PHOENIX TECHNOLOGY SERVICES

TVD
1:240
Feet

MWD Gamma / ROP (5")

Client: *Whiting Petroleum*

Well Name: RAZOR #12F-0103A
API/UWID: 05-123-38711-00
County: Weld **Field:** Wildcat
Permit #: 15-0325
State: Colorado **Country:** USA

Longitude: 103° 49' 5.369 W
Latitude: 40° 51' 16.78 N

Rig Name:	Unit 409
Job Number:	1523839
Ground Level:	4936.80 ft
Kelly Bushing:	4957.80 ft
Drill Floor:	21.00 ft
Permanent Datum:	Mean Sea Level
Drilling Measured From:	Kelly Bushing
Spud Date:	August 24, 2015
Bottom Hole Temp:	234.0 °F
Log Start Depth:	0.00 ft
Log End Depth:	5850.00 ft

Reference Data

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

Personnel

Company Representative
Kenny Wilkerson

Geologist

Directional Driller(s)
Brandon Davis
Jon Willy

MWD Operator(s)
Larry Seebeck
Joe Owens

Comments:
-

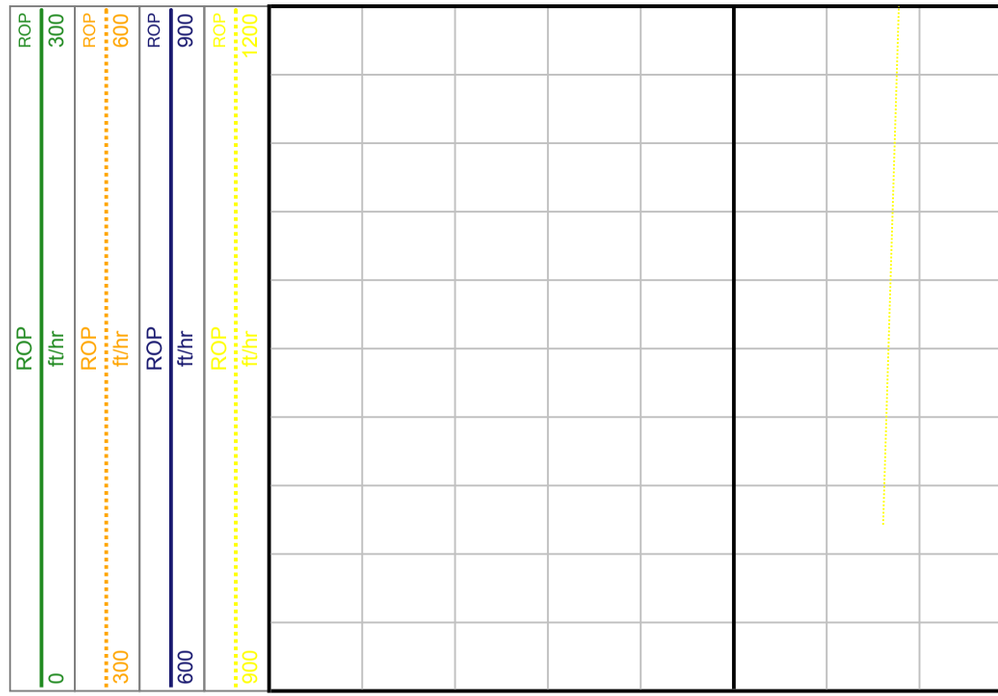
Main Leg

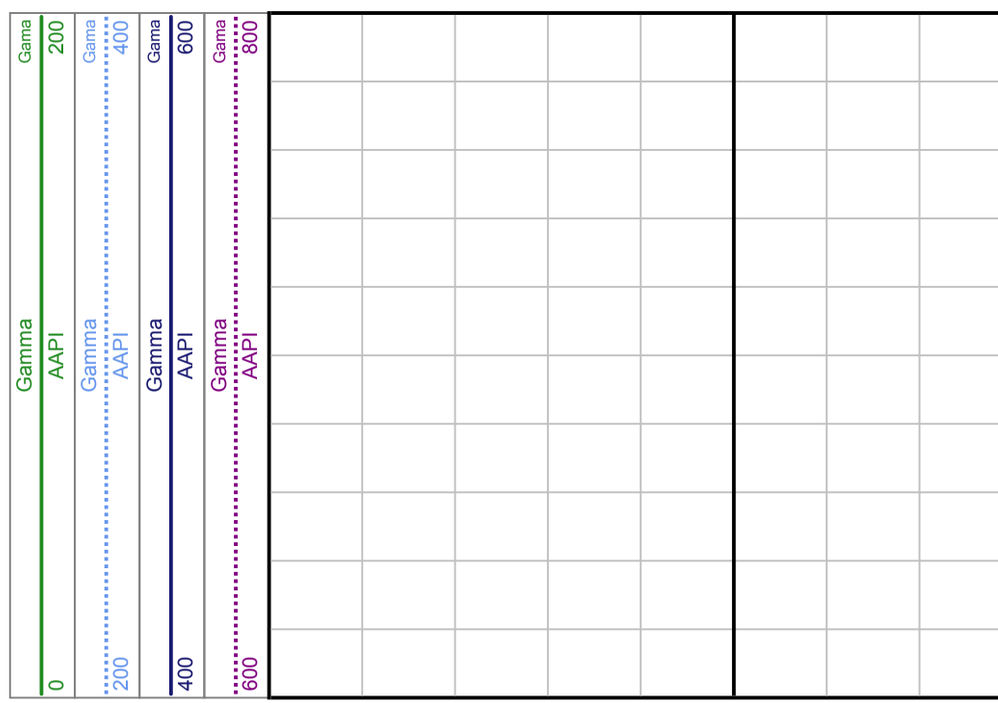
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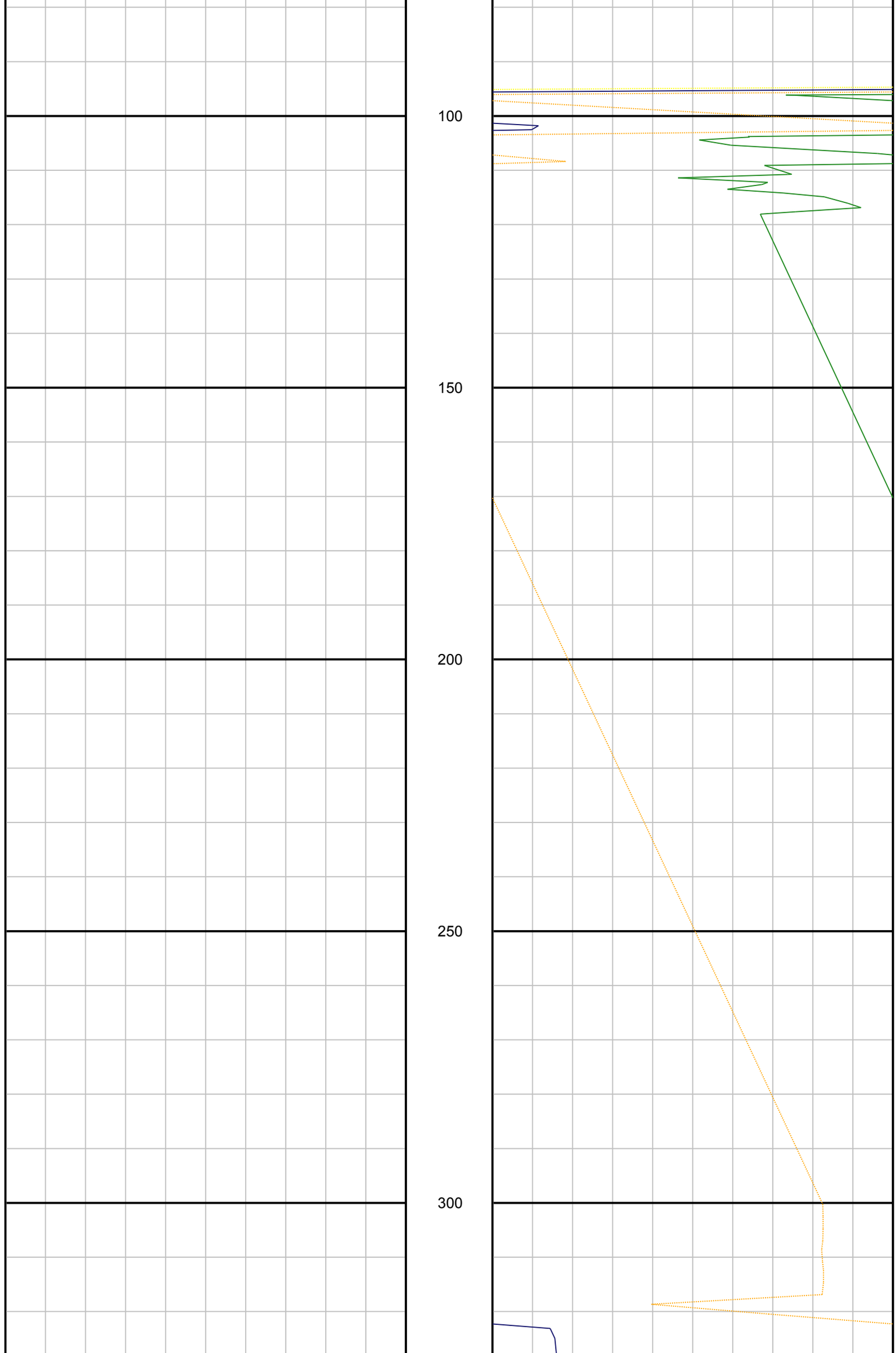
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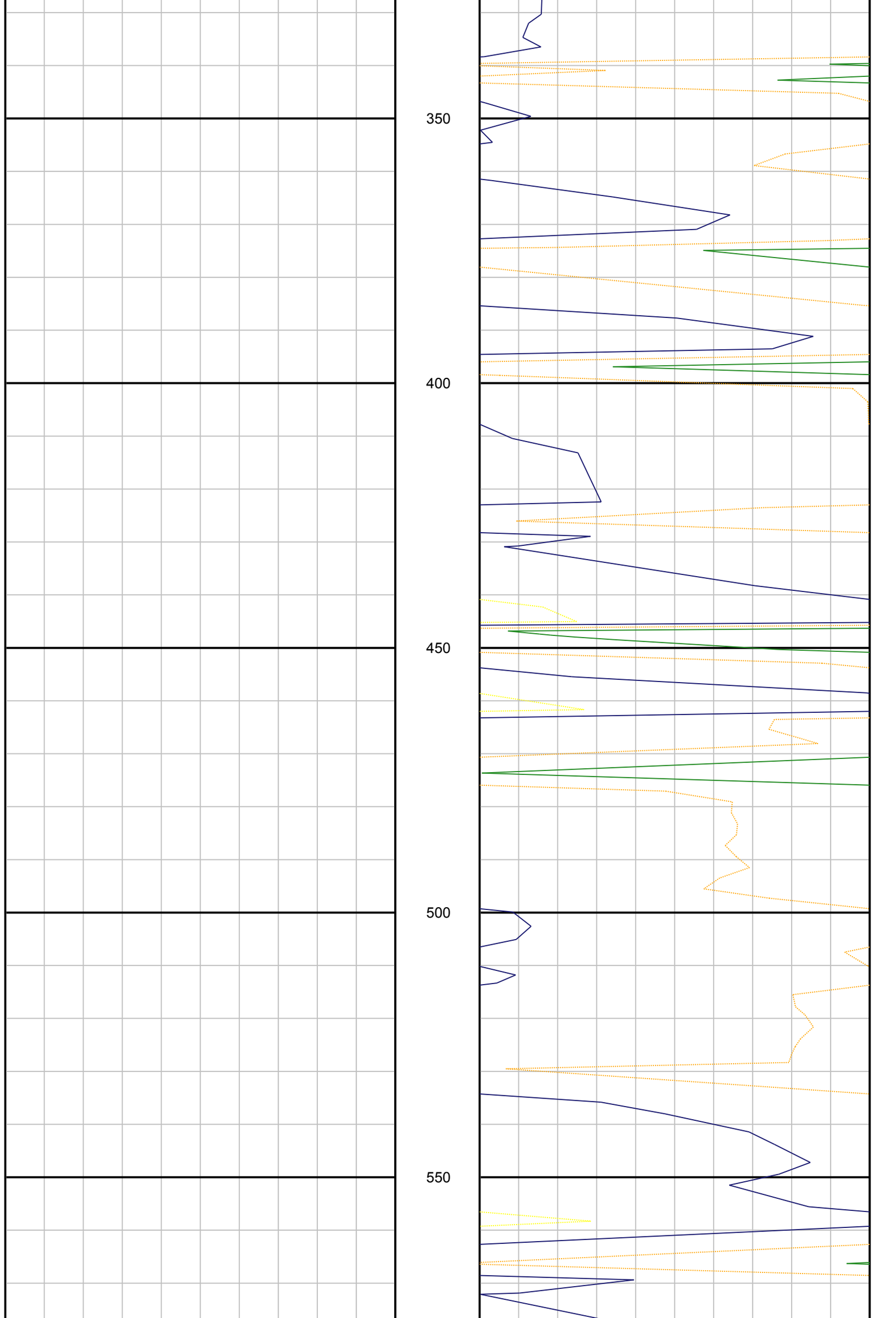
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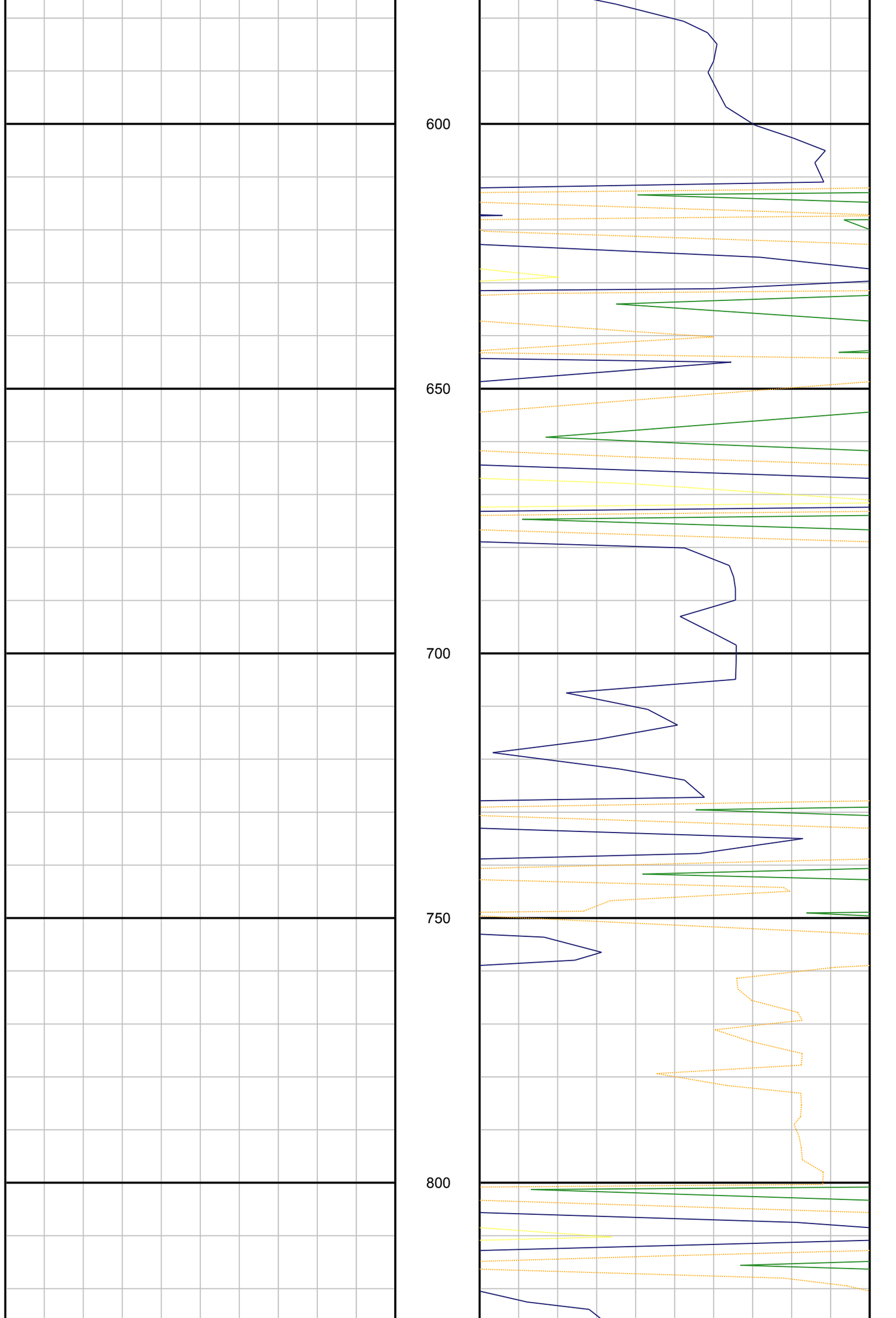
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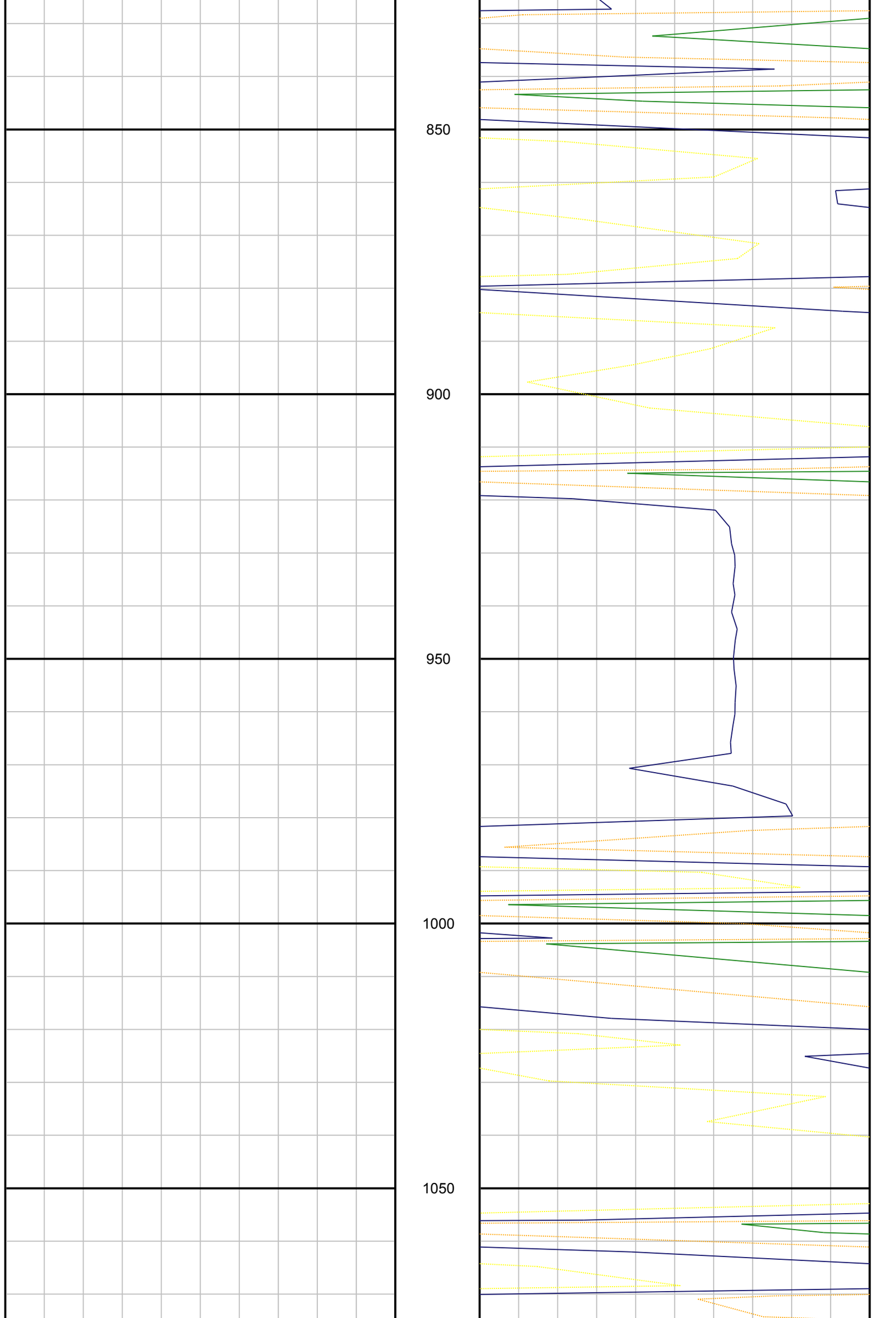


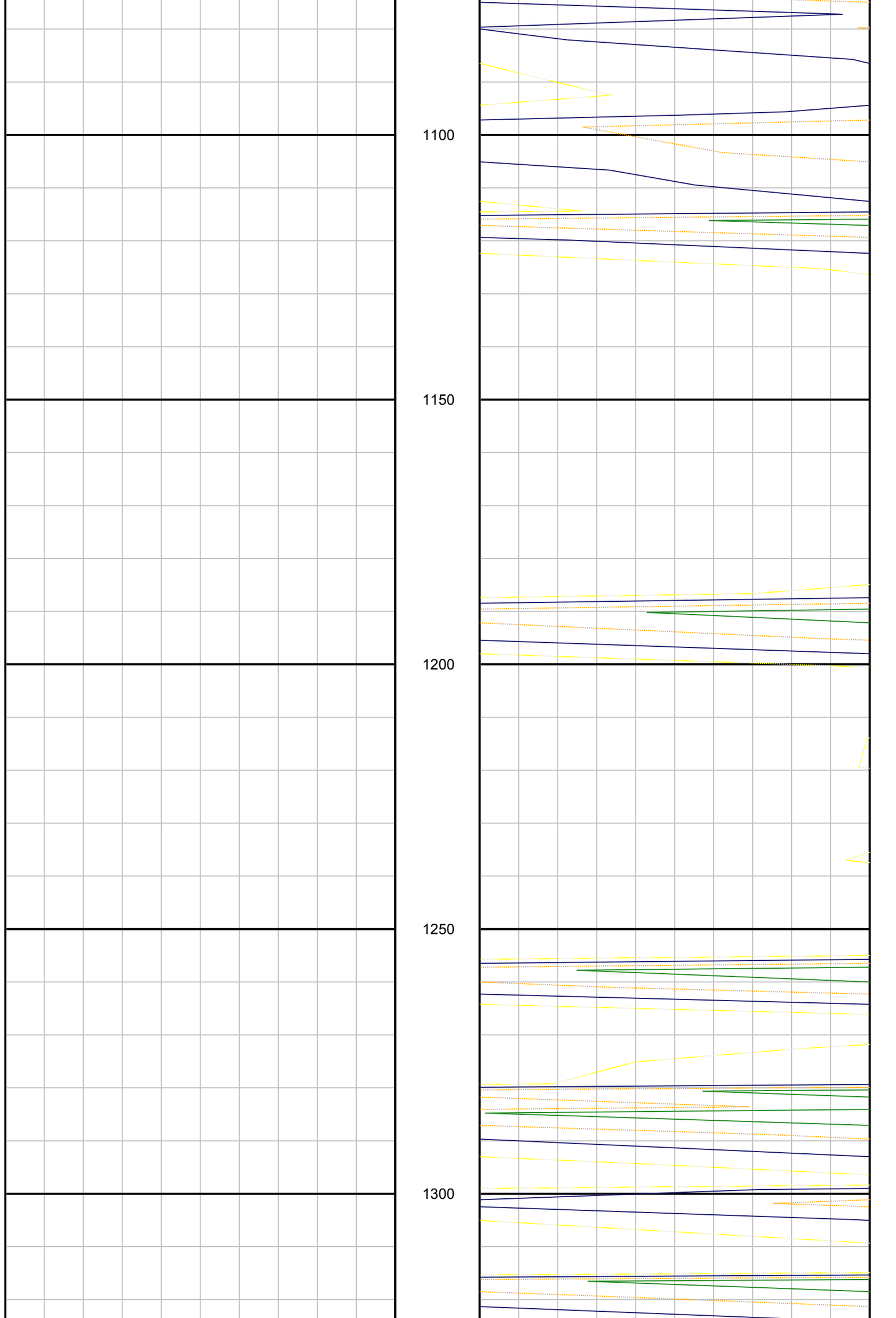


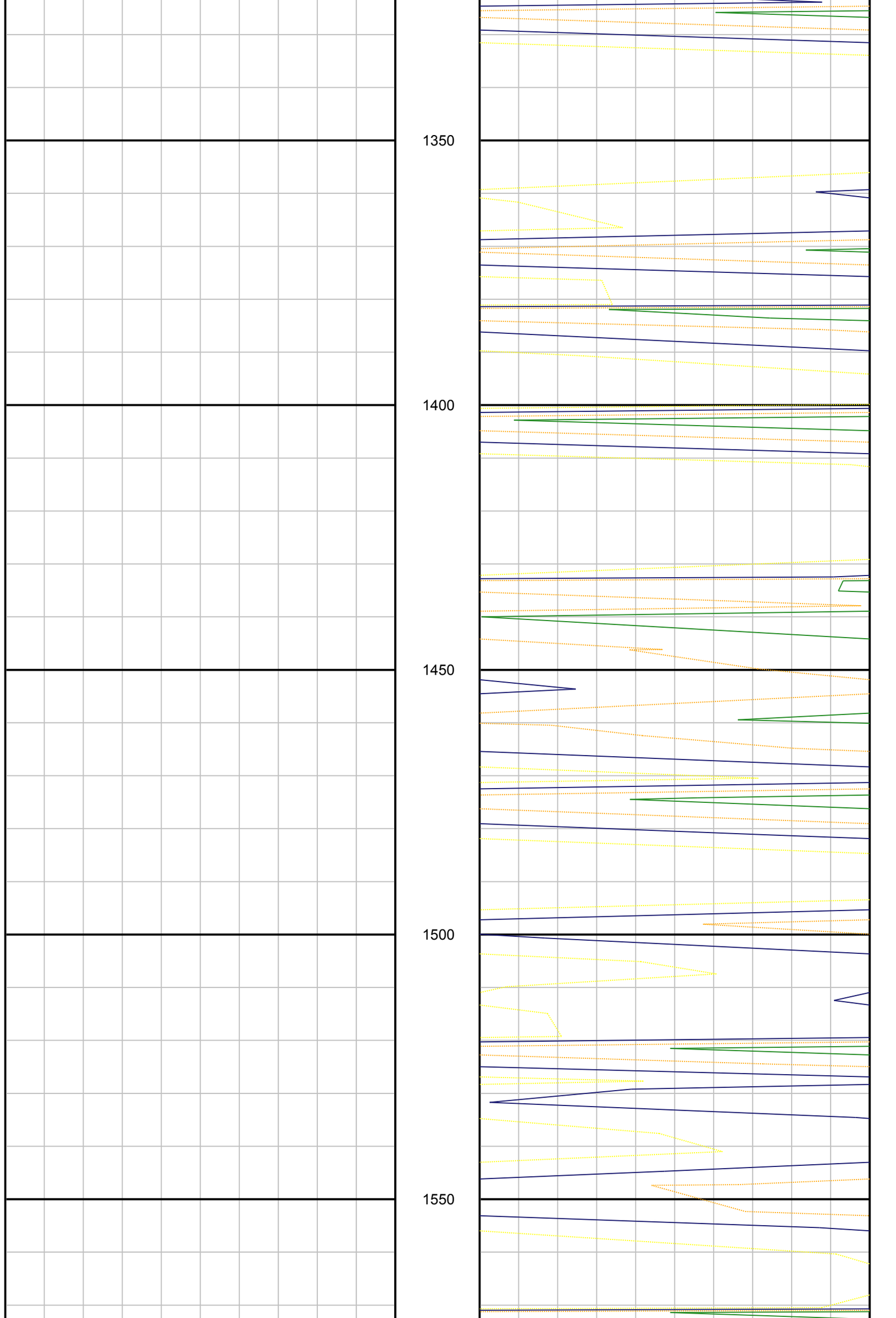

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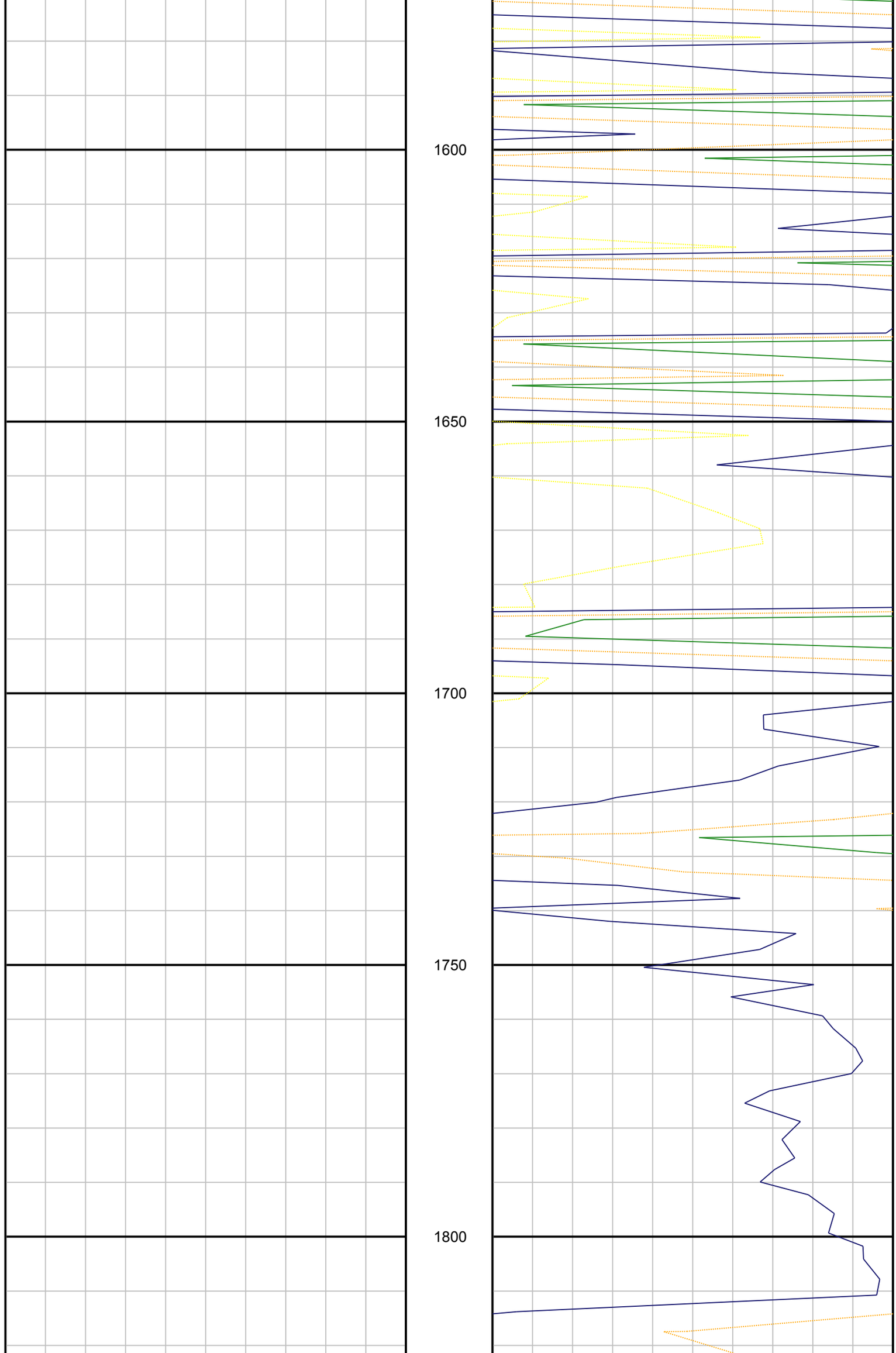

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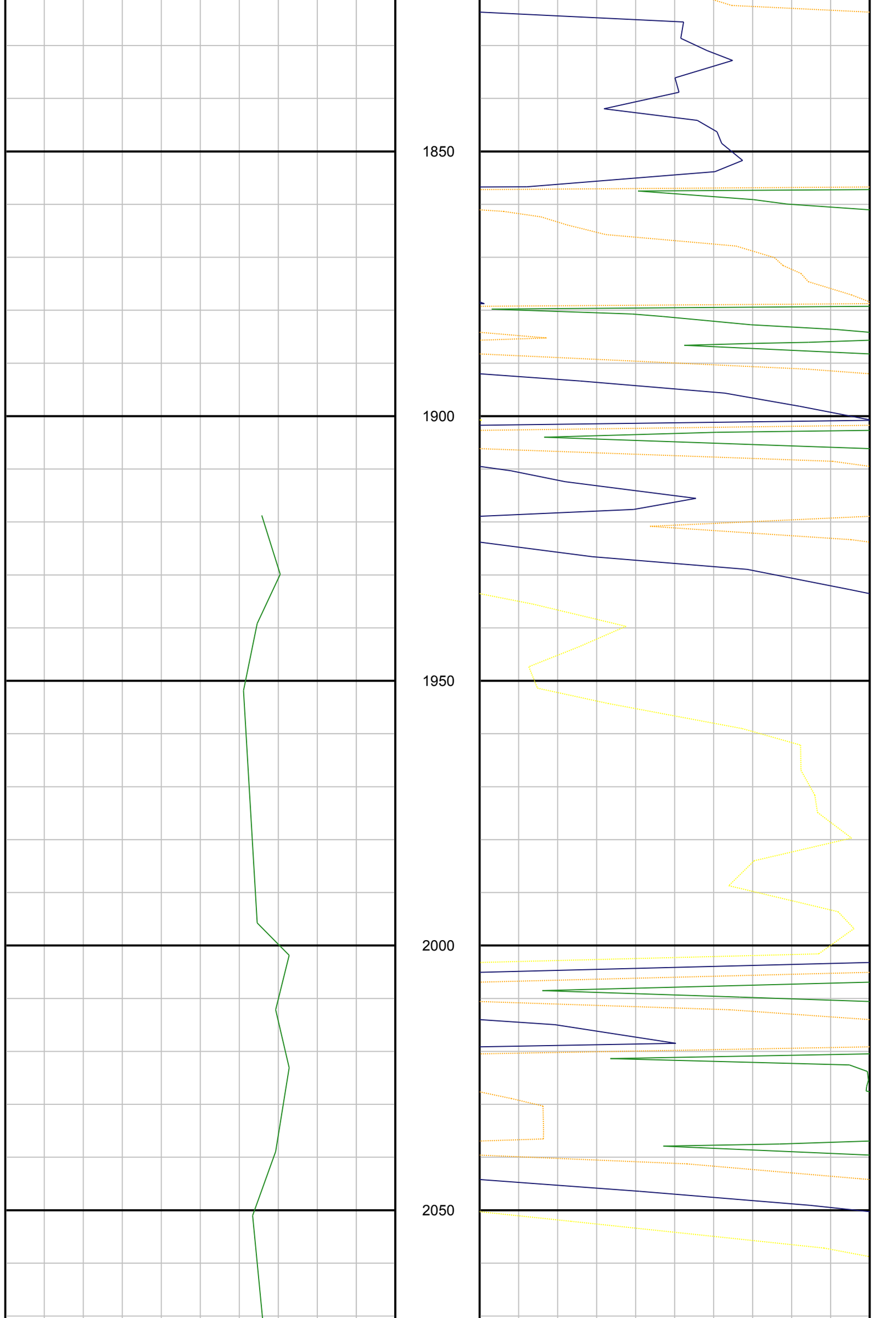

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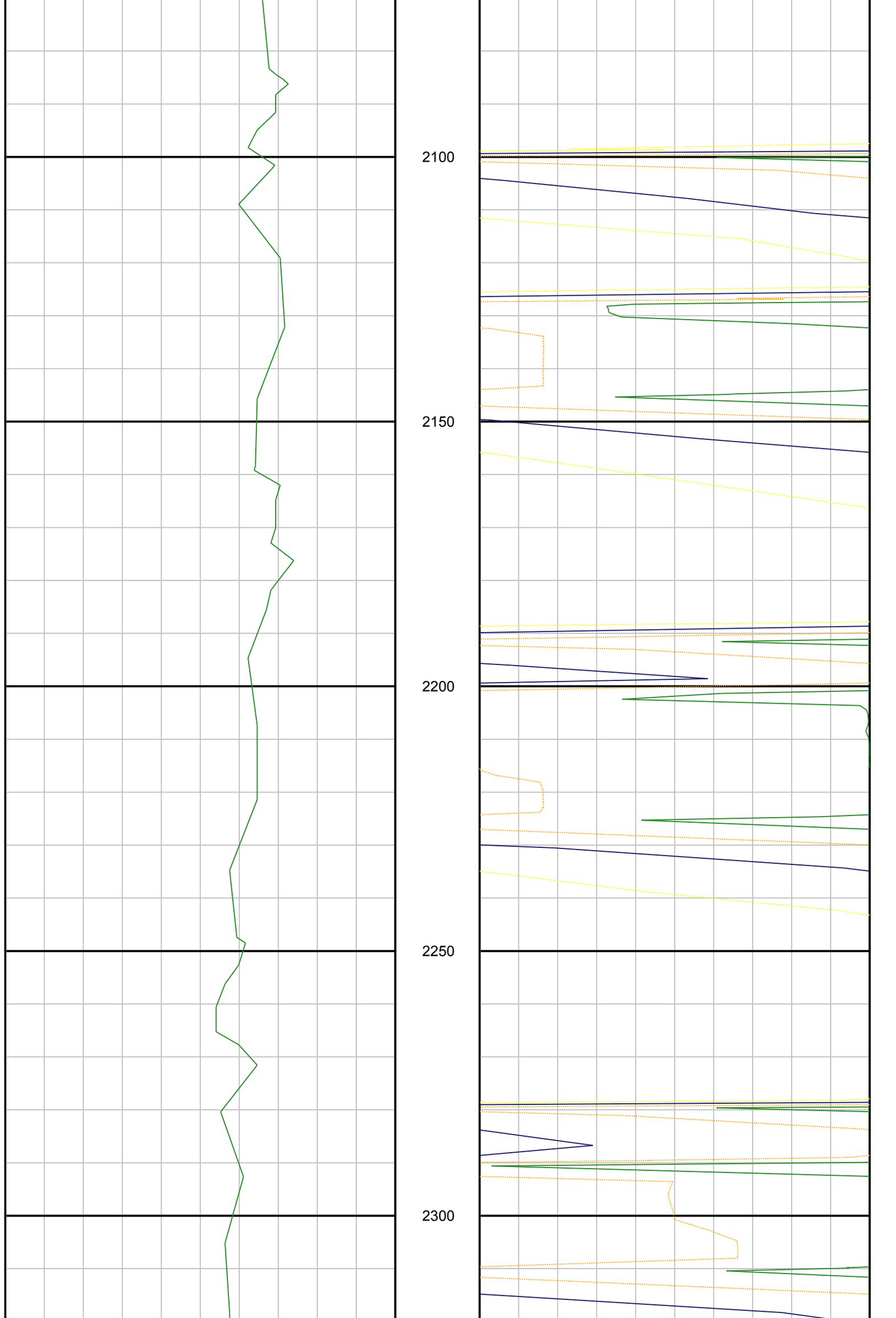

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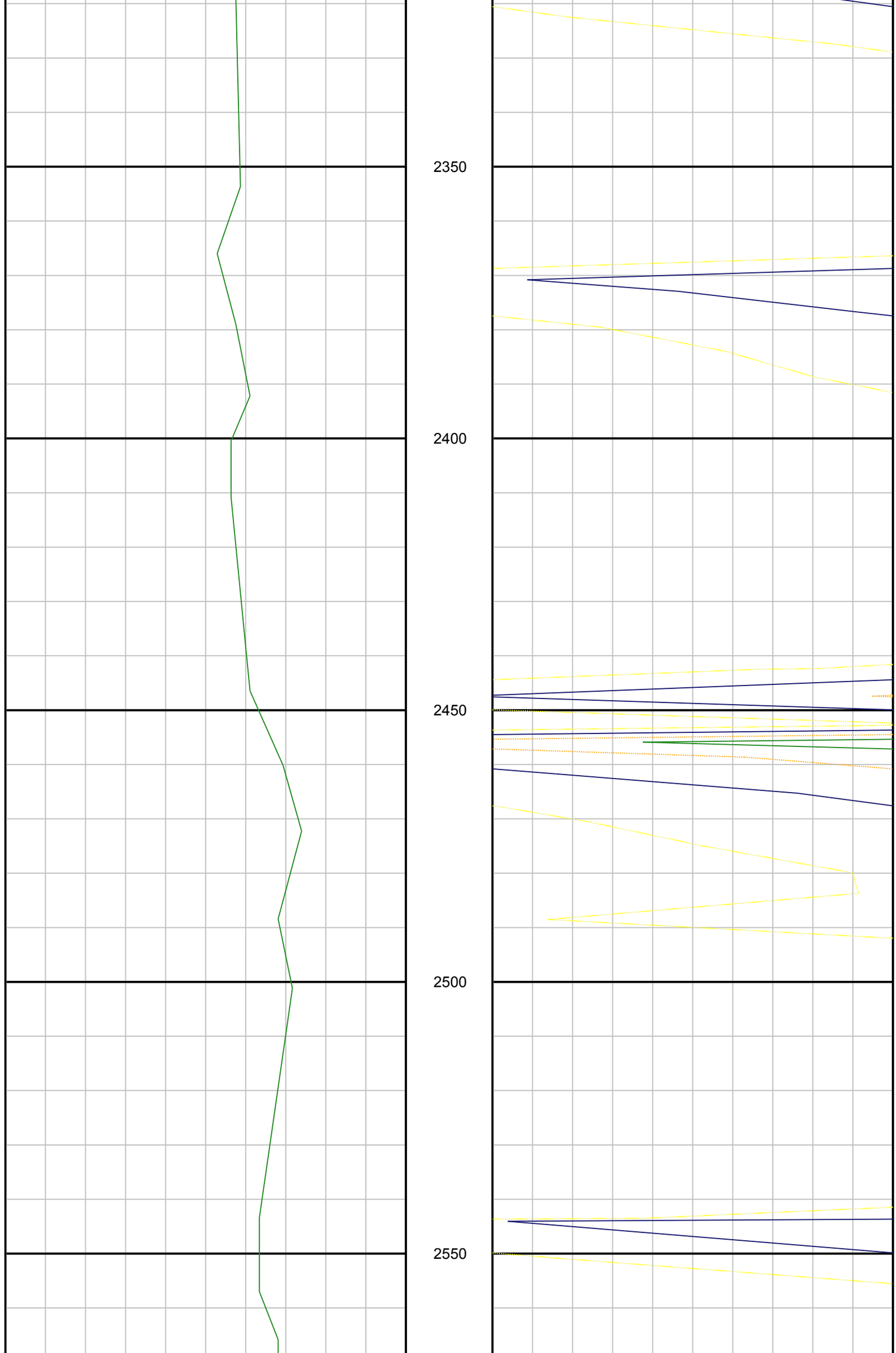

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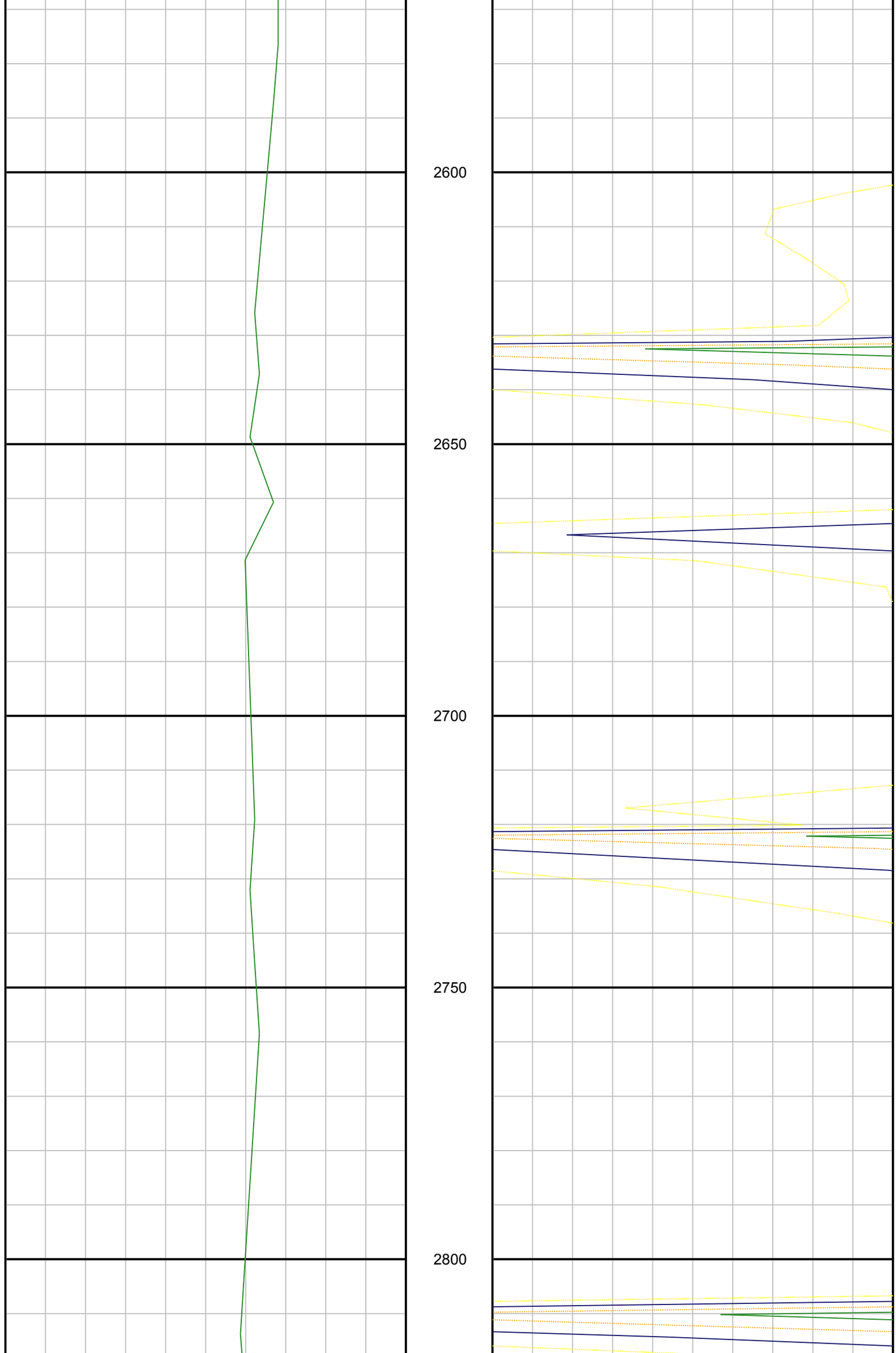

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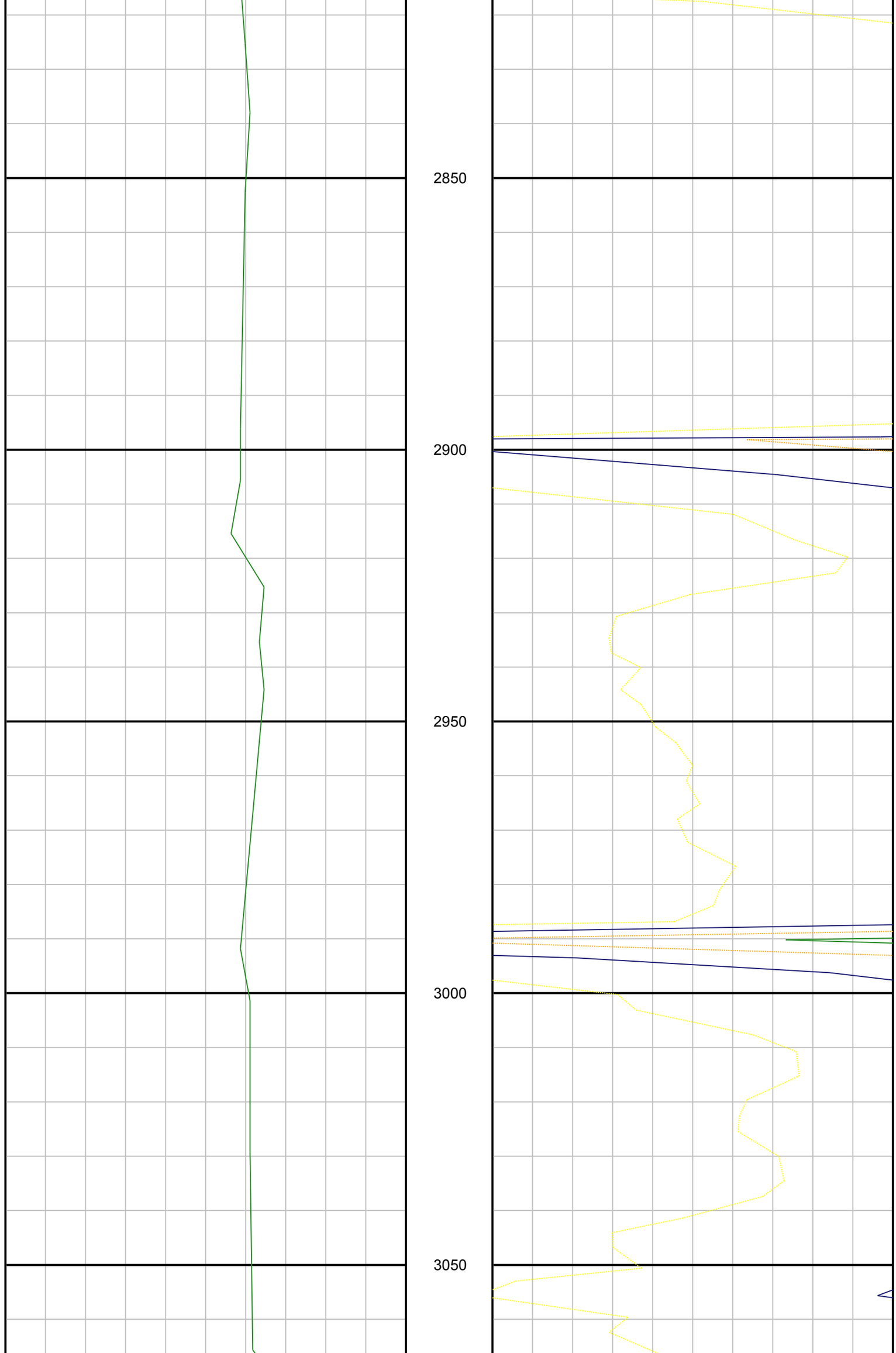

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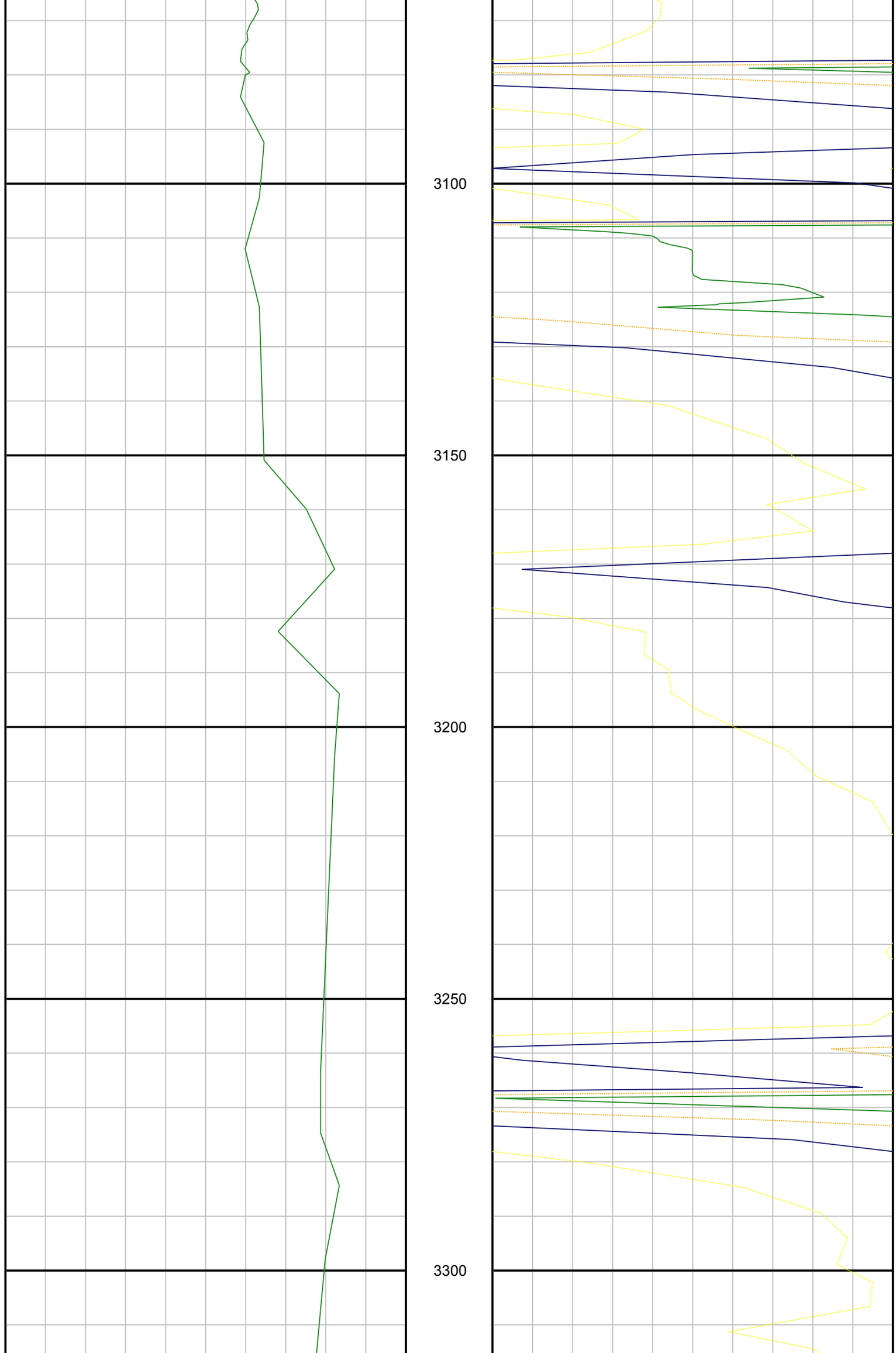

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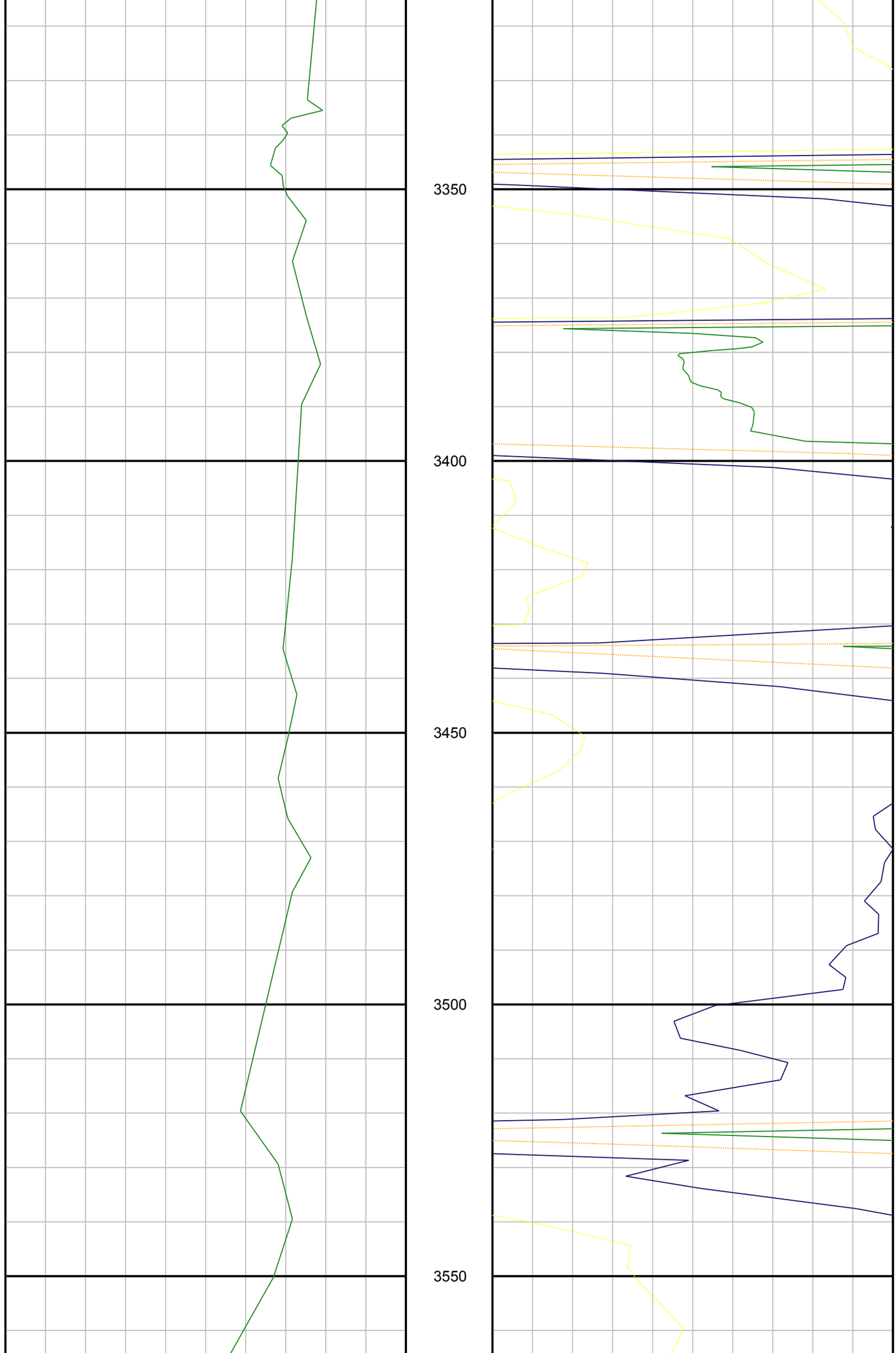

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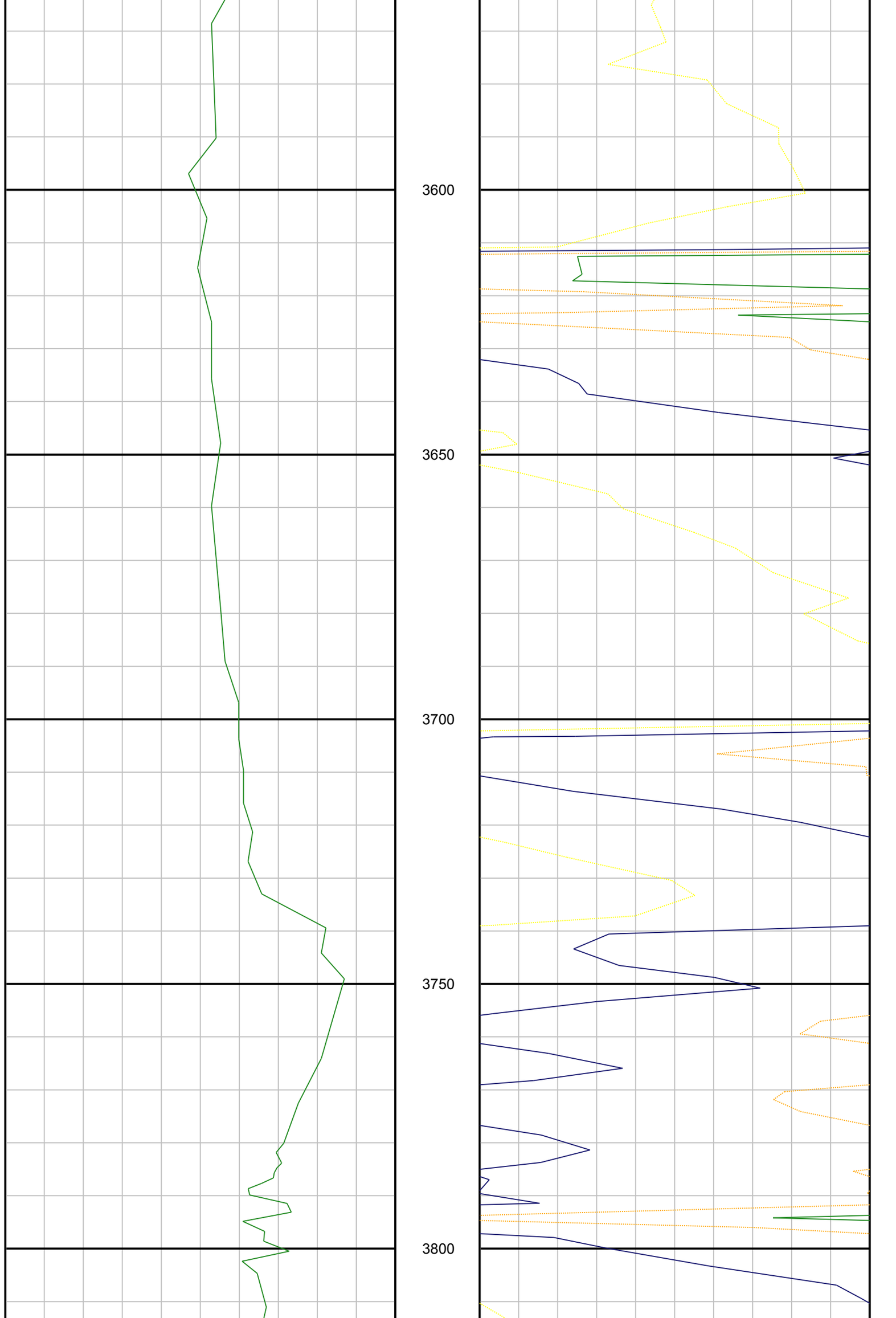

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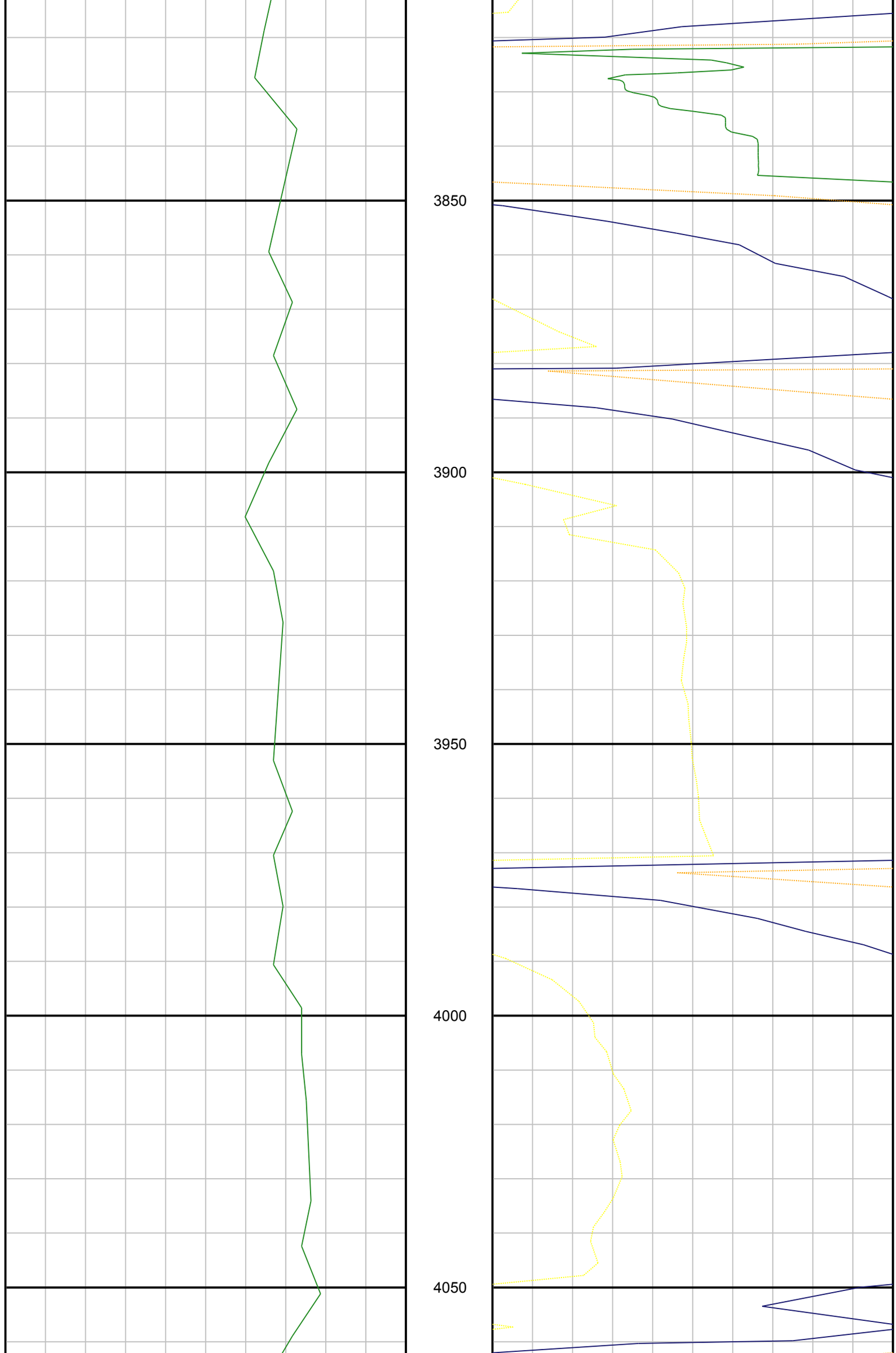

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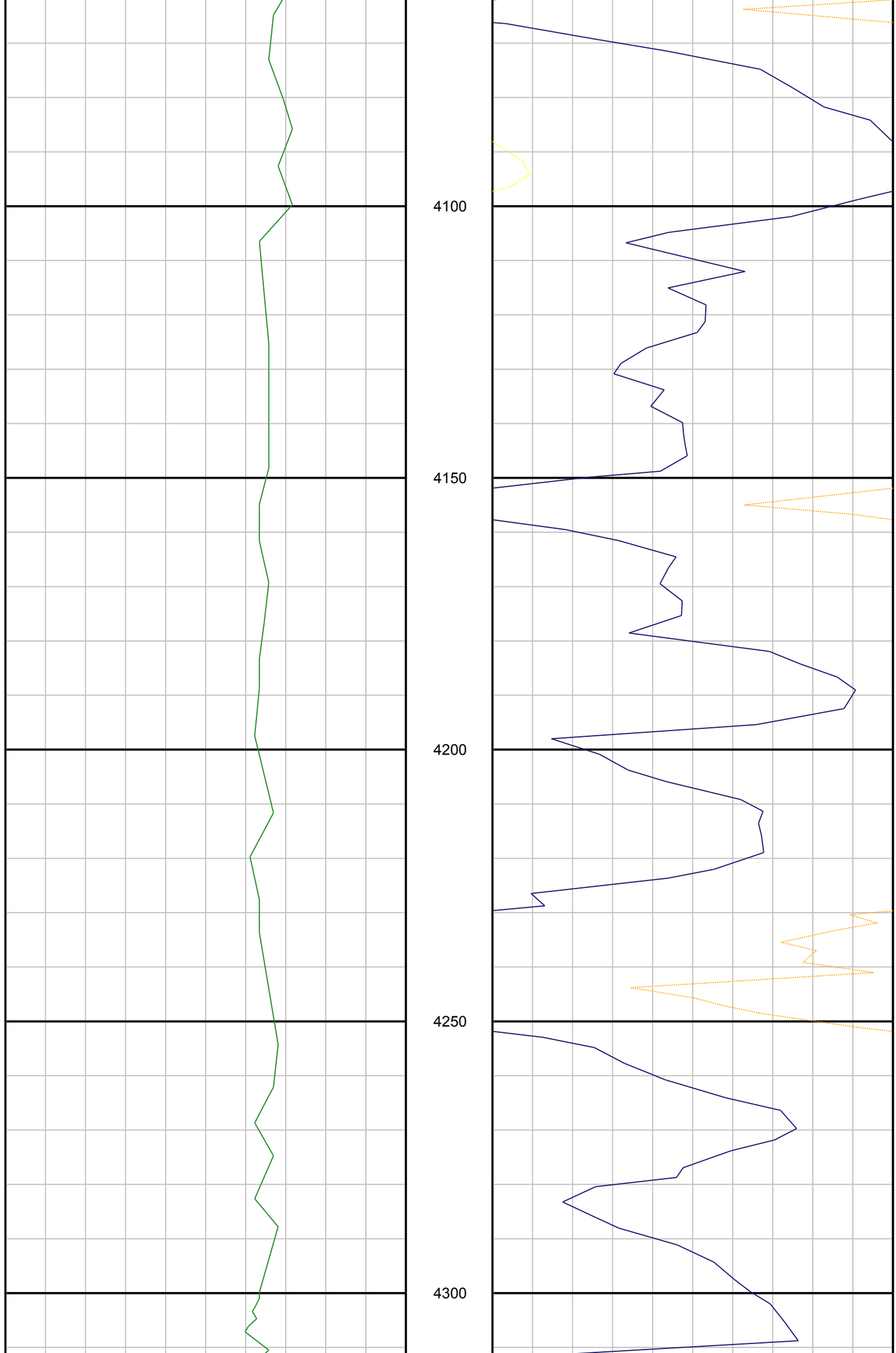

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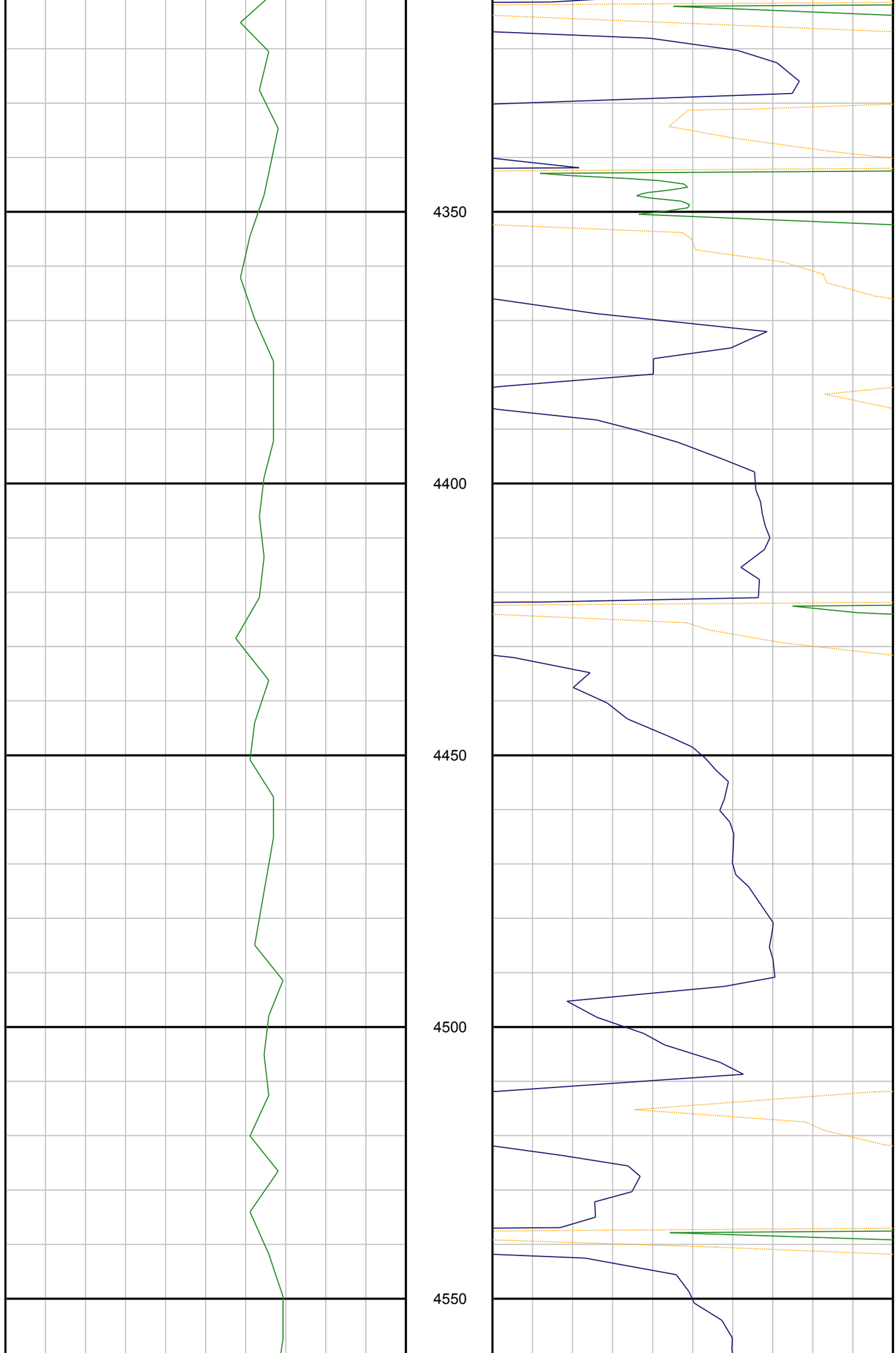

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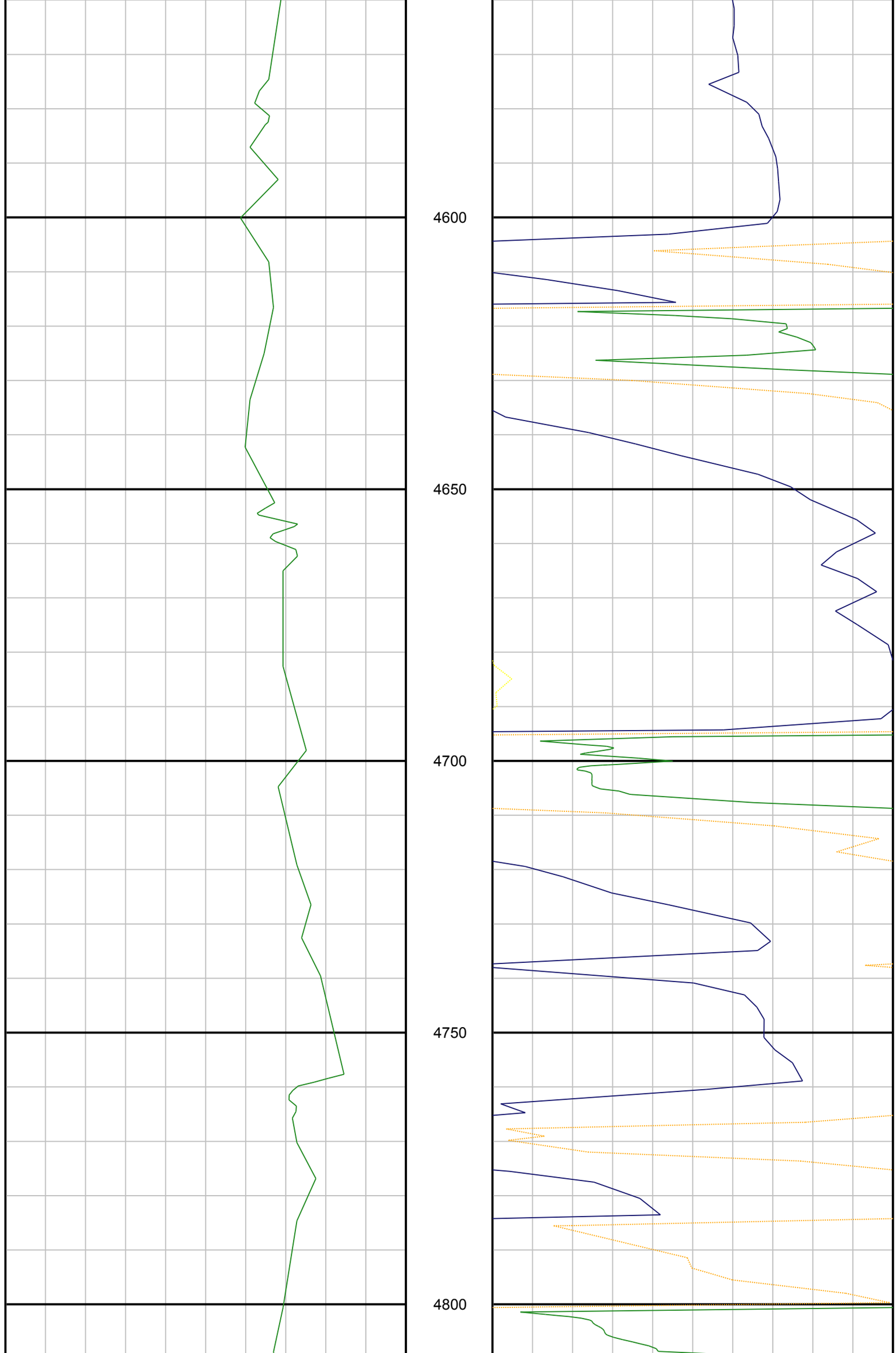

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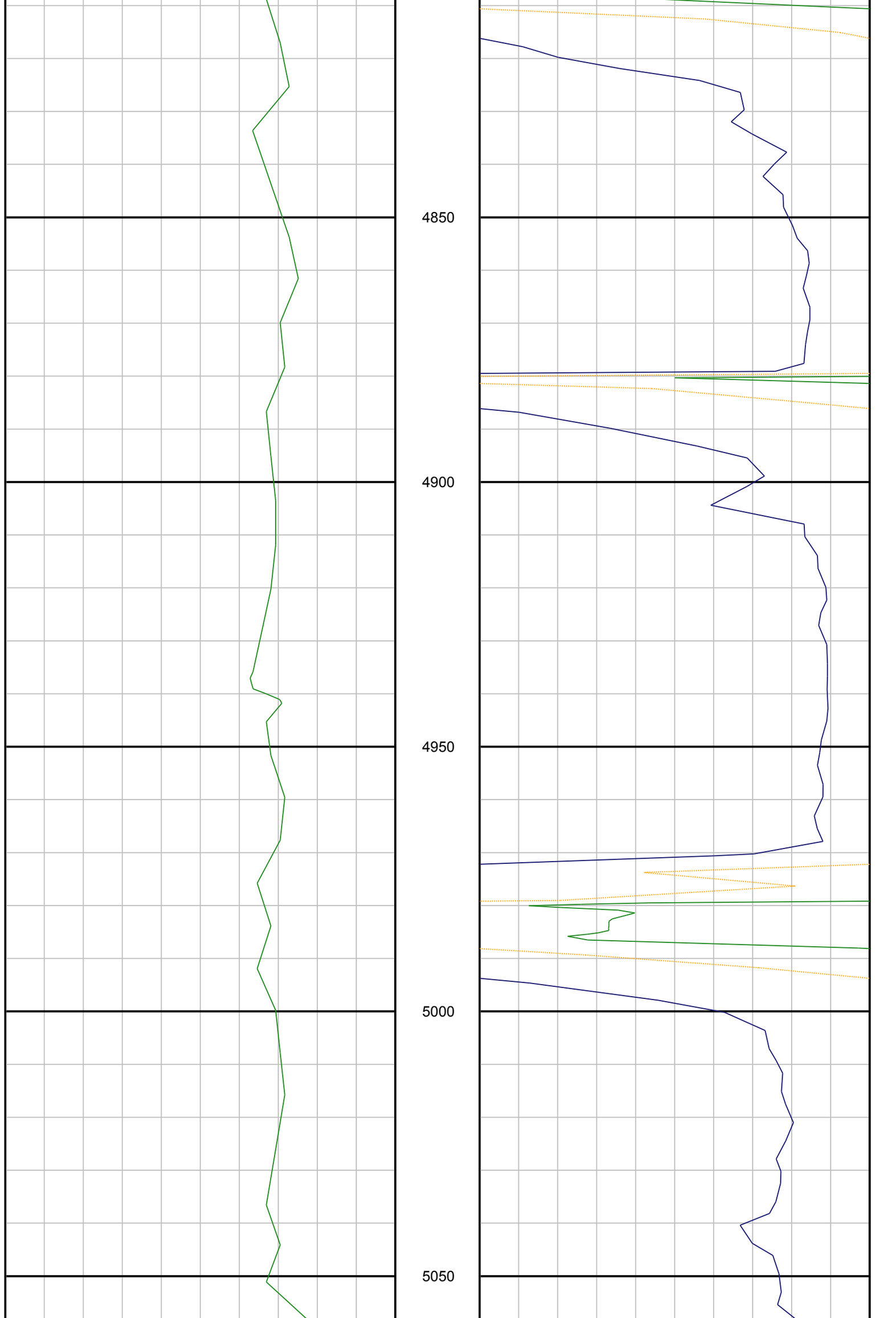

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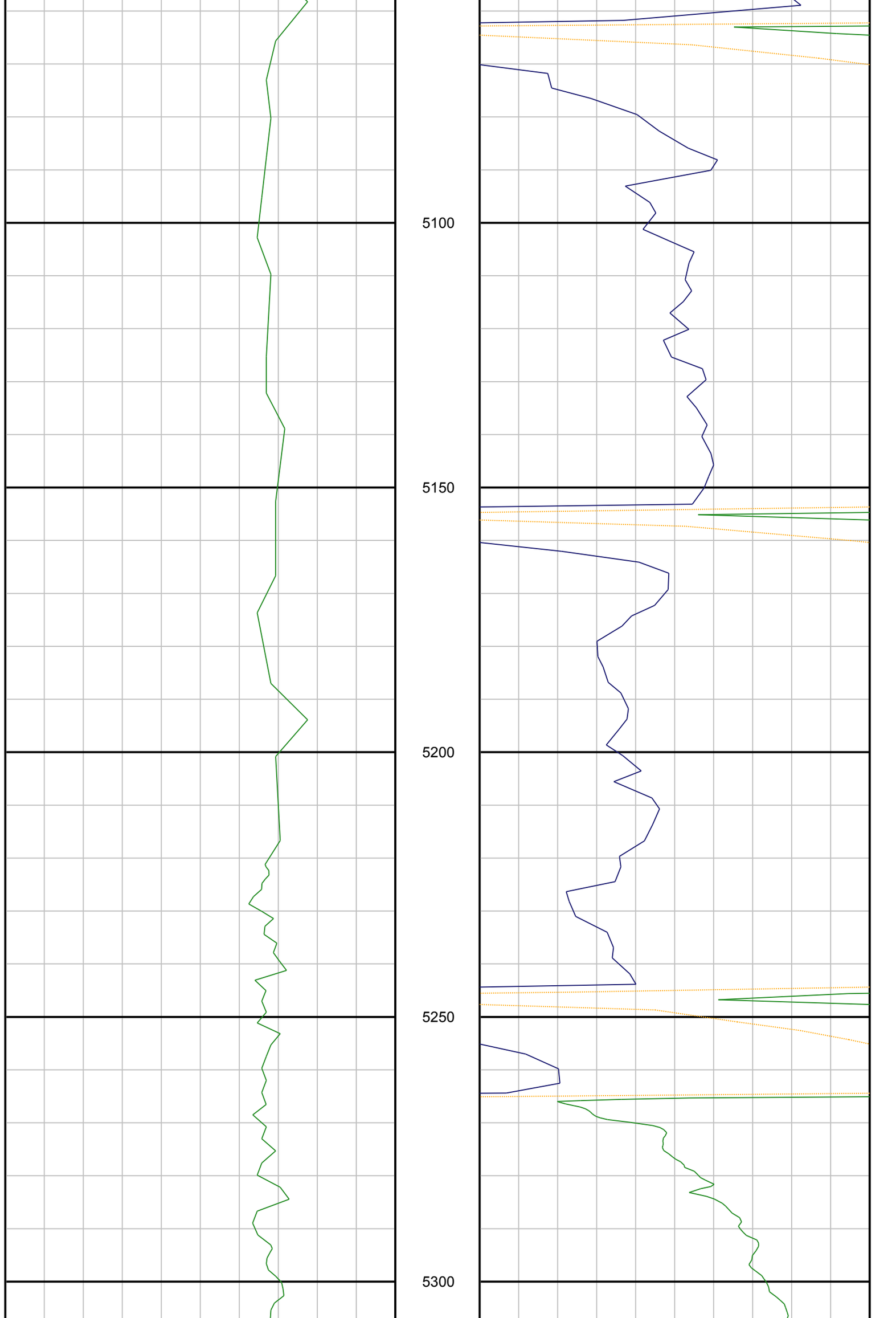

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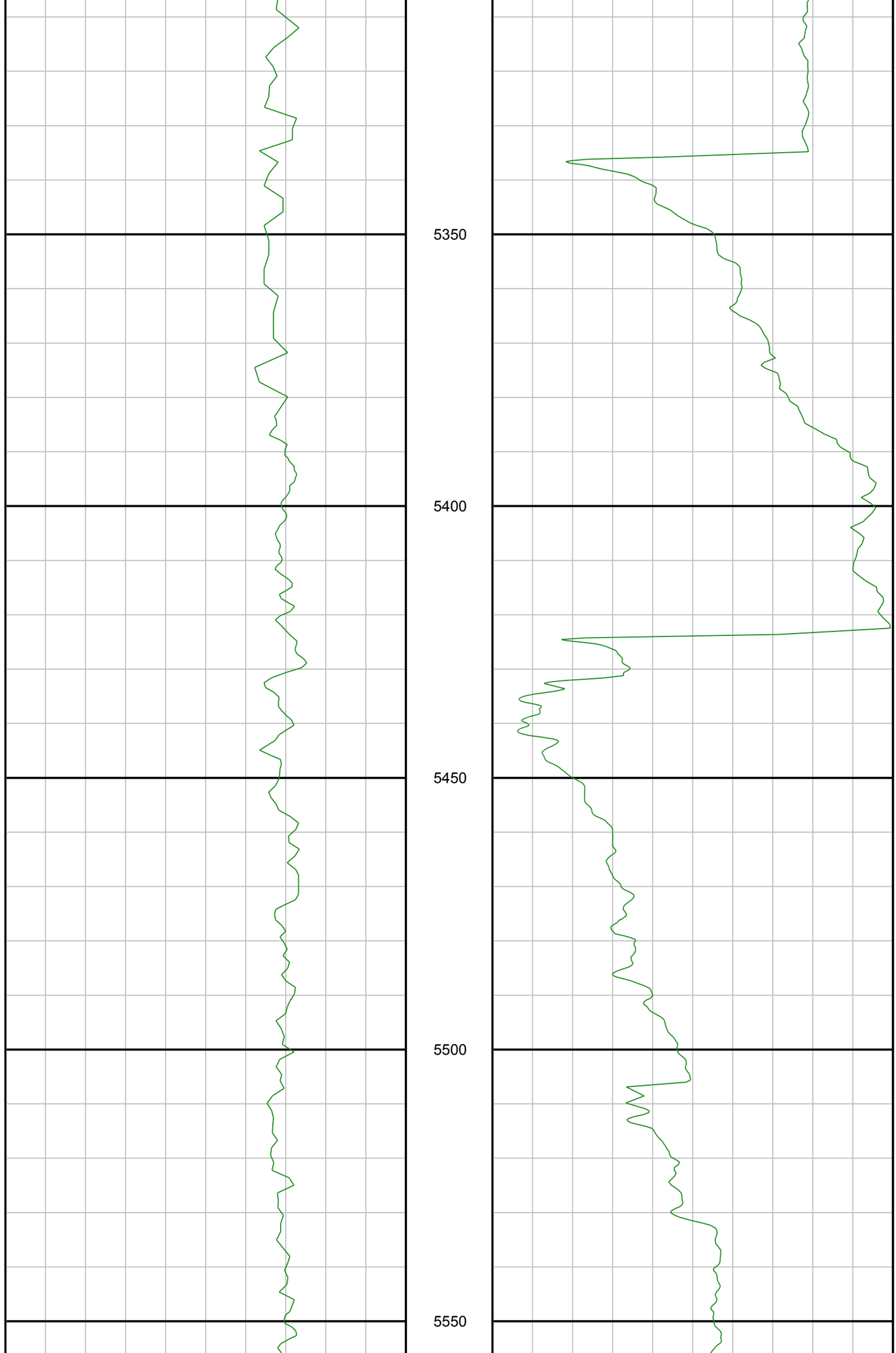

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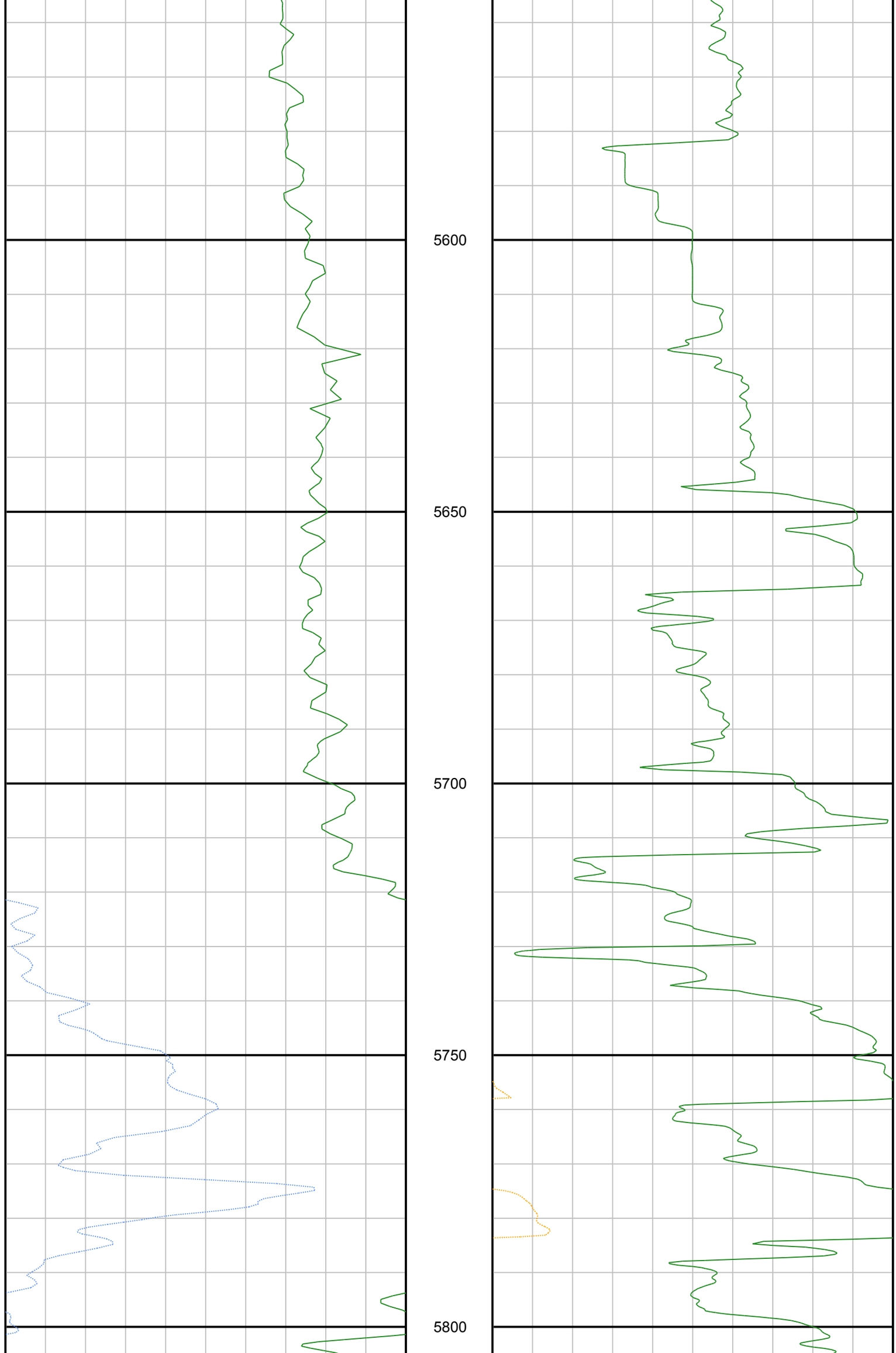

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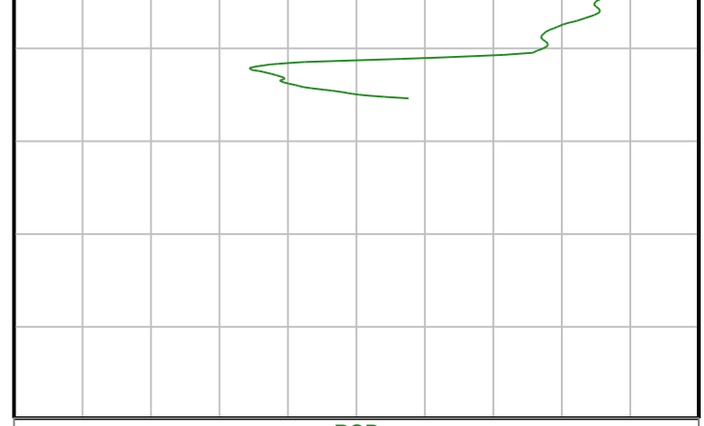

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Gamma		Gama
0	AAPI	200
Gamma		Gama
200	AAPI	400
Gamma		Gama
400	AAPI	600
Gamma		Gama
600	AAPI	800

5850



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	• *Tie-in Point*
2	**114.00**	0.16	151.14	114.00	-0.14	-0.14	0.08	0.14	0.00	
3	**232.00**	0.17	179.40	232.00	-0.46	-0.46	0.16	0.07	0.00	
4	**509.00**	5.44	221.50	508.57	-10.71	-10.71	-8.54	1.92	0.02	
5	**694.00**	8.85	216.64	692.11	-28.70	-28.70	-22.85	1.87	0.02	
6	**786.00**	13.42	212.92	782.36	-43.35	-43.35	-32.88	5.03	0.05	
7	**879.00**	13.41	216.19	872.82	-61.11	-61.11	-45.12	0.82	0.00	
8	**971.00**	15.64	213.72	961.88	-80.04	-80.04	-58.30	2.52	0.02	
9	**1156.00**	15.02	214.63	1140.29	-120.51	-120.51	-85.77	0.36	0.00	
10	**1433.00**	14.05	216.65	1408.43	-177.02	-177.02	-126.24	0.40	0.00	
11	**1617.00**	13.22	221.47	1587.24	-210.71	-210.71	-153.50	0.76	0.00	
12	**1709.00**	12.79	223.99	1676.88	-225.92	-225.92	-167.54	0.77	0.00	
13	**1801.00**	11.48	223.43	1766.83	-239.89	-239.89	-180.91	1.43	-0.01	
14	**1841.00**	10.73	223.68	1806.08	-245.48	-245.48	-186.22	1.88	-0.02	
15	**1990.00**	9.18	221.56	1952.83	-264.40	-264.40	-203.68	1.07	-0.01	
16	**2083.00**	10.87	218.68	2044.41	-276.80	-276.80	-214.09	1.89	0.02	
17	**2175.00**	11.60	209.32	2134.65	-291.64	-291.64	-224.04	2.13	0.01	
18	**2267.00**	15.17	217.54	2224.15	-309.25	-309.25	-235.91	4.39	0.04	
19	**2359.00**	18.75	218.23	2312.13	-330.42	-330.42	-252.40	3.90	0.04	
20	**2451.00**	17.77	216.02	2399.50	-353.39	-353.39	-269.80	1.30	-0.01	
21	**2543.00**	16.81	216.95	2487.34	-375.38	-375.38	-286.06	1.09	-0.01	
22	**2636.00**	15.78	213.84	2576.60	-396.63	-396.63	-301.18	1.45	-0.01	
23	**2729.00**	15.47	213.72	2666.17	-417.45	-417.45	-315.11	0.34	0.00	
24	**2821.00**	14.94	215.02	2754.95	-437.37	-437.37	-328.73	0.68	-0.01	
25	**2913.00**	14.67	214.04	2843.89	-456.73	-456.73	-342.05	0.40	0.00	
26	**3005.00**	14.52	213.49	2932.92	-476.00	-476.00	-354.94	0.22	0.00	
27	**3098.00**	13.76	214.27	3023.11	-494.87	-494.87	-367.60	0.84	-0.01	
28	**3189.00**	14.56	212.46	3111.34	-513.46	-513.46	-379.83	1.00	0.01	
29	**3373.00**	12.87	213.66	3290.09	-550.04	-550.04	-403.61	0.93	-0.01	
30	**3465.00**	12.73	212.29	3379.80	-567.13	-567.13	-414.70	0.36	0.00	
31	**3557.00**	14.52	209.21	3469.21	-585.77	-585.77	-425.74	2.10	0.02	
32	**3741.00**	13.92	208.98	3647.57	-625.27	-625.27	-447.72	0.33	0.00	
33	**3833.00**	13.62	207.89	3736.93	-644.52	-644.52	-458.15	0.43	0.00	
34	**3925.00**	13.55	211.62	3826.36	-663.27	-663.27	-468.87	0.96	0.00	
35	**4017.00**	13.75	219.41	3915.76	-680.90	-680.90	-481.46	2.01	0.00	
36	**4201.00**	11.78	215.33	4095.21	-713.12	-713.12	-506.21	1.18	-0.01	
37	**4293.00**	11.29	213.69	4185.35	-728.28	-728.28	-516.64	0.64	-0.01	
38	**4385.00**	11.12	213.98	4275.60	-743.13	-743.13	-526.59	0.19	0.00	
39	**4477.00**	9.50	213.25	4366.11	-756.83	-756.83	-535.71	1.77	-0.02	
40	**4569.00**	8.95	213.85	4456.92	-769.12	-769.12	-543.86	0.61	-0.01	
41	**4661.00**	8.02	212.10	4547.91	-780.50	-780.50	-551.26	1.05	-0.01	
42	**4753.00**	5.90	206.85	4639.23	-790.16	-790.16	-556.81	2.40	-0.02	
43	**4845.00**	4.31	222.45	4730.87	-796.93	-796.93	-561.27	2.28	-0.02	
44	**4937.00**	2.62	232.20	4822.70	-800.77	-800.77	-565.27	1.94	-0.02	
45	**5028.00**	2.23	232.87	4913.62	-803.12	-803.12	-568.32	0.43	0.00	

46	**5120.00**	0.99	282.08	5005.58	-804.03	-804.03	-570.53	1.90	-0.01
47	**5212.00**	1.13	275.17	5097.56	-803.78	-803.78	-572.21	0.21	0.00
48	**5304.00**	1.02	269.28	5189.55	-803.71	-803.71	-573.93	0.17	0.00
49	**5396.00**	3.07	336.36	5281.49	-801.46	-801.46	-575.74	3.08	0.02
50	**5442.00**	10.53	359.78	5327.14	-796.12	-796.12	-576.25	16.97	0.16
51	**5488.00**	14.38	19.31	5372.07	-786.52	-786.52	-574.38	12.30	0.08
52	**5534.00**	20.60	25.72	5415.93	-773.83	-773.83	-568.97	14.14	0.14
53	**5580.00**	24.68	22.42	5458.38	-757.65	-757.65	-561.79	9.29	0.09
54	**5626.00**	31.02	17.18	5499.03	-737.43	-737.43	-554.62	14.76	0.14
55	**5672.00**	34.67	8.75	5537.69	-713.15	-713.15	-549.12	12.70	0.08
56	**5718.00**	39.64	359.06	5574.38	-685.51	-685.51	-547.37	16.67	0.11
57	**5764.00**	45.28	355.04	5608.31	-654.52	-654.52	-549.03	13.60	0.12
58	**5810.00**	51.87	350.92	5638.73	-620.33	-620.33	-553.30	15.82	0.14
59	**5856.00**	53.27	350.74	5666.69	-584.27	-584.27	-559.12	3.06	0.03
60	**5902.00**	60.13	351.03	5691.93	-546.33	-546.33	-565.20	14.92	0.15
61	**5948.00**	61.99	350.77	5714.19	-506.58	-506.58	-571.57	4.07	0.04
62	**5994.00**	68.75	350.77	5733.35	-465.33	-465.33	-578.28	14.70	0.15
63	**6040.00**	69.23	350.85	5749.84	-422.94	-422.94	-585.13	1.06	0.01
64	**6086.00**	71.60	352.52	5765.26	-380.06	-380.06	-591.40	6.18	0.05
65	**6132.00**	71.80	352.82	5779.70	-336.75	-336.75	-596.97	0.76	0.00
66	**6179.00**	72.71	354.52	5794.03	-292.26	-292.26	-601.90	3.95	0.02
67	**6225.00**	73.30	354.21	5807.47	-248.48	-248.48	-606.22	1.44	0.01
68	**6271.00**	77.03	354.17	5819.25	-204.25	-204.25	-610.72	8.11	0.08
69	**6317.00**	82.57	353.19	5827.39	-159.27	-159.27	-615.71	12.22	0.12
70	**6424.00**	87.34	351.41	5836.80	-53.68	-53.68	-629.99	4.76	0.04
71	**6517.00**	87.62	352.65	5840.89	38.33	38.33	-642.87	1.37	0.00
72	**6610.00**	88.91	352.61	5843.70	130.52	130.52	-654.79	1.39	0.01
73	**6703.00**	89.69	353.98	5844.84	222.87	222.87	-665.65	1.70	0.01
74	**6796.00**	89.86	353.84	5845.21	315.35	315.35	-675.52	0.24	0.00
75	**6981.00**	90.50	359.76	5844.62	499.97	499.97	-685.84	3.22	0.00
76	**7074.00**	91.51	0.77	5842.99	592.96	592.96	-685.41	1.54	0.01
77	**7166.00**	91.51	0.38	5840.57	684.92	684.92	-684.49	0.42	0.00
78	**7261.00**	90.42	2.83	5838.97	779.86	779.86	-681.83	2.82	-0.01
79	**7354.00**	90.31	2.82	5838.38	872.75	872.75	-677.24	0.12	0.00
80	**7446.00**	89.11	0.85	5838.84	964.69	964.69	-674.30	2.51	-0.01
81	**7539.00**	89.61	3.19	5839.88	1057.62	1057.62	-671.02	2.57	0.01
82	**7632.00**	90.14	4.49	5840.08	1150.41	1150.41	-664.79	1.51	0.01
83	**7725.00**	90.53	3.79	5839.54	1243.16	1243.16	-658.08	0.86	0.00
84	**7817.00**	91.43	2.41	5837.97	1335.01	1335.01	-653.10	1.79	0.01
85	**7910.00**	91.23	2.22	5835.81	1427.91	1427.91	-649.35	0.30	0.00
86	**8003.00**	91.45	2.17	5833.63	1520.82	1520.82	-645.79	0.24	0.00
87	**8096.00**	91.54	2.30	5831.21	1613.72	1613.72	-642.16	0.17	0.00
88	**8189.00**	91.87	2.87	5828.44	1706.58	1706.58	-637.97	0.71	0.00
89	**8282.00**	92.07	2.91	5825.24	1799.41	1799.41	-633.28	0.22	0.00
90	**8375.00**	90.17	2.81	5823.42	1892.27	1892.27	-628.64	2.05	-0.02
91	**8467.00**	89.72	2.84	5823.51	1984.16	1984.16	-624.11	0.49	0.00
92	**8559.00**	89.66	2.92	5824.01	2076.04	2076.04	-619.49	0.11	0.00
93	**8652.00**	89.66	3.50	5824.56	2168.89	2168.89	-614.28	0.62	0.00
94	**8744.00**	89.58	3.28	5825.17	2260.73	2260.73	-608.84	0.25	0.00
95	**8836.00**	89.19	3.54	5826.16	2352.56	2352.56	-603.37	0.51	0.00
96	**8928.00**	89.81	1.07	5826.96	2444.47	2444.47	-599.67	2.77	0.01
97	**9021.00**	90.45	0.89	5826.75	2537.46	2537.46	-598.08	0.71	0.01
98	**9115.00**	89.94	0.66	5826.43	2631.45	2631.45	-596.81	0.60	-0.01
99	**9207.00**	89.97	0.56	5826.50	2723.44	2723.44	-595.83	0.11	0.00
100	**9300.00**	89.86	0.11	5826.64	2816.44	2816.44	-595.28	0.50	0.00
101	**9392.00**	89.75	0.16	5826.96	2908.44	2908.44	-595.07	0.13	0.00
102	**9485.00**	91.01	358.92	5826.34	3001.43	3001.43	-595.81	1.90	0.01
103	**9577.00**	90.81	358.99	5824.88	3093.41	3093.41	-597.49	0.23	0.00
104	**9670.00**	90.09	358.70	5824.15	3186.38	3186.38	-599.37	0.83	-0.01
105	**9854.00**	90.09	358.62	5823.86	3370.33	3370.33	-603.67	0.04	0.00
106	**9946.00**	89.89	358.37	5823.87	3462.30	3462.30	-606.08	0.35	0.00
107	**10039.00**	90.11	358.86	5823.87	3555.27	3555.27	-608.33	0.58	0.00
108	**10131.00**	88.99	357.17	5824.60	3647.21	3647.21	-611.52	2.20	-0.01
109	**10223.00**	89.52	356.47	5825.79	3739.06	3739.06	-616.62	0.95	0.01
110	**10315.00**	87.96	354.88	5827.82	3830.77	3830.77	-623.56	2.42	-0.02
111	**10407.00**	90.67	355.65	5828.92	3922.44	3922.44	-631.15	3.06	0.03
112	**10500.00**	90.48	355.28	5827.98	4015.14	4015.14	-638.50	0.45	0.00
113	**10592.00**	90.03	354.95	5827.57	4106.81	4106.81	-646.34	0.61	0.00
114	**10684.00**	90.73	356.96	5826.96	4198.57	4198.57	-652.83	2.31	0.01

115	**10777.00**	91.56	358.90	5825.10	4291.49	4291.49	-656.18	2.27	0.01
116	**10869.00**	91.31	359.07	5822.80	4383.44	4383.44	-657.81	0.33	0.00
117	**10960.00**	91.51	358.66	5820.56	4474.40	4474.40	-659.62	0.50	0.00
118	**11052.00**	91.79	0.92	5817.91	4566.35	4566.35	-659.95	2.47	0.00
119	**11144.00**	91.79	1.01	5815.04	4658.30	4658.30	-658.40	0.10	0.00
120	**11236.00**	91.71	0.41	5812.23	4750.25	4750.25	-657.27	0.66	0.00
121	**11328.00**	90.95	359.23	5810.09	4842.22	4842.22	-657.55	1.53	-0.01
122	**11420.00**	90.42	1.47	5808.99	4934.20	4934.20	-656.99	2.50	-0.01
123	**11512.00**	89.55	0.71	5809.02	5026.19	5026.19	-655.24	1.26	-0.01
124	**11604.00**	90.03	4.08	5809.35	5118.09	5118.09	-651.40	3.70	0.01
125	**11696.00**	88.83	2.83	5810.27	5209.92	5209.92	-645.85	1.88	-0.01
126	**11788.00**	88.38	0.89	5812.51	5301.84	5301.84	-642.87	2.16	0.00
127	**11880.00**	91.56	2.89	5812.56	5393.77	5393.77	-639.84	4.08	0.03
128	**11972.00**	91.96	2.64	5809.73	5485.62	5485.62	-635.40	0.51	0.00
129	**12064.00**	90.22	2.35	5807.98	5577.51	5577.51	-631.40	1.92	-0.02
130	**12156.00**	90.06	1.79	5807.76	5669.45	5669.45	-628.07	0.63	0.00
131	**12248.00**	90.42	2.46	5807.37	5761.39	5761.39	-624.66	0.83	0.00
132	**12340.00**	90.59	2.25	5806.56	5853.30	5853.30	-620.88	0.29	0.00
133	**12432.00**	90.42	2.97	5805.75	5945.20	5945.20	-616.69	0.80	0.00
134	**12524.00**	90.11	2.60	5805.33	6037.09	6037.09	-612.22	0.52	0.00
135	**12616.00**	90.17	2.25	5805.10	6129.01	6129.01	-608.33	0.39	0.00
136	**12708.00**	89.83	1.60	5805.10	6220.96	6220.96	-605.24	0.80	0.00
137	**12800.00**	89.02	1.18	5806.02	6312.93	6312.93	-603.01	0.99	-0.01
138	**12891.00**	88.63	0.68	5807.89	6403.89	6403.89	-601.53	0.70	0.00
139	**12983.00**	89.97	0.69	5809.01	6495.88	6495.88	-600.43	1.46	0.01
140	**13075.00**	89.94	0.26	5809.09	6587.88	6587.88	-599.67	0.47	0.00
141	**13167.00**	88.27	357.42	5810.52	6679.83	6679.83	-601.53	3.58	-0.02
142	**13259.00**	88.16	356.92	5813.39	6771.68	6771.68	-606.07	0.56	0.00
143	**13318.00**	87.96	356.71	5815.39	6830.55	6830.55	-609.35	0.49	0.00