



Composite Log

Natural Formation Evaluation
Gamma Ray
Propagation Resistivity

Company: Noble Energy

Well: KIDD LD22-770

Field: Weld County

Region: Continental US Country: United States

Surface Location:

Latitude: 40° 43' 51.060" N

Longitude: 103° 51' 16.884" W

Other Services:

Wellbore Survey
Drilling Dynamics

Elevations:

N/A

KB:

DF:

GL:

4821.00 ft.

30.00 ft.

4821.00 ft.

Magnetic Field Reference

Dip Angle: 67.39 °

Azi Reference North:

Mag to Reference

Grid

Top: 726 ft.

Date From: 28/Aug/15

Date To: 01/Sept/15

Total

Bottom: 10396 ft.

Date To: 27/Aug/15

Field Strength: 52969.9 nT

North Correction:

6.95 °

Interval Logged

Top: 726 ft.

Date From: 28/Aug/15

Date To: 01/Sept/15

Total

Bottom: 10396 ft.

Date To: 27/Aug/15

Field Strength: 52969.9 nT

North Correction:

6.95 °

Borehole Record

Hole Size

From

To

Size

Weight

From

To

8.750 in.

726 ft.

6280 ft.

9.625 in.

55.00 lb/ft

0 ft.

758 ft.

6.125 in.

6280 ft.

10396 ft.

7.000 in.

36.00 lb/ft

Casing Record

Hole Size

From

To

Size

Weight

From

To

8.750 in.

726 ft.

6280 ft.

9.625 in.

55.00 lb/ft

0 ft.

758 ft.

6.125 in.

6280 ft.

10396 ft.

7.000 in.

36.00 lb/ft

Mud Record

Type

From

To

Hole Size

Interval

Inc / Azi (Start)

Inc / Azi (End)

Water Based Mud

824 ft.

10396 ft.

Deviation Record

Type

From

To

Hole Size

Interval

Inc / Azi (Start)

Inc / Azi (End)

Water Based Mud

824 ft.

10396 ft.

8.750 in.

5554 ft.

4.33° / 116.0°

84.0° / 356.5°

6.125 in.

4226 ft.

84.0° / 356.5°

92.6° / 358.2°

6.125 in.

4226 ft.

84.0° / 356.5°

92.6° / 358.2°

Acquisition System Software Version

Advantage 2.20U4

PATS 6.4.1.34

Rig: / Contractor: H&P 326

Job No.: 7469134

District: / Unit: Rockies

Other

/ Noble Energy

/ D&E

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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	Bottom	From	To	Start	End	
							(ft.)	(ft.)	(ft.)	(ft.)			
1	1	1	8.750	PDC	0.200	Mud Motor	680.77	5527.77	726	5573	28/Aug/2015 00:30	29/Aug/2015 01:00	15
2	2	2	8.750	PDC	0.200	Mud Motor	5531.39	6114.81	5761	6170	29/Aug/2015 04:20	29/Aug/2015 21:00	6.8
3	3	3	6.125	PDC	2.375	Mud Motor	6114.81	10341	6170	10396	30/Aug/2015 01:54	1/Sept/2015 09:30	38.2

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Bill Stavely	8/27/2015	8/27/2015	Mike Guernsey	8/28/2015	9/2/2015	Ken Perry	8/26/2015	9/1/2015
Nathan Leopold	8/26/2015	9/1/2015	Maia Matarrese	8/26/2015	9/1/2015			

Witness	
Name	LWD Run Number
John	Runs 1-3
Chris	Runs 1-3

Mud Properties Record												
Date / Time		LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
28/Aug/2015	02:30	1	824	Water Based Mud	8.6	2	11.9	N/A	0 / 98	Active Mud Pit	500	0.0
28/Aug/2015	14:00	1	4345	Water Based Mud	8.8	2	9.7	N/A	0 / 96	Active Mud Pit	600	0.0
29/Aug/2015	02:30	2	5574	Water Based Mud	10.7	12	9.4	N/A	0/88	Active Mud Pit	800	0.0
29/Aug/2015	14:00	2	6136	Water Based Mud	10.6	11	9.5	N/A	0/88.5	Active Mud Pit	800	0.0
30/Aug/2015	02:30	3	6168	Water Based Mud	10.9	12	9.3	N/A	0/87.5	Active Mud Pit	700	0.0
30/Aug/2015	14:00	3	6168	Water Based Mud	9.8	5	8.7	N/A	0/92.5	Active Mud Pit	1200	0.0
31/Aug/2015	05:00	3	7058	Water Based Mud	10.1	9	10.0	N/A	0/91.2	Active Mud Pit	1300	0.0
31/Aug/2015	17:00	3	8311	Water Based Mud	10.3	12	9.5	N/A	0/90.3	Active Mud Pit	1200	0.0

Mud Resistivity Record					Surface			Downhole			
Date / Time		LWD Run No.	Measured Depth (ft.)	Surface Temp (deg F)	Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)	BHCT (deg F)	Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
28/Aug/2015	02:15	1	768	71	1.85	N/A	N/A	90	1.47	N/A	N/A
28/Aug/2015	18:08	1	1898	66	2.40	N/A	N/A	104	1.54	N/A	N/A
29/Aug/2015	06:15	1	5236	74	1.42	N/A	N/A	147	0.73	N/A	N/A
29/Aug/2015	23:54	1	5574	66	1.52	N/A	N/A	93	1.10	N/A	N/A

Mnemonics		
Curve	Description	Units
GRAM	Gamma Ray Apparant 0.5 ft Avg.	API
GRIM	Gamma Ray Data Point Indicator	Unitless
GRAX	Gamma Ray Apparant 0.5 ft. Avg.	API
GRIX	Gamma Ray Density	Unitless
GRSIM	Gamma Ray Sliding Indicator	ft
GRSI	Gamma Ray Sliding Indicator	ft
GRTX	Gamma Ray Time Since Drilled	min
GRTM	Gamma Ray Time Since Drilled	min
ROP_AVG	Rate of Penetration 3.0 ft Avg.	ft/hr
RPCHM	Resistivity Phase- Corrected- 2MHz	ohm-m
RPCLM	Resisitivity Phase- Corrected- 400kHz	ohm-m
RACHM	Resisitivity Attenuation- Corrected- 2MHz	ohm-m
RACLM	Resisitivity Attenuation- Corrected- 400kHz	ohm-m

RPTHM	Resistivity Time Since Drilled	min
RPSIHM	Resisitivity Sliding Indicator	ft
CACLM	Acoustic Caliper- Corrected	mmho/m

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft.)	Max O.D. (in.)	Min I.D. (in.)
1	CS	12601575	-	73.33	7.000	2.250
1	BCPM	11601761	Telemetry	62.83	7.000	2.250
1	FLEX SUB	12601575	-	55.87	5.000	2.250
1	OTK	12601575	Directional	51.04	7.031	2.165
1	OTK	12601575	Resistivity	45.23	7.031	2.165
1	OTK	12601575	Gamma	41.19	7.031	2.165
1	OTK	12601575	Pressure	40.31	7.031	2.165
1	CS	12601575	-	37.17	7.000	2.250
2	DIR	10428009	Directional	57.82	6.750	3.250
2	SRIG	12131437	Gamma	54.86	6.750	3.250
3	DIR	13153780	Directional	56.96	4.750	2.250
3	SRIG	12600744	Gamma	53.46	4.750	2.250

Service and Tool Mnemonics

Mnemonic	Name	Description
BCPM	BCPM	Mud pulse telemetry and downhole tool power module
DIR	Directional	Wellbore directional survey
FLEX SUB	Flex Sub	Flexible sub connection
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
CS	Closure Sub	BHA power ring isolator allowing insertion of inert sub into electrically powered BHA

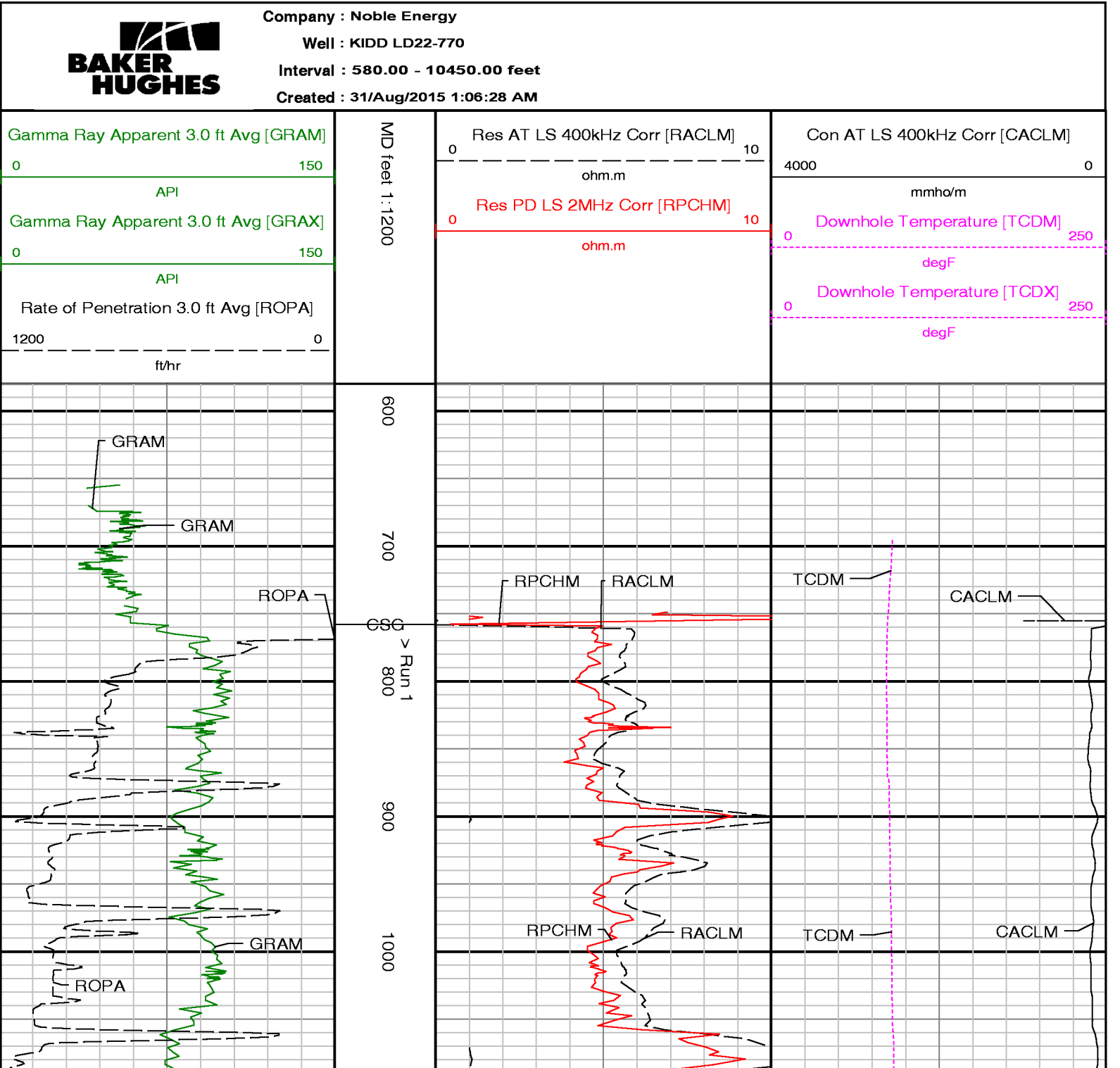
Comments

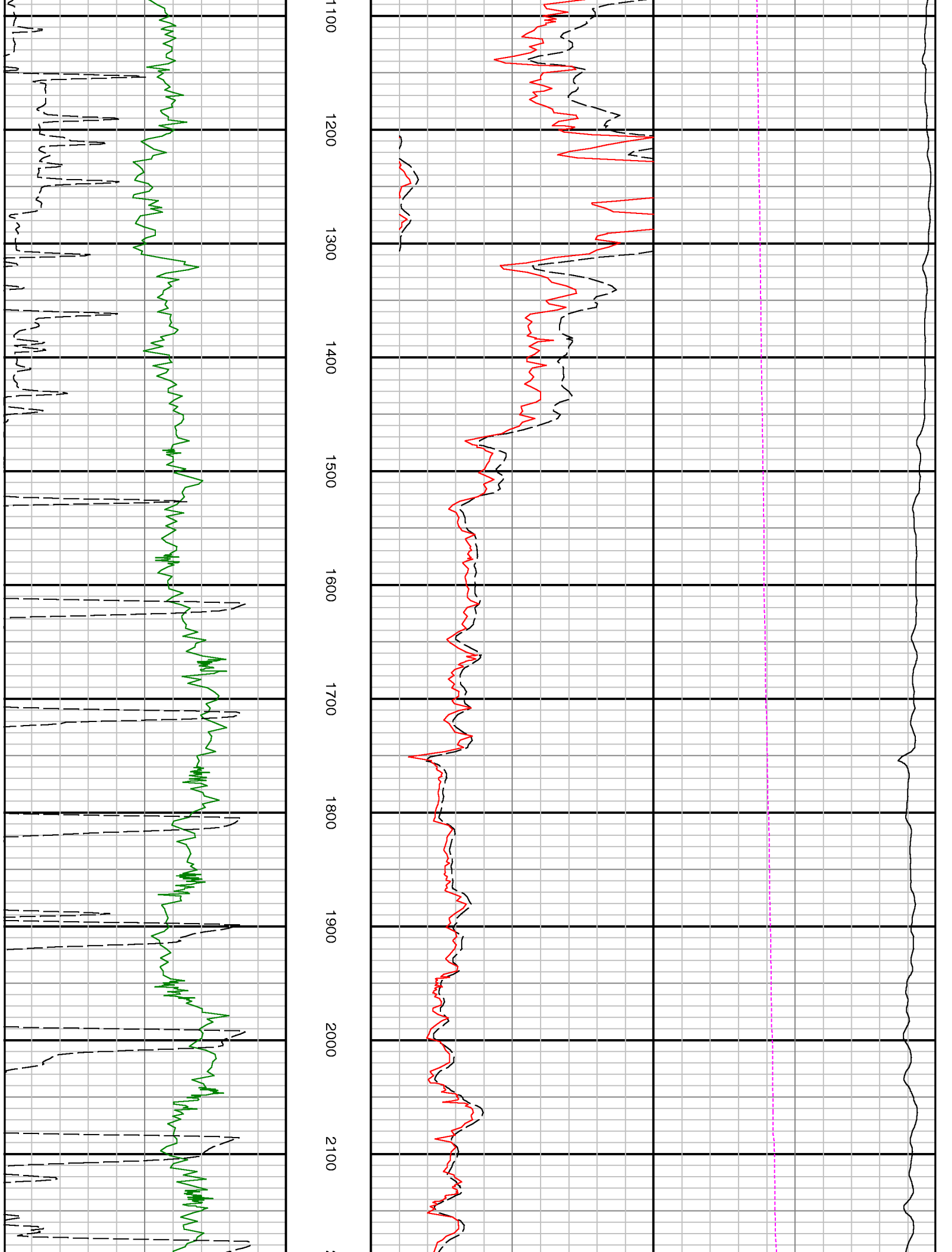
<p>(1) Baker Hughes Run 1 utilized 6 3/4 inch OnTrak service (Gamma Ray, Resisitivity, Directional and VSS) behind an 8 3/4 inch bit and steerable assembly from 726 feet to 5574 feet MD (726 feet to 5501.25 feet TVD).</p> <p>(2) Baker Hughes Run 2 utilized 6 3/4 NaviGamma service (Gamma Ray, Directional and VSS) behind an 8 3/4 inch bit and steerable assembly from 5574 to 6170 feet MD (5500 feet to 5742 feet TVD).</p> <p>(3) Baker Hughes Run 3 utilized 4 3/4 NaviGamma service (Gamma Ray, Directional and VSS) behind a 6 1/8 inch bit and steerable assembly to drill lateral from 6170 feet to 10396 feet MD.</p> <p>(2) Depth measurements are obtained from a depth control system (Pason EDR) not supplied or operated by Baker Hughes Inteq. Due to a lack of control by Baker Hughes Inteq logging engineers, depth calibrations & measurements could not be independtly verified. Unverified depths supplied to Inteq are being used in present logging data.</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 the resistivity sensor offset to correspond with resistivity data acquired while sliding.</p> <p>(4) A sliding indicator is shown to the left edge of track 1 as a heavy line. The indicator has been depth-shifted to the gamma sensor offset to correspond with gamma ray data acquired while sliding.</p>

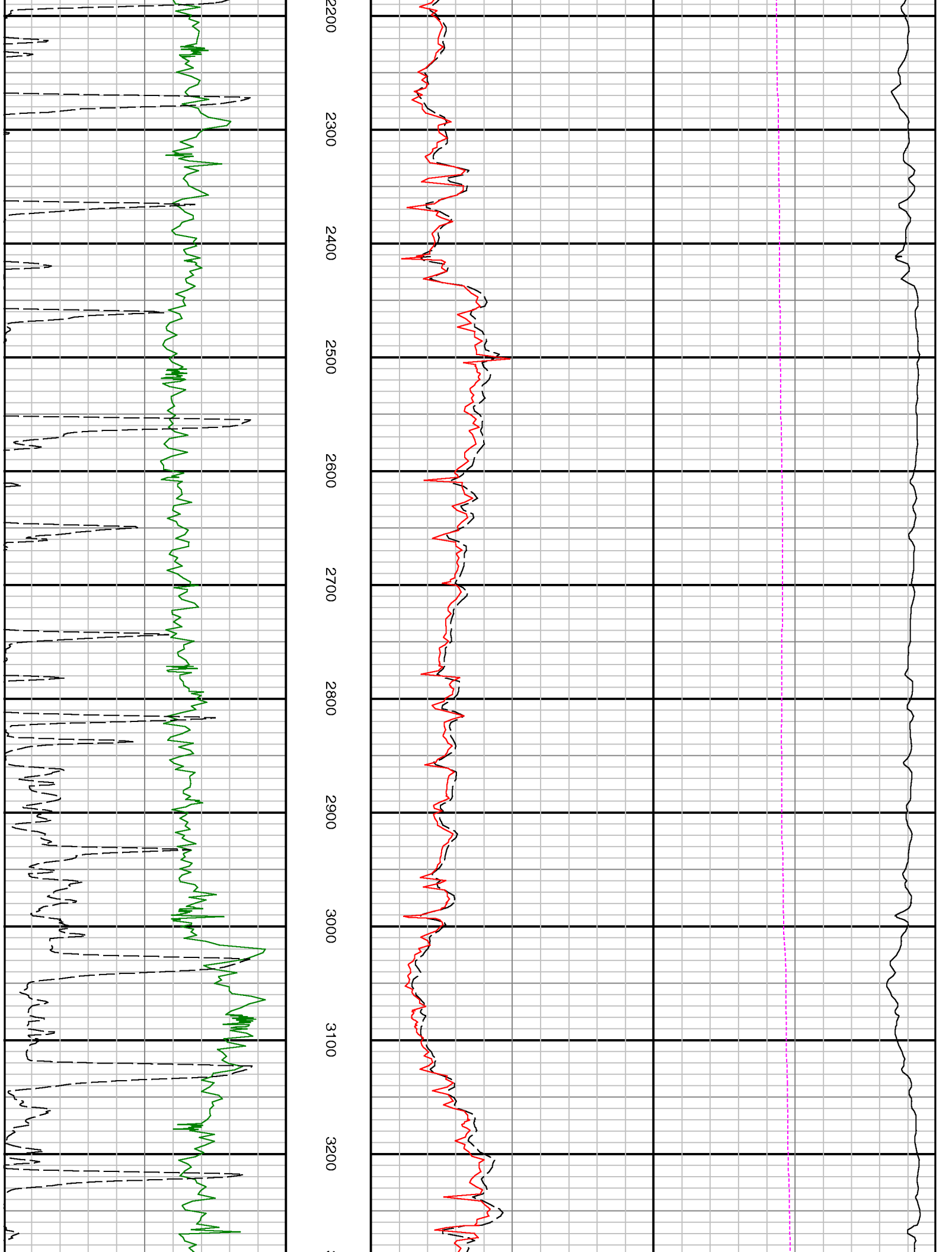
Remarks

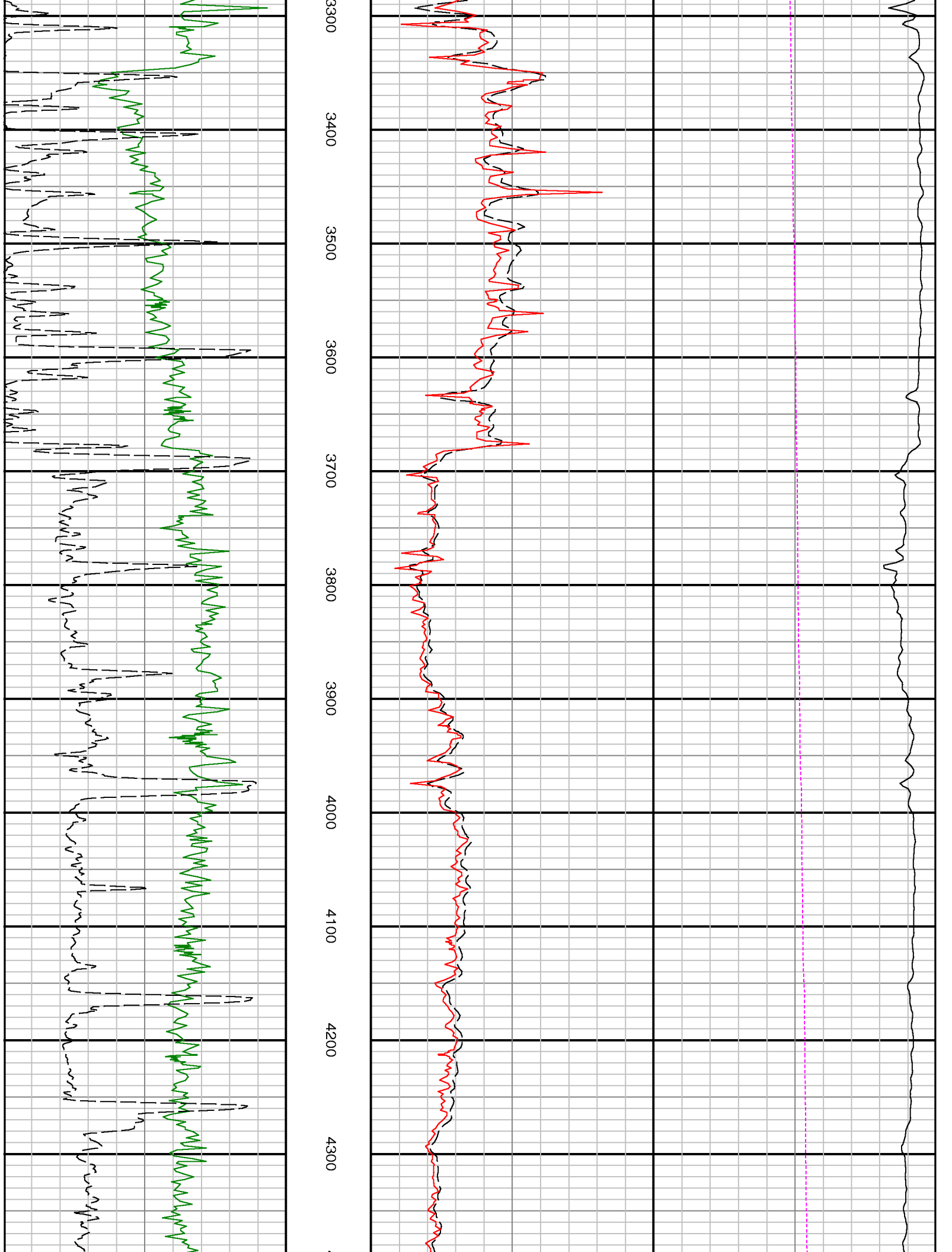
Number	Measured	Hole	LWD	Remark
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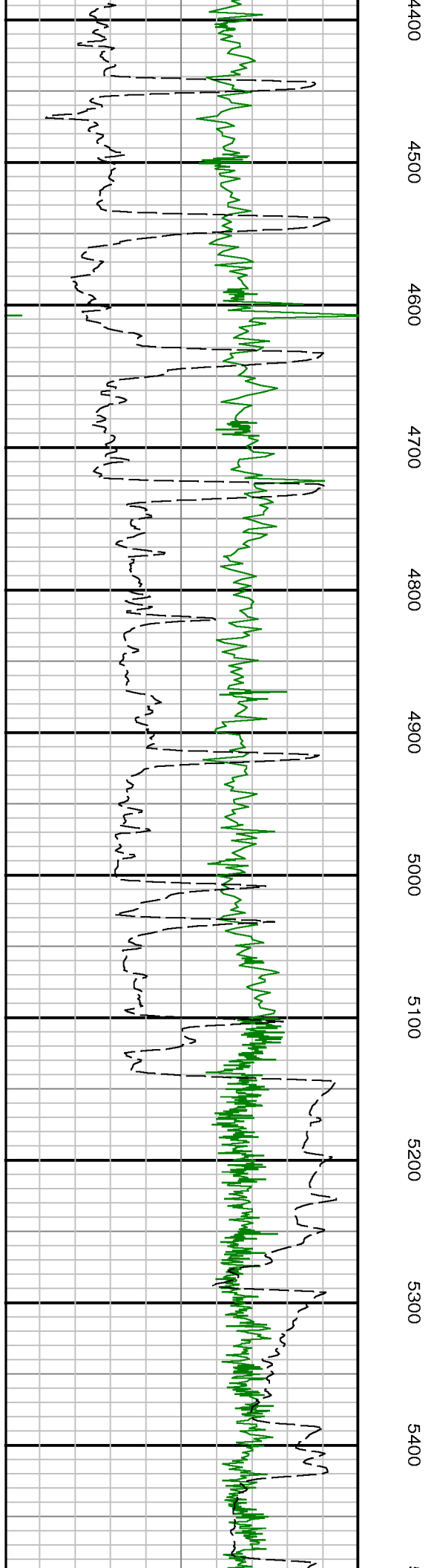
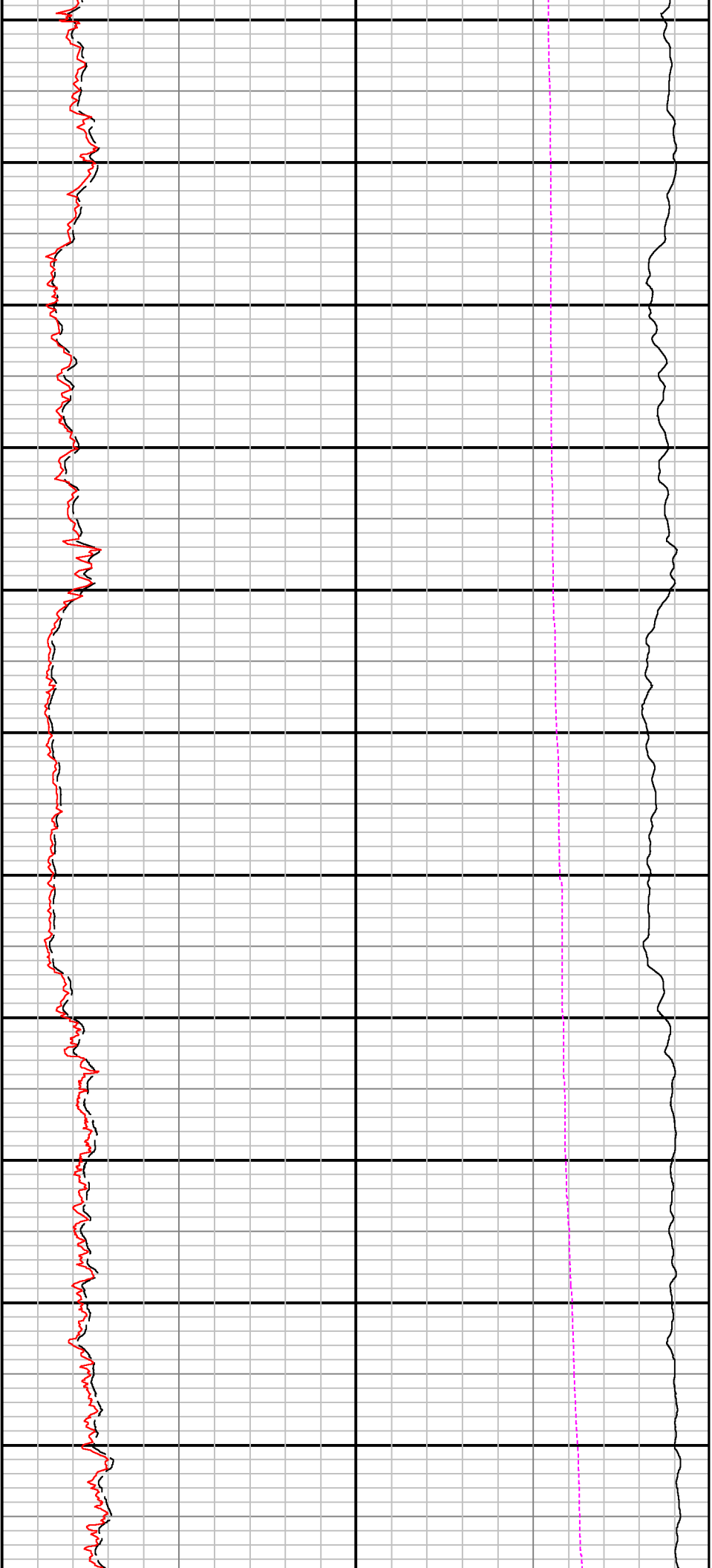
	Depth (ft.)	Section (in.)	Run No.	
1	750	8.750	1	The interval from 726 to 768 feet MD (726 to 768 feet TVD) Has no drilling data due to sensor to bit offset at the beginning of the well.
2	5550	8.750	2	The interval from 5528 to 5573 feet MD (5464 to 5500 feet TVD) was logged up to 16.0 hours after being drilled due to a trip out for an OnTrak BCMP1 desync.
3	6150	6.125	3	The interval from 6114 to 6170 feet MD (5737 to 5742 feet TVD) was logged up to 27.01 hours after being drilled due to a trip out to run 7" casing
4	10375	6.125	3	The interval from 10341 to 10396 feet MD was not logged due to the bit to gamma sensor offset.

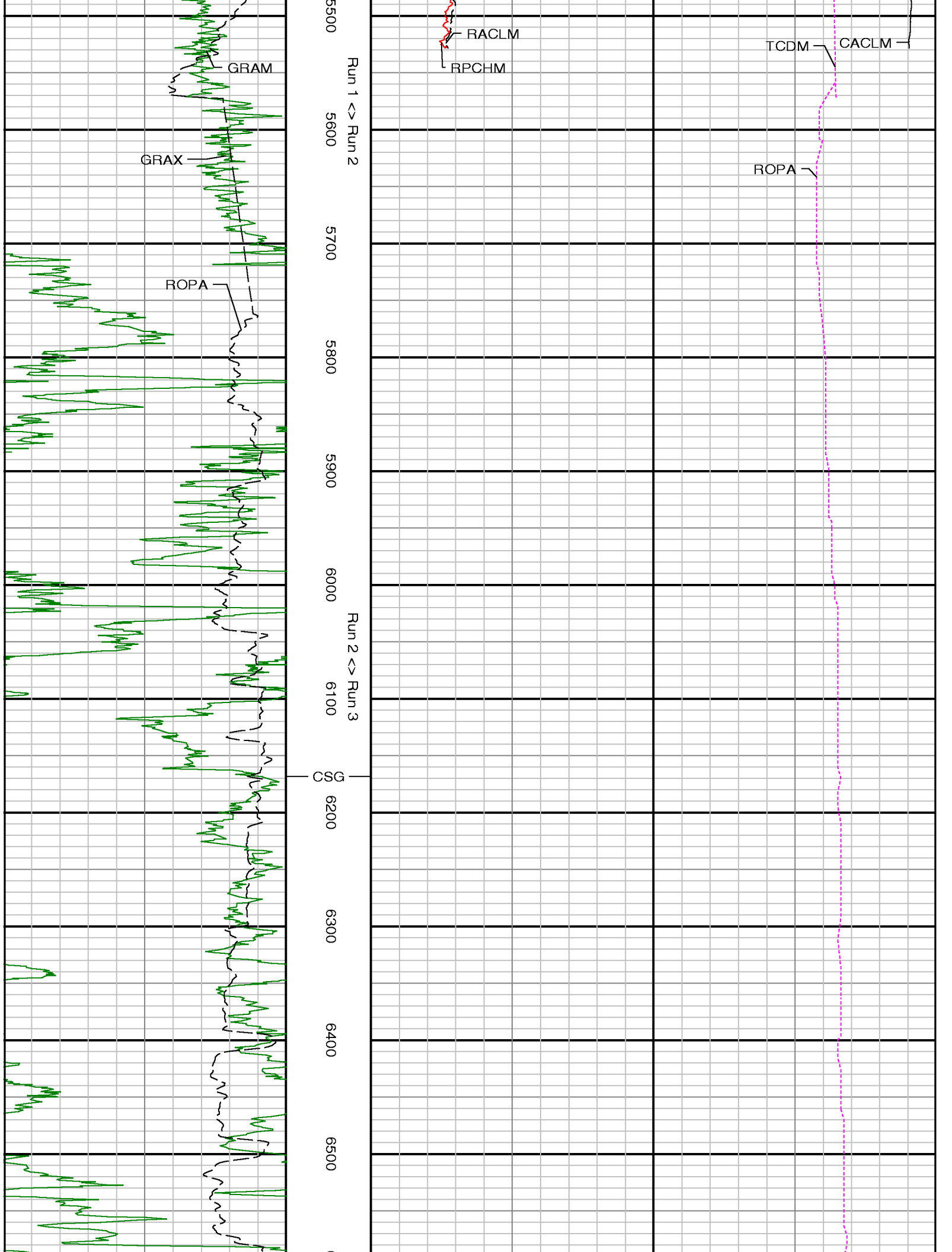


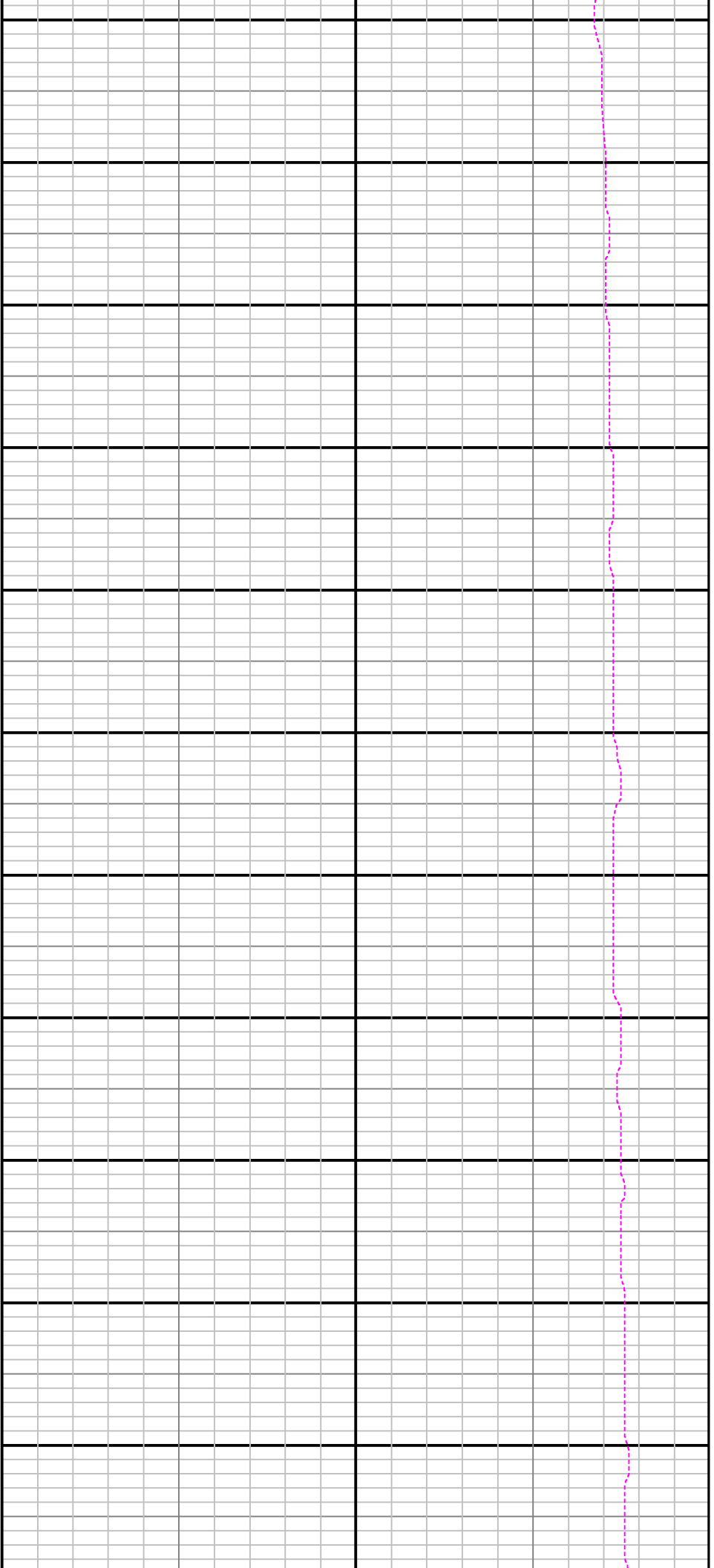












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