

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 (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	2.00	AutoTrak Curve	1952.00	1109.00	1952.00	11121.00	2017-06-13 15:36	2017-06-15 05:37	30.88

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Ryan Wunderlich	2017-06-12	2017-06-15	Steven Cano	2017-06-12	2017-06-15			

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+ (%)
2017-06-13 01:47	1	1900.00	Oil Based Mud	9.0	9	N/A	N/A	77.5/22.5	Active Pit	27000	0.00
2017-06-14 07:20	1	6222.00	Oil Based Mud	9.3	10	N/A	N/A	74.7/25.3	Active Pit	32300	0.00
2017-06-15 08:03	1	10738.00	Oil Based Mud	9.3	11	N/A	N/A	74.8/25.2	Active Pit	25000	0.00

Mud Resistivity Record

Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Surface			BHCT (degF)	Downhole		
				Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)		Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
2017-06-15 08:29	1	11121.00	90.0	100.000	N/A	N/A	200.0	100.000	N/A	N/A

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	OnTrak	12858682	Pressure	1.23	5602.02	6.750	0.000
1	OnTrak	12858682	Gamma (double)	2.12	5602.91	6.750	0.000
1	OnTrak	12858682	Resistivity (4tx)	6.16	5606.95	6.750	0.000
1	OnTrak	12858682	Directional (mag)	11.95	5612.74	6.750	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
OTK	OnTrak	Sensor Sub (Inc, Azi, Temp, Azimuthal GR, Res, AP, VSS), OnTrak Platform
BCPM	BCPM	Bi-Directional Communication and Power Module, OnTrak Platform

Comments

- 1 Depth measurements 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.
- 2 Baker Hughes LWD run 1 utilized 6 3/4 inch Ontrak services (Multiple Propagation Resistivity, Gamma Ray, and Directional) behind a 8 1/2 inch bit and rotary steerable assembly to perform a MAD (Measurement After Drilling) Pass from 1952 to 11121 feet MD (1952 to 6166 feet TVD). The data collected during this run was ream logged up to 12 hours after being drilled and it is presented independent of the drilling log.

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5596.00	8.500	1	The interval from 5596 to 11121 feet MD (5586 to 6115 feet TVD) due to sensor to bit offset at well TD.

Curve Mnemonics

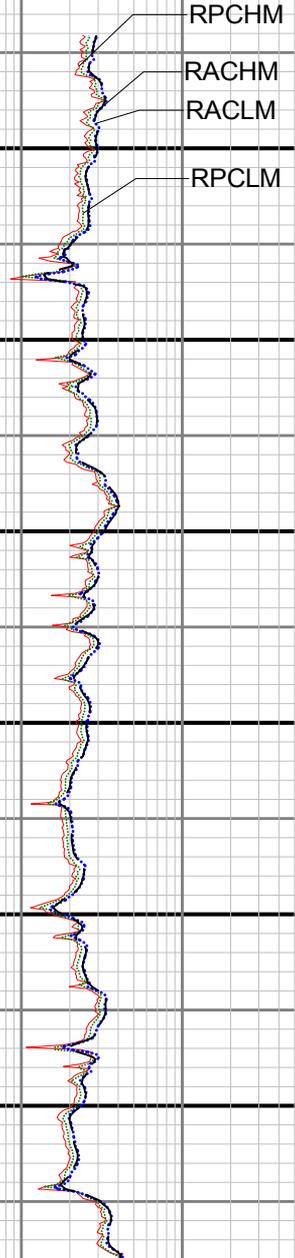
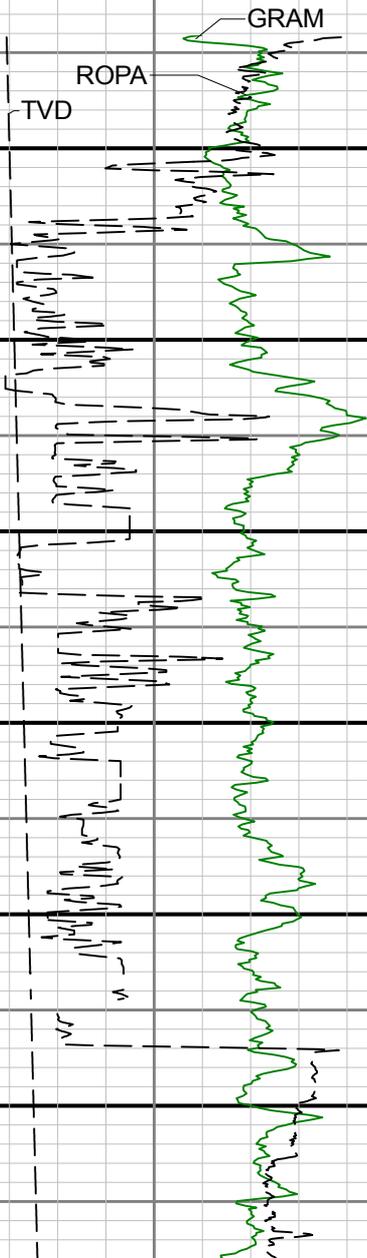
Presented Curves	Description	Units
CACLM	Conductivity Attenuation - Corrected - 400kHz	mmho/m
RACHM	Resistivity Attenuation - Corrected - 2MHz	ohm.m
RACLM	Resistivity Attenuation - Corrected - 400kHz	ohm.m
RPCHM	Resistivity Phase - Corrected - 2MHz	ohm.m
RPCLM	Resistivity Phase - Corrected - 400kHz	ohm.m
TCDX	Downhole Temperature	degF
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
GRAM	Gamma Ray - Apparent 3 ft Average	API

	Company	Noble Energy		
	Well	Constitution Federal LC21-655		
	Interval	Date From: 2017-06-14 10:23:58	Top:	1941.00
	Created	Date To: 2017-06-15 10:24:07	Bottom:	5530.00
		2017-06-15 16:23		

Gamma Ray - Apparent 3 ft Average [GRAM]	MD 1:1200 feet	Resistivity Phase - Corrected - 2MHz [RPCHM]	Conductivity Attenuation - Corrected - 400kHz [CACLM]
0 150		0.2 200	4000 0
API		ohm.m	mmho/m
Depth Averaged ROP 3 ft Average [ROPA]		Resistivity Phase - Corrected - 400kHz [RPCLM]	Tool Temperature [TCDX]
1200 0		0.2 200	0 300
ft/h	ohm.m	degF	
True Vertical Depth [TVD]	Resistivity Attenuation - Corrected - 2MHz [RACHM]		
0 10000	0.2 200		
ft	ohm.m		
	Resistivity Attenuation - Corrected - 400kHz [RACLM]		
	0.2 200		

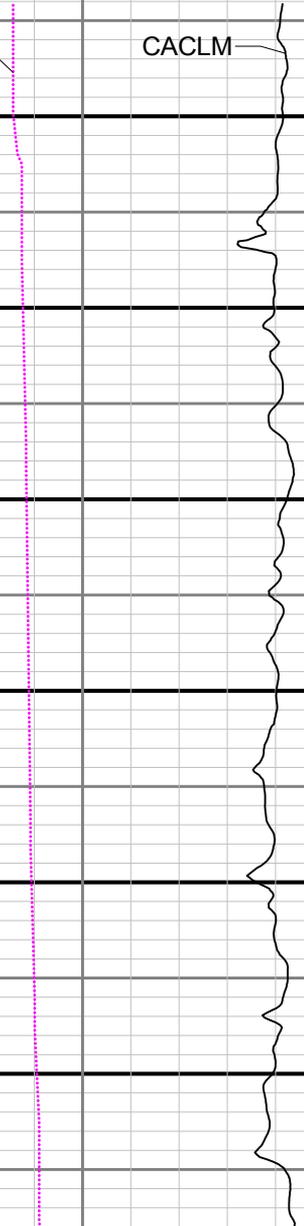
1800 1900 2000 2100 2200 2300 2400 2500

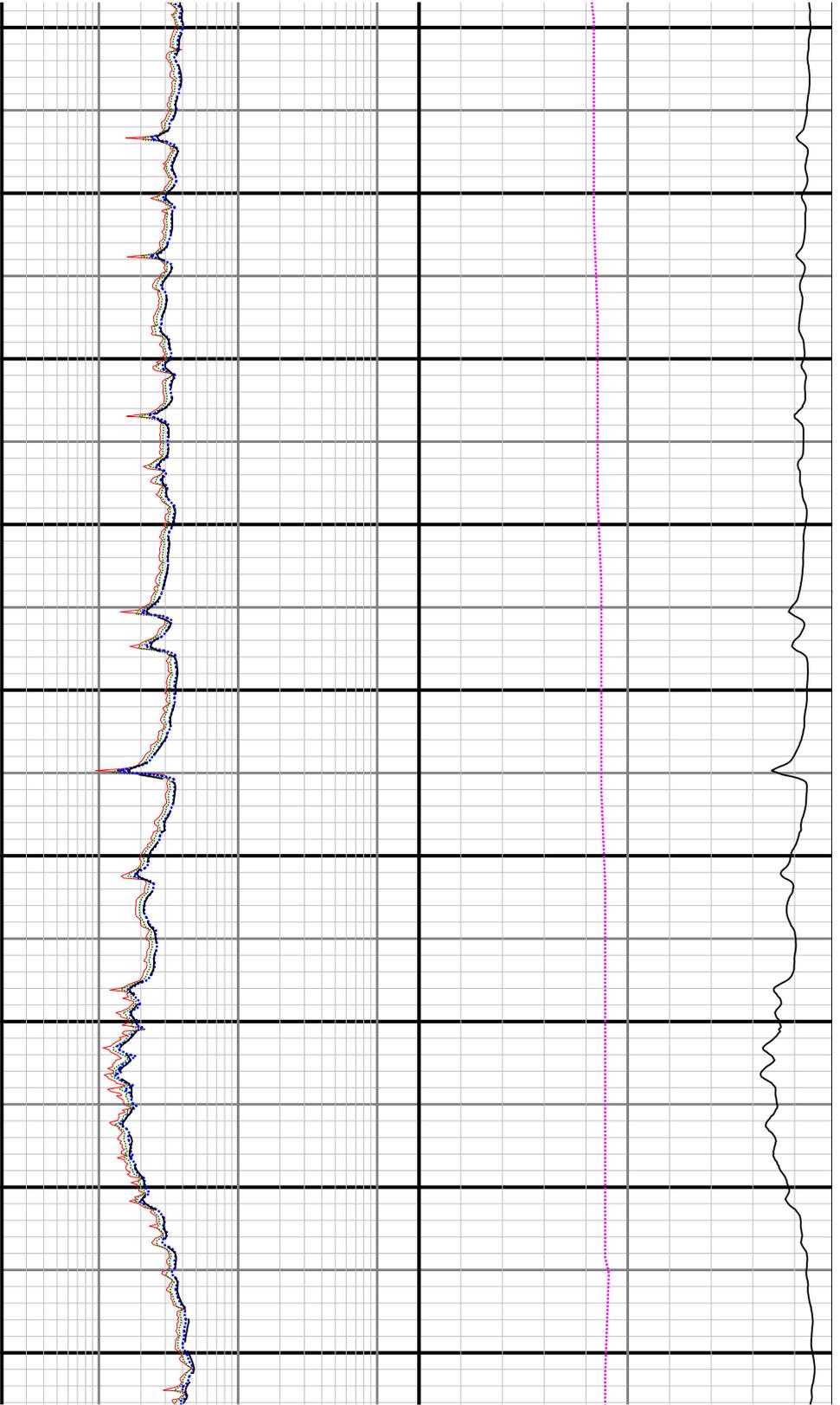
>R1



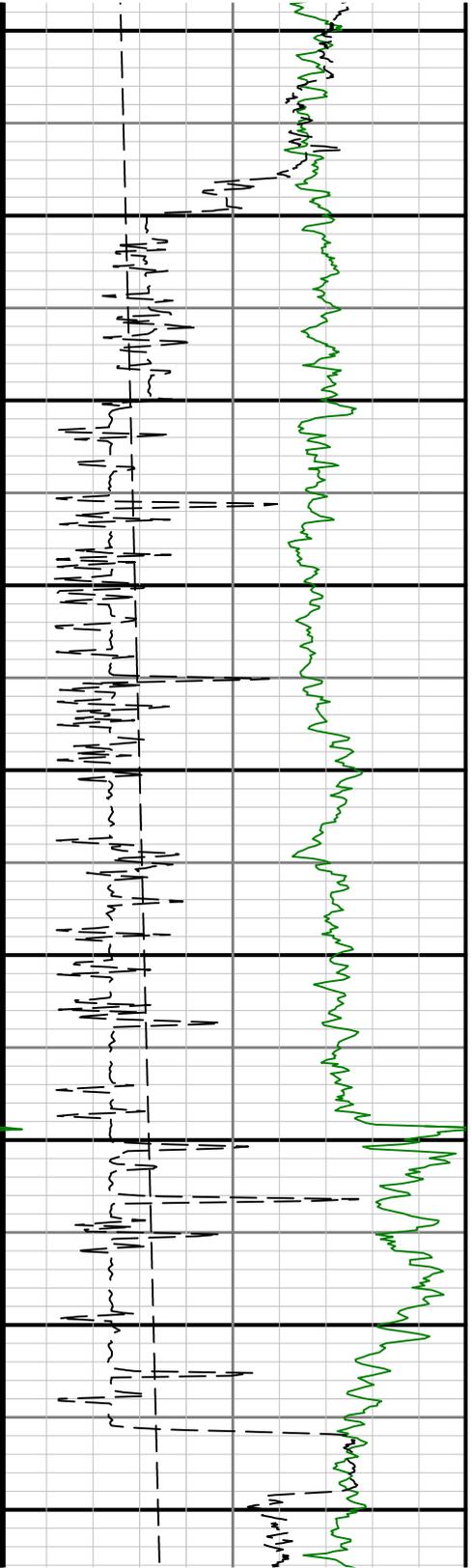
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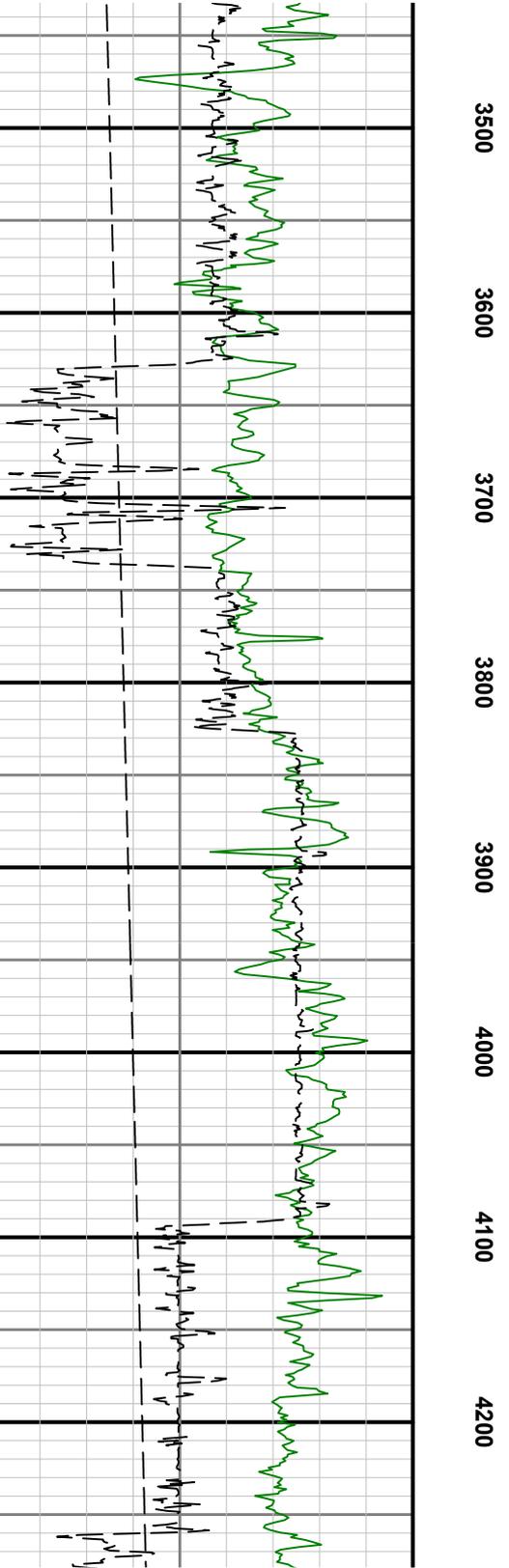
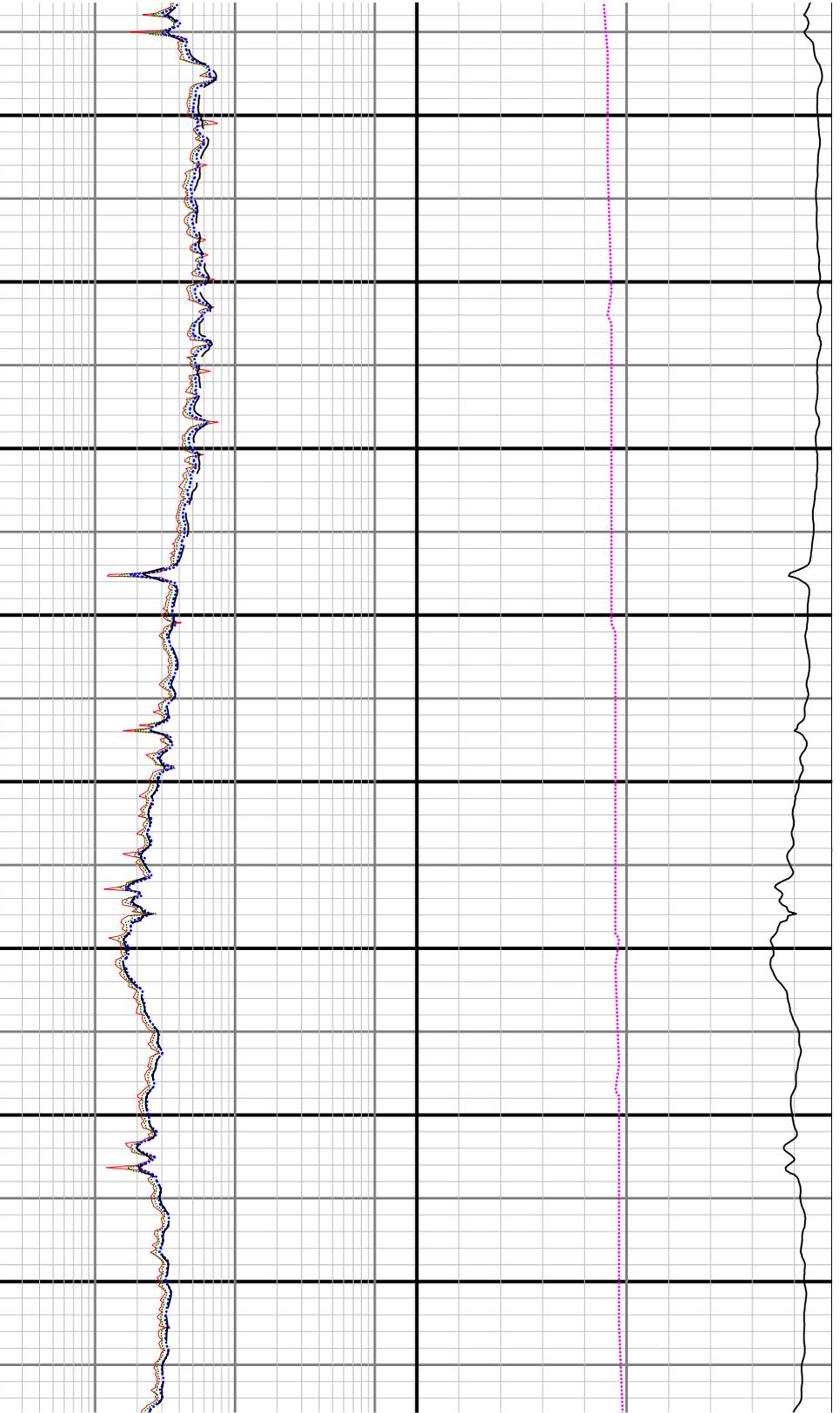
CACLM

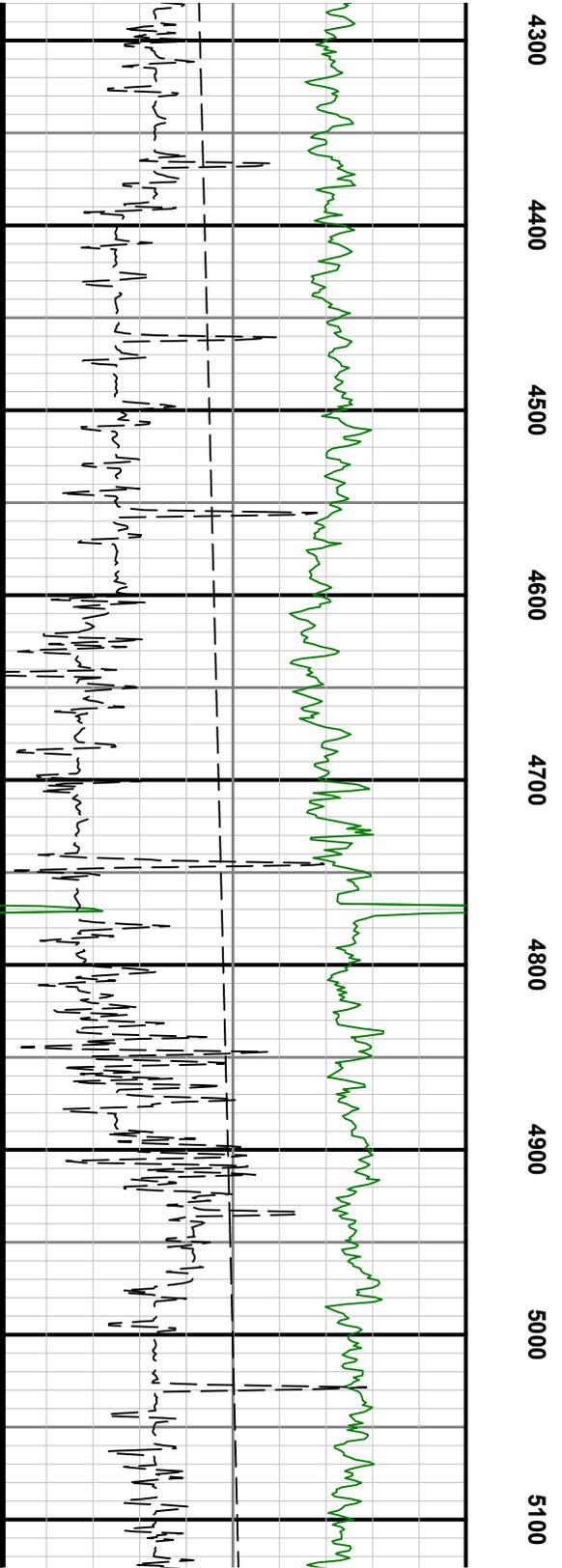
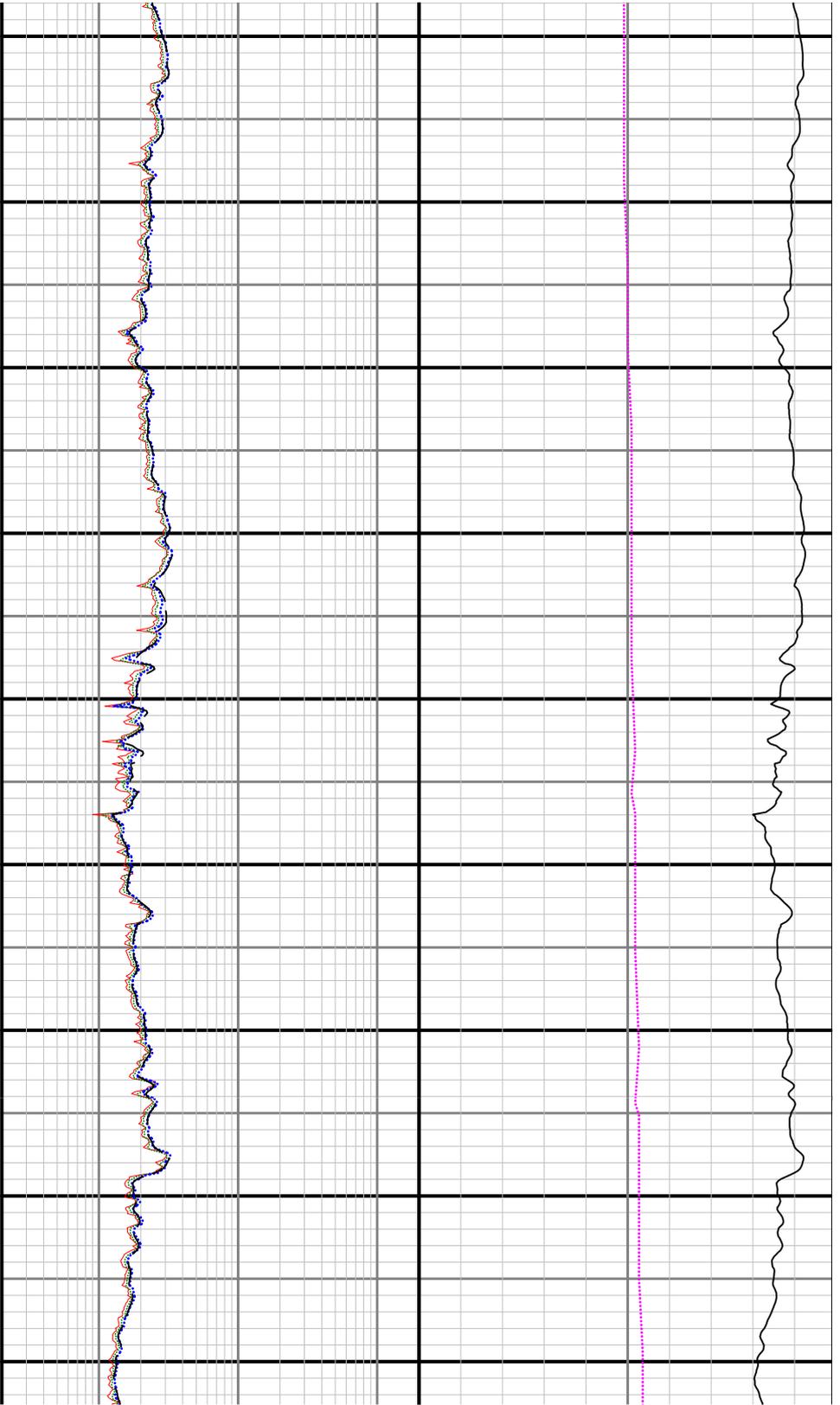


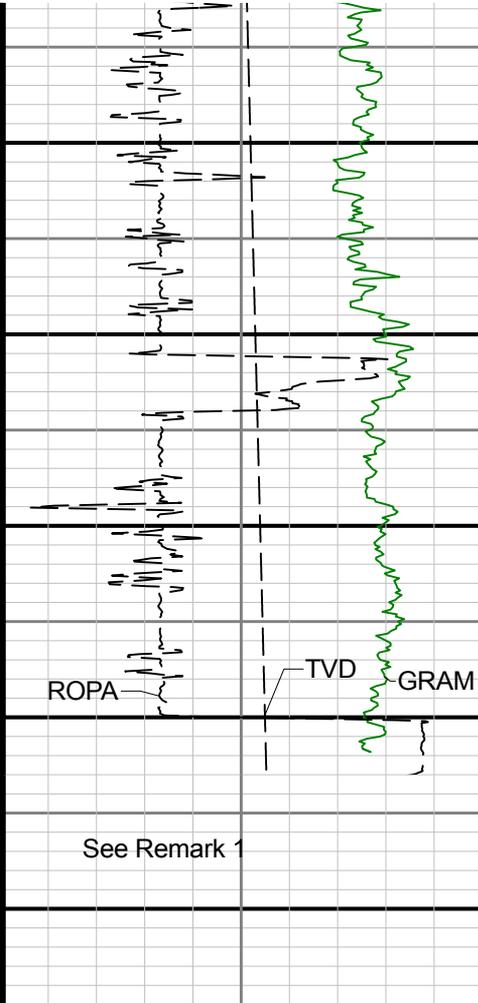


2600 2700 2800 2900 3000 3100 3200 3300 3400

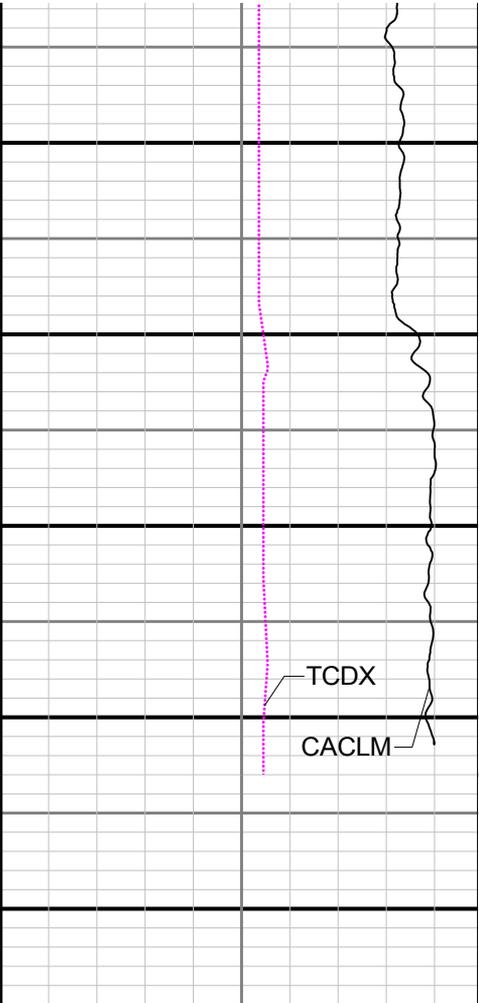
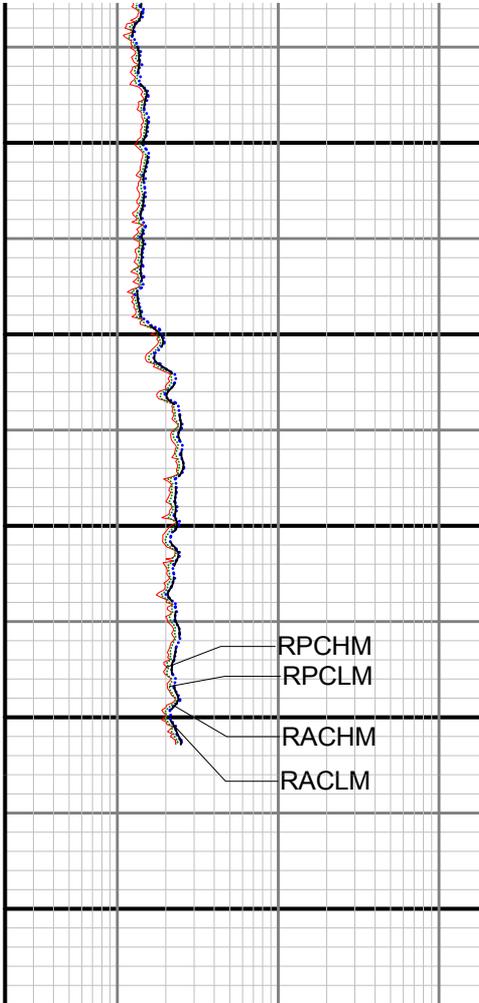








5200
5300
5400
5500
5600



Gamma Ray - Apparent 3 ft Average [GRAM]	0	150
API		
Depth Averaged ROP 3 ft Average [ROPA]	1200	0
ft/h		
True Vertical Depth [TVD]	0	10000
ft		

MD 1:1200 feet

Resistivity Phase - Corrected - 2MHz [RPCHM]	0.2	200
ohm.m		
Resistivity Phase - Corrected - 400kHz [RPCLM]	0.2	200
ohm.m		
Resistivity Attenuation - Corrected - 2MHz [RACHM]	0.2	200
ohm.m		
Resistivity Attenuation - Corrected - 400kHz [RACLm]	0.2	200
ohm.m		

Conductivity Attenuation - Corrected - 400kHz [CACLM]	4000	0
mmho/m		
Tool Temperature [TCDX]	0	300
degF		