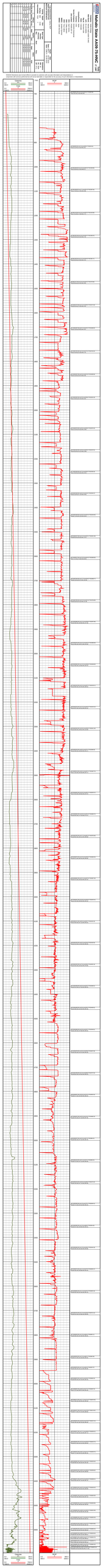

ENSIGN Directional Services

Mahalo State AA09-75-HNC

TVD 2":100'

Company: Noble Energy
Well Name: Mahalo State AA09-75-HNC
API: 05-123-39055
Rig Id: Precision 829
State: Colorado
County/Parish: Weld
Country: USA
Survey Company: ENSIGN Directional
Job number: PD829-207-37
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:	840 ft	02-03-2015
End:	11862 ft	02-09-2015

Casing	Depth	Size
Surface:	830	9 5/8
Intermediate:	7018	7

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

Elevations
KB: 16
GL: 4695
DF: 4711

Run	Bit Size	Offsets		Depths		Dates	
		Gamma	Survey	Start	End	Start	End
1	13.5			0	840	02-02-2015	02-02-2015
2	8.75	55.03	52.03	840	7028	02-03-2015	02-05-2015
3	6.125	62.99	59.99	7028	8427	02-06-2015	02-07-2015
4	6.125	63.42	60.42	8427	11862	02-08-2015	02-09-2015
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(691.00) Inc(1.0) Azm(181.5) TVD(690.96)
VS(5.40) NS(-5.49) EW(2.59)

#3 MD(920.00) Inc(1.5) Azm(205.3) TVD(919.91)
VS(10.15) NS(-10.20) EW(1.25)

#4 MD(1009.00) Inc(1.6) Azm(202.8) TVD(1008.88)
VS(12.38) NS(-12.40) EW(0.27)

#5 MD(1098.00) Inc(1.7) Azm(201.0) TVD(1097.84)
VS(14.79) NS(-14.78) EW(-0.68)

#6 MD(1193.00) Inc(1.8) Azm(203.2) TVD(1192.80)
VS(17.51) NS(-17.46) EW(-1.77)

#7 MD(1287.00) Inc(1.8) Azm(194.7) TVD(1286.75)
VS(20.33) NS(-20.25) EW(-2.73)

#8 MD(1382.00) Inc(1.5) Azm(184.9) TVD(1381.71)
VS(23.03) NS(-22.93) EW(-3.21)

#9 MD(1477.00) Inc(1.6) Azm(194.5) TVD(1476.68)
VS(25.56) NS(-25.45) EW(-3.65)

#10 MD(1572.00) Inc(1.5) Azm(200.5) TVD(1571.64)
VS(28.04) NS(-27.90) EW(-4.42)

#11 MD(1667.00) Inc(0.7) Azm(181.5) TVD(1666.62)
VS(29.79) NS(-29.65) EW(-4.87)

#12 MD(1762.00) Inc(1.3) Azm(172.2) TVD(1761.61)
VS(31.44) NS(-31.29) EW(-4.74)

#13 MD(1857.00) Inc(2.6) Azm(221.8) TVD(1856.56)
VS(34.15) NS(-33.97) EW(-6.03)

#14 MD(1952.00) Inc(2.9) Azm(239.6) TVD(1951.45)
VS(37.09) NS(-36.79) EW(-9.54)

#15 MD(2079.00) Inc(3.8) Azm(239.9) TVD(2078.23)
VS(41.04) NS(-40.53) EW(-15.95)

#16 MD(2169.00) Inc(5.8) Azm(253.5) TVD(2167.91)
VS(44.06) NS(-43.31) EW(-22.89)

#17 MD(2258.00) Inc(7.3) Azm(250.0) TVD(2256.33)
VS(47.60) NS(-46.53) EW(-32.52)

#18 MD(2348.00) Inc(9.4) Azm(244.0) TVD(2345.37)
VS(53.18) NS(-51.70) EW(-44.50)

#19 MD(2438.00) Inc(10.6) Azm(242.4) TVD(2434.00)
VS(60.71) NS(-58.76) EW(-58.44)

#20 MD(2527.00) Inc(11.3) Azm(243.1) TVD(2521.38)
VS(68.95) NS(-66.50) EW(-73.47)

#21 MD(2617.00) Inc(11.8) Azm(244.3) TVD(2609.56)
VS(77.47) NS(-74.48) EW(-89.63)

#22 MD(2706.00) Inc(11.2) Azm(240.6) TVD(2696.77)
VS(86.19) NS(-82.67) EW(-105.36)

#23 MD(2796.00) Inc(12.3) Azm(241.6) TVD(2784.89)
VS(95.58) NS(-91.52) EW(-121.40)

#24 MD(2886.00) Inc(11.3) Azm(238.5) TVD(2872.98)
VS(105.28) NS(-100.69) EW(-137.36)

#25 MD(2975.00) Inc(12.4) Azm(242.4) TVD(2960.09)
VS(114.80) NS(-109.67) EW(-153.26)

#26 MD(3065.00) Inc(11.8) Azm(238.9) TVD(3048.09)
VS(124.58) NS(-118.90) EW(-169.70)

#27 MD(3154.00) Inc(12.4) Azm(237.1) TVD(3135.11)
VS(135.00) NS(-128.79) EW(-185.52)

#28 MD(3244.00) Inc(11.5) Azm(235.3) TVD(3223.16)
VS(145.87) NS(-139.15) EW(-201.01)

#29 MD(3334.00) Inc(10.9) Azm(239.2) TVD(3311.45)
VS(155.83) NS(-148.61) EW(-215.69)

#30 MD(3423.00) Inc(9.6) Azm(237.4) TVD(3399.03)
VS(164.59) NS(-156.92) EW(-229.17)

#31 MD(3513.00) Inc(10.1) Azm(247.1) TVD(3487.70)
VS(172.16) NS(-164.03) EW(-242.77)

#32 MD(3602.00) Inc(10.5) Azm(252.1) TVD(3575.27)
VS(178.19) NS(-169.56) EW(-257.67)

#33 MD(3692.00) Inc(10.8) Azm(251.5) TVD(3663.72)
VS(183.92) NS(-174.76) EW(-273.47)

#34 MD(3782.00) Inc(11.1) Azm(251.3) TVD(3752.08)
VS(189.92) NS(-180.21) EW(-289.68)

#35 MD(3872.00) Inc(12.0) Azm(248.3) TVD(3840.26)
VS(196.72) NS(-186.45) EW(-306.58)

#36 MD(3961.00) Inc(12.1) Azm(247.0) TVD(3927.30)
VS(204.37) NS(-193.52) EW(-323.76)

#37 MD(4051.00) Inc(10.8) Azm(246.0) TVD(4015.51)
VS(212.03) NS(-200.63) EW(-340.15)

#38 MD(4141.00) Inc(9.5) Azm(245.7) TVD(4104.10)
VS(219.00) NS(-207.12) EW(-354.62)

#39 MD(4230.00) Inc(8.3) Azm(234.8) TVD(4192.03)
VS(226.13) NS(-213.84) EW(-366.56)

#40 MD(4320.00) Inc(7.6) Azm(236.0) TVD(4281.16)
VS(233.55) NS(-220.92) EW(-376.80)

#41 MD(4409.00) Inc(6.3) Azm(232.2) TVD(4369.51)
VS(240.12) NS(-227.20) EW(-385.54)

#42 MD(4499.00) Inc(5.8) Azm(235.3) TVD(4459.01)
VS(245.99) NS(-232.82) EW(-393.18)

#43 MD(4589.00) Inc(4.9) Azm(233.7) TVD(4548.61)
VS(251.09) NS(-237.68) EW(-400.02)

#44 MD(4678.00) Inc(3.8) Azm(228.8) TVD(4637.36)
VS(255.46) NS(-241.87) EW(-405.30)

#45 MD(4768.00) Inc(1.6) Azm(208.8) TVD(4727.25)
VS(258.62) NS(-244.94) EW(-408.15)

#46 MD(4857.00) Inc(0.9) Azm(131.5) TVD(4816.24)
VS(260.17) NS(-246.49) EW(-408.23)

#47 MD(4947.00) Inc(0.5) Azm(116.4) TVD(4906.23)
VS(260.78) NS(-247.13) EW(-407.35)

#48 MD(5037.00) Inc(0.3) Azm(67.5) TVD(4996.23)
VS(260.85) NS(-247.22) EW(-406.78)

#49 MD(5126.00) Inc(0.1) Azm(76.1) TVD(5085.23)
VS(260.73) NS(-247.11) EW(-406.49)

#50 MD(5216.00) Inc(0.8) Azm(186.6) TVD(5175.22)
VS(261.34) NS(-247.72) EW(-406.48)

#51 MD(5305.00) Inc(1.0) Azm(170.1) TVD(5264.21)
VS(262.71) NS(-249.10) EW(-406.42)

#52 MD(5395.00) Inc(1.0) Azm(98.5) TVD(5354.20)
VS(263.57) NS(-249.99) EW(-405.51)

#53 MD(5485.00) Inc(1.0) Azm(109.3) TVD(5444.19)
VS(263.90) NS(-250.36) EW(-403.99)

#54 MD(5574.00) Inc(1.1) Azm(107.5) TVD(5533.17)
VS(264.36) NS(-250.88) EW(-402.44)

#55 MD(5664.00) Inc(1.1) Azm(107.4) TVD(5623.16)
VS(264.82) NS(-251.40) EW(-400.79)

#56 MD(5754.00) Inc(1.2) Azm(103.8) TVD(5713.14)
VS(265.24) NS(-251.88) EW(-399.06)

#57 MD(5843.00) Inc(1.6) Azm(98.4) TVD(5802.11)
VS(265.58) NS(-252.28) EW(-396.92)

#58 MD(5933.00) Inc(1.5) Azm(80.1) TVD(5892.08)
VS(265.47) NS(-252.26) EW(-394.52)

#59 MD(5978.00) Inc(1.4) Azm(94.5) TVD(5937.07)
VS(265.38) NS(-252.21) EW(-393.39)

#60 MD(6023.00) Inc(4.0) Azm(164.9) TVD(5982.02)
VS(266.90) NS(-253.76) EW(-392.43)

#61 MD(6067.00) Inc(8.5) Azm(171.5) TVD(6025.75)
VS(271.57) NS(-258.47) EW(-391.55)

#62 MD(6112.00) Inc(11.7) Azm(174.0) TVD(6070.05)
VS(279.36) NS(-266.29) EW(-390.58)

#63 MD(6157.00) Inc(15.2) Azm(178.0) TVD(6113.81)
VS(289.77) NS(-276.73) EW(-389.90)

#64 MD(6202.00) Inc(15.9) Azm(176.9) TVD(6157.16)
VS(301.80) NS(-288.78) EW(-389.36)

#65 MD(6247.00) Inc(17.1) Azm(168.5) TVD(6200.31)
VS(314.37) NS(-301.42) EW(-387.71)

#66 MD(6292.00) Inc(21.8) Azm(169.3) TVD(6242.73)
VS(328.97) NS(-316.12) EW(-384.84)

#67 MD(6337.00) Inc(26.7) Azm(174.7) TVD(6283.75)
VS(347.17) NS(-334.41) EW(-382.35)

#68 MD(6382.00) Inc(31.6) Azm(178.4) TVD(6323.04)
VS(368.98) NS(-356.28) EW(-381.08)

#69 MD(6426.00) Inc(35.0) Azm(180.6) TVD(6359.82)
VS(393.11) NS(-380.43) EW(-380.89)

#70 MD(6471.00) Inc(37.9) Azm(183.0) TVD(6396.01)
VS(419.83) NS(-407.14) EW(-381.75)

#71 MD(6516.00) Inc(42.3) Azm(185.7) TVD(6430.43)
VS(448.78) NS(-436.03) EW(-383.98)

#72 MD(6561.00) Inc(43.9) Azm(186.1) TVD(6463.28)
VS(479.45) NS(-466.61) EW(-387.14)

#73 MD(6606.00) Inc(47.0) Azm(182.4) TVD(6494.85)
VS(511.48) NS(-498.58) EW(-389.49)

#74 MD(6650.00) Inc(48.0) Azm(183.2) TVD(6524.58)
VS(543.92) NS(-530.98) EW(-391.08)

#75 MD(6695.00) Inc(52.7) Azm(181.0) TVD(6553.29)
VS(578.55) NS(-565.59) EW(-392.32)

#76 MD(6740.00) Inc(58.2) Azm(179.1) TVD(6578.80)
VS(615.58) NS(-602.64) EW(-392.34)

#77 MD(6785.00) Inc(64.3) Azm(176.6) TVD(6600.44)
VS(654.90) NS(-642.04) EW(-390.83)

#78 MD(6830.00) Inc(68.0) Azm(177.2) TVD(6618.63)
VS(695.90) NS(-683.13) EW(-388.61)

#79 MD(6874.00) Inc(68.9) Azm(177.2) TVD(6634.79)
VS(736.68) NS(-724.01) EW(-386.61)

#80 MD(6919.00) Inc(72.2) Azm(177.2) TVD(6649.77)
VS(778.96) NS(-766.38) EW(-384.54)

#82 MD(6982.00) Inc(80.9) Azm(178.1) TVD(6664.26)
VS(840.02) NS(-827.57) EW(-381.85)

#140 MD(11800.00) Inc(91.4) Azm(178.8) TVD(6676.15)
VS(5636.24) NS(-5633.46) EW(-177.60)