

SlimPulse - Gamma Ray

1 in / 100 ft & 5 in / 100 ft True Vertical Depth

Recorded Mode, Composite Log



Company:

Noble Energy

Well:

Rohn State LD03-64-1HN

Field:

Wattenberg

County:

Weld

State:

Colorado

Country:

USA

| | | | |
|-----------|-----|-----------|--------------|
| Section: | 04 | APIN: | 05-123-37462 |
| Township: | 09N | Rig Name: | H&P 277 |
| Range: | 58W | Rig Type: | Top Drive |

FL:

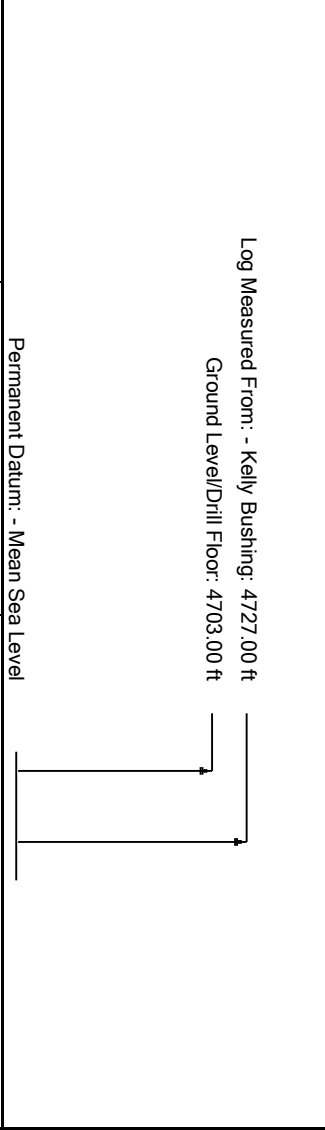
NAD 83 Colorado State Plane, Northern Zone, US Feet

FL1:

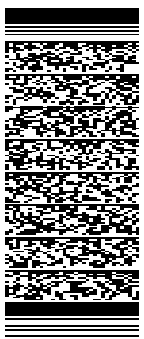
Latitude: N 40° 46' 43.00" Northing: 1530686.69 ft US

FL2:

Longitude: W 103° 51' 40.86" Easting: 3453806.26 ft US



| | | | |
|--------------------|-----------------------------------|--------------------------|-----------------------------------|
| Acquisition Dates: | 12-Sep-2014 – 18-Sep-2014 | Other Services: | Permanent Datum: - Mean Sea Level |
| Log Interval: | 1226.00(ft)TVD to 5742.00(ft)TVD | Directional Drilling | |
| Index Types: | True Vertical Depth | Surveys / Continuous D&I | |
| Index Scales: | 1:1200 1" / 100', 1:240 5" / 100' | Downhole Temperature | |
| Depth Source: | Driller's Depth | Downhole Shocks | |
| Depth Sensor: | PASON | | |
| Print Type: | Final | | |
| Spud Date: | 11-Sep-2014 | | |



Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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Borehole Size/Casing Record

| | | | | | | |
|-----------------------|-------|-------|-------|--|--|--|
| Bit | | | | | | |
| Bit Size (in) | 13.5 | 8.75 | 6.125 | | | |
| Top Driller (ft) | 0 | 1226 | 6067 | | | |
| Bottom Driller (ft) | 1226 | 6067 | 10142 | | | |
| Casing | | | | | | |
| Size (in) | 9.625 | 7 | | | | |
| Weight (lbm/ft) | 35 | 32 | | | | |
| Inner Diameter (in) | 8.934 | 6.094 | | | | |
| Grade | J55 | P110 | | | | |
| Top Driller (ft) | 0 | 0 | | | | |
| Bottom Driller (ft) | 1216 | 6057 | | | | |

Operational Run Summary

| | | | | | | |
|----------------------------------|----------------|----------------|--|--|--|--|
| Parameter (unit) | Run001 | Run003 | | | | |
| Date Log Started | 12-Sep-2014 | 16-Sep-2014 | | | | |
| Time Log Started | 20:10:13 | 12:14:36 | | | | |
| Date Log Finished | 14-Sep-2014 | 18-Sep-2014 | | | | |
| Time Log Finished | 03:12:21 | 20:46:55 | | | | |
| | | | | | | |
| Bit Size (in) | 8.750 | 6.125 | | | | |
| Bit Start Depth (ft) | 1226.00 | 6067.00 | | | | |
| Bit Stop Depth (ft) | 6067.00 | 10142.00 | | | | |
| Top Log Interval (ft) | 1166.00 | 6006.00 | | | | |
| Bottom Log Interval (ft) | 6006.00 | 10075.00 | | | | |
| | | | | | | |
| Max Hole Deviation (deg) | 81.38 | 92.92 | | | | |
| Azimuth of Max Deviation (deg) | 86.61 | 89.92 | | | | |
| | | | | | | |
| Logging Unit Number | Command Center | Command Center | | | | |
| Logging Unit Location | Zone 2 | Zone 2 | | | | |
| Recorded By | Chad Welty | Chad Welty | | | | |
| Witnessed By | Maria Valles | Maria Valles | | | | |
| Service Order Number | 14CCO0652 | 14CCO0652 | | | | |

Borehole Fluids

| | | | | | | |
|------------------------------------|-------------|-------------|--|--|--|--|
| Parameter(unit) | Run001 | Run003 | | | | |
| Fluid Type | Water | Water | | | | |
| Fluid Name | Fresh Water | Fresh Water | | | | |
| Max Recorded Temperatures (degF) | 82 | 118 | | | | |
| Source of Sample | Active Tank | Active Tank | | | | |

| | | | | | | |
|-----------------------------------|------------|------------|--|--|--|--|
| Salinity (ppm) | 1150 | 1400 | | | | |
| Density (lbm/gal) | Zoned | 10.85 | | | | |
| Funnel Viscosity (s) | 44 | 36 | | | | |
| Fluid Loss (cm3) | | | | | | |
| PH | 9.6 | 9.5 | | | | |
| Source RMF | Pressed | Pressed | | | | |
| RMC | Pressed | Pressed | | | | |
| RM @ Meas Temp (ohm.m@degF) | 0.2 @ 68 | 0.2 @ 68 | | | | |
| RMF @ Meas Temp (ohm.m@degF) | 0.15 @ 68 | 0.15 @ 68 | | | | |
| RMC @ Meas Temp (ohm.m@degF) | | | | | | |
| RM @ BHT (ohm.m@degF) | 0.07 @ 212 | 0.07 @ 212 | | | | |
| RMF @ BHT (ohm.m@degF) | 0.05 @ 212 | 0.05 @ 212 | | | | |
| RMC @ BHT (ohm.m@degF) | NaN @ 212 | NaN @ 212 | | | | |
| Total Solid (%) | 6.7 | 10.7 | | | | |
| High Gravity Solids (%) | 4 | 8.3 | | | | |

Zoned Borehole Fluids

Run001

| Parameter | Value | Start |
|-----------|-------|----------------------|
| Density | 8.75 | 9/12/2014 8:10:13 PM |
| Density | 8.7 | 9/13/2014 2:30:00 AM |
| Density | 9.75 | 9/13/2014 2:30:00 PM |

Remarks and Equipment Summary

Data presented is from tool memory and acquired while drilling from 1226 ft MD to 10142 ft MD

Depth Reference: Driller's Depth.

Environmental Corrections: Gamma Ray is corrected for bit size, mud weight, and tool collar thickness. Barite and Potassium in the mud affect Gamma Ray readings.

Run002 has a casing failure with no new footage drilled.

| Run001: Remarks | Run003: Remarks |
|---|--|
| Run Objective: Drill Vertical and Curve Section | Run Objective: Drill Lateral Section. |
| Bit to GR: 60.69 ft. Bit to D&I: 57.66 ft. | Bit to GR: 66.08 ft. Bit to D&I: 63.05 ft. |
| Drilled from: 1226 ft MD to 6067 ft MD. Logged from: 1166 ft MD to 6006 ft MD. | Drilled from: 6067 ft MD to 10142 ft MD. Logged from: 6006 ft MD to 10075 ft MD. |
| SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 16-Aug-2013 SlimPulse GR calibrated on: 24-May-2014 | SlimPulse Software: v11.0C00 SlimPulse D&I calibrated on: 16-Aug-2013 SlimPulse GR calibrated on: 24-May-2014 |
| PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs & Mike Hicks MWD: Chad Welty & Maria Valles | PathFinder a Schlumberger Co. Personnel: DD: Jordan Timbs & Mike Hicks MWD: Chad Welty, Maria Valles, Dennis Lipcovski |
| Reason for POOH: Curve Section TD. | Reason for POOH: Well TD. |

| Run001: Toolstring | | | |
|--------------------|--------|------------|--------|
| Equip name | Length | MP name | Offset |
| Fltr Sub: 6 3/4" | 140.33 | Filter sub | |
| :DR19520 | | | |
| Flex DC: 6 3/4"[| 137.13 | NMFC | |
| 2]:DR18673 | | | |

| Run003: Toolstring | | | |
|--------------------|--|--|--|
| | | | |

Flex DC: 6 3/4"[106.05
1]:DR18671

NFC

| Equip name | Length | MP name | Offset |
|-------------------------------|--------|------------|--------|
| Filtr Sub: 4 3/4": DR20585 | 143.8 | Filter Sub | |
| NMDC: 4 3/4"[3]:DR10032 | 140.69 | NMDC | |

| | | | |
|-----------------------------|--------|------|--|
| NMDC: 4 3/4"[2]:DR24730 | 110.63 | NMDC | |
|-----------------------------|--------|------|--|

SPULSE-GEN:DR 75.00
8627
FLOWSUB:DR2248
9
SPCOLLAR:DR862
7
SPMA:359
SPEC:893
SPBA
UBHO:675U175

MWD

SPULSE-GEN:DR 80.41
10660
FLOWSUB:DR2209
7
SPCOLLAR:DR1066
0
SPMA:2084
SPEC:939
SPBA:Q01347
UBHO:475U187

— GR 60.77

— D&I 57.74

— GR 66.08

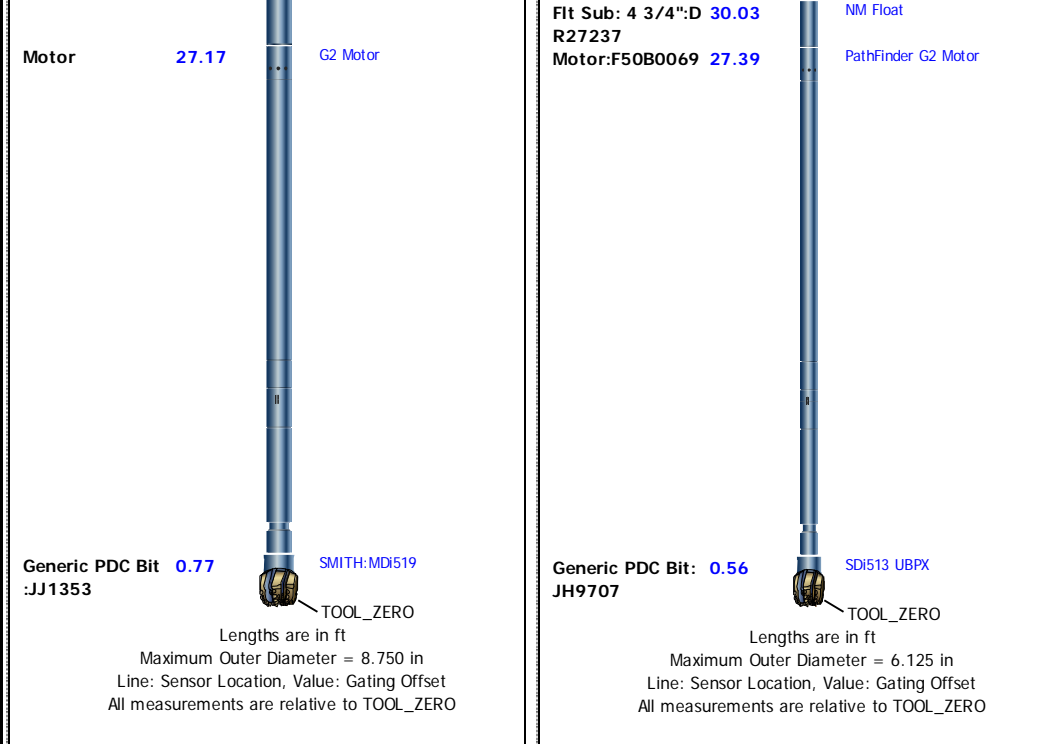
— D&I 63.05

Flt Sub: 6 3/4": 40.1
DR15145
NMDC: 6 3/4":D 37.27
R18313

Float Sub

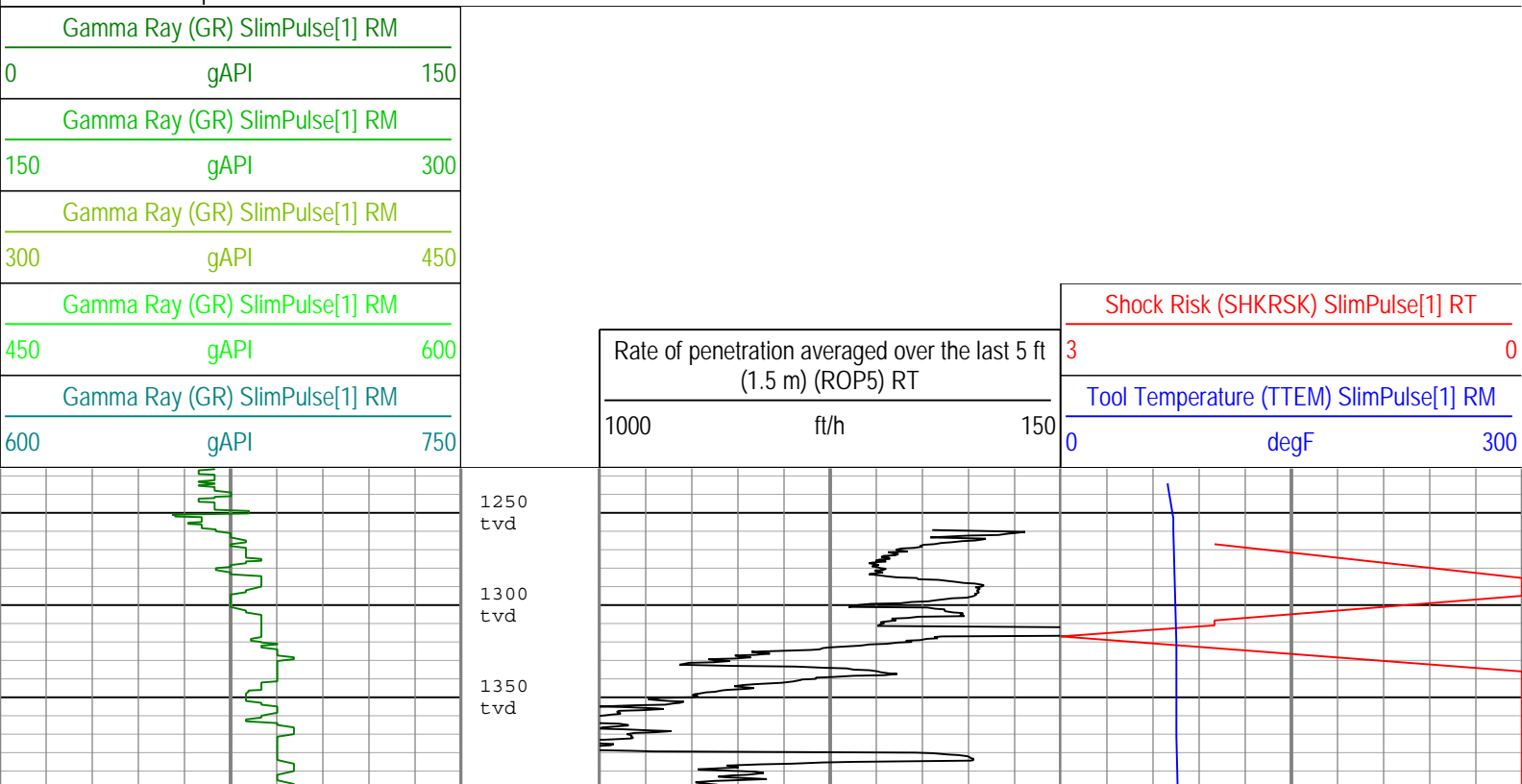
Pony

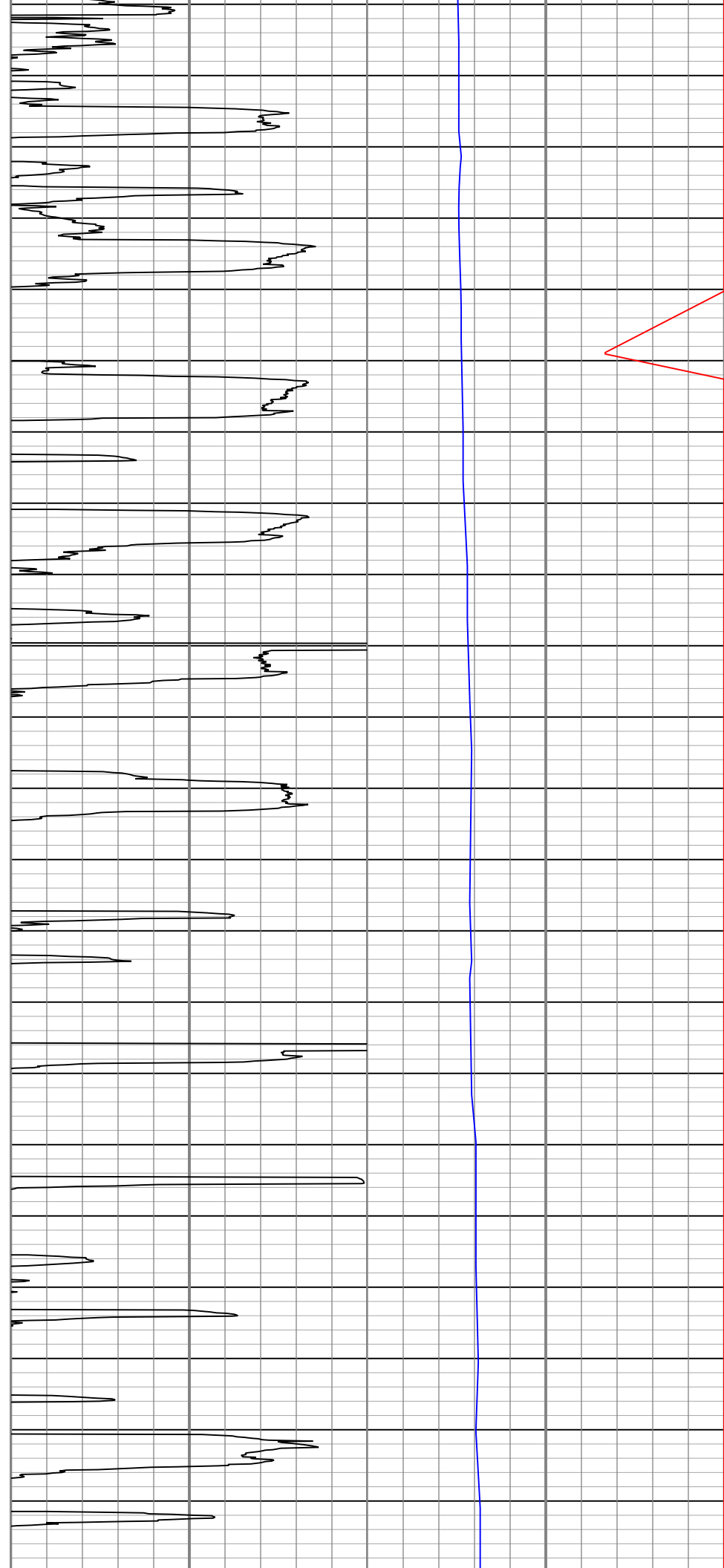
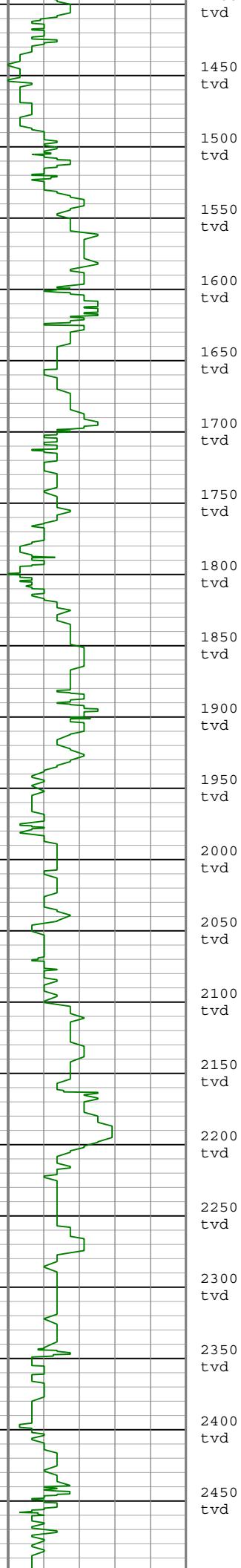
| | | | |
|-----------------------------|-------|------|--|
| NMDC: 4 3/4"[1]:DR14410 | 44.47 | NMPC | |
|-----------------------------|-------|------|--|

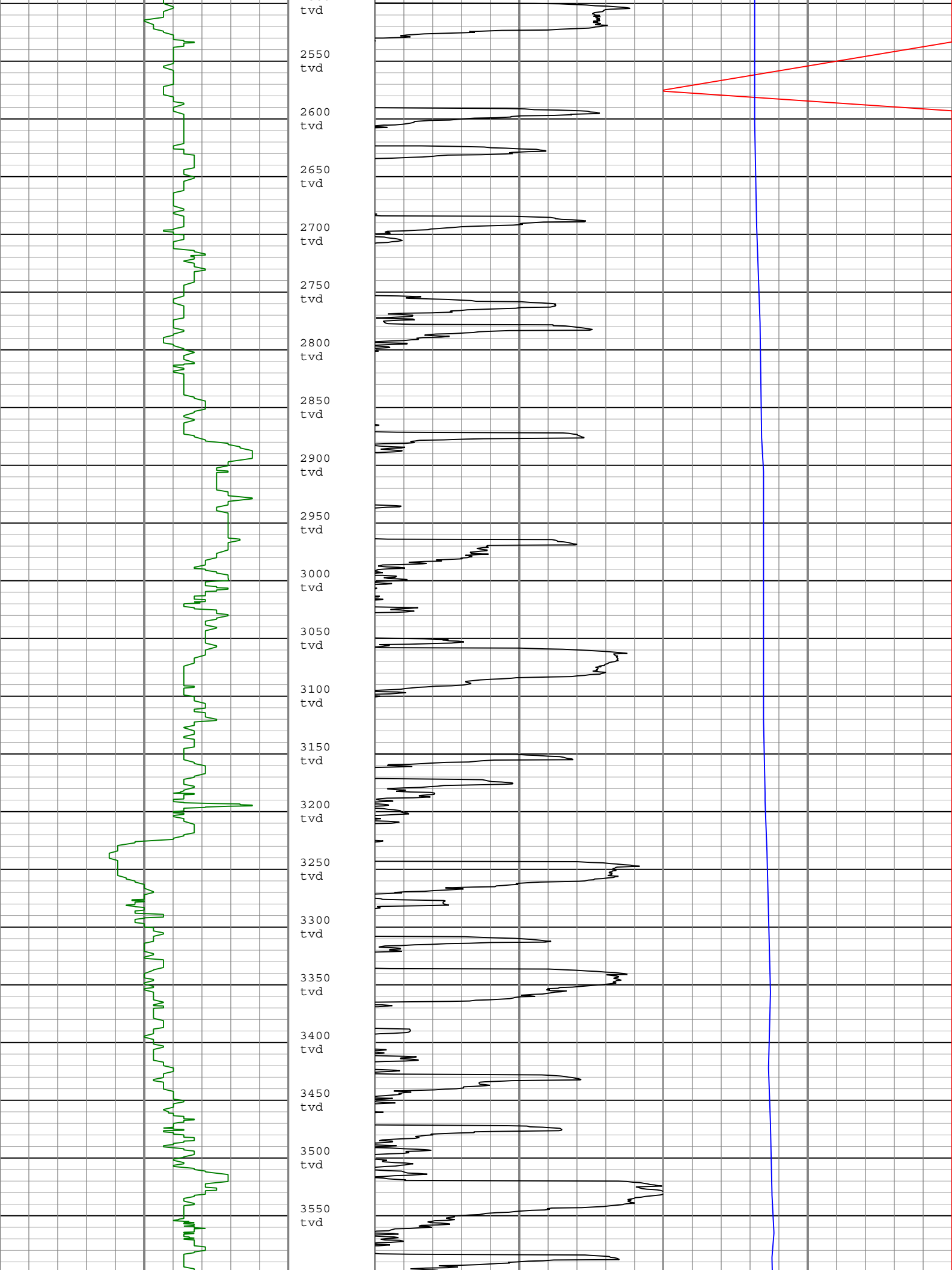


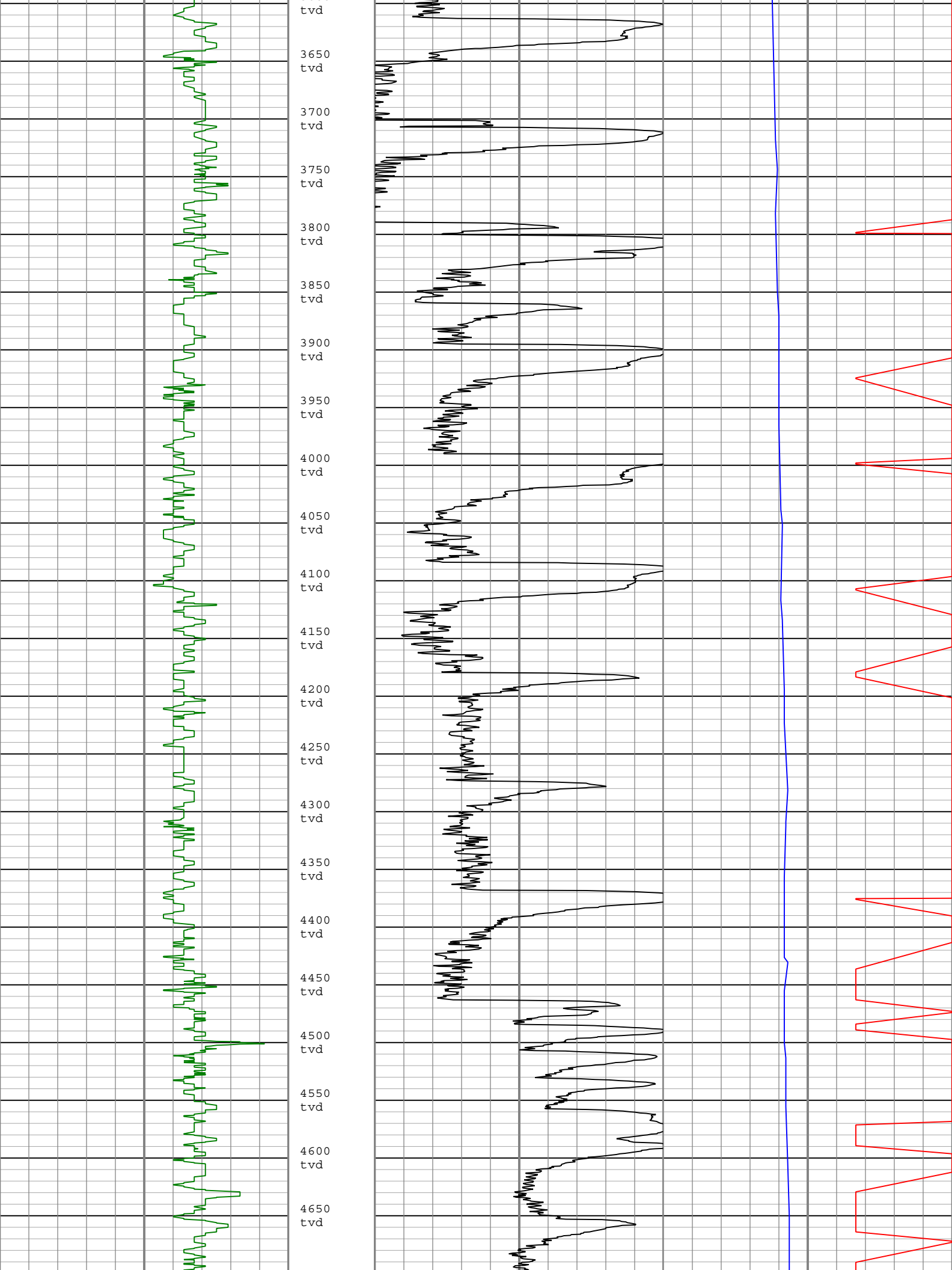
| Composite 1 | | | | | | | |
|--|----------------|-----------|------------|-------------|-------------------------|-----------------------------|-----------------------|
| 1 in / 100 ft True Vertical Depth | | | | | | | |
| Composite Summary | | | | | | | |
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | Include Parallel Data |
| Run001 | Drilling | Down | 1258.75 ft | 6069.42 ft | 12-Sep-2014 9:53:45 PM | 14-Sep-2014 3:12:21 AM | No |
| Run003 | Drilling | Down | 6017.50 ft | 10144.25 ft | 16-Sep-2014 12:14:36 PM | 18-Sep-2014 8:46:55 PM | No |
| All depths are referenced to toolstring zero | | | | | | | |
| Log | | | | | Company:Noble Energy | Well:Rohn State LD03-64-1HN | |
| Composite 1:S116 | | | | | | | |

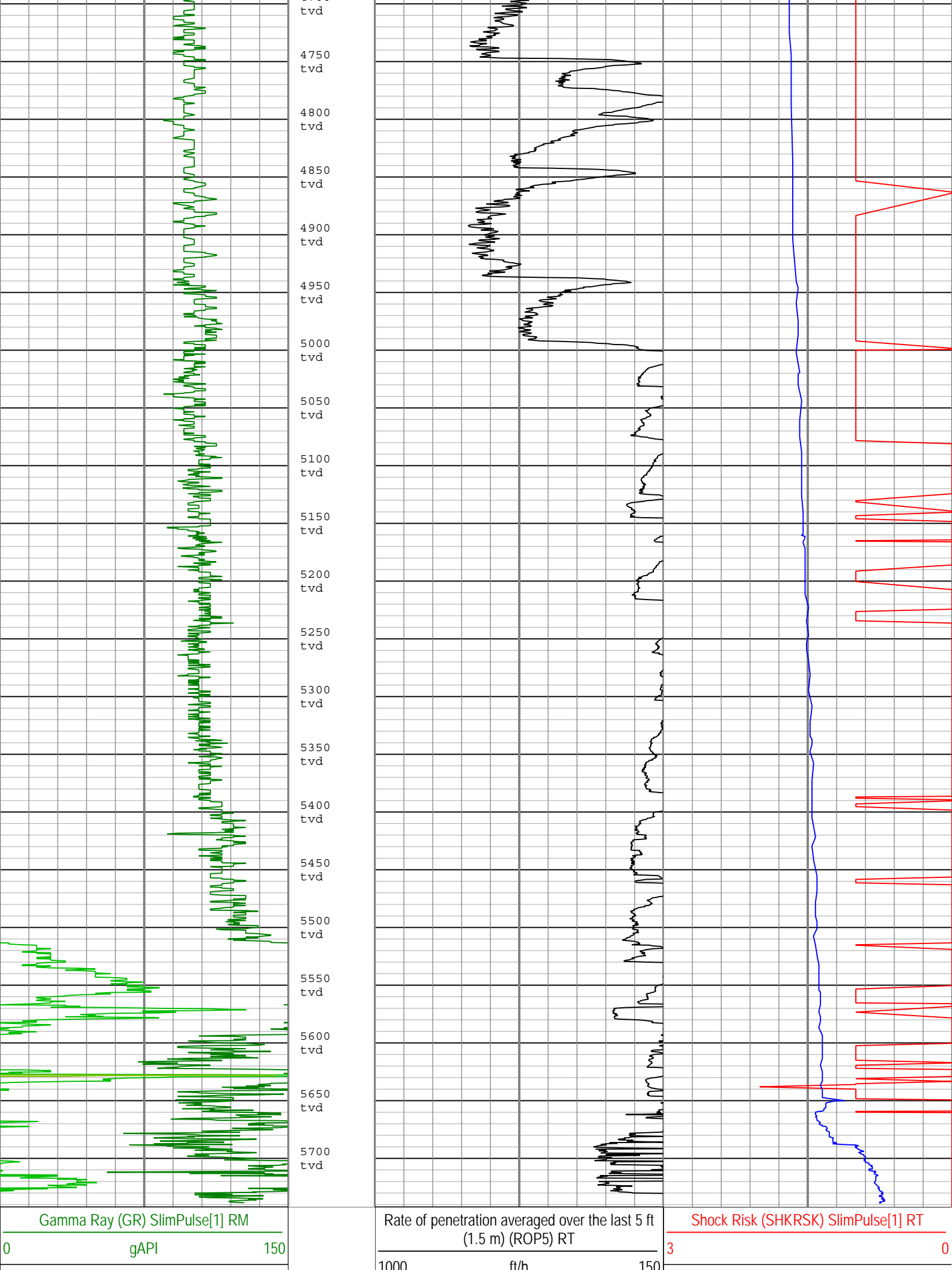
Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final TVD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: TVD
Creation Date: 22-Sep-2014 15:01:04











| | | | | | | | | |
|--|------|-----|---|------|-----|--|--|--|
| Gamma Ray (GR) SlimPulse[1] RM | | | Tool Temperature (TTEM) SlimPulse[1] RM | | | | | |
| 150 | gAPI | 300 | 0 | degF | 300 | | | |
| Gamma Ray (GR) SlimPulse[1] RM | | | | | | | | |
| 300 | gAPI | 450 | | | | | | |
| Gamma Ray (GR) SlimPulse[1] RM | | | | | | | | |
| 450 | gAPI | 600 | | | | | | |
| Gamma Ray (GR) SlimPulse[1] RM | | | | | | | | |
| 600 | gAPI | 750 | | | | | | |
| Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final TVD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: TVD | | | | | | | | |
| Creation Date: 22-Sep-2014 15:01:04 | | | | | | | | |

Channel Processing Parameters

Run001: Parameters

| Parameter | Description | Tool | Value | Unit |
|-----------|------------------------|------------|-------------|---------|
| BS | Bit Size | DNMSESSION | Depth Zoned | in |
| DFD | Drilling Fluid Density | Borehole | Time Zoned | lbm/gal |
| GR_SRC | GR Source Selection | SPULSE-GEN | GAMMA_EXT | |

Run001Depth Zoned Parameters

| Parameter | Value | Start (ft) | Stop (ft) |
|-----------|-------|--------------|-------------|
| BS | 8.75 | 1226.04 | 5667.48 |
| BS | 6.125 | 5667.48 | 5667.6 |

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

| Parameter | Value | Start Time | Stop Time | Start Depth (ft) | Stop Depth (ft) |
|-----------|-------|----------------------|----------------------|--------------------|-------------------|
| DFD | 8.75 | 12-Sep-2014 21:53:45 | 13-Sep-2014 02:30:00 | 1258.75 | 2417.83 |
| DFD | 8.7 | 13-Sep-2014 02:30:00 | 13-Sep-2014 14:30:00 | 2417.83 | 5182.33 |
| DFD | 9.75 | 13-Sep-2014 14:30:00 | 14-Sep-2014 03:12:21 | 5182.33 | 6069.42 |

All depth are at tool zero.

Run003: Parameters

| Parameter | Description | Tool | Value | Unit |
|-----------|------------------------|------------|-------------|---------|
| BS | Bit Size | DNMSESSION | Depth Zoned | in |
| DFD | Drilling Fluid Density | Borehole | 10.85 | lbm/gal |
| GR_SRC | GR Source Selection | SPULSE-GEN | GAMMA_EXT | |

Run003Depth Zoned Parameters

| Parameter | Value | Start (ft) | Stop (ft) |
|-----------|-------|--------------|-------------|
| BS | 8.75 | 5625.89 | 5667.48 |
| BS | 6.125 | 5667.48 | 5742.44 |

All depth are actual.

Tool Control Parameters

Composite 1

5 in / 100 ft True Vertical Depth

Composite Summary

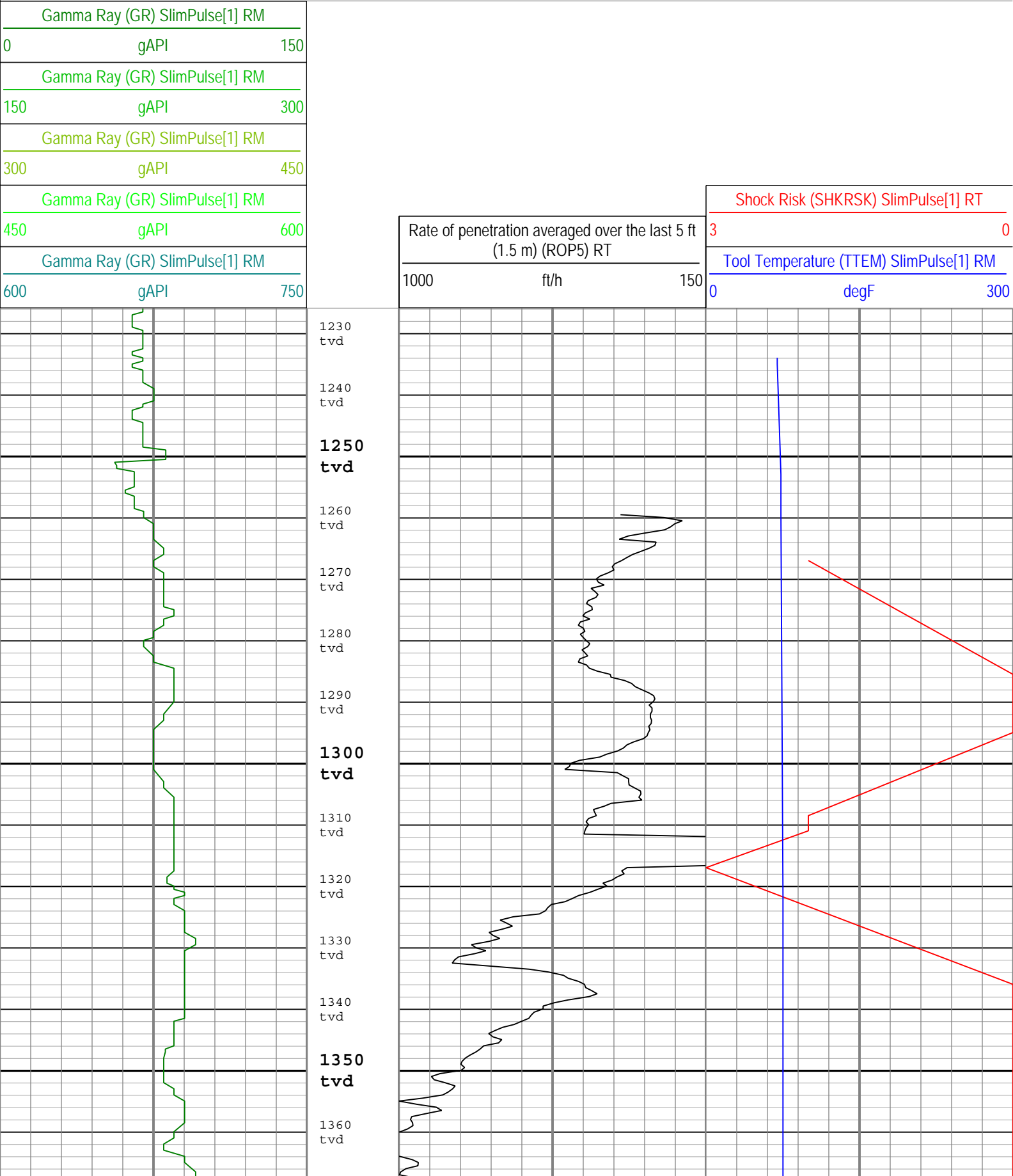
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | Include Parallel Data |
|----------|----------------|-----------|------------|------------|----------------------|----------------------|-----------------------|
| Run001 | Drilling | Down | 1258.75 ft | 6069.42 ft | 12-Sep-2014 21:53:45 | 14-Sep-2014 03:12:21 | No |

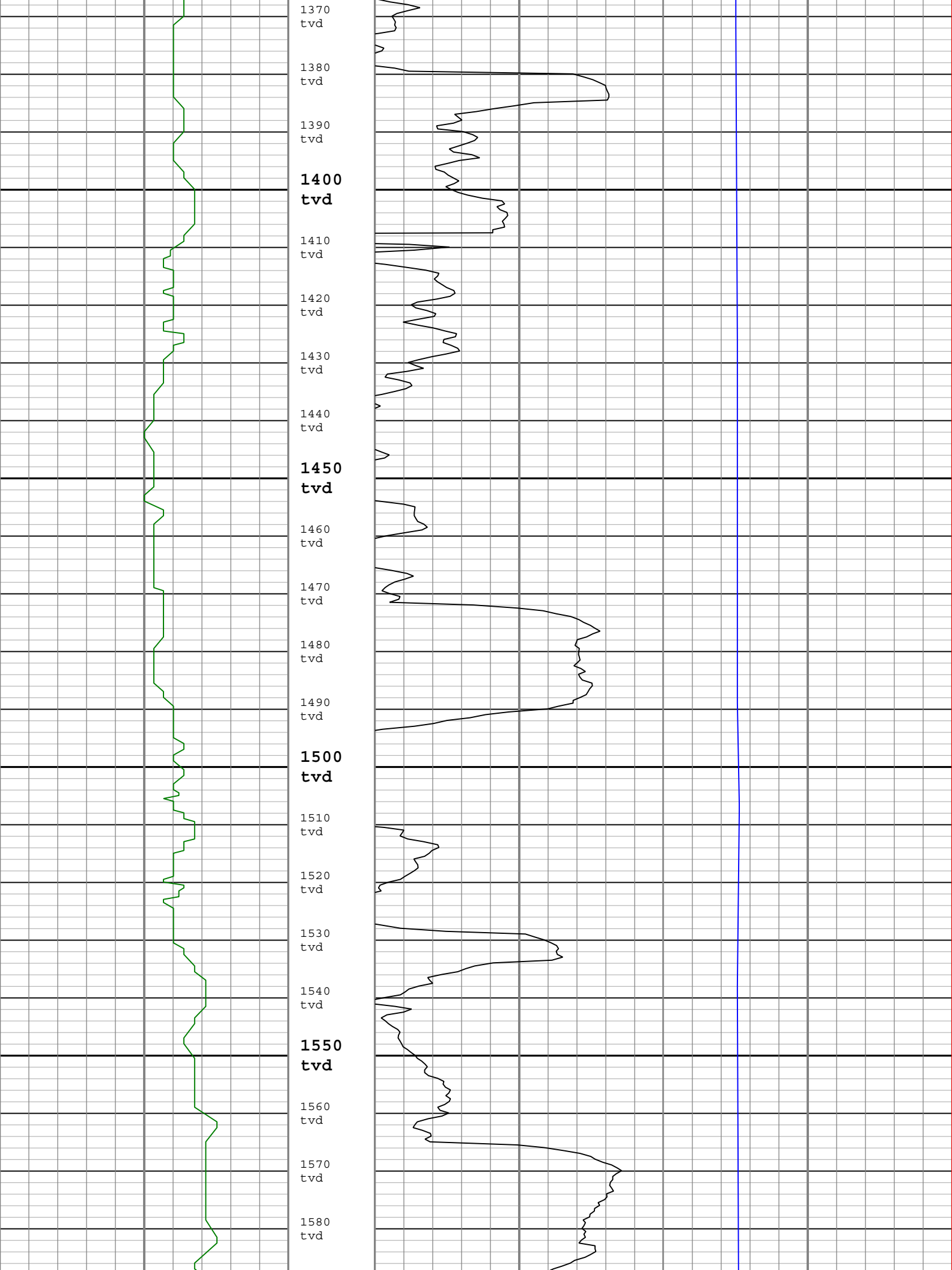
| | | | | | | | |
|--------|----------|------|------------|-------------|----------------------------|---------------------------|----|
| | | | | | 9:53:45 PM | 3:12:21 AM | |
| Run003 | Drilling | Down | 6017.50 ft | 10144.25 ft | 16-Sep-2014 12:14:36 PM | 18-Sep-2014 8:46:55 PM | No |

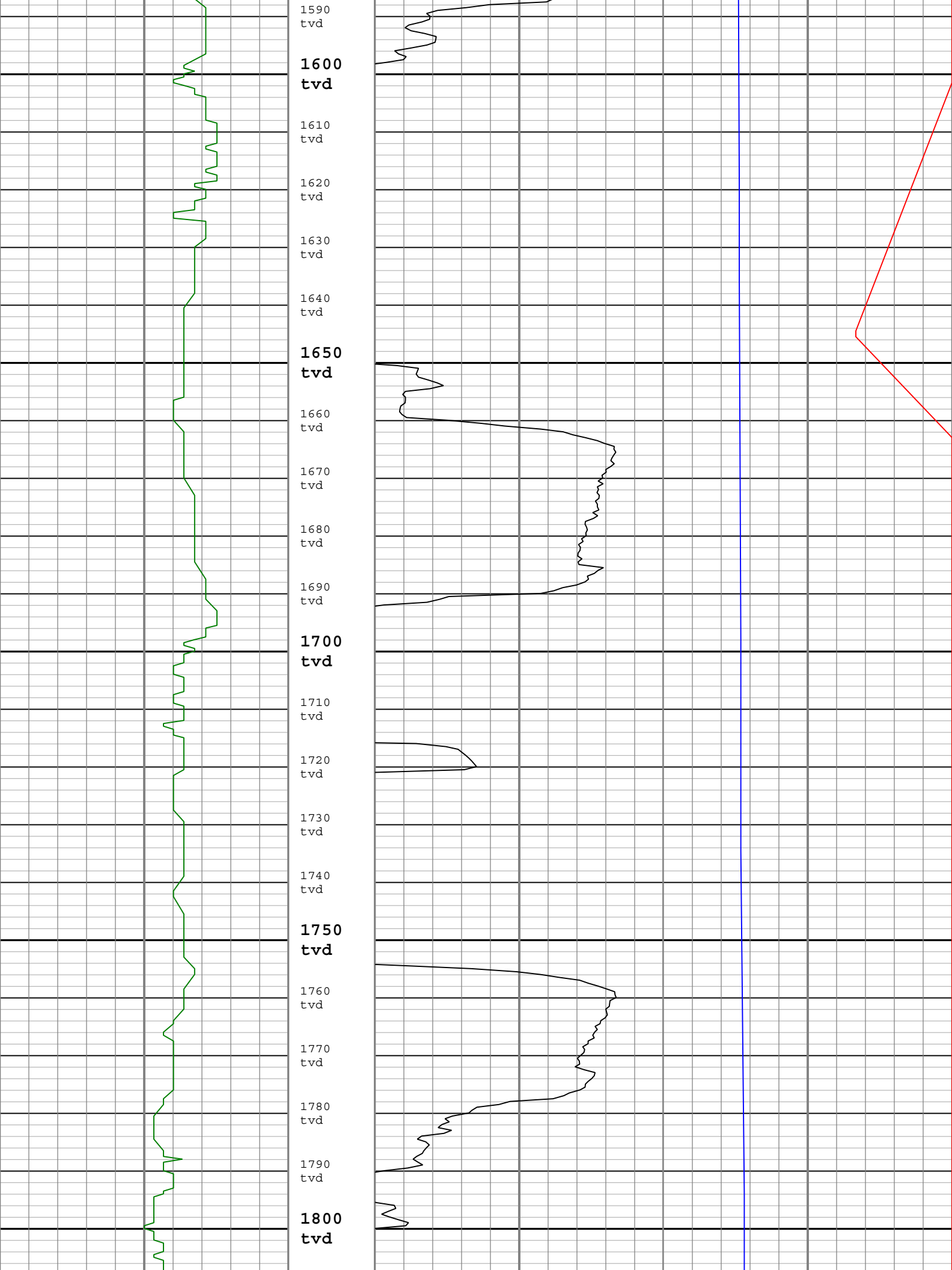
All depths are referenced to toolstring zero

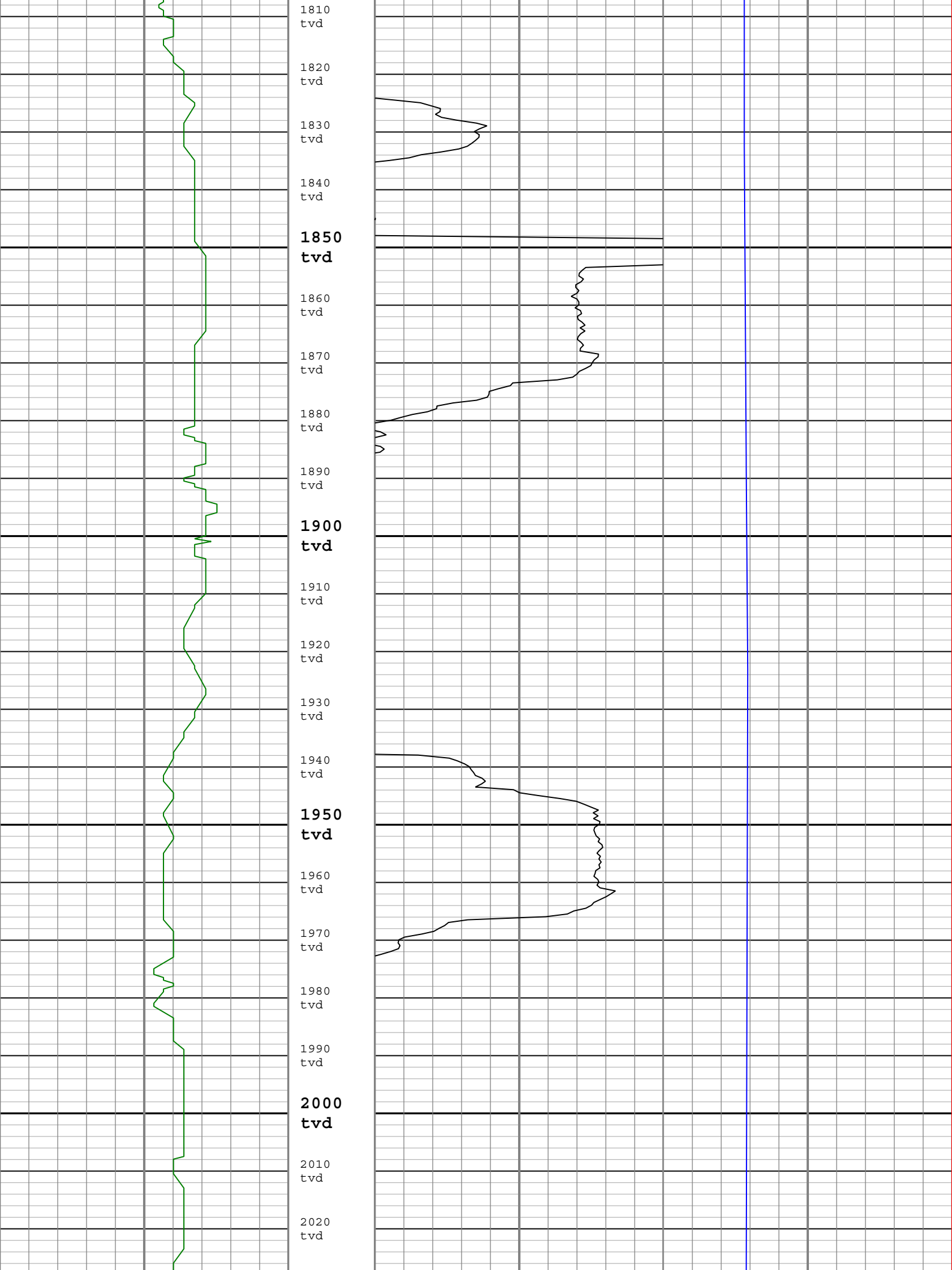
| | | |
|-----|----------------------|-----------------------------|
| Log | Company:Noble Energy | Well:Rohn State LD03-64-1HN |
| | | Composite 1:S116 |

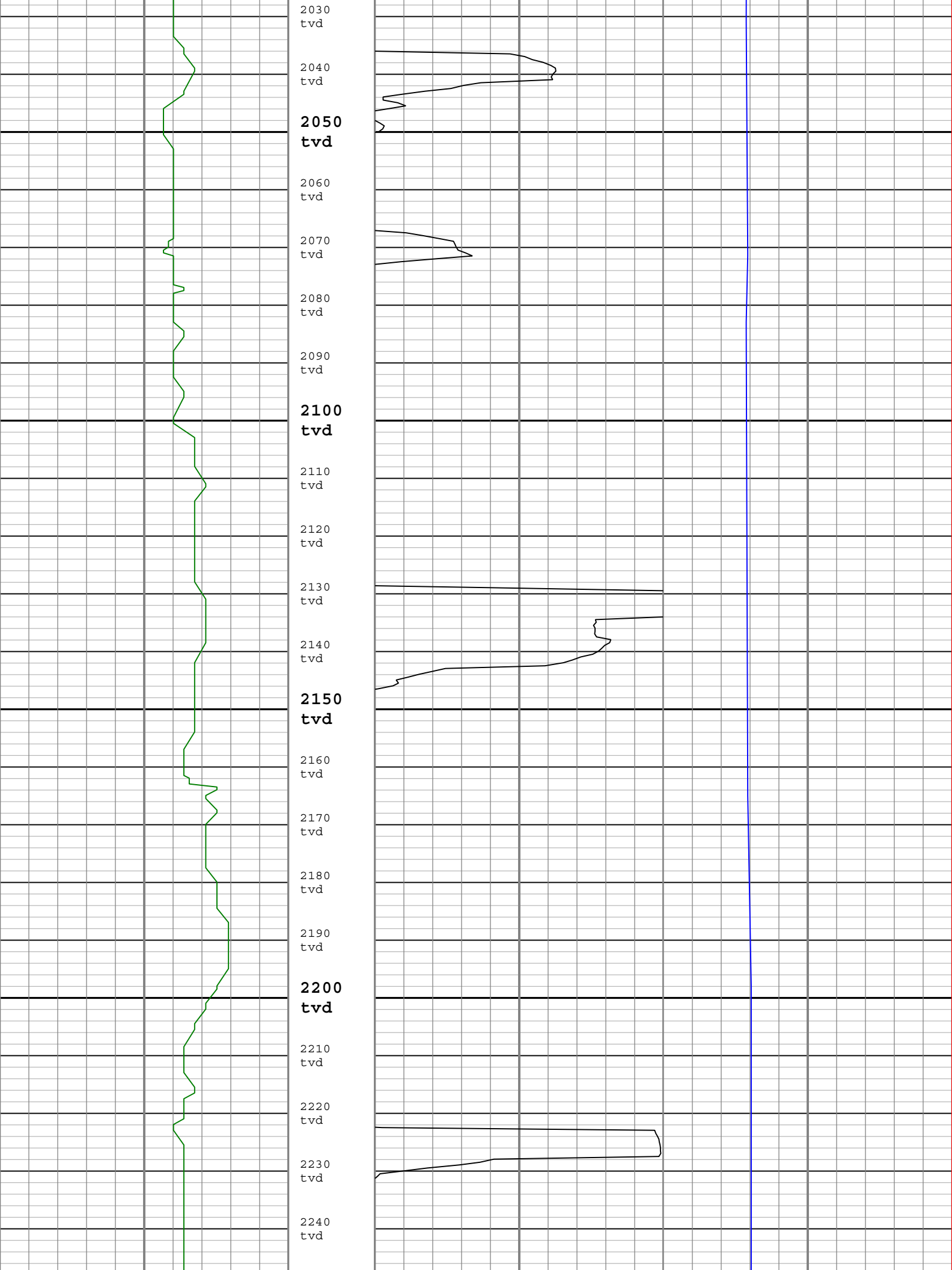
Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final TVD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: TVD
Creation Date: 22-Sep-2014 15:01:07

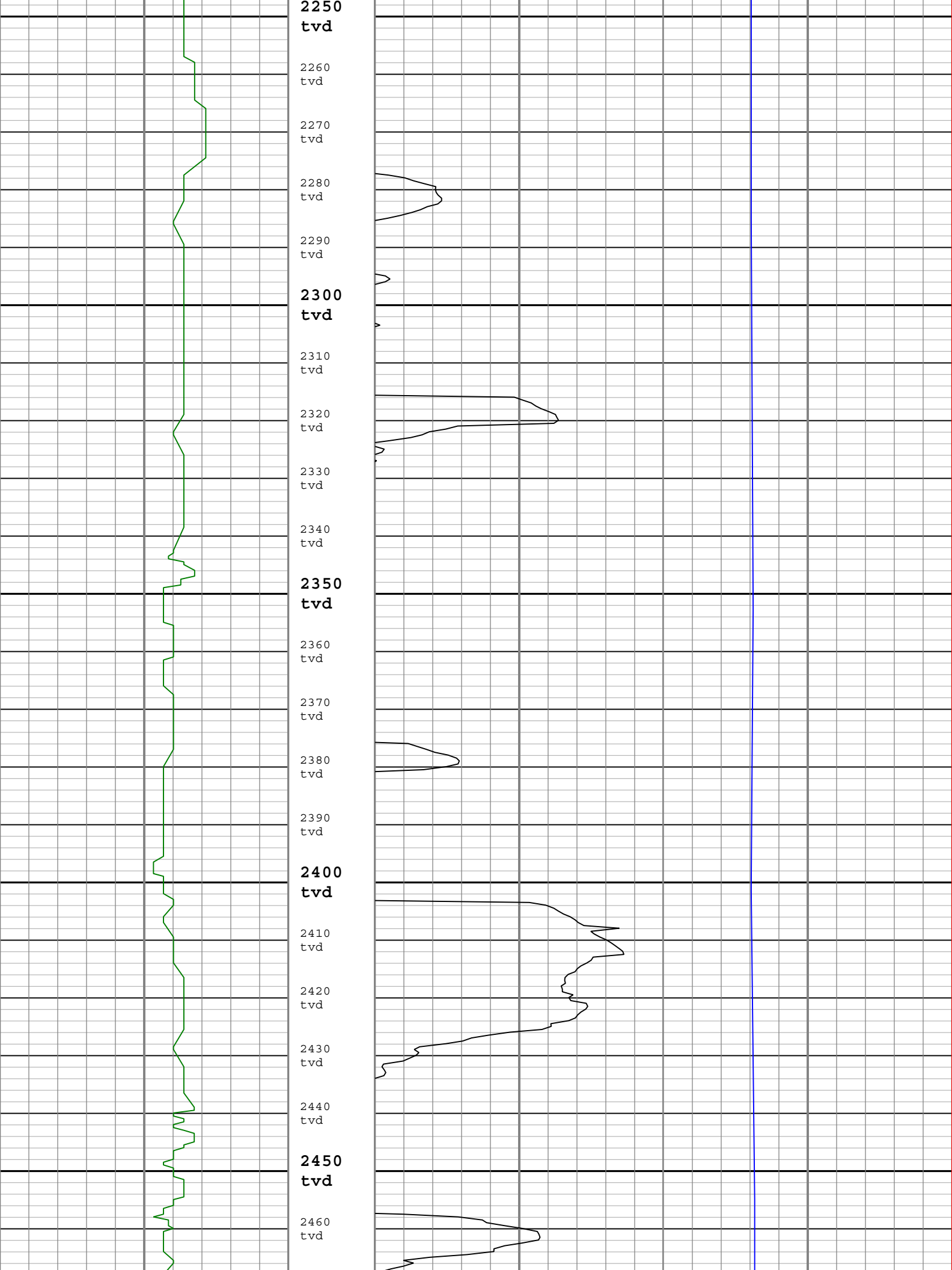


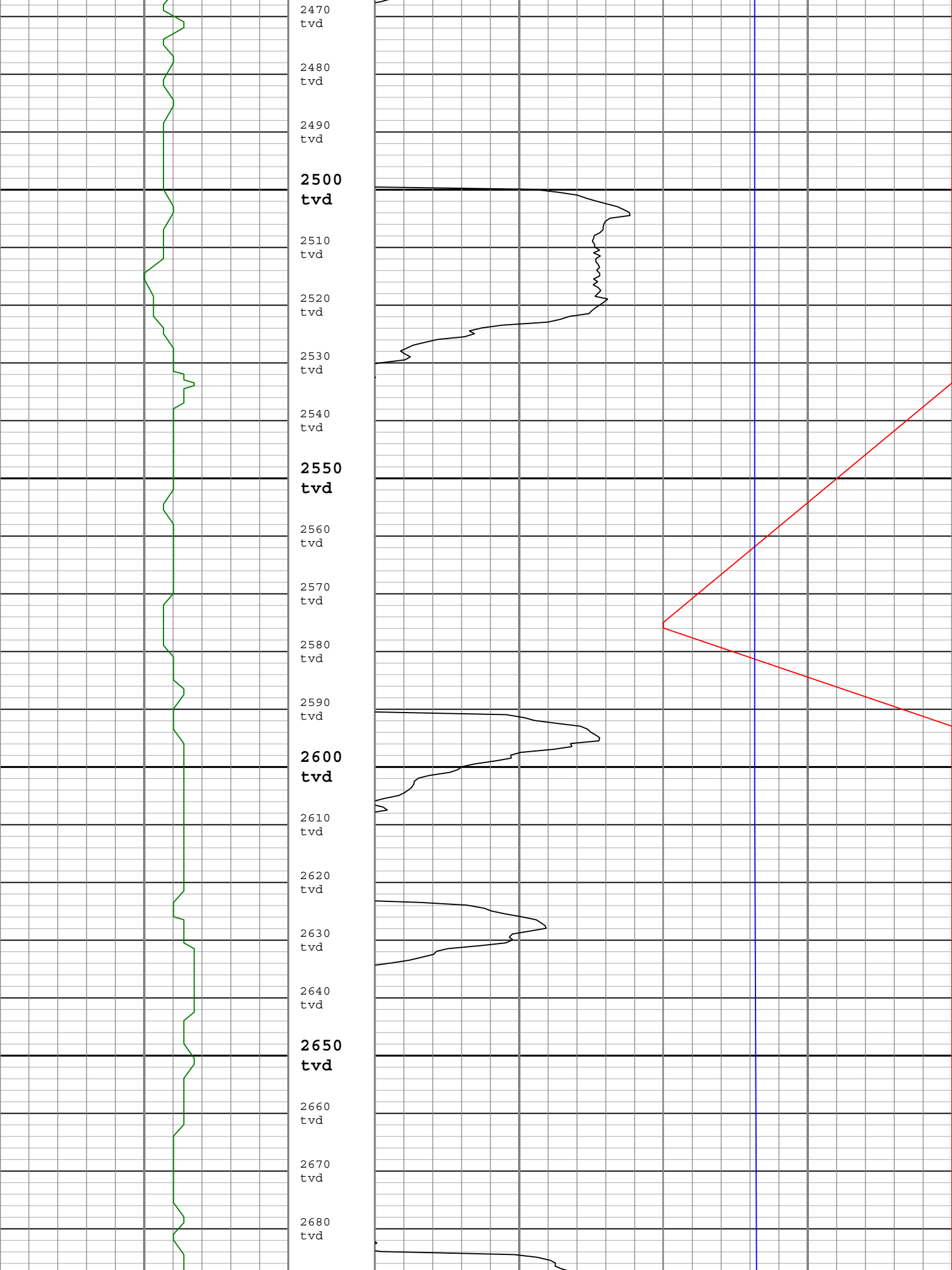


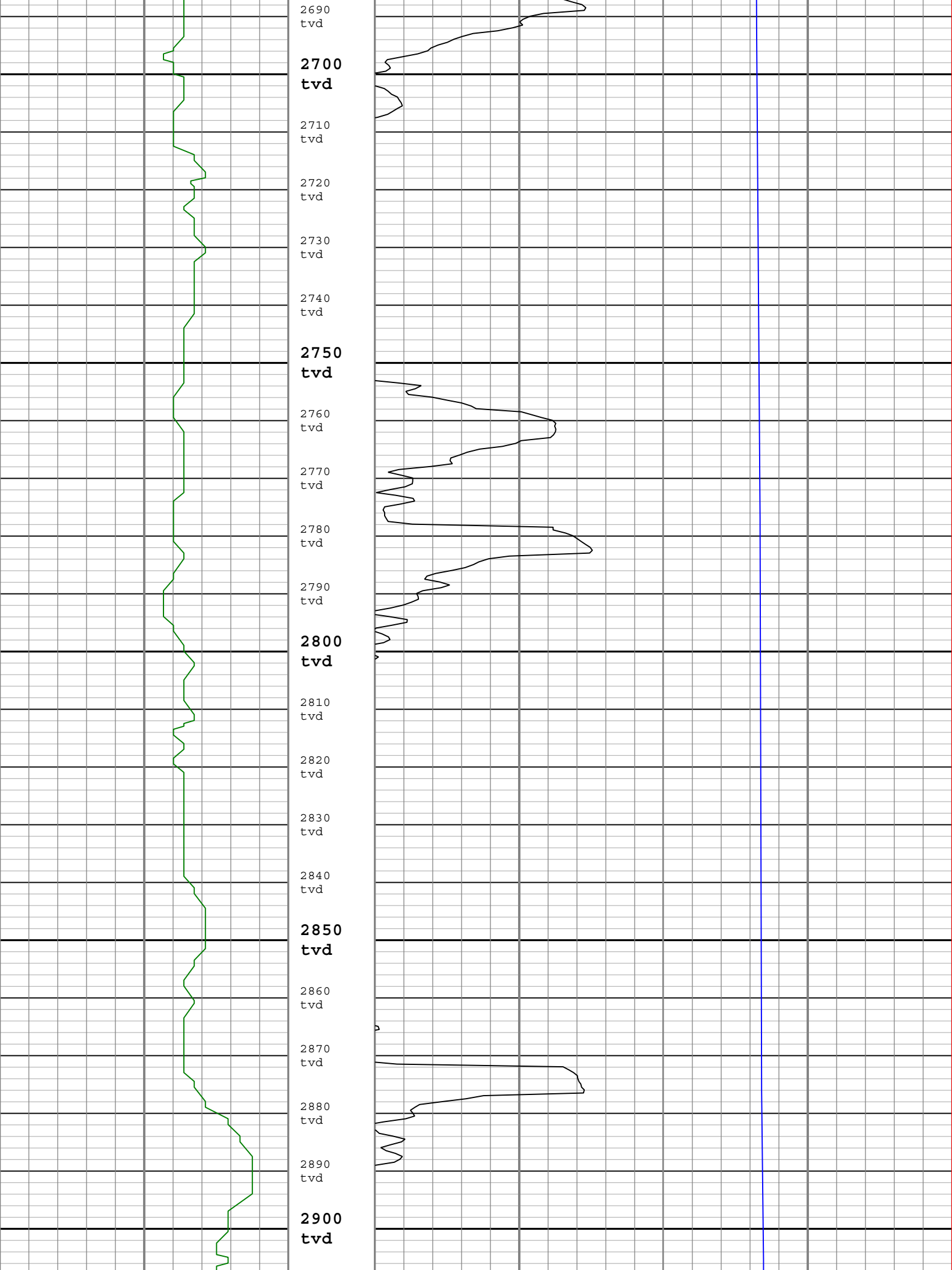


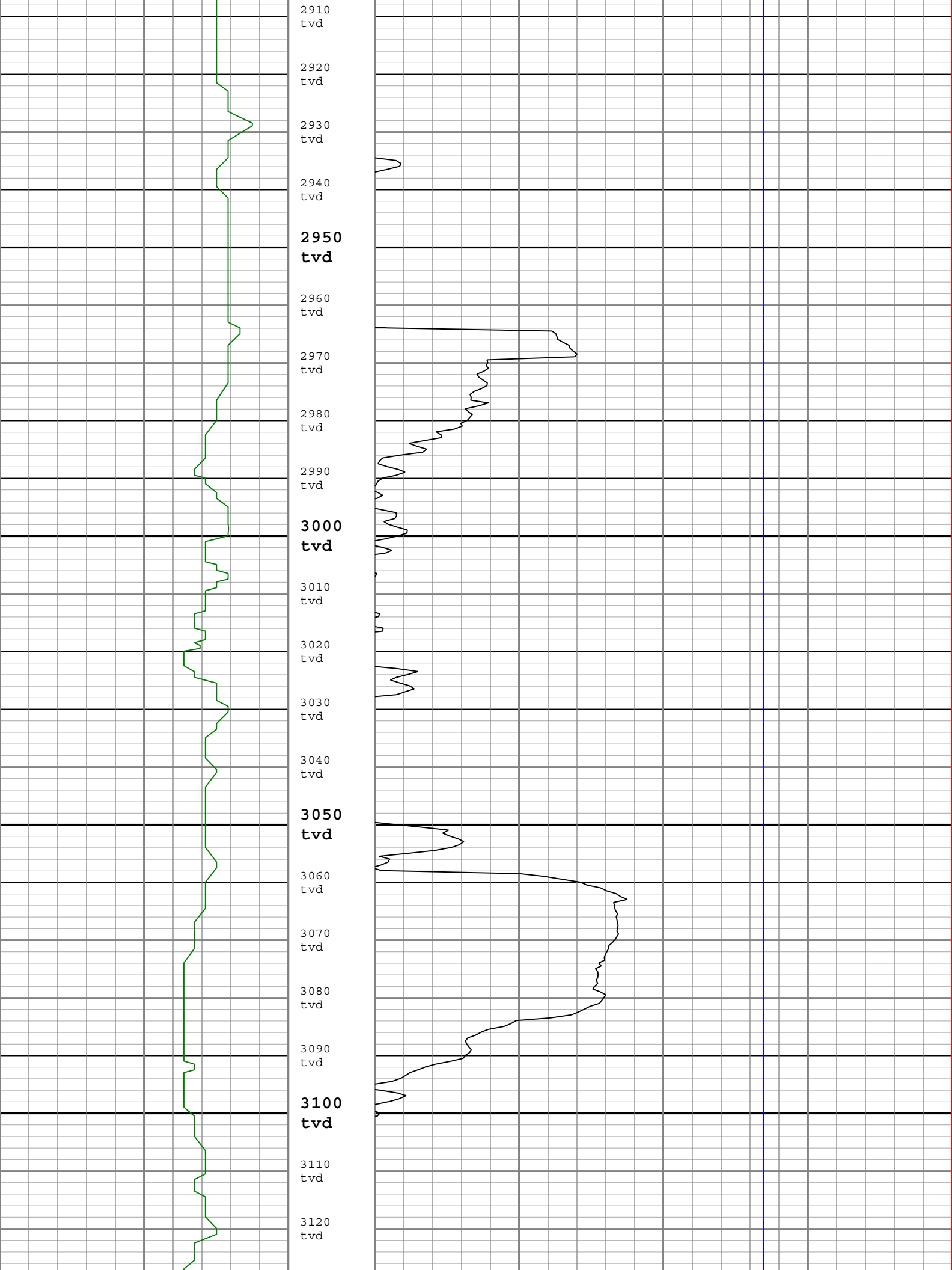


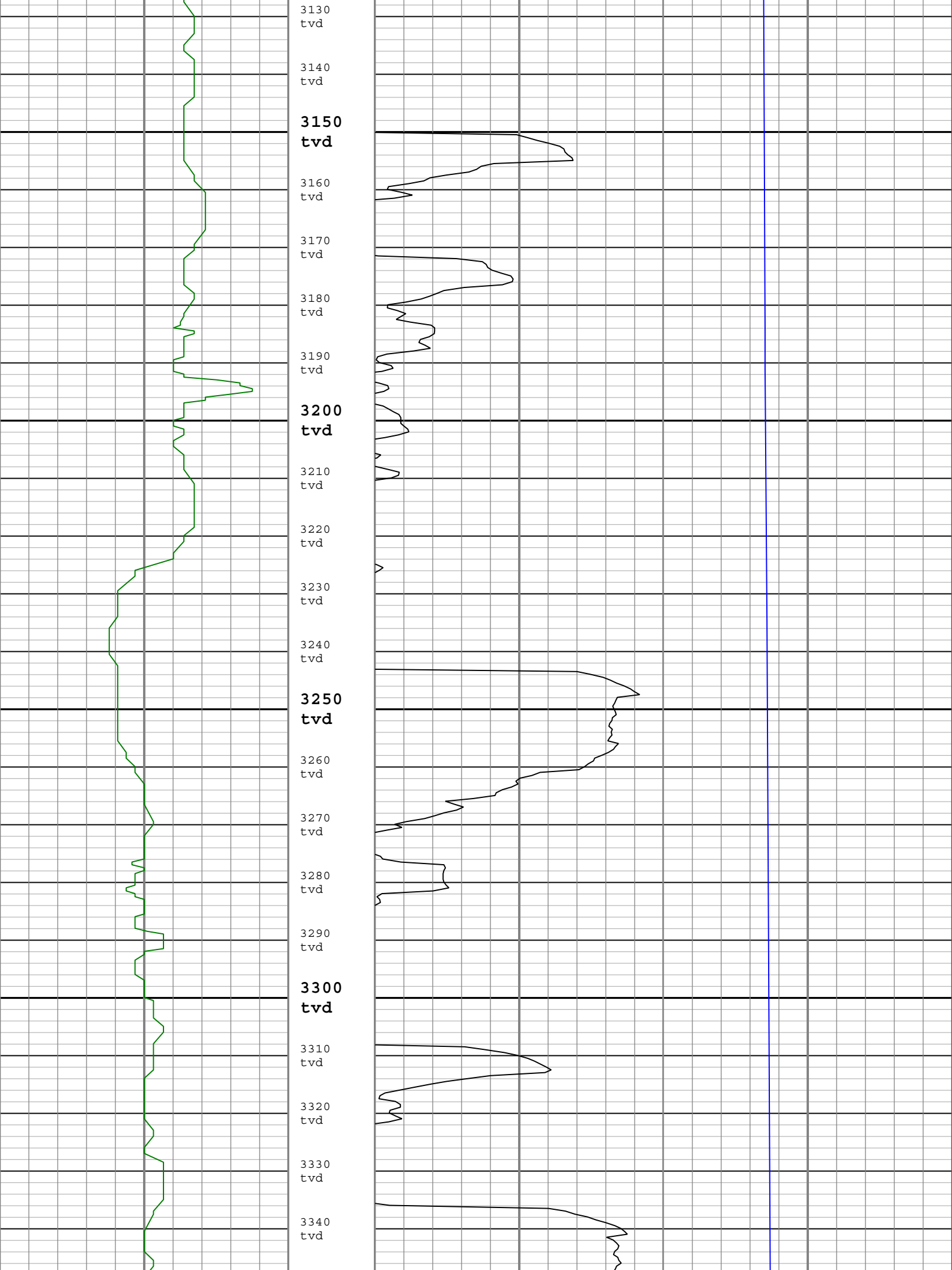


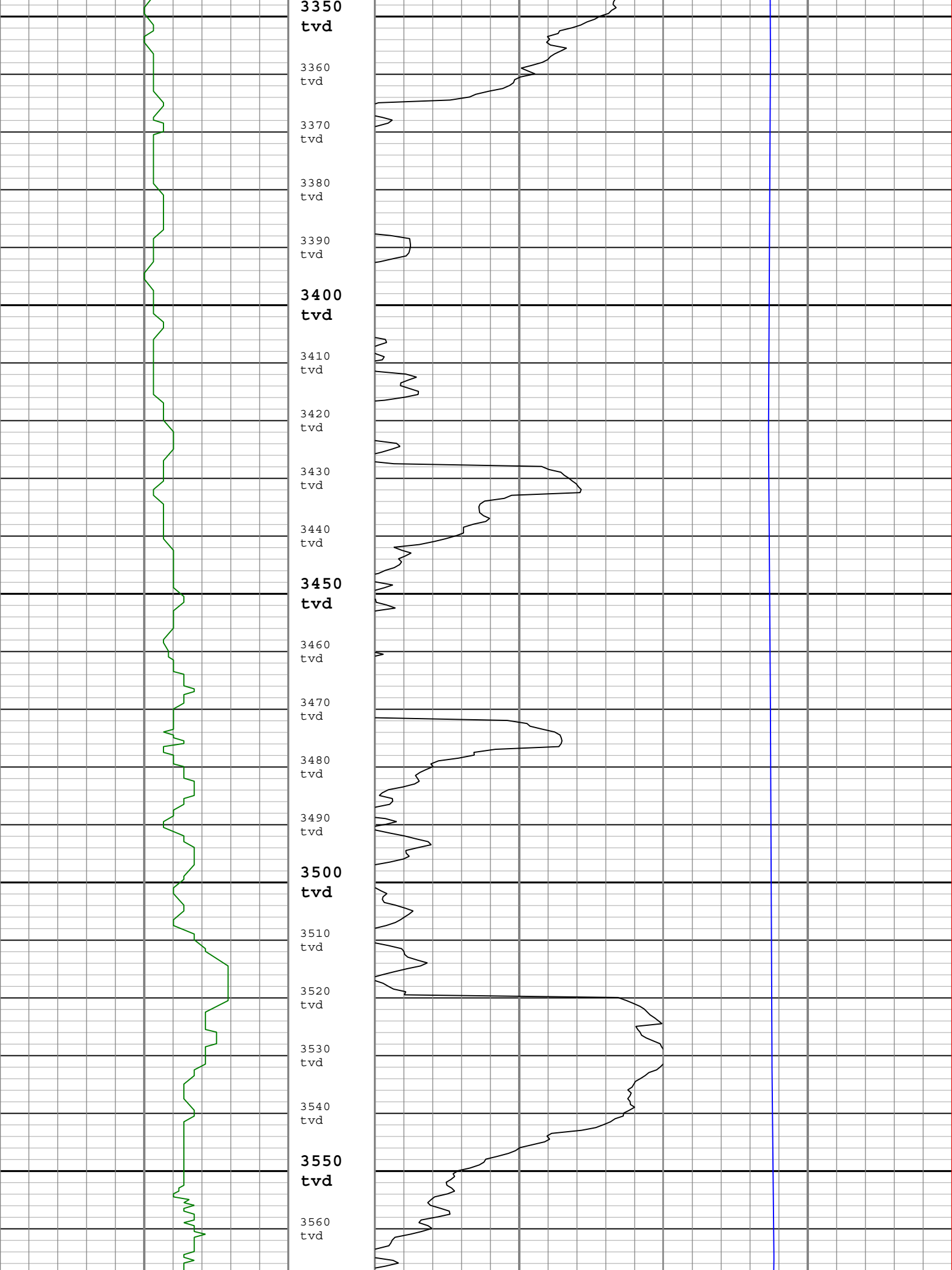


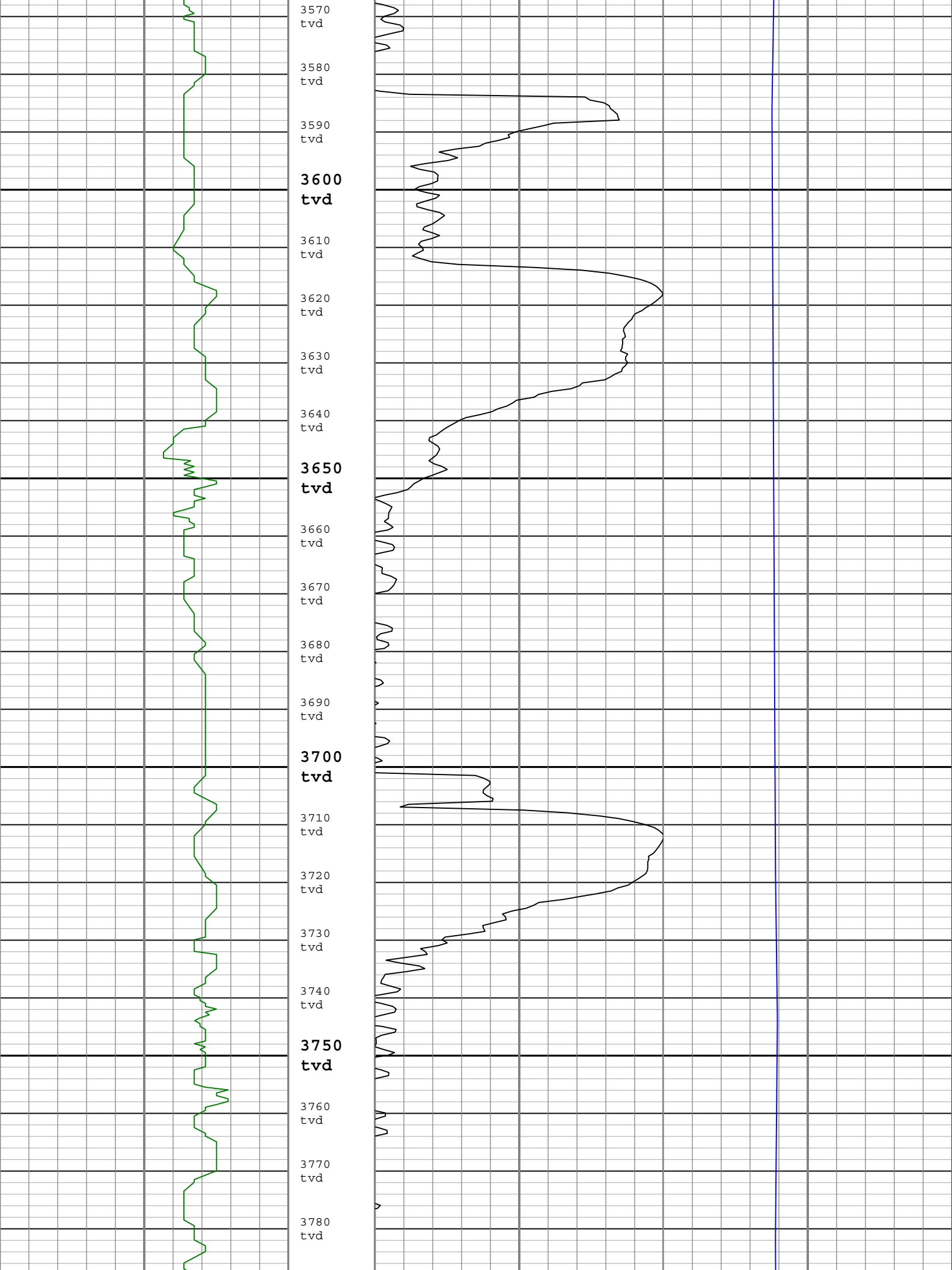


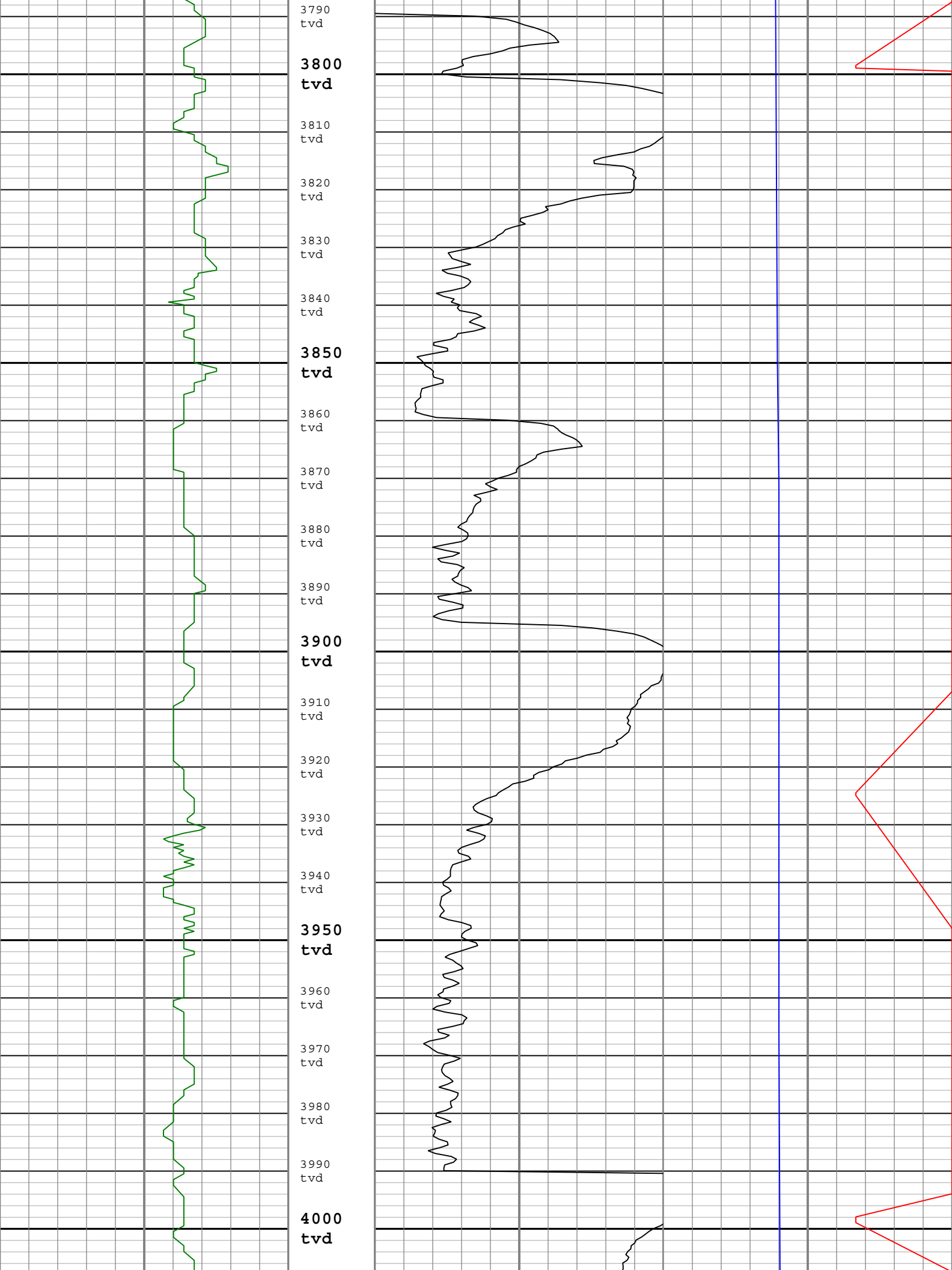


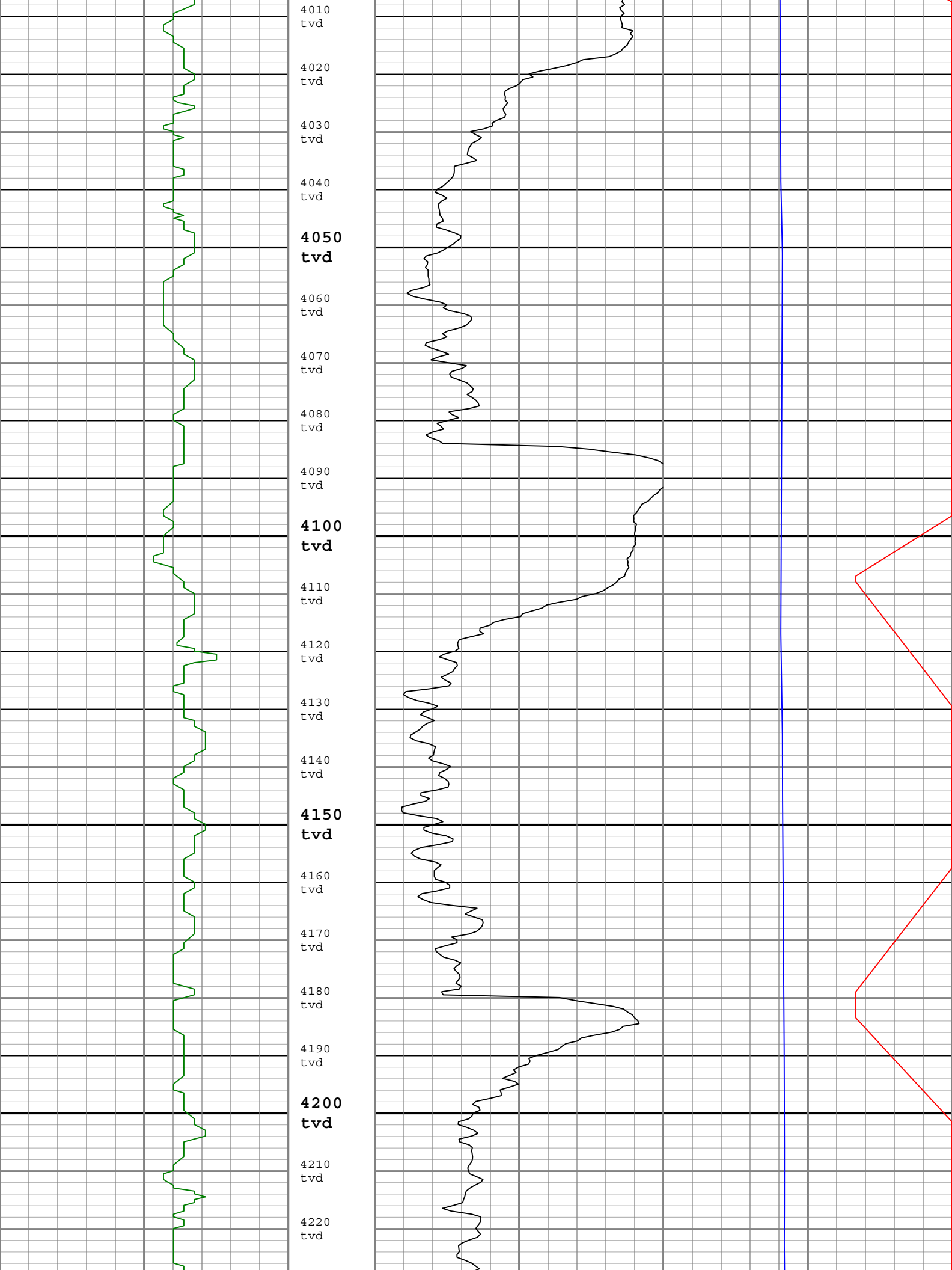


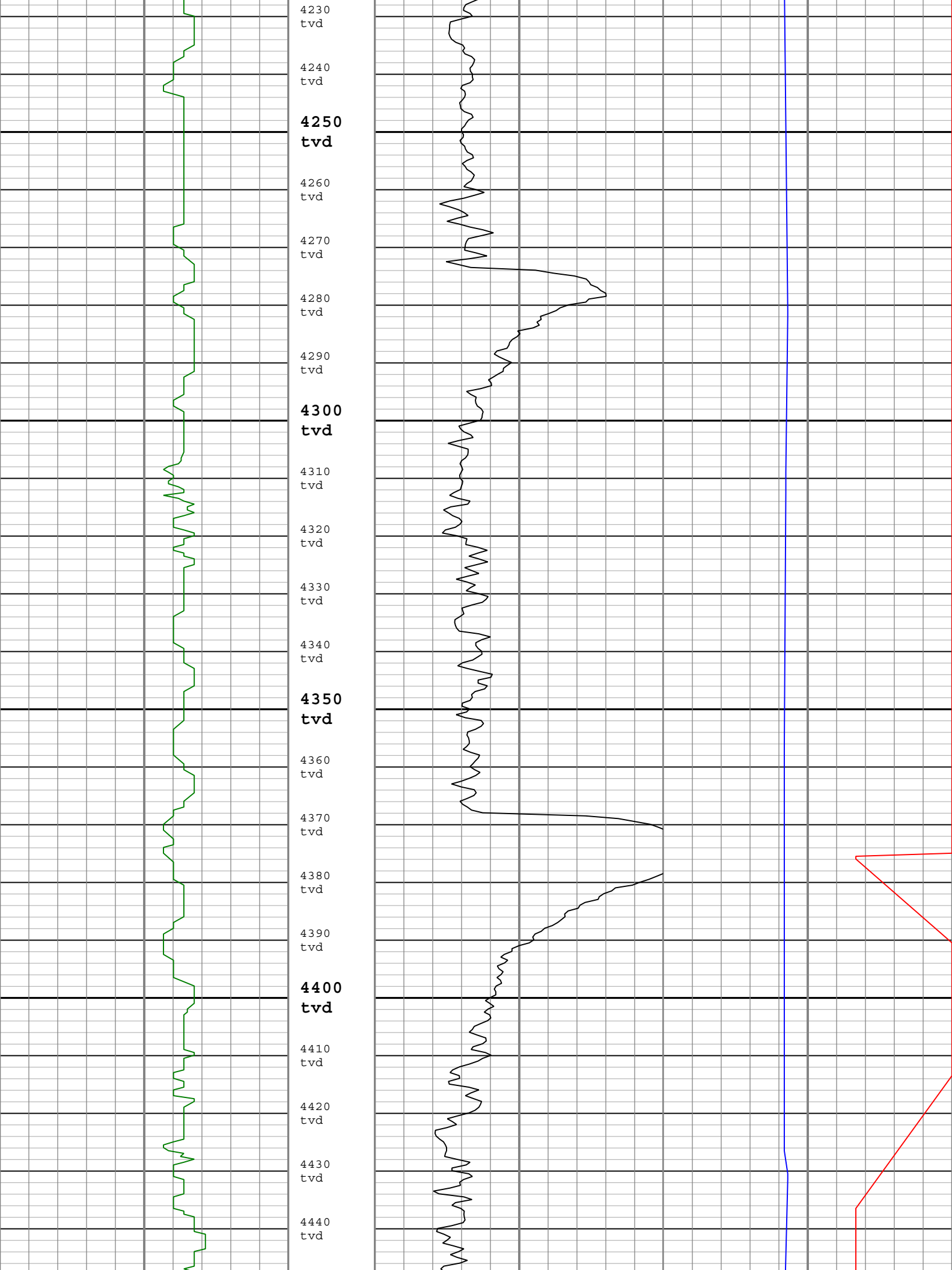


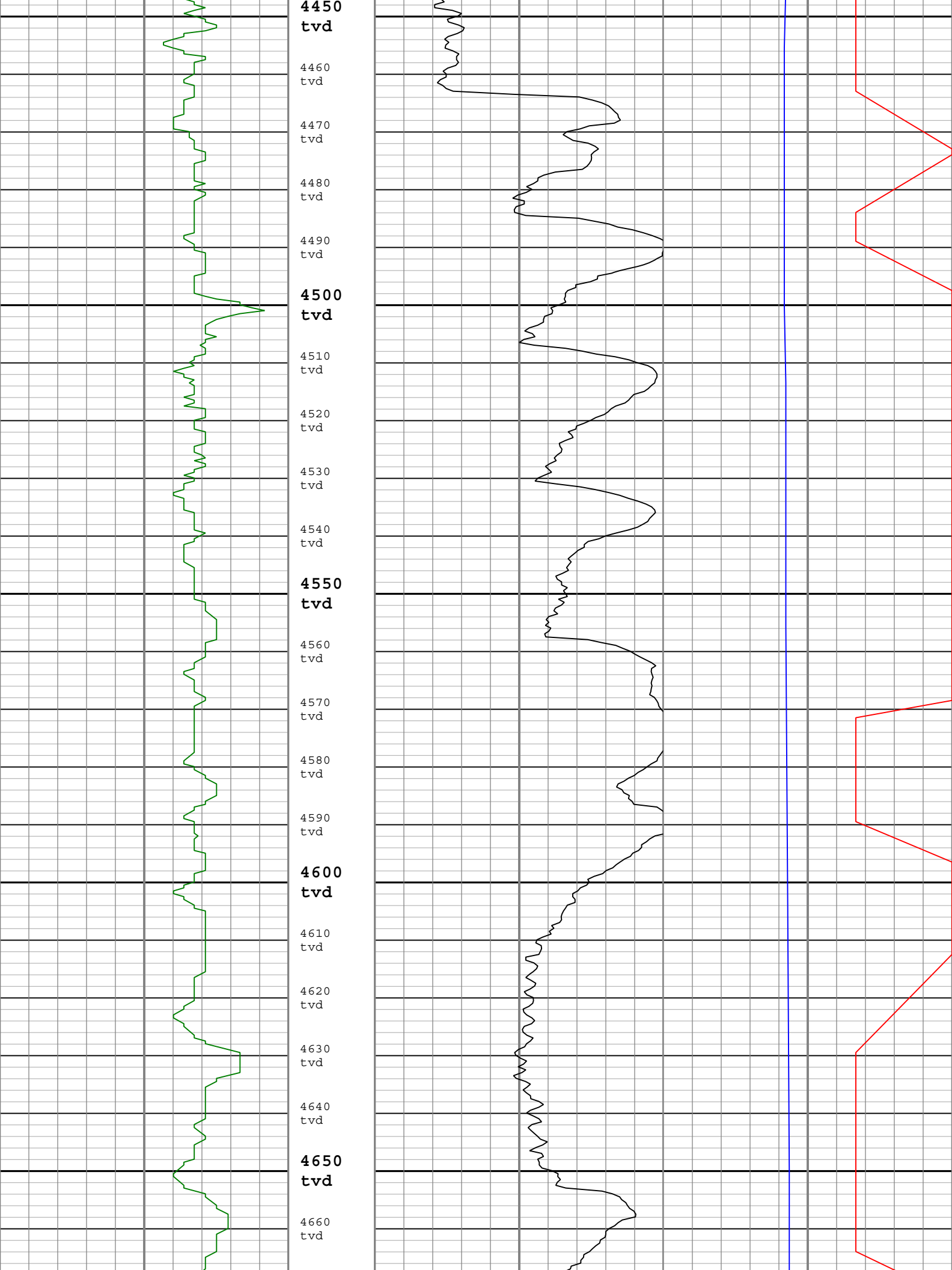


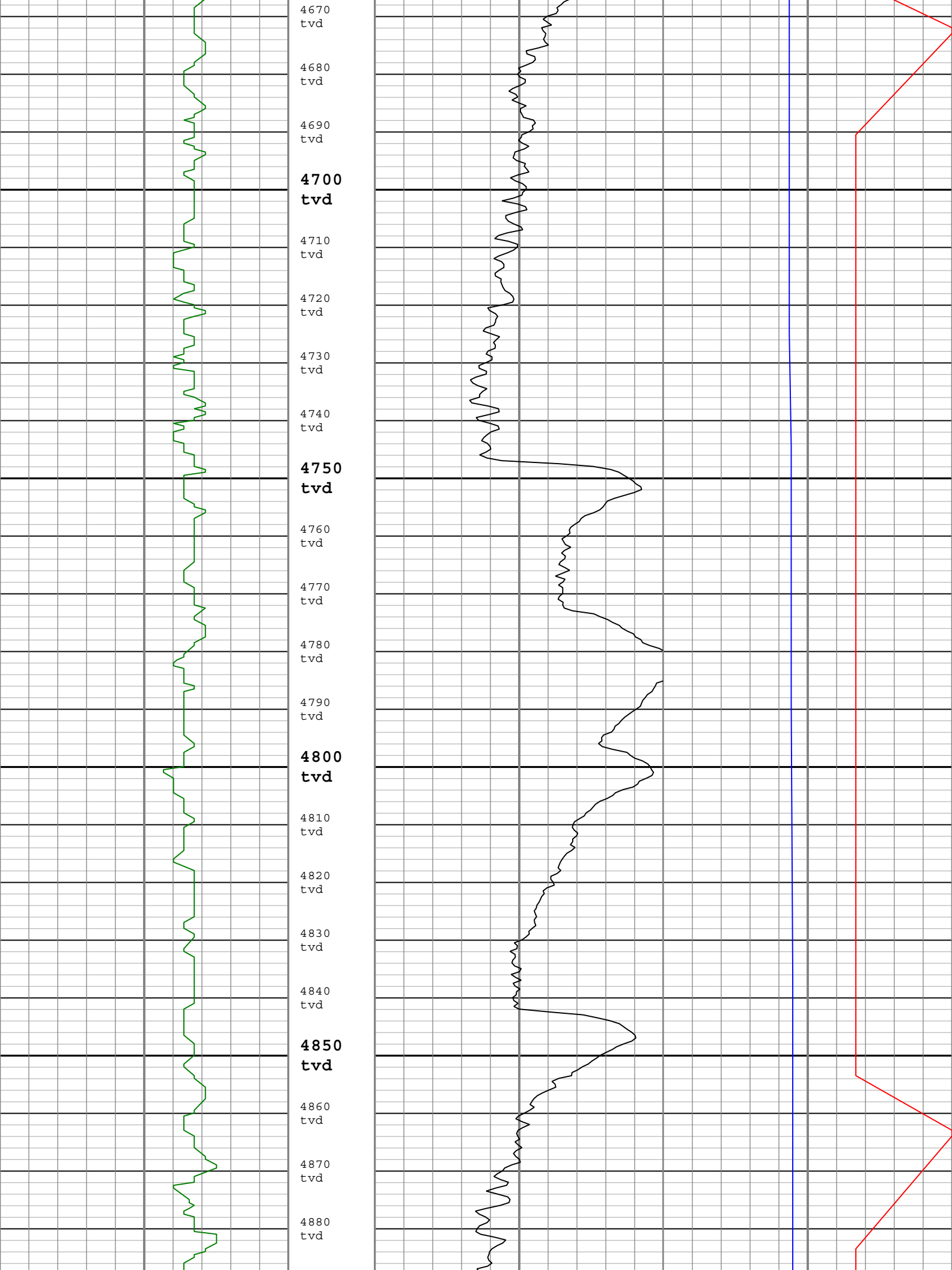


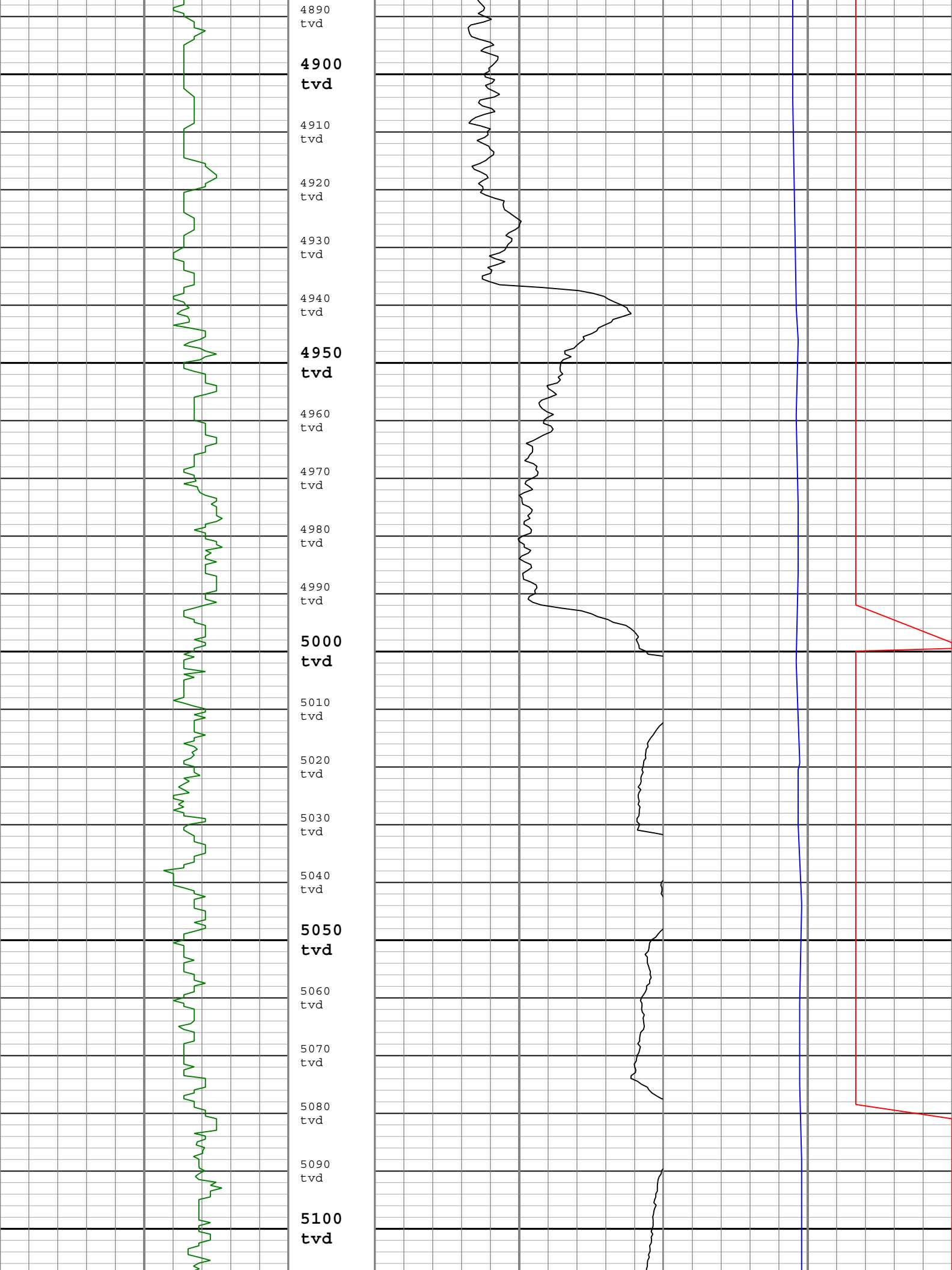


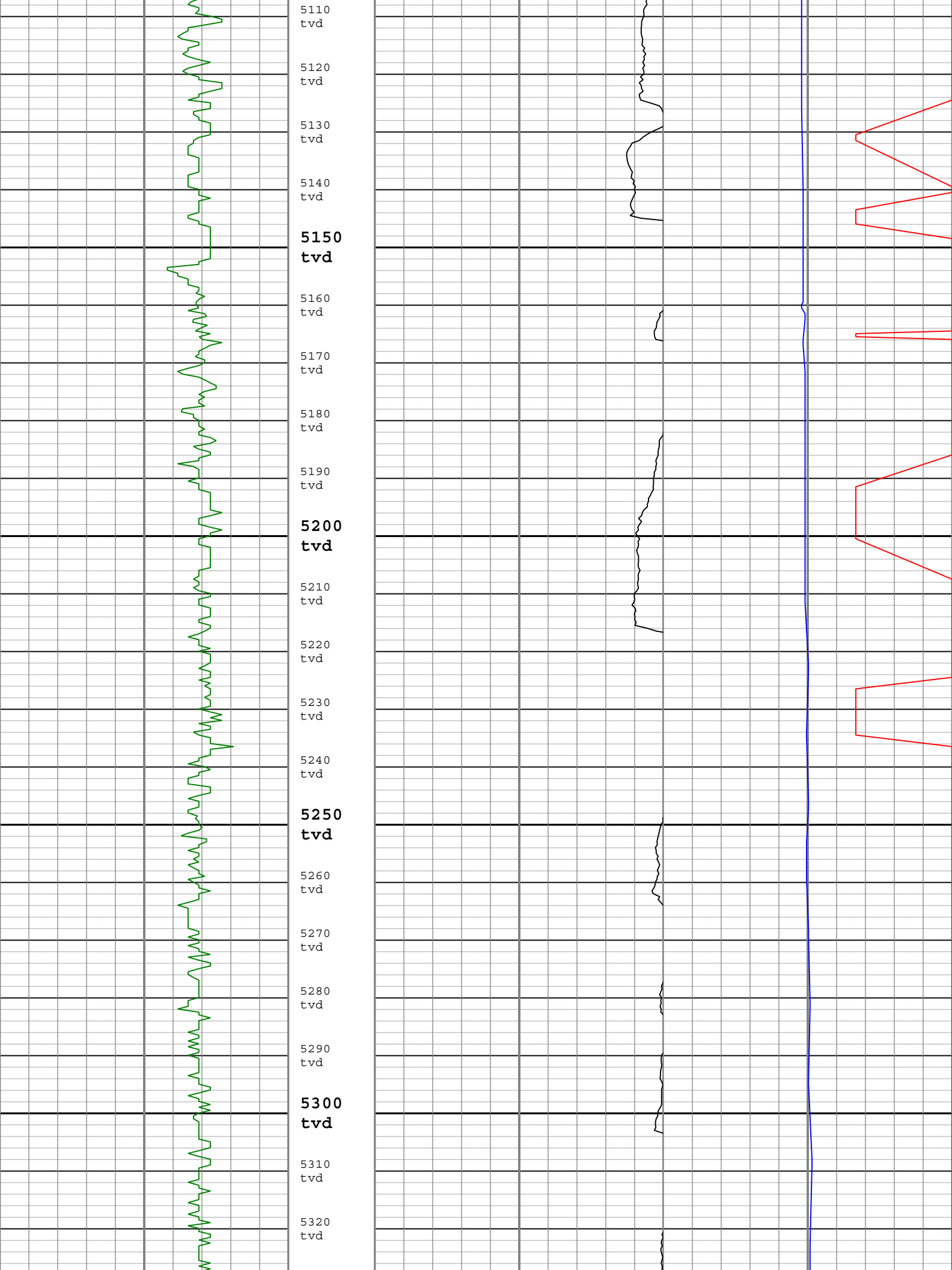


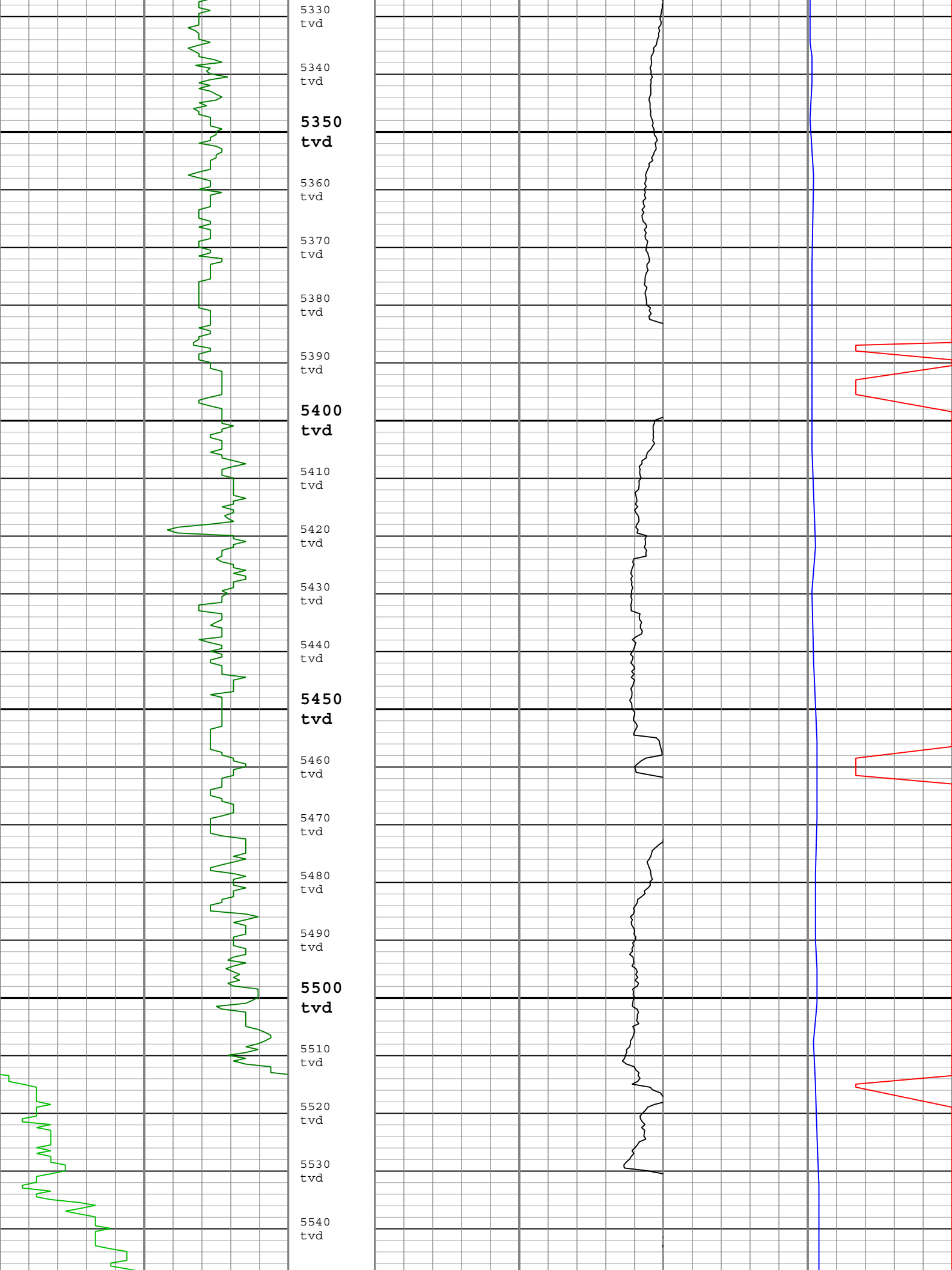


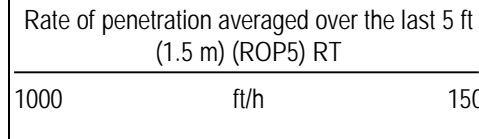
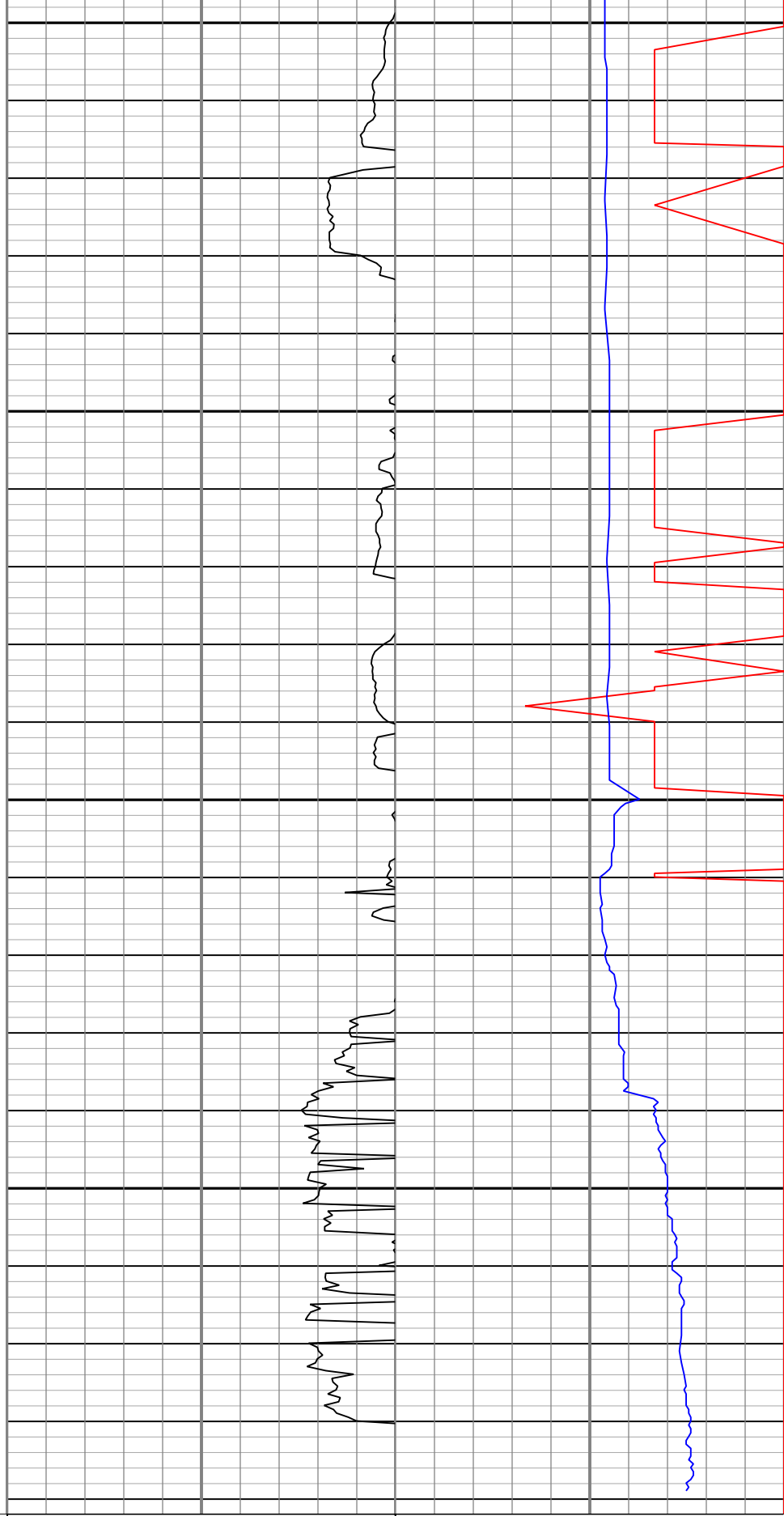
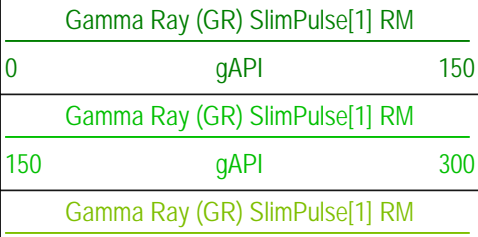
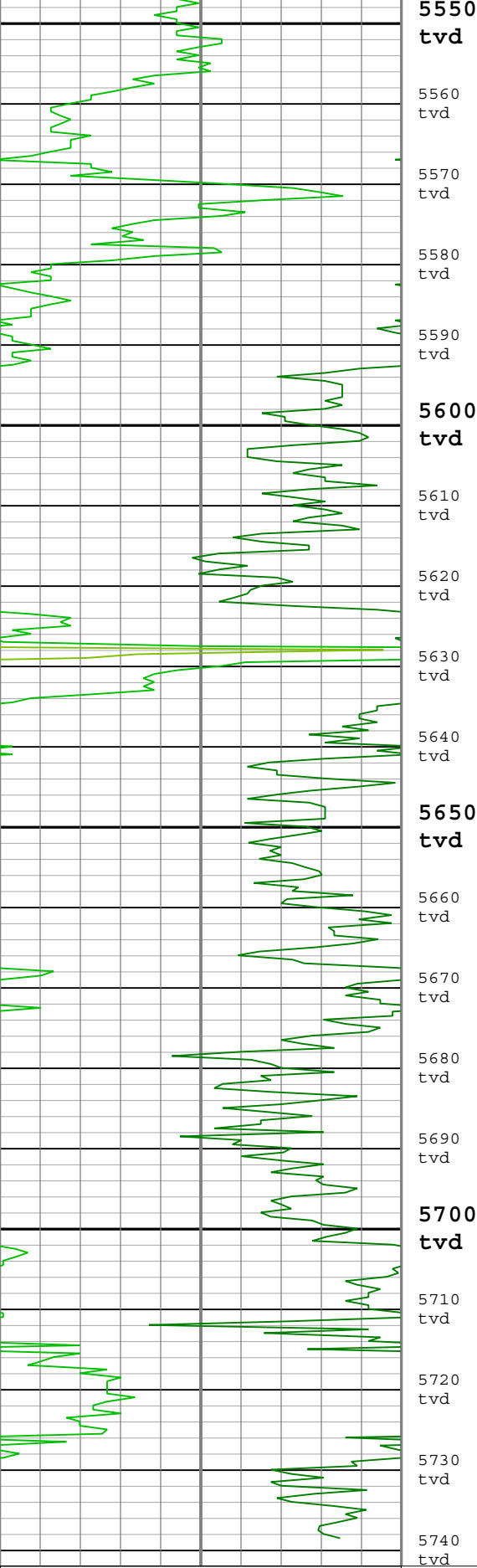












| | | |
|--------------------------------|------|-----|
| 300 | gAPI | 450 |
| Gamma Ray (GR) SlimPulse[1] RM | | |
| 450 | gAPI | 600 |
| Gamma Ray (GR) SlimPulse[1] RM | | |
| 600 | gAPI | 750 |

Description: SlimPulse Gamma Ray 1 Format: Log (SlimPulse Gamma Ray Final TVD) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: TVD
Creation Date: 22-Sep-2014 15:01:07

Channel Processing Parameters

Run001: Parameters

| Parameter | Description | Tool | Value | Unit |
|-----------|------------------------|------------|-------------|---------|
| BS | Bit Size | DNMSESSION | Depth Zoned | in |
| DFD | Drilling Fluid Density | Borehole | Time Zoned | lbm/gal |
| GR_SRC | GR Source Selection | SPULSE-GEN | GAMMA_EXT | |

Run001Depth Zoned Parameters

| Parameter | Value | Start (ft) | Stop (ft) |
|-----------|-------|--------------|-------------|
| BS | 8.75 | 1226.04 | 5667.48 |
| BS | 6.125 | 5667.48 | 5667.6 |

All depth are actual.

Run001Time Zoned Parameters

Pass Drilling

| Parameter | Value | Start Time | Stop Time | Start Depth (ft) | Stop Depth (ft) |
|-----------|-------|----------------------|----------------------|--------------------|-------------------|
| DFD | 8.75 | 12-Sep-2014 21:53:45 | 13-Sep-2014 02:30:00 | 1258.75 | 2417.83 |
| DFD | 8.7 | 13-Sep-2014 02:30:00 | 13-Sep-2014 14:30:00 | 2417.83 | 5182.33 |
| DFD | 9.75 | 13-Sep-2014 14:30:00 | 14-Sep-2014 03:12:21 | 5182.33 | 6069.42 |

All depth are at tool zero.

Run003: Parameters

| Parameter | Description | Tool | Value | Unit |
|-----------|------------------------|------------|-------------|---------|
| BS | Bit Size | DNMSESSION | Depth Zoned | in |
| DFD | Drilling Fluid Density | Borehole | 10.85 | lbm/gal |
| GR_SRC | GR Source Selection | SPULSE-GEN | GAMMA_EXT | |

Run003Depth Zoned Parameters

| Parameter | Value | Start (ft) | Stop (ft) |
|-----------|-------|--------------|-------------|
| BS | 8.75 | 5625.89 | 5667.48 |
| BS | 6.125 | 5667.48 | 5742.44 |

All depth are actual.

Tool Control Parameters

Survey Record

| Survey Calculation | | | |
|--------------------|-----------------------------|----------------------------|---------------------------------|
| Method : | Minimum Radius of Curvature | DLS Method : | Lubinski |
| North Reference : | Grid North | Total Correction Formula : | Magnetic Dec - Grid Convergence |
| Grid Convergence : | 1.06 deg | | |

Rig Location

| | | | |
|------------|---------------|-------------|-------------------|
| Latitude : | 40° 46' 43" N | Longitude : | 103° 51' 40.86" W |
|------------|---------------|-------------|-------------------|

Tie In Point

| | | | | | |
|----------------------|---------|---------------------|----------|---------------------------|-----------|
| Measured Depth: | 0.00 ft | Inclination: | 0.00 deg | Azimuth: | 0.00 deg |
| True Vertical Depth: | 0.00 ft | North Displacement: | 0.00 ft | East Displacement: | 0.00 ft |
| N/-S VSec Origin: | 0.00 ft | E/-W VSec Origin: | 0.00 ft | Vertical Section Azimuth: | 92.47 deg |

| D&I Inits Computed and Values Used - Run001 | | | | | | | | | | | | | | | |
|---|------------|---------------|---------------|-------------------------------------|-------------|---------------|---------------|-------------------------|-----------------|------------------|------------------|--------------------------|----|----|----|
| Geomagnetic Model : | | | | BGGM 2014 | | | | Geomagnetic Date : | | | | 12-Sep-2014 | | | |
| Computed Location B : | | | | 52972.09 nT +/- 300.00nT | | | | Used Location B : | | | | 52972.09 nT +/- 300.00nT | | | |
| Computed Location G : | | | | 999.58 mgn +/- 2.50mgn | | | | Used Location G : | | | | 999.58 mgn +/- 2.50mgn | | | |
| Computed Magnetic Dip : | | | | 67.38 deg +/- 0.45deg | | | | Used Magnetic Dip : | | | | 67.38 deg +/- 0.45deg | | | |
| Computed Magnetic Dec : | | | | 8.04 deg | | | | Used Magnetic Dec : | | | | 8.04 deg | | | |
| Computed Total Correction : | | | | 6.98 deg | | | | Used Total Correction : | | | | 6.98 deg | | | |
| D&I Inits Computed and Values Used - Run003 | | | | | | | | | | | | | | | |
| Geomagnetic Model : | | | | BGGM 2014 | | | | Geomagnetic Date : | | | | 16-Sep-2014 | | | |
| Computed Location B : | | | | 52970.61 nT +/- 300.00nT | | | | Used Location B : | | | | 52970.61 nT +/- 300.00nT | | | |
| Computed Location G : | | | | 999.58 mgn +/- 2.50mgn | | | | Used Location G : | | | | 999.58 mgn +/- 2.50mgn | | | |
| Computed Magnetic Dip : | | | | 67.38 deg +/- 0.45deg | | | | Used Magnetic Dip : | | | | 67.38 deg +/- 0.45deg | | | |
| Computed Magnetic Dec : | | | | 8.04 deg | | | | Used Magnetic Dec : | | | | 8.04 deg | | | |
| Computed Total Correction : | | | | 6.98 deg | | | | Used Total Correction : | | | | 6.98 deg | | | |
| Survey Quality Index | | | | | | | | | | | | | | | |
| 0 : Long Survey passed all criteria | | | | 2 : Long Survey failed mag criteria | | | | 9 : Manual | | | | | | | |
| 28 : Tie-In Point | | | | | | | | | | | | | | | |
| Survey Correction Index | | | | | | | | | | | | | | | |
| 0 : No correction | | | | | | | | | | | | | | | |
| Survey Description Index | | | | | | | | | | | | | | | |
| 0 : Not Flagged Survey | | | | 1 : DMAG Corrected Survey | | | | 7 : Projection to Bit | | | | | | | |
| Seq | MD (ft) | Incl (deg) | Azim (deg) | Course (ft) | TVD (ft) | V Sec (ft) | N/ -S (ft) | E/ -W (ft) | Closure (ft) | at Azim (deg) | DLS deg/100ft | Tool Type | QI | CI | DI |
| 1 | 0.00 | 0.00 | 0.00 | ---- | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 90.00 | 0.00 | TIP | 28 | 0 | 0 |
| 2 | 285.00 | 0.60 | 345.74 | 285.00 | 284.99 | -0.43 | 1.45 | -0.37 | 1.48 | 345.74 | 0.21 | Other | 9 | 0 | 0 |
| 3 | 630.00 | 0.30 | 155.14 | 345.00 | 629.99 | -0.53 | 2.38 | -0.43 | 2.43 | 349.68 | 0.26 | Other | 9 | 0 | 0 |
| 4 | 940.00 | 0.70 | 262.24 | 310.00 | 939.98 | -2.03 | 1.39 | -1.97 | 2.40 | 305.15 | 0.27 | Other | 9 | 0 | 0 |
| 5 | 1200.00 | 1.00 | 185.94 | 260.00 | 1199.96 | -3.73 | -1.09 | -3.78 | 3.94 | 253.96 | 0.41 | Other | 9 | 0 | 0 |
| 6 | 1317.00 | 0.48 | 175.39 | 117.00 | 1316.95 | -3.73 | -2.59 | -3.84 | 4.63 | 236.02 | 0.46 | SlimPulse | 9 | 0 | 1 |
| 7 | 1411.00 | 0.45 | 176.99 | 94.00 | 1410.95 | -3.64 | -3.35 | -3.79 | 5.05 | 228.53 | 0.03 | SlimPulse | 9 | 0 | 1 |
| 8 | 1506.00 | 1.74 | 191.02 | 95.00 | 1505.93 | -3.82 | -5.14 | -4.05 | 6.53 | 218.23 | 1.38 | SlimPulse | 9 | 0 | 1 |
| 9 | 1600.00 | 2.86 | 137.89 | 94.00 | 1599.86 | -2.39 | -8.28 | -2.75 | 8.73 | 198.36 | 2.43 | SlimPulse | 9 | 0 | 1 |
| 10 | 1695.00 | 5.32 | 125.99 | 95.00 | 1694.61 | 2.95 | -12.63 | 2.41 | 12.86 | 169.21 | 2.73 | SlimPulse | 9 | 0 | 1 |
| 11 | 1789.00 | 6.83 | 134.97 | 94.00 | 1788.08 | 10.70 | -19.14 | 9.89 | 21.56 | 152.68 | 1.89 | SlimPulse | 9 | 0 | 1 |
| 12 | 1884.00 | 9.01 | 140.22 | 95.00 | 1882.17 | 19.87 | -28.85 | 18.64 | 34.35 | 147.13 | 2.42 | SlimPulse | 9 | 0 | 1 |
| 13 | 1979.00 | 10.33 | 145.04 | 95.00 | 1975.82 | 30.05 | -41.55 | 28.28 | 50.26 | 145.75 | 1.63 | SlimPulse | 9 | 0 | 1 |
| 14 | 2074.00 | 10.05 | 143.15 | 95.00 | 2069.32 | 40.48 | -55.16 | 38.14 | 67.06 | 145.34 | 0.46 | SlimPulse | 9 | 0 | 1 |
| 15 | 2168.00 | 10.67 | 145.65 | 94.00 | 2161.79 | 50.89 | -68.91 | 47.97 | 83.96 | 145.16 | 0.81 | SlimPulse | 9 | 0 | 1 |
| 16 | 2262.00 | 10.17 | 143.90 | 94.00 | 2254.24 | 61.28 | -82.80 | 57.77 | 100.95 | 145.10 | 0.63 | SlimPulse | 9 | 0 | 1 |
| 17 | 2356.00 | 9.70 | 143.16 | 94.00 | 2346.83 | 71.47 | -95.84 | 67.40 | 117.16 | 144.88 | 0.52 | SlimPulse | 9 | 0 | 1 |
| 18 | 2451.00 | 9.57 | 152.97 | 95.00 | 2440.50 | 80.43 | -109.28 | 75.79 | 133.01 | 145.26 | 1.73 | SlimPulse | 9 | 0 | 1 |
| 19 | 2546.00 | 11.59 | 150.79 | 95.00 | 2533.88 | 89.33 | -124.65 | 84.04 | 150.33 | 146.01 | 2.17 | SlimPulse | 9 | 0 | 1 |
| 20 | 2641.00 | 11.16 | 149.60 | 95.00 | 2627.01 | 99.33 | -140.91 | 93.35 | 169.03 | 146.48 | 0.52 | SlimPulse | 9 | 0 | 1 |
| 21 | 2735.00 | 10.85 | 150.71 | 94.00 | 2719.28 | 108.93 | -156.47 | 102.28 | 186.94 | 146.83 | 0.40 | SlimPulse | 9 | 0 | 1 |
| 22 | 2829.00 | 10.72 | 149.16 | 94.00 | 2811.62 | 118.39 | -171.69 | 111.09 | 204.49 | 147.10 | 0.34 | SlimPulse | 9 | 0 | 1 |
| 23 | 2924.00 | 9.79 | 147.26 | 95.00 | 2905.11 | 127.89 | -186.07 | 119.99 | 221.39 | 147.18 | 1.04 | SlimPulse | 9 | 0 | 1 |
| 24 | 3019.00 | 8.85 | 144.48 | 95.00 | 2998.85 | 137.05 | -198.81 | 128.60 | 236.78 | 147.10 | 1.10 | SlimPulse | 9 | 0 | 1 |
| 25 | 3113.00 | 11.02 | 141.09 | 94.00 | 3091.44 | 147.44 | -211.69 | 138.45 | 252.95 | 146.82 | 2.39 | SlimPulse | 9 | 0 | 1 |
| 26 | 3208.00 | 10.90 | 138.87 | 95.00 | 3184.70 | 159.64 | -225.52 | 150.06 | 270.90 | 146.36 | 0.46 | SlimPulse | 9 | 0 | 1 |
| 27 | 3302.00 | 10.96 | 143.63 | 94.00 | 3277.00 | 171.37 | -239.41 | 161.20 | 288.62 | 146.05 | 0.96 | SlimPulse | 9 | 0 | 1 |
| 28 | 3397.00 | 12.62 | 148.30 | 95.00 | 3370.00 | 182.86 | -255.52 | 172.01 | 308.01 | 146.05 | 2.01 | SlimPulse | 9 | 0 | 1 |
| 29 | 3492.00 | 13.27 | 146.86 | 95.00 | 3462.58 | 195.04 | -273.47 | 183.43 | 329.30 | 146.15 | 0.76 | SlimPulse | 9 | 0 | 1 |
| 30 | 3587.00 | 12.11 | 144.57 | 95.00 | 3555.26 | 207.51 | -290.72 | 195.16 | 350.16 | 146.13 | 1.33 | SlimPulse | 9 | 0 | 1 |
| 31 | 3681.00 | 9.68 | 140.47 | 94.00 | 3647.56 | 218.86 | -304.86 | 205.91 | 367.88 | 145.96 | 2.71 | SlimPulse | 9 | 0 | 1 |
| 32 | 3776.00 | 7.85 | 146.57 | 95.00 | 3741.45 | 228.01 | -316.43 | 214.57 | 382.32 | 145.86 | 2.16 | SlimPulse | 9 | 0 | 1 |
| 33 | 3871.00 | 6.99 | 145.37 | 95.00 | 3835.65 | 235.30 | -326.60 | 221.43 | 394.59 | 145.86 | 0.92 | SlimPulse | 9 | 0 | 1 |

| | | | | | | | | | | | | | | | |
|----|---------|-------|--------|-------|---------|---------|---------|---------|---------|--------|-------|-----------|---|---|---|
| 34 | 3966.00 | 5.27 | 147.31 | 95.00 | 3930.10 | 241.30 | -335.03 | 227.07 | 404.72 | 145.87 | 1.82 | SlimPulse | 9 | 0 | 1 |
| 35 | 4060.00 | 2.50 | 144.98 | 94.00 | 4023.88 | 245.03 | -340.35 | 230.58 | 411.09 | 145.88 | 2.95 | SlimPulse | 9 | 0 | 1 |
| 36 | 4155.00 | 1.24 | 77.54 | 95.00 | 4118.84 | 247.29 | -341.82 | 232.77 | 413.55 | 145.75 | 2.45 | SlimPulse | 9 | 0 | 1 |
| 37 | 4250.00 | 1.27 | 97.17 | 95.00 | 4213.81 | 249.33 | -341.73 | 234.82 | 414.63 | 145.50 | 0.45 | SlimPulse | 9 | 0 | 1 |
| 38 | 4345.00 | 0.89 | 92.34 | 95.00 | 4308.80 | 251.12 | -341.89 | 236.60 | 415.78 | 145.32 | 0.41 | SlimPulse | 9 | 0 | 1 |
| 39 | 4439.00 | 0.56 | 176.36 | 94.00 | 4402.79 | 251.90 | -342.38 | 237.36 | 416.60 | 145.27 | 1.06 | SlimPulse | 9 | 0 | 1 |
| 40 | 4534.00 | 0.30 | 205.70 | 95.00 | 4497.79 | 251.85 | -343.07 | 237.28 | 417.13 | 145.33 | 0.35 | SlimPulse | 9 | 0 | 1 |
| 41 | 4629.00 | 0.25 | 295.99 | 95.00 | 4592.79 | 251.56 | -343.20 | 236.99 | 417.06 | 145.37 | 0.41 | SlimPulse | 9 | 0 | 1 |
| 42 | 4724.00 | 0.29 | 271.81 | 95.00 | 4687.79 | 251.13 | -343.10 | 236.56 | 416.77 | 145.41 | 0.13 | SlimPulse | 9 | 0 | 1 |
| 43 | 4818.00 | 0.23 | 305.88 | 94.00 | 4781.79 | 250.73 | -342.98 | 236.17 | 416.44 | 145.45 | 0.17 | SlimPulse | 9 | 0 | 1 |
| 44 | 4913.00 | 0.46 | 352.77 | 95.00 | 4876.78 | 250.51 | -342.49 | 235.97 | 415.91 | 145.43 | 0.36 | SlimPulse | 9 | 0 | 1 |
| 45 | 5007.00 | 0.12 | 57.54 | 94.00 | 4970.78 | 250.53 | -342.07 | 236.01 | 415.58 | 145.40 | 0.45 | SlimPulse | 9 | 0 | 1 |
| 46 | 5102.00 | 7.51 | 96.55 | 95.00 | 5065.51 | 256.81 | -342.72 | 242.27 | 419.72 | 144.74 | 7.81 | SlimPulse | 9 | 0 | 1 |
| 47 | 5197.00 | 14.46 | 97.52 | 95.00 | 5158.71 | 274.84 | -344.99 | 260.21 | 432.12 | 142.97 | 7.32 | SlimPulse | 9 | 0 | 1 |
| 48 | 5292.00 | 22.19 | 90.03 | 95.00 | 5248.84 | 304.63 | -346.55 | 289.96 | 451.87 | 140.08 | 8.49 | SlimPulse | 9 | 0 | 1 |
| 49 | 5386.00 | 31.06 | 89.76 | 94.00 | 5332.78 | 346.67 | -346.46 | 332.05 | 479.89 | 136.22 | 9.44 | SlimPulse | 9 | 0 | 1 |
| 50 | 5481.00 | 39.77 | 88.49 | 95.00 | 5410.13 | 401.57 | -345.55 | 387.03 | 518.83 | 131.76 | 9.20 | SlimPulse | 9 | 0 | 1 |
| 51 | 5576.00 | 48.62 | 88.03 | 95.00 | 5478.18 | 467.55 | -343.52 | 453.16 | 568.64 | 127.16 | 9.32 | SlimPulse | 9 | 0 | 1 |
| 52 | 5670.00 | 56.82 | 88.17 | 94.00 | 5535.07 | 542.06 | -341.05 | 527.85 | 628.44 | 122.87 | 8.72 | SlimPulse | 9 | 0 | 1 |
| 53 | 5765.00 | 63.37 | 88.01 | 95.00 | 5582.40 | 624.12 | -338.30 | 610.11 | 697.64 | 119.01 | 6.90 | SlimPulse | 9 | 0 | 1 |
| 54 | 5860.00 | 68.67 | 87.62 | 95.00 | 5621.00 | 710.61 | -334.99 | 696.82 | 773.16 | 115.68 | 5.59 | SlimPulse | 9 | 0 | 1 |
| 55 | 5954.00 | 75.74 | 86.17 | 94.00 | 5649.71 | 799.63 | -330.12 | 786.13 | 852.62 | 112.78 | 7.66 | SlimPulse | 9 | 0 | 1 |
| 56 | 6008.00 | 81.36 | 87.15 | 54.00 | 5660.43 | 852.26 | -327.04 | 838.94 | 900.43 | 111.30 | 10.56 | SlimPulse | 9 | 0 | 1 |
| 57 | 6078.00 | 85.59 | 85.62 | 70.00 | 5668.38 | 921.39 | -322.65 | 908.33 | 963.94 | 109.56 | 6.43 | SlimPulse | 0 | 0 | 0 |
| 58 | 6172.00 | 85.49 | 85.24 | 94.00 | 5675.68 | 1014.40 | -315.19 | 1001.75 | 1050.16 | 107.47 | 0.41 | SlimPulse | 0 | 0 | 0 |
| 59 | 6266.00 | 86.46 | 85.81 | 94.00 | 5682.28 | 1107.48 | -307.88 | 1095.23 | 1137.70 | 105.70 | 1.19 | SlimPulse | 0 | 0 | 0 |
| 60 | 6360.00 | 88.52 | 84.56 | 94.00 | 5686.40 | 1200.63 | -299.99 | 1188.80 | 1226.08 | 104.16 | 2.57 | SlimPulse | 0 | 0 | 0 |
| 61 | 6455.00 | 89.52 | 86.38 | 95.00 | 5688.02 | 1294.90 | -292.50 | 1283.49 | 1316.40 | 102.84 | 2.19 | SlimPulse | 0 | 0 | 0 |
| 62 | 6549.00 | 91.72 | 88.39 | 94.00 | 5687.01 | 1388.51 | -288.21 | 1377.37 | 1407.22 | 101.82 | 3.17 | SlimPulse | 0 | 0 | 0 |
| 63 | 6644.00 | 91.89 | 90.23 | 95.00 | 5684.02 | 1483.32 | -287.07 | 1472.32 | 1500.03 | 101.03 | 1.95 | SlimPulse | 0 | 0 | 0 |
| 64 | 6739.00 | 92.92 | 89.92 | 95.00 | 5680.03 | 1578.15 | -287.20 | 1567.23 | 1593.34 | 100.38 | 1.13 | SlimPulse | 0 | 0 | 0 |
| 65 | 6834.00 | 90.14 | 90.12 | 95.00 | 5677.49 | 1673.02 | -287.24 | 1662.19 | 1686.81 | 99.80 | 2.94 | SlimPulse | 0 | 0 | 0 |
| 66 | 6928.00 | 90.83 | 90.09 | 94.00 | 5676.70 | 1766.94 | -287.41 | 1756.18 | 1779.56 | 99.29 | 0.73 | SlimPulse | 0 | 0 | 0 |
| 67 | 7023.00 | 91.65 | 94.39 | 95.00 | 5674.65 | 1861.89 | -291.12 | 1851.07 | 1873.82 | 98.94 | 4.61 | SlimPulse | 0 | 0 | 0 |
| 68 | 7118.00 | 90.28 | 95.67 | 95.00 | 5673.05 | 1956.78 | -299.45 | 1945.68 | 1968.60 | 98.75 | 1.98 | SlimPulse | 0 | 0 | 0 |
| 69 | 7212.00 | 89.11 | 93.64 | 94.00 | 5673.56 | 2050.70 | -307.08 | 2039.36 | 2062.37 | 98.56 | 2.49 | SlimPulse | 2 | 0 | 0 |
| 70 | 7307.00 | 89.00 | 90.69 | 95.00 | 5675.13 | 2145.68 | -310.67 | 2134.27 | 2156.76 | 98.28 | 3.11 | SlimPulse | 0 | 0 | 0 |
| 71 | 7402.00 | 87.25 | 87.51 | 95.00 | 5678.24 | 2240.45 | -309.18 | 2229.19 | 2250.52 | 97.90 | 3.82 | SlimPulse | 2 | 0 | 0 |
| 72 | 7496.00 | 86.59 | 86.72 | 94.00 | 5683.29 | 2333.90 | -304.45 | 2322.94 | 2342.81 | 97.47 | 1.09 | SlimPulse | 0 | 0 | 0 |
| 73 | 7591.00 | 88.62 | 85.68 | 95.00 | 5687.25 | 2428.24 | -298.16 | 2417.64 | 2435.96 | 97.03 | 2.40 | SlimPulse | 0 | 0 | 0 |
| 74 | 7686.00 | 89.86 | 86.35 | 95.00 | 5688.50 | 2522.63 | -291.55 | 2512.40 | 2529.27 | 96.62 | 1.48 | SlimPulse | 0 | 0 | 0 |
| 75 | 7780.00 | 89.35 | 85.68 | 94.00 | 5689.15 | 2616.03 | -285.02 | 2606.17 | 2621.72 | 96.24 | 0.89 | SlimPulse | 0 | 0 | 0 |
| 76 | 7875.00 | 89.24 | 87.16 | 95.00 | 5690.32 | 2710.49 | -279.09 | 2700.97 | 2715.35 | 95.90 | 1.56 | SlimPulse | 0 | 0 | 0 |
| 77 | 7969.00 | 89.17 | 88.51 | 94.00 | 5691.62 | 2804.17 | -275.54 | 2794.90 | 2808.43 | 95.63 | 1.44 | SlimPulse | 0 | 0 | 0 |
| 78 | 8064.00 | 87.97 | 87.59 | 95.00 | 5693.98 | 2898.86 | -272.30 | 2889.81 | 2902.62 | 95.38 | 1.59 | SlimPulse | 0 | 0 | 0 |
| 79 | 8158.00 | 89.24 | 88.09 | 94.00 | 5696.26 | 2992.52 | -268.76 | 2983.71 | 2995.80 | 95.15 | 1.45 | SlimPulse | 0 | 0 | 0 |
| 80 | 8253.00 | 88.80 | 88.21 | 95.00 | 5697.89 | 3087.24 | -265.70 | 3078.65 | 3090.09 | 94.93 | 0.49 | SlimPulse | 0 | 0 | 0 |
| 81 | 8348.00 | 88.01 | 87.52 | 95.00 | 5700.54 | 3181.89 | -262.16 | 3173.54 | 3184.35 | 94.72 | 1.10 | SlimPulse | 0 | 0 | 0 |
| 82 | 8442.00 | 89.28 | 87.75 | 94.00 | 5702.77 | 3275.53 | -258.28 | 3267.44 | 3277.62 | 94.52 | 1.37 | SlimPulse | 0 | 0 | 0 |
| 83 | 8537.00 | 88.97 | 87.51 | 95.00 | 5704.22 | 3370.18 | -254.35 | 3362.34 | 3371.95 | 94.33 | 0.41 | SlimPulse | 0 | 0 | 0 |
| 84 | 8632.00 | 88.52 | 86.97 | 95.00 | 5706.30 | 3464.76 | -249.78 | 3457.21 | 3466.21 | 94.13 | 0.74 | SlimPulse | 0 | 0 | 0 |
| 85 | 8726.00 | 88.31 | 86.78 | 94.00 | 5708.90 | 3558.28 | -244.65 | 3551.03 | 3559.45 | 93.94 | 0.30 | SlimPulse | 0 | 0 | 0 |
| 86 | 8821.00 | 89.62 | 87.58 | 95.00 | 5710.61 | 3652.85 | -239.98 | 3645.90 | 3653.81 | 93.77 | 1.62 | SlimPulse | 0 | 0 | 0 |
| 87 | 8916.00 | 90.00 | 86.85 | 95.00 | 5710.93 | 3747.45 | -235.37 | 3740.70 | 3748.20 | 93.60 | 0.87 | SlimPulse | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|-----|----------|-------|-------|-------|---------|---------|---------|---------|---------|-------|------|-----------|---|---|---|
| 87 | 8916.00 | 90.00 | 88.63 | 95.00 | 5710.92 | 3747.43 | -233.37 | 3740.79 | 3748.20 | 93.60 | 0.87 | SlimPulse | 0 | 0 | 0 |
| 88 | 9011.00 | 90.41 | 87.89 | 95.00 | 5710.58 | 3842.08 | -231.01 | 3835.68 | 3842.65 | 93.45 | 1.18 | SlimPulse | 0 | 0 | 0 |
| 89 | 9105.00 | 89.86 | 90.26 | 94.00 | 5710.35 | 3935.90 | -229.50 | 3929.67 | 3936.35 | 93.34 | 2.59 | SlimPulse | 0 | 0 | 0 |
| 90 | 9200.00 | 89.86 | 89.85 | 95.00 | 5710.58 | 4030.82 | -229.59 | 4024.66 | 4031.20 | 93.26 | 0.43 | SlimPulse | 0 | 0 | 0 |
| 91 | 9295.00 | 90.28 | 89.26 | 95.00 | 5710.47 | 4125.70 | -228.86 | 4119.66 | 4126.02 | 93.18 | 0.76 | SlimPulse | 0 | 0 | 0 |
| 92 | 9389.00 | 89.28 | 90.29 | 94.00 | 5710.83 | 4219.59 | -228.49 | 4213.66 | 4219.85 | 93.10 | 1.52 | SlimPulse | 0 | 0 | 0 |
| 93 | 9484.00 | 89.52 | 92.41 | 95.00 | 5711.83 | 4314.56 | -230.73 | 4308.62 | 4314.80 | 93.07 | 2.24 | SlimPulse | 0 | 0 | 0 |
| 94 | 9579.00 | 89.35 | 93.46 | 95.00 | 5712.77 | 4409.55 | -235.58 | 4403.49 | 4409.78 | 93.06 | 1.12 | SlimPulse | 0 | 0 | 0 |
| 95 | 9673.00 | 88.69 | 92.99 | 94.00 | 5714.38 | 4503.53 | -240.87 | 4497.33 | 4503.77 | 93.07 | 0.85 | SlimPulse | 0 | 0 | 0 |
| 96 | 9768.00 | 85.91 | 90.76 | 95.00 | 5718.85 | 4598.40 | -243.99 | 4592.15 | 4598.62 | 93.04 | 3.76 | SlimPulse | 0 | 0 | 0 |
| 97 | 9863.00 | 85.94 | 89.87 | 95.00 | 5725.60 | 4693.09 | -244.51 | 4686.91 | 4693.27 | 92.99 | 0.93 | SlimPulse | 0 | 0 | 0 |
| 98 | 9958.00 | 86.39 | 89.23 | 95.00 | 5731.95 | 4787.76 | -243.77 | 4781.70 | 4787.89 | 92.92 | 0.82 | SlimPulse | 2 | 0 | 0 |
| 99 | 10053.00 | 86.87 | 89.18 | 95.00 | 5737.54 | 4882.44 | -242.46 | 4876.52 | 4882.55 | 92.85 | 0.50 | SlimPulse | 0 | 0 | 0 |
| 100 | 10077.00 | 86.84 | 89.49 | 24.00 | 5738.86 | 4906.37 | -242.18 | 4900.48 | 4906.46 | 92.83 | 1.28 | SlimPulse | 0 | 0 | 0 |
| 101 | 10142.00 | 86.84 | 89.49 | 65.00 | 5742.44 | 4971.18 | -241.60 | 4965.38 | 4971.26 | 92.79 | 0.00 | SlimPulse | 9 | 0 | 7 |

Calibration Report

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run001

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

893

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 24-May-2014

| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit | | |
|----------------------------|------|--------|---------|-----------|--------|------------|--|--|
| Gamma Ray Calibration Gain | | Master | 1.0000 | 0.9000 | 1.0645 | 1.1000 | | |

SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run003

Primary Equipment :

Elec. cartridge, 150C max with GR

SPEC

939

GRGain - Gamma Ray: Blanket

Master (Time Frame File): 12:00:00 24-May-2014

| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit | | |
|----------------------------|------|--------|---------|-----------|--------|------------|--|--|
| Gamma Ray Calibration Gain | | Master | 1.0000 | 0.9000 | 1.0645 | 1.1000 | | |

| | |
|----------|------------------------|
| Company: | Noble Energy |
| Well: | Rohn State LD03-64-1HN |
| Field: | Wagon Wheel |

Field: Wattenberg
County: Weld
State: Colorado
Country: USA



SlimPulse - Gamma Ray

1 in / 100 ft & 5 in / 100 ft True Vertical Depth

Recorded Mode, Composite Log