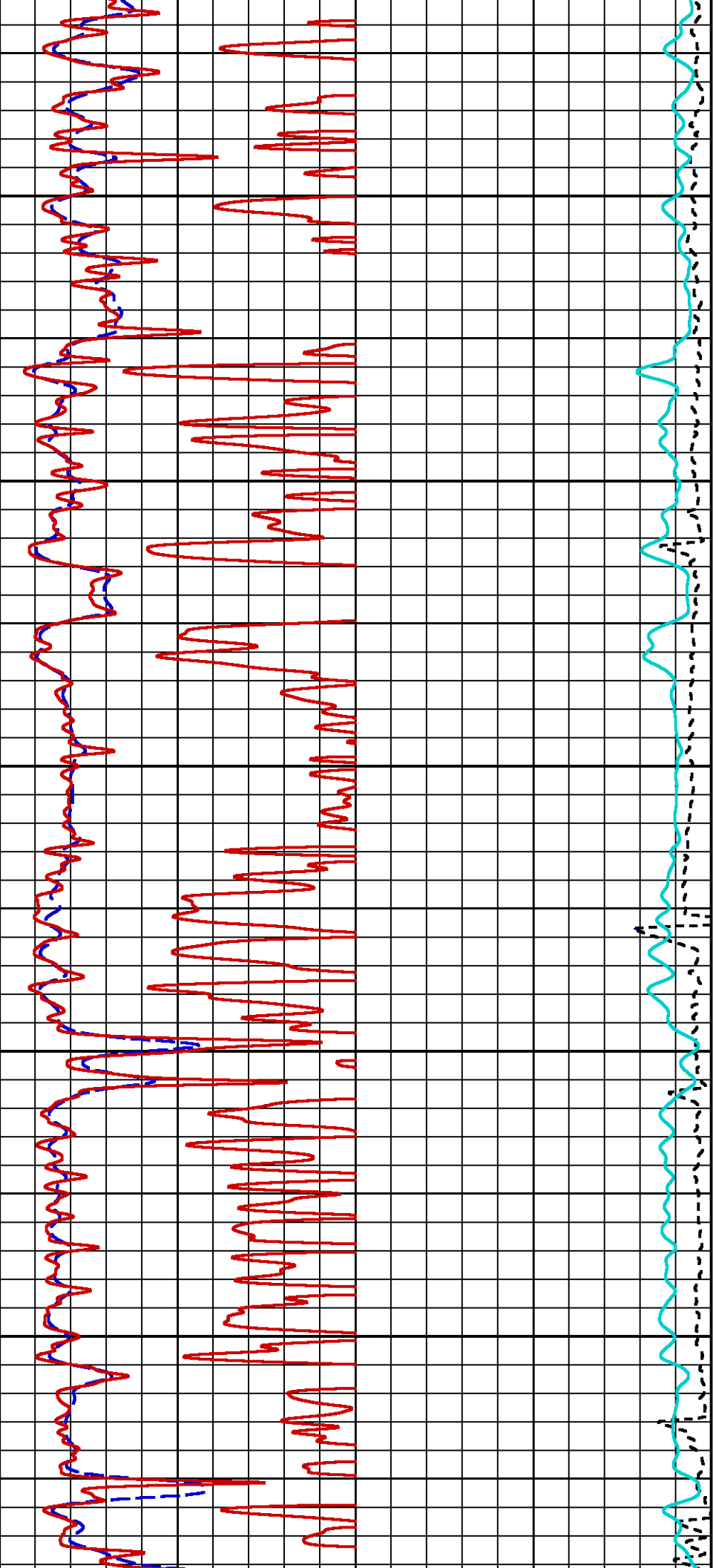
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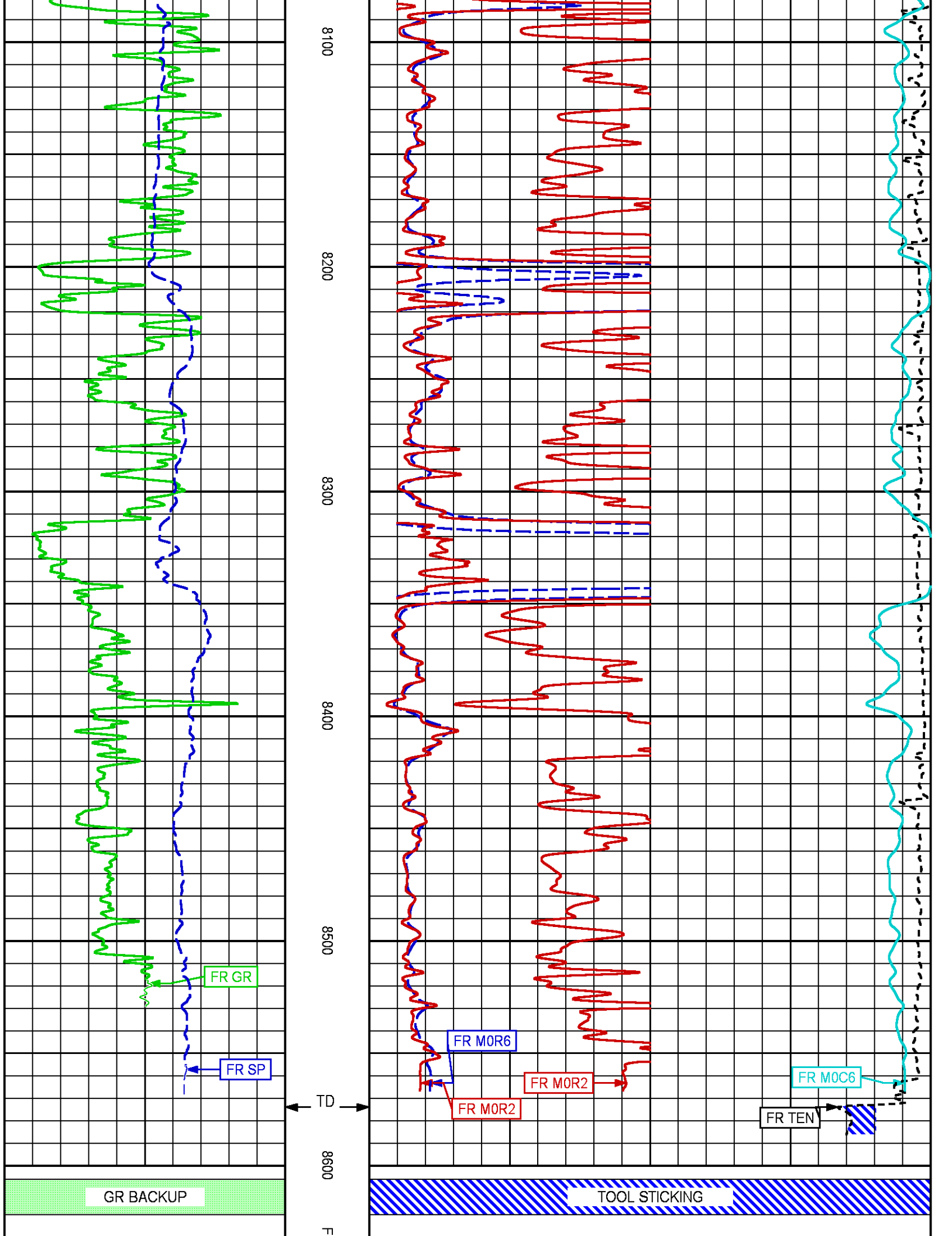
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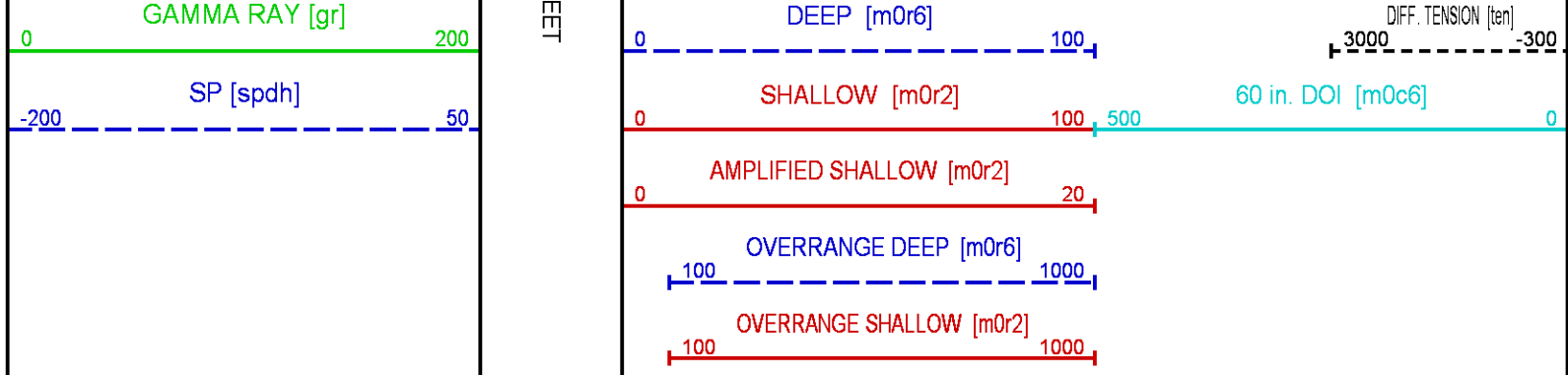












## MAIN LOG 5"/100FT SCALE

ECLIPS 6.2i ECLIPS General Release Rel 6.2i Wed Jun 12 12:21:40 CDT 2013  
Updates: 1 Patches: 7

Plotted: Wed Oct 14 21:22:45 2015

### PARAMETER AND FILTER SUMMARY REPORT

File: /dat1a/md11447/n87cb\_kb02.prm  
LOGGING MODE: DEPTH DIRECTION: UP  
TOP DEPTH: 106.250 ft BOTTOM DEPTH: 8586.000 ft

#### SYMMETRIC FILTER

| MEASUREMENT TYPE | PARAMETER       | VALUE      | UNITS | INTERVAL (ft) |        |
|------------------|-----------------|------------|-------|---------------|--------|
| TTRM             | FILTER ( )      | medium (1) |       | TOP           | BOTTOM |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| Y AXIS CALIPER   | FILTER ( )      | medium (1) |       | "             | "      |
| TENSION          | FILTER ( )      | medium (1) |       | "             | "      |
| GR               | FILTER ( )      | medium (1) |       | "             | "      |
| CN               | FILTER ( )      | medium (1) |       | "             | "      |
| CALIPER          | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| ZDL MED RES      | FILTER (hrd1*)  | medium     |       | "             | "      |
|                  | FILTER (hrd1s*) | medium     |       | "             | "      |
|                  | FILTER (hrd2*)  | medium     |       | "             | "      |
|                  | FILTER (hrd2s*) | medium     |       | "             | "      |
|                  | FILTER (soft*)  | medium     |       | "             | "      |
| SP-SPDH          | FILTER ( )      | medium (1) |       | "             | "      |

#### BOREHOLE & CEMENT

| MEASUREMENT TYPE                  | PARAMETER                  | VALUE          | UNITS        | INTERVAL (ft) |          |
|-----------------------------------|----------------------------|----------------|--------------|---------------|----------|
| CASING - BOREHOLE & CEMENT VOLUME | CASING O.D.                | 4.500          | in           | TOP           | BOTTOM   |
|                                   | CASING THICKNESS           | 0.326          | in           | "             | "        |
| BIT SIZE                          | BIT SIZE                   | 7.875          | in           | "             | "        |
| MUD SAMPLE RESISTIVITY            | MUD SAMPLE TEMP            | 95.0           | degF         | "             | "        |
|                                   | MUD SAMPLE RES             | 2.250          | ohm.m        | "             | "        |
| BOREHOLE TEMP from GRADIENT       | Known BH REF TEMP          | 190.0          | degF         | "             | "        |
|                                   | at BH REF DEPTH            | 8574.0         | ft           | "             | "        |
|                                   | with TEMP GRADIENT         | 0.700          | 0.01 degF/ft | "             | "        |
| BOREHOLE CORR DIAMETER SOURCE     | CALIPER/FIXED DIA. (cnbh*) | USE FIXED SIZE |              | TOP           | 1599.500 |
|                                   | USE CALIPER                |                |              | 1599.500      | BOTTOM   |
|                                   | CALIPER/FIXED DIA. (mbh*)  | USE FIXED SIZE |              | TOP           | 1624.250 |
|                                   | USE CALIPER                |                |              | 1624.250      | BOTTOM   |
| BOREHOLE CORR DIAMETER            | FIXED DIAMETER (cnbh*)     | 8.625          | in           | TOP           | 1598.500 |
|                                   |                            | 7.875          | in           | 1598.500      | BOTTOM   |

|                           |                       |               |    |          |          |
|---------------------------|-----------------------|---------------|----|----------|----------|
|                           | FIXED DIAMETER (mbh*) | 7.875         | in | 1636.250 | BOTTOM   |
|                           |                       | 8.625         | in | TOP      | 1636.250 |
| BH MUD RESISTIVITY SOURCE | RMUD SOURCE (HDIL)    | TOOL MEASURED |    | TOP      | BOTTOM   |

| CN PROCESSING                 |                      |           |       |               |          |
|-------------------------------|----------------------|-----------|-------|---------------|----------|
| MEASUREMENT TYPE              | PARAMETER            | VALUE     | UNITS | INTERVAL (ft) |          |
| 2446 CN MATRIX                | 2446 MATRIX          | SANDSTONE |       | TOP           | BOTTOM   |
| CN SALINITY CORRECTION        | SALINITY             | 0         | ppm   | "             | "        |
| CN TOOL STANDOFF              | ENABLE STANDOFF CORR | OFF       |       | "             | "        |
|                               | STANDOFF AMOUNT      | 0.00      | in    | "             | "        |
| CN CASING & CEMENT CORRECTION | CORRECTION           | ON        |       | TOP           | 1624.500 |
|                               |                      | OFF       |       | 1624.500      | BOTTOM   |
|                               | BIT SIZE BEHIND CSNG | 11.000    | in    | TOP           | 1625.000 |
|                               |                      | 7.875     | in    | 1625.000      | BOTTOM   |

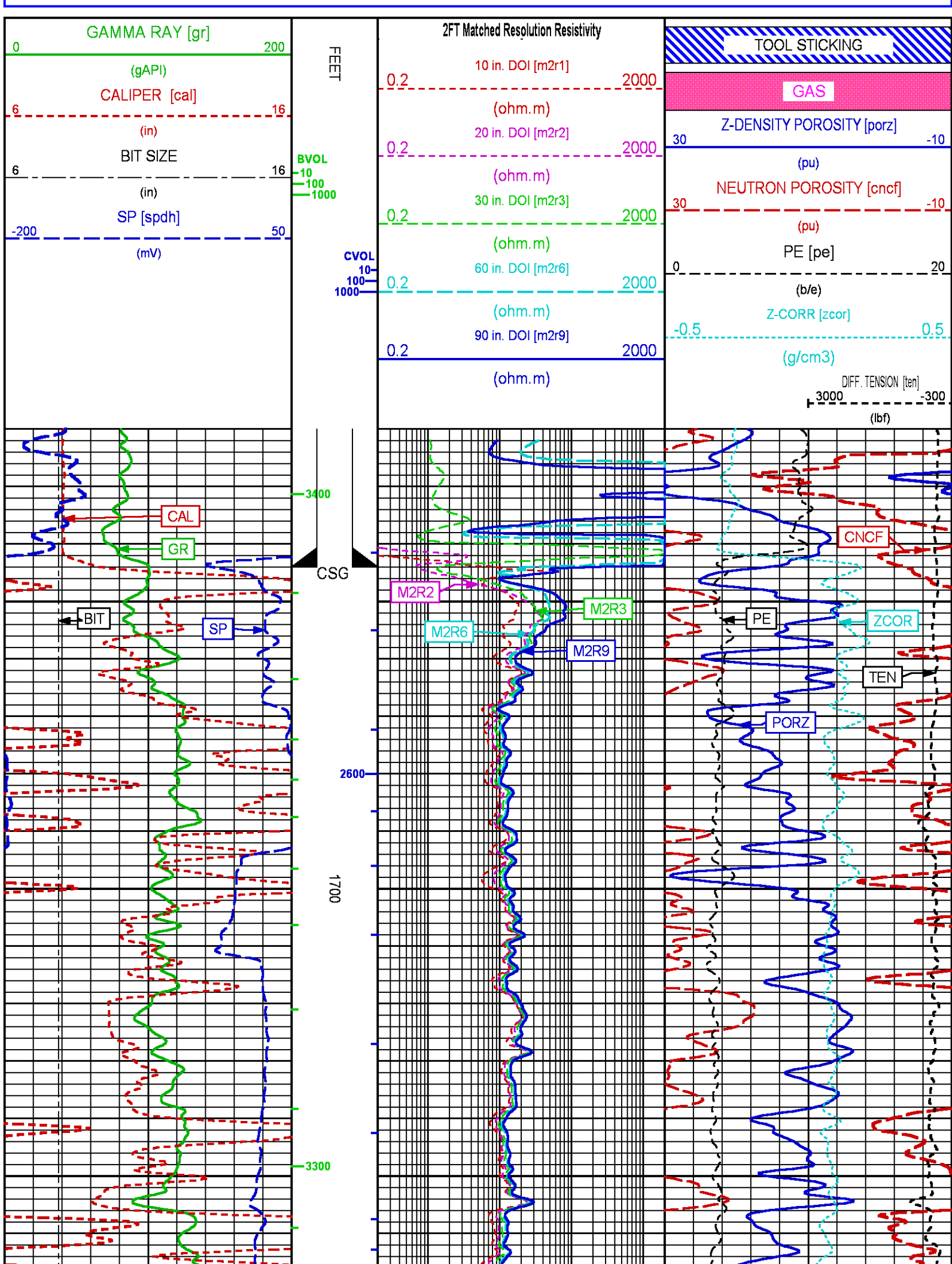
| ZDL PROCESSING   |                      |                |       |               |        |
|------------------|----------------------|----------------|-------|---------------|--------|
| MEASUREMENT TYPE | PARAMETER            | VALUE          | UNITS | INTERVAL (ft) |        |
| DENSITY POROSITY | RHOmatrix            | 2.680          | g/cm3 | TOP           | BOTTOM |
|                  | RHOfluid             | 1.000          | g/cm3 | "             | "      |
| ZDL              | DENX TRACKING        | ON             |       | "             | "      |
| TRACKING TIME    | Logging Spd for Gain | Over 10 ft/min |       | "             | "      |

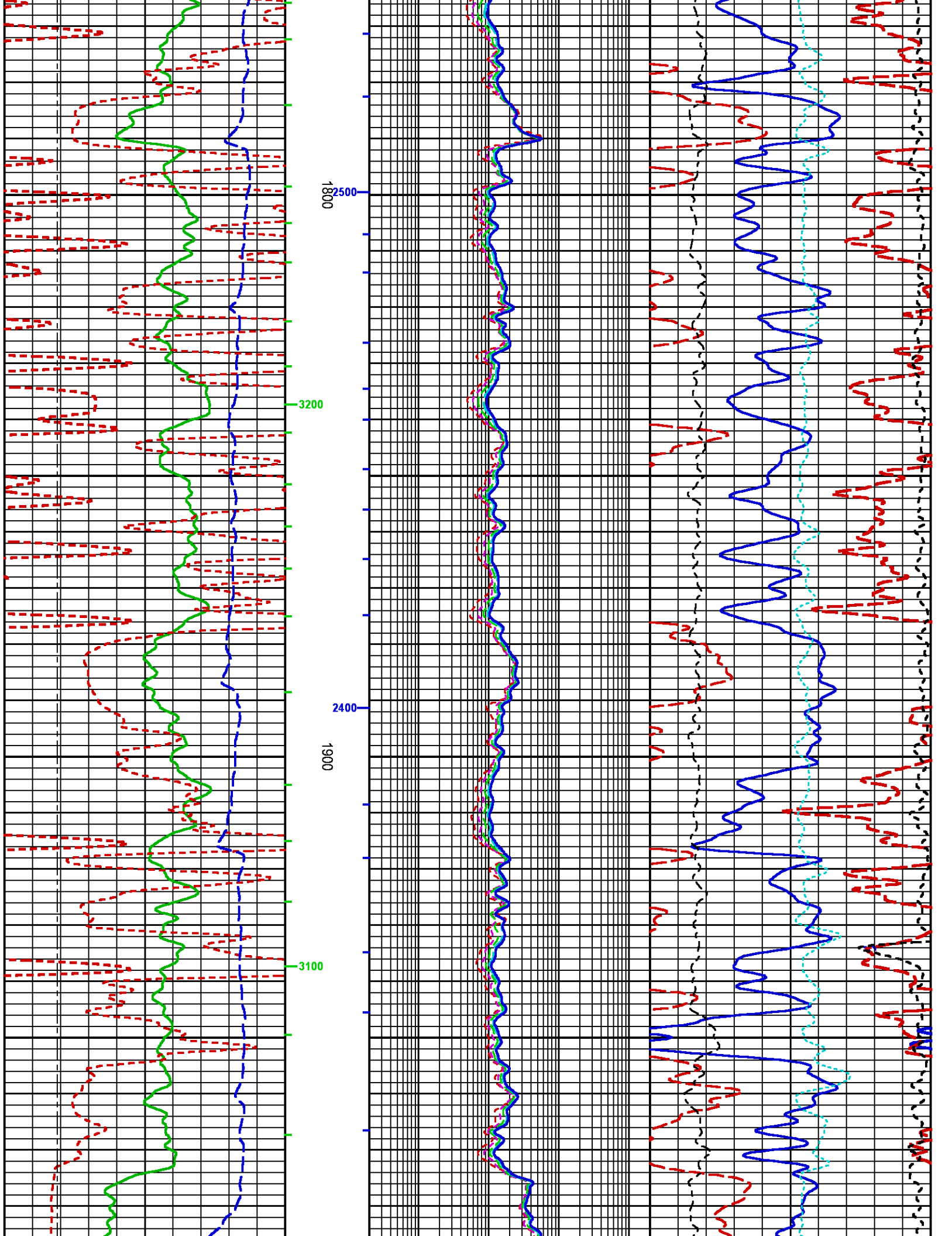
| HDIL PROCESSING              |                  |            |       |               |        |
|------------------------------|------------------|------------|-------|---------------|--------|
| MEASUREMENT TYPE             | PARAMETER        | VALUE      | UNITS | INTERVAL (ft) |        |
| HDIL TEMPERATURE CORRECTION  | TEMP CORR SOURCE | USE RXTEMP |       | TOP           | BOTTOM |
| ADAPTIVE BOREHOLE CORRECTION | ABC PROCESSING   | ON         |       | "             | "      |
|                              | ABC to CALCULATE | STANDOFF   |       | "             | "      |
|                              | STANDOFF         | 1.50       | in    | "             | "      |
|                              | TOOL POSITION    | ECCENTERED |       | "             | "      |
|                              | Rmud MULTIPLIER  | 1.000      |       | "             | "      |

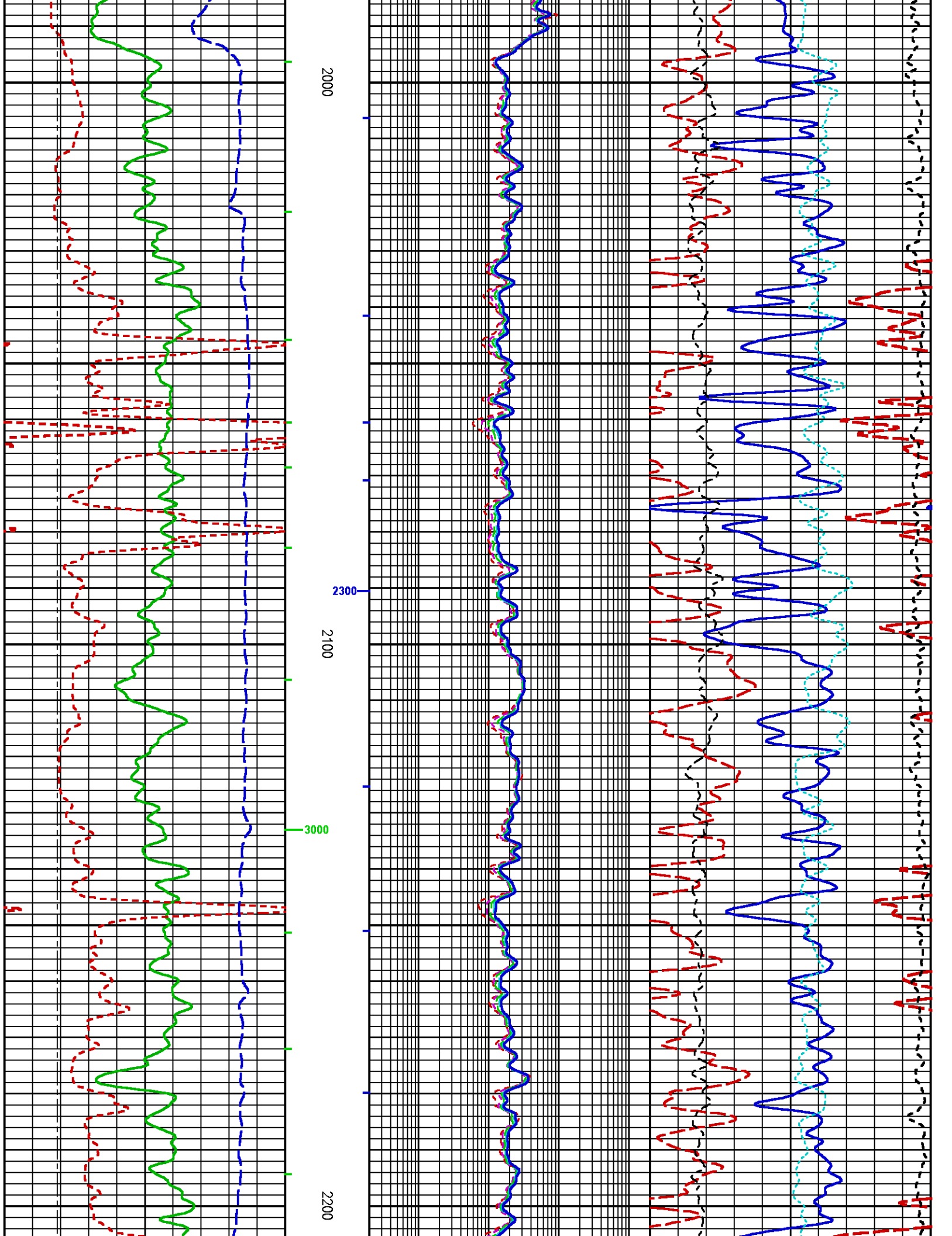
| CURVE DESCRIPTION REPORT |                      |   |
|--------------------------|----------------------|---|
| CURVE NAME               | CREATION DATE        | CURVE DESCRIPTION   |
| F1:BIT                   | Oct 14 17:39:42 2015 | BIT SIZE  |
| F1:BVOL                  | Oct 14 17:39:42 2015 | BOREHOLE VOLUME   |
| F1:CAL                   | Oct 14 17:39:42 2015 | CALIPER   |
| F1:CNCF                  | Oct 14 17:39:42 2015 | FIELD NORMALIZED COMPENSATED NEUTRON POROSITY               |
| F1:CVOL                  | Oct 14 17:39:42 2015 | CEMENT VOLUME   |
| F1:GR                    | Oct 14 17:39:42 2015 | GAMMA RAY   |
| F1:M2R1                  | Oct 14 17:39:42 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 10-INCH DOI |
| F1:M2R2                  | Oct 14 17:39:42 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 20-INCH DOI |
| F1:M2R3                  | Oct 14 17:39:42 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 30-INCH DOI |
| F1:M2R6                  | Oct 14 17:39:42 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 60-INCH DOI |
| F1:M2R9                  | Oct 14 17:39:42 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 90-INCH DOI |
| F1:PE                    | Oct 14 17:39:42 2015 | PHOTO ELECTRIC CROSS-SECTION                                |
| F1:PORZ                  | Oct 14 17:39:42 2015 | POROSITY FOR SELECTABLE MATRIX                              |
| F1:SPDH                  | Oct 14 17:39:42 2015 | SPONTANEOUS POTENTIAL PROCESSED IN COMMON REMOTE            |
| F1:TEN                   | Oct 14 17:39:42 2015 | DIFFERENTIAL TENSION  |
| F1:ZCOR                  | Oct 14 17:39:42 2015 | DENSITY CORRECTION  |

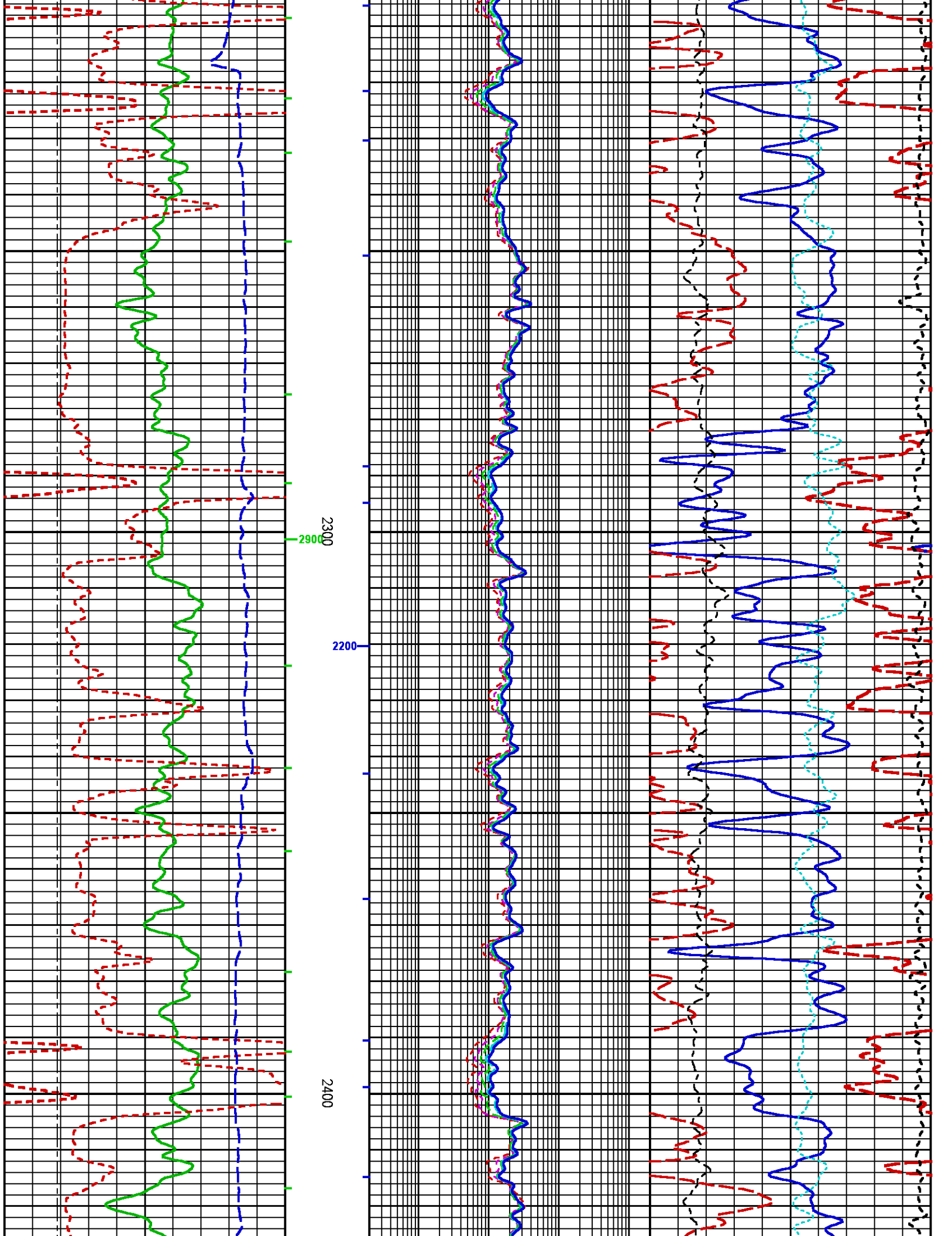
| CURVE MEASURE POINT OFFSET |             |       |             |       |             |       |             |
|----------------------------|-------------|-------|-------------|-------|-------------|-------|-------------|
| CURVE                      | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) |
| BIT                        | 0.00        | M2R1  | 10.75       | M2R9  | 10.75       | TEN   | 0.00        |
| CAL                        | 37.50       | M2R2  | 10.75       | PE    | 37.25       | ZCOR  | 37.25       |
| CNCF                       | 48.12       | M2R3  | 10.75       | PORZ  | 37.25       |       |             |
| GR                         | 55.00       | M2R6  | 10.75       | SPDH  | 16.75       |       |             |

|                      |  |
|----------------------|--|
| <b>Presentation</b>  | : sys1:/dat1a/md11447/MAIN_5.fvpdf [5"/100' Scale] |
| <b>Plot Interval</b> | : 1620 - 8595 Feet                                 |
| <b>Data File 1</b>   | : F1 : sys1:/dat1a/md11447/MAIN.xtf                |
| <b>Created On</b>    | : Oct 14 17:39:42 2015                             |
| <b>Company</b>       | : PICEANCE ENERGY LLC                              |
| <b>Well</b>          | : FEDERAL 28-21E                                   |
| <b>Field</b>         | : VEGA   |
| <b>File Interval</b> | : 1620 - 8595 Feet                                 |
| <b>OCT</b>           | : n87cb_kb   |

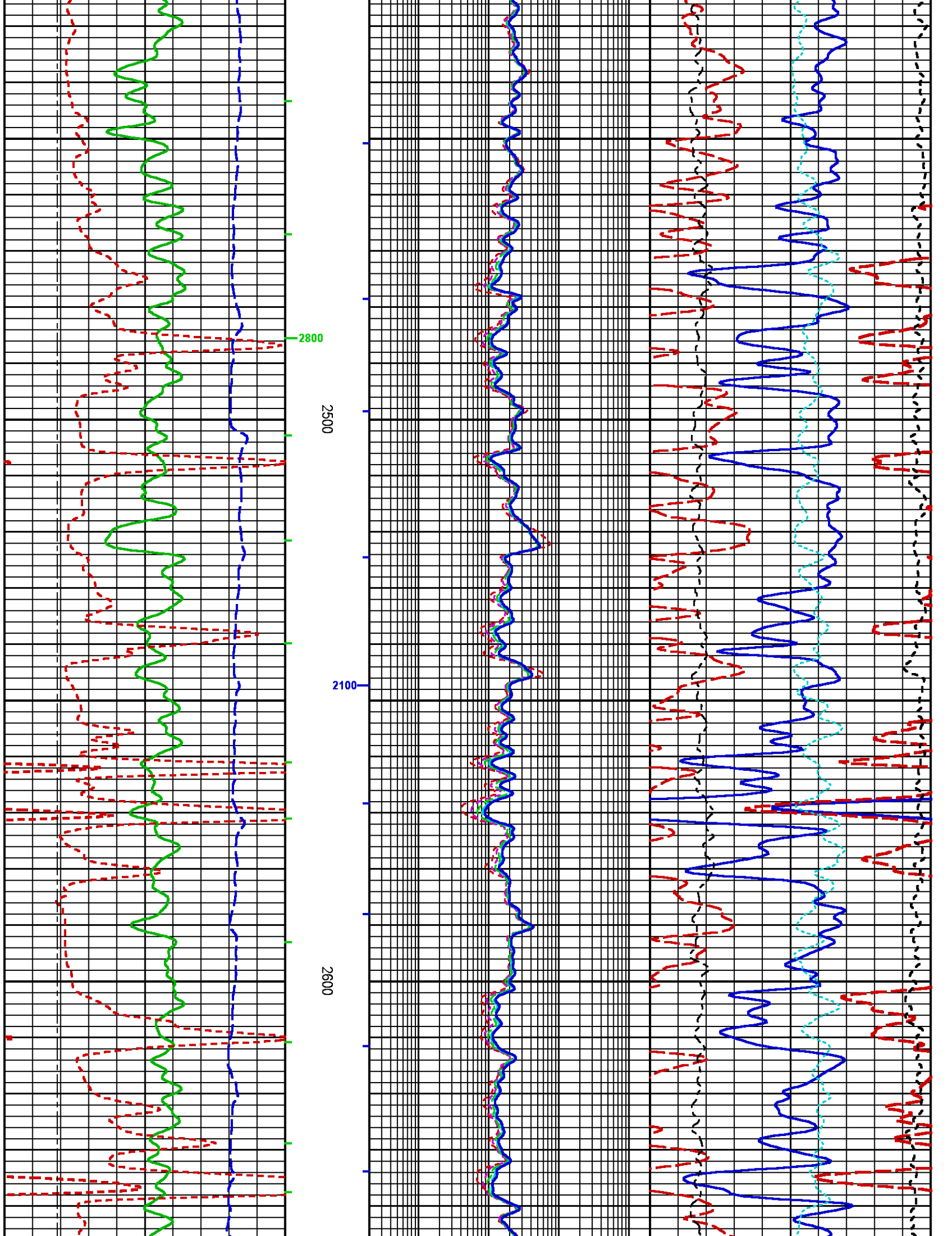




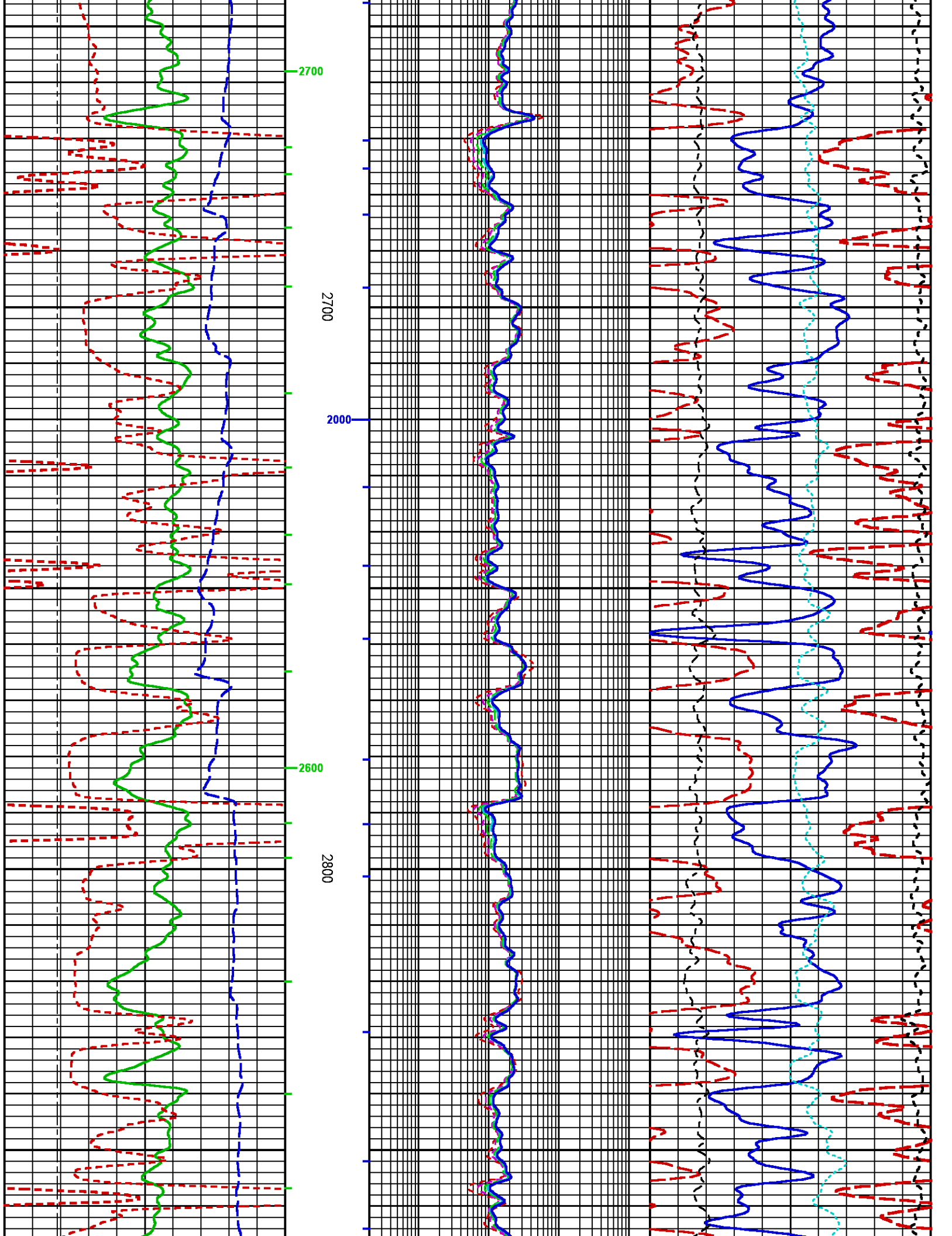


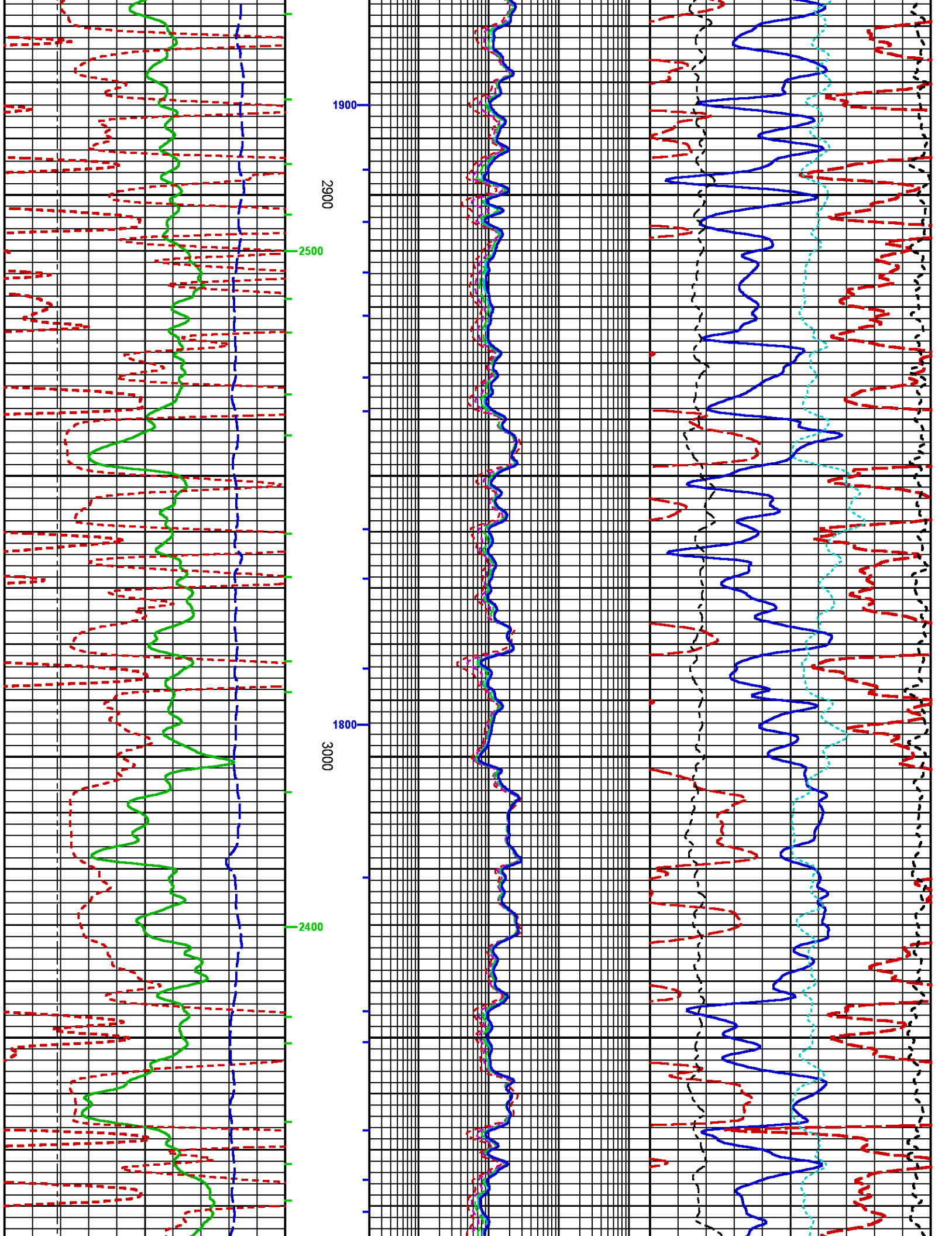


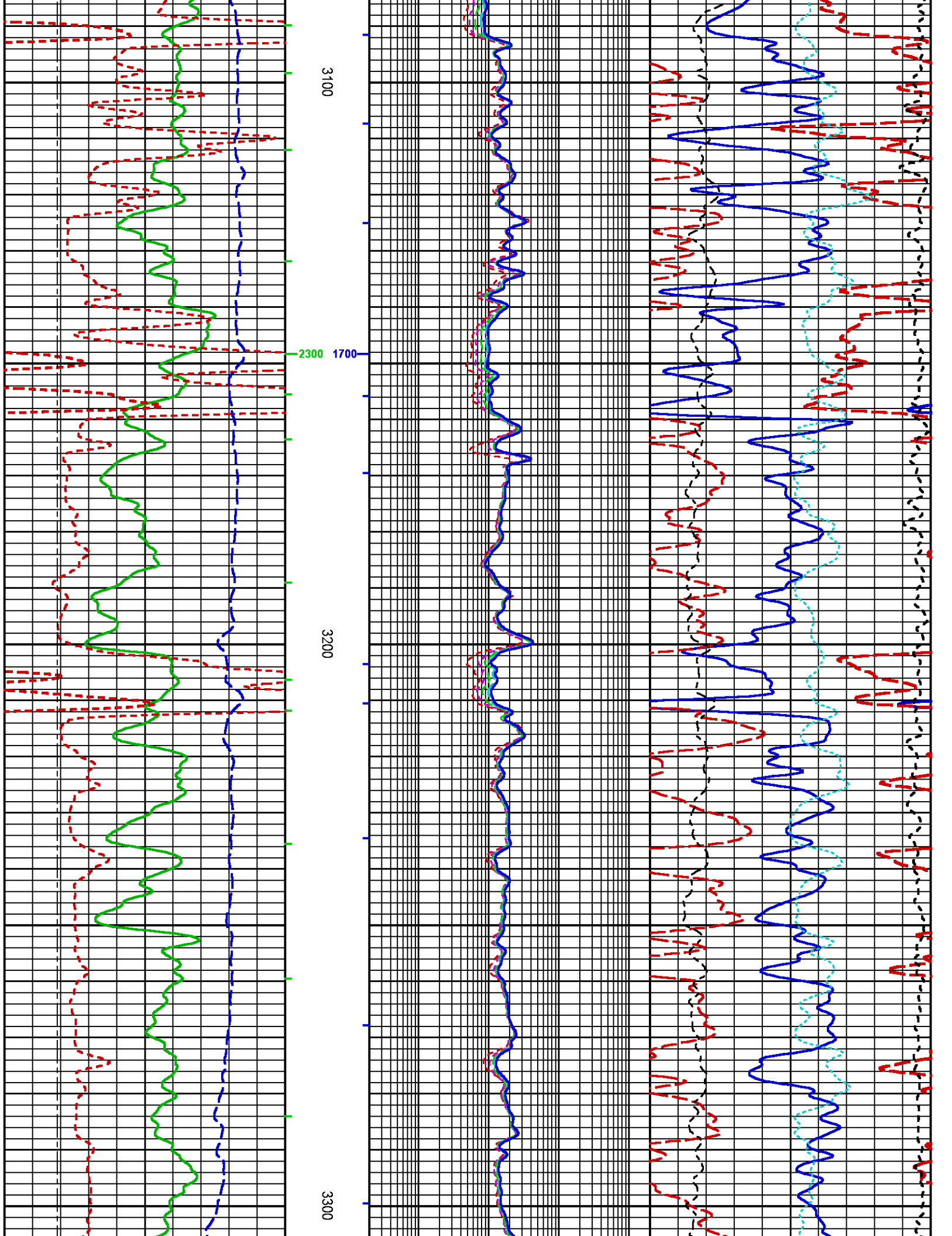


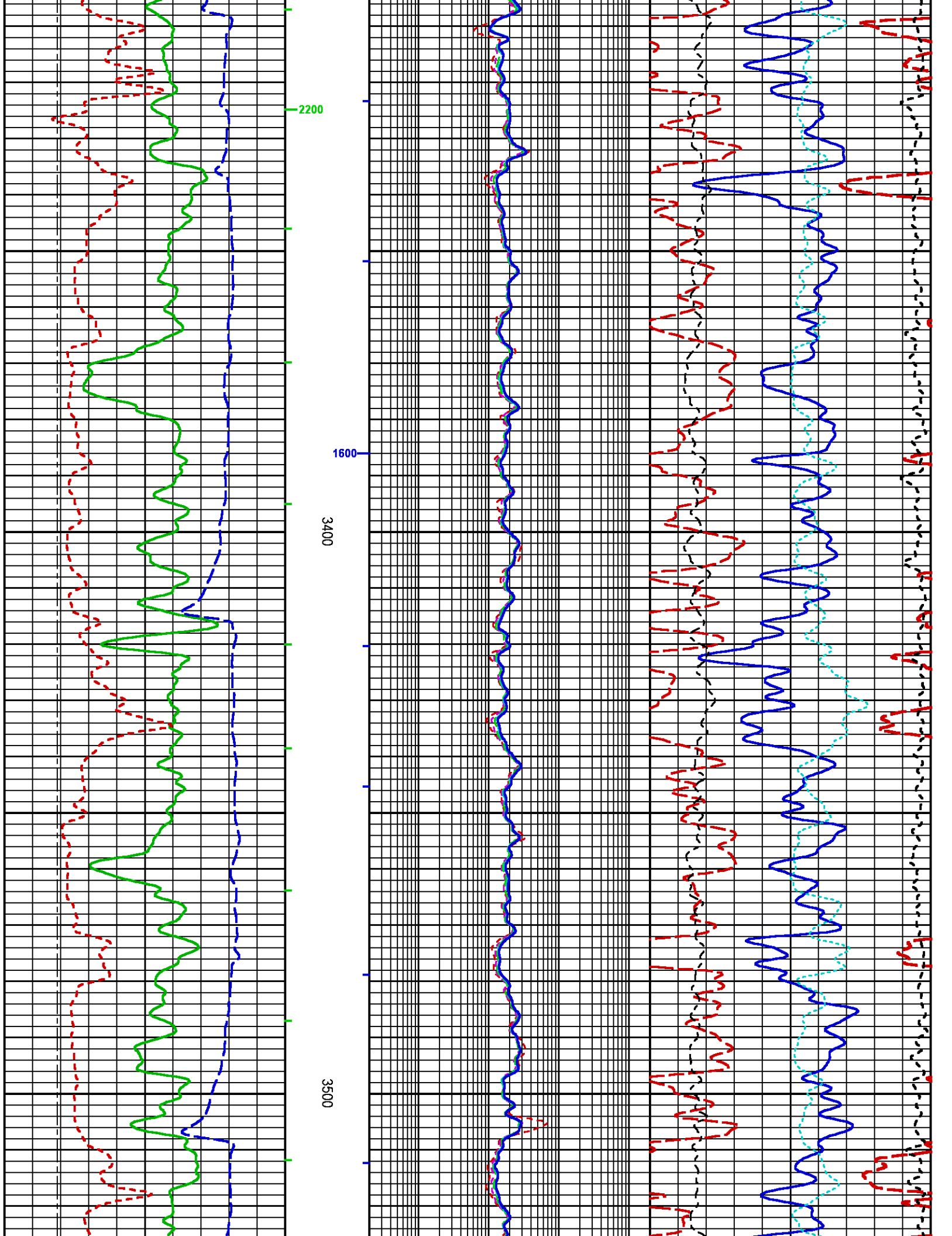


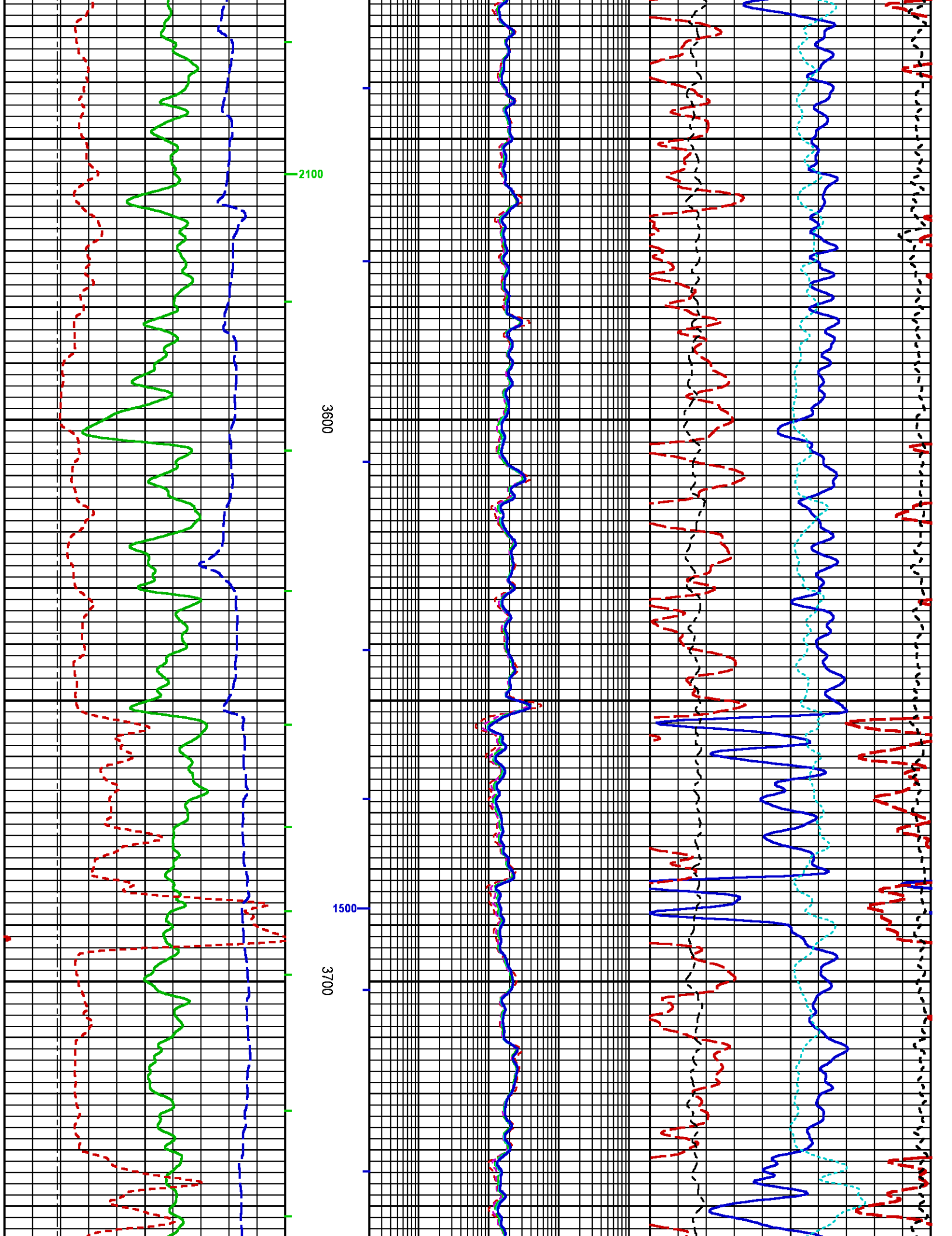


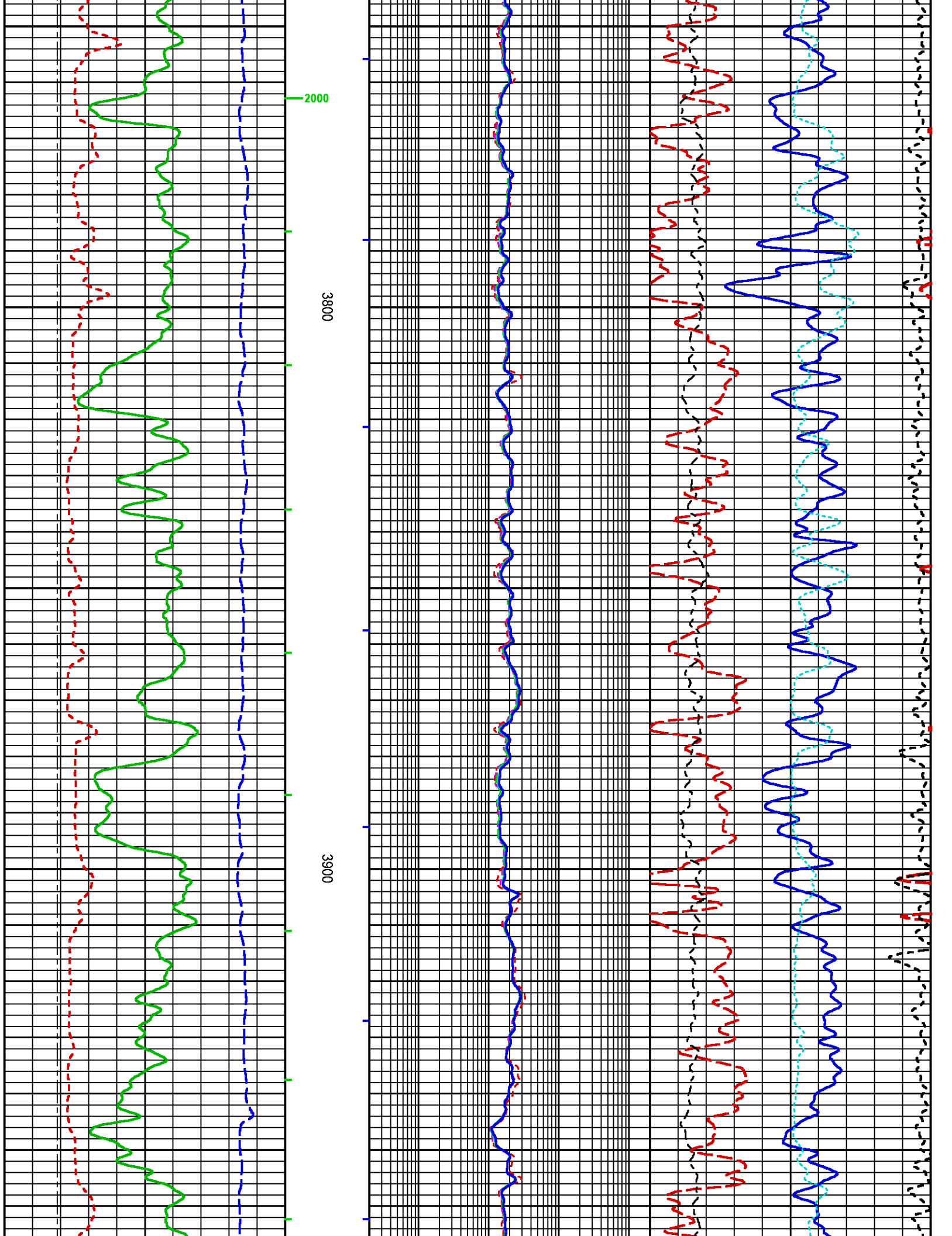


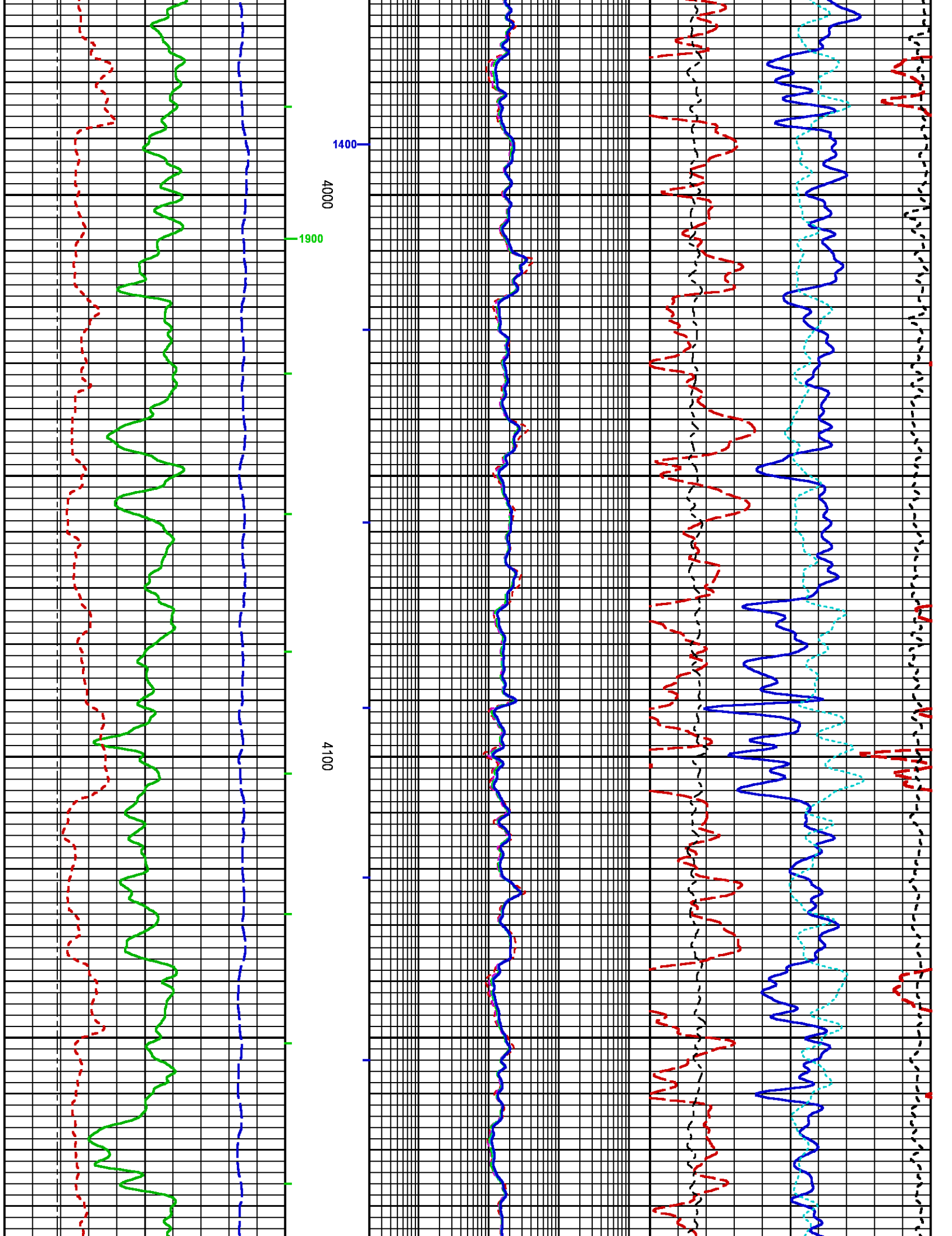




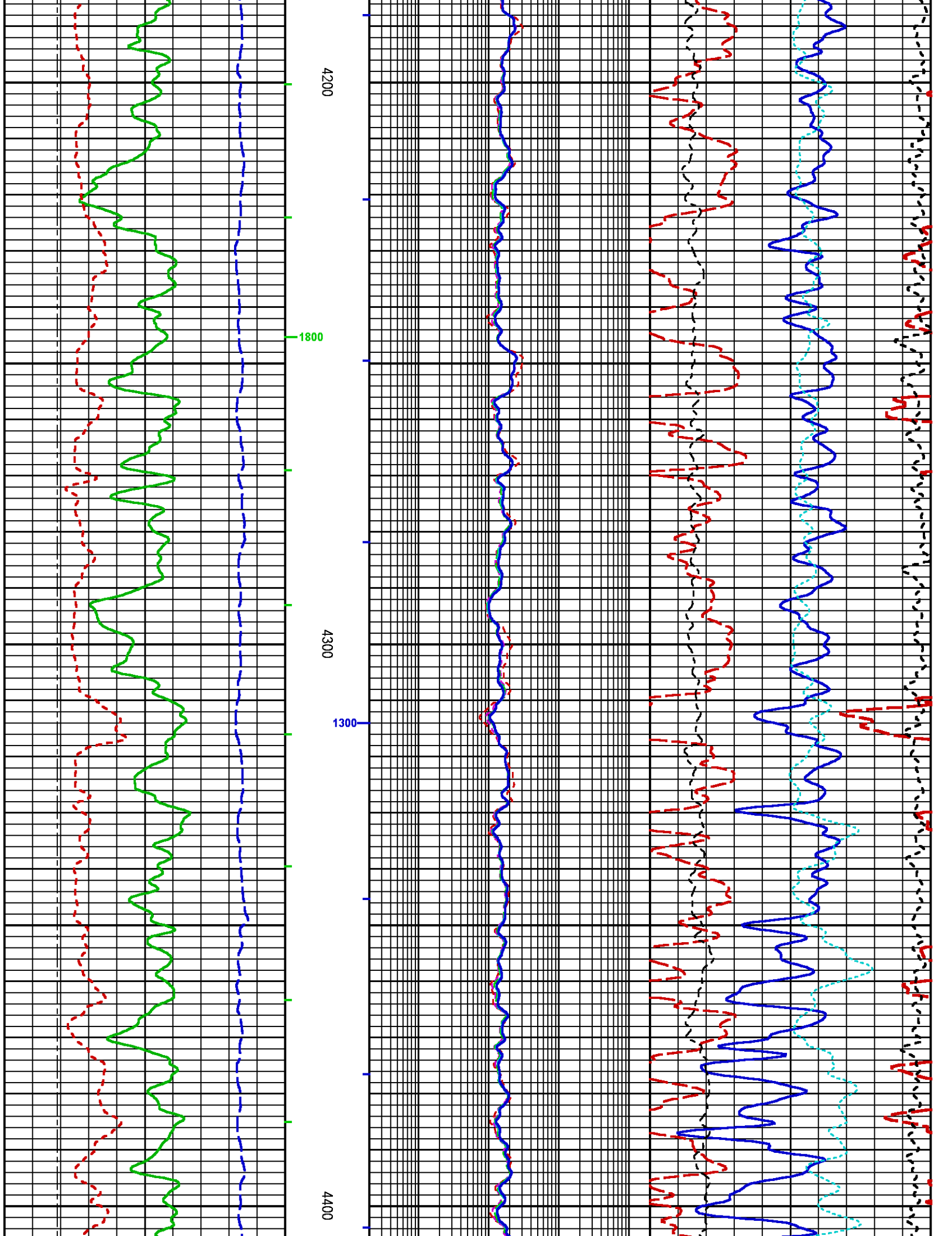




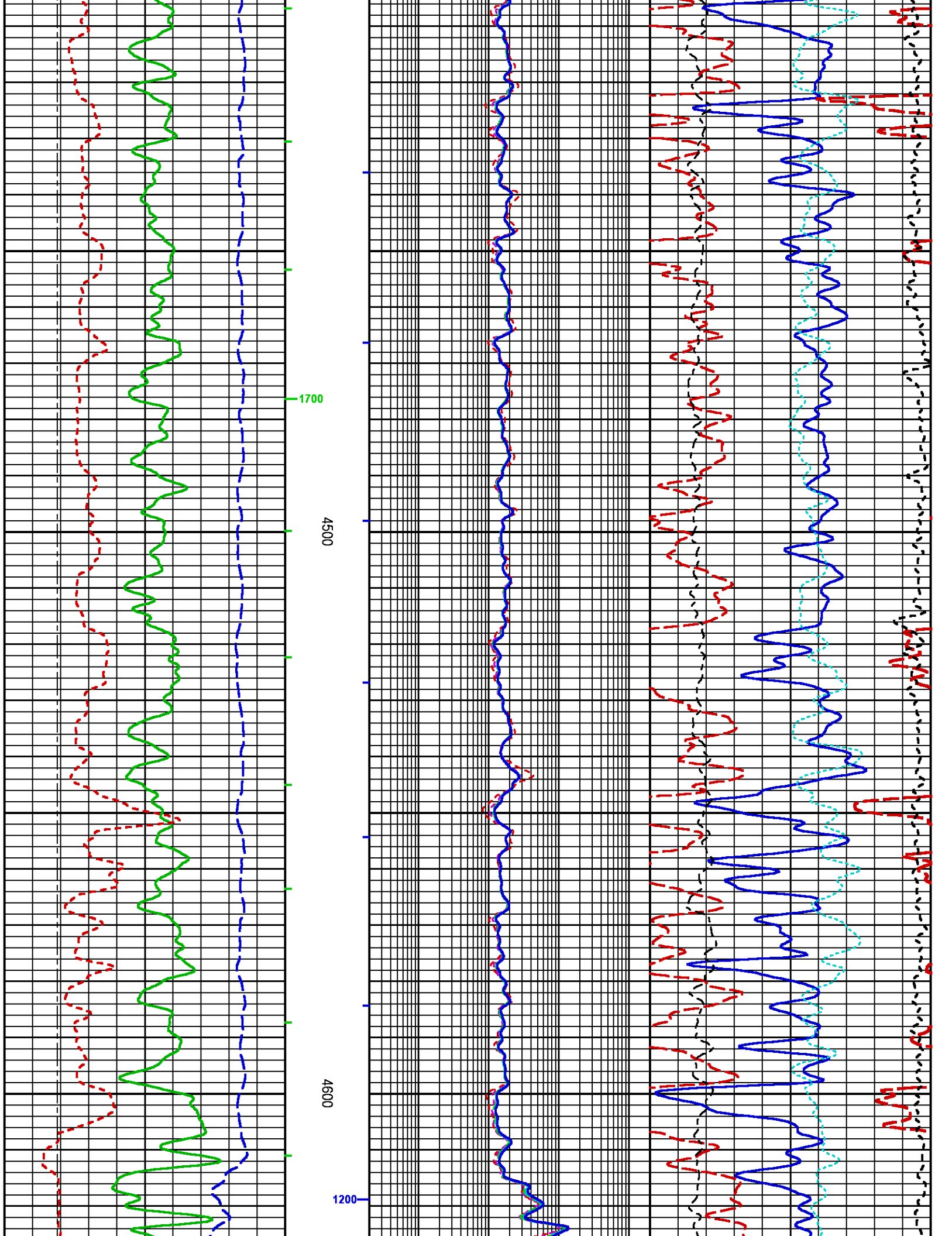


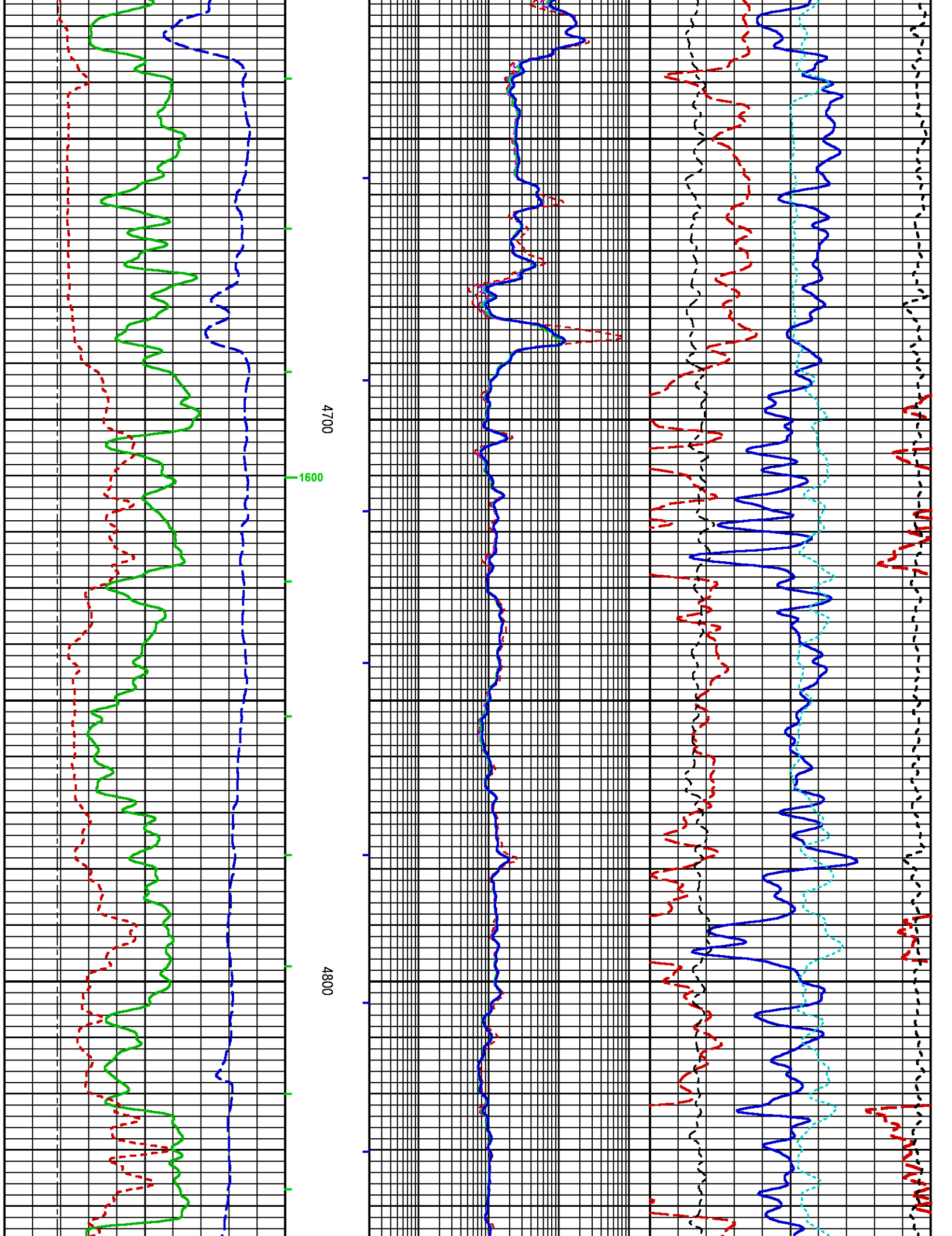


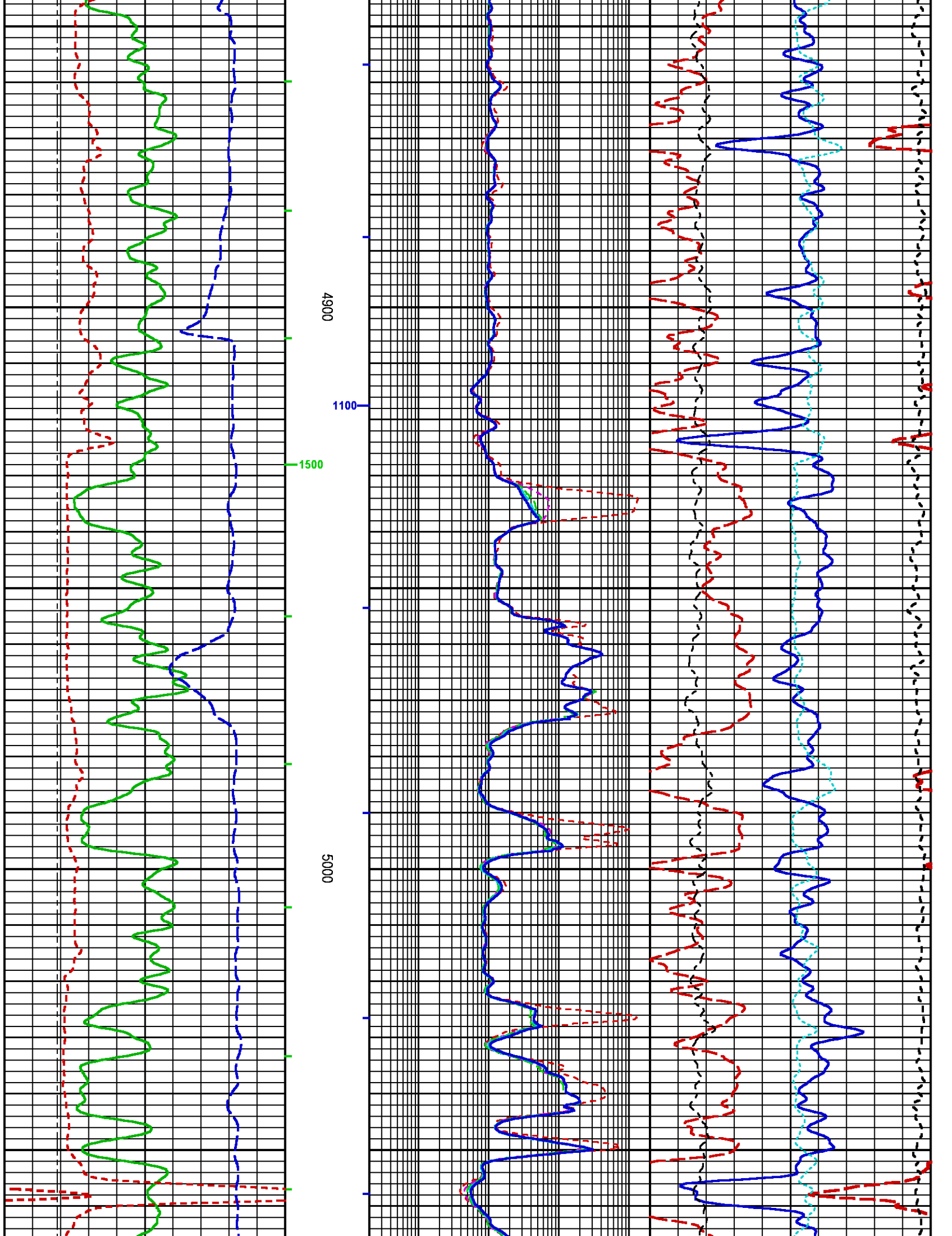


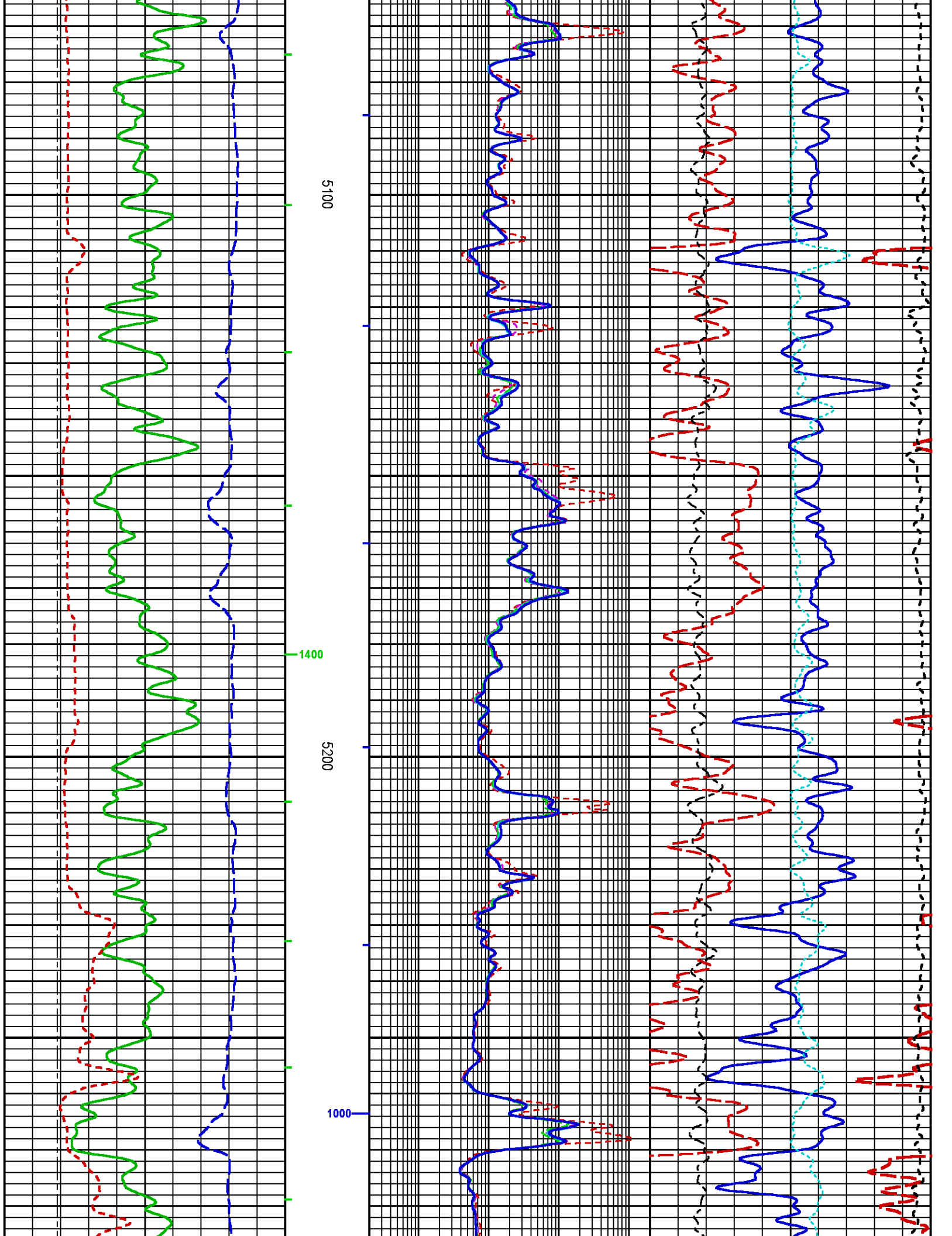


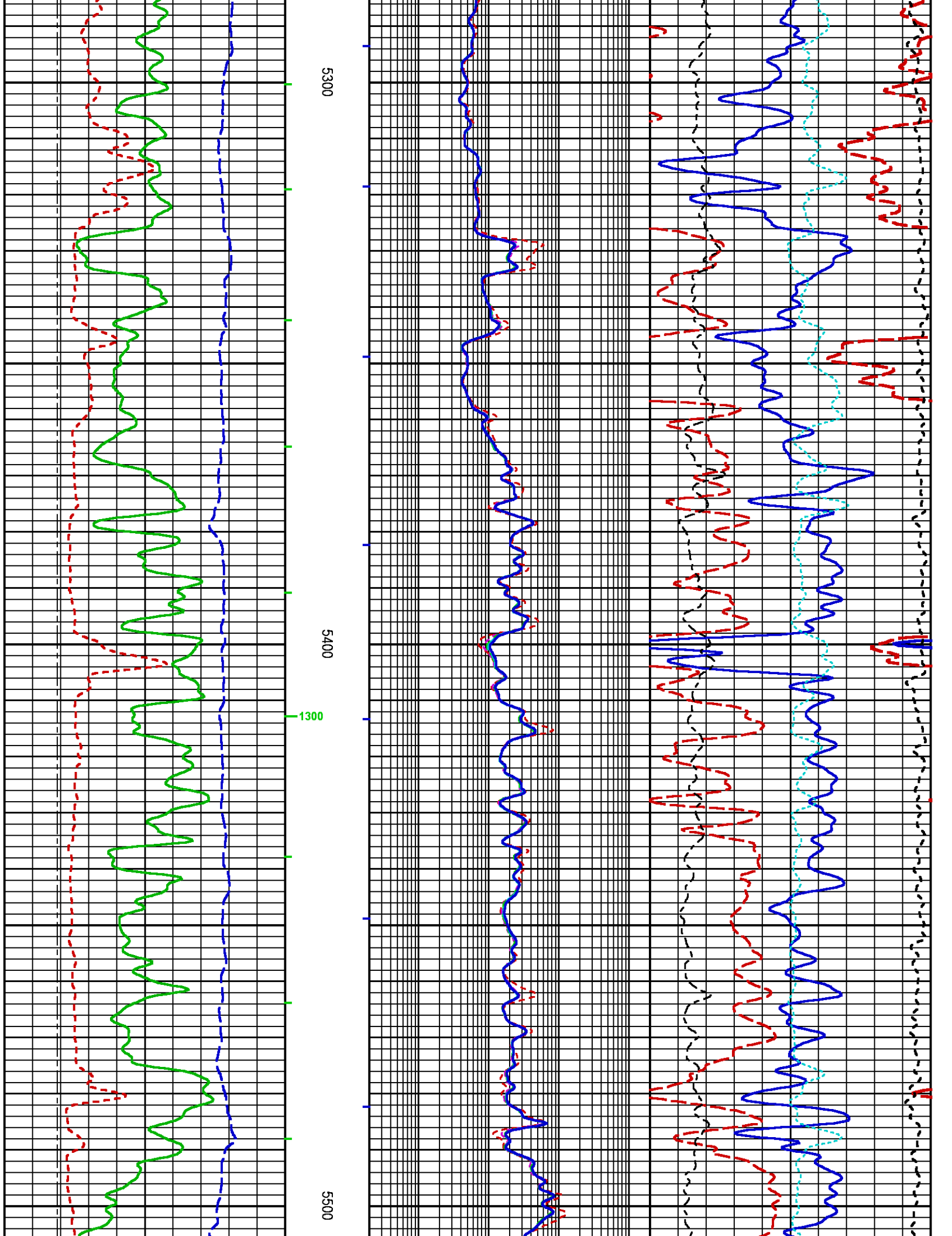


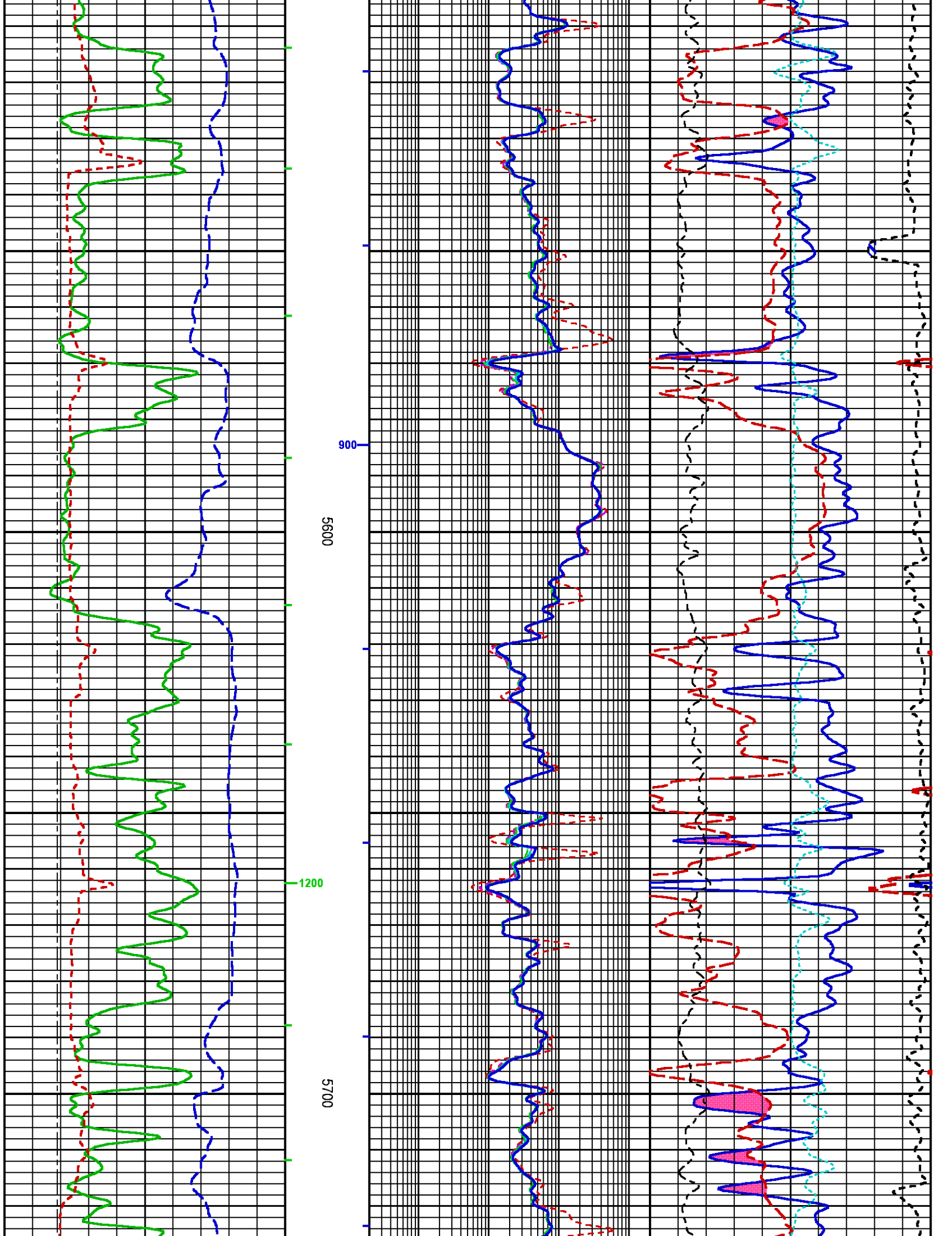


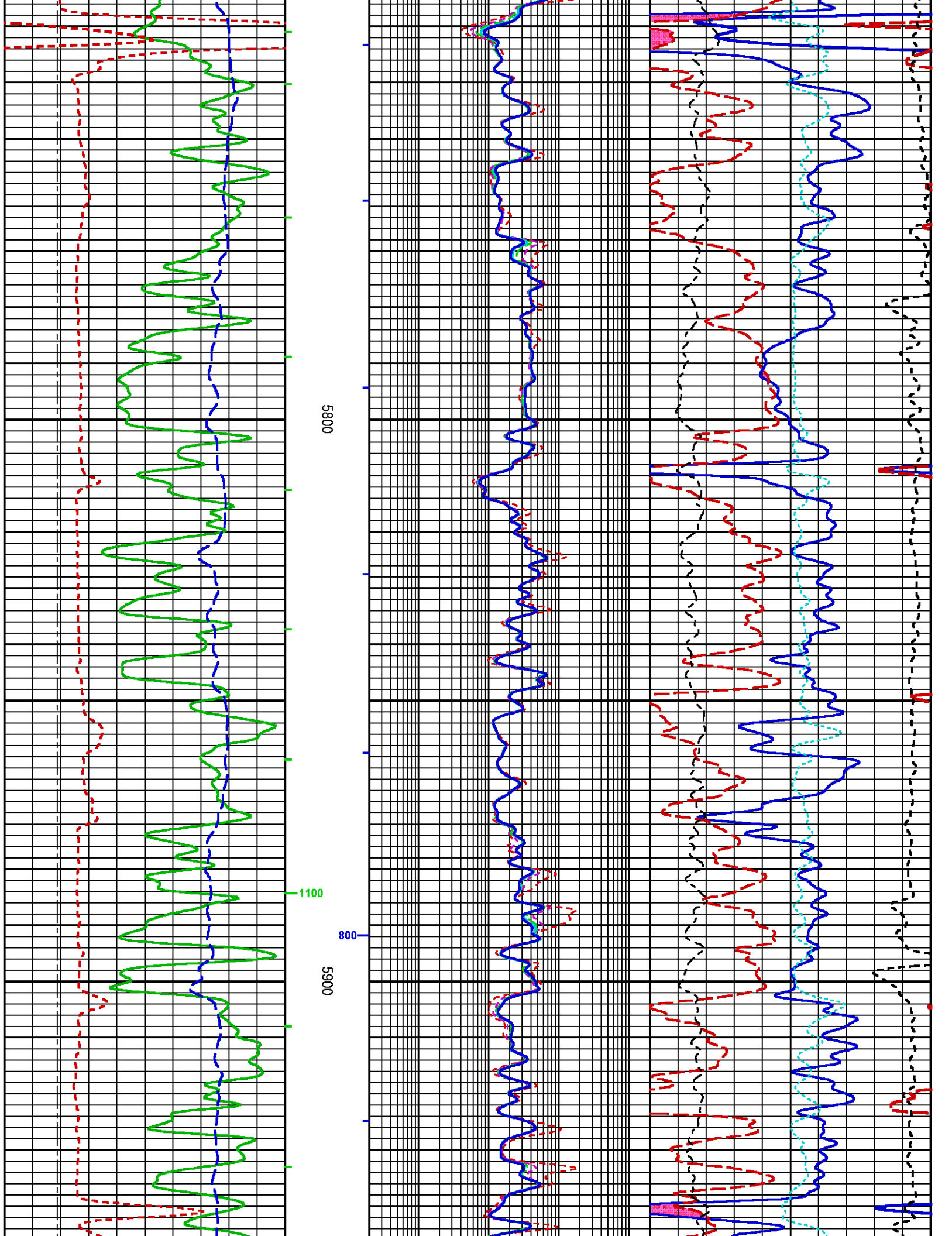




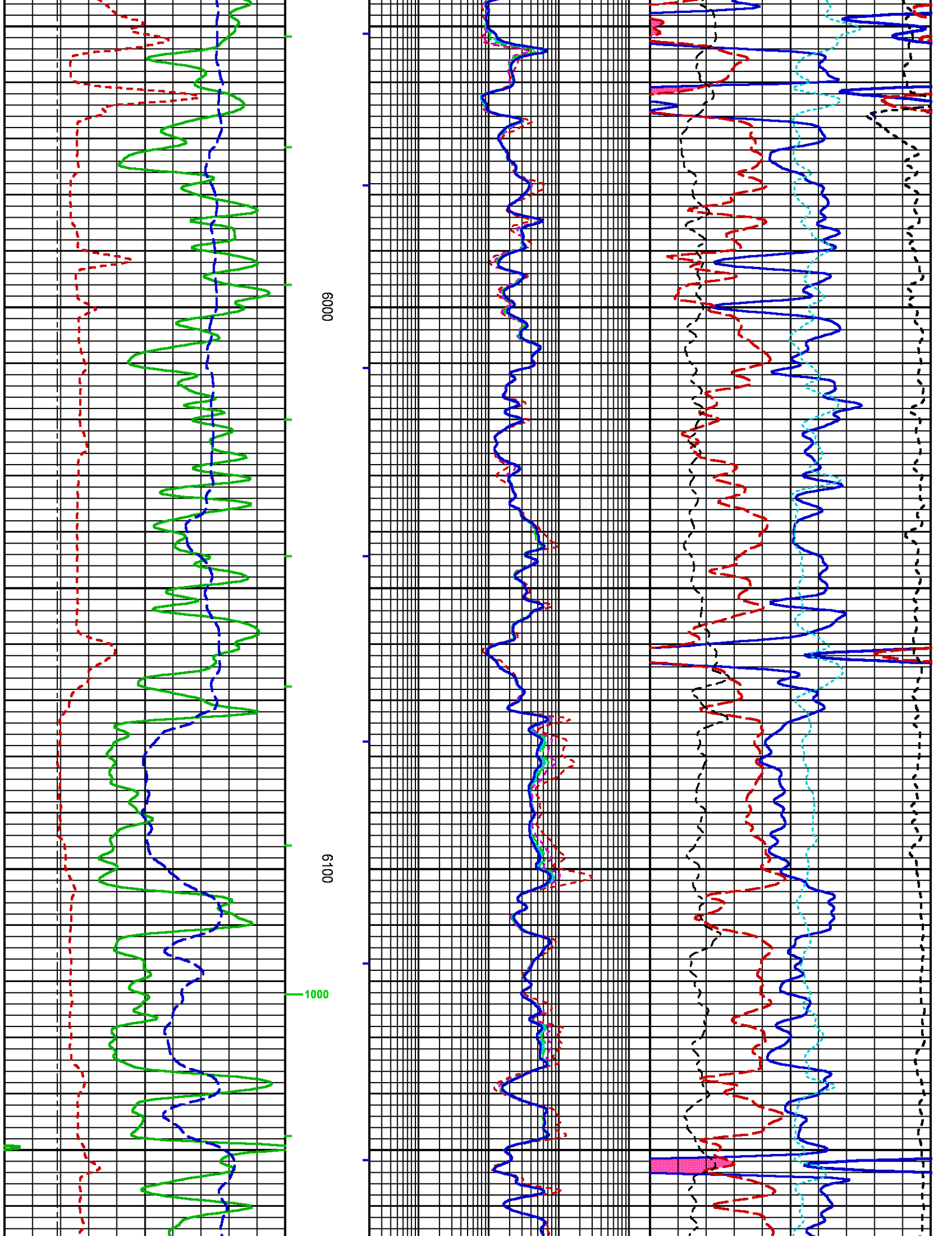




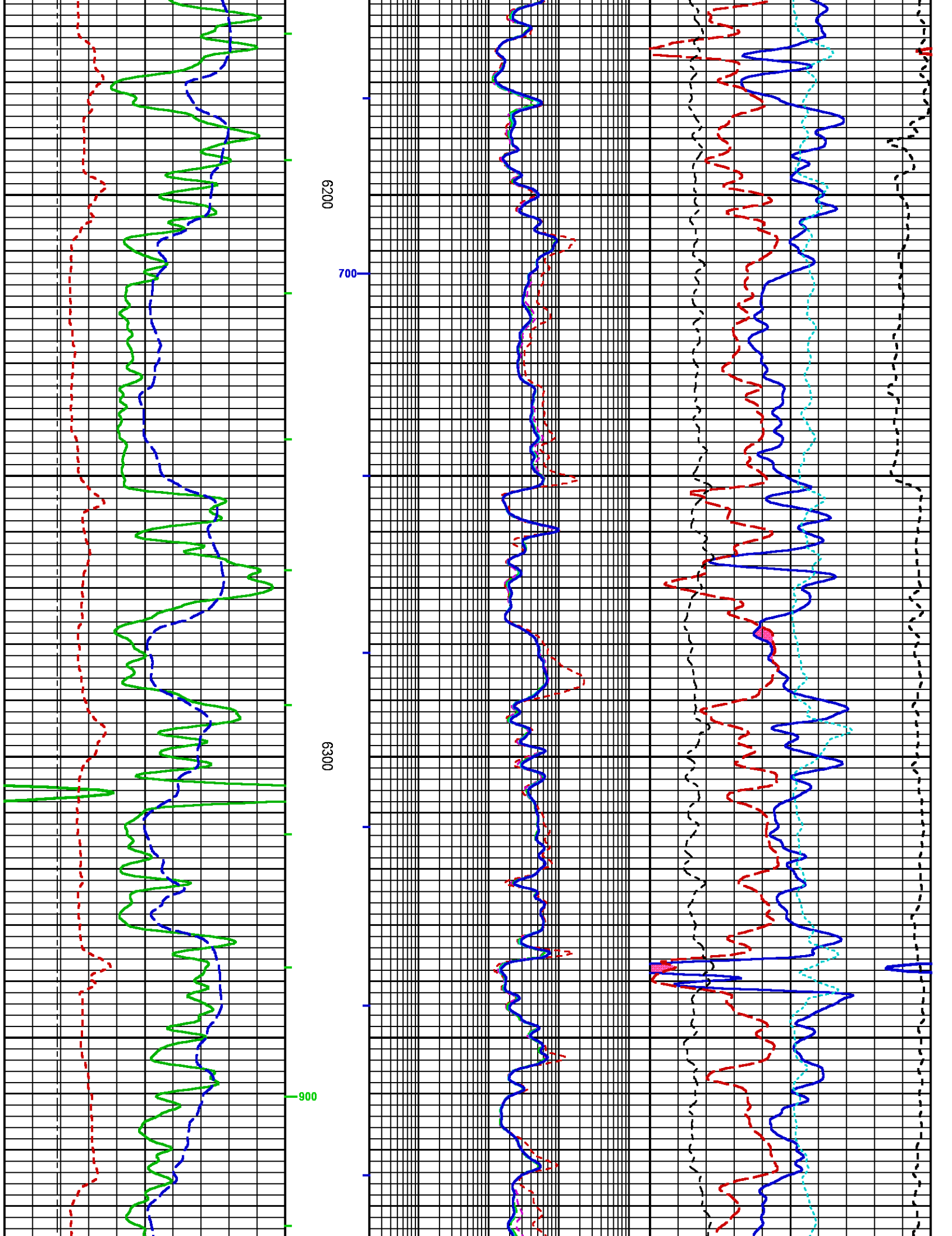


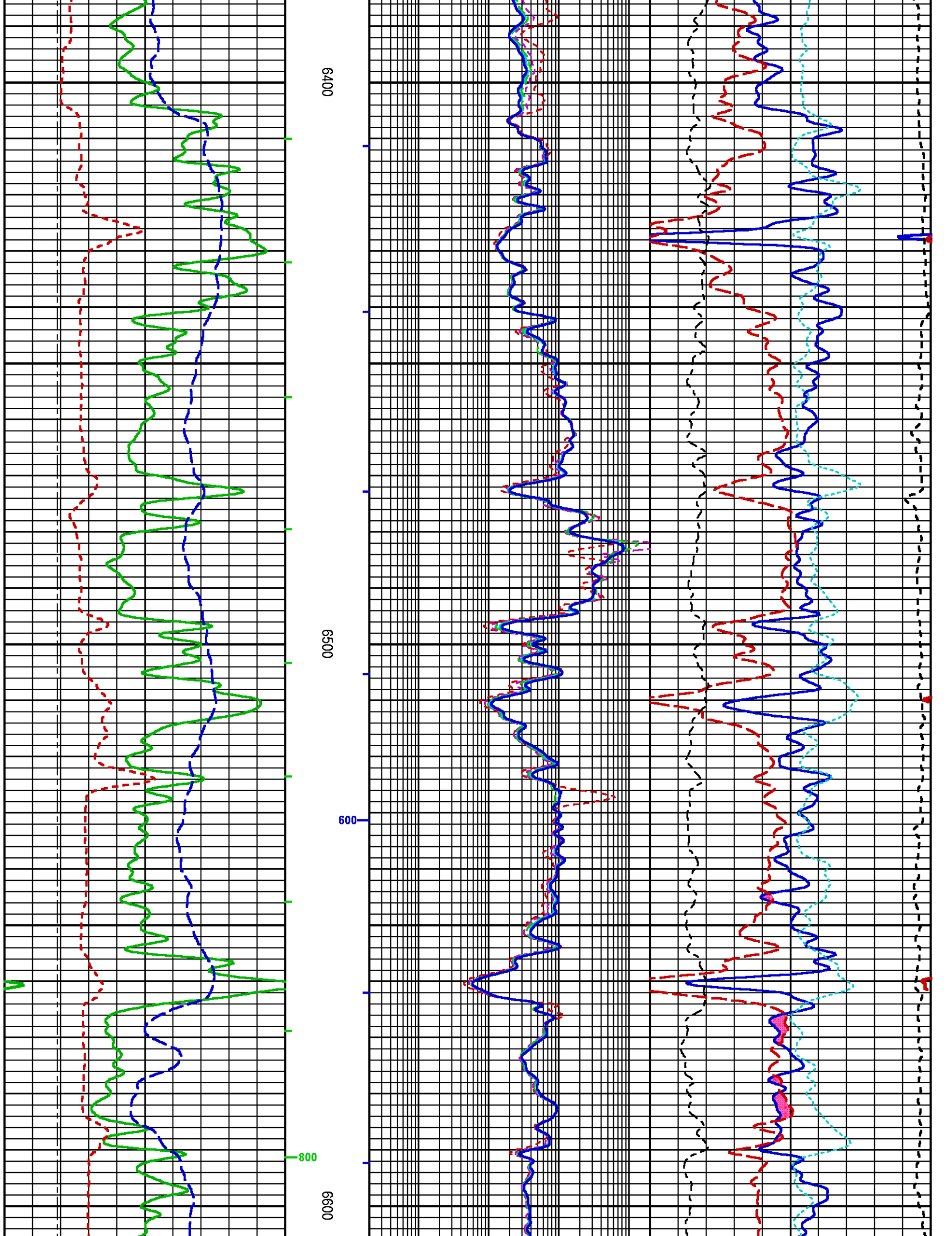


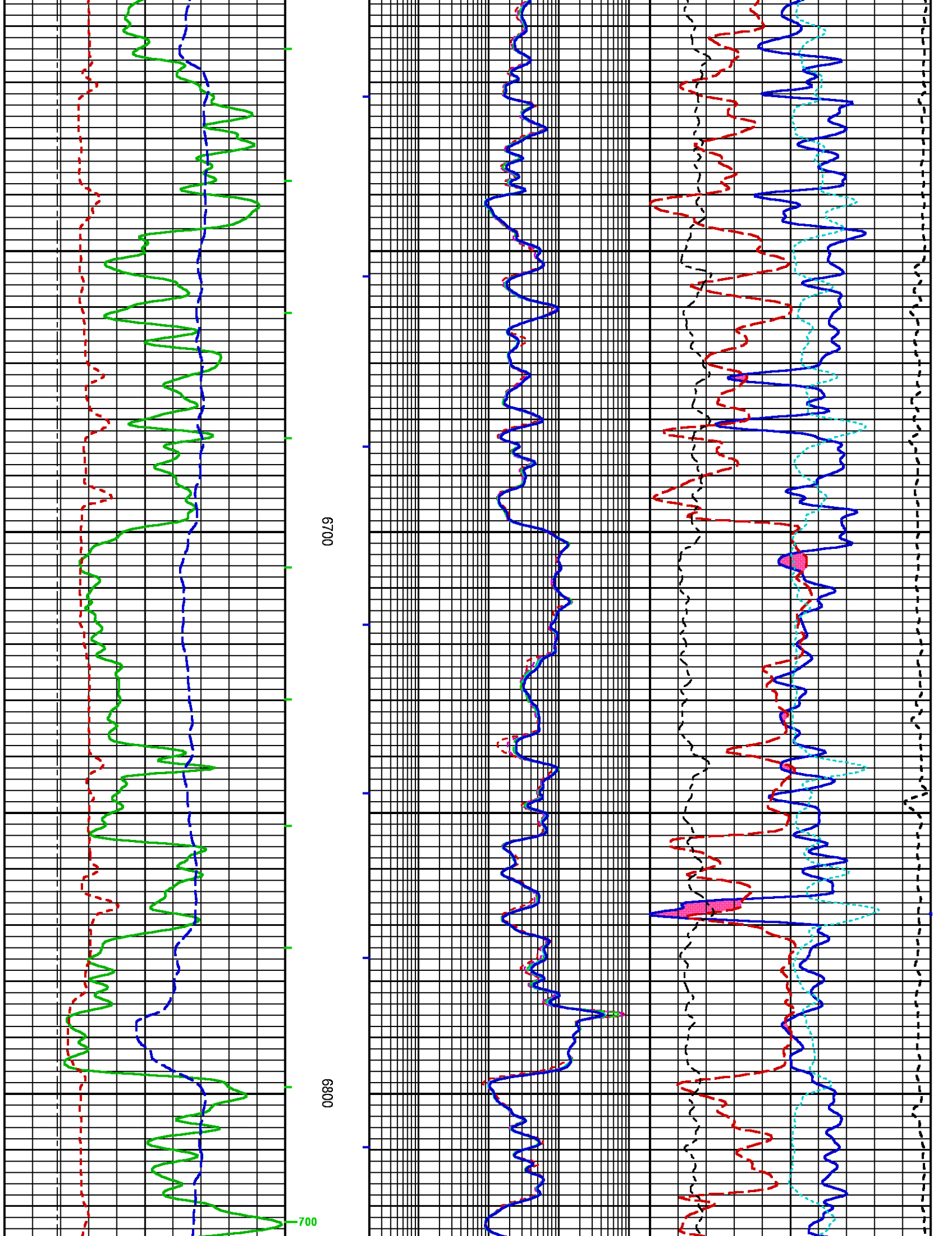


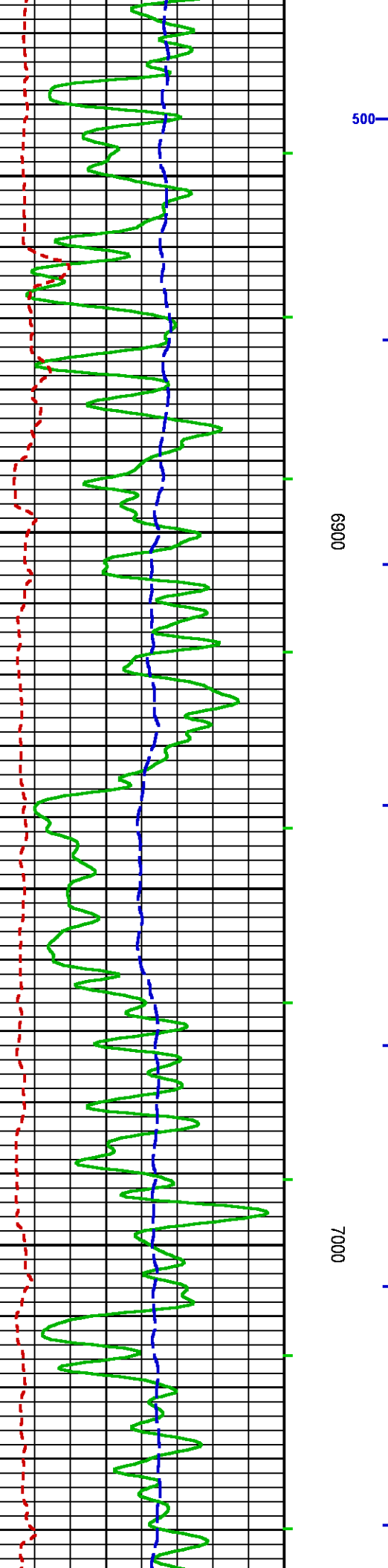
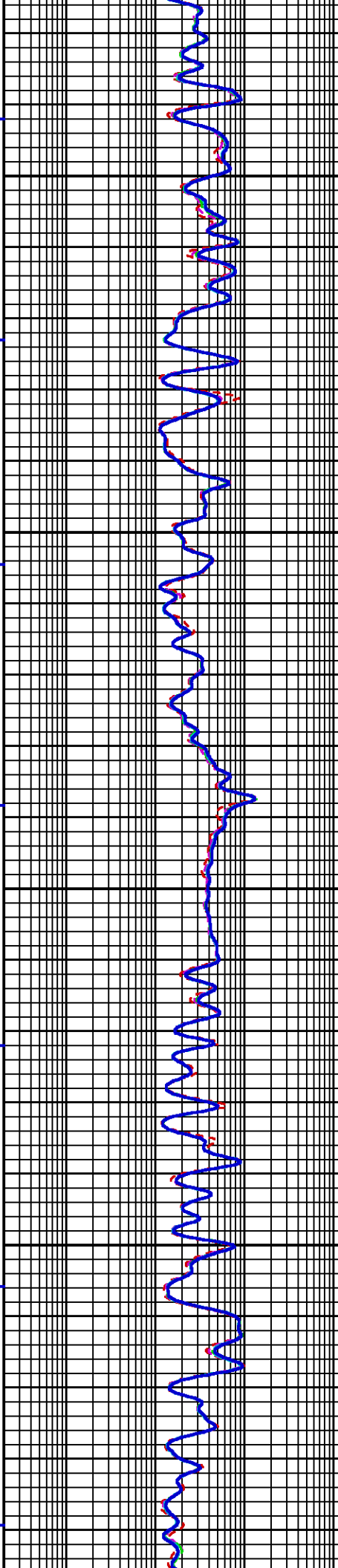
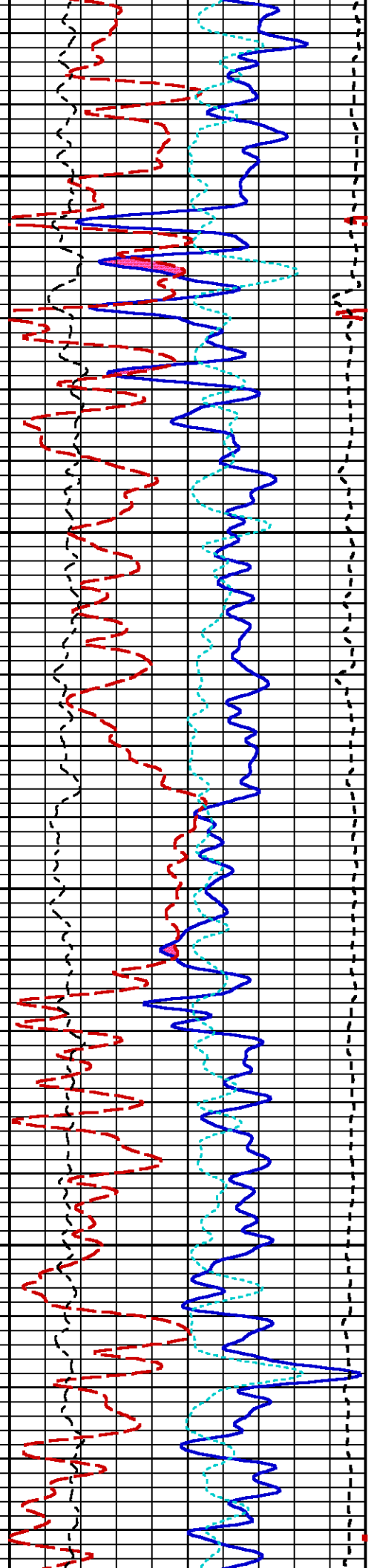


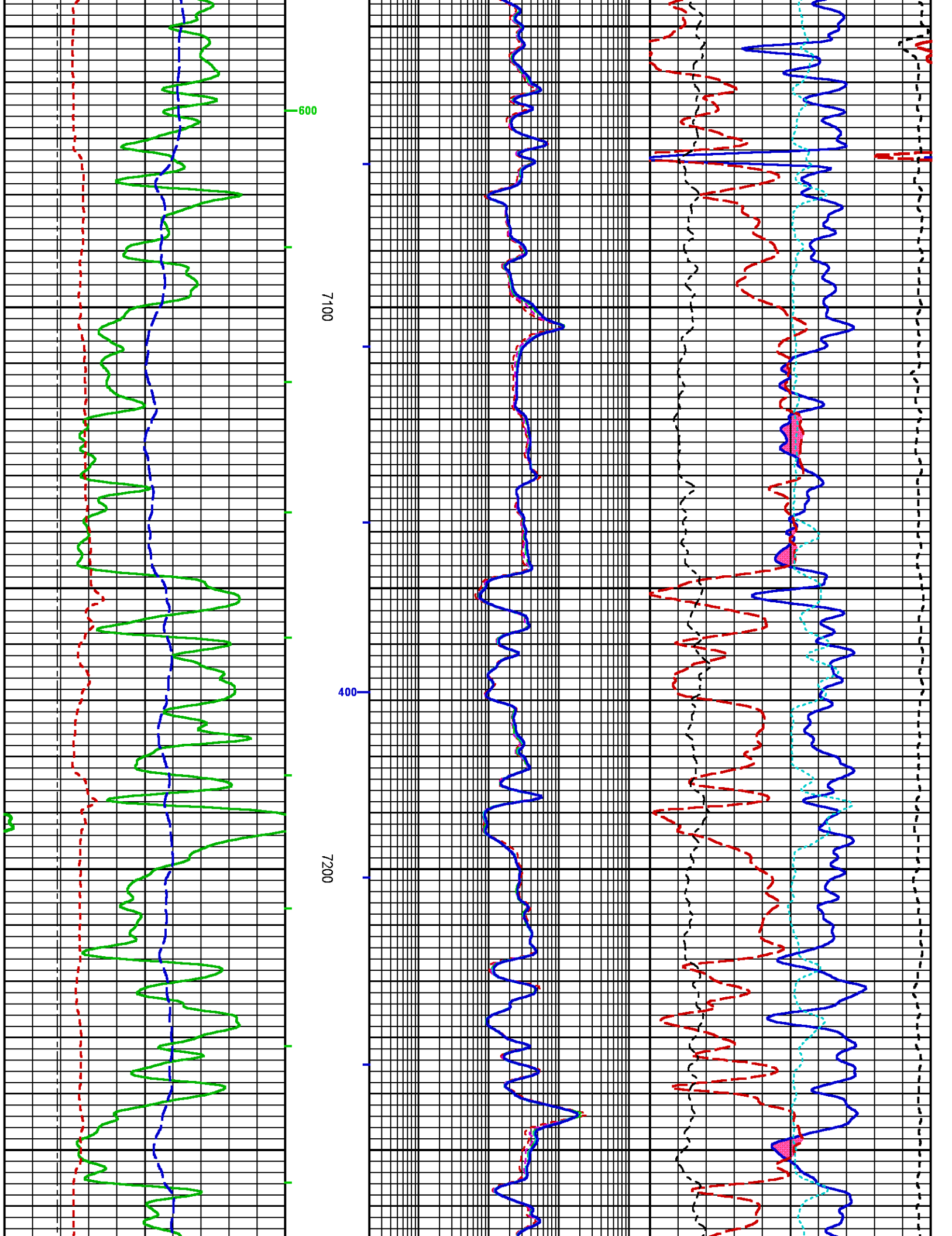


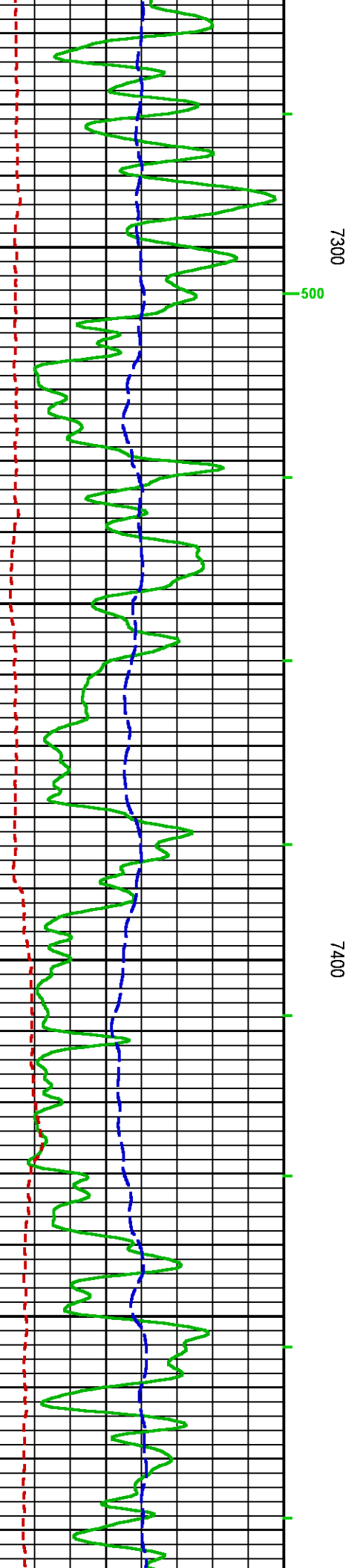
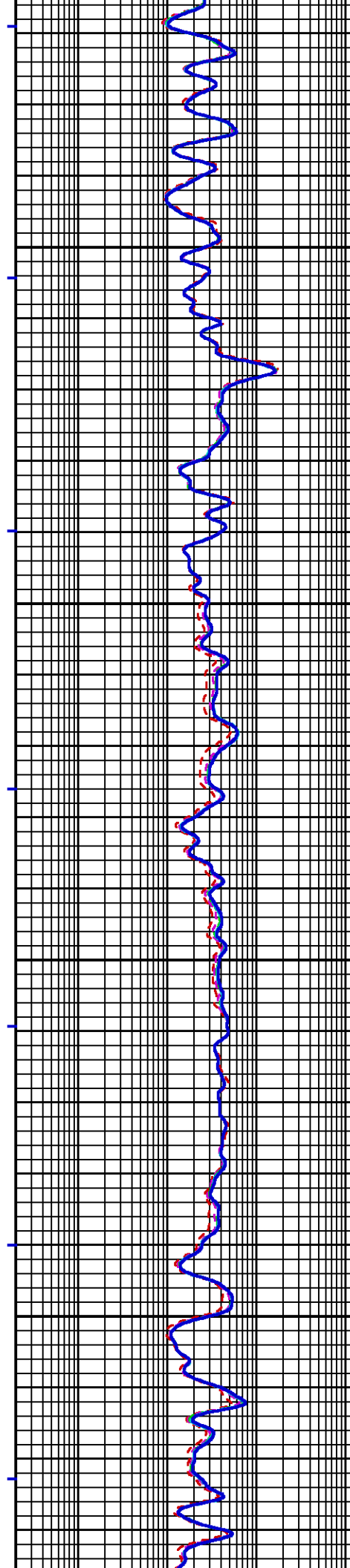
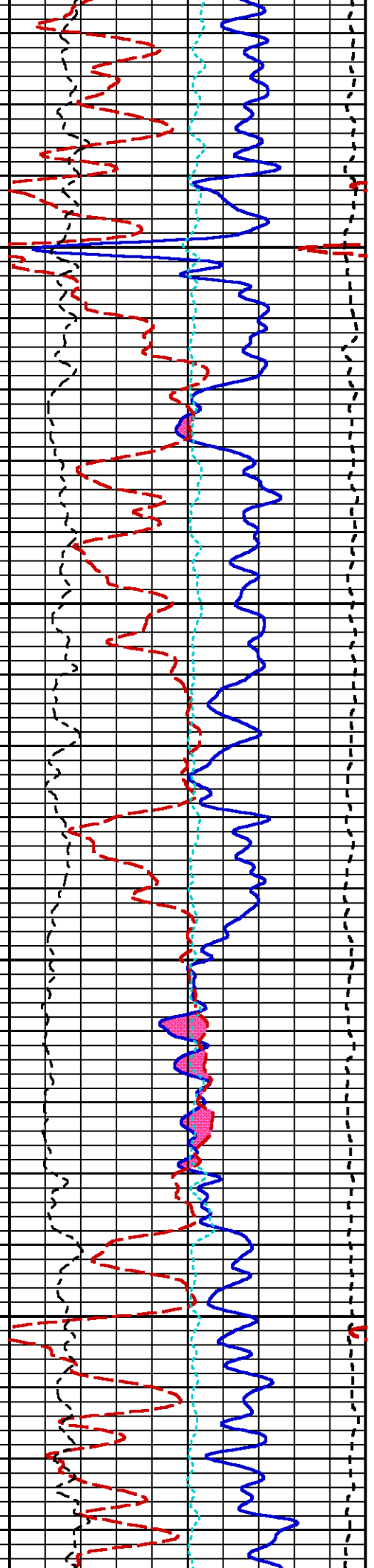


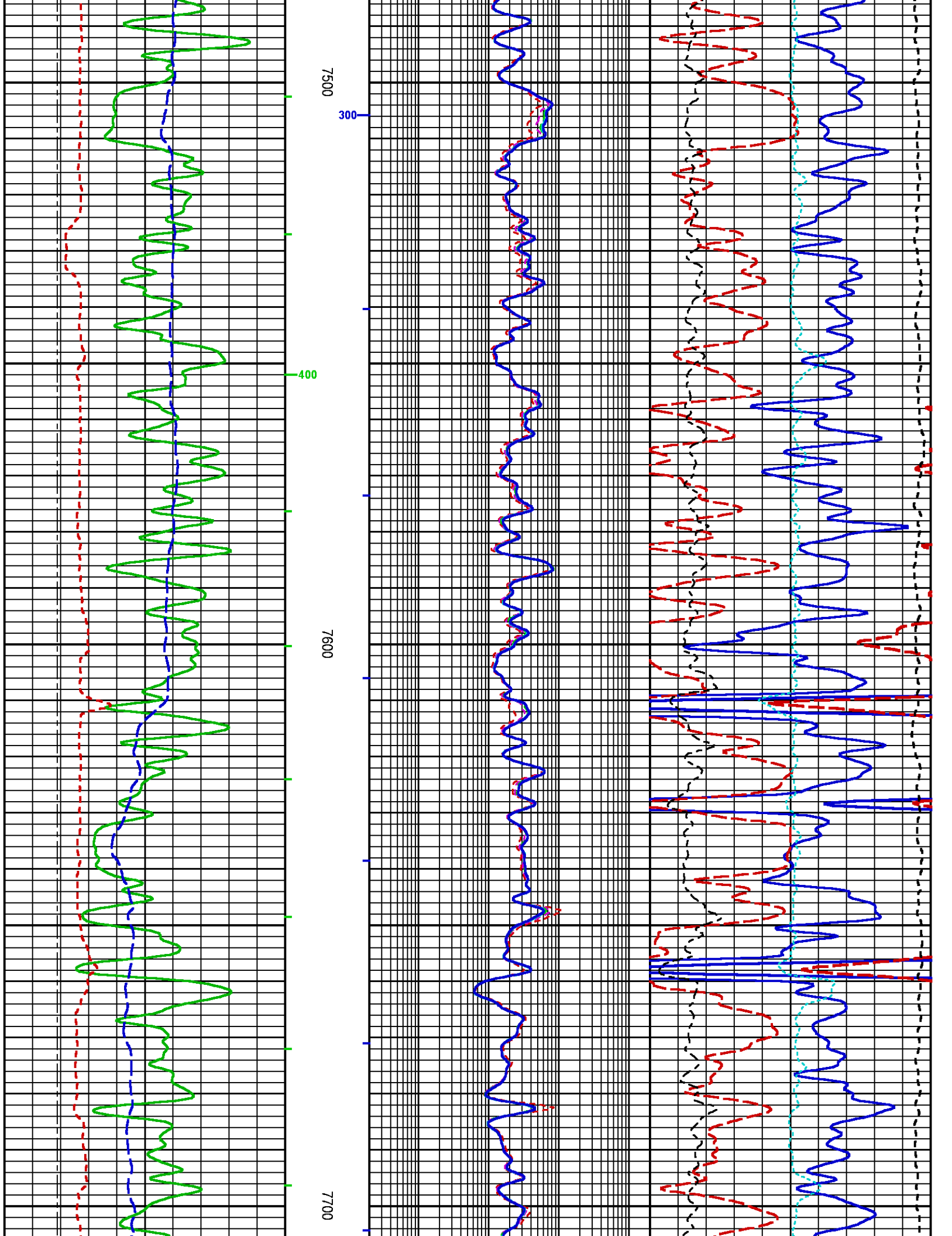




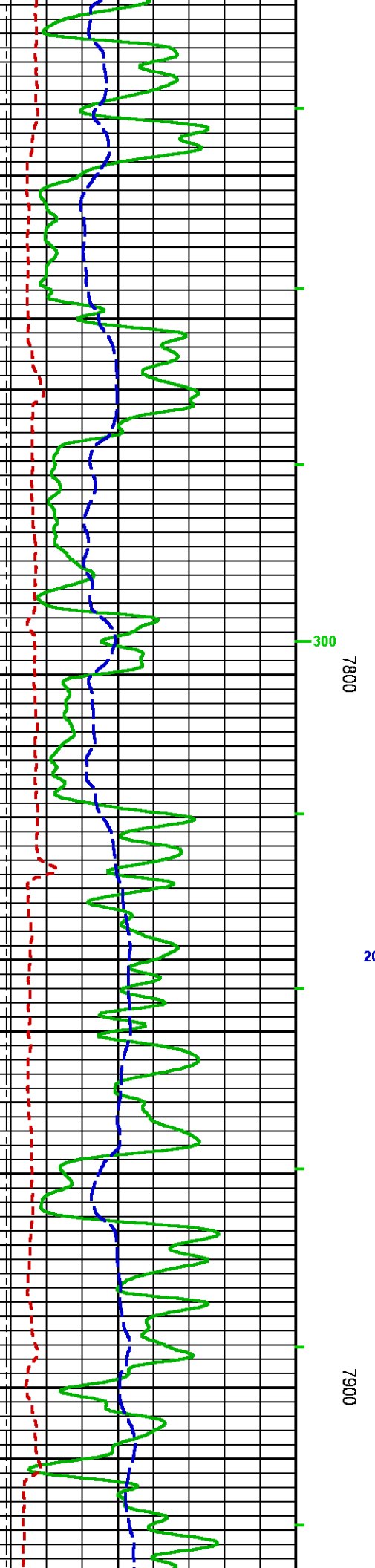
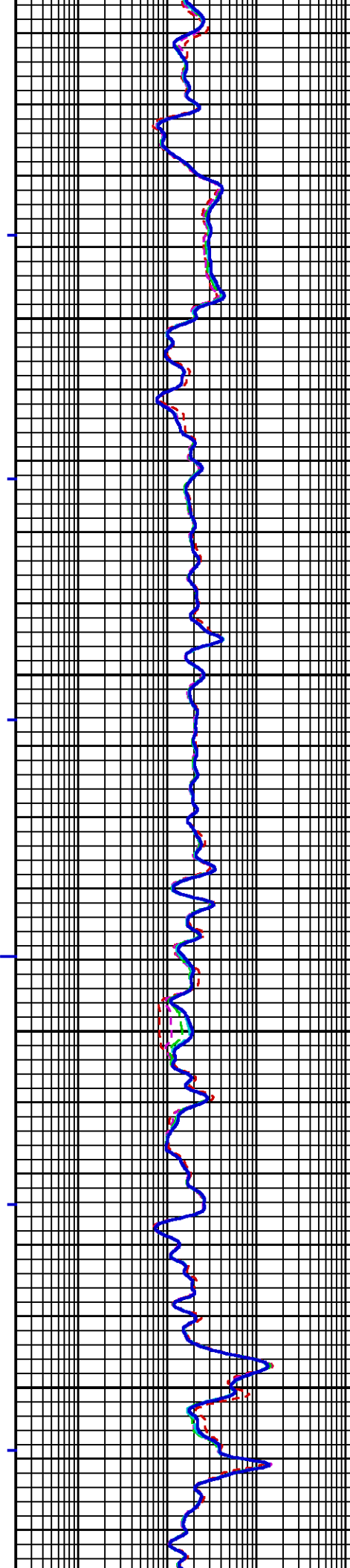
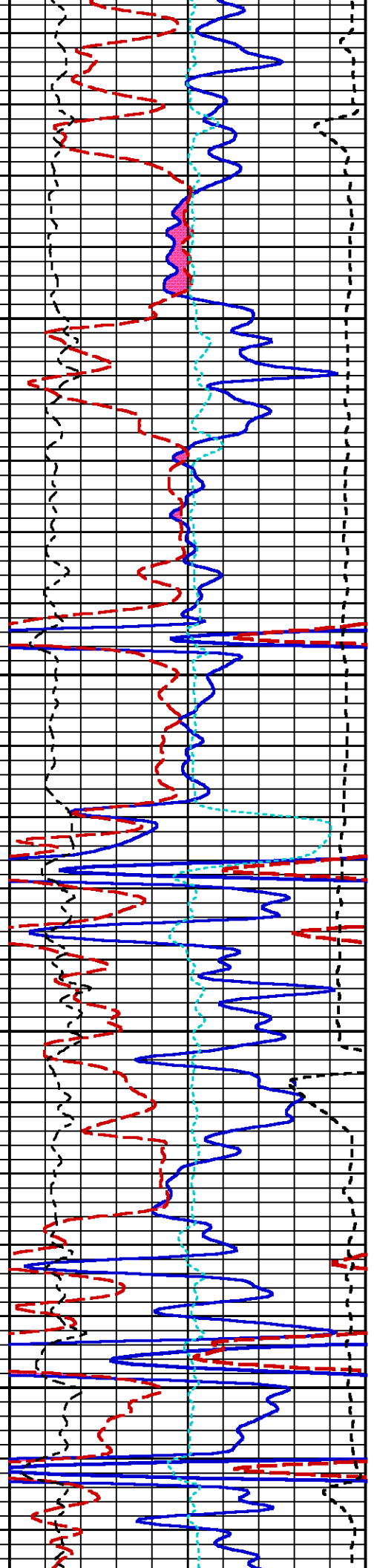




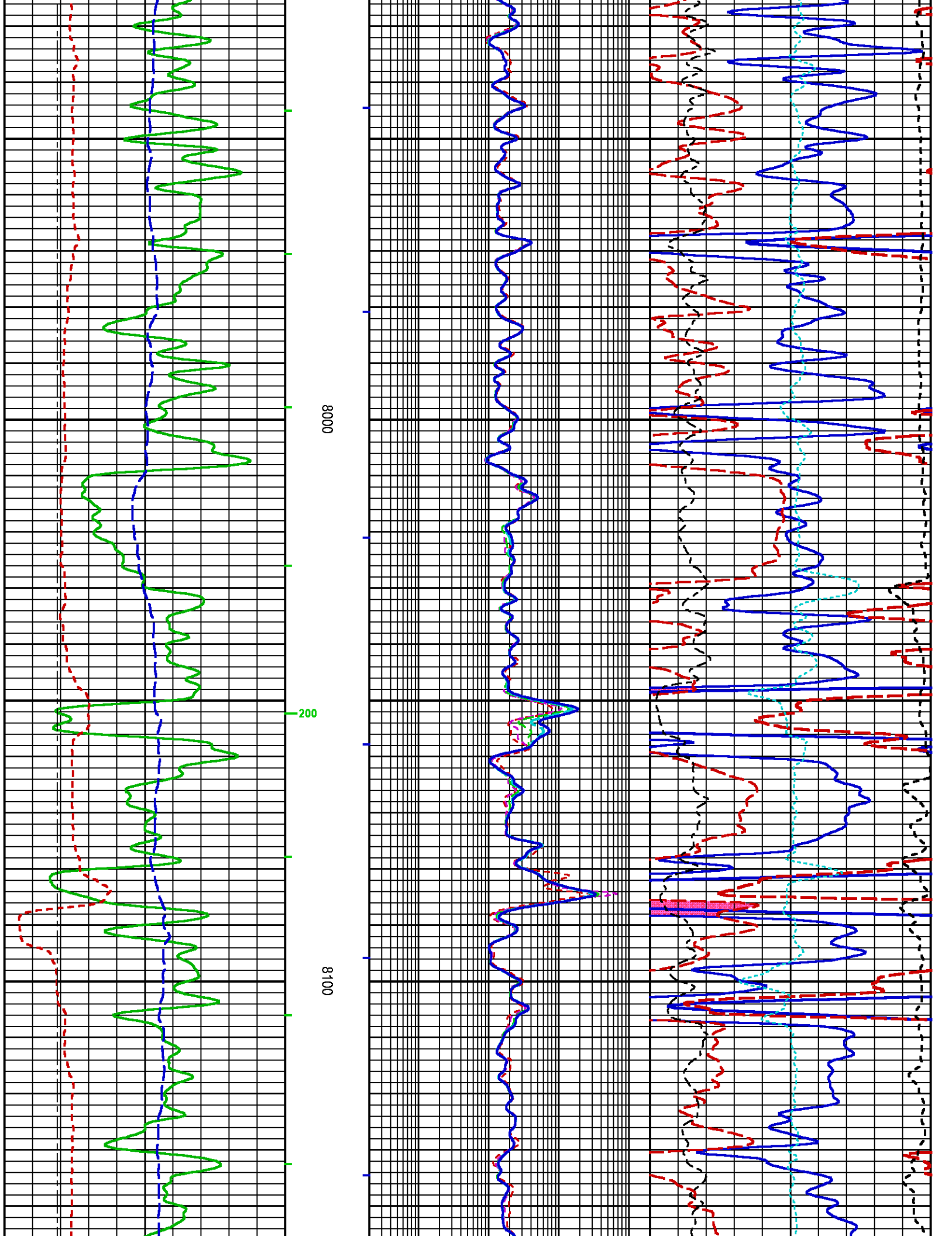


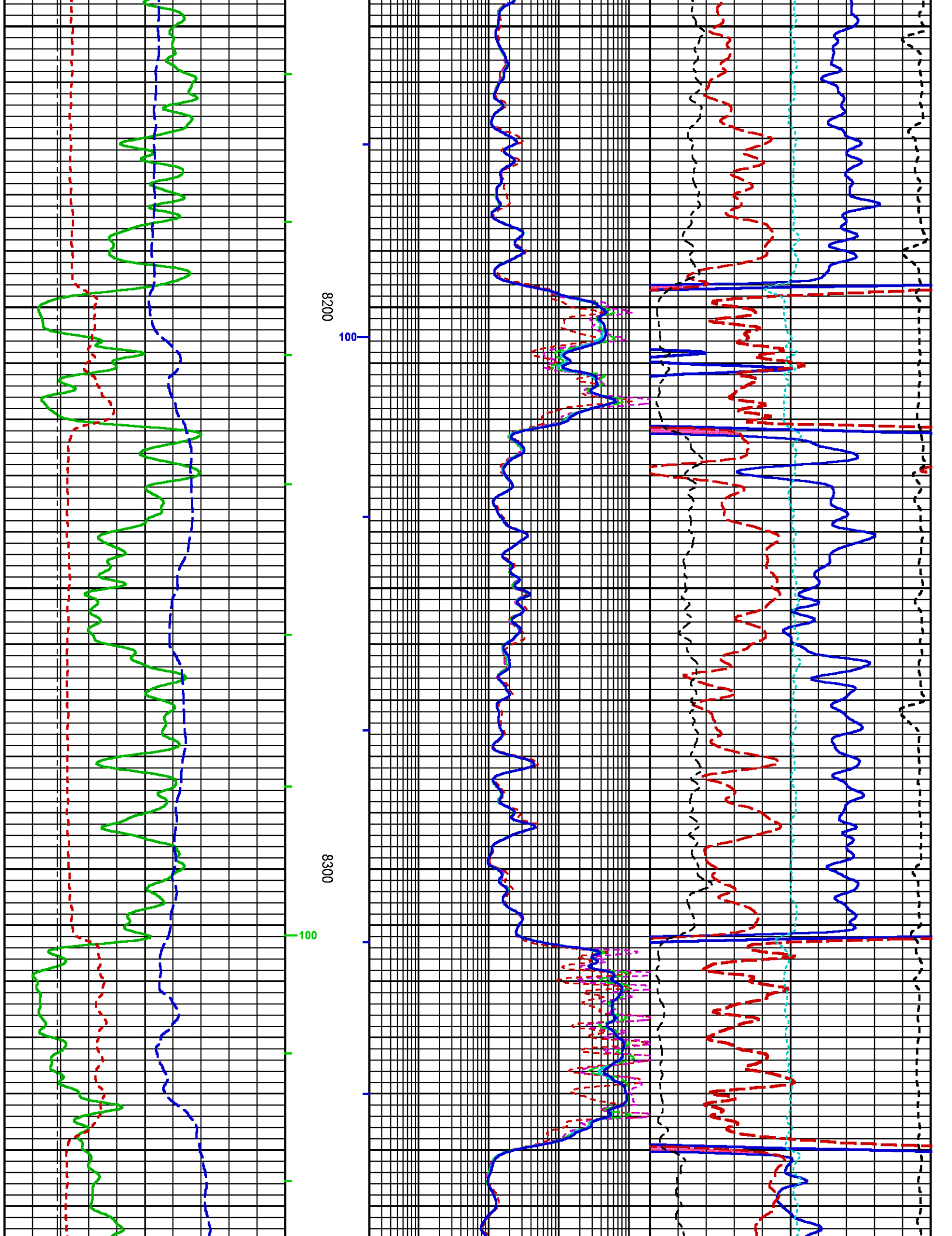


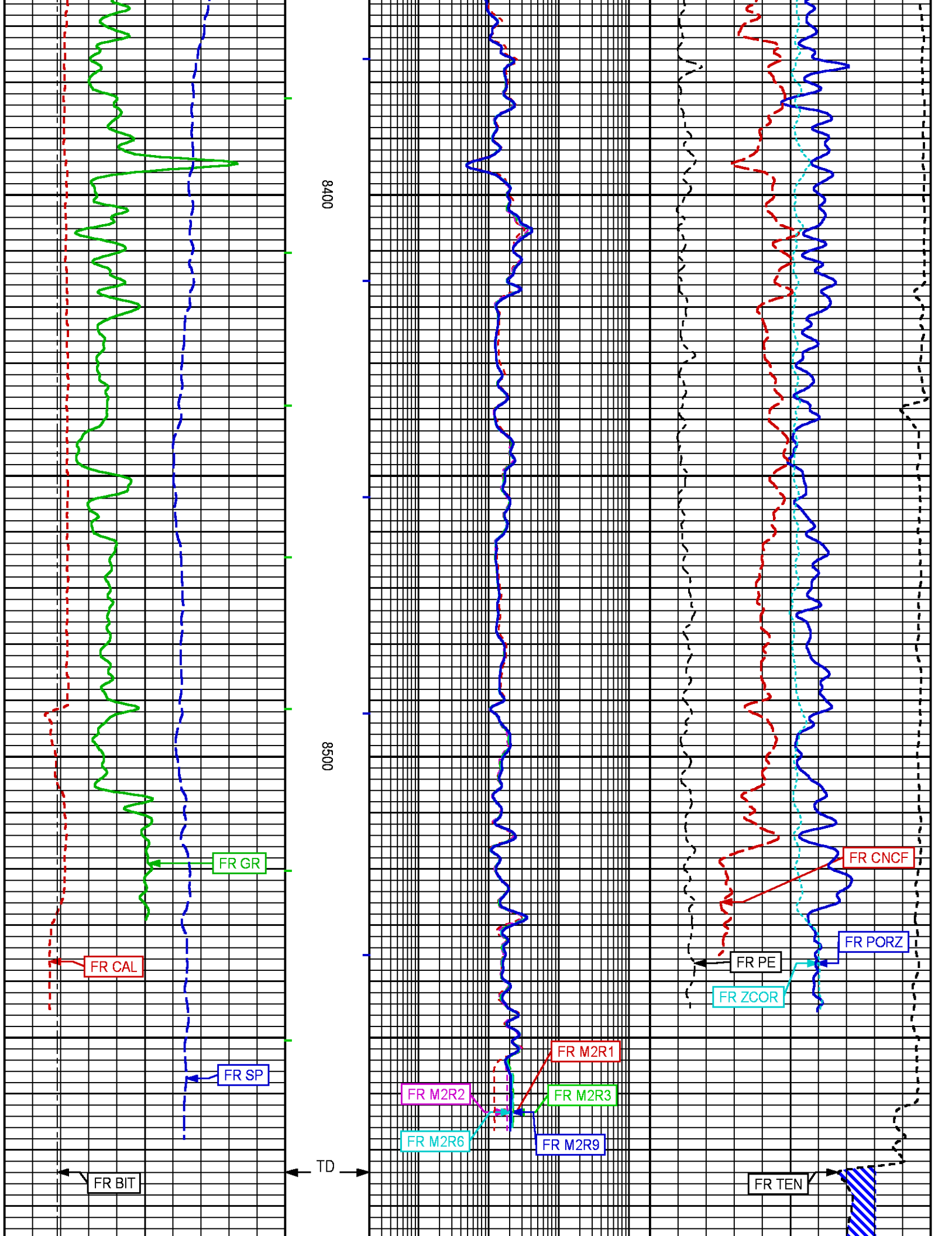


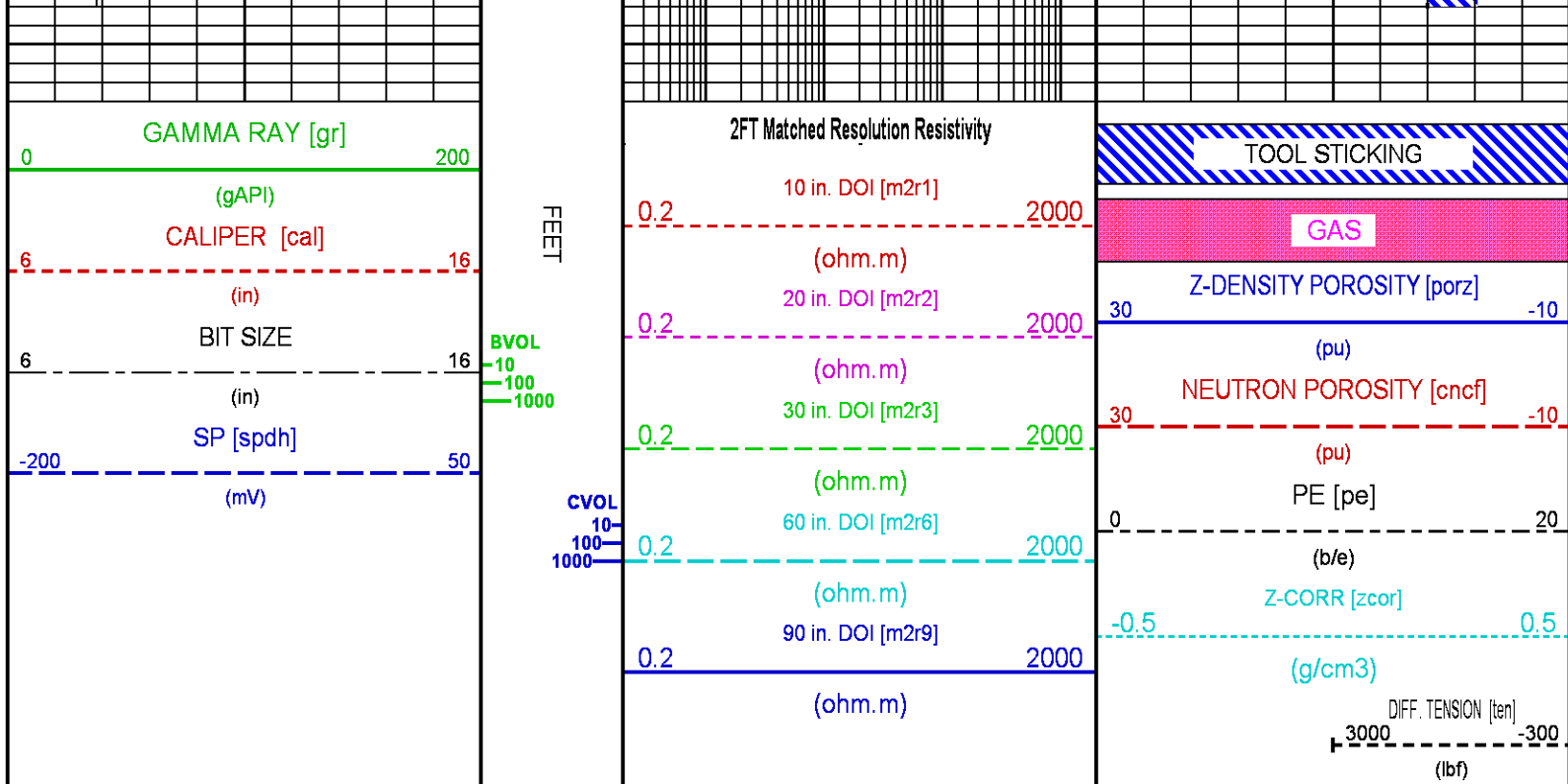












REPEAT LOG

ECLIPS 6.2i ECLIPS General Release Rel 6.2i Wed Jun 12 12:21:40 CDT 2013  
Updates: 1 Patches: 7

Plotted: Wed Oct 14 21:19:31 2015

## PARAMETER AND FILTER SUMMARY REPORT

File: /dat1a/md11447/n87cb\_kb01.prm  
LOGGING MODE: DEPTH DIRECTION: UP  
TOP DEPTH: 8240.250 ft BOTTOM DEPTH: 8596.250 ft

### SYMMETRIC FILTER

| MEASUREMENT TYPE | PARAMETER       | VALUE      | UNITS | INTERVAL (ft) |        |
|------------------|-----------------|------------|-------|---------------|--------|
| TTRM             | FILTER ( )      | medium (1) |       | TOP           | BOTTOM |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| Y AXIS CALIPER   | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| TENSION          | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| GR               | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| CN               | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| CALIPER          | FILTER ( )      | medium (1) |       | "             | "      |
|                  | FILTER (.h)     | medium (1) |       | "             | "      |
|                  | FILTER (.i)     | medium (1) |       | "             | "      |
| ZDL MED RES      | FILTER (hrd1*)  | medium     |       | "             | "      |
|                  | FILTER (hrd1s*) | medium     |       | "             | "      |
|                  | FILTER (hrd2*)  | medium     |       | "             | "      |
| SP-SPDH          | FILTER (hrd2s*) | medium     |       | "             | "      |
|                  | FILTER (soft*)  | medium     |       | "             | "      |
|                  | FILTER ( )      | medium (1) |       | "             | "      |

### BOREHOLE & CEMENT

| MEASUREMENT TYPE | PARAMETER | VALUE | UNITS | INTERVAL (ft) |
|------------------|-----------|-------|-------|---------------|
|------------------|-----------|-------|-------|---------------|

| MEASUREMENT TYPE                  | PARAMETER                  | VALUE         | UNITS        | INTERVAL (ft) |        |
|-----------------------------------|----------------------------|---------------|--------------|---------------|--------|
| CASING - BOREHOLE & CEMENT VOLUME | CASING O.D.                | 4.500         | in           | TOP           | BOTTOM |
|                                   | CASING THICKNESS           | 0.326         | in           | "             | "      |
| BIT SIZE                          | BIT SIZE                   | 7.875         | in           | "             | "      |
| MUD SAMPLE RESISTIVITY            | MUD SAMPLE TEMP            | 95.0          | degF         | "             | "      |
|                                   | MUD SAMPLE RES             | 2.250         | ohm.m        | "             | "      |
| BOREHOLE TEMP from GRADIENT       | Known BH REF TEMP          | 190.0         | degF         | "             | "      |
|                                   | at BH REF DEPTH            | 8574.0        | ft           | "             | "      |
|                                   | with TEMP GRADIENT         | 0.700         | 0.01 degF/ft | "             | "      |
| BOREHOLE CORR DIAMETER SOURCE     | CALIPER/FIXED DIA. (cnbh*) | USE CALIPER   |              | "             | "      |
|                                   | CALIPER/FIXED DIA. (mbh*)  | USE CALIPER   |              | "             | "      |
| BOREHOLE CORR DIAMETER            | FIXED DIAMETER (cnbh*)     | 7.875         | in           | "             | "      |
|                                   | FIXED DIAMETER (mbh*)      | 7.875         | in           | "             | "      |
| BH MUD RESISTIVITY SOURCE         | RMUD SOURCE (HDIL)         | TOOL MEASURED |              | "             | "      |

| CN PROCESSING                 |                      |           |       |               |        |
|-------------------------------|----------------------|-----------|-------|---------------|--------|
| MEASUREMENT TYPE              | PARAMETER            | VALUE     | UNITS | INTERVAL (ft) |        |
| 2446 CN MATRIX                | 2446 MATRIX          | SANDSTONE |       | TOP           | BOTTOM |
| CN SALINITY CORRECTION        | SALINITY             | 0         | ppm   | "             | "      |
| CN TOOL STANDOFF              | ENABLE STANDOFF CORR | OFF       |       | "             | "      |
|                               | STANDOFF AMOUNT      | 0.00      | in    | "             | "      |
| CN CASING & CEMENT CORRECTION | CORRECTION           | OFF       |       | "             | "      |
|                               | BIT SIZE BEHIND CSNG | 7.875     | in    | "             | "      |

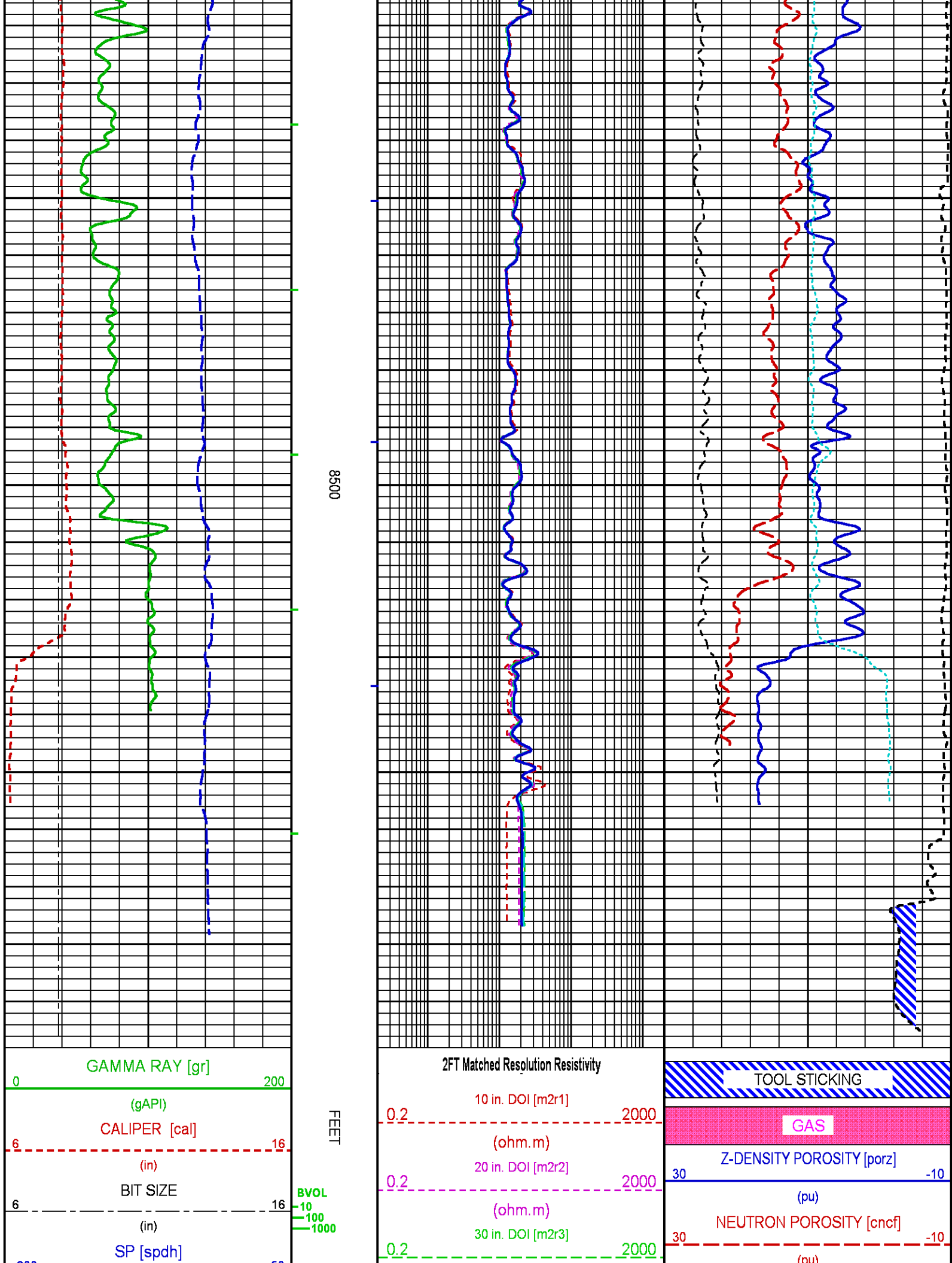
| ZDL PROCESSING   |                      |                |       |               |        |
|------------------|----------------------|----------------|-------|---------------|--------|
| MEASUREMENT TYPE | PARAMETER            | VALUE          | UNITS | INTERVAL (ft) |        |
| DENSITY POROSITY | RHOmatrix            | 2.680          | g/cm3 | TOP           | BOTTOM |
|                  | RHOfluid             | 1.000          | g/cm3 | "             | "      |
| ZDL              | DENX TRACKING        | ON             |       | "             | "      |
| TRACKING TIME    | Logging Spd for Gain | Over 10 ft/min |       | "             | "      |

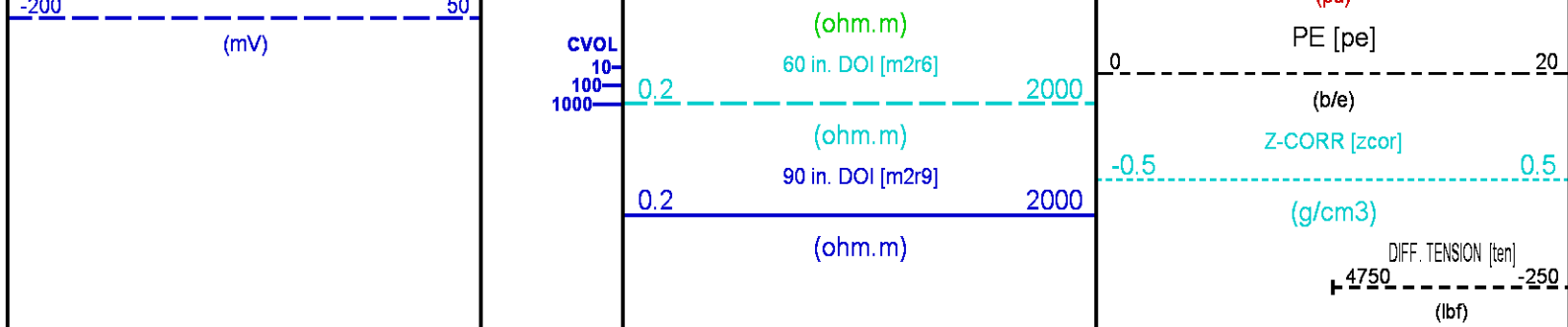
| HDIL PROCESSING              |                  |            |       |               |        |
|------------------------------|------------------|------------|-------|---------------|--------|
| MEASUREMENT TYPE             | PARAMETER        | VALUE      | UNITS | INTERVAL (ft) |        |
| HDIL TEMPERATURE CORRECTION  | TEMP CORR SOURCE | USE RXTEMP |       | TOP           | BOTTOM |
| ADAPTIVE BOREHOLE CORRECTION | ABC PROCESSING   | ON         |       | "             | "      |
|                              | ABC to CALCULATE | STANDOFF   |       | "             | "      |
|                              | STANDOFF         | 1.50       | in    | "             | "      |
|                              | TOOL POSITION    | ECCENTERED |       | "             | "      |
|                              | Rmud MULTIPLIER  | 1.000      |       | "             | "      |

| CURVE DESCRIPTION REPORT |                      |   |
|--------------------------|----------------------|---|
| CURVE NAME               | CREATION DATE        | CURVE DESCRIPTION   |
| F1:BIT                   | Oct 14 17:20:30 2015 | BIT SIZE  |
| F1:BVOL                  | Oct 14 17:20:30 2015 | BOREHOLE VOLUME   |
| F1:CAL                   | Oct 14 17:20:30 2015 | CALIPER   |
| F1:CNCF                  | Oct 14 17:20:30 2015 | FIELD NORMALIZED COMPENSATED NEUTRON POROSITY               |
| F1:CVOL                  | Oct 14 17:20:30 2015 | CEMENT VOLUME   |
| F1:GR                    | Oct 14 17:20:30 2015 | GAMMA RAY   |
| F1:M2R1                  | Oct 14 17:20:30 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 10-INCH DOI |
| F1:M2R2                  | Oct 14 17:20:30 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 20-INCH DOI |
| F1:M2R3                  | Oct 14 17:20:30 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 30-INCH DOI |
| F1:M2R6                  | Oct 14 17:20:30 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 60-INCH DOI |
| F1:M2R9                  | Oct 14 17:20:30 2015 | VERTICAL 2-FOOT RESOLUTION MATCHED RESISTIVITY, 90-INCH DOI |
| F1:PE                    | Oct 14 17:20:30 2015 | PHOTO ELECTRIC CROSS-SECTION                                |
| F1:PORZ                  | Oct 14 17:20:30 2015 | POROSITY FOR SELECTABLE MATRIX                              |
| F1:SPDH                  | Oct 14 17:20:30 2015 | SPONTANEOUS POTENTIAL PROCESSED IN COMMON REMOTE            |
| F1:TEN                   | Oct 14 17:20:30 2015 | DIFFERENTIAL TENSION  |
| F1:ZCOR                  | Oct 14 17:20:30 2015 | DENSITY CORRECTION  |

| CURVE MEASURE POINT OFFSET |             |       |             |       |             |       |             |
|----------------------------|-------------|-------|-------------|-------|-------------|-------|-------------|
| CURVE                      | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) | CURVE | OFFSET (ft) |
| BIT                        | 0.00        | M2R1  | 10.75       | M2R9  | 10.75       | TEN   | 0.00        |
| CAL                        | 37.50       | M2R2  | 10.75       | PE    | 37.25       | ZCOR  | 37.25       |
| CNCF                       | 48.12       | M2R3  | 10.75       | PORZ  | 37.25       |       |             |
| GR                         | 55.00       | M2R6  | 10.75       | SPDH  | 16.75       |       |             |







## CALIBRATION / VERIFICATION SUMMARY

### GR PRIMARY CALIBRATION SUMMARY

TOOL #: 1329XA 177857

DATE/TIME PERFORMED: Tue Oct 6 13:03:19 2015

UNIT #: 3882TD HL6713

CALB JIG #: 4702NK DA-434

|    | BACKGROUND<br>(cts/s) | CALBRTR ON<br>(cts/s) | CR DIFF<br>(cts/s)   | MULT  | BACKGROUND<br>(gAPI) | CALBRTR ON<br>(gAPI) | CALBRTR<br>(gAPI) |
|----|-----------------------|-----------------------|----------------------|-------|----------------------|----------------------|-------------------|
| GR | 171.33                | 1101.93               | 930.6<br>830.0 980.0 | 0.161 | 27.62                | 177.62               | 150               |

### GR PRIMARY VERIFICATION SUMMARY

TOOL #: 1329XA 177857

DATE/TIME PERFORMED: Tue Oct 6 13:09:27 2015

UNIT #: 3882TD HL6713

VERI JIG #: 4702NK DA-434

|    | BACKGROUND<br>(cts/s) | CALBRTR ON<br>(cts/s) | MULT  | BACKGROUND<br>(gAPI) | CALBRTR ON<br>(gAPI) | DIFF.<br>(gAPI)         |
|----|-----------------------|-----------------------|-------|----------------------|----------------------|-------------------------|
| GR | 167.20                | 1110.89               | 0.161 | 26.95                | 179.06               | 152.11<br>140.00 160.00 |

### GR BEFORE LOG VERIFICATION SUMMARY

TOOL #: 1329XA 177857

DATE/TIME PERFORMED: Wed Oct 14 14:05:24 2015

DAYS SINCE CAL: 8

UNIT #: 3882TD HL6713

VERI JIG #: 4702NK DA-434

|    | BACKGROUND<br>(cts/s) | CALBRTR ON<br>(cts/s) | MULT  | BACKGROUND<br>(gAPI) | CALBRTR ON<br>(gAPI) | DIFF.<br>(gAPI)         |
|----|-----------------------|-----------------------|-------|----------------------|----------------------|-------------------------|
| GR | 280.02                | 1218.71               | 0.161 | 45.14                | 196.44               | 151.30<br>142.11 162.11 |



## GR AFTER LOG VERIFICATION SUMMARY

TOOL #: 1329XA 177857

DATE/TIME PERFORMED: Wed Oct 14 21:36:44 2015

DAYS SINCE CAL: 8

UNIT #: 3882TD HL6713

VERI JIG #: 4702NK DA-434

|    | BACKGROUND<br>(cts/s) | CALBRTR ON<br>(cts/s) | MULT  | BACKGROUND<br>(gAPI) | CALBRTR ON<br>(gAPI) | DIFF.<br>(gAPI) |
|----|-----------------------|-----------------------|-------|----------------------|----------------------|-----------------|
| GR | 168.80                | 1103.04               | 0.161 | 27.21                | 177.80               | 150.59          |
|    |                       |                       |       |                      |                      | 141.30 161.30   |

## CN PRIMARY CALIBRATION SUMMARY

TOOL #: 2446XA 10103362

DATE/TIME PERFORMED: Tue Oct 6 12:14:46 2015

UNIT #: 3882TD HL6713

CALIBRATOR #: 2437XB 10038567

SOURCE #: 4717XS N-919

|       | MEASURED<br>CPS | DEADTM CORR<br>CPS | DTC<br>SSN/LSN | NOMINAL<br>SSN/LSN | CORRECTION<br>FACTOR | POROSITY<br>(pu) |
|-------|-----------------|--------------------|----------------|--------------------|----------------------|------------------|
| LSN   | 580.20          | 588.39             |                |                    |                      |                  |
| SSN   | 1562.35         | 1612.75            |                |                    |                      |                  |
| RATIO |                 |                    | 2.74093        | 2.75100            | 1.00367              |                  |
|       |                 |                    |                |                    | 0.97000 1.07000      |                  |
| CN    |                 |                    |                |                    |                      | 21.358           |

## CN PRIMARY VERIFICATION SUMMARY

TOOL #: 2446XA 10103362

DATE/TIME PERFORMED: Tue Oct 6 12:21:45 2015

UNIT #: 3882TD HL6713

ICE BLOCK #: 4717ND D-164

|       | MEASURED<br>CPS | DEADTM CORR<br>CPS | DTC<br>SSN/LSN | CORRECTION<br>FACTOR | DTC CORR<br>SSN/LSN | POROSITY<br>(pu) |
|-------|-----------------|--------------------|----------------|----------------------|---------------------|------------------|
| LSN   | 1655.16         | 1723.68            |                |                      |                     |                  |
| SSN   | 4100.91         | 4467.40            |                |                      |                     |                  |
| RATIO |                 |                    | 2.59178        | 1.00367              | 2.60292             |                  |
| CN    |                 |                    |                |                      |                     | 19.269           |

## CN BEFORE LOG VERIFICATION SUMMARY

TOOL #: 2446XA 10103362

DATE/TIME PERFORMED: Wed Oct 14 13:59:28 2015

DAYS SINCE CAL: 8

UNIT #: 3882TD HL6713 ICE BLOCK #: 4717ND D--164

|       | MEASURED<br>CPS | DEADTM CORR<br>CPS | DTC<br>SSN/LSN | CORRECTION<br>FACTOR | DTC CORR<br>SSN/LSN | POROSITY<br>(pu)        |
|-------|-----------------|--------------------|----------------|----------------------|---------------------|-------------------------|
| LSN   | 1625.91         | 1691.98            |                |                      |                     |                         |
| SSN   | 4072.73         | 4433.96            |                |                      |                     |                         |
| RATIO |                 |                    | 2.62058        | 1.00367              | 2.63203             |                         |
| CN    |                 |                    |                |                      |                     | 19.677<br>17.269 21.269 |

## CN AFTER LOG VERIFICATION SUMMARY

|         |                 |                      |                          |                 |   |
|---------|-----------------|----------------------|--------------------------|-----------------|---|
| TOOL #: | 2446XA 10103362 | DATE/TIME PERFORMED: | Wed Oct 14 21:30:28 2015 | DAYS SINCE CAL: | 8 |
| UNIT #: | 3882TD HL6713   | ICE BLOCK #:         | 4717ND D--164            |                 |   |

|       | MEASURED<br>CPS | DEADTM CORR<br>CPS | DTC<br>SSN/LSN | CORRECTION<br>FACTOR | DTC CORR<br>SSN/LSN | POROSITY<br>(pu)        |
|-------|-----------------|--------------------|----------------|----------------------|---------------------|-------------------------|
| LSN   | 1658.22         | 1726.99            |                |                      |                     |                         |
| SSN   | 4077.76         | 4439.92            |                |                      |                     |                         |
| RATIO |                 |                    | 2.57090        | 1.00367              | 2.58190             |                         |
| CN    |                 |                    |                |                      |                     | 18.978<br>17.677 21.677 |

## CAL PRIMARY CALIBRATION SUMMARY

|         |                 |                      |                         |
|---------|-----------------|----------------------|-------------------------|
| TOOL #: | 2234XA 10195311 | DATE/TIME PERFORMED: | Tue Oct 6 11:58:10 2015 |
| UNIT #: | 3882TD HL6713   |                      |                         |

|         | SMALL RING | LARGE RING | MULT    | ADD      | SMALL RING<br>(in) | LARGE RING<br>(in) |
|---------|------------|------------|---------|----------|--------------------|--------------------|
| CALIPER | 1500.0     | 2396.8     | 0.00794 | -4.04237 | 7.875              | 15.000             |

## CAL BEFORE LOG VERIFICATION SUMMARY

|         |                 |                      |                          |                 |   |
|---------|-----------------|----------------------|--------------------------|-----------------|---|
| TOOL #: | 2234XA 10195311 | DATE/TIME PERFORMED: | Wed Oct 14 14:36:27 2015 | DAYS SINCE CAL: | 8 |
| UNIT #: | 3882TD HL6713   |                      |                          |                 |   |

|         | I.D.   | MULT    | ADD      | I.D.<br>(in) |
|---------|--------|---------|----------|--------------|
| CALIPER | 1500.8 | 0.00794 | -4.04873 | 7.875        |

## CAL AFTER LOG VERIFICATION SUMMARY

TOOL #: 2234XA 10195311

DATE/TIME PERFORMED: Wed Oct 14 21:10:19 2015

|                 |   |
|-----------------|---|
| DAYS SINCE CAL: | 8 |
|-----------------|---|

UNIT #: 3882TD HL6713

|         | I.D.   | MULT    | ADD      | I.D.<br>(in) |
|---------|--------|---------|----------|--------------|
| CALIPER | 1540.8 | 0.00794 | -4.04873 | 8.193        |
|         |        |         |          | 7.375 8.375  |

## ZDL PRIMARY CALIBRATION SUMMARY

TOOL: 2234XA 10195311

DATE/TIME PERFORMED: Tue Oct 6 11:49:17 2015

UNIT: 3882TD HL6713

|            |               |
|------------|---------------|
| CALB BLKS: | 2225XA 114927 |
|------------|---------------|

|         |               |
|---------|---------------|
| CS SRC: | 4703NT 10207B |
|---------|---------------|

| SS CS PK<br>(Channel) | LS CS PK<br>(Channel) | SS_BKGD<br>(cps) | LS BKGD<br>(cps) |
|-----------------------|-----------------------|------------------|------------------|
| 225.2                 | 225.1                 | 1484.4           | 1725.2           |
| 220.0 230.0           | 220.0 230.0           |                  |                  |

|                    | SS<br>(cps)       | LS<br>(cps)        | SHR                  | DEN<br>(g/cm3) | CORR<br>(g/cm3) | PE<br>(b/e) |
|--------------------|-------------------|--------------------|----------------------|----------------|-----------------|-------------|
| MG (LO PE)         | 21282.6           | 10887.9            | 0.639<br>0.585 0.685 | 1.703          | 0.002           | 2.180       |
| AL                 | 12386.8           | 1099.4             |                      | 2.697          | -0.008          |             |
| AL + SHIM          | 17067.5           | 1909.4             |                      | 2.617          | 0.159           |             |
| MG + SHIM (HI PE)  | 10398.2           | 5191.1             | 0.248<br>0.210 0.270 |                |                 | 8.600       |
| RATIO AL + SHIM/AL | 1.38<br>1.32 1.42 | 1.74<br>1.64 1.84  |                      |                |                 |             |
| RATIO MG/AL        | 1.72<br>1.65 1.78 | 9.90<br>9.40 10.20 |                      |                |                 |             |

## ZDL BEFORE LOG VERIFICATION SUMMARY

TOOL #: 2234XA 10195311

DATE/TIME PERFORMED: Wed Oct 14 14:04:14 2015

DAYS SINCE CAL: 8

UNIT #: 3882TD HL6713

|    | TOTAL<br>(cps)     | CSPK<br>(Channel) | HV<br>(V)          |
|----|--------------------|-------------------|--------------------|
| LS | 1721.8             | 223.3             | 1248.0             |
|    | 1625.2      1825.2 | 220.0      230.0  | 1100.0      1550.0 |
| SS | 1477.0             | 224.5             | 1288.0             |

|           |        |                     |       |        |        |
|-----------|--------|---------------------|-------|--------|--------|
| 1384.4    | 1584.4 | 220.0               | 230.0 | 1100.0 | 1550.0 |
| LV<br>(V) |        | PAD CURRENT<br>(mA) |       |        |        |
| 5.0       |        | 70.7                |       |        |        |
| 4.8       | 5.2    | 50.0                | 120.0 |        |        |

## ZDL AFTER LOG VERIFICATION SUMMARY

TOOL #: 2234XA 10195311

DATE/TIME PERFORMED: Wed Oct 14 21:28:11 2015

DAYS SINCE CAL: 8

UNIT #: 3882TD HL6713

|    |                |                   |               |
|----|----------------|-------------------|---------------|
|    | TOTAL<br>(cps) | CSPK<br>(Channel) | HV<br>(V)     |
| LS | 1722.4         | 224.6             | 1260.1        |
|    | 1625.2 1825.2  | 220.0 230.0       | 1100.0 1550.0 |
| SS | 1475.2         | 225.2             | 1301.7        |
|    | 1384.4 1584.4  | 220.0 230.0       | 1100.0 1550.0 |

|           |     |                     |       |
|-----------|-----|---------------------|-------|
| LV<br>(V) |     | PAD CURRENT<br>(mA) |       |
| 5.0       |     | 72.3                |       |
| 4.8       | 5.2 | 50.0                | 120.0 |

## HDIL PRIMARY CALIBRATION SUMMARY

TOOL #: 1515MA 10326319

DATE/TIME PERFORMED: Fri Oct 2 17:14:59 2015

UNIT #: GPAMO LABSYS\_5

GRCOND ID & DATE: a.30 083096

|          | ZERO DATA(mv) | 10 KHz       | 30 KHz       | 50 KHz       | 70 KHz       | 90 KHz       | 110 KHz      | 130 KHz      | 150 KHz |
|----------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| Coil 0 R | -0.006        | 0.001        | 0.002        | -0.001       | -0.003       | 0.001        | 0.001        | -0.002       |         |
|          | -0.200 0.200  | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 0 Q | 0.008         | 0.009        | 0.004        | 0.001        | 0.002        | 0.001        | 0.001        | 0.001        |         |
|          | -1.000 1.000  | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 1 R | -0.007        | 0.001        | 0.002        | 0.002        | 0.002        | 0.001        | -0.002       | -0.005       |         |
|          | -0.200 0.200  | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 1 Q | 0.002         | 0.003        | -0.001       | 0.001        | 0.003        | 0.004        | 0.004        | 0.004        |         |
|          | -1.000 1.000  | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 2 R | 0.003         | 0.001        | 0.001        | 0.002        | 0.004        | 0.002        | 0.004        | 0.005        |         |
|          | -0.200 0.200  | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 2 Q | -0.008        | -0.008       | -0.002       | -0.000       | -0.002       | -0.002       | 0.001        | -0.001       |         |
|          | -1.000 1.000  | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 3 R | 0.005         | 0.004        | -0.001       | 0.004        | 0.004        | 0.003        | 0.004        | -0.000       |         |
|          | -0.100 0.100  | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 3 Q | -0.012        | -0.011       | -0.001       | -0.001       | -0.000       | 0.001        | 0.002        | 0.001        |         |
|          | -0.500 0.500  | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |         |
| Coil 4 R | -0.013        | -0.004       | 0.003        | -0.008       | -0.005       | 0.001        | -0.003       | -0.001       |         |
|          | -0.200 0.200  | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 |         |
| Coil 4 Q | 0.012         | 0.005        | 0.007        | 0.001        | 0.002        | 0.004        | 0.007        | 0.000        |         |
|          | -0.200 0.200  | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 |         |

|          |              |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Coil 4 Q | -0.012       | 0.003        | 0.007        | 0.001        | -0.002       | -0.004       | -0.007       | -0.000       |
|          | -1.000 1.000 | -0.400 0.400 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 |
| Coil 5 R | -0.009       | 0.000        | 0.004        | 0.005        | 0.004        | 0.003        | 0.000        | 0.002        |
|          | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 |
| Coil 5 Q | -0.013       | -0.009       | -0.001       | 0.008        | -0.005       | 0.003        | 0.006        | 0.010        |
|          | -2.000 2.000 | -0.800 0.800 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 |
| Coil 6 R | -0.002       | 0.018        | -0.033       | -0.028       | -0.008       | 0.014        | 0.017        | 0.039        |
|          | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 |
| Coil 6 Q | -0.020       | 0.000        | 0.023        | -0.015       | -0.043       | -0.038       | -0.006       | -0.003       |
|          | -5.000 5.000 | -2.000 2.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 |

|             |               |               |               |               |               |                |                |                 |
|-------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|-----------------|
| ELEC. GAINS | 10 KHz        | 30 KHz        | 50 KHz        | 70 KHz        | 90 KHz        | 110 KHz        | 130 KHz        | 150 KHz         |
| Coil 0 M    | 125.41        | 123.76        | 120.57        | 116.00        | 110.13        | 103.32         | 95.69          | 87.31           |
|             | 100.00 150.00 | 100.00 150.00 | 98.00 150.00  | 96.00 140.00  | 92.00 140.00  | 87.00 130.00   | 82.00 120.00   | 76.00 110.00    |
| Coil 0 P    | 7.920         | 24.864        | 41.512        | 57.904        | 74.182        | 90.191         | 105.955        | 121.300         |
|             | 6.000 9.000   | 19.000 28.000 | 32.000 47.000 | 44.000 66.000 | 57.000 85.000 | 70.000 100.000 | 82.000 120.000 | 95.000 140.000  |
| Coil 1 M    | 220.65        | 218.15        | 213.39        | 206.42        | 197.52        | 187.09         | 175.17         | 161.82          |
|             | 180.00 270.00 | 180.00 270.00 | 170.00 260.00 | 170.00 250.00 | 160.00 250.00 | 160.00 230.00  | 150.00 220.00  | 140.00 200.00   |
| Coil 1 P    | 7.635         | 23.962        | 40.019        | 55.872        | 71.649        | 87.248         | 102.624        | 117.782         |
|             | 6.000 9.000   | 19.000 28.000 | 32.000 48.000 | 45.000 67.000 | 57.000 88.000 | 70.000 110.000 | 83.000 120.000 | 96.000 140.000  |
| Coil 2 M    | 439.21        | 433.65        | 423.09        | 407.82        | 388.07        | 364.89         | 338.73         | 309.46          |
|             | 360.00 540.00 | 360.00 540.00 | 350.00 530.00 | 340.00 510.00 | 330.00 500.00 | 310.00 470.00  | 300.00 440.00  | 270.00 410.00   |
| Coil 2 P    | 8.085         | 25.321        | 42.277        | 59.027        | 75.693        | 92.136         | 108.374        | 124.296         |
|             | 6.000 9.000   | 19.000 29.000 | 32.000 48.000 | 45.000 67.000 | 58.000 87.000 | 71.000 110.000 | 84.000 130.000 | 96.000 140.000  |
| Coil 3 M    | 719.45        | 712.08        | 697.97        | 677.29        | 649.58        | 615.08         | 576.21         | 530.95          |
|             | 590.00 880.00 | 580.00 870.00 | 570.00 850.00 | 550.00 830.00 | 530.00 800.00 | 500.00 760.00  | 470.00 710.00  | 440.00 650.00   |
| Coil 3 P    | 7.741         | 24.319        | 40.681        | 56.925        | 73.177        | 89.294         | 105.303        | 121.045         |
|             | 6.000 10.000  | 20.000 29.000 | 33.000 49.000 | 46.000 69.000 | 59.000 89.000 | 72.000 110.000 | 85.000 130.000 | 98.000 150.000  |
| Coil 4 M    | 1149.2        | 1137.1        | 1113.9        | 1079.2        | 1033.1        | 977.4          | 912.9          | 839.0           |
|             | 900.0 1400.0  | 900.0 1300.0  | 900.0 1300.0  | 850.0 1300.0  | 800.0 1200.0  | 800.0 1200.0   | 750.0 1100.0   | 700.0 1000.0    |
| Coil 4 P    | 7.935         | 24.958        | 41.757        | 58.421        | 75.077        | 91.629         | 108.030        | 124.163         |
|             | 6.000 10.000  | 20.000 30.000 | 33.000 50.000 | 46.000 70.000 | 60.000 90.000 | 73.000 110.000 | 86.000 130.000 | 99.000 150.000  |
| Coil 5 M    | 2314.2        | 2255.8        | 2151.3        | 2017.9        | 1870.2        | 1720.4         | 1572.0         | 1423.9          |
|             | 1900.0 2800.0 | 1800.0 2800.0 | 1800.0 2700.0 | 1800.0 2600.0 | 1700.0 2500.0 | 1600.0 2400.0  | 1500.0 2200.0  | 1400.0 2100.0   |
| Coil 5 P    | 8.275         | 25.817        | 42.526        | 58.418        | 73.541        | 88.005         | 101.893        | 115.279         |
|             | 6.000 10.000  | 20.000 31.000 | 34.000 51.000 | 48.000 72.000 | 62.000 93.000 | 76.000 110.000 | 89.000 130.000 | 100.000 150.000 |
| Coil 6 M    | 5992.9        | 5937.0        | 5827.5        | 5663.5        | 5441.5        | 5168.1         | 4846.2         | 4466.8          |
|             | 4700.0 7100.0 | 4700.0 7000.0 | 4600.0 6900.0 | 4400.0 6600.0 | 4200.0 6400.0 | 4000.0 6000.0  | 3700.0 5600.0  | 3400.0 5100.0   |
| Coil 6 P    | 7.897         | 25.143        | 42.127        | 59.031        | 75.986        | 92.892         | 109.743        | 126.368         |
|             | 7.000 10.000  | 22.000 32.000 | 36.000 54.000 | 51.000 76.000 | 65.000 98.000 | 80.000 120.000 | 94.000 140.000 | 110.000 160.000 |

|           |               |            |            |            |            |           |           |           |
|-----------|---------------|------------|------------|------------|------------|-----------|-----------|-----------|
| AM Factor | 10 KHz        | 30 KHz     | 50 KHz     | 70 KHz     | 90 KHz     | 110 KHz   | 130 KHz   | 150 KHz   |
| Coil 0 R  | 595           | 46         | -46        | -86        | -107       | -120      | -128      | -134      |
|           | -200 800      | -500 200   | -600 100   | -600 50    | -500 20    | -500 20   | -500 20   | -500 20   |
| Coil 0 Q  | 2253          | 857        | 524        | 359        | 253        | 176       | 114       | 63        |
|           | -3000 6000    | -1000 2000 | -1000 1200 | -500 900   | -400 700   | -400 600  | -400 500  | -400 400  |
| Coil 1 R  | 564           | 78         | 17         | -5         | -14        | -20       | -23       | -25       |
|           | 450 650       | 20 130     | -30 60     | -50 40     | -55 30     | -60 20    | -60 10    | -60 10    |
| Coil 1 Q  | 1227          | 490        | 305        | 218        | 167        | 133       | 108       | 89        |
|           | 0 2500        | 0 900      | 0 600      | 0 450      | 0 350      | 0 300     | 0 250     | 0 250     |
| Coil 2 R  | 195.4         | 30.5       | 9.5        | 2.4        | -1.0       | -2.6      | -3.9      | -4.9      |
|           | 140.0 230.0   | 0.0 51.0   | -10.0 25.0 | -15.0 15.0 | -16.0 10.0 | -16.0 7.0 | -16.0 5.0 | -16.0 3.0 |
| Coil 2 Q  | 314.3         | 135.3      | 88.7       | 67.6       | 55.9       | 49.0      | 44.8      | 41.5      |
|           | -200.0 1000.0 | 0.0 350.0  | 0.0 220.0  | 0.0 160.0  | 0.0 130.0  | 0.0 110.0 | 0.0 100.0 | 0.0 90.0  |
| Coil 3 R  | 47.1          | 6.3        | 1.1        | -0.5       | -1.3       | -1.8      | -2.3      | -1.9      |

|          |         |        |        |       |        |       |        |       |        |       |        |       |        |       |        |        |
|----------|---------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|--------|
|          | 37.0    | 62.0   | 0.0    | 12.0  | -3.0   | 6.0   | -4.0   | 4.0   | -5.0   | 2.0   | -5.0   | 1.0   | -6.0   | 1.0   | -6.0   | 1.0    |
| Coil 3 Q | 93.1    |        | 40.9   |       | 29.2   |       | 25.3   |       | 24.0   |       | 24.0   |       | 24.2   |       | 24.8   |        |
|          | -140.0  | 280.0  | -40.0  | 100.0 | -20.0  | 70.0  | -10.0  | 60.0  | -10.0  | 50.0  | -10.0  | 50.0  | -10.0  | 50.0  | -10.0  | 50.0   |
| Coil 4 R | 7.75    |        | -0.10  |       | -1.11  |       | -1.40  |       | -1.38  |       | -1.49  |       | -1.69  |       | -1.64  |        |
|          | 2.00    | 18.00  | -3.00  | 6.00  | -3.50  | 3.00  | -3.90  | 2.00  | -4.20  | 2.00  | -4.50  | 2.00  | -4.70  | 2.00  | -5.00  | 2.00   |
| Coil 4 Q | 17.17   |        | 10.28  |       | 10.14  |       | 11.40  |       | 13.29  |       | 15.31  |       | 17.38  |       | 19.56  |        |
|          | -100.00 | 100.00 | -30.00 | 50.00 | -20.00 | 40.00 | -10.00 | 40.00 | -10.00 | 40.00 | -10.00 | 45.00 | -10.00 | 50.00 | -10.00 | 60.00  |
| Coil 5 R | -0.27   |        | -1.24  |       | -1.27  |       | -1.33  |       | -1.23  |       | -1.13  |       | -1.16  |       | -1.04  |        |
|          | -2.00   | 5.80   | -3.20  | 2.40  | -4.50  | 3.10  | -4.70  | 3.20  | -4.80  | 3.20  | -5.00  | 3.30  | -5.20  | 3.40  | -5.40  | 3.50   |
| Coil 5 Q | 4.89    |        | 4.67   |       | 6.42   |       | 8.36   |       | 10.48  |       | 12.74  |       | 15.12  |       | 17.28  |        |
|          | -60.00  | 70.00  | -20.00 | 30.00 | -20.00 | 30.00 | -20.00 | 35.00 | -20.00 | 45.00 | -20.00 | 50.00 | -20.00 | 60.00 | -30.00 | 70.00  |
| Coil 6 R | -2.89   |        | -1.72  |       | -1.33  |       | -1.11  |       | -0.89  |       | -0.89  |       | -0.90  |       | -0.89  |        |
|          | -4.80   | 1.00   | -5.70  | 3.80  | -6.50  | 4.90  | -6.90  | 5.40  | -7.30  | 5.80  | -7.50  | 6.00  | -7.70  | 6.10  | -7.90  | 6.30   |
| Coil 6 Q | 6.30    |        | 4.54   |       | 5.83   |       | 7.86   |       | 9.86   |       | 12.07  |       | 14.38  |       | 16.46  |        |
|          | -30.00  | 30.00  | -20.00 | 25.00 | -20.00 | 35.00 | -30.00 | 50.00 | -35.00 | 60.00 | -40.00 | 70.00 | -50.00 | 80.00 | -60.00 | 100.00 |

|           |        |        |        |        |        |         |         |         |
|-----------|--------|--------|--------|--------|--------|---------|---------|---------|
| MM Factor | 10 KHz | 30 KHz | 50 KHz | 70 KHz | 90 KHz | 110 KHz | 130 KHz | 150 KHz |
| Coil 0 M  | 0.993  | 0.991  | 0.987  | 0.987  | 0.985  | 0.984   | 0.984   | 0.985   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 0 P  | 0.109  | 0.227  | 0.315  | 0.274  | 0.245  | 0.178   | 0.141   | 0.073   |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 1 M  | 0.988  | 0.986  | 0.982  | 0.981  | 0.979  | 0.979   | 0.978   | 0.979   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 1 P  | 0.098  | 0.230  | 0.285  | 0.275  | 0.210  | 0.154   | 0.088   | -0.003  |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 2 M  | 0.992  | 0.989  | 0.988  | 0.987  | 0.986  | 0.985   | 0.984   | 0.983   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 2 P  | 0.028  | 0.074  | 0.115  | 0.152  | 0.178  | 0.181   | 0.136   | 0.073   |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 3 M  | 1.002  | 1.001  | 1.000  | 1.000  | 0.999  | 0.998   | 0.999   | 0.999   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 3 P  | -0.002 | 0.051  | 0.114  | 0.130  | 0.125  | 0.055   | 0.048   | 0.077   |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 4 M  | 1.010  | 1.009  | 1.008  | 1.008  | 1.007  | 1.006   | 1.005   | 1.005   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 4 P  | 0.026  | 0.079  | 0.119  | 0.160  | 0.165  | 0.164   | 0.151   | 0.066   |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 5 M  | 1.025  | 1.025  | 1.025  | 1.023  | 1.022  | 1.023   | 1.021   | 1.022   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 5 P  | 0.026  | 0.030  | 0.093  | 0.127  | 0.083  | 0.028   | 0.067   | -0.012  |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |
| Coil 6 M  | 1.015  | 1.018  | 1.016  | 1.015  | 1.014  | 1.021   | 1.022   | 1.021   |
|           | 0.900  | 1.100  | 0.900  | 1.100  | 0.900  | 1.100   | 0.900   | 1.100   |
| Coil 6 P  | -0.044 | 0.090  | 0.038  | 0.108  | 0.008  | -0.093  | -0.033  | -0.248  |
|           | -2.000 | 2.000  | -2.000 | 2.000  | -2.000 | 2.000   | -2.000  | 2.000   |

PARMS

TCID 0

TCID 1

Cal Temp  
(degF)

T Factor

IDs

1.143

0.877

99.5

1.04

## HDIL BEFORE LOG VERIFICATION SUMMARY

TOOL # 1515MA 10326319 DATE/TIME PERFORMED: Wed Oct 14 14:52:00 2015 DAYS SINCE CAL 11

|  | ZERO DATA(mv) | 10 KHz | 30 KHz | 50 KHz | 70 KHz | 90 KHz | 110 KHz | 130 KHz | 150 KHz |
|--|---------------|--------|--------|--------|--------|--------|---------|---------|---------|
|--|---------------|--------|--------|--------|--------|--------|---------|---------|---------|

|          |              |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Coil 0 R | -0.012       | -0.007       | -0.007       | -0.008       | -0.009       | -0.008       | -0.008       | -0.009       |
|          | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 0 Q | 0.007        | 0.008        | 0.002        | 0.001        | 0.003        | 0.000        | -0.001       | -0.001       |
|          | -1.000 1.000 | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 1 R | -0.010       | -0.003       | -0.001       | 0.001        | 0.001        | -0.002       | -0.003       | -0.006       |
|          | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 1 Q | -0.001       | 0.001        | -0.003       | -0.002       | 0.003        | 0.003        | 0.002        | 0.004        |
|          | -1.000 1.000 | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 2 R | -0.002       | -0.003       | -0.004       | -0.003       | -0.004       | -0.005       | -0.005       | -0.004       |
|          | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 2 Q | -0.005       | -0.005       | -0.002       | -0.002       | -0.002       | -0.000       | -0.003       | -0.002       |
|          | -1.000 1.000 | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 3 R | -0.012       | -0.006       | -0.007       | -0.004       | -0.002       | -0.003       | -0.005       | -0.007       |
|          | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 3 Q | -0.013       | -0.014       | -0.008       | -0.004       | -0.005       | -0.000       | 0.003        | 0.001        |
|          | -0.500 0.500 | -0.200 0.200 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 | -0.100 0.100 |
| Coil 4 R | -0.024       | -0.012       | -0.010       | -0.010       | -0.010       | -0.010       | -0.004       | -0.006       |
|          | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 |
| Coil 4 Q | -0.011       | 0.001        | -0.008       | -0.008       | -0.003       | -0.000       | -0.001       | 0.000        |
|          | -1.000 1.000 | -0.400 0.400 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 | -0.200 0.200 |
| Coil 5 R | -0.011       | -0.007       | 0.010        | 0.019        | 0.003        | 0.012        | -0.003       | -0.006       |
|          | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 |
| Coil 5 Q | -0.010       | -0.011       | -0.014       | -0.001       | -0.003       | 0.006        | 0.009        | 0.003        |
|          | -2.000 2.000 | -0.800 0.800 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 | -0.400 0.400 |
| Coil 6 R | -0.002       | -0.007       | -0.024       | -0.014       | -0.022       | -0.019       | 0.006        | 0.007        |
|          | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 |
| Coil 6 Q | -0.018       | 0.010        | -0.007       | 0.014        | -0.031       | -0.044       | -0.031       | -0.012       |
|          | -5.000 5.000 | -2.000 2.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 | -1.000 1.000 |


|  | ELEC. GAINS | 10 KHz | 30 KHz | 50 KHz | 70 KHz | 90 KHz | 110 KHz | 130 KHz | 150 KHz |
|--|-------------|--------|--------|--------|--------|--------|---------|---------|---------|
|--|-------------|--------|--------|--------|--------|--------|---------|---------|---------|

|          |               |               |               |               |               |                |                |                |
|----------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|
| Coil 0 M | 124.93        | 123.39        | 120.26        | 115.81        | 110.09        | 103.44         | 95.87          | 87.79          |
|          | 100.00 150.00 | 100.00 150.00 | 98.00 150.00  | 96.00 140.00  | 92.00 140.00  | 87.00 130.00   | 82.00 120.00   | 76.00 110.00   |
| Coil 0 P | 8.016         | 25.150        | 41.980        | 58.617        | 75.118        | 91.292         | 107.327        | 122.889        |
|          | 6.000 9.000   | 19.000 28.000 | 32.000 47.000 | 44.000 66.000 | 57.000 85.000 | 70.000 100.000 | 82.000 120.000 | 95.000 140.000 |
| Coil 1 M | 220.06        | 217.74        | 213.07        | 206.38        | 197.68        | 187.47         | 175.71         | 162.97         |
|          | 180.00 270.00 | 180.00 270.00 | 170.00 260.00 | 170.00 250.00 | 160.00 250.00 | 160.00 230.00  | 150.00 220.00  | 140.00 200.00  |
| Coil 1 P | 7.718         | 24.218        | 40.442        | 56.528        | 72.501        | 88.230         | 103.889        | 119.184        |
|          | 6.000 9.000   | 19.000 28.000 | 32.000 48.000 | 45.000 67.000 | 57.000 86.000 | 70.000 110.000 | 83.000 120.000 | 96.000 140.000 |
| Coil 2 M | 438.82        | 433.66        | 423.22        | 408.37        | 388.88        | 366.34         | 340.22         | 311.99         |
|          | 360.00 540.00 | 360.00 540.00 | 350.00 530.00 | 340.00 510.00 | 330.00 500.00 | 310.00 470.00  | 300.00 440.00  | 270.00 410.00  |
| Coil 2 P | 8.146         | 25.523        | 42.622        | 59.552        | 76.385        | 92.956         | 109.399        | 125.462        |
|          | 6.000 9.000   | 19.000 29.000 | 32.000 48.000 | 45.000 67.000 | 58.000 87.000 | 71.000 110.000 | 84.000 130.000 | 96.000 140.000 |
| Coil 3 M | 715.88        | 709.14        | 695.39        | 675.24        | 648.02        | 615.46         | 576.65         | 533.23         |
|          | 590.00 880.00 | 580.00 870.00 | 570.00 850.00 | 550.00 830.00 | 530.00 800.00 | 500.00 760.00  | 470.00 710.00  | 440.00 650.00  |
| Coil 3 P | 7.819         | 24.582        | 41.128        | 57.586        | 74.033        | 90.328         | 106.596        | 122.529        |
|          | 6.000 10.000  | 20.000 29.000 | 33.000 49.000 | 46.000 69.000 | 59.000 89.000 | 72.000 110.000 | 85.000 130.000 | 98.000 150.000 |
| Coil 4 M | 1150.6        | 1139.3        | 1116.4        | 1082.6        | 1037.5        | 983.2          | 918.7          | 847.3          |
|          | 900.0 1400.0  | 900.0 1300.0  | 900.0 1300.0  | 850.0 1300.0  | 800.0 1200.0  | 800.0 1200.0   | 750.0 1100.0   | 700.0 1000.0   |
| Coil 4 P | 7.985         | 25.145        | 42.066        | 58.890        | 75.711        | 92.352         | 108.953        | 125.199        |
|          | 6.000 10.000  | 20.000 30.000 | 33.000 50.000 | 46.000 70.000 | 60.000 90.000 | 73.000 110.000 | 86.000 130.000 | 99.000 150.000 |





|          |        |        |        |        |        |        |         |         |        |        |        |        |         |         |         |         |
|----------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|---------|---------|---------|---------|
| Coil 1 P | 4.718  | 10.718 | 21.218 | 27.218 | 37.442 | 43.442 | 53.528  | 59.528  | 69.501 | 75.501 | 85.230 | 91.230 | 100.889 | 106.889 | 116.184 | 122.184 |
| Coil 2 M | 438.58 | 432.93 | 421.70 | 406.71 | 386.67 | 364.22 | 337.86  | 309.91  |        |        |        |        |         |         |         |         |
|          | 430.04 | 447.59 | 424.99 | 442.33 | 414.75 | 431.68 | 400.20  | 416.53  | 381.11 | 398.66 | 359.01 | 373.67 | 333.42  | 347.03  | 305.75  | 318.23  |
| Coil 2 P | 8.187  | 25.596 | 42.669 | 59.537 | 76.278 | 92.806 | 109.165 | 125.089 |        |        |        |        |         |         |         |         |
|          | 5.146  | 11.146 | 22.523 | 28.523 | 39.622 | 45.622 | 56.552  | 62.552  | 73.385 | 79.385 | 89.956 | 95.956 | 106.399 | 112.399 | 122.462 | 128.462 |
| Coil 3 M | 715.66 | 708.16 | 693.02 | 672.60 | 644.66 | 612.07 | 572.76  | 529.40  |        |        |        |        |         |         |         |         |
|          | 701.56 | 730.20 | 694.96 | 723.32 | 681.48 | 709.30 | 661.74  | 688.75  | 635.06 | 660.98 | 603.15 | 627.77 | 565.11  | 588.18  | 522.56  | 543.89  |
| Coil 3 P | 7.862  | 24.656 | 41.172 | 57.561 | 73.939 | 90.159 | 106.351 | 122.142 |        |        |        |        |         |         |         |         |
|          | 4.819  | 10.819 | 21.582 | 27.582 | 38.128 | 44.128 | 54.586  | 60.586  | 71.033 | 77.033 | 87.328 | 93.328 | 103.596 | 109.596 | 119.529 | 125.529 |
| Coil 4 M | 1151.3 | 1138.7 | 1113.7 | 1079.2 | 1032.4 | 978.7  | 913.4   | 842.2   |        |        |        |        |         |         |         |         |
|          | 1127.6 | 1173.6 | 1116.5 | 1162.1 | 1094.1 | 1138.8 | 1061.0  | 1104.3  | 1016.8 | 1058.3 | 963.5  | 1002.8 | 900.4   | 937.1   | 830.4   | 864.3   |
| Coil 4 P | 8.029  | 25.215 | 42.118 | 58.872 | 75.616 | 92.190 | 108.701 | 124.838 |        |        |        |        |         |         |         |         |
|          | 4.985  | 10.985 | 22.145 | 28.145 | 39.066 | 45.066 | 55.890  | 61.890  | 72.711 | 78.711 | 89.352 | 95.352 | 105.953 | 111.953 | 122.199 | 128.199 |
| Coil 5 M | 2321.4 | 2261.3 | 2153.5 | 2021.0 | 1871.8 | 1725.1 | 1575.4  | 1431.9  |        |        |        |        |         |         |         |         |
|          | 2273.5 | 2366.3 | 2217.1 | 2307.6 | 2115.7 | 2202.1 | 1986.8  | 2067.9  | 1843.1 | 1918.3 | 1698.2 | 1767.5 | 1552.7  | 1616.1  | 1410.8  | 1468.3  |
| Coil 5 P | 8.508  | 26.456 | 43.527 | 59.762 | 75.266 | 90.006 | 104.285 | 117.931 |        |        |        |        |         |         |         |         |
|          | 5.466  | 11.466 | 23.382 | 29.382 | 40.482 | 46.482 | 56.792  | 62.792  | 72.352 | 78.352 | 87.167 | 93.167 | 101.540 | 107.540 | 115.323 | 121.323 |
| Coil 6 M | 6012.9 | 5955.3 | 5836.9 | 5675.4 | 5449.1 | 5187.8 | 4862.0  | 4499.4  |        |        |        |        |         |         |         |         |
|          | 5890.1 | 6130.5 | 5839.5 | 6077.9 | 5735.1 | 5969.2 | 5579.2  | 5806.9  | 5365.4 | 5584.4 | 5103.7 | 5312.1 | 4788.9  | 4984.3  | 4432.7  | 4613.6  |
| Coil 6 P | 8.013  | 25.426 | 42.541 | 59.556 | 76.620 | 93.567 | 110.545 | 127.211 |        |        |        |        |         |         |         |         |
|          | 4.972  | 10.972 | 22.366 | 28.366 | 39.508 | 45.508 | 56.610  | 62.610  | 73.751 | 79.751 | 90.773 | 96.773 | 107.843 | 113.843 | 124.627 | 130.627 |

|   |   |  |                                       |                                   |
|---|---|--|---------------------------------------|-----------------------------------|
|  | <b>COMPANY</b><br><b>WELL</b><br><b>FIELD</b><br><b>COUNTY</b>                                | <b>PICEANCE ENERGY LLC</b><br><b>PICEANCE FEDERAL 28-21E</b><br><b>VEGA</b><br><b>MESA</b> | <b>STATE</b> <b>COLORADO</b>          | <b>FILE NO:</b><br><b>MD11447</b> |
|   | <b>LOCATION:</b><br>SHL: 1981' FSL & 2484' FWL<br>BHL: 113' FSL & 881' FEL<br>SEC 28 T9S R93W | <b>ELEVATIONS:</b><br>KB 7701 FT<br>DF 7700 FT<br>GL 7679 FT                               | <b>API NO:</b><br><b>05-077-10250</b> |                                   |
|   | <b>DATE</b> <b>14-OCT-2015</b>  |  | <b>FINAL PRINT</b>                    |                                   |