ENSIGN Directional Services

70 Ranch State BB18-647

MD
2":100’

Company: Noble Energy
Well Name: 70 Ranch State BB18-647
API:
Rig Id: H&P 326
State: Colorado
County/Parish: Weld
Country: USA
Survey Company: ENSIGN Directional
Job number: HP326-207-18
DD1 Zach Gentry
DD2 Tyler Bachelder
DD3 Colby Hansen
MWD1 Andrew Demrow
MWD2 Derek Saykally
MWD3 Buster Snider

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

	Depth	Date
Start:	777 ft	08/1/2015
End:	ft	

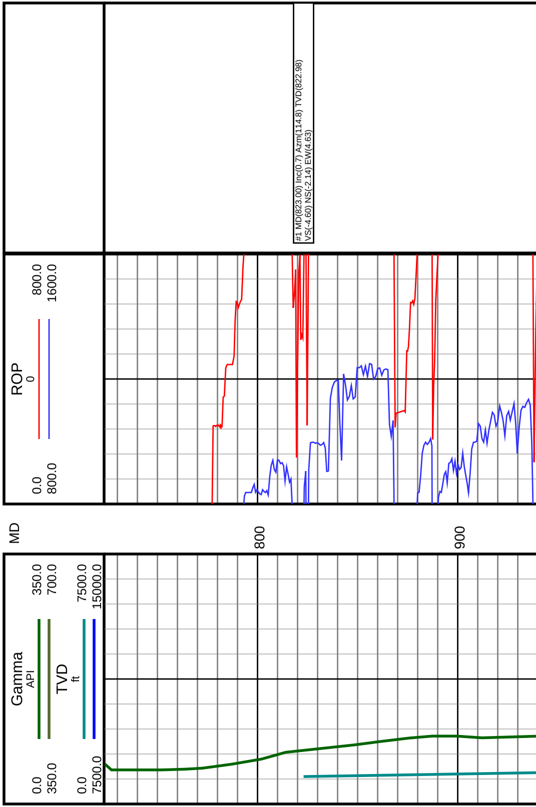
Casing	Depth	Size
Surface:	777	9 5/8
Intermediate:	6912	7

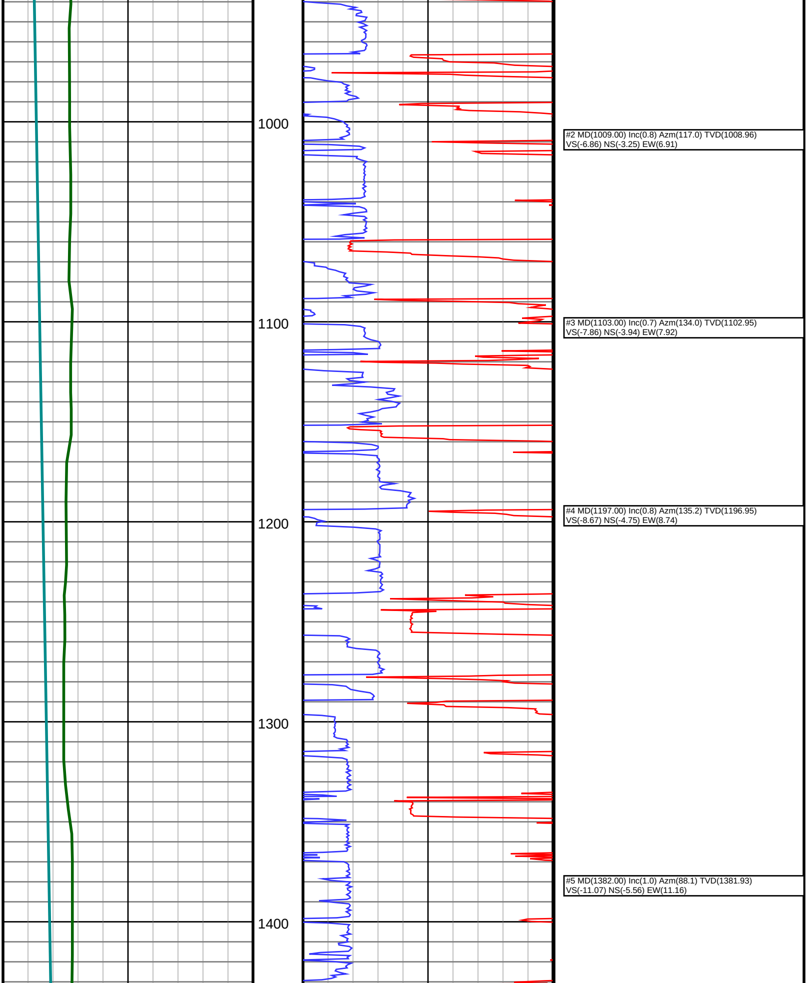
Mud Type:
Density:
Viscosity:
Rm: **Rmf:** **Rmc:**

Elevations
KB: 30
GL: 4855
DF: 4885

		Offsets		Depths		Dates	
Run	Bit Size	Gamma	Survey	Start	End	Start	End
1	8.75	54.98	49.98	777	6683	08/1/2015	08/3/2015
2	8.75	54.44	59.44	6683	6912	08/3/2015	08/3/2015
3	6.125	61.09	66.09	6912	11344	08/4/2015	08/6/2015
4	6.125	61.09	66.09	11344	16057	08/7/2015	08/10/2015
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.



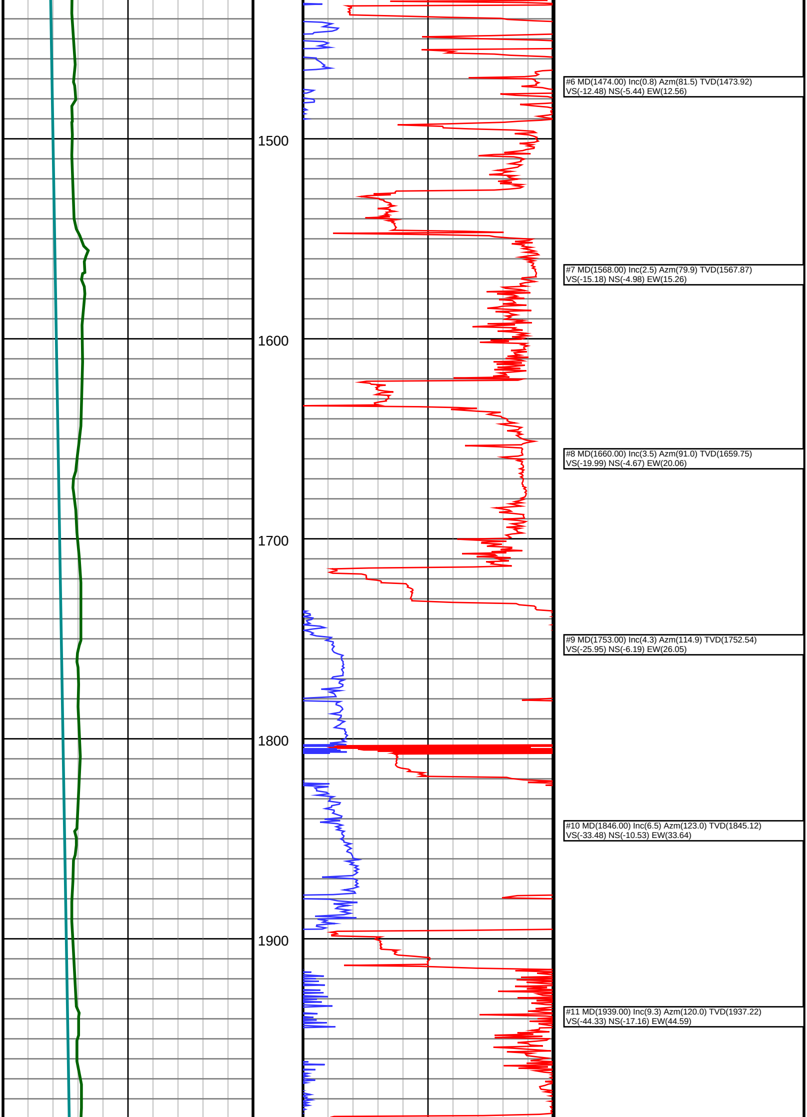


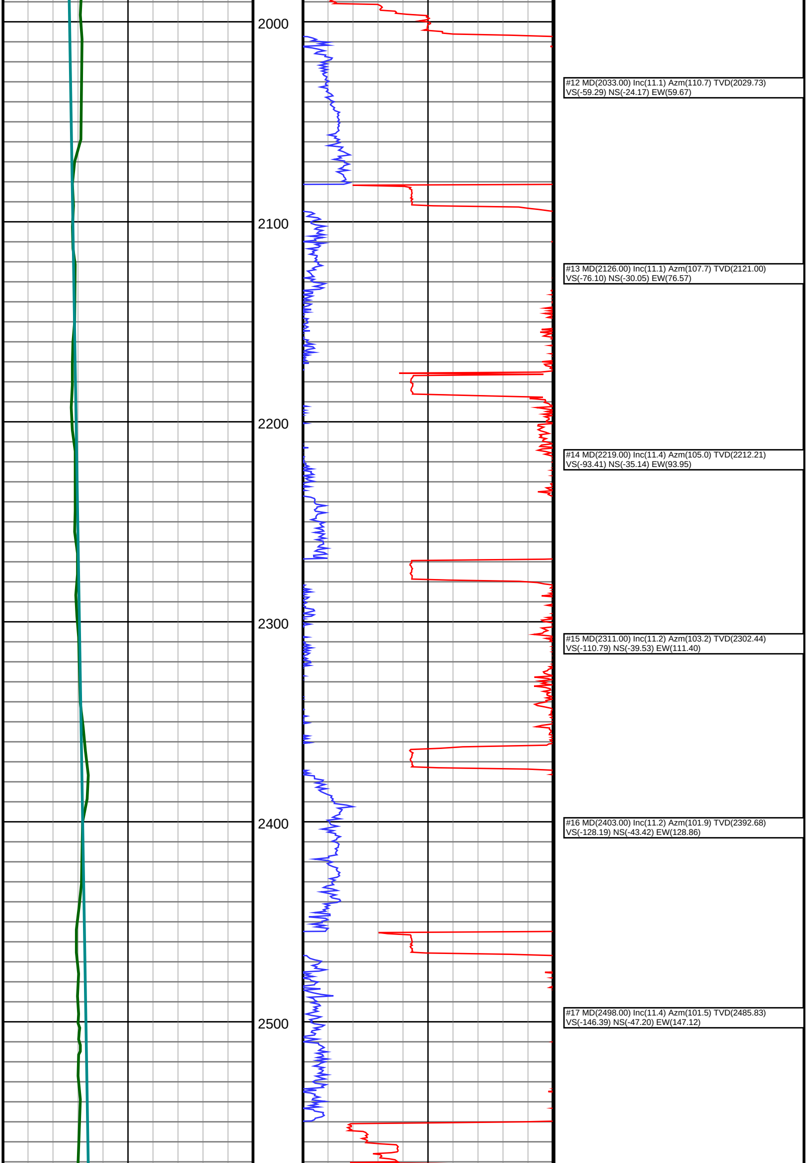
#2 MD(1009.00) Inc(0.8) Azm(117.0) TVD(1008.96)
VS(-6.86) NS(-3.25) EW(6.91)

#3 MD(1103.00) Inc(0.7) Azm(134.0) TVD(1102.95)
VS(-7.86) NS(-3.94) EW(7.92)

#4 MD(1197.00) Inc(0.8) Azm(135.2) TVD(1196.95)
VS(-8.67) NS(-4.75) EW(8.74)

#5 MD(1382.00) Inc(1.0) Azm(88.1) TVD(1381.93)
VS(-11.07) NS(-5.56) EW(11.16)





#12 MD(2033.00) Inc(11.1) Azm(110.7) TVD(2029.73)
VS(-59.29) NS(-24.17) EW(59.67)

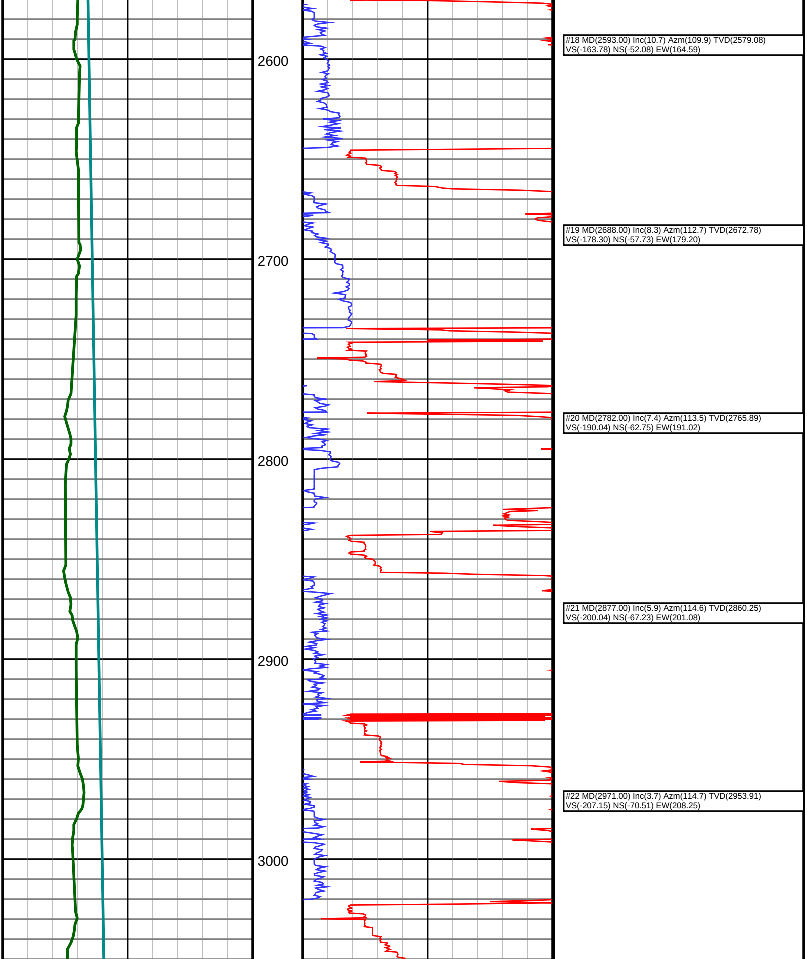
#13 MD(2126.00) Inc(11.1) Azm(107.7) TVD(2121.00)
VS(-76.10) NS(-30.05) EW(76.57)

#14 MD(2219.00) Inc(11.4) Azm(105.0) TVD(2212.21)
VS(-93.41) NS(-35.14) EW(93.95)

#15 MD(2311.00) Inc(11.2) Azm(103.2) TVD(2302.44)
VS(-110.79) NS(-39.53) EW(111.40)

#16 MD(2403.00) Inc(11.2) Azm(101.9) TVD(2392.68)
VS(-128.19) NS(-43.42) EW(128.86)

#17 MD(2498.00) Inc(11.4) Azm(101.5) TVD(2485.83)
VS(-146.39) NS(-47.20) EW(147.12)



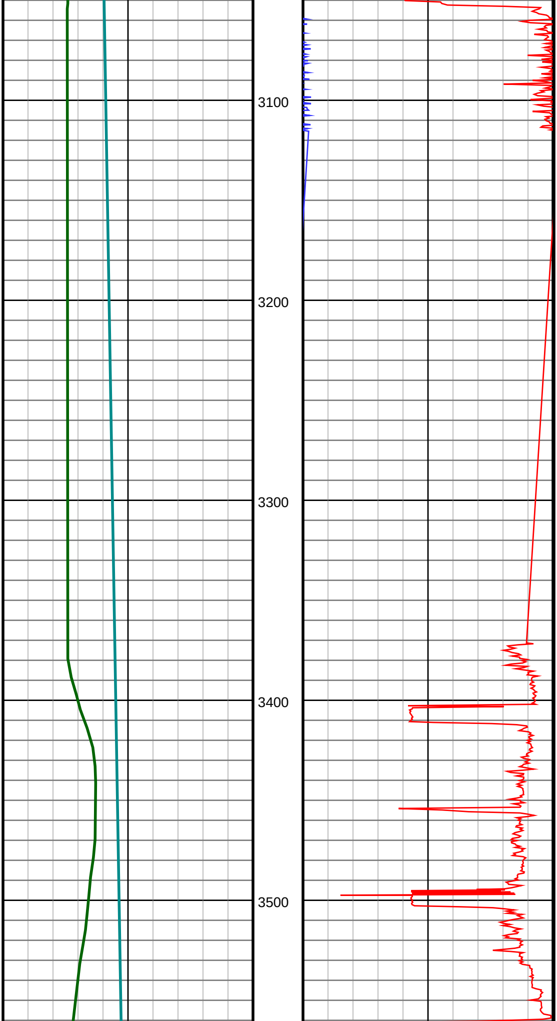
#18 MD(2593.00) Inc(10.7) Azm(109.9) TVD(2579.08)
VS(-163.78) NS(-52.08) EW(164.59)

#19 MD(2688.00) Inc(8.3) Azm(112.7) TVD(2672.78)
VS(-178.30) NS(-57.73) EW(179.20)

#20 MD(2782.00) Inc(7.4) Azm(113.5) TVD(2765.89)
VS(-190.04) NS(-62.75) EW(191.02)

#21 MD(2877.00) Inc(5.9) Azm(114.6) TVD(2860.25)
VS(-200.04) NS(-67.23) EW(201.08)

#22 MD(2971.00) Inc(3.7) Azm(114.7) TVD(2953.91)
VS(-207.15) NS(-70.51) EW(208.25)



#23 MD(3066.00) Inc(2.1) Azm(55.5) TVD(3048.81)
VS(-211.34) NS(-70.82) EW(212.44)

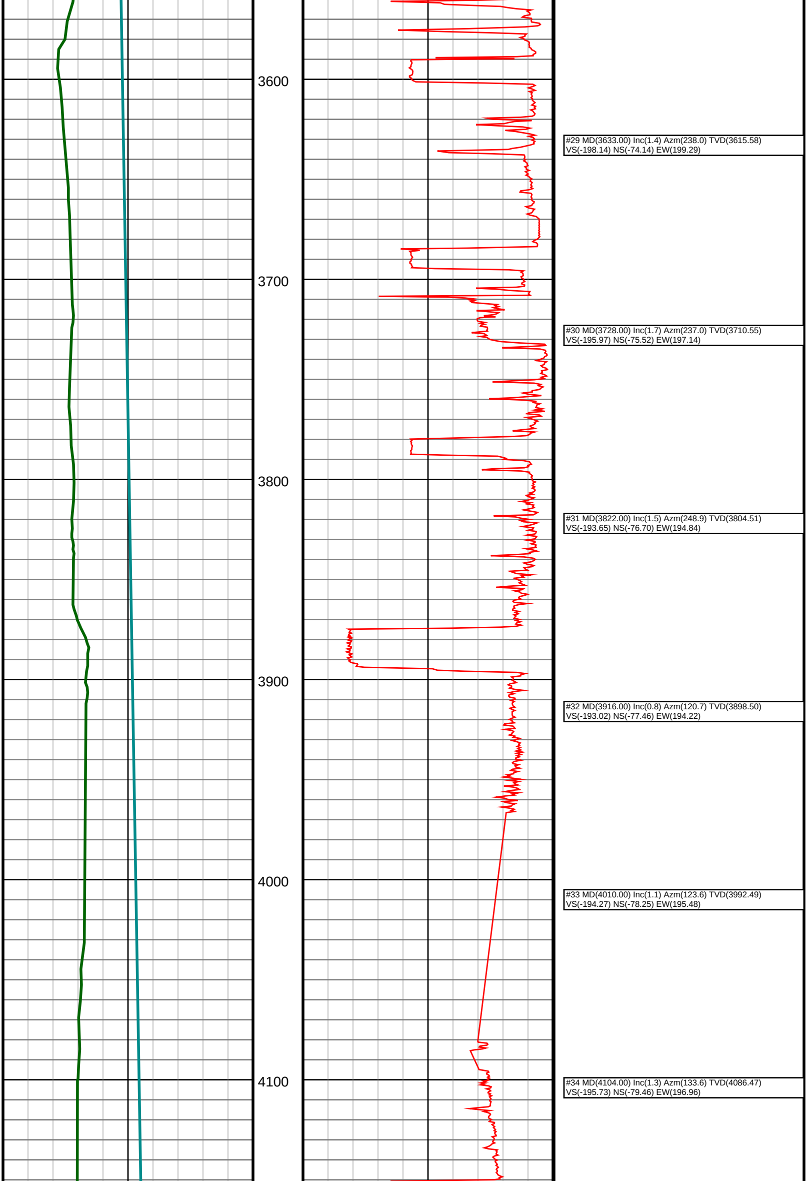
#24 MD(3160.00) Inc(1.8) Azm(266.1) TVD(3142.79)
VS(-211.31) NS(-69.95) EW(212.40)

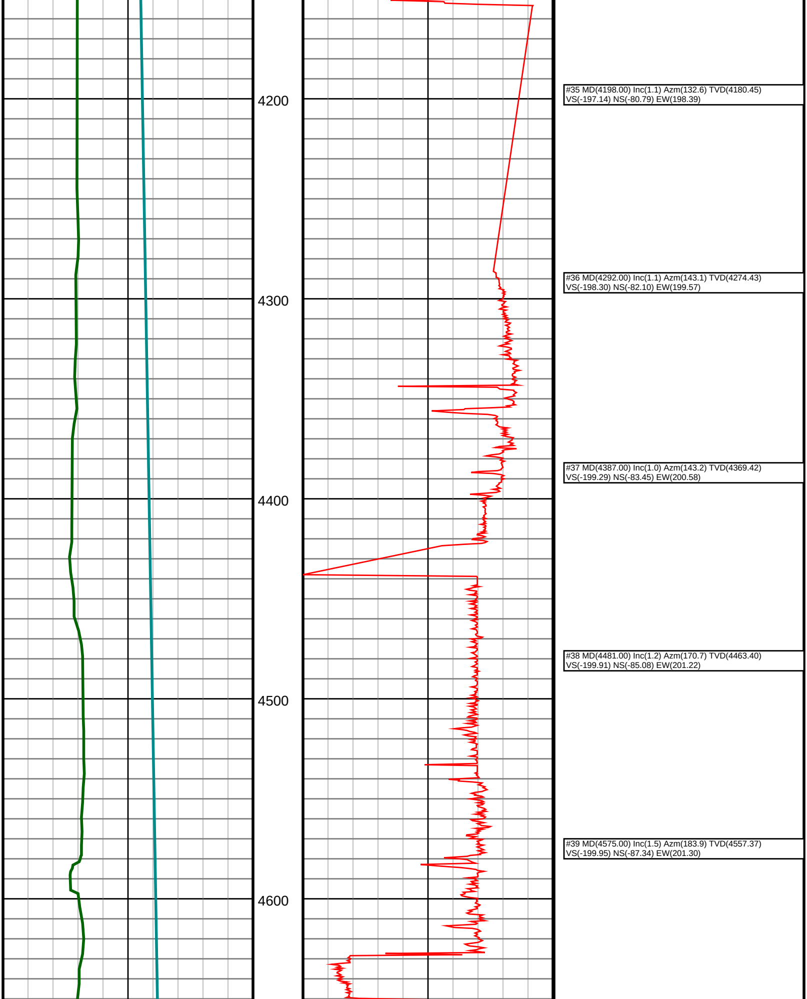
#25 MD(3255.00) Inc(1.7) Azm(261.6) TVD(3237.74)
VS(-208.45) NS(-70.26) EW(209.54)

#26 MD(3350.00) Inc(1.6) Azm(257.3) TVD(3332.70)
VS(-205.72) NS(-70.76) EW(206.82)

#27 MD(3444.00) Inc(1.9) Azm(244.1) TVD(3426.66)
VS(-203.04) NS(-71.72) EW(204.15)

#28 MD(3538.00) Inc(1.7) Azm(245.5) TVD(3520.62)
VS(-200.41) NS(-72.95) EW(201.54)





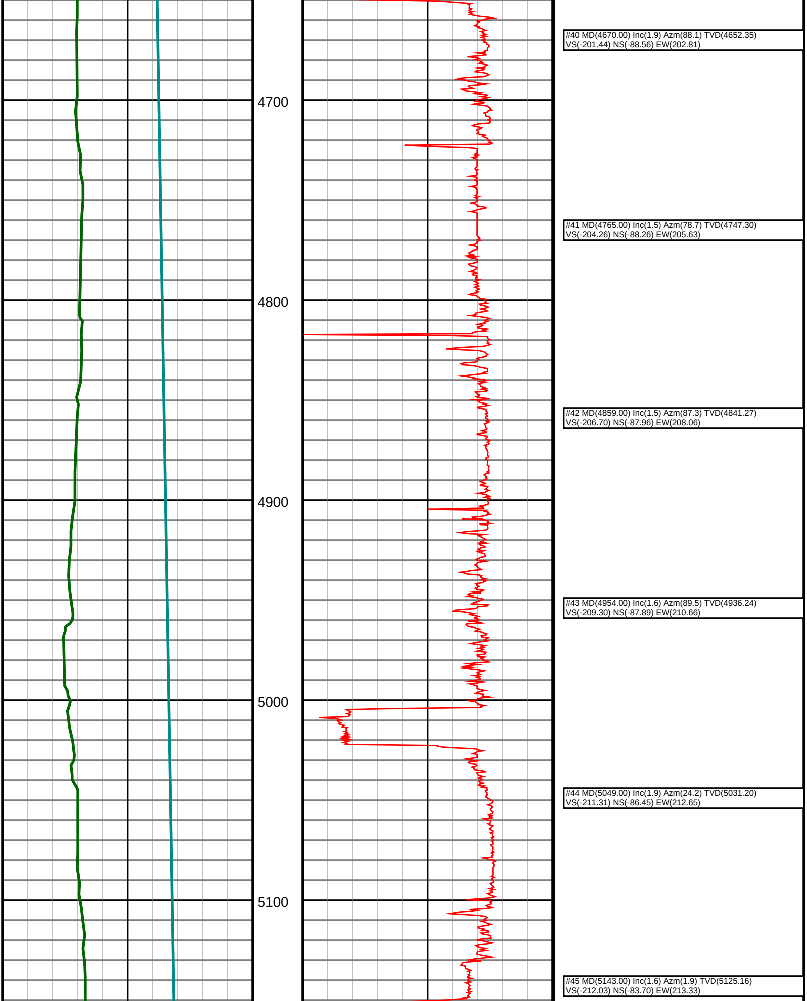
#35 MD(4198.00) Inc(1.1) Azm(132.6) TVD(4180.45)
VS(-197.14) NS(-80.79) EW(198.39)

#36 MD(4292.00) Inc(1.1) Azm(143.1) TVD(4274.43)
VS(-198.30) NS(-82.10) EW(199.57)

#37 MD(4387.00) Inc(1.0) Azm(143.2) TVD(4369.42)
VS(-199.29) NS(-83.45) EW(200.58)

#38 MD(4481.00) Inc(1.2) Azm(170.7) TVD(4463.40)
VS(-199.91) NS(-85.08) EW(201.22)

#39 MD(4575.00) Inc(1.5) Azm(183.9) TVD(4557.37)
VS(-199.95) NS(-87.34) EW(201.30)



#40 MD(4670.00) Inc(1.9) Azm(88.1) TVD(4652.35)
VS(-201.44) NS(-88.56) EW(202.81)

#41 MD(4765.00) Inc(1.5) Azm(78.7) TVD(4747.30)
VS(-204.26) NS(-88.26) EW(205.63)

#42 MD(4859.00) Inc(1.5) Azm(87.3) TVD(4841.27)
VS(-206.70) NS(-87.96) EW(208.06)

#43 MD(4954.00) Inc(1.6) Azm(89.5) TVD(4936.24)
VS(-209.30) NS(-87.89) EW(210.66)

#44 MD(5049.00) Inc(1.9) Azm(24.2) TVD(5031.20)
VS(-211.31) NS(-86.45) EW(212.65)

#45 MD(5143.00) Inc(1.6) Azm(1.9) TVD(5125.16)
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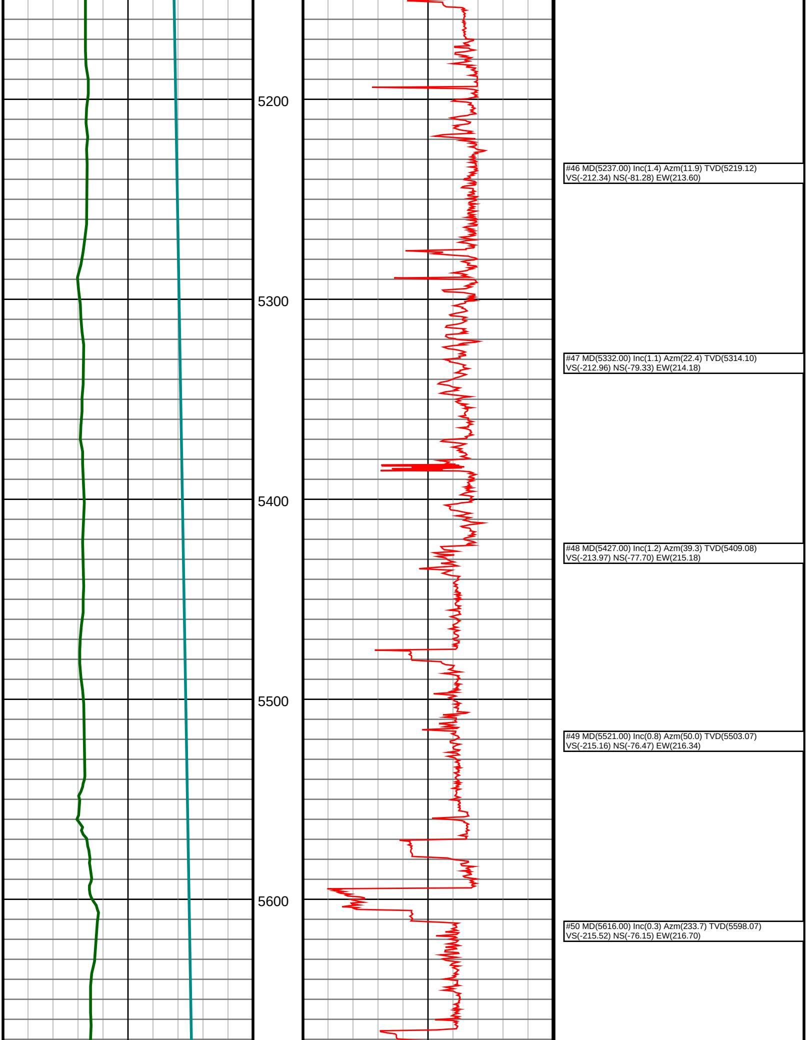

#46 MD(5237.00) Inc(1.4) Azm(11.9) TVD(5219.12)
VS(-212.34) NS(-81.28) EW(213.60)

#47 MD(5332.00) Inc(1.1) Azm(22.4) TVD(5314.10)
VS(-212.96) NS(-79.33) EW(214.18)

#48 MD(5427.00) Inc(1.2) Azm(39.3) TVD(5409.08)
VS(-213.97) NS(-77.70) EW(215.18)

#49 MD(5521.00) Inc(0.8) Azm(50.0) TVD(5503.07)
VS(-215.16) NS(-76.47) EW(216.34)

#50 MD(5616.00) Inc(0.3) Azm(233.7) TVD(5598.07)
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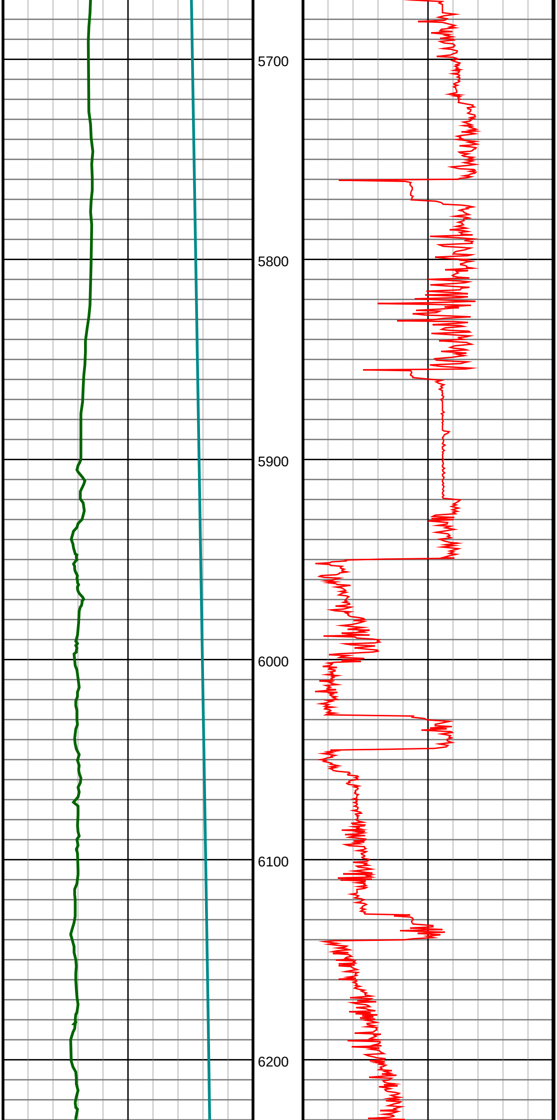


#51 MD(5710.00) Inc(0.6) Azm(226.3) TVD(5692.06)
VS(-214.98) NS(-76.63) EW(216.16)

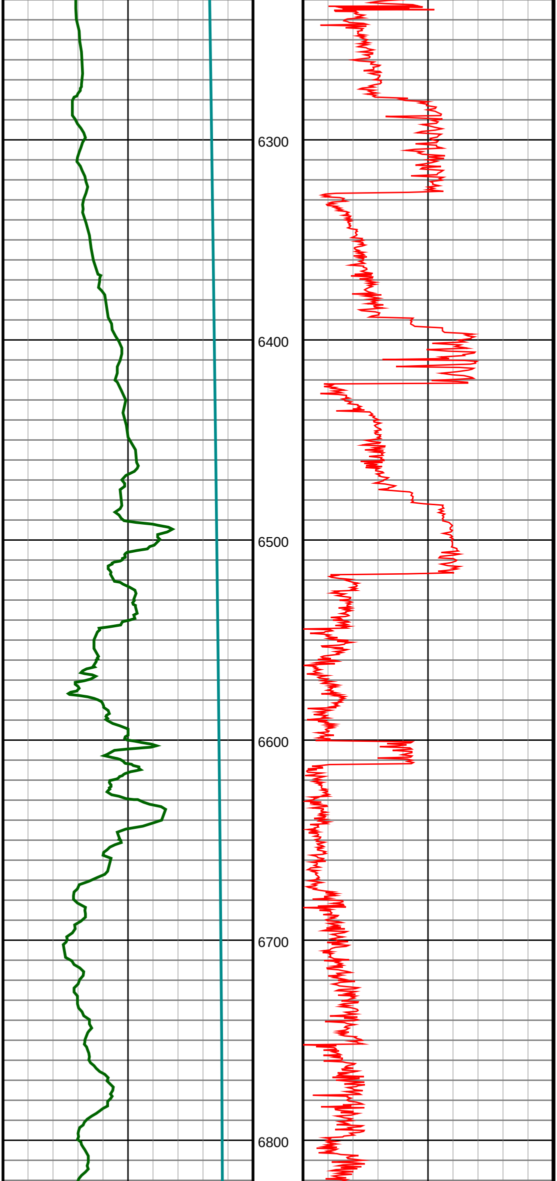
#52 MD(5804.00) Inc(0.6) Azm(226.1) TVD(5786.06)
VS(-214.26) NS(-77.31) EW(215.46)

#53 MD(5899.00) Inc(0.8) Azm(225.1) TVD(5881.05)
VS(-213.47) NS(-78.07) EW(214.68)

#54 MD(5993.00) Inc(5.1) Azm(288.7) TVD(5974.92)
VS(-209.09) NS(-77.17) EW(210.28)

#55 MD(6088.00) Inc(12.3) Azm(287.3) TVD(6068.76)
VS(-195.47) NS(-72.80) EW(196.59)

#56 MD(6182.00) Inc(23.7) Azm(286.0) TVD(6158.01)
VS(-167.78) NS(-64.60) EW(168.78)



#57 MD(6277.00) Inc(34.7) Azm(279.4) TVD(6240.85)
VS(-122.77) NS(-54.90) EW(123.62)

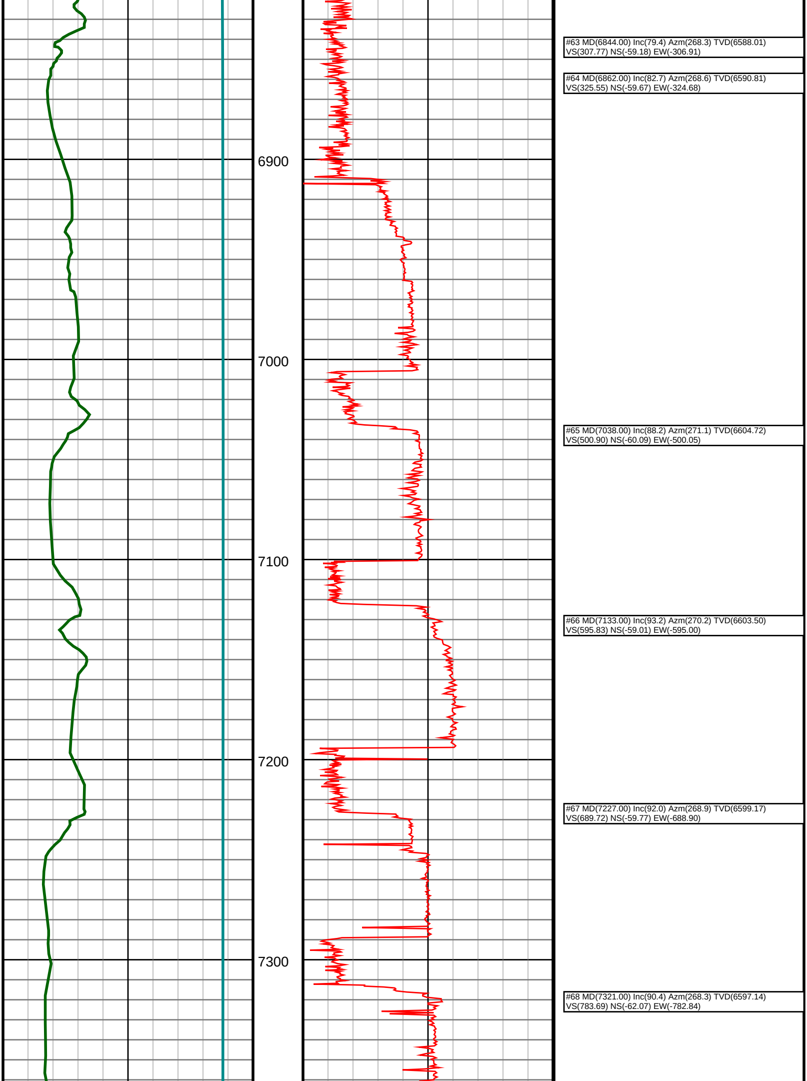
#58 MD(6371.00) Inc(38.2) Azm(272.4) TVD(6316.49)
VS(-67.40) NS(-49.29) EW(68.15)

#59 MD(6466.00) Inc(43.2) Azm(264.5) TVD(6388.51)
VS(-5.55) NS(-51.13) EW(6.33)

#60 MD(6560.00) Inc(48.0) Azm(266.1) TVD(6454.26)
VS(61.44) NS(-56.56) EW(-60.59)

#61 MD(6655.00) Inc(55.1) Azm(271.0) TVD(6513.37)
VS(135.71) NS(-58.25) EW(-134.84)

#62 MD(6750.00) Inc(65.9) Azm(269.8) TVD(6560.08)
VS(218.25) NS(-57.68) EW(-217.40)



#63 MD(6844.00) Inc(79.4) Azm(268.3) TVD(6588.01)
VS(307.77) NS(-59.18) EW(-306.91)

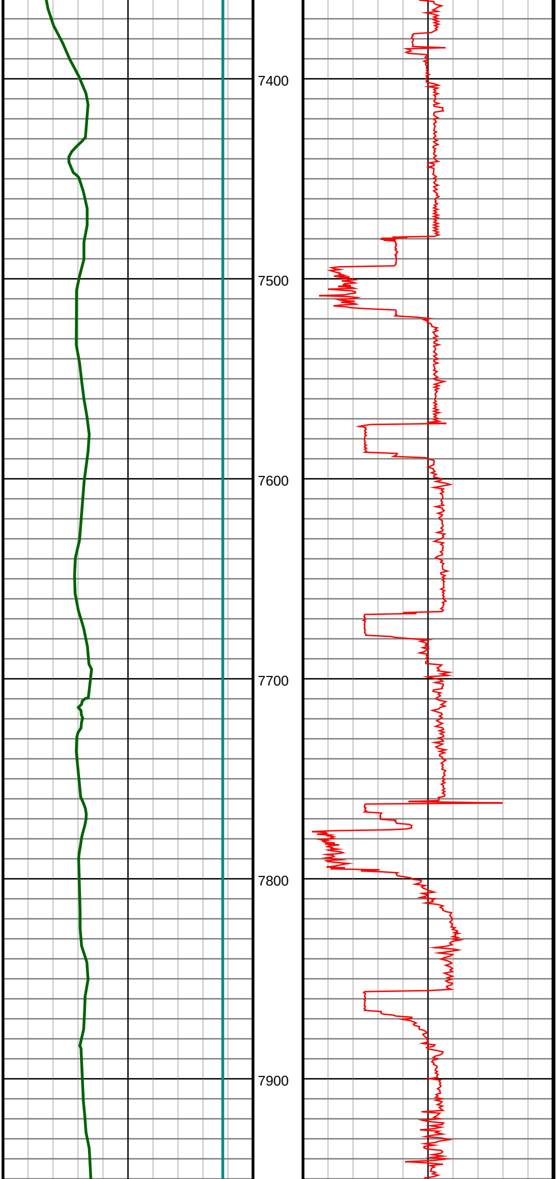
#64 MD(6862.00) Inc(82.7) Azm(268.6) TVD(6590.81)
VS(325.55) NS(-59.67) EW(-324.68)

#65 MD(7038.00) Inc(88.2) Azm(271.1) TVD(6604.72)
VS(500.90) NS(-60.09) EW(-500.05)

#66 MD(7133.00) Inc(93.2) Azm(270.2) TVD(6603.50)
VS(595.83) NS(-59.01) EW(-595.00)

#67 MD(7227.00) Inc(92.0) Azm(268.9) TVD(6599.17)
VS(689.72) NS(-59.77) EW(-688.90)

#68 MD(7321.00) Inc(90.4) Azm(268.3) TVD(6597.14)
VS(783.69) NS(-62.07) EW(-782.84)



#69 MD(7416.00) Inc(91.7) Azm(267.9) TVD(6595.35)
VS(878.66) NS(-65.22) EW(-877.77)

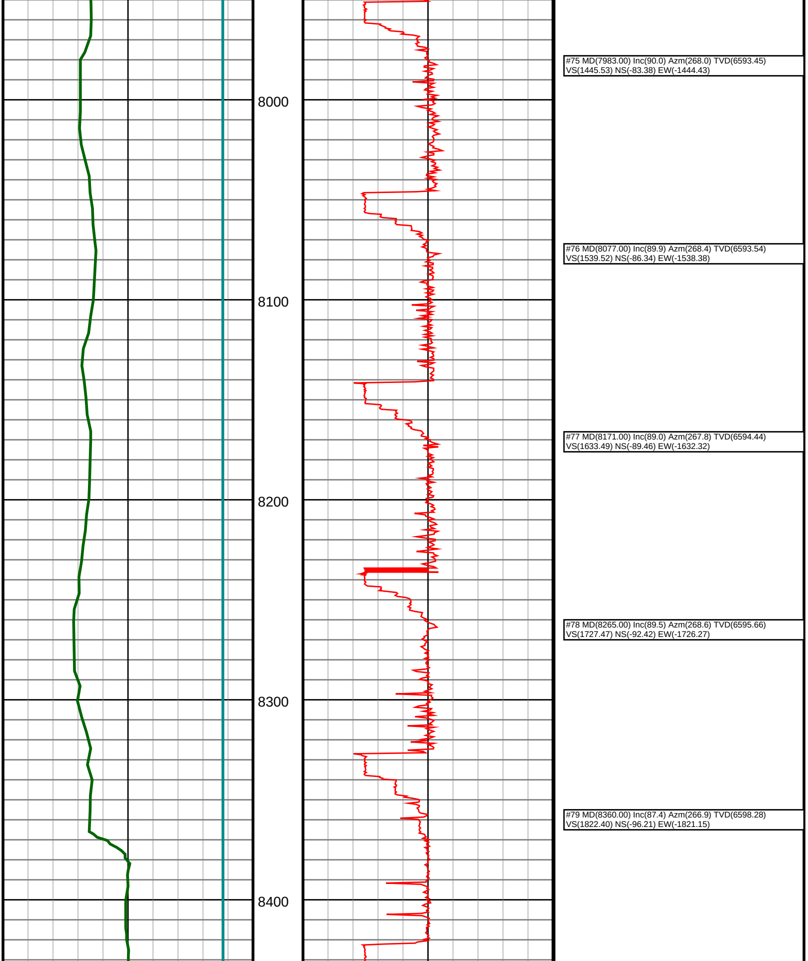
#70 MD(7511.00) Inc(89.6) Azm(268.5) TVD(6594.23)
VS(973.63) NS(-68.17) EW(-972.71)

#71 MD(7605.00) Inc(90.0) Azm(267.9) TVD(6594.55)
VS(1067.62) NS(-71.09) EW(-1066.67)

#72 MD(7699.00) Inc(91.6) Azm(268.7) TVD(6593.22)
VS(1161.60) NS(-73.86) EW(-1160.61)

#73 MD(7793.00) Inc(89.9) Azm(268.1) TVD(6591.94)
VS(1255.58) NS(-76.48) EW(-1254.56)

#74 MD(7888.00) Inc(89.1) Azm(267.8) TVD(6592.73)
VS(1350.55) NS(-79.90) EW(-1349.50)



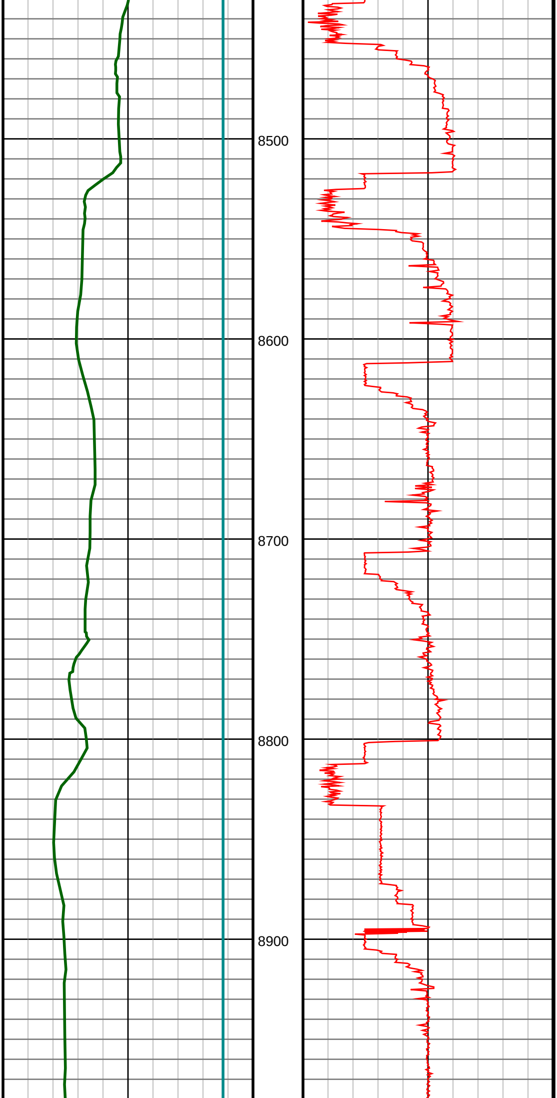
#75 MD(7983.00) Inc(90.0) Azm(268.0) TVD(6593.45)
VS(1445.53) NS(-83.38) EW(-1444.43)

#76 MD(8077.00) Inc(89.9) Azm(268.4) TVD(6593.54)
VS(1539.52) NS(-86.34) EW(-1538.38)

#77 MD(8171.00) Inc(89.0) Azm(267.8) TVD(6594.44)
VS(1633.49) NS(-89.46) EW(-1632.32)

#78 MD(8265.00) Inc(89.5) Azm(268.6) TVD(6595.66)
VS(1727.47) NS(-92.42) EW(-1726.27)

#79 MD(8360.00) Inc(87.4) Azm(266.9) TVD(6598.28)
VS(1822.40) NS(-96.21) EW(-1821.15)



#80 MD(8454.00) Inc(88.0) Azm(267.6) TVD(6602.11)
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#81 MD(8549.00) Inc(90.4) Azm(269.4) TVD(6603.44)
VS(2011.24) NS(-103.22) EW(-2009.91)

#82 MD(8643.00) Inc(91.0) Azm(269.9) TVD(6602.24)
VS(2105.23) NS(-103.71) EW(-2103.90)

#83 MD(8737.00) Inc(88.9) Azm(267.8) TVD(6602.25)
VS(2199.22) NS(-105.56) EW(-2197.87)

#84 MD(8832.00) Inc(90.3) Azm(270.3) TVD(6602.85)
VS(2294.21) NS(-107.15) EW(-2292.84)

#85 MD(8926.00) Inc(90.8) Azm(269.4) TVD(6601.87)
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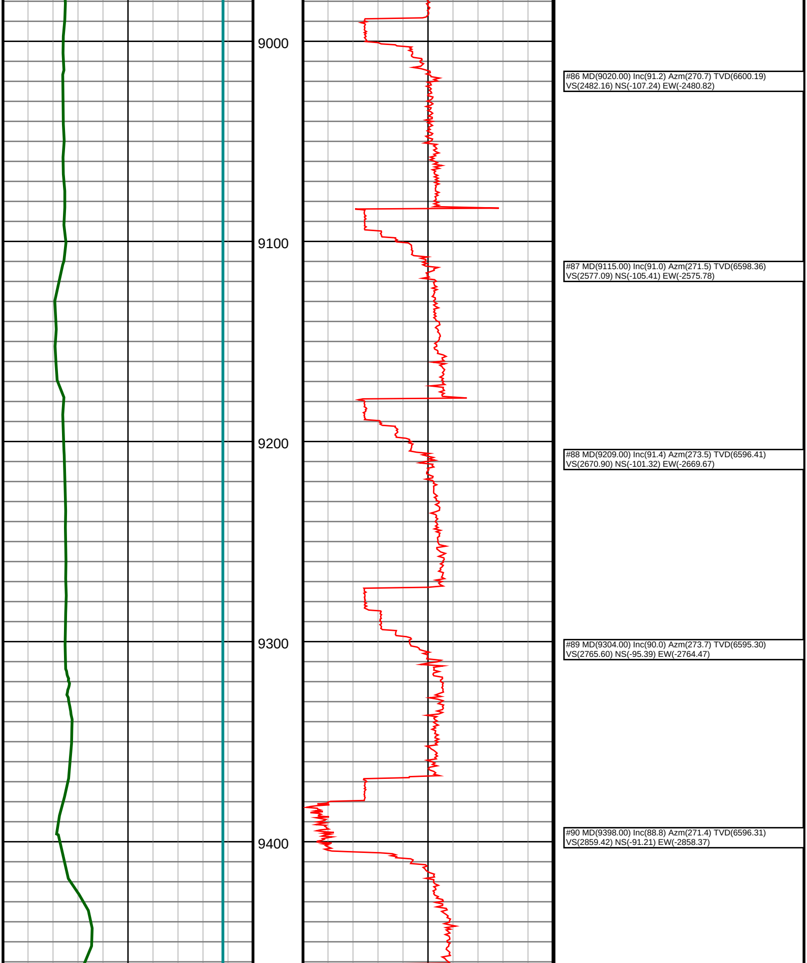


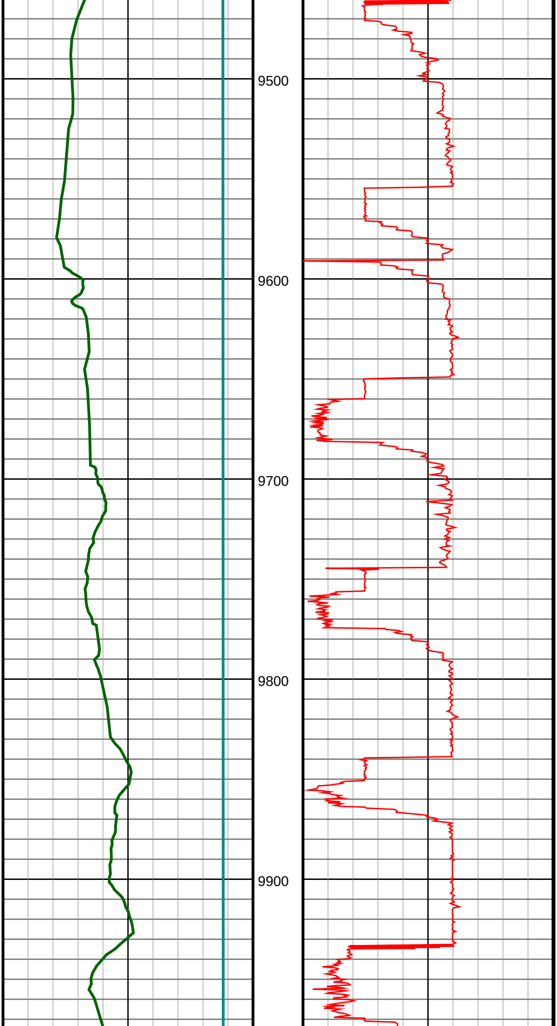
#86 MD(9020.00) Inc(91.2) Azm(270.7) TVD(6600.19)
VS(2482.16) NS(-107.24) EW(-2480.82)

#87 MD(9115.00) Inc(91.0) Azm(271.5) TVD(6598.36)
VS(2577.09) NS(-105.41) EW(-2575.78)

#88 MD(9209.00) Inc(91.4) Azm(273.5) TVD(6596.41)
VS(2670.90) NS(-101.32) EW(-2669.67)

#89 MD(9304.00) Inc(90.0) Azm(273.7) TVD(6595.30)
VS(2765.60) NS(-95.39) EW(-2764.47)

#90 MD(9398.00) Inc(88.8) Azm(271.4) TVD(6596.31)
VS(2859.42) NS(-91.21) EW(-2858.37)



#91 MD(9493.00) Inc(89.7) Azm(270.6) TVD(6597.52)
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#92 MD(9587.00) Inc(88.7) Azm(270.9) TVD(6598.85)
VS(3048.31) NS(-88.30) EW(-3047.33)

#93 MD(9682.00) Inc(88.5) Azm(270.0) TVD(6601.21)
VS(3143.26) NS(-87.52) EW(-3142.29)

#94 MD(9870.00) Inc(88.6) Azm(267.5) TVD(6606.03)
VS(3331.18) NS(-91.66) EW(-3330.17)

#95 MD(9964.00) Inc(89.9) Azm(269.0) TVD(6607.27)
VS(3425.15) NS(-94.52) EW(-3424.11)

#96 MD(10058.00) Inc(90.8) Azm(269.0) TVD(6606.64)
VS(3519.15) NS(-96.17) EW(-3518.09)

#97 MD(10153.00) Inc(90.6) Azm(269.7) TVD(6605.41)
VS(3614.14) NS(-97.30) EW(-3613.08)

#98 MD(10245.00) Inc(90.3) Azm(268.1) TVD(6604.65)
VS(3706.13) NS(-99.09) EW(-3705.06)

#99 MD(10430.00) Inc(90.4) Azm(267.0) TVD(6603.42)
VS(3891.05) NS(-107.03) EW(-3889.88)

#100 MD(10523.00) Inc(90.7) Azm(266.8) TVD(6602.53)
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#101 MD(10616.00) Inc(90.5) Azm(267.1) TVD(6601.59)
VS(4076.91) NS(-117.04) EW(-4075.60)

#102 MD(10710.00) Inc(89.8) Azm(268.1) TVD(6601.33)
VS(4170.87) NS(-121.00) EW(-4169.51)

#103 MD(10804.00) Inc(89.3) Azm(267.2) TVD(6602.06)
VS(4264.83) NS(-124.89) EW(-4263.43)

#104 MD(10897.00) Inc(91.1) Azm(267.2) TVD(6601.77)
VS(4357.78) NS(-129.42) EW(-4356.31)

#105 MD(10990.00) Inc(91.8) Azm(268.1) TVD(6599.42)
VS(4450.72) NS(-133.20) EW(-4449.21)

#106 MD(11081.00) Inc(91.3) Azm(268.4) TVD(6596.90)
VS(4541.67) NS(-135.94) EW(-4540.13)

#107 MD(11268.00) Inc(88.8) Azm(265.8) TVD(6596.66)
VS(4728.52) NS(-145.37) EW(-4726.86)

#108 MD(11360.00) Inc(88.9) Azm(266.1) TVD(6598.49)
VS(4820.36) NS(-151.92) EW(-4818.61)

#109 MD(11453.00) Inc(88.8) Azm(268.2) TVD(6600.39)
VS(4913.28) NS(-156.59) EW(-4911.47)

#110 MD(11546.00) Inc(89.0) Azm(268.5) TVD(6602.18)
VS(5006.25) NS(-159.29) EW(-5004.41)

#111 MD(11640.00) Inc(91.6) Azm(269.8) TVD(6601.67)
VS(5100.24) NS(-160.67) EW(-5098.39)

#112 MD(11733.00) Inc(91.8) Azm(270.6) TVD(6598.94)
VS(5193.18) NS(-160.32) EW(-5191.35)

#113 MD(11826.00) Inc(92.1) Azm(271.4) TVD(6595.76)
VS(5286.08) NS(-158.74) EW(-5284.28)

#114 MD(11918.00) Inc(91.0) Azm(270.5) TVD(6593.22)
VS(5378.00) NS(-157.25) EW(-5376.23)

#115 MD(12010.00) Inc(90.6) Azm(269.8) TVD(6591.87)
VS(5469.97) NS(-156.99) EW(-5468.22)

#116 MD(12105.00) Inc(90.1) Azm(268.5) TVD(6591.26)
VS(5564.97) NS(-158.37) EW(-5563.20)

#117 MD(12199.00) Inc(90.2) Azm(270.5) TVD(6590.99)
VS(5658.96) NS(-159.17) EW(-5657.19)

#118 MD(12294.00) Inc(92.3) Azm(273.9) TVD(6588.91)
VS(5753.78) NS(-155.52) EW(-5752.08)

#119 MD(12389.00) Inc(91.6) Azm(272.9) TVD(6585.71)
VS(5848.46) NS(-149.88) EW(-5846.86)

#120 MD(12483.00) Inc(91.9) Azm(273.3) TVD(6582.86)
VS(5942.19) NS(-144.73) EW(-5940.67)

#121 MD(12578.00) Inc(88.5) Azm(271.6) TVD(6582.52)
VS(6037.01) NS(-140.67) EW(-6035.57)

#122 MD(12672.00) Inc(91.2) Azm(271.8) TVD(6582.77)
VS(6130.91) NS(-137.95) EW(-6129.52)

#123 MD(12766.00) Inc(91.4) Azm(271.1) TVD(6580.59)
VS(6224.81) NS(-135.65) EW(-6223.47)

#124 MD(12860.00) Inc(90.4) Azm(271.1) TVD(6579.07)
VS(6318.74) NS(-133.92) EW(-6317.44)

#125 MD(12954.00) Inc(89.2) Azm(270.0) TVD(6579.40)
VS(6412.71) NS(-133.07) EW(-6411.43)

#126 MD(13048.00) Inc(90.3) Azm(271.0) TVD(6579.80)
VS(6506.68) NS(-132.30) EW(-6505.42)

#127 MD(13143.00) Inc(89.9) Azm(270.3) TVD(6579.62)
VS(6601.65) NS(-131.24) EW(-6600.42)

#128 MD(13238.00) Inc(89.7) Azm(270.6) TVD(6579.99)
VS(6696.62) NS(-130.54) EW(-6695.41)

#129 MD(13332.00) Inc(90.1) Azm(270.6) TVD(6580.19)
VS(6790.59) NS(-129.60) EW(-6789.41)

#130 MD(13426.00) Inc(89.7) Azm(270.1) TVD(6580.39)
VS(6884.57) NS(-129.07) EW(-6883.41)

#131 MD(13520.00) Inc(91.4) Azm(270.8) TVD(6579.53)
VS(6978.54) NS(-128.36) EW(-6977.39)

#132 MD(13615.00) Inc(89.2) Azm(270.4) TVD(6579.03)
VS(7073.50) NS(-127.34) EW(-7072.38)

#133 MD(13709.00) Inc(87.4) Azm(269.8) TVD(6581.81)
VS(7167.44) NS(-127.16) EW(-7166.34)

#134 MD(13804.00) Inc(88.0) Azm(269.1) TVD(6585.68)
VS(7262.36) NS(-128.08) EW(-7261.25)

#135 MD(13898.00) Inc(87.7) Azm(269.0) TVD(6589.29)
VS(7356.29) NS(-129.69) EW(-7355.17)

#136 MD(13992.00) Inc(88.9) Azm(270.1) TVD(6592.14)
VS(7450.24) NS(-130.44) EW(-7449.12)

#137 MD(14086.00) Inc(88.0) Azm(269.1) TVD(6594.72)
VS(7544.20) NS(-131.11) EW(-7543.08)

#138 MD(14181.00) Inc(88.7) Azm(268.7) TVD(6597.49)
VS(7639.16) NS(-132.96) EW(-7638.02)

#139 MD(14275.00) Inc(90.8) Azm(269.1) TVD(6597.91)
VS(7733.15) NS(-134.77) EW(-7732.00)

#140 MD(14465.00) Inc(89.7) Azm(269.7) TVD(6597.04)
VS(7923.14) NS(-136.76) EW(-7921.98)

#141 MD(14559.00) Inc(91.6) Azm(270.4) TVD(6595.93)
VS(8017.12) NS(-136.72) EW(-8015.97)

#142 MD(14653.00) Inc(92.0) Azm(270.6) TVD(6592.99)
VS(8111.05) NS(-135.95) EW(-8109.92)

#143 MD(14748.00) Inc(91.2) Azm(269.8) TVD(6590.39)
VS(8206.00) NS(-135.67) EW(-8204.88)

#144 MD(14842.00) Inc(90.8) Azm(269.1) TVD(6588.76)
VS(8299.98) NS(-136.64) EW(-8298.86)

#145 MD(14937.00) Inc(91.6) Azm(270.6) TVD(6586.76)
VS(8394.95) NS(-136.95) EW(-8393.84)

#146 MD(15030.00) Inc(91.3) Azm(270.9) TVD(6584.43)
VS(8487.88) NS(-135.75) EW(-8486.80)

#147 MD(15125.00) Inc(90.0) Azm(270.8) TVD(6583.41)
VS(8582.83) NS(-134.32) EW(-8581.78)

#148 MD(15314.00) Inc(88.2) Azm(270.3) TVD(6586.46)
VS(8771.74) NS(-132.46) EW(-8770.74)

#149 MD(15408.00) Inc(89.3) Azm(268.6) TVD(6588.55)
VS(8865.71) NS(-133.30) EW(-8864.71)

#150 MD(15502.00) Inc(90.1) Azm(270.1) TVD(6589.02)
VS(8959.70) NS(-134.30) EW(-8958.70)

#151 MD(15597.00) Inc(89.2) Azm(269.2) TVD(6589.60)
VS(9054.70) NS(-134.84) EW(-9053.69)

#152 MD(15692.00) Inc(90.1) Azm(270.5) TVD(6590.21)
VS(9149.68) NS(-135.08) EW(-9148.69)

#153 MD(15786.00) Inc(88.8) Azm(268.6) TVD(6591.11)
VS(9243.67) NS(-135.80) EW(-9242.67)

#154 MD(15881.00) Inc(90.2) Azm(270.1) TVD(6591.94)
VS(9338.66) NS(-136.82) EW(-9337.66)

#155 MD(15976.00) Inc(87.8) Azm(269.3) TVD(6593.56)
VS(9433.63) NS(-137.25) EW(-9432.64)