

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+ (%)
12/Mar/2016	13:00	1	1926.0	Oil Based Mud	9.8	17	N/A	13.8	61.8/25.3	Active Pits	33000	N/A
13/Mar/2016	01:00	1	5356.0	Oil Based Mud	9.5	14	N/A	14.4	63.3/25.5	Active Pits	39000	N/A

Mud Resistivity Record

Date / Time		LWD Run No.	Measured Depth (ft.)	Surface Temp (deg F)	Surface			BHCT	Downhole		
					Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)	(deg F)	Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
12/Mar/2016	13:40	1	1850.0	70	100.00	100.00	100.00	122	57.69	57.69	57.69

Mnemonics

Curve	Description	Units
CACLM	Conductivity (AT) (LS) 400kHz – Compensated Borehole Corrected	mho/o
GRAM	Gamma Ray Apparent, 0.5 ft. Avg	API
RACHM	Resistivity, Attenuation (LS) 2 MHZ – Compensated Borehole Corrected	ohm.m
RACLM	Resistivity, Attenuation (LS) 400 kHz – Compensated Borehole Corrected	ohm.m
RPCHM	Resistivity, Phase Difference (LS) 2 MHZ – Compensated Borehole Corrected	ohm.m
RPCLM	Resistivity, Phase Difference (LS) 400 kHz – Compensated Borehole Corrected	ohm.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	12445995	-	83.90	7.000	2.165
1	BCPM	11823270	Telemetry	73.70	7.000	2.165
1	FLEX SUB	13651950	-	66.55	6.250	2.165
1	OTK	12349020	Directional	61.68	7.031	2.165
1	OTK	12349020	Resistivity	55.87	7.031	2.165
1	OTK	12349020	Gamma	51.84	7.031	2.165
1	OTK	12349020	Pressure	50.95	7.031	2.165
1	CS	13351962	-	48.25	7.000	2.165

Service and Tool Mnemonics

Mnemonic	Name	Description
BCPM	BCPM	Mud pulse telemetry and downhole tool power module
FLEX SUB	Flex Sub	Flexible sub connection
OTK	OnTrak	Propagation resistivity, propagation conductivity, gamma ray, directional, annular pressure, system memory and VSS
CS	Closure Sub	BHA power ring isolator allowing insertion of inert sub into electrically powered BHA

Comments

1. Baker Hughes INTEQ run 1 utilized 6 3/4 inch Ontrak Services. (Multiple Propagation Resistivity, Gamma Ray, VSS, and Directional) behind an 8 1/2 inch bit and

steerable assembly from 1916 to 5818 feet MD (1915.90 to 5765.00 feet IVD).

2. Depth measurements were obtained from a depth tracking system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes LWD 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.

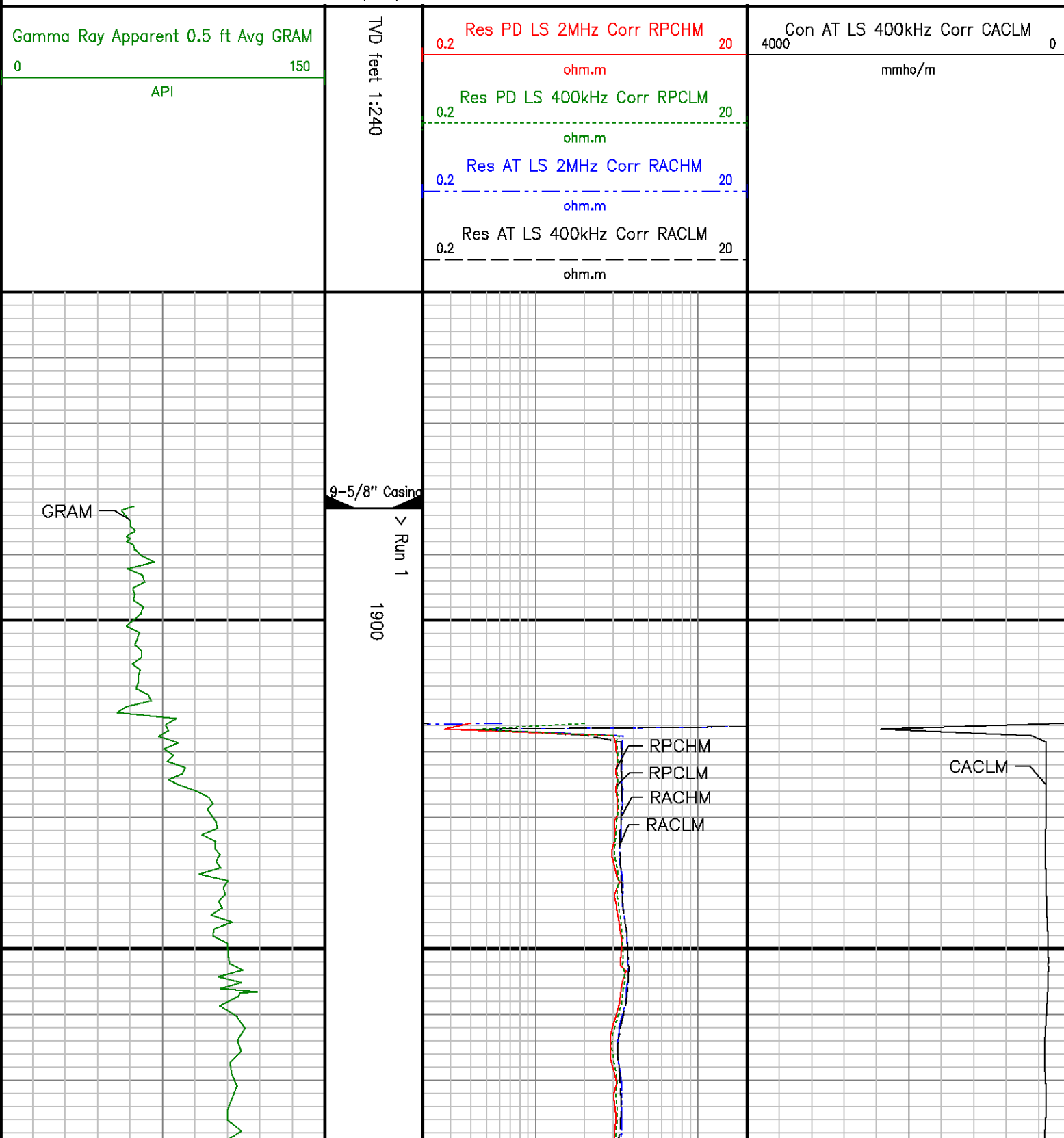


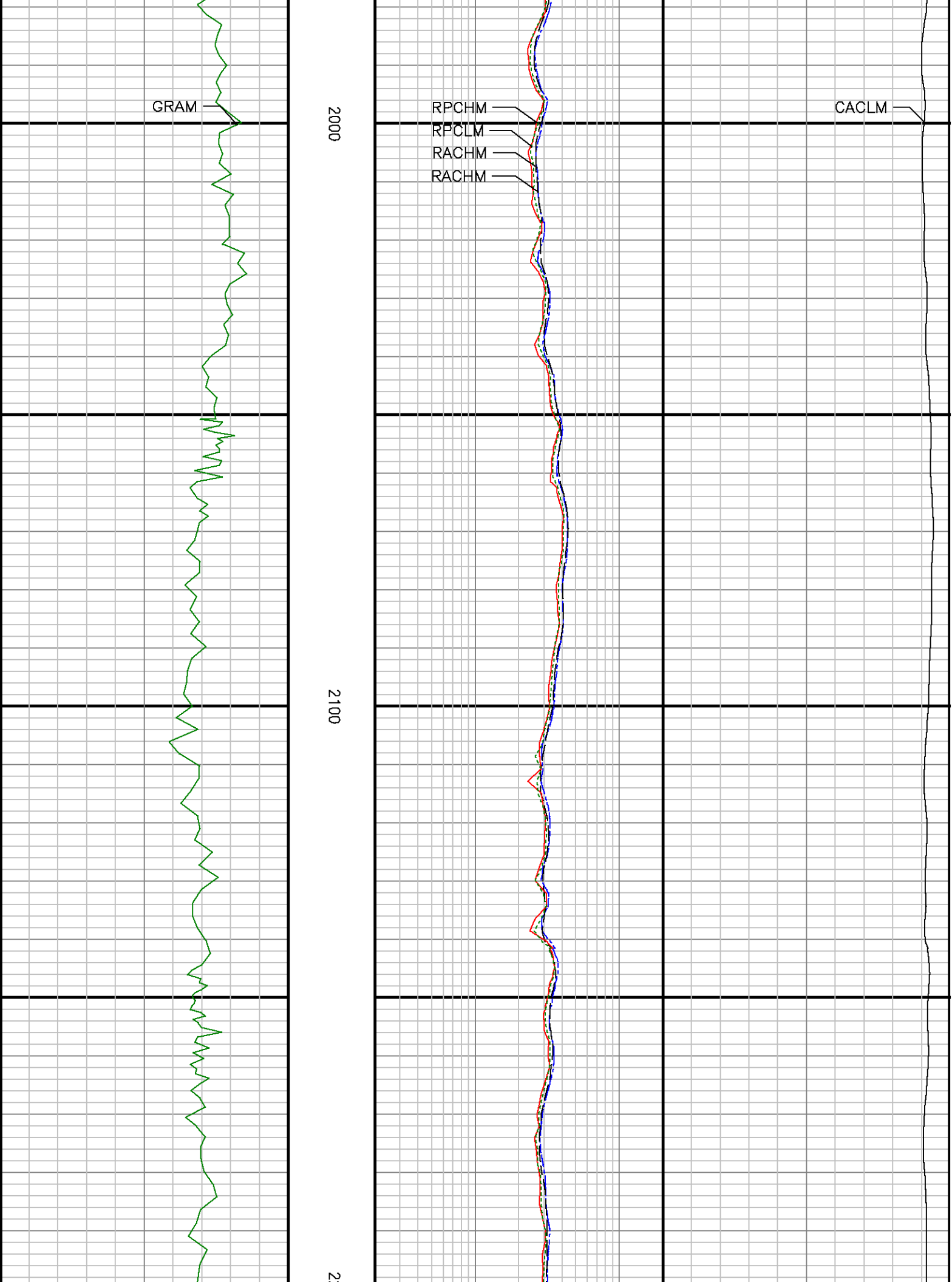
Company : Noble Energy

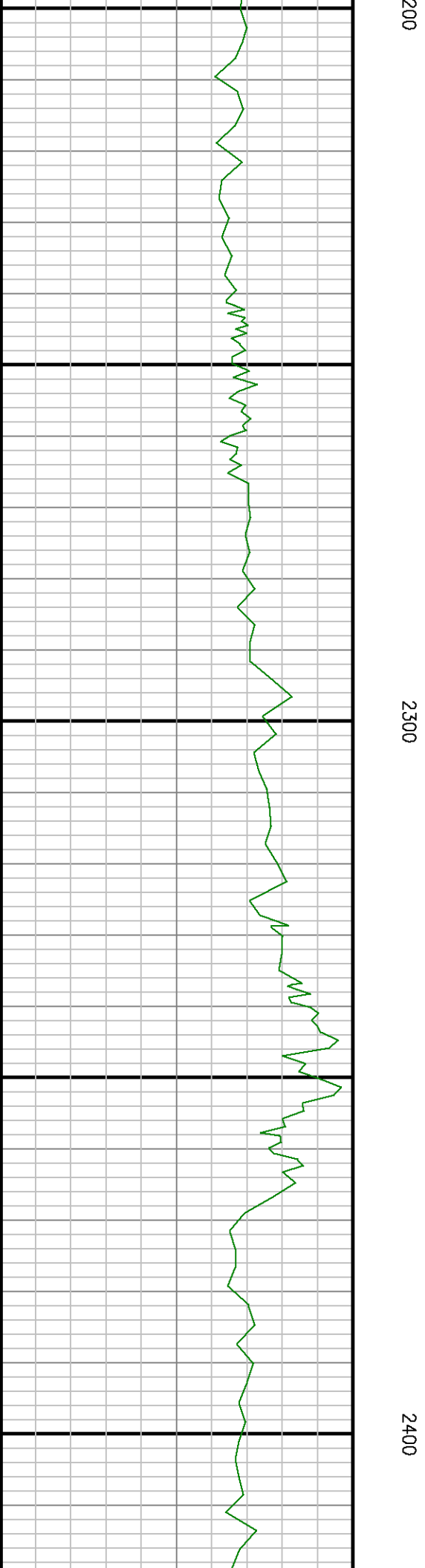
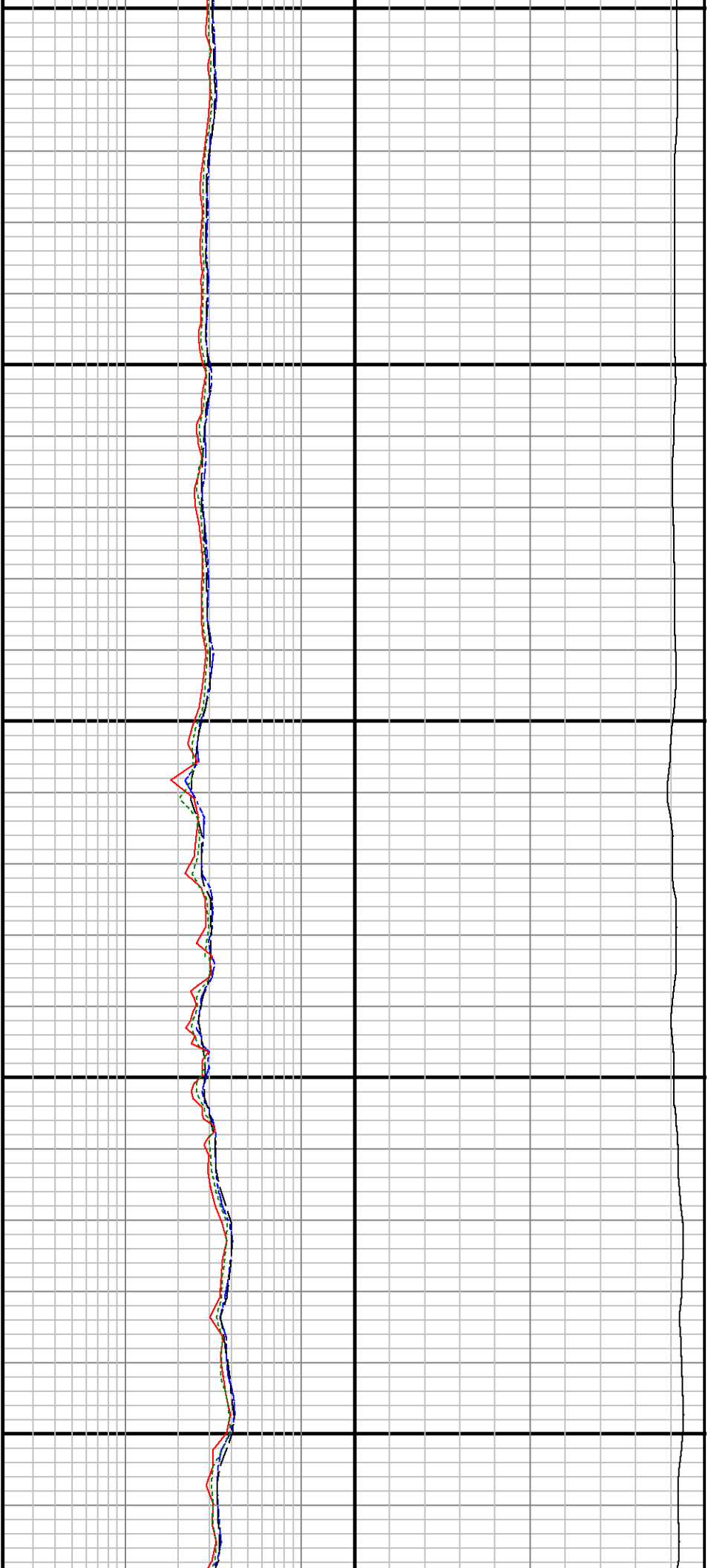
Well : Wells Ranch State BB01-690

Interval : 1850.00 - 5755.00 feet

Created : 13/Mar/2016 2:23:44 PM





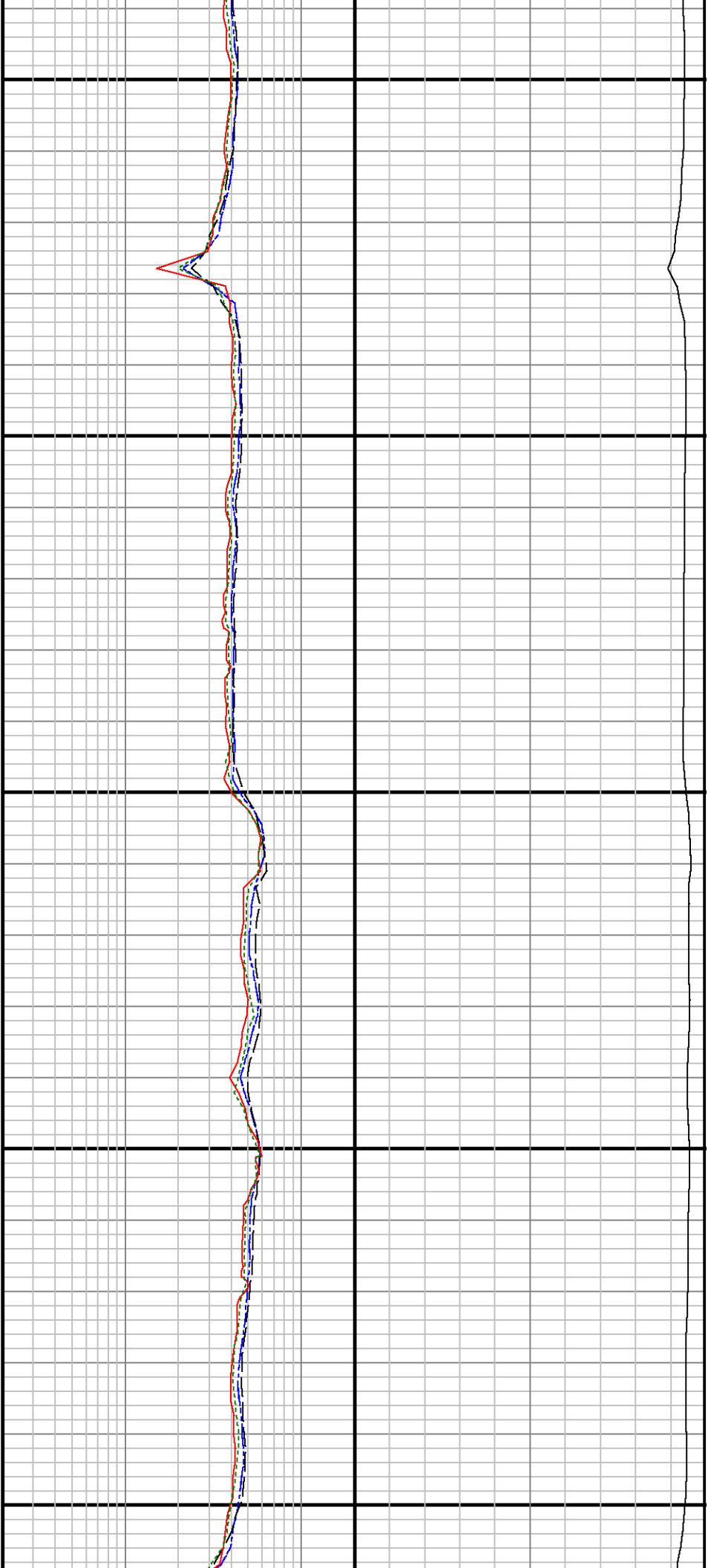




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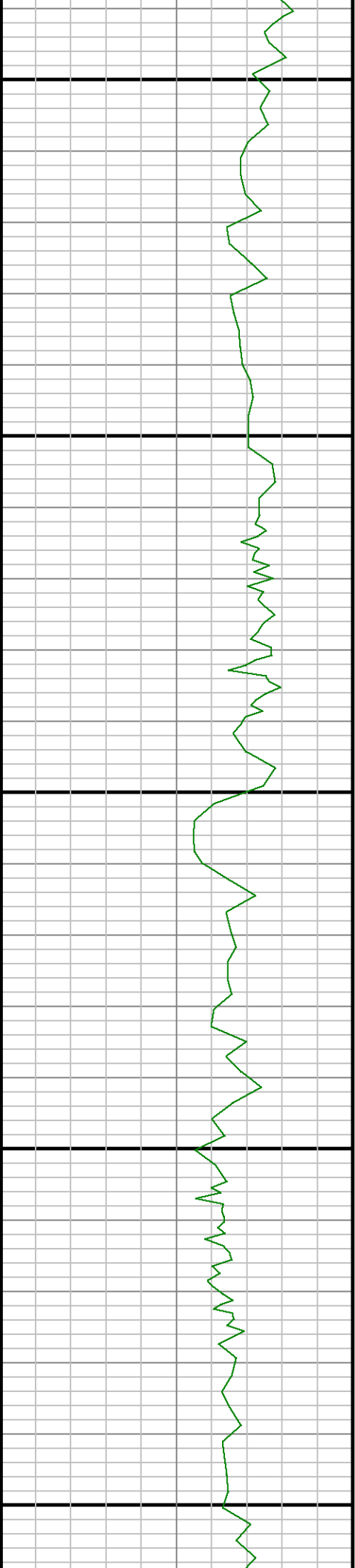
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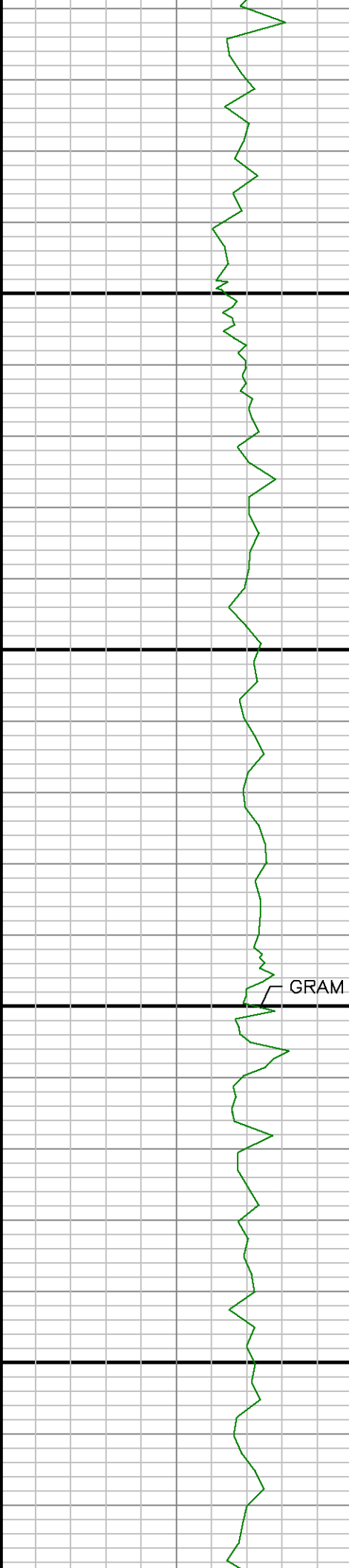




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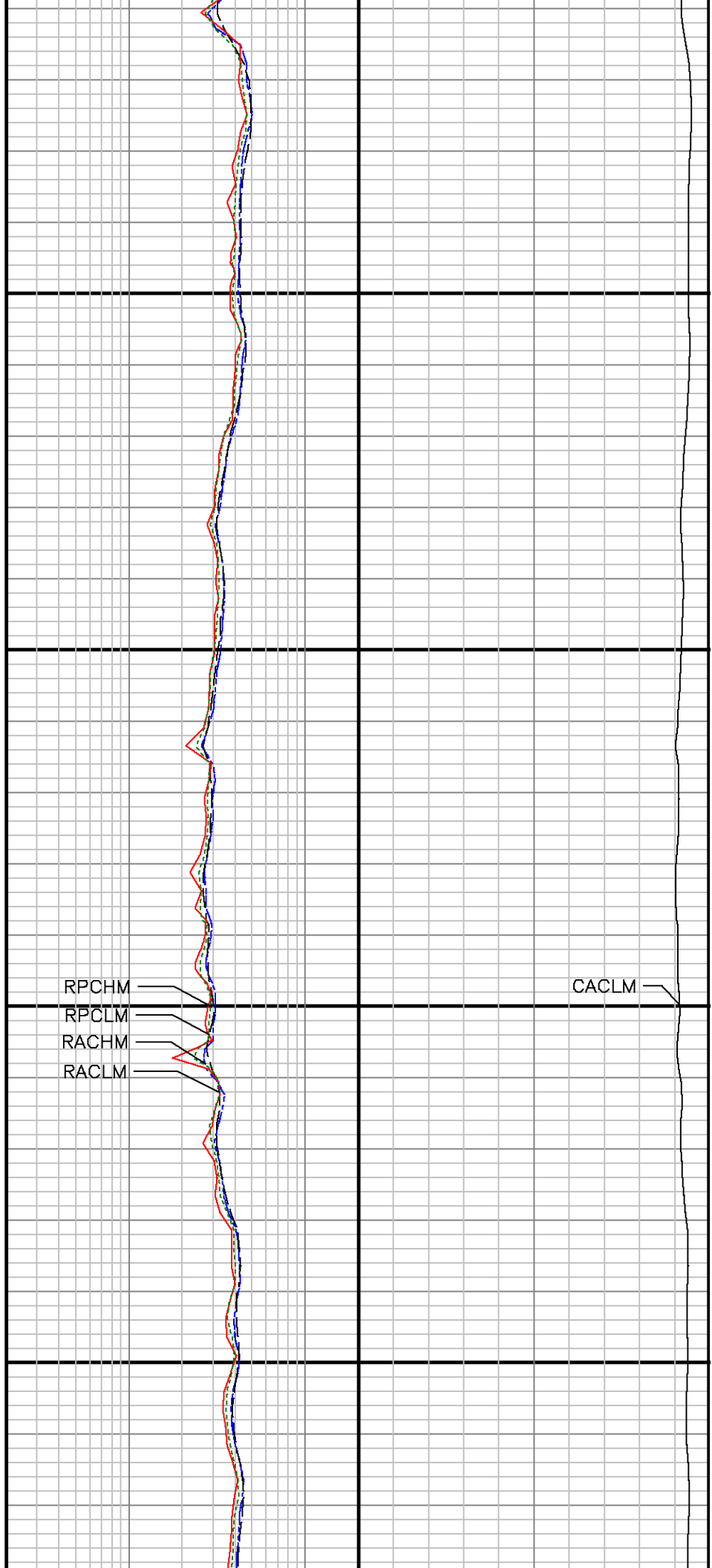
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2900

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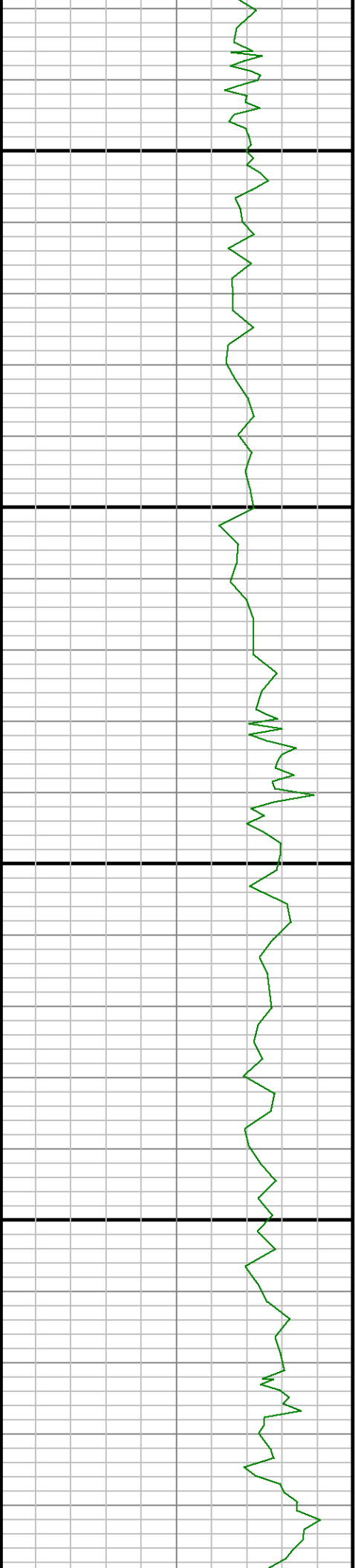


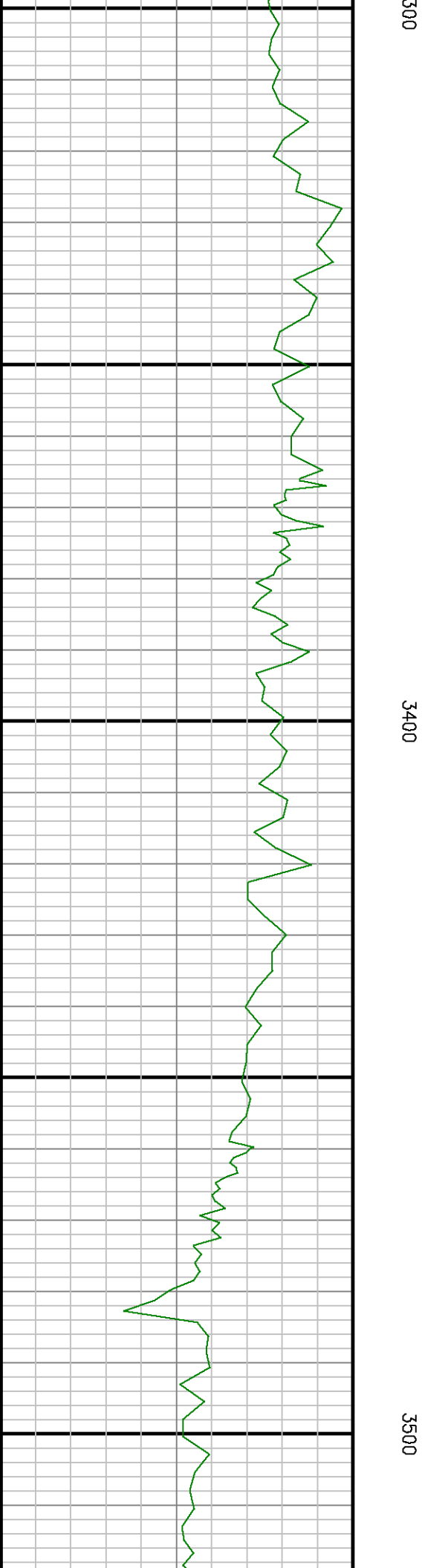


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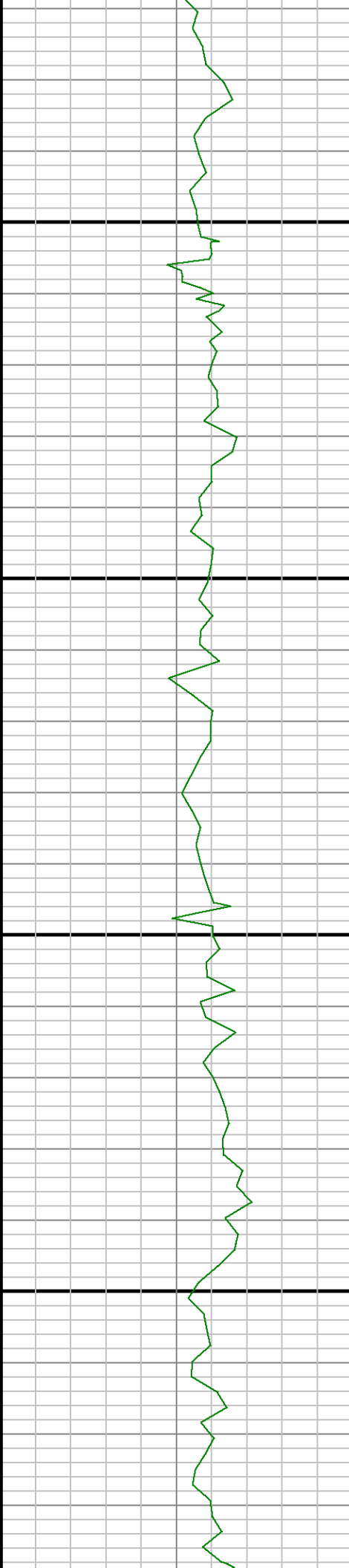


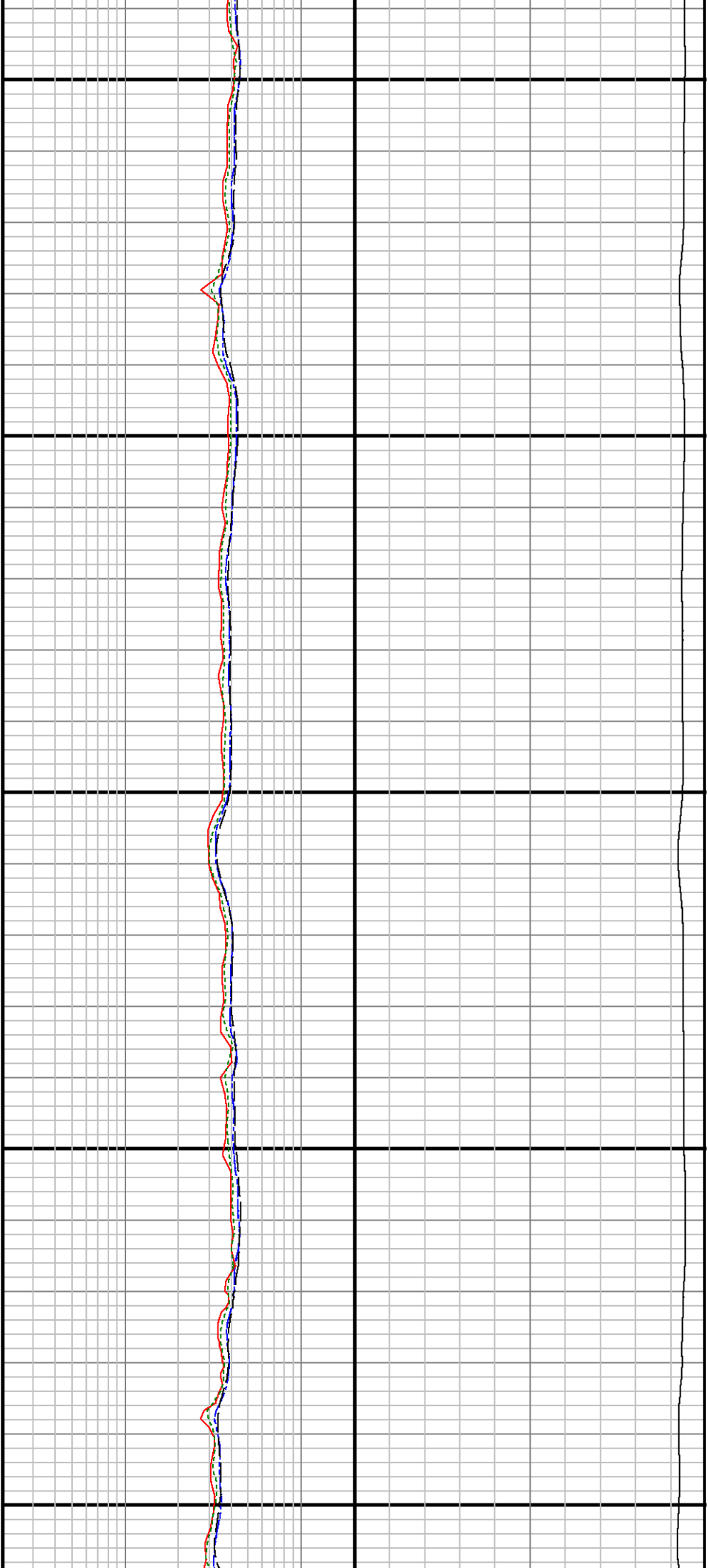




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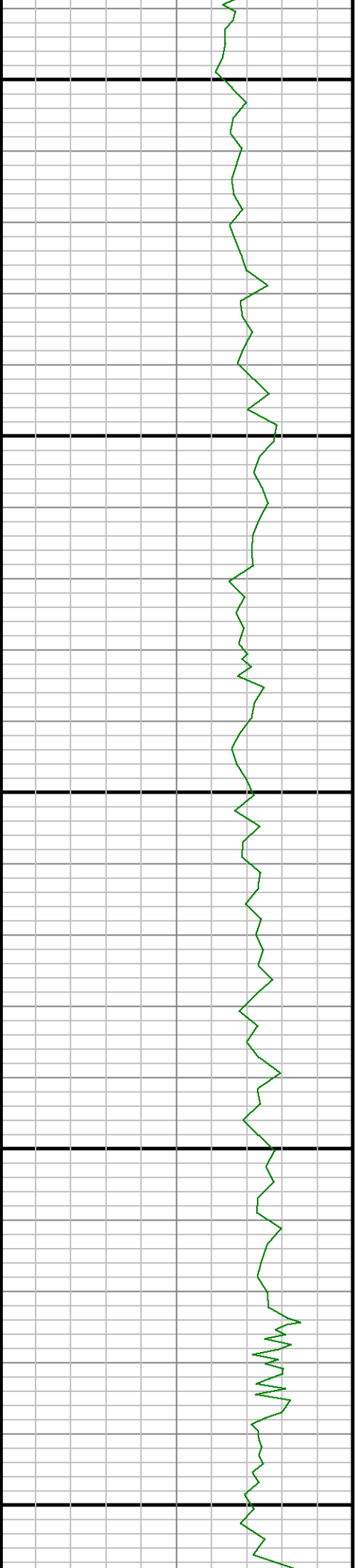
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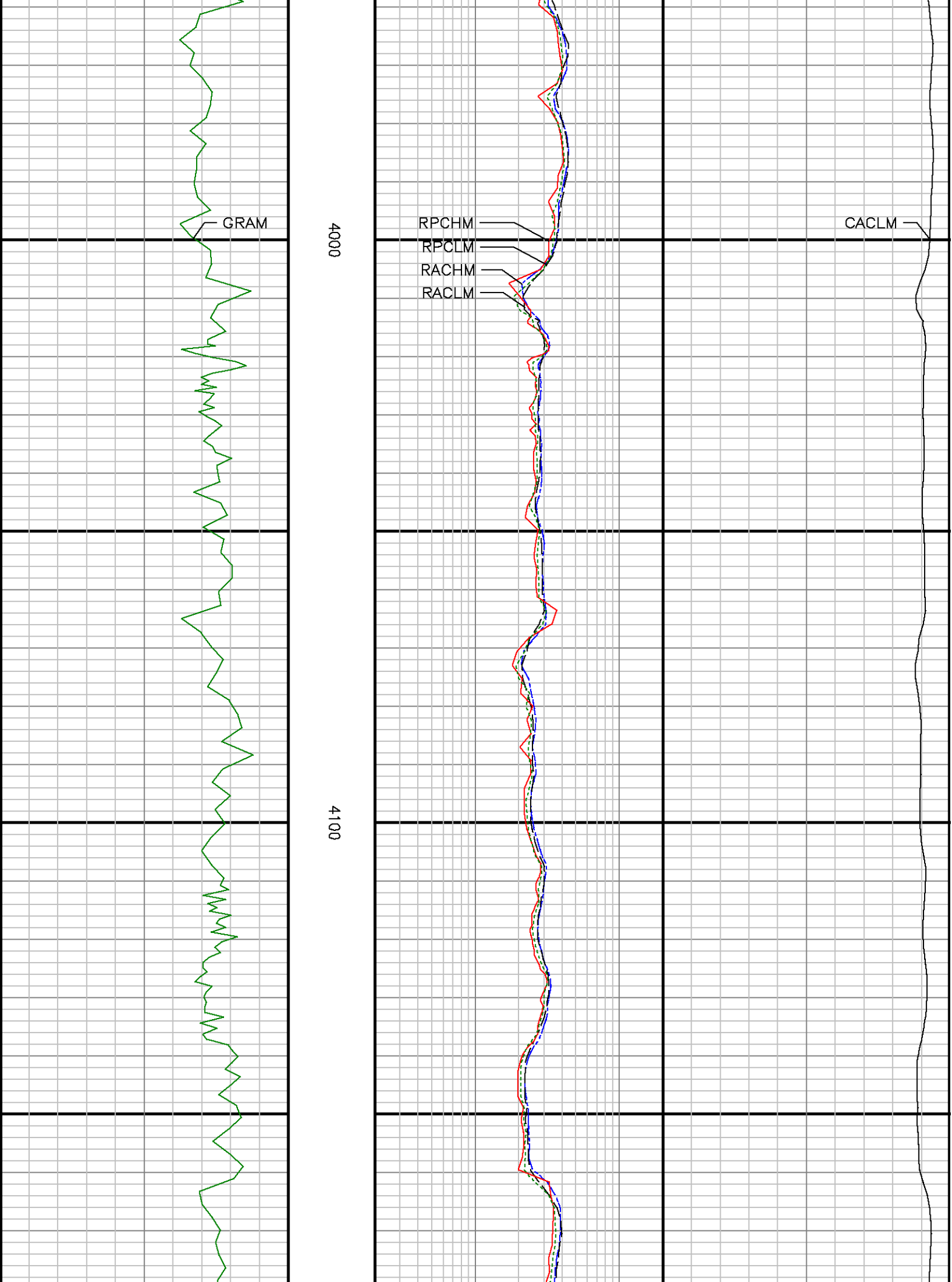


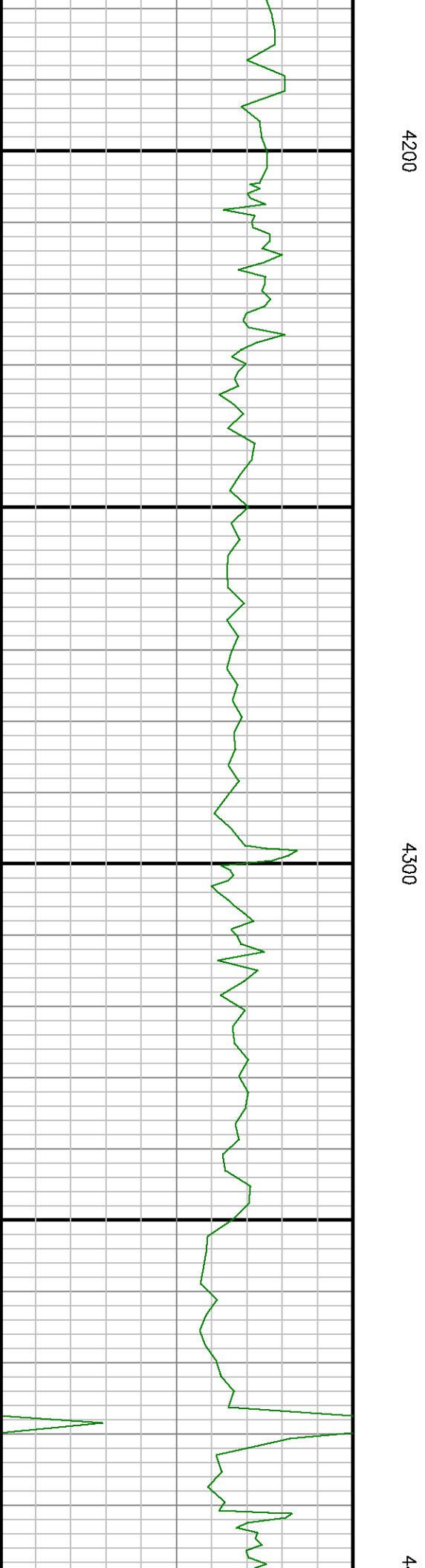
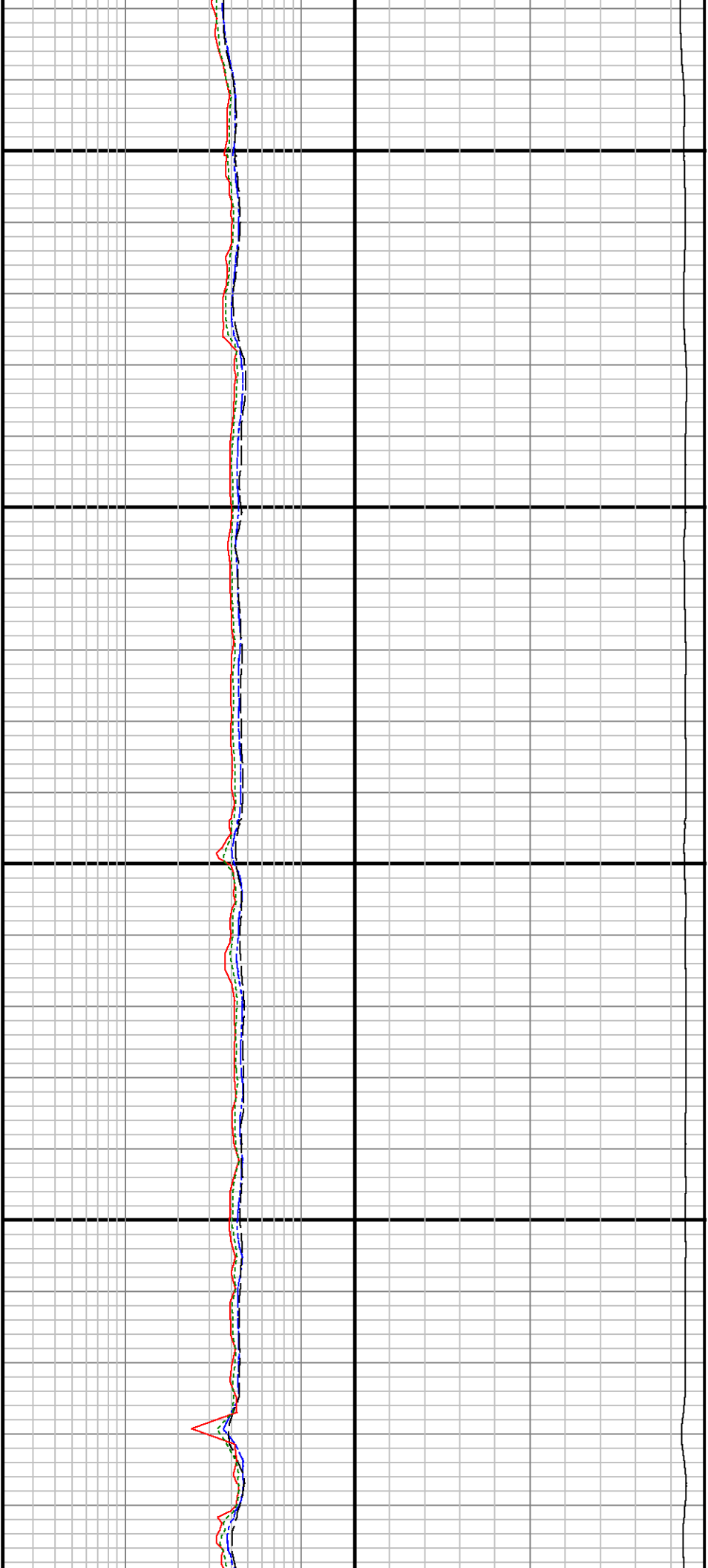


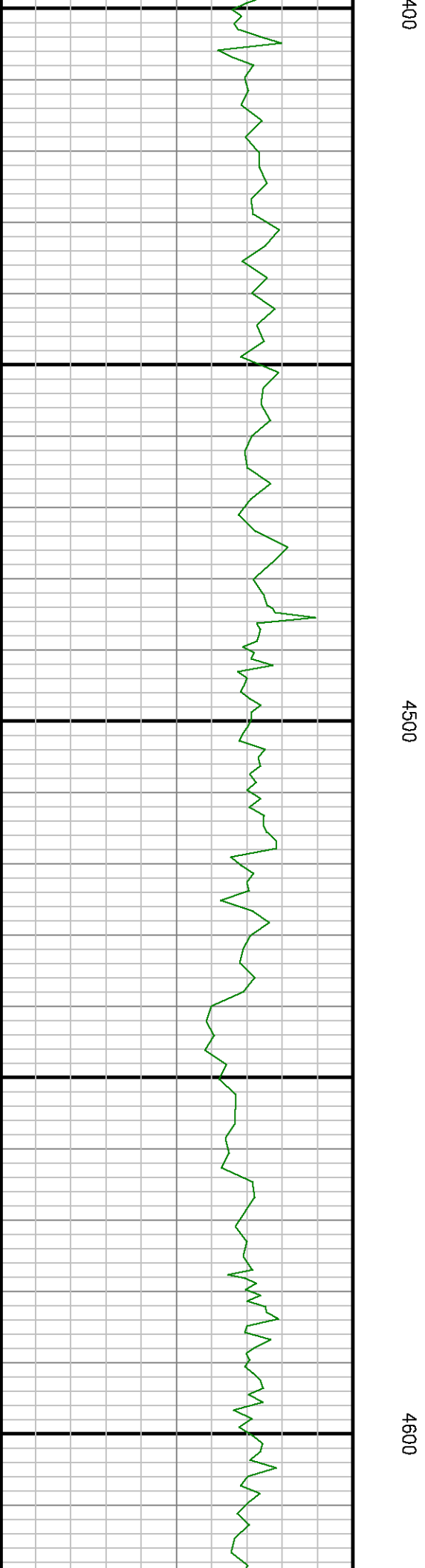
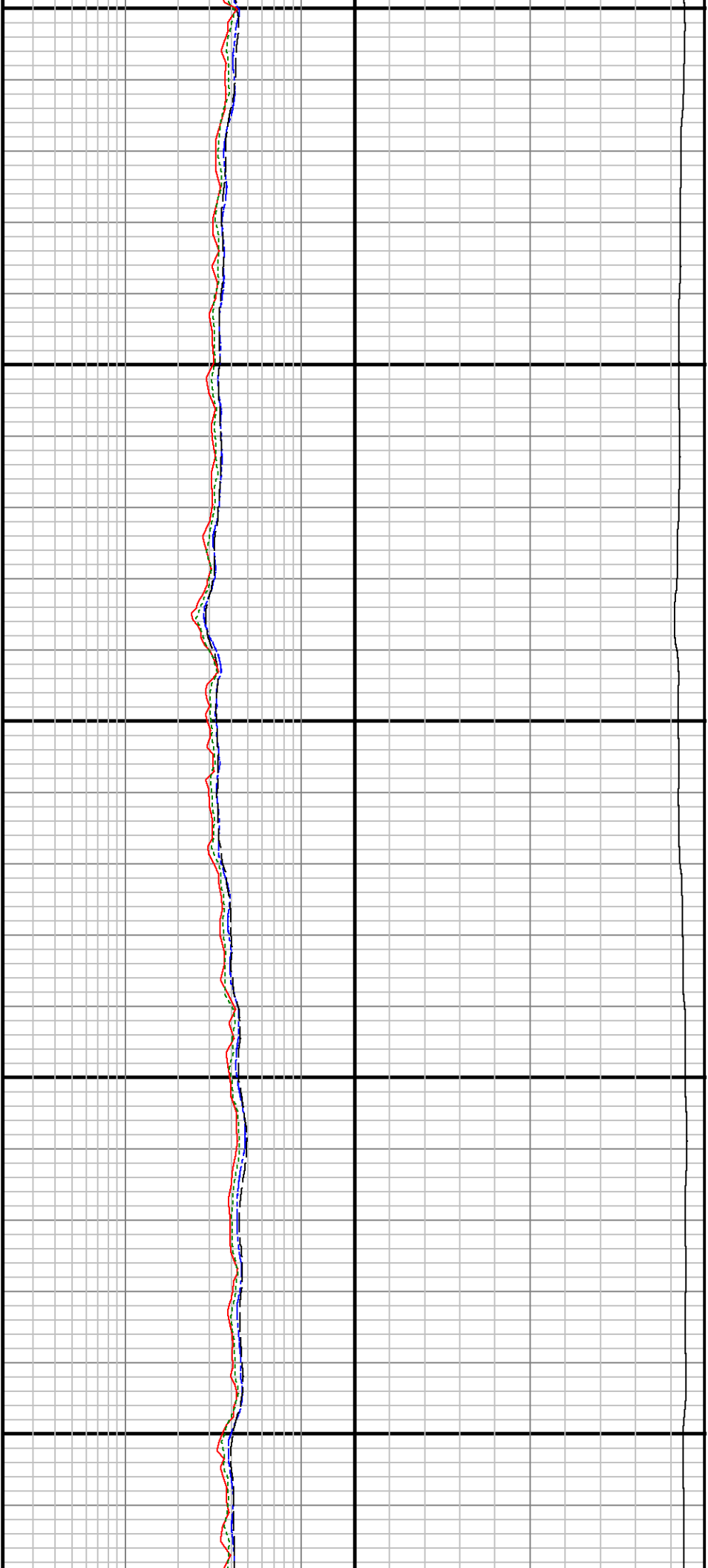
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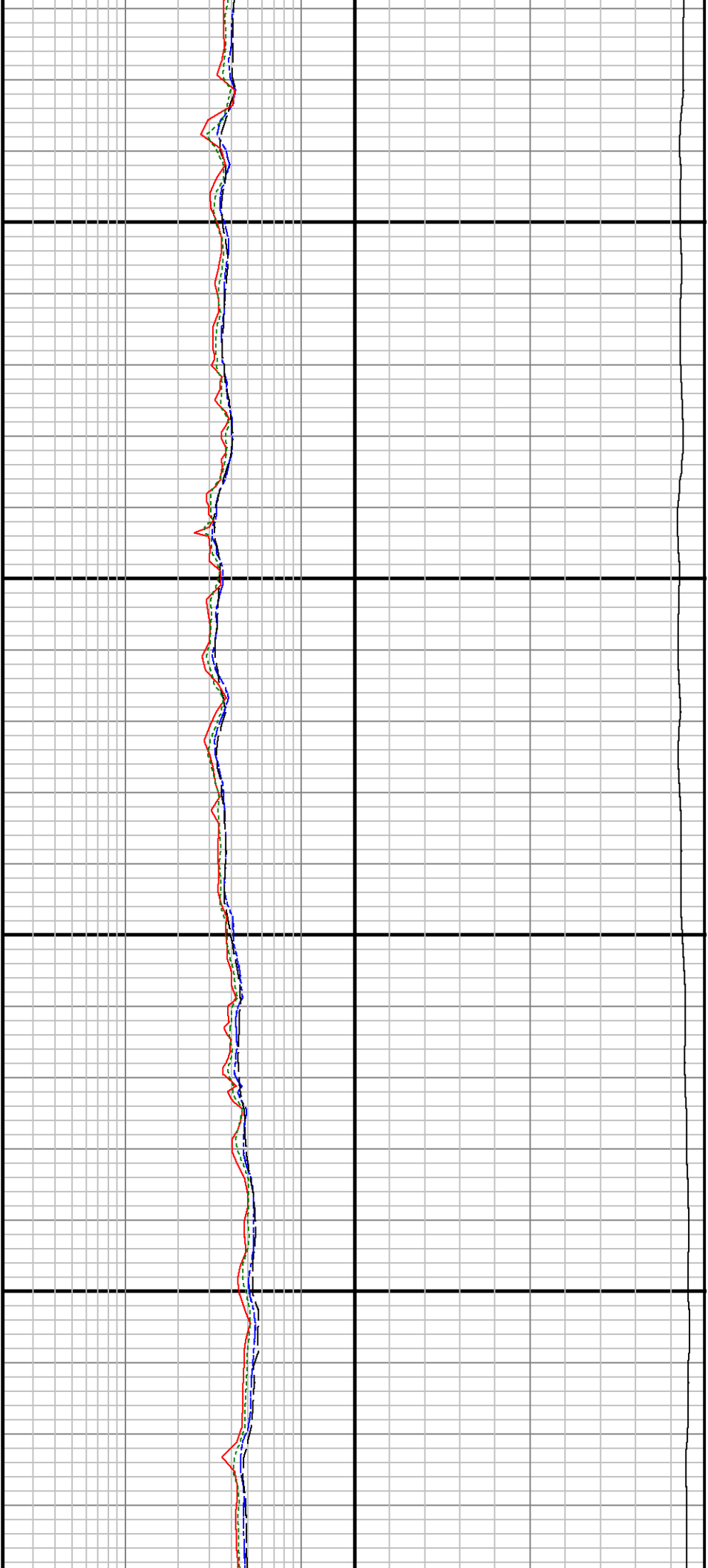
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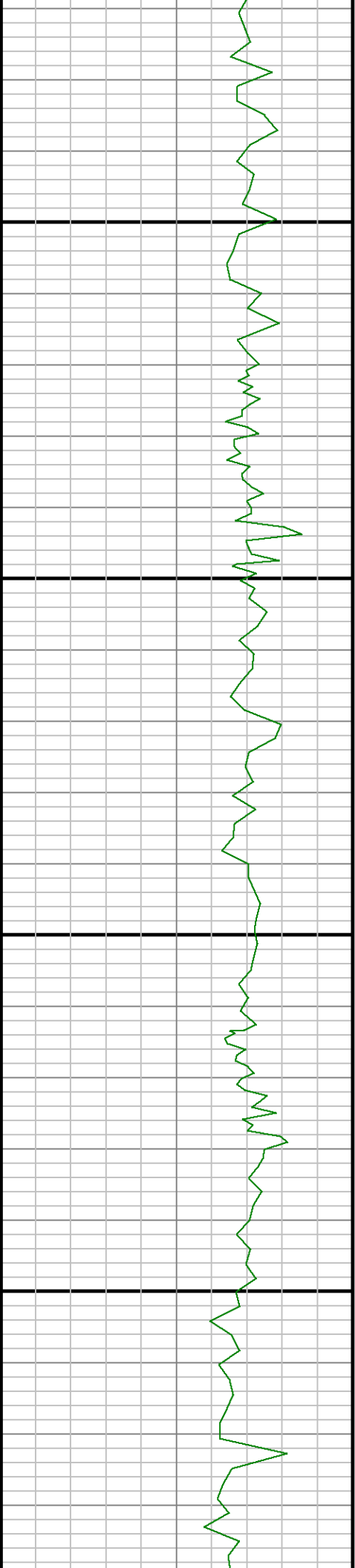


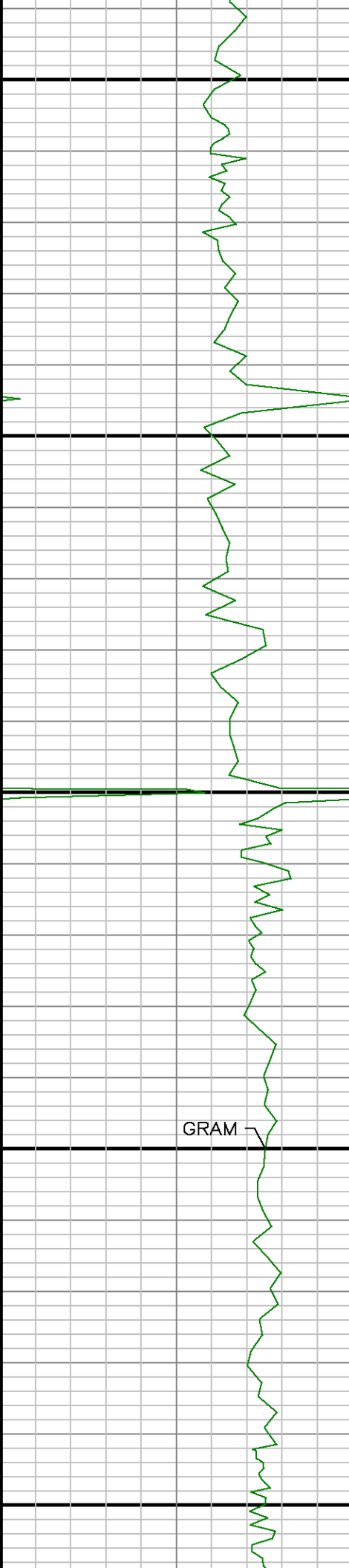




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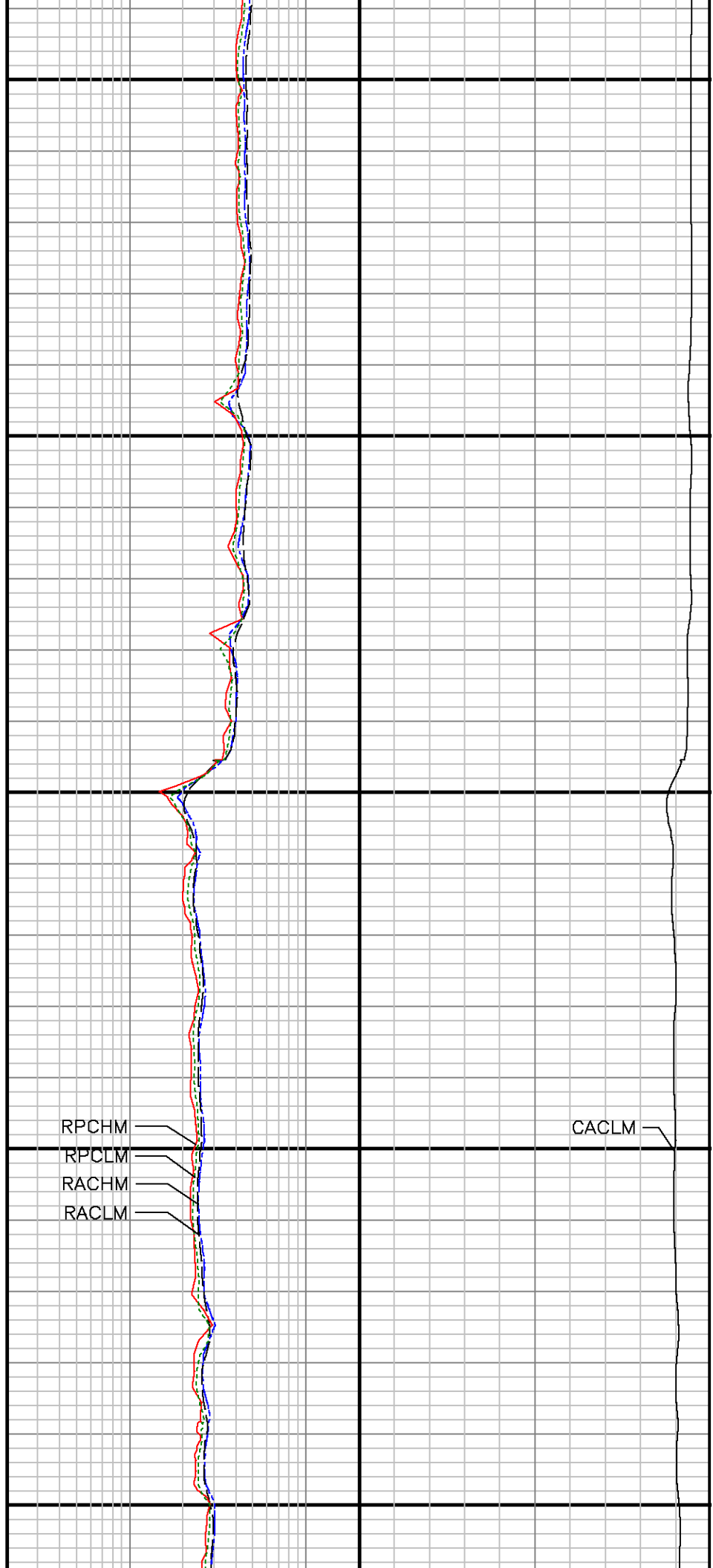
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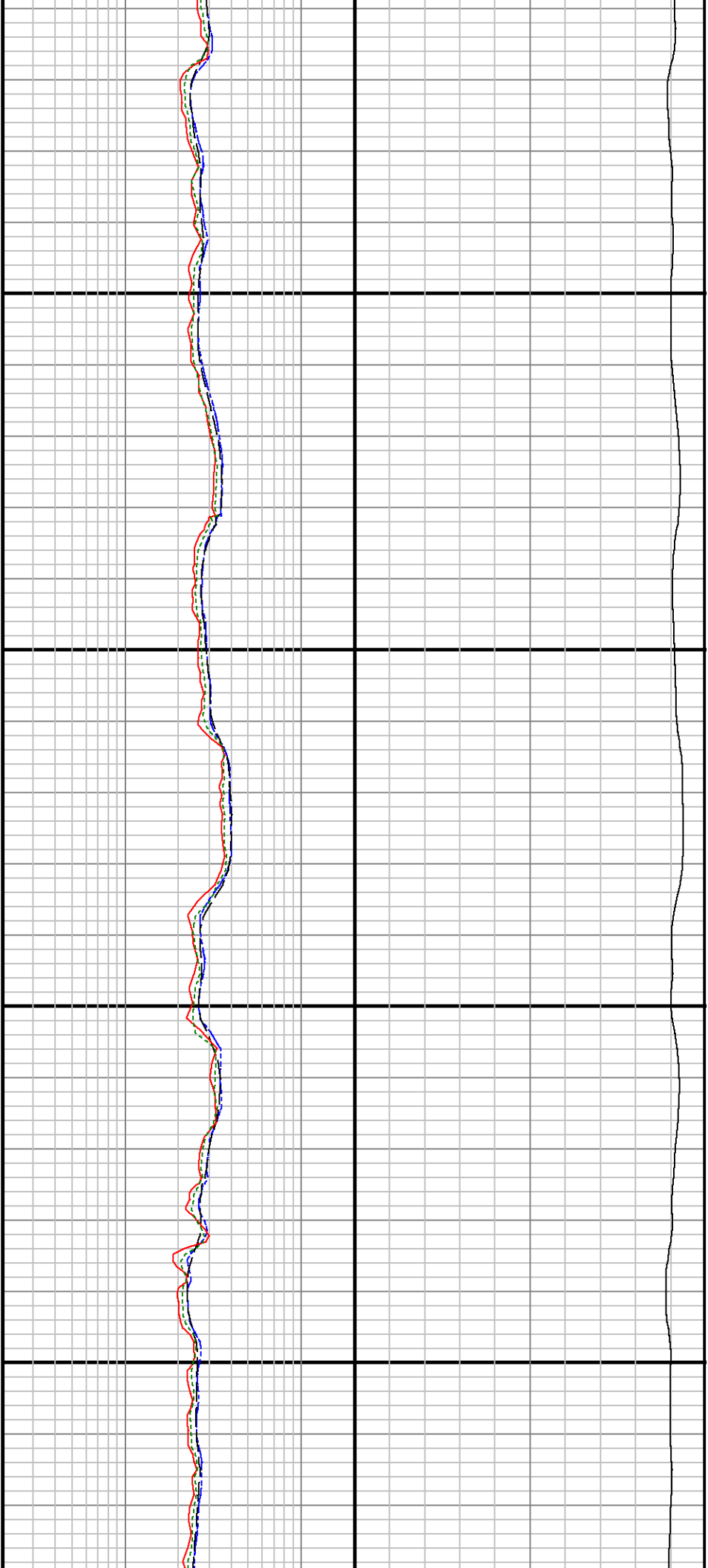




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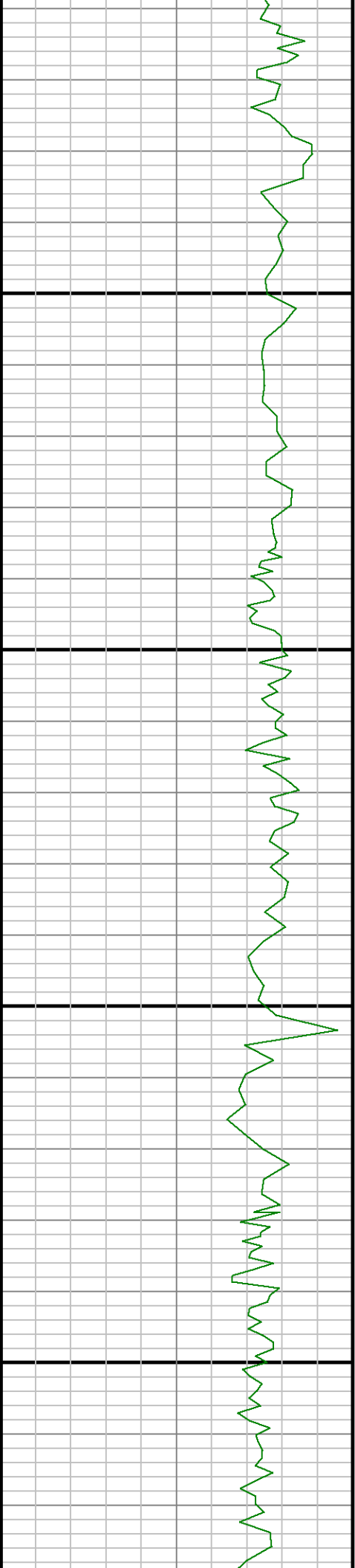
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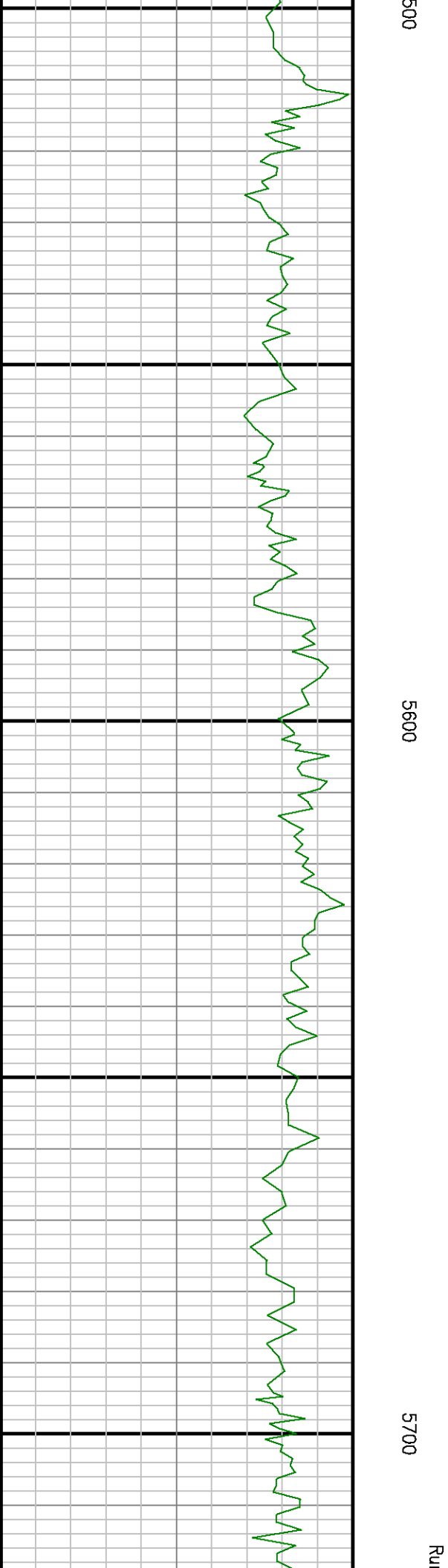


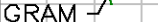



5100

5200





	
Gamma Ray Apparent 0.5 ft Avg GRAM 0 150	API
TVD feet 1:240	<div>Res PD LS 2MHz Corr RPCHM 0.2 20 ohm.m</div> <div>Res PD LS 400kHz Corr RPCLM 0.2 20 ohm.m</div> <div>Res AT LS 2MHz Corr RACHM 0.2 20 ohm.m</div> <div>Res AT LS 400kHz Corr RACLM 0.2 20 ohm.m</div>
	Con AT LS 400kHz Corr CACLM 4000 0 mmho/m

ADVANTAGE Final Survey Listing												
Operator :Noble Energy				Field : Weld County				API No : 06-123-41988-0				
Well :Wells Ranch State BB01-690				Rig : H&P 321				Job : 7841194				
Wellbore : Wells Ranch State BB01-690 Orig Hole												
Well Origin												
Latitude		40.4339 deg					Longitude		-104.3550 deg			
North Reference		Grid					Drill Depth Zero		Rig Floor			
Vertical Datum is		Ground Level					Vertical Datum to DDZ		30.00 ft			
Vertical Section North		0.00 ft					Vertical Section East		0.00 ft			
Vertical Section Azimuth		272.7100 deg					Vertical Section Depth		0.00ft			
Grid Convergence		-0.7400 deg					Magnetic Declination		8.2527 deg			
Total Correction		7.5127 deg					TVD Calculation Method		Minimal Curvature			
D-Raw Calculation		Magcorr1					Local Magnetic Field		52633 nT			
Local Magnetic Dip Angle		67.0471 deg					Local Gravity Field		9.799 m/s^2			
Tie	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Incr VS ft	Crs Len ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
U	0.00	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00				
	82.00	0.0900	138.8000	-0.06	0.04	82.00	-0.04	-0.04	82.00	0.11	0.11	169.02
	176.00	0.2300	121.0000	-0.20	0.25	176.00	-0.26	0.22	94.00	0.16	0.15	-18.72
	268.00	0.2400	18.2700	-0.11	0.47	268.00	-0.48	0.45	92.00	0.40	0.01	-111.86
	361.00	0.4500	355.7300	0.44	0.51	361.00	-0.48	1.00	93.00	0.26	0.23	-24.24
	453.00	0.6500	9.3400	1.31	0.66	452.99	-0.50	1.88	92.00	0.26	0.22	14.79
	547.00	0.7800	357.4500	2.48	0.62	546.99	-0.50	3.04	94.00	0.21	0.14	-12.65
	641.00	0.7100	358.7100	3.70	0.58	640.98	-0.40	4.27	94.00	0.08	-0.07	1.34
	736.00	0.8600	358.5400	4.99	0.66	735.97	-0.31	5.58	95.00	0.16	0.15	-0.18
	831.00	0.6700	339.9200	6.22	0.34	830.96	-0.05	6.80	95.00	0.32	-0.19	-19.60
926.00	0.6000	349.4300	7.23	0.06	925.96	0.28	7.85	95.00	0.13	-0.07	10.01	
1020.00	0.5300	1.6900	8.15	-0.02	1019.95	0.40	8.77	94.00	0.15	-0.07	13.04	
1115.00	0.5600	344.9200	9.03	-0.13	1114.95	0.55	9.67	95.00	0.17	0.03	-17.65	
1209.00	0.5600	23.4000	9.90	-0.06	1208.94	0.53	10.54	94.00	0.39	0.00	40.94	
1304.00	0.6100	9.0700	10.82	0.20	1303.94	0.31	11.50	95.00	0.16	0.05	-15.08	
1399.00	0.4500	0.4400	11.70	0.28	1398.93	0.27	12.38	95.00	0.19	-0.17	-9.08	
1493.00	0.7300	11.0100	12.57	0.15	1492.93	0.22	12.24	94.00	0.22	0.22	11.24	
1587.00	0.7300	11.0100	12.57	0.15	1586.93	0.22	12.24	94.00	0.22	0.22	11.24	
1681.00	0.7300	11.0100	12.57	0.15	1680.93	0.22	12.24	94.00	0.22	0.22	11.24	
1775.00	0.7300	11.0100	12.57	0.15	1774.93	0.22	12.24	94.00	0.22	0.22	11.24	

	1493.00	0.7300	11.0100	12.86	0.40	1492.93	0.20	13.34	94.00	0.32	0.30	11.24
	1585.00	0.8200	5.9600	13.88	0.58	1584.92	0.08	14.58	92.00	0.12	0.10	-5.49
	1683.00	0.6500	15.8400	15.12	0.80	1682.91	-0.09	15.83	98.00	0.22	-0.17	10.08
	1778.00	0.6700	33.1900	16.10	1.26	1777.91	-0.49	16.92	95.00	0.21	0.02	18.26
	1872.00	0.6400	15.5500	17.06	1.70	1871.90	-0.89	17.98	94.00	0.22	-0.03	-18.77
	1909.00	0.5400	1.9900	17.44	1.76	1908.90	-0.93	18.36	37.00	0.46	-0.27	-36.65
	1947.00	0.2100	294.4900	17.65	1.70	1946.90	-0.87	18.57	38.00	1.31	-0.87	-177.63
	2042.00	0.3300	271.5600	17.73	1.27	2041.90	-0.43	19.01	95.00	0.17	0.13	-24.14
	2136.00	1.3000	313.7200	18.47	0.23	2135.89	0.65	20.29	94.00	1.15	1.03	44.65
	2231.00	2.6000	325.4000	20.99	-1.77	2230.83	2.76	23.51	95.00	1.42	1.37	12.29
	2326.00	4.0100	339.3900	25.87	-4.17	2325.67	5.39	28.95	95.00	1.70	1.48	14.73
	2421.00	5.2300	331.2800	32.78	-7.42	2420.36	8.96	36.58	95.00	1.45	1.28	-8.54
	2515.00	6.4700	327.7600	41.02	-12.30	2513.87	14.23	46.16	94.00	1.37	1.32	-3.74
	2610.00	7.3800	323.8500	50.47	-18.76	2608.18	21.12	57.60	95.00	1.08	0.96	-4.12
	2705.00	7.8400	326.1300	60.78	-25.97	2702.34	28.81	70.18	95.00	0.58	0.48	2.40
	2799.00	8.7500	326.6000	72.07	-33.48	2795.35	36.85	83.74	94.00	0.97	0.97	0.50
	2894.00	9.9900	324.0300	84.77	-42.29	2889.09	46.25	99.21	95.00	1.38	1.31	-2.71
	2989.00	10.3100	323.9700	98.31	-52.13	2982.60	56.72	115.95	95.00	0.34	0.34	-0.06
	3083.00	10.1200	329.7400	112.25	-61.24	3075.11	66.48	132.60	94.00	1.11	-0.20	6.14
	3178.00	10.1100	324.3000	126.23	-70.32	3168.64	76.20	149.26	95.00	1.01	-0.01	-5.73
	3273.00	9.2900	323.6200	139.18	-79.73	3262.28	86.22	165.27	95.00	0.87	-0.86	-0.72
	3367.00	8.9800	326.0300	151.51	-88.11	3355.09	95.18	180.18	94.00	0.81	-0.33	4.69
	3462.00	10.1200	323.6200	164.52	-96.99	3448.77	104.66	195.93	95.00	1.43	1.20	-4.64
	3557.00	11.9400	319.4600	178.71	-108.33	3542.01	116.66	214.09	95.00	2.09	1.92	-4.38
	3651.00	11.2900	318.8900	193.03	-120.70	3634.09	129.69	233.02	94.00	0.70	-0.69	-0.61
	3746.00	11.4700	318.1400	207.07	-133.12	3727.22	142.76	251.76	95.00	0.25	0.19	-0.79
	3841.00	10.9400	319.1000	220.92	-145.32	3820.41	155.61	270.22	95.00	0.59	-0.56	1.01
	3935.00	10.1100	319.3300	233.92	-156.54	3912.83	167.42	287.39	94.00	0.88	-0.88	0.24
	4030.00	9.8800	324.8900	246.91	-166.66	4006.39	178.15	303.86	95.00	1.04	-0.24	5.85
	4125.00	9.7300	322.8300	259.98	-176.20	4100.00	188.29	320.04	95.00	0.40	-0.16	-2.17
	4220.00	10.2100	324.2800	273.21	-185.97	4193.56	198.68	336.49	95.00	0.57	0.51	1.53
	4314.00	11.0700	323.6800	287.24	-196.17	4285.95	209.54	353.84	94.00	0.92	0.91	-0.64
	4409.00	11.0000	326.3700	302.14	-206.60	4379.19	220.65	372.02	95.00	0.55	-0.07	2.83
	4504.00	9.6600	320.0900	315.60	-216.73	4472.65	231.42	389.03	95.00	1.84	-1.41	-6.61
Tie	MD ft	Incl deg	Azim deg	North ft	East ft	TVD ft	VS ft	Incr VS ft	Crs Len ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft
	4599.00	9.7400	321.3700	328.19	-226.86	4566.29	242.12	405.04	95.00	0.24	0.08	1.35
	4693.00	10.8600	323.2600	341.50	-237.12	4658.78	253.00	421.84	94.00	1.24	1.19	2.01
	4788.00	11.4700	322.7200	356.19	-248.20	4751.98	264.76	440.24	95.00	0.65	0.84	-0.57
	4882.00	11.4000	323.5000	371.09	-259.38	4844.11	276.64	458.87	94.00	0.18	-0.07	0.83
	4977.00	10.6800	325.1600	385.86	-270.00	4937.36	287.94	477.06	95.00	0.83	-0.76	1.75
	5072.00	9.7900	327.8100	399.93	-279.33	5030.84	297.93	493.94	95.00	1.06	-0.94	2.79
	5167.00	9.6900	328.3000	413.56	-287.83	5124.47	307.07	510.01	95.00	0.14	-0.11	0.52
	5261.00	9.9800	324.8500	426.95	-296.68	5217.09	316.54	526.06	94.00	0.70	0.31	-3.67
	5356.00	10.2600	322.3100	440.38	-306.59	5310.62	327.07	542.75	95.00	0.55	0.29	-2.67
	5451.00	10.4900	317.1100	453.41	-317.65	5404.06	338.73	559.84	95.00	1.01	0.24	-5.47
Projection to TD:	5545.00	10.4100	323.4100	466.50	-328.54	5496.51	350.23	576.86	94.00	1.22	-0.09	6.70
	5640.00	9.6400	324.5900	479.87	-338.26	5590.06	360.57	593.40	95.00	0.84	-0.81	1.24
	5735.00	11.6100	327.4400	494.42	-348.02	5683.42	371.00	610.91	95.00	2.15	2.07	3.00
	5766.00	10.4100	326.4200	499.38	-351.24	5713.85	374.46	616.83	31.00	3.92	-3.87	-3.29
	5818.00	10.4100	326.4200	507.21	-356.44	5765.00	380.02	626.22	52.00	0.00	-0.00	0.00