



Drilling Dynamics
Gamma Ray

Scale:

1:1200 MD

Company: Noble Energy

Well: Wells Ranch AA22-631

Depth Reference:

Field: Weld County

Driller's Depth

County: WELD

Country: United States

Status:

Final Print

Surface Location:

Latitude:

Longitude:

Other Services:

Wellbore Survey
VSS

API No: 05123422700

Job ID: 7874280

SEC: 22

TWN: 6N

RGE: 63W

Permanent Datum (P.D.): Mean Sea Level

Elevation:

0.00 ft

KB:

DF:

4775.00 ft

Log Measured From:

Rig Floor

Above P.D.

4775.00 ft

GL:

4745.00 ft

Dates

Interval Logged

Magnetic Field Reference

Date From: 2016-03-28

Top: (ft)

1880.00

Azi Reference North:

Grid

Dip Angle: (deg)

67.18

Date To: 2016-03-30

Bottom: (ft)

11880.00

Total Magnetic Field Strength: (nT)

52448

Spud Date: 2016-03-27

Mag to Reference North Correction: (deg)

7.27 E

Borehole Record

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

8.500

1890.00

11880.37

9.625

36.00

0.00

1880.00

Mud Record

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Oil Based Mud

1890.00

11880.37

8.500

9990.37

0.23 | 212.25

90.11 | 87.27

Acquisition System

Software Version

Other

Baker Hughes Cadence

G3.2

Rig: H&P 321

Prior Studio

3.2.7268.7

Contractor: Helmerich & Payne Drilling Co

District: RMD

Unit: 1

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Log Run Summary

Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours (h)
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	0.61	AutoTrak Curve	1877.84	11873.83	1890.00	11880.37	2016-03-28 18:52	2016-03-30 16:10	40.18

Crew

Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Austin Small		2016-03-27	2016-03-31	David Browning		2016-03-27	2016-03-31	Hans Carey		2016-03-27	2016-03-31
Will Drake		2016-03-27	2016-03-31								

Mud Properties Record

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2016-03-27 09:39	1	1890.00	Oil Based Mud	9.0	26	N/A	0.0	0/99.6	Active Pit	350	0.00
2016-03-28 14:45	1	1890.00	Oil Based Mud	10.2	70	N/A	0.0	72/28	Active Pit	44000	0.00
2016-03-29 16:00	1	7257.32	Oil Based Mud	9.9	47	N/A	0.0	72/28	Active Pit	44000	0.00
2016-03-30 13:45	1	11470.27	Oil Based Mud	10.1	46	N/A	0.0	74/26	Active Pit	48000	0.00

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	ATC_SU	12161973	Near Bit VSS	5.93	6.54	7.000	4.330
1	ATC_SU	12161973	Near Bit Inclination	5.93	6.54	7.000	4.330
1	ATC_MWD	12023678	Gamma (single)	2.17	12.16	7.000	3.250
1	ATC_MWD	12023678	Directional (mag)	12.24	22.23	7.000	3.250

Comments


- 1 Baker Hughes Run 1 utilized a 6 3/4 inch AutoTrak Curve (Rotary Steerable, Directional and Gamma Ray) tool behind an 8 1/2 inch bit and rotary steerable assembly from 1890.0 ft. MD (1890 ft. TVD) to 11877.0 ft. MD (6699.57 ft. TVD).
- 2 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to represent logging data.

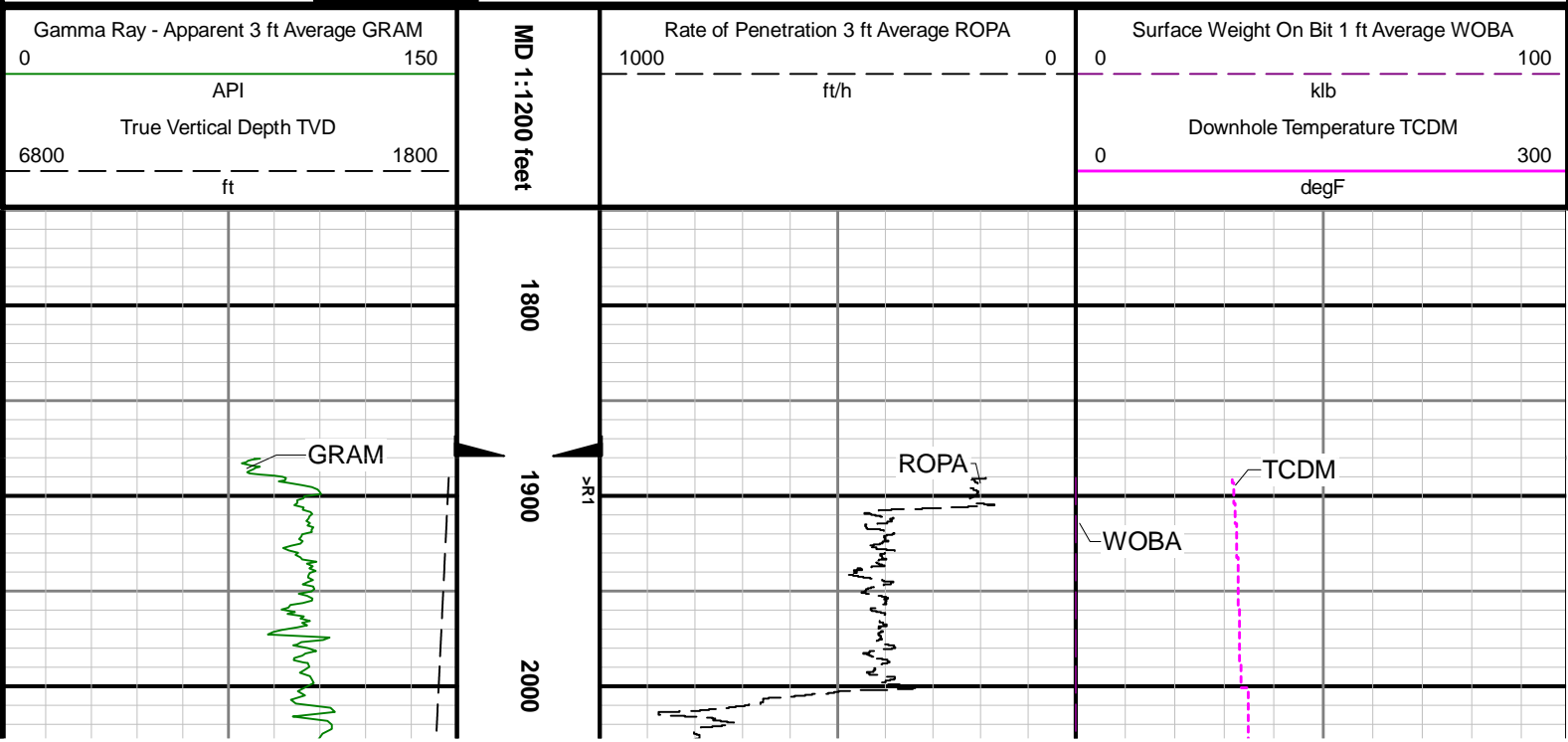
Remarks

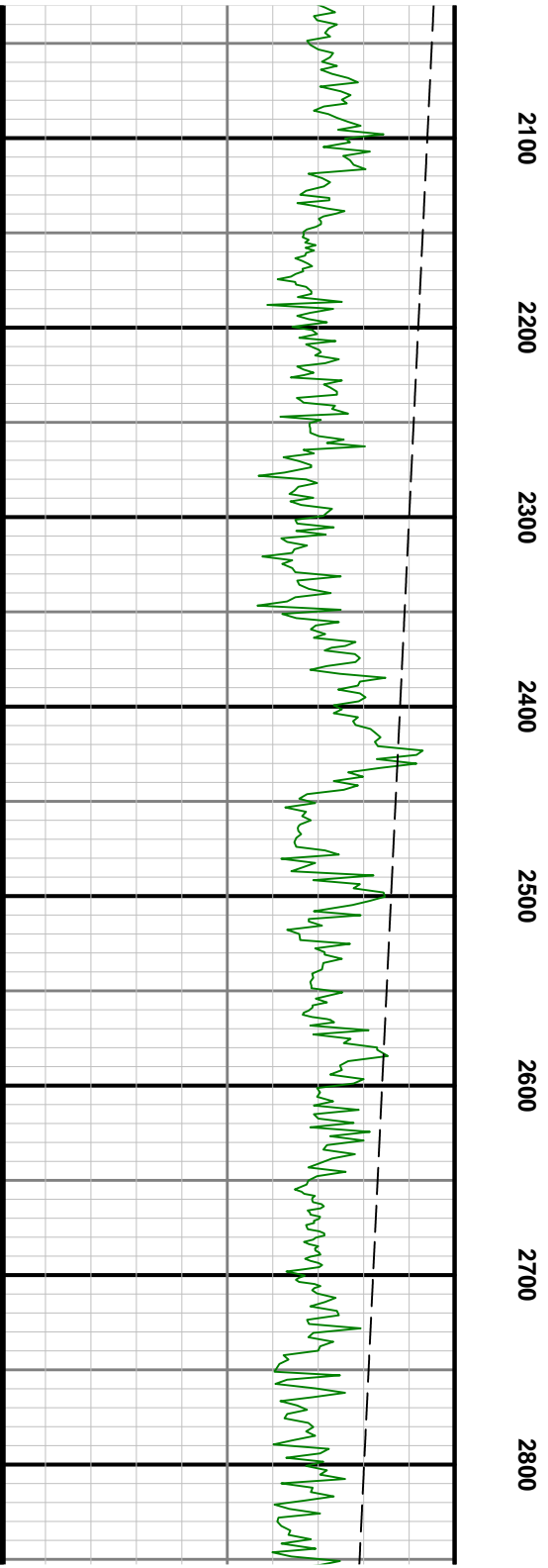
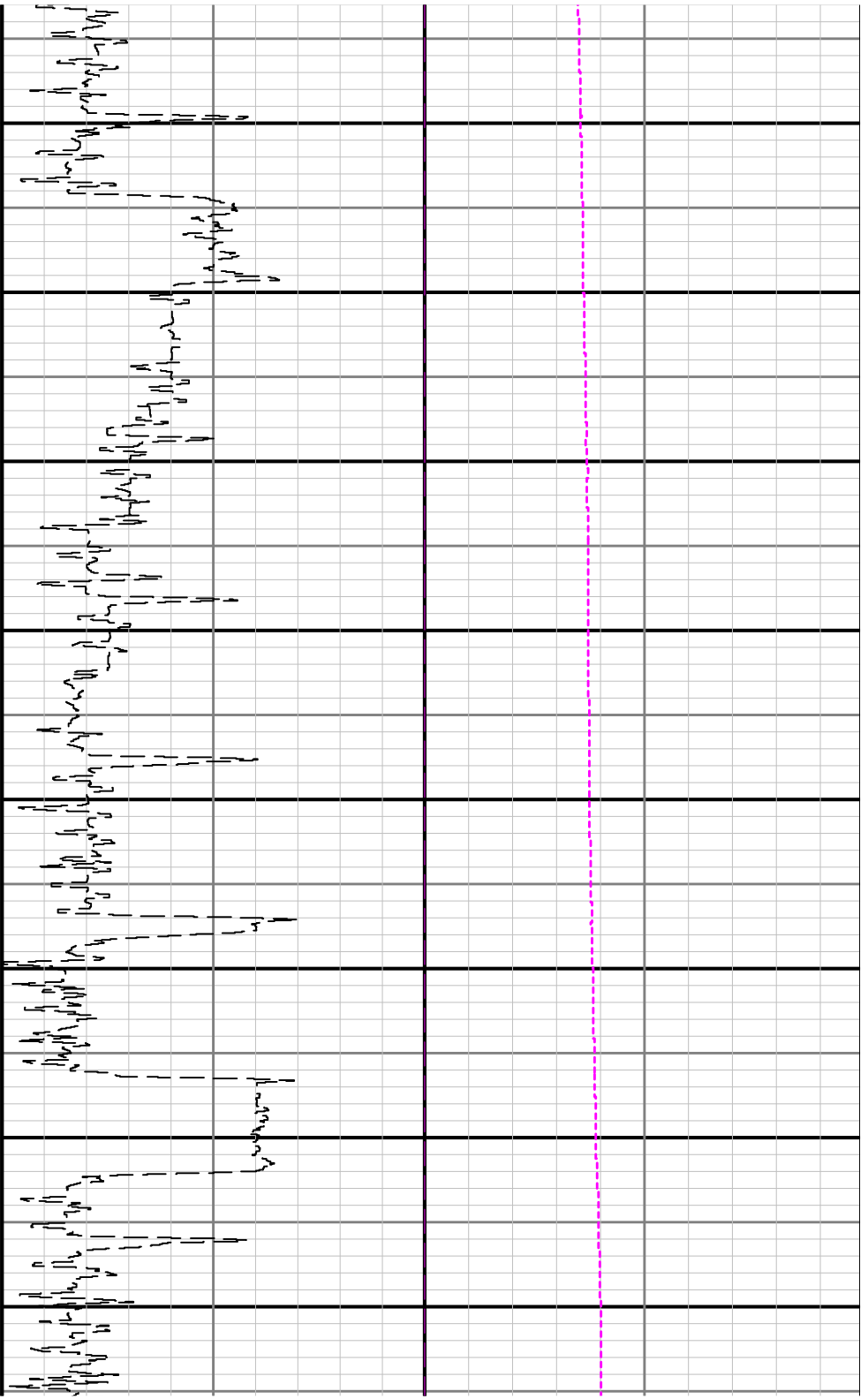
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	11675.00	8.500	1	Gap in gamma data due to tool losing power and shutting off during downlink. Continued drilling ahead to TD without picking up to relog the gamma data.

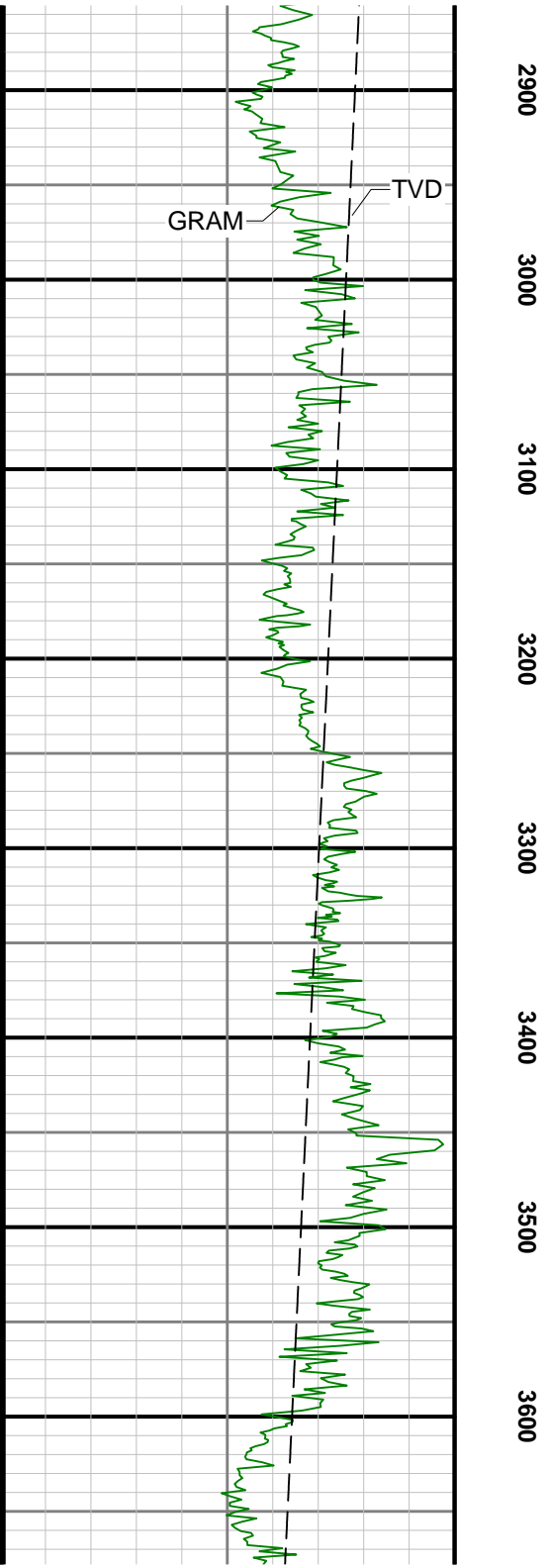
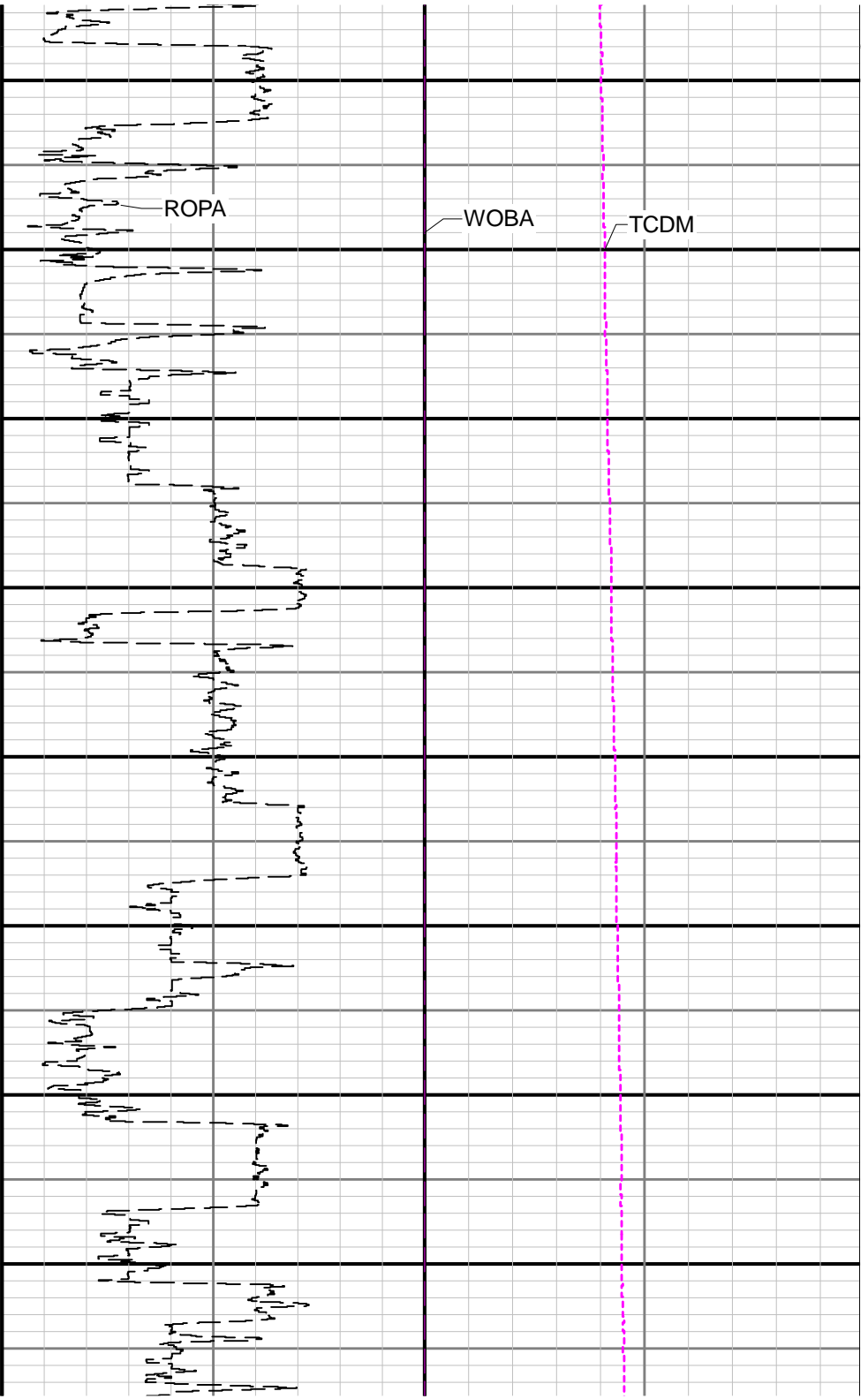
Curve Mnemonics

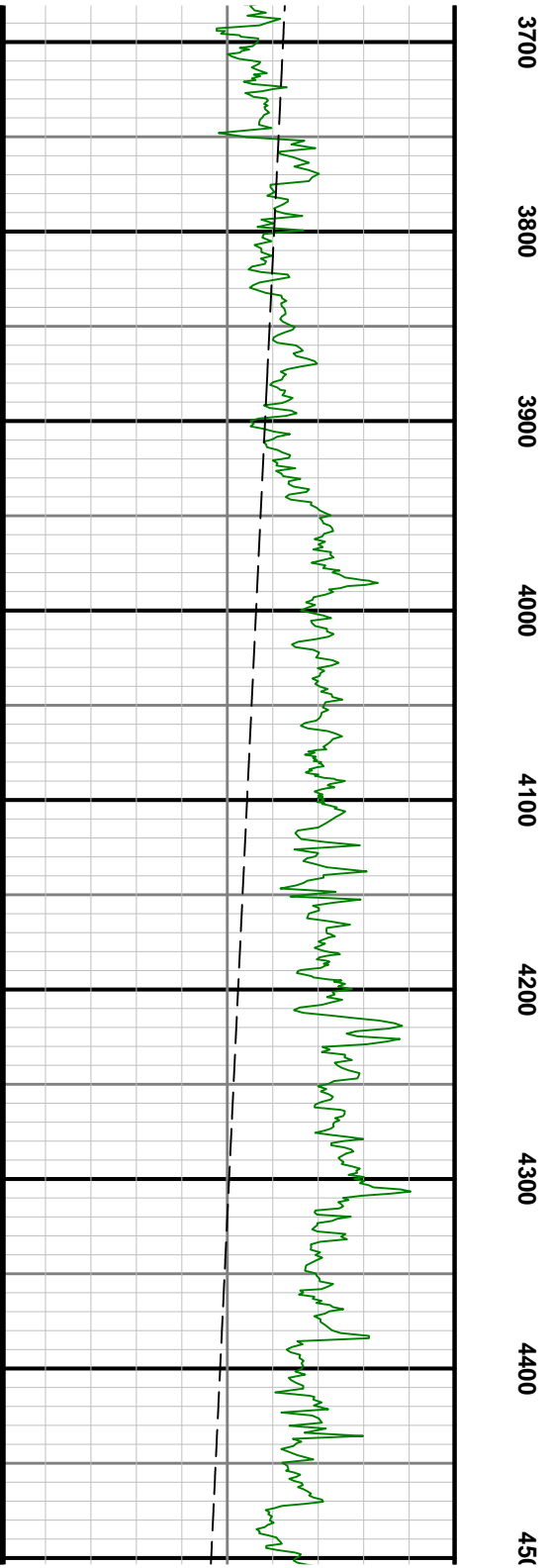
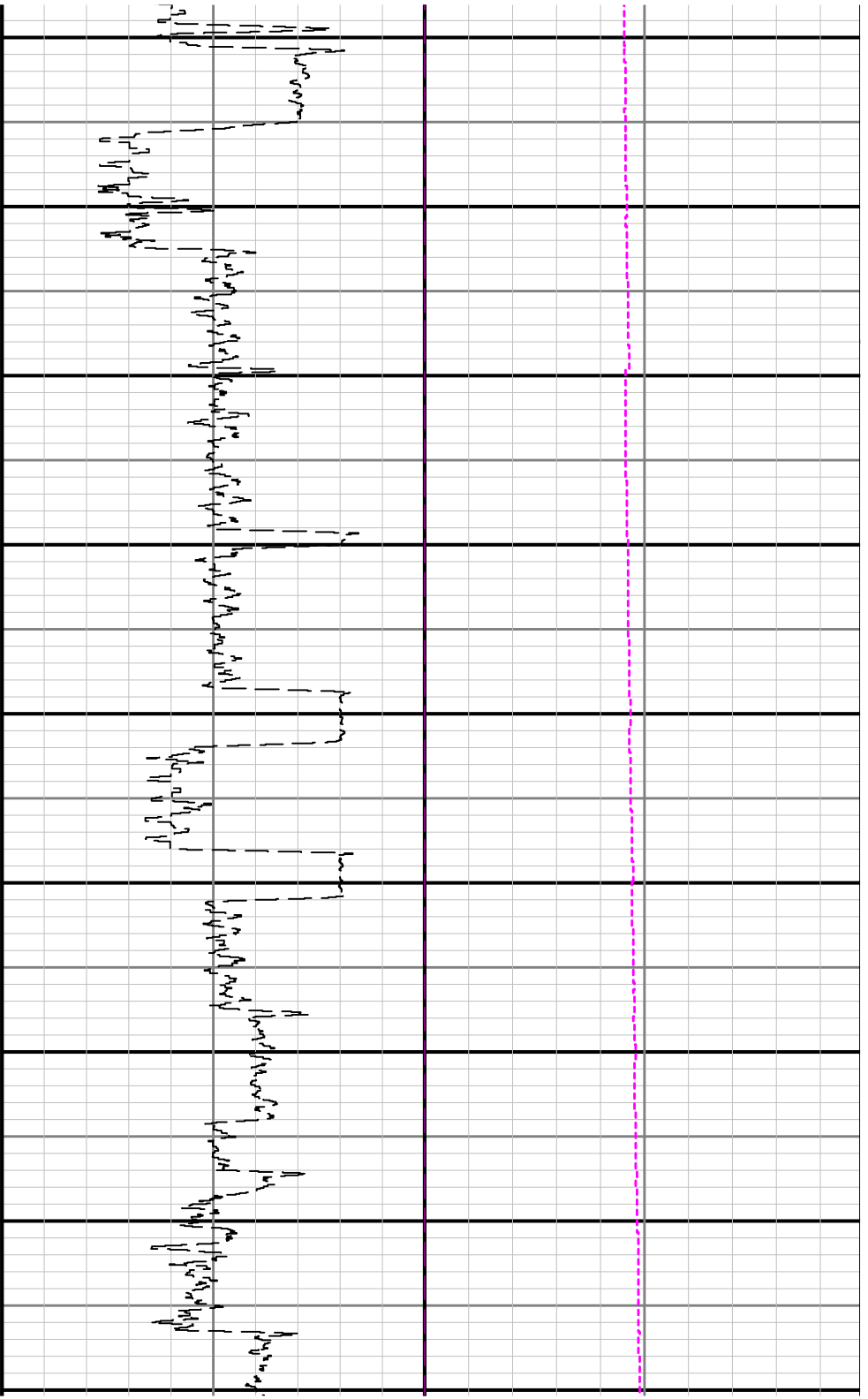
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
GRAM	Gamma Ray - Apparent 3 ft Average	API
TCDM	Downhole Temperature	degF
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb

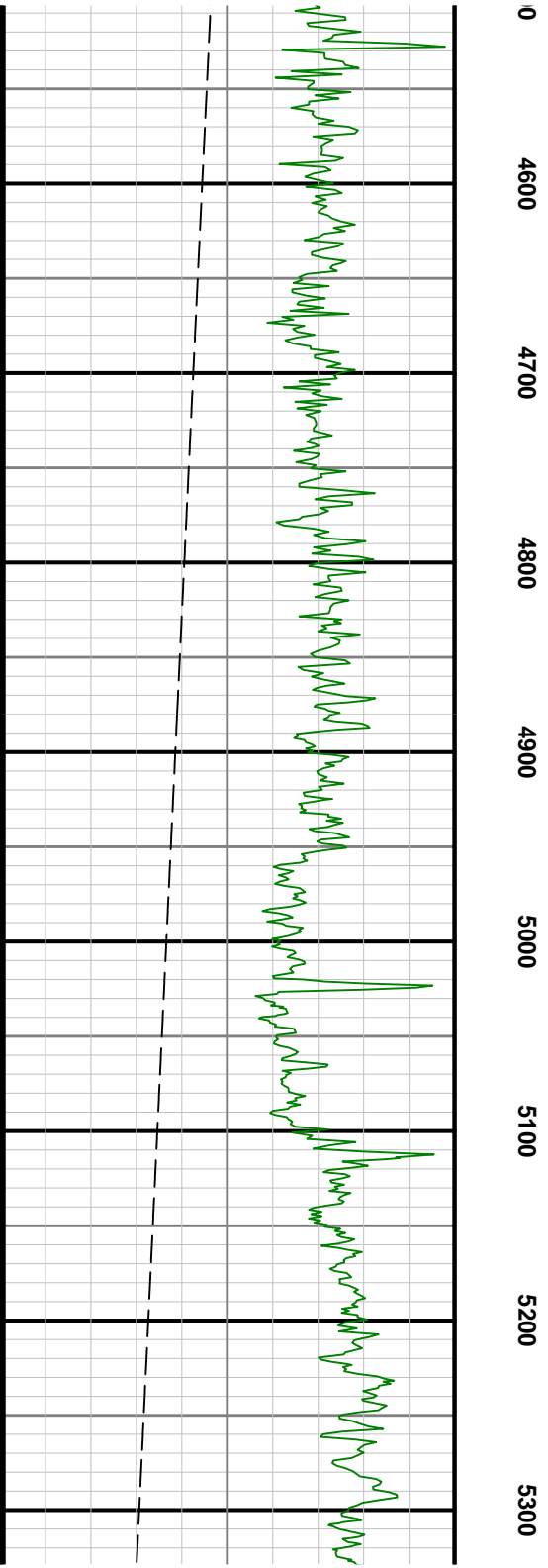
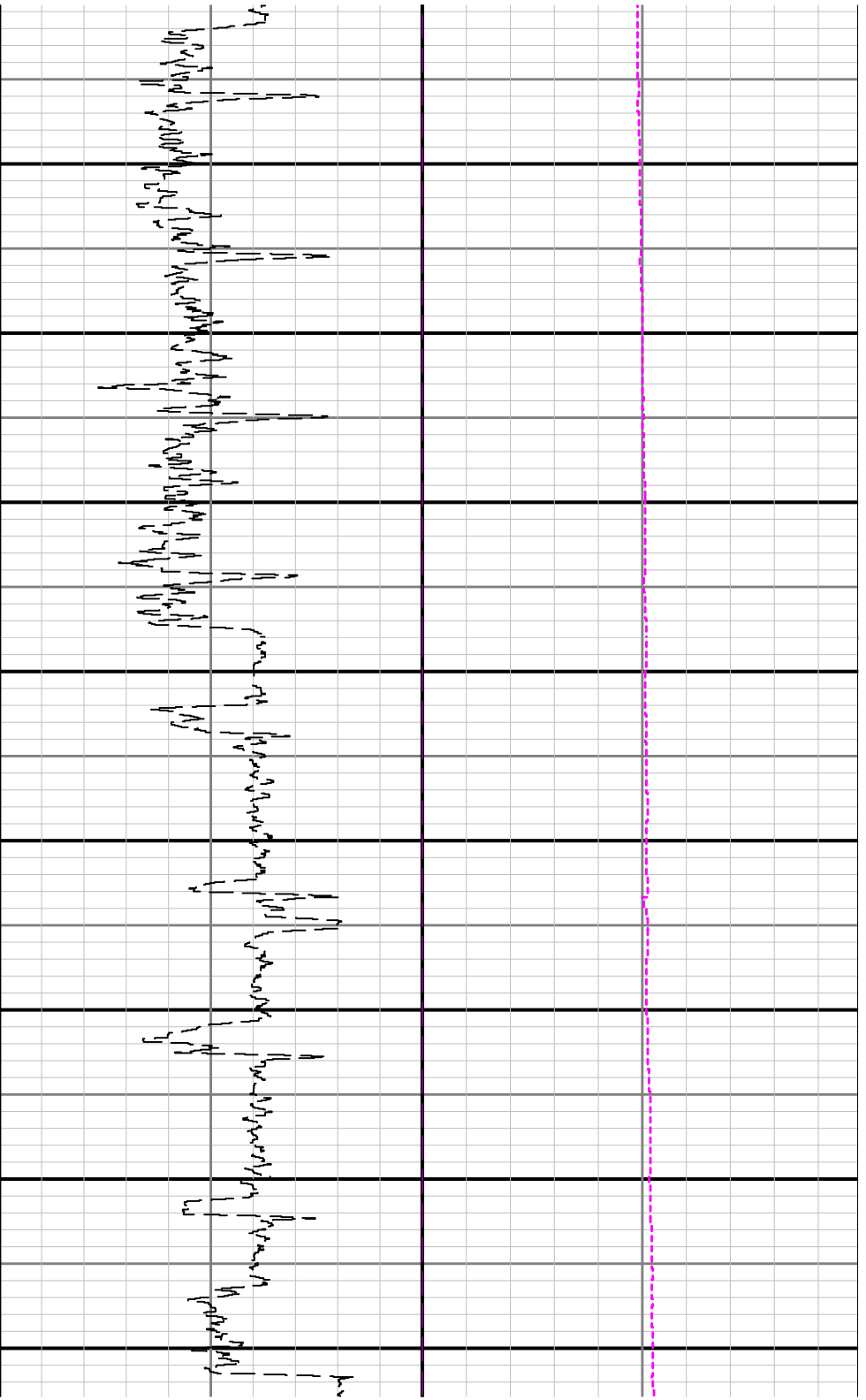
	Company	Noble Energy			
	Well	Wells Ranch AA22-631			
	Interval	Date From:	2016-03-28 18:52	Top:	1880.00
	Created	Date To:	2016-03-30 16:09	Bottom:	11880.00
		2016-03-31 10:04			

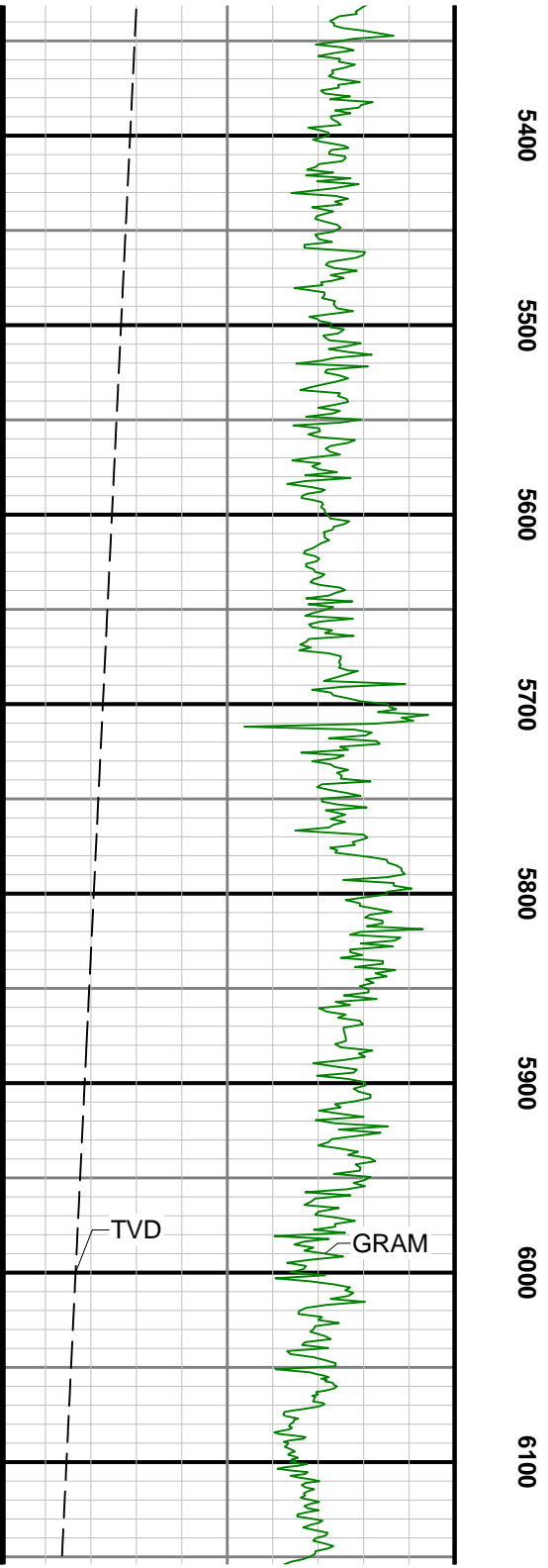
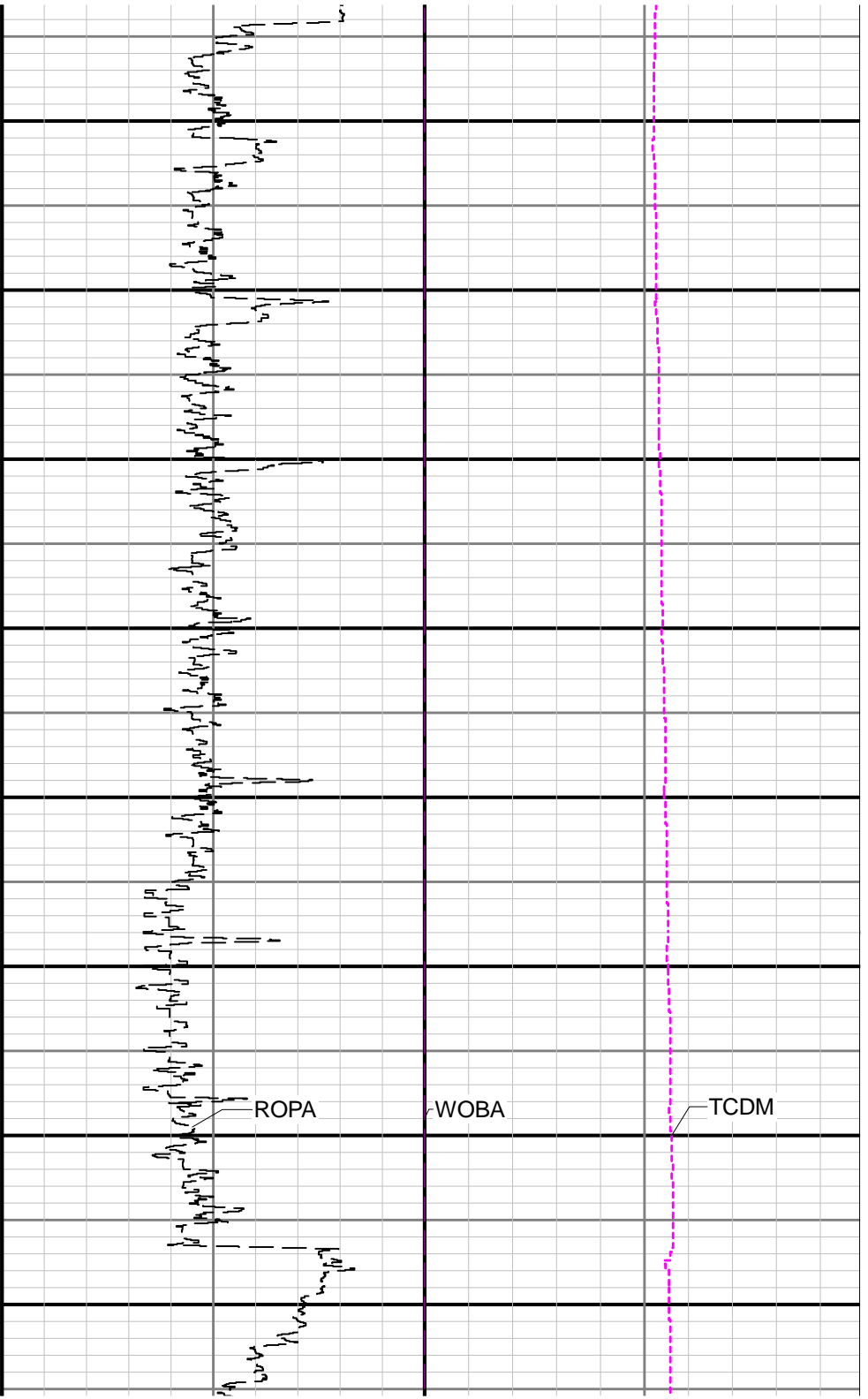


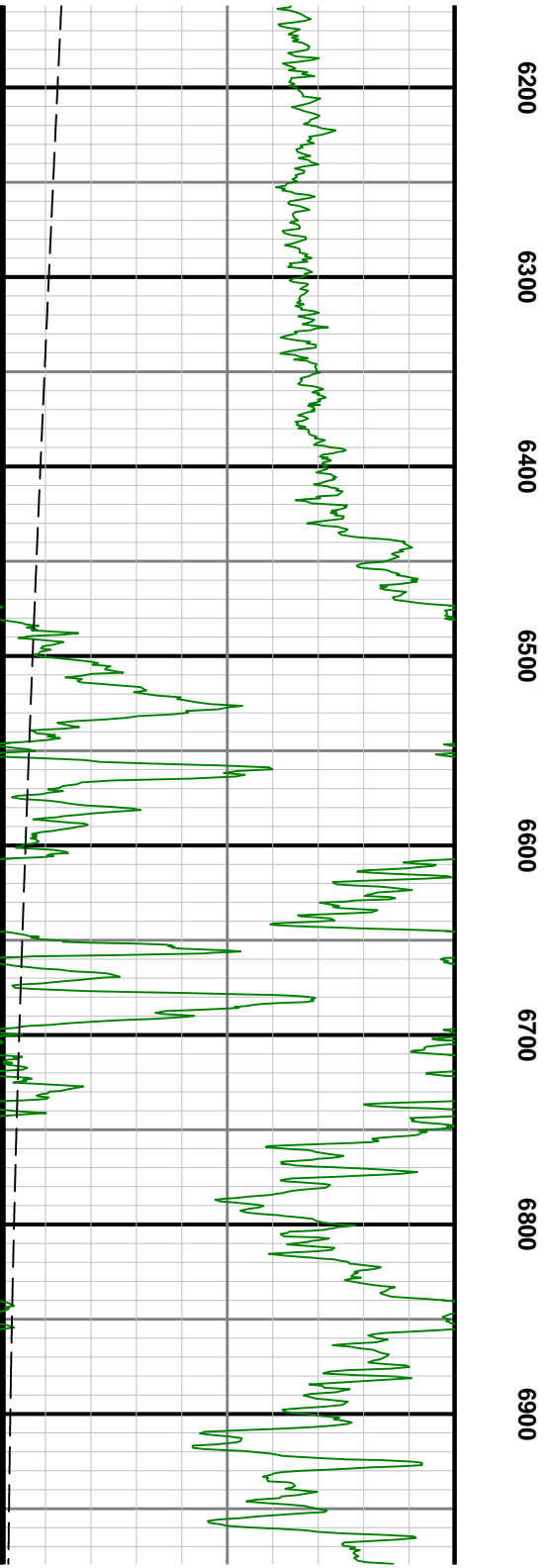
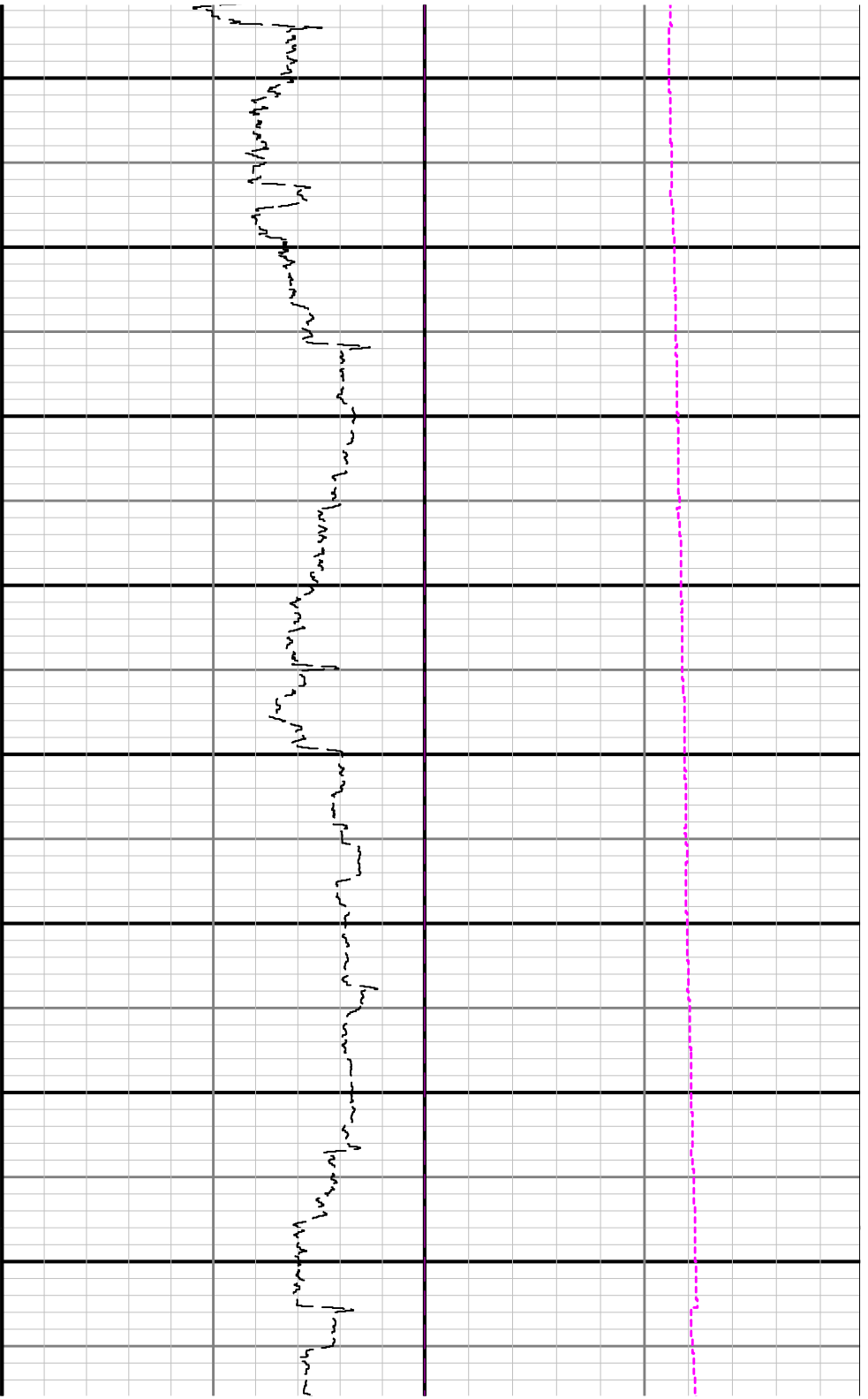


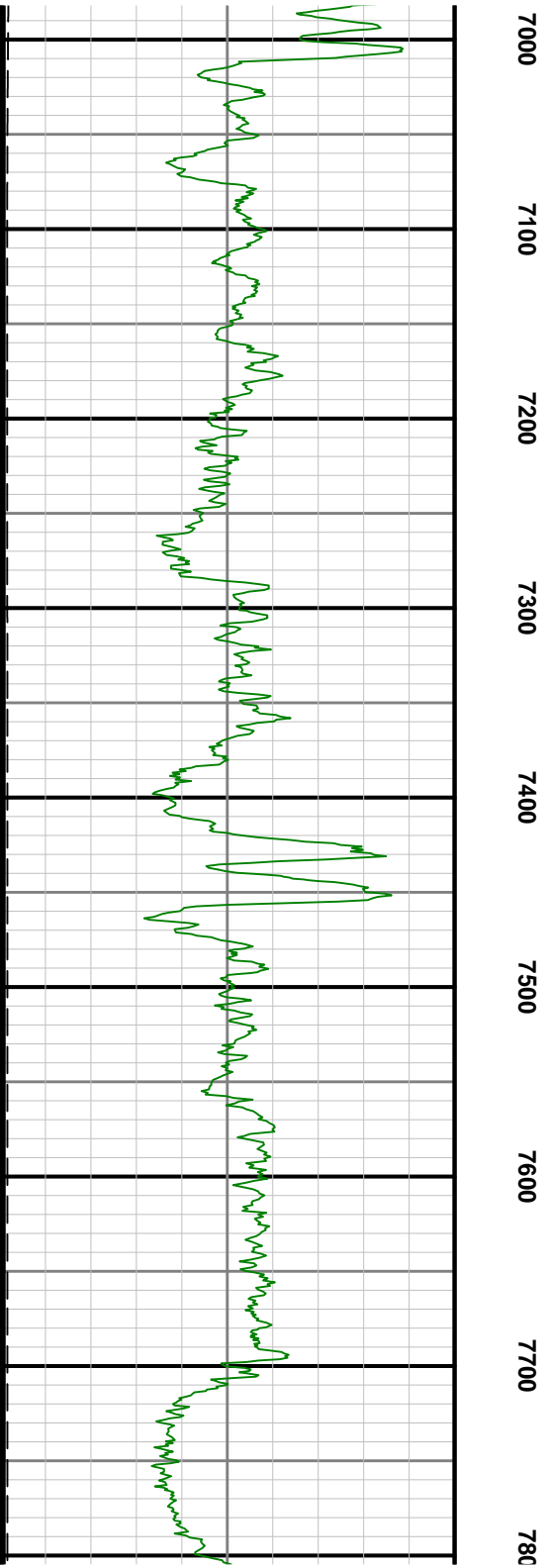
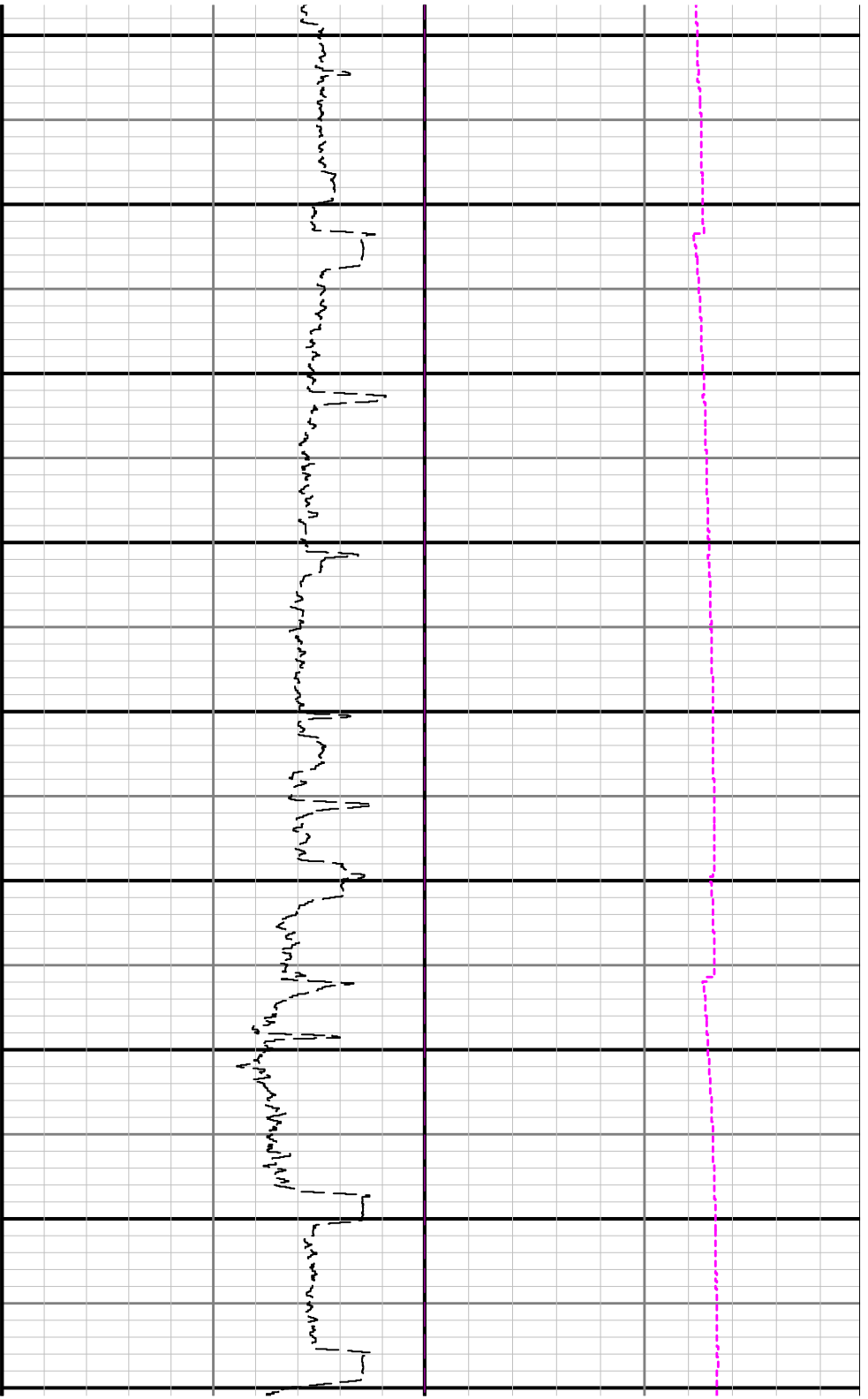


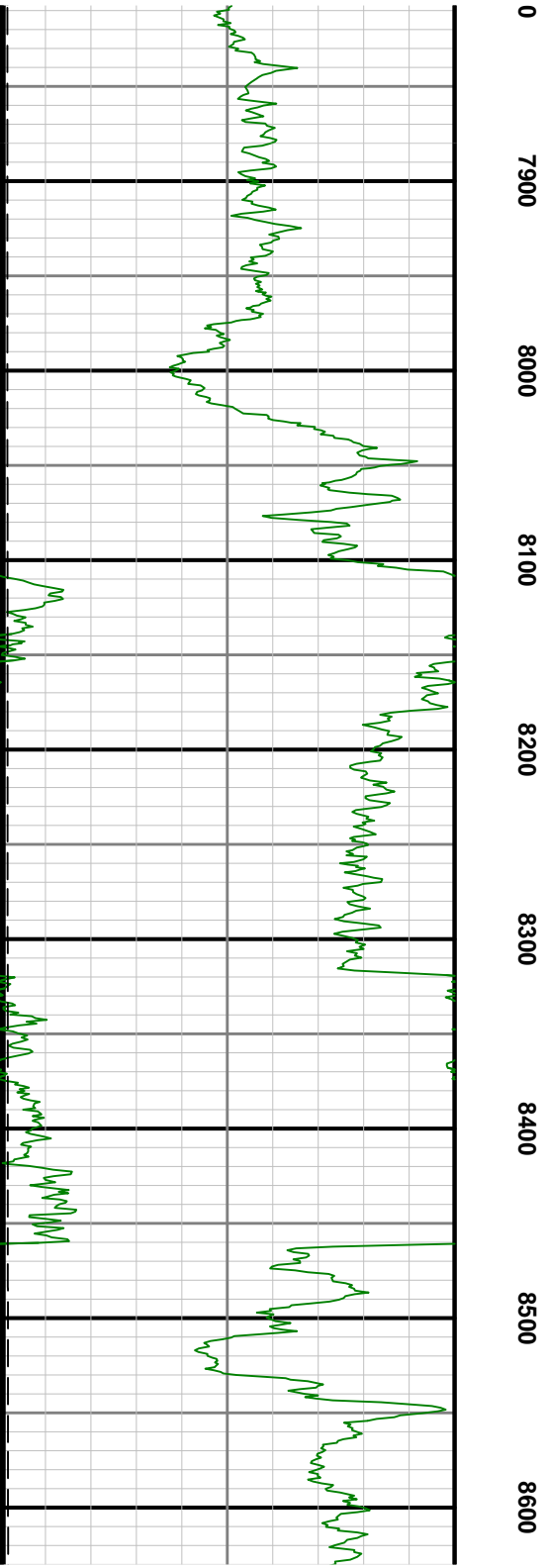
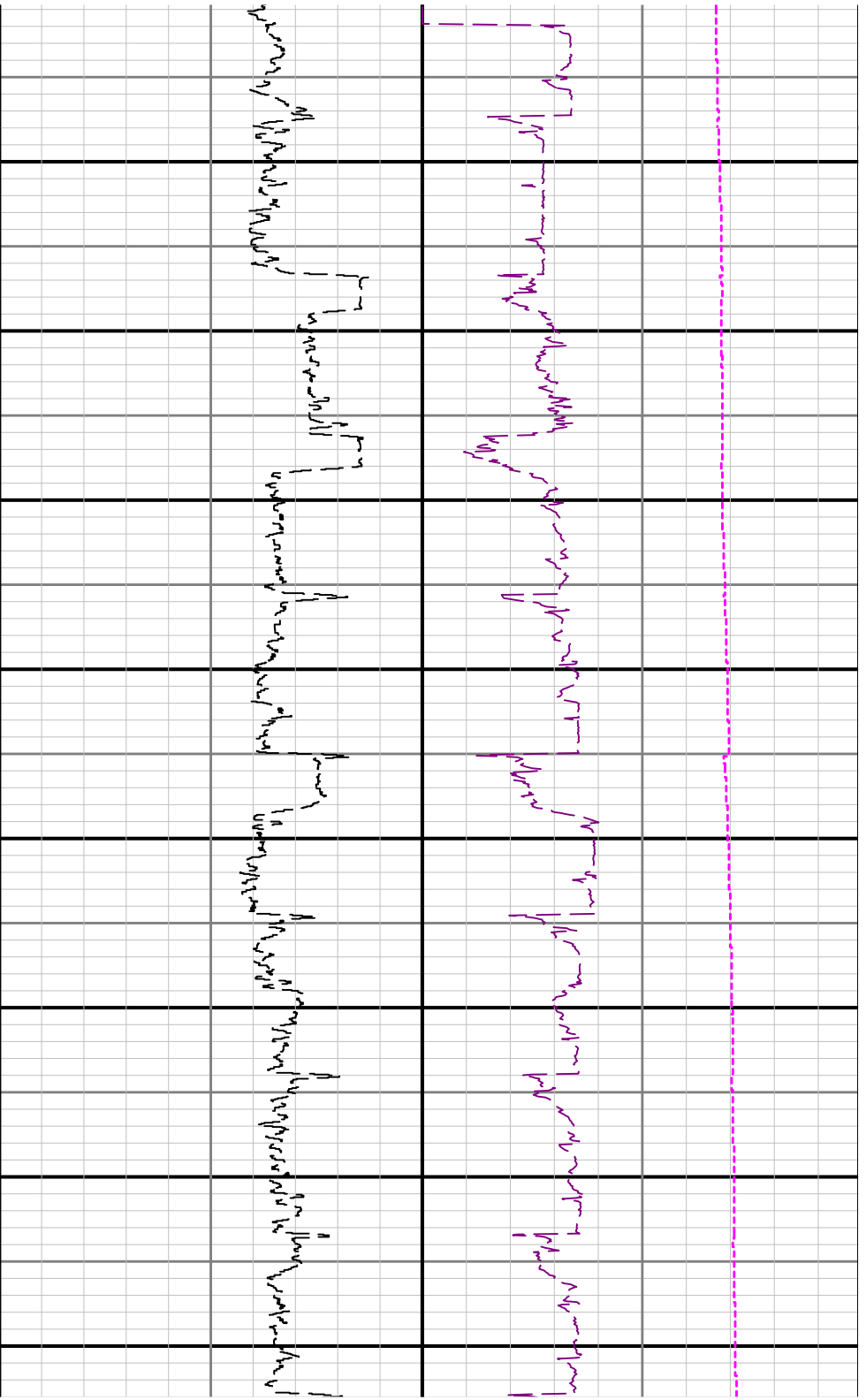


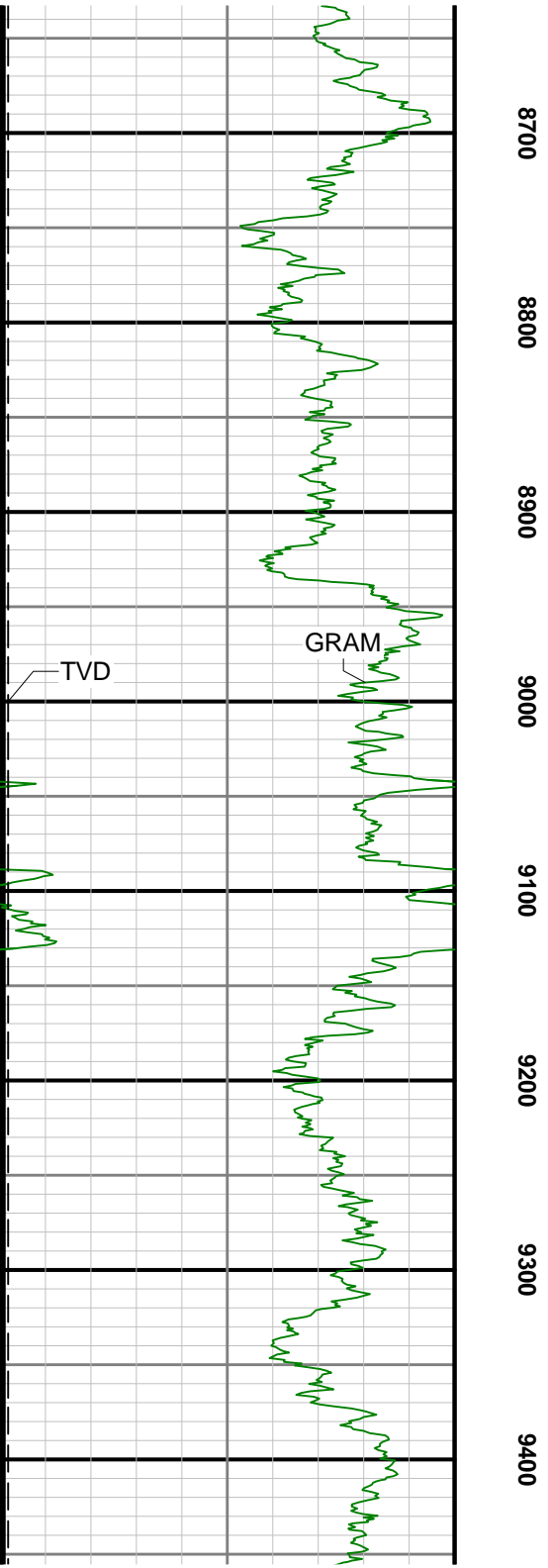
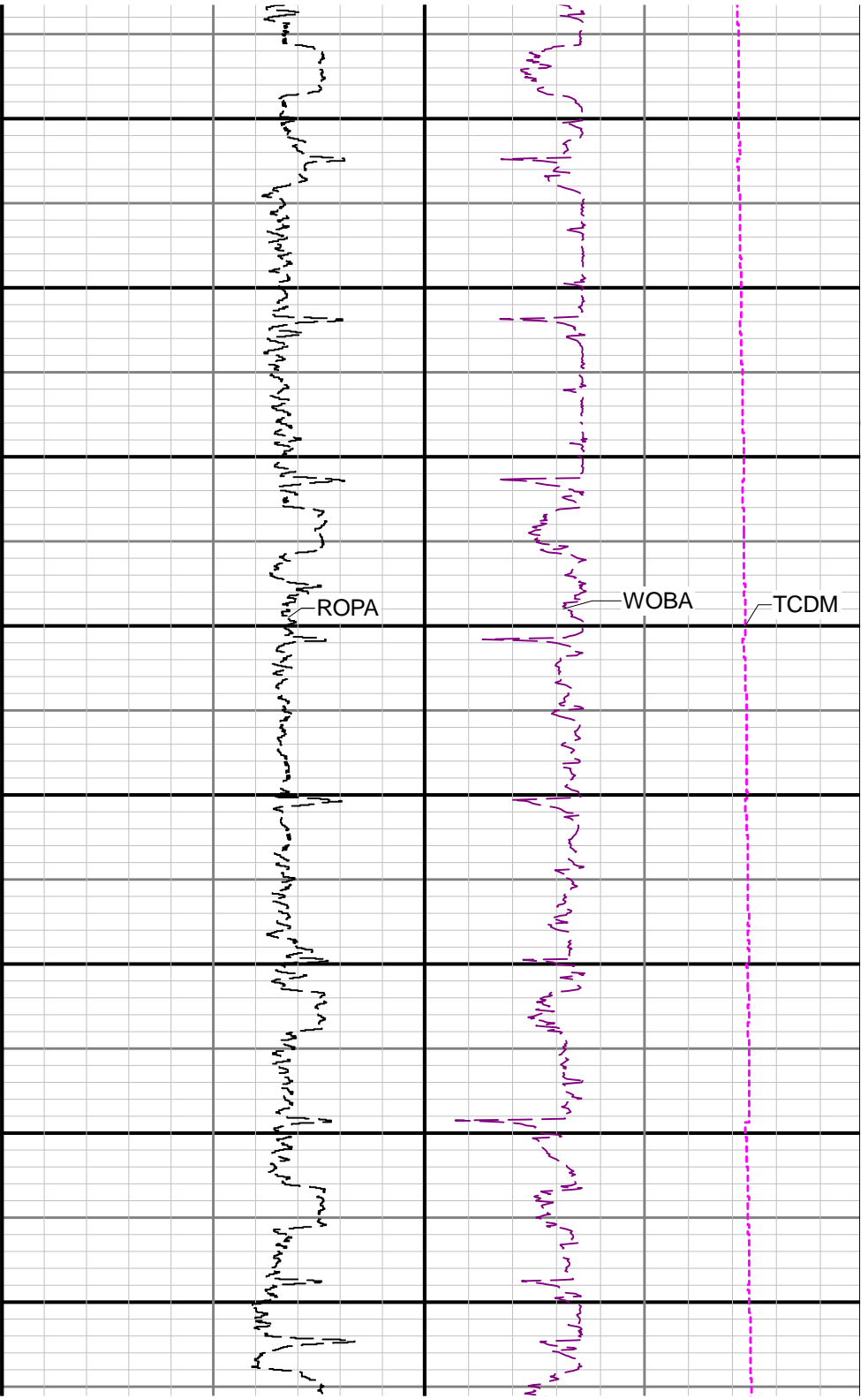


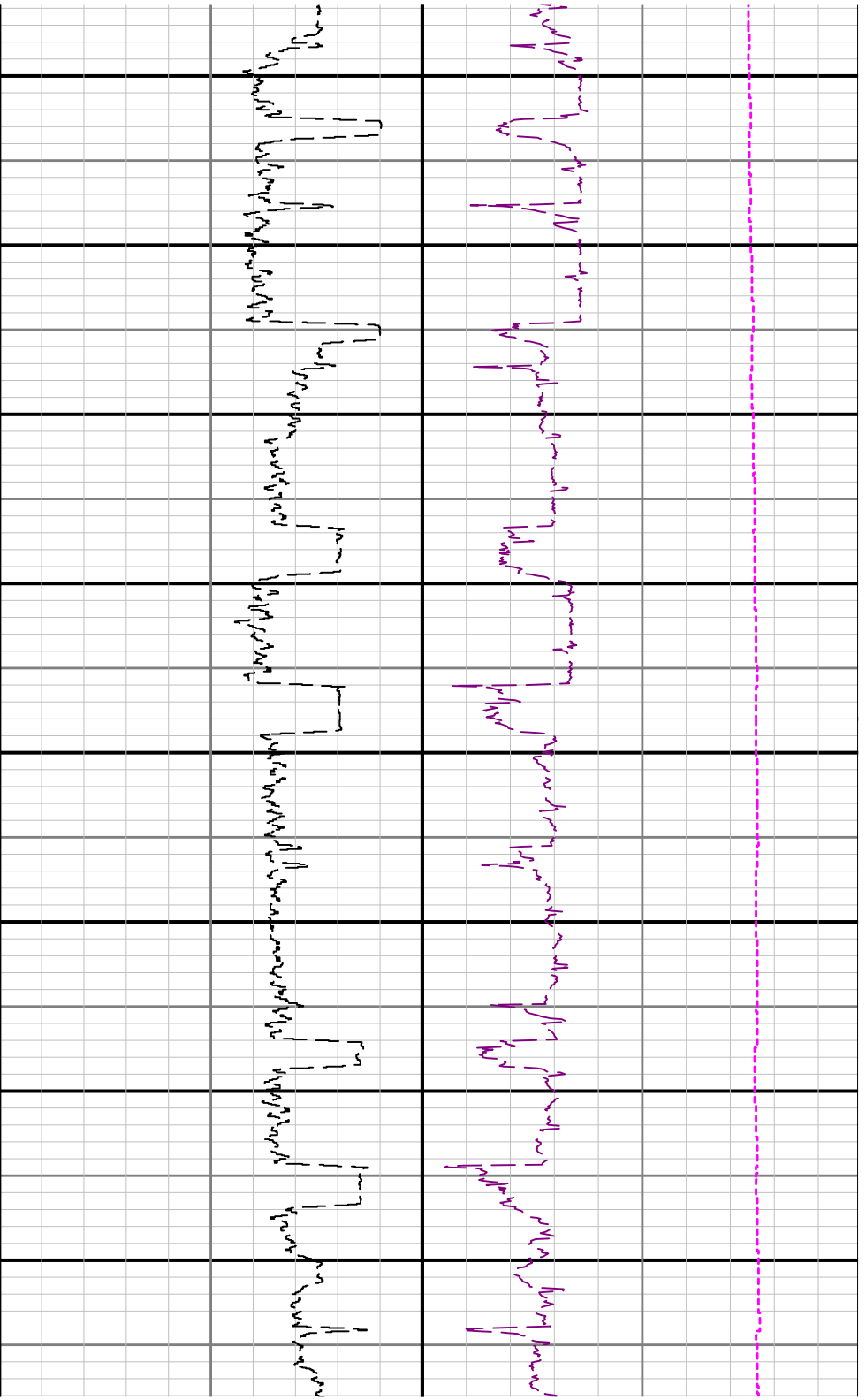












9500

9600

9700

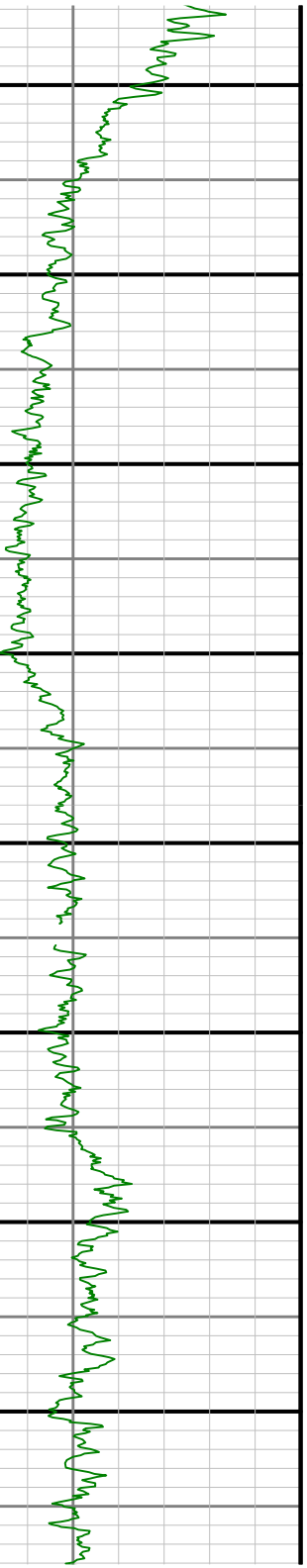
9800

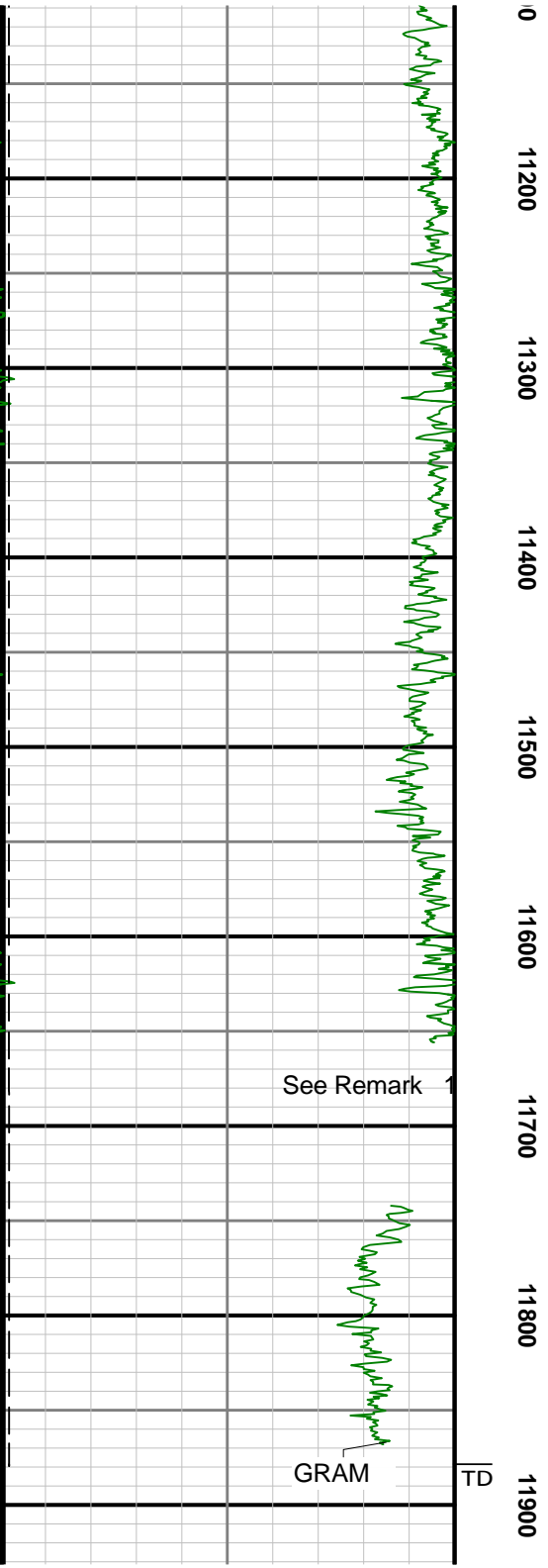
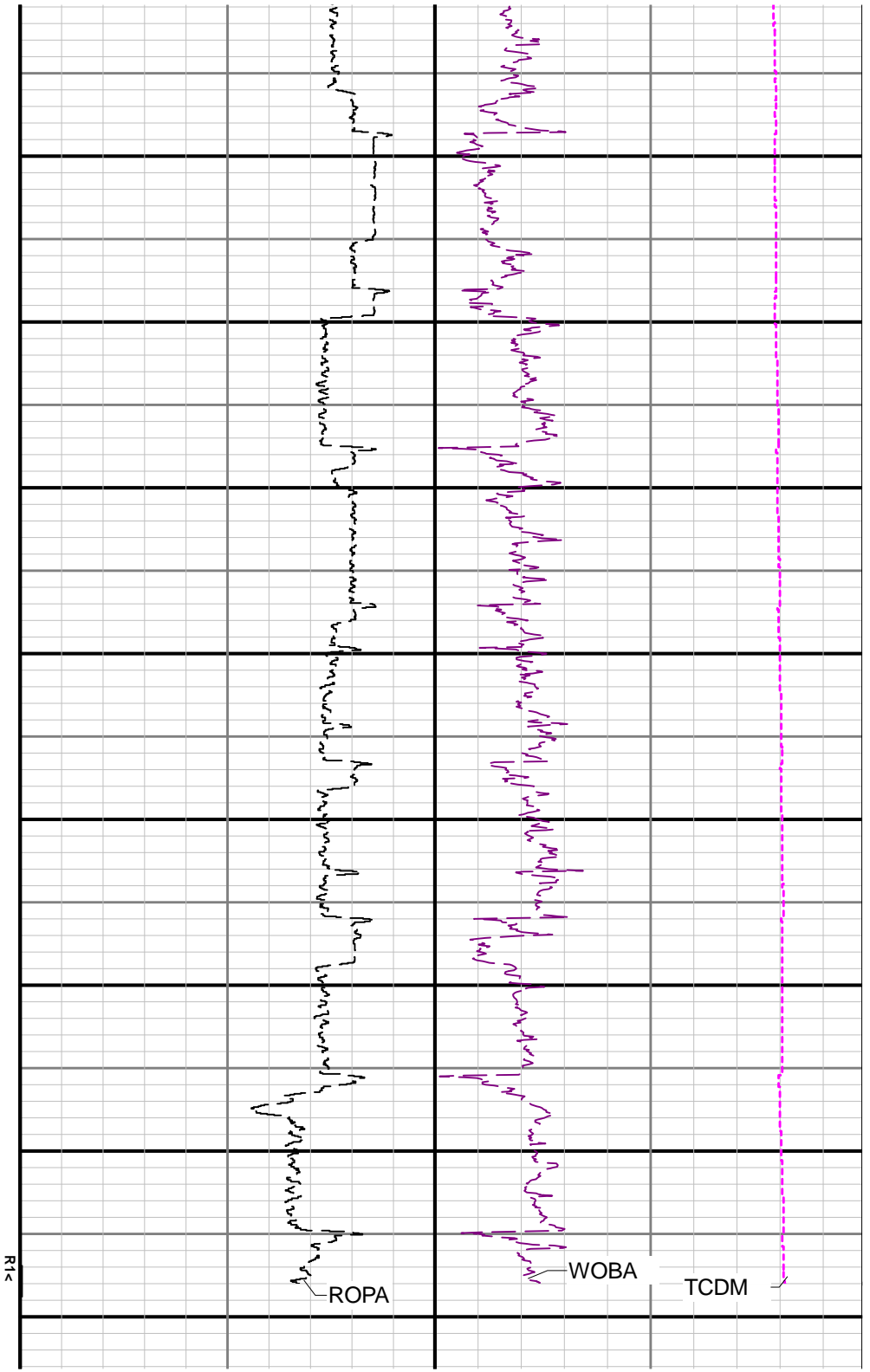
9900

10000

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10200





	12000		
Gamma Ray - Apparent 3 ft Average GRAM 0 ————— 150 API True Vertical Depth TVD 6800 ————— 1800 ft	MD 1:1200 feet	Rate of Penetration 3 ft Average ROPA 1000 ————— 0 ft/h	Surface Weight On Bit 1 ft Average WOB 0 ————— 100 klb Downhole Temperature TCDM 0 ————— 300 degF