Heartland C31-78-1HN

MD
1":100'

Company:	Noble Energy Inc
Well Name:	Heartland C31-78-1HN
API:	05-123-39953
Rig Id:	Precision 828
State:	Colorado
County/Parish:	Weld
Country:	USA
Survey Company:	Ensign Directional
Job number:	05-123-39554
Company Man 1	Gary Stapleton
Directional Driller 1	Tyler Batchelder
Directional Driller 2	Matt Mason
Directional Driller 3	Dustin Davis
MWD 1	Mark Bigler
MWD 2	Derek Saykally

Log measurements: Gama
Depth measured from: KB
Maximum temperature:

	Depth	Date
Start:	726 ft	9/19/2014
End:	11,987 ft	9/25/2014

Casing	Depth	Size
Surface:	726	9.625
Intermediate:	7347	7
Intermediate2:	11,987	

Mud Type: Water Based
Density:
Viscosity:
Rm: **Rmf:** **Rmc:**

Elevations
KB: 4860
GL: 4844
DF: 4860

Run	Bit Size	Offsets Gamma	Offsets Survey	Depths Start	Depths End	Dates Start	Dates End
1	8 3/4	59.77	54.77	726	7357	9/20/2014	9/22/2014
2	6 1/8	61.87	56.87	7357	11,987	9/23/2014	9/25/2014
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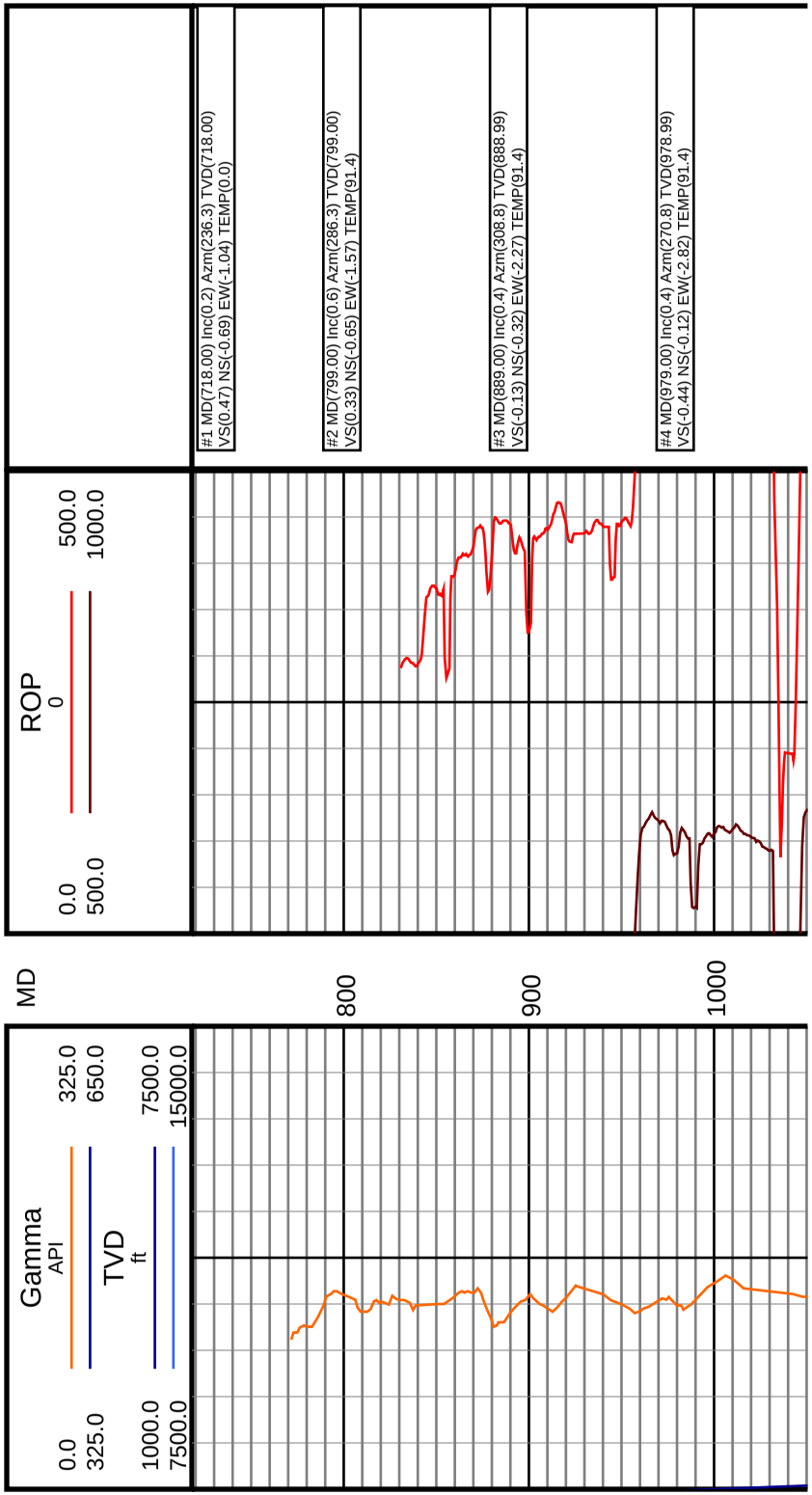

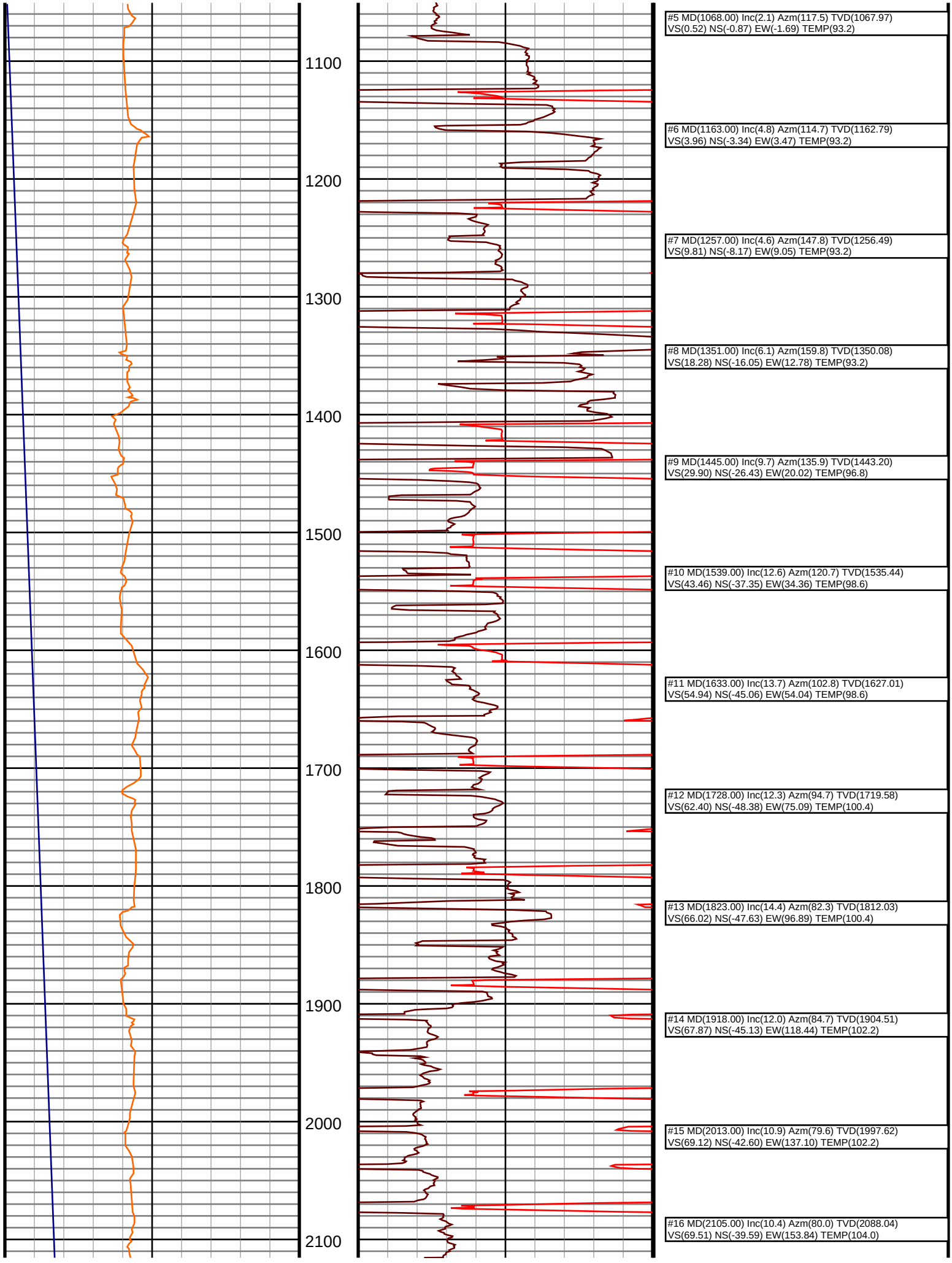
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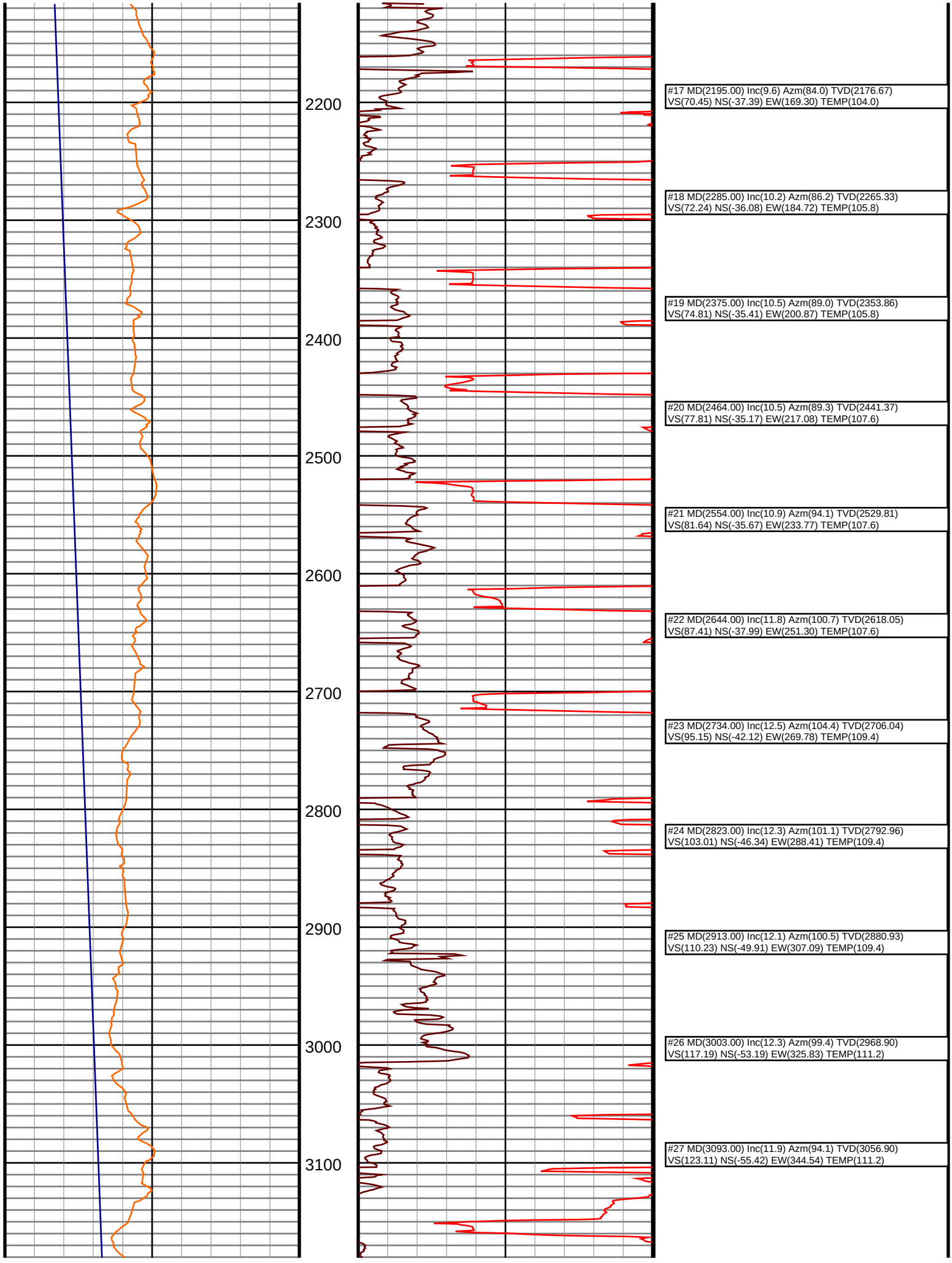
2100
#5 MD(1068.00) Inc(2.1) Azm(117.5) TVD(1067.97)
VS(0.52) NS(-0.87) EW(-1.69) TEMP(93.2)
#6 MD(1163.00) Inc(4.8) Azm(114.7) TVD(1162.79)
VS(3.96) NS(-3.34) EW(3.47) TEMP(93.2)
#7 MD(1257.00) Inc(4.6) Azm(147.8) TVD(1256.49)
VS(9.81) NS(-8.17) EW(9.05) TEMP(93.2)
#8 MD(1351.00) Inc(6.1) Azm(159.8) TVD(1350.08)
VS(18.28) NS(-16.05) EW(12.78) TEMP(93.2)
#9 MD(1445.00) Inc(9.7) Azm(135.9) TVD(1443.20)
VS(29.90) NS(-26.43) EW(20.02) TEMP(96.8)
#10 MD(1539.00) Inc(12.6) Azm(120.7) TVD(1535.44)
VS(43.46) NS(-37.35) EW(34.36) TEMP(98.6)
#11 MD(1633.00) Inc(13.7) Azm(102.8) TVD(1627.01)
VS(54.94) NS(-45.06) EW(54.04) TEMP(98.6)
#12 MD(1728.00) Inc(12.3) Azm(94.7) TVD(1719.58)
VS(62.40) NS(-48.38) EW(75.09) TEMP(100.4)
#13 MD(1823.00) Inc(14.4) Azm(82.3) TVD(1812.03)
VS(66.02) NS(-47.63) EW(96.89) TEMP(100.4)
#14 MD(1918.00) Inc(12.0) Azm(84.7) TVD(1904.51)
VS(67.87) NS(-45.13) EW(118.44) TEMP(102.2)
#15 MD(2013.00) Inc(10.9) Azm(79.6) TVD(1997.62)
VS(69.12) NS(-42.60) EW(137.10) TEMP(102.2)
#16 MD(2105.00) Inc(10.4) Azm(80.0) TVD(2088.04)
VS(69.51) NS(-39.59) EW(153.84) TEMP(104.0)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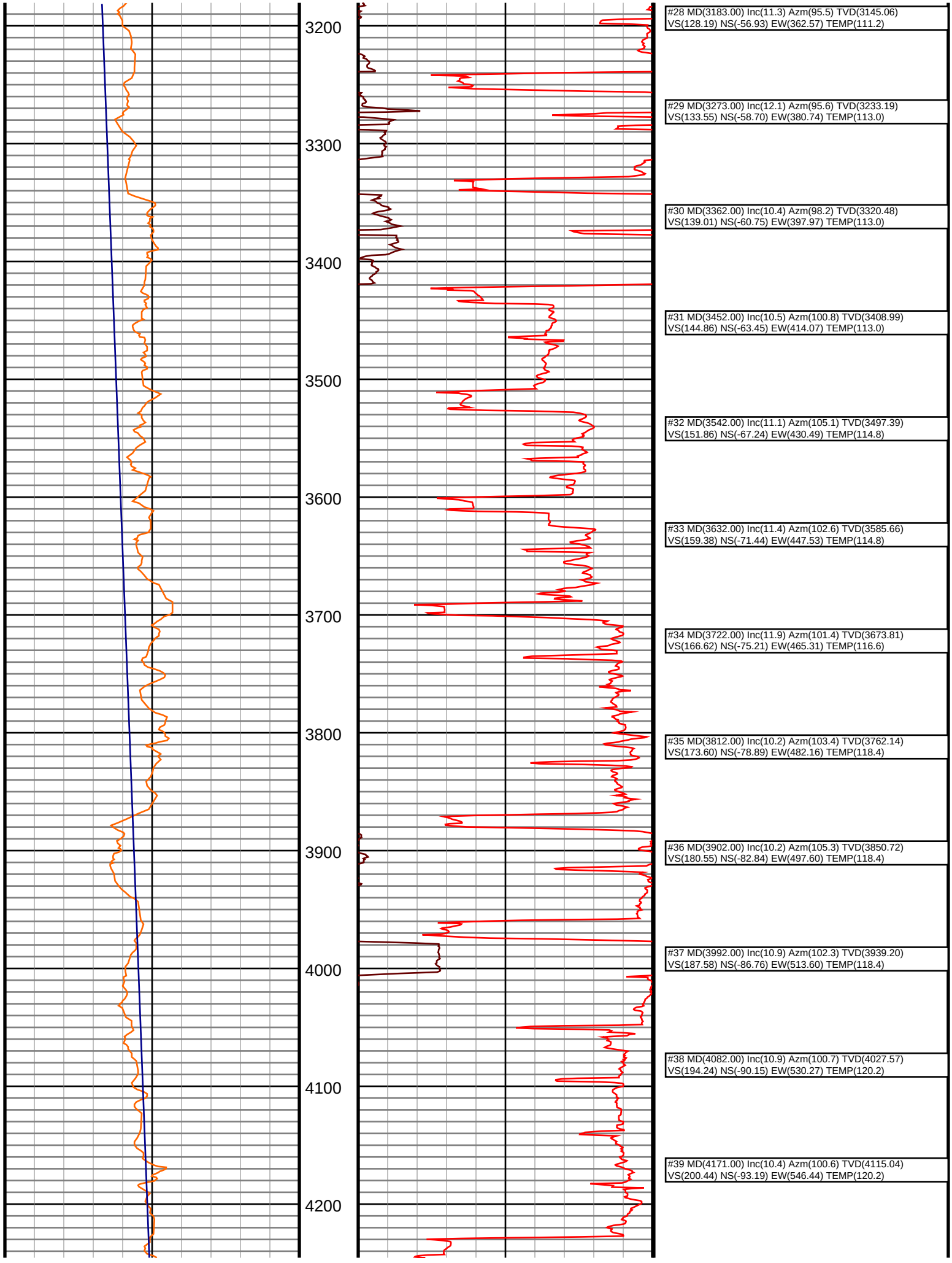
VS(70.45) NS(-37.39) EW(169.30) TEMP(104.0)
#18 MD(2285.00) Inc(10.2) Azm(86.2) TVD(2265.33)
VS(72.24) NS(-36.08) EW(184.72) TEMP(105.8)
#19 MD(2375.00) Inc(10.5) Azm(89.0) TVD(2353.86)
VS(74.81) NS(-35.41) EW(200.87) TEMP(105.8)
#20 MD(2464.00) Inc(10.5) Azm(89.3) TVD(2441.37)
VS(77.81) NS(-35.17) EW(217.08) TEMP(107.6)
#21 MD(2554.00) Inc(10.9) Azm(94.1) TVD(2529.81)
VS(81.64) NS(-35.67) EW(233.77) TEMP(107.6)
#22 MD(2644.00) Inc(11.8) Azm(100.7) TVD(2618.05)
VS(87.41) NS(-37.99) EW(251.30) TEMP(107.6)
#23 MD(2734.00) Inc(12.5) Azm(104.4) TVD(2706.04)
VS(95.15) NS(-42.12) EW(269.78) TEMP(109.4)
#24 MD(2823.00) Inc(12.3) Azm(101.1) TVD(2792.96)
VS(103.01) NS(-46.34) EW(288.41) TEMP(109.4)
#25 MD(2913.00) Inc(12.1) Azm(100.5) TVD(2880.93)
VS(110.23) NS(-49.91) EW(307.09) TEMP(109.4)
#26 MD(3003.00) Inc(12.3) Azm(99.4) TVD(2968.90)
VS(117.19) NS(-53.19) EW(325.83) TEMP(111.2)
#27 MD(3093.00) Inc(11.9) Azm(94.1) TVD(3056.90)
VS(123.11) NS(-55.42) EW(344.54) TEMP(111.2)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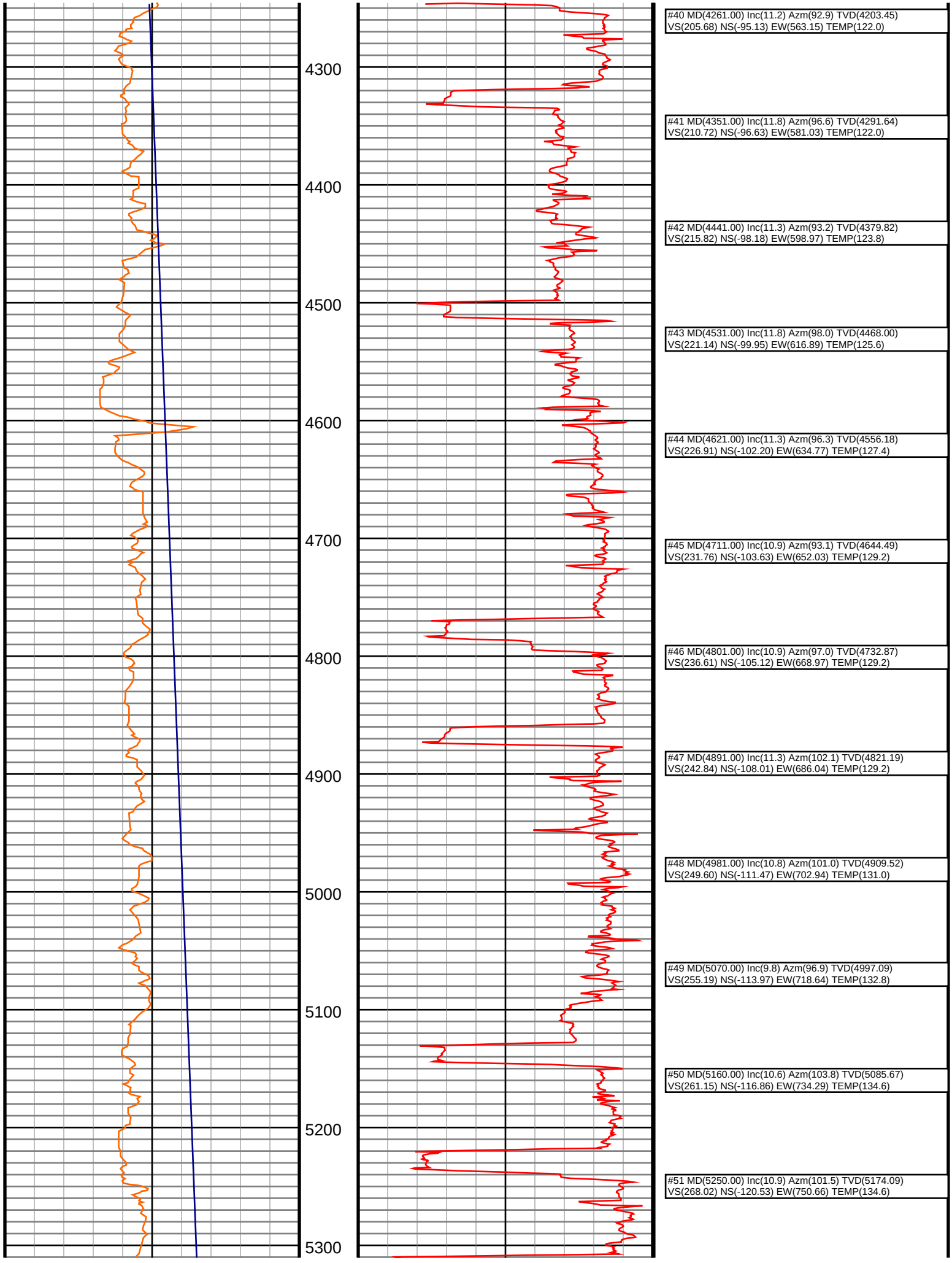
VS(128.19) NS(-56.93) EW(362.57) TEMP(111.2)
#29 MD(3273.00) Inc(12.1) Azm(95.6) TVD(3233.19)
VS(133.55) NS(-58.70) EW(380.74) TEMP(113.0)
#30 MD(3362.00) Inc(10.4) Azm(98.2) TVD(3320.48)
VS(139.01) NS(-60.75) EW(397.97) TEMP(113.0)
#31 MD(3452.00) Inc(10.5) Azm(100.8) TVD(3408.99)
VS(144.86) NS(-63.45) EW(414.07) TEMP(113.0)
#32 MD(3542.00) Inc(11.1) Azm(105.1) TVD(3497.39)
VS(151.86) NS(-67.24) EW(430.49) TEMP(114.8)
#33 MD(3632.00) Inc(11.4) Azm(102.6) TVD(3585.66)
VS(159.38) NS(-71.44) EW(447.53) TEMP(114.8)
#34 MD(3722.00) Inc(11.9) Azm(101.4) TVD(3673.81)
VS(166.62) NS(-75.21) EW(465.31) TEMP(116.6)
#35 MD(3812.00) Inc(10.2) Azm(103.4) TVD(3762.14)
VS(173.60) NS(-78.89) EW(482.16) TEMP(118.4)
#36 MD(3902.00) Inc(10.2) Azm(105.3) TVD(3850.72)
VS(180.55) NS(-82.84) EW(497.60) TEMP(118.4)
#37 MD(3992.00) Inc(10.9) Azm(102.3) TVD(3939.20)
VS(187.58) NS(-86.76) EW(513.60) TEMP(118.4)
#38 MD(4082.00) Inc(10.9) Azm(100.7) TVD(4027.57)
VS(194.24) NS(-90.15) EW(530.27) TEMP(120.2)
#39 MD(4171.00) Inc(10.4) Azm(100.6) TVD(4115.04)
VS(200.44) NS(-93.19) EW(546.44) TEMP(120.2)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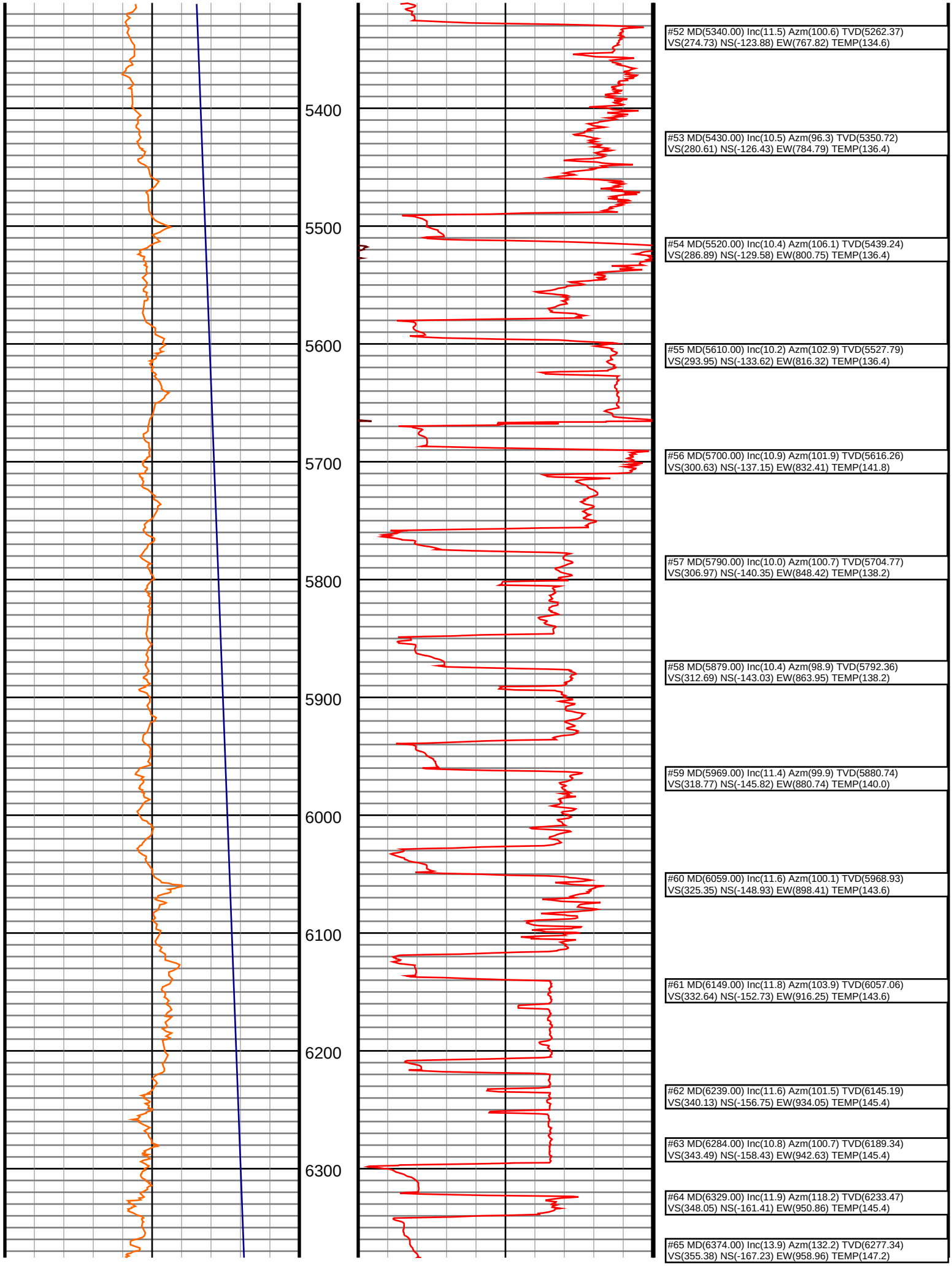
VS(205.68) NS(-95.13) EW(563.15) TEMP(122.0)
#41 MD(4351.00) Inc(11.8) Azm(96.6) TVD(4291.64)
VS(210.72) NS(-96.63) EW(581.03) TEMP(122.0)
#42 MD(4441.00) Inc(11.3) Azm(93.2) TVD(4379.82)
VS(215.82) NS(-98.18) EW(598.97) TEMP(123.8)
#43 MD(4531.00) Inc(11.8) Azm(98.0) TVD(4468.00)
VS(221.14) NS(-99.95) EW(616.89) TEMP(125.6)
#44 MD(4621.00) Inc(11.3) Azm(96.3) TVD(4556.18)
VS(226.91) NS(-102.20) EW(634.77) TEMP(127.4)
#45 MD(4711.00) Inc(10.9) Azm(93.1) TVD(4644.49)
VS(231.76) NS(-103.63) EW(652.03) TEMP(129.2)
#46 MD(4801.00) Inc(10.9) Azm(97.0) TVD(4732.87)
VS(236.61) NS(-105.12) EW(668.97) TEMP(129.2)
#47 MD(4891.00) Inc(11.3) Azm(102.1) TVD(4821.19)
VS(242.84) NS(-108.01) EW(686.04) TEMP(129.2)
#48 MD(4981.00) Inc(10.8) Azm(101.0) TVD(4909.52)
VS(249.60) NS(-111.47) EW(702.94) TEMP(131.0)
#49 MD(5070.00) Inc(9.8) Azm(96.9) TVD(4997.09)
VS(255.19) NS(-113.97) EW(718.64) TEMP(132.8)
#50 MD(5160.00) Inc(10.6) Azm(103.8) TVD(5085.67)
VS(261.15) NS(-116.86) EW(734.29) TEMP(134.6)
#51 MD(5250.00) Inc(10.9) Azm(101.5) TVD(5174.09)
VS(268.02) NS(-120.53) EW(750.66) TEMP(134.6)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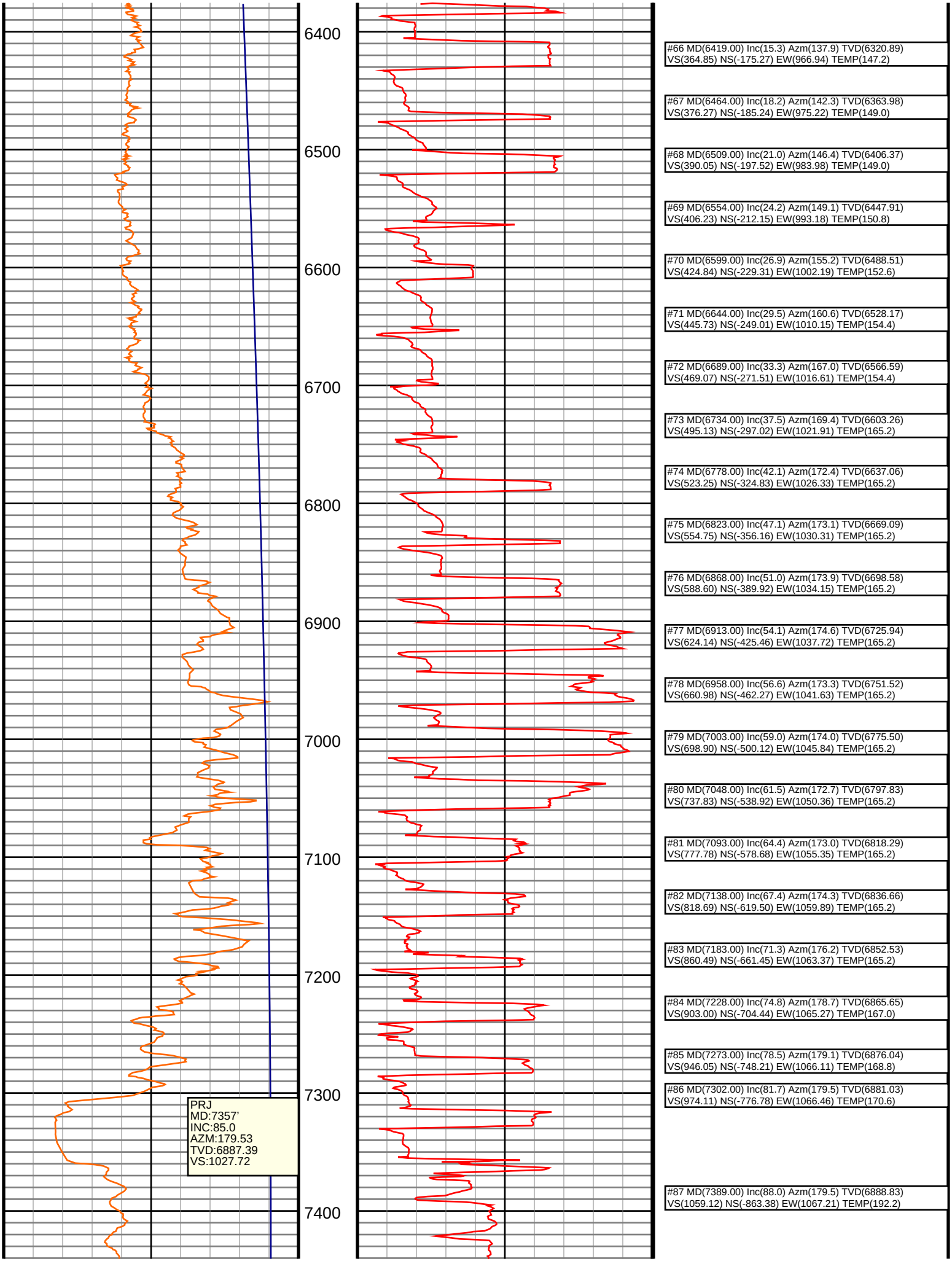
#53 MD(5430.00) Inc(10.5) Azm(96.3) TVD(5350.72) VS(280.61) NS(-126.43) EW(784.79) TEMP(136.4)
#54 MD(5520.00) Inc(10.4) Azm(106.1) TVD(5439.24) VS(286.89) NS(-129.58) EW(800.75) TEMP(136.4)
#55 MD(5610.00) Inc(10.2) Azm(102.9) TVD(5527.79) VS(293.95) NS(-133.62) EW(816.32) TEMP(136.4)
#56 MD(5700.00) Inc(10.9) Azm(101.9) TVD(5616.26) VS(300.63) NS(-137.15) EW(832.41) TEMP(141.8)
#57 MD(5790.00) Inc(10.0) Azm(100.7) TVD(5704.77) VS(306.97) NS(-140.35) EW(848.42) TEMP(138.2)
#58 MD(5879.00) Inc(10.4) Azm(98.9) TVD(5792.36) VS(312.69) NS(-143.03) EW(863.95) TEMP(138.2)
#59 MD(5969.00) Inc(11.4) Azm(99.9) TVD(5880.74) VS(318.77) NS(-145.82) EW(880.74) TEMP(140.0)
#60 MD(6059.00) Inc(11.6) Azm(100.1) TVD(5968.93) VS(325.35) NS(-148.93) EW(898.41) TEMP(143.6)
#61 MD(6149.00) Inc(11.8) Azm(103.9) TVD(6057.06) VS(332.64) NS(-152.73) EW(916.25) TEMP(143.6)
#62 MD(6239.00) Inc(11.6) Azm(101.5) TVD(6145.19) VS(340.13) NS(-156.75) EW(934.05) TEMP(145.4)
#63 MD(6284.00) Inc(10.8) Azm(100.7) TVD(6189.34) VS(343.49) NS(-158.43) EW(942.63) TEMP(145.4)
#64 MD(6329.00) Inc(11.9) Azm(118.2) TVD(6233.47) VS(348.05) NS(-161.41) EW(950.86) TEMP(145.4)
#65 MD(6374.00) Inc(13.9) Azm(132.2) TVD(6277.34) VS(355.38) NS(-167.23) EW(958.96) TEMP(147.2)



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#67 MD(6464.00) Inc(18.2) Azm(142.3) TVD(6363.98) VS(376.27) NS(-185.24) EW(975.22) TEMP(149.0)

#68 MD(6509.00) Inc(21.0) Azm(146.4) TVD(6406.37) VS(390.05) NS(-197.52) EW(983.98) TEMP(149.0)

#69 MD(6554.00) Inc(24.2) Azm(149.1) TVD(6447.91) VS(406.23) NS(-212.15) EW(993.18) TEMP(150.8)

#70 MD(6599.00) Inc(26.9) Azm(155.2) TVD(6488.51) VS(424.84) NS(-229.31) EW(1002.19) TEMP(152.6)

#71 MD(6644.00) Inc(29.5) Azm(160.6) TVD(6528.17) VS(445.73) NS(-249.01) EW(1010.15) TEMP(154.4)

#72 MD(6689.00) Inc(33.3) Azm(167.0) TVD(6566.59) VS(469.07) NS(-271.51) EW(1016.61) TEMP(154.4)

#73 MD(6734.00) Inc(37.5) Azm(169.4) TVD(6603.26) VS(495.13) NS(-297.02) EW(1021.91) TEMP(165.2)

#74 MD(6778.00) Inc(42.1) Azm(172.4) TVD(6637.06) VS(523.25) NS(-324.83) EW(1026.33) TEMP(165.2)

#75 MD(6823.00) Inc(47.1) Azm(173.1) TVD(6669.09) VS(554.75) NS(-356.16) EW(1030.31) TEMP(165.2)

#76 MD(6868.00) Inc(51.0) Azm(173.9) TVD(6698.58) VS(588.60) NS(-389.92) EW(1034.15) TEMP(165.2)

#77 MD(6913.00) Inc(54.1) Azm(174.6) TVD(6725.94) VS(624.14) NS(-425.46) EW(1037.72) TEMP(165.2)

#78 MD(6958.00) Inc(56.6) Azm(173.3) TVD(6751.52) VS(660.98) NS(-462.27) EW(1041.63) TEMP(165.2)

#79 MD(7003.00) Inc(59.0) Azm(174.0) TVD(6775.50) VS(698.90) NS(-500.12) EW(1045.84) TEMP(165.2)

#80 MD(7048.00) Inc(61.5) Azm(172.7) TVD(6797.83) VS(737.83) NS(-538.92) EW(1050.36) TEMP(165.2)

#81 MD(7093.00) Inc(64.4) Azm(173.0) TVD(6818.29) VS(777.78) NS(-578.68) EW(1055.35) TEMP(165.2)

#82 MD(7138.00) Inc(67.4) Azm(174.3) TVD(6836.66) VS(818.69) NS(-619.50) EW(1059.89) TEMP(165.2)

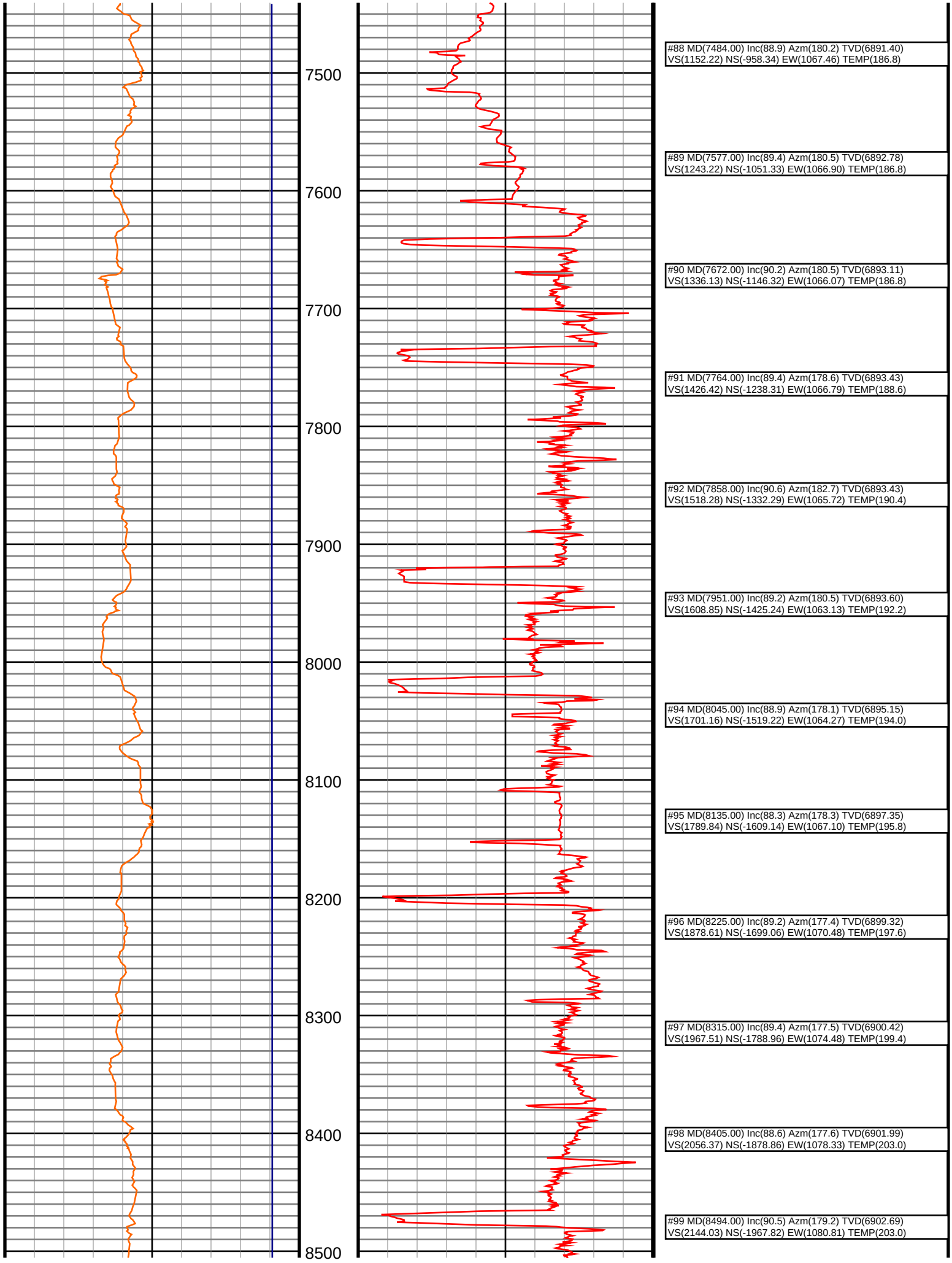
#83 MD(7183.00) Inc(71.3) Azm(176.2) TVD(6852.53) VS(860.49) NS(-661.45) EW(1063.37) TEMP(165.2)

#84 MD(7228.00) Inc(74.8) Azm(178.7) TVD(6865.65) VS(903.00) NS(-704.44) EW(1065.27) TEMP(167.0)

#85 MD(7273.00) Inc(78.5) Azm(179.1) TVD(6876.04) VS(946.05) NS(-748.21) EW(1066.11) TEMP(168.8)

#86 MD(7302.00) Inc(81.7) Azm(179.5) TVD(6881.03) VS(974.11) NS(-776.78) EW(1066.46) TEMP(170.6)

#87 MD(7389.00) Inc(88.0) Azm(179.5) TVD(6888.83) VS(1059.12) NS(-863.38) EW(1067.21) TEMP(192.2)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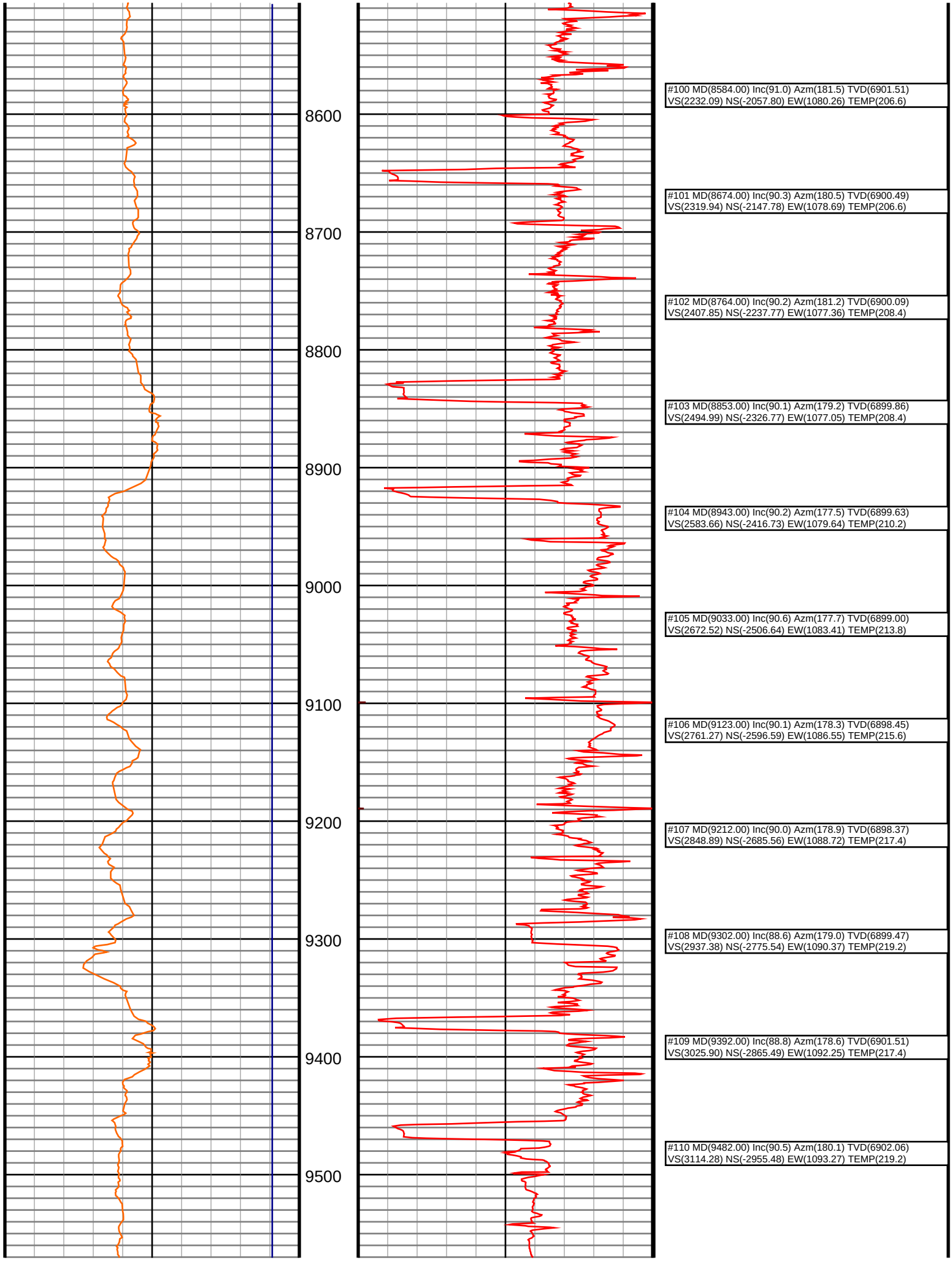
VS(1152.22) NS(-958.34) EW(1067.46) TEMP(186.8)
#89 MD(7577.00) Inc(89.4) Azm(180.5) TVD(6892.78)
VS(1243.22) NS(-1051.33) EW(1066.90) TEMP(186.8)
#90 MD(7672.00) Inc(90.2) Azm(180.5) TVD(6893.11)
VS(1336.13) NS(-1146.32) EW(1066.07) TEMP(186.8)
#91 MD(7764.00) Inc(89.4) Azm(178.6) TVD(6893.43)
VS(1426.42) NS(-1238.31) EW(1066.79) TEMP(188.6)
#92 MD(7858.00) Inc(90.6) Azm(182.7) TVD(6893.43)
VS(1518.28) NS(-1332.29) EW(1065.72) TEMP(190.4)
#93 MD(7951.00) Inc(89.2) Azm(180.5) TVD(6893.60)
VS(1608.85) NS(-1425.24) EW(1063.13) TEMP(192.2)
#94 MD(8045.00) Inc(88.9) Azm(178.1) TVD(6895.15)
VS(1701.16) NS(-1519.22) EW(1064.27) TEMP(194.0)
#95 MD(8135.00) Inc(88.3) Azm(178.3) TVD(6897.35)
VS(1789.84) NS(-1609.14) EW(1067.10) TEMP(195.8)
#96 MD(8225.00) Inc(89.2) Azm(177.4) TVD(6899.32)
VS(1878.61) NS(-1699.06) EW(1070.48) TEMP(197.6)
#97 MD(8315.00) Inc(89.4) Azm(177.5) TVD(6900.42)
VS(1967.51) NS(-1788.96) EW(1074.48) TEMP(199.4)
#98 MD(8405.00) Inc(88.6) Azm(177.6) TVD(6901.99)
VS(2056.37) NS(-1878.86) EW(1078.33) TEMP(203.0)
#99 MD(8494.00) Inc(90.5) Azm(179.2) TVD(6902.69)
VS(2144.03) NS(-1967.82) EW(1080.81) TEMP(203.0)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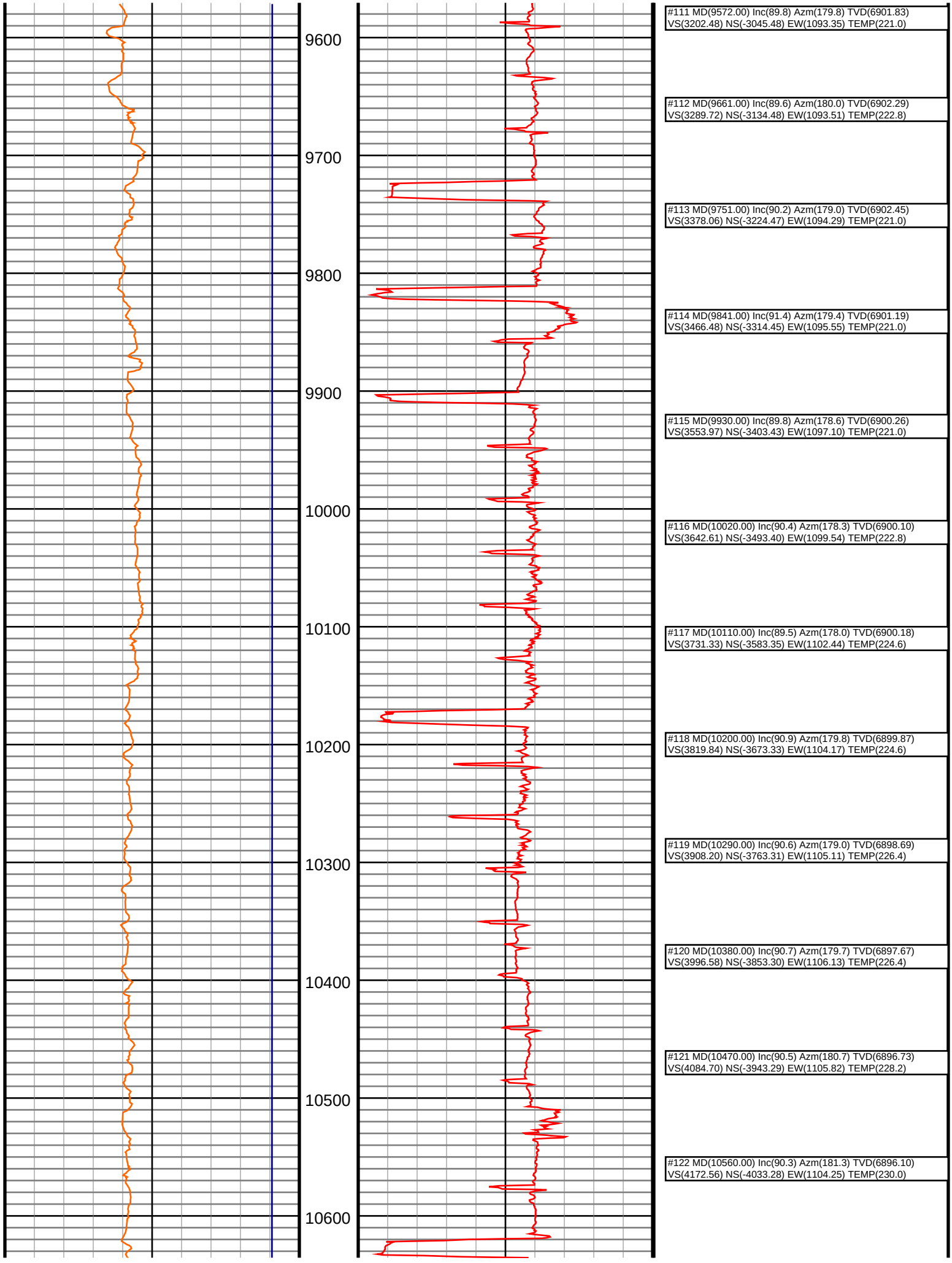
#100 MD(8584.00) Inc(91.0) Azm(181.5) TVD(6901.51)
VS(2232.09) NS(-2057.80) EW(1080.26) TEMP(206.6)
#101 MD(8674.00) Inc(90.3) Azm(180.5) TVD(6900.49)
VS(2319.94) NS(-2147.78) EW(1078.69) TEMP(206.6)
#102 MD(8764.00) Inc(90.2) Azm(181.2) TVD(6900.09)
VS(2407.85) NS(-2237.77) EW(1077.36) TEMP(208.4)
#103 MD(8853.00) Inc(90.1) Azm(179.2) TVD(6899.86)
VS(2494.99) NS(-2326.77) EW(1077.05) TEMP(208.4)
#104 MD(8943.00) Inc(90.2) Azm(177.5) TVD(6899.63)
VS(2583.66) NS(-2416.73) EW(1079.64) TEMP(210.2)
#105 MD(9033.00) Inc(90.6) Azm(177.7) TVD(6899.00)
VS(2672.52) NS(-2506.64) EW(1083.41) TEMP(213.8)
#106 MD(9123.00) Inc(90.1) Azm(178.3) TVD(6898.45)
VS(2761.27) NS(-2596.59) EW(1086.55) TEMP(215.6)
#107 MD(9212.00) Inc(90.0) Azm(178.9) TVD(6898.37)
VS(2848.89) NS(-2685.56) EW(1088.72) TEMP(217.4)
#108 MD(9302.00) Inc(88.6) Azm(179.0) TVD(6899.47)
VS(2937.38) NS(-2775.54) EW(1090.37) TEMP(219.2)
#109 MD(9392.00) Inc(88.8) Azm(178.6) TVD(6901.51)
VS(3025.90) NS(-2865.49) EW(1092.25) TEMP(217.4)
#110 MD(9482.00) Inc(90.5) Azm(180.1) TVD(6902.06)
VS(3114.28) NS(-2955.48) EW(1093.27) TEMP(219.2)


9600
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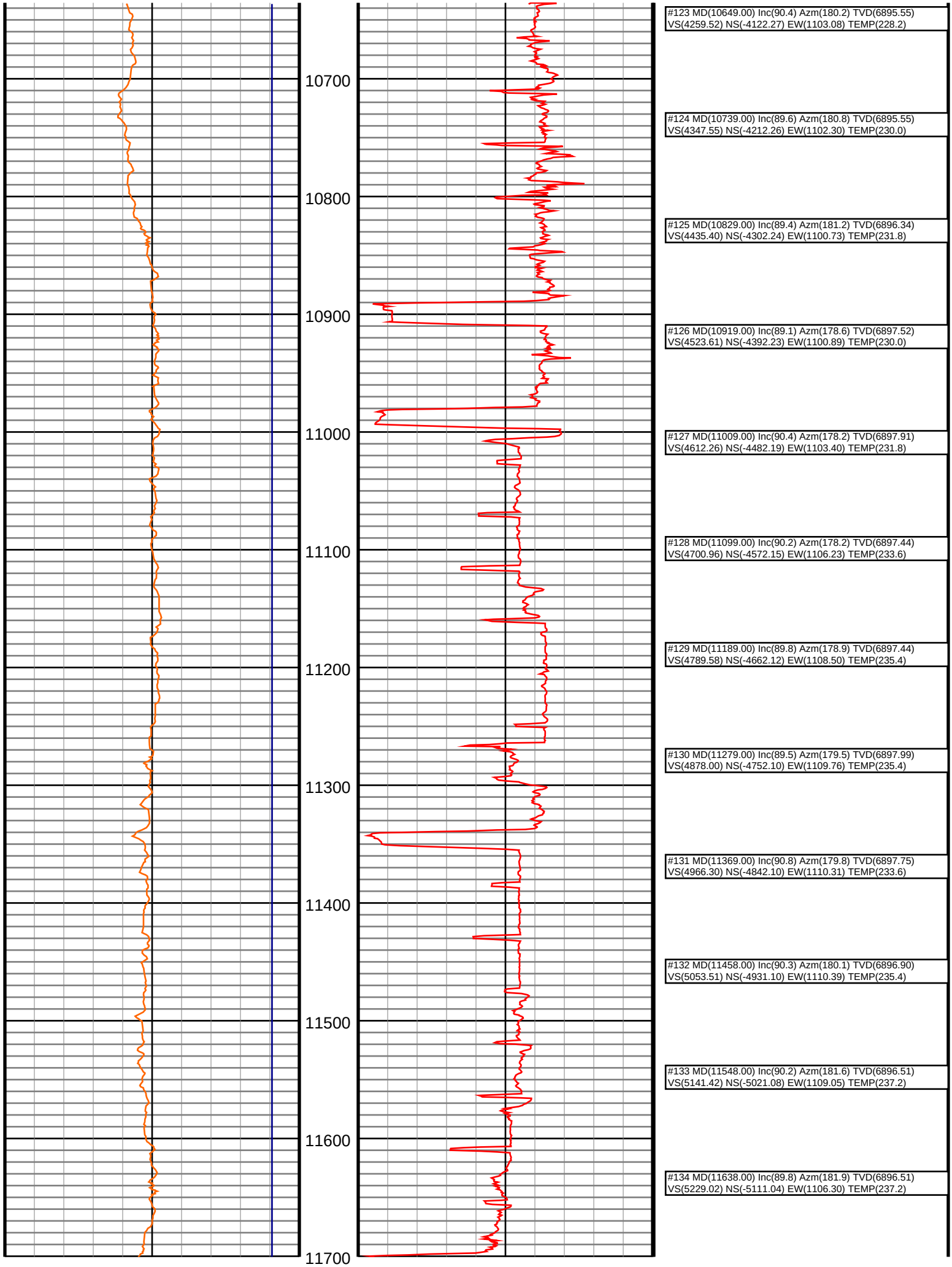
10300
10400
10500
10600
#111 MD(9572.00) Inc(89.8) Azm(179.8) TVD(6901.83)
VS(3202.48) NS(-3045.48) EW(1093.35) TEMP(221.0)
#112 MD(9661.00) Inc(89.6) Azm(180.0) TVD(6902.29)
VS(3289.72) NS(-3134.48) EW(1093.51) TEMP(222.8)
#113 MD(9751.00) Inc(90.2) Azm(179.0) TVD(6902.45)
VS(3378.06) NS(-3224.47) EW(1094.29) TEMP(221.0)
#114 MD(9841.00) Inc(91.4) Azm(179.4) TVD(6901.19)
VS(3466.48) NS(-3314.45) EW(1095.55) TEMP(221.0)
#115 MD(9930.00) Inc(89.8) Azm(178.6) TVD(6900.26)
VS(3553.97) NS(-3403.43) EW(1097.10) TEMP(221.0)
#116 MD(10020.00) Inc(90.4) Azm(178.3) TVD(6900.10)
VS(3642.61) NS(-3493.40) EW(1099.54) TEMP(222.8)
#117 MD(10110.00) Inc(89.5) Azm(178.0) TVD(6900.18)
VS(3731.33) NS(-3583.35) EW(1102.44) TEMP(224.6)
#118 MD(10200.00) Inc(90.9) Azm(179.8) TVD(6899.87)
VS(3819.84) NS(-3673.33) EW(1104.17) TEMP(224.6)
#119 MD(10290.00) Inc(90.6) Azm(179.0) TVD(6898.69)
VS(3908.20) NS(-3763.31) EW(1105.11) TEMP(226.4)
#120 MD(10380.00) Inc(90.7) Azm(179.7) TVD(6897.67)
VS(3996.58) NS(-3853.30) EW(1106.13) TEMP(226.4)
#121 MD(10470.00) Inc(90.5) Azm(180.7) TVD(6896.73)
VS(4084.70) NS(-3943.29) EW(1105.82) TEMP(228.2)
#122 MD(10560.00) Inc(90.3) Azm(181.3) TVD(6896.10)
VS(4172.56) NS(-4033.28) EW(1104.25) TEMP(230.0)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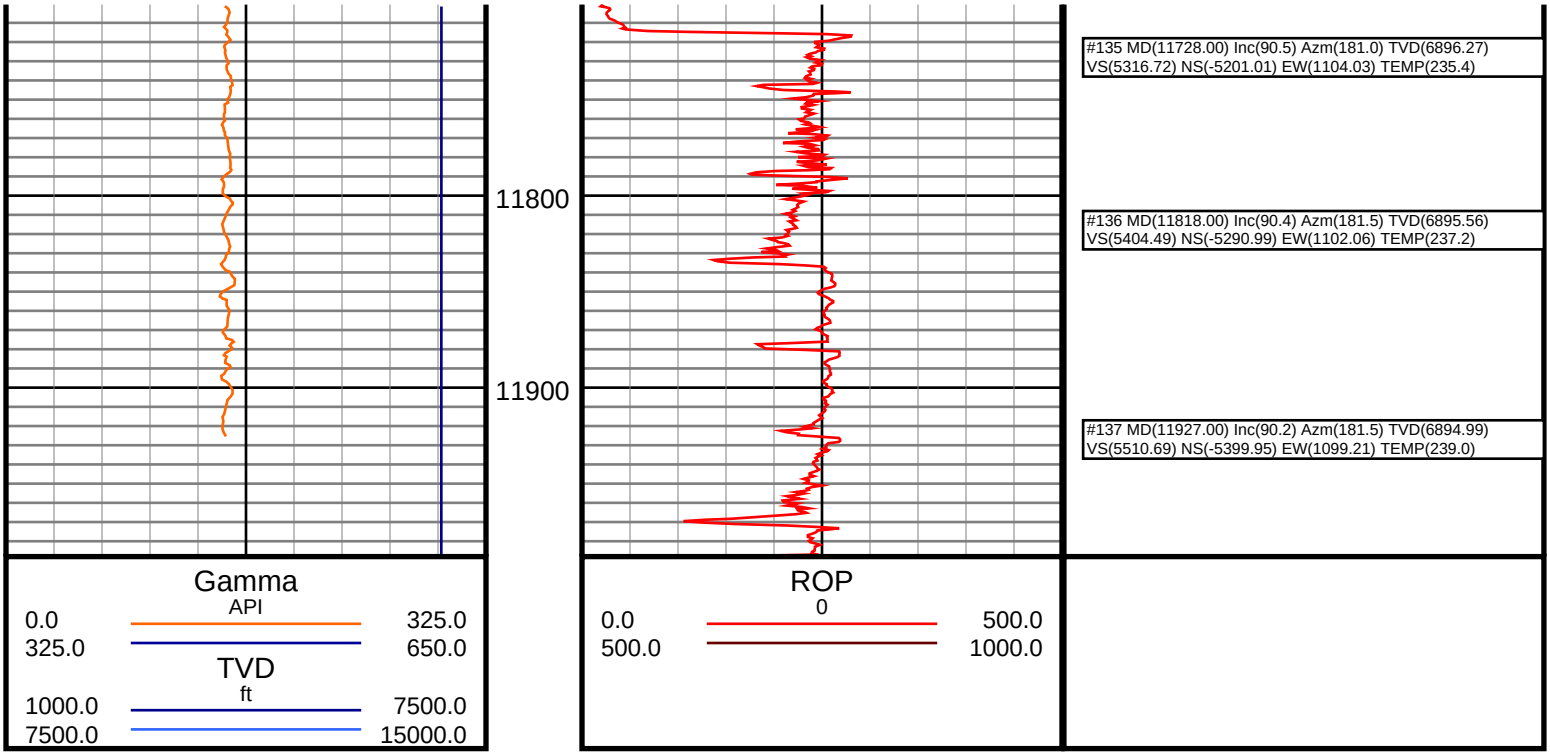
#123 MD(10649.00) Inc(90.4) Azm(180.2) TVD(6895.55) VS(4259.52) NS(-4122.27) EW(1103.08) TEMP(228.2)
#124 MD(10739.00) Inc(89.6) Azm(180.8) TVD(6895.55) VS(4347.55) NS(-4212.26) EW(1102.30) TEMP(230.0)
#125 MD(10829.00) Inc(89.4) Azm(181.2) TVD(6896.34) VS(4435.40) NS(-4302.24) EW(1100.73) TEMP(231.8)
#126 MD(10919.00) Inc(89.1) Azm(178.6) TVD(6897.52) VS(4523.61) NS(-4392.23) EW(1100.89) TEMP(230.0)
#127 MD(11009.00) Inc(90.4) Azm(178.2) TVD(6897.91) VS(4612.26) NS(-4482.19) EW(1103.40) TEMP(231.8)
#128 MD(11099.00) Inc(90.2) Azm(178.2) TVD(6897.44) VS(4700.96) NS(-4572.15) EW(1106.23) TEMP(233.6)
#129 MD(11189.00) Inc(89.8) Azm(178.9) TVD(6897.44) VS(4789.58) NS(-4662.12) EW(1108.50) TEMP(235.4)
#130 MD(11279.00) Inc(89.5) Azm(179.5) TVD(6897.99) VS(4878.00) NS(-4752.10) EW(1109.76) TEMP(235.4)
#131 MD(11369.00) Inc(90.8) Azm(179.8) TVD(6897.75) VS(4966.30) NS(-4842.10) EW(1110.31) TEMP(233.6)
#132 MD(11458.00) Inc(90.3) Azm(180.1) TVD(6896.90) VS(5053.51) NS(-4931.10) EW(1110.39) TEMP(235.4)
#133 MD(11548.00) Inc(90.2) Azm(181.6) TVD(6896.51) VS(5141.42) NS(-5021.08) EW(1109.05) TEMP(237.2)
#134 MD(11638.00) Inc(89.8) Azm(181.9) TVD(6896.51) VS(5229.02) NS(-5111.04) EW(1106.30) TEMP(237.2)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11900
#135 MD(11728.00) Inc(90.5) Azm(181.0) TVD(6896.27)
VS(5316.72) NS(-5201.01) EW(1104.03) TEMP(235.4)
#136 MD(11818.00) Inc(90.4) Azm(181.5) TVD(6895.56)
VS(5404.49) NS(-5290.99) EW(1102.06) TEMP(237.2)
#137 MD(11927.00) Inc(90.2) Azm(181.5) TVD(6894.99)
VS(5510.69) NS(-5399.95) EW(1099.21) TEMP(239.0)
Gamma
API
0.0
325.0
325.0
650.0
TVD
ft
1000.0
7500.0
7500.0
15000.0
ROP
0
0.0
500.0
500.0
1000.0