ENSIGN Directional

Josephine 19O-314

MD
2":100’

Company: PDC Energy Inc.
Well Name: Joesphine 19O-314
API:
County/Parish: WELD
State: CO
Country: USA
Job number: 158-80
Field: WATTENBERG
Rig Id: Ensign 158
Survey Company: Ensign
Operator: Petroleum Development Corp.
Company Man: Dean Haight/Shane Paris

Daylight DD: Breven Williams
Night DD: TJ Simpson

Daylight MWD: Justin Klatt
Night MWD: Roy Montante

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

	Depth	Date
Start:	0 ft	8/22/2017
End:	ft	

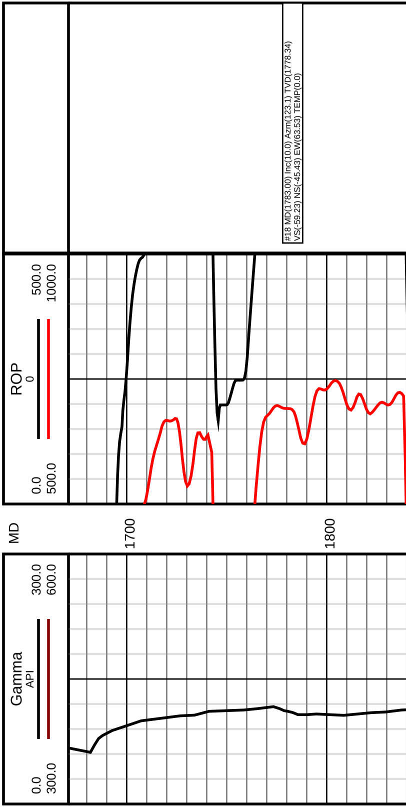
Casing	Depth	Size
Surface:	1695 ft	9 5/8"
Intermediate:		

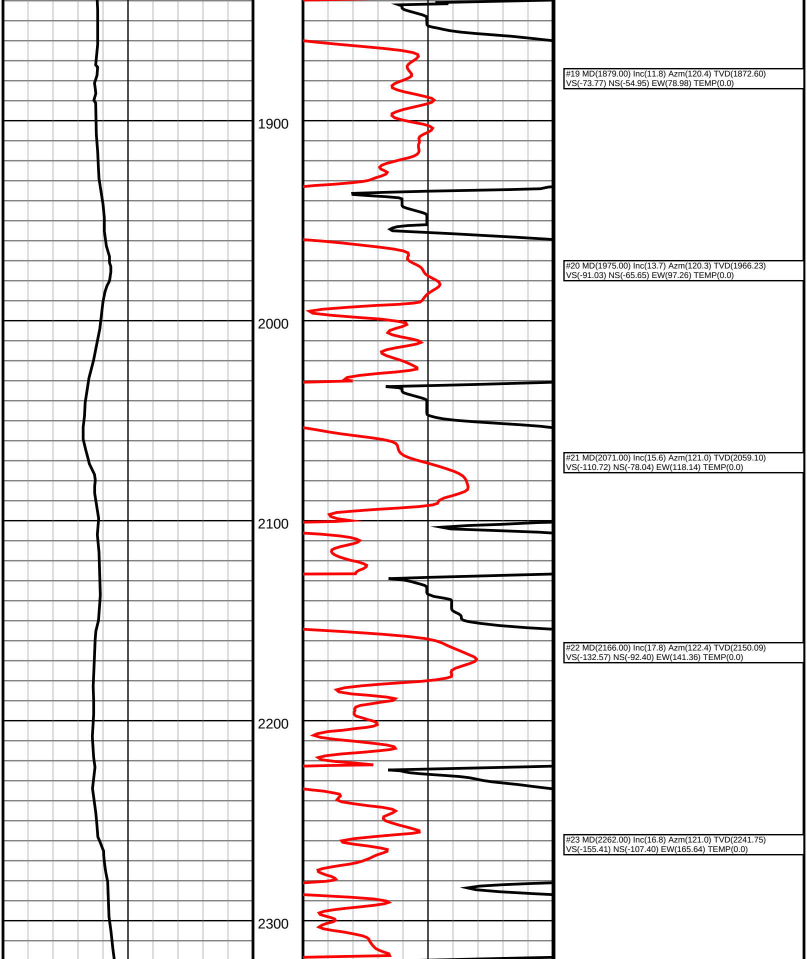
Mud Type: H2O
Density:
Viscosity:
Rm: **Rmf:** **Rmc:**

Elevations
KB: 4649 ft
GL: 4626 ft
DF: 4649 ft

		Offsets		Depths		Dates	
Run	**Bit Size**	**Gamma**	**Survey**	**Start**	**End**	**Start**	**End**
1	12.25"		60.97 ft	0 ft	1695 ft	8/22/2017	08/23/2017
2	8.5"	62.25 ft	57.25 ft	1695 ft		8/24/2017	
3							
4							
5							
6							
7							
8							
9							
10							

Ensign 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.





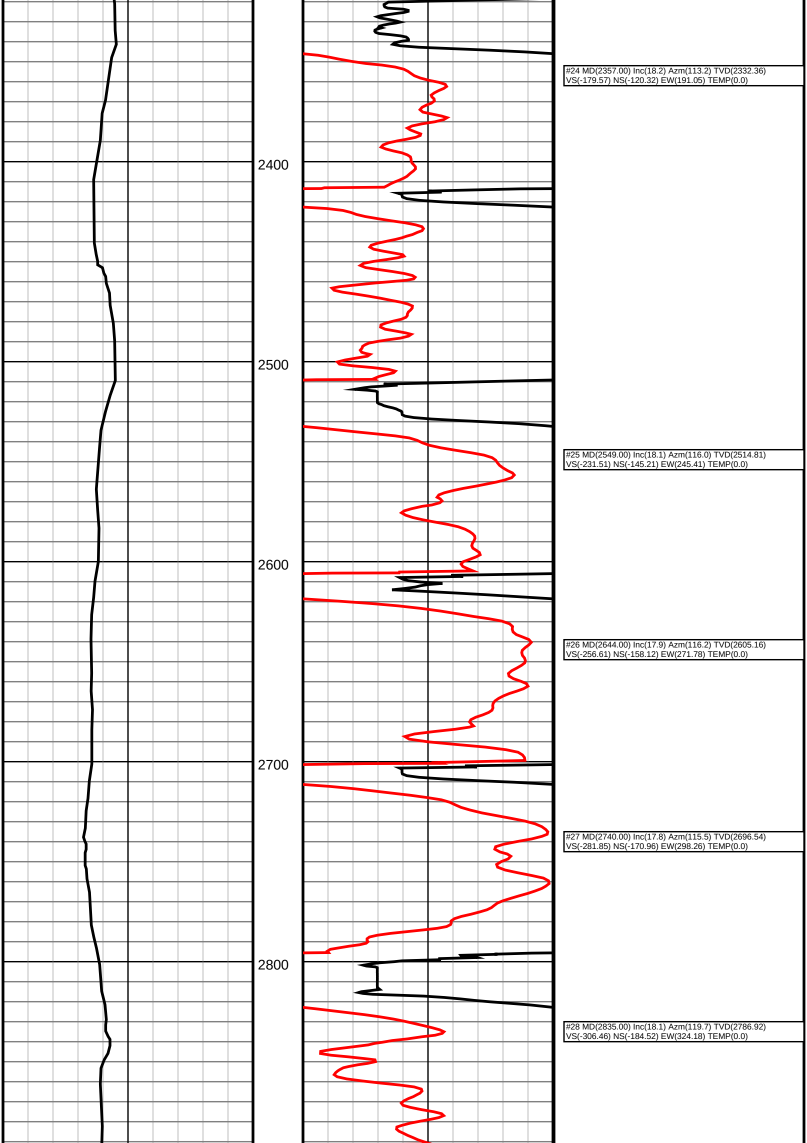
#19 MD(1879.00) Inc(11.8) Azm(120.4) TVD(1872.60)
VS(-73.77) NS(-54.95) EW(78.98) TEMP(0.0)

#20 MD(1975.00) Inc(13.7) Azm(120.3) TVD(1966.23)
VS(-91.03) NS(-65.65) EW(97.26) TEMP(0.0)

#21 MD(2071.00) Inc(15.6) Azm(121.0) TVD(2059.10)
VS(-110.72) NS(-78.04) EW(118.14) TEMP(0.0)

#22 MD(2166.00) Inc(17.8) Azm(122.4) TVD(2150.09)
VS(-132.57) NS(-92.40) EW(141.36) TEMP(0.0)

#23 MD(2262.00) Inc(16.8) Azm(121.0) TVD(2241.75)
VS(-155.41) NS(-107.40) EW(165.64) TEMP(0.0)



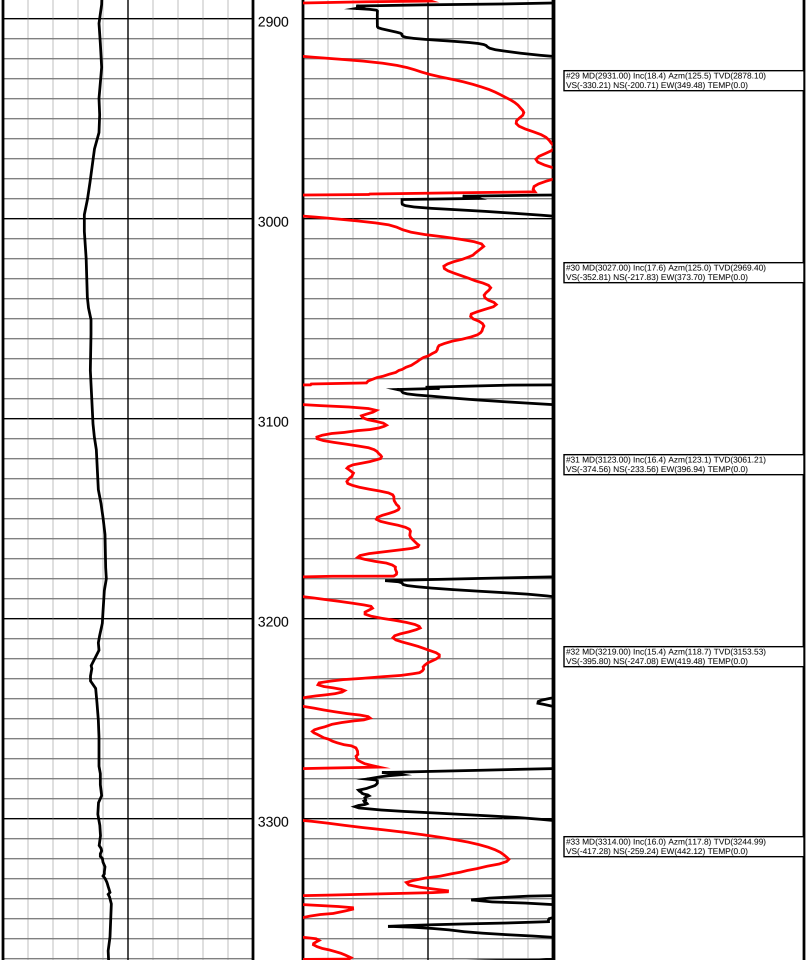
#24 MD(2357.00) Inc(18.2) Azm(113.2) TVD(2332.36)
VS(-179.57) NS(-120.32) EW(191.05) TEMP(0.0)

#25 MD(2549.00) Inc(18.1) Azm(116.0) TVD(2514.81)
VS(-231.51) NS(-145.21) EW(245.41) TEMP(0.0)

#26 MD(2644.00) Inc(17.9) Azm(116.2) TVD(2605.16)
VS(-256.61) NS(-158.12) EW(271.78) TEMP(0.0)

#27 MD(2740.00) Inc(17.8) Azm(115.5) TVD(2696.54)
VS(-281.85) NS(-170.96) EW(298.26) TEMP(0.0)

#28 MD(2835.00) Inc(18.1) Azm(119.7) TVD(2786.92)
VS(-306.46) NS(-184.52) EW(324.18) TEMP(0.0)



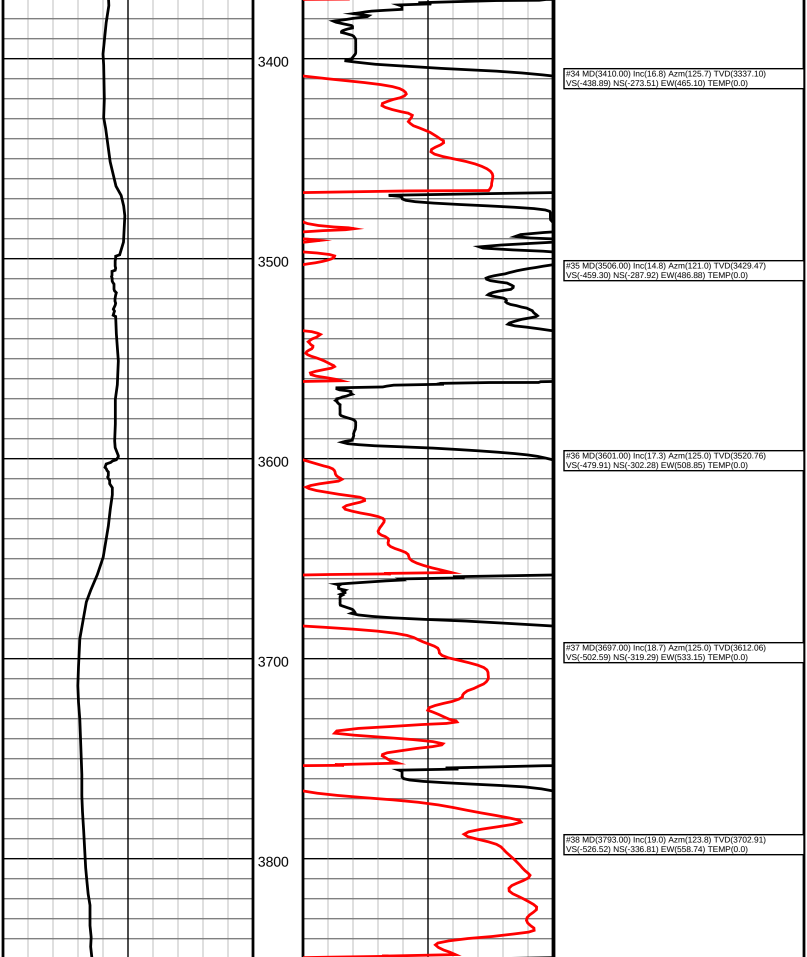
#29 MD(2931.00) Inc(18.4) Azm(125.5) TVD(2878.10)
VS(-330.21) NS(-200.71) EW(349.48) TEMP(0.0)

#30 MD(3027.00) Inc(17.6) Azm(125.0) TVD(2969.40)
VS(-352.81) NS(-217.83) EW(373.70) TEMP(0.0)

#31 MD(3123.00) Inc(16.4) Azm(123.1) TVD(3061.21)
VS(-374.56) NS(-233.56) EW(396.94) TEMP(0.0)

#32 MD(3219.00) Inc(15.4) Azm(118.7) TVD(3153.53)
VS(-395.80) NS(-247.08) EW(419.48) TEMP(0.0)

#33 MD(3314.00) Inc(16.0) Azm(117.8) TVD(3244.99)
VS(-417.28) NS(-259.24) EW(442.12) TEMP(0.0)



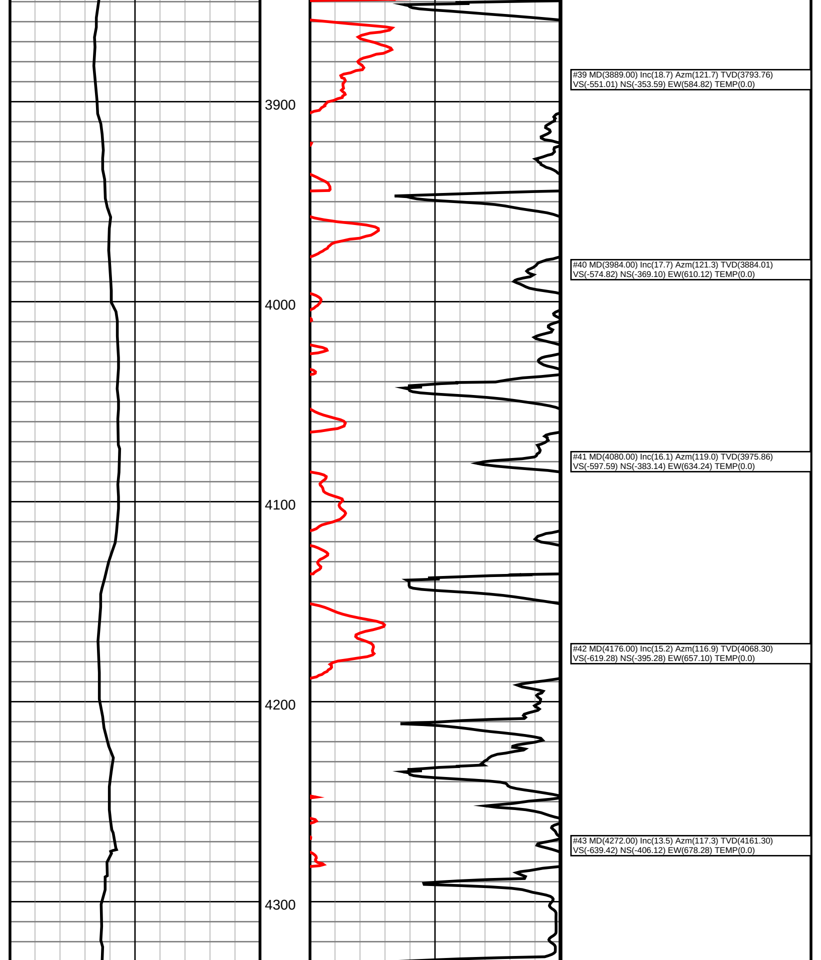
#34 MD(3410.00) Inc(16.8) Azm(125.7) TVD(3337.10)
VS(-438.89) NS(-273.51) EW(465.10) TEMP(0.0)

#35 MD(3506.00) Inc(14.8) Azm(121.0) TVD(3429.47)
VS(-459.30) NS(-287.92) EW(486.88) TEMP(0.0)

#36 MD(3601.00) Inc(17.3) Azm(125.0) TVD(3520.76)
VS(-479.91) NS(-302.28) EW(508.85) TEMP(0.0)

#37 MD(3697.00) Inc(18.7) Azm(125.0) TVD(3612.06)
VS(-502.59) NS(-319.29) EW(533.15) TEMP(0.0)

#38 MD(3793.00) Inc(19.0) Azm(123.8) TVD(3702.91)
VS(-526.52) NS(-336.81) EW(558.74) TEMP(0.0)



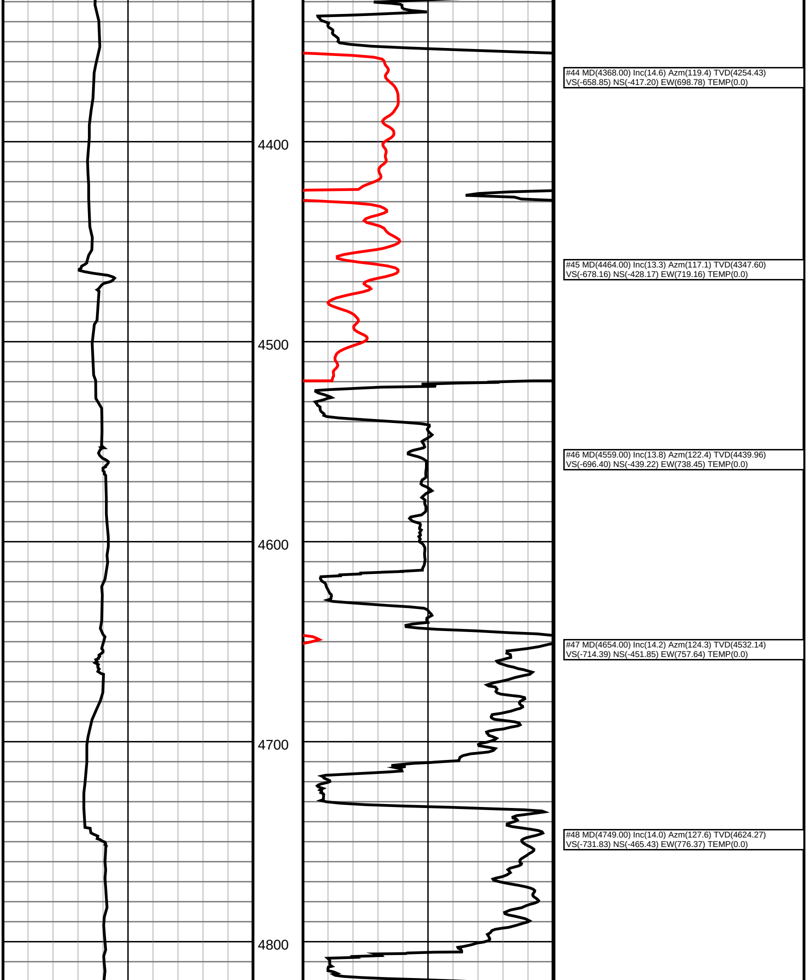
#39 MD(3889.00) Inc(18.7) Azm(121.7) TVD(3793.76)
VS(-551.01) NS(-353.59) EW(584.82) TEMP(0.0)

#40 MD(3984.00) Inc(17.7) Azm(121.3) TVD(3884.01)
VS(-574.82) NS(-369.10) EW(610.12) TEMP(0.0)

#41 MD(4080.00) Inc(16.1) Azm(119.0) TVD(3975.86)
VS(-597.59) NS(-383.14) EW(634.24) TEMP(0.0)

#42 MD(4176.00) Inc(15.2) Azm(116.9) TVD(4068.30)
VS(-619.28) NS(-395.28) EW(657.10) TEMP(0.0)

#43 MD(4272.00) Inc(13.5) Azm(117.3) TVD(4161.30)
VS(-639.42) NS(-406.12) EW(678.28) TEMP(0.0)



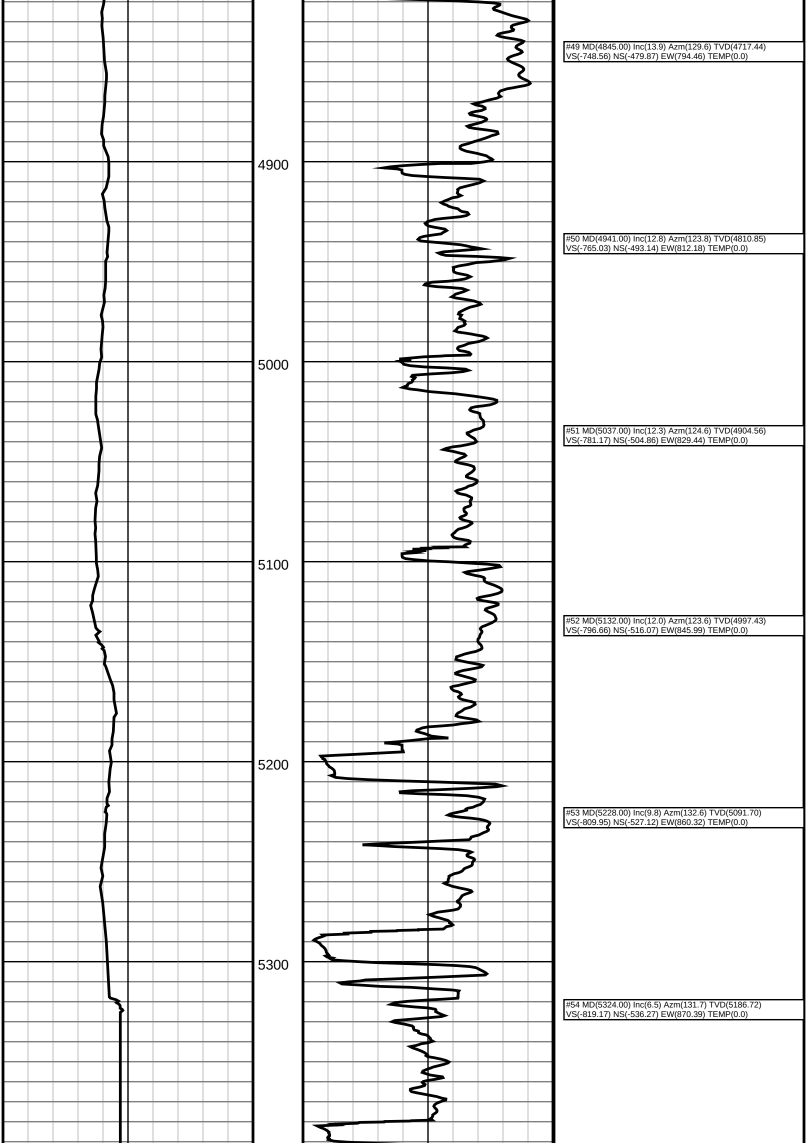
#44 MD(4368.00) Inc(14.6) Azm(119.4) TVD(4254.43)
VS(-658.85) NS(-417.20) EW(698.78) TEMP(0.0)

#45 MD(4464.00) Inc(13.3) Azm(117.1) TVD(4347.60)
VS(-678.16) NS(-428.17) EW(719.16) TEMP(0.0)

#46 MD(4559.00) Inc(13.8) Azm(122.4) TVD(4439.96)
VS(-696.40) NS(-439.22) EW(738.45) TEMP(0.0)

#47 MD(4654.00) Inc(14.2) Azm(124.3) TVD(4532.14)
VS(-714.39) NS(-451.85) EW(757.64) TEMP(0.0)

#48 MD(4749.00) Inc(14.0) Azm(127.6) TVD(4624.27)
VS(-731.83) NS(-465.43) EW(776.37) TEMP(0.0)



#49 MD(4845.00) Inc(13.9) Azm(129.6) TVD(4717.44)
VS(-748.56) NS(-479.87) EW(794.46) TEMP(0.0)

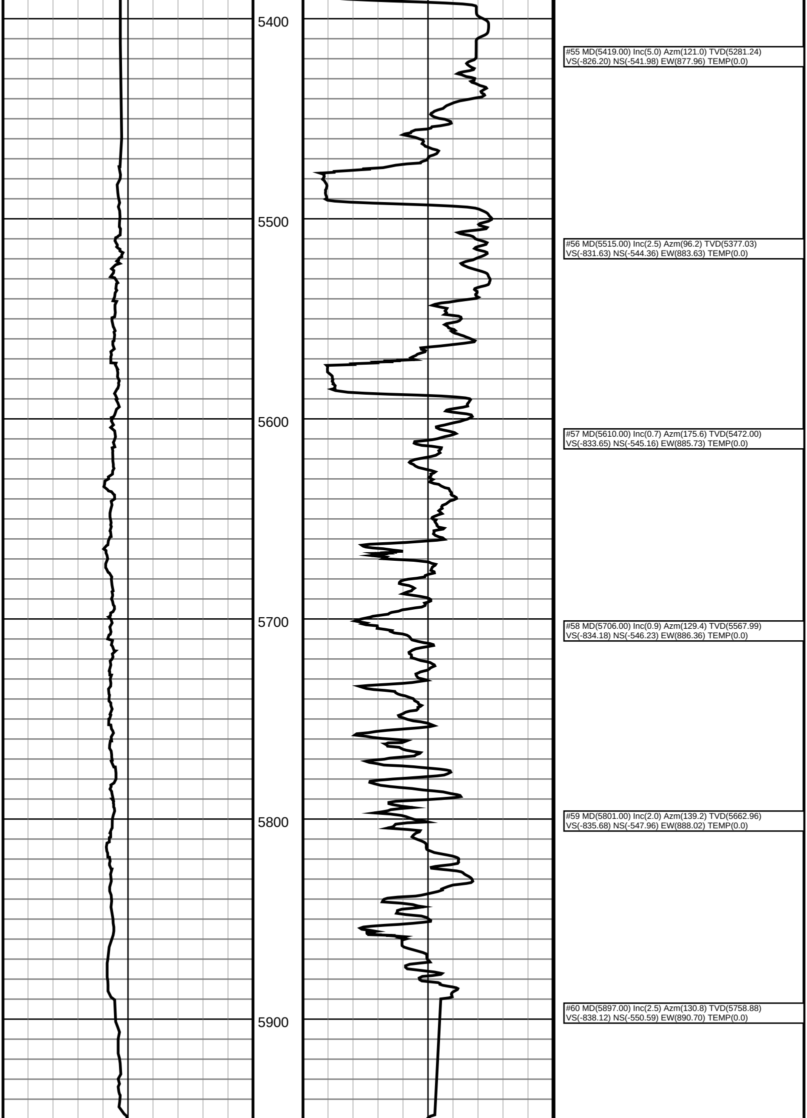
#50 MD(4941.00) Inc(12.8) Azm(123.8) TVD(4810.85)
VS(-765.03) NS(-493.14) EW(812.18) TEMP(0.0)

#51 MD(5037.00) Inc(12.3) Azm(124.6) TVD(4904.56)
VS(-781.17) NS(-504.86) EW(829.44) TEMP(0.0)

#52 MD(5132.00) Inc(12.0) Azm(123.6) TVD(4997.43)
VS(-796.66) NS(-516.07) EW(845.99) TEMP(0.0)

#53 MD(5228.00) Inc(9.8) Azm(132.6) TVD(5091.70)
VS(-809.95) NS(-527.12) EW(860.32) TEMP(0.0)

#54 MD(5324.00) Inc(6.5) Azm(131.7) TVD(5186.72)
VS(-819.17) NS(-536.27) EW(870.39) TEMP(0.0)



#55 MD(5419.00) Inc(5.0) Azm(121.0) TVD(5281.24)
VS(-826.20) NS(-541.98) EW(877.96) TEMP(0.0)

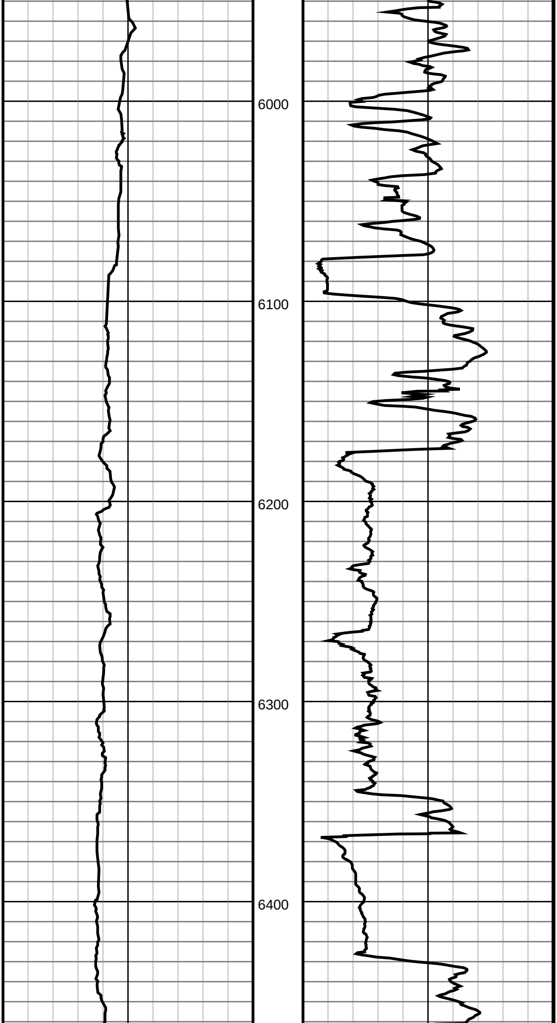
#56 MD(5515.00) Inc(2.5) Azm(96.2) TVD(5377.03)
VS(-831.63) NS(-544.36) EW(883.63) TEMP(0.0)

#57 MD(5610.00) Inc(0.7) Azm(175.6) TVD(5472.00)
VS(-833.65) NS(-545.16) EW(885.73) TEMP(0.0)

#58 MD(5706.00) Inc(0.9) Azm(129.4) TVD(5567.99)
VS(-834.18) NS(-546.23) EW(886.36) TEMP(0.0)

#59 MD(5801.00) Inc(2.0) Azm(139.2) TVD(5662.96)
VS(-835.68) NS(-547.96) EW(888.02) TEMP(0.0)

#60 MD(5897.00) Inc(2.5) Azm(130.8) TVD(5758.88)
VS(-838.12) NS(-550.59) EW(890.70) TEMP(0.0)



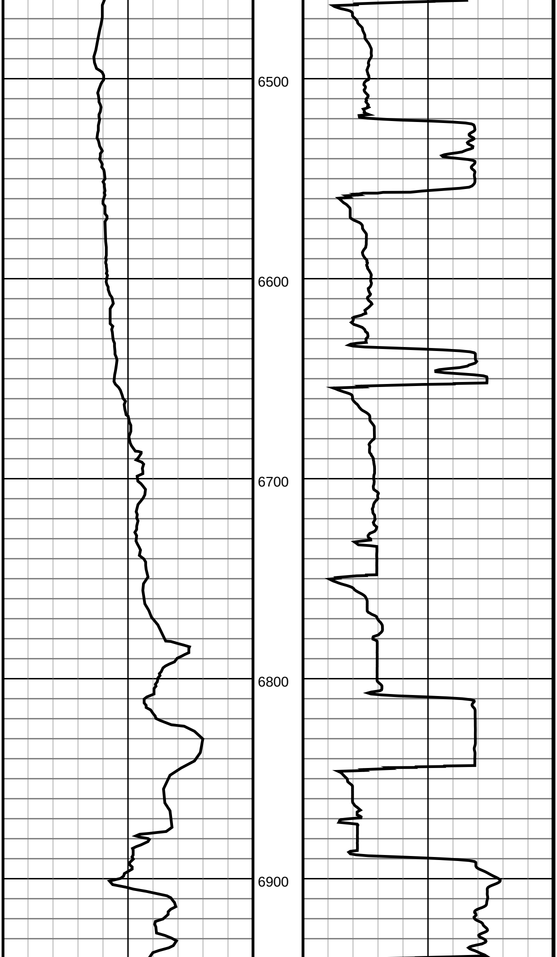
#61 MD(5992.00) Inc(3.0) Azm(122.5) TVD(5853.77)
VS(-841.53) NS(-553.28) EW(894.36) TEMP(0.0)

#62 MD(6118.00) Inc(3.5) Azm(89.8) TVD(5979.58)
VS(-847.97) NS(-555.04) EW(900.99) TEMP(149.3)

#63 MD(6214.00) Inc(1.0) Azm(260.8) TVD(6075.53)
VS(-850.06) NS(-555.16) EW(903.10) TEMP(149.3)

#64 MD(6310.00) Inc(10.9) Azm(265.6) TVD(6170.90)
VS(-840.12) NS(-556.00) EW(893.19) TEMP(149.3)

#65 MD(6405.00) Inc(18.6) Azm(273.0) TVD(6262.71)
VS(-816.10) NS(-555.89) EW(869.07) TEMP(149.3)



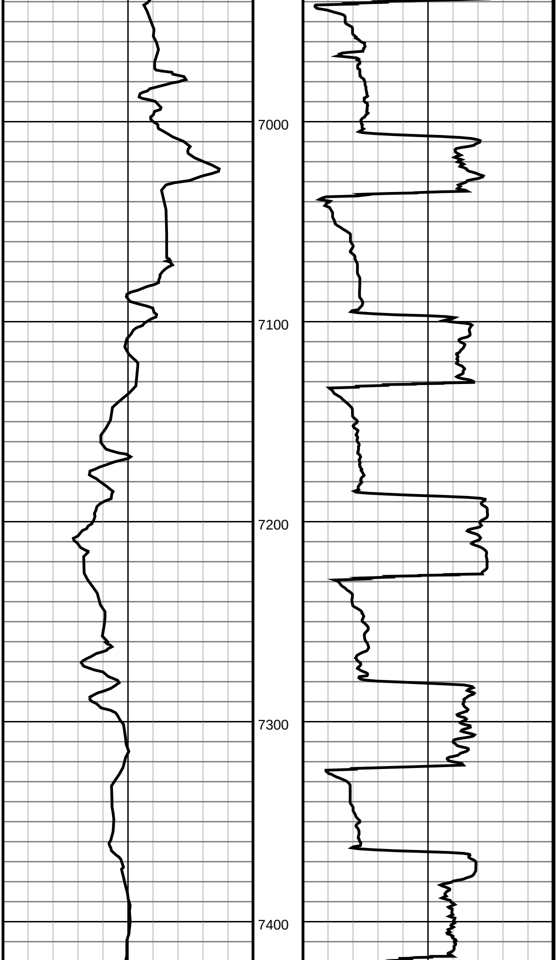
#66 MD(6501.00) Inc(24.0) Azm(274.4) TVD(6352.12)
VS(-781.67) NS(-553.59) EW(834.29) TEMP(149.3)

#67 MD(6597.00) Inc(29.5) Azm(273.2) TVD(6437.81)
VS(-738.99) NS(-550.77) EW(791.19) TEMP(164.1)

#68 MD(6692.00) Inc(38.0) Azm(271.4) TVD(6516.73)
VS(-686.69) NS(-548.75) EW(738.50) TEMP(164.1)

#69 MD(6788.00) Inc(47.7) Azm(273.9) TVD(6587.03)
VS(-622.11) NS(-545.60) EW(673.38) TEMP(164.1)

#70 MD(6883.00) Inc(53.8) Azm(271.4) TVD(6647.12)
VS(-549.25) NS(-542.27) EW(599.93) TEMP(164.1)



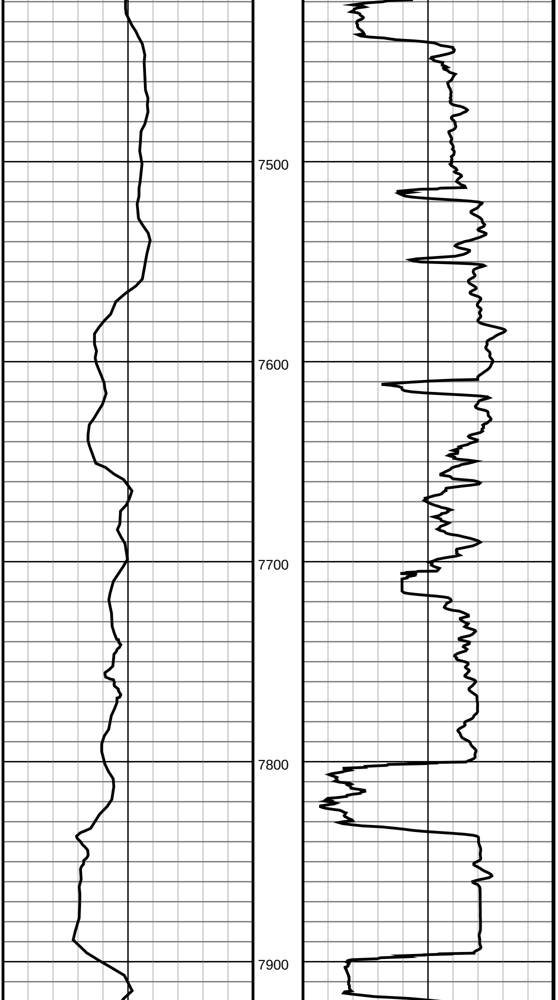
#71 MD(6979.00) Inc(58.9) Azm(267.9) TVD(6700.30)
VS(-469.65) NS(-542.83) EW(520.07) TEMP(164.1)

#72 MD(7075.00) Inc(67.1) Azm(268.8) TVD(6743.85)
VS(-384.35) NS(-545.27) EW(434.64) TEMP(164.1)

#73 MD(7170.00) Inc(75.4) Azm(269.8) TVD(6774.36)
VS(-294.74) NS(-546.35) EW(344.77) TEMP(164.1)

#74 MD(7266.00) Inc(82.2) Azm(272.3) TVD(6793.00)
VS(-201.17) NS(-544.60) EW(250.68) TEMP(164.1)

#75 MD(7361.00) Inc(90.0) Azm(272.1) TVD(6799.46)
VS(-107.24) NS(-540.97) EW(156.04) TEMP(164.1)



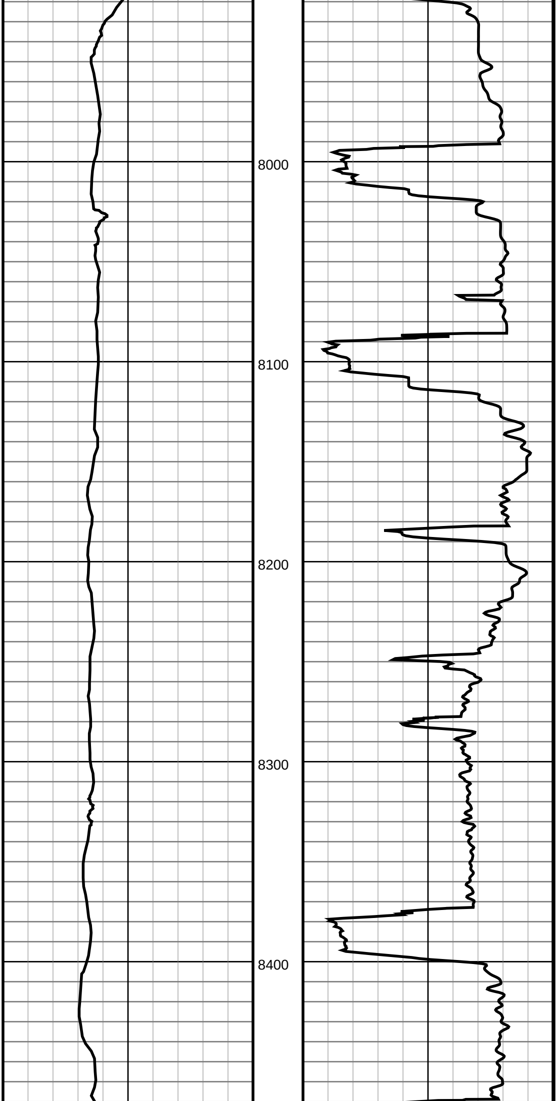
#76 MD(7457.00) Inc(89.4) Azm(269.3) TVD(6799.96)
VS(-11.74) NS(-539.79) EW(60.06) TEMP(164.1)

#77 MD(7553.00) Inc(89.0) Azm(268.6) TVD(6801.30)
VS(84.01) NS(-541.55) EW(-35.92) TEMP(164.1)

#78 MD(7649.00) Inc(89.1) Azm(268.4) TVD(6802.89)
VS(179.80) NS(-544.07) EW(-131.87) TEMP(178.9)

#79 MD(7744.00) Inc(88.2) Azm(268.1) TVD(6805.13)
VS(274.61) NS(-546.97) EW(-226.80) TEMP(178.9)

#80 MD(7840.00) Inc(89.7) Azm(268.3) TVD(6806.89)
VS(370.43) NS(-549.98) EW(-322.73) TEMP(178.9)



#81 MD(7936.00) Inc(92.6) Azm(270.7) TVD(6804.96)
VS(466.09) NS(-550.82) EW(-418.69) TEMP(178.9)

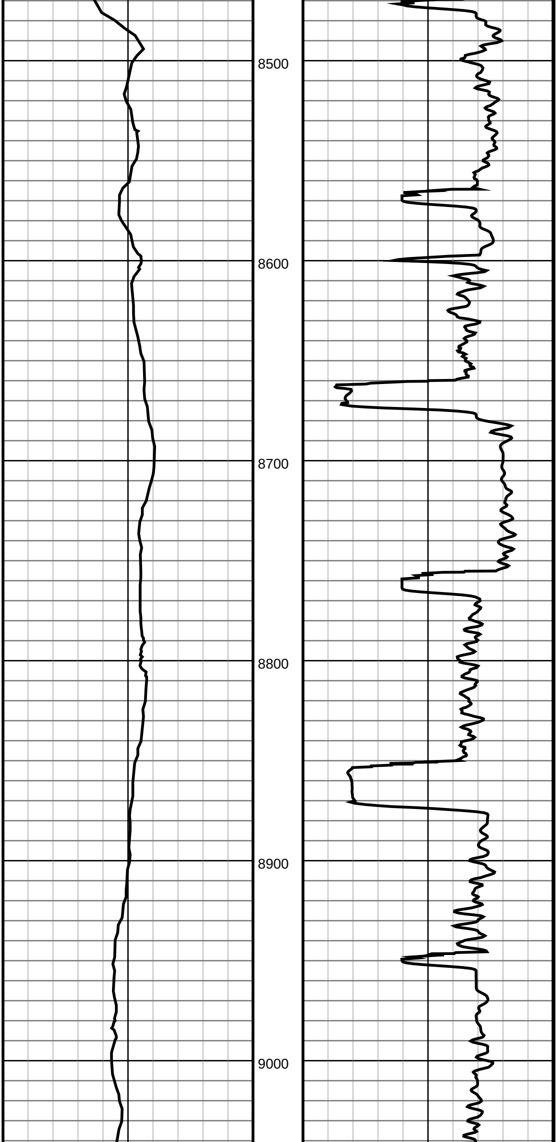
#82 MD(8030.00) Inc(91.1) Azm(271.4) TVD(6801.93)
VS(559.49) NS(-549.10) EW(-512.62) TEMP(178.9)

#83 MD(8126.00) Inc(89.7) Azm(272.3) TVD(6801.26)
VS(654.78) NS(-546.00) EW(-608.57) TEMP(178.9)

#84 MD(8222.00) Inc(89.7) Azm(270.9) TVD(6801.76)
VS(750.12) NS(-543.32) EW(-704.53) TEMP(178.9)

#85 MD(8317.00) Inc(89.8) Azm(269.3) TVD(6802.17)
VS(844.72) NS(-543.15) EW(-799.52) TEMP(178.9)

#86 MD(8413.00) Inc(89.7) Azm(272.0) TVD(6802.59)
VS(940.23) NS(-542.06) EW(-895.51) TEMP(178.9)



#87 MD(8508.00) Inc(89.1) Azm(271.3) TVD(6803.59)
VS(1034.56) NS(-539.33) EW(-990.46) TEMP(178.9)

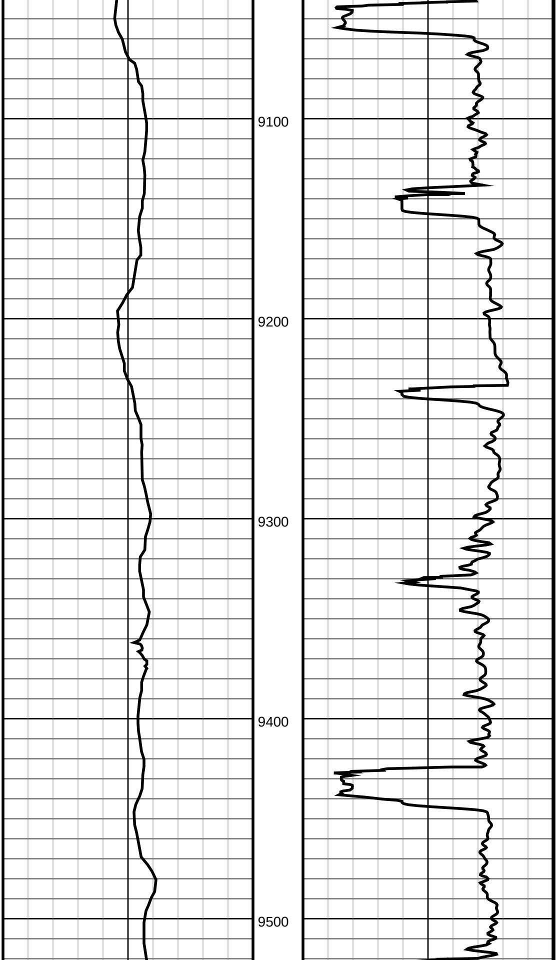
#88 MD(8604.00) Inc(88.6) Azm(271.3) TVD(6805.51)
VS(1129.94) NS(-537.15) EW(-1086.42) TEMP(178.9)

#89 MD(8699.00) Inc(89.3) Azm(271.1) TVD(6807.26)
VS(1224.35) NS(-535.16) EW(-1181.38) TEMP(178.9)

#90 MD(8794.00) Inc(88.2) Azm(271.1) TVD(6809.33)
VS(1318.77) NS(-533.34) EW(-1276.34) TEMP(178.9)

#91 MD(8890.00) Inc(90.6) Azm(272.5) TVD(6810.33)
VS(1414.06) NS(-530.32) EW(-1372.28) TEMP(178.9)

#92 MD(8986.00) Inc(89.9) Azm(272.3) TVD(6809.91)
VS(1509.23) NS(-526.30) EW(-1468.19) TEMP(178.9)



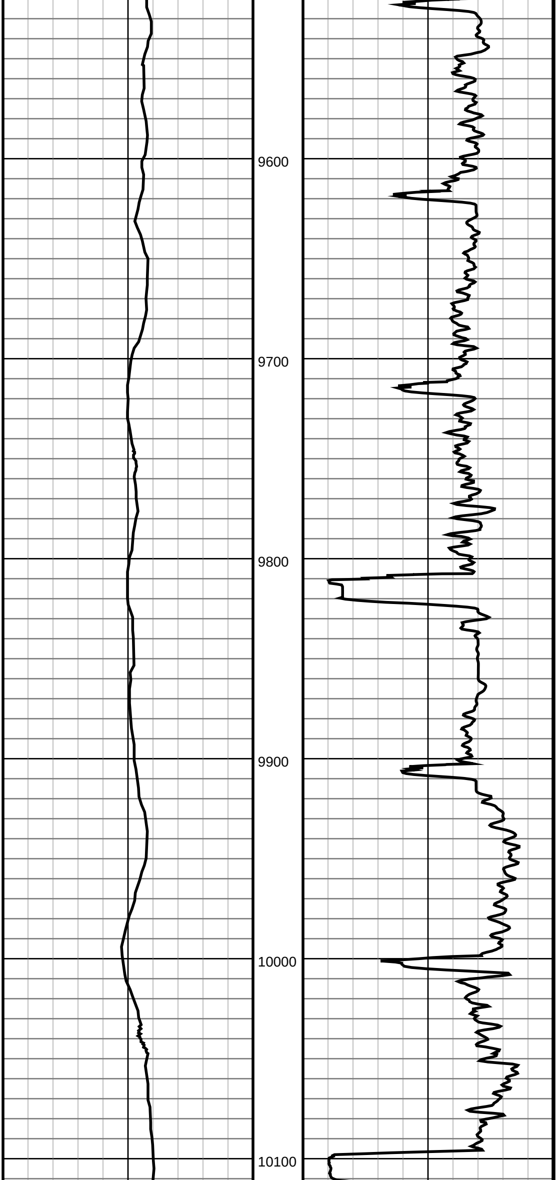
#93 MD(9081.00) Inc(91.5) Azm(271.8) TVD(6808.75)
VS(1603.48) NS(-522.90) EW(-1563.12) TEMP(178.9)

#94 MD(9177.00) Inc(90.7) Azm(271.4) TVD(6806.91)
VS(1698.80) NS(-520.22) EW(-1659.06) TEMP(178.9)

#95 MD(9273.00) Inc(90.4) Azm(271.4) TVD(6805.99)
VS(1794.18) NS(-517.88) EW(-1755.03) TEMP(193.7)

#96 MD(9368.00) Inc(89.8) Azm(271.3) TVD(6805.82)
VS(1888.58) NS(-515.64) EW(-1850.00) TEMP(193.7)

#97 MD(9464.00) Inc(91.2) Azm(270.9) TVD(6804.99)
VS(1984.01) NS(-513.80) EW(-1945.98) TEMP(193.7)



#98 MD(9560.00) Inc(90.7) Azm(270.7) TVD(6803.39)
VS(2079.48) NS(-512.46) EW(-2041.96) TEMP(193.7)

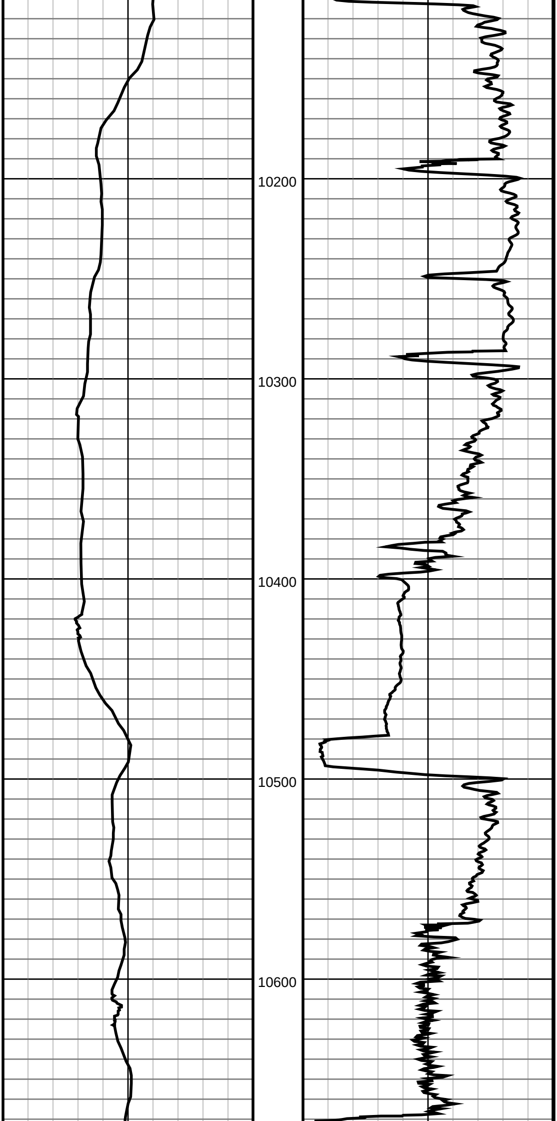
#99 MD(9656.00) Inc(90.2) Azm(270.4) TVD(6802.64)
VS(2175.01) NS(-511.54) EW(-2137.95) TEMP(193.7)

#100 MD(9752.00) Inc(89.7) Azm(270.0) TVD(6802.72)
VS(2270.60) NS(-511.20) EW(-2233.95) TEMP(193.7)

#101 MD(9847.00) Inc(90.9) Azm(270.2) TVD(6802.23)
VS(2365.20) NS(-511.04) EW(-2328.94) TEMP(193.7)

#102 MD(9943.00) Inc(90.1) Azm(269.8) TVD(6801.39)
VS(2460.82) NS(-511.04) EW(-2424.94) TEMP(193.7)

#103 MD(10039.00) Inc(89.8) Azm(270.0) TVD(6801.47)
VS(2556.45) NS(-511.20) EW(-2520.94) TEMP(193.7)



#104 MD(10134.00) Inc(90.7) Azm(270.9) TVD(6801.06)
VS(2651.00) NS(-510.46) EW(-2615.93) TEMP(193.7)

#105 MD(10230.00) Inc(90.6) Azm(270.5) TVD(6799.97)
VS(2746.50) NS(-509.28) EW(-2711.92) TEMP(193.7)

#106 MD(10326.00) Inc(90.9) Azm(270.0) TVD(6798.71)
VS(2842.07) NS(-508.87) EW(-2807.91) TEMP(193.7)

#107 MD(10421.00) Inc(91.3) Azm(269.3) TVD(6796.89)
VS(2936.73) NS(-509.45) EW(-2902.89) TEMP(193.7)

#108 MD(10517.00) Inc(90.0) Azm(270.0) TVD(6795.80)
VS(3032.39) NS(-510.03) EW(-2998.88) TEMP(193.7)

#109 MD(10612.00) Inc(90.7) Azm(269.3) TVD(6795.22)
VS(3127.06) NS(-510.61) EW(-3093.87) TEMP(193.7)

#110 MD(10707.00) Inc(90.1) Azm(270.7) TVD(6794.56)
VS(3221.67) NS(-510.61) EW(-3188.87) TEMP(193.7)

#111 MD(10803.00) Inc(89.0) Azm(270.9) TVD(6795.31)
VS(3317.16) NS(-509.27) EW(-3284.86) TEMP(193.7)

#112 MD(10899.00) Inc(89.2) Azm(270.9) TVD(6796.82)
VS(3412.62) NS(-507.76) EW(-3380.83) TEMP(193.7)

#113 MD(10994.00) Inc(89.3) Azm(270.4) TVD(6798.06)
VS(3507.13) NS(-506.69) EW(-3475.82) TEMP(193.7)

#114 MD(11090.00) Inc(90.1) Azm(271.4) TVD(6798.56)
VS(3602.60) NS(-505.18) EW(-3571.80) TEMP(193.7)

#115 MD(11185.00) Inc(91.0) Azm(271.1) TVD(6797.65)
VS(3697.01) NS(-503.11) EW(-3666.77) TEMP(193.7)

#116 MD(11280.00) Inc(91.9) Azm(270.7) TVD(6795.25)
VS(3791.46) NS(-501.61) EW(-3761.73) TEMP(193.7)

#117 MD(11376.00) Inc(90.4) Azm(271.3) TVD(6793.32)
VS(3886.89) NS(-499.94) EW(-3857.69) TEMP(193.7)

#118 MD(11472.00) Inc(88.9) Azm(271.3) TVD(6793.91)
VS(3982.28) NS(-497.76) EW(-3953.66) TEMP(193.7)

#119 MD(11567.00) Inc(89.9) Azm(271.3) TVD(6794.90)
VS(4076.68) NS(-495.61) EW(-4048.63) TEMP(193.7)

#120 MD(11662.00) Inc(91.2) Azm(271.3) TVD(6793.99)
VS(4171.08) NS(-493.45) EW(-4143.60) TEMP(193.7)

#121 MD(11757.00) Inc(88.9) Azm(271.6) TVD(6793.91)
VS(4265.46) NS(-491.05) EW(-4238.57) TEMP(193.7)

#122 MD(11853.00) Inc(89.4) Azm(271.1) TVD(6795.33)
VS(4360.84) NS(-488.79) EW(-4334.53) TEMP(193.7)

#123 MD(11948.00) Inc(91.2) Azm(271.3) TVD(6794.83)
VS(4455.25) NS(-486.80) EW(-4429.50) TEMP(208.5)

#124 MD(12044.00) Inc(92.3) Azm(270.9) TVD(6791.90)
VS(4550.64) NS(-484.95) EW(-4525.44) TEMP(208.5)

#125 MD(12140.00) Inc(89.6) Azm(271.1) TVD(6790.31)
VS(4646.08) NS(-483.28) EW(-4621.40) TEMP(193.7)

#126 MD(12236.00) Inc(89.1) Azm(270.5) TVD(6791.40)
VS(4741.56) NS(-481.94) EW(-4717.38) TEMP(208.5)

#127 MD(12331.00) Inc(88.5) Azm(270.4) TVD(6793.39)
VS(4836.09) NS(-481.19) EW(-4812.36) TEMP(208.5)

#128 MD(12427.00) Inc(89.5) Azm(269.7) TVD(6795.07)
VS(4931.69) NS(-481.11) EW(-4908.34) TEMP(208.5)

#129 MD(12523.00) Inc(90.6) Azm(267.9) TVD(6794.98)
VS(5027.46) NS(-483.12) EW(-5004.32) TEMP(208.5)

#130 MD(12619.00) Inc(90.4) Azm(268.1) TVD(6794.14)
VS(5123.31) NS(-486.47) EW(-5100.25) TEMP(208.5)

#131 MD(12714.00) Inc(90.7) Azm(267.6) TVD(6793.23)
VS(5218.18) NS(-490.03) EW(-5195.18) TEMP(208.5)

#132 MD(12810.00) Inc(90.3) Azm(267.4) TVD(6792.39)
VS(5314.08) NS(-494.22) EW(-5291.09) TEMP(1.2)

#133 MD(12874.00) Inc(90.0) Azm(267.0) TVD(6792.23)
VS(5378.03) NS(-497.35) EW(-5355.01) TEMP(1.2)