

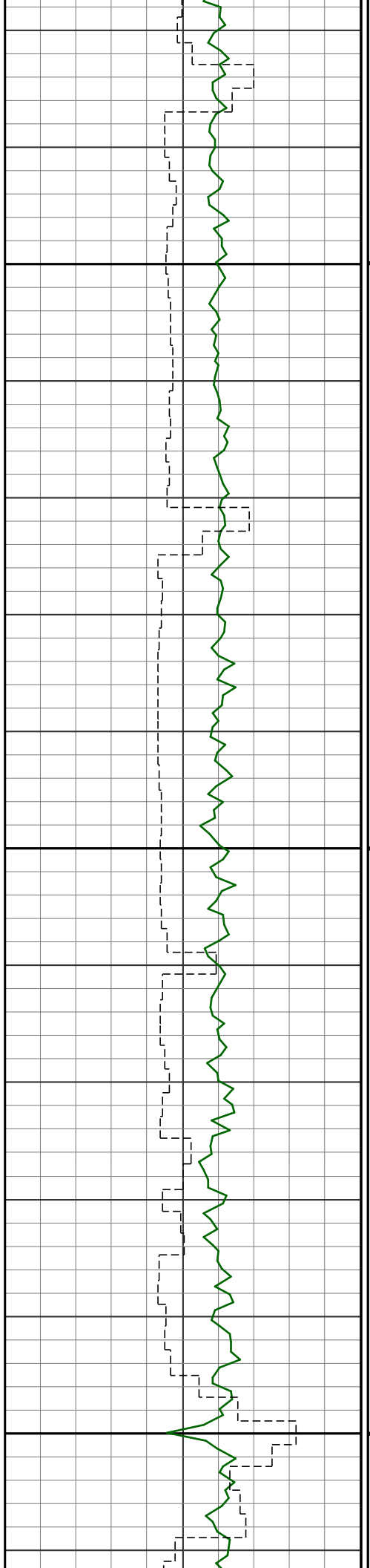
PATHFINDER A Schlumberger Company												RESISTIVITY	
												1 : 240	
												METERS MD	
COMPANY : CONOCOPHILLIPS CANADA RESOURCES CORP.													
WELL : COPRC MIRROR LAKE P-20													
FIELD : MIRROR LAKE													
TERRITORY : NWT													
COUNTRY : CANADA													
UWI : 300P206500126450													
WELL IDENTIFIER : 2081													
LATITUDE : 64°59'57.98372" N										OTHER SERVICES			
LONGITUDE : 126°47'8.73410" W													
WELL LOCATION : NORTHING:7210027.780m EASTING:604406.010m										DIRECTIONAL GAMMA RAY ROP			
DEPTH REFERENCE : ROTARY TABLE													
REFERENCE ELEVATION : 5.20 m													
GROUND ELEVATION : 284.15 m													
BOREHOLE RECORD						DEVIATION RECORD							
HOLE SIZE	mm	FROM	m	TO	m	INCLINATION	deg	FROM	m	TO	m		
311.0		0		602		00 - 02		0		1739			
222.0		602		2152		02 - 31		1739		1921			
156.0		2152		3142		31 - 61		1921		2025			
						61 - 90		2025		2323			
						90 +/-2		2323		3142			
CASING RECORD													
CASING SIZE	mm	FROM	m	TO	m								
244.5		0		602									
177.8		0		2152									
DRILLING Co.: BEAVER DRILLING LTD													
RIG : 2													
LWD UNIT No.: KIT #7 DISTRICT : CALGARY													
SPUD DATE : 29-JAN-14													
LWD START DATE : 07-FEB-14 DEPTH : 603 m													
LWD END DATE : 19-FEB-14 DEPTH : 3142 m													
TOTAL DEPTH : 3142 m													

RUN DATA											
RUN NUMBER		RUN #1		RUN #2		RUN #3					
START DATE		07-FEB-14		11-FEB-14		16-FEB-12					
START TIME		03:45		04:30		05:30					
END DATE		10-FEB-14		14-FEB-14		19-FEB-12					
END TIME		23:00		00:30		00:30					
DEPTH IN m		603		1921		2152					
DEPTH OUT m		1599		2152		3142					
LOG TOP m		603		1901		2132					
LOG BOTTOM m		1579		2132		3118					
HOLE SIZE mm		222.0		222.0		156.0					
MUD DATA @ m		1800		2010		3070					
MUD TYPE		OIL BASED		OIL BASED		OIL BASED					
DENSITY kg/m3		1020.0		1010.0		1140.0					
VISCOSITY s/L		68		78		68					
pH						3.5					
FLUID LOSS cm3/30											
SALINITY ppm		36000		41000		36000					
Rm ohmm @ deg C		@		@		@					
Rmf ohmm @ deg C		@		@		@					

MAX REC TEMP deg C			60			
Rm @ MAX TEMP ohmm						
LWD ENGINEER #1	G. GRIGORE	G. GRIGORE	C. KONKIN			
LWD ENGINEER #2						
LWD ENGINEER #3						

REMARKS
CONOCOPHILLIPS CANADA RESOURCES CORP.
WELL NAME: COPRC MIRROR LAKE P-20
UWI: 300P206500126450 WELL IDENTIFIER: 2081
PATHFINDER JOB #: 13CGT0297
ALL LOGGING DATA IS MEMORY ONLY UNLESS STATED OTHERWISE.
ALL REFERENCES TO LOG TOP, LOG BOTTOM OR LOGGING TOOL DEPTH REFER TO THE GAMMA RAY SENSOR UNLESS STATED OTHERWISE. SENSOR OFFSETS FOR THE OTHER LOGGING TOOLS ARE SHOWN IN THE BHA REPORT ON THE LOG TRAILER.
ALL ANNOTATIONS IN THE DEPTH TRACK ARE REFERENCED TO BIT DEPTH.
GAMMA RAY HAS BEEN AVERAGED AT A HIGHER INTERVAL OF 0.3500m TO SMOOTH OUT THE CURVE.
THE ACCOMPANYING LAS FILE HAS A STEP INTERVAL OF 0.1524m AND WILL NOT SHOW THIS SAME EFFECT.
DEPTH IS CORRECTED TO PIPE TALLY.
RUN #1: 6 3/4" XPULSE GAMMA LOGGING RUN.
RUN #2: 6 3/4" XPULSE GAMMA LOGGING RUN.
RUN #3: 4 3/4" SAWR LOGGING RUN.
RESISTIVITIES ARE CLAMPED (200 OHMM ATTENUATION 3000 OHMM PHASE) WHERE FORMATION RESISTIVITY IS BEYOND SENSOR LIMITATIONS.
REMARK #1: GAMMA RAY LOGGED THROUGH CASING FROM 2128m-2152m MD (2013m-2014m TVD).
THE TRACK ON THE RIGHT HAND SIDE OF THE LOG IS THE SLIDE INDICATOR.
NOTICE - All interpretations are opinions based on inferences from electrical or other measurements and we do not guarantee the accuracy or correctness of any interpretations. We shall not, except in the case of gross or willful negligence on our part, be liable or responsible for loss, costs, damages or expenses incurred or sustained by anyone as a result of any interpretations made by one of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions as set out in our current Price Schedule.
PATHFINDER - A Schlumberger Company
Version No : RX5 V6.04C Release 24Oct2012
Plot Time : 21-Aug-2014 20:55

0	GRCA API	150	DEPTH	0.2	RSPH ohmm	2000	0.2	RSAH ohmm	2000
	avg = 35 cm		MD m		avg = 15 cm			avg = 15 cm	
100	ROP m/hr	0	1m = 240m	0.2	RMPH ohmm	2000	0.2	RMAH ohmm	2000
	avg = 1 m		COMMENTS		avg = 15 cm			avg = 15 cm	
			SHOES	0.2	RDPH ohmm	2000	0.2	RDAH ohmm	2000
					avg = 15 cm			avg = 15 cm	
				0.2	RSPL ohmm	2000	0.2	RSAL ohmm	2000
					avg = 15 cm			avg = 15 cm	
				0.2	RMPL ohmm	2000	0.2	RMAL ohmm	2000
					avg = 15 cm			avg = 15 cm	



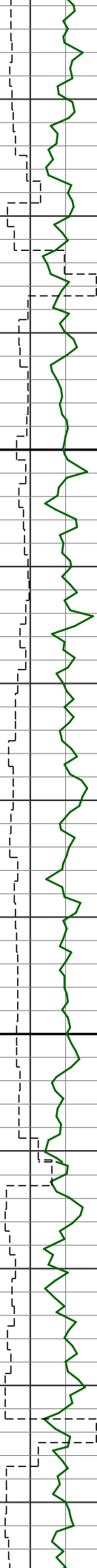
675

0.9 318.0
16 683.5

700

0.9 317.9
17 721.5

725

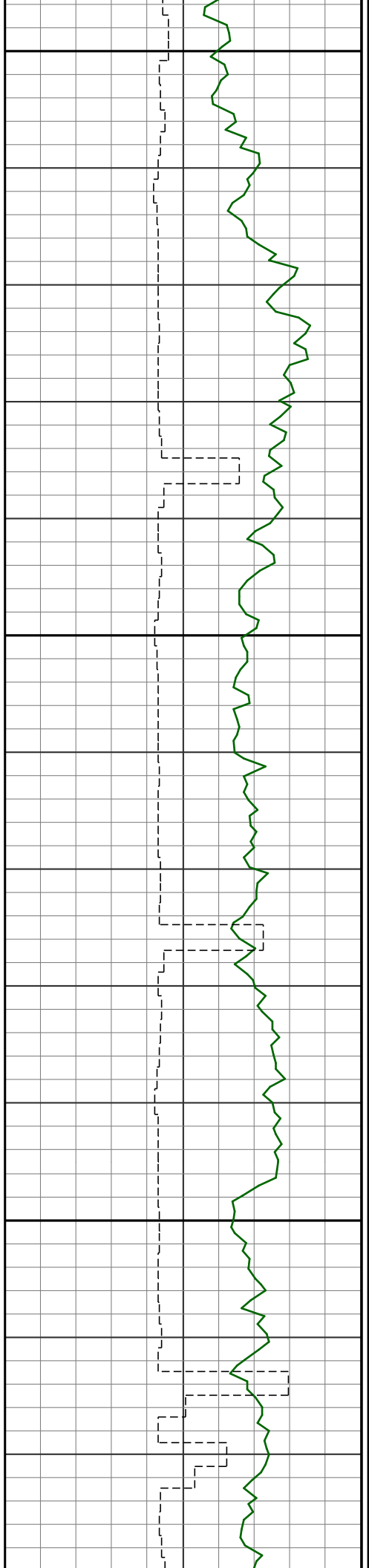


750

15 0.9 254.4
18 759.6

775

16 0.7 282.4



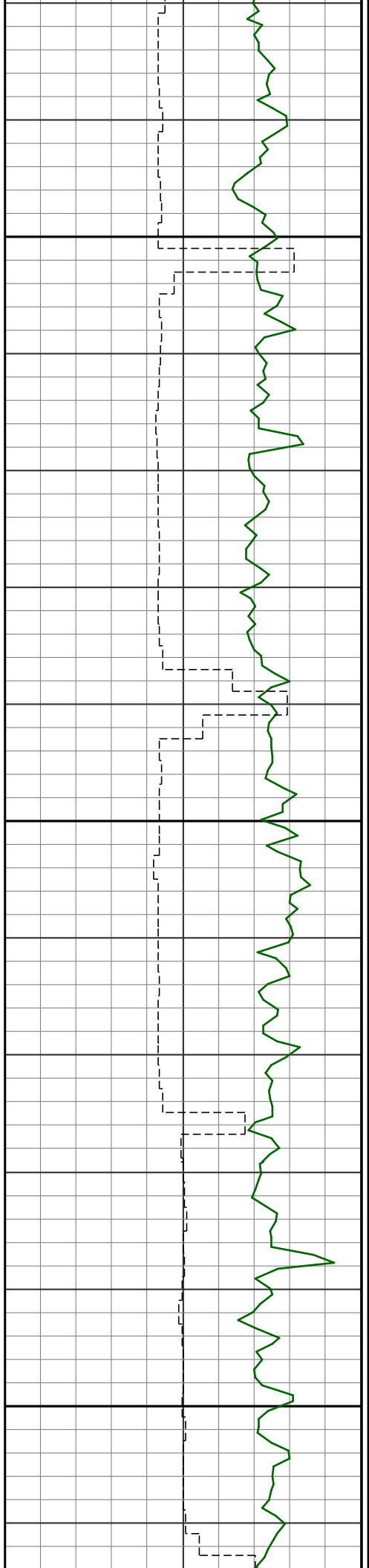
800

825

850

19 797.7

0.4 326.9
20 835.7



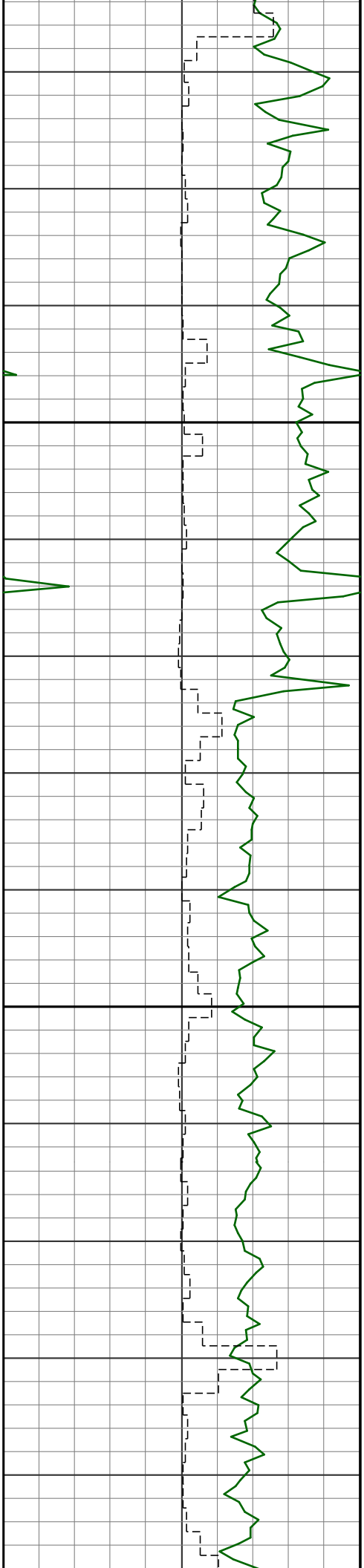
875

900

925

0.4 355.6
21 873.8

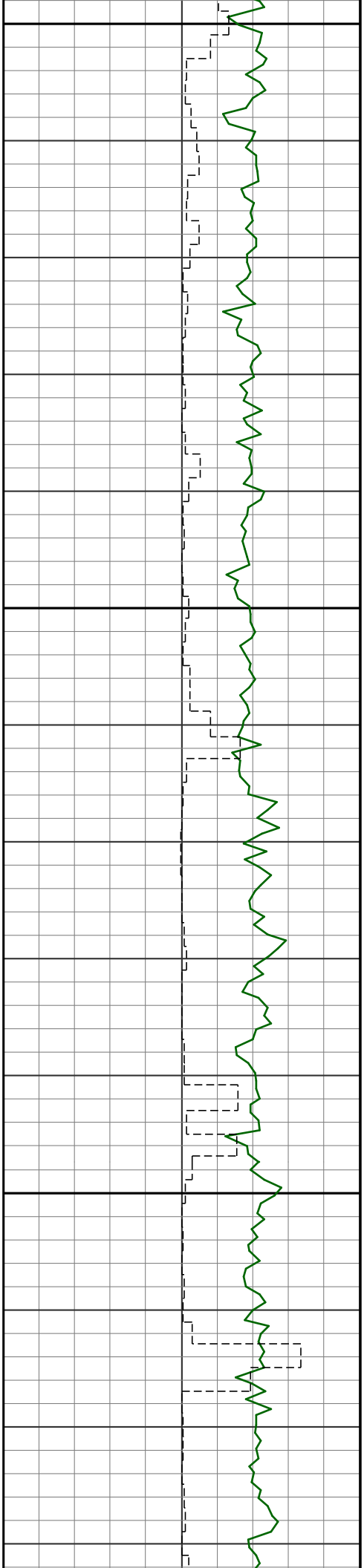
0.8 20.4
22 911.9



950

975

4s 0.7 19.5
23 987.9

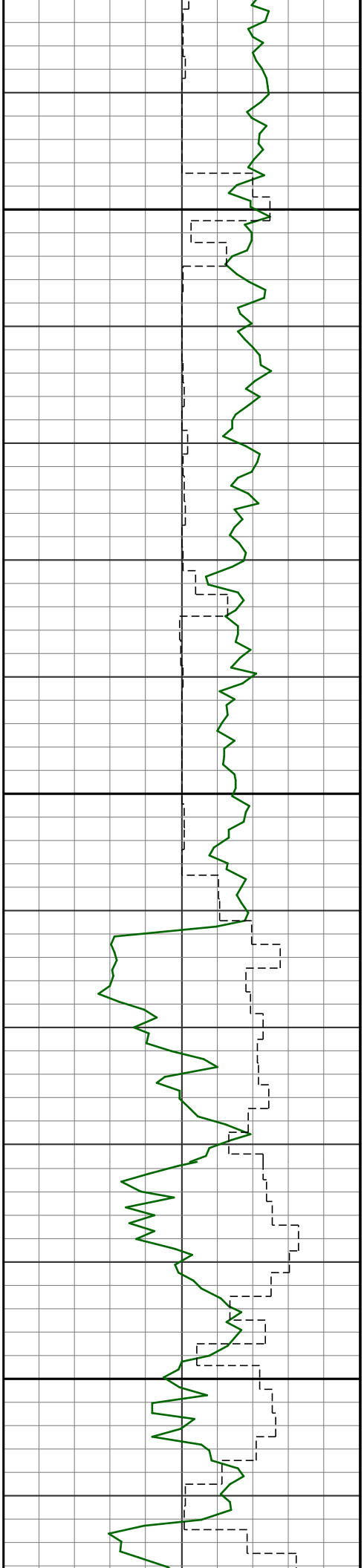


1000

1025

1050

1.5 14.8
24 1044.9



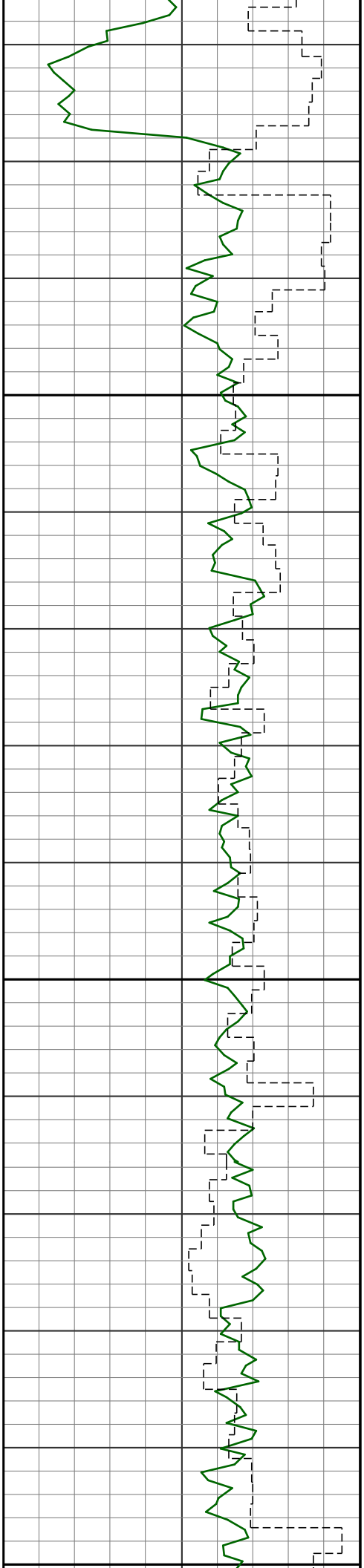
1075

1100

1125

1.3 27.5
s 25 1082.9

1.6 29.0
s 26 1120.8



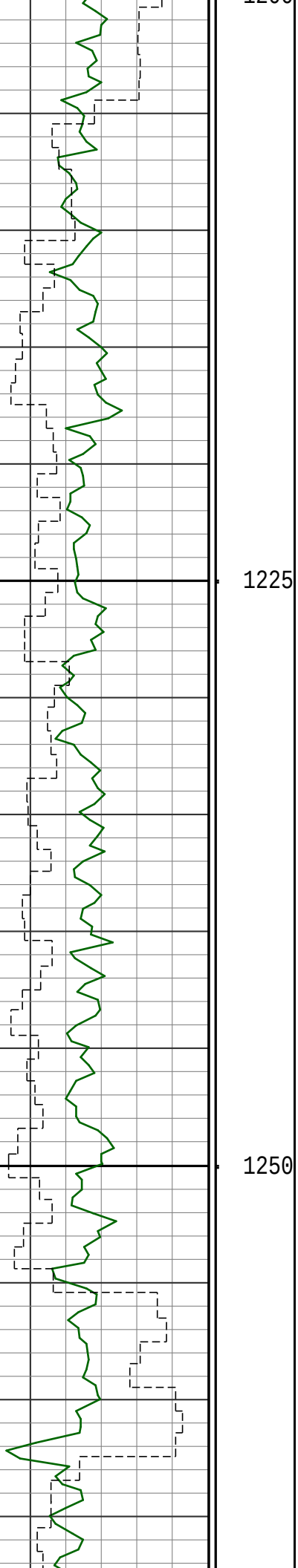
1150

1175

1200

1.1 38.2
27 1158.8

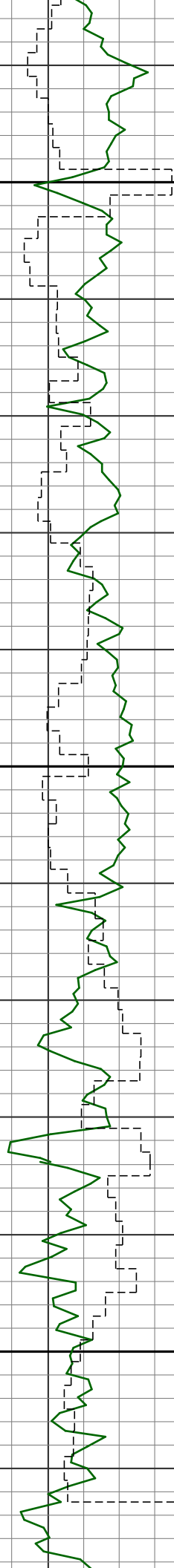
0.9 31.8
28 1196.8



1225

1250

0.7 28.1
29 1234.8



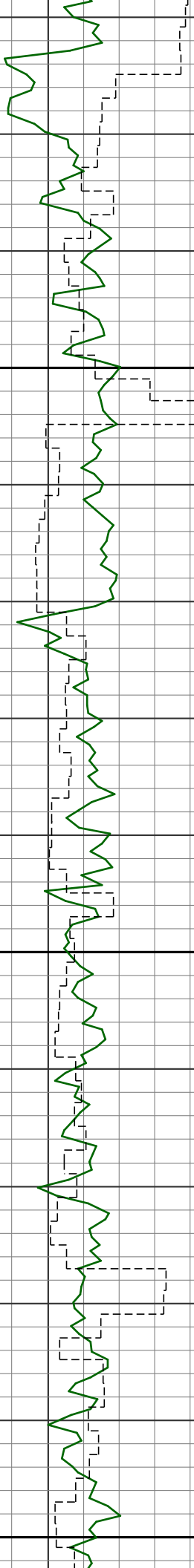
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1300

1325

1.1 150.4
30 1272.8

1.0 101.4
31 1310.8



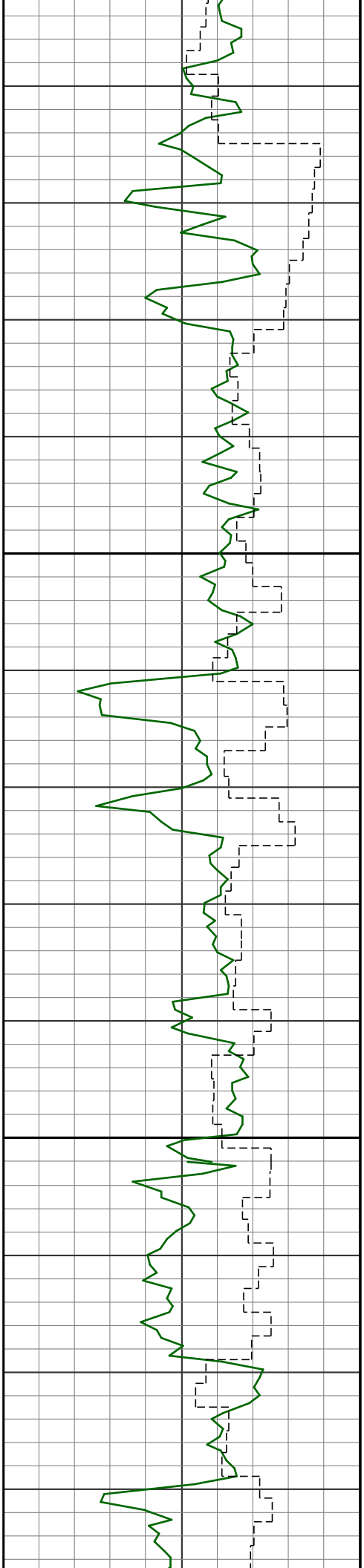
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1375

1400

1.2 349.9
32 1349.3

1.4 15.4
33 1387.3

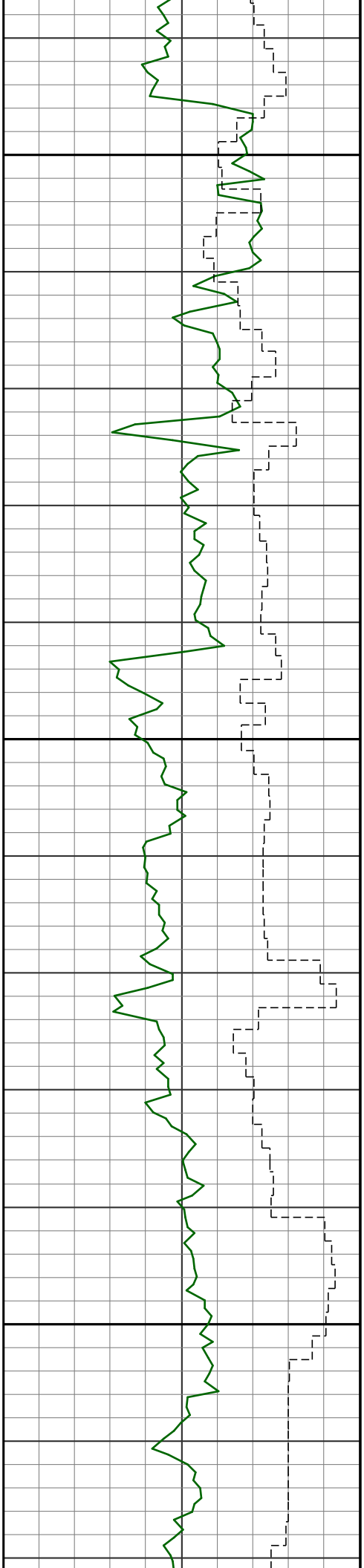


1425

0.4 0.1
34 1425.3

1450

0.6 1.7
35 1463.3

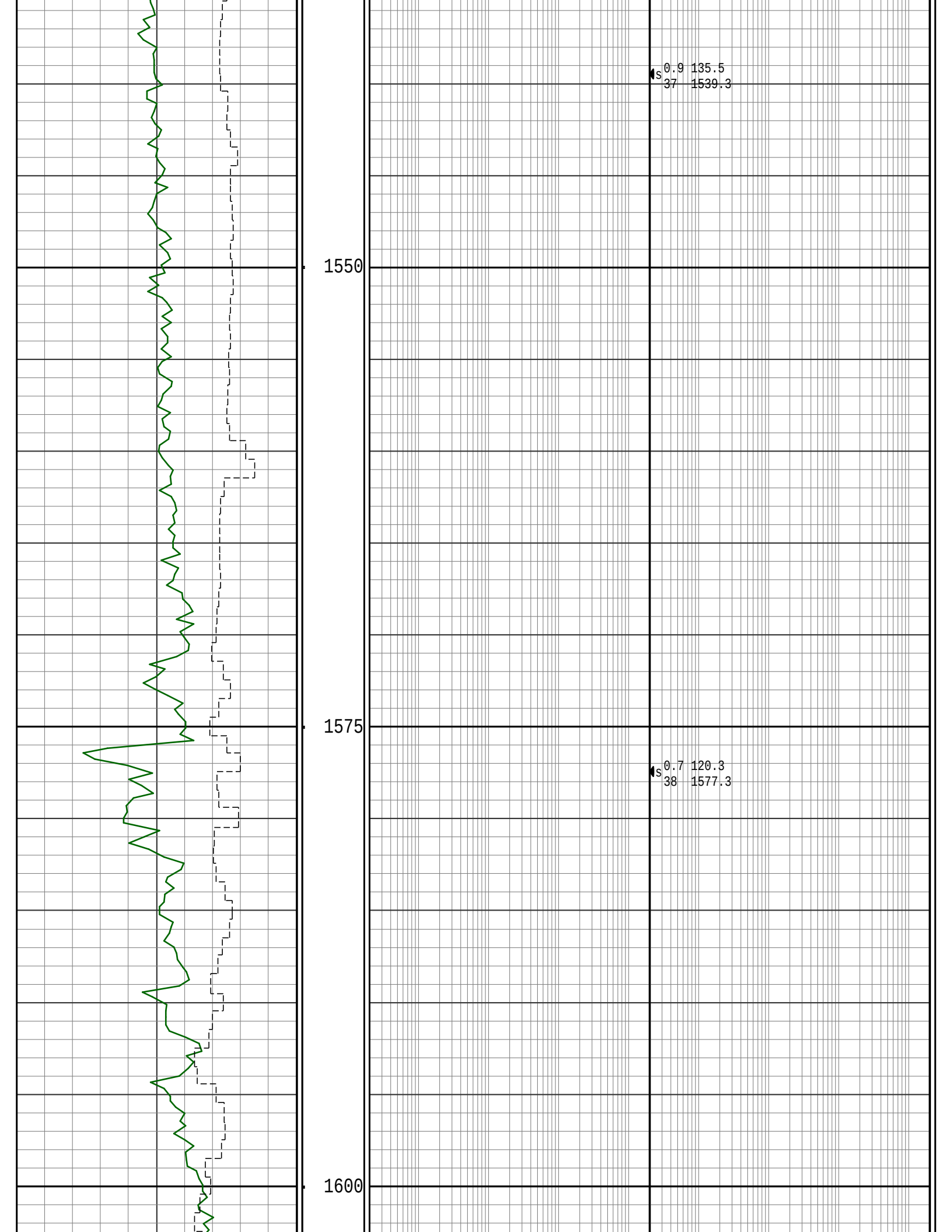


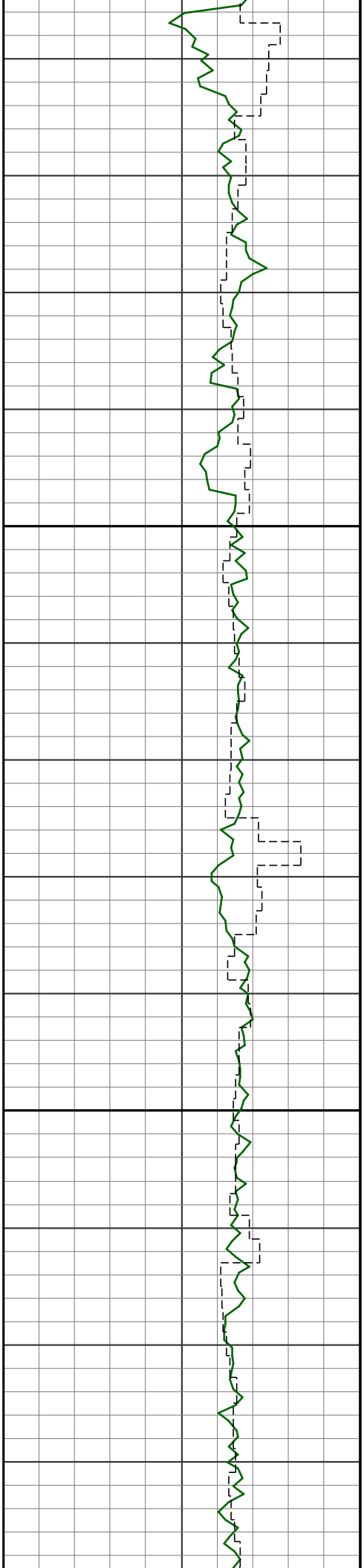
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1500

1525

0.9 5.7
36 1501.3



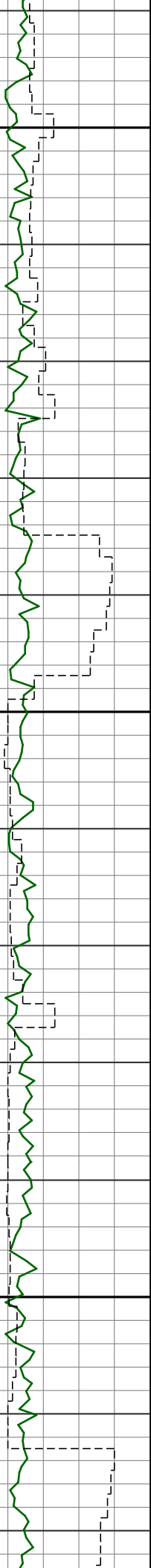


1625

1650

0.5 75.0
39 1615.3

1.0 54.8
40 1653.8



1675

1700

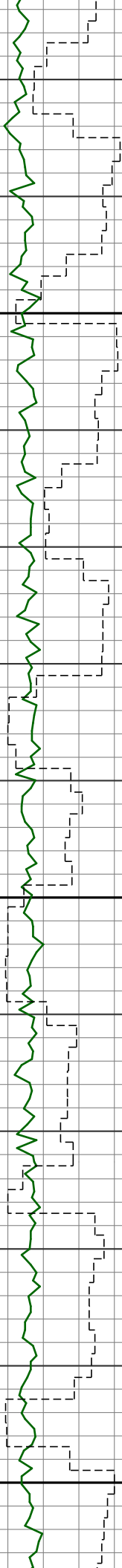
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41 1691.7

1.8 359.8
42 1710.7

1.9 10.6
43 1719.7

1.6 353.8
44 1729.7



1750

1775

1800

s 2.3 320.9
45 1738.7

s 3.7 313.1
46 1748.7

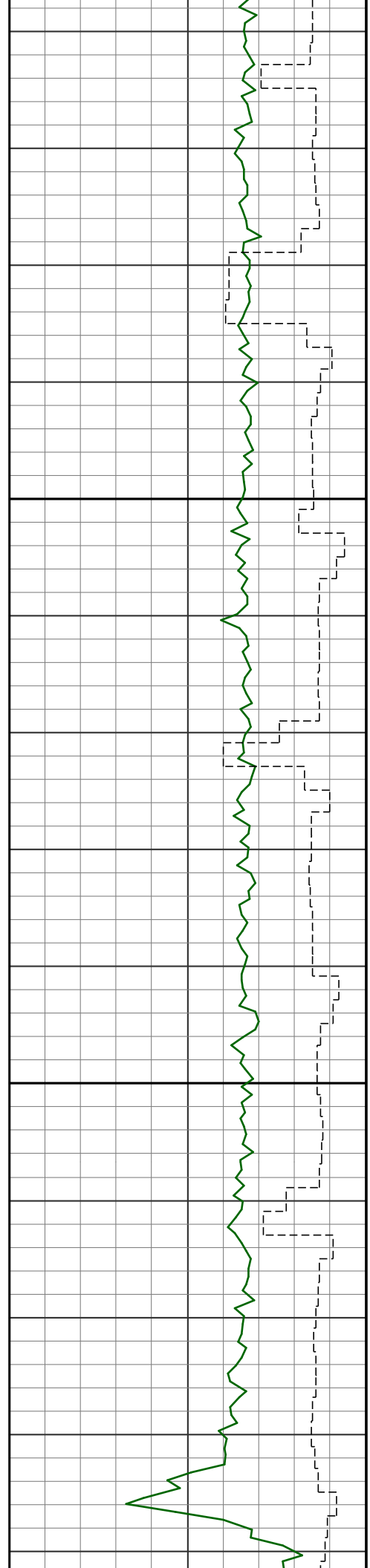
s 5.1 309.2
47 1757.7

s 6.1 306.6
48 1767.1

s 7.0 301.5
49 1776.6

s 8.5 304.9
50 1785.5

s 9.9 302.3
51 1795.9



1825

1850

s 10.8 296.8
52 1804.7

s 11.6 293.2
53 1814.0

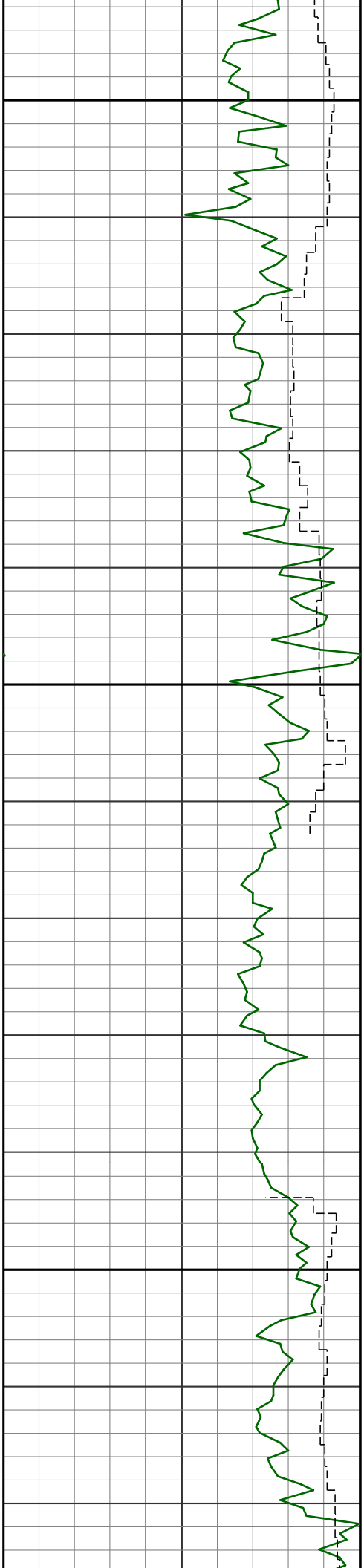
s 12.9 289.7
54 1823.3

s 14.6 285.2
55 1832.5

s 16.2 285.7
56 1841.7

s 18.1 286.9
57 1850.8

s 20.0 286.2
58 1859.8



1875

1900

1925

S 21.6 284.5
59 1869.6

S 23.7 283.0
60 1877.4

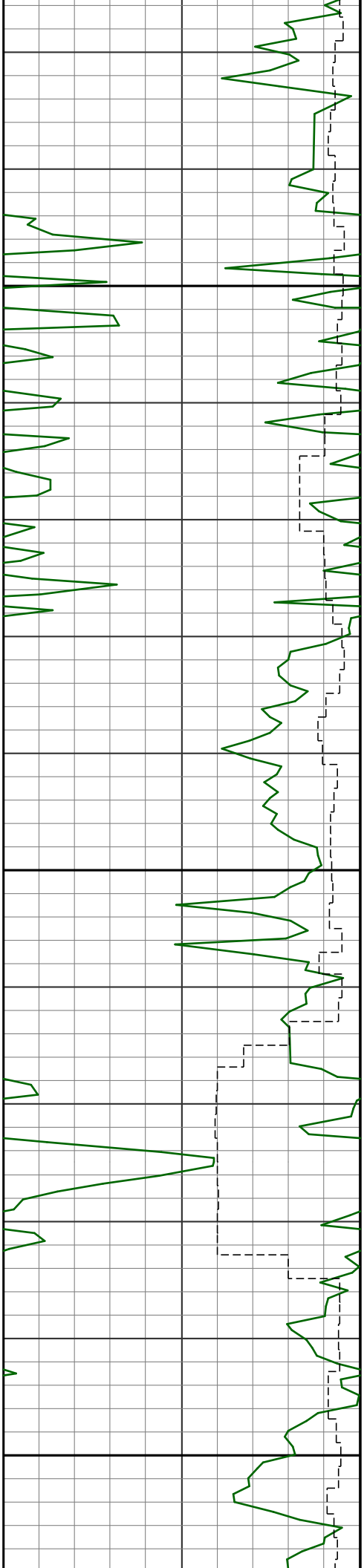
S 25.5 284.7
61 1886.5

S 27.0 282.3
62 1895.0

S 28.8 283.4
63 1903.4

S 30.9 281.1
64 1912.1

S 34.6 284.4
65 1919.7



1950

1975

2000

S 37.7 282.9
66 1927.3

S 40.3 282.3
67 1934.7

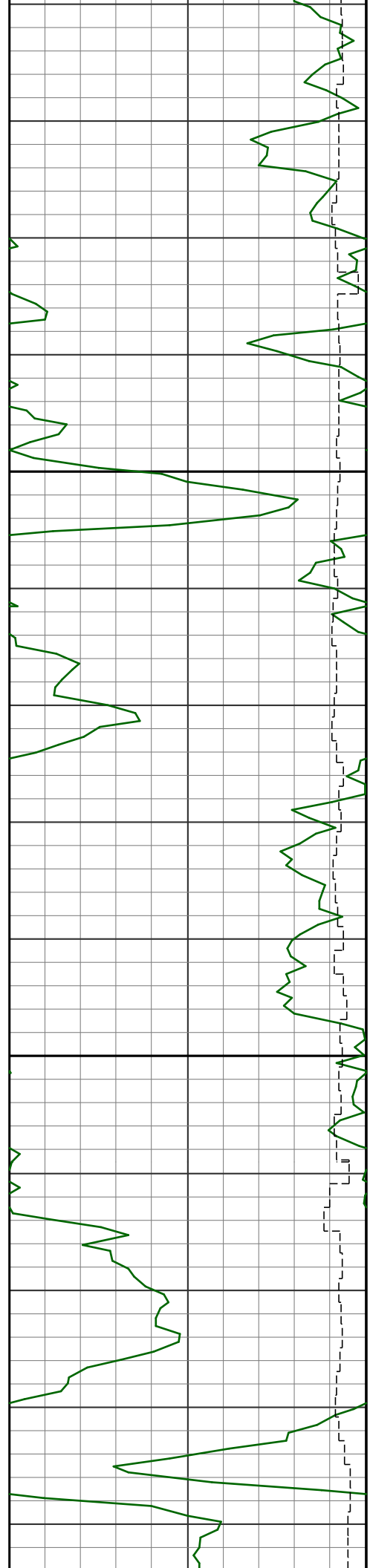
S 42.5 282.3
68 1941.8

S 44.3 279.9
69 1948.8

S 46.3 280.5
70 1955.4

S 48.4 280.0
71 1961.9

S 50.7 277.7
72 1968.0



2025

2050

s 53.8 279.7
73 1974.5

s 57.3 277.6
74 1979.3

s 60.6 278.5
75 1984.2

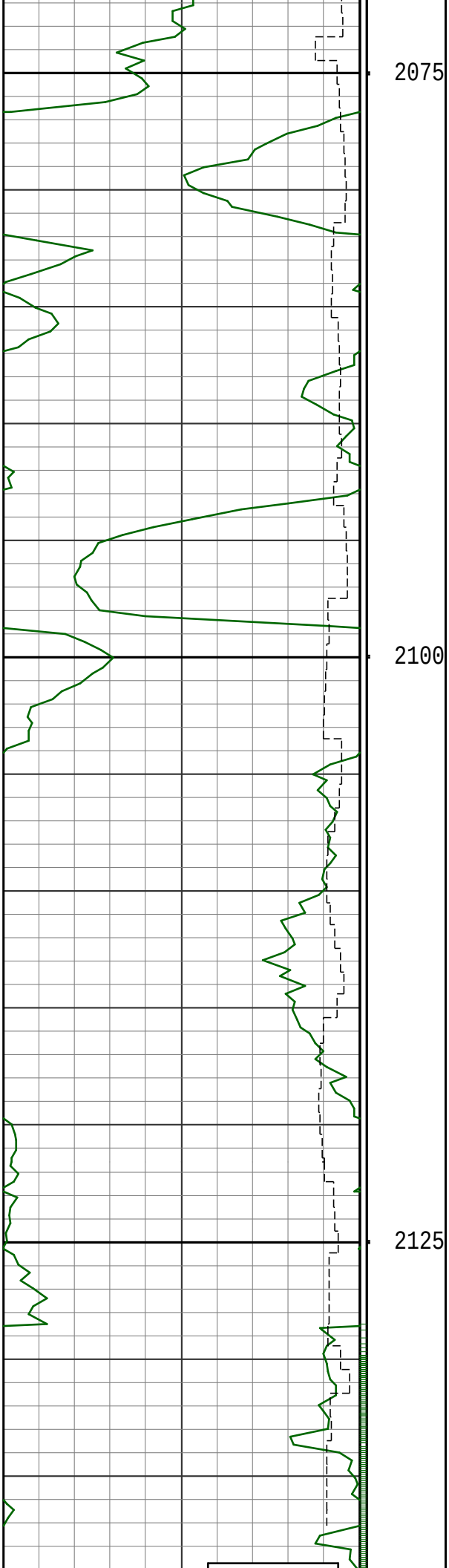
s 64.2 278.5
76 1988.6

s 66.0 277.5
77 1992.6

s 67.7 277.0
78 1996.3

s 70.2 276.7
79 1999.7

s 72.8 276.9



80	2002.7
75.3 81	278.4 2005.3
77.9 82	276.7 2007.5
79.7 83	278.0 2009.4
81.8 84	277.5 2010.9
84.2 85	277.4 2012.1
85.9 86	277.9 2013.1

SEE REMARK #1

R
N
U

1

2150

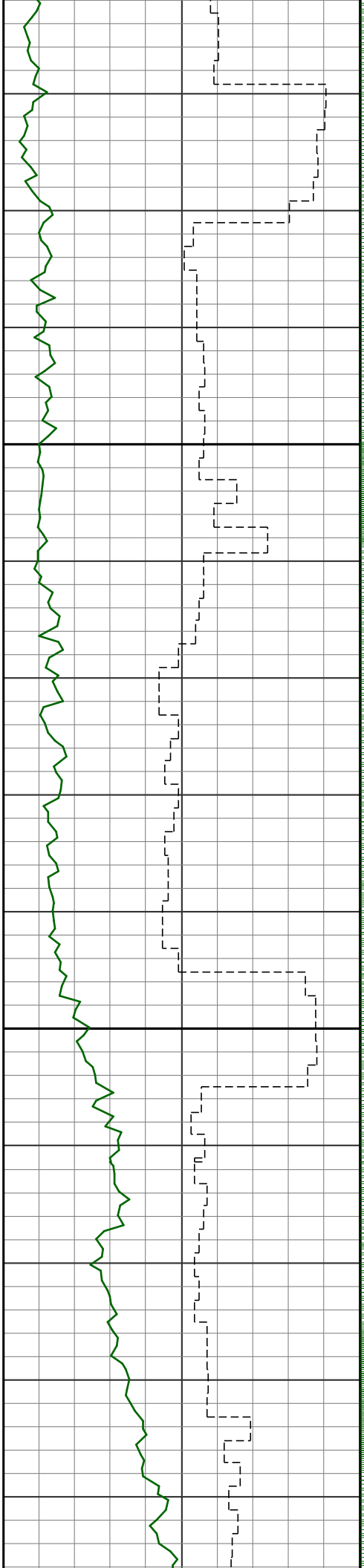
S 87.9 276.7
87 2014.2

2175

S 88.0 279.9
88 2014.9

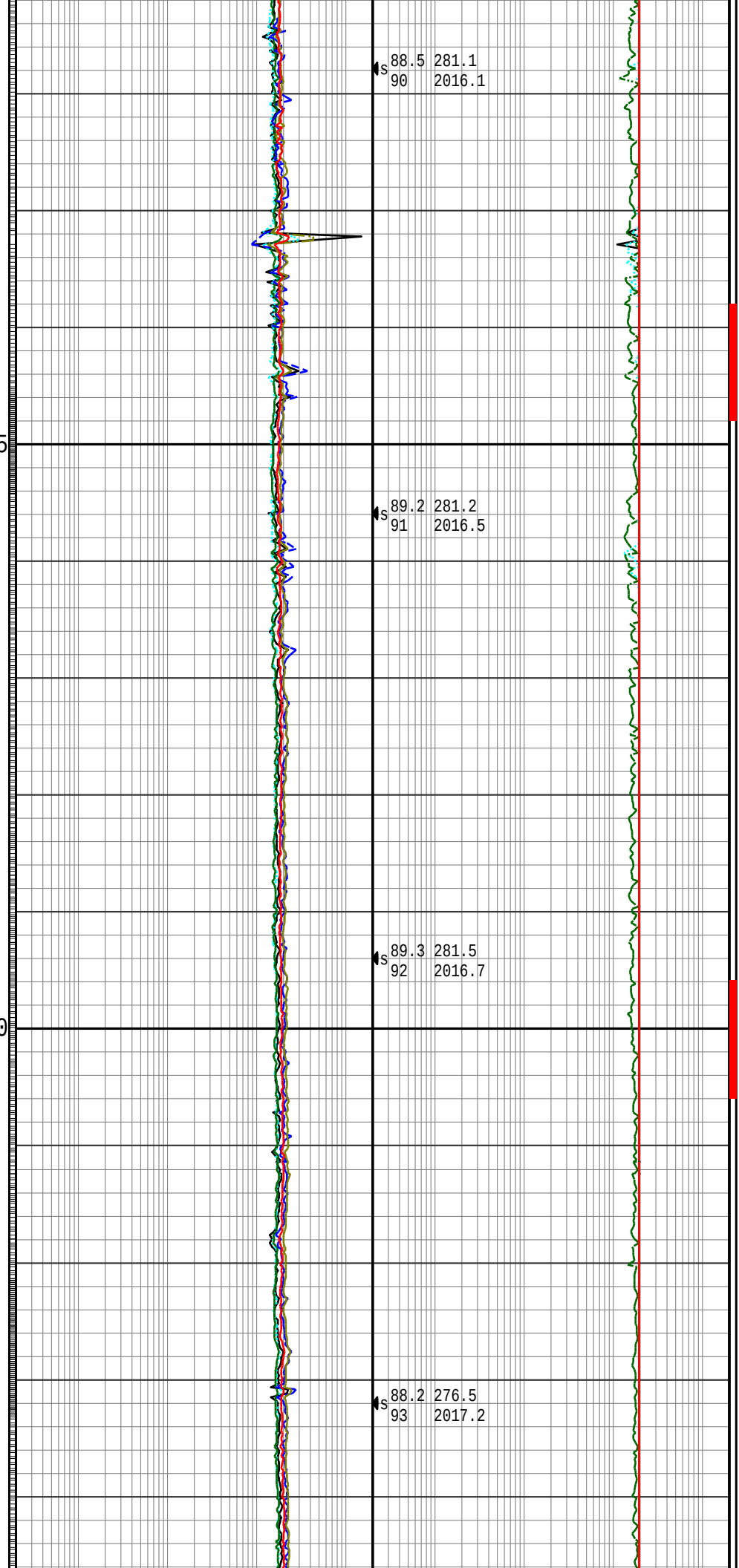
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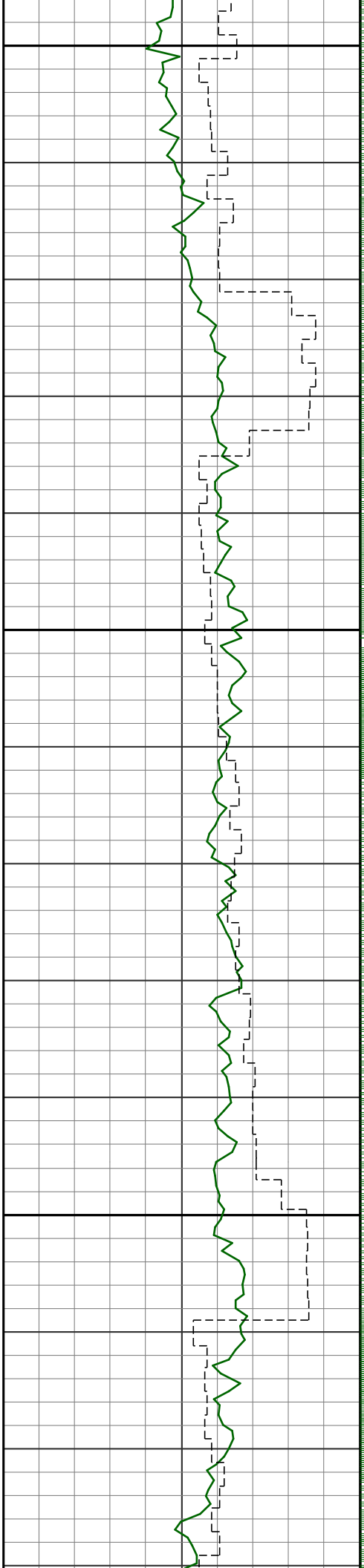
S 88.0 280.5
89 2015.5



2225

2250

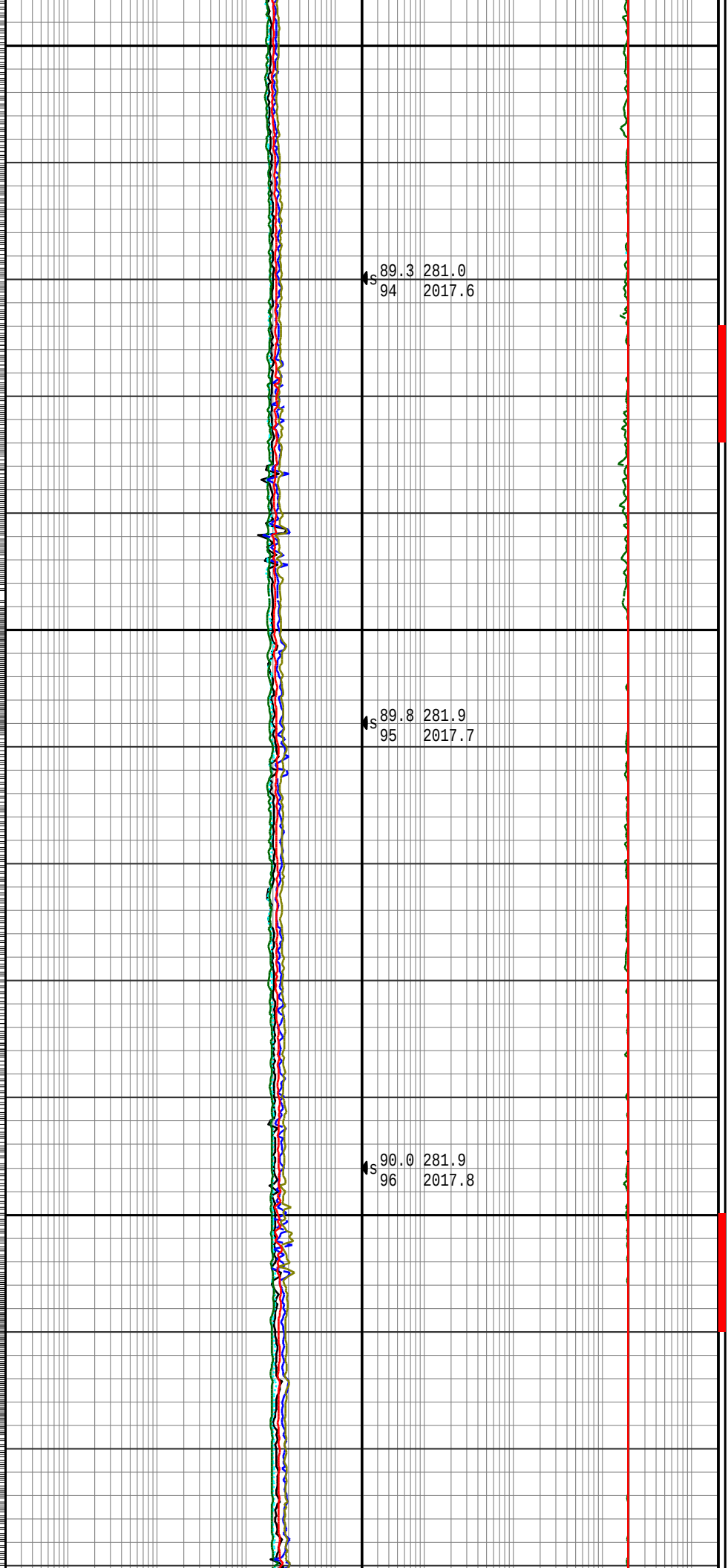


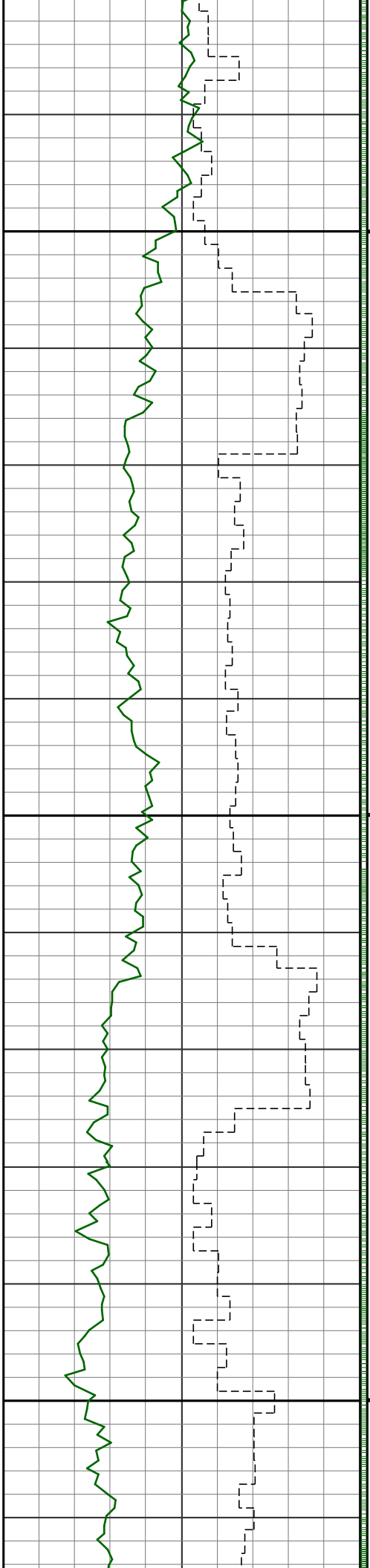


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2300

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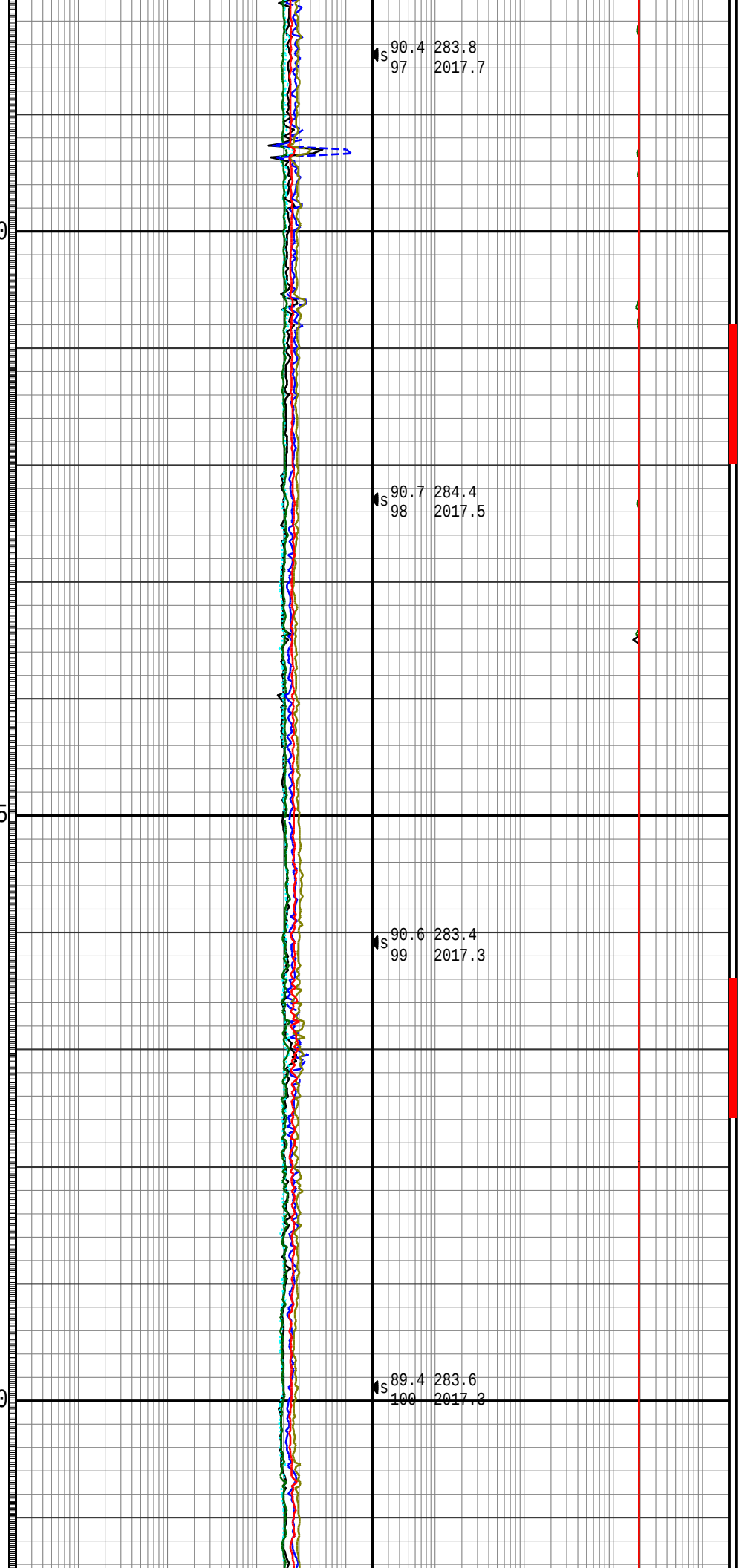


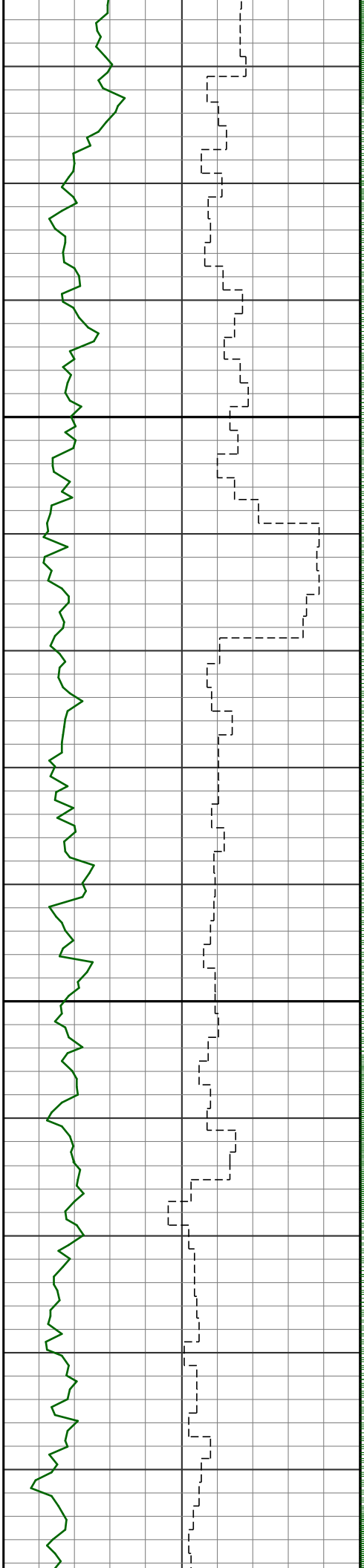


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2375

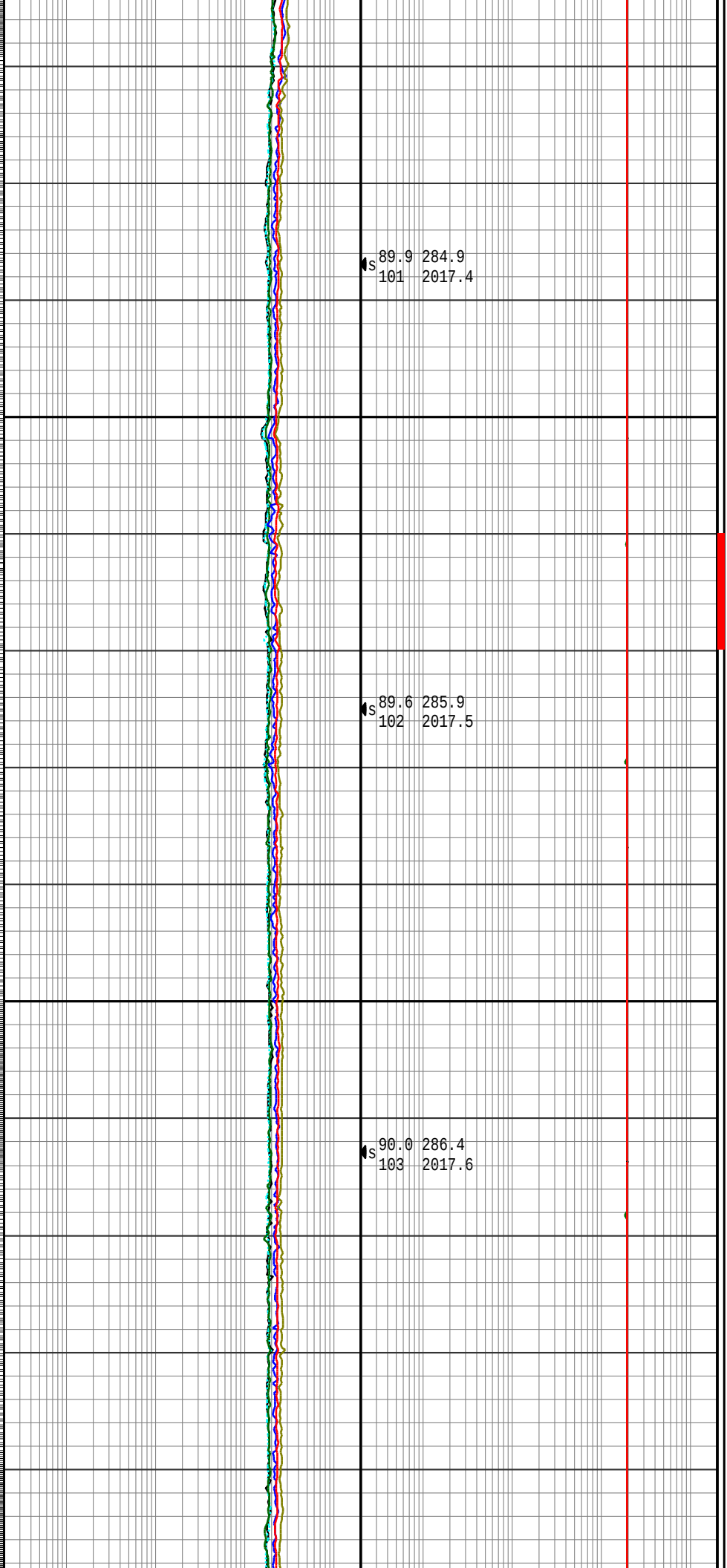
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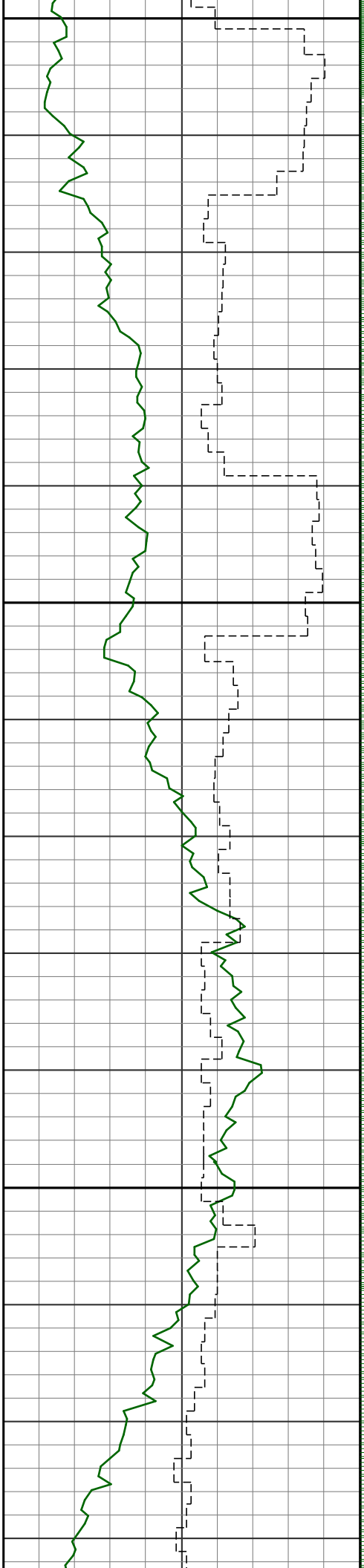




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2450

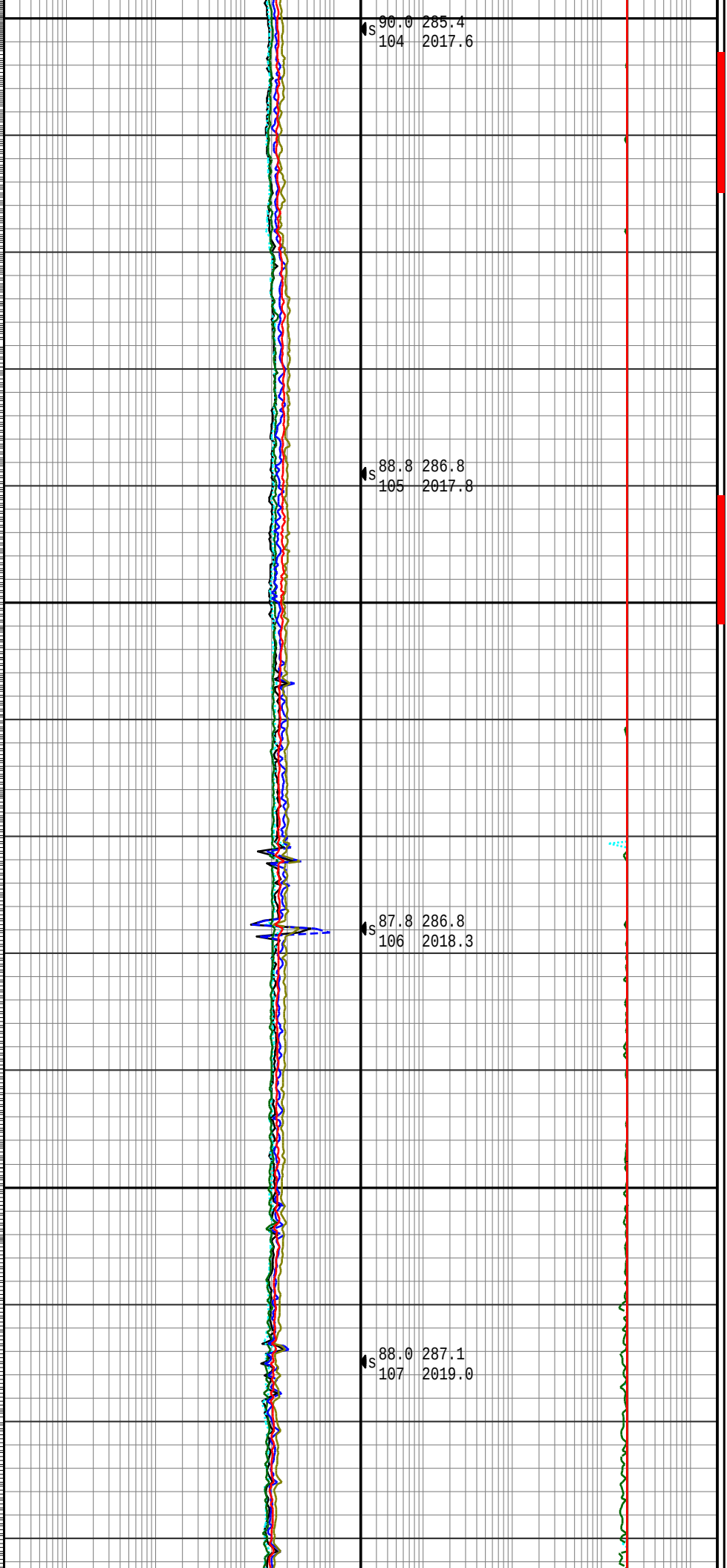


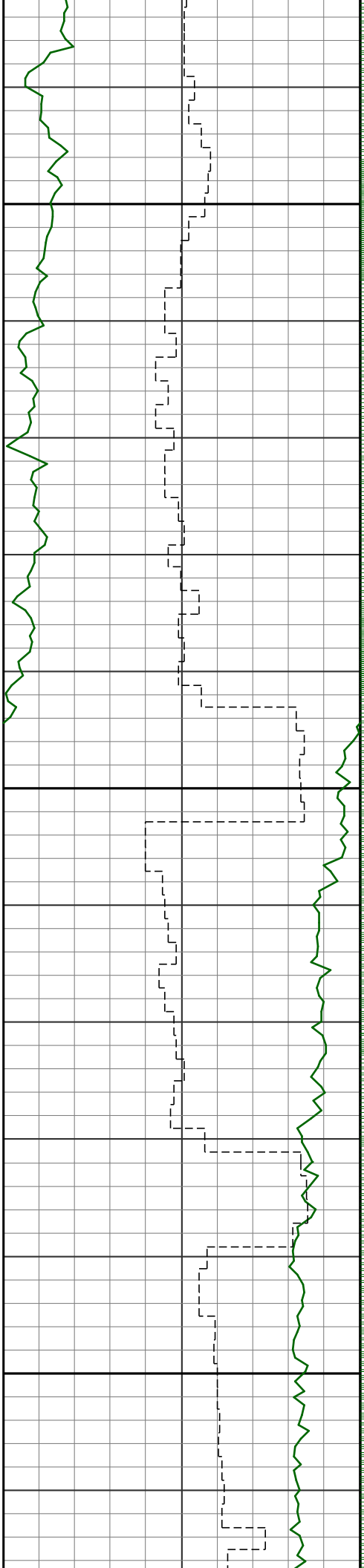


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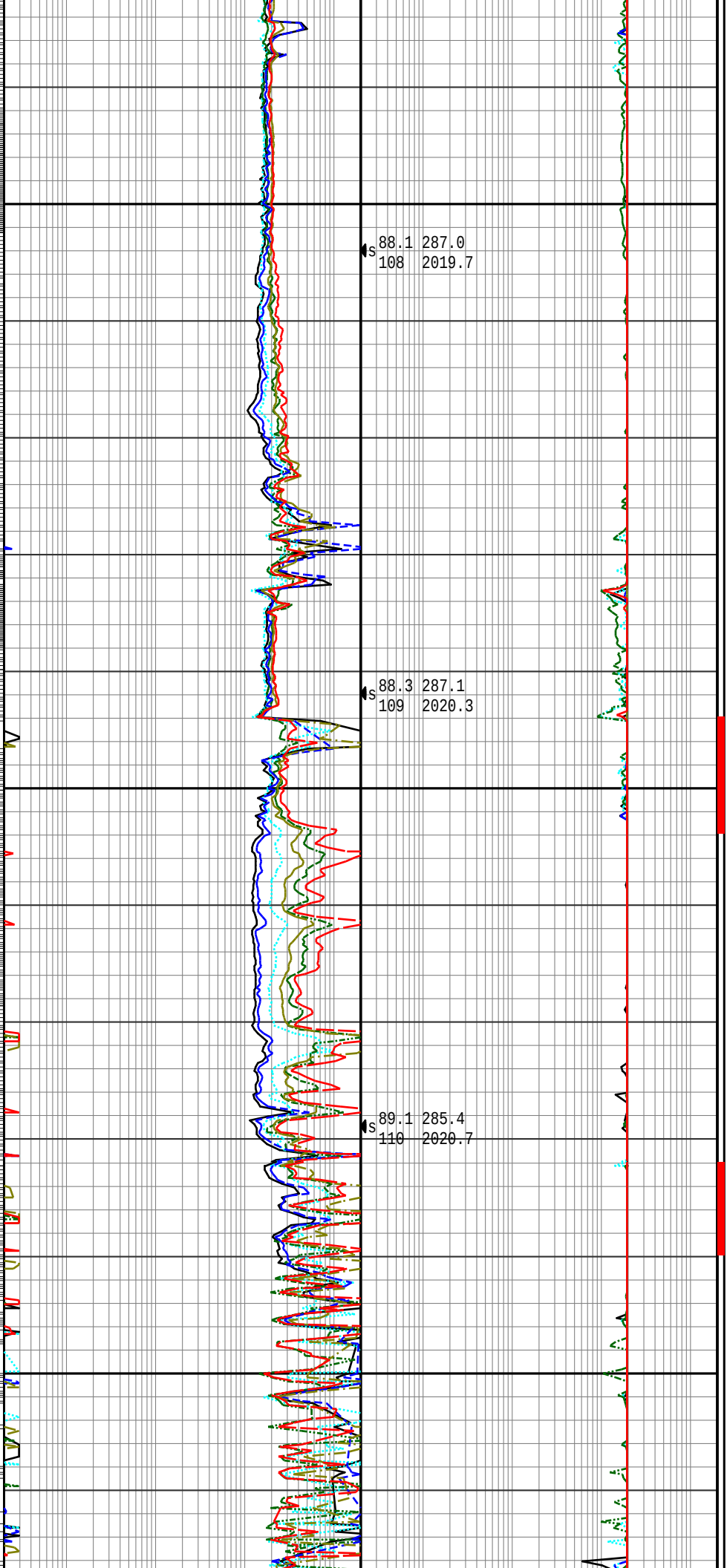


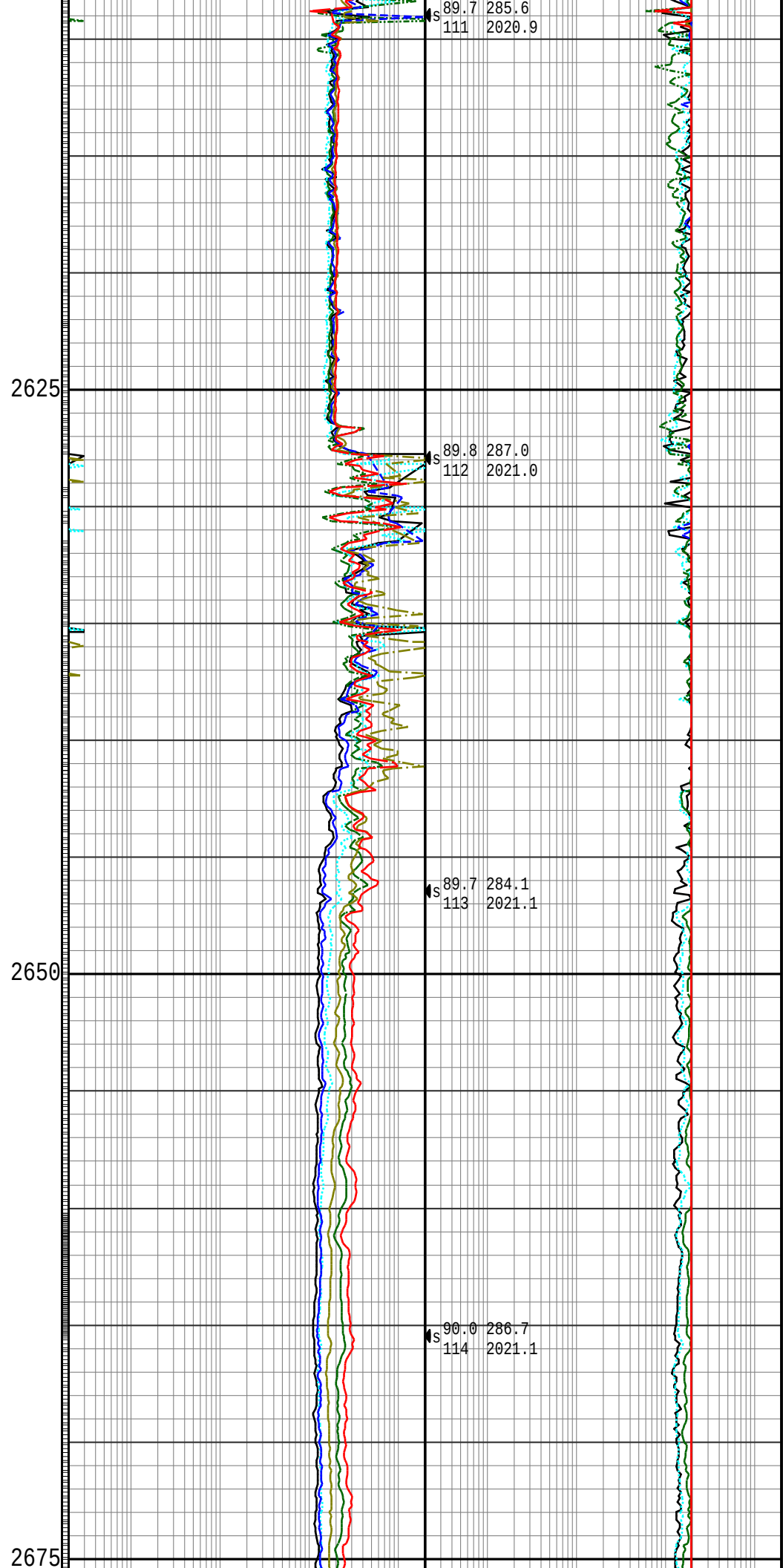
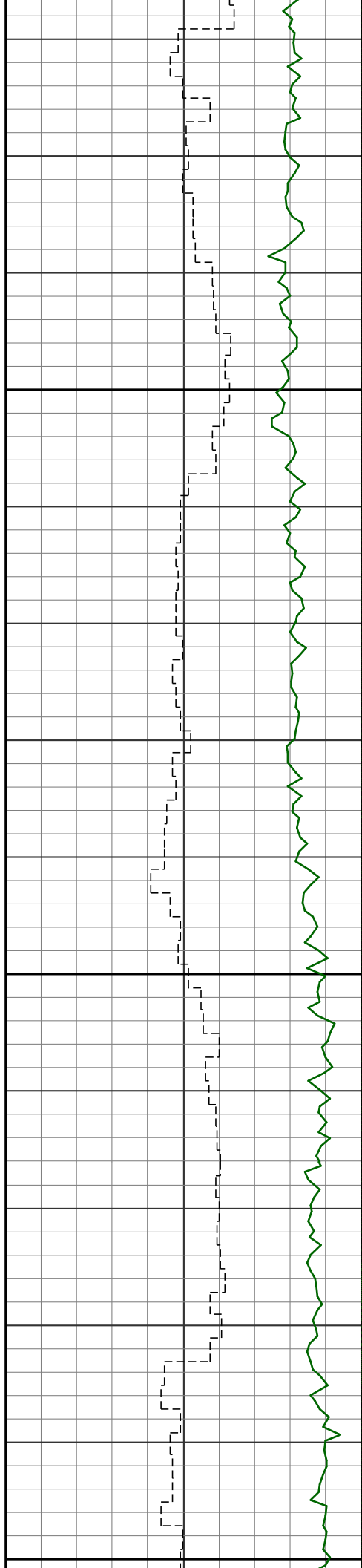


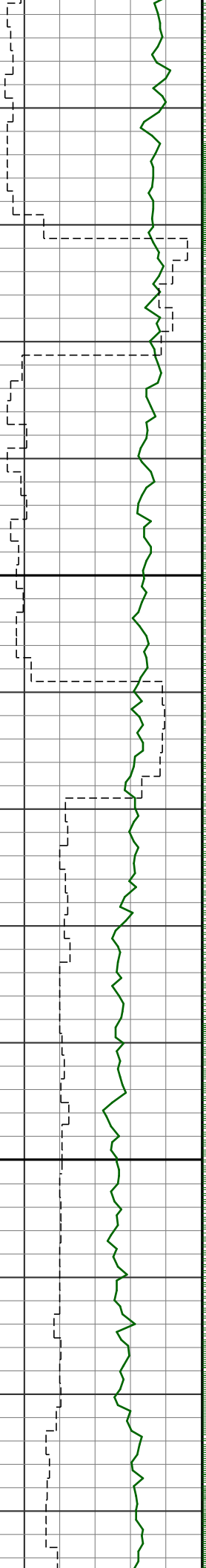
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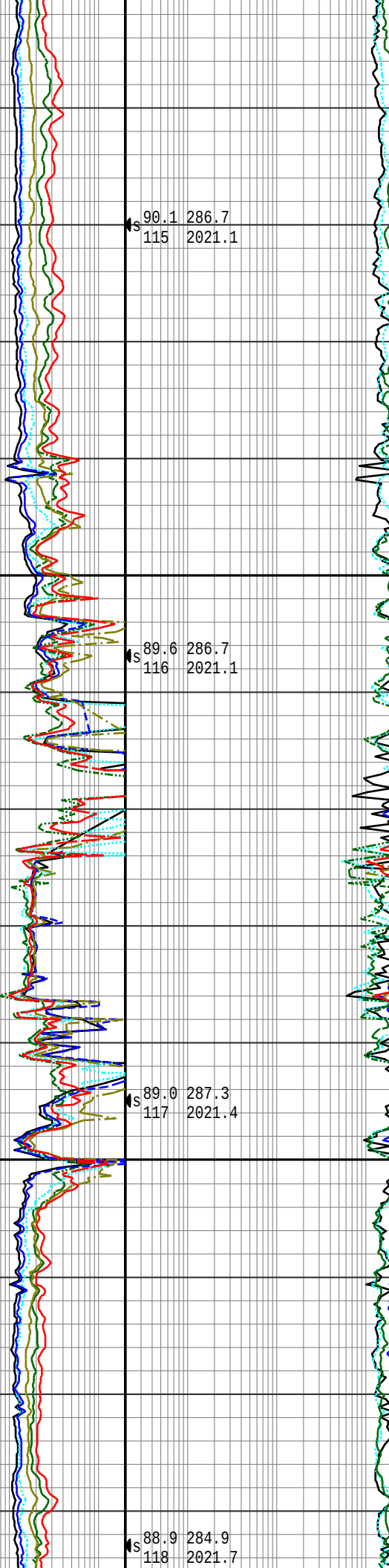






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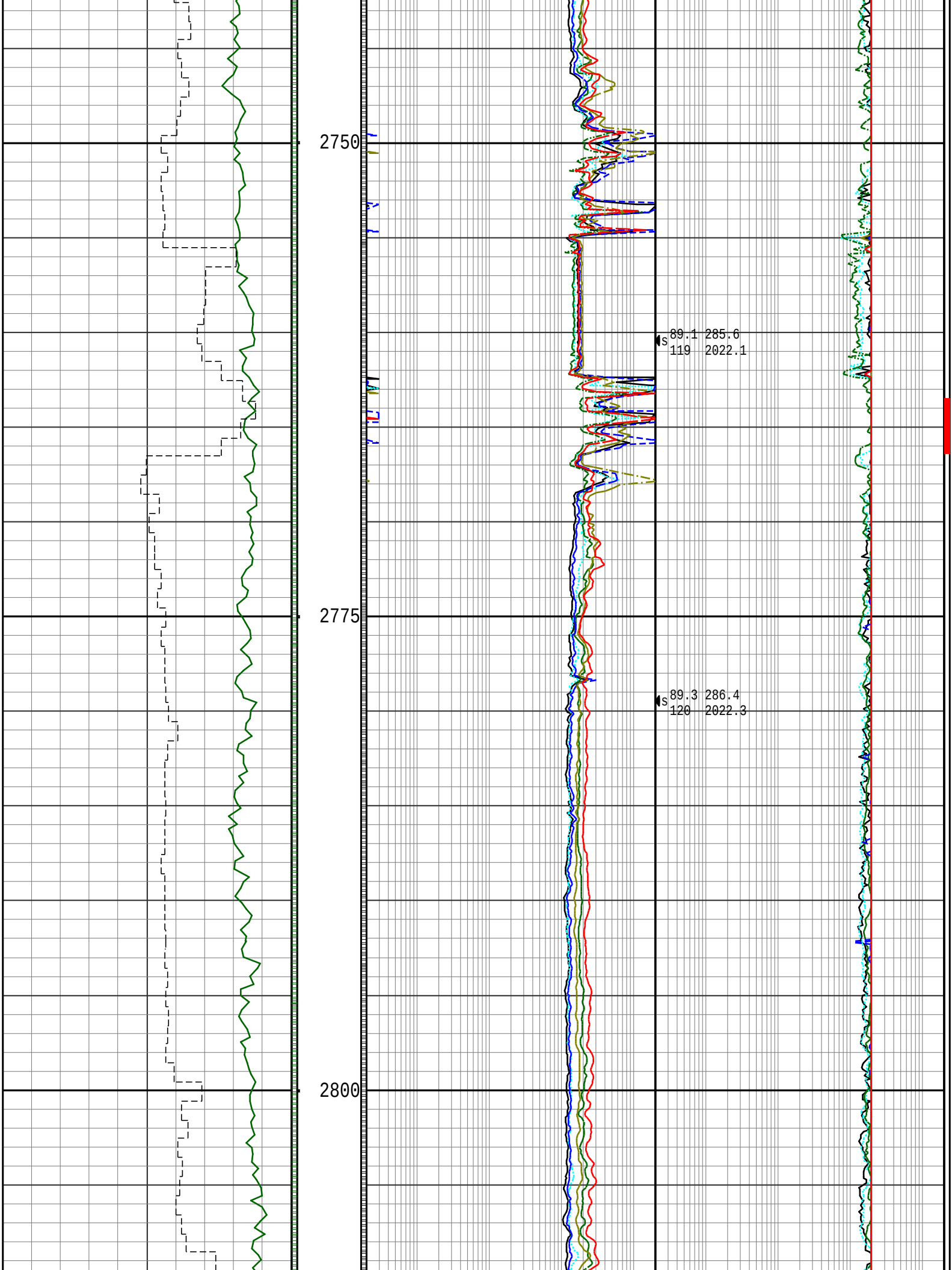


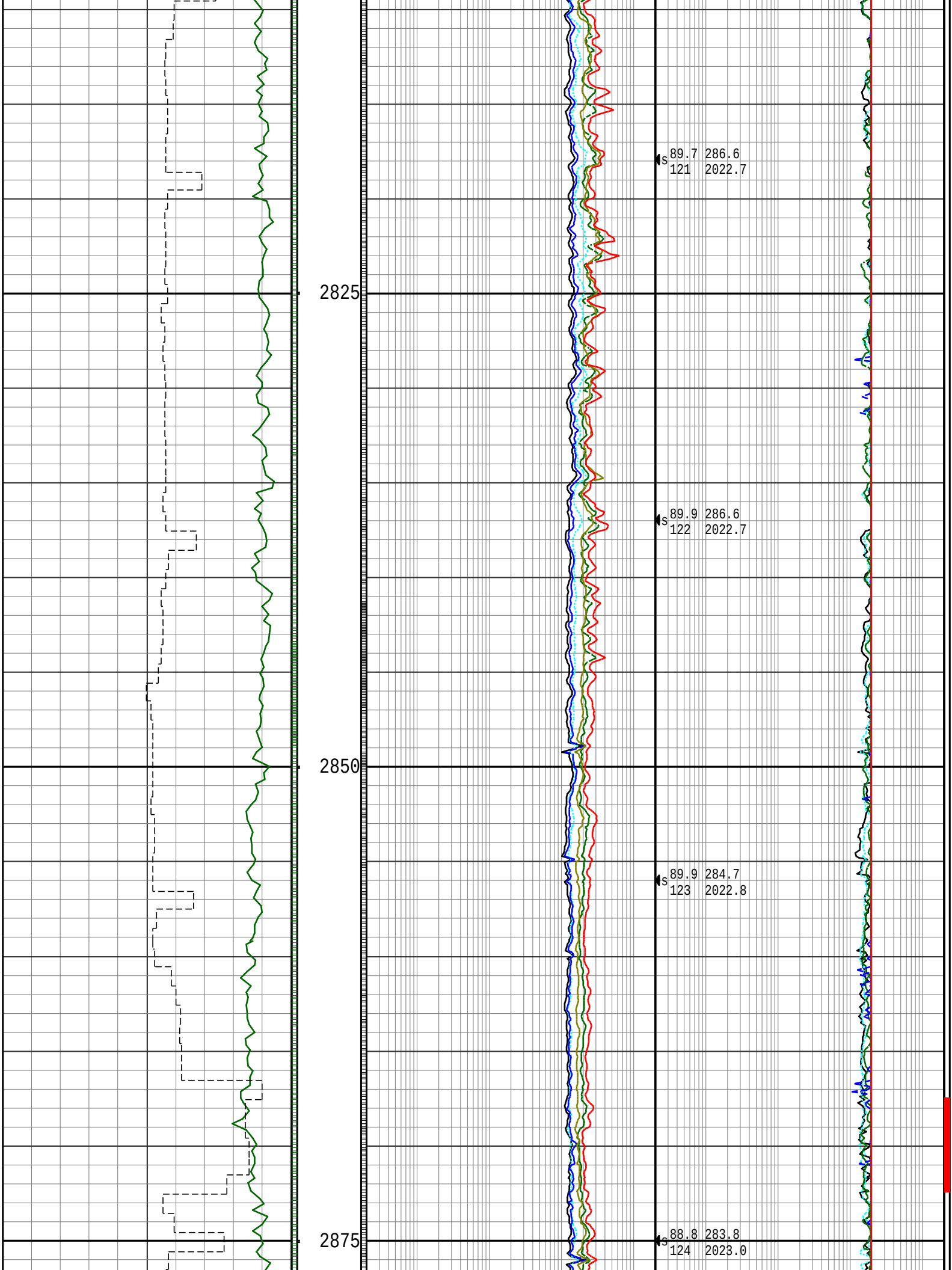
S 90.1 286.7
115 2021.1

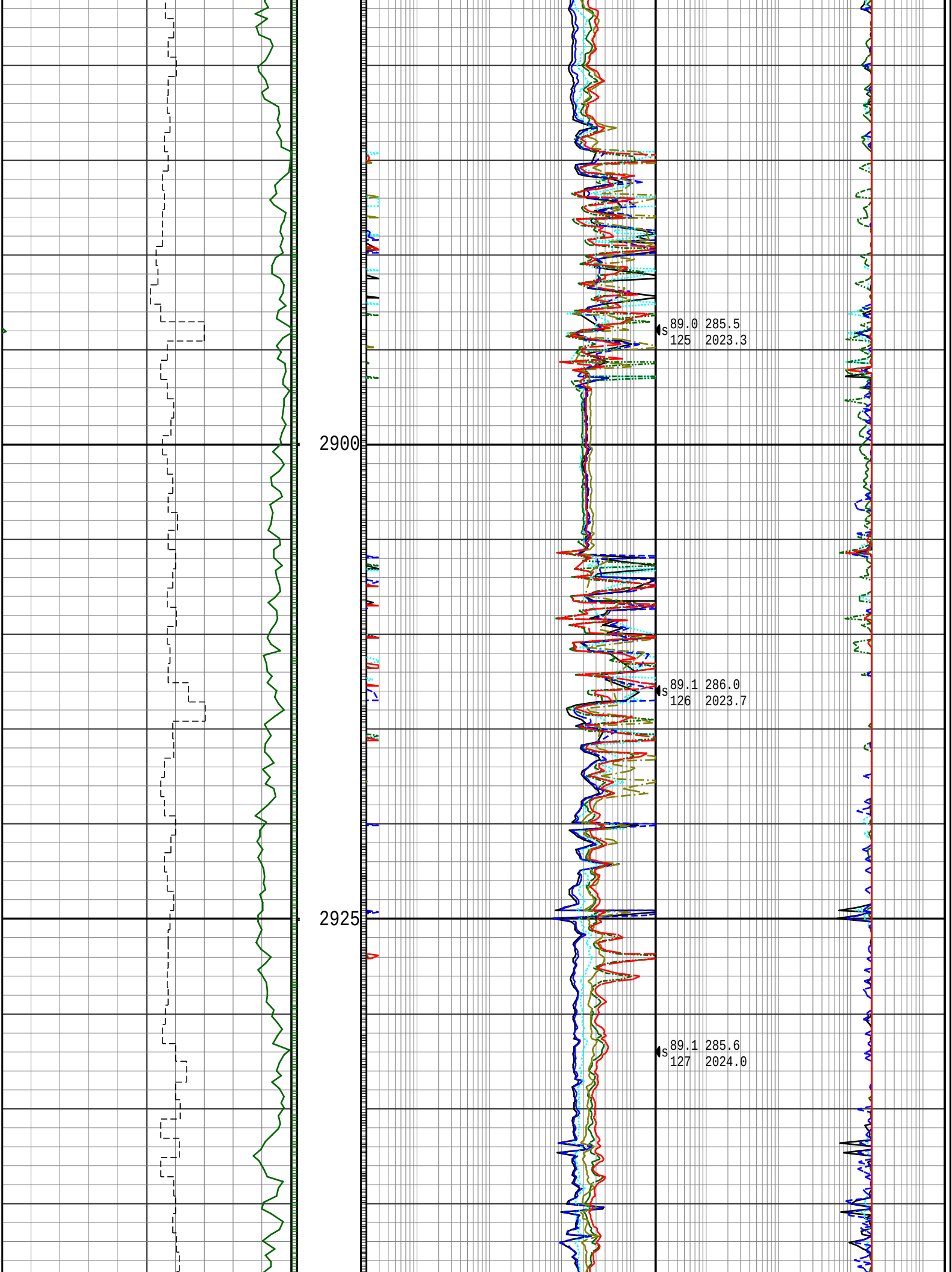
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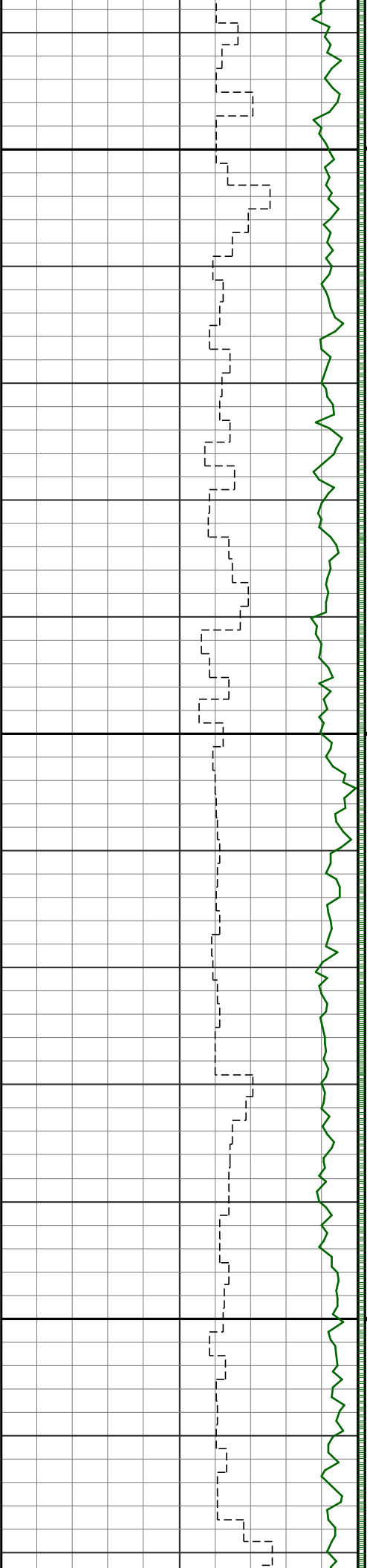
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S 88.9 284.9
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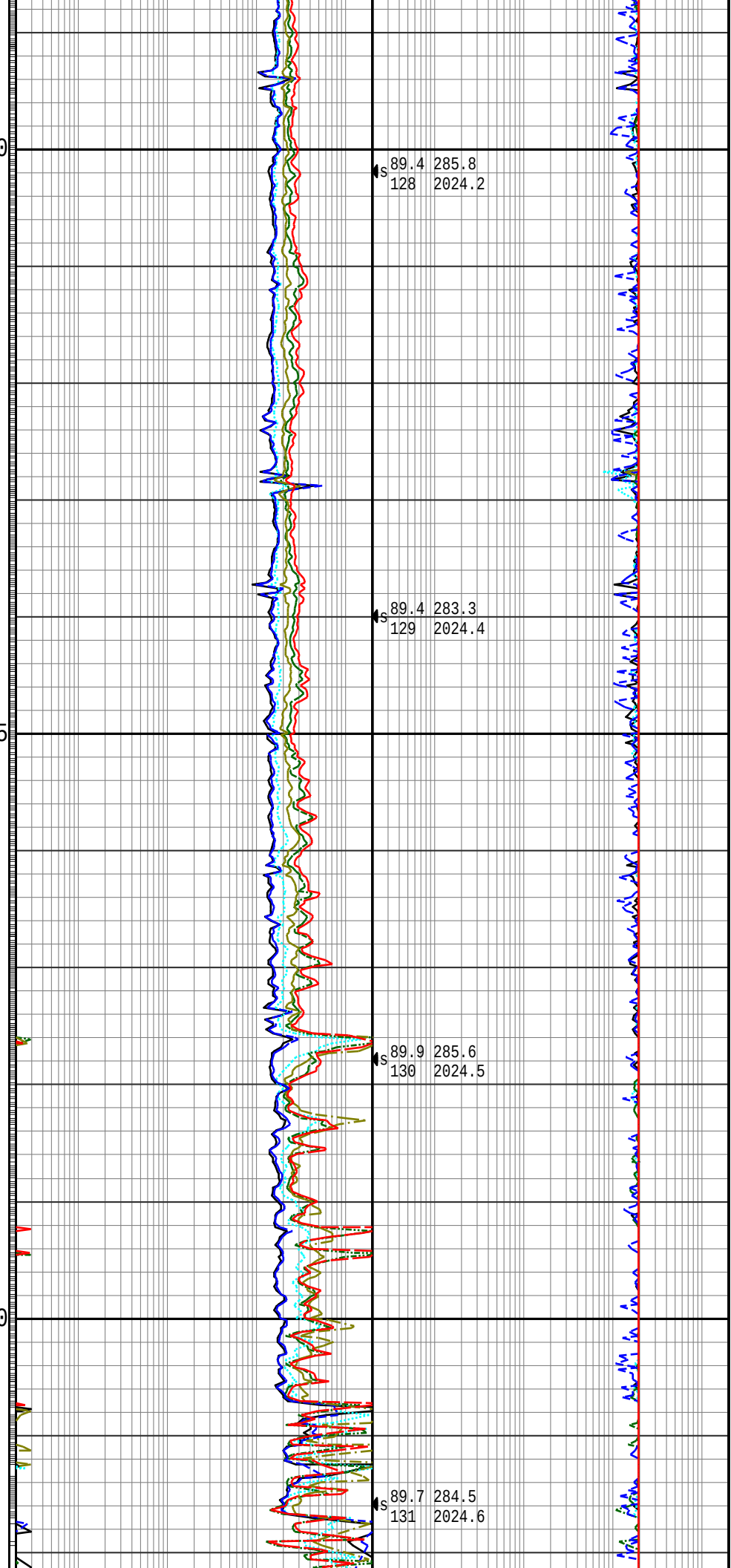


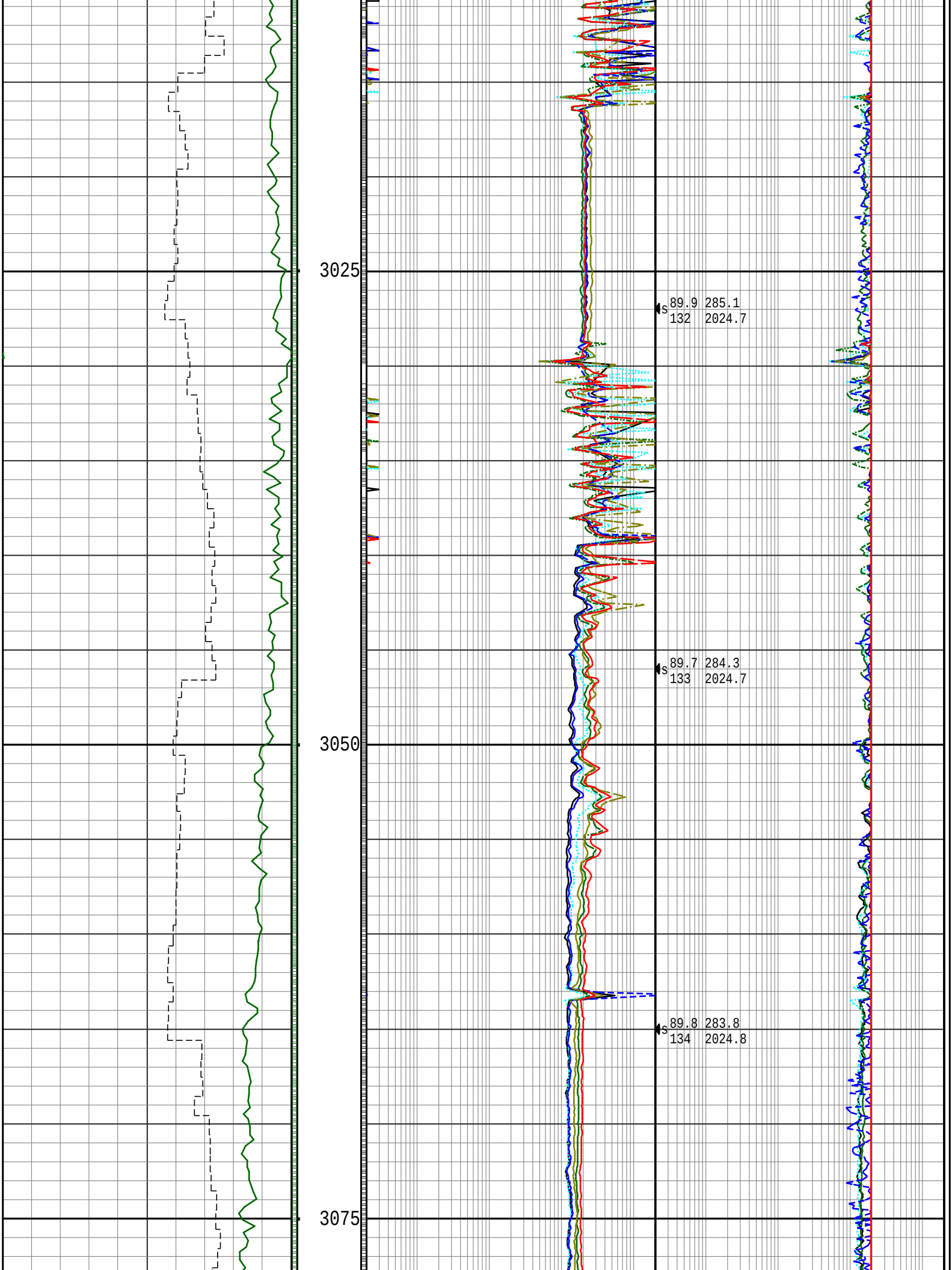


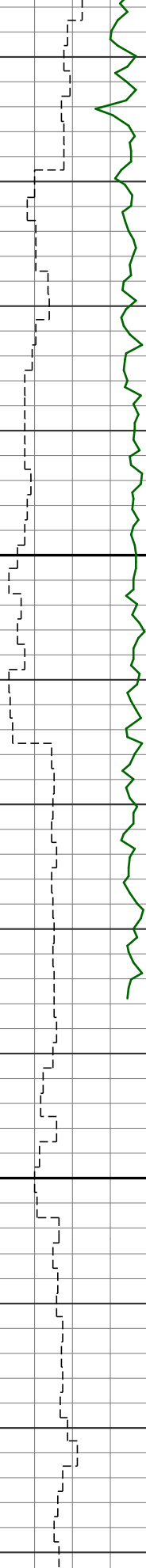
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3000





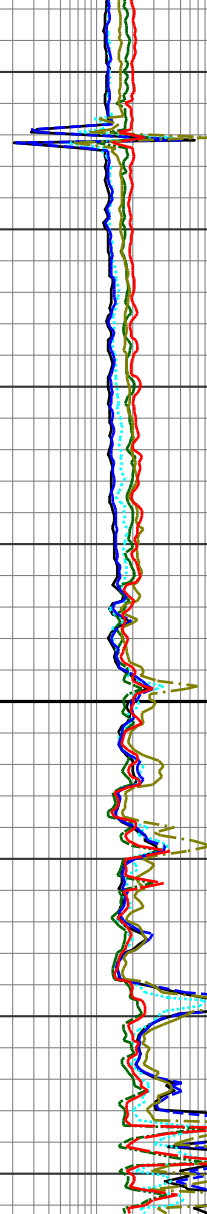


3100

3125

R
U
N

1



89.9 284.9
135 2024.9

89.9 283.7
136 2024.9

89.9 283.7
137 2025.0

PROJECTED SURVEY

0	GRCA API	150	DEPTH MD m	0.2	RSPH ohmm	2000	0.2	RSAH ohmm	2000
	avg = 35 cm		1m = 240m		avg = 15 cm			avg = 15 cm	
100	ROP m/hr	0	COMMENTS	0.2	RMPH ohmm	2000	0.2	RMAH ohmm	2000
	avg = 1 m		SHOES		avg = 15 cm			avg = 15 cm	
				0.2	RDPH ohmm	2000	0.2	RDAH ohmm	2000
					avg = 15 cm			avg = 15 cm	
				0.2	RSPL ohmm	2000	0.2	RSAL ohmm	2000
					avg = 15 cm			avg = 15 cm	
				0.2	RMPL ohmm	2000	0.2	RMAL ohmm	2000
					avg = 15 cm			avg = 15 cm	
				0.2	RDPL ohmm	2000	0.2	RDAL ohmm	2000
					avg = 15 cm			avg = 15 cm	
								inc azi	
								# TVD	

Survey Report

Vertical Section Plane: 285.02°	Total Correction: 22.82° West to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: COPRC MIRROR LAKE P-20
RT: 5.20m ROTARY TABLE TO GROUND LEVEL	FIELD: MIRROR LAKE

Measured Depth (m)	Inclination (deg)	Azimuth (deg)	TVD (m)	Course Length (m)	Vertical Section (m)	Rect Co-ord North (m)	Rect Co-ord East (m)	Closure Distance (m)	Closure Direction (deg)	Dog-leg Severity (dg/30m)	Temp (deg C)
TIED INTO SURFACE @ 0.0m MD.											
0.00	0.00	0.00	0.00		0.00	0.00 N	0.00 E	0.00	0.00		
THE FOLLOWING ARE EXTREME MWD SURVEYS.											
28.00	0.50	17.20	28.00	28.00	-0.00	0.12 N	0.04 E	0.12	17.20	0.54	
56.00	0.60	17.20	56.00	28.00	-0.01	0.37 N	0.12 E	0.39	17.20	0.11	
84.98	0.40	17.20	84.98	28.98	-0.02	0.62 N	0.19 E	0.64	17.20	0.21	
131.00	0.30	17.20	131.00	46.02	-0.04	0.88 N	0.27 E	0.92	17.20	0.07	
188.00	0.20	17.20	188.00	57.00	-0.04	1.12 N	0.35 E	1.17	17.20	0.05	
244.00	0.20	17.20	244.00	56.00	-0.05	1.31 N	0.40 E	1.37	17.20	0.00	
300.00	0.20	17.20	300.00	56.00	-0.06	1.49 N	0.46 E	1.56	17.20	0.00	
412.00	2.00	17.20	411.97	112.00	-0.14	3.55 N	1.10 E	3.71	17.20	0.48	
450.00	2.30	17.20	449.94	38.00	-0.20	4.91 N	1.52 E	5.14	17.20	0.24	
467.00	0.40	17.20	466.94	17.00	-0.21	5.29 N	1.64 E	5.54	17.20	3.35	
486.00	1.30	17.20	485.94	19.00	-0.22	5.56 N	1.72 E	5.82	17.20	1.42	
544.00	1.90	17.20	543.91	58.00	-0.28	7.11 N	2.20 E	7.44	17.20	0.31	
600.00	1.40	17.20	599.89	56.00	-0.34	8.65 N	2.68 E	9.05	17.20	0.27	
608.40	1.60	17.20	608.29	8.40	-0.35	8.86 N	2.74 E	9.27	17.20	0.72	
645.63	0.60	311.10	645.51	37.23	-0.20	9.48 N	2.75 E	9.87	16.17	1.18	
683.60	0.90	318.00	683.48	37.97	0.23	9.84 N	2.40 E	10.13	13.71	0.25	
721.66	0.90	317.90	721.53	38.06	0.73	10.28 N	2.00 E	10.47	11.01	0.00	
759.75	0.90	254.40	759.62	38.09	1.24	10.42 N	1.51 E	10.53	8.25	0.75	
797.80	0.70	282.40	797.66	38.05	1.73	10.39 N	1.00 E	10.44	5.48	0.34	
835.87	0.40	326.90	835.73	38.07	2.06	10.55 N	0.70 E	10.58	3.78	0.39	
873.90	0.40	355.60	873.76	38.03	2.21	10.80 N	0.61 E	10.81	3.25	0.16	
912.00	0.80	20.40	911.86	38.10	2.22	11.18 N	0.70 E	11.20	3.56	0.37	
988.00	0.70	19.50	987.85	76.00	2.14	12.11 N	1.04 E	12.16	4.89	0.04	
1045.10	1.50	14.84	1044.94	57.10	2.11	13.16 N	1.34 E	13.23	5.83	0.42	
1083.10	1.28	27.45	1082.93	38.00	2.02	14.02 N	1.67 E	14.12	6.78	0.30	
1121.00	1.59	29.00	1120.82	37.90	1.81	14.86 N	2.12 E	15.01	8.11	0.25	
1159.00	1.10	38.20	1158.81	38.00	1.53	15.61 N	2.60 E	15.82	9.45	0.42	
1197.00	0.90	31.80	1196.80	38.00	1.31	16.15 N	2.98 E	16.42	10.46	0.18	
1235.00	0.70	28.10	1234.80	38.00	1.17	16.60 N	3.25 E	16.92	11.07	0.16	
1273.00	1.10	150.40	1272.80	38.00	0.86	16.49 N	3.54 E	16.87	12.11	1.25	
1311.00	1.00	101.40	1310.79	38.00	0.27	16.11 N	4.04 E	16.61	14.09	0.69	
1349.50	1.20	349.90	1349.29	38.50	0.11	16.44 N	4.30 E	16.99	14.66	1.42	
1387.50	1.40	15.40	1387.28	38.00	0.27	17.28 N	4.35 E	17.82	14.14	0.48	
1425.50	0.40	0.10	1425.27	38.00	0.30	17.86 N	4.48 E	18.41	14.08	0.80	
1463.50	0.62	1.66	1463.27	38.00	0.38	18.20 N	4.48 E	18.74	13.84	0.17	
1501.50	0.88	5.67	1501.27	38.00	0.48	18.69 N	4.52 E	19.23	13.59	0.21	
1539.50	0.90	135.50	1539.27	38.00	0.27	18.77 N	4.76 E	19.36	14.22	1.27	
1577.50	0.70	120.30	1577.26	38.00	-0.21	18.44 N	5.17 E	19.15	15.65	0.23	
1615.50	0.50	75.00	1615.26	38.00	-0.58	18.37 N	5.53 E	19.18	16.75	0.39	
1654.00	1.00	54.80	1653.76	38.50	-0.94	18.60 N	5.96 E	19.54	17.78	0.43	
1692.00	1.20	31.40	1691.75	38.00	-1.26	19.13 N	6.44 E	20.19	18.61	0.39	
1711.00	1.80	359.80	1710.74	19.00	-1.24	19.60 N	6.54 E	20.67	18.46	1.58	
1720.00	1.90	10.60	1719.74	9.00	-1.19	19.89 N	6.57 E	20.95	18.28	1.21	
1730.00	1.60	353.80	1729.73	10.00	-1.13	20.19 N	6.59 E	21.24	18.07	1.77	
1739.00	2.30	320.90	1738.73	9.00	-0.94	20.46 N	6.46 E	21.45	17.52	4.31	
1749.00	3.71	313.14	1748.72	10.00	-0.49	20.83 N	6.10 E	21.71	16.31	4.39	

2818.00	89.70	286.60	2022.66	38.50	905.59	229.42 N	876.07 W	905.61	284.67	0.35
2837.00	89.90	286.60	2022.73	19.00	924.59	234.84 N	894.28 W	924.60	284.71	0.32
2856.00	89.90	284.70	2022.76	19.00	943.58	239.97 N	912.57 W	943.60	284.73	3.00
2875.00	88.80	283.80	2022.98	19.00	962.58	244.65 N	930.99 W	962.59	284.72	2.24
2894.00	89.00	285.50	2023.34	19.00	981.58	249.45 N	949.36 W	981.59	284.72	2.70
2913.00	89.10	286.00	2023.66	19.00	1000.57	254.61 N	967.65 W	1000.58	284.74	0.80
2932.00	89.10	285.60	2023.96	19.00	1019.57	259.78 N	985.93 W	1019.58	284.76	0.63
2951.00	89.40	285.80	2024.20	19.00	1038.56	264.92 N	1004.22 W	1038.57	284.78	0.57
2970.00	89.40	283.30	2024.40	19.00	1057.56	269.69 N	1022.61 W	1057.57	284.77	3.95
2989.00	89.90	285.60	2024.52	19.00	1076.56	274.43 N	1041.00 W	1076.57	284.77	3.72
3008.00	89.70	284.50	2024.59	19.00	1095.56	279.37 N	1059.35 W	1095.57	284.77	1.77
3027.00	89.90	285.10	2024.65	19.00	1114.56	284.22 N	1077.72 W	1114.57	284.77	1.00
3046.00	89.70	284.30	2024.72	19.00	1133.56	289.04 N	1096.10 W	1133.57	284.77	1.30
3065.00	89.80	283.80	2024.80	19.00	1152.55	293.65 N	1114.53 W	1152.57	284.76	0.80
3085.00	89.90	284.90	2024.85	20.00	1172.55	298.61 N	1133.90 W	1172.56	284.75	1.66
3103.00	89.90	283.70	2024.88	18.00	1190.55	303.06 N	1151.35 W	1190.56	284.75	2.00
STRAIGHT LINE PROJECTION TO BIT DEPTH @ 3142m MD.										
3142.00	89.90	283.70	2024.95	39.00	1229.54	312.29 N	1189.24 W	1229.56	284.71	0.00

EQUIPMENT DATA						
RUN NUMBER	1	2	3			
RES DTA						
RES MANDREL			R47M674-D			
RES SIZE mm			121.0			
RES VERIFIER						
API BLANKET			0013			
HDS-1M DTA						
HDS-1M MANDREL						
HDS-1M SIZE mm						
DNSC DTA						
DNSC MANDREL						
DNSC SIZE mm						
DENSITY SOURCE NO.						
NEUTRON SOURCE NO.						
CLSS DTA						
CLSS MANDREL						
CLSS SIZE mm						
DPM DTA						
DPM SIZE mm						
DFT DTA						
DFT MANDREL						
DFT SIZE mm						
PZIG UXM DTA						
PZIG LXM DTA						
PZIG SIZE mm						

BOTTOM HOLE ASSEMBLY RECORD							
RUN 1 m		RUN 2 m		RUN 3 m			
PDC BIT	0.20	PDC BIT	0.25	PDC BIT	0.19		
STEERABLE MOTOR	9.62	STEERABLE MOTOR	9.62	STEERABLE MOTOR	8.93		
NM FLOAT SUB	0.54	NM FLOAT SUB	0.54	NM PONY SUB	3.10		
NM PONY	2.97	NM PONY	2.97	NMDC	9.47		
XPULSE (DIR/GR)	9.35	XPULSE (DIR/GR)	9.35	LANDING SUB	0.58		
LANDING SUB	0.54	LANDING SUB	0.54	SAWR (RES/GR)	6.18		
NMDC	9.20	NMDC	9.20	ABS (BATTERY)	4.79		
NMDC	8.28	NMDC	8.28	X/O SUB	0.87		
X/O SUB	0.80	X/O SUB	0.80	NMDC	9.50		

X/O SUB	0.00	X/O SUB	0.00	X/O SUB	0.00		
3 JTS HWDP	27.54	3 JTS HWDP	27.54	3 JTS HWDP	27.54		
JARS	5.13	JARS	5.13	JARS	5.07		
37 JTS HWDP	344.73	37 JTS HWDP	344.73	JARS	5.07		
				HWDP	9.18		
				126 JTS DP	1197.00		
				36 JTS HWDP	335.55		
=====		=====		=====			
TOTAL BHA	418.90	TOTAL BHA	418.95	TOTAL BHA	1618.77		
SENSOR OFFSETS:		SENSOR OFFSETS:		SENSOR OFFSETS:			
DIRECTIONAL	20.22	DIRECTIONAL	20.27	DIRECTIONAL	19.18		
GAMMA RAY	14.97	GAMMA RAY	15.02	GAMMA RAY	23.39		
				RESISTIVITY	25.43		
				AWR INCLINATION	23.26		

RESISTIVITY



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1 : 240

METERS MD