



PHOENIX  
TECHNOLOGY SERVICES

MD  
1:240  
Feet

MWD Gamma / ROP (5")

Client: Whiting Petroleum Corp

Well Name: Razor Federal #12F-1308B

API/UWID: 051233871200

County: Weld Field: Wildcat

Permit #: 15-0360

State: Colorado Country: USA

Longitude: 103° 49' 3.23731 W  
Latitude: 40° 51' 16.04828 N

Personnel

Company Representative  
Kenny Wilkerson

Geologist

Directional Driller(s)  
Derrick Gracie  
Brandon Davis

MWD Operator(s)  
Justin Amari  
Larry Seebeck

Reference Data

North Reference: True North  
Magnetic Declination: 7.44  
Grid Convergence: 0.00  
Total Mag Correction: 7.44

Comments:

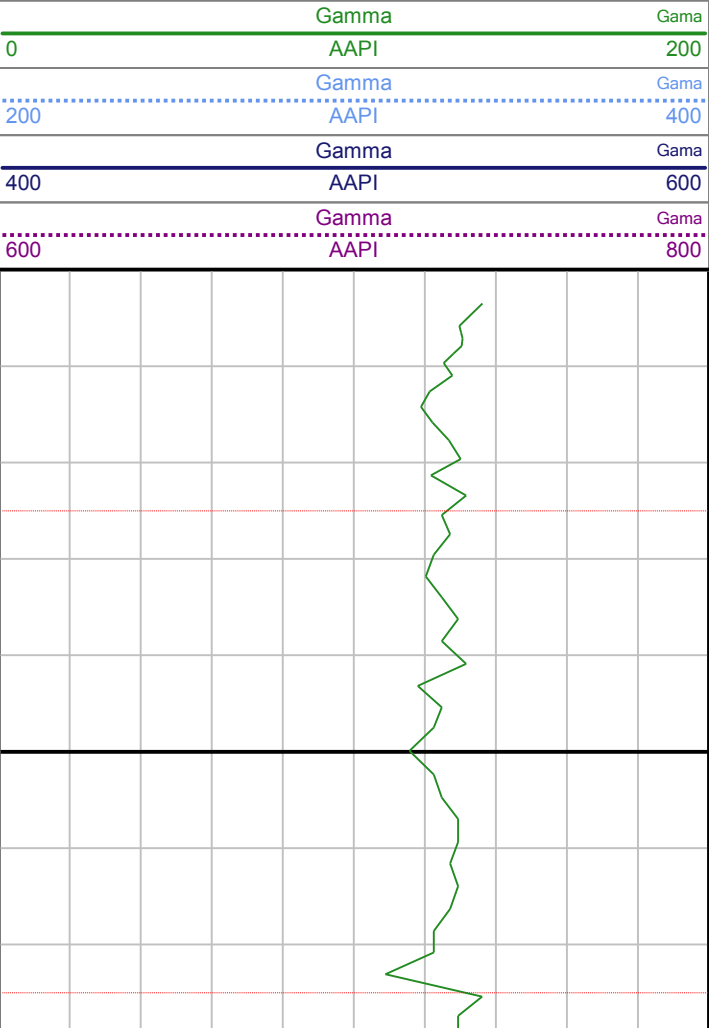
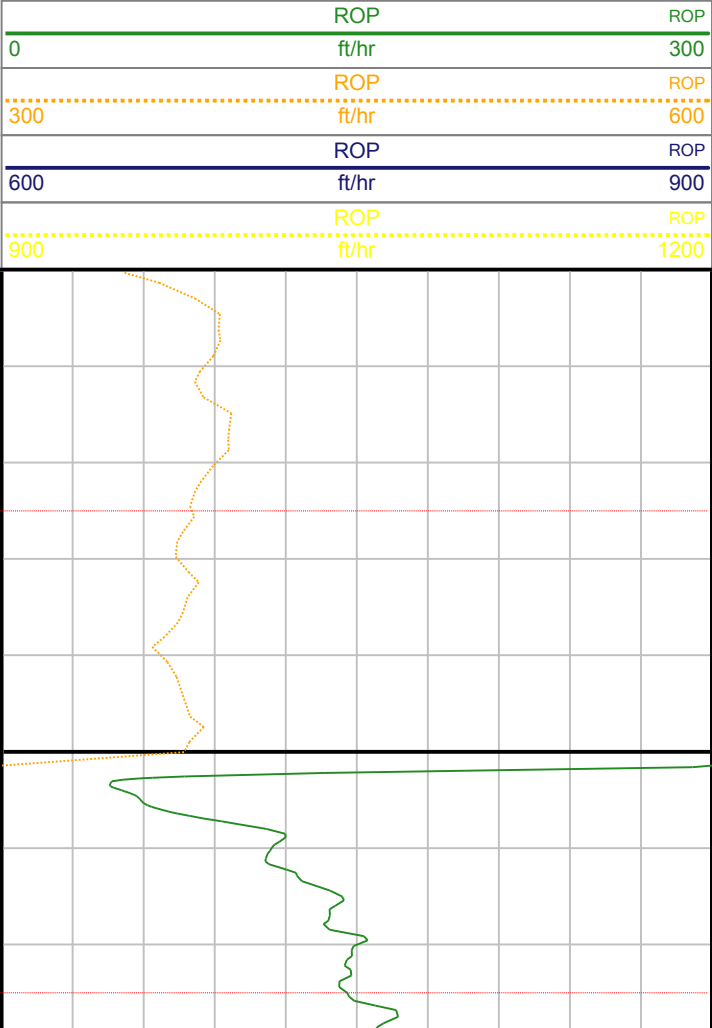
Main Leg

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1:240

Log

Index Scale: 1:240    Index Unit: Feet    Index Type: MD    Creation Date: July 16, 2015 18:40

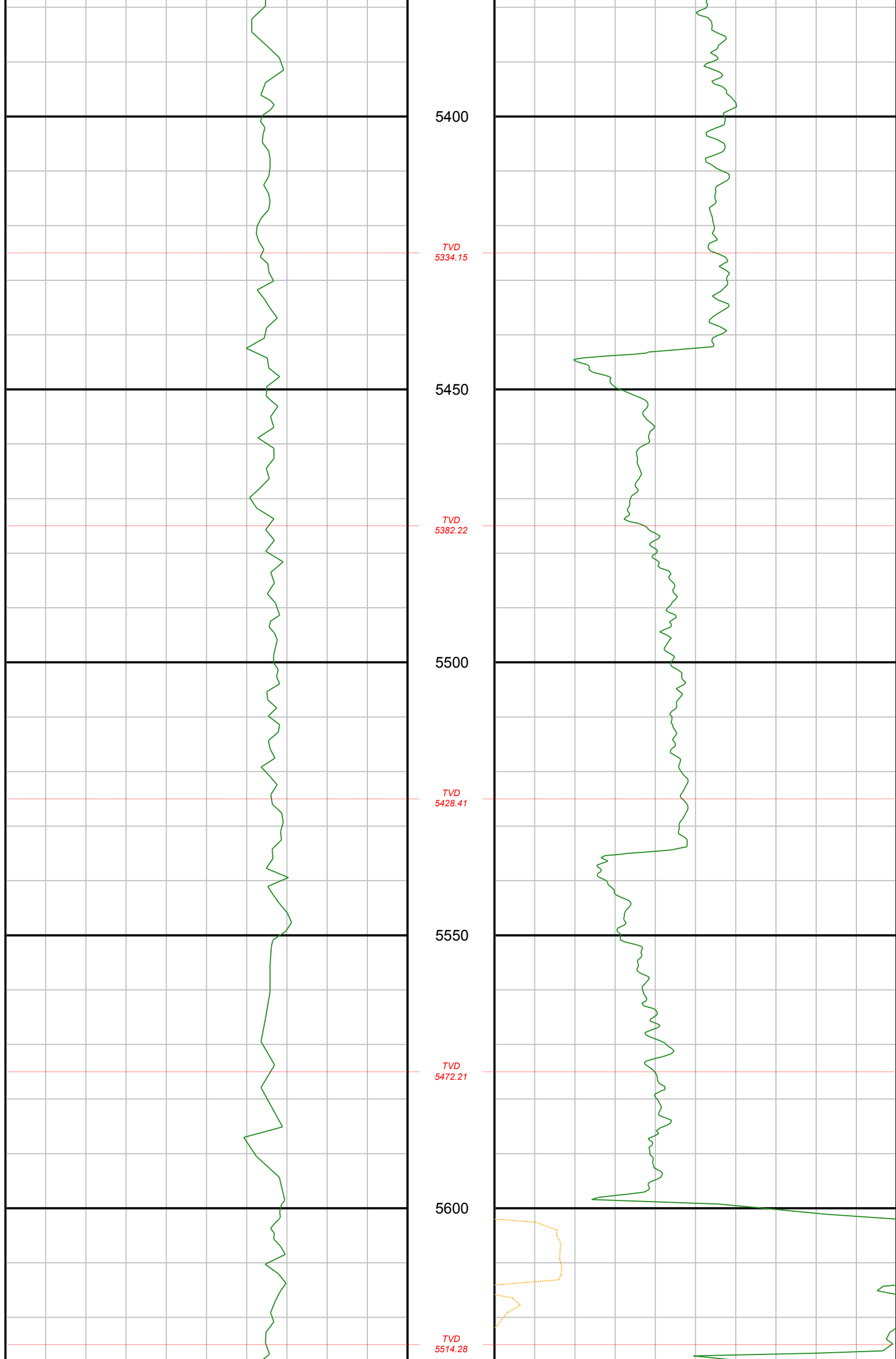


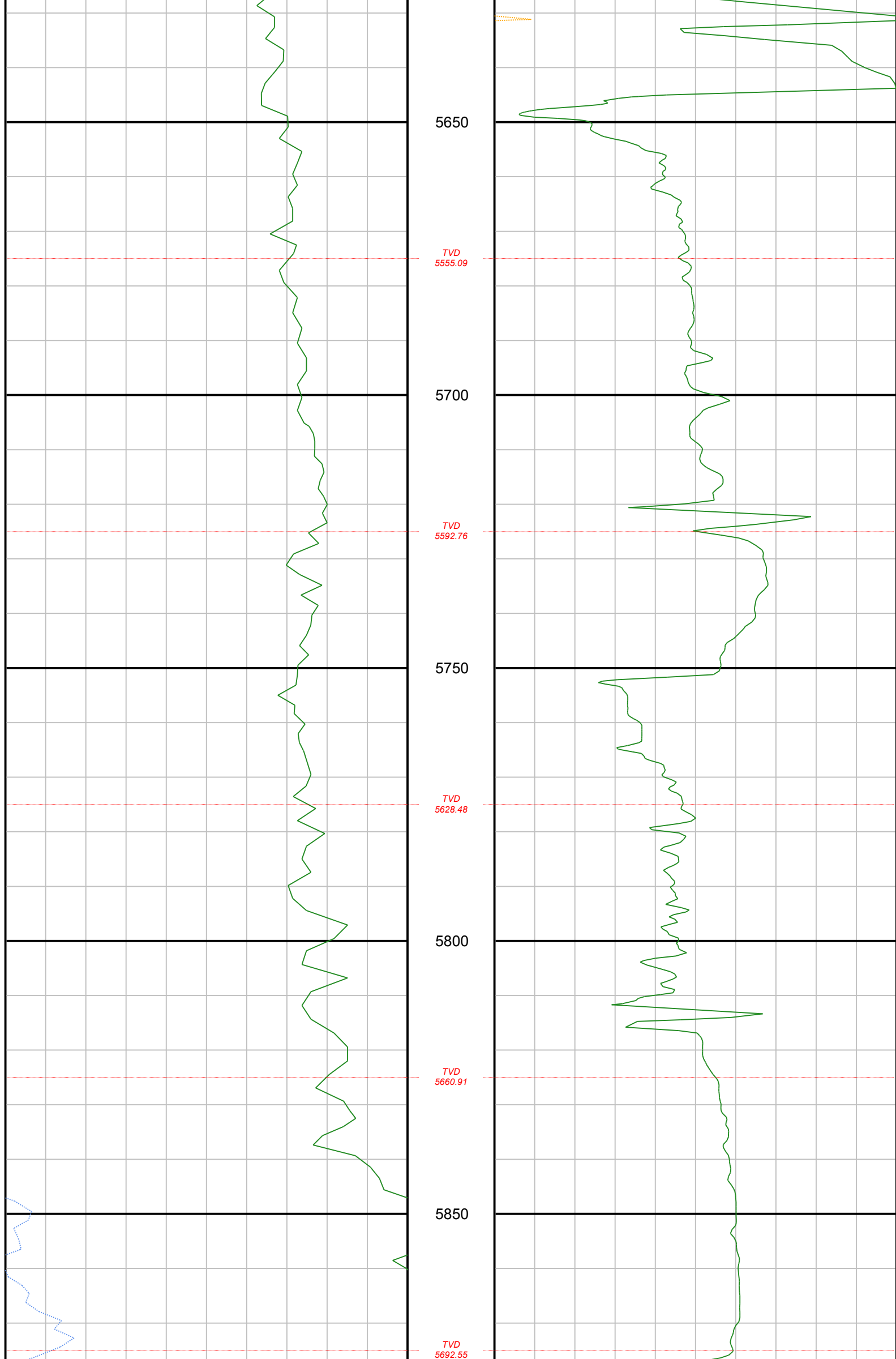
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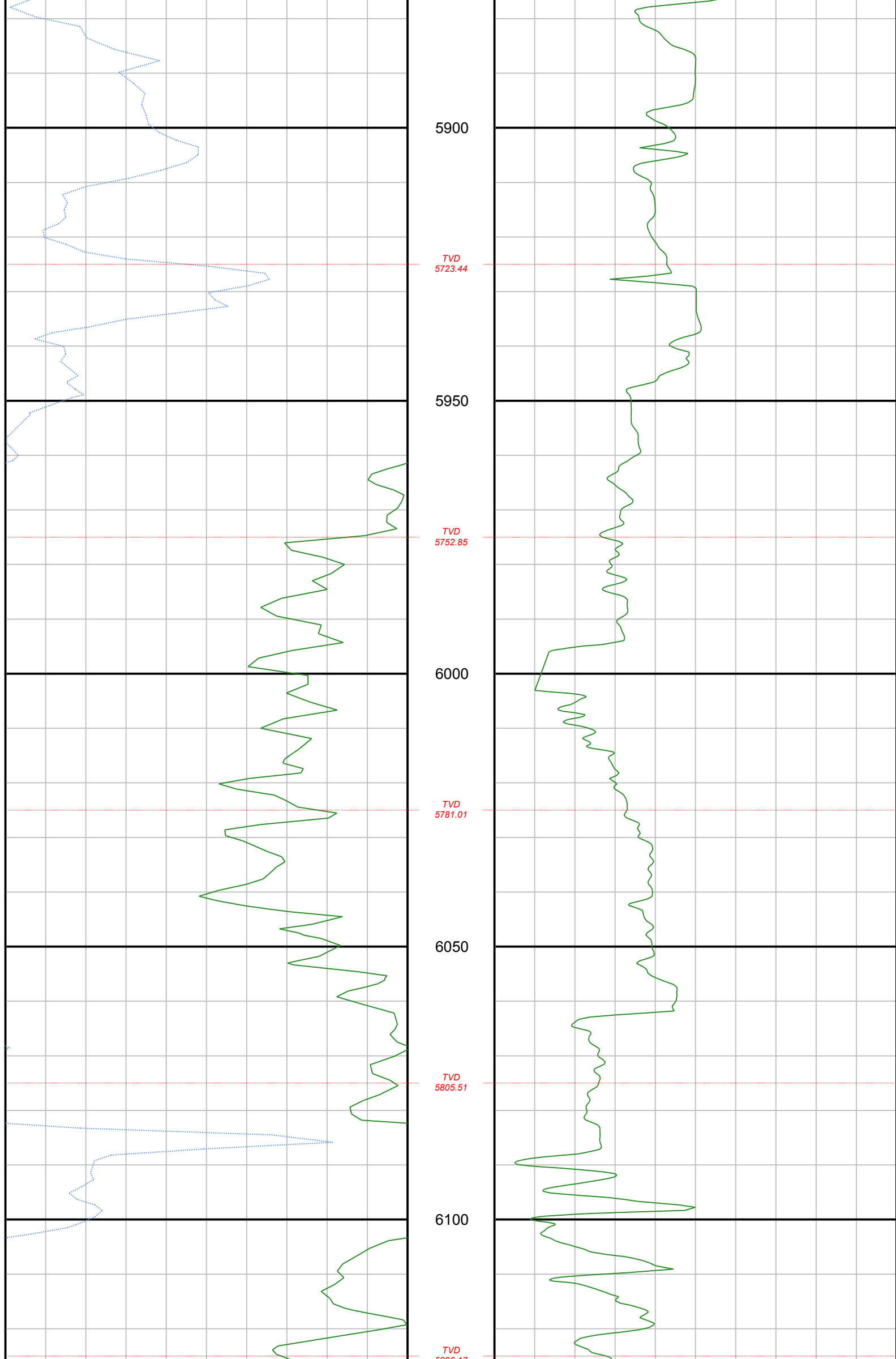
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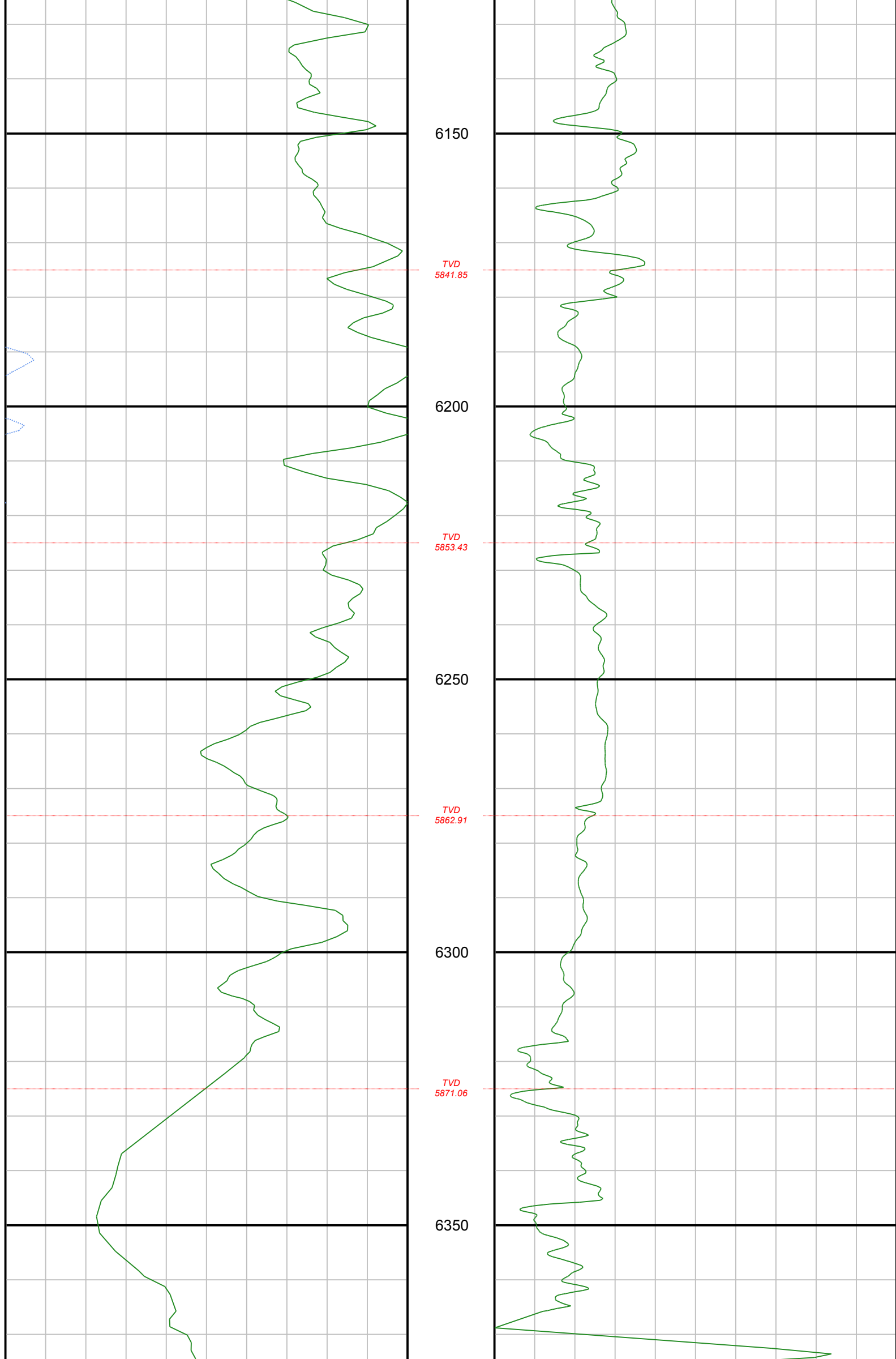
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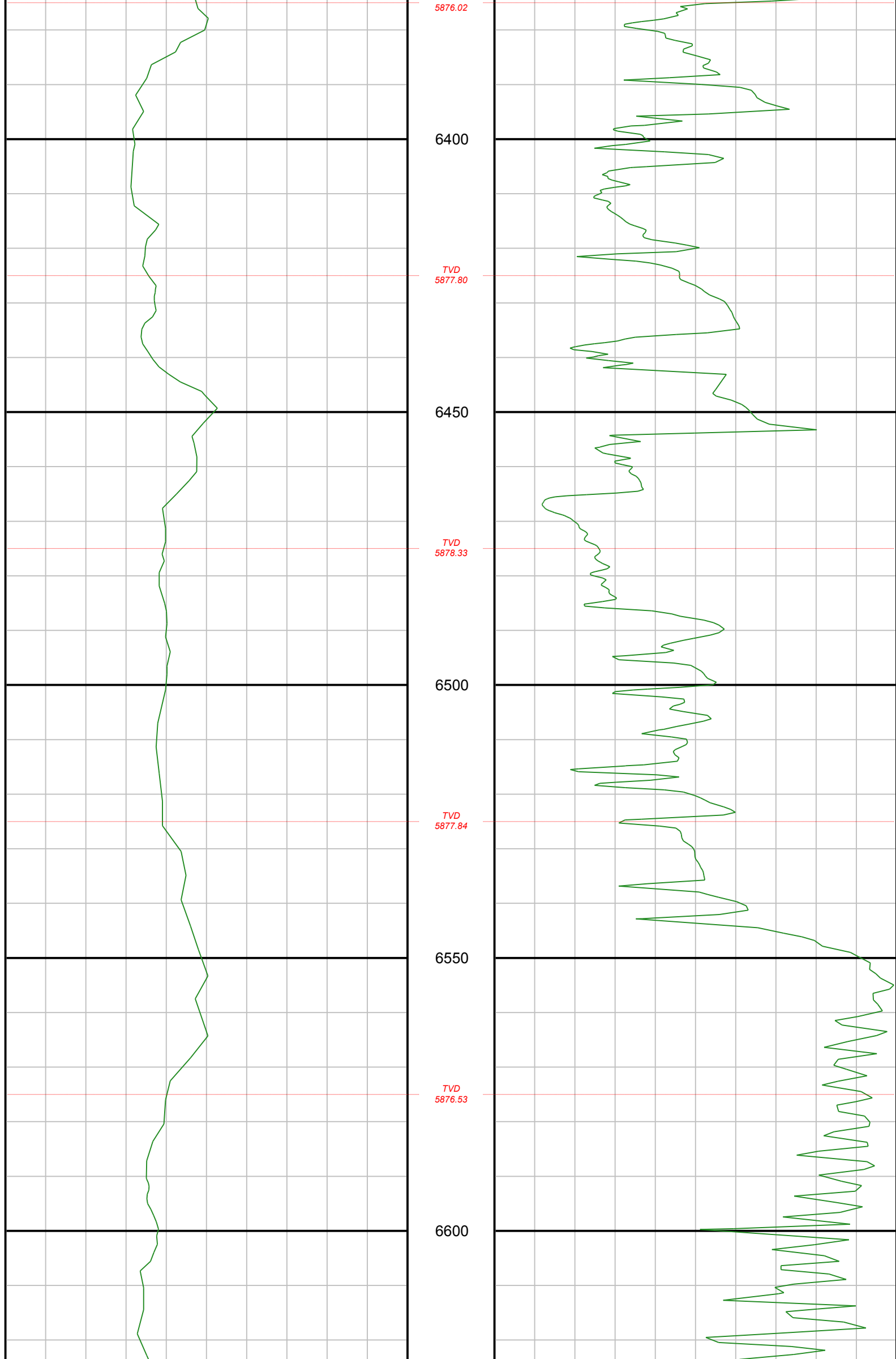
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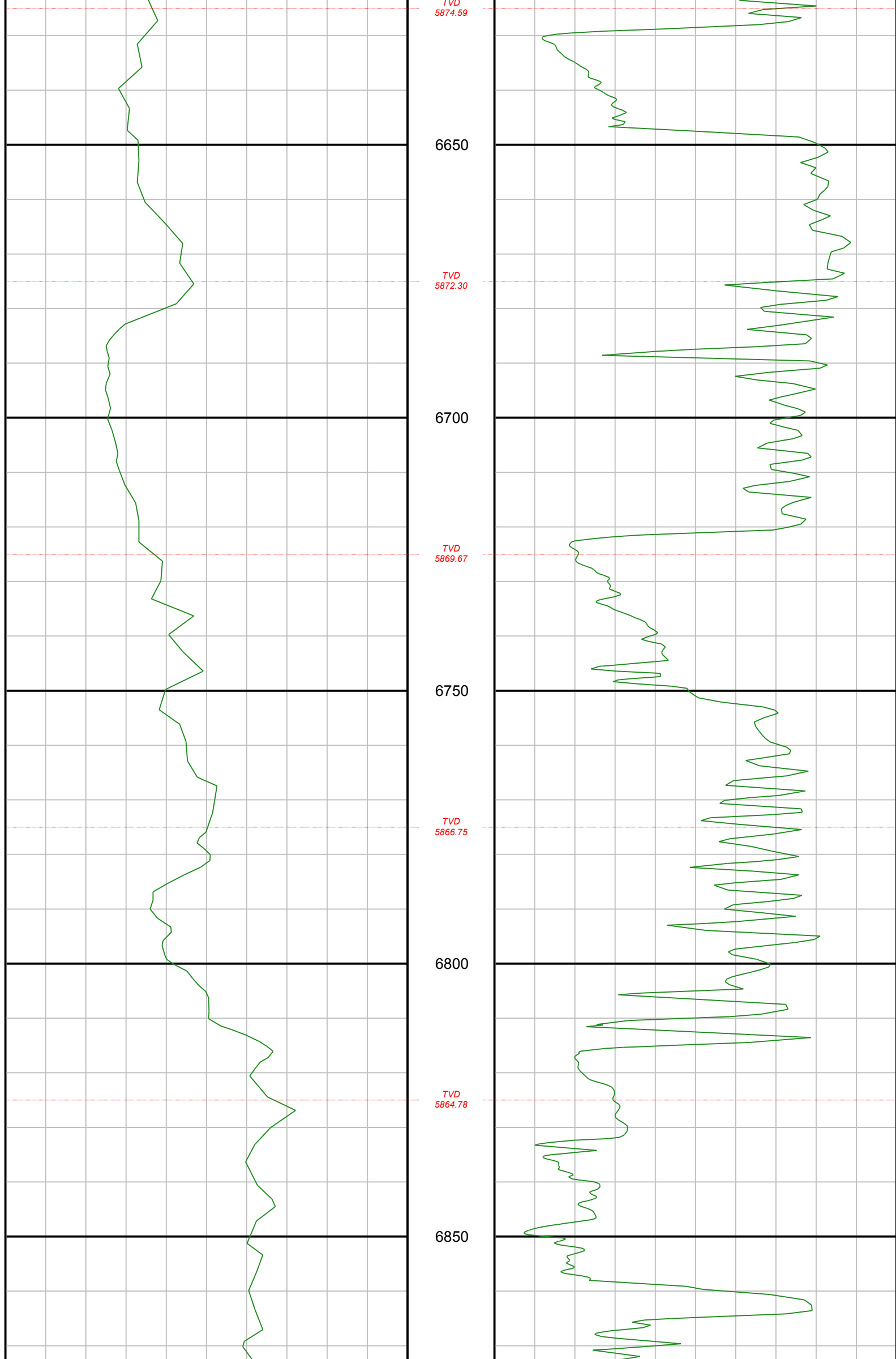


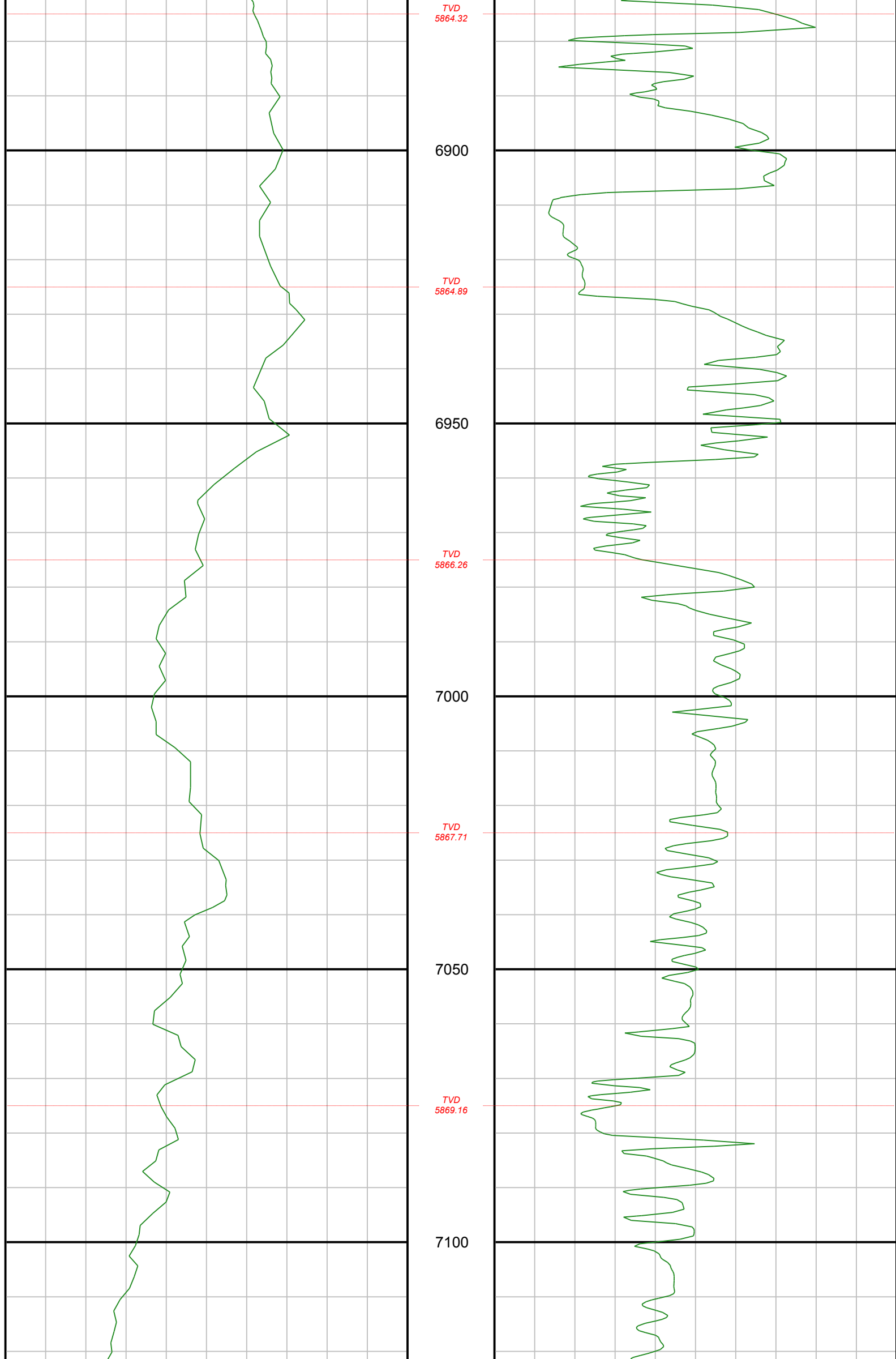




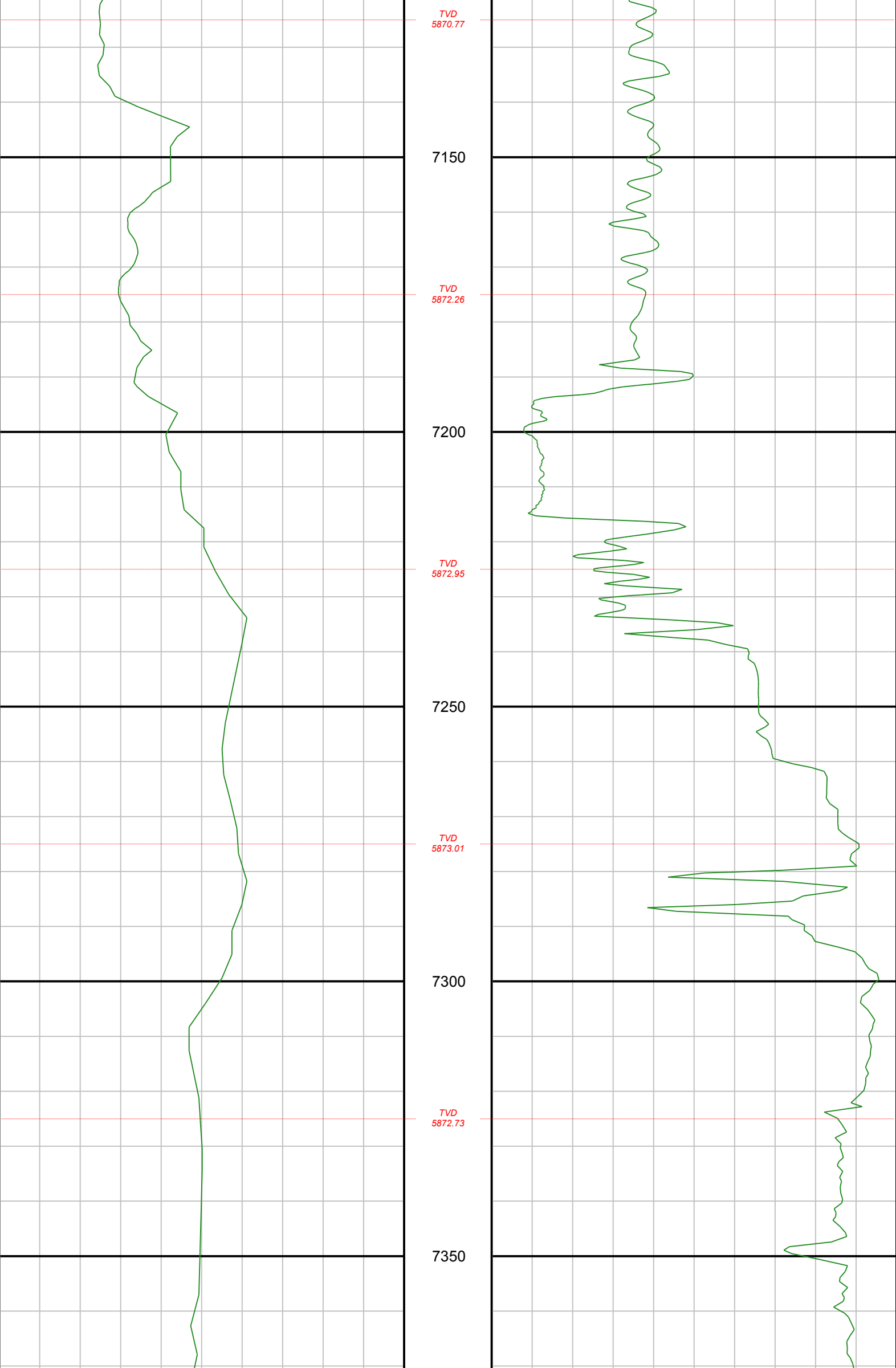


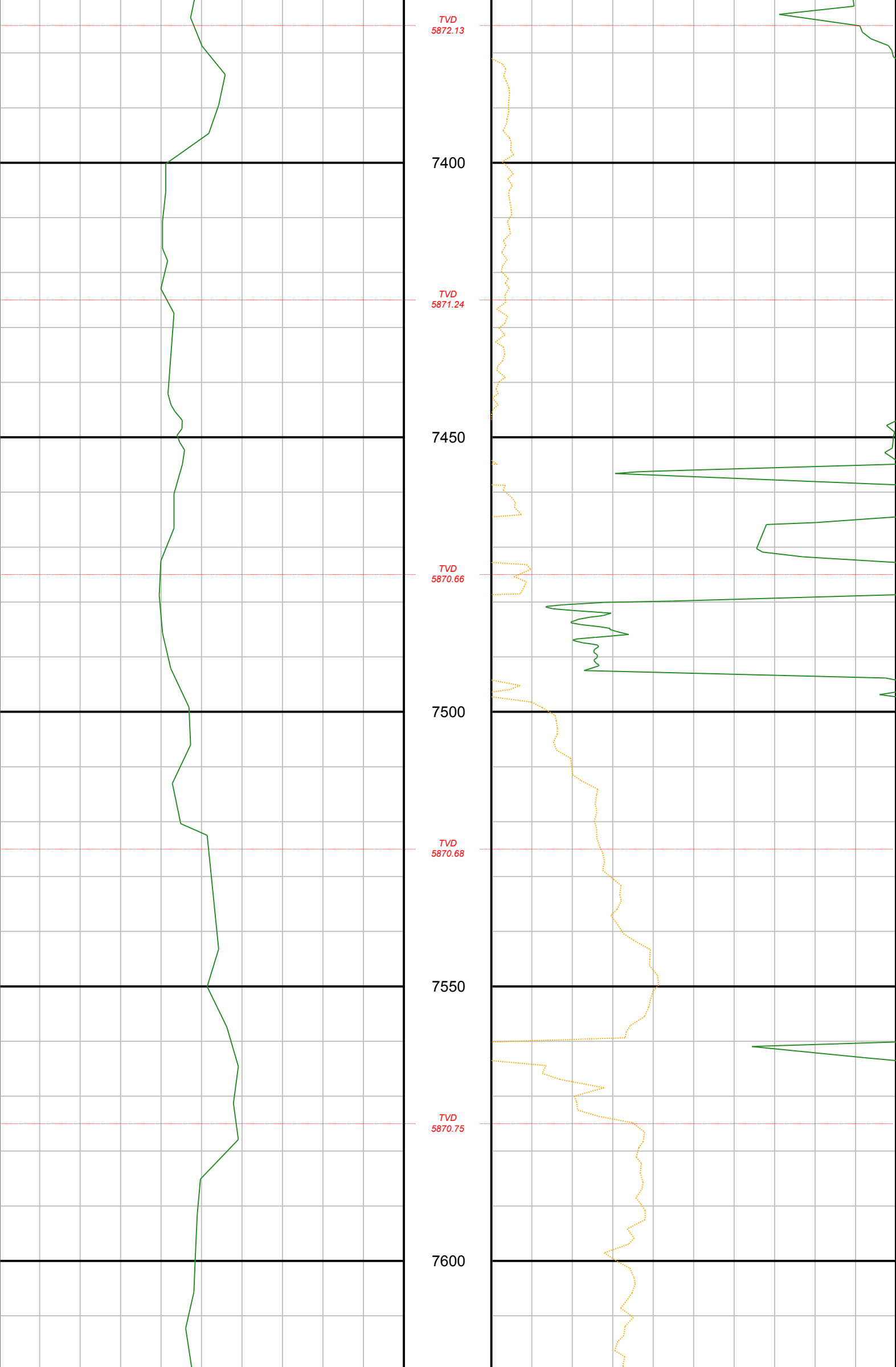


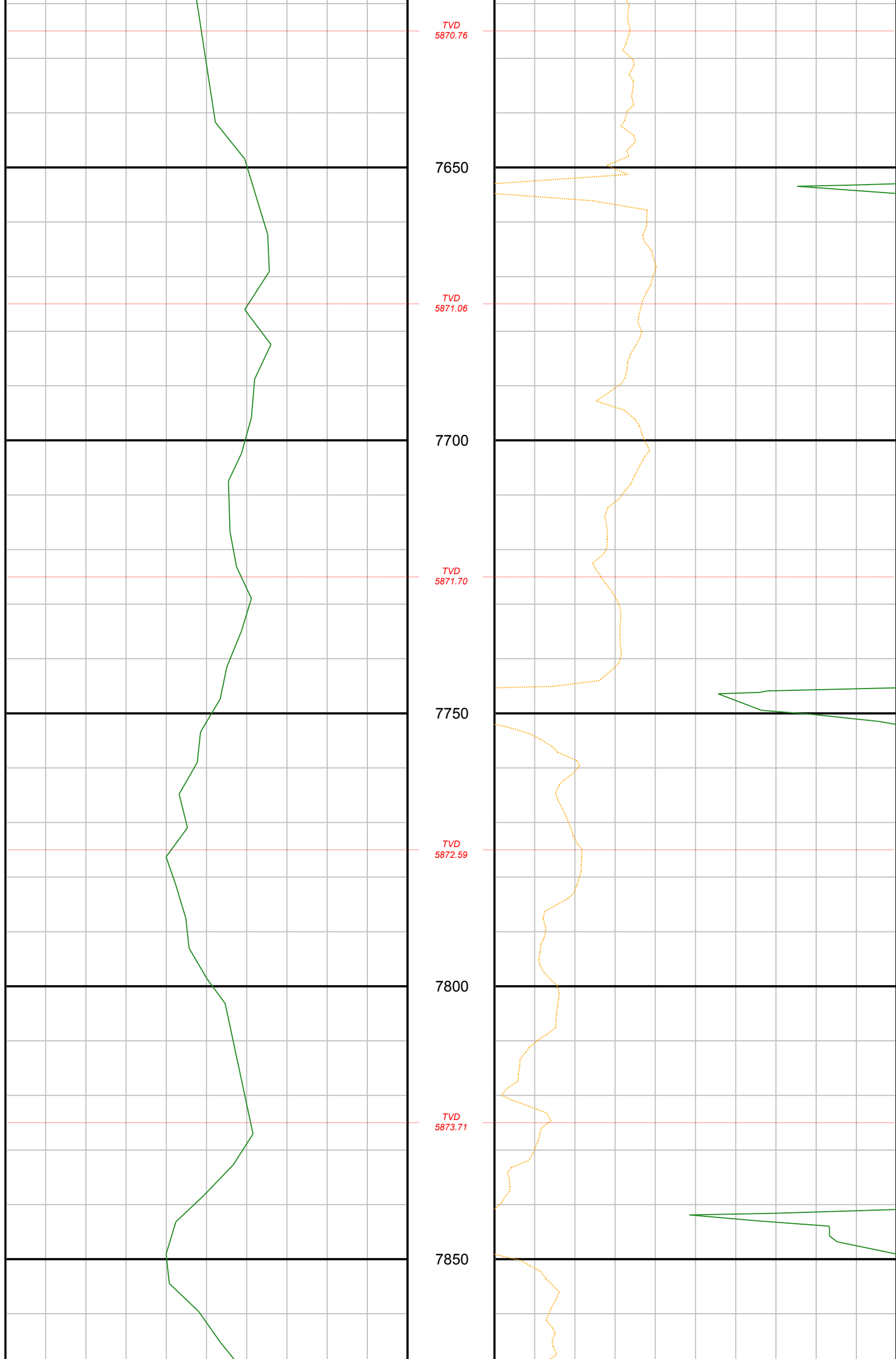


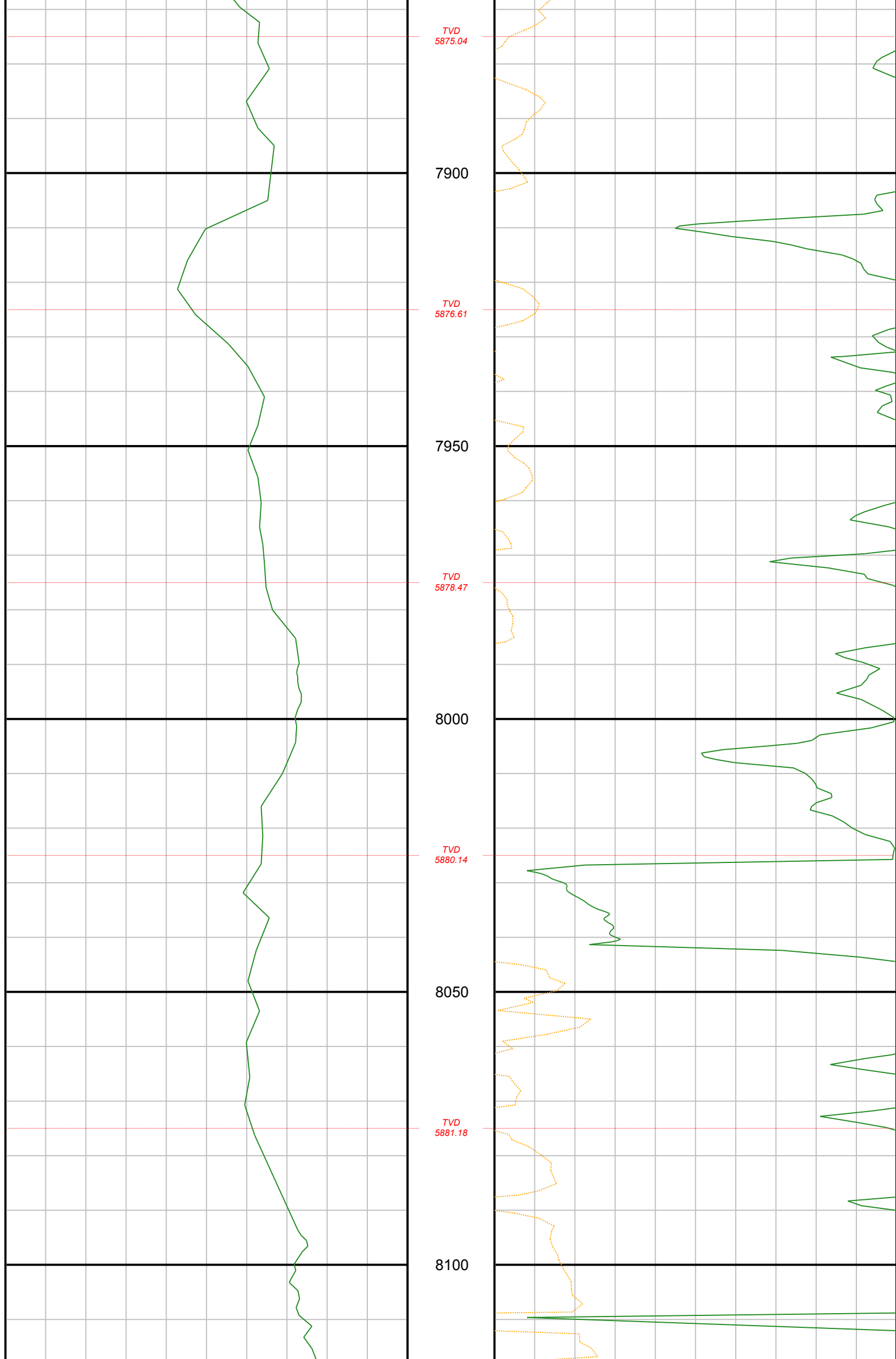


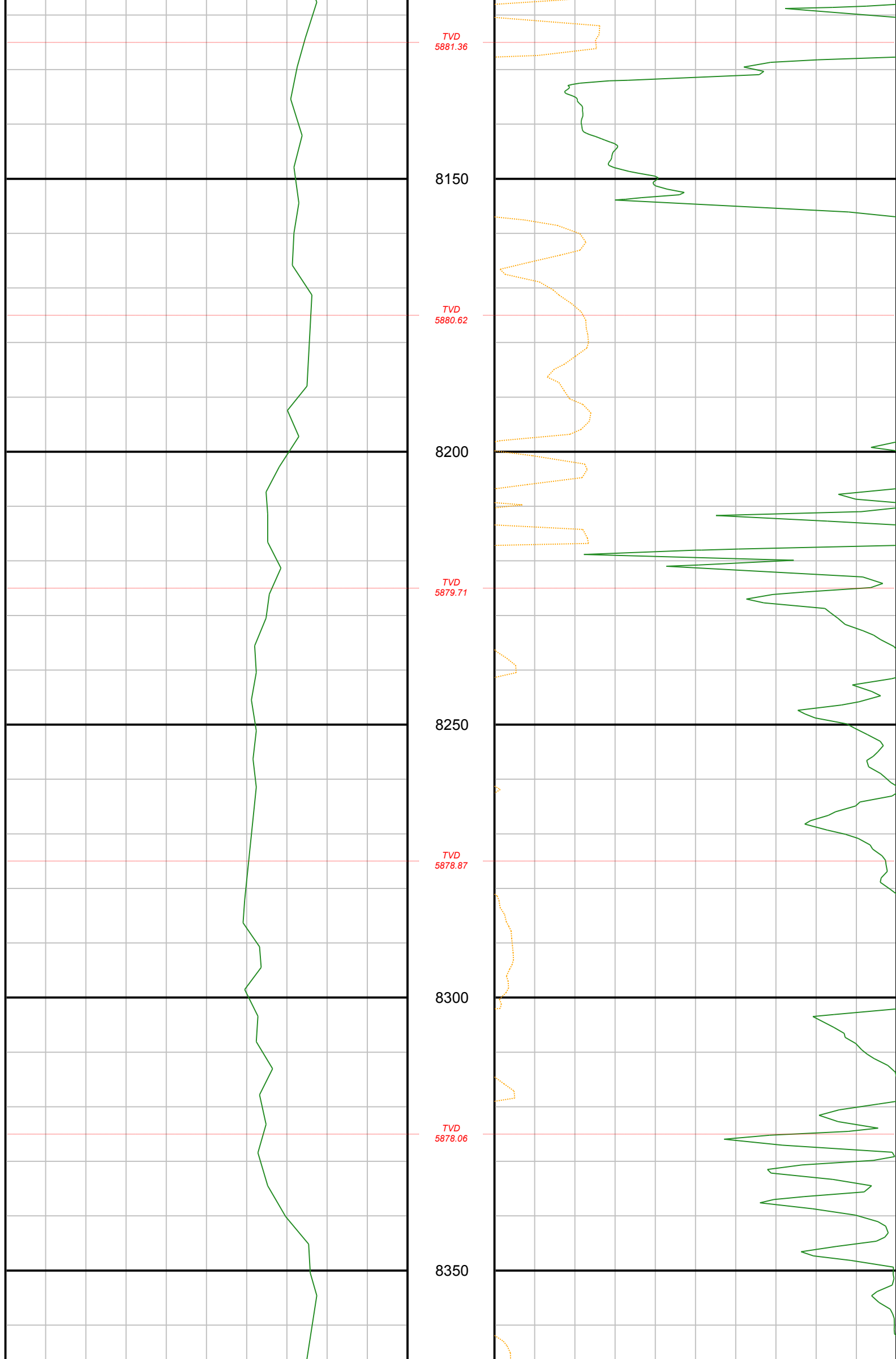


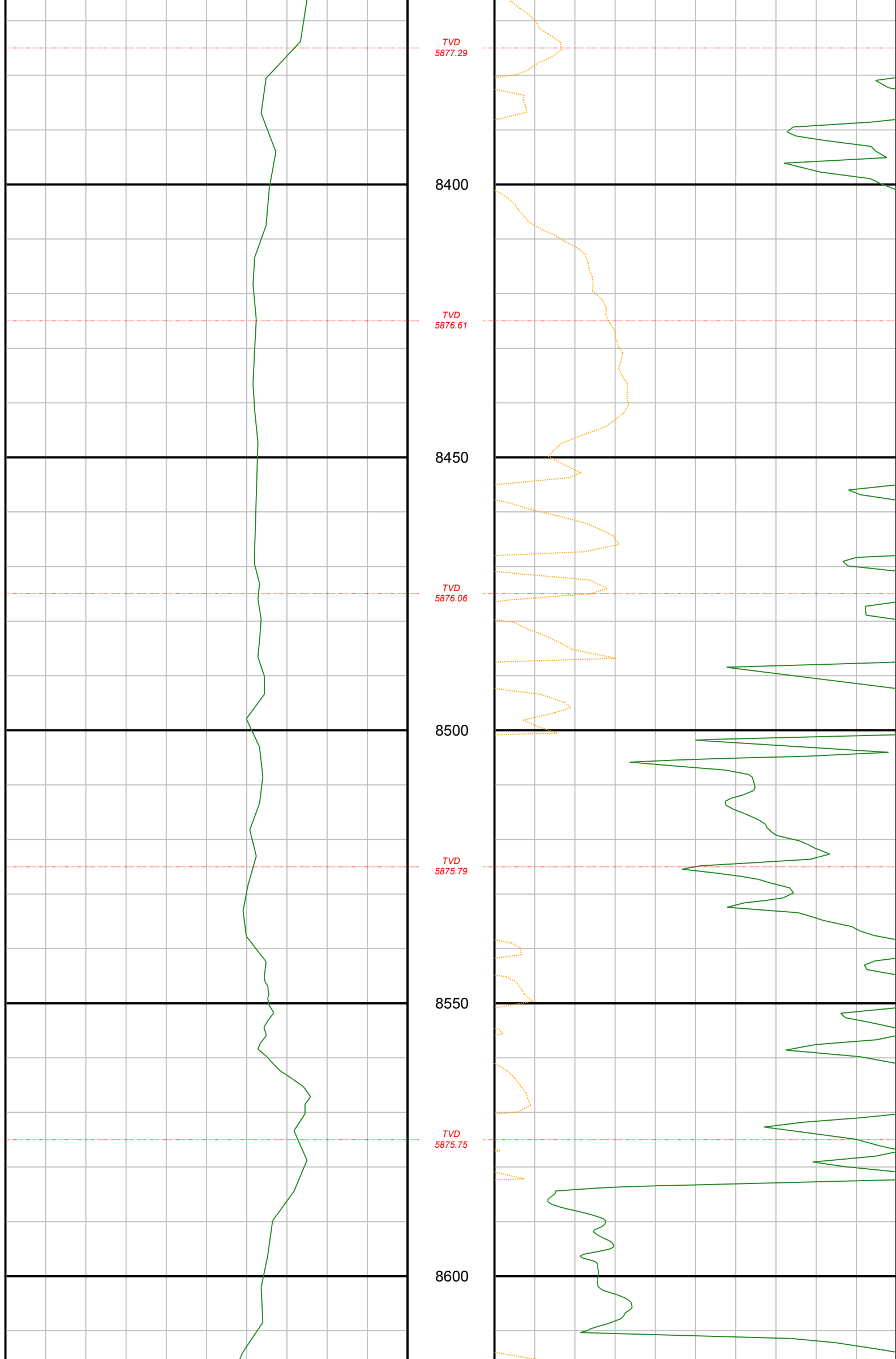


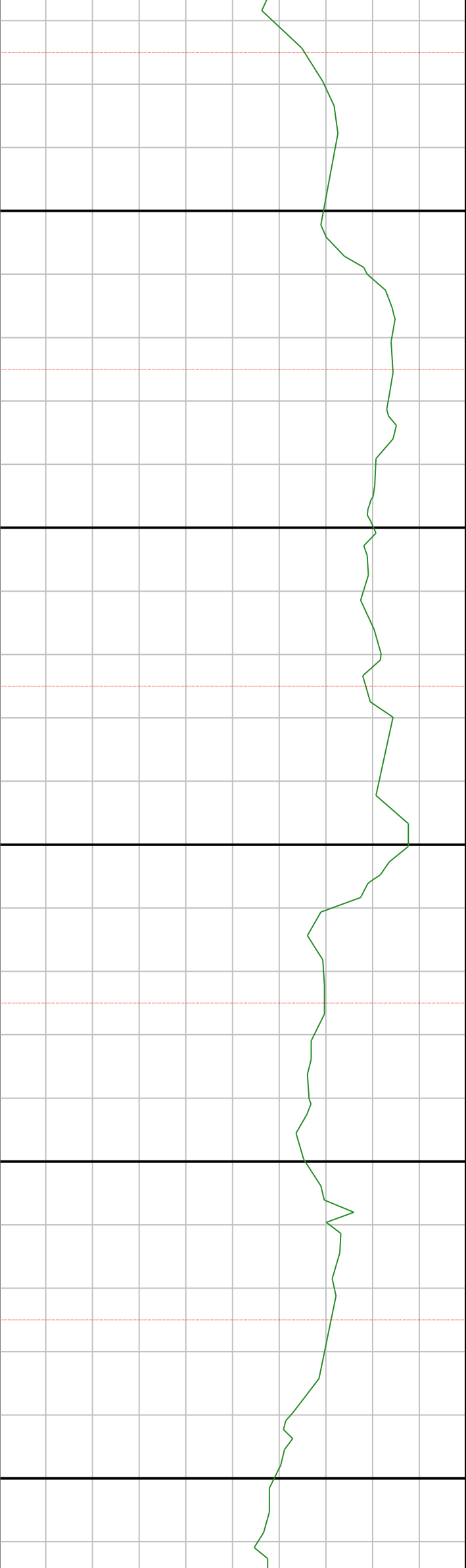












TVD  
5875.86

8650

TVD  
5876.26

8700

TVD  
5877.06

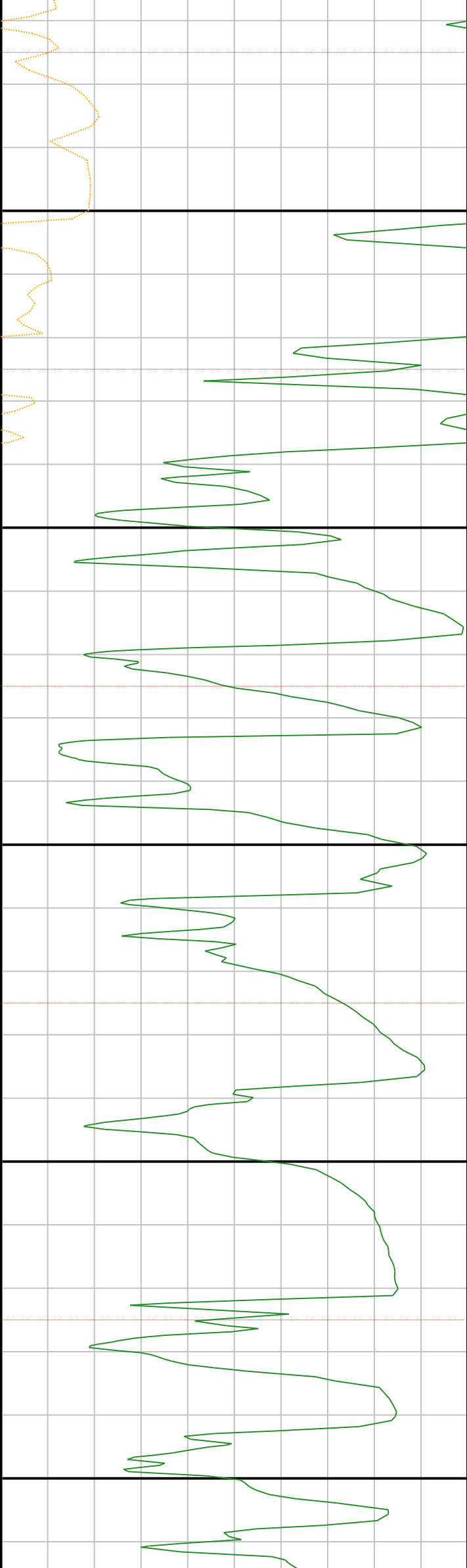
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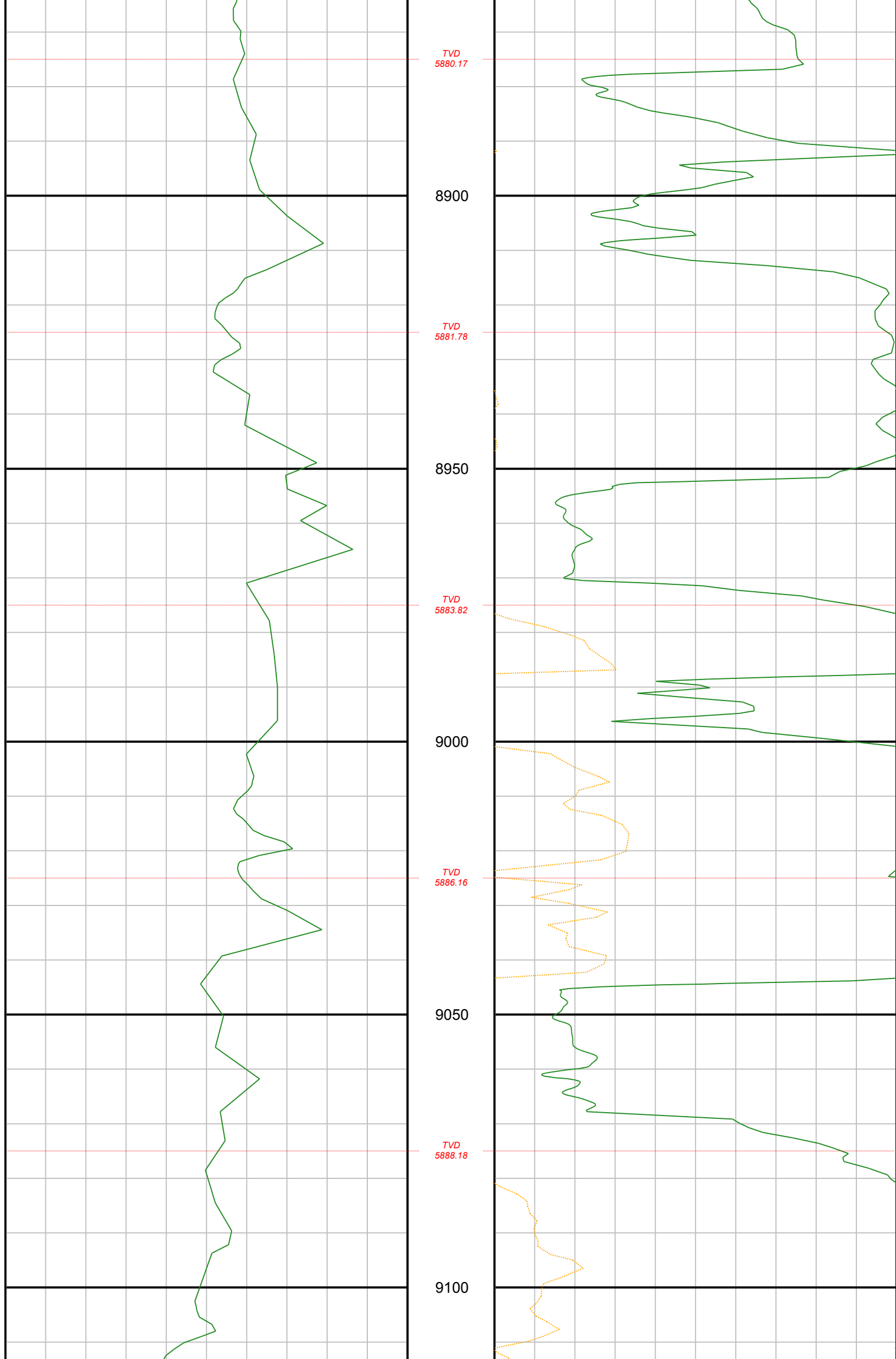
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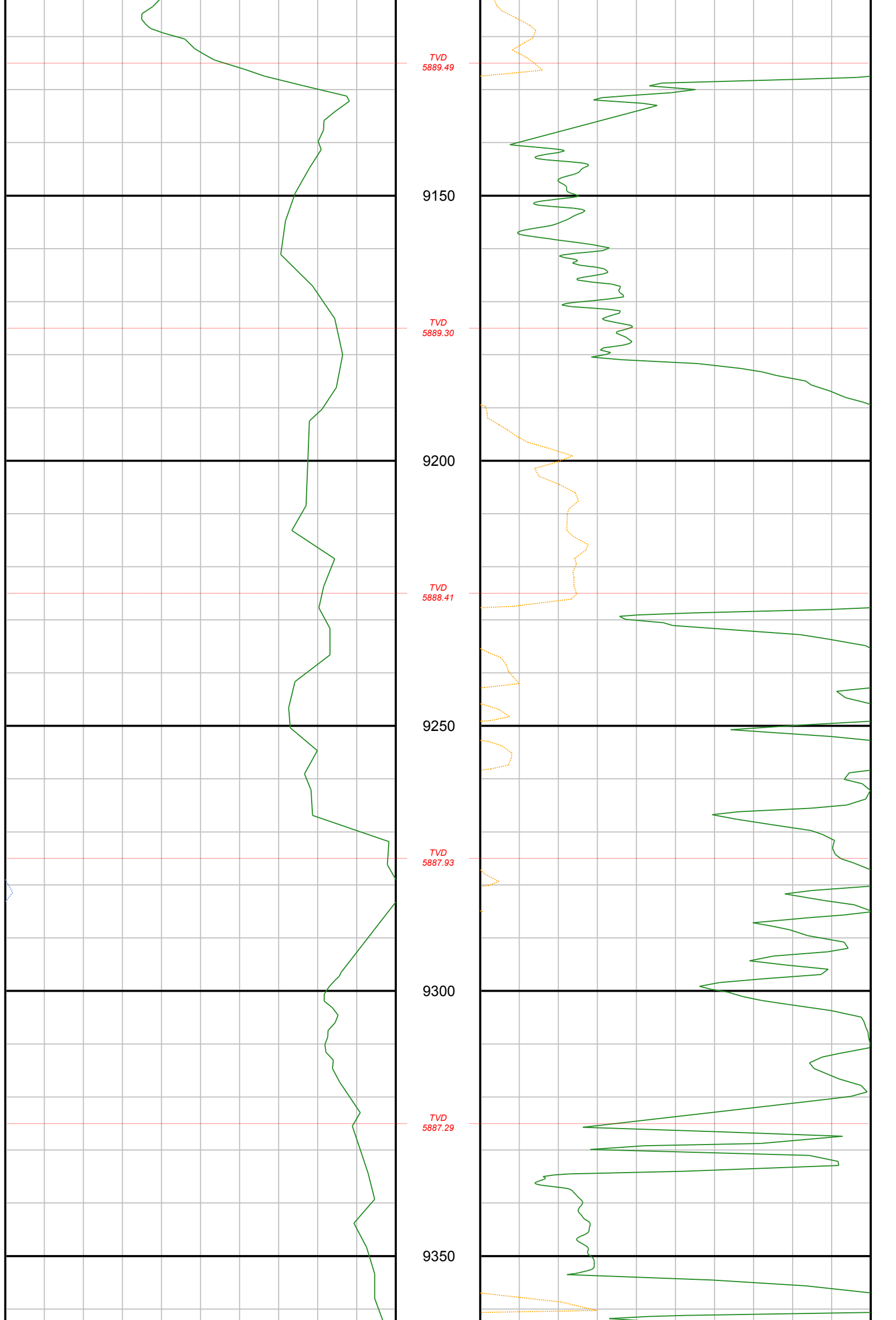
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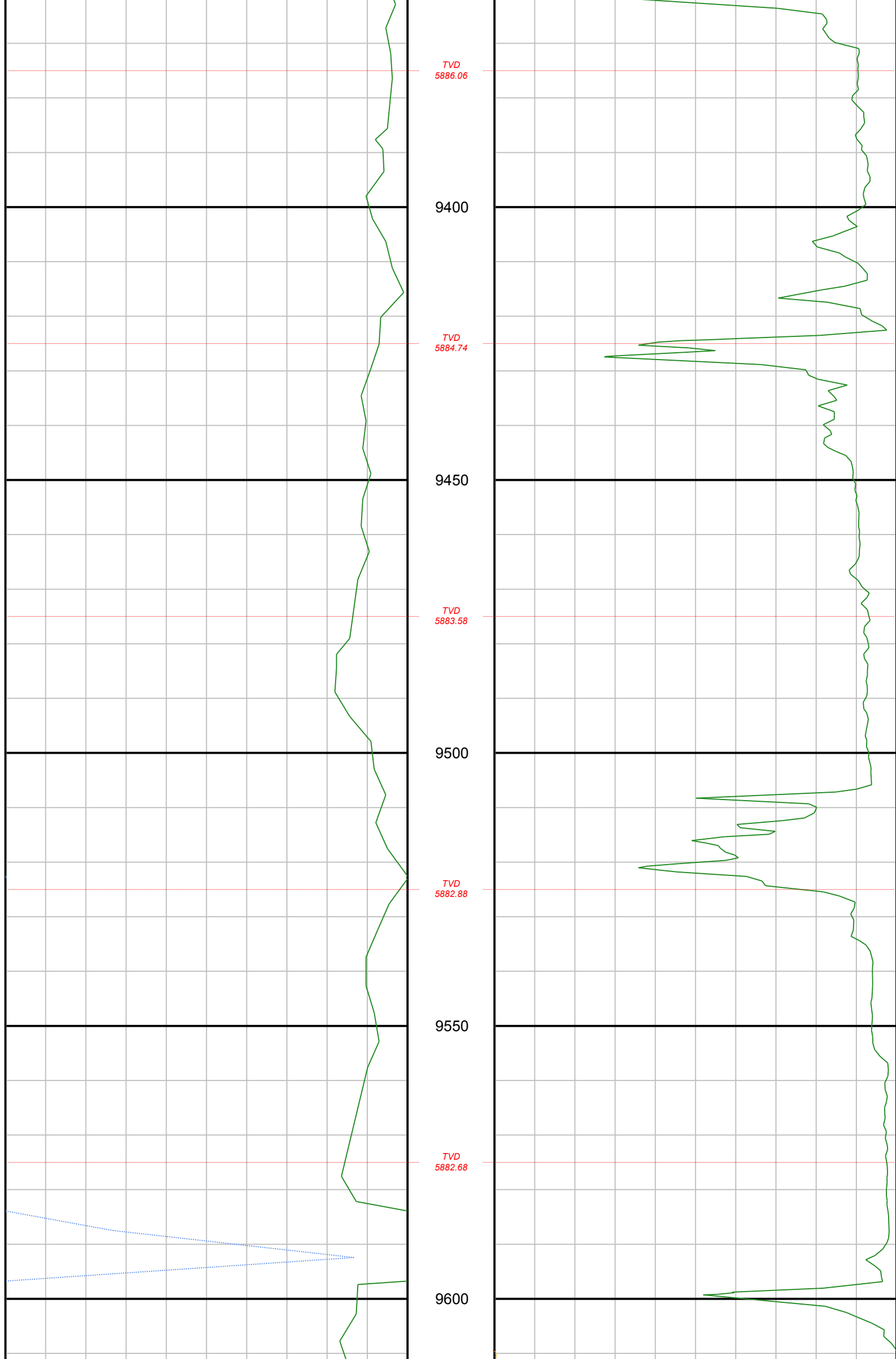
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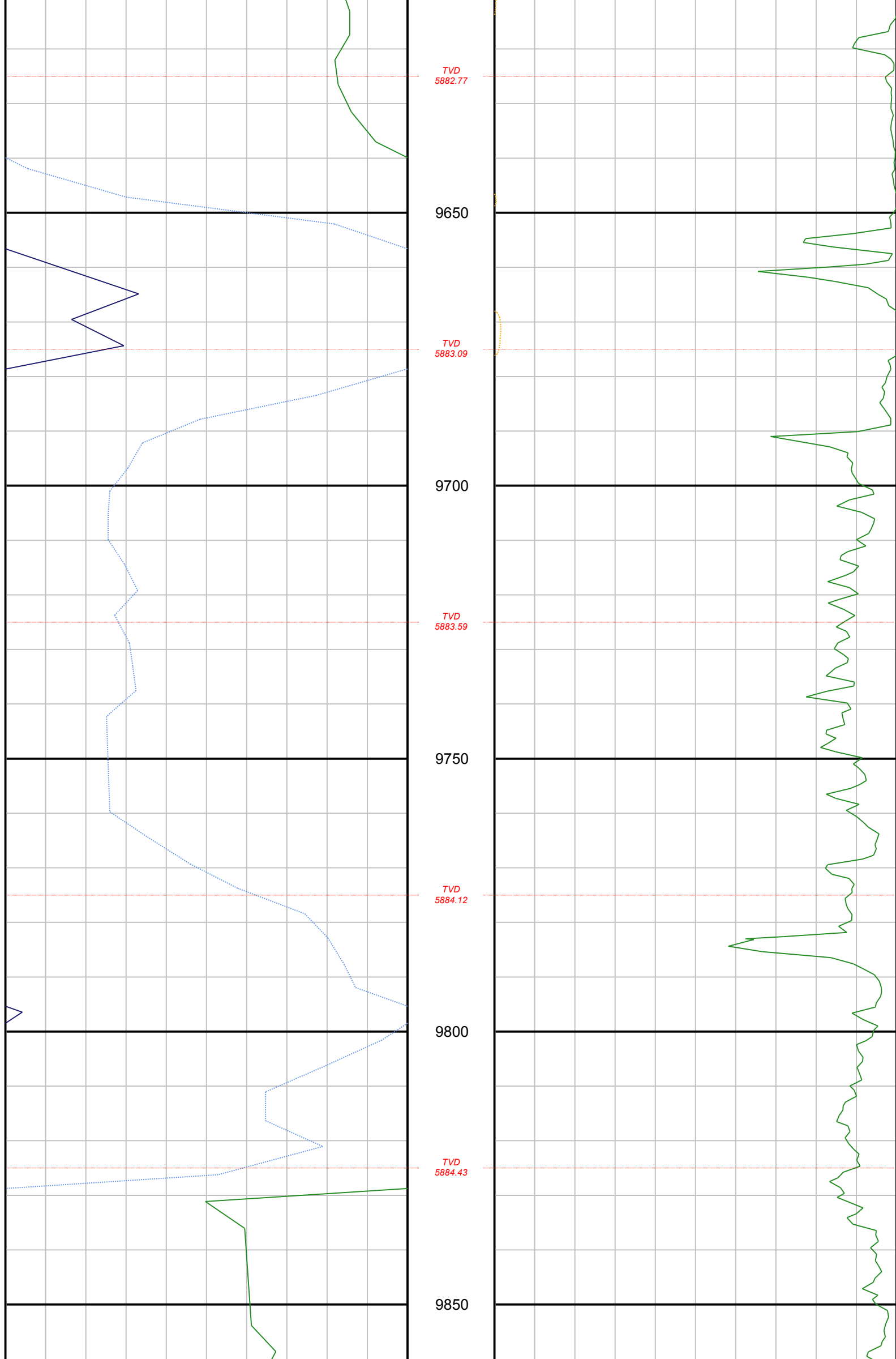


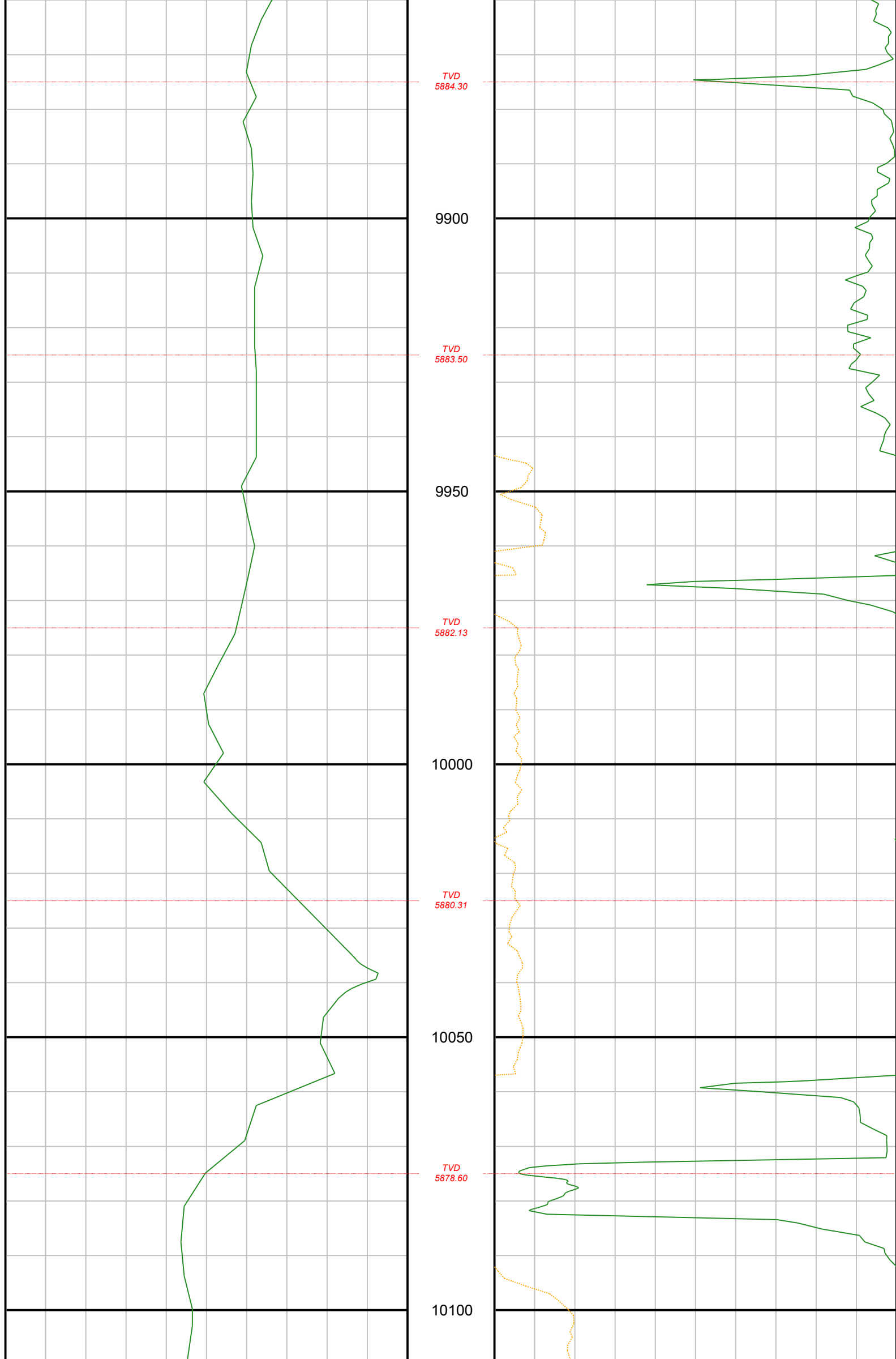


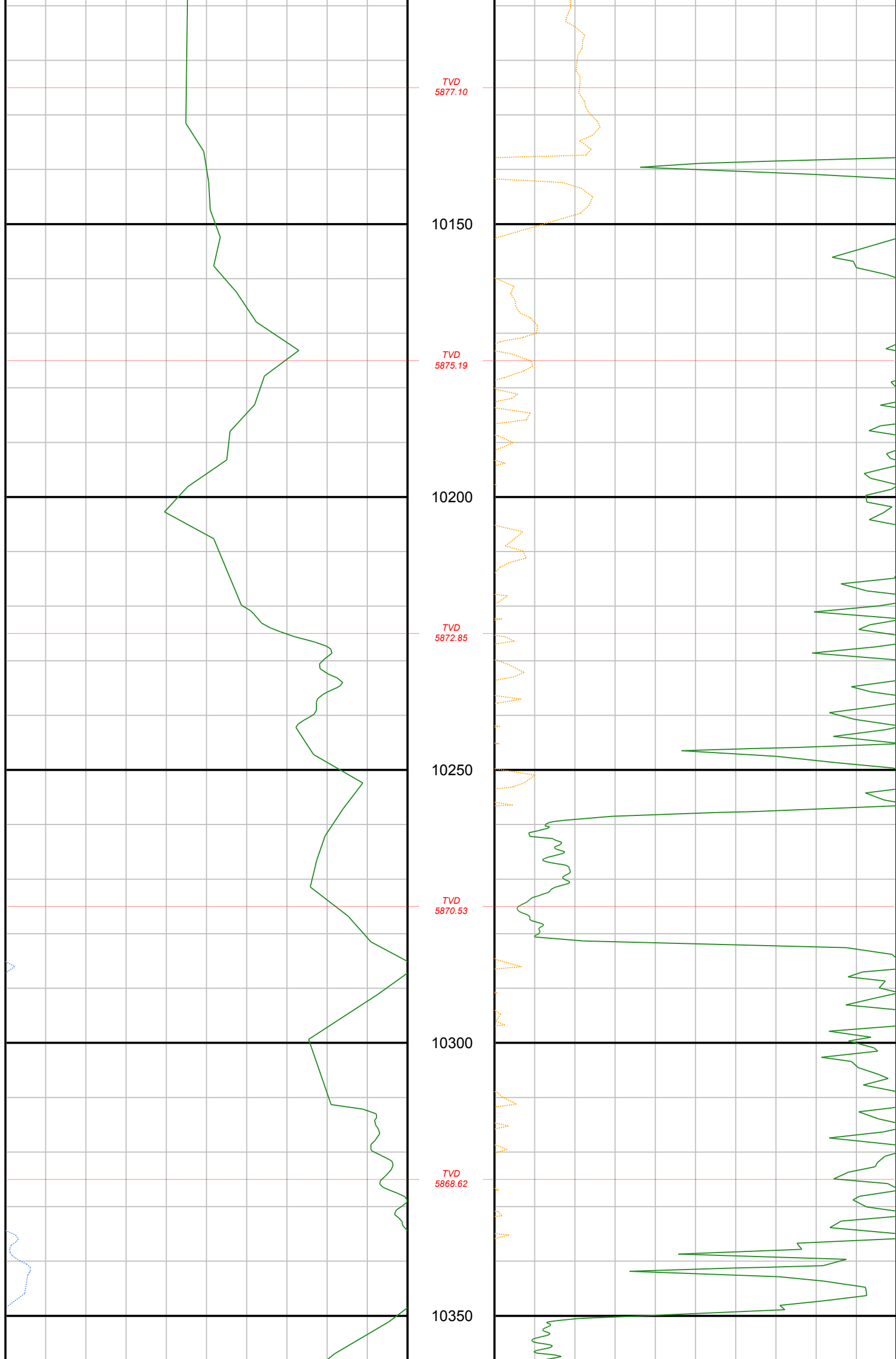


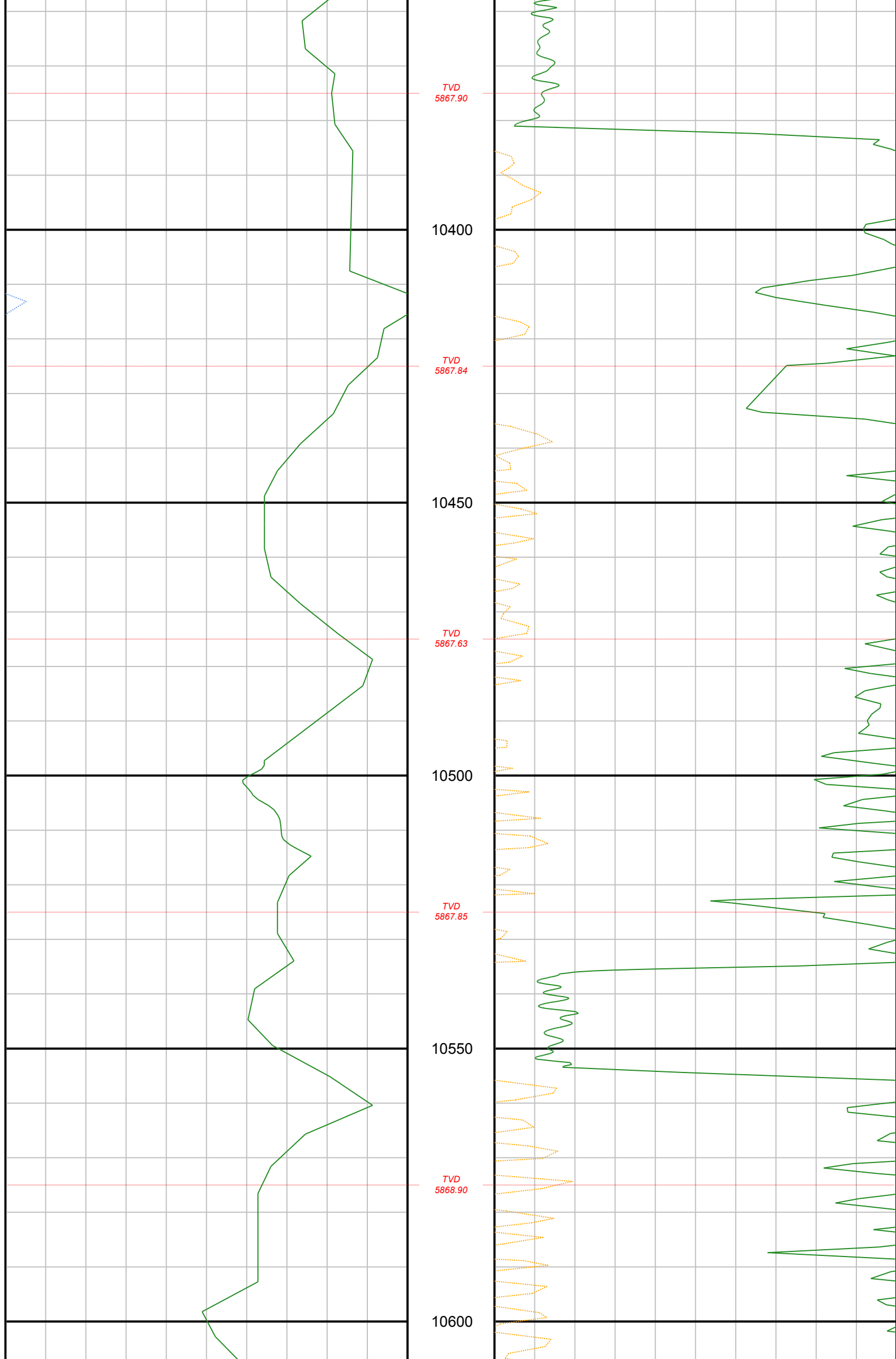


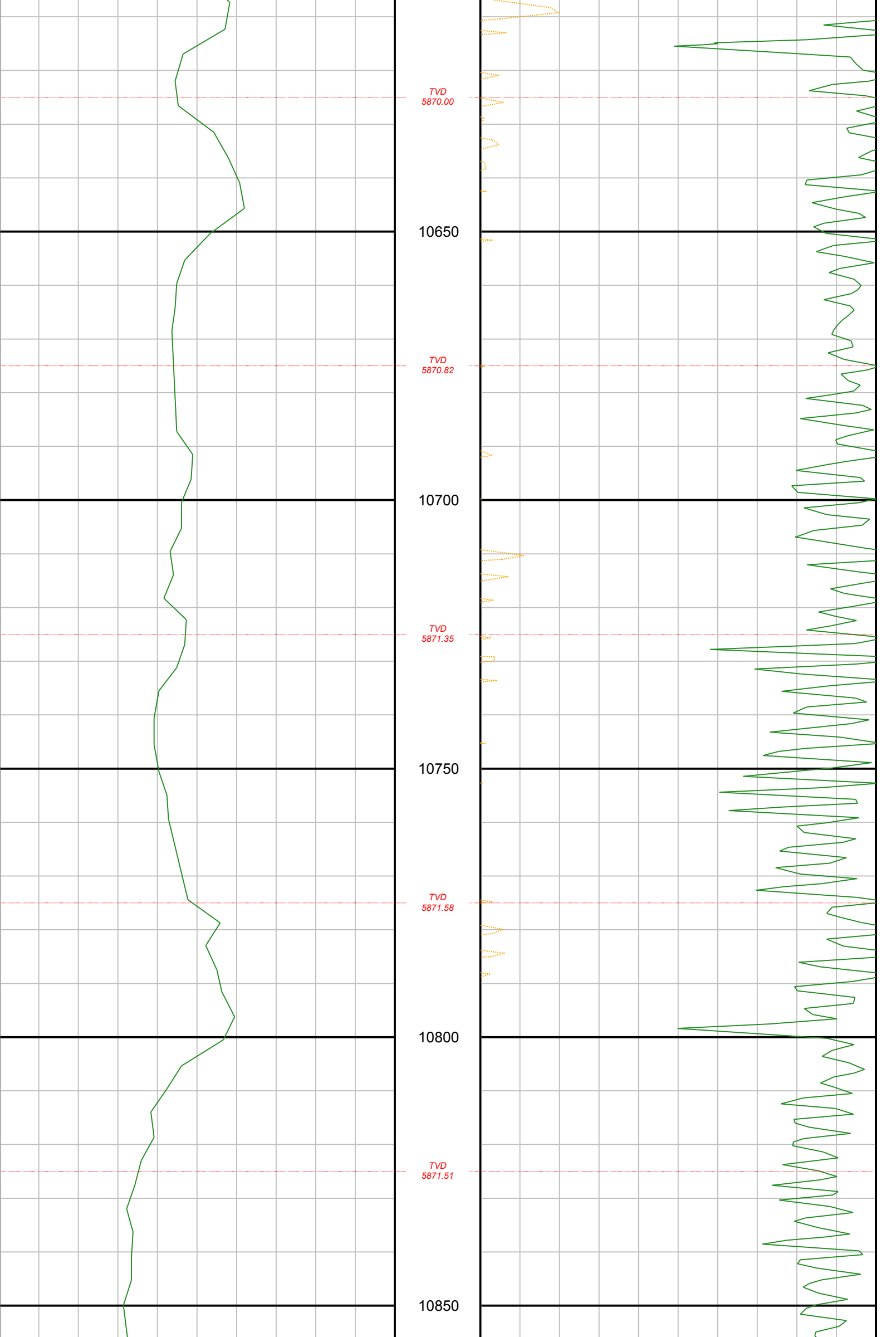


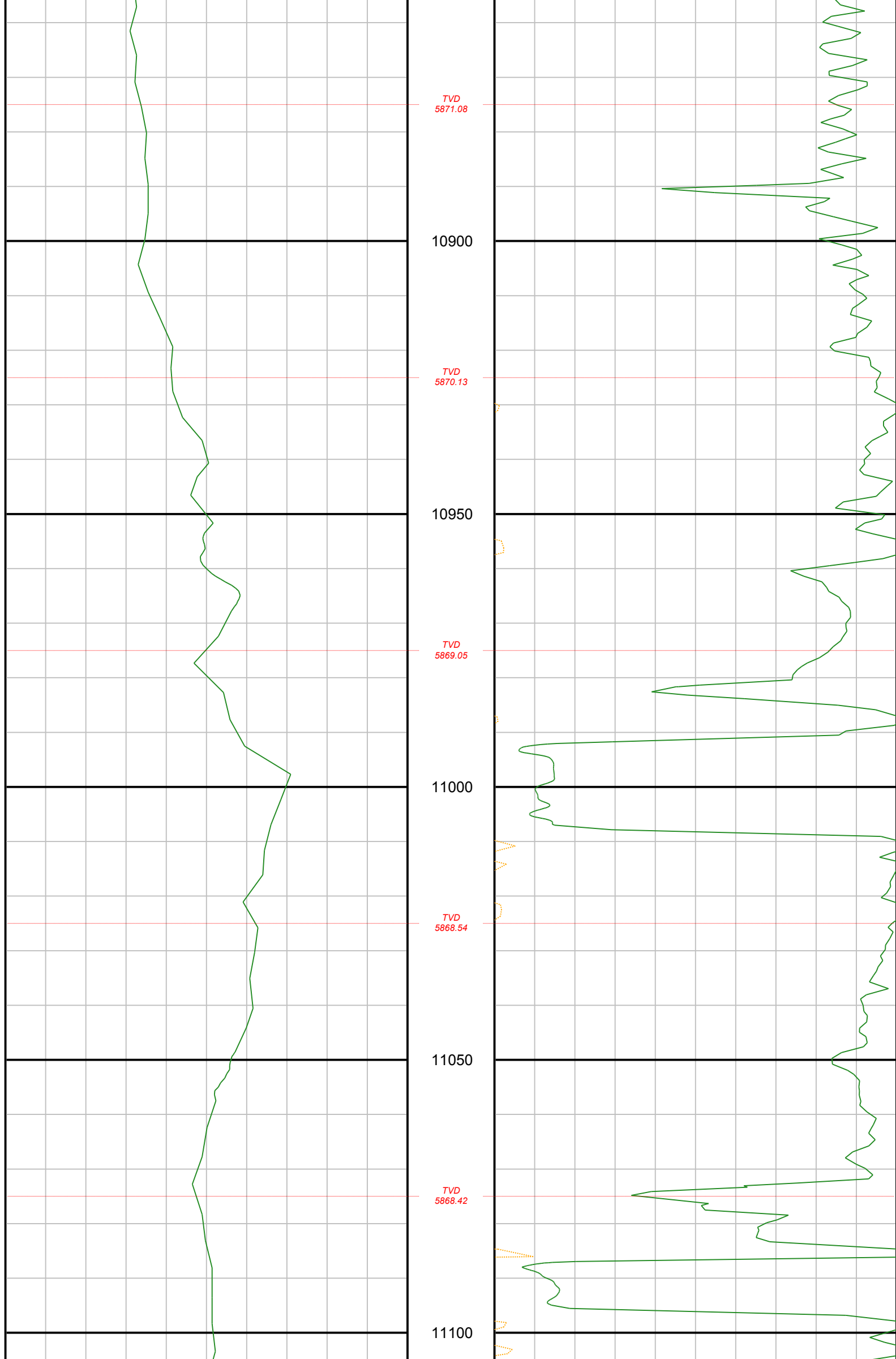




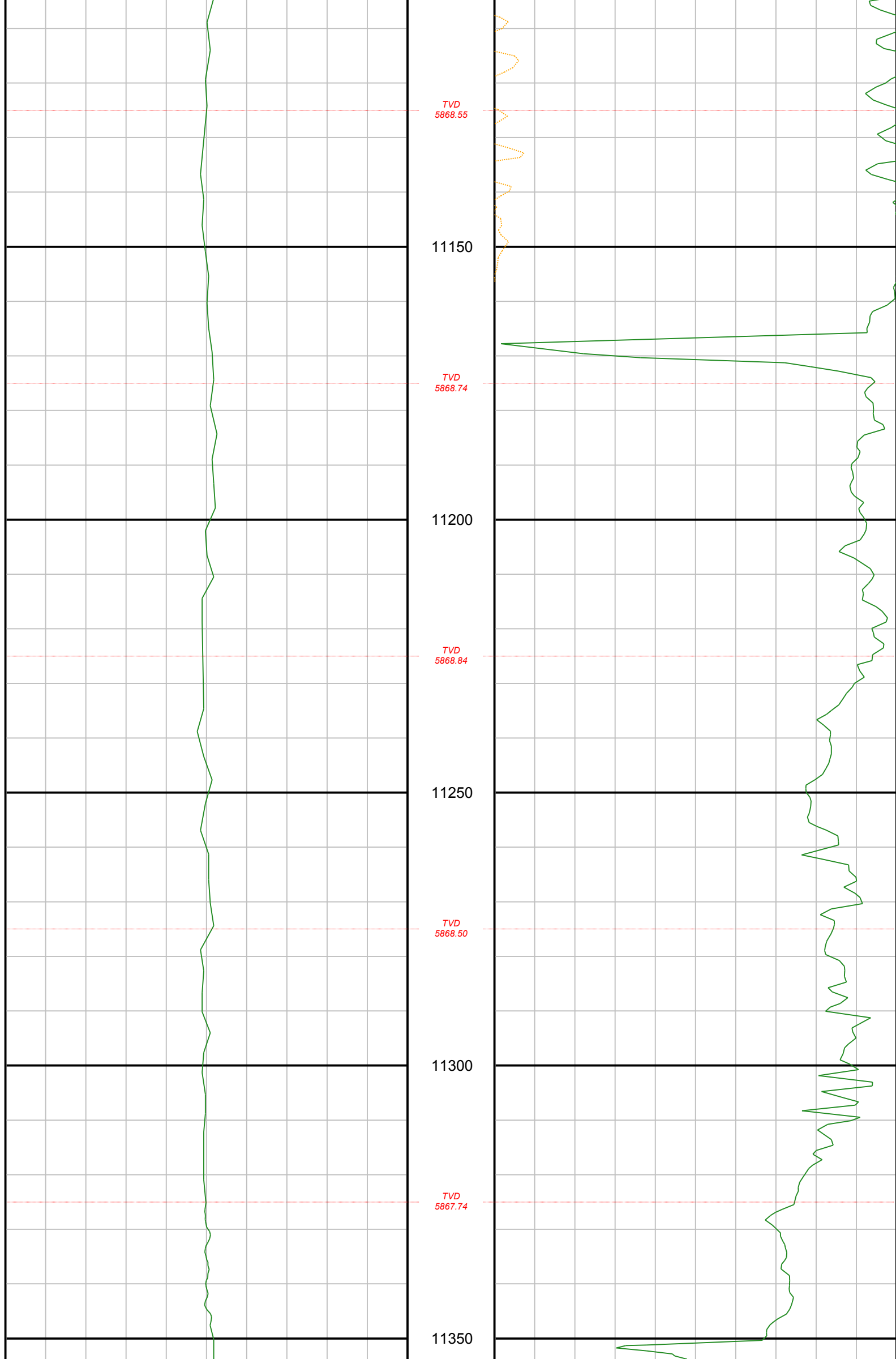


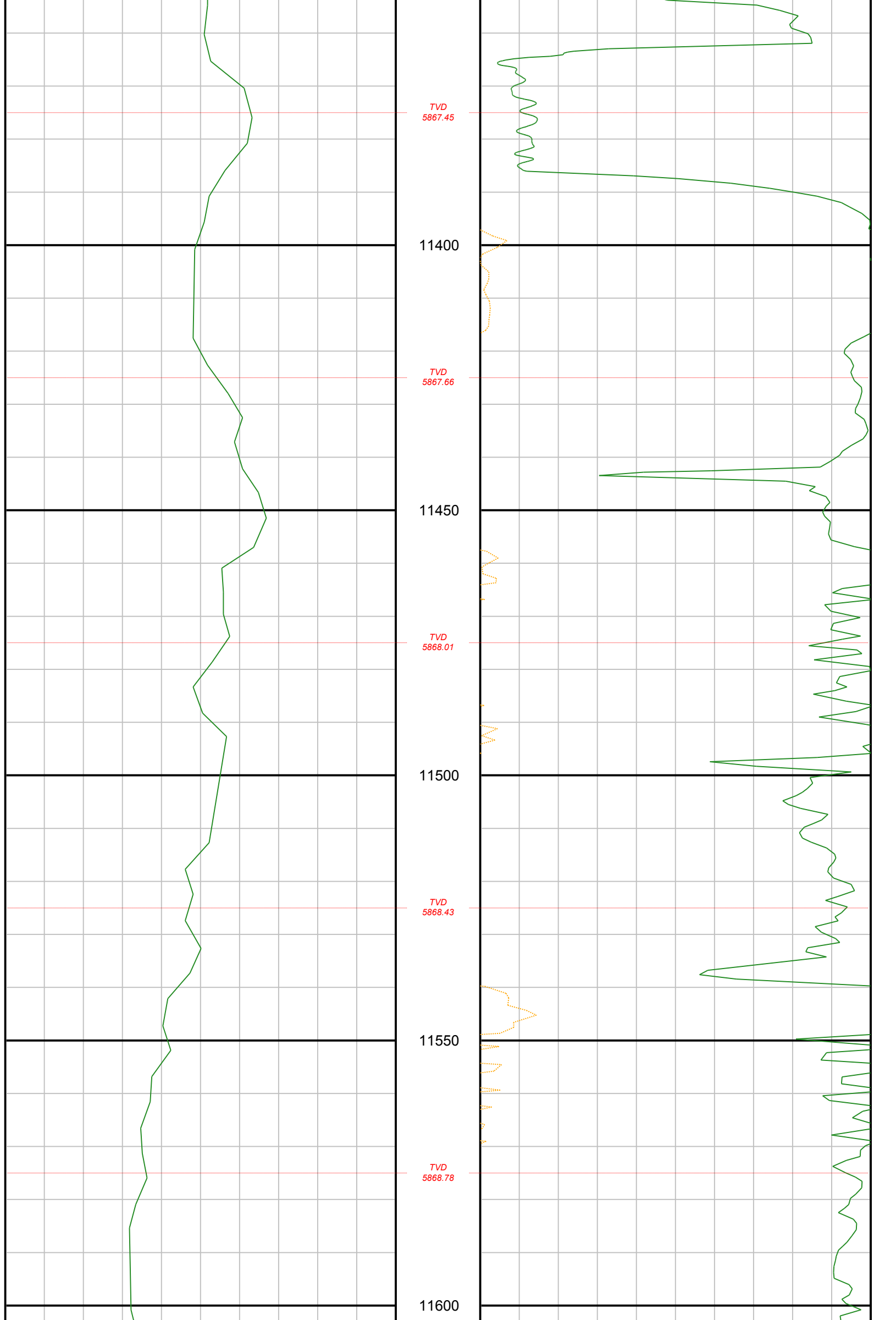


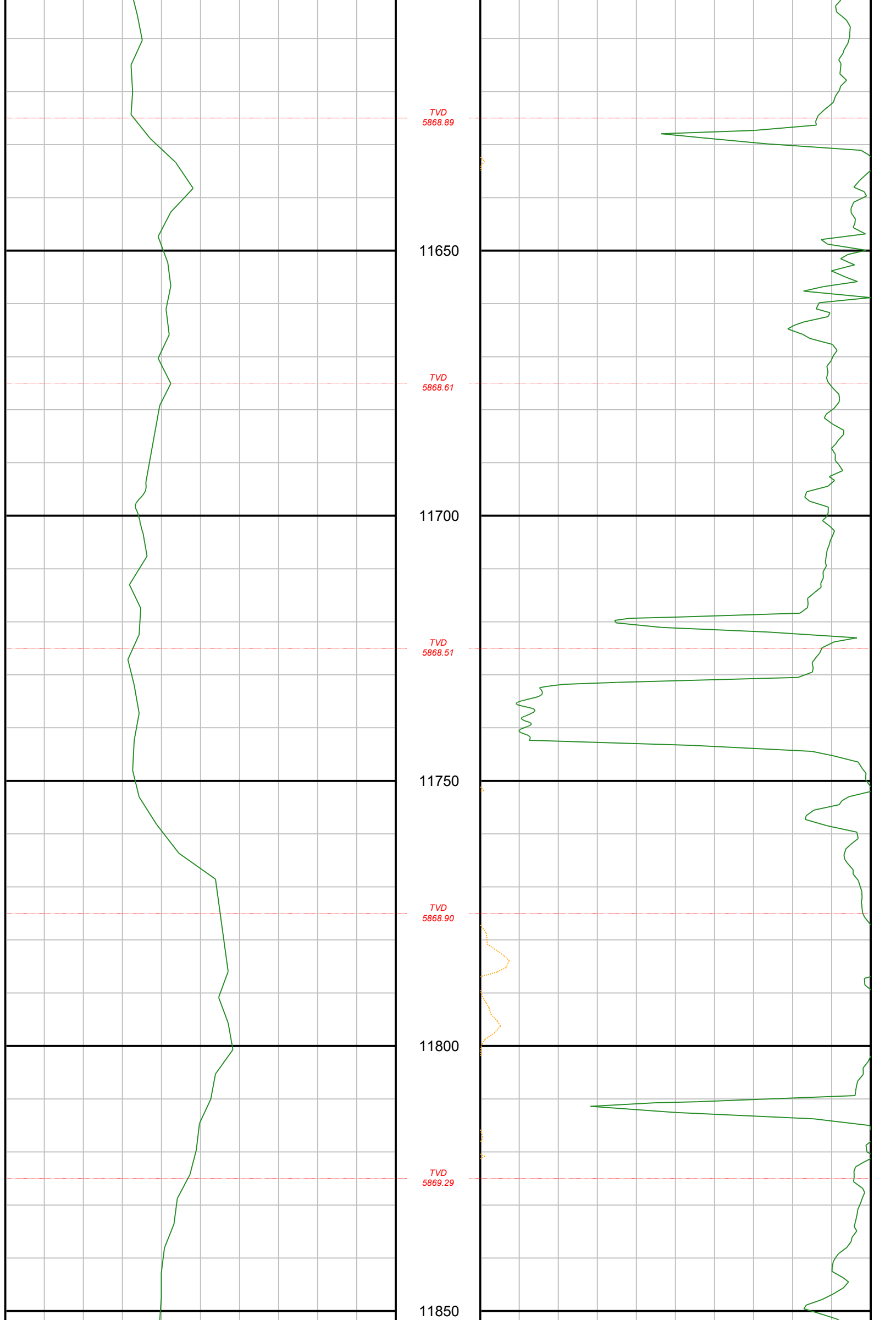


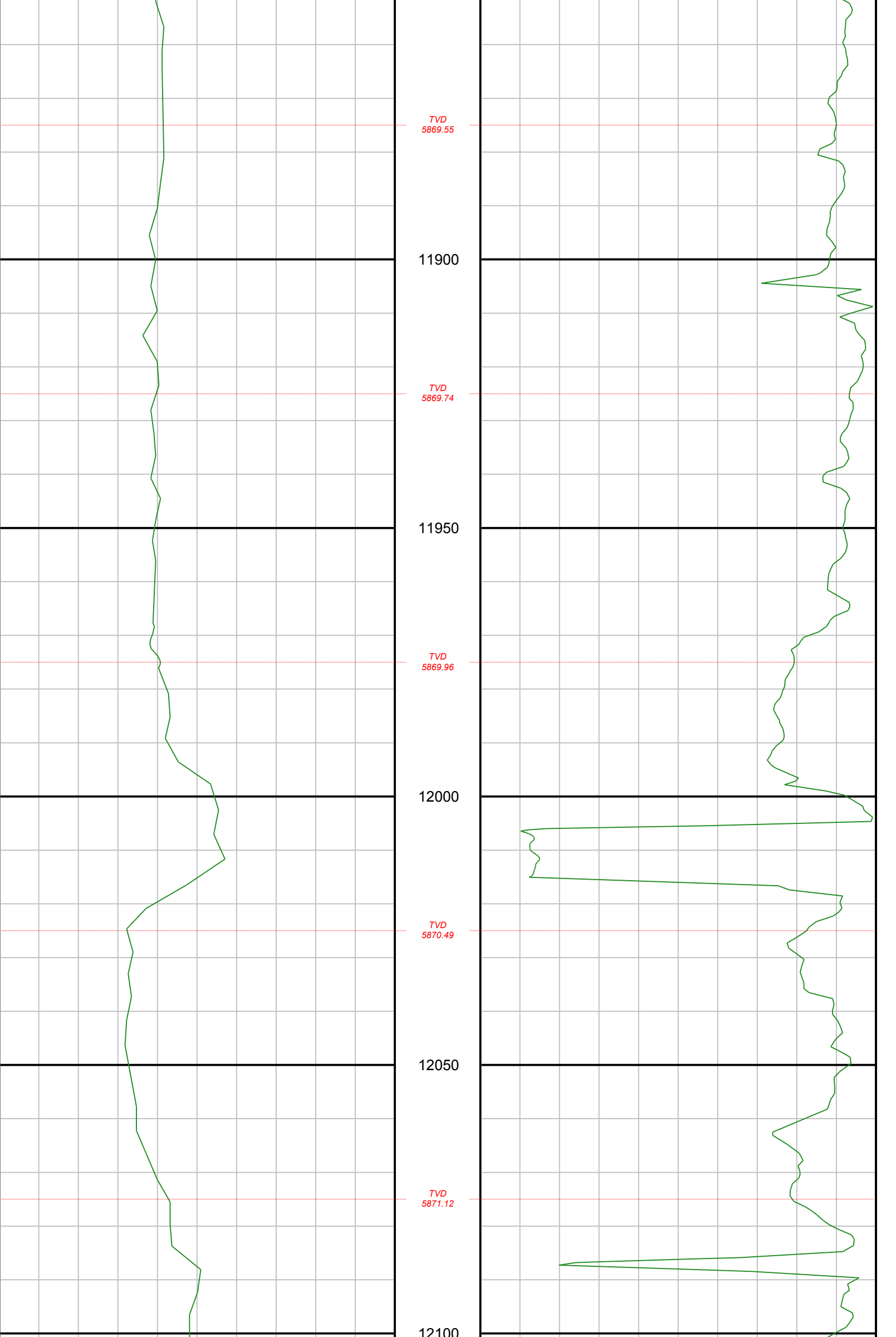


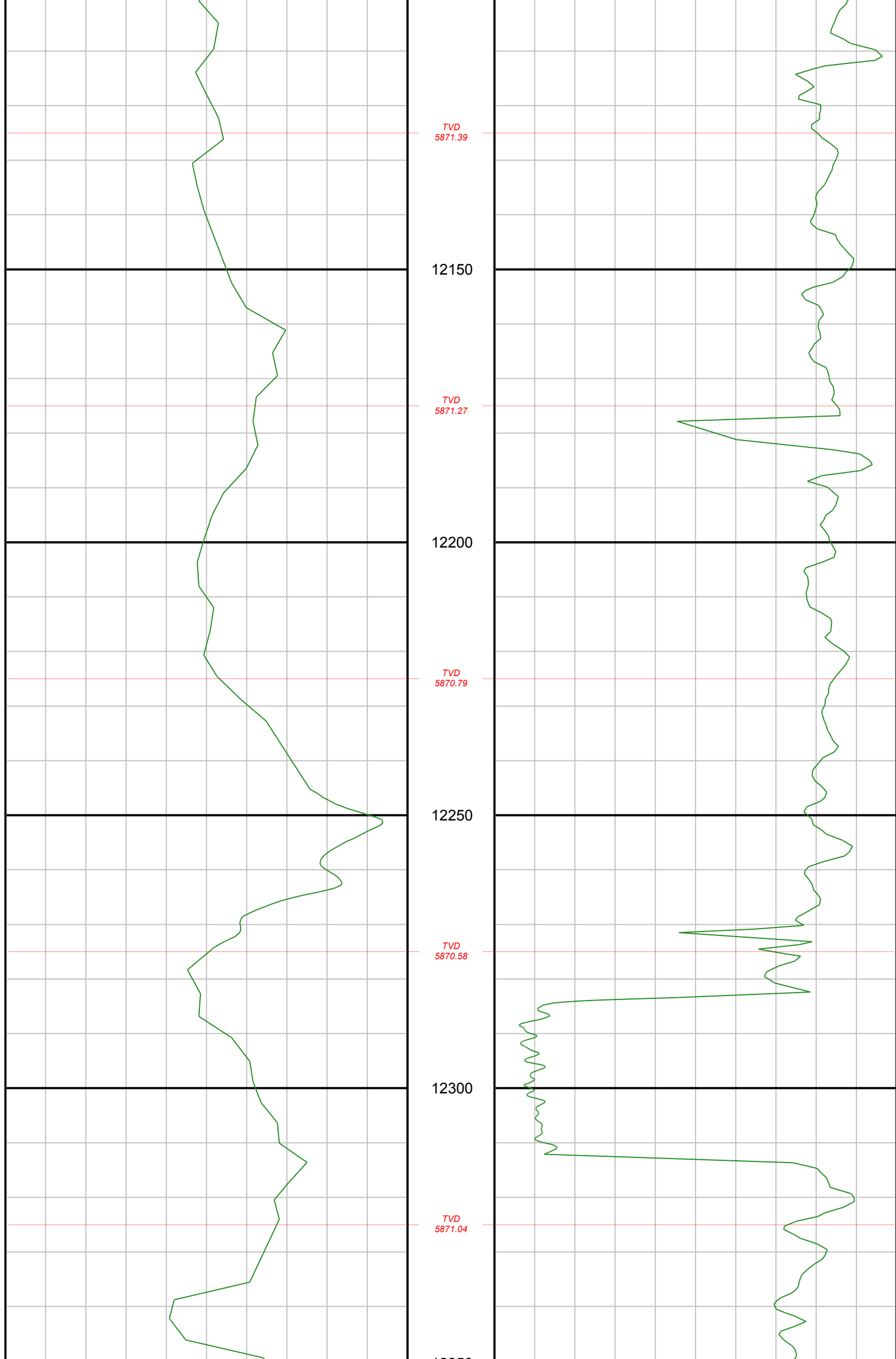


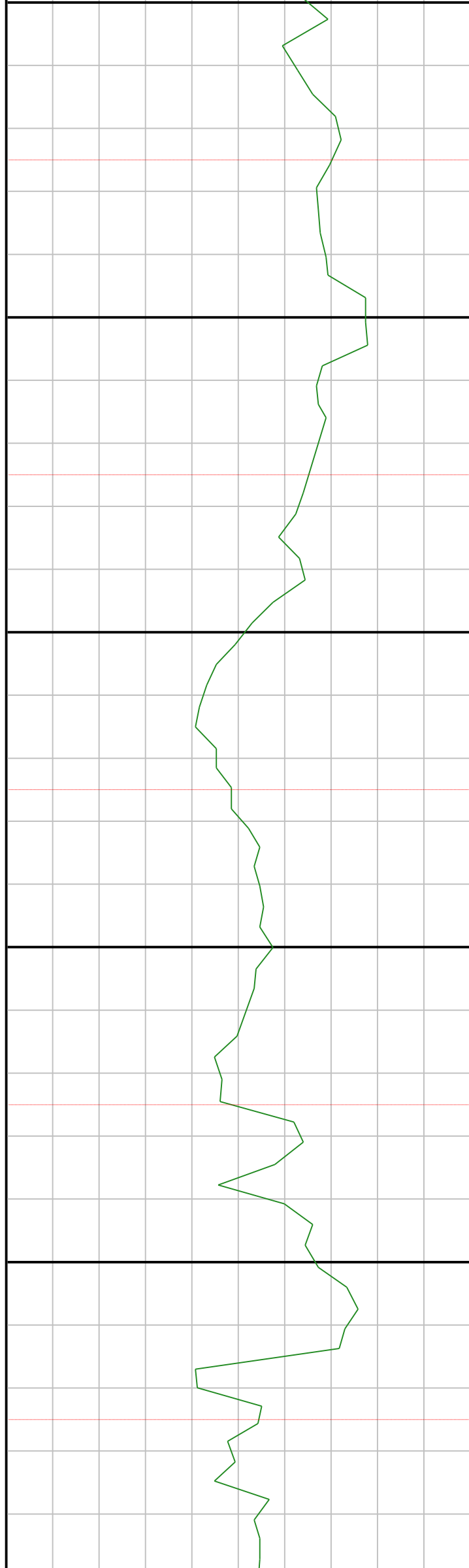












12350

TVD  
5871.55

12400

TVD  
5871.86

12450

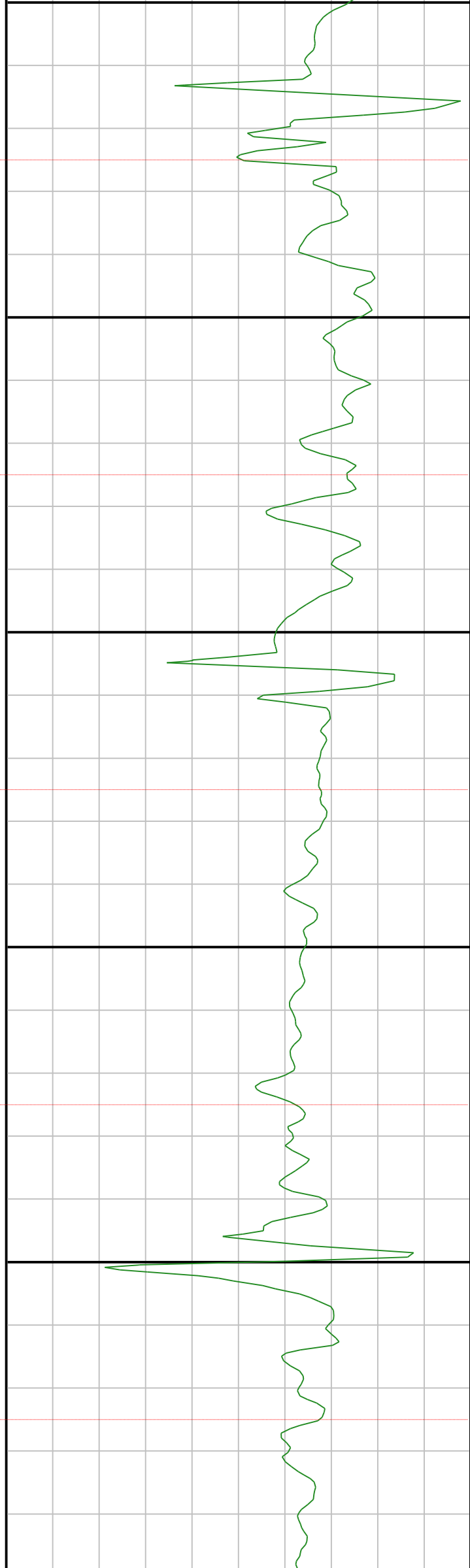
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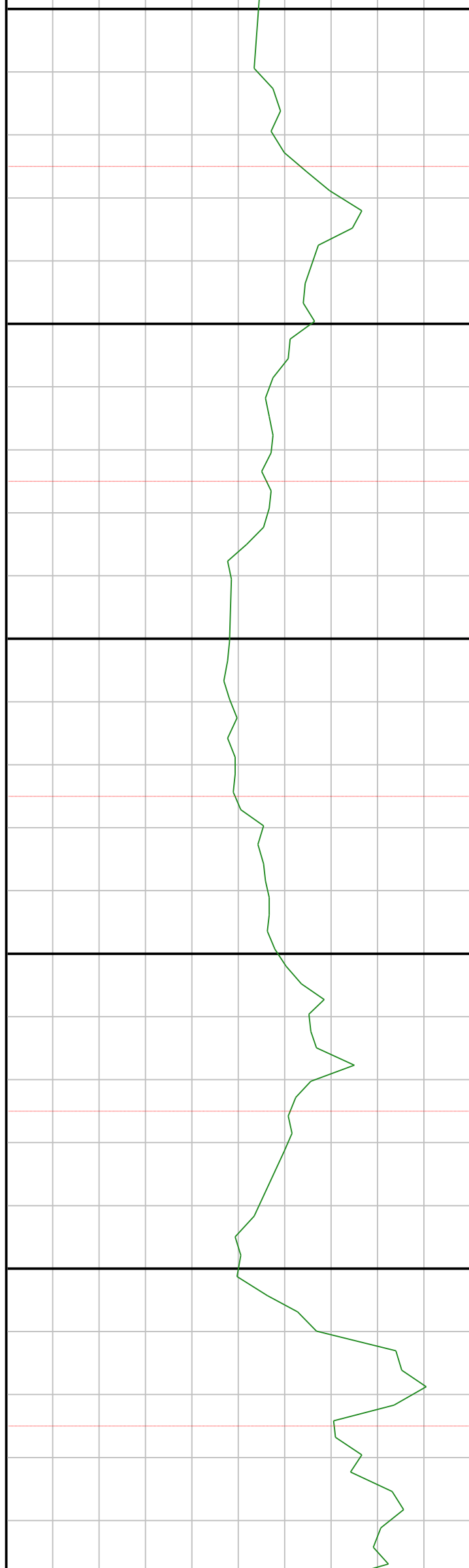
12500

TVD  
5871.81

12550

TVD  
5871.88





12600

TVD  
5872.03

12650

TVD  
5871.90

12700

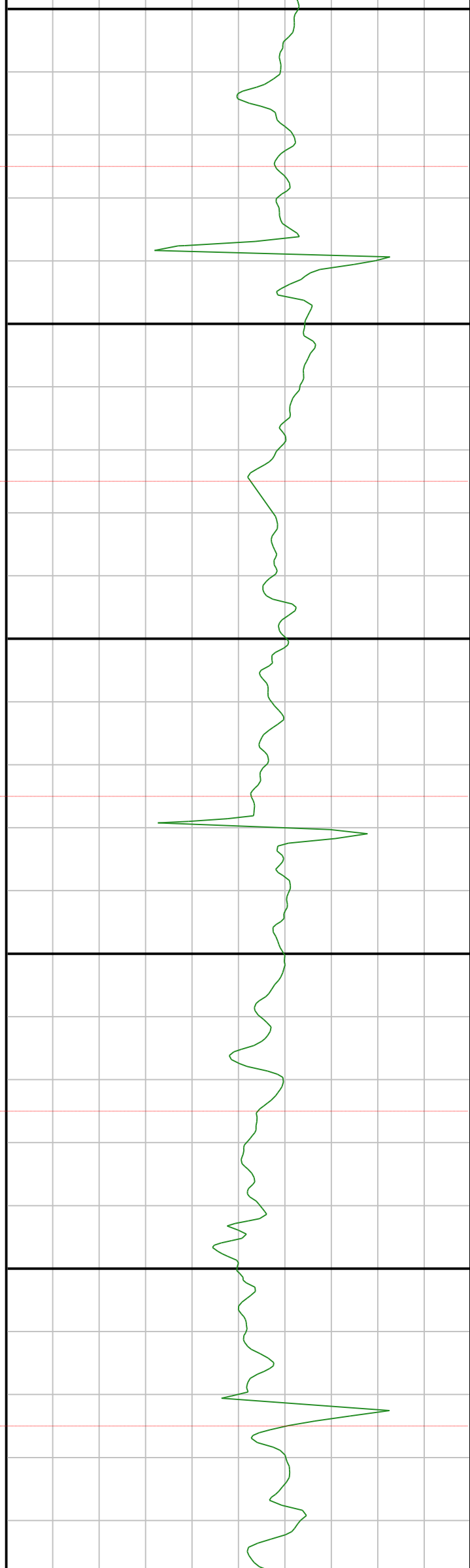
TVD  
5871.59

12750

TVD  
5871.29

12800

TVD  
5870.98





12850

TVD  
5870.64

12900

TVD  
5870.26

12950

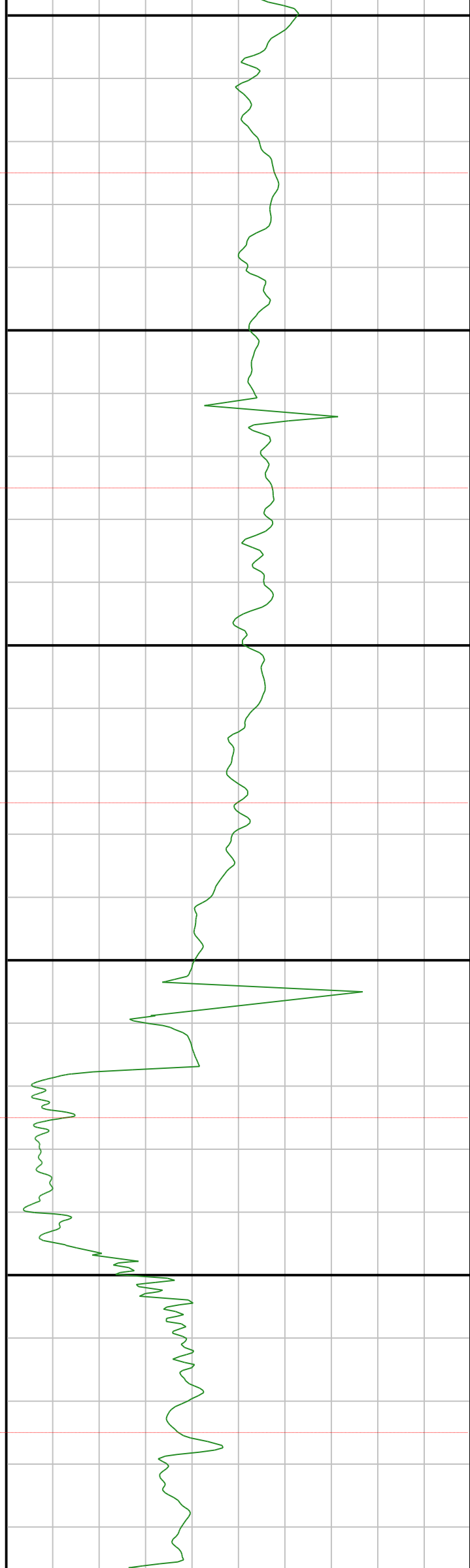
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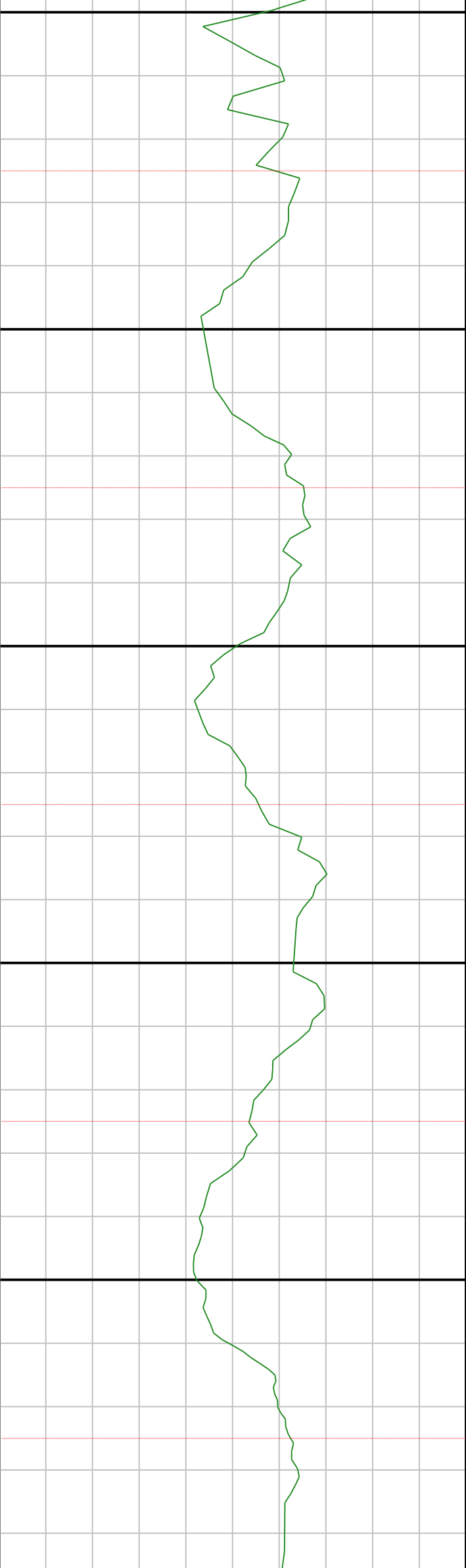
TVD  
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13050

TVD  
5871.43







13100

TVD  
5872.74

13150

TVD  
5874.06

13200

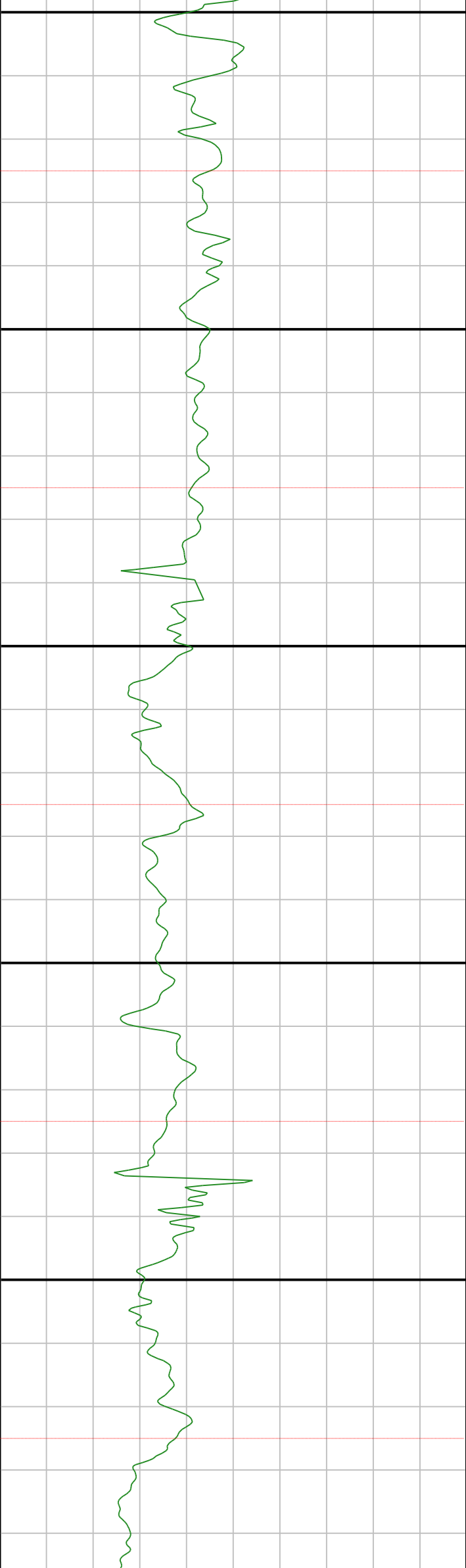
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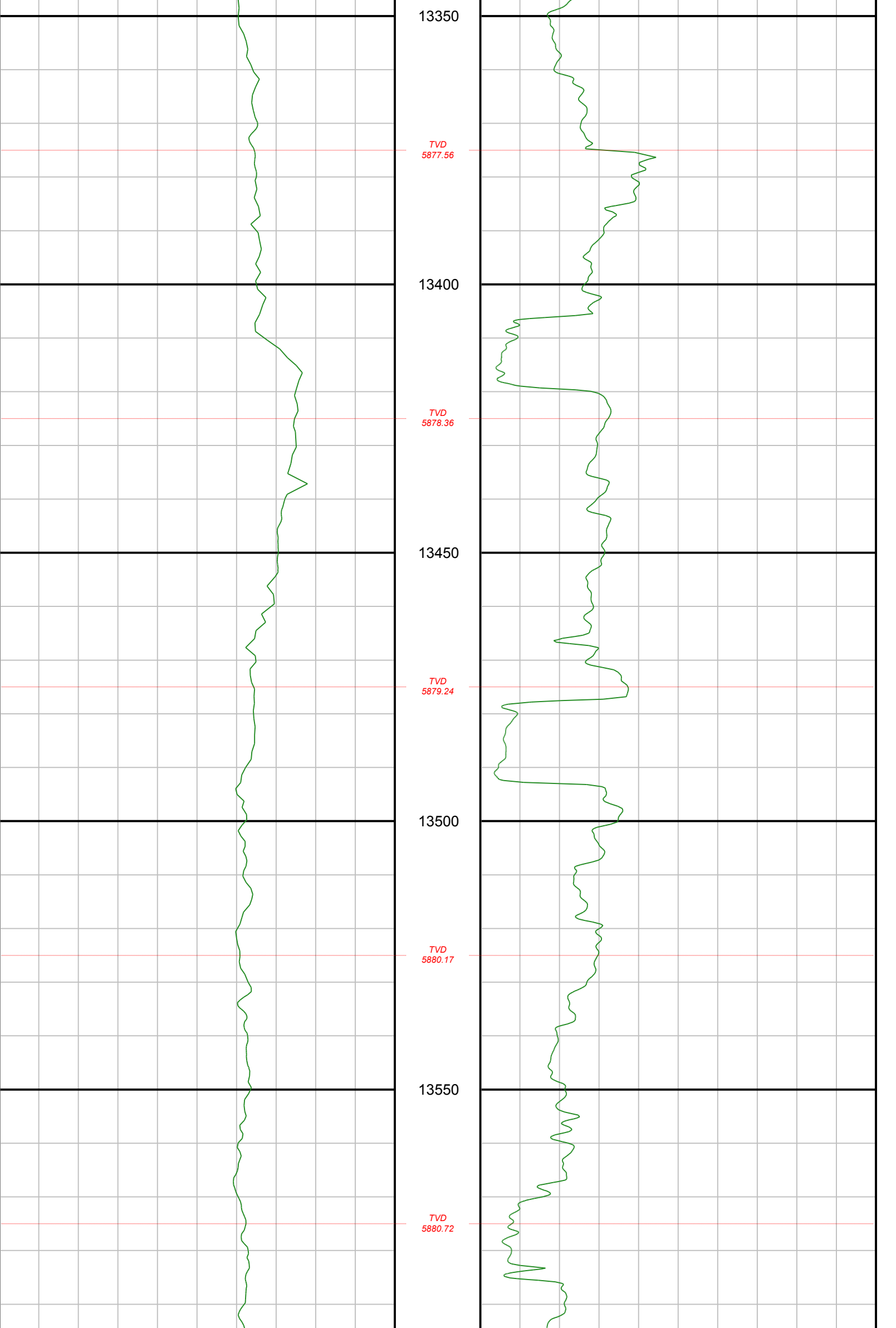
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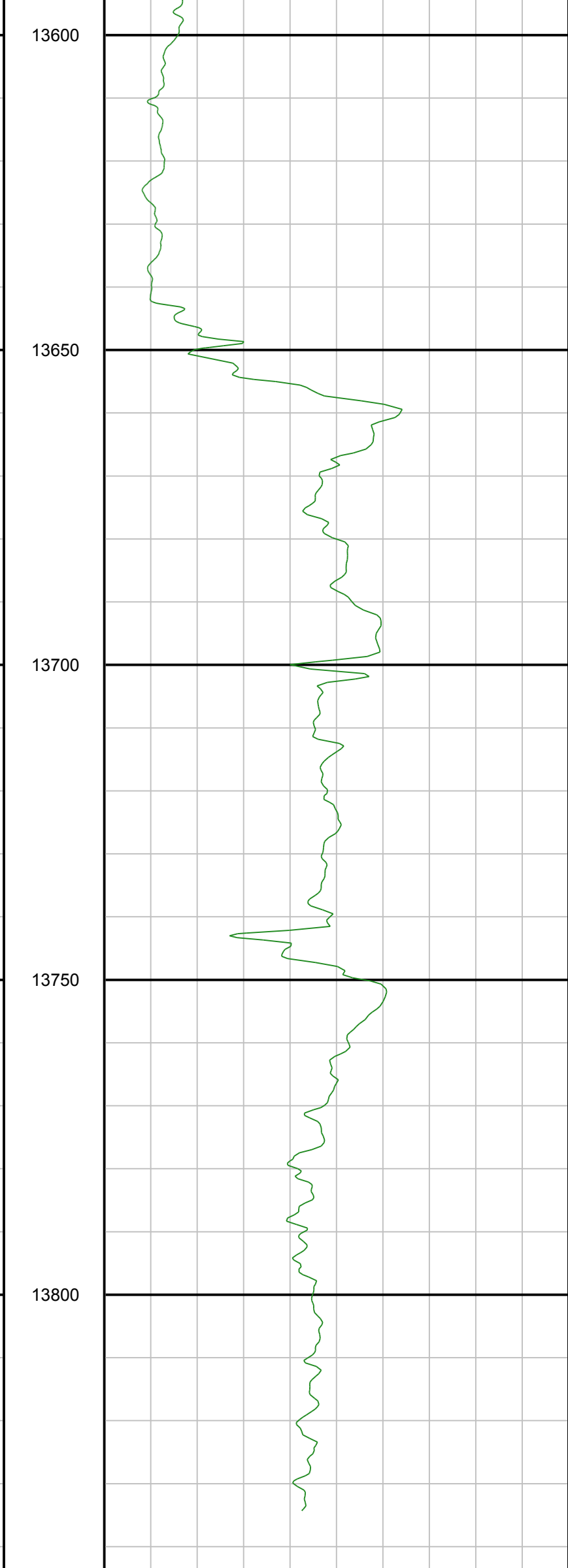
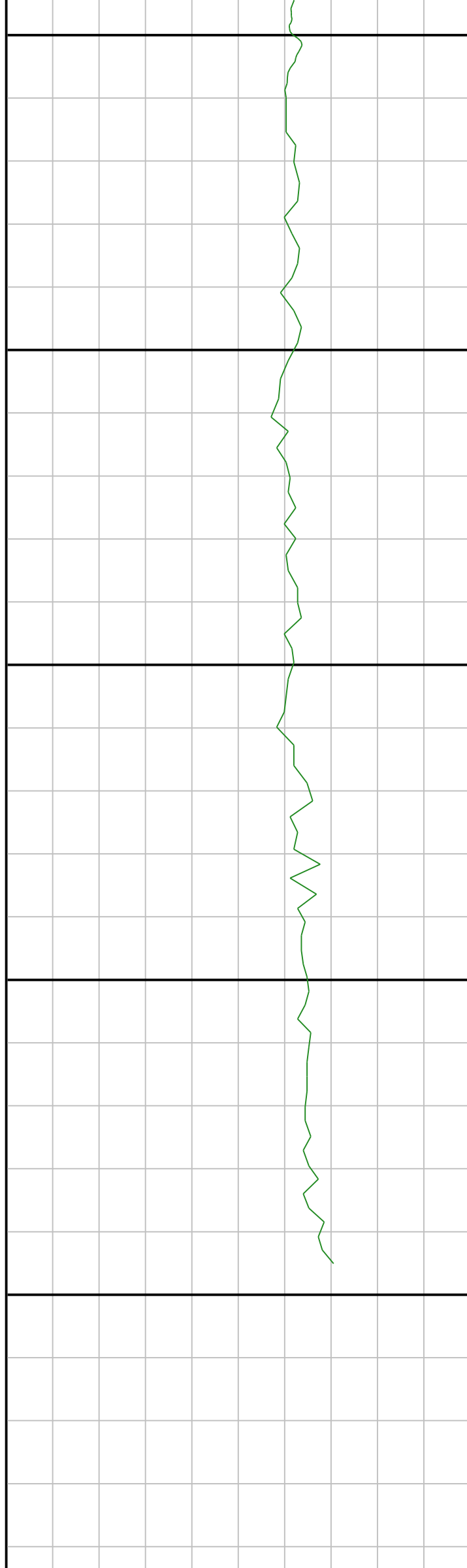
TVD  
5876.17

13300

TVD  
5876.89







Gamma								Gama	
0	AAPI								200
Gamma								Gama	
200	AAPI								400
Gamma								Gama	
400	AAPI								600
Gamma								Gama	
600	AAPI								800

13850

ROP								ROP	
0	ft/hr								300
ROP								ROP	
300	ft/hr								600
ROP								ROP	
600	ft/hr								900
ROP								ROP	
900	ft/hr								1200

Survey Information

Seq	MD (ft)	Inc (°)	Azm (°)	TVD (ft)	V Sec (ft)	N/-S (ft)	E/-W (ft)	DLS (°/100ft)	Bld Rate (°/ft)
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	324.00	0.34	111.54	324.00	0.46	-0.35	0.89	0.10	0.00
3	417.00	0.78	101.57	416.99	0.79	-0.58	1.77	0.48	0.00
4	509.00	1.73	96.90	508.97	1.31	-0.87	3.76	1.04	0.01
5	601.00	3.13	97.50	600.89	2.26	-1.37	7.63	1.52	0.02
6	694.00	4.15	91.98	693.70	3.39	-1.82	13.51	1.16	0.01
7	786.00	6.36	91.05	785.30	4.59	-2.02	21.94	2.40	0.02
8	879.00	8.17	94.18	877.55	6.54	-2.60	33.68	1.99	0.02
9	971.00	9.45	93.93	968.47	9.18	-3.59	47.73	1.39	0.01
10	1064.00	11.09	92.30	1059.97	12.00	-4.48	64.29	1.79	0.02
11	1156.00	13.65	89.10	1149.83	14.50	-4.66	83.99	2.88	0.03
12	1248.00	13.17	89.76	1239.32	16.80	-4.45	105.32	0.55	-0.01
13	1340.00	12.83	89.96	1328.97	19.18	-4.40	126.02	0.37	0.00
14	1432.00	12.79	92.00	1418.68	21.92	-4.74	146.41	0.49	0.00
15	1524.00	12.80	93.05	1508.39	25.20	-5.64	166.76	0.25	0.00
16	1616.00	12.64	94.37	1598.13	28.88	-6.95	186.98	0.36	0.00
17	1709.00	12.07	95.72	1688.98	32.94	-8.70	206.80	0.69	-0.01
18	1801.00	11.14	93.37	1779.10	36.58	-10.18	225.24	1.13	-0.01
19	1824.00	10.96	92.71	1801.67	37.33	-10.41	229.64	0.96	-0.01
20	1982.00	8.64	79.56	1957.38	39.04	-8.97	256.32	2.03	-0.01
21	2074.00	11.59	81.58	2047.94	38.32	-6.36	272.27	3.23	0.03
22	2167.00	14.50	88.27	2138.53	39.07	-4.64	293.15	3.52	0.03
23	2259.00	13.64	85.85	2227.77	40.57	-3.51	315.48	1.13	-0.01
24	2350.00	13.41	85.86	2316.25	41.54	-1.97	336.71	0.25	0.00
25	2442.00	12.77	85.03	2405.86	42.34	-0.32	357.48	0.73	-0.01
26	2534.00	12.29	81.06	2495.67	42.28	2.08	377.28	1.07	-0.01
27	2626.00	11.64	78.42	2585.67	41.12	5.47	396.05	0.92	-0.01
28	2718.00	14.79	86.25	2675.23	40.96	8.10	416.86	3.93	0.03
29	2810.00	14.17	86.51	2764.30	42.21	9.55	439.82	0.68	-0.01
30	2902.00	13.81	84.44	2853.58	43.08	11.30	461.99	0.67	0.00
31	2994.00	13.12	82.63	2943.05	43.19	13.70	483.27	0.88	-0.01
32	3086.00	15.31	85.52	3032.23	43.56	15.99	505.74	2.50	0.02
33	3178.00	14.39	84.30	3121.15	44.25	18.08	529.23	1.06	-0.01
34	3270.00	12.65	81.52	3210.60	44.16	20.70	550.57	2.02	-0.02
35	3362.00	12.26	92.28	3300.45	45.39	21.79	570.29	2.55	0.00
36	3454.00	10.69	88.32	3390.61	47.68	21.66	588.58	1.91	-0.02
37	3546.00	9.38	85.17	3481.20	48.68	22.54	604.58	1.54	-0.01
38	3730.00	10.97	92.86	3662.31	52.11	22.93	637.01	1.13	0.01
39	3822.00	10.15	90.92	3752.75	54.65	22.36	653.86	0.97	-0.01
40	3914.00	9.61	90.72	3843.38	56.73	22.13	669.65	0.59	-0.01
41	4006.00	11.19	92.89	3933.87	59.22	21.59	686.24	1.77	0.02
42	4098.00	13.77	92.63	4023.69	62.50	20.63	706.10	2.81	0.03
43	4190.00	13.62	90.69	4113.07	65.69	20.00	727.87	0.53	0.00
44	4281.00	13.18	90.52	4201.60	68.39	19.78	748.96	0.49	0.00
45	4373.00	13.54	88.35	4291.11	70.67	19.99	770.21	0.67	0.00
46	4465.00	12.80	88.72	4380.69	72.60	20.53	791.16	0.81	-0.01
47	4557.00	10.84	92.11	4470.73	74.91	20.44	810.00	2.26	-0.02
48	4649.00	8.69	96.75	4561.40	77.86	19.30	825.55	2.49	-0.02
49	4741.00	7.03	91.66	4652.53	80.31	18.32	838.08	1.95	-0.02
50	4833.00	7.36	96.33	4743.81	82.47	17.51	849.56	0.73	0.00
51	4925.00	4.76	86.39	4835.29	84.01	17.10	859.23	3.04	-0.03
52	5017.00	3.63	86.55	4927.04	84.39	17.52	865.95	1.23	-0.01
53	5109.00	1.23	116.82	5018.95	85.10	17.25	869.74	2.87	-0.03
54	5201.00	1.29	126.48	5110.93	86.36	16.19	871.45	0.24	0.00
55	5293.00	1.71	127.30	5202.90	88.02	14.74	873.38	0.46	0.00
56	5385.00	2.33	128.58	5294.87	89.14	12.76	874.63	1.28	0.01

• Tie-in Point

	5338.00	2.33	126.36	5247.87	89.14	13.76	874.63	1.38	0.01
57	5385.00	6.36	164.60	5294.73	92.39	10.65	876.06	9.96	0.09
58	5430.00	13.70	174.52	5339.02	100.19	2.93	877.24	16.70	0.16
59	5477.00	18.85	178.36	5384.12	113.33	-10.20	877.99	11.19	0.11
60	5522.00	25.84	182.07	5425.72	130.28	-27.29	877.84	15.84	0.16
61	5569.00	30.84	179.30	5467.07	152.40	-49.59	877.62	11.00	0.11
62	5614.00	33.60	178.32	5505.14	176.28	-73.58	878.12	6.24	0.06
63	5661.00	35.51	177.45	5543.85	202.85	-100.21	879.11	4.20	0.04
64	5706.00	42.43	177.73	5578.81	231.05	-128.47	880.30	15.38	0.15
65	5753.00	44.00	176.77	5613.06	263.15	-160.62	881.84	3.62	0.03
66	5798.00	50.20	175.72	5643.68	296.06	-193.49	884.02	13.88	0.14
67	5845.00	50.72	175.53	5673.60	332.27	-229.63	886.78	1.15	0.01
68	5890.00	51.07	175.41	5701.98	367.16	-264.44	889.54	0.80	0.01
69	5937.00	54.10	175.14	5730.54	404.47	-301.64	892.62	6.46	0.06
70	5982.00	53.95	174.96	5756.97	440.86	-337.92	895.76	0.46	0.00
71	6029.00	58.46	172.30	5783.11	479.91	-376.72	900.11	10.69	0.10
72	6074.00	63.13	172.64	5805.06	519.17	-415.65	905.26	10.40	0.10
73	6122.00	67.67	171.74	5825.04	562.80	-458.88	911.19	9.61	0.09
74	6166.00	74.10	172.52	5839.44	604.34	-500.04	916.88	14.71	0.15
75	6215.00	77.77	171.17	5851.35	651.85	-547.08	923.62	7.95	0.07
76	6260.00	79.48	171.05	5860.22	695.93	-590.66	930.44	3.81	0.04
77	6307.00	80.59	170.77	5868.35	742.18	-636.37	937.75	2.43	0.02
78	6392.00	87.93	169.73	5876.85	826.58	-719.67	952.07	8.72	0.09
79	6485.00	90.28	170.61	5878.30	919.43	-811.28	967.94	2.70	0.03
80	6578.00	92.04	171.32	5876.42	1012.33	-903.10	982.55	2.04	0.02
81	6671.00	92.80	173.77	5872.49	1105.23	-995.23	994.60	2.76	0.01
82	6765.00	93.50	177.66	5867.33	1198.99	-1088.81	1001.61	4.20	0.01
83	6858.00	90.20	179.45	5864.32	1291.52	-1181.71	1003.96	4.04	-0.04
84	6951.00	88.29	181.18	5865.55	1383.80	-1274.69	1003.45	2.77	-0.02
85	7044.00	88.38	181.03	5868.25	1475.89	-1367.64	1001.65	0.19	0.00
86	7137.00	88.01	179.92	5871.18	1568.10	-1460.59	1000.88	1.26	0.00
87	7230.00	89.78	181.59	5872.97	1660.28	-1553.55	999.66	2.62	0.02
88	7323.00	90.50	181.36	5872.75	1752.32	-1646.52	997.26	0.81	0.01
89	7417.00	91.15	180.83	5871.39	1845.43	-1740.49	995.47	0.89	0.01
90	7509.00	89.80	180.06	5870.63	1936.70	-1832.48	994.75	1.69	-0.01
91	7602.00	90.06	180.06	5870.74	2029.05	-1925.48	994.65	0.28	0.00
92	7696.00	89.27	178.63	5871.29	2122.51	-2019.47	995.73	1.74	-0.01
93	7789.00	88.77	178.88	5872.88	2215.07	-2112.44	997.75	0.60	-0.01
94	7882.00	88.32	178.89	5875.25	2307.59	-2205.39	999.56	0.48	0.00
95	7975.00	87.71	178.80	5878.47	2400.09	-2298.31	1001.43	0.66	-0.01
96	8068.00	89.08	179.27	5881.07	2492.58	-2391.26	1003.00	1.56	0.01
97	8160.00	91.12	180.05	5880.91	2584.00	-2483.26	1003.54	2.37	0.02
98	8253.00	90.95	179.09	5879.23	2676.42	-2576.24	1004.24	1.05	0.00
99	8346.00	90.90	179.09	5877.73	2768.92	-2669.21	1005.72	0.05	0.00
100	8439.00	90.70	178.80	5876.43	2861.45	-2762.19	1007.43	0.38	0.00
101	8532.00	90.11	178.80	5875.77	2954.01	-2855.16	1009.38	0.63	-0.01
102	8625.00	89.78	181.48	5875.86	3046.33	-2948.16	1009.15	2.90	0.00
103	8718.00	88.91	181.14	5876.93	3138.41	-3041.12	1007.02	1.00	-0.01
104	8810.00	88.94	180.83	5878.65	3229.55	-3133.09	1005.44	0.34	0.00
105	8902.00	88.15	180.02	5880.99	3320.80	-3225.06	1004.76	1.23	-0.01
106	8995.00	87.20	179.52	5884.76	3413.12	-3317.98	1005.13	1.15	-0.01
107	9087.00	88.01	180.04	5888.61	3504.45	-3409.90	1005.49	1.05	0.01
108	9179.00	91.23	181.32	5889.22	3595.66	-3501.88	1004.39	3.77	0.04
109	9271.00	90.34	178.75	5887.96	3687.00	-3593.86	1004.34	2.96	-0.01
110	9364.00	91.62	180.59	5886.37	3779.39	-3686.84	1004.87	2.41	0.01
111	9456.00	91.34	180.38	5883.99	3870.63	-3778.80	1004.10	0.38	0.00
112	9549.00	90.20	180.79	5882.74	3962.86	-3871.79	1003.15	1.30	-0.01
113	9641.00	89.66	180.95	5882.85	4054.05	-3963.78	1001.75	0.61	-0.01
114	9734.00	89.30	181.00	5883.70	4146.20	-4056.76	1000.17	0.39	0.00
115	9826.00	89.78	181.48	5884.43	4237.30	-4148.74	998.18	0.74	0.01
116	9918.00	91.20	181.73	5883.65	4328.32	-4240.69	995.60	1.57	0.02
117	10010.00	92.24	181.60	5880.89	4419.29	-4332.61	992.93	1.14	0.01
118	10102.00	91.60	181.73	5877.80	4510.25	-4424.52	990.26	0.71	-0.01
119	10194.00	92.74	181.70	5874.32	4601.18	-4516.41	987.50	1.24	0.01
120	10287.00	92.60	181.55	5869.99	4693.08	-4609.27	984.87	0.22	0.00
121	10379.00	90.00	181.56	5867.90	4784.09	-4701.21	982.37	2.83	-0.03
122	10472.00	90.31	181.97	5867.65	4876.06	-4794.16	979.51	0.55	0.00
123	10564.00	88.49	181.93	5868.61	4967.00	-4886.10	976.38	1.98	-0.02
124	10656.00	89.10	182.28	5870.55	5057.88	-4978.02	973.00	0.76	0.01
125	10748.00	89.72	181.82	5871.49	5148.79	-5069.96	969.71	0.84	0.01

126	10840.00	90.36	181.31	5871.43	5239.82	-5161.92	967.20	0.89	0.01
127	10932.00	91.48	180.95	5869.95	5330.94	-5253.89	965.38	1.28	0.01
128	11024.00	90.28	180.69	5868.54	5422.13	-5345.87	964.07	1.33	-0.01
129	11116.00	89.75	181.66	5868.52	5513.25	-5437.85	962.18	1.20	-0.01
130	11208.00	89.86	180.33	5868.83	5604.40	-5529.83	960.58	1.45	0.00
131	11300.00	91.03	181.35	5868.11	5695.59	-5621.81	959.23	1.69	0.01
132	11392.00	89.75	179.51	5867.49	5786.86	-5713.80	958.54	2.44	-0.01
133	11484.00	89.50	179.14	5868.09	5878.34	-5805.79	959.63	0.49	0.00
134	11576.00	89.64	179.17	5868.78	5969.85	-5897.78	960.99	0.16	0.00
135	11668.00	90.50	178.63	5868.67	6061.40	-5989.76	962.75	1.10	0.01
136	11759.00	89.41	178.34	5868.74	6152.02	-6080.73	965.16	1.24	-0.01
137	11851.00	89.72	178.27	5869.44	6243.66	-6172.69	967.88	0.35	0.00
138	11943.00	89.83	177.94	5869.80	6335.33	-6264.64	970.92	0.38	0.00
139	12036.00	89.13	178.45	5870.64	6427.98	-6357.59	973.85	0.93	-0.01
140	12128.00	89.94	178.67	5871.39	6519.58	-6449.55	976.16	0.91	0.01
141	12220.00	90.73	178.48	5870.85	6611.18	-6541.52	978.45	0.88	0.01
142	12312.00	89.24	177.89	5870.88	6702.84	-6633.47	981.36	1.74	-0.02
143	12404.00	89.66	177.87	5871.76	6794.53	-6725.41	984.77	0.46	0.00
144	12496.00	90.20	178.27	5871.87	6886.21	-6817.35	987.86	0.73	0.01
145	12587.00	89.72	178.27	5871.94	6976.86	-6908.31	990.61	0.53	-0.01
146	12679.00	90.36	178.13	5871.87	7068.52	-7000.26	993.50	0.71	0.01
147	12771.00	90.34	177.23	5871.31	7160.24	-7092.19	997.23	0.98	0.00
148	12863.00	90.39	177.04	5870.72	7252.02	-7184.07	1001.82	0.21	0.00
149	12955.00	90.50	176.56	5870.01	7343.85	-7275.92	1006.96	0.54	0.00
150	13047.00	88.60	178.09	5870.73	7435.60	-7367.81	1011.25	2.65	-0.02
151	13139.00	88.43	178.18	5873.12	7527.24	-7459.73	1014.25	0.21	0.00
152	13231.00	88.80	177.83	5875.34	7618.89	-7551.65	1017.45	0.55	0.00
153	13323.00	89.30	177.48	5876.86	7710.61	-7643.56	1021.21	0.66	0.01
154	13415.00	89.05	177.73	5878.19	7802.33	-7735.47	1025.06	0.38	0.00
155	13507.00	88.88	179.28	5879.85	7893.93	-7827.42	1027.46	1.69	0.00
156	13599.00	89.92	181.00	5880.82	7985.26	-7919.41	1027.23	2.18	0.01