Schlumberger

Company: **ESSO Australia Pty. Ltd.**

Well: **HLA A1A**
Field: **Halibut GDA 94**
Rig: **ISDL 453** State: **Victoria**

Rig: ISDL 453
Field: Halibut GDA 94
Location: Bass Strait
Well: HLA A1A
Company: ESSO Australia Pty. Ltd.

Gamma Ray Service
1:500 True Vertical Depth
Real Time Log

Location			Elevation	
Total depth:	2952.0 m		K.B.	Top Drive
Spud date:	18−Nov−2003		G.L.	−73.00 m
Runs:	1	To 3	D.F.	29.45 m

Permanent datum: Mean Sea Level — Elev.: 0 m
Log measured from: Drill Floor — 29.45 m above Perm. datum
Depth reference: Driller's Depth

API serial no.	Y = 5748514.60 m	Longitude	Latitude
	X = 615284.93 m	E148º19'13.20''	S38º24'15.015''

Depth logged: 616.0 m To 2935.0 m — Mag decl: 13.21 deg. — Other services:
Date logged: 20−Nov−03 To 30−Nov−03 — Mag dip: −68.86 deg. — Directional Drilling, D&I

Bore hole record			Casing record			
Hole size	from	to	Size	Density	from	to
20 in.	0.0 m	178.0 m	20 in.	94.0 lb/ft	Surface	178.0 m
12 1/4 in.	178.0 m	616.0 m	10 3/4 in.	40.5 lb/ft	Surface	616.0 m
8 1/2 in.	616.0 m	2952.0 m				

Mud record			Borehole deviation record			
Type	from	to	Min	Max	from	to
KCL/PHPA/Glycol	616.0 m	2952.0 m	5.38 deg.	36.48 deg.	616.0 m	2527.0 m
			38.21 deg	59.19 deg.	2527.0 m	2781.0 m
			59.67 deg	66.30 deg.	2781.0 m	2952.0 m

Surface equipment		Software record			
Unit	OLU−FB−924	IDEAL Wis	ID8_0C_07		
Depth system	DES−CA_01−017	SPM	hspm8_0c_13		
		LWD			
		MWD	V7.0c00		

Bit Run Summary

Run number		1	2	3
Bit size	in	8.5	8.5	8.5
Bit start depth	m	616.0 m	2527.0 m	2781.0 m
Bit end depth	m	2527.0 m	2781.0 m	2952.0 m
Top interval logged	m	616.0 m	2509.7 m	2764.0 m
Bottom interval logged	m	2509.8 m	2763.7 m	2935.0 m
Begin log: time		8:45	20:00	16:50
Begin log: date		20−Nov−03	26−Nov−03	29−Nov−03
End log: time		13:33	19:50	5:00
End log: date		25− Nov−03	28−Nov−03	30−Nov−03
Mud data				
Depth	m	2527.0	2781.0	2913.0

Type		KCl/PHPA/GLYC.	KCl/PHPA/GLYC.	KCl/PHPA/GLYC.							
Mud weight	ppg	9.55	9.70	9.8							
Solids	%	4.7	6.1	6.5							
Chlorides	ppm	33,500	37,000	37,500							
Rm											
Rmf											
Rmc											
Potassium	ppm	37,441	41,353	41,912							
Environmental data											
GR											
Mud weight	ppg	9.55	9.70	9.8							
Bit size	in	8.5	8.5	8.5							
Resistivity											
Neutron porosity											
Hole Size											
Mud weight											
Temperature											
Mud salinity											
Formation salinity											
Recording rate 1	SEC										
Recording rate 2	SEC										
Filtering GR		3 pt	3 pt	3 pt							
Filtering density											
Filtering Neutron											
Company representative		R. Morris	B. Davis	G.Campbell	B. Steel						
Anadrill personnel		K. Handley	C. Tue	C. Soper	C. Cocks	D. Hastie					

OTHER SERVICES FOR RUN1	OTHER SERVICES FOR RUN2	OTHER SERVICES FOR RUN3
Gamma Ray Directional Drilling Directional Surveys	Gamma Ray Directional Drilling Directional Surveys	Gamma Ray Directional Drilling Directional Surveys
REMARKS: RUN NUMBER 1	**REMARKS: RUN NUMBER 2**	**REMARKS: RUN NUMBER 3**
8−1/2 in. hole was drilled from 616.0 m to 2527.0 m. Depth is referenced to the Driller's Depth. Gamma Ray is corrected for Tool Size, Bit Size and Mud Weight. Mud type is KCL/PHPA/Glycol. POOH due to bit change.	8−1/2 in. hole was drilled from 2527.0 m to 2781.0 m. Depth is referenced to the Driller's Depth. Gamma Ray is corrected for Tool Size, Bit Size and Mud Weight. Mud type is KCL/PHPA/Glycol. POOH due to bit change.	8−1/2 in. hole was drilled from 2781.0 m to 2952.0 m. Depth is referenced to the Driller's Depth. Gamma Ray is corrected for Tool Size, Bit Size and Mud Weight. Mud type is KCL/PHPA/Glycol. POOH due to TD of HLA A1A

Thank You for Choosing Schlumberger

EQUIPMENT DESCRIPTION

RUN1

DOWNHOLE EQUIPMENT

6−3/4 in. PowerPulse* 22.20

MDC: Z408−AC
MEC: 108−BA
MDI: 108−BC
MGR: 146−AA

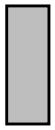
DH Software v7.0c00

D&I 17.90

GR 17.25

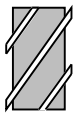
6−1/2 in. PMDC 13.75

S/N: ASS15700



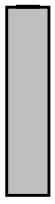
6−1/8 in. NM Stab. 12.06

S/N: DOTS4058
Stab. OD: 8−1/4 in.



6−1/2 in. PMDC 10.61

S/N: 9612058



6−3/4 in. PowerPak* Motor 7.92

A675XP7850
S/N: 3604
1.50 deg. bend
8−3/8 in. Motor Sleeve

RUN2

DOWNHOLE EQUIPMENT

6−3/4 in. PowerPulse* 22.21

MDC: Z408−AC
MEC: 108−BA
MDI: 108−BC
MGR: 146−AA

DH Software v7.0c00

D&I 17.91

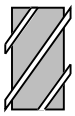
GR 17.26

6−1/2 in. PMDC 13.76

S/N: ASS15700

6−1/8 in. NM Stab. 12.07

S/N: DOTS4058
Stab. OD: 8−1/4 in.

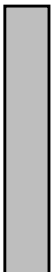


6−1/2 in. PMDC 10.62

S/N: 9612058

6 3/4 in. PowerPak* Motor 7.93

A675XP7850
S/N: 3604
1.50 deg. bend
8−3/8 in. Motor Sleeve



RUN3

DOWNHOLE EQUIPMENT

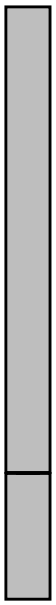
6−3/4 in. PowerPulse* 21.94

MDC: 066−AB
MEC: 612−BB
MDI: 626−BC
MGR: 295−AA

DH Software v6.1c00

D&I 17.63

GR 16.98

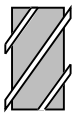


6−1/2 in. PMDC 13.72

S/N: ASS15700

6−1/8 in. NM Stab. 12.03

S/N: DOTS4058
Stab. OD: 8−1/4 in.

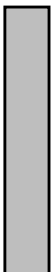


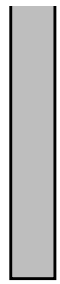
6−1/2 in. PMDC 10.58

S/N: 9612058

6−3/4 in. PowerPak* Motor 7.89

A675XP7850
S/N: 2307
0 deg. bend
8−3/8 in. Motor Sleeve





Smith PDC Bit — 0.00 — 0.24

8−1/2 in. OD

S75HPX S/N: JS6695A

Maximum string diameter 8.50 in.

All lengths in Meters

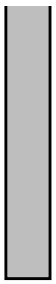
REED TCI BIT — 0.00 — 0.25

8−1/2 in. OD

TD53AKPRDH S/N: T96931

Maximum string diameter 8.50 in.

All lengths in Meters



Smith PDC Bit — 0.00 — 0.20

8−1/2 in. OD

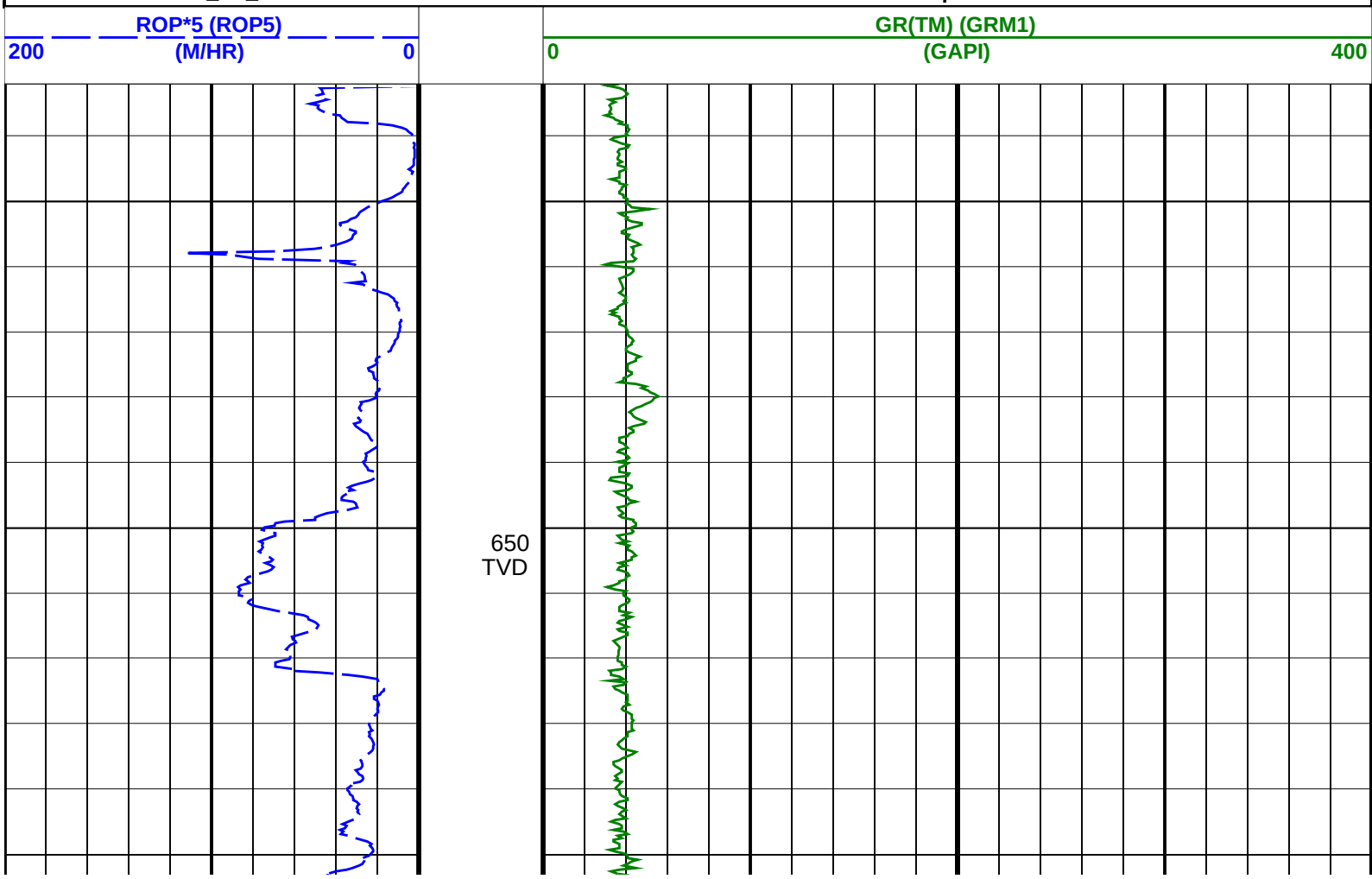
S75HPX S/N: JS6695A

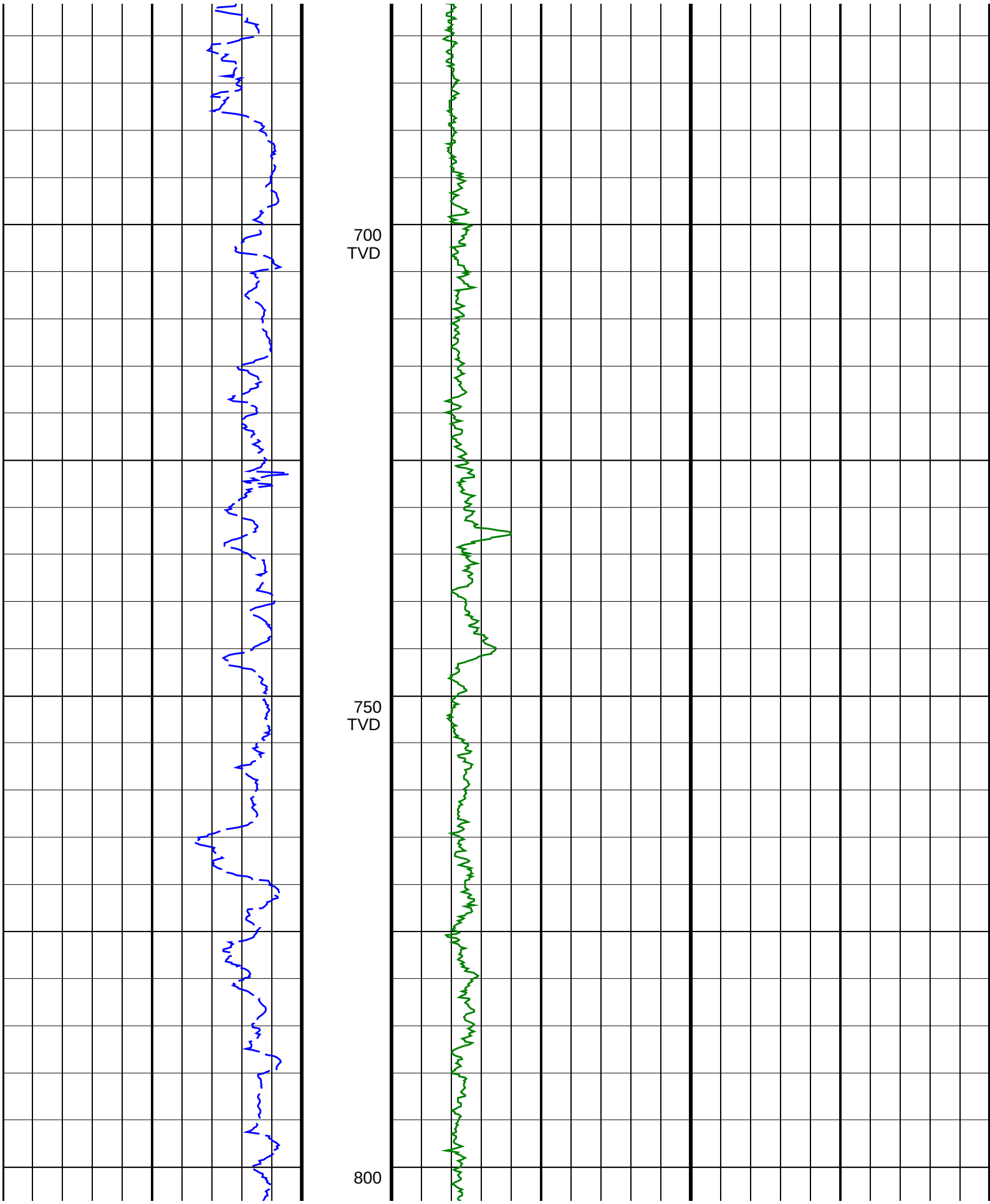
Maximum string diameter 8.50 in.

All lengths in Meters

HLA A1A GR 1:500 TVD

IDEAL Version: ID8_0C_07 <TVD> Vertical Scale: 1:500 **Graphics File Created: 30−Nov−2003 14:24**

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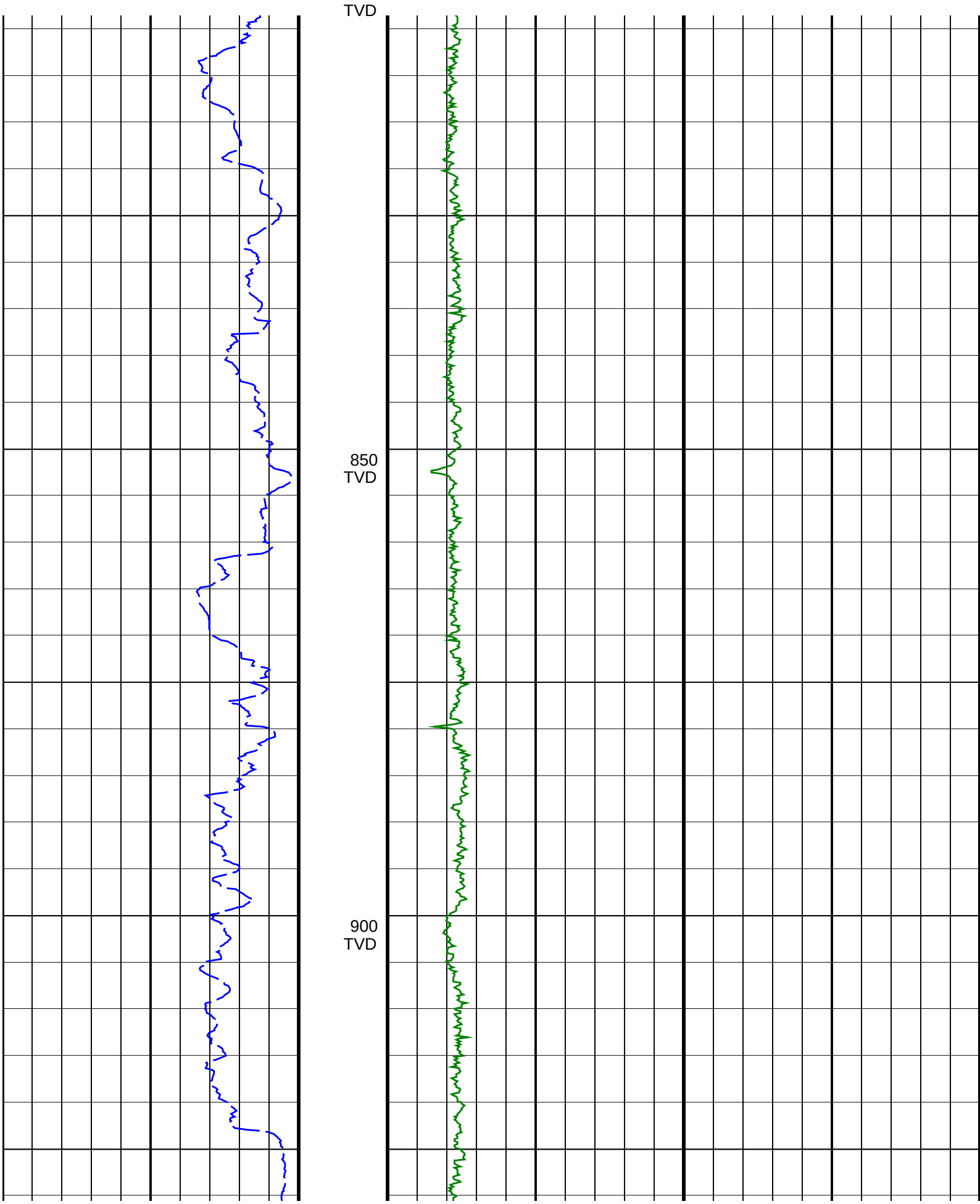
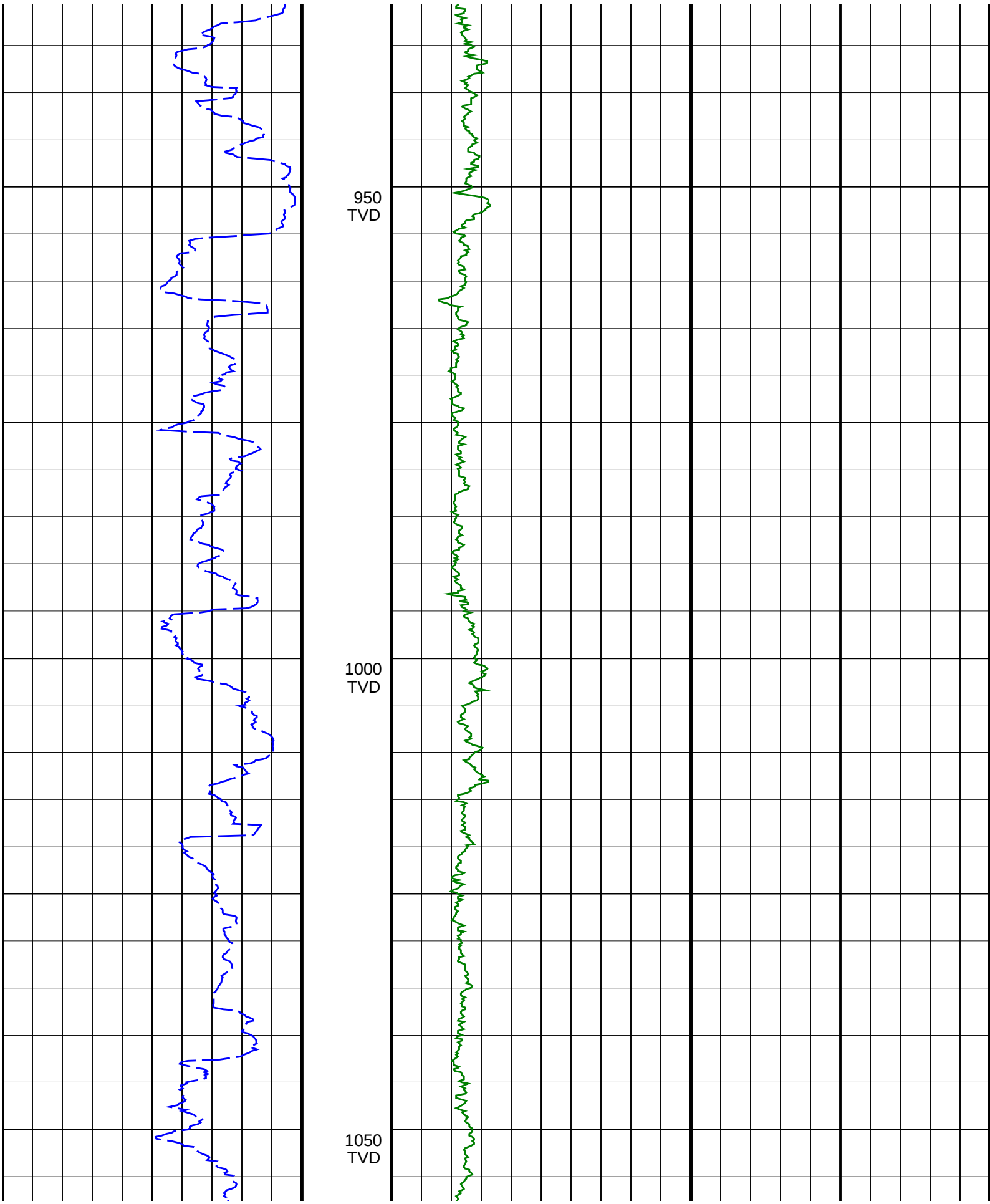
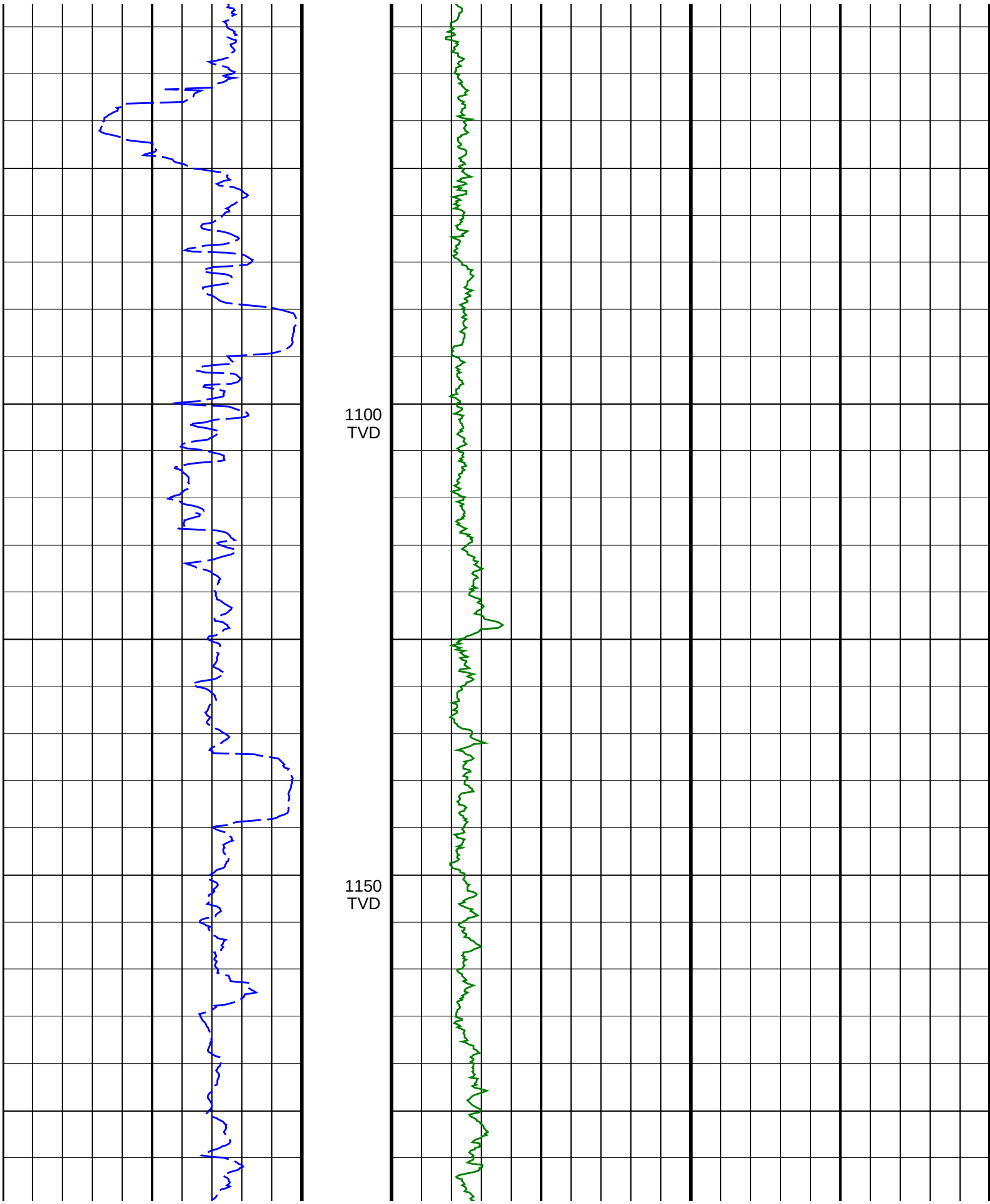
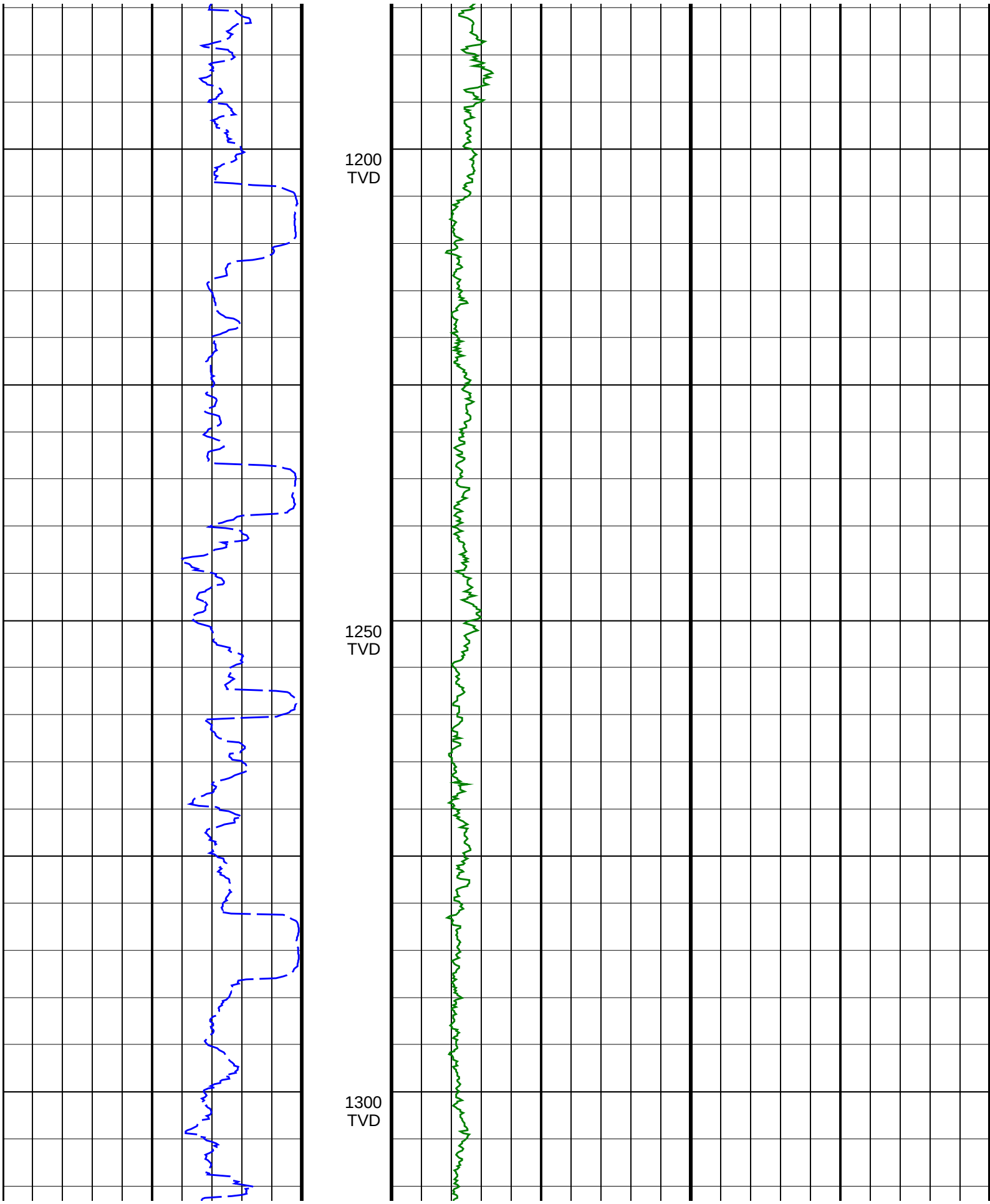
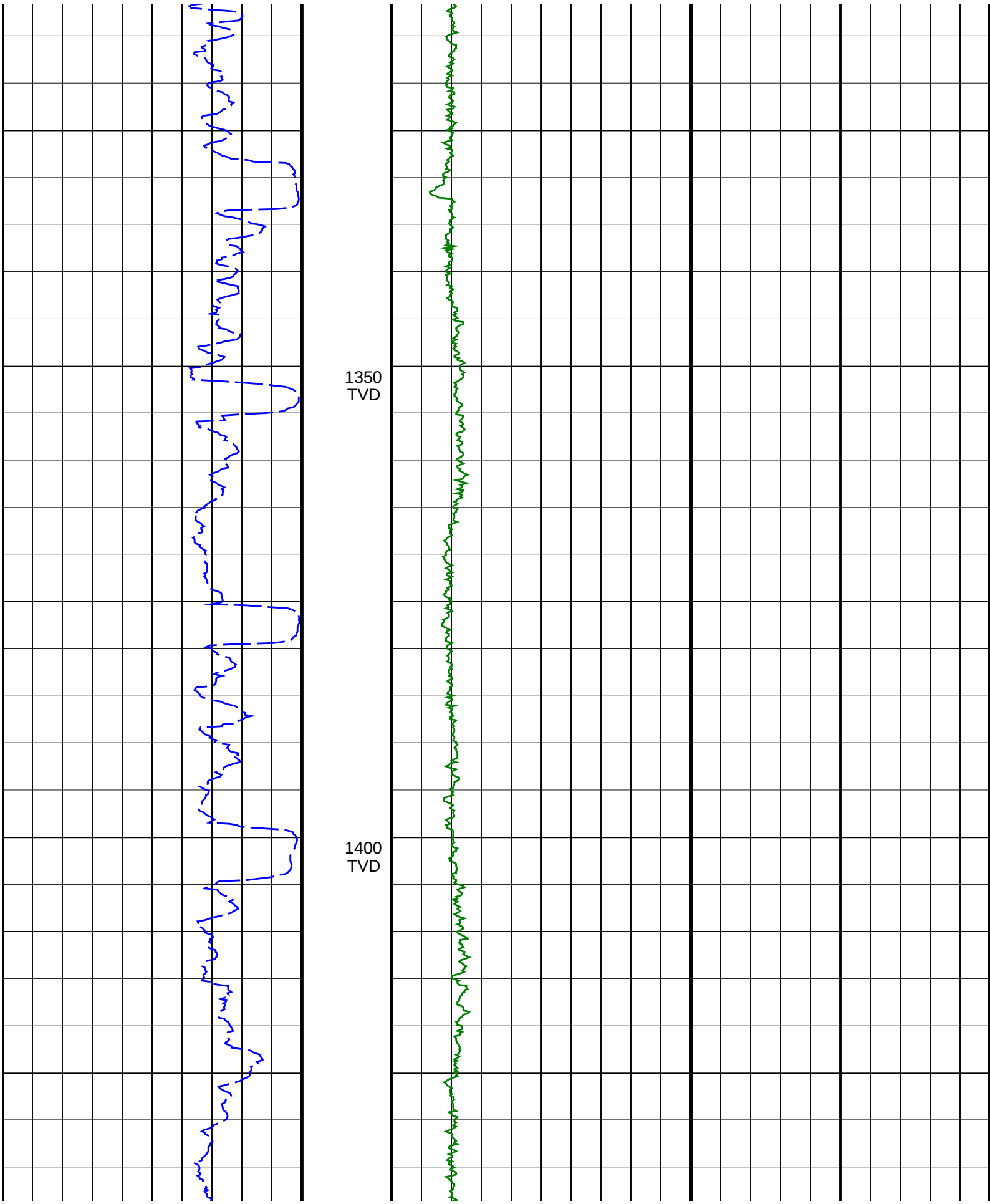
TVD
750
TVD
800

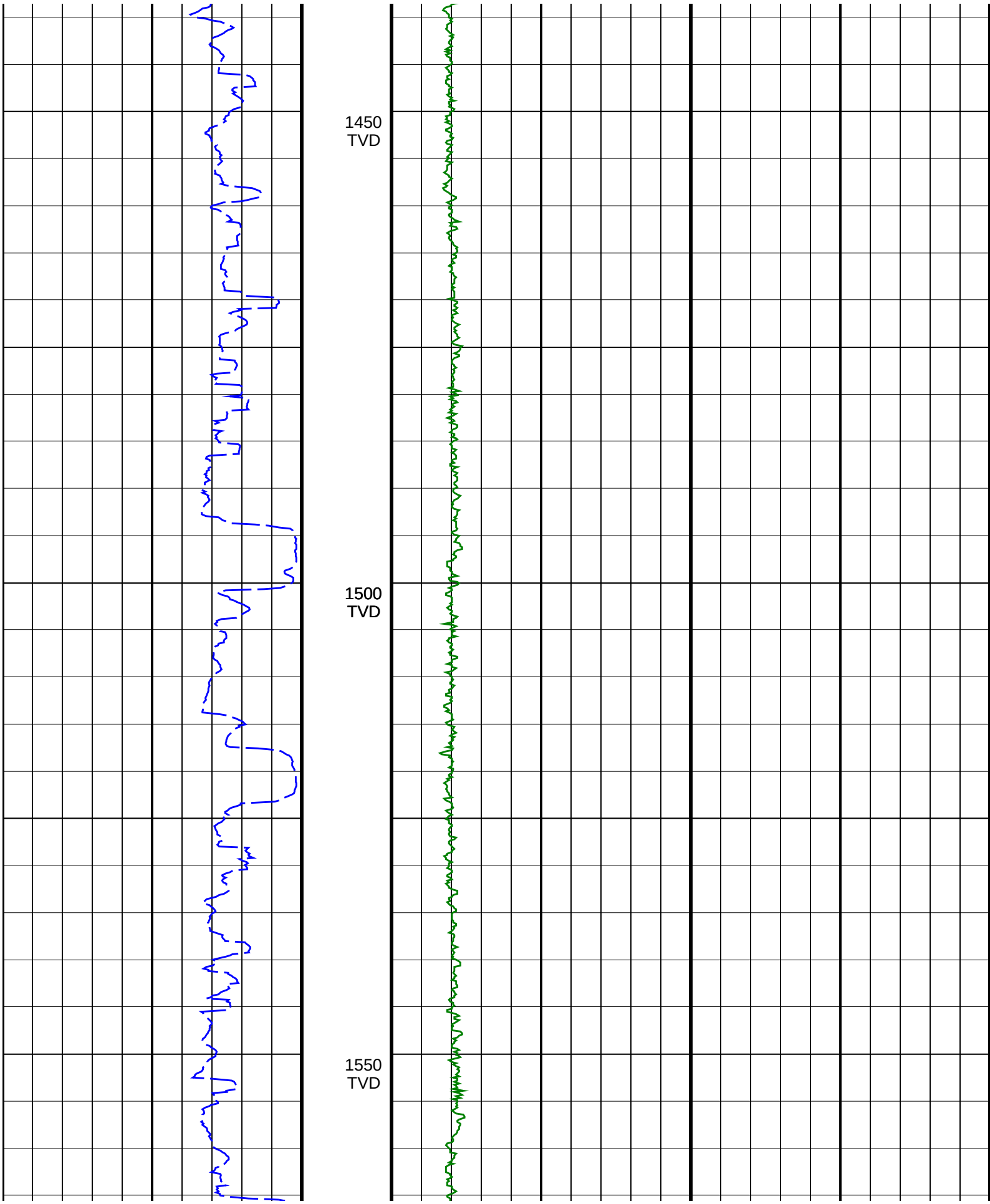

TVD
850
TVD
900
TVD

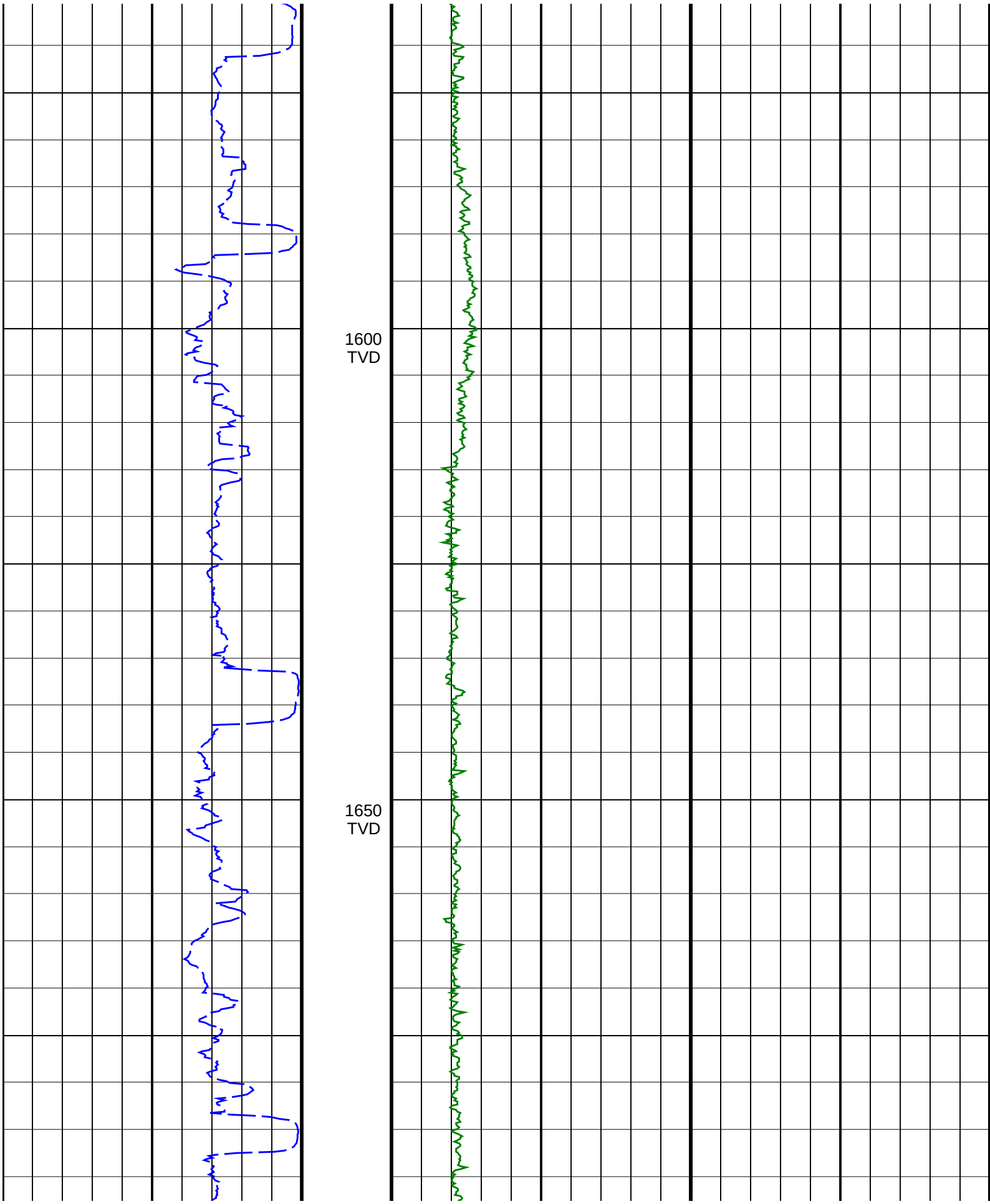

950
TVD
1000
TVD
1050
TVD


1100
TVD
1150
TVD


1200
TVD
1250
TVD
1300
TVD


1350
TVD
1400
TVD


1450
TVD
1500
TVD
1550
TVD


1600
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1650
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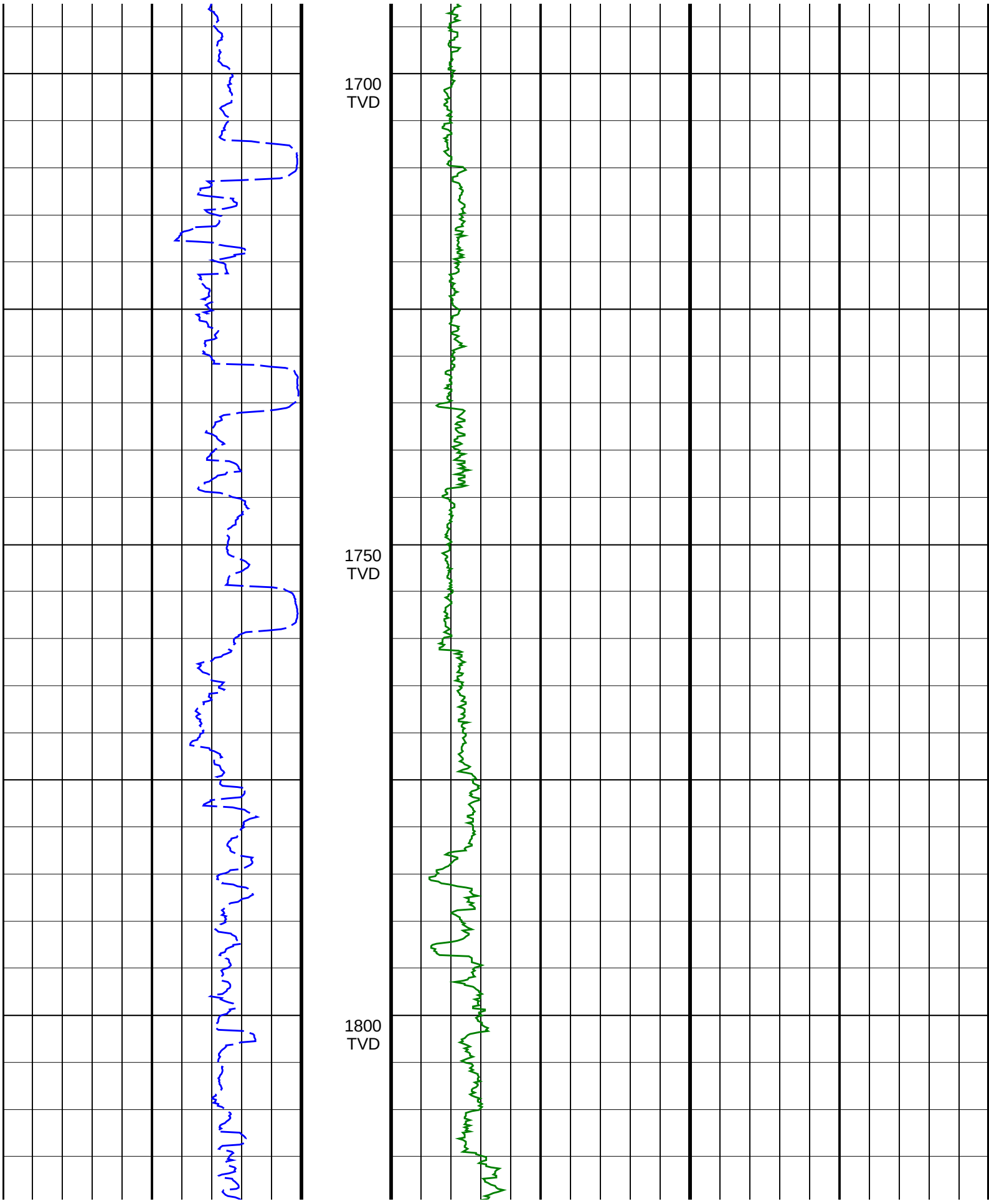
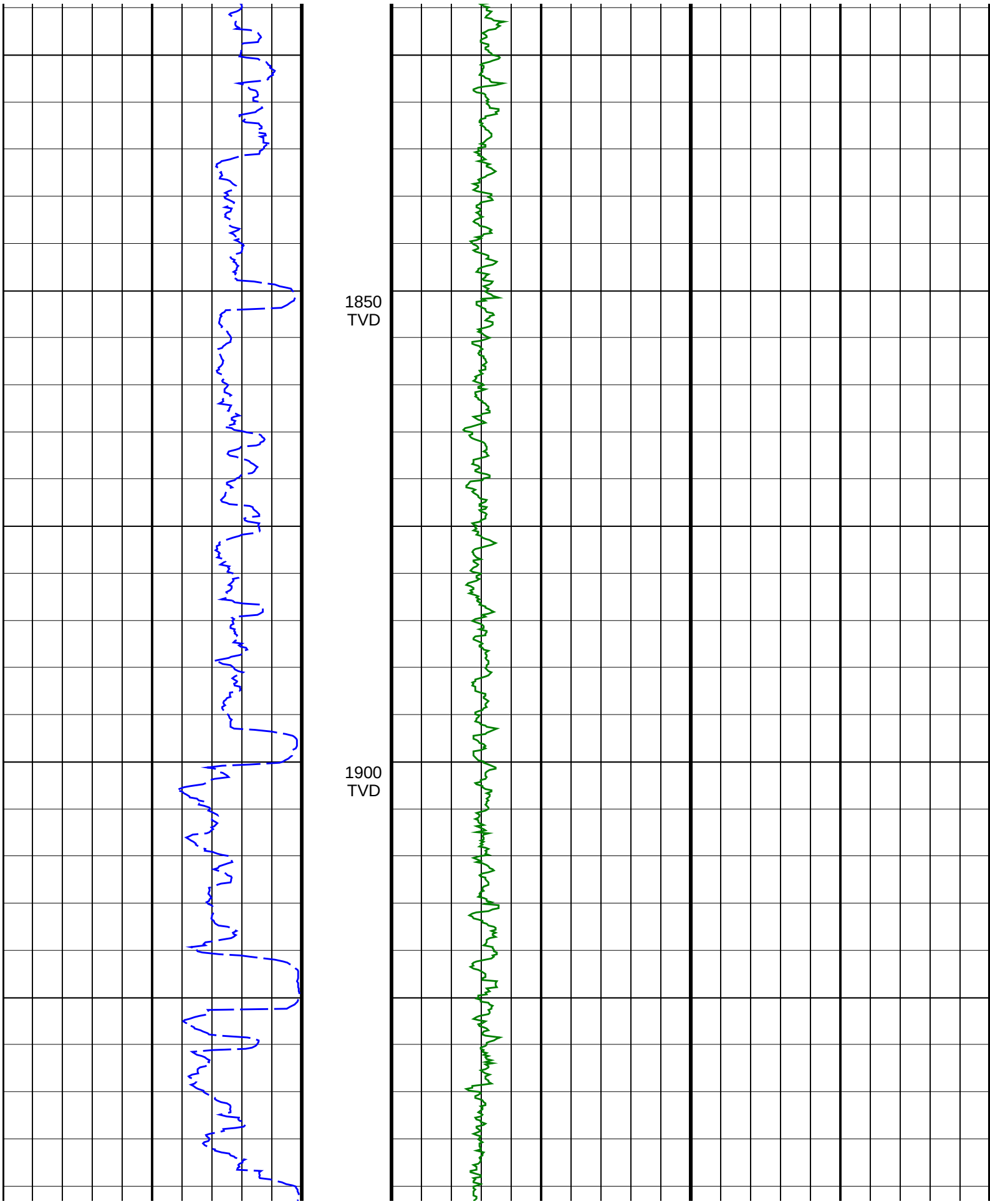

1700
TVD
1750
TVD
1800
TVD


1850
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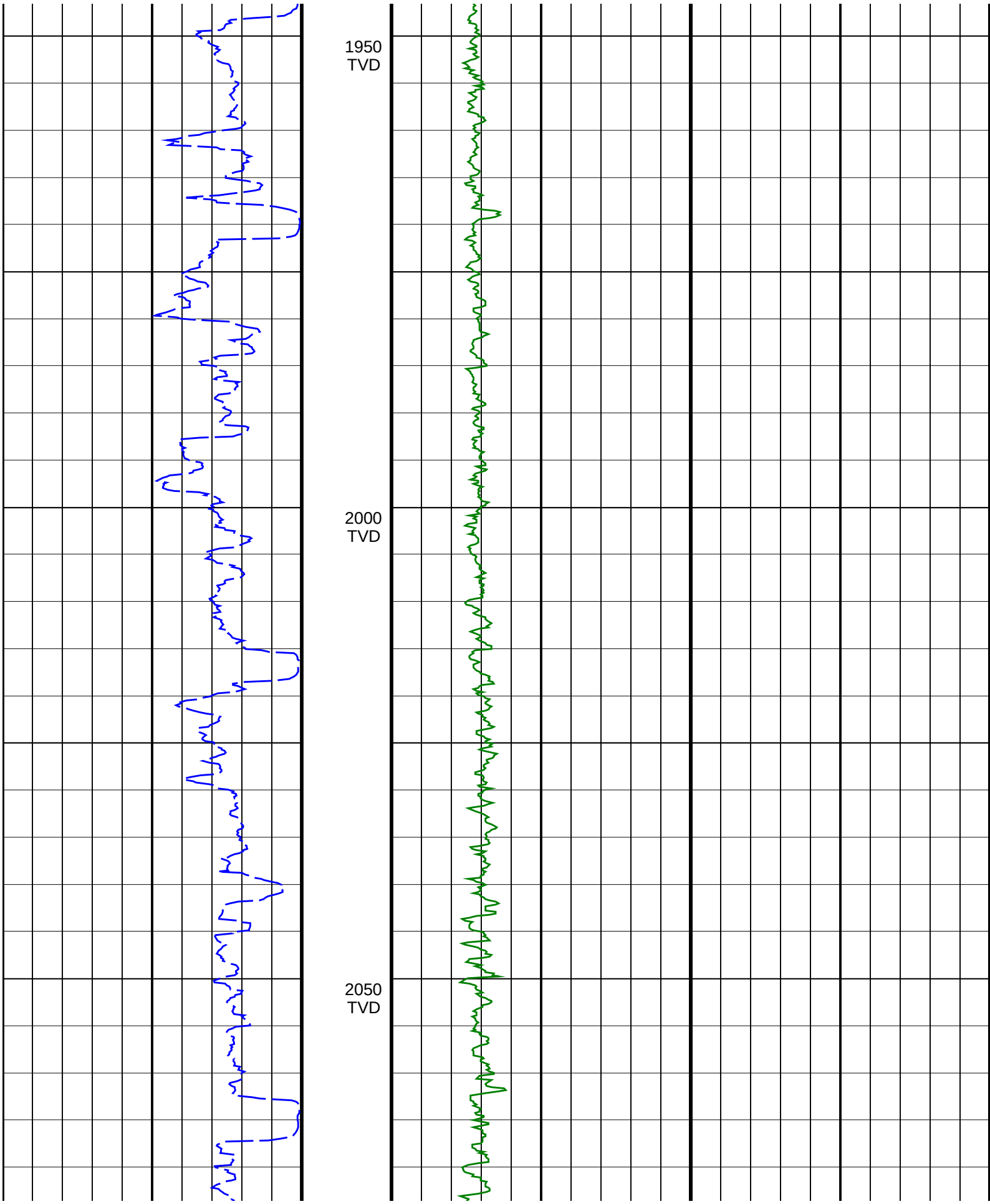
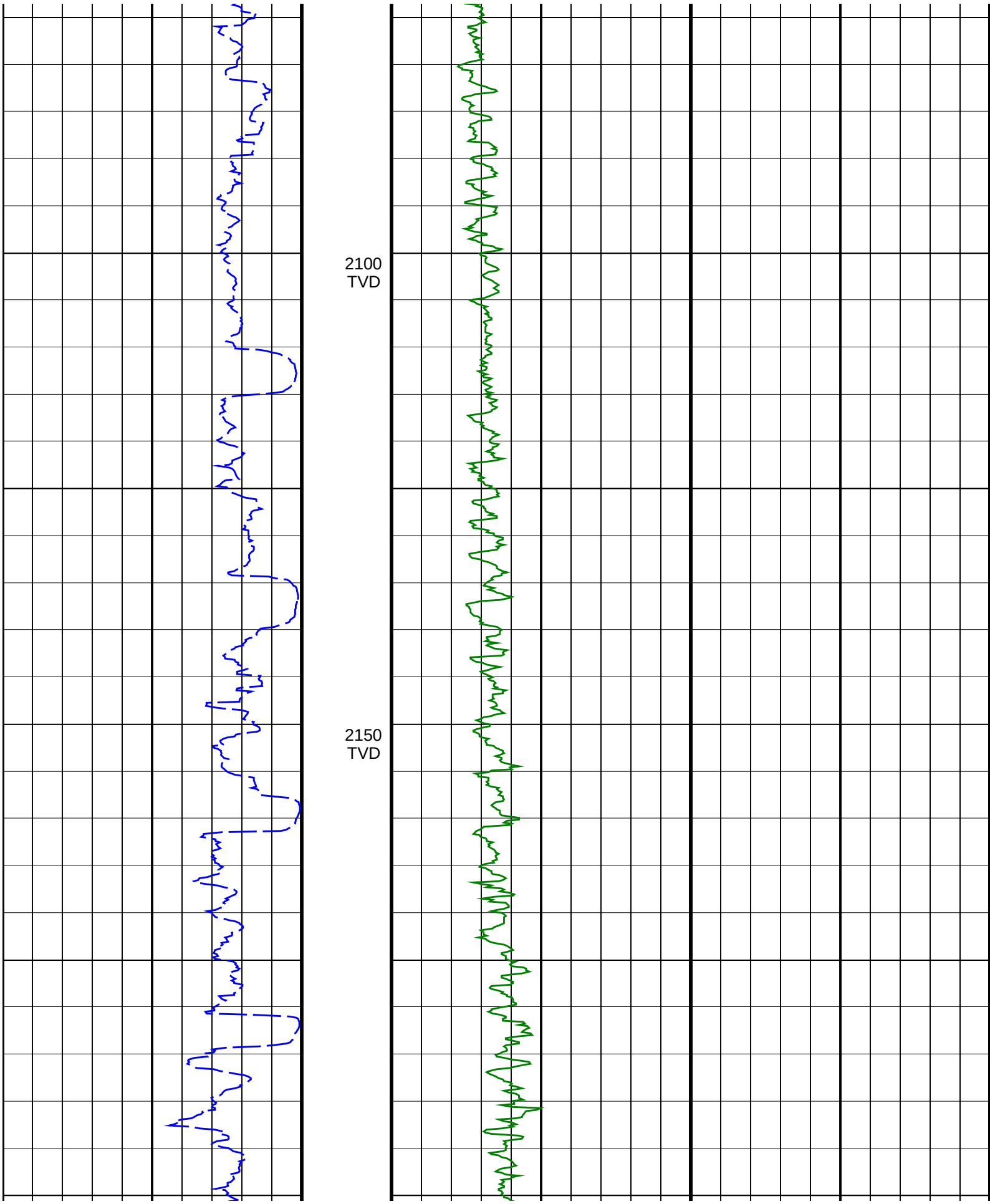
1900
TVD


1950
TVD
2000
TVD
2050
TVD


2100
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2150
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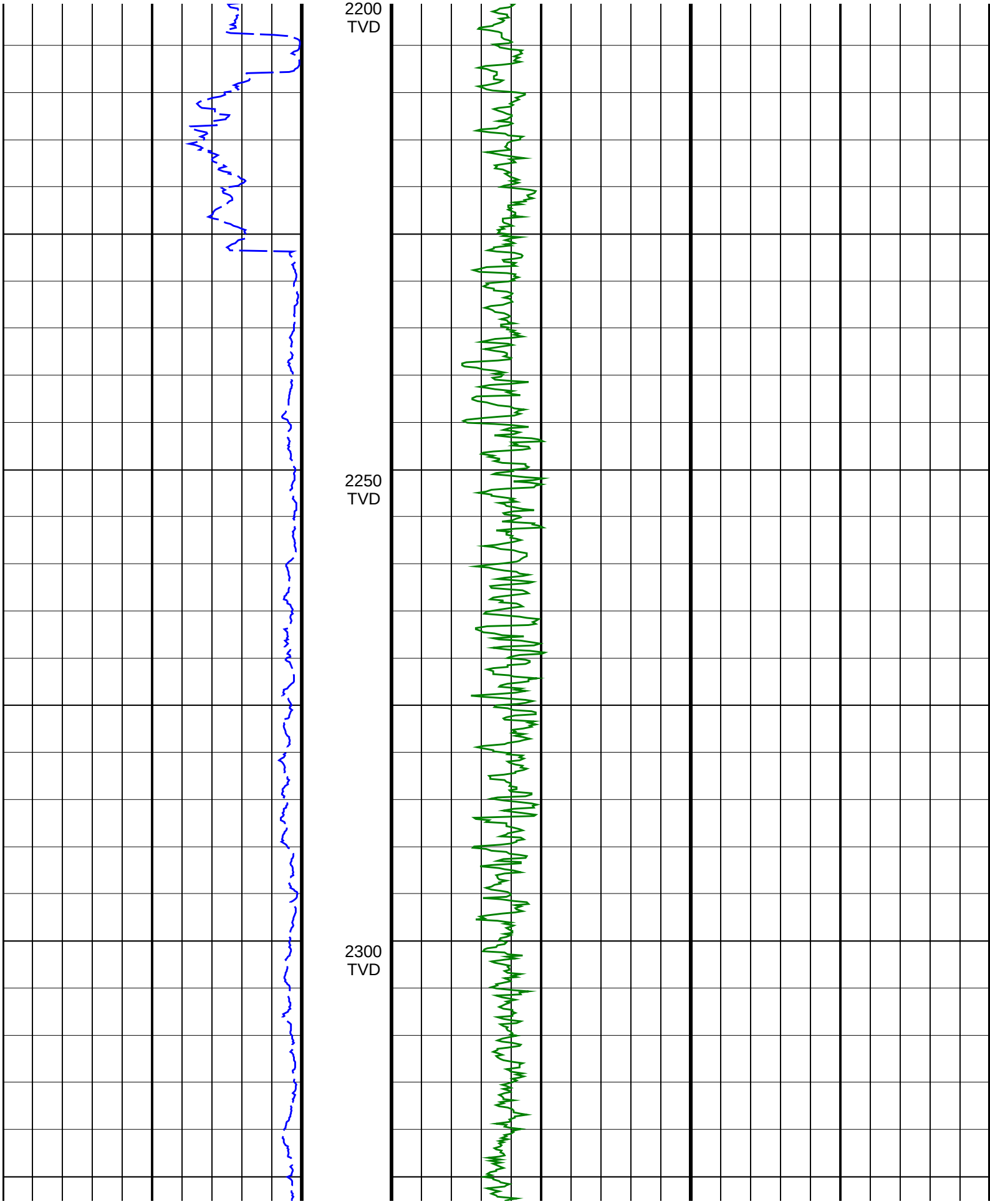
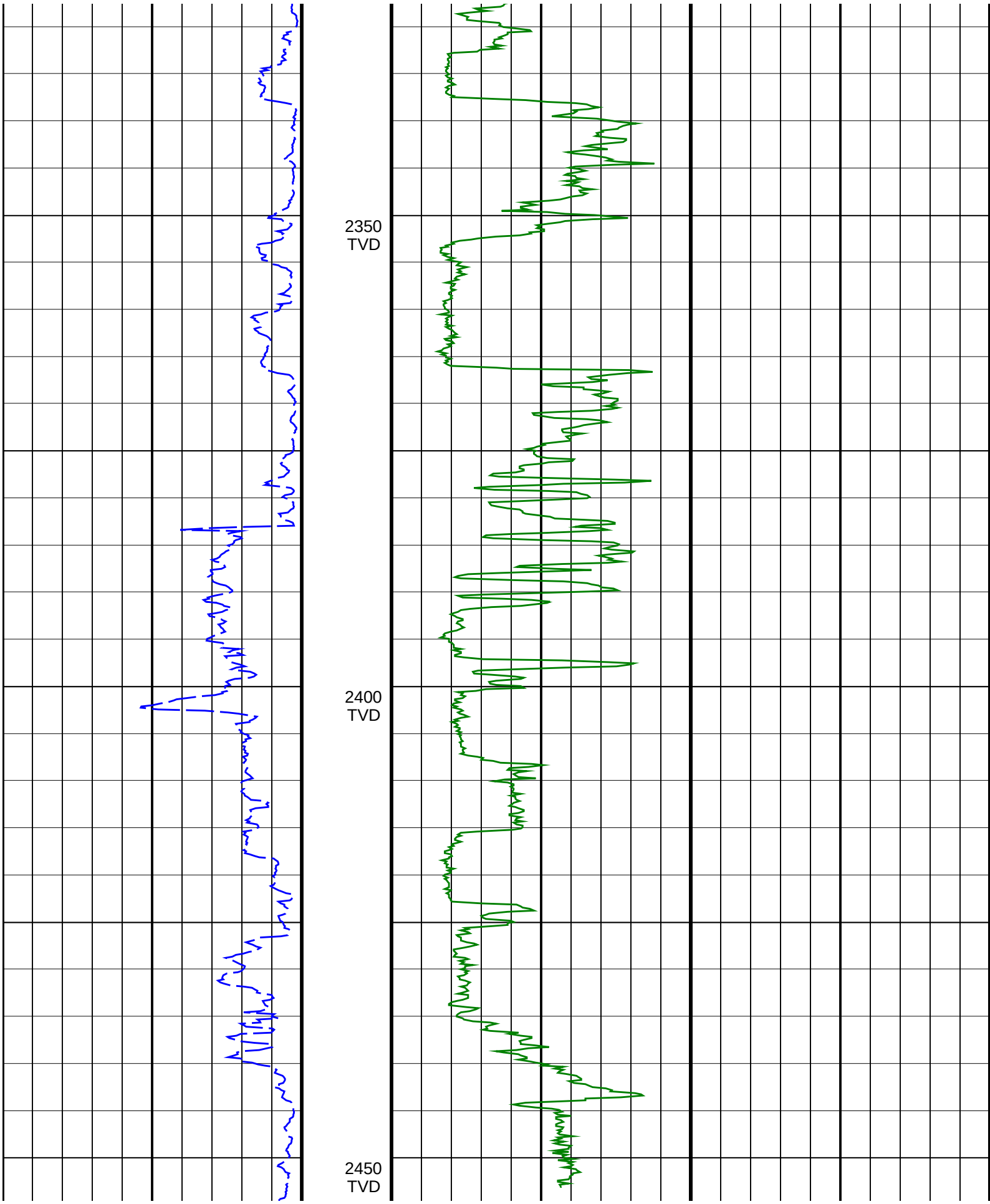
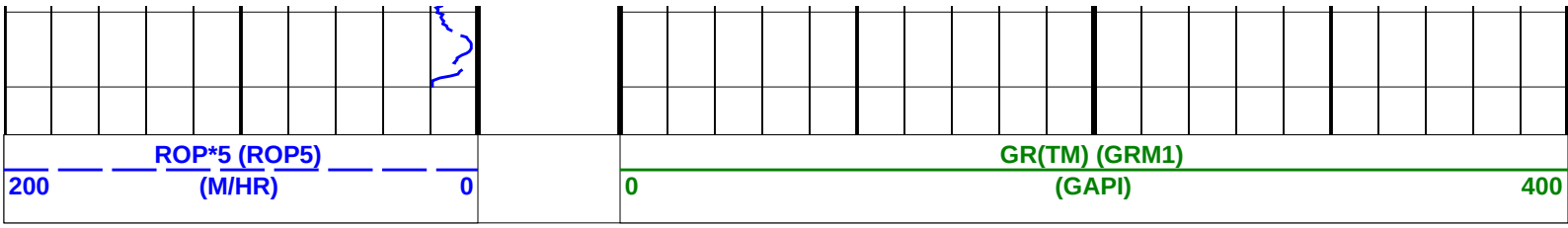

2200
TVD
2250
TVD
2300
TVD


2350
TVD
2400
TVD
2450
TVD



SCHLUMBERGER

Survey report 30−Nov−2003 10:28:15 Page 1 of 4

Client.....: ESSO Australia Pty. Ltd.
Field.....: Halibut GDA 94

Well.....: HLA A1A
API number.....:
Engineer.....: Kym Handley
RIG:.....: ISDL 453
STATE:.....: Victoria

Spud date.....: 18−Nov−2003
Last survey date.....: 30−Nov−03
Total accepted surveys...: 84
MD of first survey.....: 586.90 m
MD of last survey.....: 2952.00 m

−−−−− Survey calculation methods−−−−−−−−−−
Method for positions.....: Minimum curvature
Method for DLS.....: Mason & Taylor

−−−−− Depth reference −−−−−−−−−−−−−−−−−−−−
Permanent datum.....: Mean Sea Level
Depth reference.....: Driller's Depth
GL above permanent.....: −73.00 m
KB above permanent.....: Top Drive
DF above permanent.....: 29.45 m

−−−−− Vertical section origin−−−−−−−−−−−−−−−
Latitude (+N/S−).....: 0.00 m
Departure (+E/W−).....: 0.00 m

−−−−− Platform reference point−−−−−−−−−−−−−−
Latitude (+N/S−).....: −304.57 m
Departure (+E/W−).....: −304.57 m

−−−−− Geomagnetic data −−−−−−−−−−−−−−−−−−−−−
Magnetic model.....: BGGM version 2002
Magnetic date.....: 16−Nov−2003
Magnetic field strength..: 1201.99 HCNT
Magnetic dec (+E/W−).....: 13.21 degrees
Magnetic dip.....: −68.86 degrees

−−−−− MWD survey Reference Criteria −−−−−−−−−
Reference G.....: 1000.04 mGal
Reference H.....: 1201.99 HCNT
Reference Dip.....: −68.86 degrees
Tolerance of G.....: (+/−) 2.50 mGal
Tolerance of H.....: (+/−) 6.00 HCNT
Tolerance of Dip.....: (+/−) 0.45 degrees

−−−−− Corrections −−−−−−−−−−−−−−−−−−−−−−−−−
Magnetic dec (+E/W−).....: 13.21 degrees
Grid convergence (+E/W−).: −0.82 degrees
Total az corr (+E/W−)....: 14.03 degrees
Azimuth from rotary table to target: 4.09 degrees (Total az corr = magnetic dec − grid conv)

Survey Correction Type ...:
I=Sag Corrected Inclination
M=Schlumberger Magnetic Correction
S=Shell Magnetic Correction
F=Failed Axis Correction
R=Magnetic Resonance Tool Correction
D=Dmag Magnetic Correction

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S− (m)	Displ +E/W− (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 10m)	Srvy Tool type	Tool Corr (deg)
1	586.90	0.33	53.09	0.00	586.88	−4.99	−6.26	17.55	18.63	109.63	0.00	TIP	None
2	604.00	0.21	67.80	17.10	603.98	−4.95	−6.22	17.62	18.68	109.44	0.08	GYR	None
3	632.70	5.38	14.50	28.70	632.64	−3.60	−4.90	18.00	18.66	105.21	1.83	GYR	None
4	661.50	10.39	13.90	28.80	661.16	0.29	−1.06	18.97	19.00	93.21	1.74	GYR	None
5	698.72	15.90	15.49	37.22	697.39	8.60	7.11	21.14	22.30	71.40	1.48	MWD	None
6	727.37	18.13	12.34	28.65	724.78	16.86	15.25	23.14	27.71	56.61	0.84	MWD	None
7	756.00	18.95	0.80	28.63	751.93	25.91	24.25	24.15	34.23	44.88	1.31	MWD	None
8	784.51	19.90	2.30	28.51	778.82	35.39	33.73	24.41	41.64	35.90	0.38	MWD	None
9	813.31	22.44	4.68	28.80	805.68	45.78	44.11	25.06	50.73	29.60	0.93	MWD	None
10	842.05	26.09	5.41	28.74	831.87	57.59	55.87	26.10	61.67	25.04	1.27	MWD	None
11	870.97	30.30	3.92	28.92	857.36	71.25	69.49	27.20	74.62	21.38	1.48	MWD	None
12	900.08	31.07	3.20	29.11	882.39	86.10	84.31	28.12	88.88	18.45	0.29	MWD	None
13	928.94	30.81	2.99	28.86	907.14	100.94	99.13	28.92	103.26	16.27	0.10	MWD	None
14	957.41	32.72	2.86	28.47	931.35	115.92	114.10	29.69	117.90	14.59	0.67	MWD	None
15	986.17	34.80	4.76	28.76	955.26	131.90	130.04	30.76	133.63	13.31	0.81	MWD	None
16	1014.83	34.93	5.38	28.66	978.77	148.28	146.36	32.21	149.86	12.41	0.13	MWD	None

17	1043.18	34.24	4.73	28.35	1002.11	164.37	162.39	33.62	165.83	11.70	0.28	MWD	None
18	1071.97	33.75	4.05	28.79	1025.98	180.47	178.44	34.86	181.81	11.05	0.22	MWD	None
19	1100.47	33.24	3.80	28.50	1049.75	196.20	194.13	35.93	197.43	10.49	0.19	MWD	None
20	1129.24	32.96	3.55	28.77	1073.85	211.91	209.81	36.94	213.04	9.99	0.11	MWD	None
21	1157.85	33.70	3.83	28.61	1097.75	227.63	225.50	37.95	228.67	9.55	0.26	MWD	None
22	1186.49	33.19	3.18	28.64	1121.65	243.41	241.25	38.92	244.37	9.16	0.22	MWD	None
23	1215.46	34.28	3.05	28.97	1145.74	259.50	257.32	39.79	260.37	8.79	0.38	MWD	None
24	1244.42	33.79	2.75	28.96	1169.74	275.70	273.50	40.61	276.50	8.45	0.18	MWD	None
25	1273.35	32.89	2.40	28.93	1193.91	291.60	289.39	41.33	292.32	8.13	0.32	MWD	None
26	1301.93	33.51	3.84	28.58	1217.83	307.24	305.01	42.18	307.92	7.87	0.35	MWD	None
27	1330.72	33.78	4.63	28.79	1241.79	323.19	320.92	43.36	323.84	7.69	0.18	MWD	None
28	1359.40	33.67	4.68	28.68	1265.65	339.12	336.79	44.65	339.74	7.55	0.04	MWD	None
29	1388.04	34.85	5.24	28.64	1289.32	355.24	352.85	46.05	355.84	7.44	0.43	MWD	None
30	1416.40	34.07	5.21	28.36	1312.70	371.28	368.83	47.51	371.88	7.34	0.28	MWD	None

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S− (m)	Displ +E/W− (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 10m)	Srvy tool type	Corr (deg)
31	1445.06	34.47	4.92	28.66	1336.39	387.42	384.91	48.93	388.01	7.25	0.15	MWD	None
32	1473.68	34.48	4.26	28.62	1359.98	403.62	401.06	50.23	404.19	7.14	0.13	MWD	None
33	1502.44	34.58	3.88	28.76	1383.67	419.92	417.32	51.39	420.47	7.02	0.08	MWD	None
34	1530.99	35.08	4.46	28.55	1407.11	436.22	433.58	52.57	436.76	6.91	0.21	MWD	None
35	1559.85	34.60	4.63	28.86	1430.79	452.71	450.01	53.88	453.23	6.83	0.17	MWD	None
36	1588.53	34.58	4.77	28.68	1454.40	468.99	466.24	55.21	469.50	6.75	0.03	MWD	None
37	1617.25	33.83	4.58	28.72	1478.16	485.14	482.33	56.53	485.63	6.68	0.26	MWD	None
38	1645.96	34.14	4.27	28.71	1501.96	501.18	498.33	57.77	501.67	6.61	0.12	MWD	None
39	1674.76	34.52	4.61	28.80	1525.75	517.43	514.53	59.02	517.90	6.54	0.15	MWD	None
40	1703.49	33.57	4.49	28.73	1549.55	533.51	530.56	60.30	533.98	6.48	0.33	MWD	None
41	1732.46	34.52	3.52	28.97	1573.56	549.73	546.74	61.43	550.18	6.41	0.38	MWD	None
42	1761.37	34.69	3.69	28.91	1597.35	566.15	563.12	62.46	566.58	6.33	0.07	MWD	None
43	1789.70	33.96	3.89	28.33	1620.75	582.12	579.06	63.52	582.54	6.26	0.26	MWD	None
44	1818.25	35.03	5.25	28.55	1644.28	598.29	595.18	64.81	598.70	6.21	0.46	MWD	None
45	1847.12	34.04	4.99	28.87	1668.06	614.65	611.48	66.27	615.06	6.19	0.35	MWD	None
46	1875.80	33.93	4.54	28.68	1691.84	630.68	627.46	67.60	631.09	6.15	0.10	MWD	None
47	1904.04	34.25	3.82	28.24	1715.23	646.51	643.24	68.76	646.91	6.10	0.18	MWD	None
48	1932.93	34.71	4.24	28.89	1739.04	662.86	659.56	69.91	663.25	6.05	0.18	MWD	None
49	1961.62	35.30	3.22	28.69	1762.54	679.32	675.98	70.98	679.70	5.99	0.29	MWD	None
50	1990.63	34.82	3.23	29.01	1786.29	695.98	692.62	71.91	696.34	5.93	0.17	MWD	None
51	2019.23	34.91	3.62	28.60	1809.75	712.33	708.94	72.89	712.68	5.87	0.08	MWD	None
52	2048.31	34.31	3.52	29.08	1833.69	728.85	725.42	73.92	729.18	5.82	0.21	MWD	None
53	2077.10	34.25	3.18	28.79	1857.48	745.06	741.61	74.87	745.38	5.76	0.07	MWD	None
54	2105.66	33.72	3.05	28.56	1881.16	761.02	757.55	75.73	761.33	5.71	0.19	MWD	None
55	2134.30	33.77	3.16	28.64	1904.97	776.93	773.44	76.60	777.22	5.66	0.03	MWD	None
56	2163.25	34.18	4.88	28.95	1928.98	793.11	789.57	77.73	793.39	5.62	0.36	MWD	None
57	2192.05	34.61	4.86	28.80	1952.75	809.38	805.78	79.11	809.66	5.61	0.15	MWD	None
58	2220.46	34.87	4.70	28.41	1976.09	825.56	821.92	80.46	825.85	5.59	0.10	MWD	None
59	2249.13	34.25	4.51	28.67	1999.70	841.83	838.13	81.77	842.11	5.57	0.22	MWD	None
60	2277.70	34.38	4.65	28.57	2023.30	857.93	854.18	83.05	858.21	5.55	0.05	MWD	None

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S− (m)	Displ +E/W− (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 10m)	Srvy tool type	Corr (deg)
61	2306.02	33.94	4.54	28.32	2046.73	873.83	870.03	84.33	874.11	5.54	0.16	MWD	None
62	2335.12	34.45	4.71	29.10	2070.80	890.19	886.34	85.65	890.46	5.52	0.18	MWD	None
63	2364.29	33.94	4.90	29.17	2094.93	906.58	902.67	87.02	906.86	5.51	0.18	MWD	None
64	2393.28	34.32	3.70	28.99	2118.93	922.84	918.89	88.24	923.12	5.49	0.27	MWD	None
65	2421.92	35.27	4.07	28.64	2142.45	939.19	935.20	89.35	939.45	5.46	0.34	MWD	None
66	2450.28	35.91	4.12	28.36	2165.51	955.69	951.66	90.52	955.95	5.43	0.23	MWD	None
67	2479.07	36.30	4.30	28.79	2188.77	972.66	968.58	91.77	972.92	5.41	0.14	MWD	None
68	2507.28	36.48	4.80	28.21	2211.48	989.39	985.26	93.10	989.65	5.40	0.12	MWD	None
69	2535.06	38.21	5.40	27.78	2233.56	1006.24	1002.05	94.60	1006.50	5.39	0.64	MWD	None
70	2563.79	42.31	5.15	28.73	2255.48	1024.80	1020.53	96.30	1025.06	5.39	1.43	MWD	None

71	2592.58	46.33	4.80	28.79	2276.08	1044.91	1040.56	98.04	1045.17	5.38	1.40	MWD	None
72	2621.59	49.82	4.69	29.01	2295.46	1066.49	1062.07	99.83	1066.75	5.37	1.20	MWD	None
73	2649.97	53.11	4.61	28.38	2313.13	1088.68	1084.19	101.63	1088.95	5.36	1.16	MWD	None
74	2679.12	57.16	2.06	29.15	2329.80	1112.59	1108.06	103.01	1112.84	5.31	1.56	MWD	None
75	2707.94	58.64	1.15	28.82	2345.11	1136.98	1132.47	103.69	1137.20	5.23	0.58	MWD	None
76	2736.76	58.93	2.71	28.82	2360.05	1161.61	1157.10	104.52	1161.81	5.16	0.47	MWD	None
77	2765.34	59.19	2.70	28.58	2374.74	1186.11	1181.59	105.68	1186.30	5.11	0.09	MWD	None
78	2793.68	59.67	2.93	28.34	2389.16	1210.51	1205.96	106.87	1210.68	5.06	0.18	MWD	None
79	2822.22	60.83	2.67	28.54	2403.32	1235.28	1230.71	108.08	1235.44	5.02	0.41	MWD	None
80	2850.98	62.46	2.43	28.76	2416.98	1260.58	1255.99	109.21	1260.73	4.97	0.57	MWD	None
81	2879.95	63.96	2.62	28.97	2430.03	1286.43	1281.82	110.35	1286.57	4.92	0.52	MWD	None
82	2908.68	65.60	2.64	28.73	2442.27	1312.41	1307.79	111.54	1312.54	4.87	0.57	MWD	None
83	2933.99	66.14	2.47	25.31	2452.62	1335.50	1330.86	112.57	1335.62	4.83	0.22	MWD	None
84	2952.00	66.30	2.50	18.01	2459.88	1351.98	1347.33	113.29	1352.08	4.81	0.09	Projection to TD	

Company: **ESSO Australia Pty. Ltd.**

Schlumberger

Well: **HLA A1A**

Field: **Halibut GDA 94**

Rig: **ISDL 453**

State: **Victoria**

Gamma Ray Service
1:500 True Vertical Depth
Real Time Log