

BAKER HUGHES				LWD MEMORY LOG									
Gamma Ray													
Scale:		Company: Noble Energy											
1:240 TVD		Well: RILEY LD19-722											
Depth Reference:		Field: Weld Co											
Driller's Depth		County: Weld County		State: Colorado									
Status:		Surface Location:		Other Services:									
Final Print		Latitude:		Wellbore Survey									
API No: 0512343479		Longitude:											
Job ID: 8132075		UTM: N/A											
		SEC: 19		TWN: 9N		RGE: 58W							
Permanent Datum (P.D.): Ground Level		Elevation: 4820.00 ft		KB: N/A									
Log Measured From: Rig Floor		Above P.D. 30.00 ft		DF: 4850.00 ft									
		GL: 4820.00 ft											
Dates				Interval Logged				Magnetic Field Reference					
Date From: 2016-10-20				Top: (ft) 1917.00				Azi Reference North: Grid				Dip Angle: (deg) 67.17	
Date To: 2016-10-21				Bottom: (ft) 5921.00				Total Magnetic Field Strength: (nT) 52646					
Spud Date: 2016-10-19								Mag to Reference North Correction: (deg) 6.59 E					
Borehole Record				Casing Record									
Hole Size (in)		From (ft)		To (ft)		Size (in)		Weight (lb/ft)		From (ft)		To (ft)	
8.500		1940.00		10665.00		9.625		36.00		30.00		1940.00	
11.875		30.00		1940.00									
Mud Record				Deviation Record									
Type		From (ft)		To (ft)		Hole Size (in)		Interval (ft)		Inc Az (Start)		Inc Az (End)	
Oil Based Mud		0.00		10665.89		8.500		10665.89		1.62 173.43		90.49 351.38	
Acquisition System				Software Version				Other					
Baker Hughes Cadence				RT4.0				Rig: HP 524					
PlotStudio				4.0.7570.8				Contractor: Helmerich & Payne Drilling Co					
								District: RMD					
								Unit: D&E					

"These interpretations and analyses ("Interpretations") are opinions provided by Baker Hughes Oilfield Operations, Inc ("Baker Hughes"), based upon industry practice, empirical relationships, assumptions and measurements, (many of which may be provided by the customer). The Interpretations are not infallible and may be subject to different opinions. Vjwu."Dcmgt"Jwijgu"fqgu"pqv"ycttcpv"vjgkt"ceewtce{"."eqttgevpguu."qt"eqorngvgpguu."qt"vjcv"vjg"ewuvqogt u"cpflqt"cp{" vjktf"rctv{ u"tgnkcpeg"qp"uwej"Kpvgtrtgvcvkq u"yknn"ceeqornkuj"cp{"rctvkewnct"tguwnvu0"Vjg"ewuvqogt"cuuwogu"hwnn" responsibility for the use of the Interpretations and for decisions based thereon and the customer agrees to release, defend and indemnify Baker Hughes, its parent, subsidiaries and affiliated or related entities, and subcontractors, together with its and their officers, directors, employees, agents and invitees against, any and all claims, losses, damages, or expenses sustained by the customer or any third party arising out of reliance upon or use of the Interpretations, without regard to the cause(s) thereof, including without limitation any form of negligence on the part of Baker Hughes. Unless other contract terms have been agreed to by the parties, each party's liabilities and qdnkicvkq u"ujcnn"dg"iqxgtpgf"d{"Dcmgt"Jwijgu"Kpeqtrqtcvgf u"Yqtnfykfg"Vgtou"cpf"Eqpfkvkq u0\$""

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	1917.10	10652.99	1930.00	10665.89	2016-10-20 07:00	2016-10-22 00:42	37.66

Crew								
Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
David Browning	2016-10-19	2016-10-22	Steven Cano	2016-10-21	2016-10-22			

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+ (%)
2016-10-19 13:29	1	1940.00	Oil Based Mud	9.7	11	N/A	22.0	81.4/18.6	Active Pit	22500	0.00
2016-10-20 09:25	1	2346.82	Oil Based Mud	9.2	8	N/A	18.4	83.3/16.7	Active Pit	23000	0.00
2016-10-20 20:00	1	5266.26	Oil Based Mud	9.1	10	N/A	19.2	83.3/16.7	Active Pit	18000	0.00
2016-10-21 08:00	1	7110.20	Oil Based Mud	8.9	9	N/A	29.6	84.4/15.6	Active Pit	17000	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	12683420	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU	12683420	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD	12398343	Gamma (single)	2.74	12.90	7.000	3.250
1	ATC_MWD	12398343	Directional (mag)	12.26	22.42	7.000	3.250

Service and Tool Mnemonics		
Mnemonic	Name	Description

Mnemonic	Name	Description
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

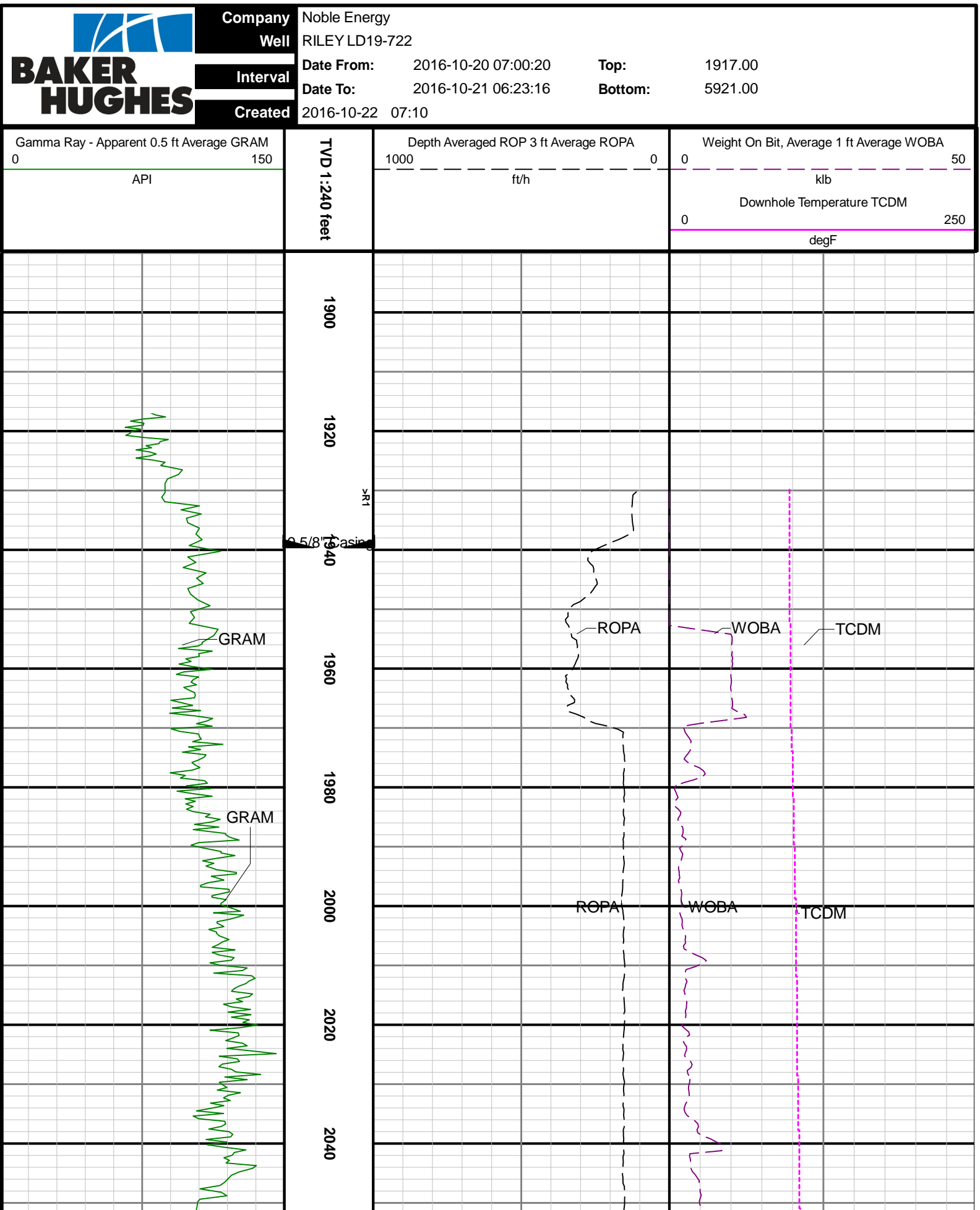
- 1
- Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
- 2
- Baker Hughes LWD Run 1 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1954 to 10665 feet MD (1953 to 5881 feet TVD).

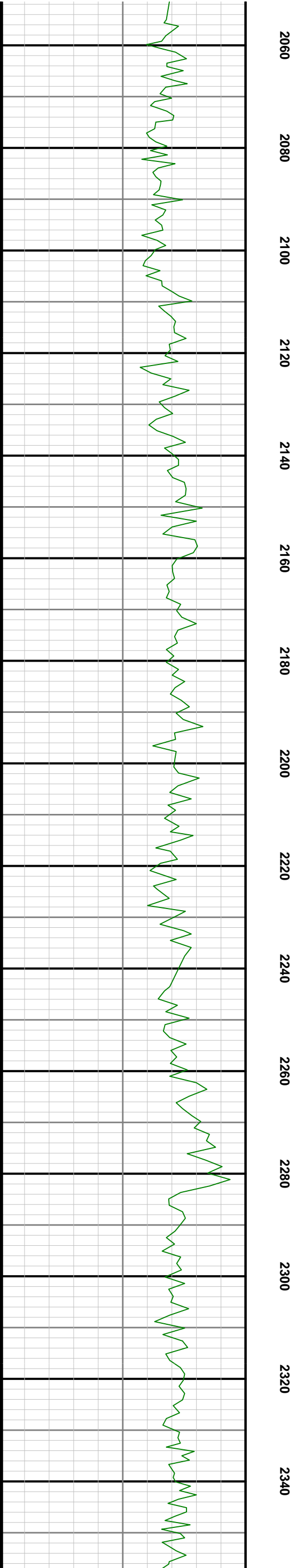
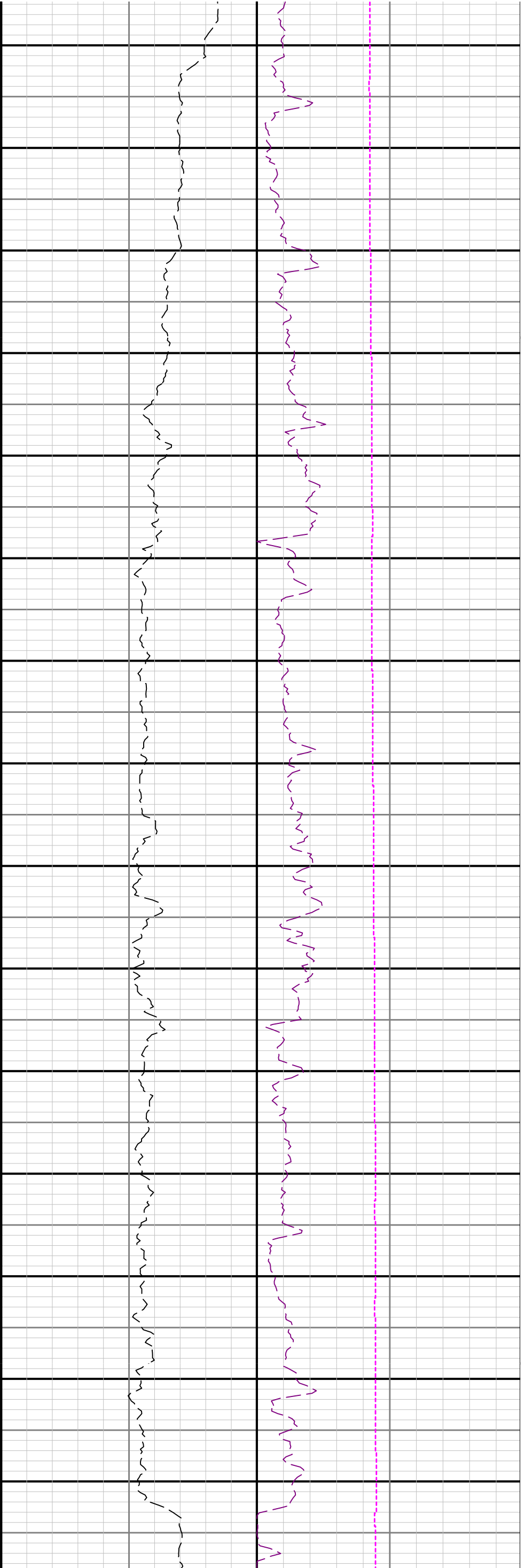
Remarks

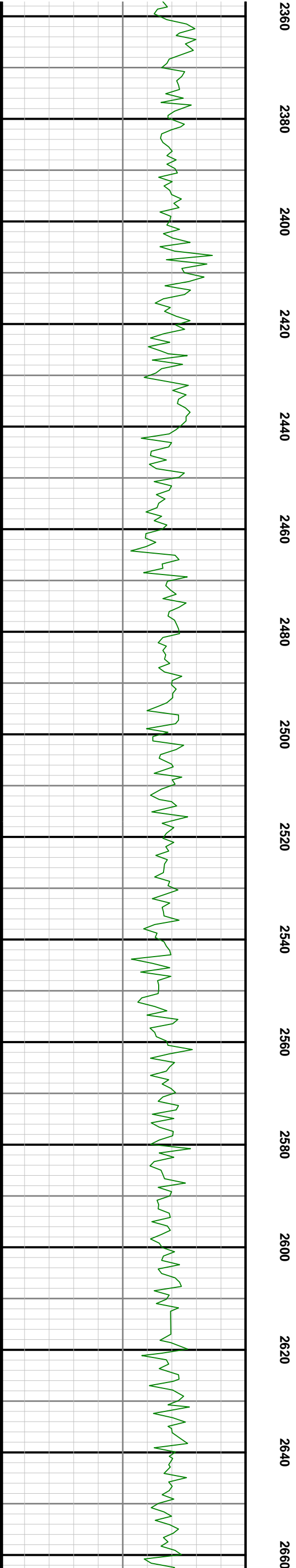
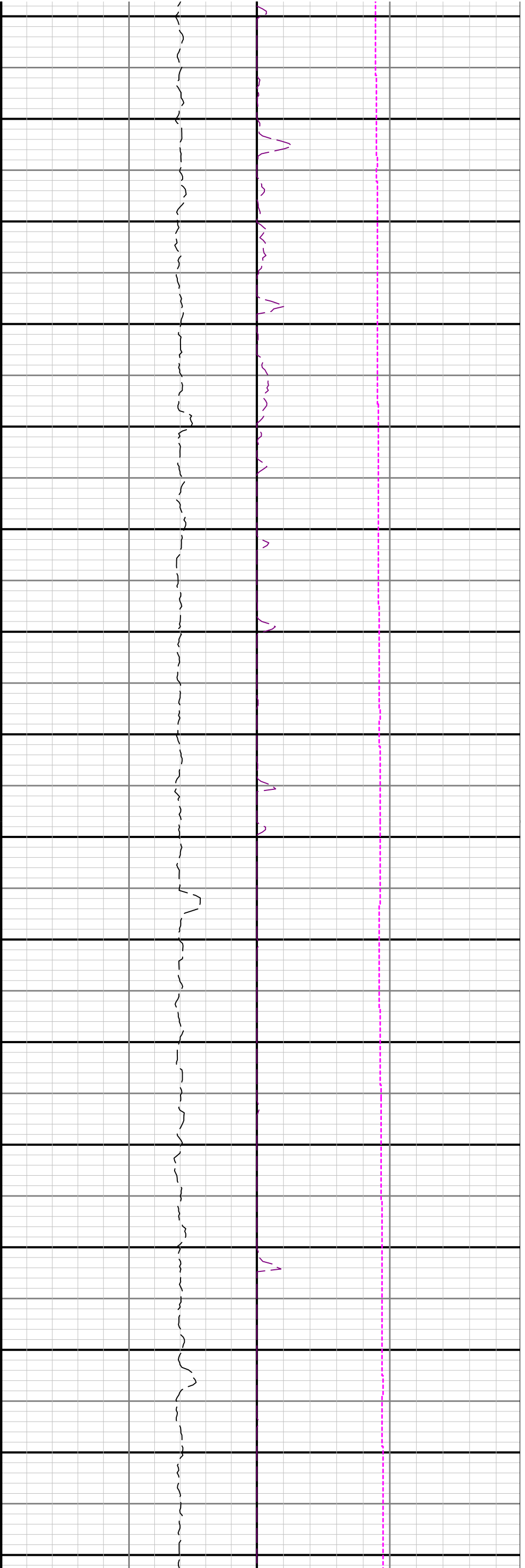
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	10665.00	8.500	1	The interval from 10652 to 10665 feet MD (5882 to 5881 feet TVD) has no gamma ray data due to sensor to bit offset.

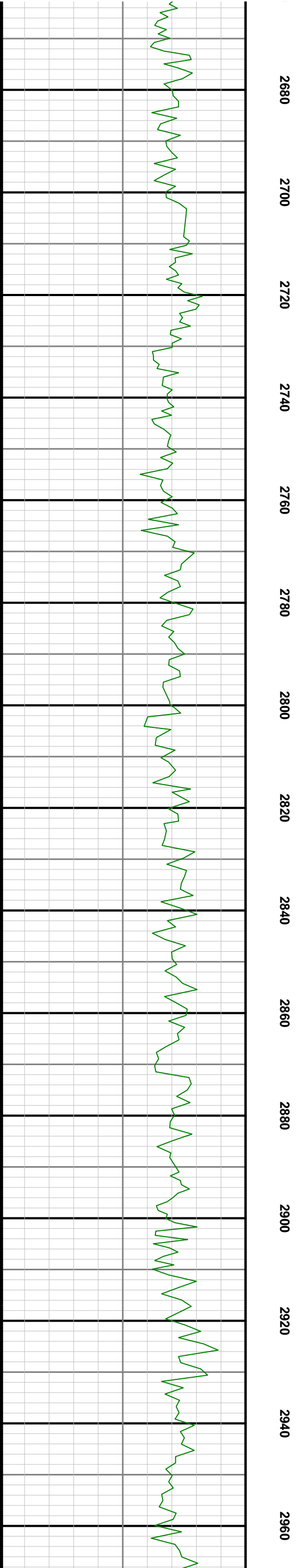
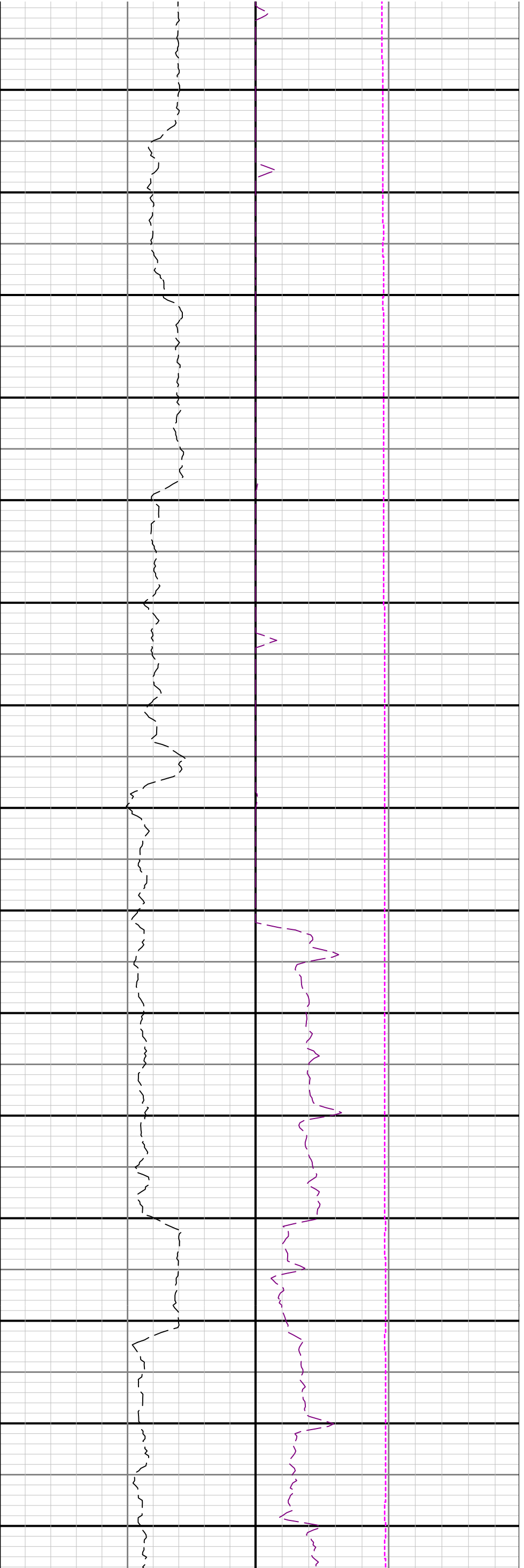
Curve Mnemonics

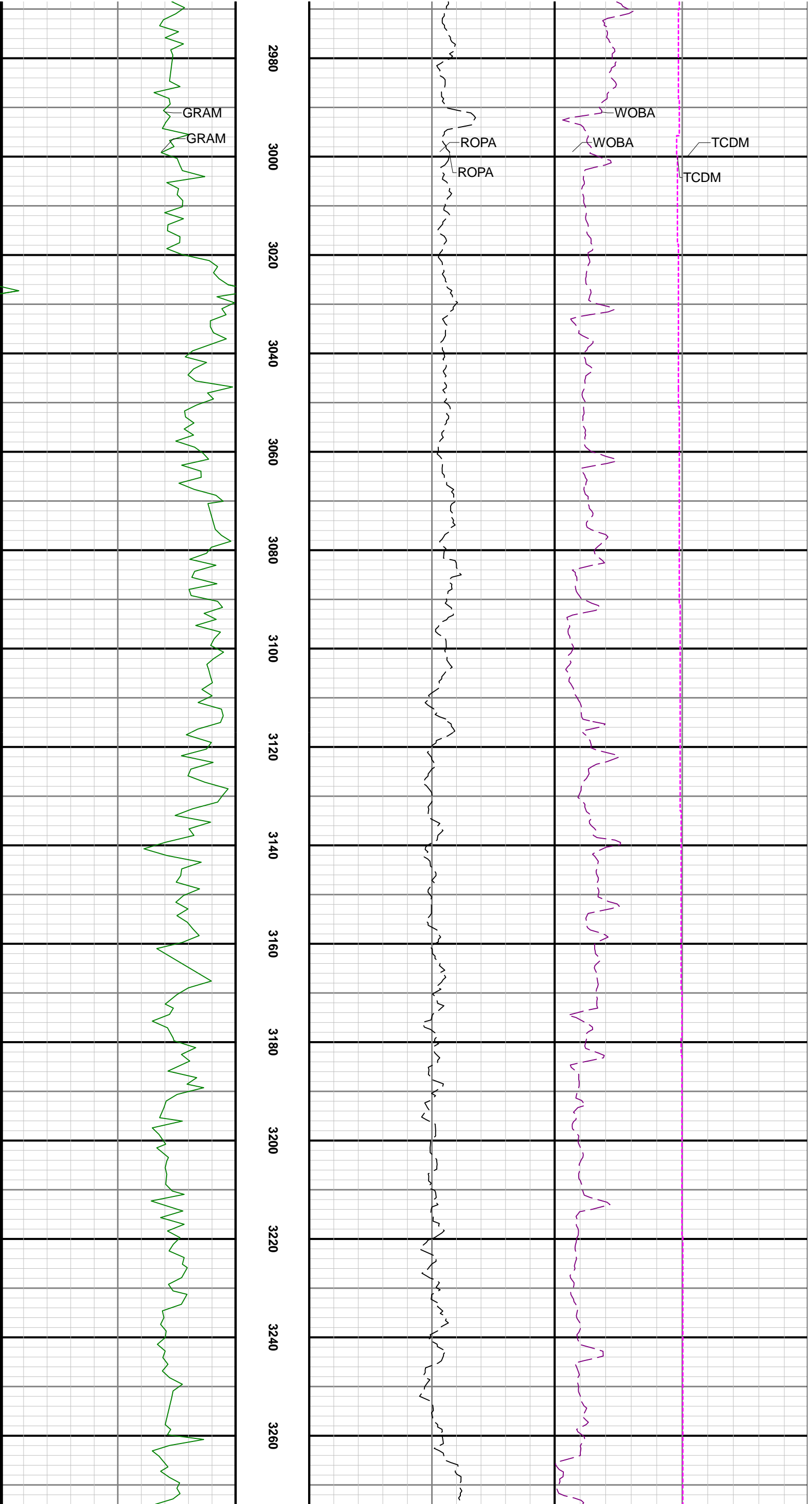
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent 0.5 ft Average	API
TCDM	Downhole Temperature	degF

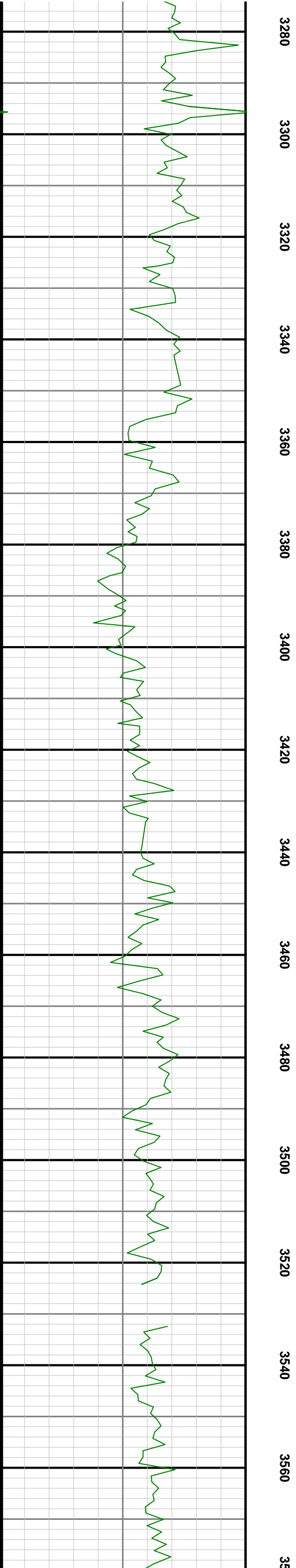
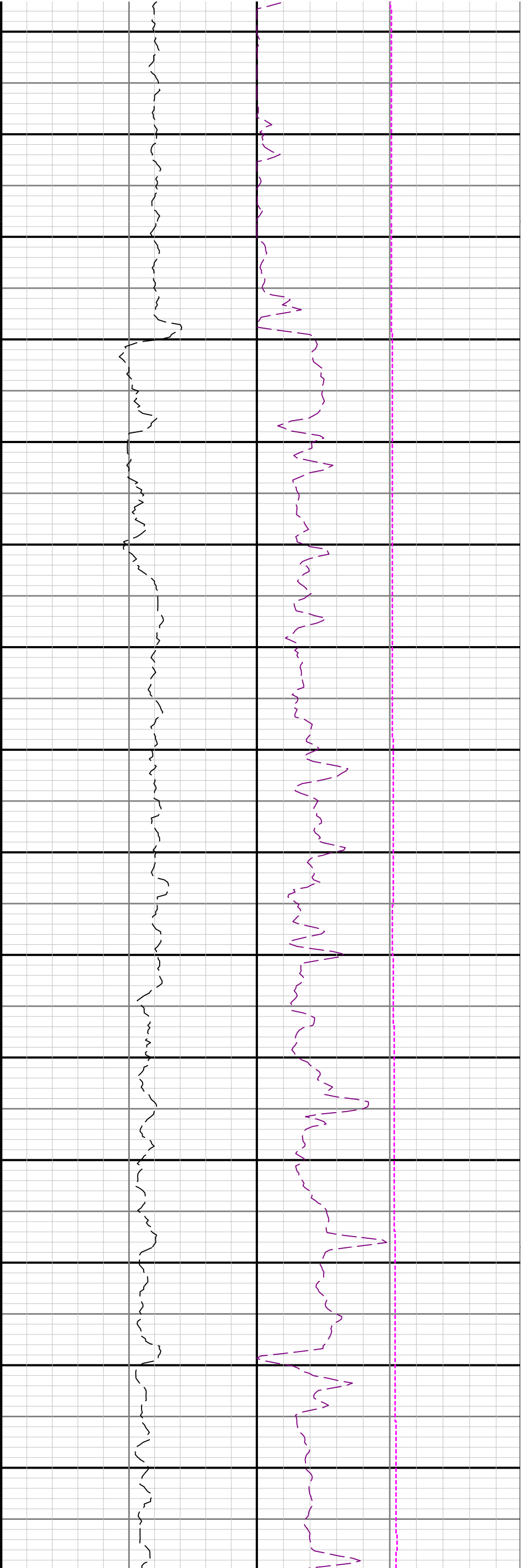


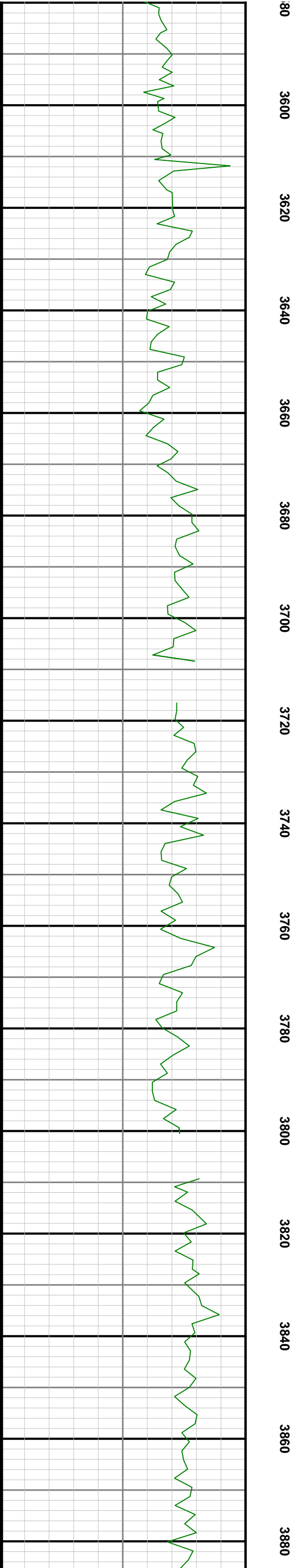
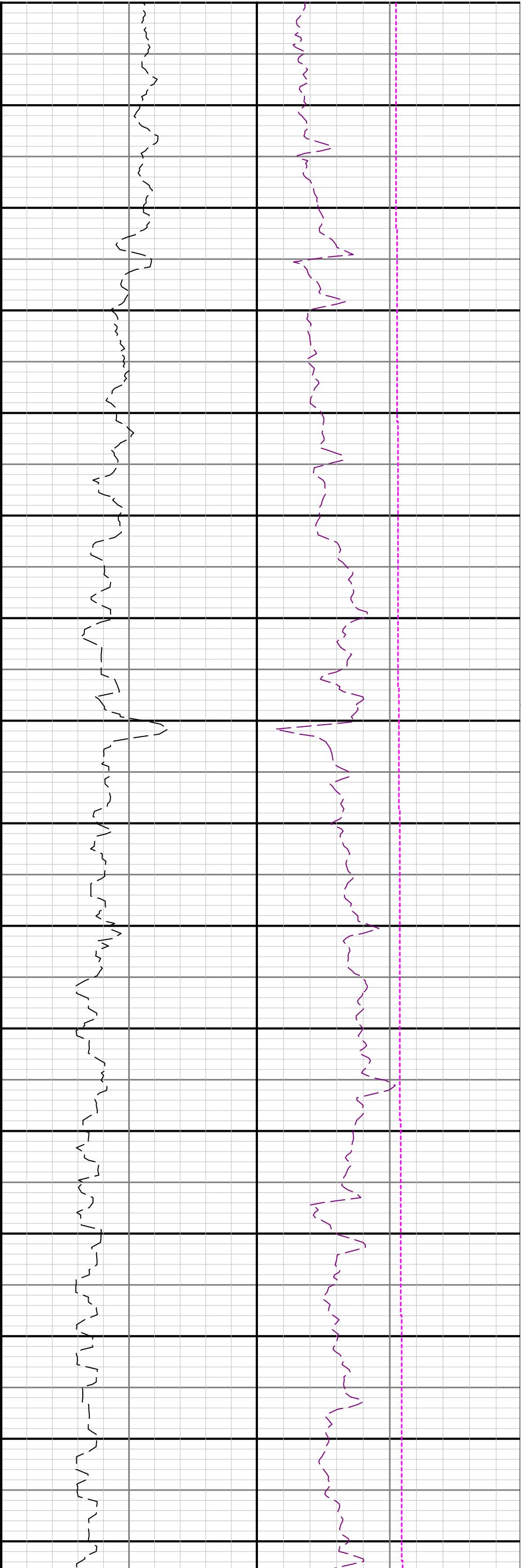


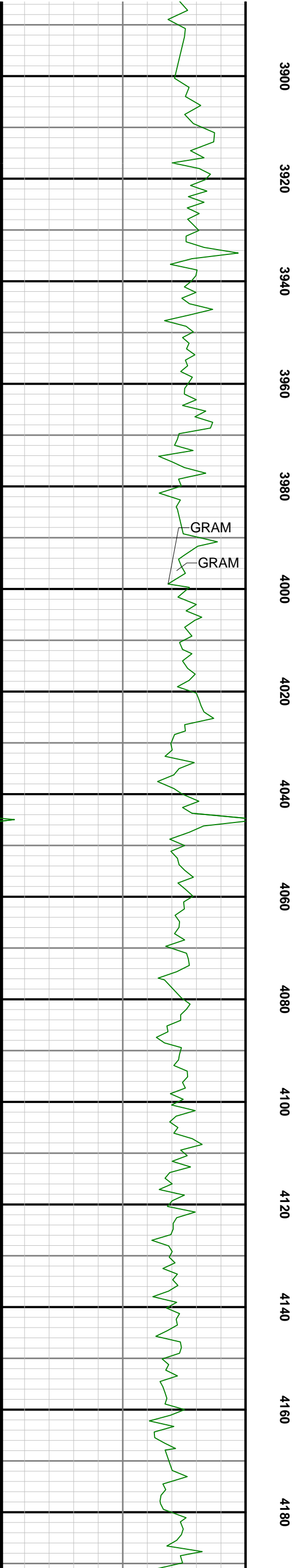
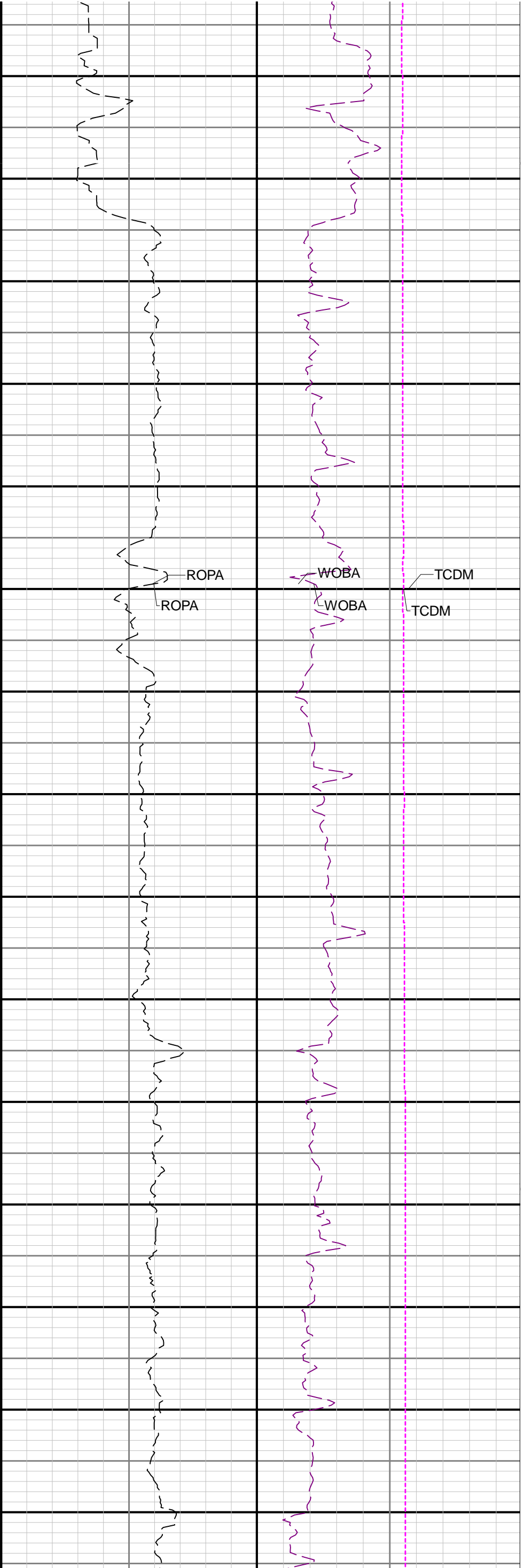


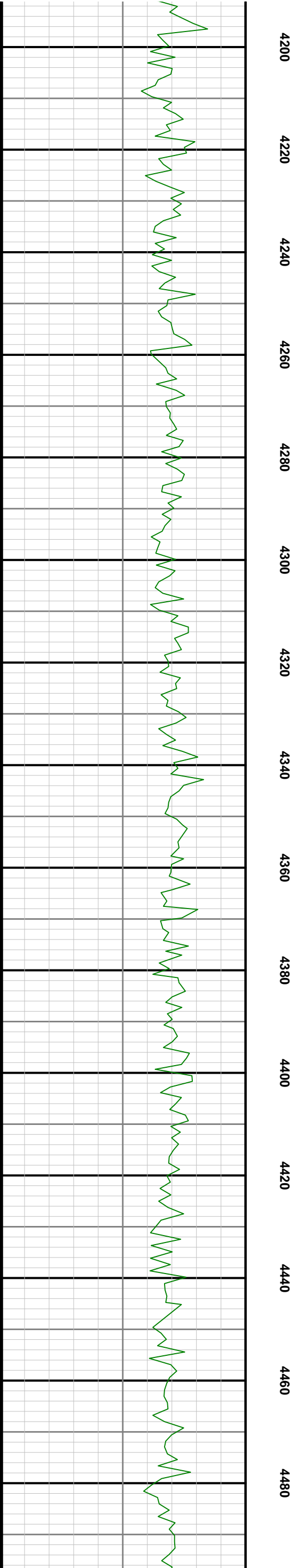
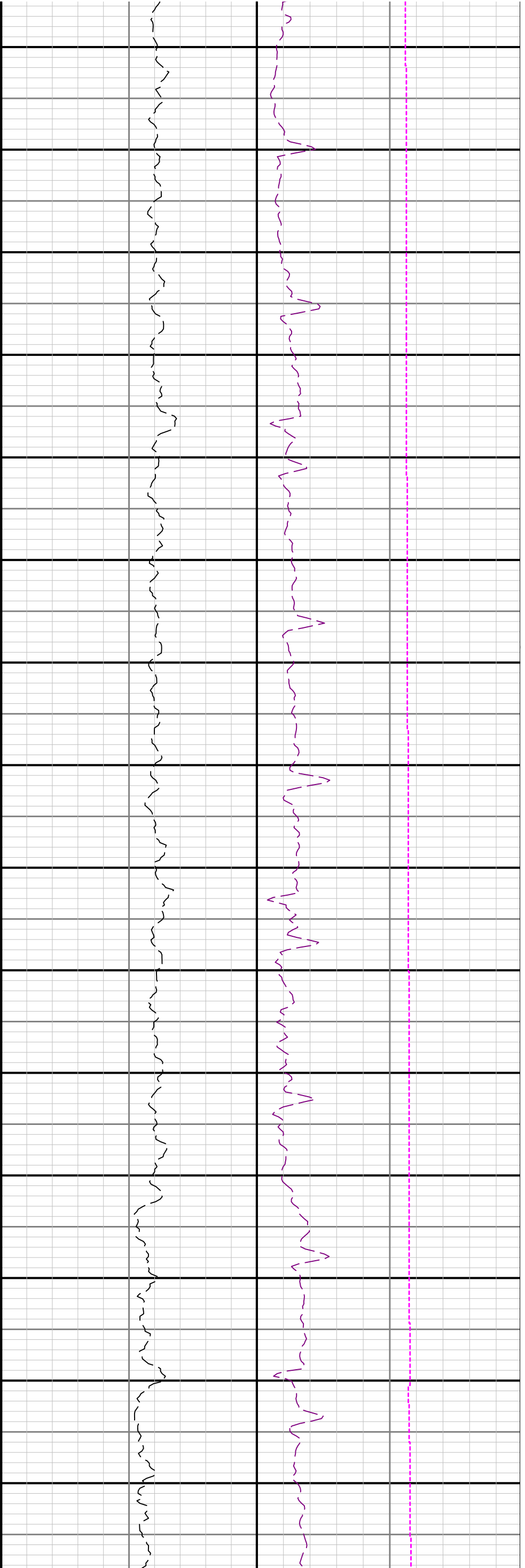


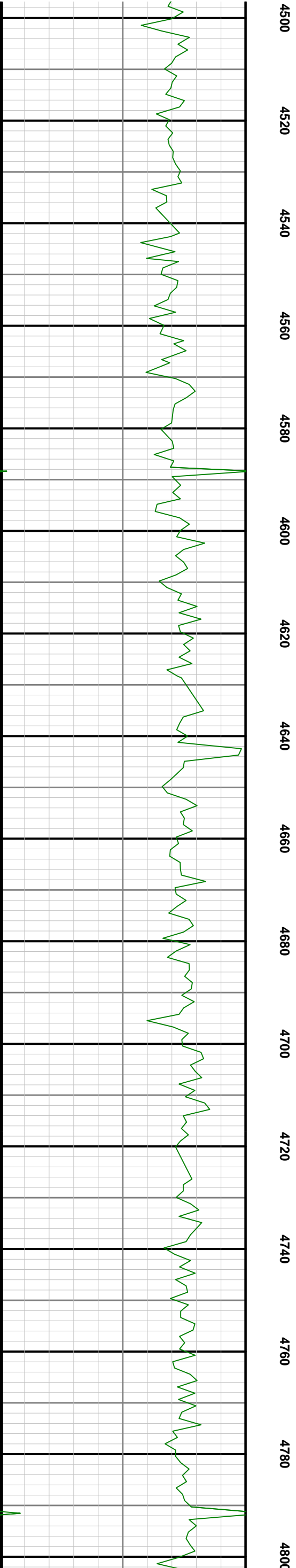
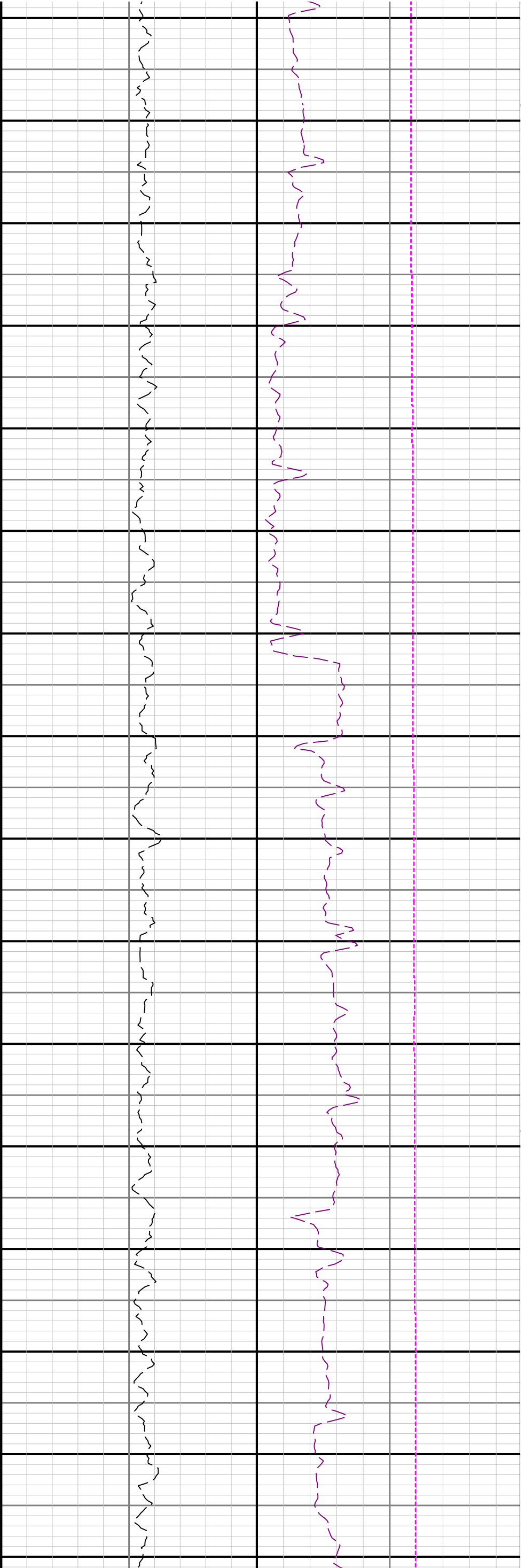


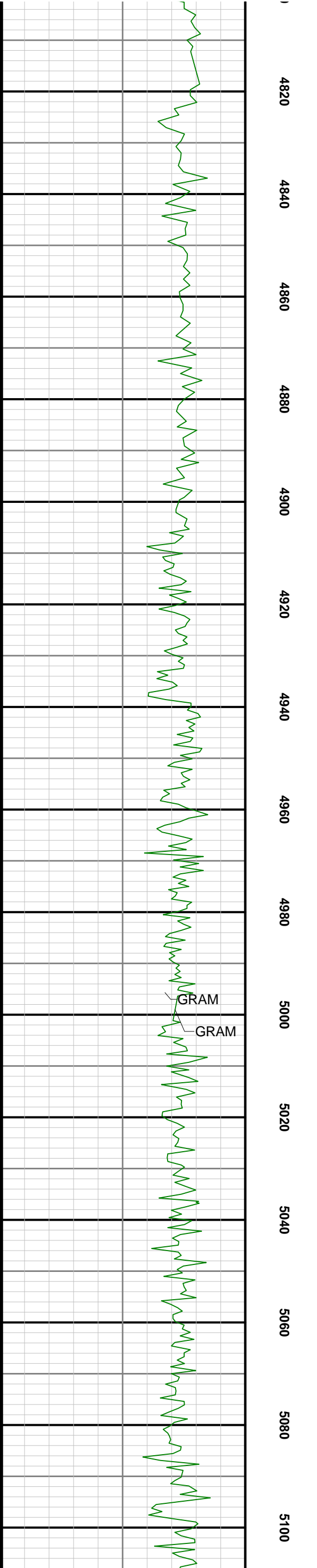
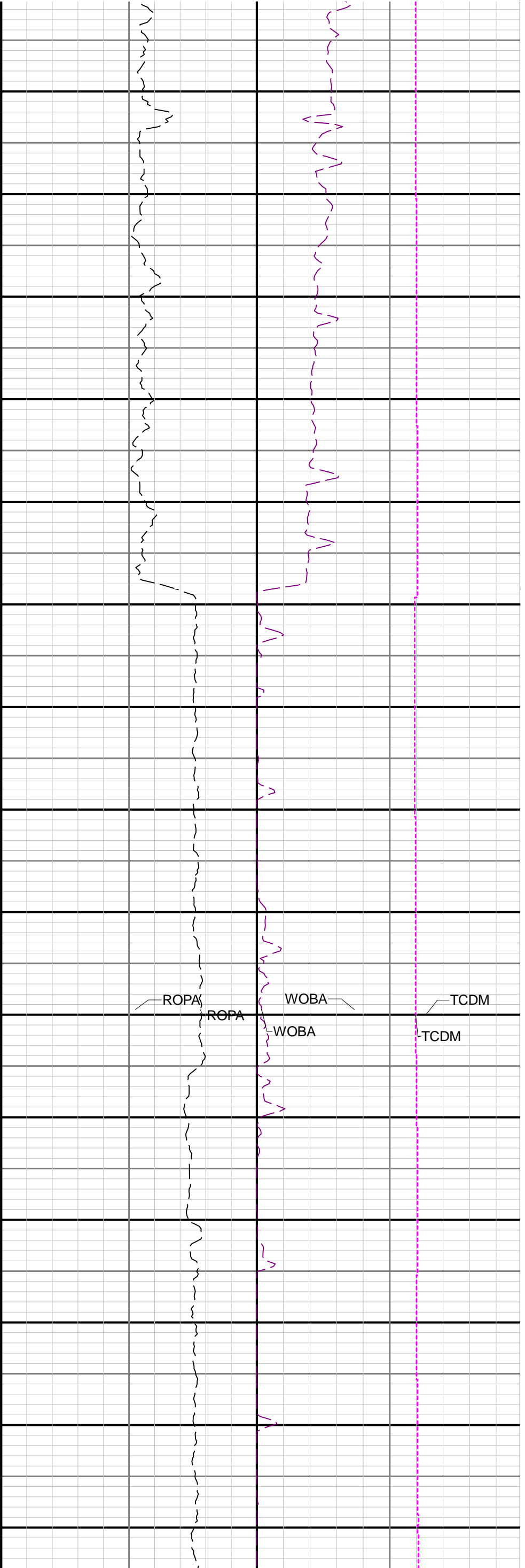


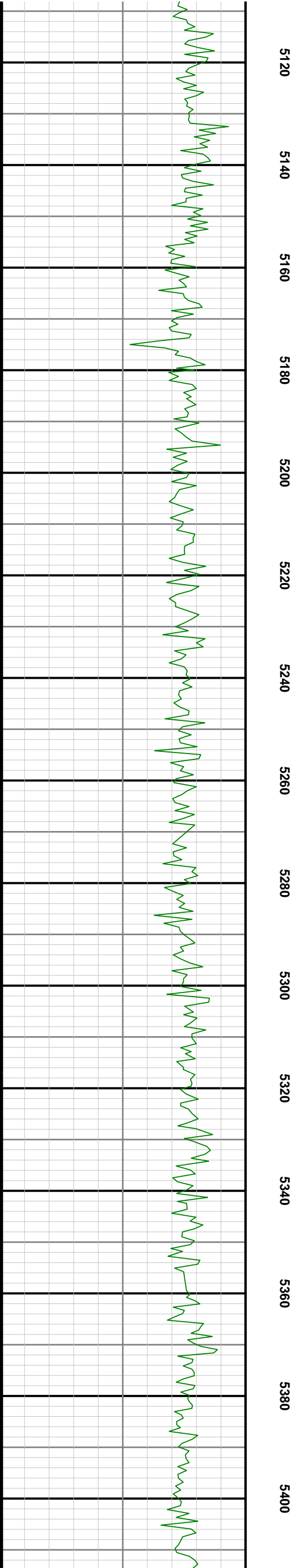
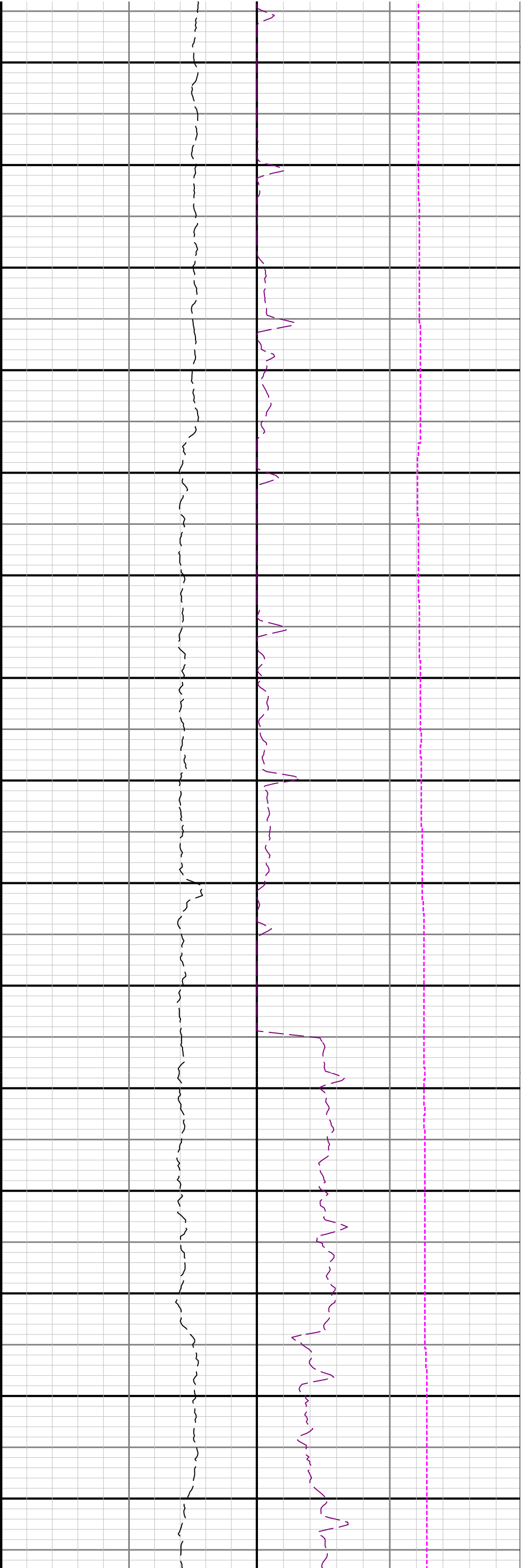


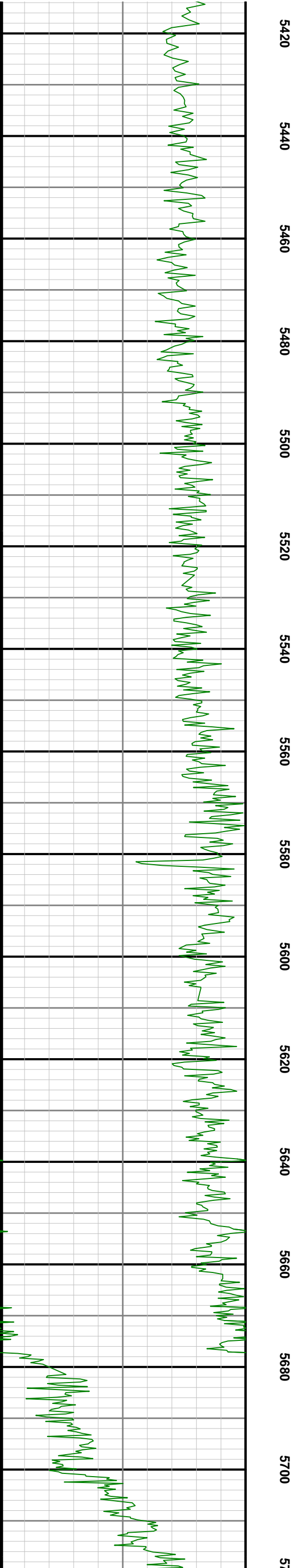
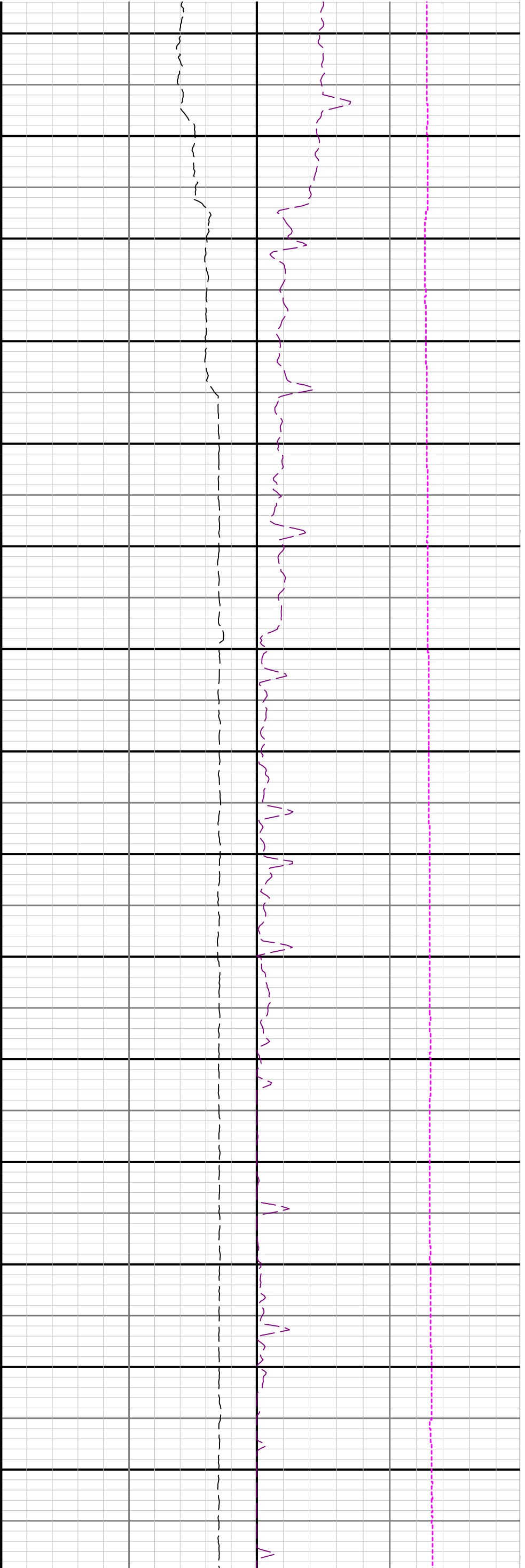


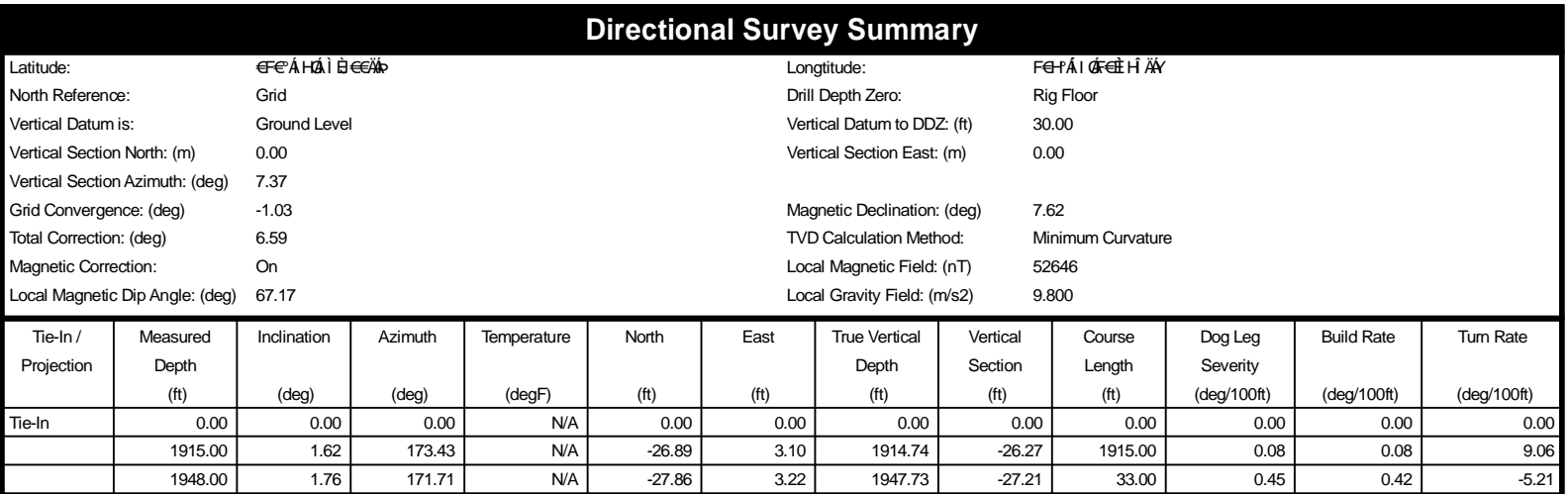












	2042.00	1.19	35.30	N/A	-28.49	4.00	2041.72	-27.74	94.00	2.92	-0.61	-145.12
	2137.00	7.61	11.21	N/A	-21.51	5.79	2136.39	-20.59	95.00	6.89	6.76	-25.36
	2231.00	7.40	7.03	N/A	-9.39	7.74	2229.59	-8.32	94.00	0.62	-0.22	-4.45
	2326.00	7.32	6.73	N/A	2.69	9.20	2323.80	3.85	95.00	0.09	-0.08	-0.32
	2421.00	7.22	29.11	N/A	13.92	12.81	2418.06	15.45	95.00	2.96	-0.11	23.56
	2515.00	8.88	57.00	N/A	23.03	21.78	2511.16	25.64	94.00	4.46	1.77	29.67
	2610.00	11.01	84.79	N/A	27.85	36.97	2604.78	32.37	95.00	5.46	2.24	29.25
	2704.00	13.26	96.19	N/A	27.51	56.63	2696.69	34.54	94.00	3.49	2.39	12.13
	2799.00	15.08	105.70	N/A	22.99	79.37	2788.81	32.98	95.00	3.10	1.92	10.01
	2893.00	15.71	113.43	N/A	14.62	102.82	2879.45	27.68	94.00	2.28	0.67	8.22
	2988.00	15.71	122.01	N/A	2.68	125.53	2970.91	18.76	95.00	2.44	0.00	9.03
	3083.00	15.67	121.87	N/A	-10.91	147.33	3062.37	8.08	95.00	0.06	-0.04	-0.15
	3177.00	15.70	121.69	N/A	-24.29	168.93	3152.87	-2.42	94.00	0.06	0.03	-0.19
	3272.00	15.89	121.16	N/A	-37.77	191.00	3244.28	-12.96	95.00	0.25	0.20	-0.56
	3366.00	15.80	120.37	N/A	-50.90	213.05	3334.71	-23.15	94.00	0.25	-0.10	-0.84
	3461.00	15.85	118.40	N/A	-63.61	235.62	3426.11	-32.86	95.00	0.57	0.05	-2.07
	3556.00	15.81	114.95	N/A	-75.24	258.77	3517.51	-41.43	95.00	0.99	-0.04	-3.63
	3650.00	15.91	111.33	N/A	-85.33	282.38	3607.93	-48.40	94.00	1.06	0.11	-3.85
	3744.00	13.67	110.31	N/A	-93.87	304.80	3698.81	-54.00	94.00	2.40	-2.38	-1.09
	3839.00	13.72	111.93	N/A	-101.98	325.78	3791.11	-59.34	95.00	0.41	0.05	1.71
	3934.00	13.69	116.72	N/A	-111.24	346.27	3883.41	-65.90	95.00	1.19	-0.03	5.04
	4028.00	13.28	123.65	N/A	-122.22	365.20	3974.83	-74.37	94.00	1.77	-0.44	7.37
	4123.00	13.50	122.25	N/A	-134.19	383.66	4067.24	-83.86	95.00	0.41	0.23	-1.47
	4217.00	13.43	121.16	N/A	-145.69	402.28	4158.66	-92.88	94.00	0.28	-0.07	-1.16
	4312.00	13.51	118.09	N/A	-156.62	421.51	4251.05	-101.26	95.00	0.76	0.08	-3.23
	4407.00	13.44	113.37	N/A	-166.23	441.43	4343.44	-108.23	95.00	1.16	-0.07	-4.97
	4501.00	13.59	110.82	N/A	-174.49	461.78	4434.83	-113.81	94.00	0.65	0.16	-2.71
	4596.00	13.53	110.65	N/A	-182.37	482.61	4527.19	-118.96	95.00	0.08	-0.06	-0.18
	4690.00	13.58	110.01	N/A	-190.03	503.27	4618.57	-123.90	94.00	0.17	0.05	-0.68
	4784.00	13.53	108.87	N/A	-197.36	524.05	4709.95	-128.51	94.00	0.29	-0.05	-1.21
	4879.00	14.39	107.66	N/A	-204.53	545.81	4802.14	-132.83	95.00	0.96	0.91	-1.27
	4973.00	13.55	110.11	N/A	-211.86	567.28	4893.36	-137.34	94.00	1.09	-0.89	2.61
	5067.00	11.97	85.20	N/A	-214.84	587.35	4985.11	-137.72	94.00	6.04	-1.68	-26.50
	5162.00	13.29	64.45	N/A	-209.30	607.03	5077.85	-129.70	95.00	4.94	1.39	-21.84
	5256.00	18.12	54.59	N/A	-196.16	628.71	5168.33	-113.89	94.00	5.85	5.14	-10.49
	5351.00	21.29	45.17	N/A	-175.43	652.99	5257.78	-90.22	95.00	4.71	3.34	-9.92
	5445.00	23.38	36.47	N/A	-148.39	676.19	5344.75	-60.43	94.00	4.16	2.22	-9.26
	5540.00	24.91	26.26	N/A	-115.27	696.26	5431.47	-25.01	95.00	4.68	1.61	-10.75
	5634.00	28.24	11.27	N/A	-75.66	709.38	5515.63	15.97	94.00	7.94	3.54	-15.95
	5729.00	34.14	359.09	N/A	-26.87	713.36	5596.94	64.86	95.00	9.07	6.21	-12.82
	5824.00	42.75	353.39	N/A	31.95	709.21	5671.30	122.66	95.00	9.79	9.06	-6.00
	5918.00	53.02	352.07	N/A	101.01	700.34	5734.25	190.01	94.00	10.97	10.93	-1.40
	6013.00	60.42	350.87	N/A	179.49	688.53	5786.35	266.33	95.00	7.86	7.79	-1.26
	6107.00	67.51	350.73	N/A	262.81	675.03	5827.58	347.23	94.00	7.54	7.54	-0.15
	6202.00	73.94	352.97	N/A	351.53	662.36	5858.93	433.59	95.00	7.12	6.77	2.36
	6297.00	75.41	357.09	N/A	442.79	654.44	5884.04	523.08	95.00	4.46	1.55	4.34
	6391.00	79.91	0.65	N/A	534.56	652.65	5904.13	613.86	94.00	6.05	4.79	3.79
	6486.00	86.12	4.15	N/A	628.71	656.62	5915.68	707.74	95.00	7.49	6.54	3.68
	6580.00	88.86	5.30	N/A	722.29	664.35	5919.80	801.54	94.00	3.16	2.91	1.22
	6675.00	90.37	5.58	N/A	816.85	673.36	5920.44	896.48	95.00	1.62	1.59	0.29
	6769.00	90.58	5.32	N/A	910.43	682.29	5919.66	990.43	94.00	0.36	0.22	-0.28
	6864.00	90.89	5.10	N/A	1005.02	690.91	5918.44	1085.35	95.00	0.40	0.33	-0.23
	6958.00	90.83	4.20	N/A	1098.70	698.53	5917.03	1179.23	94.00	0.96	-0.06	-0.96
	7053.00	90.95	2.83	N/A	1193.51	704.36	5915.55	1274.00	95.00	1.45	0.13	-1.44
	7148.00	90.95	1.49	N/A	1288.43	707.94	5913.98	1368.60	95.00	1.41	0.00	-1.41
	7242.00	90.89	0.29	N/A	1382.40	709.40	5912.47	1461.98	94.00	1.28	-0.06	-1.28
	7337.00	90.86	358.38	N/A	1477.38	708.29	5911.02	1556.03	95.00	2.01	-0.03	-2.01
	7432.00	90.83	357.10	N/A	1572.30	704.55	5909.62	1649.68	95.00	1.35	-0.03	-1.35
	7526.00	90.71	356.64	N/A	1666.15	699.42	5908.36	1742.10	94.00	0.51	-0.13	-0.49
	7621.00	90.68	355.19	N/A	1760.90	692.65	5907.20	1835.20	95.00	1.53	-0.03	-1.53
	7716.00	90.62	355.35	N/A	1855.57	684.82	5906.13	1928.08	95.00	0.18	-0.06	0.17
	7810.00	90.62	356.01	N/A	1949.29	677.74	5905.11	2020.13	94.00	0.70	0.00	0.70
	7905.00	90.68	357.08	N/A	2044.11	672.01	5904.03	2113.43	95.00	1.13	0.06	1.13
	7999.00	90.62	356.84	N/A	2137.97	667.03	5902.96	2205.88	94.00	0.26	-0.06	-0.26
	8094.00	90.52	357.73	N/A	2232.86	662.53	5902.02	2299.40	95.00	0.94	-0.11	0.94
	8189.00	90.55	359.54	N/A	2327.83	660.26	5901.13	2393.29	95.00	1.91	0.03	1.91
	8283.00	90.52	357.02	N/A	2421.77	657.44	5900.25	2486.10	94.00	2.68	-0.03	-2.68
	8378.00	90.52	355.18	N/A	2516.55	650.98	5899.39	2579.26	95.00	1.94	0.00	-1.94
	8472.00	90.65	356.00	N/A	2610.26	643.75	5898.43	2671.27	94.00	0.88	0.14	0.87
	8567.00	90.62	356.22	N/A	2705.04	637.31	5897.38	2764.44	95.00	0.23	-0.03	0.23
	8662.00	90.58	357.73	N/A	2799.90	632.30	5896.38	2857.87	95.00	1.59	-0.04	1.59
	8756.00	90.46	358.80	N/A	2893.85	629.45	5895.53	2950.68	94.00	1.15	-0.13	1.14
	8851.00	90.46	359.73	N/A	2988.84	628.23	5894.77	3044.73	95.00	0.98	0.00	0.98
	8946.00	90.40	359.86	N/A	3083.83	627.89	5894.06	3138.90	95.00	0.15	-0.06	0.14
	9041.00	90.46	0.52	N/A	3178.83	628.21	5893.34	3233.15	95.00	0.70	0.06	0.69
	9135.00	90.40	0.69	N/A	3272.82	629.20	5892.64	3326.49	94.00	0.19	-0.06	0.18
	9230.00	90.55	0.53	N/A	3367.81	630.21	5891.85	3420.83	95.00	0.23	0.16	-0.17
	9325.00	90.40	1.16	N/A	3462.80	631.61	5891.06	3515.21	95.00	0.68	-0.16	0.66
	9419.00	90.40	0.53	N/A	3556.79	633.00	5890.41	3608.60	94.00	0.67	0.00	-0.67
	9514.00	90.46	0.77	N/A	3651.78	634.08	5889.69	3702.94	95.00	0.26	0.06	0.25
	9609.00	90.40	1.00	N/A	3746.76	635.54	5888.98	3797.33	95.00	0.25	-0.06	0.24
	9703.00	90.43	1.77	N/A	3840.73	637.82	5888.30	3890.82	94.00	0.82	0.03	0.82
	9798.00	90.37	2.08	N/A	3935.68	641.01	5887.64	3985.39	95.00	0.33	-0.06	0.33
	9893.00	90.40	2.83	N/A	4030.59	645.08	5887.00	4080.03	95.00	0.79	0.03	0.79
	9987.00	90.40	3.21	N/A	4124.45	650.03	5886.34	4173.76	94.00	0.40	0.00	0.40
	10082.00	90.43	2.86	N/A	4219.32	655.06	5885.65	4268.49	95.00	0.37	0.03	-0.37
	10177.00	90.46	2.29	N/A	4314.22	659.33	5884.91	4363.15	95.00	0.60	0.03	-0.60
	10271.00	90.37	0.91	N/A	4408.18	661.95	5884.23	4456.67	94.00	1.47	-0.10	-1.47
	10366.00	90.46	0.44	N/A	4503.17	663.07	5883.55	4551.02	95.00	0.50	0.09	-0.49
	10460.00	90.46	357.88	N/A	4597.15	661.69	5882.79	4644.05	94.00	2.72	0.00	-2.72
	10555.00	90.46	355.84	N/A	4692.00	656.49	5882.03	4737.44	95.00	2.15	0.00	-2.15
	10641.00	90.49	351.38	N/A	4777.44	646.92	5881.31	4820.95	86.00	5.19	0.03	-5.19
Projection	10665.00	90.49	351.38	N/A	4801.16	643.32	5881.11	4844.02	24.00	0.00	0.00	0.00