



REALTIME AND MEMORY LOG

Natural Formation Evaluation
Multiple Propagation Resistivity
Gamma Ray

Scale:

1:240

MEASURED DEPTH

Company: Anadarko E&P

Well: Wishbone 29C-24HZ

Field: Weld County (Kerr McGee)

County Weld State Colorado

Status:

FINAL PRINT

Surface Location:

Latitude: 40° 7' 2.622" N

Longitude: 104° 43' 53.288" W

Other Services:

Directional

API Number:
05-123-37153

Section:24

TWN: 2N

Range 66E

Permanent Datum (P.D.): Ground Level _____ Elevation: 19.00 ft.

Log Measured From: Kelly Bushing _____ 19.00 ft. Above P.D.

Depth Reference: Driller's Depth _____

Elevations: 19.00 ft. N/A

KB: _____
DF: _____
GL: 5080.00 ft.

Interval Logged

Top: 6846 ft.

Bottom: 11959 ft.

Spud Date: 10/Jun/13

Dates

Date From: 11/Jun/13

Date To: 18/Jun/13

Total

Magnetic Field Reference

Dip Angle: 66.93°

Azi Reference North: True

Mag to Reference

Field Strength: 52959.0 nT

North Correction: 8.41°

Borehole Record

Casing Record

| Hole Size | From | To | Size | Weight | From | To |
|------------|----------|-----------|-----------|-------------|---------|----------|
| 13,500 in. | Surface | 1029 ft. | 9,600 in. | 36.00 lb/ft | Surface | 1029 ft. |
| 8,500 in. | 1029 ft. | 7927 ft. | 7,000 in. | 26.00 lb/ft | Surface | 7917 ft. |
| 6,125 in. | 7927 ft. | 11999 ft. | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Mud Record

Deviation Record

| Type | From | To | Hole Size | Interval | Inc / Az (Start) | Inc / Az (End) |
|-------------|---------|-----------|------------|----------------|------------------|----------------|
| Water Based | Surface | 11999 ft. | 13,500 in. | Surface | 0.0° / 0.0° | 0.7° / 142.5° |
| | | | 8,500 in. | Vertical/Curve | 0.7° / 142.5° | 87.4° / 1.0° |
| | | | 6,125 in. | Lateral | 87.4° / 1.0° | 90.2° / 359.5° |
| | | | | | / | / |
| | | | | | / | / |
| | | | | | / | / |
| | | | | | / | / |

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Log Run Summary

| LWD Run No. | BHA Run No. | Bit Run No. | Bit Size (in.) | Bit Type | Bit Gauge Length (in.) | Assembly Type | Logged Interval | | Bit Depth Interval | | Date / Time | | Circ. Time (hrs.) |
|-------------|-------------|-------------|----------------|----------|------------------------|---------------|-----------------|-------------|--------------------|---------|-------------------|-------------------|-------------------|
| | | | | | | | Top (m.) | Bottom (m.) | From (m.) | To (m.) | Start | End | |
| 1 | 1 | 2 | 8.750 | PDC | | Mud Motor | 6846 | 7883 | 6846 | 7927 | 11/Jun/2013 09:00 | 11/Jun/2014 12:30 | 43.75 |
| 2 | 2 | 3 | 6.125 | PDC | | Mud Motor | 7883 | 7883 | 7927 | 7927 | 14/Jun/2013 16:15 | 14/Jul/2014 18:40 | 0.75 |
| 3 | 3 | 4 | 6.125 | PDC | | Mud Motor | 7883 | 11959 | 7927 | 11999 | 15/Jun/2013 20:35 | 18/Jun/2013 00:50 | 29.14 |

Crew

| Name | Arrive | Depart | Name | Arrive | Depart | Name | Arrive | Depart |
|-----------|------------|------------|----------------|------------|------------|-------------------|------------|------------|
| | Wellsite | Wellsite | | Wellsite | Wellsite | | Wellsite | Wellsite |
| Greg Dore | 10/June/13 | 17/June/13 | Kevin Sheridan | 10/June/13 | 17/June/13 | Jeremiah Davidson | 15/June/13 | 17/June/13 |

Mud Properties Record

| Date / Time | | LWD Run No. | Measured Depth (m.) | Mud Type | Density (sg) | Viscosity (cp) | pH | Fluid Loss (cc) | Oil / Water | Source | Total Chlorides (ppm) | K+ (%) |
|-------------|-------|----------------|---------------------------|-----------------|-----------------|-------------------|-----|-----------------------|----------------|---------|-----------------------------|-----------|
| 12/June/13 | 06:30 | 1 | 6030 | Water Based Mud | 8.5 | 26 | 7.0 | N/A | 0/99.4 | Mud Pit | 1300 | N/A |
| 15/June/13 | 05:00 | 3 | 7810 | Water Based Mud | 9.7 | 39 | 9.0 | N/A | 0/93 | Mud Pit | 1800 | N/A |

Mud Resistivity Record

| | | | | Surface | | | | Downhole | | | |
|-------------|-------|----------------|---------------------------|----------------------------|---------------|----------------|----------------|-----------------|-------------------------|--------------------------|--------------------------|
| Date / Time | | LWD Run No. | Measured Depth (m.) | Surface Temp (deg C) | Rm (ohm.m) | Rmf (ohm.m) | Rmc (ohm.m) | BHCT (deg C) | Rm @ BHCT (ohm.m) | Rmf @ BHCT (ohm.m) | Rmc @ BHCT (ohm.m) |
| 16/Jun/2013 | 07:16 | 3 | 8032 | 70 | 1.05 | N/A | N/A | 193 | 0.40 | N/A | N/A |
| 16/Jun/2013 | 22:15 | 3 | 10319 | 74 | 1.28 | N/A | N/A | 225 | 0.43 | N/A | N/A |
| 17/Jun/2013 | 04:15 | 3 | 10970 | 64 | 1.37 | N/A | N/A | 234 | 0.39 | N/A | N/A |

Mnemonics

| Curve | Description | Units |
|---------|--|----------|
| CACHM | Conductivity (AT) (LS) 2 MHZ – Compensated Borehole Corrected | mho/o |
| GRAX | Gamma Ray Apparent, 0.5 ft. Avg | API |
| GRIX | Gamma Ray Data Density | points |
| GRAM | Gamma Ray Apparent, 0.5 ft. Avg | API |
| GRIM | Gamma Ray Data Density | points |
| GRTX | Gamma Time Since Drilled | min |
| RACHM | Resistivity (AT) (LS) 2 MHZ – Compensated Borehole Corrected | ohm.m |
| RACLM | Resistivity (AT) (LS) 400 kHz – Compensated Borehole Corrected | ohm.m |
| RPCHM | Resistivity (PD) (LS) 2 MHZ – Compensated Borehole Corrected | ohm.m |
| RPCLM | Resistivity (PD) (LS) 400 kHz – Compensated Borehole Corrected | ohm.m |
| RPSIHM | Resistivity Slide Indicator | unitless |
| RPTHM | Time Since Drilled (RPCHM) | min |
| TCDM | Downhole Temperature | degF |
| TCDX | Downhole Temperature | degF |
| ROP_AVG | Rate of Penetration, 3.0 ft. Avg | ft/hr |
| | | |

Equipment and Service Data

| LWD Run No. | Tool | Serial Number | Measurement | Bit Offset (m.) | Max O.D. (in.) | Min I.D. (in.) |
|-------------------|------|------------------|-------------|-----------------------|----------------------|----------------------|
| 1 | DIR | 12323378 | Directional | 47.09 | 6.750 | 3.500 |
| 1 | SRIG | 10473320 | Gamma | 43.71 | 6.750 | 0.000 |
| 2 | CS | 12161789 | - | 76.18 | 4.900 | 1.750 |
| 2 | BCPM | 12638199 | Telemetry | 65.08 | 5.140 | 1.750 |
| 2 | STAB | 11883702 | - | 62.19 | 0.000 | 1.750 |
| 2 | OTK | 11790139 | Directional | 56.49 | 5.066 | 1.750 |
| 2 | OTK | 11790139 | Resistivity | 43.31 | 5.066 | 1.750 |

| | | | | | | |
|---|------|----------|-------------|-------|-------|-------|
| 2 | OTK | 11790139 | Resistivity | 43.31 | 5.066 | 1.750 |
| 2 | OTK | 11790139 | Gamma | 51.80 | 5.066 | 1.750 |
| 2 | OTK | 11790139 | Pressure | 47.75 | 5.066 | 1.750 |
| 2 | CS | 10607808 | - | 37.40 | 5.000 | 1.750 |
| 3 | CS | 10568716 | - | 72.72 | 4.880 | 0.000 |
| 3 | BCPM | 12505248 | Telemetry | 61.76 | 5.140 | 0.000 |
| 3 | STAB | 10354300 | - | 58.94 | 0.000 | 1.750 |
| 3 | OTK | 10266171 | Directional | 54.40 | 4.843 | 2.569 |
| 3 | OTK | 10266171 | Resistivity | 48.43 | 4.843 | 2.569 |
| 3 | OTK | 10266171 | Gamma | 41.24 | 4.843 | 2.569 |
| 3 | OTK | 10266171 | Pressure | 43.87 | 4.843 | 2.569 |
| 3 | CS | 1043208 | - | 37.42 | 4.960 | 0.000 |

Service and Tool Mnemonics

| Mnemonic | Name | Description |
|----------|-----------------------|--|
| BCPM | BCPM | Mud pulse telemetry and downhole tool power module |
| DIR | Directional | Wellbore directional survey |
| OTK | OnTrak | Propagation resistivity, propagation conductivity, gamma ray, directional, annular pressure, system memory and VSS |
| SRIG | Inclination and Gamma | Probe based gamma ray and inclination module |
| STAB | Stabilizer | Stabilizer assembly |
| CS | Closure Sub | BHA power ring isolator allowing insertion of inert sub into electrically powered BHA |

Comments

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| <p>(1) Baker Hughes INTEQ run 1 utilized 6 1/2 inch NaviGamma services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 1029 to 7927 feet MD (1029 to 7506 feet TVD)</p> <p>(2) Baker Hughes INTEQ runs 2 and 3 utilized 4 3/4 inch OnTrak services (Multiple Propagation Resistivity, Gamma Ray, Directional) behind a 6 1/8 inch bit and steerable assembly from 7927 to 11999 feet MD (7606 to 7515 feet TVD)</p> <p>(3) A sliding indicator is shown to the right edge of track 2 as a heavy line. The indicator has been depth-shifted to resistivity sensor offset to correspond with resistivity data acquired while sliding.</p> |
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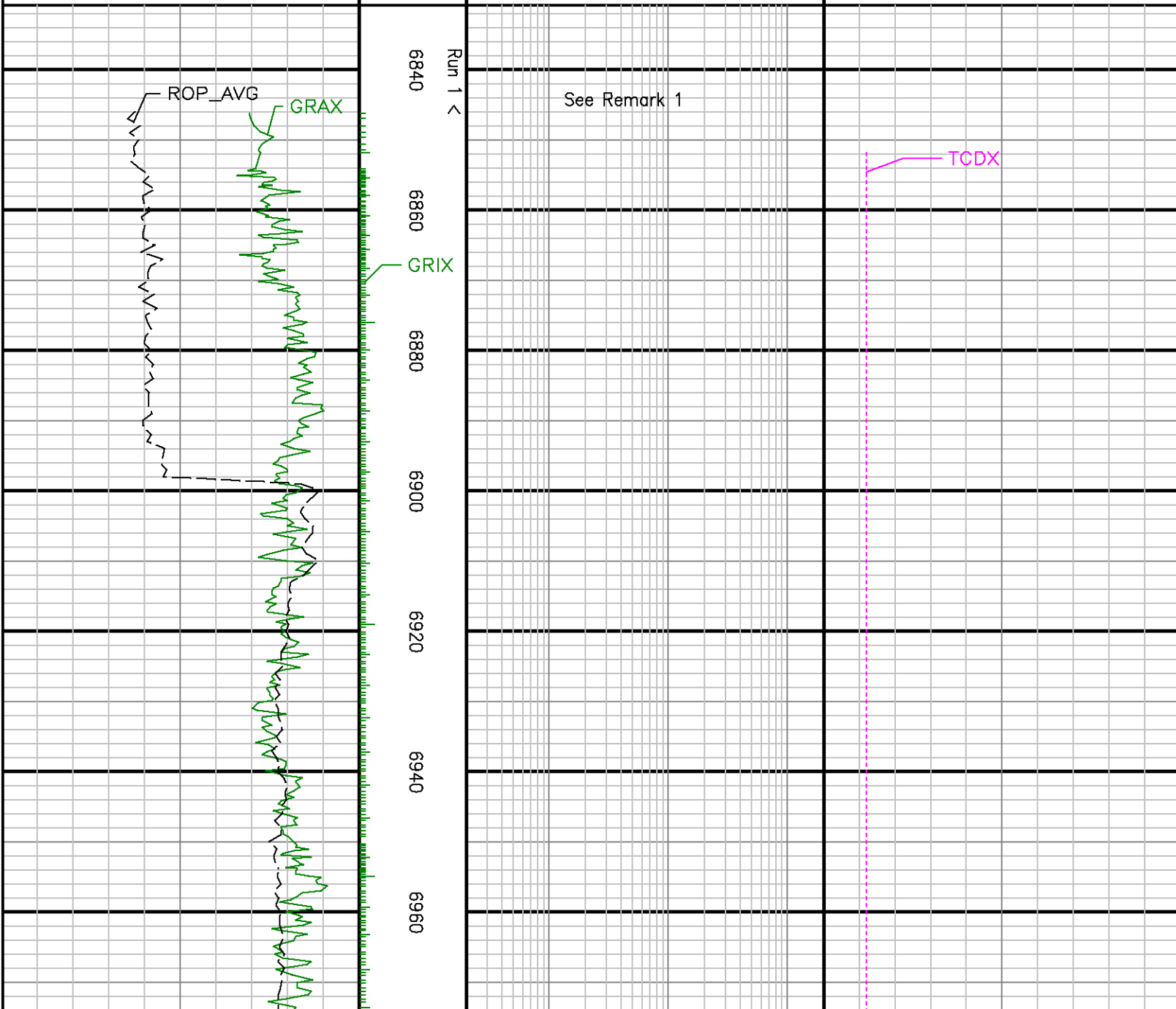
Remarks

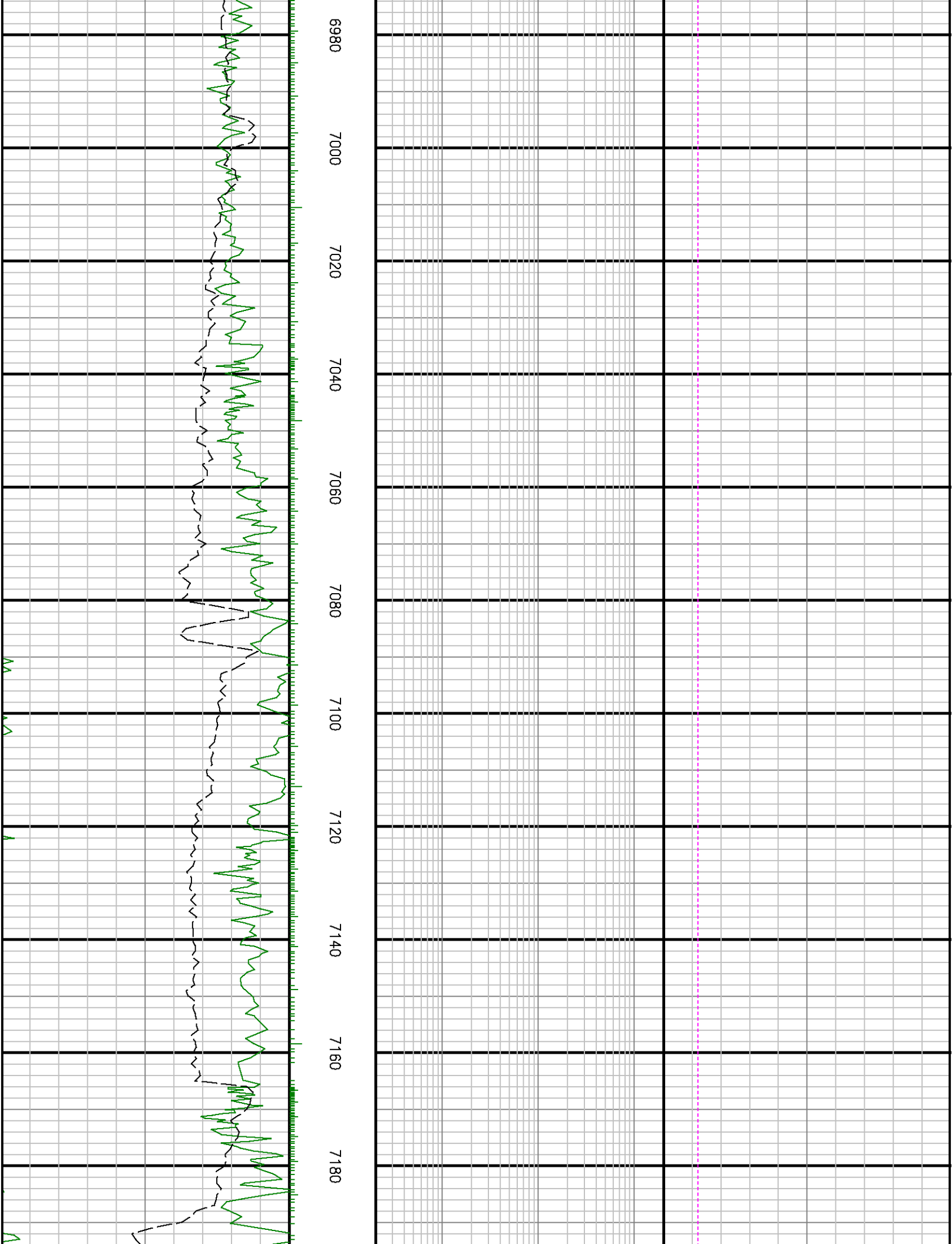
| Number | Measured | Hole | LWD | Remark |
|--------|---------------|------------------|---------|--|
| | Depth (m.) | Section (in.) | Run No. | |
| 1 | 6846 | 8.750 | 1 | The interval from 7555 to 7599 feet MD (7101 to 7103 feet TVD) was logged up to 60 hours after being drilled due to a trip out of the hole for casing and cement operations and picking up the lateral assembly. |
| 2 | 7884 | 6.125 | 3 | The interval from 7884 to 7899 feet MD (7504 to 7504 feet TVD) and from 7947 to 7956 feet MD (7506 to 7506 feet TVD) was not logged due to third party depth tracking issues. |
| 3 | 7891 | 6.125 | 3 | The variances in the memory data from 7891 to 7907 feet MD (7504 to 7505 feet TVD) is attenuated due to logging behind casing. |
| 4 | 11959 | 6.125 | 3 | The interval from 11959 to 11999 feet MD (7515 to 7515 feet TVD) was not logged due to sensor offsets to bit at TD. |
| | | | | |

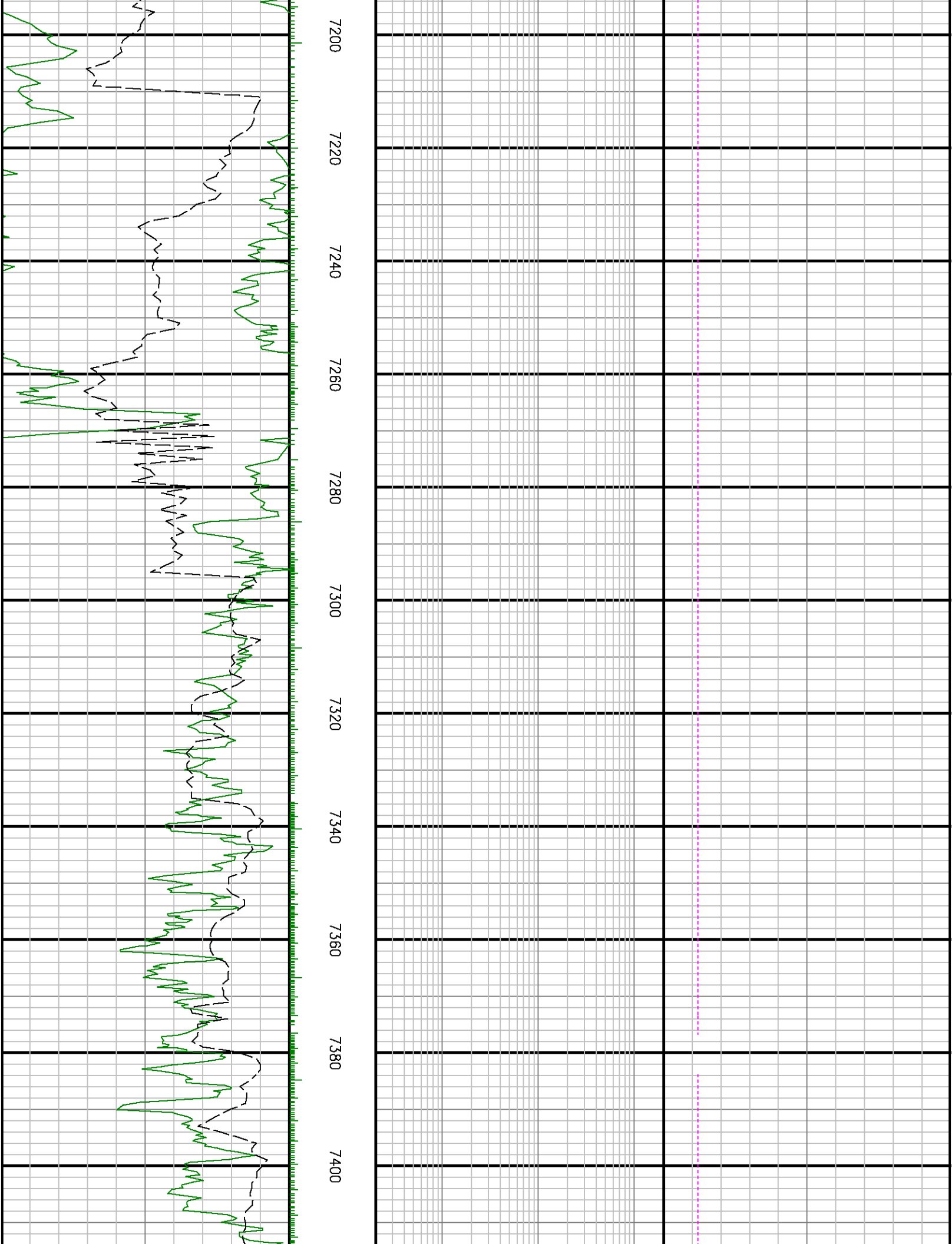


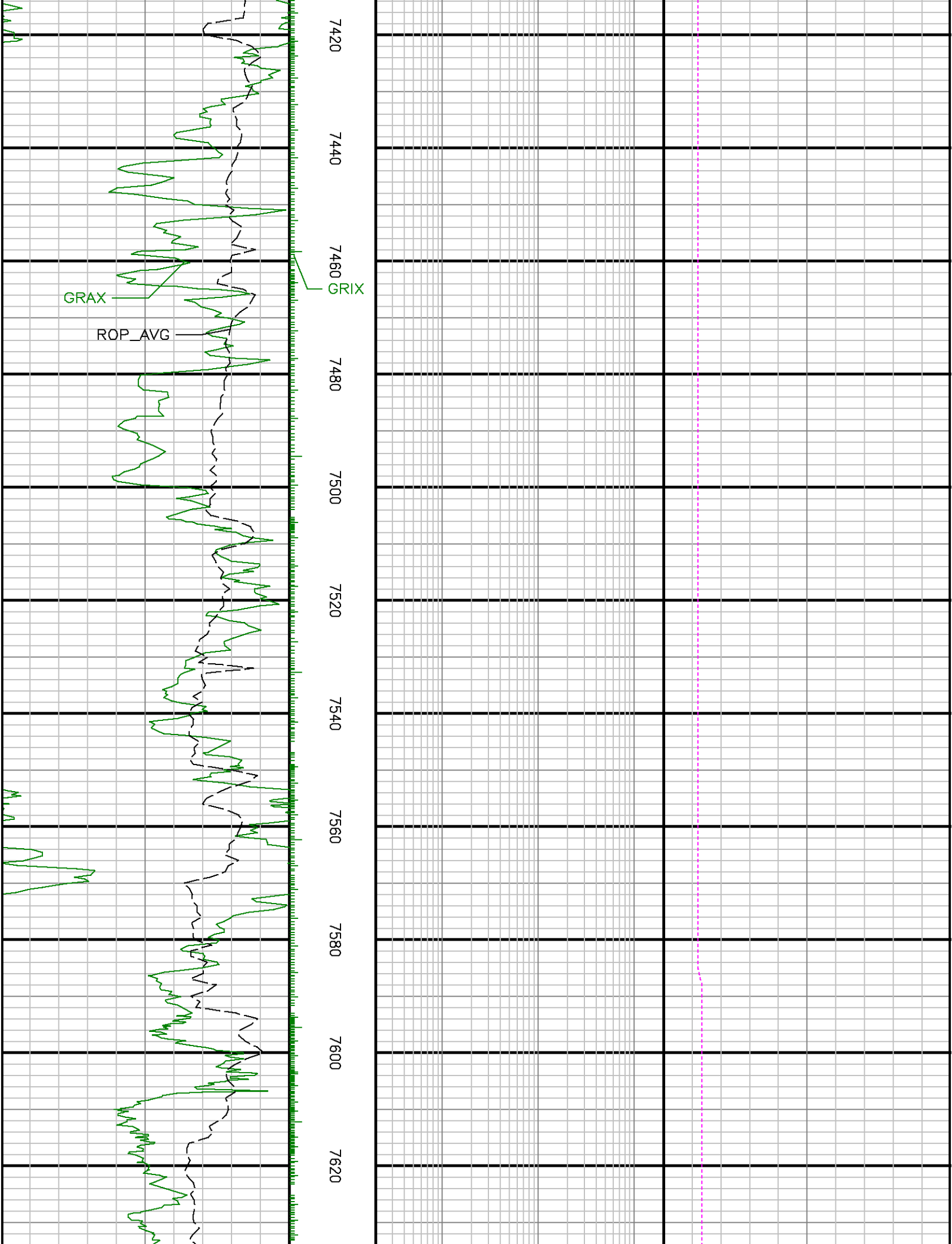
Company : Anadarko E&P
Well : Wishbone 29C-24HZ
Interval : 6830.82 - 12020.00 feet
Created : 18/Jun/2013 7:19:18 AM

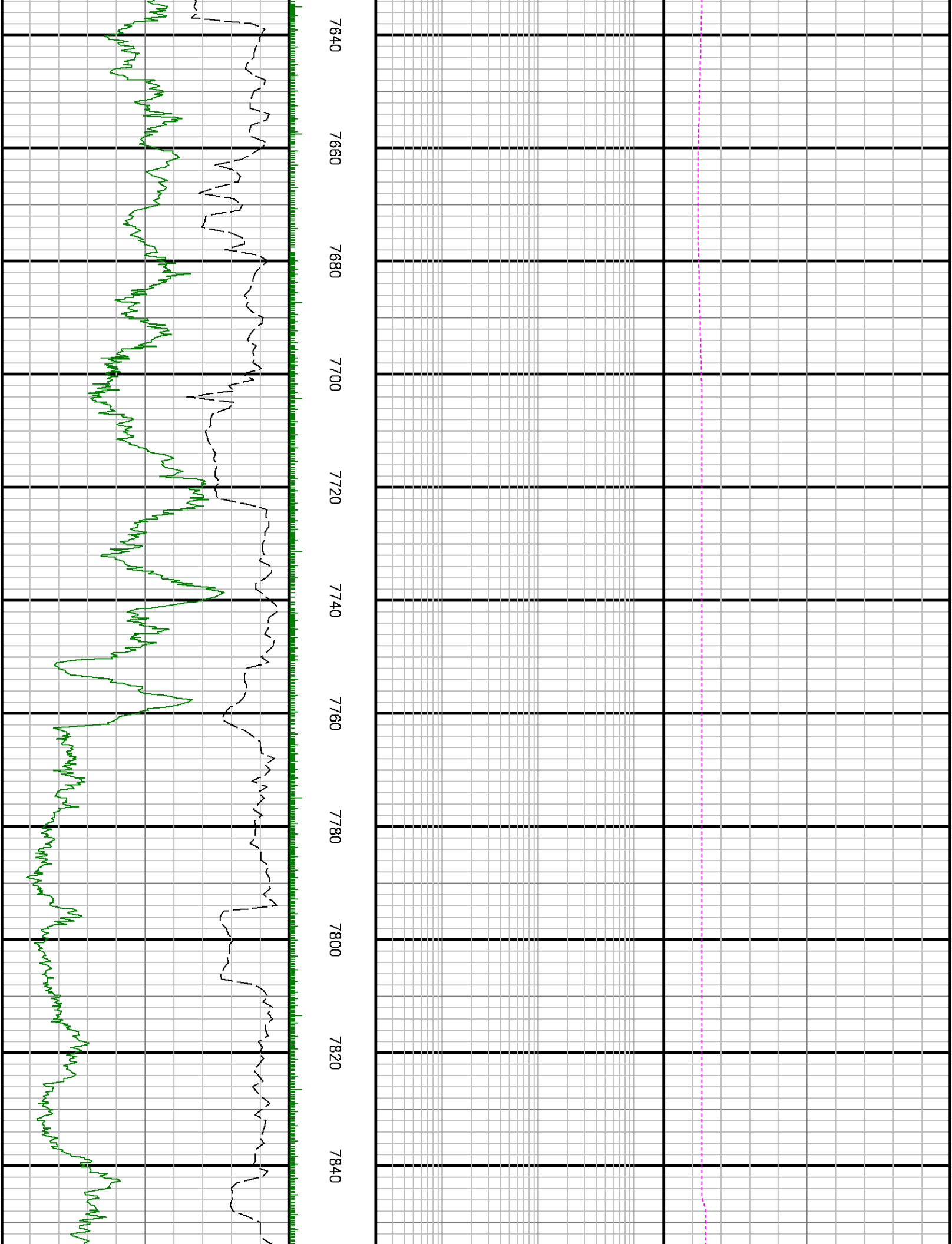
| | | | |
|--|---------------|---|--|
| Gamma Ray Apparent 0.5 ft Avg [GRAX] 0 150 API | MD feet 1:240 | Res PD LS 2MHz Corr [RPCHM] 0.2 200 ohm.m | Time Since Drilled [RPTHM] 0 600 min |
| Rate of Penetration 3.0 ft Avg [ROP_AVG] 500 0 ft/hr | | Res PD LS 400kHz Corr [RPCLM] 0.2 200 ohm.m | Downhole Temperature [TCDX] 150 350 degF |
| Gamma Ray Apparent 0.5 ft Avg [GRAM] 0 150 API | | Res AT LS 2MHz Corr [RACHM] 0.2 200 ohm.m | Con AT LS 2MHz Corr CACHM 40 0 mmho/m |
| | | Res AT LS 400kHz Corr [RACLM] 0.2 200 ohm.m | Downhole Temperature [TCDM] 150 350 degF |
| | | | |

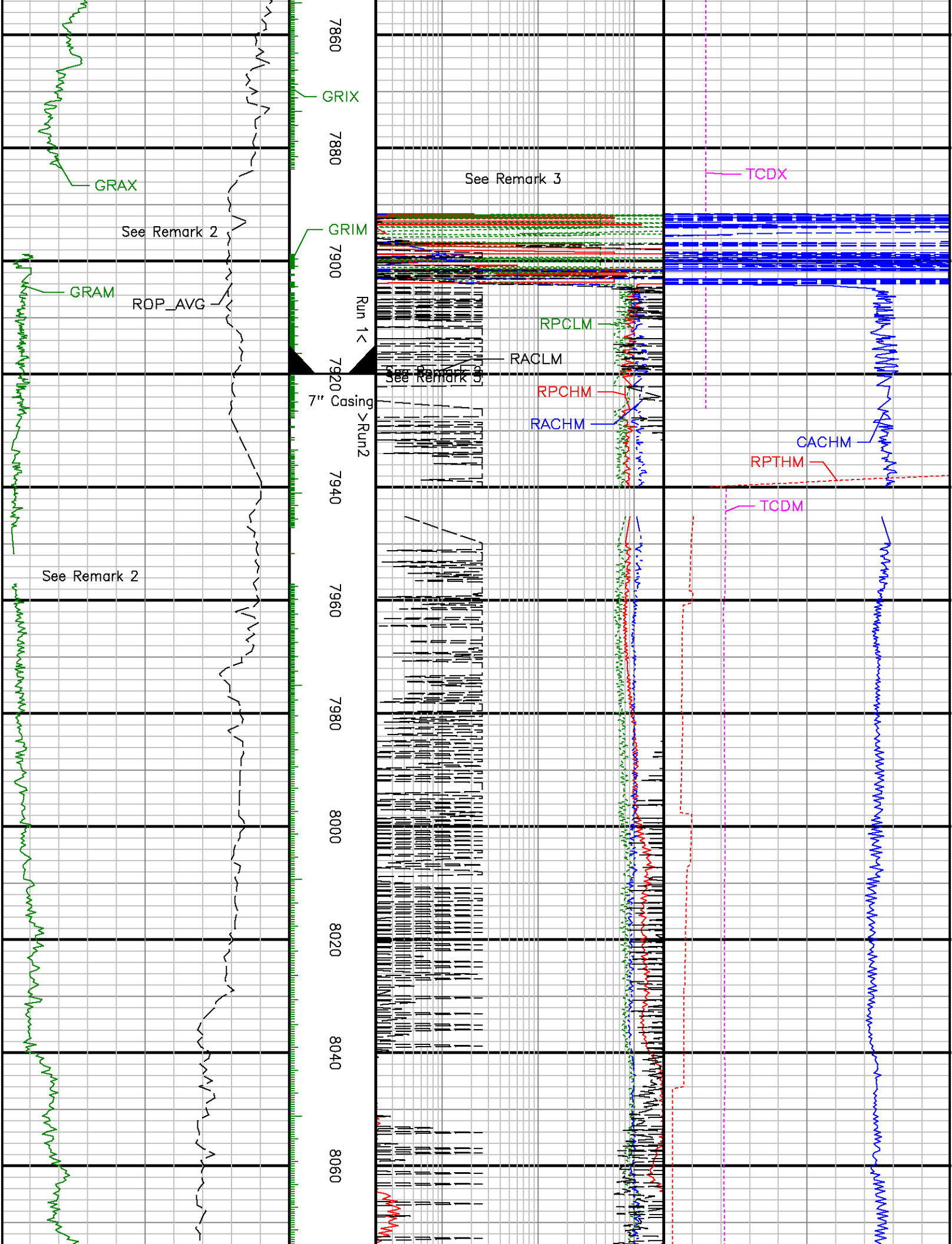


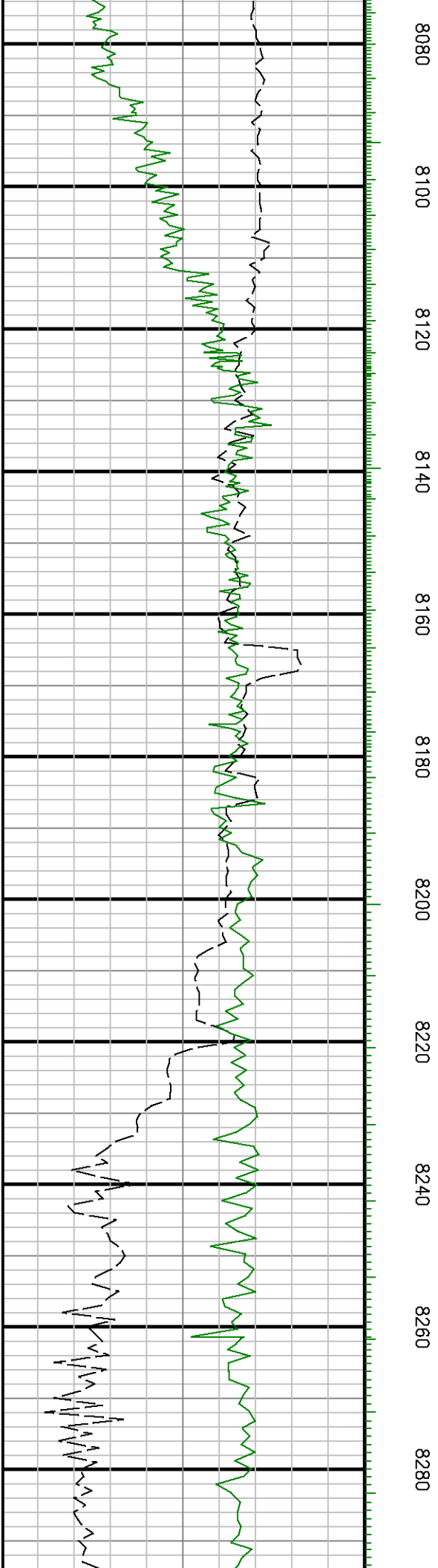
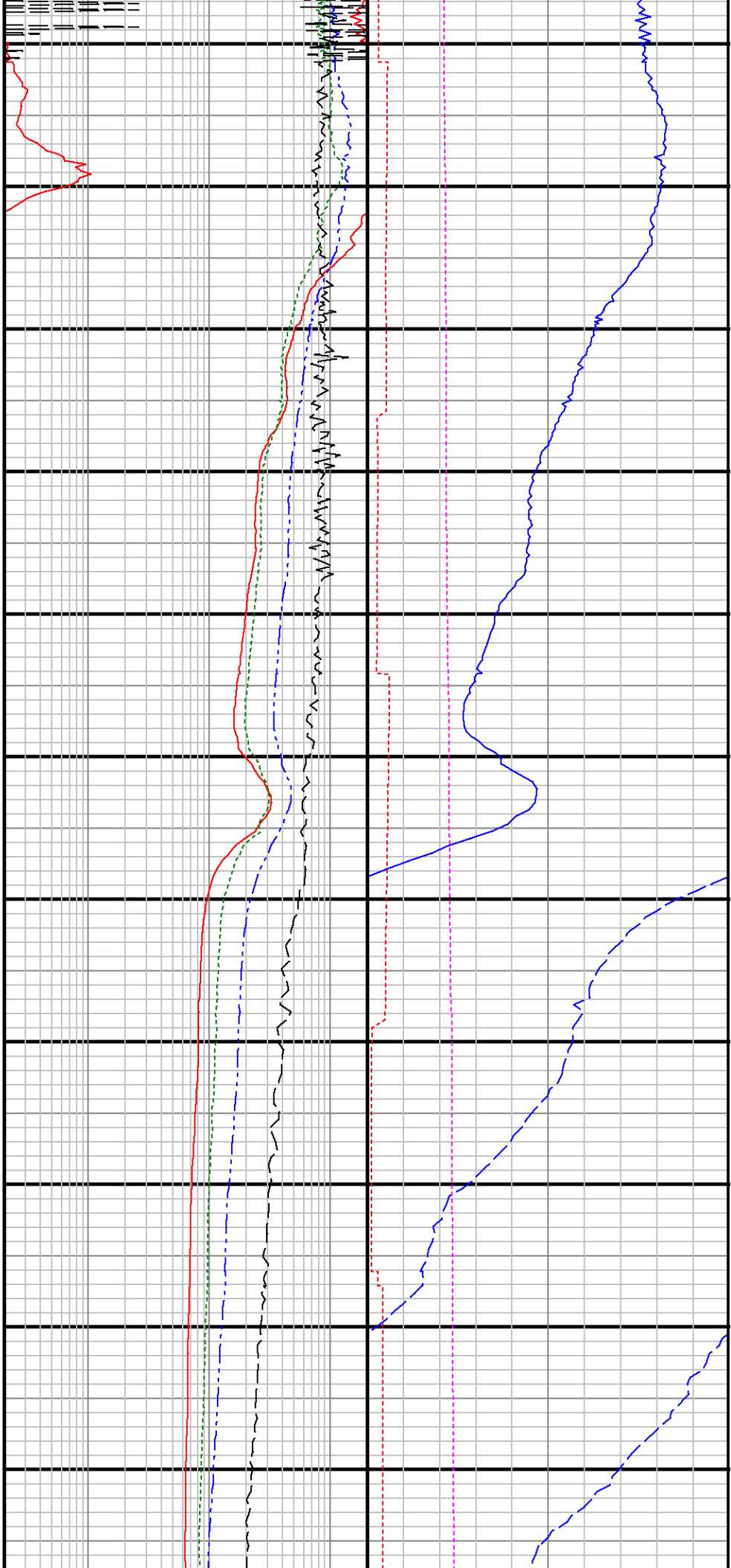


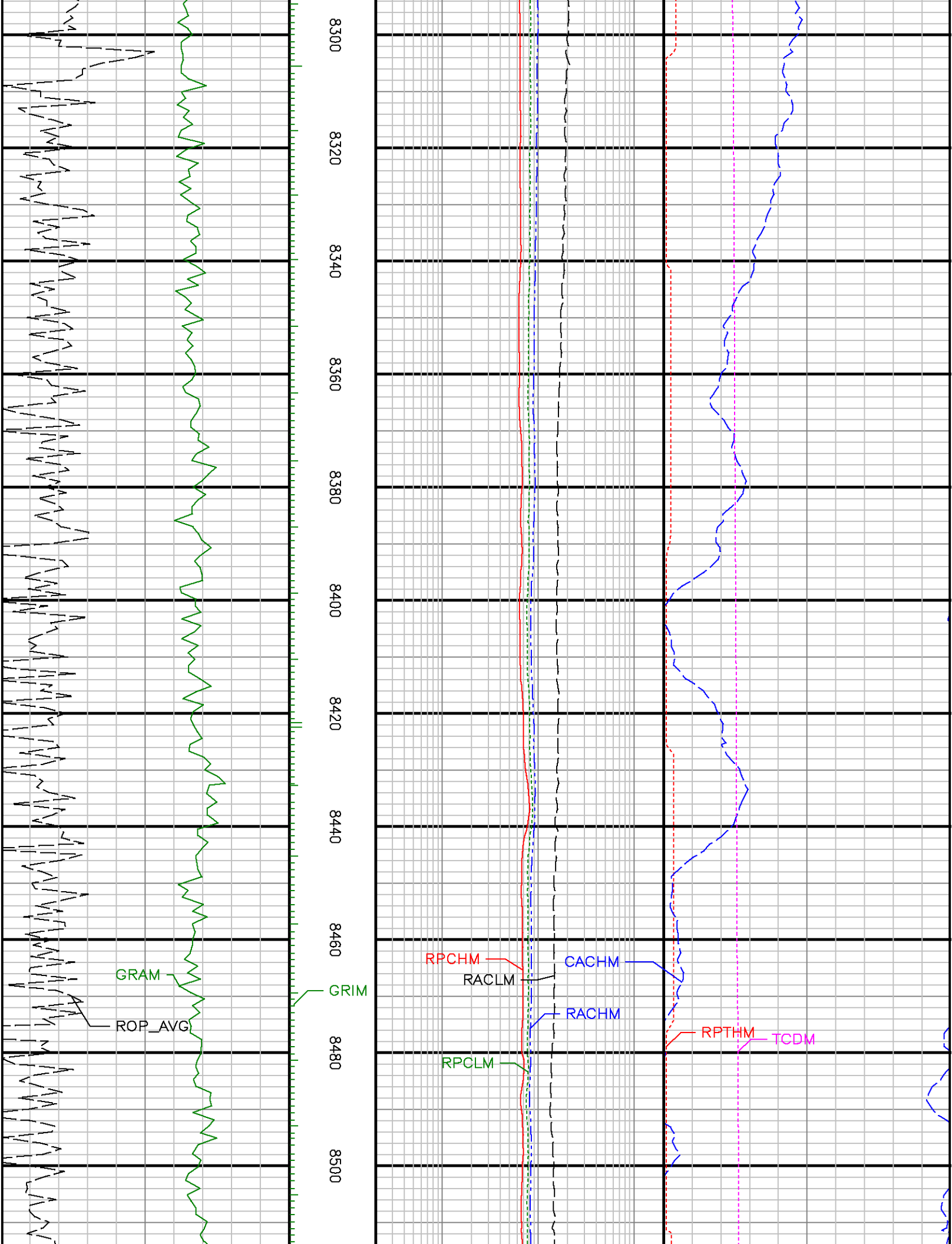


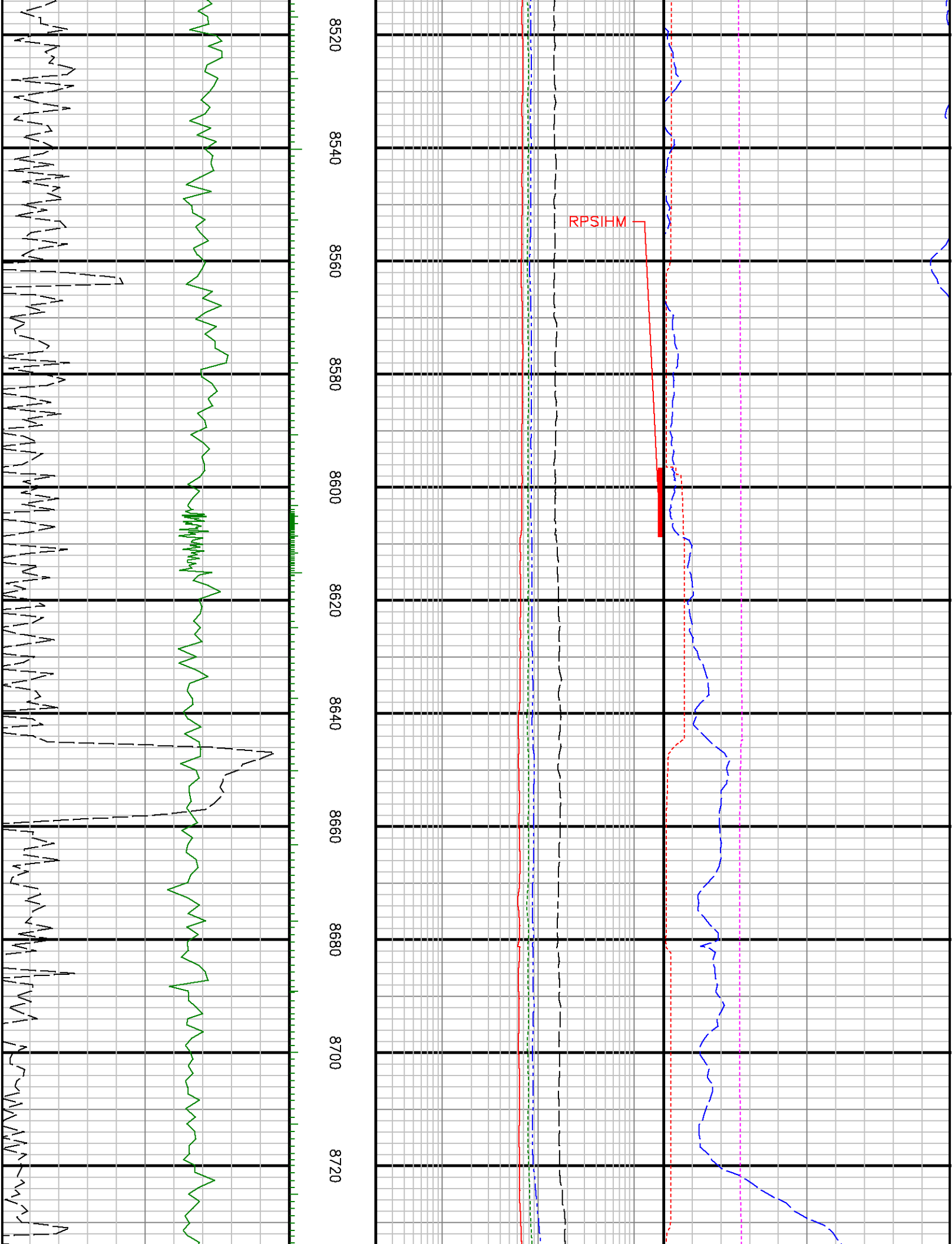


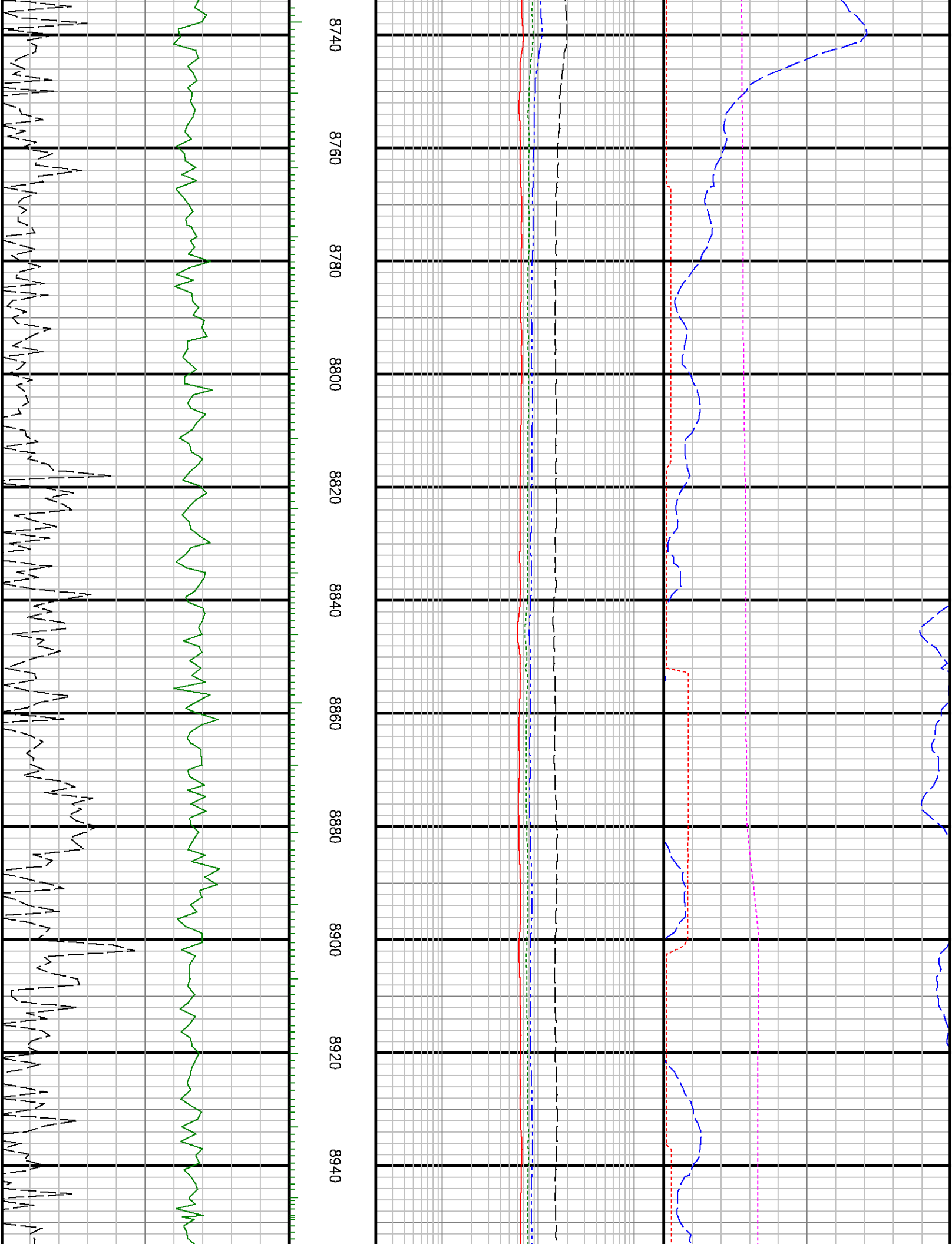


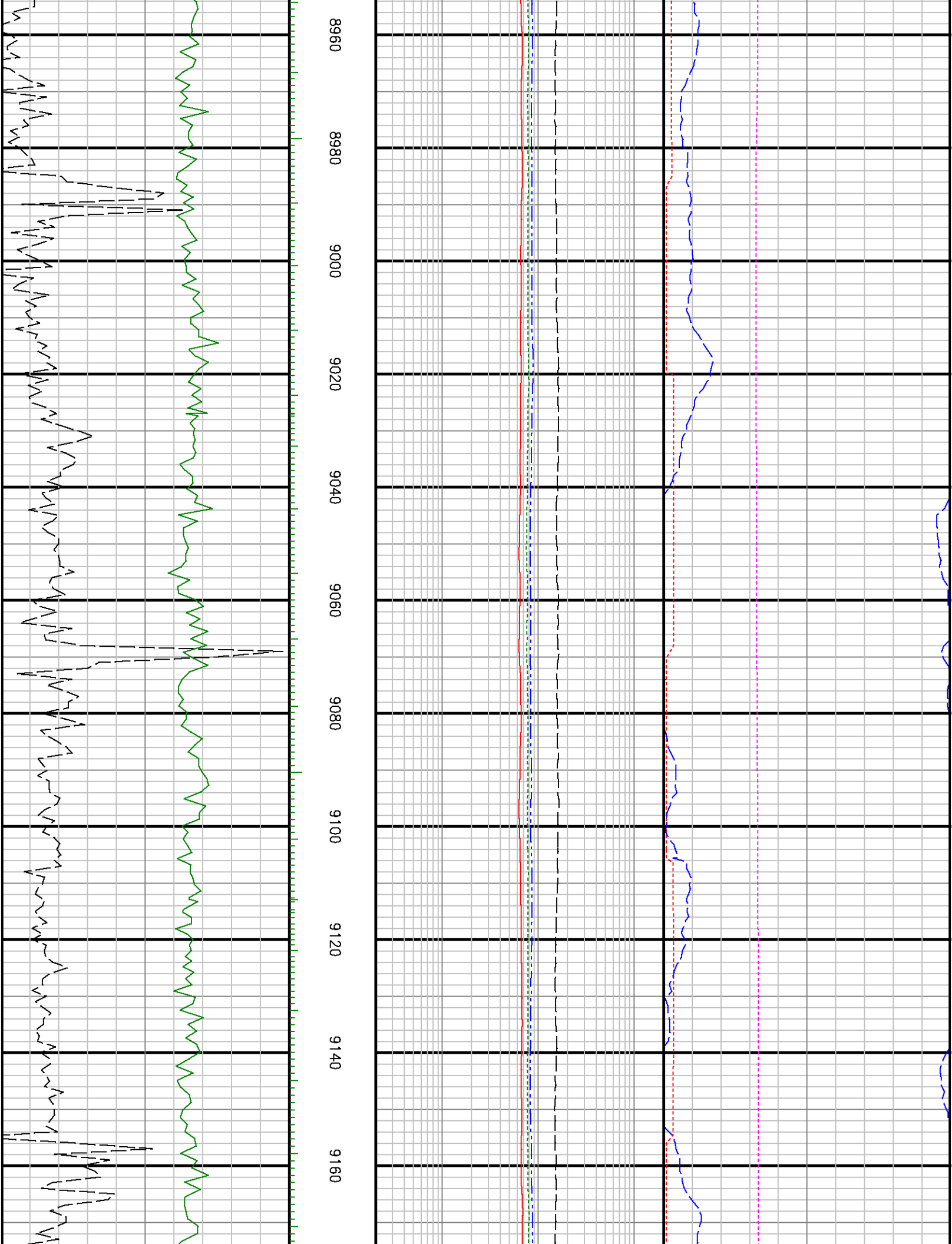


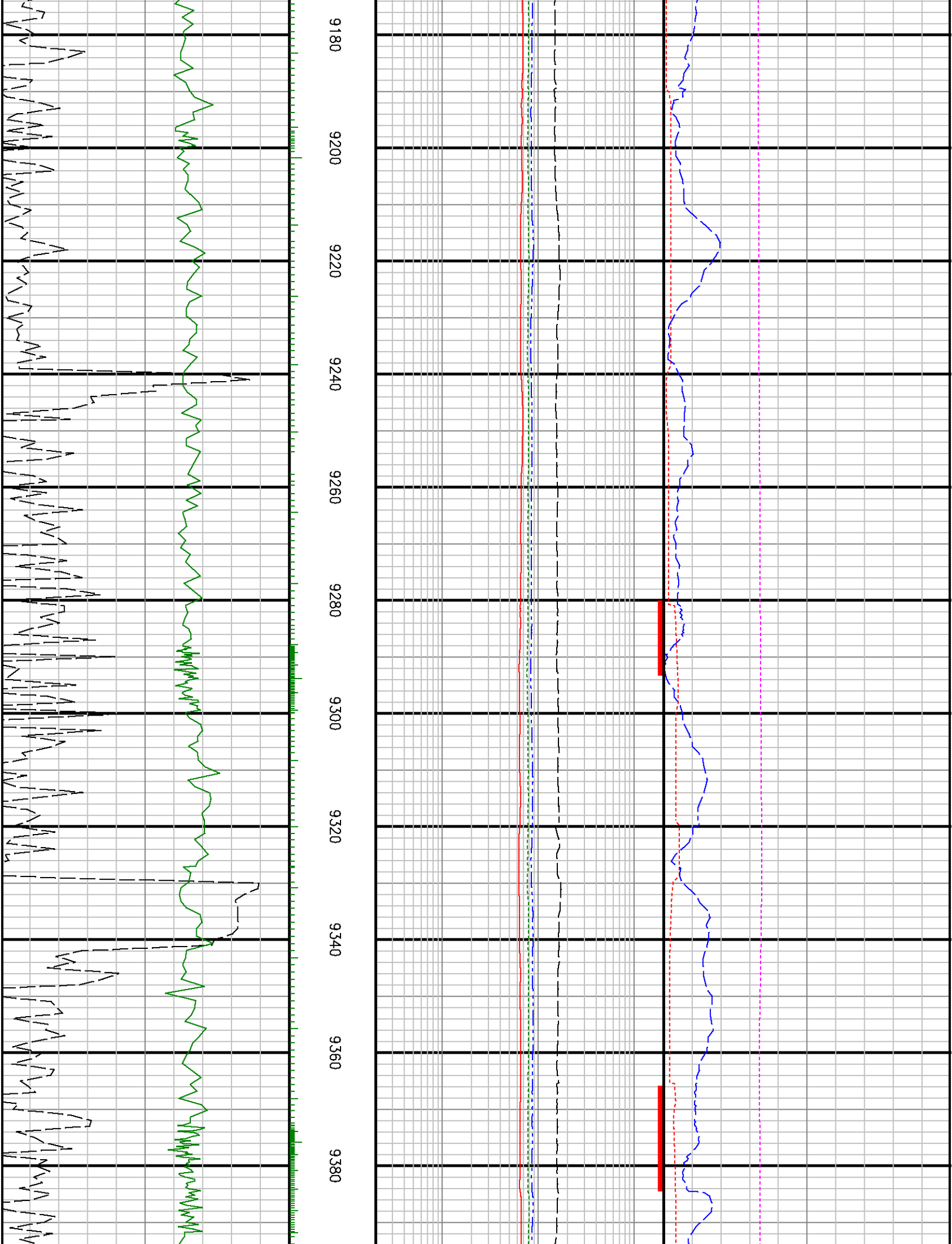


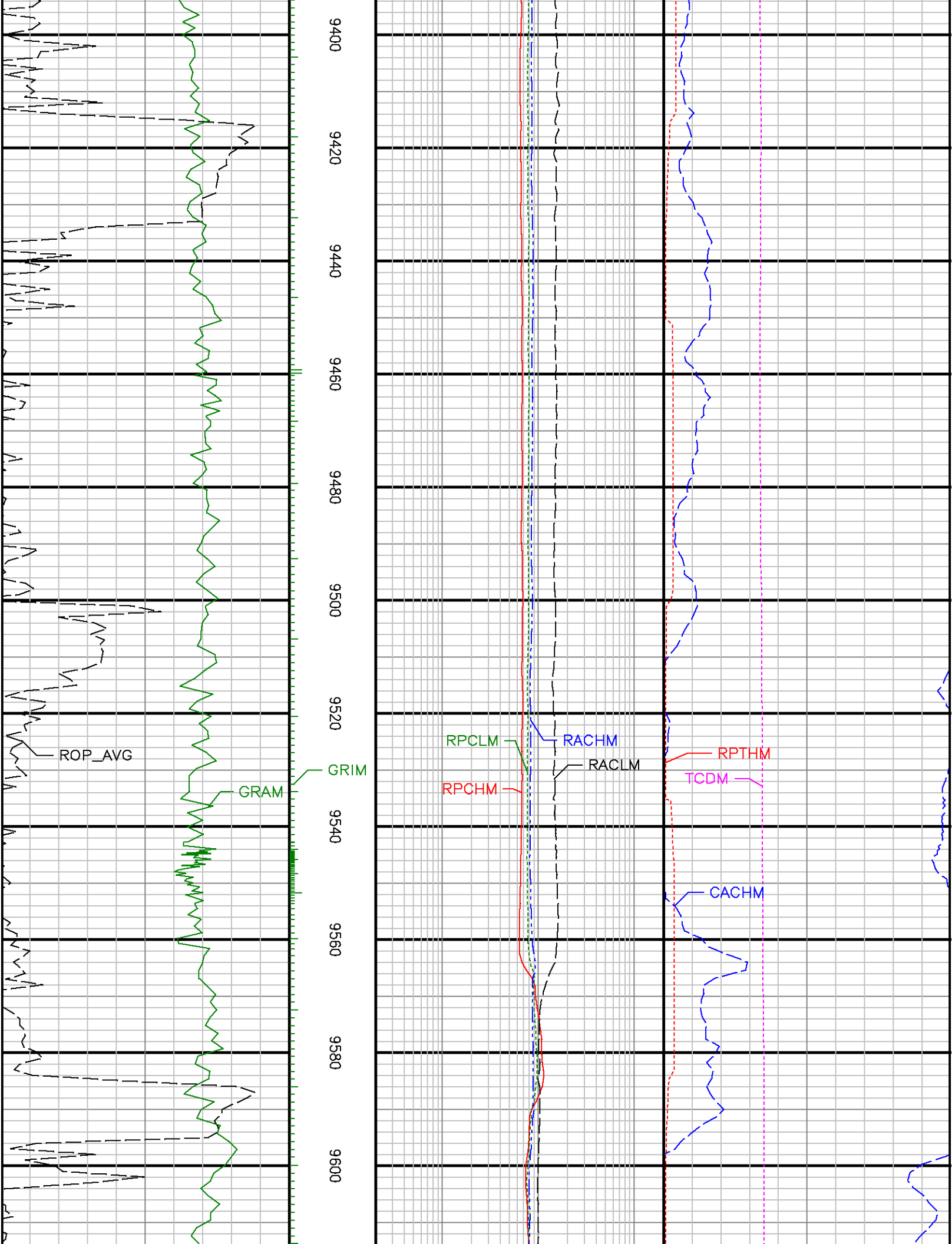


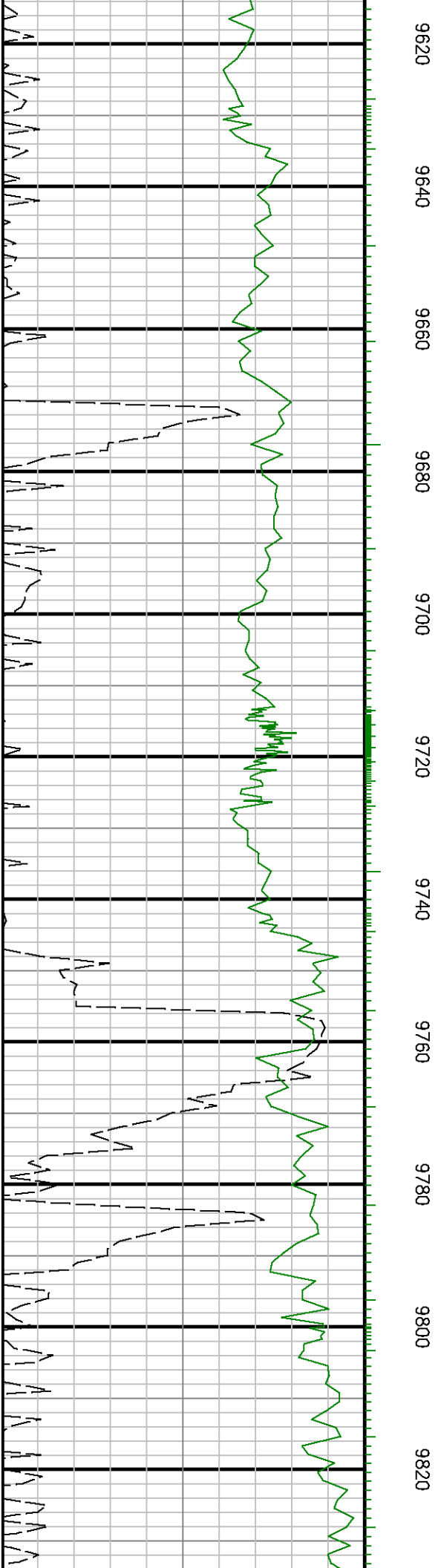
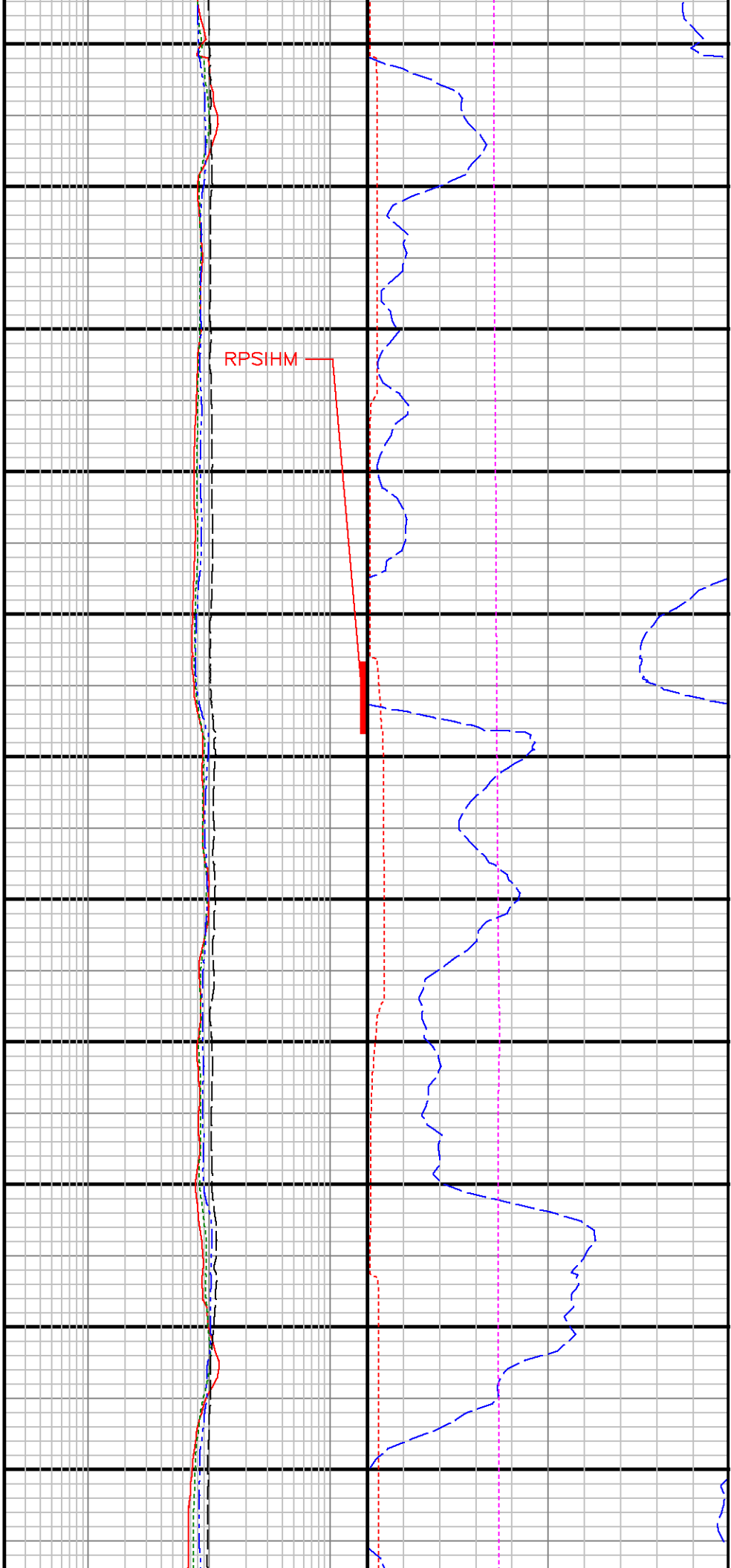


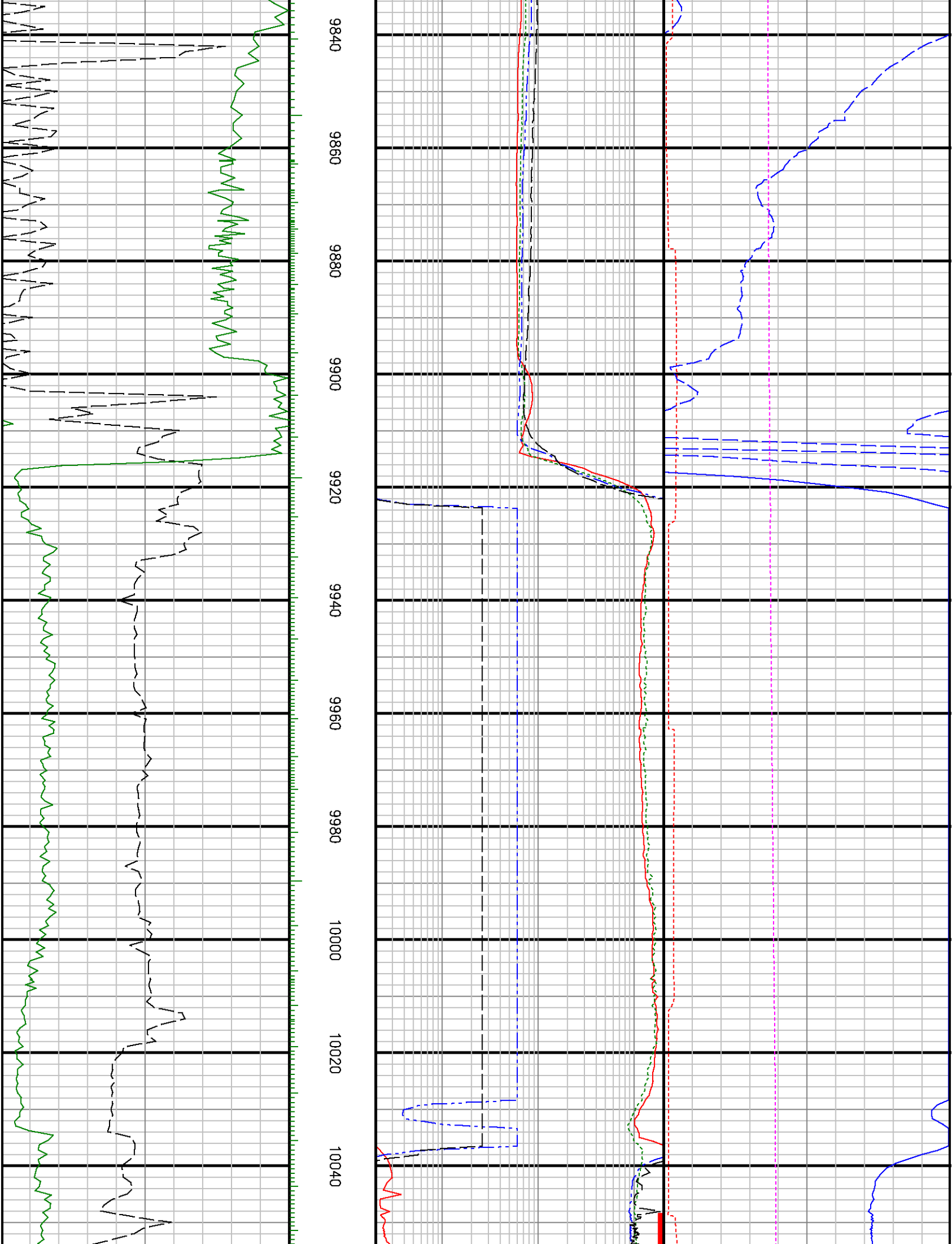


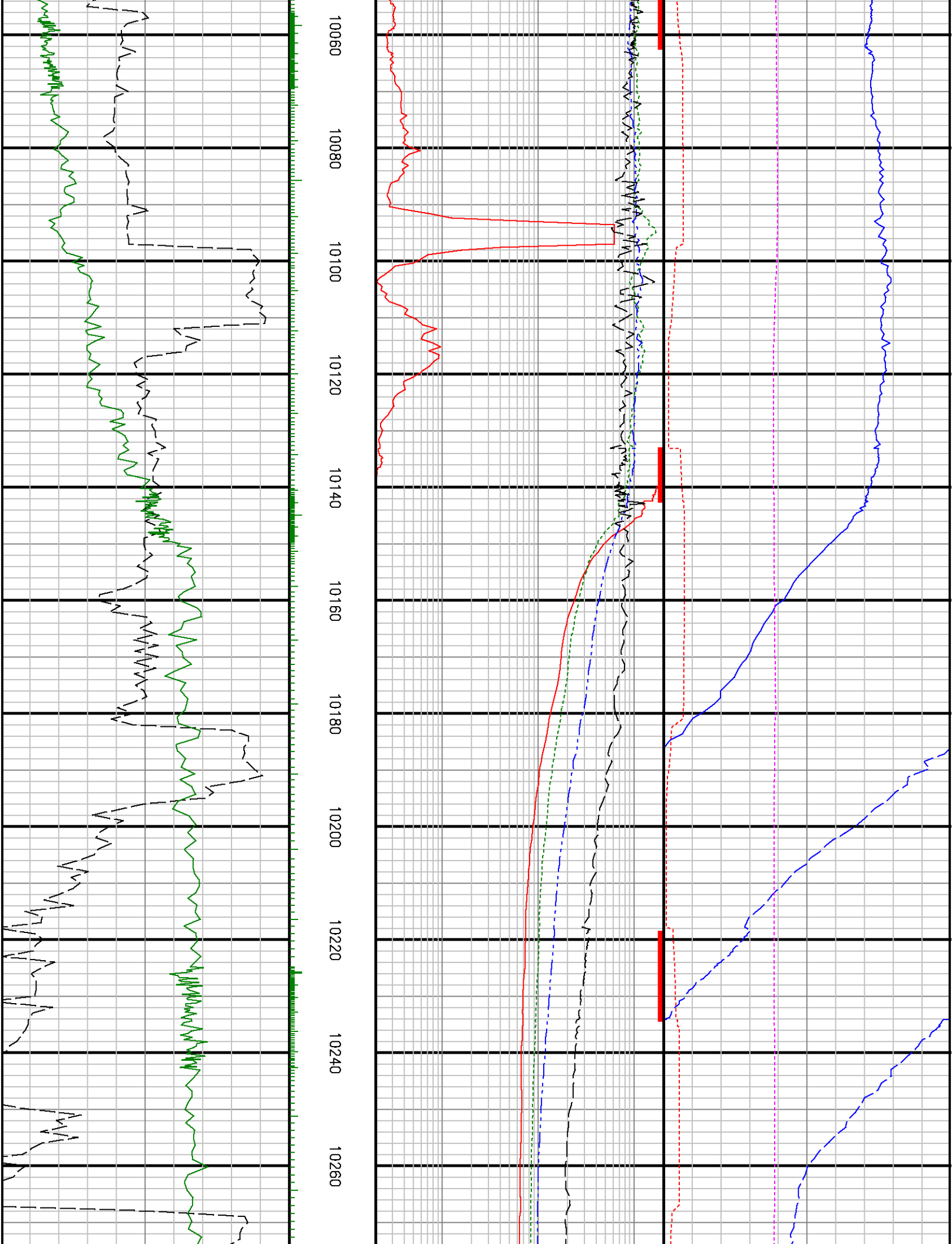


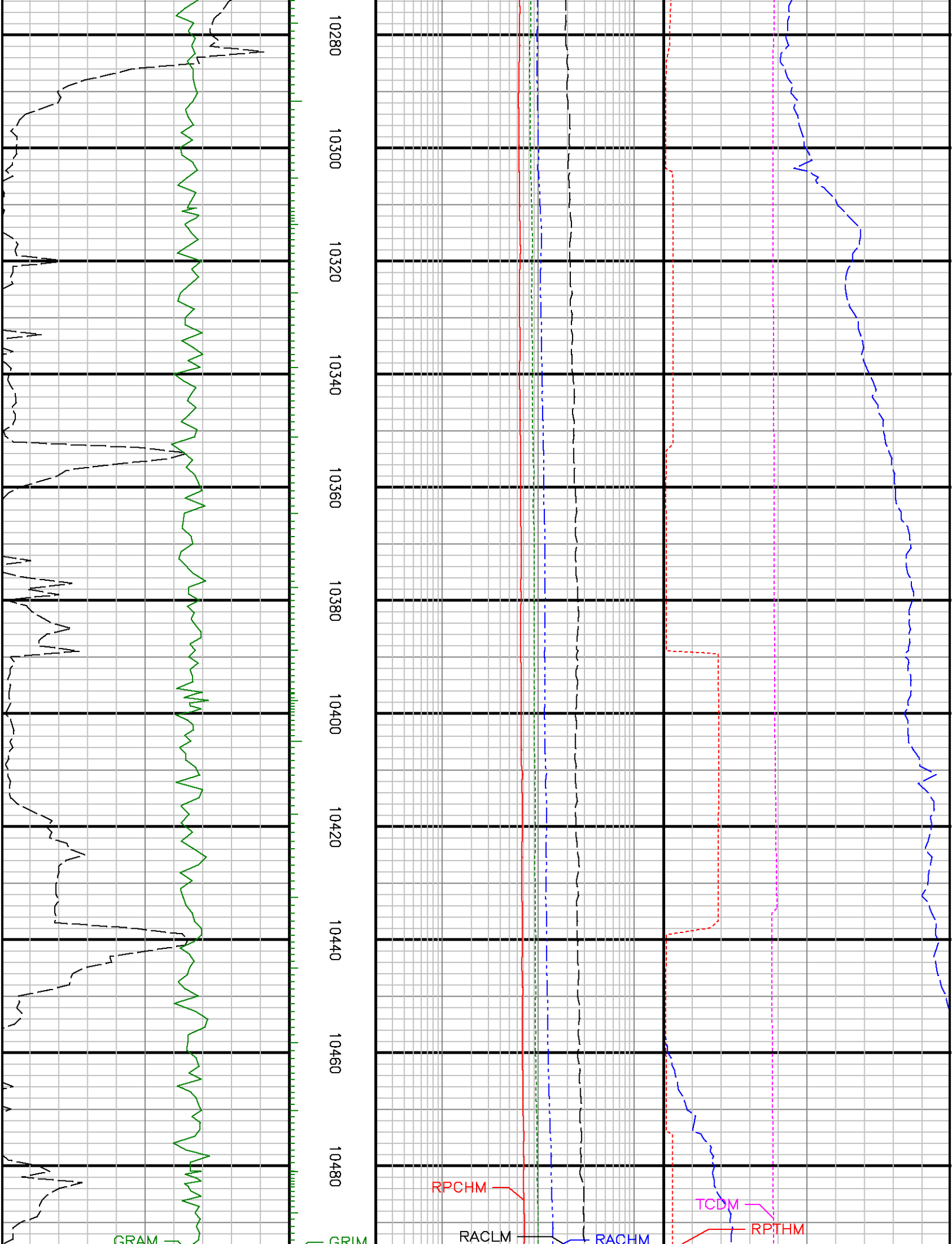


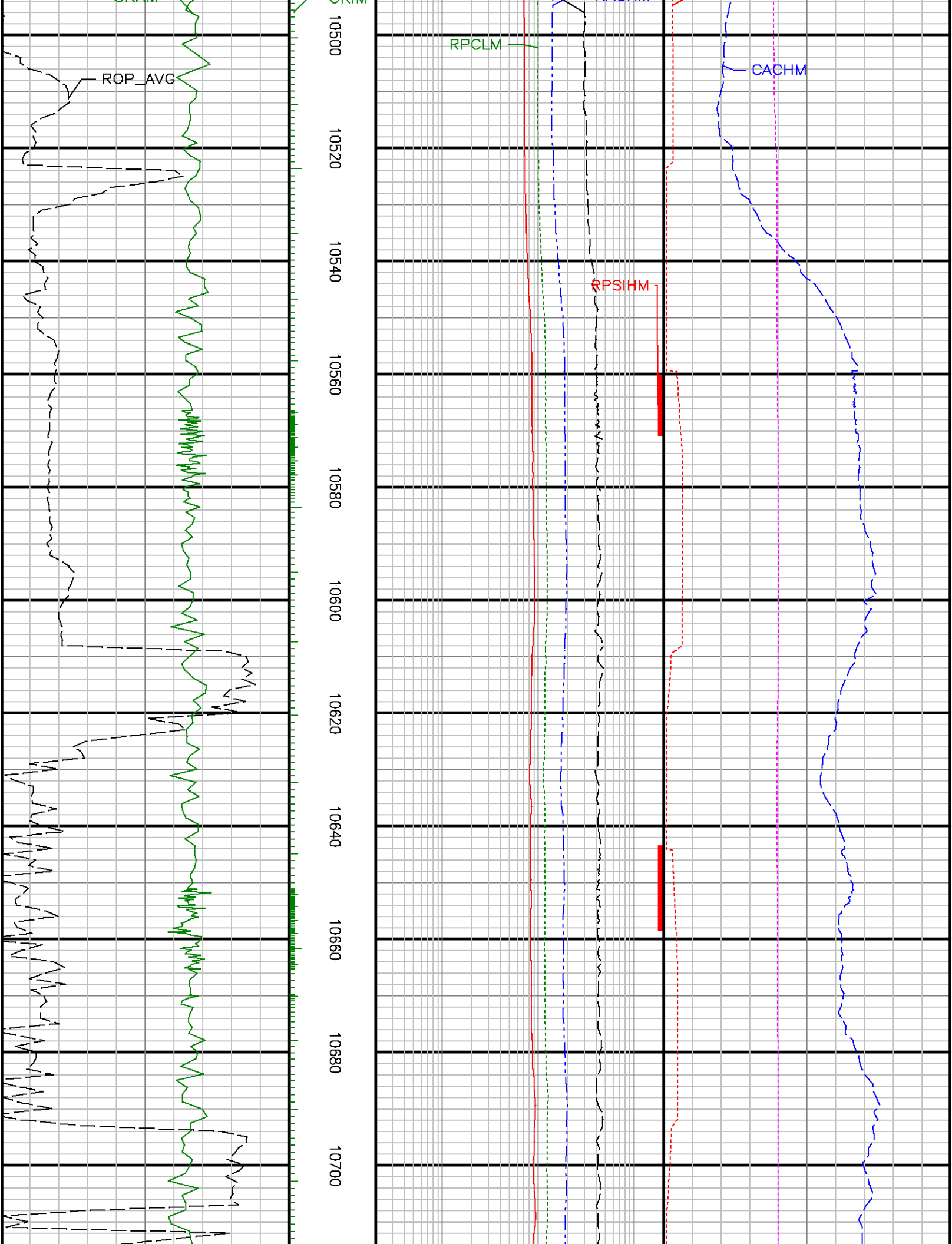


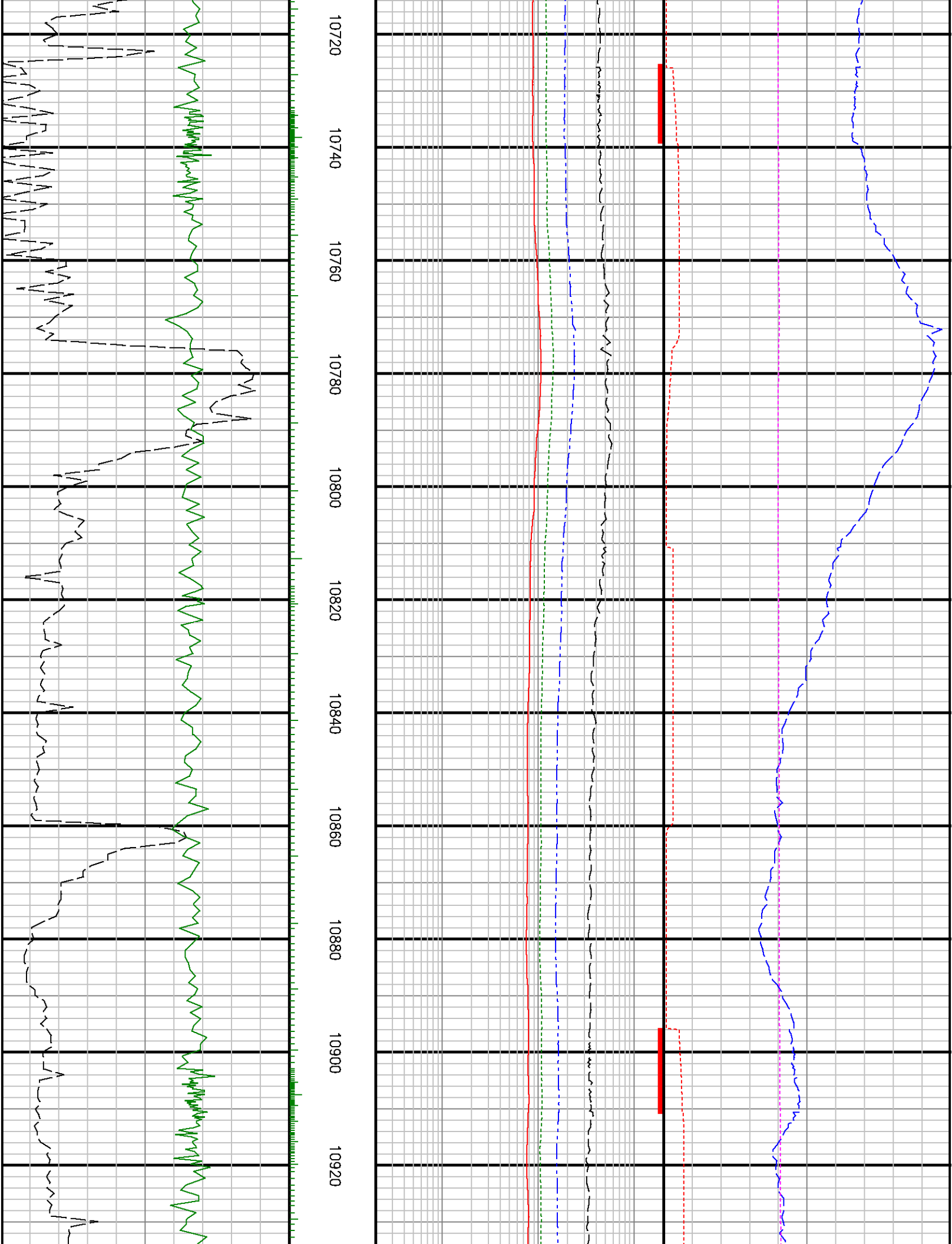


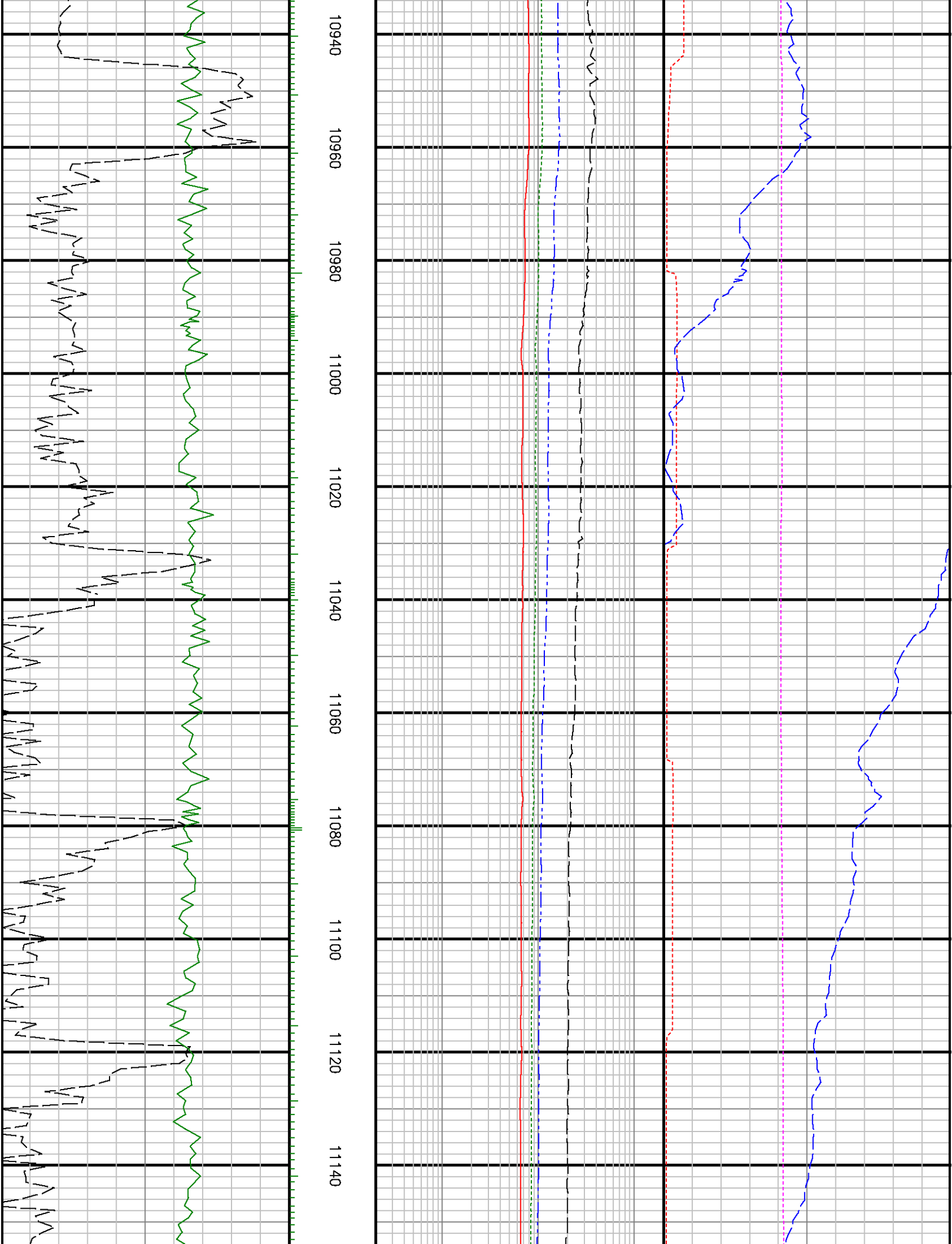


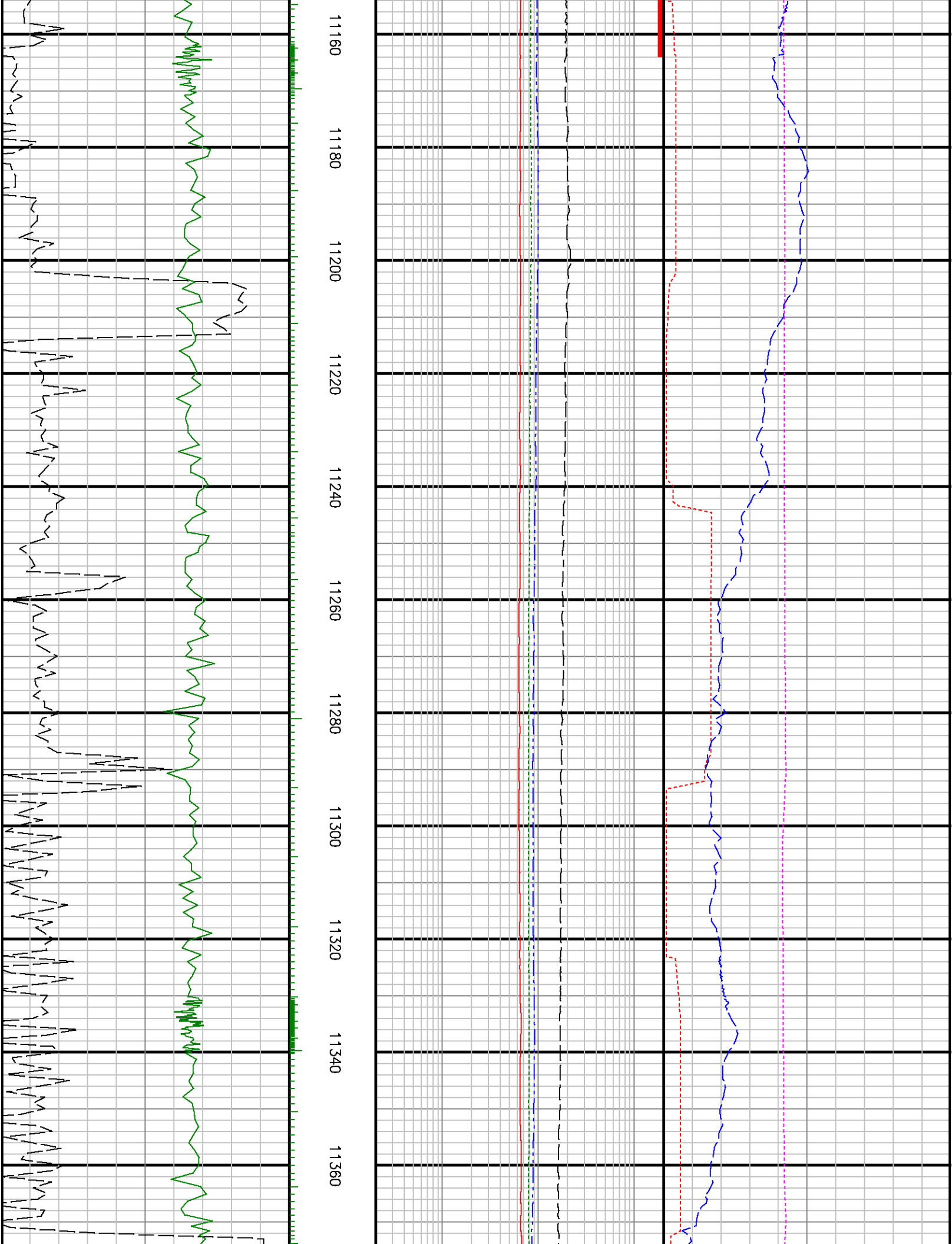


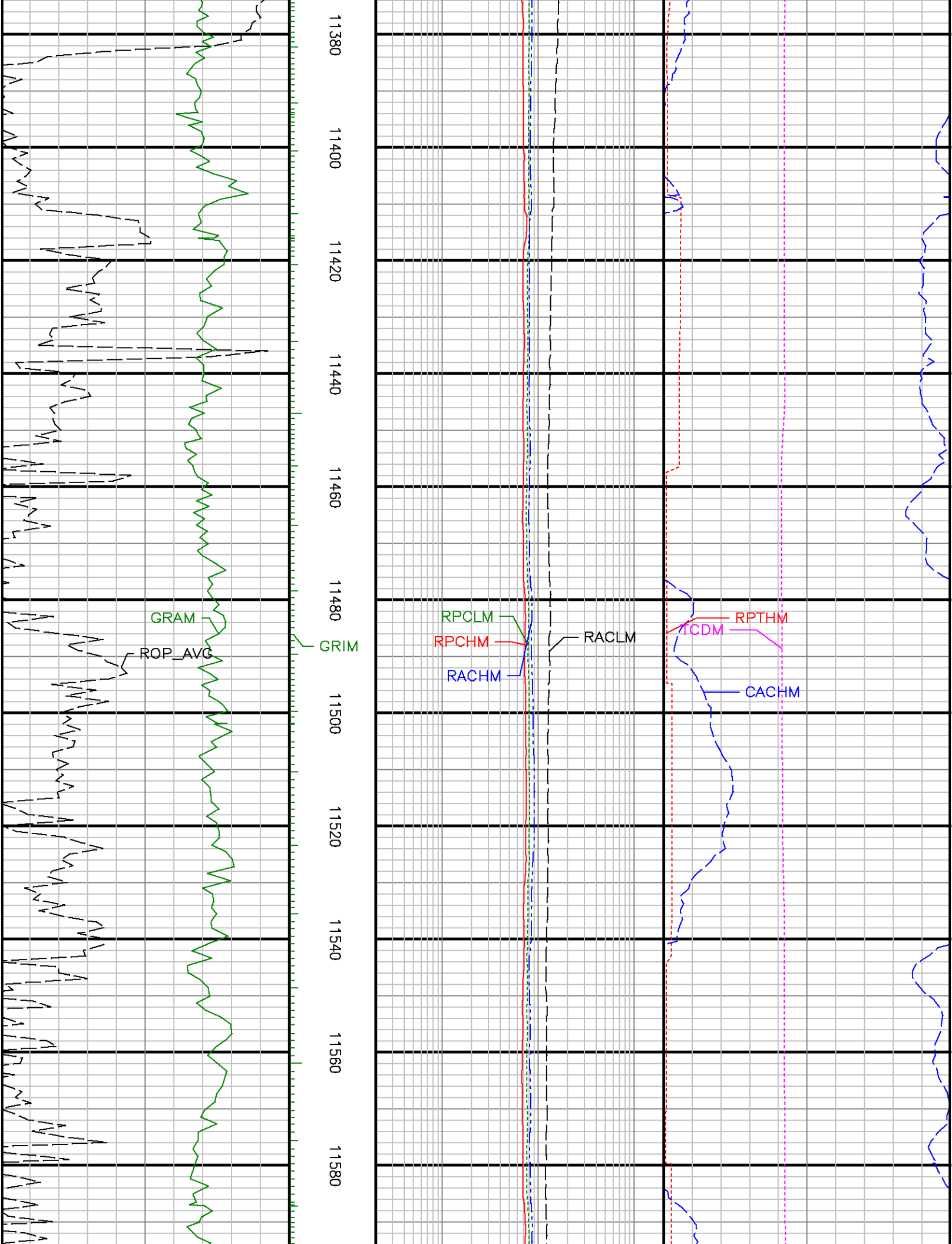


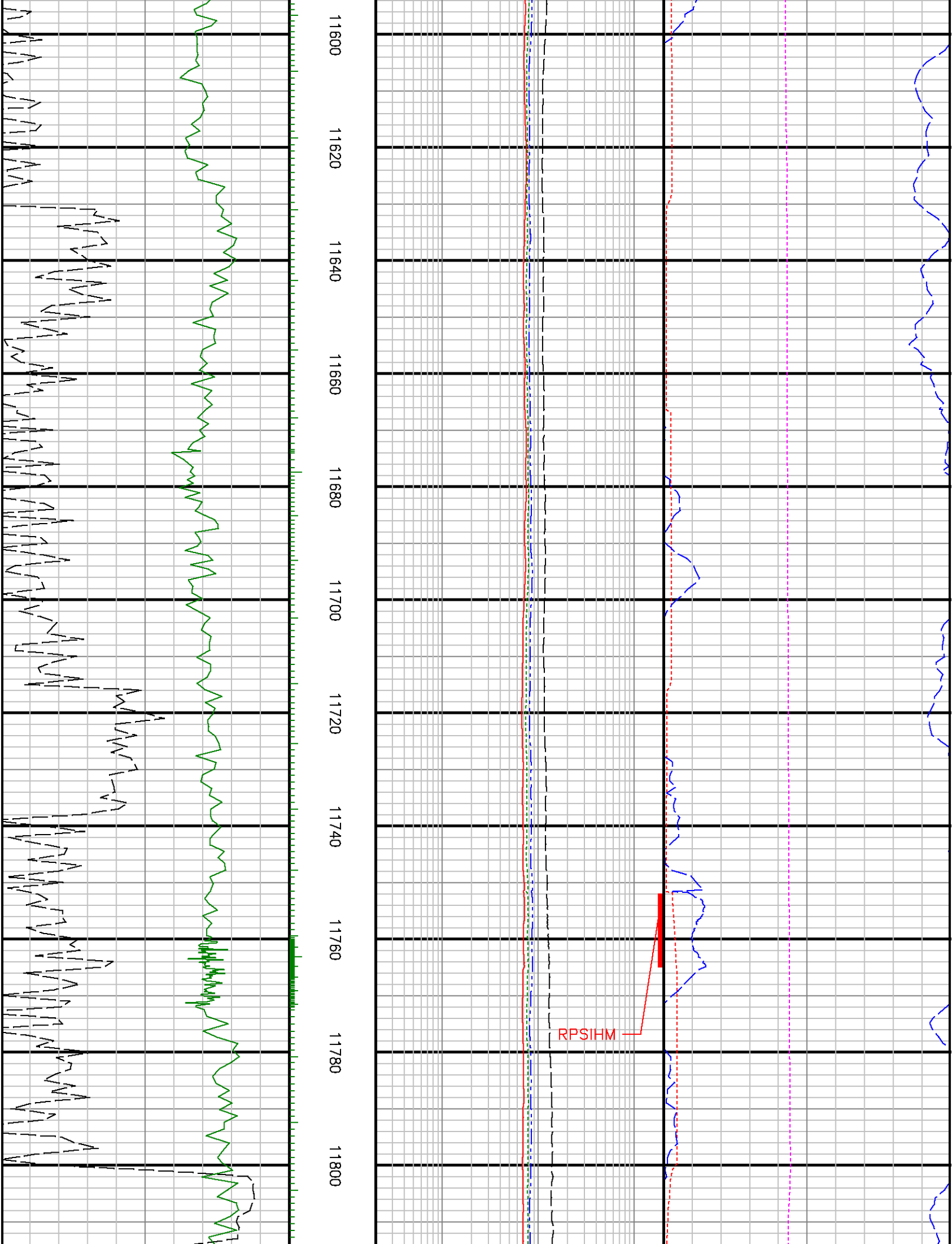


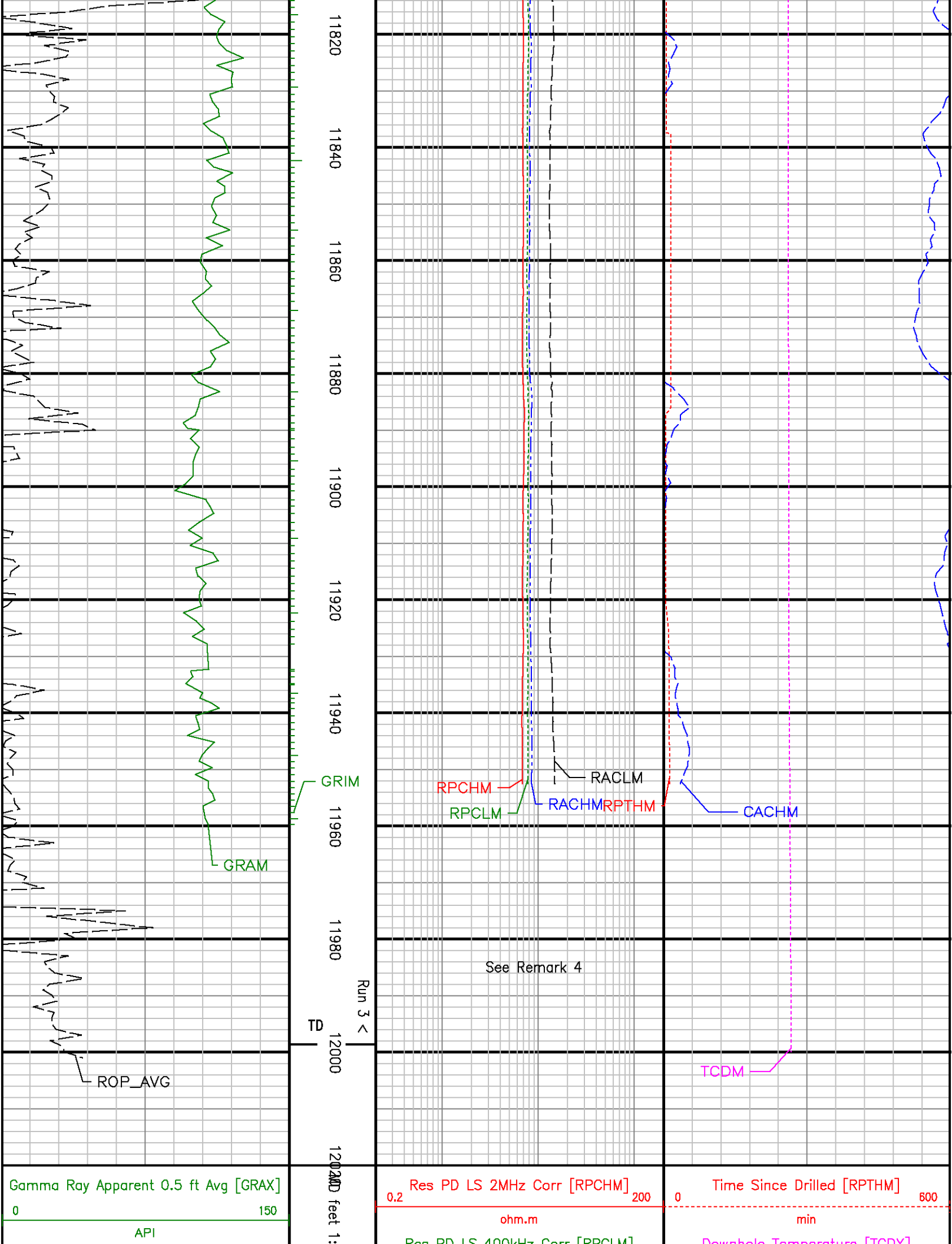












| | | | |
|--|-----|-------------------------------|-----------------------------|
| Rate of Penetration 3.0 ft Avg [ROP_AVG] | 240 | Res FD LS 400kHz Corr [RFCLM] | Downhole Temperature [TCDX] |
| 500 ————— 0 | | 0.2 ————— 200 | degF |
| ft/hr | | ohm.m | Con AT LS 2MHz Corr CACHM |
| Gamma Ray Apparent 0.5 ft Avg [GRAM] | | 0.2 ————— 200 | 40 ————— 0 |
| 0 ————— 150 | | ohm.m | mmho/m |
| API | | Res AT LS 400kHz Corr [RACLM] | Downhole Temperature [TCDM] |
| | | 0.2 ————— 200 | 150 ————— 350 |
| | | ohm.m | degF |