



LWD Composite Log

Gamma Ray

Scale:		Company: ConocoPhillips				
1:1200 MD		Well: Rush 4-65 29-30 3AH				
Depth Reference:		Field: Arapahoe County (NAD83/TN)				
Driller's Depth		County: Arapahoe				
State:		Country: United States				
Status: Final Print		Surface Location: <div>Latitude: $40^{\circ} 45' 13.76''$ N</div> <div>Longitude: $104^{\circ} 45' 13.76''$ W</div>				
API No: 05005072650000		Other Services:				
Job ID: 8618778		SEC: 28 TWN: 4S RGE: 6SW				
Permanent Datum (P.D.): Mean Sea Level		Elevation: 0.00 ft				
Log Measured From: Rig Floor		Above P.D. 5720.00 ft				
Elev. KB: N/A		Elev. DF: 5720.00 ft				
Elev. GL: 5696.00 ft						
Dates		Interval Logged				
Date From: 2017-07-17		Top: (ft) 0.00				
Date To: 2017-07-22		Bottom: (ft) 15644.86				
Spud Date: 2017-07-15		Total Magnetic Field Strength: (nT) 51805				
		Mag to Reference North Correction: (deg) 8.72 E				
Borehole Record		Casing Record				
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
12.250	24.00	2303.00	9.625	36.00	24.00	2292.00
8.500	2303.00	15645.00				
Mud Record						
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	2303.00	15645.00	8.500	13342.00	1.75 338.54	92.92 270.95
Acquisition System						
Baker Hughes Cadence	Software Version			RT4.1		
Pilot Studio	4.1.7763.3			Rig:	H & P 448	
				Contractor:	Helmerich & Payne Drilling Co	
				District:	R.M.A. Unit: D & E	

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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	6.00	Steerable	2260.00	7447.00	2303.00	7490.00	2017-07-17 17:39	2017-07-18 15:35	19.14
2	2	8.500	PDC	6.00	Rotary	7490.00	14808.00	7490.00	14823.00	2017-07-19 11:33	2017-07-21 02:59	37.83

3	3	8.500	PDC	2.00	Rotary	14808.00	15632.00	14823.00	15645.00	2017-07-21 21:01	2017-07-22 02:24	10.26
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Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Zac Williams	2017-07-15	2017-07-18	Brent Cass	2017-07-18	2017-07-23			

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+ (%)
2017-07-17 13:06	1	2303.00	Oil Based Mud	9.7	20	0.0	12.0	60.2/39.8	Flow Line	66000	0.00
2017-07-17 17:00	1	2303.00	Oil Based Mud	9.5	23	0.0	9.6	61.8/38.2	Active Pit	87000	0.00
2017-07-19 03:11	2	7490.00	Oil Based Mud	9.3	15	0.0	9.0	64.2/35.8	Active Pit	73000	0.00
2017-07-21 14:05	3	14822.47	Oil Based Mud	9.7	21	0.0	6.4	65.2/34.8	Active Pit	69000	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	NaviGamma	12366174	Gamma (single)	6.65	43.72	6.750	3.250
1	NaviGamma	12366174	Directional (mag)	10.15	47.22	6.750	3.250
1	NaviGamma	12366174	VSS	10.15	47.22	6.750	3.250
2	ATC_SU	12194650	Near Bit Inclination	5.93	6.93	7.000	4.330
2	ATC_SU	12194650	Near Bit VSS	5.93	6.93	7.000	4.330
2	ATC_MWD	12706130	Gamma (single)	2.20	12.55	7.000	3.250
2	ATC_MWD	12706130	Directional (mag)	12.27	22.62	7.000	3.250
3	ATC_SU	12215165	Near Bit VSS	5.93	6.93	7.000	4.330
3	ATC_SU	12215165	Near Bit Inclination	5.93	6.93	7.000	4.330
3	ATC_MWD	12232962	Gamma (single)	2.20	12.55	7.000	3.250
3	ATC_MWD	12232962	Directional (mag)	12.27	22.62	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
GAM	NaviGamma	Probe Based Gamma Module, NaviTrak Platform
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments


1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes Drilling Services. Due to the 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 present logging data.
2	Baker Hughes LWD run 1 utilized 6.750 inch NaviGamma services (Gamma Ray and Directional) behind an 8.50 inch bit and steerable assembly from 2303 to 7490 feet MD (2302 to 7413 feet TVD).
3	Baker Hughes LWD runs 2 and 3 utilized a 6.75 inch Gamma Service (Directional and Gamma Ray) tool behind an 8.5 inch bit and Rotary Steerable Assembly from 7447 to 15645 feet MD (7413 to 7980 ft. TVD).
4	Numerous gaps in Gamma Ray data are present throughout the log due to downlinking and surveying while drilling ahead.

Remarks

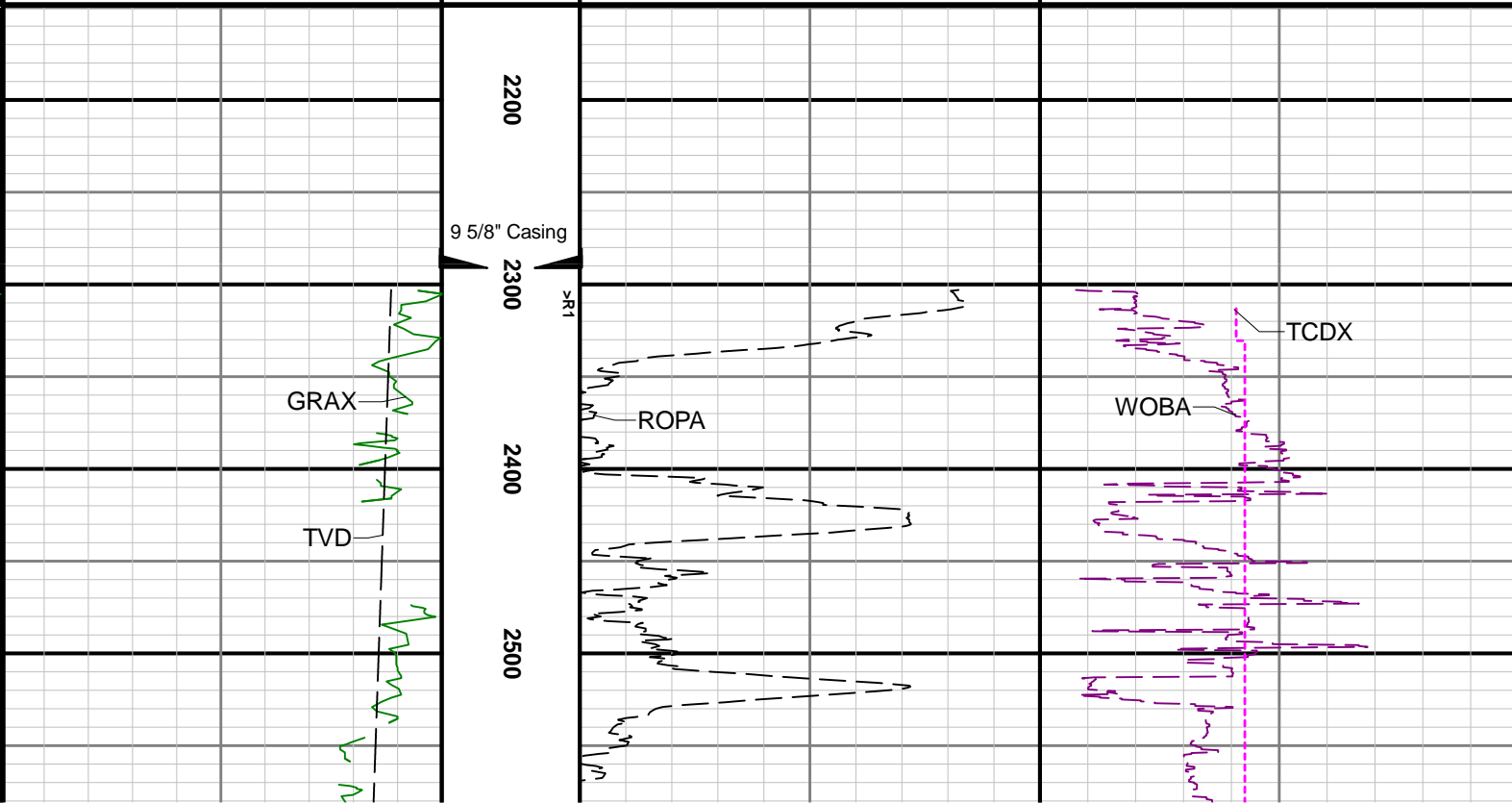
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	15632.00	8.500	3	The interval from 15632 to 15645 feet MD (7981 to 7980 feet TVD) was not logged due to the sensor to bit offset at well TD.

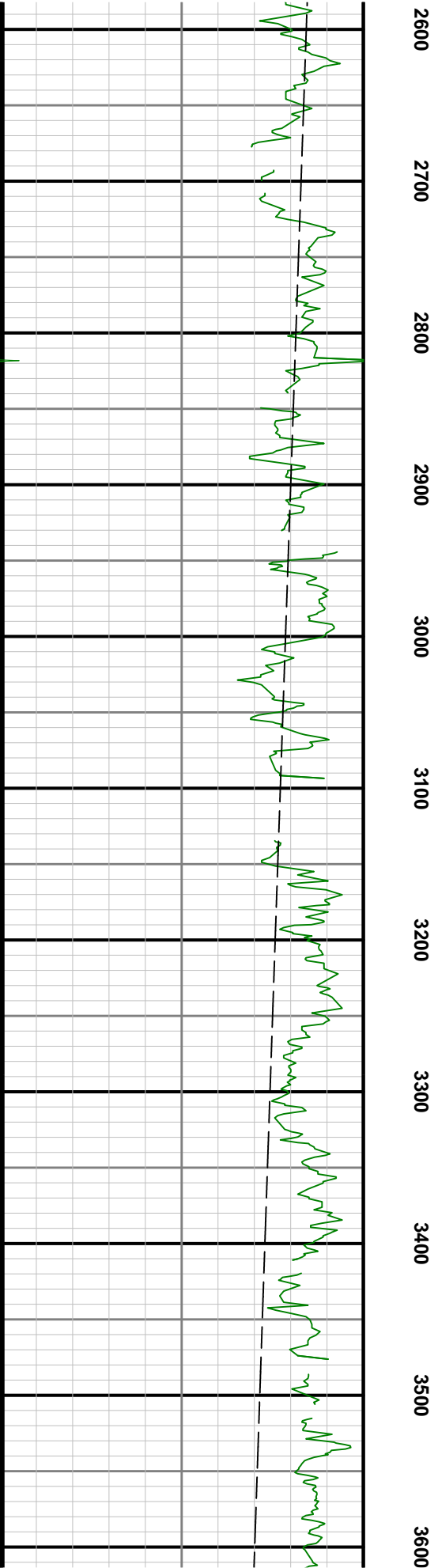
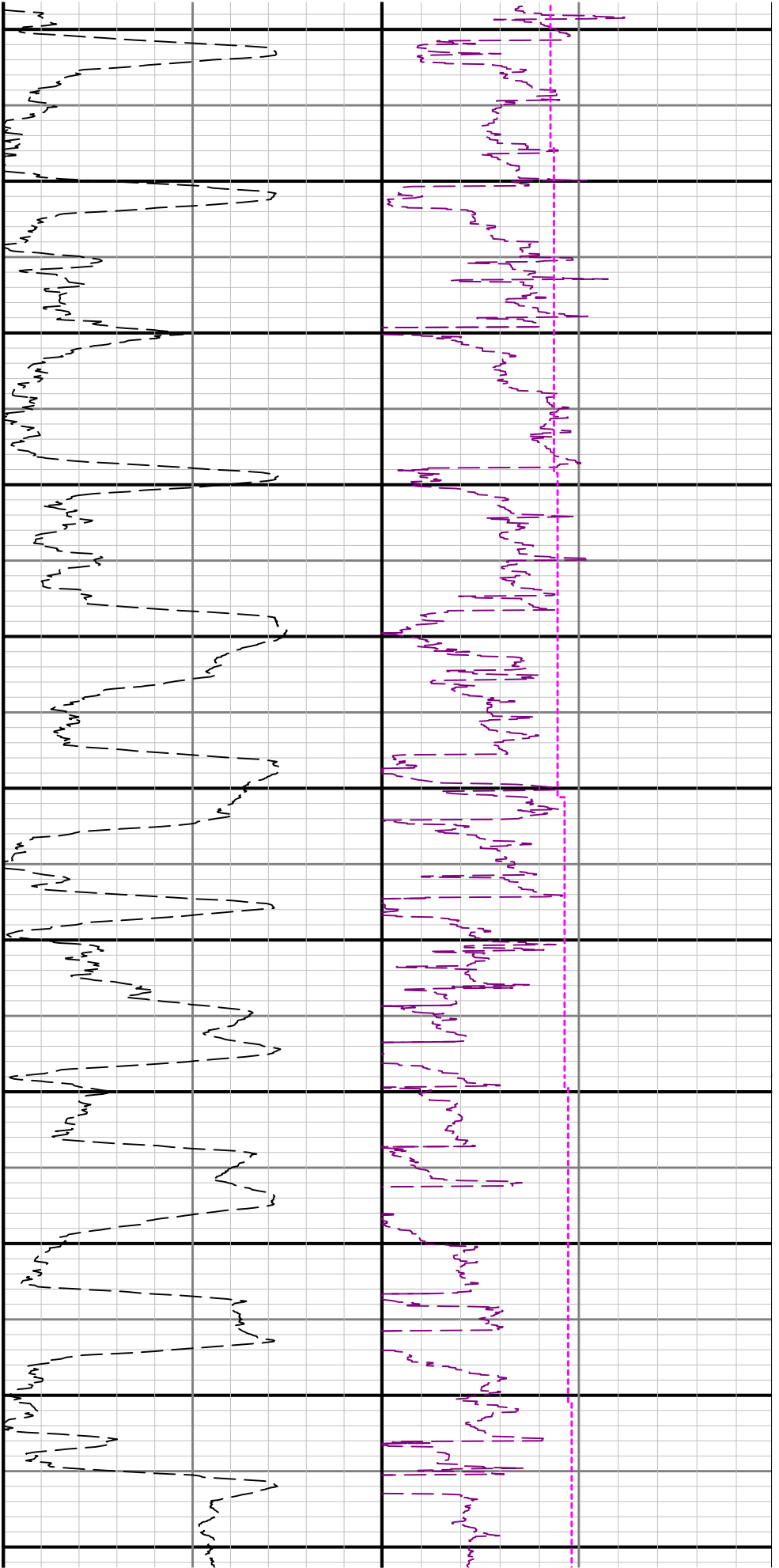
Curve Mnemonics

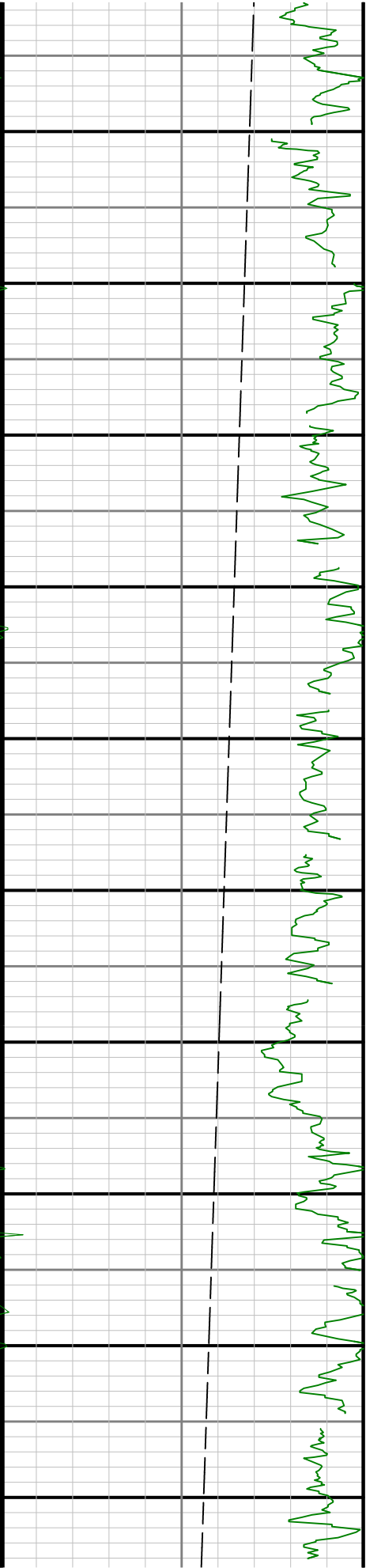
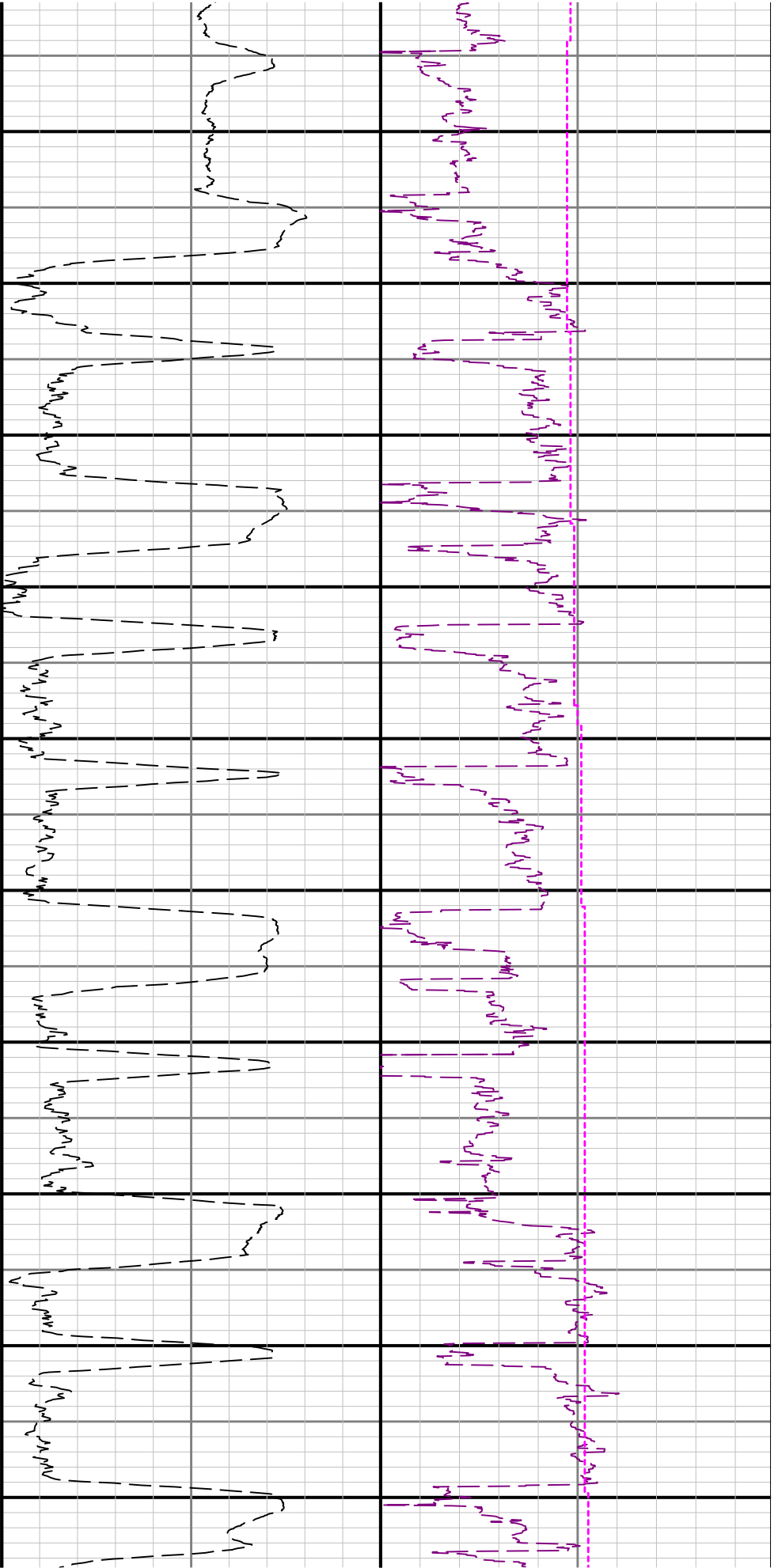
Presented Curves	Description	Units
TCDX	Downhole Temperature	degF
ROPA	Depth Averaged ROP 10 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
GRAX	Gamma Ray - Apparent - Real-Time 3 ft Average	API
TCDM	Downhole Temperature	degF

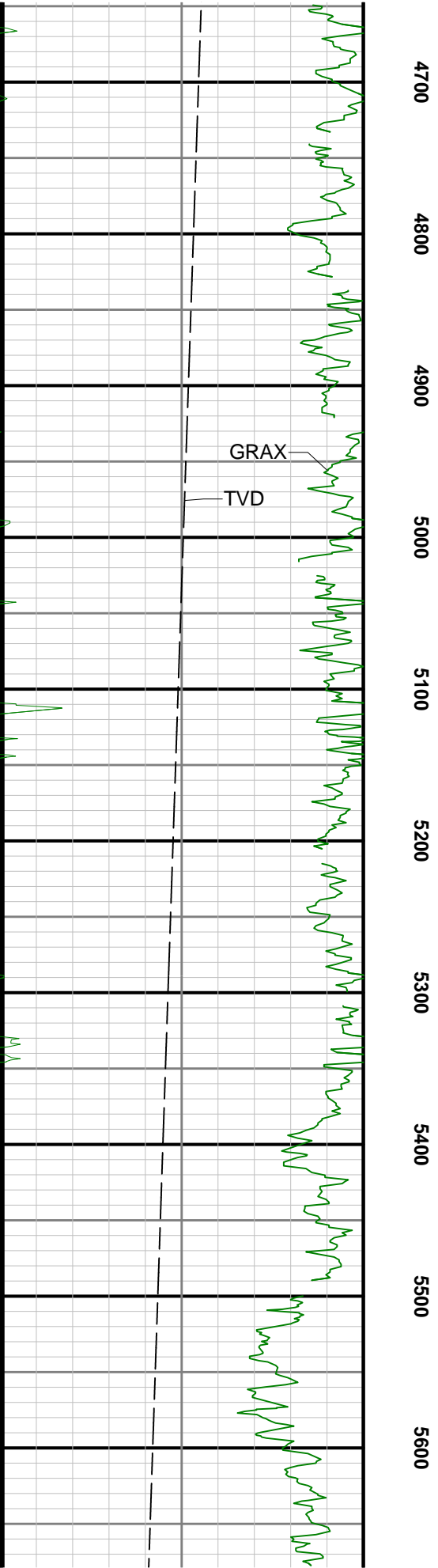
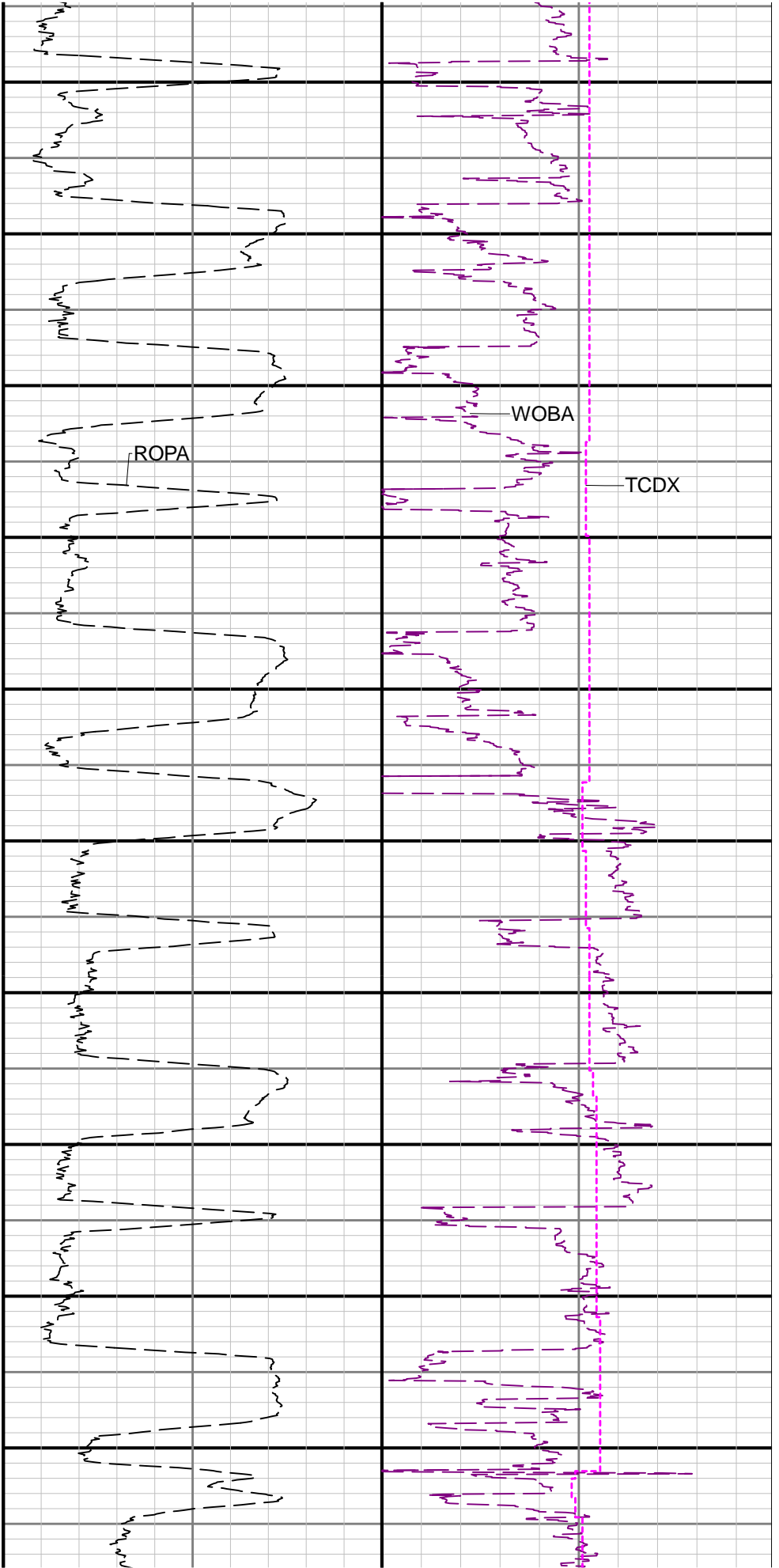
	Company	ConocoPhillips			
	Well	Rush 4-65 29-30 3AH			
	Interval	Date From:	2017-07-17 17:39:58	Top:	2289.00
	Created	Date To:	2017-07-22 02:22:03	Bottom:	15645.00
		2017-07-27 16:45:37			

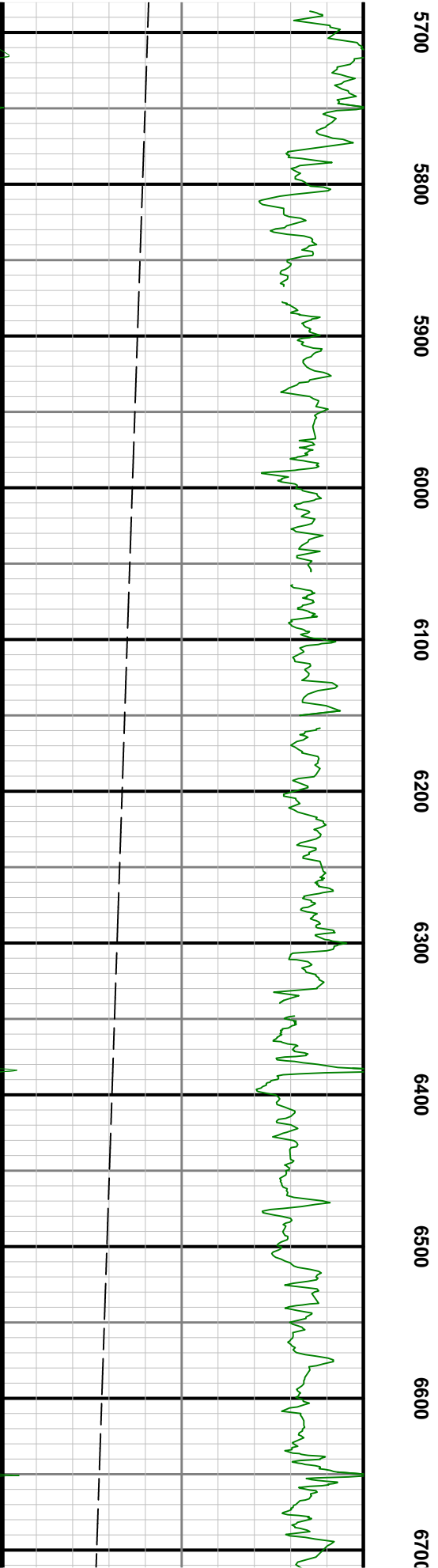
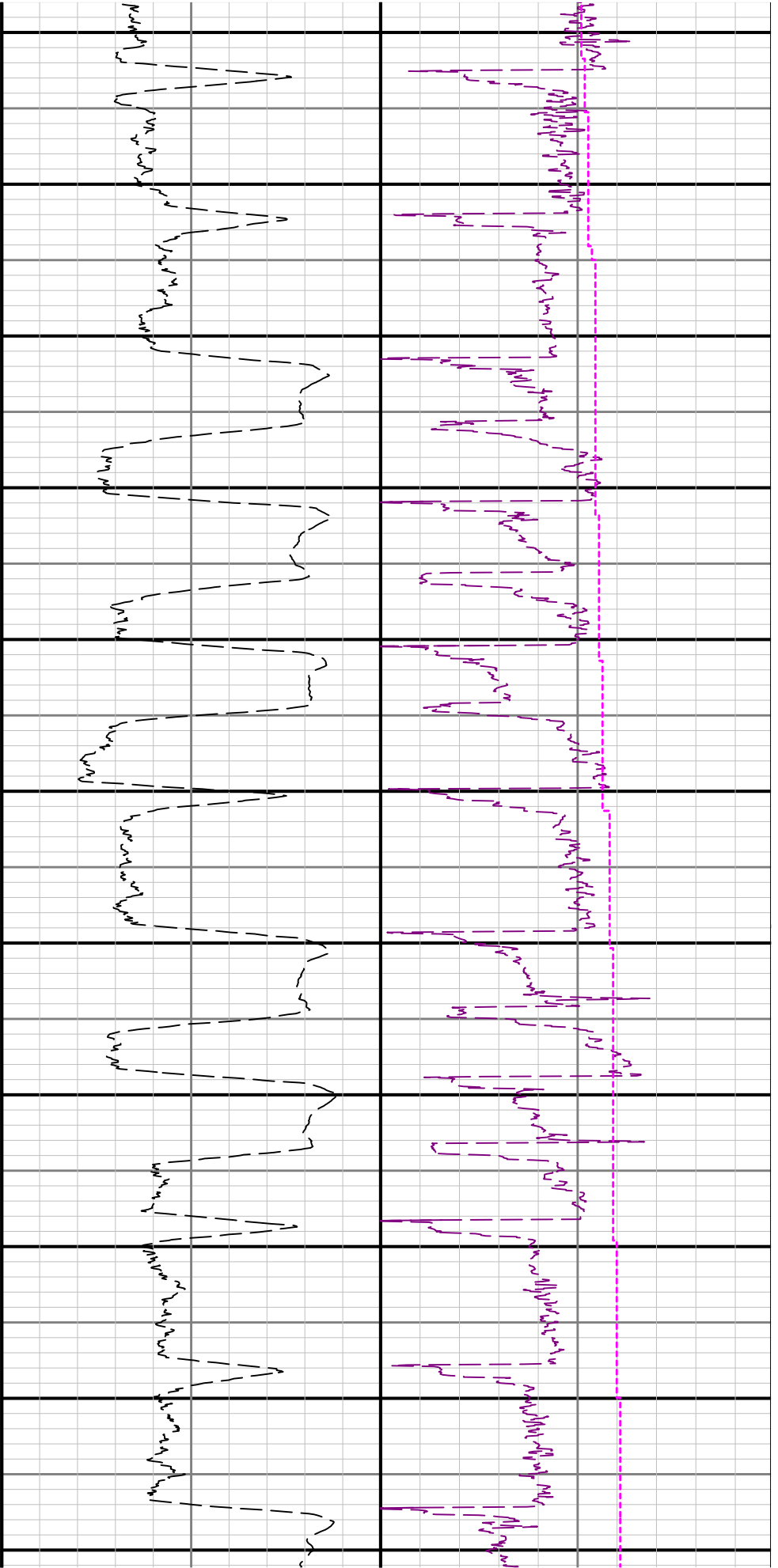
Gamma Ray - Apparent 3 ft Average GRAX 0 150	MD 1:1200 feet	Depth Averaged ROP 10 ft Average ROPA 1000 0	Weight On Bit, Average 1 ft Average WOBA 0 50
API		ft/h	klb
Gamma Ray - Apparent 3 ft Average GRAM 0 150			Downhole Temperature TCDX 0 300
API			degF
True Vertical Depth TVD 8500 1500			Downhole Temperature TCDM 0 300
ft			degF

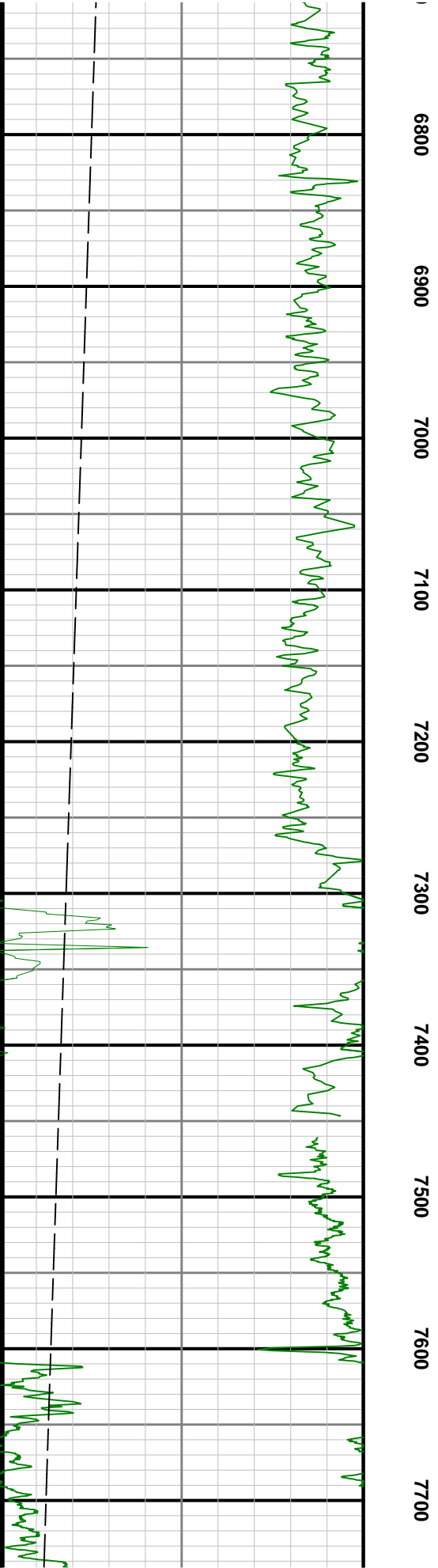
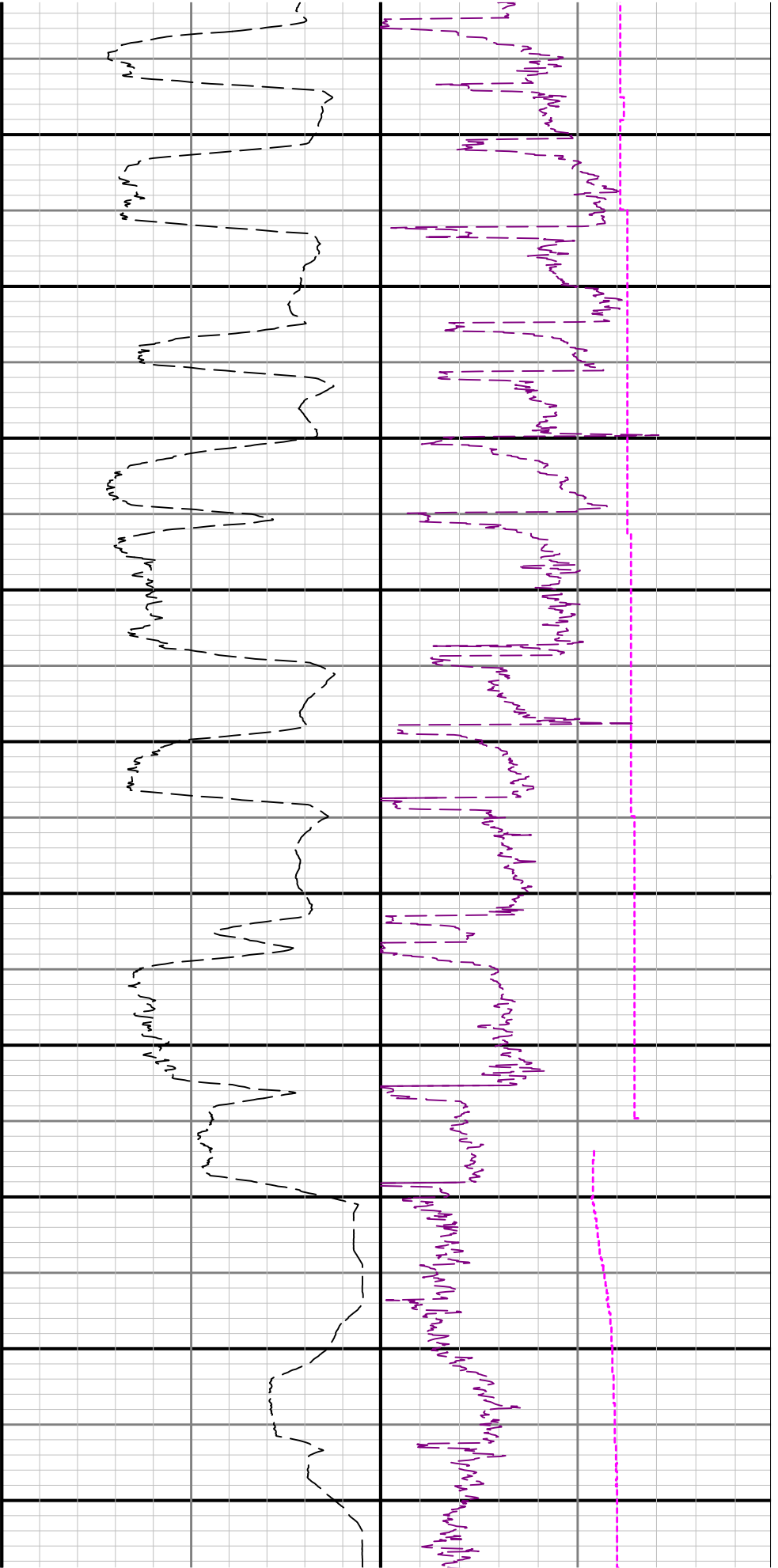


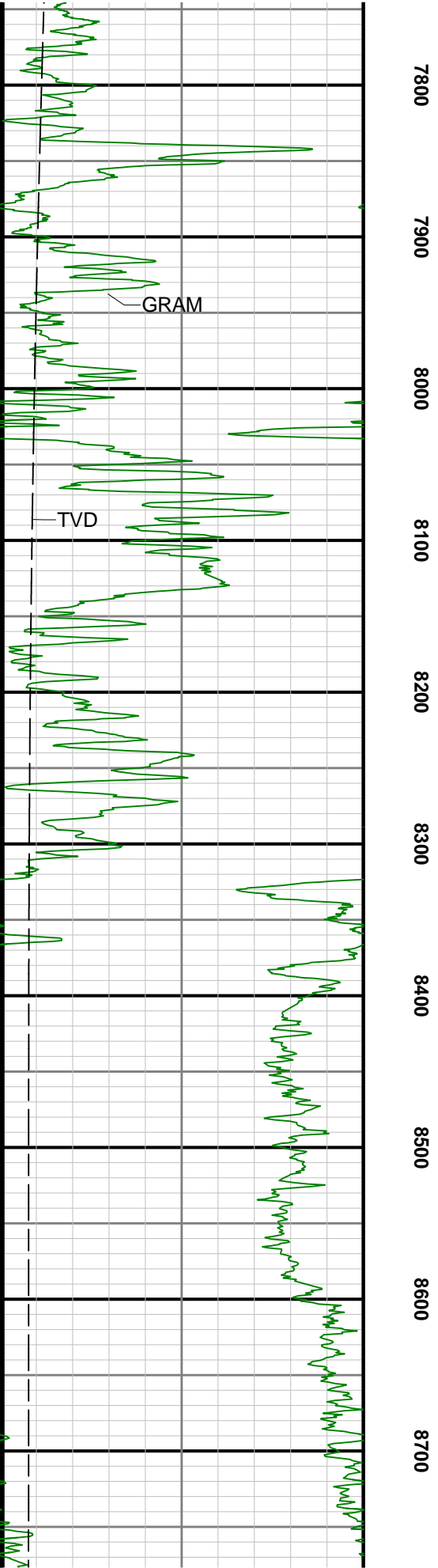
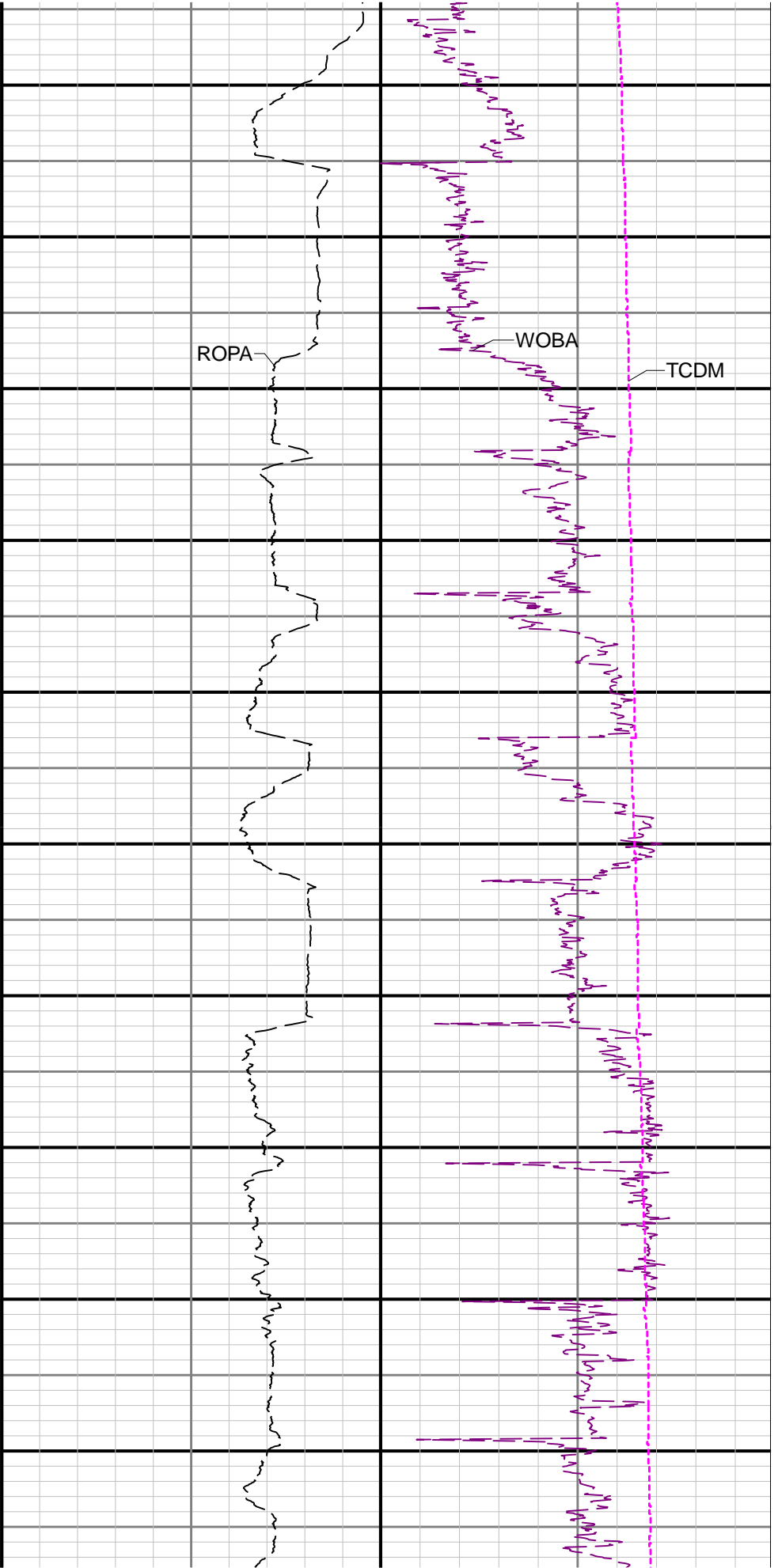


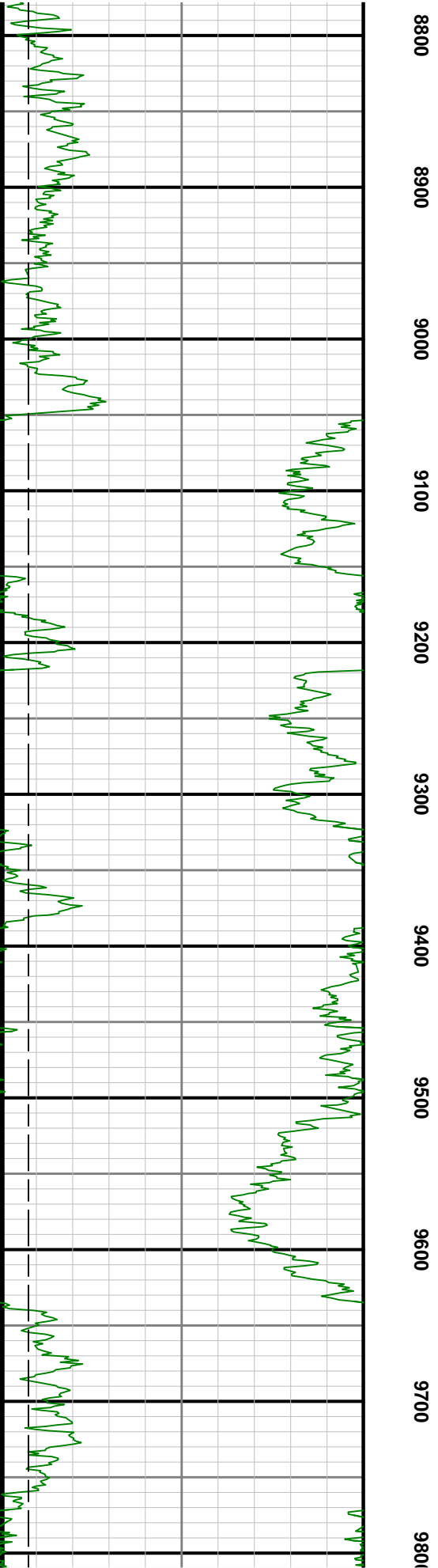
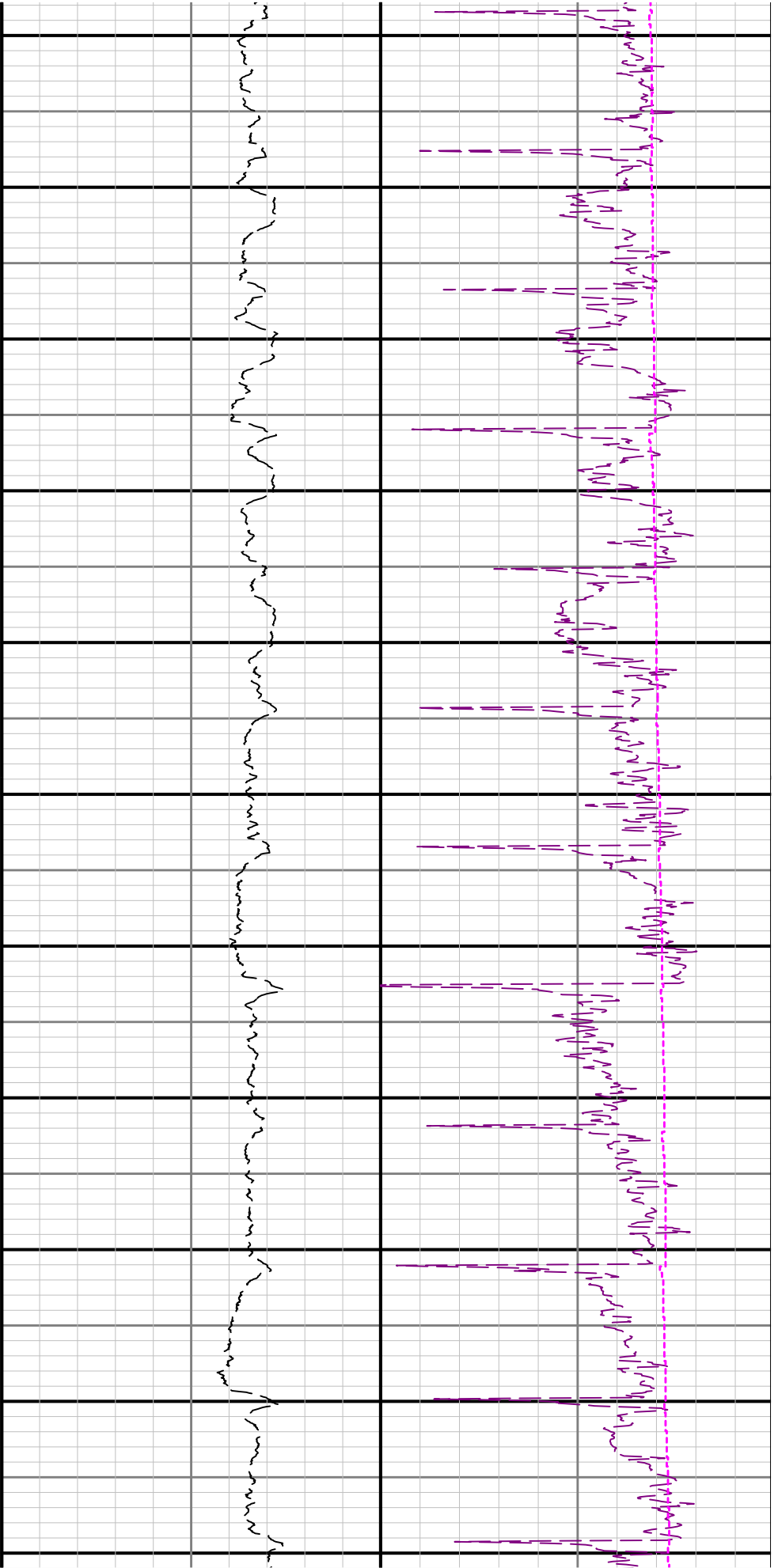


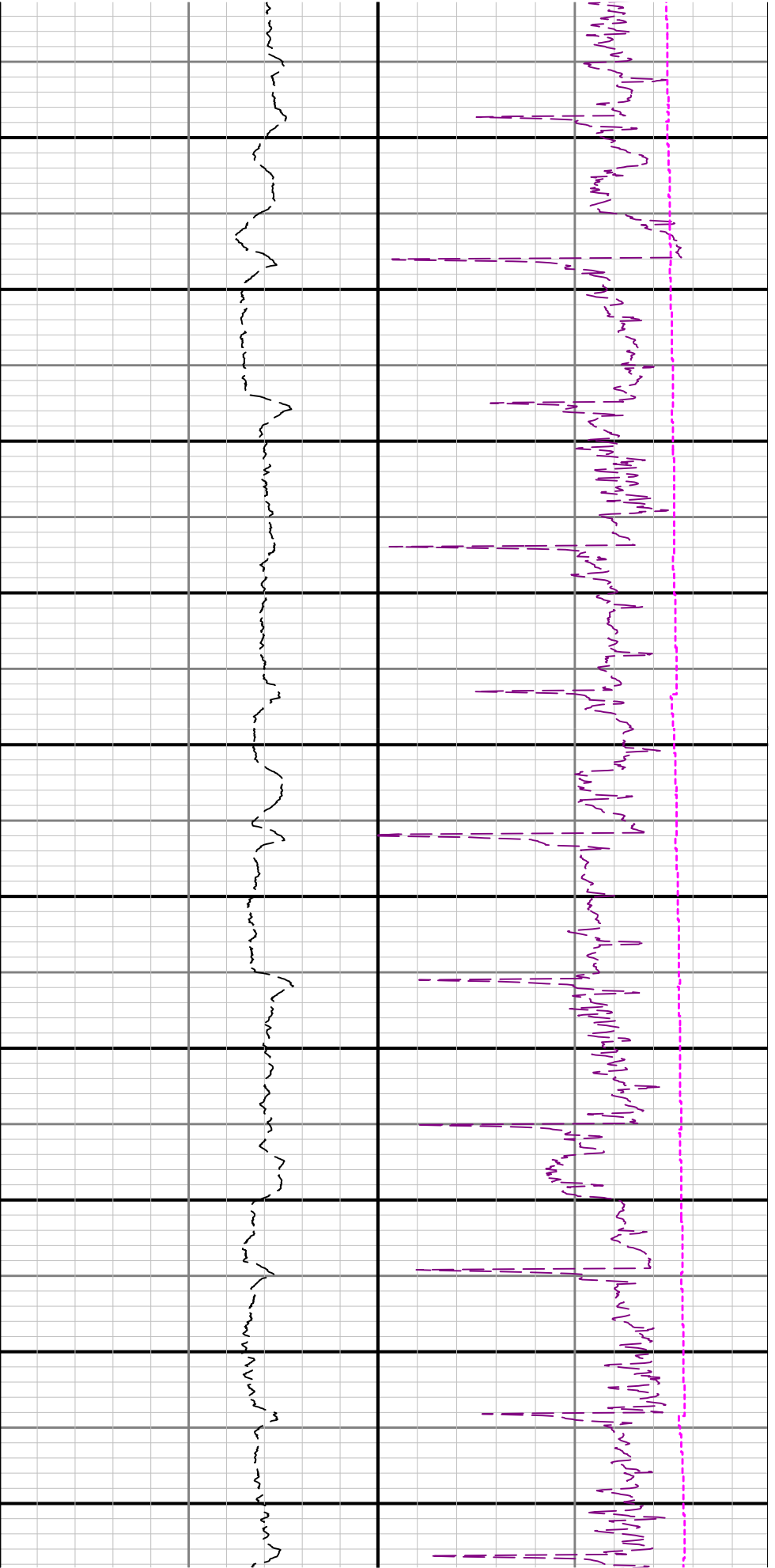












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