PATHFINDER

A Schlumberger Company

AZIMUTHAL DENSITY
NEUTRON DENSITY
GAMMA-RAY

5" = 100'
FEET MD

COMPANY : TEKTON WINDSOR LLC
WELL : RAINDANCE 3
FIELD : WATTENBERG
COUNTY : WELD
STATE : CO
COUNTRY : U.S.A.
API No.: 05-123-36172

COMPANY : TEKTON WINDSOR LLC
WELL : RAINDANCE 3
FIELD : WATTENBERG
COUNTY : WELD
STATE : CO
COUNTRY : U.S.A.
API No.: 05-123-36172

WELL LOCATION

LAT:40°27'05"N LON:104°55'41"W
X:3,159,184' Y:1,407,744'NAD83

SEC: 30 TWP: 06N RANGE: 67W

OTHER SERVICES

DIRECTIONAL
ROP
CALIPER/PE

DEPTH REF. : ROTARY TABLE
ELEVATION : 22.50 ft (ROTARY TABLE - GROUND LEVEL)
ALTITUDE : 4982.00 ft (GROUND LEVEL - MEAN SEA LEVEL)

BOREHOLE RECORD

HOLE SIZE in	FROM ft	TO ft
12 1/4	0	900
8 3/4	900	7822
6 1/8	7822	12022

CASING RECORD

CASING SIZE in	FROM ft	TO ft
9 5/8	0	895
7	0	7809

DEVIATION RECORD

INCLINATION deg	FROM ft	TO ft
00 - 07	0	6063
07 - 90	6063	8700
90 +/-1	8700	12022

DRILLING Co.: FRONTIER DRILLING
RIG : 10
LWD UNIT No.: TRAILER DISTRICT : CASPER
SPUD DATE : 06-MAR-14
LWD START DATE : 02-APR-14 DEPTH : 7850 ft
LWD END DATE : 06-APR-14 DEPTH : 12022 ft
TOTAL DEPTH : 12022 ft

RUN DATA

RUN NUMBER	1
START DATE	03-APR-14
START TIME	01:45
END DATE	06-APR-14
END TIME	02:30
DEPTH IN ft	7822
DEPTH OUT ft	12022
LOG TOP ft	7809
LOG BOTTOM ft	11949
HOLE SIZE in	6 1/8
MUD DATA @ ft	10576
MUD TYPE	WATER BASED
DENSITY lb/gal	10.10
VISCOSITY s/qt	45
pH	9.6
FLUID LOSS cm3/30	5.0
SALINITY mg/L	1600
Rm ohmm @ deg F	@
Rmf ohmm @ deg F	@

MAX REC TEMP deg F	217					
Rm @ MAX TEMP ohmm						
LWD ENGINEER #1	M. IBRAHIM					
LWD ENGINEER #2	B. SCHMIDT					
LWD ENGINEER #3						

REMARKS

TEKTON WINDSOR LLC.
PATHFINDER JOB #: 14CAS0271.

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.

THIRD PARTY DEPTH TRACKING SERVICES PROVIDED BY PASON.

RUN #1: 4 3/4" HDS-1L/GAMMA/IDNSC LOGGING RUN.

DENSITY POROSITY (DPHI) IS CALCULATED FOR A MATRIX DENSITY OF 2.68 G/CC AND A FLUID DENSITY OF 1.00 G/CC.

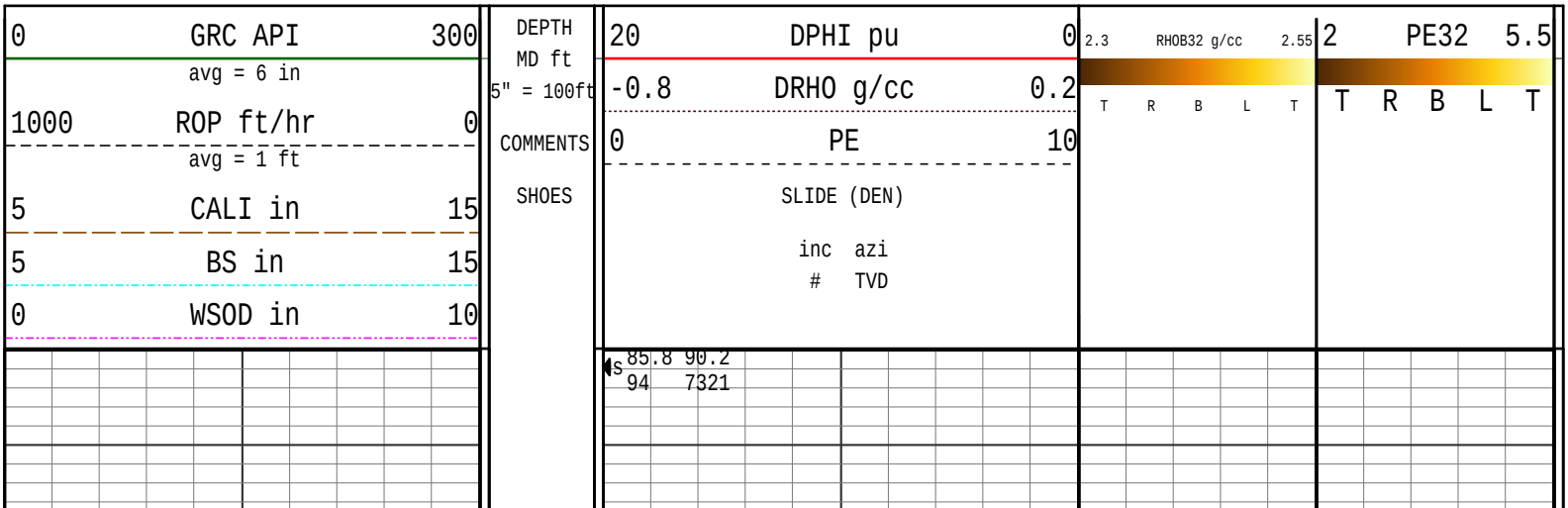
DENSITY DATA DENSITY (DDDN) TO THE LEFT OF THE DENSITY TRACK REPRESENTS 0-4 SAMPLES PER FOOT.
THE SLIDE INDICATOR TO THE LEFT OF THE DENSITY TRACK IS OFFSET TO THE DENSITY MEASUREMENT POINT.

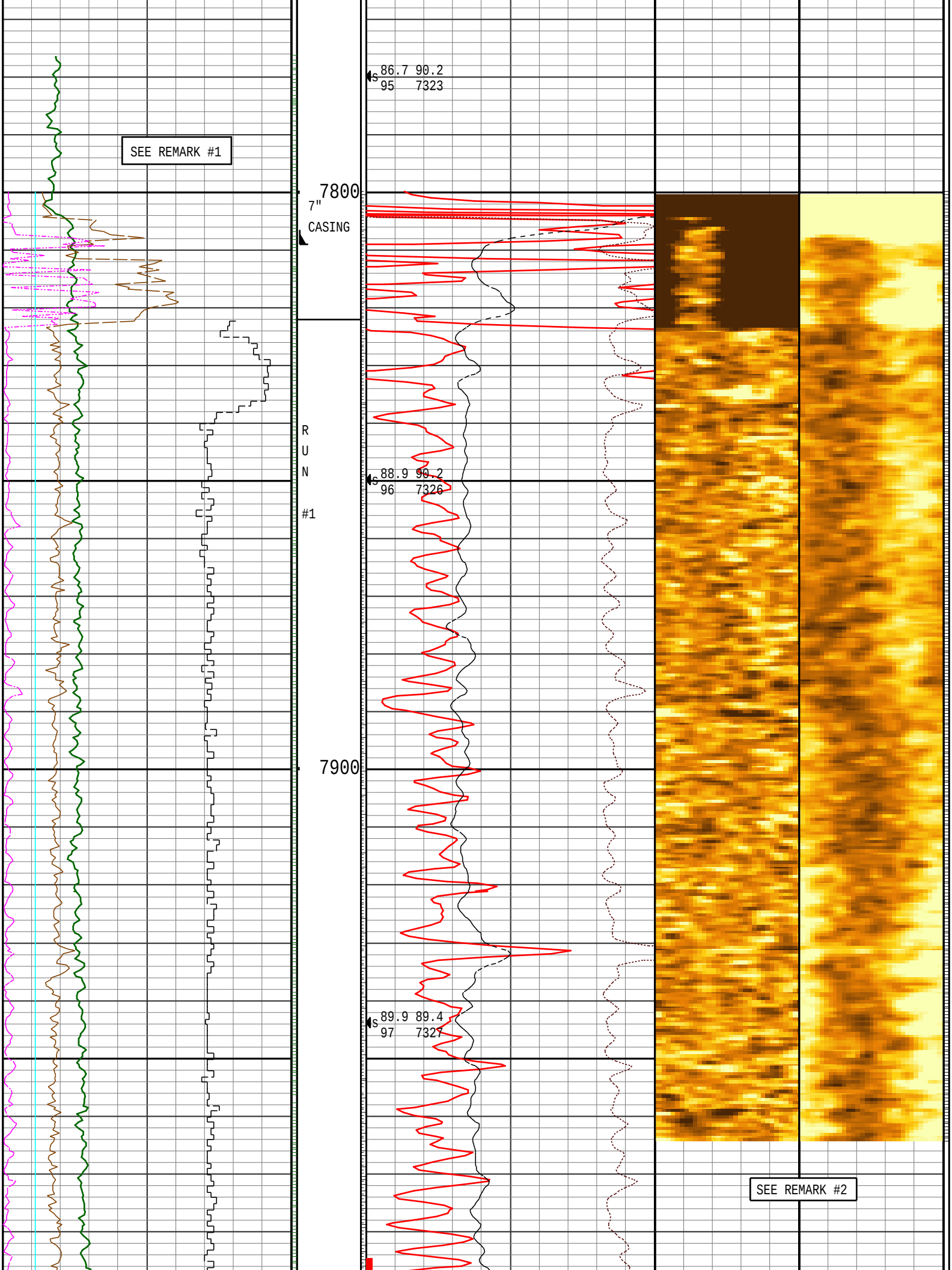
DENSITY MEASUREMENTS MAY BE SUBSTANDARD THROUGH INTERVALS OF HIGH WEIGHTED STANDOFF (WSOD).
HIGH WSOD IS CAUSED BY POOR WALL CONTACT AND MAY BE THE RESULT OF UNFAVORABLE STABILIZER POSITION, UNFAVORABLE TOOLFACE ORIENTATION DURING SLIDING, EXCESSIVE HOLE ENLARGEMENT OR HIGH ROP'S.

REMARK #1: GAMMA-RAY LOGGED THROUGH CASING FROM 7776'-7809'MD (7323'-7325'TVD).
REMARK #2: IMAGING DATA FROM 7964'-11977'MD IS UNAVAILABLE.

PATHFINDER - A Schlumberger Company

Version No : RX5 V6.05A Release 13Dec2013
Plot Time : 06-Apr-2014 04:53




SEE REMARK #1
7800
7"
CASING
R
U
N
#1
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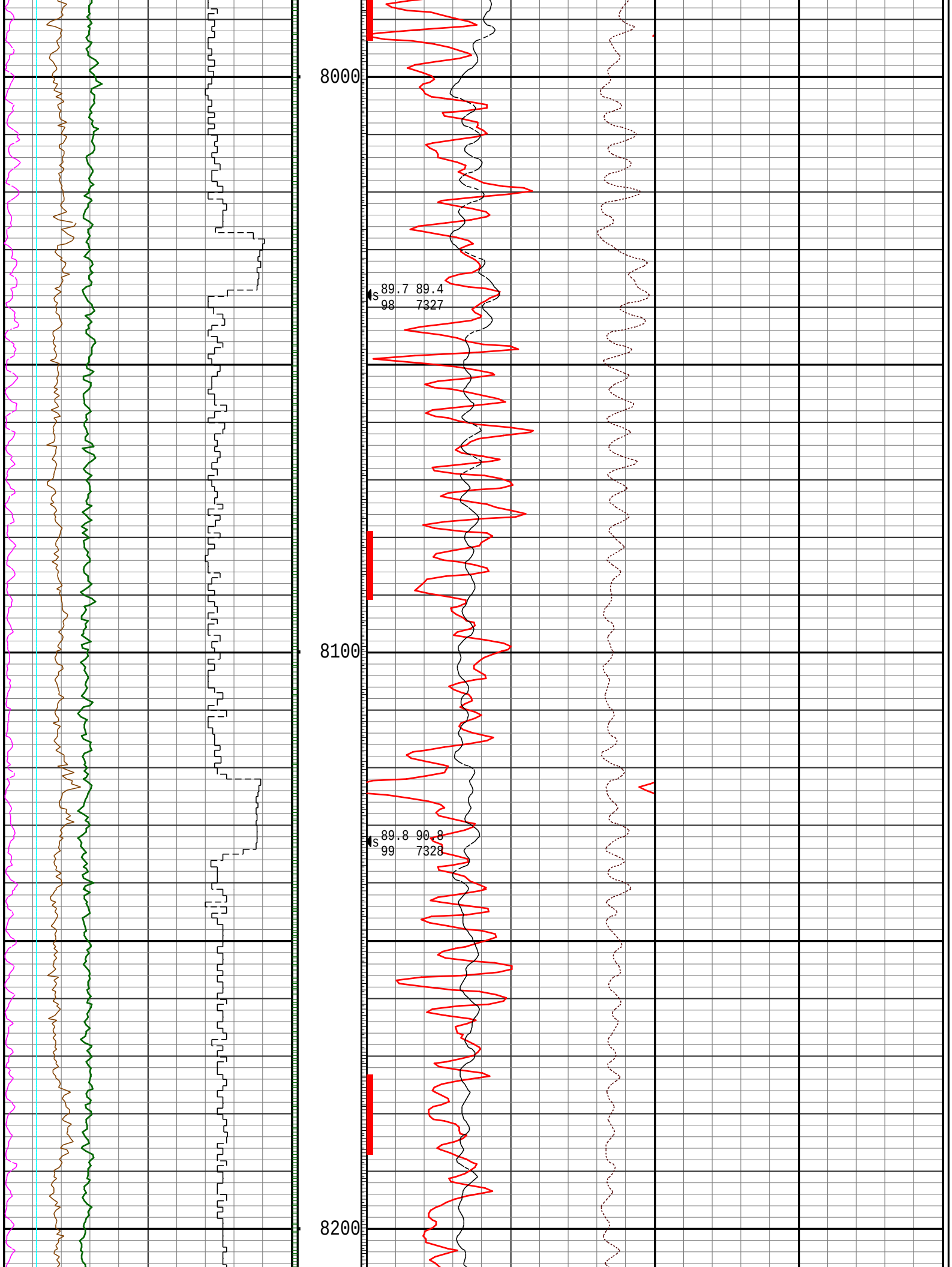
86.7 90.2
95 7323
88.9 90.2
96 7326
89.9 89.4
97 7327
SEE REMARK #2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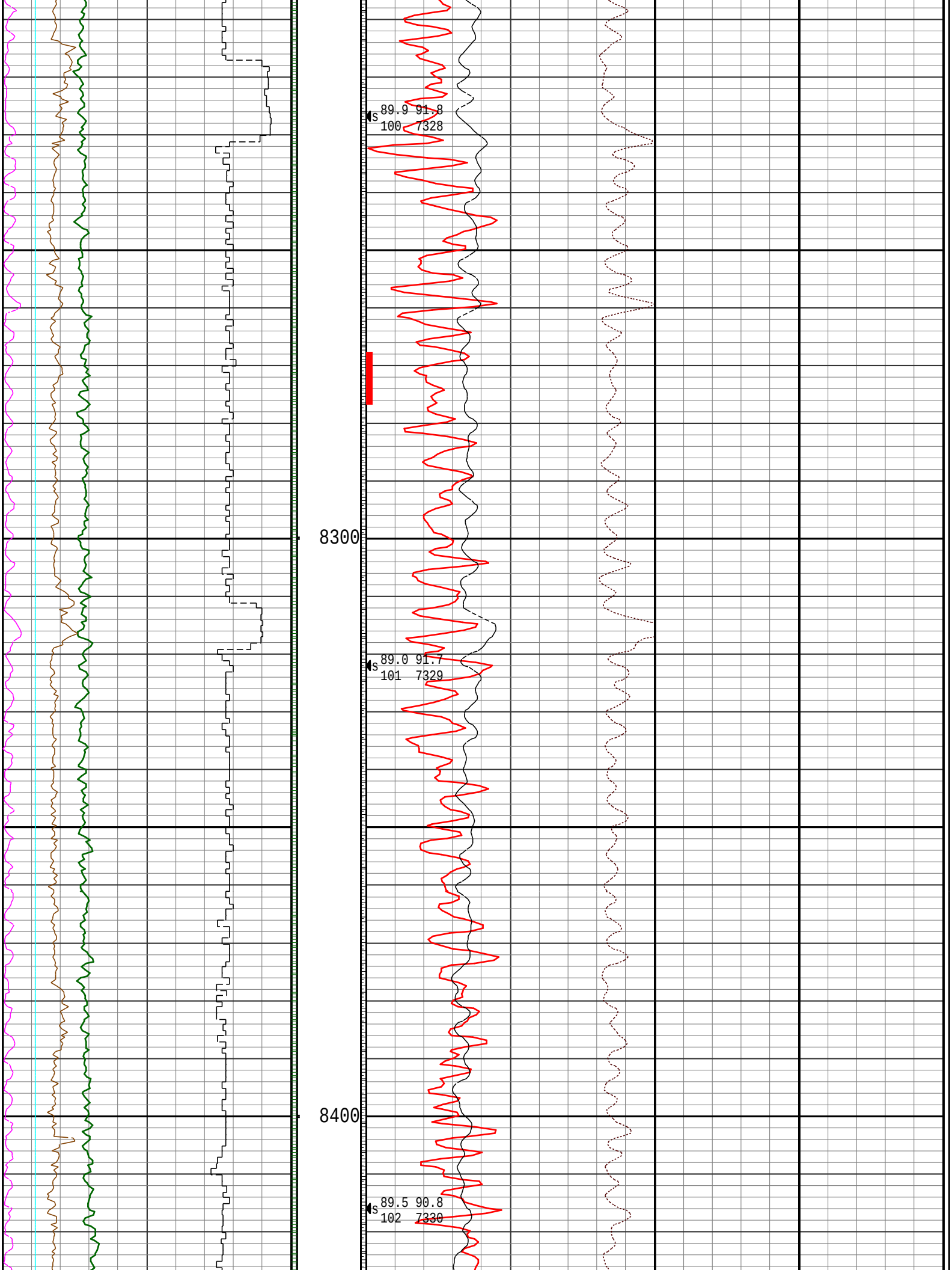
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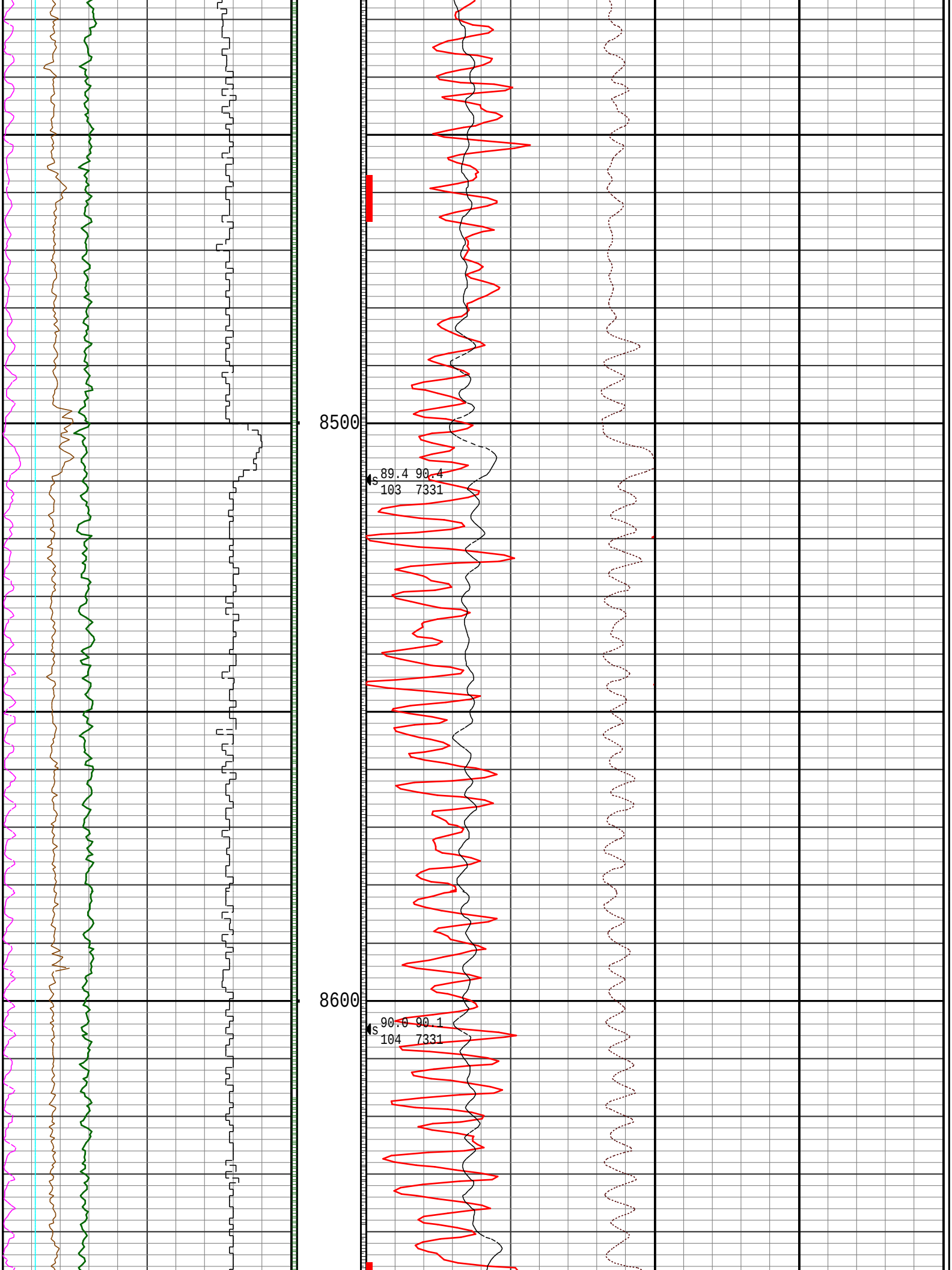
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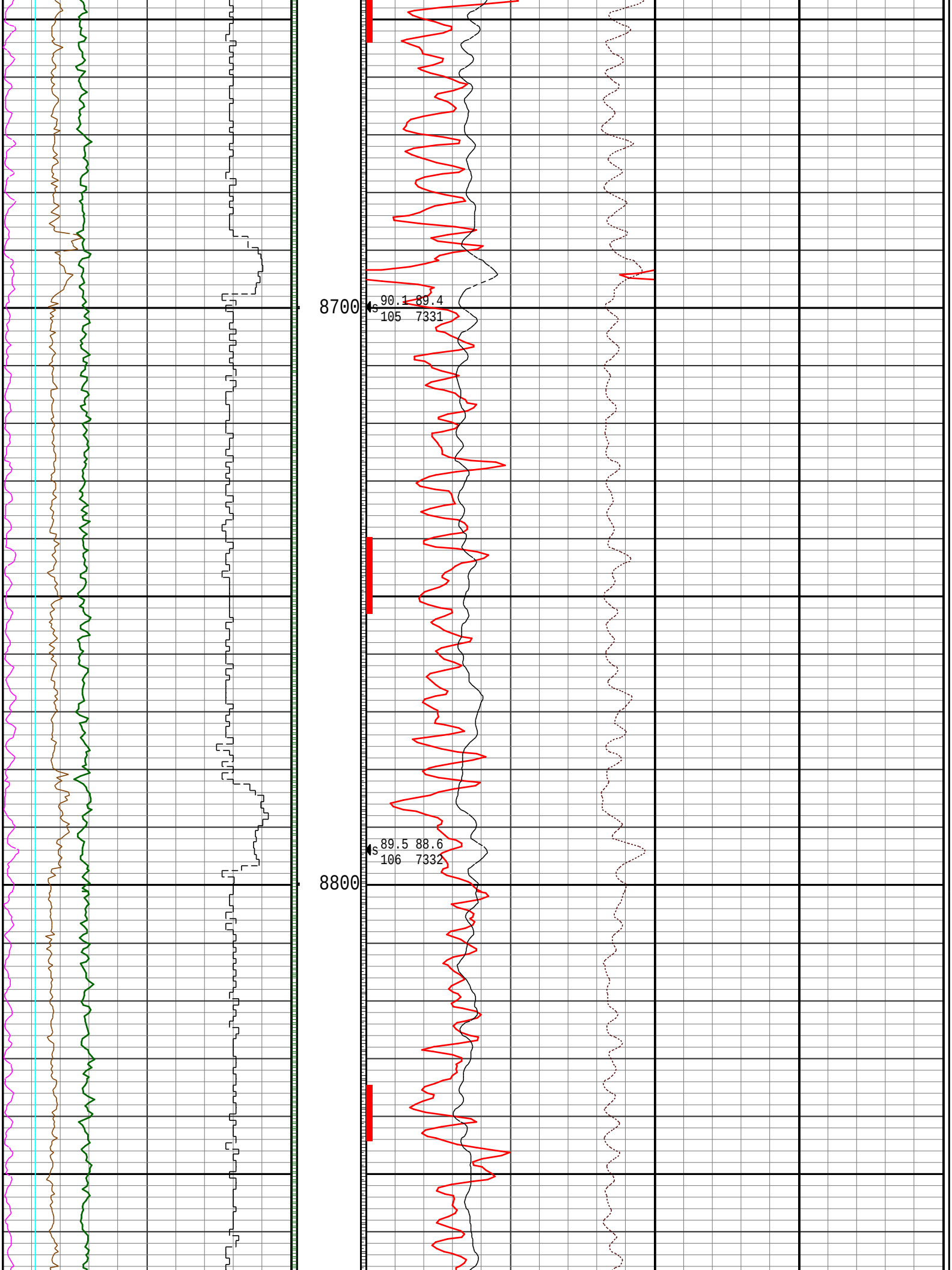
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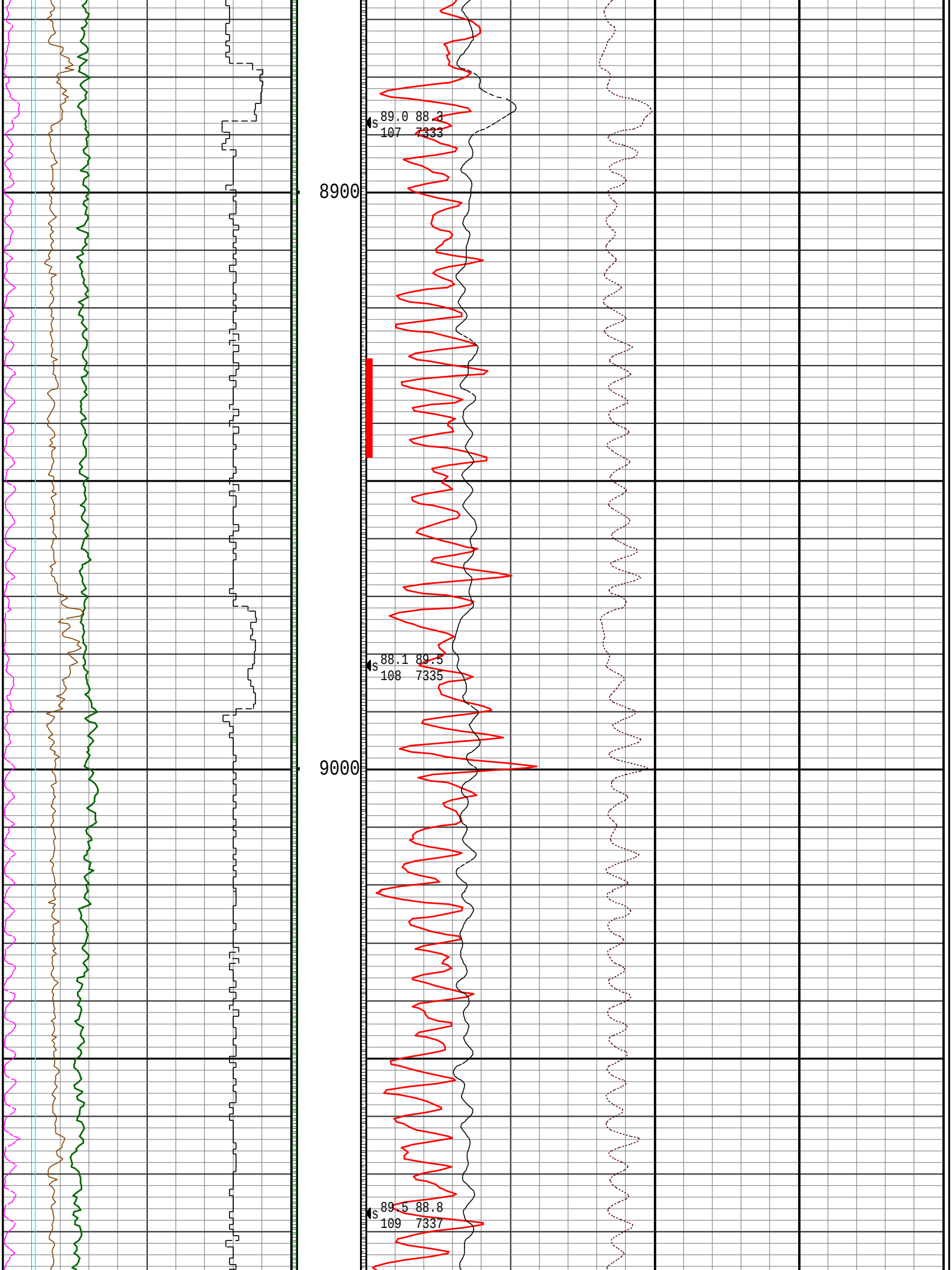
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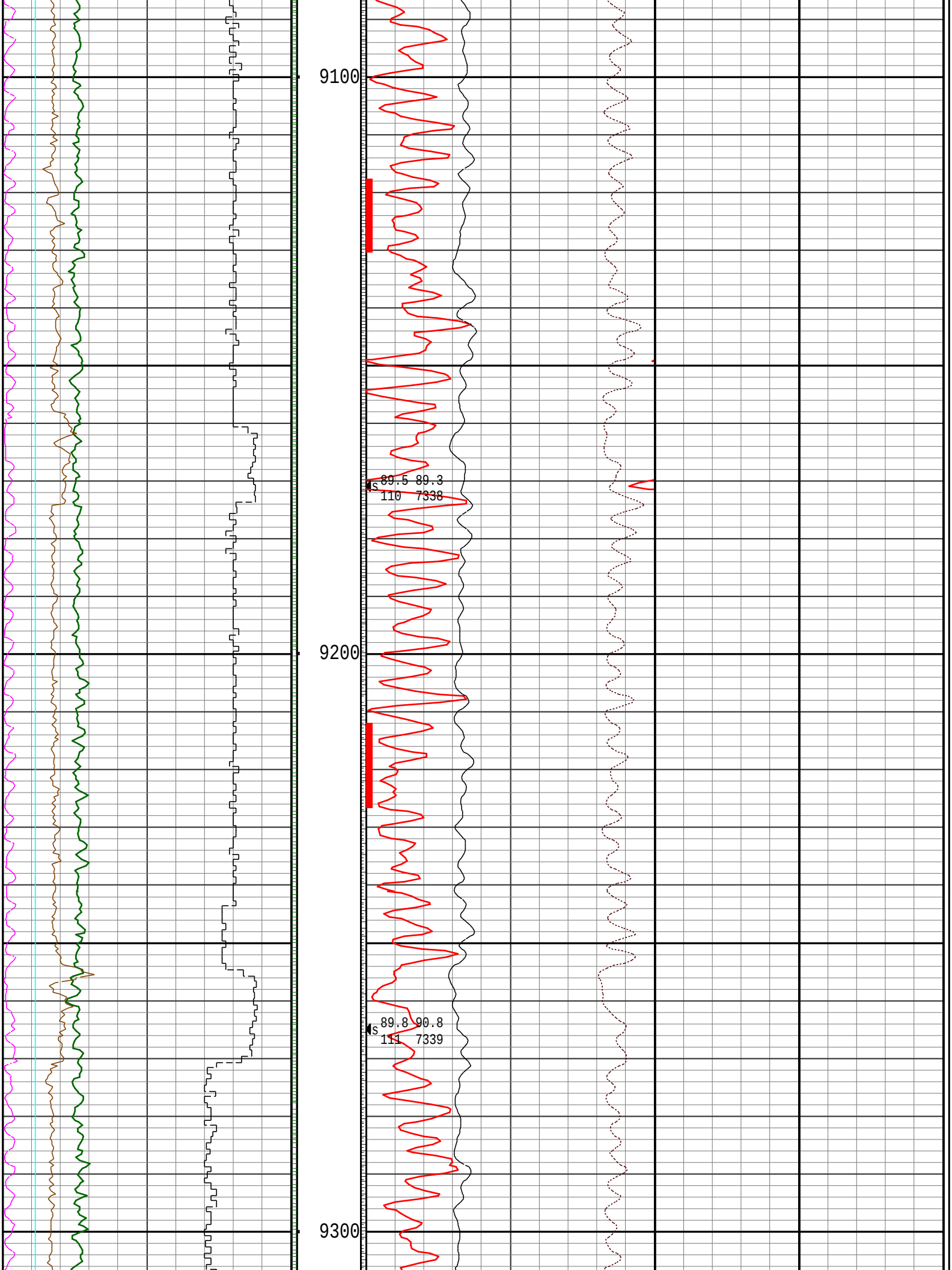
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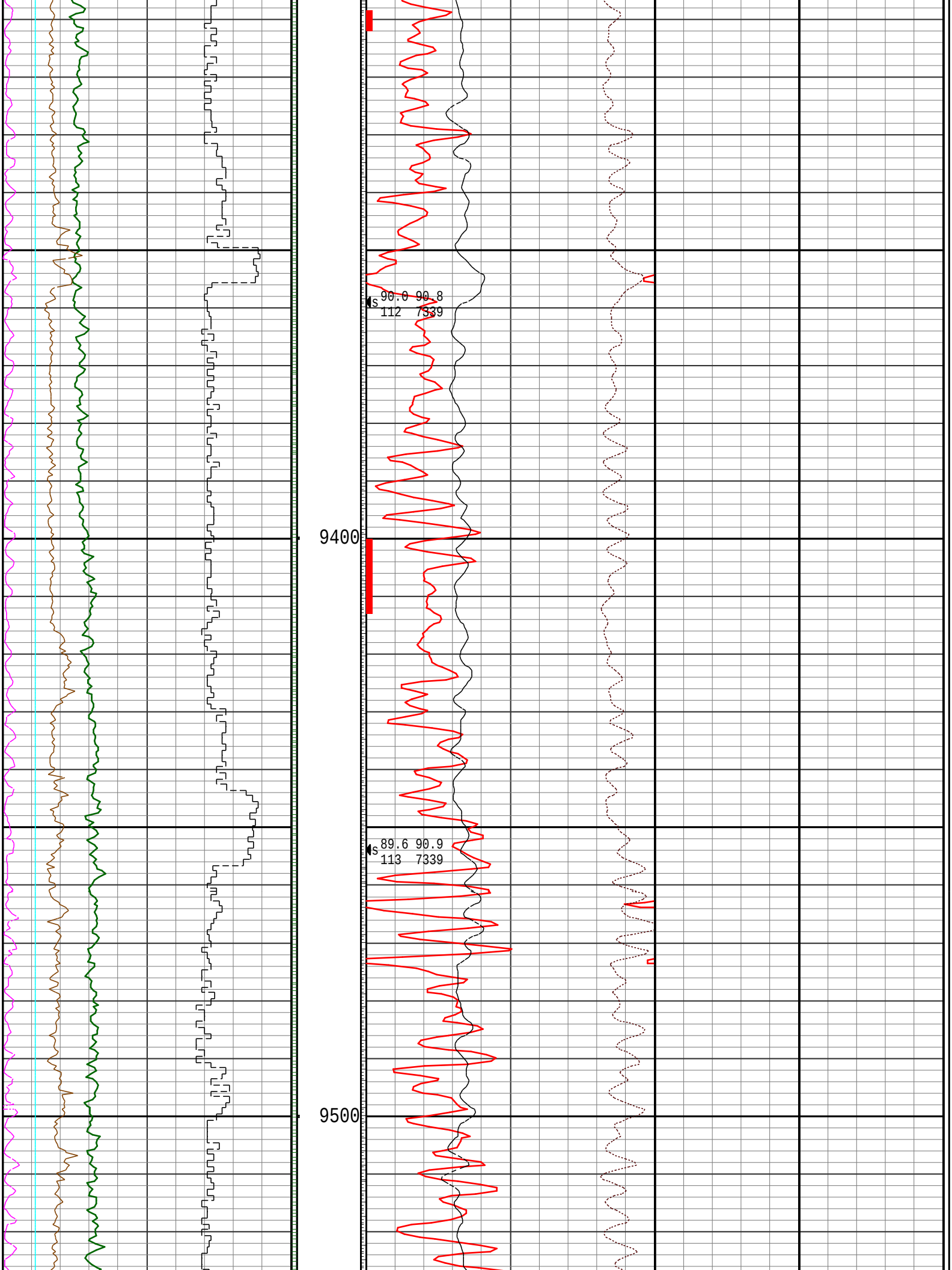
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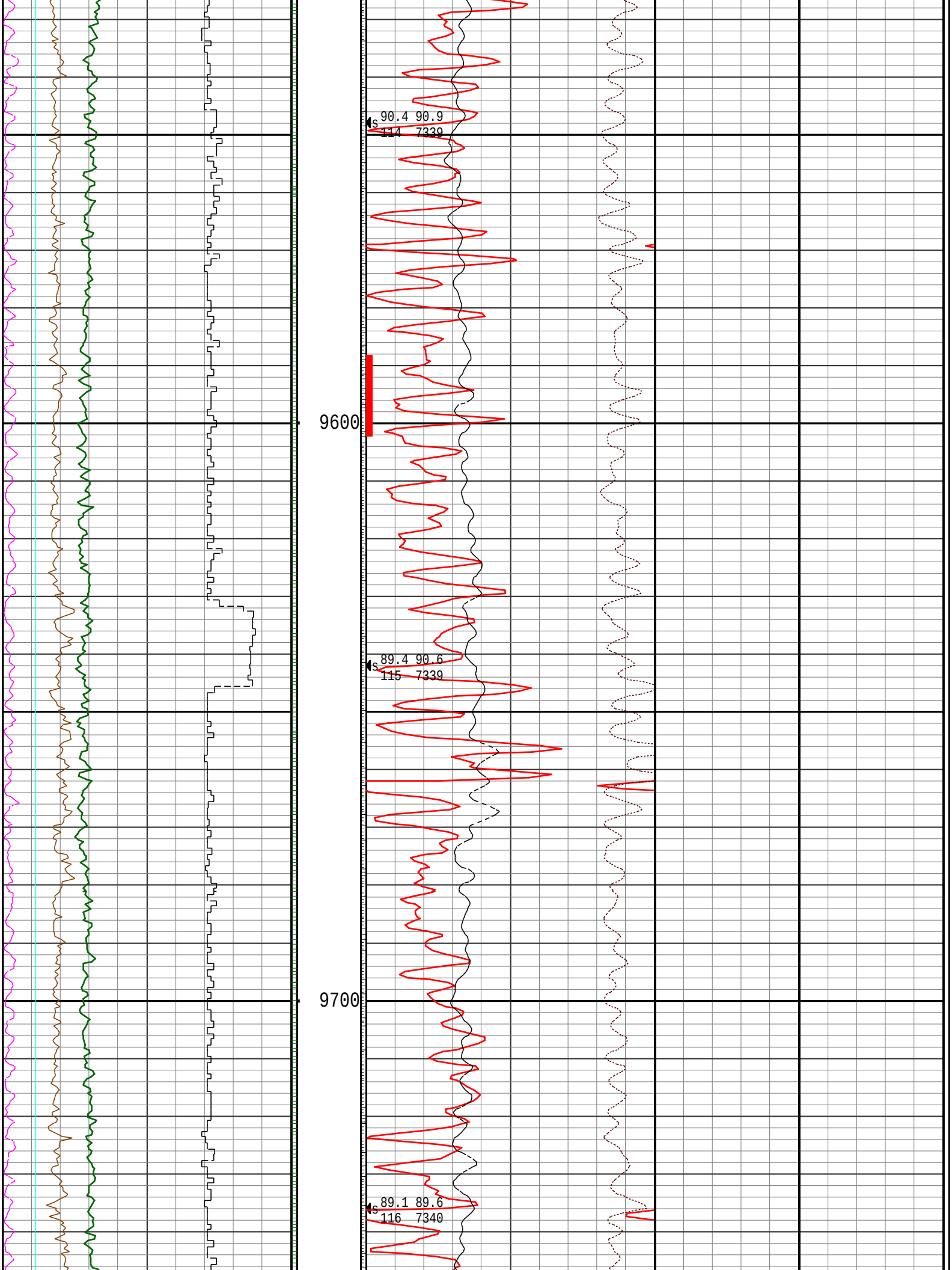
9500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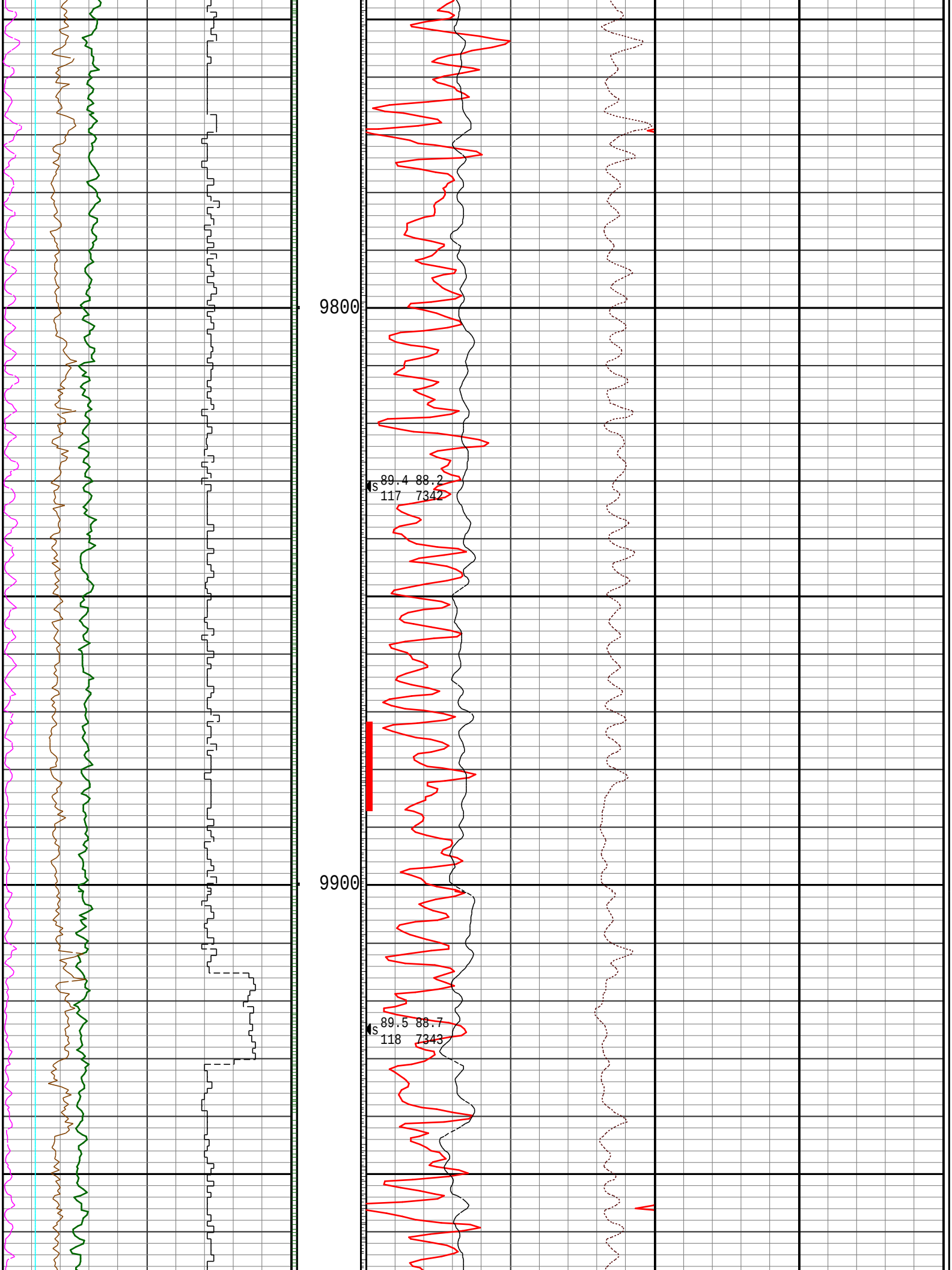
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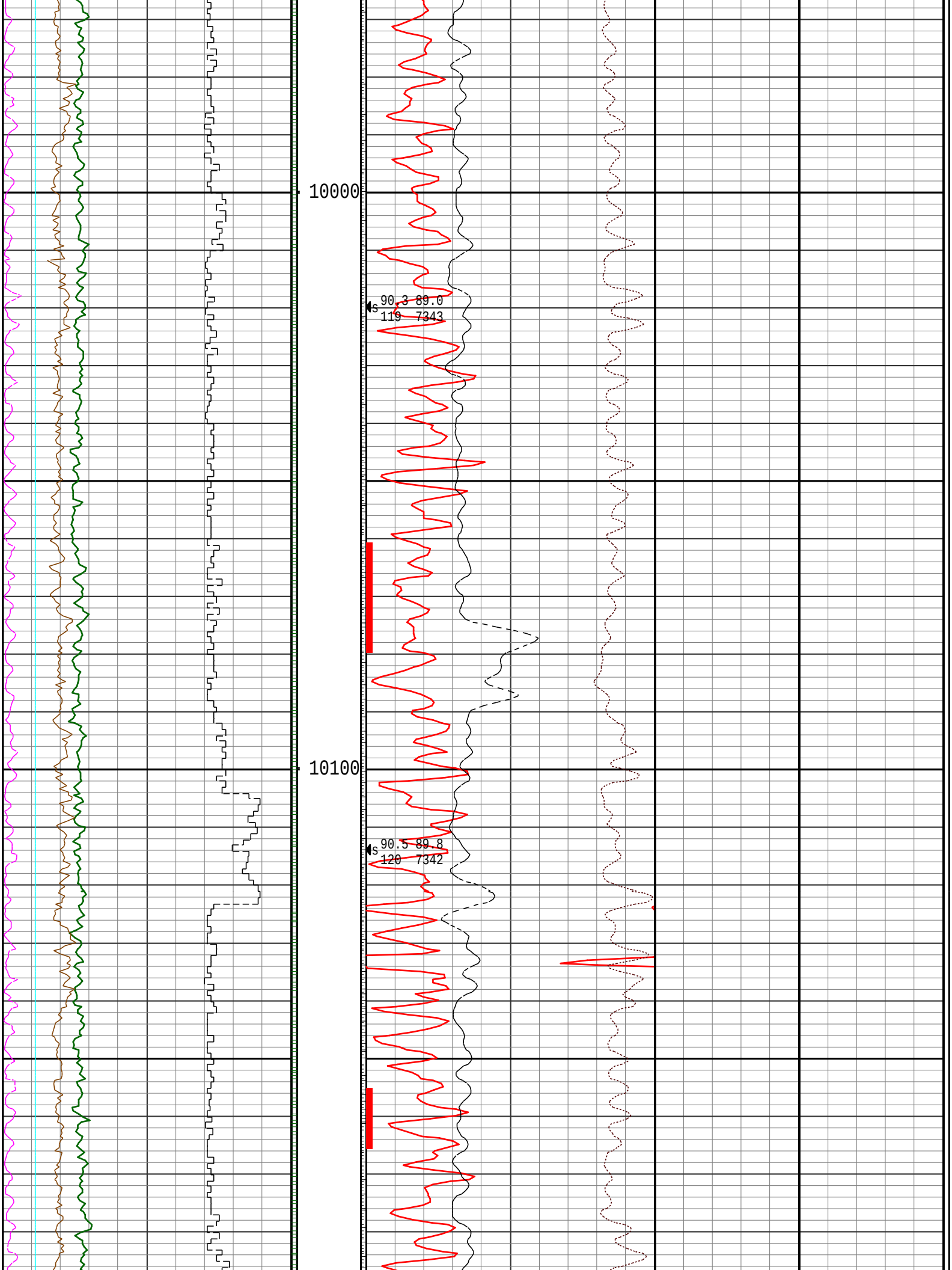
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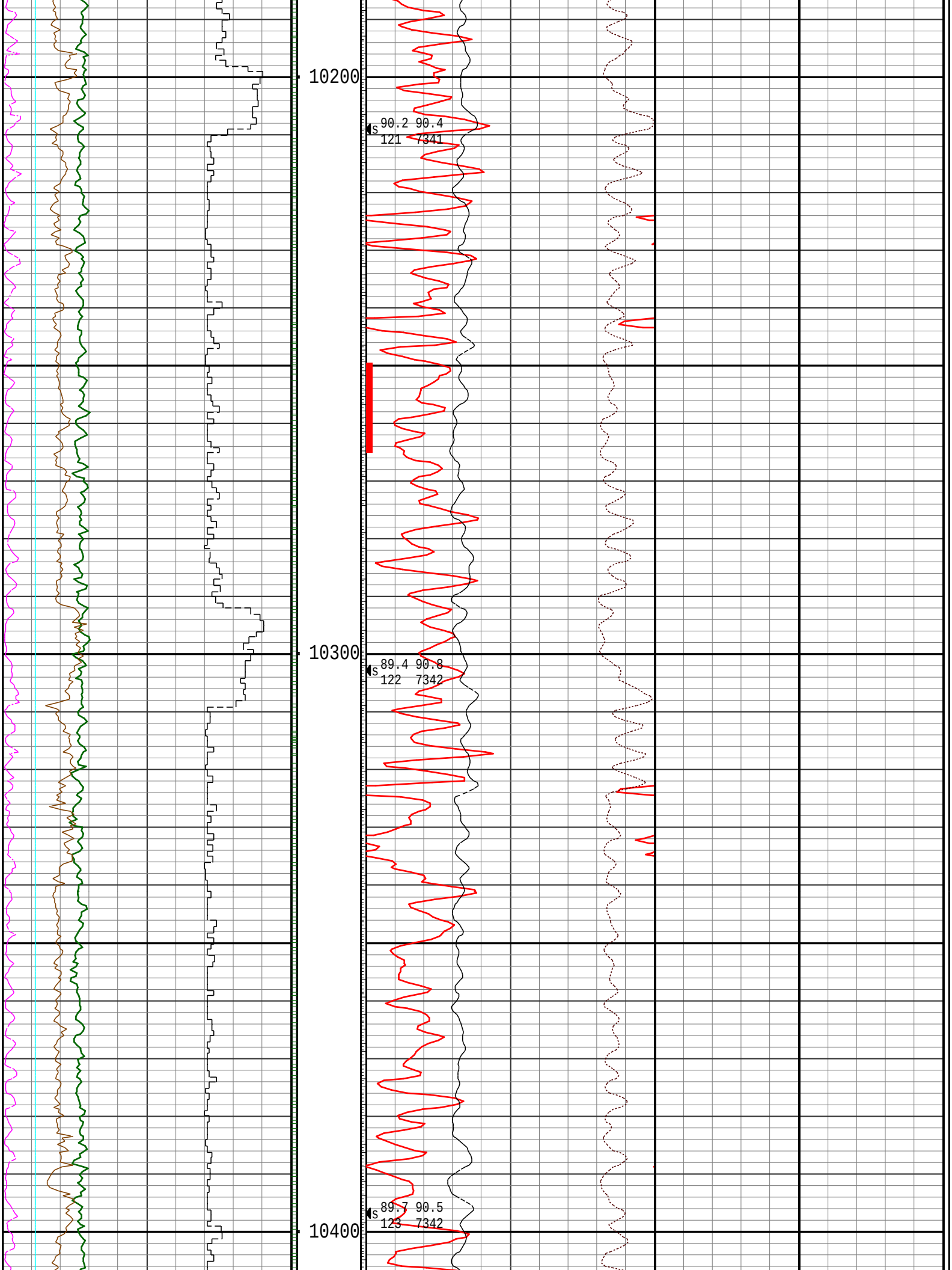
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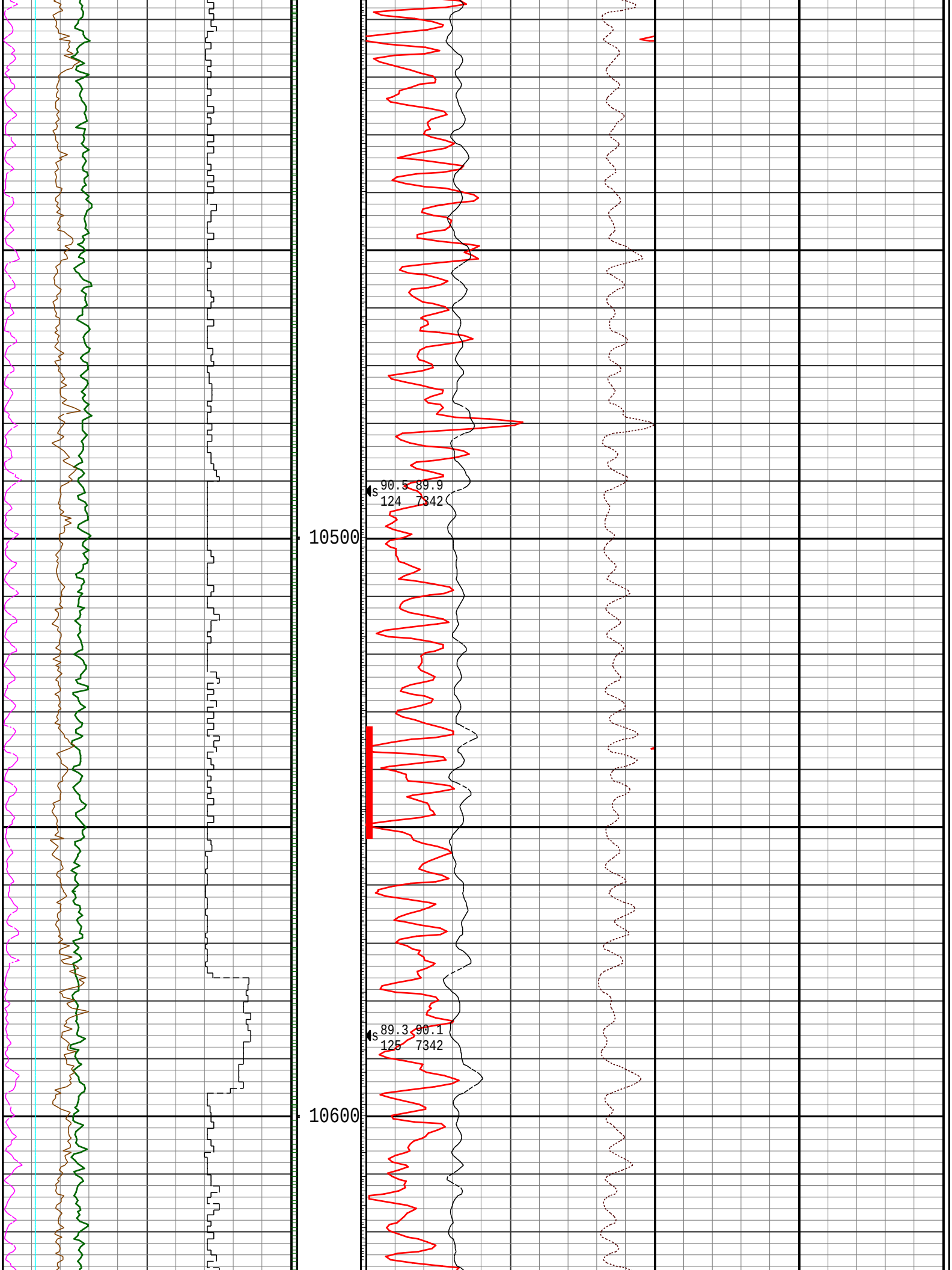
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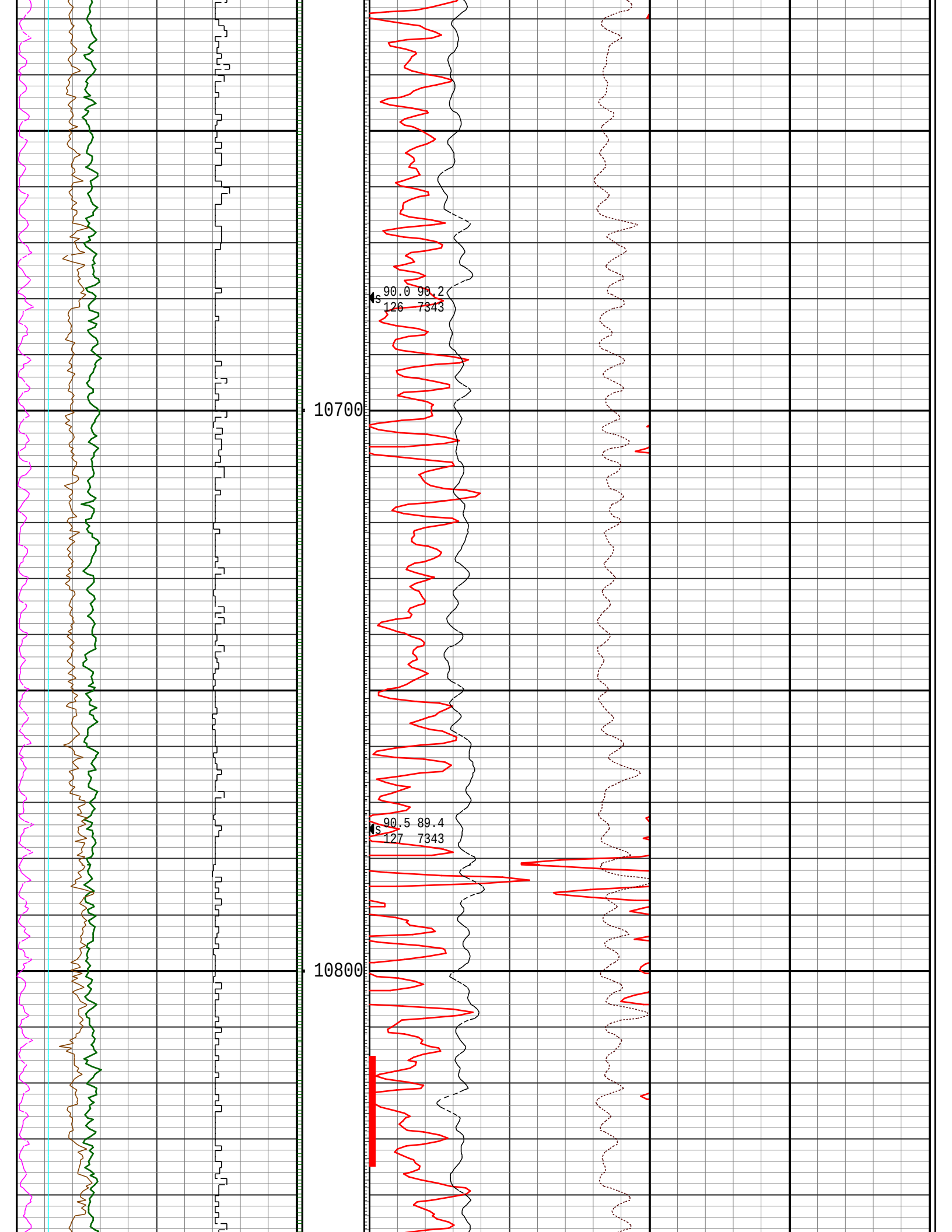
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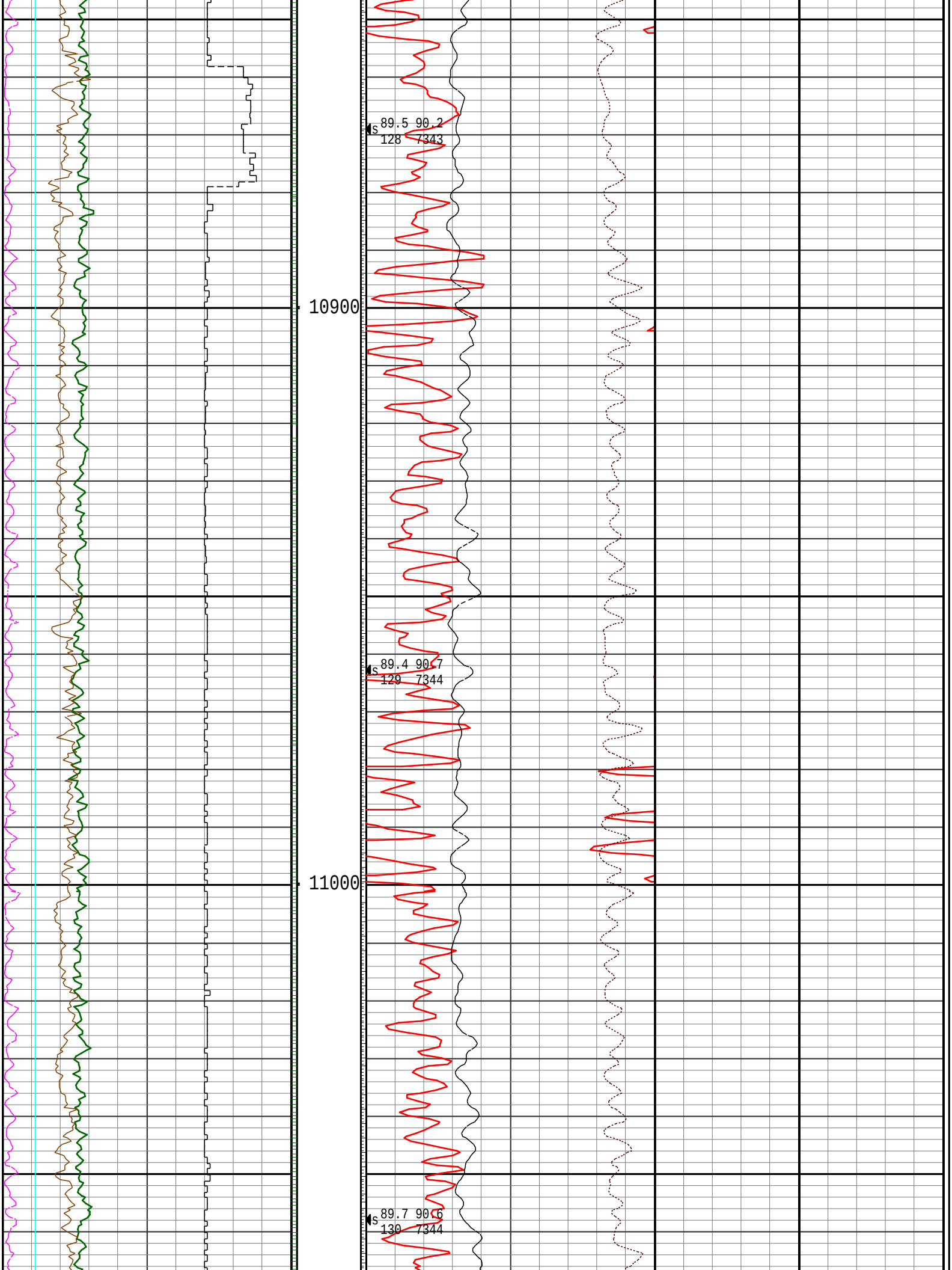
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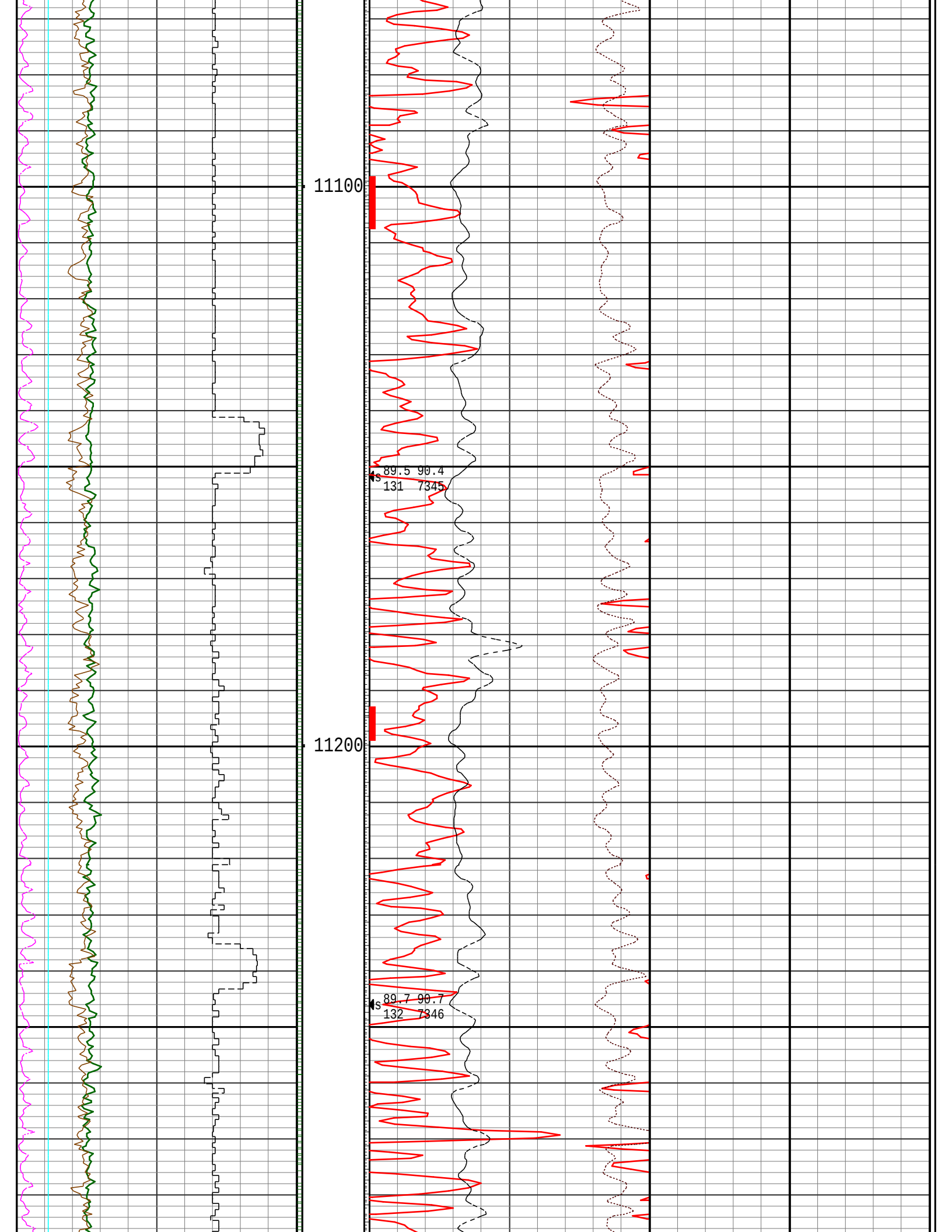
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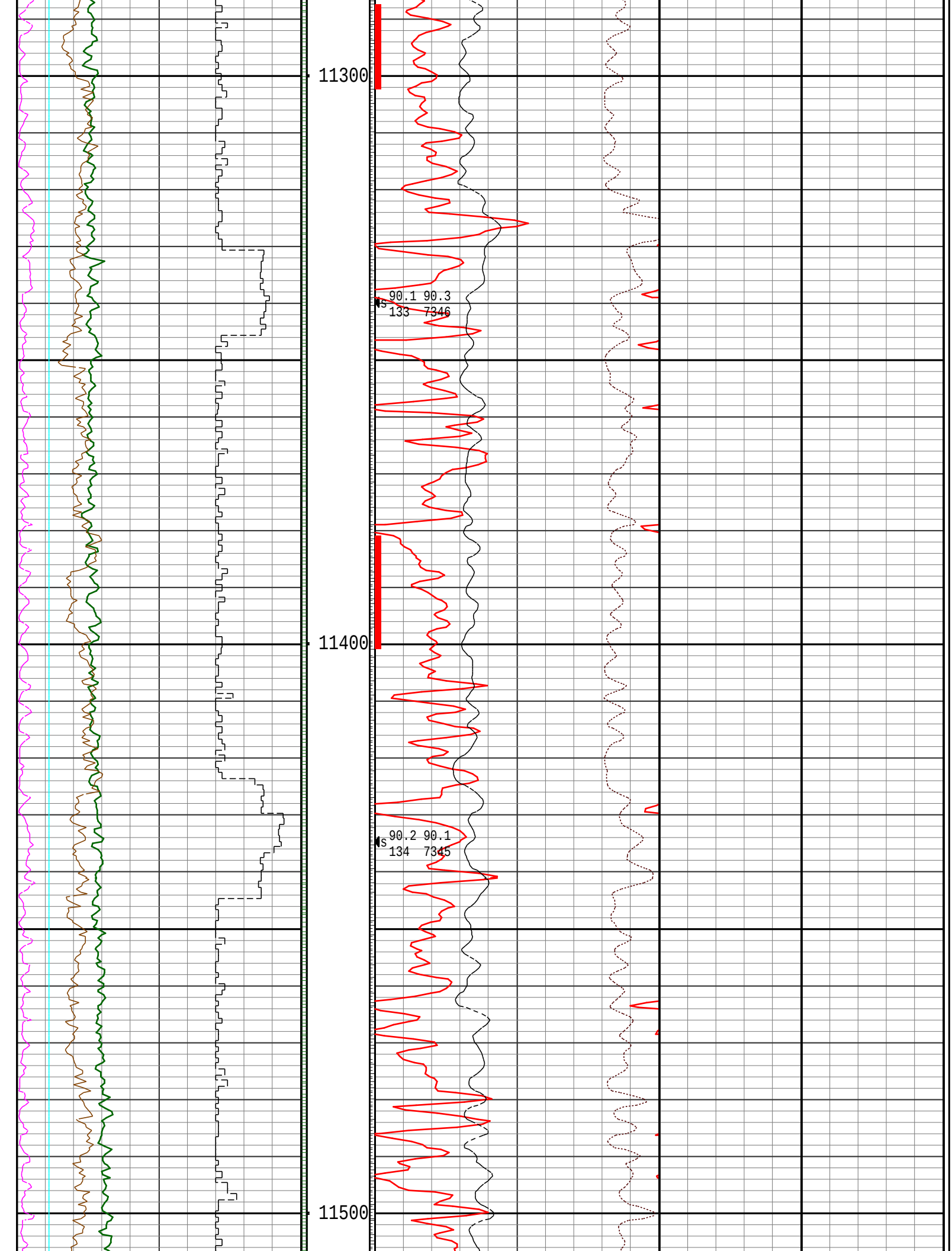
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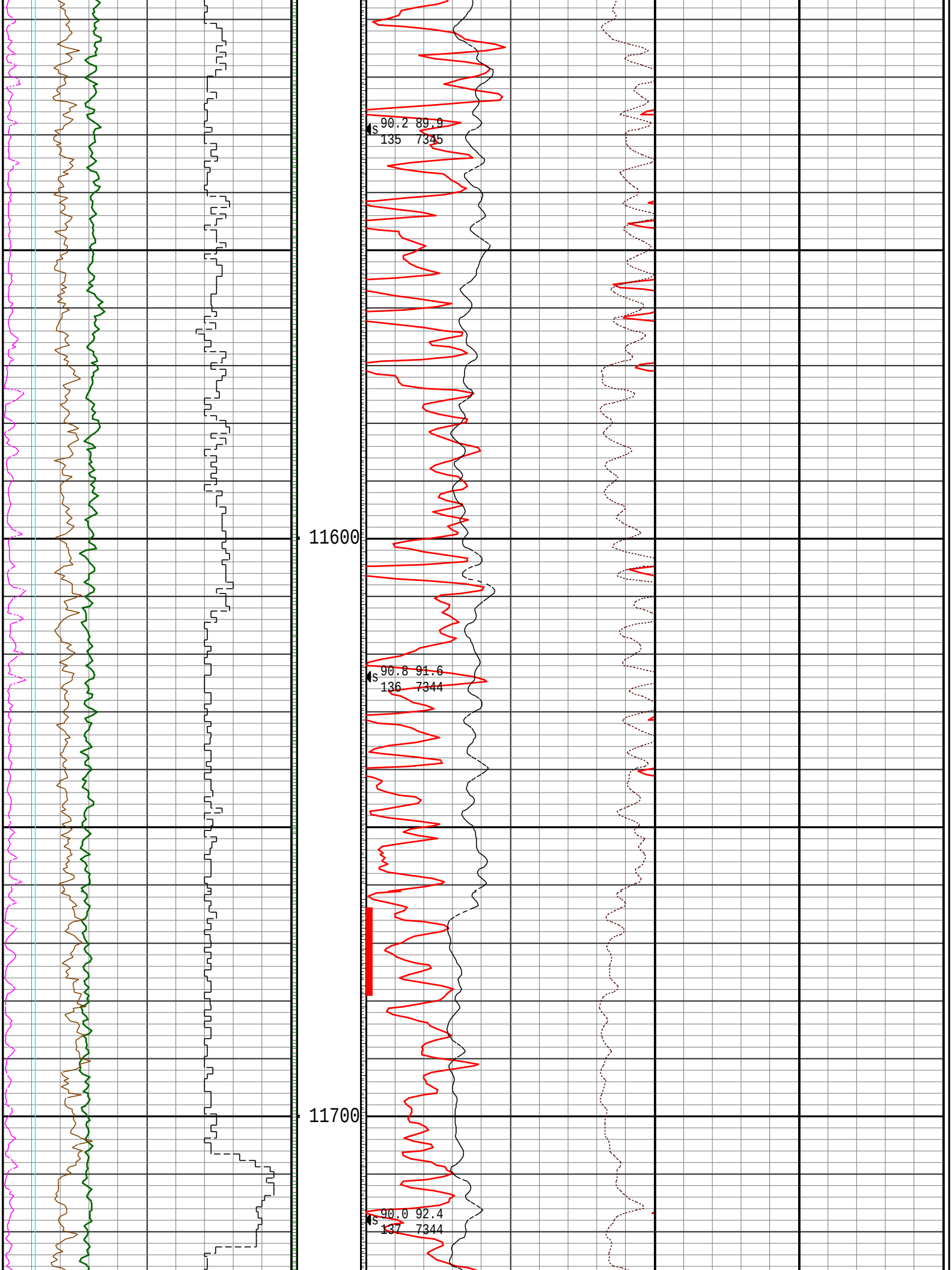
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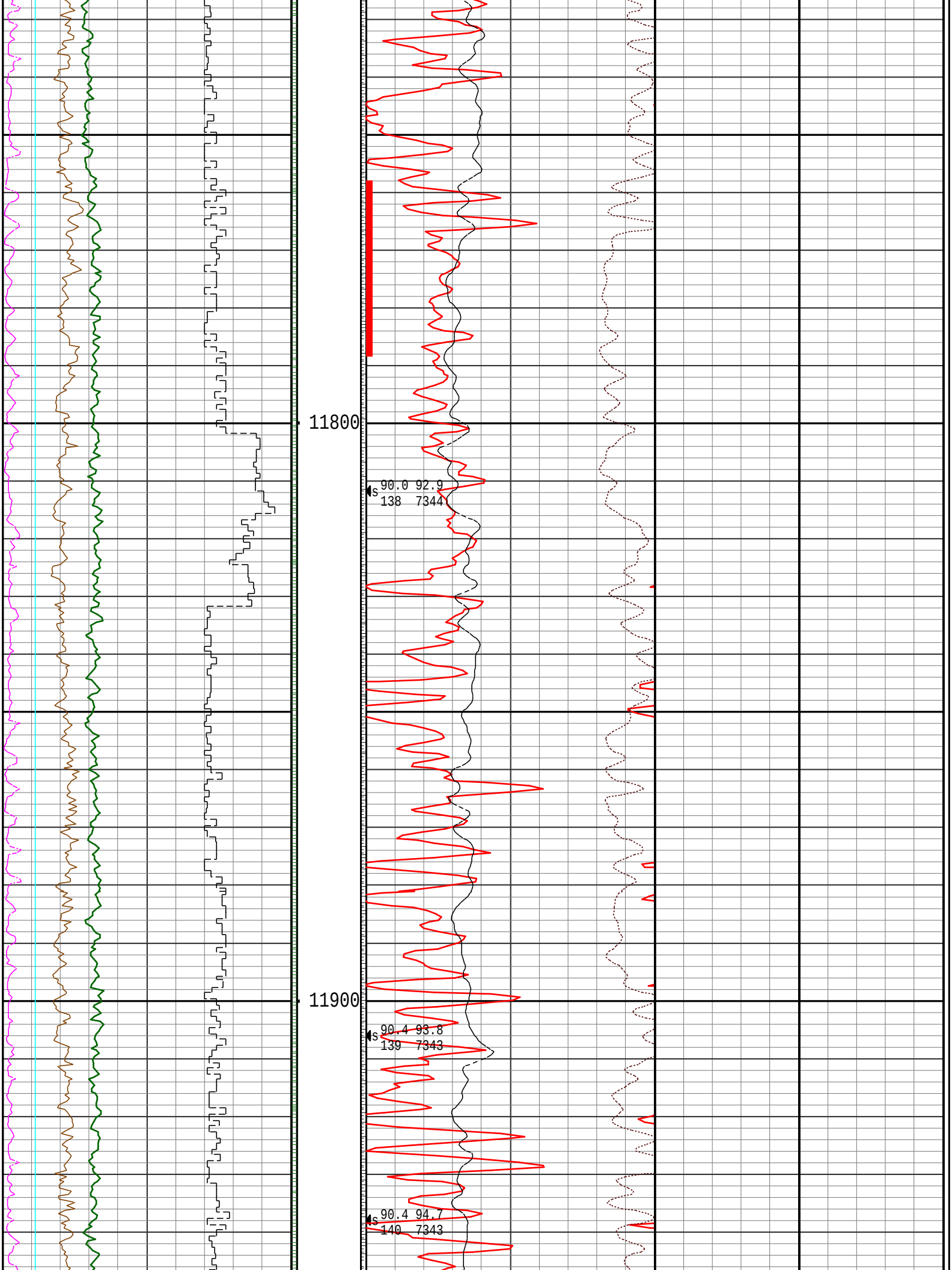
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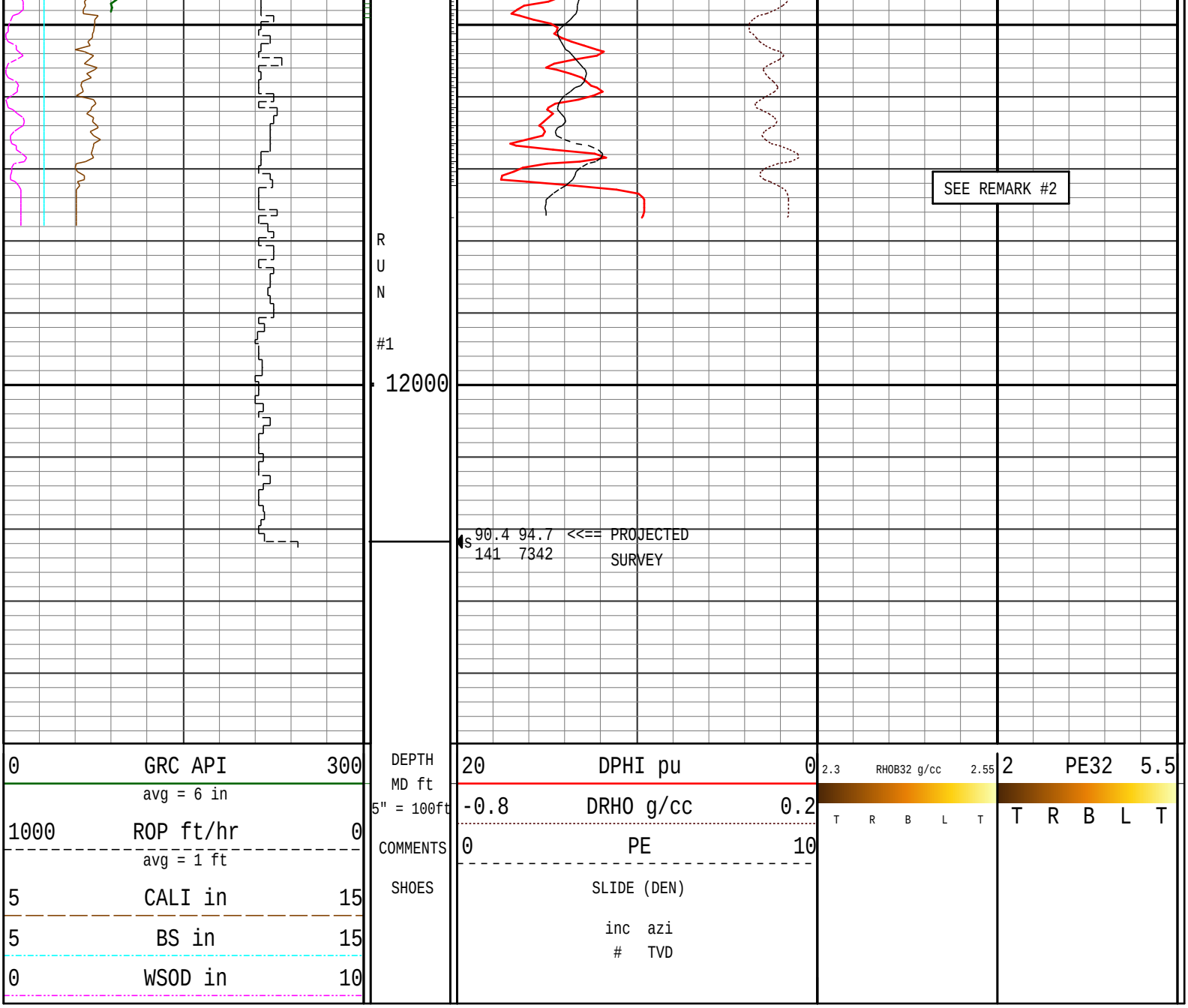

Survey Report

Vertical Section Plane: 99.32°	Total Correction: 8.58° East to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: RAINDANCE 3
RT: 22.5 FT ROTARY TABLE TO GROUND LEVEL	FIELD: WATTENBERG

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
THE FOLLOWING ARE ENSIGN MWD SURVEYS.											
151.00	0.40	239.20	151.00	151.00	-0.40	0.27 S	0.45 W	0.53	239.20	0.27	
253.00	0.40	279.60	253.00	102.00	-1.03	0.39 S	1.11 W	1.18	250.51	0.27	
345.00	0.60	285.40	344.99	92.00	-1.83	0.21 S	1.89 W	1.90	263.62	0.22	
437.00	0.90	198.60	436.99	92.00	-2.43	0.77 S	2.59 W	2.70	253.45	1.15	
529.00	1.90	189.10	528.96	92.00	-2.54	2.96 S	3.06 W	4.25	225.93	1.11	
622.00	2.80	180.50	621.88	93.00	-2.18	6.75 S	3.32 W	7.53	206.19	1.04	
713.00	4.10	175.80	712.71	91.00	-1.08	12.22 S	3.10 W	12.61	194.24	1.46	
805.00	5.50	179.10	804.39	92.00	0.47	19.91 S	2.79 W	20.10	187.98	1.55	
918.00	7.50	175.90	916.66	113.00	3.14	32.68 S	2.18 W	32.75	183.82	1.80	
1012.00	9.10	168.20	1009.67	94.00	7.24	46.08 S	0.22 W	46.08	180.27	2.07	
1105.00	9.70	158.40	1101.43	93.00	13.92	60.56 S	4.17 E	60.71	176.06	1.84	
1197.00	9.50	161.90	1192.14	92.00	21.40	74.98 S	9.38 E	75.57	172.87	0.67	
1289.00	8.60	158.40	1283.00	92.00	28.43	88.60 S	14.27 E	89.74	170.85	1.15	
1381.00	7.20	149.90	1374.12	92.00	35.63	99.98 S	19.69 E	101.90	168.86	1.98	
1473.00	6.30	163.30	1465.49	92.00	41.50	109.81 S	24.04 E	112.41	167.65	1.96	
1565.00	6.20	166.40	1556.94	92.00	45.65	119.47 S	26.66 E	122.41	167.42	0.38	
1658.00	6.50	170.70	1649.37	93.00	49.29	129.54 S	28.69 E	132.68	167.51	0.60	

1749.00	7.80	167.50	1739.66	91.00	53.23	140.66 S	30.86 E	144.00	167.63	1.49
1841.00	6.40	165.60	1830.96	92.00	57.61	151.72 S	33.48 E	155.37	167.55	1.54
1934.00	7.10	161.70	1923.31	93.00	62.36	162.20 S	36.58 E	166.27	167.29	0.90
2026.00	7.10	171.00	2014.61	92.00	66.78	173.21 S	39.25 E	177.60	167.23	1.25
2118.00	7.70	163.30	2105.85	92.00	71.28	184.73 S	41.91 E	189.42	167.22	1.26
2210.00	6.70	163.30	2197.12	92.00	76.33	195.77 S	45.23 E	200.93	166.99	1.09
2302.00	7.40	164.30	2288.42	92.00	81.19	206.62 S	48.37 E	212.20	166.82	0.77
2396.00	7.90	162.80	2381.59	94.00	86.64	218.62 S	51.92 E	224.70	166.64	0.57
2491.00	7.70	159.40	2475.71	95.00	92.73	230.81 S	56.09 E	237.53	166.34	0.53
2584.00	7.10	157.50	2567.93	93.00	98.87	241.95 S	60.48 E	249.40	165.97	0.70
2676.00	8.20	161.00	2659.11	92.00	104.98	253.41 S	64.79 E	261.56	165.66	1.30
2770.00	6.90	158.90	2752.30	94.00	111.02	265.02 S	69.01 E	273.85	165.40	1.41
2864.00	7.90	167.30	2845.51	94.00	116.30	276.59 S	72.46 E	285.92	165.32	1.56
2957.00	7.10	166.60	2937.72	93.00	120.91	288.41 S	75.20 E	298.05	165.39	0.87
3052.00	7.70	162.90	3031.93	95.00	126.01	300.21 S	78.43 E	310.28	165.36	0.81
3147.00	7.60	169.40	3126.08	95.00	130.99	312.47 S	81.46 E	322.91	165.39	0.92
3242.00	7.50	171.70	3220.26	95.00	135.00	324.78 S	83.51 E	335.34	165.58	0.34
3337.00	7.70	165.40	3314.43	95.00	139.46	337.07 S	86.01 E	347.87	165.69	0.90
3432.00	7.40	163.10	3408.60	95.00	144.74	349.08 S	89.39 E	360.35	165.64	0.45
3526.00	7.70	154.00	3501.79	94.00	151.06	360.53 S	93.91 E	372.56	165.40	1.31
3621.00	7.80	159.90	3595.93	95.00	157.90	372.31 S	98.92 E	385.22	165.12	0.84
3714.00	8.00	157.70	3688.04	93.00	164.40	384.22 S	103.54 E	397.93	164.92	0.39
3810.00	8.20	157.30	3783.09	96.00	171.53	396.72 S	108.72 E	411.35	164.67	0.22
3903.00	6.90	165.60	3875.28	93.00	177.29	408.25 S	112.67 E	423.51	164.57	1.82
3997.00	6.70	165.20	3968.62	94.00	181.81	419.02 S	115.47 E	434.64	164.59	0.22
4092.00	6.40	160.50	4063.00	95.00	186.62	429.37 S	118.65 E	445.46	164.55	0.65
4185.00	7.10	158.70	4155.35	93.00	192.05	439.61 S	122.47 E	456.35	164.43	0.79
4280.00	7.90	161.00	4249.54	95.00	198.14	451.25 S	126.73 E	468.71	164.31	0.90
4374.00	6.90	160.60	4342.76	94.00	203.92	462.69 S	130.71 E	480.80	164.23	1.07
4468.00	8.00	166.60	4435.96	94.00	209.16	474.38 S	134.10 E	492.97	164.22	1.43
4562.00	8.50	164.90	4528.99	94.00	214.55	487.45 S	137.43 E	506.45	164.26	0.59
4655.00	8.00	165.60	4621.03	93.00	220.00	500.35 S	140.83 E	519.79	164.28	0.55
4750.00	8.80	170.80	4715.01	95.00	224.97	513.93 S	143.63 E	533.62	164.39	1.16
4844.00	8.40	170.50	4807.95	94.00	229.46	527.80 S	145.92 E	547.60	164.55	0.43
4937.00	7.60	162.90	4900.05	93.00	234.39	540.38 S	148.84 E	560.50	164.60	1.43
5029.00	7.00	160.80	4991.30	92.00	239.78	551.49 S	152.48 E	572.18	164.54	0.71
5124.00	7.40	158.00	5085.55	95.00	245.72	562.62 S	156.67 E	584.03	164.44	0.56
5217.00	8.00	159.10	5177.71	93.00	252.09	574.22 S	161.23 E	596.43	164.32	0.66
5311.00	7.90	155.90	5270.81	94.00	258.94	586.23 S	166.20 E	609.33	164.17	0.48
5405.00	7.60	156.20	5363.95	94.00	265.90	597.82 S	171.34 E	621.89	164.01	0.32
5498.00	7.10	156.20	5456.19	93.00	272.40	608.70 S	176.14 E	633.67	163.86	0.54
5592.00	6.80	164.90	5549.50	94.00	277.87	619.39 S	179.94 E	645.00	163.80	1.16
5686.00	6.80	169.80	5642.84	94.00	282.03	630.24 S	182.37 E	656.10	163.86	0.62
5781.00	7.30	171.40	5737.12	95.00	285.77	641.74 S	184.27 E	667.67	163.98	0.57
5876.00	6.40	181.70	5831.45	95.00	288.33	653.00 S	185.02 E	678.71	164.18	1.60
5970.00	6.80	175.40	5924.82	94.00	290.36	663.79 S	185.31 E	689.17	164.40	0.88
6063.00	7.10	175.80	6017.14	93.00	293.03	675.01 S	186.17 E	700.21	164.58	0.33
6158.00	7.30	162.00	6111.40	95.00	297.17	686.60 S	188.47 E	712.00	164.65	1.83
6252.00	8.90	157.30	6204.46	94.00	303.77	698.99 S	193.12 E	725.18	164.56	1.84
6346.00	8.30	157.30	6297.40	94.00	311.22	711.96 S	198.54 E	739.12	164.42	0.64
6438.00	7.30	154.30	6388.55	92.00	318.10	723.35 S	203.64 E	751.47	164.28	1.17
6532.00	8.90	153.10	6481.61	94.00	325.82	735.22 S	209.52 E	764.49	164.09	1.71
6628.00	9.60	161.20	6576.36	96.00	333.98	749.42 S	215.46 E	779.78	163.96	1.54

Survey Report

Vertical Section Plane: 99.32°	Total Correction: 8.58° East to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: RAINDANCE 3
RT: 22.5 FT ROTARY TABLE TO GROUND LEVEL	FIELD: WATTENBERG

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
6675.00	8.90	158.50	6622.75	47.00	337.69	756.51 S	218.05 E	787.31	163.92	1.75	
6722.00	9.70	148.00	6669.14	47.00	342.17	763.25 S	221.49 E	794.74	163.82	3.98	
6769.00	11.20	136.60	6715.36	47.00	348.42	769.93 S	226.72 E	802.62	163.59	5.42	
6815.00	13.20	129.00	6760.32	46.00	356.54	776.48 S	233.87 E	810.94	163.24	5.57	
6862.00	15.70	120.00	6805.84	47.00	367.15	783.04 S	243.55 E	820.04	162.72	7.14	
6909.00	18.60	113.00	6850.75	47.00	380.39	789.15 S	255.96 E	829.62	162.03	7.56	
6956.00	21.90	109.00	6894.84	47.00	396.32	794.94 S	271.16 E	839.91	161.17	7.61	
7003.00	25.90	106.00	6937.80	47.00	415.16	800.62 S	289.32 E	851.29	160.13	8.89	
7050.00	29.50	103.50	6979.41	47.00	436.90	806.15 S	310.45 E	863.86	158.94	8.05	
7095.00	33.50	101.40	7017.77	45.00	460.37	811.20 S	333.40 E	877.04	157.66	9.22	
7142.00	37.50	100.70	7056.03	47.00	487.65	816.42 S	360.19 E	892.34	156.19	8.55	
7189.00	42.10	98.20	7092.13	47.00	517.72	821.33 S	389.86 E	909.15	154.61	10.36	
7236.00	46.30	97.00	7125.82	47.00	550.46	825.64 S	422.33 E	927.39	152.91	9.11	
7283.00	49.30	96.10	7157.39	47.00	585.24	829.61 S	456.91 E	947.11	151.16	6.54	
7330.00	54.00	94.40	7186.54	47.00	621.99	832.96 S	493.61 E	968.23	149.35	10.39	
7377.00	58.60	92.80	7212.61	47.00	660.88	835.40 S	532.62 E	990.75	147.48	10.19	
7424.00	61.80	92.40	7235.97	47.00	701.38	837.25 S	573.36 E	1014.76	145.60	6.85	
7471.00	64.90	93.00	7257.05	47.00	743.10	839.23 S	615.31 E	1040.63	143.75	6.69	
7518.00	69.60	91.70	7275.22	47.00	786.11	841.00 S	658.61 E	1068.20	141.93	10.32	
7564.00	74.00	91.20	7289.58	46.00	829.39	842.10 S	702.28 E	1096.51	140.17	9.62	
7611.00	77.60	92.10	7301.11	47.00	874.54	843.42 S	747.82 E	1127.20	138.44	7.88	

7659.00	80.40	91.70	7310.27	48.00	921.25	844.98 S	794.91 E	1160.11	136.75	5.89	
7706.00	83.40	91.20	7316.89	47.00	967.34	846.16 S	841.42 E	1193.30	135.16	6.47	
7752.00	85.80	90.20	7321.22	46.00	1012.62	846.71 S	887.20 E	1226.40	133.66	5.65	
TIED INTO ENSIGN MWD SURVEY AT 7780'MD.											
7780.00	86.70	90.20	7323.05	28.00	1040.20	846.81 S	915.14 E	1246.83	132.78	3.21	
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.											
7850.00	88.90	90.17	7325.74	70.00	1109.26	847.04 S	985.09 E	1299.18	130.69	3.14	162.46
7944.00	89.87	89.38	7326.75	94.00	1201.95	846.67 S	1079.08 E	1371.59	128.12	1.33	166.08
8038.00	89.69	89.37	7327.11	94.00	1294.54	845.64 S	1173.07 E	1446.10	125.79	0.19	169.69
8133.00	89.78	90.78	7327.55	95.00	1388.30	845.77 S	1268.07 E	1524.25	123.70	1.49	173.31
8227.00	89.87	91.85	7327.83	94.00	1481.38	847.92 S	1362.04 E	1604.41	121.90	1.14	173.31
8322.00	88.99	91.67	7328.78	95.00	1575.55	850.84 S	1456.99 E	1687.24	120.28	0.94	173.31
8416.00	89.52	90.81	7330.00	94.00	1668.61	852.88 S	1550.96 E	1769.99	118.81	1.07	173.31
8510.00	89.43	90.45	7330.86	94.00	1761.53	853.91 S	1644.95 E	1853.38	117.43	0.39	173.31
8605.00	89.96	90.14	7331.37	95.00	1855.35	854.40 S	1739.95 E	1938.41	116.15	0.65	176.92
8700.00	90.13	89.40	7331.29	95.00	1949.03	854.02 S	1834.95 E	2023.95	114.96	0.80	176.92
8794.00	89.52	88.56	7331.58	94.00	2041.50	852.34 S	1928.93 E	2108.85	113.84	1.10	176.92
8888.00	88.99	88.32	7332.80	94.00	2133.81	849.79 S	2022.89 E	2194.13	112.79	0.62	176.92
8982.00	88.11	89.47	7335.18	94.00	2226.22	847.97 S	2116.84 E	2280.36	111.83	1.54	176.92
9077.00	89.52	88.83	7337.15	95.00	2319.71	846.56 S	2211.80 E	2368.28	110.94	1.63	180.54
9171.00	89.52	89.33	7337.93	94.00	2412.21	845.05 S	2305.79 E	2455.76	110.13	0.53	180.54
9265.00	89.78	90.83	7338.51	94.00	2504.98	845.19 S	2399.78 E	2544.27	109.40	1.62	184.15
9359.00	89.96	90.80	7338.72	94.00	2597.95	846.52 S	2493.77 E	2633.54	108.75	0.19	184.15
9454.00	89.60	90.86	7339.09	95.00	2691.91	847.90 S	2588.76 E	2724.08	108.14	0.38	187.76
9548.00	90.40	90.87	7339.09	94.00	2784.88	849.32 S	2682.75 E	2813.98	107.57	0.85	187.76
9642.00	89.43	90.57	7339.23	94.00	2877.82	850.50 S	2776.74 E	2904.07	107.03	1.08	191.38
9736.00	89.08	89.64	7340.45	94.00	2970.60	850.67 S	2870.73 E	2994.12	106.51	1.06	191.38
9831.00	89.43	88.21	7341.68	95.00	3064.03	848.89 S	2965.71 E	3084.81	105.97	1.55	194.99
9925.00	89.52	88.65	7342.54	94.00	3156.34	846.31 S	3059.67 E	3174.56	105.46	0.48	194.99
10020.00	90.31	88.98	7342.68	95.00	3249.74	844.35 S	3154.65 E	3265.69	104.98	0.90	198.61
10114.00	90.48	89.79	7342.04	94.00	3342.33	843.34 S	3248.64 E	3356.32	104.55	0.88	198.61
10209.00	90.22	90.43	7341.46	95.00	3436.10	843.52 S	3343.63 E	3448.39	104.16	0.73	202.22
10303.00	89.43	90.81	7341.74	94.00	3529.02	844.54 S	3437.63 E	3539.85	103.80	0.93	202.22
10397.00	89.69	90.52	7342.47	94.00	3621.95	845.63 S	3531.62 E	3631.45	103.47	0.41	202.22
10492.00	90.48	89.92	7342.32	95.00	3715.75	846.00 S	3626.62 E	3723.98	103.13	1.04	205.83
10586.00	89.34	90.10	7342.47	94.00	3808.51	846.01 S	3720.61 E	3815.59	102.81	1.23	202.22
10680.00	89.96	90.19	7343.05	94.00	3901.30	846.25 S	3814.61 E	3907.35	102.51	0.67	205.83
10775.00	90.48	89.45	7342.68	95.00	3995.00	845.95 S	3909.61 E	4000.09	102.21	0.95	205.83
10869.00	89.52	90.21	7342.68	94.00	4087.71	845.67 S	4003.61 E	4091.95	101.93	1.30	209.45
10963.00	89.43	90.71	7343.54	94.00	4180.59	846.43 S	4097.60 E	4184.11	101.67	0.54	209.45
11058.00	89.69	90.59	7344.27	95.00	4274.50	847.51 S	4192.59 E	4277.39	101.43	0.30	213.06
11152.00	89.52	90.41	7344.92	94.00	4367.38	848.33 S	4286.59 E	4369.72	101.19	0.26	213.06
11246.00	89.69	90.70	7345.57	94.00	4460.28	849.24 S	4380.58 E	4462.14	100.97	0.36	213.06
11340.00	90.13	90.34	7345.72	94.00	4553.18	850.09 S	4474.57 E	4554.61	100.76	0.60	213.06
11435.00	90.22	90.10	7345.43	95.00	4646.98	850.45 S	4569.57 E	4648.04	100.54	0.27	213.06
11529.00	90.22	89.91	7345.07	94.00	4739.74	850.46 S	4663.57 E	4740.48	100.34	0.20	216.68
11624.00	90.84	91.59	7344.19	95.00	4833.67	851.71 S	4758.56 E	4834.18	100.15	1.88	216.68
11718.00	89.96	92.37	7343.53	94.00	4926.90	854.95 S	4852.50 E	4927.24	99.99	1.25	216.68
11812.00	90.04	92.90	7343.53	94.00	5020.26	859.27 S	4946.40 E	5020.48	99.85	0.57	216.68
11906.00	90.40	93.76	7343.17	94.00	5113.74	864.73 S	5040.24 E	5113.88	99.74	0.99	216.68

Survey Report

Vertical Section Plane: 99.32°	Total Correction: 8.58° East to True
Calculation Method: Minimum Curvature	Survey Reference: Wellhead
North Aligned to: True North	Well: RAINDANCE 3
RT: 22.5 FT ROTARY TABLE TO GROUND LEVEL	FIELD: WATTENBERG

Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
11938.00	90.40	94.66	7342.95	32.00	5145.62	867.08 S	5072.15 E	5145.73	99.70	2.81	216.68
12022.00	90.40	94.66	7342.36	84.00	5229.34	873.91 S	5155.87 E	5229.41	99.62	0.00	

PATHFINDER ENERGY SERVICES - TOOL CODES & DESCRIPTIONS

HDS1M	HIGH SPEED DIRECTIONAL SURVEY MULTILINK TOOL	CLSSM	COMPENSATED LONG SPACE SONIC TOOL
HDS1L	HIGH SPEED DIRECTIONAL SURVEY GAMMA TOOL	SCLSS	SLIM COMPENSATED LONG SPACE SONIC MULTILINK TOOL
HDS1R	HIGH SPEED DIRECTIONAL SURVEY GAMMA RETRIEVABLE TOOL	DPM	DYNAMIC PRESSURE MODULE
AWR	ARRAY WAVE RESISTIVITY GAMMA MULTILINK TOOL	PZIG	AT-BIT INCLINATION AND GAMMA RAY
CWRGM	COMPENSATED WAVE RESISTIVITY GAMMA MULTILINK TOOL	2DRS	2D ROTARY STEERING TOOL
SCWR	SLIM COMPENSATED WAVE RESISTIVITY TOOL	3DRS	3D ROTARY STEERING TOOL
DNSCM	DENSITY NEUTRON STANDOFF CALIPER MULTILINK TOOL	DFT	DRILLING FORMATION TESTER

PATHFINDER ENERGY SERVICES - MNEMONICS LIST

GENERAL

AHV	ANNULAR HOLE VOLUME TICKS
AHVT	ANNULAR HOLE VOLUME-ACCUMULATIVE TOTAL
BHV	BOREHOLE VOLUME TICKS
BHVT	BOREHOLE VOLUME-ACCUMULATIVE TOTAL
DEPT	MEASURED DEPTH
MTVD	MEASURED TRUE VERTICAL DEPTH
INC	INCLINATION
AZI	AZIMUTH
ROP	RATE OF PENETRATION
GRW	RAW GAMMA RAY
GRC	CALIBRATED GAMMA RAY
GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY
RM	RESISTIVITY OF MUD
RMF	RESISTIVITY OF MUD FILTRATE
SHOES	CASING SHOE SYMBOLS
SURVS	SURVEY TEXT SYMBOLS

4 3/4" SCWR

C15A	CWR ATTENUATION CONDUCTIVITY (15")
C15P	CWR PHASE CONDUCTIVITY (15")
C35A	CWR ATTENUATION CONDUCTIVITY (35")
C35P	CWR PHASE CONDUCTIVITY (35")
CWRFET	CWR FORMATION EXPOSURE TIME
GRC	CALIBRATED GAMMA RAY
GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY
GRFET	GAMMA RAY FORMATION EXPOSURE TIME
R15A	CWR ATTENUATION RESISTIVITY (15")
R15P	CWR PHASE RESISTIVITY (15")
R35A	CWR ATTENUATION RESISTIVITY (35")
R35P	CWR PHASE RESISTIVITY (35")
UL1A	UNCOMPENSATED 15" ATTENUATION RESISTIVITY LOWER
UL1P	UNCOMPENSATED 15" PHASE RESISTIVITY LOWER
UL3A	UNCOMPENSATED 35" ATTENUATION RESISTIVITY LOWER
UL3P	UNCOMPENSATED 35" PHASE RESISTIVITY LOWER
UU1A	UNCOMPENSATED 15" ATTENUATION RESISTIVITY UPPER
UU1P	UNCOMPENSATED 15" PHASE RESISTIVITY UPPER
UU3A	UNCOMPENSATED 35" ATTENUATION RESISTIVITY UPPER
UU3P	UNCOMPENSATED 35" PHASE RESISTIVITY UPPER

6 3/4", 8", & 9 1/2" CWR

C25A	CWR ATTENUATION CONDUCTIVITY (25")
C25P	CWR PHASE CONDUCTIVITY (25")
C55A	CWR ATTENUATION CONDUCTIVITY (55")
C55P	CWR PHASE CONDUCTIVITY (55")
CWRFET	CWR FORMATION EXPOSURE TIME
GRC	CALIBRATED GAMMA RAY
GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY
GRFET	GAMMA RAY FORMATION EXPOSURE TIME
R25A	CWR ATTENUATION RESISTIVITY (25")
R25P	CWR PHASE RESISTIVITY (25")
R55A	CWR ATTENUATION RESISTIVITY (55")
R55P	CWR PHASE RESISTIVITY (55")
UL2A	UNCOMPENSATED 25" ATTENUATION RESISTIVITY LOWER
UL2P	UNCOMPENSATED 25" PHASE RESISTIVITY LOWER
UL5A	UNCOMPENSATED 55" ATTENUATION RESISTIVITY LOWER
UL5P	UNCOMPENSATED 55" PHASE RESISTIVITY LOWER
UU2A	UNCOMPENSATED 25" ATTENUATION RESISTIVITY UPPER
UU2P	UNCOMPENSATED 25" PHASE RESISTIVITY UPPER
UU5A	UNCOMPENSATED 55" ATTENUATION RESISTIVITY UPPER
UU5P	UNCOMPENSATED 55" PHASE RESISTIVITY UPPER

4 3/4", 6 3/4", 8", & 9 1/2" AWR

GRCA	AWR CALIBRATED GAMMA RAY
GRWA	AWR RAW GAMMA RAY
TEMP_A	TEMPERATURE FROM AWR TOOL
INC_A	AWR STATIC INCLINATION
INCD_A	AWR DYNAMIC INCLINATION
RSPL	SHALLOW PHASE RESISTIVITY FROM 500 kHZ FREQUENCY
RMPL	MEDIUM PHASE RESISTIVITY FROM 500 kHZ FREQUENCY
RDPL	DEEP PHASE RESISTIVITY FROM 500 kHZ FREQUENCY
RSAL	SHALLOW ATTENUATION RESISTIVITY FROM 500 kHZ FREQUENCY
RMAL	MEDIUM ATTENUATION RESISTIVITY FROM 500 kHZ FREQUENCY
RDAL	DEEP ATTENUATION RESISTIVITY FROM 500 kHZ FREQUENCY
RSPH	SHALLOW PHASE RESISTIVITY FROM 2 MHZ FREQUENCY
RMPH	MEDIUM PHASE RESISTIVITY FROM 2 MHZ FREQUENCY
RDPH	DEEP PHASE RESISTIVITY FROM 2 MHZ FREQUENCY
RSAH	SHALLOW ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY
RMAH	MEDIUM ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY
RDAH	DEEP ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY
CSPL	SHALLOW PHASE CONDUCTIVITY FROM 500 kHZ FREQUENCY
CMPL	MEDIUM PHASE CONDUCTIVITY FROM 500 kHZ FREQUENCY
CDPL	DEEP PHASE CONDUCTIVITY FROM 500 kHZ FREQUENCY
CSPH	SHALLOW PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
CMPH	MEDIUM PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
CDPH	DEEP PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
ARFET	AWR FORMATION EXPOSURE TIME
GAFET	AWR GAMMA RAY FORMATION EXPOSURE TIME

4 3/4", 6 3/4", 8" DNSC

BS	BIT SIZE
CALI	CALIPER
DDDN	DNSC DATA DENSITY (0 - 4 SAMPLES/FT)
DGAM	DENSITY GAMMA (NATURAL)
DNPH	NEUTRON POROSITY CORRECTION
DNSFET	DNSC FORMATION EXPOSURE TIME
DPE	PE CORRECTION
NLIM	NEUTRON POROSITY (LIMESTONE MATRIX)
NNEAR	NEAR NEUTRON COUNT RATE
NRAT	NEUTRON RATIO
NSAC	ENVIRONMENTALLY CORRECTED NEUTRON
NSAN	NEUTRON POROSITY (SANDSTONE MATRIX)
PE	PHOTOELECTRIC INDEX

DPHI	DENSITY POROSITY (GIVEN MATRIX)
DHRM	DENSITY CORRECTION MINUS
PEMI	PHOTOELECTRIC INDEX (MINIMUM FILTER)
RHOB	BULK DENSITY

DRHO	DENSTIY CORRECTION	SDNP	STANDARD DEVIATION NEUTRON POROSITY
DRHP	DENSTIY CORRECTION PLUS	SDPE	STANDARD DEVIATION PE COMPUTATION
EDPH	DENSITY POROSITY-EVR PROCESSED	SDRH	STANDARD DEVIATION DENSITY
ENPH	NEUTRON POROSTIY-EVR PROCESSED	SOA	UNWEIGHTED DENSITY STANDOFF
ERHO	BULK DENSITY-EVR PROCESSED	TBDN	TIME BEHIND DNSC
NDOL	NEUTRON POROSTIY (DOLOMITE MATRIX)	WSOD	WEIGHTED STANDOFF DENSITY
NFAR	FAR NEUTRON COUNT RATE	WSON	WEIGHTED STANDOFF NEUTRON

4 3/4" SCLSS, 6 3/4" & 8" CLSS

ACFET	ACOUSTIC FORMATION EXPOSIRE TIME	SHS1	MAX SHEAR SEMBLANCE , UPPER XMITR
SO	ACOUSTIC TOOL STANDOFF	SHS2	MAX SHEAR SEMBLANCE , LOWER XMITR
SOFF	STANDOFF	SLS1	SHEAR SEMBLANCE MIN CUTOFF , UPPER XMITR
DTCU	DELTA T COMP , UPPER XMITR-FIELD PROCESSED	SLS2	SHEAR SEMBLANCE MIN CUTOFF , LOWER XMITR
DTCL	DELTA T COMP , LOWER XMITR-FIELD PROCESSED	WFT1	WAVEFORM XMITR1 , ALL 4 RCVRS (NON-PARSED)
DTP1	DELTA T COMP , UPPER XMITR-POST PROCESSED	WFT2	WAVEFORM XMITR2 , ALL 4 RCVRS (NON-PARSED)
DTP2	DELTA T COMP , LOWER XMITR-POST PROCESSED	W11C	PARSED WAVEFORM , XMITR 1 , RCVR 1
DTS1	DELTA T SHEAR , UPPER XMITR-POST PROCESSED	W12C	PARSED WAVEFORM , XMITR 1 , RCVR 2
DTS2	DELTA T SHEAR , LOWER XMITR-POST PROCESSED	W13C	PARSED WAVEFORM , XMITR 1 , RCVR 3
SEM1	SEMBLANCE , UPPER XMITR-POST PROCESSED	W14C	PARSED WAVEFORM , XMITR 1 , RCVR 4
SEM2	SEMBLANCE , LOWER XMITR-POST PROCESSED	W21C	PARSED WAVEFORM , XMITR 2 , RCVR 1
SMX1	MAX COMP SEMBLANCE , UPPER XMITR	W22C	PARSED WAVEFORM , XMITR 2 , RCVR 2
SMX2	MAX COMP SEMBLANCE , LOWER XMITR	W23C	PARSED WAVEFORM , XMITR 2 , RCVR 3
SMN1	COMP SEMBLANCE MIN CUTOFF , UPPER XMITR	W24C	PARSED WAVEFORM , XMITR 2 , RCVR 4
SMN2	COMP SEMBLANCE MIN CUTOFF , LOWER XMITR		

4 3/4" , 6 3/4" , 8" & 9 1/2" DPM & QPM

ANPR	ANNULAR PRESSURE	KPOSI	KELLY POSITION
BDEPS	BIT DEPTH STAMP	MWC	MUD WEIGHT CALCULATED
DAPR	PRESSURE TOOL DIFFERENTIAL PRESSURE	MWI_P	MUD WEIGHT IN
DPPR	PRESSURE TOOL DRILL PIPE PRESSURE	SPP_I	STANDPIPE PRESSURE
ECDM	EQUIVALENT CIRCULATING DENSITY	SWOB	SURFACE WEIGHT ON BIT
HDEPS	HOLE DEPTH STAMP	TDPM	PRESSURE TOOL ANNULAR TEMPERATURE

6 3/4" DFT

DFGR	DFT GAMMA RAW	HYDA	HYDROSTATIC PRESSURE -- AFTER
DFGRC	DFT GAMMA CALIBRATED	HYDB	HYDROSTATIC PRESSURE -- BEFORE
DFANPR	DFT ANNULAR PRESSURE	FPRES	FORMATION PRESSURE
DFECD	DFT EQUIVALENT CIRCULATING DENSITY OF THE MUD		

4 3/4", 6 3/4" PZIG

NBDINC	NEAR BIT DYNAMIC INCLINATION	NBGRC	NEAR BIT GAMMA CALIBRATED
NBSINC	NEAR BIT STATIC INCLINATION	NBTMP	NEAR BIT TEMERATURE
NBGR	NEAR BIT GAMMA RAW	NBIFET	NEAR BIT FORMATION EXPOSURE TIME

EQUIPMENT DATA

RUN NUMBER	1					
RES DTA						
RES MANDREL						
RES SIZE in						
RES VERIFIER						
API BLANKET						

HDS-1M DTA						
HDS-1M MANDREL						
HDS-1M SIZE in						
DNSC DTA	4068					
DNSC MANDREL	N47M068D					
DNSC SIZE in	4 3/4					
DENSITY SOURCE NO.	5188-GW					
NEUTRON SOURCE NO.						
CLSS DTA						
CLSS MANDREL						
CLSS SIZE in						
DPM DTA						
DPM SIZE in						
DFT DTA						
DFT MANDREL						
DFT SIZE in						
PZIG UXM DTA						
PZIG LXM DTA						
PZIG SIZE in						

BOTTOM HOLE ASSEMBLY RECORD

RUN 1	ft						
6 1/8" PDC BIT	0.50						
1.5° MUD MOTOR	29.54						
5 3/4" STAB.	4.84						
ISDNSC (DEN/CAL)	18.70						
SABS (BATTERY)	14.76						
CROSSOVER SUB	1.15						
HDS-1L (DIR/GR)	28.34						
5 3/4" STAB.	4.32						
NMDC	30.74						
NMDC	31.43						
FILTER SUB	4.58						
1 x 4" DP	31.36						
6" REAMER	7.37						
1 x 4" DP	31.44						
5 1/2" REAMER	7.37						
==========							
TOTAL BHA LENGTH	246.44						
SENSOR OFFSETS:							
DIRECTIONAL	80.82						
GAMMA-RAY	72.74						
CALIPER	45.04						
DENSITY	43.58						
IMG DIRECTIONAL	40.26						

PATHFINDER

A Schlumberger Company

GAMMA-RAY

5" = 100'
FEET MD