ENSIGN Directional Services

Mahalo State AA09-74-1BHNB

MD
2":100'

Company: Noble Energy
Well Name: Mahalo State AA09-74-1BHNB
API: 05-123-39014
Rig Id: Precision 829
State: Colorado
County/Parish: Weld
Country: USA
Survey Company: Ensign Directional
Job number: PD829-207-34
DD1 Zach Gentry
DD2 Colby Hansen
DD3 Tony Callow
MWD1 Andrew Demrow
MWD2 Collin McCloud

Log measurements: Gama, ROP
Depth measured from:
Maximum temperature:

	Depth	Date
Start:	846 ft	01-06-2015
End:	11824 ft	01-11-2015

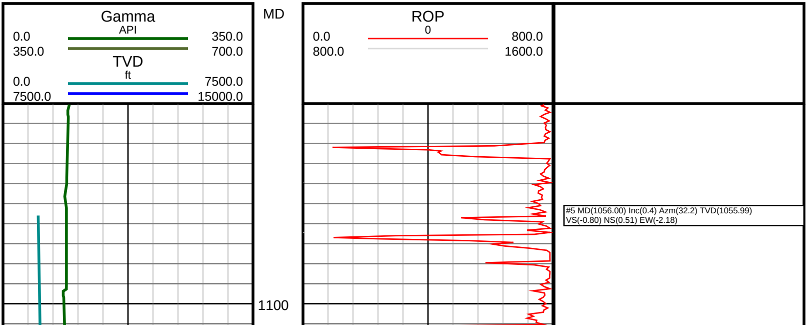
Casing	Depth	Size
Surface:	836	9 5/8
Intermediate:	7025	7

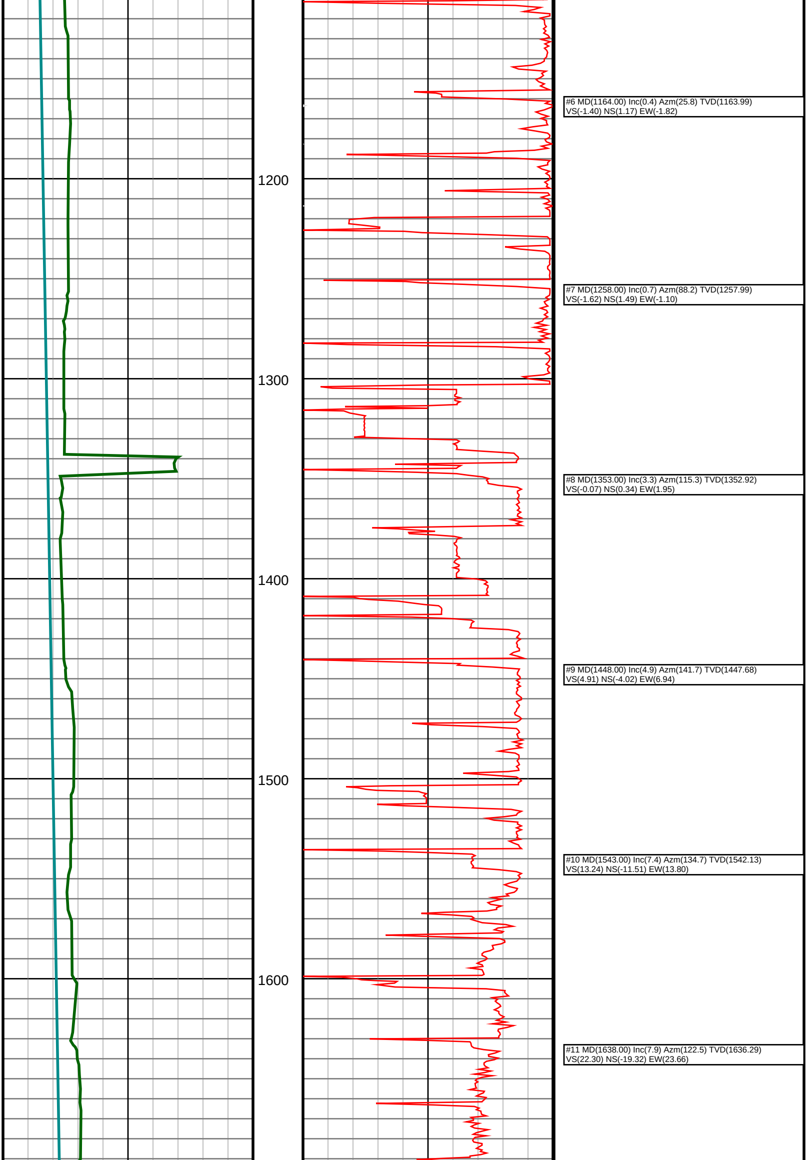
Mud Type:
Density:
Viscosity:
Rm:
Rmf:
Rmc:

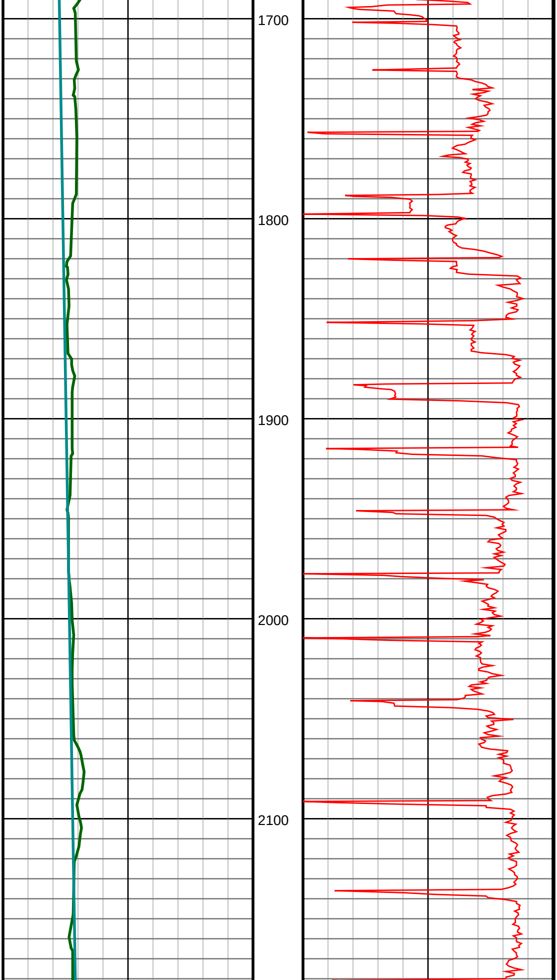
Elevations
KB: 16
GL: 4857
DF: 4873

		Offsets		Depths		Dates	
Run	Bit Size	Gamma	Survey	Start	End	Start	End
1	13.5			0	846	01-05-2015	01-06-2015
2	8.75	58.79	53.79	846	7035	01-06-2015	01-08-2015
3	6.125	65.25	60.25	7035	11824	01-09-2015	01-11-2015
4							
5							
6							
7							
8							
9							
10							

Ensign Directional uses its best efforts to provide its customers with accurate information and interpretations in conjunction with services performed but will not be held liable or responsible for the accuracy of such information or interpretation.







#12 MD(1733.00) Inc(9.5) Azm(118.8) TVD(1730.19)
VS(31.17) NS(-26.60) EW(36.04)

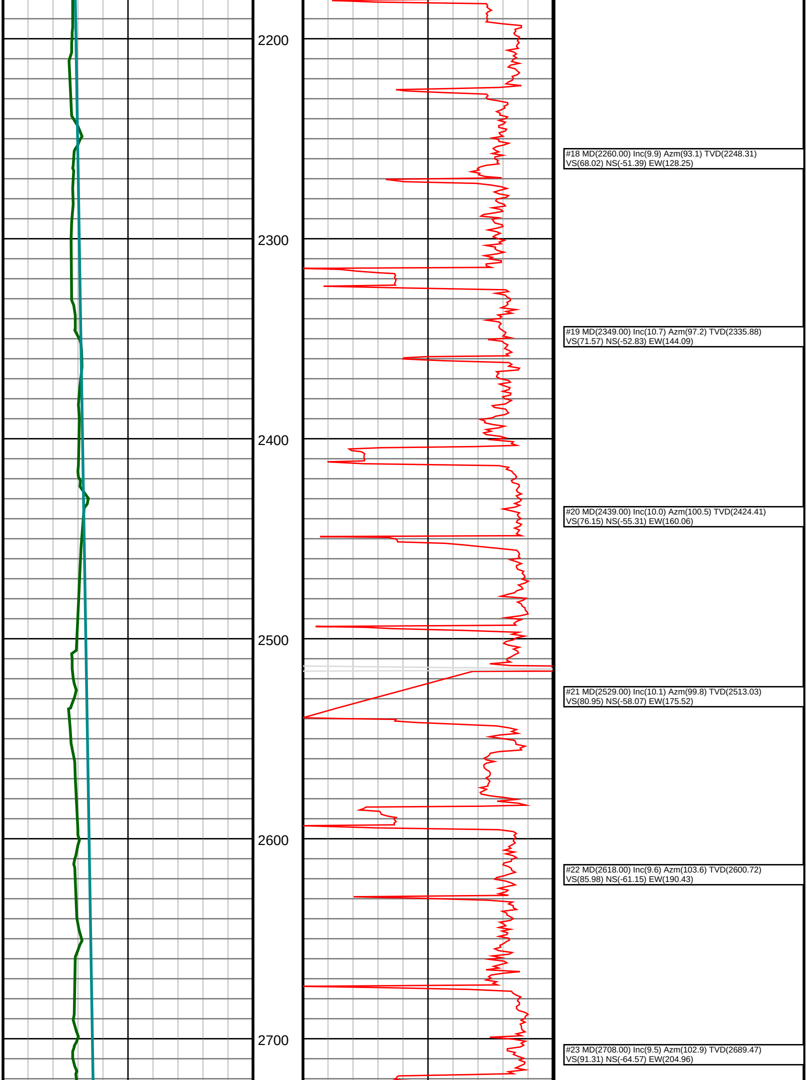
#13 MD(1828.00) Inc(11.1) Azm(113.6) TVD(1823.66)
VS(40.57) NS(-34.04) EW(51.29)

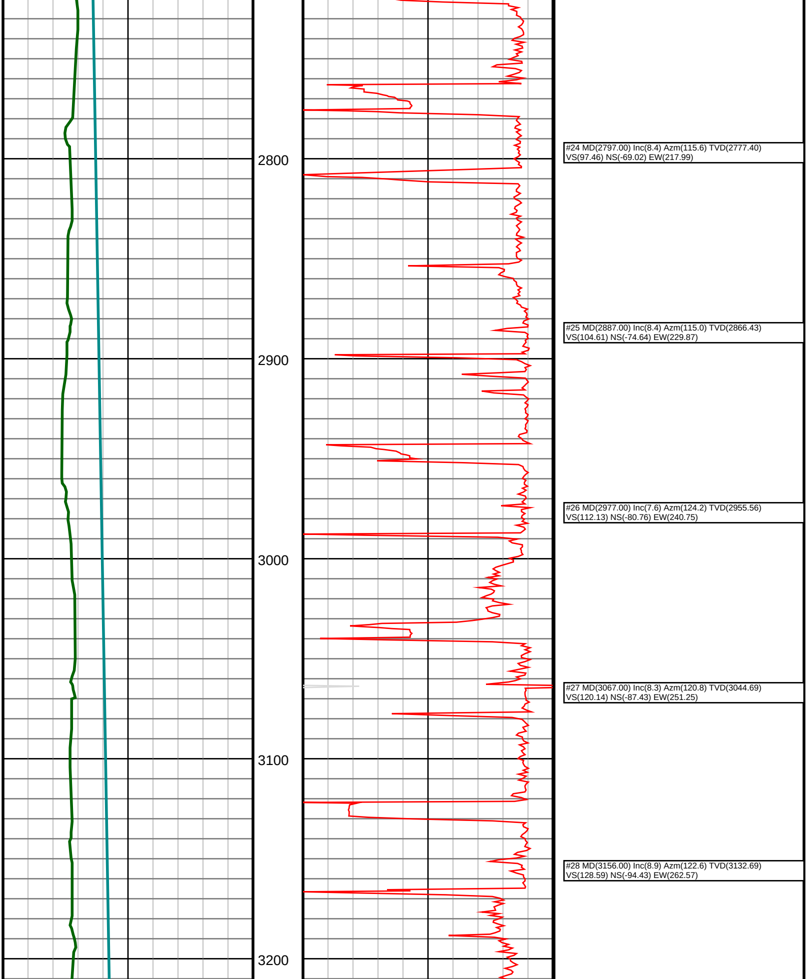
#14 MD(1923.00) Inc(11.2) Azm(106.2) TVD(1916.87)
VS(49.05) NS(-40.28) EW(68.53)

#15 MD(1991.00) Inc(11.0) Azm(106.4) TVD(1983.60)
VS(54.37) NS(-43.95) EW(81.09)

#16 MD(2081.00) Inc(10.3) Azm(99.9) TVD(2072.05)
VS(60.30) NS(-47.76) EW(97.26)

#17 MD(2170.00) Inc(10.0) Azm(96.8) TVD(2159.66)
VS(64.63) NS(-50.04) EW(112.77)





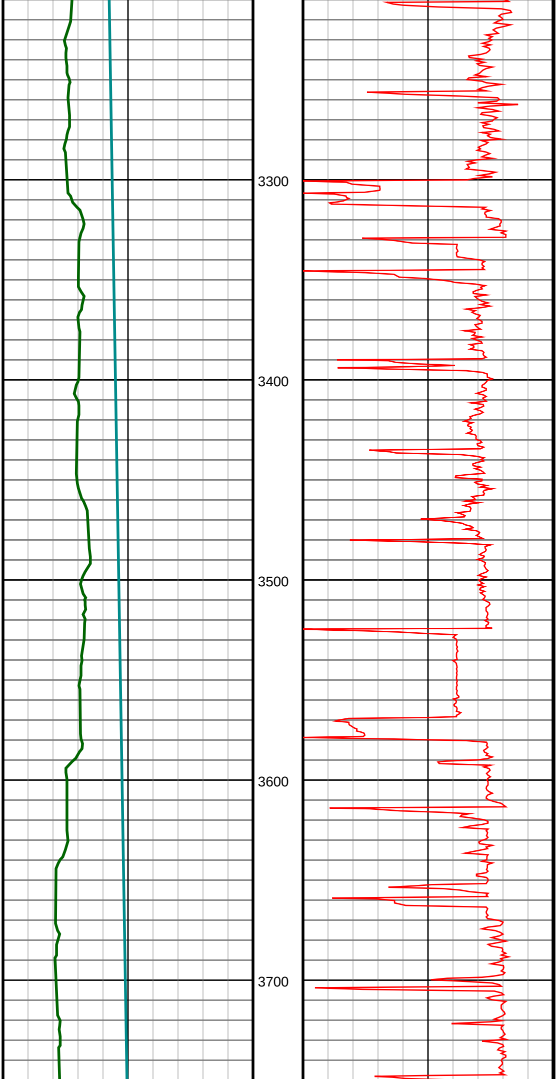
#24 MD(2797.00) Inc(8.4) Azm(115.6) TVD(2777.40)
VS(97.46) NS(-69.02) EW(217.99)

#25 MD(2887.00) Inc(8.4) Azm(115.0) TVD(2866.43)
VS(104.61) NS(-74.64) EW(229.87)

#26 MD(2977.00) Inc(7.6) Azm(124.2) TVD(2955.56)
VS(112.13) NS(-80.76) EW(240.75)

#27 MD(3067.00) Inc(8.3) Azm(120.8) TVD(3044.69)
VS(120.14) NS(-87.43) EW(251.25)

#28 MD(3156.00) Inc(8.9) Azm(122.6) TVD(3132.69)
VS(128.59) NS(-94.43) EW(262.57)



#29 MD(3246.00) Inc(8.7) Azm(120.9) TVD(3221.63)
VS(137.33) NS(-101.68) EW(274.28)

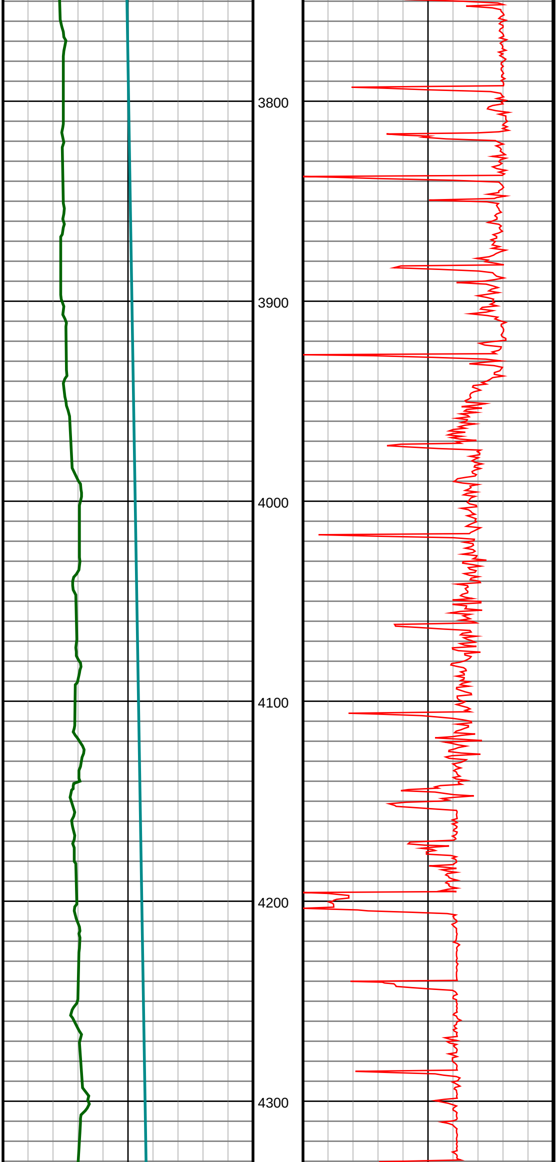
#30 MD(3335.00) Inc(8.8) Azm(116.2) TVD(3309.60)
VS(145.32) NS(-108.14) EW(286.16)

#31 MD(3425.00) Inc(8.6) Azm(114.1) TVD(3398.56)
VS(152.70) NS(-113.93) EW(298.48)

#32 MD(3515.00) Inc(8.4) Azm(112.2) TVD(3487.57)
VS(159.51) NS(-119.16) EW(310.71)

#33 MD(3604.00) Inc(9.5) Azm(106.6) TVD(3575.49)
VS(165.77) NS(-123.71) EW(323.77)

#34 MD(3694.00) Inc(9.8) Azm(105.6) TVD(3664.22)
VS(171.84) NS(-127.89) EW(338.26)



#35 MD(3783.00) Inc(9.5) Azm(105.7) TVD(3751.96)
VS(177.75) NS(-131.92) EW(352.63)

#36 MD(3873.00) Inc(9.4) Azm(105.2) TVD(3840.74)
VS(183.55) NS(-135.86) EW(366.87)

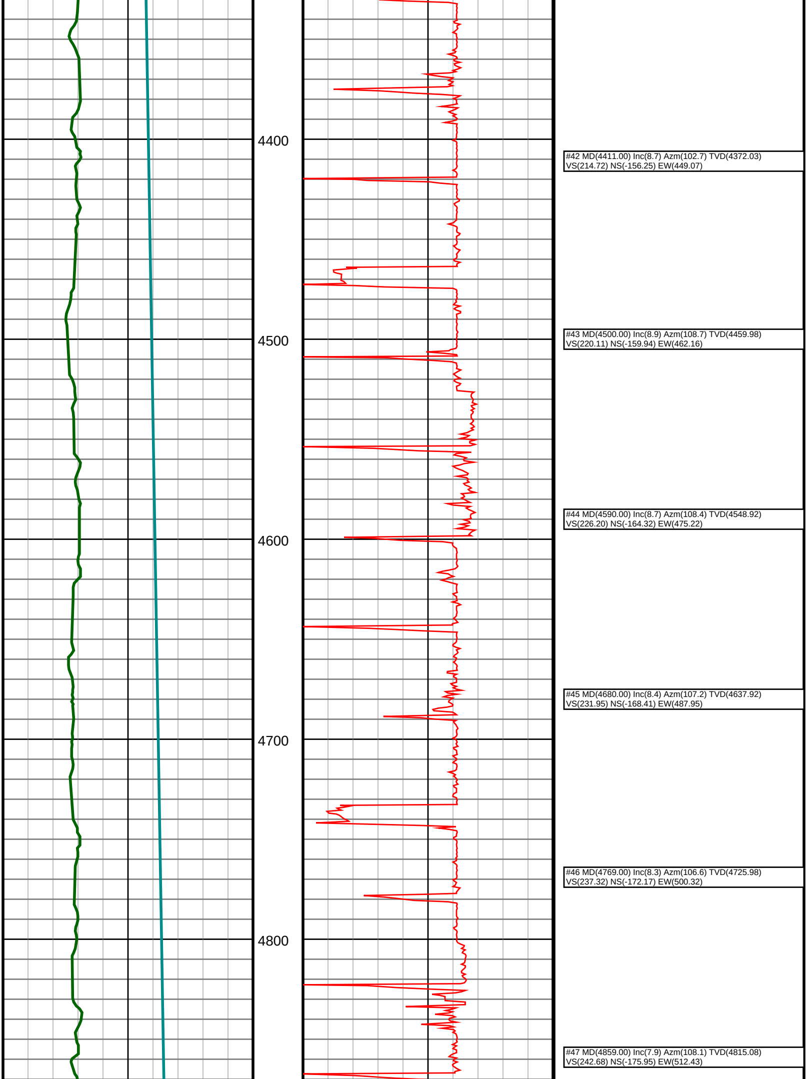
#37 MD(3963.00) Inc(9.2) Azm(104.3) TVD(3929.55)
VS(189.09) NS(-139.56) EW(380.94)

#38 MD(4052.00) Inc(9.0) Azm(103.2) TVD(4017.43)
VS(194.23) NS(-142.91) EW(394.61)

#39 MD(4142.00) Inc(9.1) Azm(103.4) TVD(4106.31)
VS(199.30) NS(-146.16) EW(408.39)

#40 MD(4231.00) Inc(9.1) Azm(104.5) TVD(4194.19)
VS(204.48) NS(-149.56) EW(422.05)

#41 MD(4321.00) Inc(8.9) Azm(104.2) TVD(4283.08)
VS(209.76) NS(-153.05) EW(435.69)



#42 MD(4411.00) Inc(8.7) Azm(102.7) TVD(4372.03)
VS(214.72) NS(-156.25) EW(449.07)

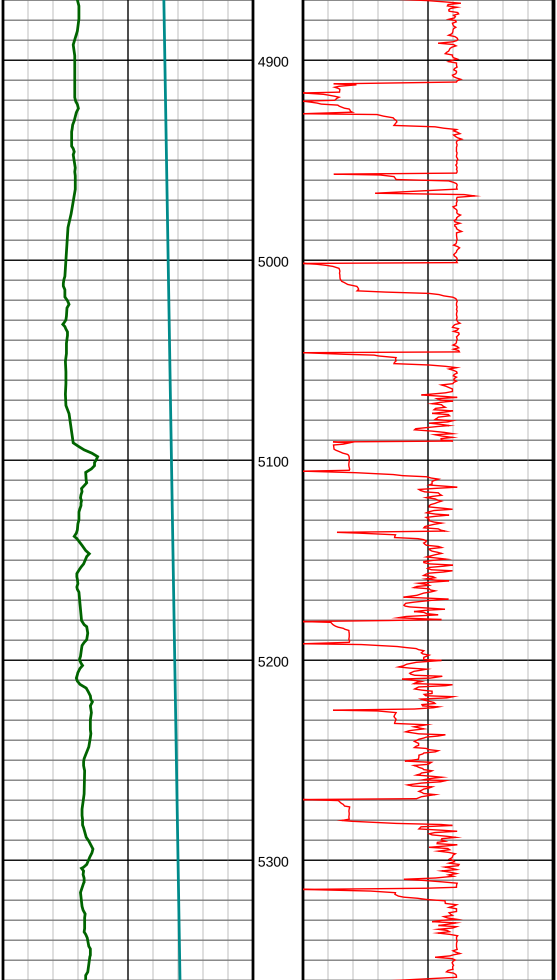
#43 MD(4500.00) Inc(8.9) Azm(108.7) TVD(4459.98)
VS(220.11) NS(-159.94) EW(462.16)

#44 MD(4590.00) Inc(8.7) Azm(108.4) TVD(4548.92)
VS(226.20) NS(-164.32) EW(475.22)

#45 MD(4680.00) Inc(8.4) Azm(107.2) TVD(4637.92)
VS(231.95) NS(-168.41) EW(487.95)

#46 MD(4769.00) Inc(8.3) Azm(106.6) TVD(4725.98)
VS(237.32) NS(-172.17) EW(500.32)

#47 MD(4859.00) Inc(7.9) Azm(108.1) TVD(4815.08)
VS(242.68) NS(-175.95) EW(512.43)



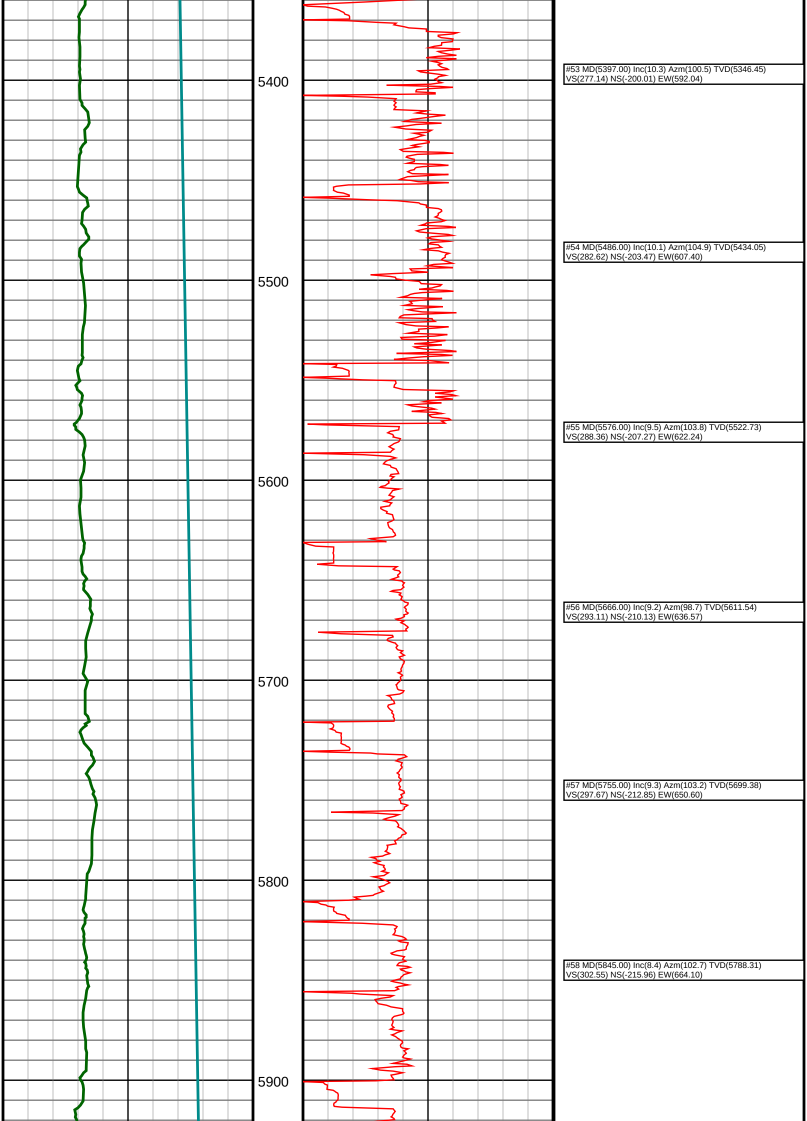
#48 MD(4949.00) Inc(7.9) Azm(116.5) TVD(4904.23)
VS(248.84) NS(-180.63) EW(523.84)

#49 MD(5038.00) Inc(8.2) Azm(116.8) TVD(4992.35)
VS(255.87) NS(-186.22) EW(534.98)

#50 MD(5128.00) Inc(9.2) Azm(108.5) TVD(5081.32)
VS(262.67) NS(-191.40) EW(547.53)

#51 MD(5217.00) Inc(9.2) Azm(99.1) TVD(5169.18)
VS(267.86) NS(-194.78) EW(561.30)

#52 MD(5307.00) Inc(10.2) Azm(99.5) TVD(5257.89)
VS(272.29) NS(-197.23) EW(576.27)



#53 MD(5397.00) Inc(10.3) Azm(100.5) TVD(5346.45)
VS(277.14) NS(-200.01) EW(592.04)

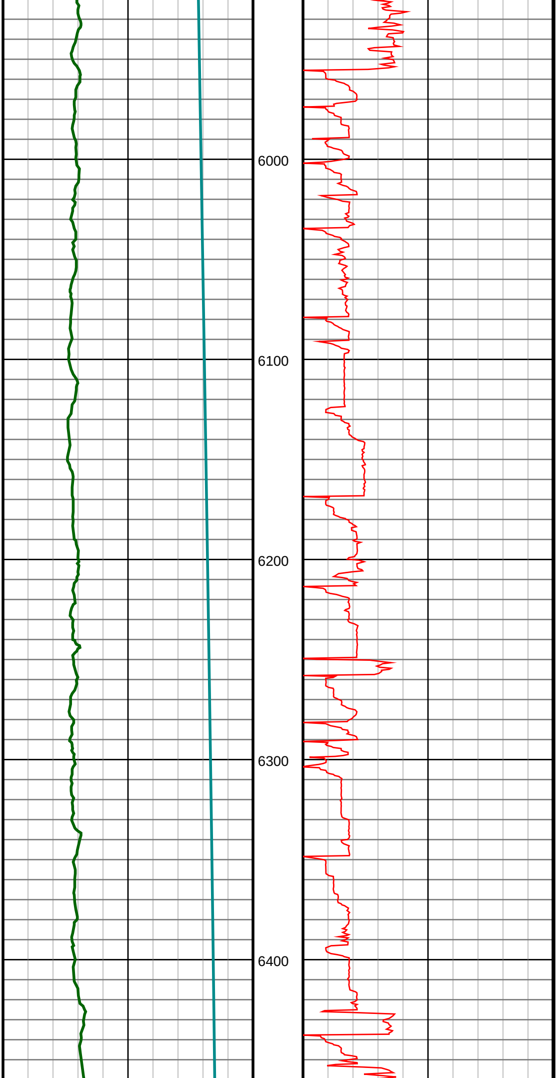
#54 MD(5486.00) Inc(10.1) Azm(104.9) TVD(5434.05)
VS(282.62) NS(-203.47) EW(607.40)

#55 MD(5576.00) Inc(9.5) Azm(103.8) TVD(5522.73)
VS(288.36) NS(-207.27) EW(622.24)

#56 MD(5666.00) Inc(9.2) Azm(98.7) TVD(5611.54)
VS(293.11) NS(-210.13) EW(636.57)

#57 MD(5755.00) Inc(9.3) Azm(103.2) TVD(5699.38)
VS(297.67) NS(-212.85) EW(650.60)

#58 MD(5845.00) Inc(8.4) Azm(102.7) TVD(5788.31)
VS(302.55) NS(-215.96) EW(664.10)



#59 MD(5934.00) Inc(8.6) Azm(106.3) TVD(5876.33)
VS(307.51) NS(-219.25) EW(676.82)

#60 MD(5979.00) Inc(7.3) Azm(116.8) TVD(5920.90)
VS(310.50) NS(-221.49) EW(682.61)

#61 MD(6024.00) Inc(7.8) Azm(137.5) TVD(5965.52)
VS(314.62) NS(-225.03) EW(687.22)

#62 MD(6068.00) Inc(10.7) Azm(151.8) TVD(6008.95)
VS(320.90) NS(-230.83) EW(691.17)

#63 MD(6113.00) Inc(14.4) Azm(159.3) TVD(6052.87)
VS(330.27) NS(-239.75) EW(695.12)

#64 MD(6158.00) Inc(19.3) Azm(159.9) TVD(6095.92)
VS(342.99) NS(-251.97) EW(699.66)

#65 MD(6203.00) Inc(22.9) Azm(162.4) TVD(6137.90)
VS(358.88) NS(-267.31) EW(704.87)

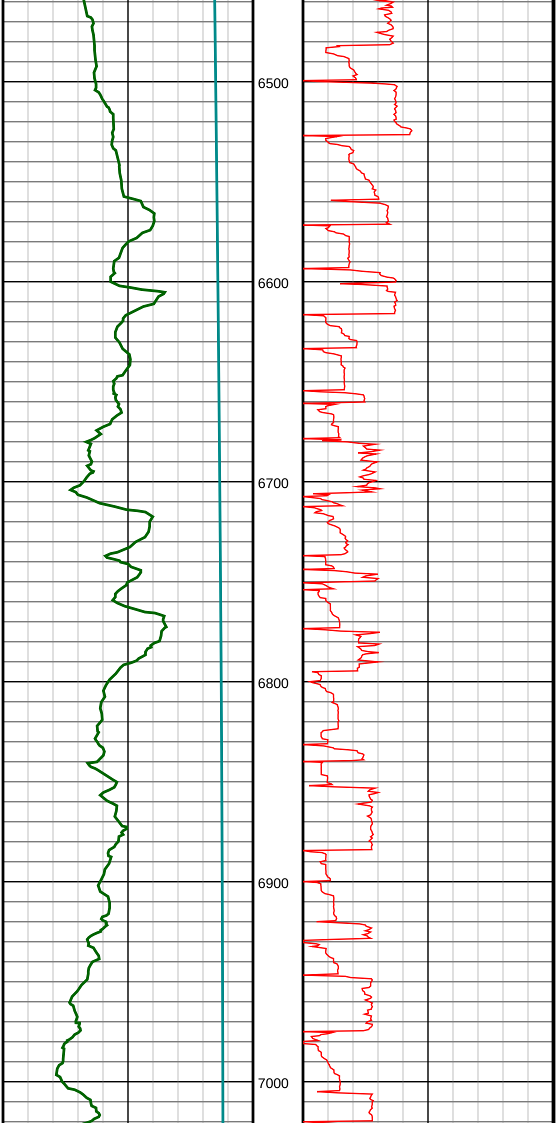
#66 MD(6248.00) Inc(25.5) Azm(165.4) TVD(6178.95)
VS(377.12) NS(-285.03) EW(709.96)

#67 MD(6293.00) Inc(28.1) Azm(168.2) TVD(6219.11)
VS(397.31) NS(-304.78) EW(714.57)

#68 MD(6338.00) Inc(32.7) Azm(167.7) TVD(6257.91)
VS(420.01) NS(-327.05) EW(719.32)

#69 MD(6382.00) Inc(38.1) Azm(168.7) TVD(6293.77)
VS(445.42) NS(-351.99) EW(724.52)

#70 MD(6427.00) Inc(43.0) Azm(168.6) TVD(6327.95)
VS(474.61) NS(-380.66) EW(730.28)



#71 MD(6472.00) Inc(44.7) Azm(167.5) TVD(6360.40)
VS(505.69) NS(-411.16) EW(736.74)

#72 MD(6517.00) Inc(46.5) Azm(169.1) TVD(6391.88)
VS(537.76) NS(-442.64) EW(743.25)

#73 MD(6562.00) Inc(49.5) Azm(172.8) TVD(6422.00)
VS(571.18) NS(-475.65) EW(748.48)

#74 MD(6606.00) Inc(52.0) Azm(174.8) TVD(6449.84)
VS(605.23) NS(-509.52) EW(752.15)

#75 MD(6651.00) Inc(56.4) Azm(176.8) TVD(6476.15)
VS(641.65) NS(-545.91) EW(754.80)

#76 MD(6696.00) Inc(59.2) Azm(177.6) TVD(6500.13)
VS(679.59) NS(-583.94) EW(756.66)

#77 MD(6741.00) Inc(62.3) Azm(176.8) TVD(6522.12)
VS(718.71) NS(-623.15) EW(758.58)

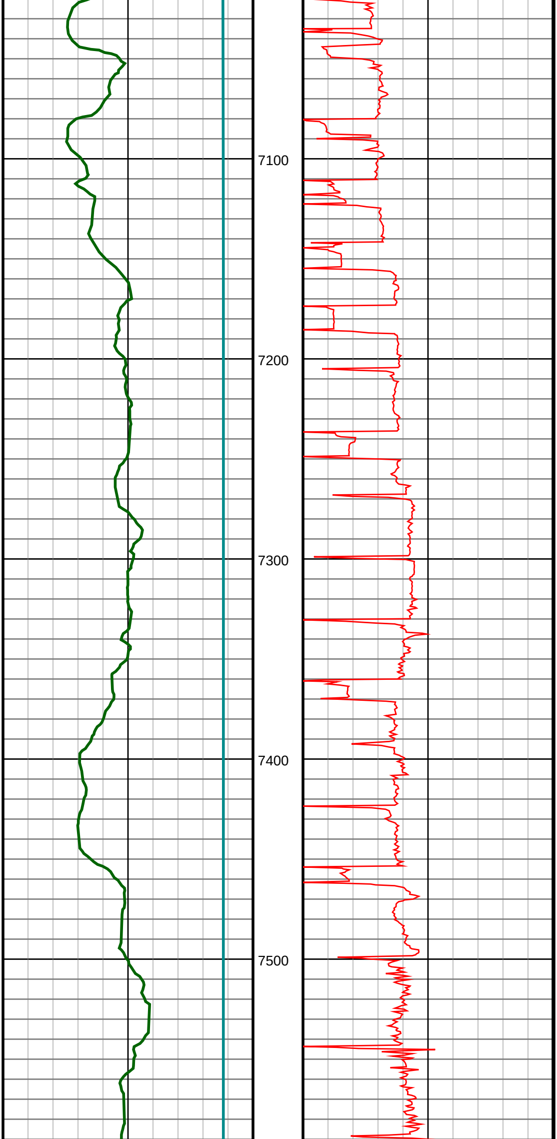
#78 MD(6786.00) Inc(66.9) Azm(176.6) TVD(6541.41)
VS(759.23) NS(-663.72) EW(760.92)

#79 MD(6830.00) Inc(71.4) Azm(176.0) TVD(6557.07)
VS(800.24) NS(-704.75) EW(763.58)

#80 MD(6875.00) Inc(74.1) Azm(176.5) TVD(6570.41)
VS(843.11) NS(-747.63) EW(766.39)

#81 MD(6920.00) Inc(77.4) Azm(176.9) TVD(6581.49)
VS(886.59) NS(-791.16) EW(768.90)

#82 MD(6980.00) Inc(81.4) Azm(178.2) TVD(6592.52)
VS(945.31) NS(-850.07) EW(771.41)



#83 MD(7081.00) Inc(84.2) Azm(179.9) TVD(6605.18)
VS(1044.81) NS(-950.25) EW(773.07)

#84 MD(7113.00) Inc(85.1) Azm(179.4) TVD(6608.17)
VS(1076.42) NS(-982.11) EW(773.26)

#85 MD(7143.00) Inc(86.4) Azm(180.9) TVD(6610.39)
VS(1106.05) NS(-1012.02) EW(773.19)

#86 MD(7175.00) Inc(88.2) Azm(181.5) TVD(6611.90)
VS(1137.64) NS(-1043.98) EW(772.52)

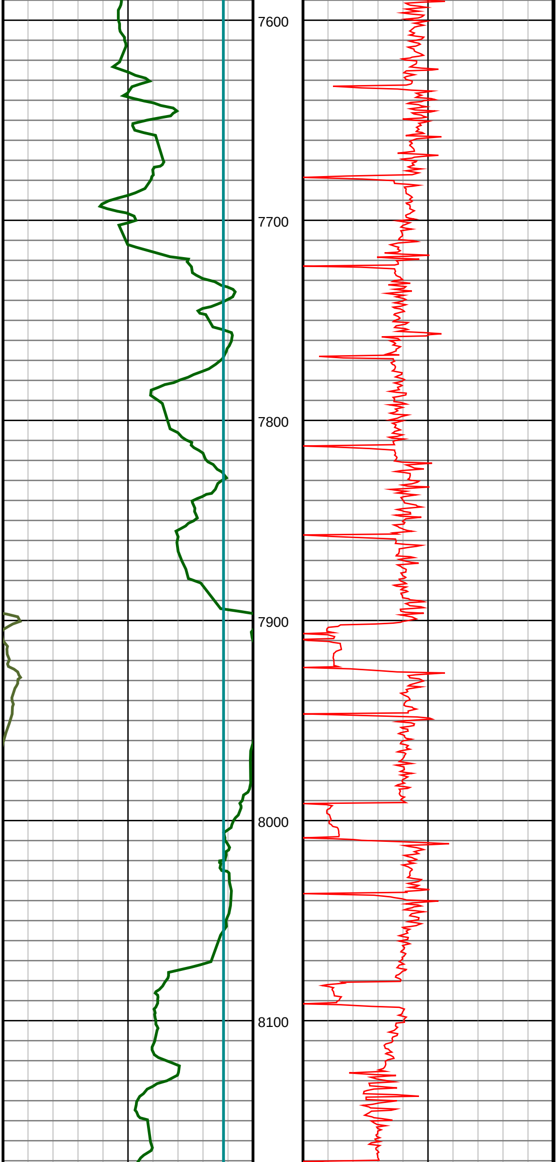
#87 MD(7206.00) Inc(89.8) Azm(181.8) TVD(6612.44)
VS(1168.22) NS(-1074.96) EW(771.62)

#88 MD(7299.00) Inc(89.9) Azm(180.8) TVD(6612.68)
VS(1260.09) NS(-1167.94) EW(769.51)

#89 MD(7391.00) Inc(91.1) Azm(179.0) TVD(6611.88)
VS(1351.28) NS(-1259.93) EW(769.67)

#90 MD(7481.00) Inc(90.4) Azm(178.5) TVD(6610.70)
VS(1440.71) NS(-1349.90) EW(771.64)

#91 MD(7571.00) Inc(89.8) Azm(178.2) TVD(6610.54)
VS(1530.21) NS(-1439.86) EW(774.23)



#92 MD(7660.00) Inc(89.8) Azm(177.9) TVD(6610.85)
VS(1618.77) NS(-1528.81) EW(777.26)

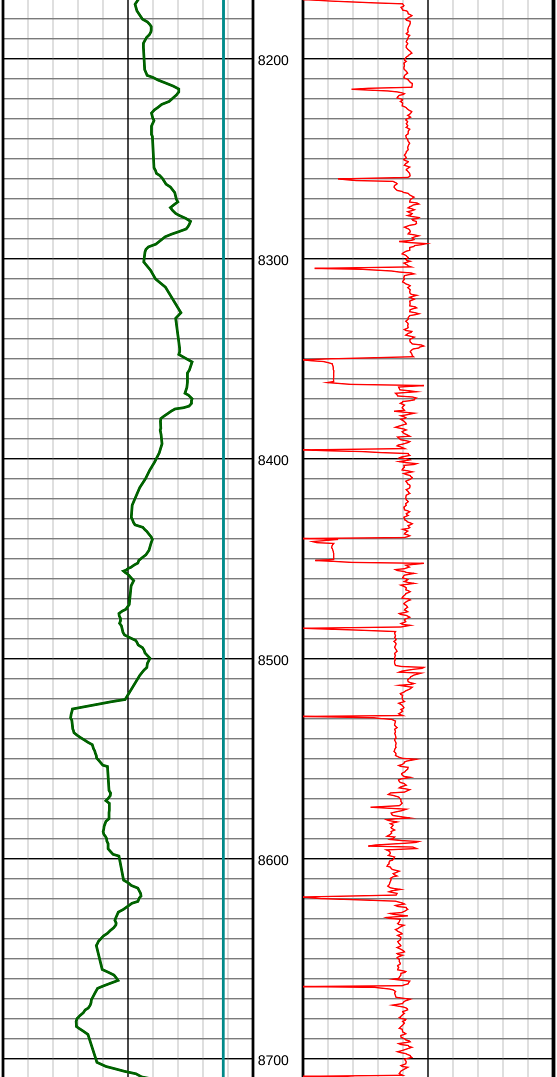
#93 MD(7750.00) Inc(88.7) Azm(177.7) TVD(6612.03)
VS(1708.35) NS(-1618.73) EW(780.71)

#94 MD(7840.00) Inc(87.9) Azm(176.7) TVD(6614.70)
VS(1797.99) NS(-1708.58) EW(785.11)

#95 MD(7929.00) Inc(89.4) Azm(178.4) TVD(6616.80)
VS(1886.59) NS(-1797.47) EW(788.91)

#96 MD(8019.00) Inc(90.7) Azm(180.2) TVD(6616.72)
VS(1975.92) NS(-1887.46) EW(790.01)

#97 MD(8109.00) Inc(90.6) Azm(181.2) TVD(6615.70)
VS(2064.96) NS(-1977.44) EW(788.91)



#98 MD(8198.00) Inc(90.1) Azm(180.2) TVD(6615.16)
VS(2153.01) NS(-2066.43) EW(787.82)

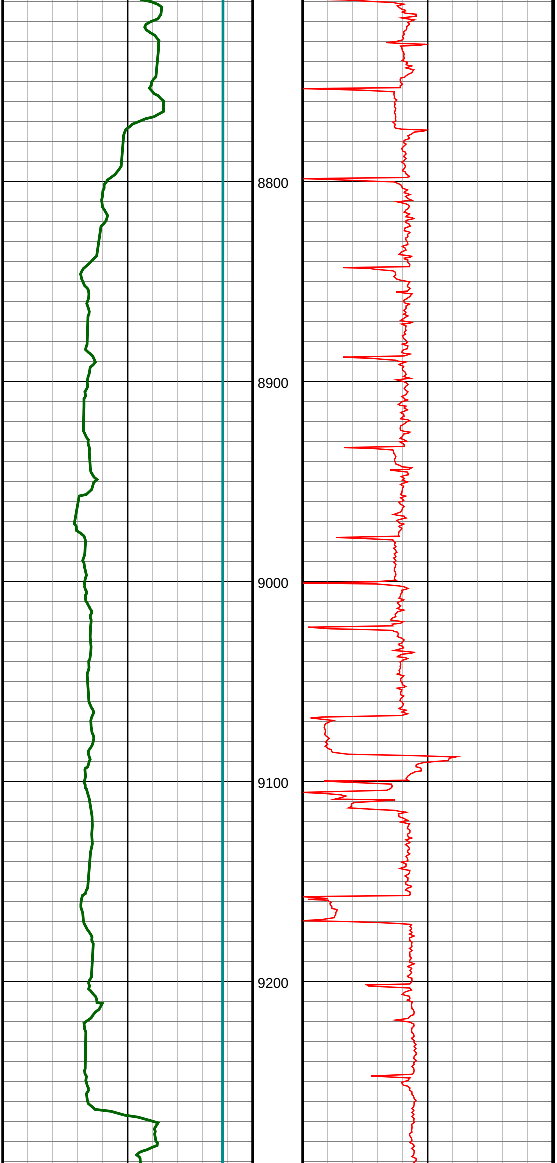
#99 MD(8288.00) Inc(89.5) Azm(180.0) TVD(6615.47)
VS(2242.18) NS(-2156.43) EW(787.66)

#100 MD(8377.00) Inc(90.4) Azm(180.2) TVD(6615.55)
VS(2330.37) NS(-2245.43) EW(787.51)

#101 MD(8467.00) Inc(92.0) Azm(181.4) TVD(6613.66)
VS(2419.36) NS(-2335.40) EW(786.25)

#102 MD(8557.00) Inc(91.6) Azm(180.7) TVD(6610.84)
VS(2508.28) NS(-2425.34) EW(784.61)

#103 MD(8646.00) Inc(91.3) Azm(180.4) TVD(6608.58)
VS(2596.34) NS(-2514.31) EW(783.75)



#104 MD(8736.00) Inc(91.1) Azm(179.5) TVD(6606.70)
VS(2685.53) NS(-2604.29) EW(783.83)

#105 MD(8826.00) Inc(91.1) Azm(179.5) TVD(6604.97)
VS(2774.81) NS(-2694.27) EW(784.62)

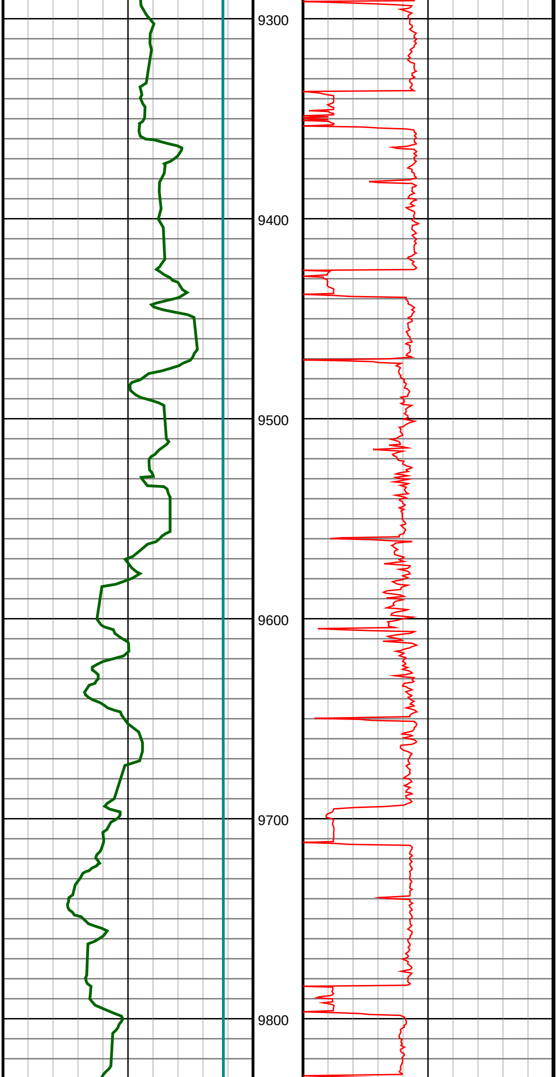
#106 MD(8916.00) Inc(91.6) Azm(180.5) TVD(6602.85)
VS(2863.98) NS(-2784.24) EW(784.62)

#107 MD(9005.00) Inc(91.5) Azm(179.4) TVD(6600.44)
VS(2952.16) NS(-2873.20) EW(784.69)

#108 MD(9095.00) Inc(90.2) Azm(180.8) TVD(6599.11)
VS(3041.32) NS(-2963.19) EW(784.54)

#109 MD(9185.00) Inc(90.3) Azm(182.9) TVD(6598.71)
VS(3130.08) NS(-3053.14) EW(781.63)

#110 MD(9274.00) Inc(91.3) Azm(182.8) TVD(6597.47)
VS(3217.58) NS(-3142.02) EW(777.21)



#111 MD(9364.00) Inc(89.8) Azm(182.4) TVD(6596.61)
VS(3306.13) NS(-3231.92) EW(773.12)

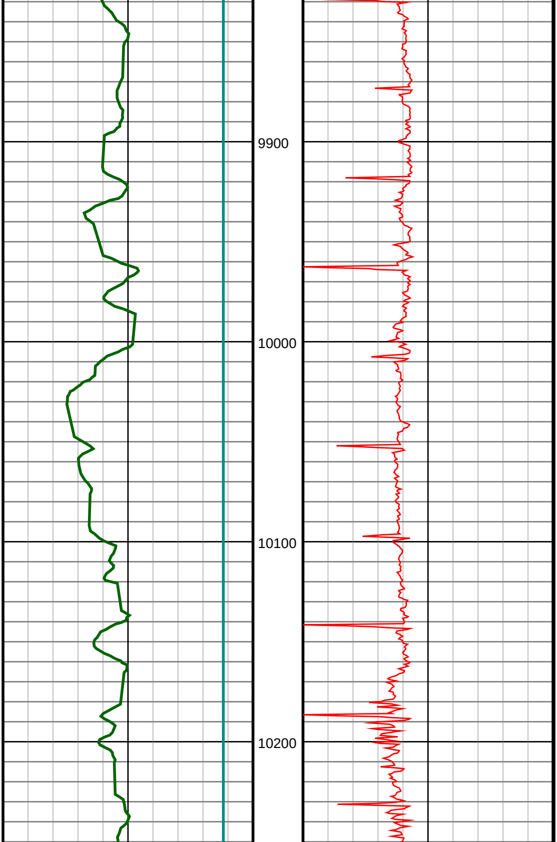
#112 MD(9454.00) Inc(88.2) Azm(181.0) TVD(6598.18)
VS(3394.91) NS(-3321.86) EW(770.45)

#113 MD(9543.00) Inc(87.4) Azm(181.1) TVD(6601.60)
VS(3482.82) NS(-3410.78) EW(768.82)

#114 MD(9633.00) Inc(86.7) Azm(180.6) TVD(6606.23)
VS(3571.71) NS(-3500.65) EW(767.49)

#115 MD(9723.00) Inc(88.5) Azm(181.0) TVD(6610.00)
VS(3660.65) NS(-3590.56) EW(766.23)

#116 MD(9812.00) Inc(90.5) Azm(180.0) TVD(6610.77)
VS(3748.74) NS(-3679.54) EW(765.46)



#117 MD(9902.00) Inc(90.2) Azm(180.1) TVD(6610.22)
VS(3837.93) NS(-3769.54) EW(765.38)

#118 MD(9992.00) Inc(90.0) Azm(180.1) TVD(6610.07)
VS(3927.10) NS(-3859.54) EW(765.22)

#119 MD(10081.00) Inc(90.1) Azm(179.7) TVD(6609.99)
VS(4015.33) NS(-3948.54) EW(765.38)

#120 MD(10171.00) Inc(89.9) Azm(179.4) TVD(6609.99)
VS(4104.62) NS(-4038.54) EW(766.08)

#121 MD(10261.00) Inc(89.5) Azm(179.4) TVD(6610.46)
VS(4193.93) NS(-4128.53) EW(767.03)

#122 MD(10350.00) Inc(89.3) Azm(179.3) TVD(6611.39)
VS(4282.26) NS(-4217.52) EW(768.04)

#123 MD(10439.00) Inc(88.7) Azm(178.4) TVD(6612.94)
VS(4370.67) NS(-4306.49) EW(769.82)

#124 MD(10529.00) Inc(89.7) Azm(178.5) TVD(6614.20)
VS(4460.15) NS(-4396.45) EW(772.26)

#125 MD(10618.00) Inc(89.7) Azm(178.1) TVD(6614.67)
VS(4548.67) NS(-4485.41) EW(774.90)

#126 MD(10708.00) Inc(91.4) Azm(180.0) TVD(6613.80)
VS(4638.04) NS(-4575.38) EW(776.39)

#127 MD(10798.00) Inc(91.9) Azm(179.6) TVD(6611.21)
VS(4727.24) NS(-4665.34) EW(776.70)

#128 MD(10887.00) Inc(91.0) Azm(178.8) TVD(6608.96)
VS(4815.58) NS(-4754.30) EW(777.95)

#129 MD(10977.00) Inc(90.4) Azm(178.8) TVD(6607.86)
VS(4905.00) NS(-4844.28) EW(779.83)

#130 MD(11067.00) Inc(89.8) Azm(178.4) TVD(6607.70)
VS(4994.46) NS(-4934.25) EW(782.03)

#131 MD(11156.00) Inc(90.6) Azm(180.6) TVD(6607.39)
VS(5082.76) NS(-5023.24) EW(782.81)

#132 MD(11246.00) Inc(92.4) Azm(183.2) TVD(6605.04)
VS(5171.47) NS(-5113.15) EW(779.82)

#133 MD(11335.00) Inc(92.4) Azm(182.7) TVD(6601.31)
VS(5258.87) NS(-5201.95) EW(775.25)

#134 MD(11425.00) Inc(92.8) Azm(183.0) TVD(6597.23)
VS(5347.27) NS(-5291.75) EW(770.78)

#135 MD(11514.00) Inc(90.7) Azm(182.0) TVD(6594.51)
VS(5434.83) NS(-5380.62) EW(766.90)