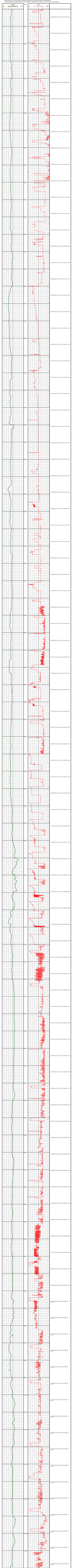

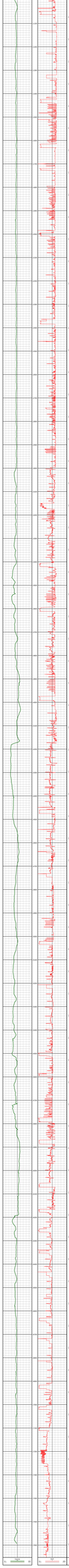

ENSIGN
Directional Services

Ward U-20-19HN

MD
2":100'

Company: Bayswater
Well Name: Ward U-20-19HN
API: 05-123-43653
County/Parish: Weld
State: Colorado
Country: USA
Job number: T38-04-207
Field: DJ Basin
Rig Id: True 38
Survey Company: Ensign Energy Inc
DAY COMPANY MAN Marsh Wing
NIGHT COMPANY MAN Mark Stoner
DIR. DRILLER DAY Tyler Batchelder
DIR. DRILLER NIGHT Pete Moriarty
LWD/MWD DAY Paul Seevers Jr
LWD/MWD NIGHT Chad Anderson

Log measurements:
Depth measured from:
Maximum temperature:

	Depth	Date
Start:	0 ft	09/12/2017
End:	17652 ft	09/20/2017

Casing	Depth	Size
Surface:	1555 ft	9 5/8"
Intermediate:		

Mud Type: OIL BASED MUD
Density: 8.5
Viscosity: 35
Rm: N/A **Rmf:** N/A **Rmc:** N/A

Elevations
KB: 25 ft
GL: 4728 ft
DF: 4753 ft

Run	Bit Size	Offsets		Depths		Dates	
		Gamma	Survey	Start	End	Start	End
1	13.5"	67.00 ft	62.00 ft	0 ft	1555 ft	6/27/2017	6/27/2017
2	8.5"	62.00 ft	57.00 ft	1555 ft	15797 ft	9/12/17	9/18/2017
3	8.5"	58.00 ft	53.00 ft	15797 ft	17652 ft	9/18/2017	9/20/2017
4							
5							
6							
7							
8							
9							
10							

Ensign Energy Inc 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.

#22 MD(2046.00) Inc(4.1) Azm(45.1) TVD(2045.43) DLS(0.5)

#23 MD(2140.00) Inc(5.1) Azm(52.3) TVD(2139.13) DLS(1.2)

#24 MD(2235.00) Inc(6.0) Azm(50.6) TVD(2233.68) DLS(1.0)

#25 MD(2329.00) Inc(7.5) Azm(48.1) TVD(2327.03) DLS(1.6)

#26 MD(2424.00) Inc(9.5) Azm(53.0) TVD(2420.98) DLS(2.2)

#27 MD(2518.00) Inc(10.7) Azm(55.9) TVD(2513.52) DLS(1.4)

#28 MD(2614.00) Inc(11.0) Azm(54.1) TVD(2607.81) DLS(0.5)

#29 MD(2708.00) Inc(11.7) Azm(48.5) TVD(2699.97) DLS(1.4)

#30 MD(2802.00) Inc(10.6) Azm(47.9) TVD(2792.20) DLS(1.2)

#31 MD(2897.00) Inc(10.4) Azm(45.7) TVD(2885.61) DLS(0.5)

#32 MD(2991.00) Inc(10.3) Azm(44.6) TVD(2978.08) DLS(0.2)

#33 MD(3086.00) Inc(9.8) Azm(43.7) TVD(3071.62) DLS(0.6)

#34 MD(3180.00) Inc(9.1) Azm(40.2) TVD(3164.34) DLS(1.0)

#35 MD(3275.00) Inc(8.9) Azm(42.8) TVD(3258.17) DLS(0.5)

#36 MD(3369.00) Inc(10.5) Azm(45.7) TVD(3350.83) DLS(1.8)

#37 MD(3464.00) Inc(10.0) Azm(43.9) TVD(3444.31) DLS(0.6)

#38 MD(3558.00) Inc(9.4) Azm(42.0) TVD(3536.97) DLS(0.7)

#39 MD(3652.00) Inc(11.7) Azm(39.7) TVD(3629.37) DLS(2.5)

#40 MD(3747.00) Inc(12.0) Azm(37.0) TVD(3722.35) DLS(0.7)

#41 MD(3842.00) Inc(12.2) Azm(35.6) TVD(3815.24) DLS(0.4)

#42 MD(3936.00) Inc(11.9) Azm(43.4) TVD(3907.17) DLS(1.8)

#43 MD(4031.00) Inc(11.2) Azm(43.0) TVD(4000.25) DLS(0.7)

#44 MD(4126.00) Inc(10.6) Azm(42.3) TVD(4093.53) DLS(0.6)

#45 MD(4220.00) Inc(10.5) Azm(42.0) TVD(4185.95) DLS(0.1)

#46 MD(4315.00) Inc(10.3) Azm(41.8) TVD(4279.38) DLS(0.2)

#47 MD(4409.00) Inc(10.1) Azm(41.1) TVD(4371.90) DLS(0.3)

#48 MD(4504.00) Inc(9.5) Azm(39.7) TVD(4465.51) DLS(0.7)

#49 MD(4599.00) Inc(8.6) Azm(38.6) TVD(4559.33) DLS(1.0)

#50 MD(4694.00) Inc(9.7) Azm(47.6) TVD(4653.12) DLS(1.9)

#51 MD(4789.00) Inc(9.2) Azm(44.3) TVD(4746.83) DLS(0.8)

#52 MD(4884.00) Inc(10.2) Azm(46.4) TVD(4840.48) DLS(1.1)

#53 MD(4979.00) Inc(9.8) Azm(45.7) TVD(4934.03) DLS(0.4)

#54 MD(5074.00) Inc(9.1) Azm(44.1) TVD(5027.74) DLS(0.8)

#55 MD(5169.00) Inc(10.1) Azm(42.0) TVD(5121.41) DLS(1.1)

#56 MD(5264.00) Inc(9.2) Azm(38.6) TVD(5215.07) DLS(1.1)

#57 MD(5358.00) Inc(10.1) Azm(43.4) TVD(5307.74) DLS(1.3)

#58 MD(5453.00) Inc(9.1) Azm(40.7) TVD(5401.41) DLS(1.2)

#59 MD(5547.00) Inc(8.3) Azm(39.0) TVD(5494.32) DLS(0.9)

#60 MD(5646.00) Inc(7.4) Azm(35.5) TVD(5592.40) DLS(1.0)

#61 MD(5741.00) Inc(6.5) Azm(33.4) TVD(5686.70) DLS(1.0)

#62 MD(5835.00) Inc(5.6) Azm(41.1) TVD(5780.17) DLS(1.3)

#63 MD(5929.00) Inc(4.9) Azm(52.5) TVD(5873.78) DLS(1.3)

#64 MD(6054.00) Inc(2.2) Azm(36.0) TVD(5998.53) DLS(2.3)

#65 MD(6147.00) Inc(0.4) Azm(266.8) TVD(6091.51) DLS(2.7)

#66 MD(6242.00) Inc(0.4) Azm(310.4) TVD(6186.51) DLS(0.3)

#67 MD(6337.00) Inc(6.2) Azm(274.3) TVD(6281.31) DLS(6.2)

#68 MD(6432.00) Inc(14.3) Azm(277.9) TVD(6374.72) DLS(8.5)

#69 MD(6526.00) Inc(19.5) Azm(266.3) TVD(6464.66) DLS(6.6)

#70 MD(6621.00) Inc(25.4) Azm(270.8) TVD(6552.42) DLS(6.5)

#71 MD(6716.00) Inc(32.6) Azm(270.0) TVD(6635.46) DLS(7.6)

#72 MD(6810.00) Inc(40.1) Azm(266.1) TVD(6711.12) DLS(8.3)

#73 MD(6905.00) Inc(46.8) Azm(268.0) TVD(6780.05) DLS(7.2)

#74 MD(7000.00) Inc(55.7) Azm(271.4) TVD(6839.47) DLS(9.8)

#75 MD(7095.00) Inc(64.4) Azm(271.2) TVD(6886.85) DLS(9.2)

#76 MD(7190.00) Inc(72.1) Azm(267.7) TVD(6922.04) DLS(8.8)

#77 MD(7284.00) Inc(78.3) Azm(266.3) TVD(6946.04) DLS(6.8)

#78 MD(7379.00) Inc(85.6) Azm(265.2) TVD(6959.33) DLS(7.8)

#79 MD(7474.00) Inc(90.1) Azm(267.5) TVD(6962.90) DLS(5.3)

#80 MD(7569.00) Inc(89.7) Azm(267.1) TVD(6963.06) DLS(0.6)

#81 MD(7663.00) Inc(90.3) Azm(268.2) TVD(6963.06) DLS(1.3)

#82 MD(7758.00) Inc(90.2) Azm(267.8) TVD(6962.65) DLS(0.4)

#83 MD(7853.00) Inc(90.5) Azm(268.5) TVD(6962.07) DLS(0.8)

#84 MD(7947.00) Inc(90.6) Azm(268.0) TVD(6961.16) DLS(0.5)

#85 MD(8042.00) Inc(90.5) Azm(267.5) TVD(6960.25) DLS(0.5)

#86 MD(8136.00) Inc(90.3) Azm(267.3) TVD(6959.60) DLS(0.3)

#87 MD(8231.00) Inc(90.1) Azm(269.3) TVD(6959.27) DLS(2.1)

#88 MD(8326.00) Inc(90.1) Azm(268.2) TVD(6959.10) DLS(1.2)

#89 MD(8421.00) Inc(90.6) Azm(269.4) TVD(6958.52) DLS(1.4)

#90 MD(8515.00) Inc(90.9) Azm(270.0) TVD(6957.29) DLS(0.7)

#91 MD(8610.00) Inc(90.7) Azm(269.8) TVD(6955.96) DLS(0.3)

#92 MD(8705.00) Inc(90.7) Azm(269.6) TVD(6954.80) DLS(0.2)

#93 MD(8799.00) Inc(90.4) Azm(270.3) TVD(6953.90) DLS(0.8)

#94 MD(8894.00) Inc(90.0) Azm(269.6) TVD(6953.57) DLS(0.8)

#95 MD(8989.00) Inc(90.0) Azm(269.4) TVD(6953.57) DLS(0.2)

#96 MD(9083.00) Inc(89.5) Azm(268.9) TVD(6953.98) DLS(0.8)

#97 MD(9178.00) Inc(89.2) Azm(269.1) TVD(6955.06) DLS(0.4)

#98 MD(9273.00) Inc(90.6) Azm(267.7) TVD(6955.22) DLS(2.1)

#99 MD(9368.00) Inc(90.4) Azm(266.3) TVD(6954.39) DLS(1.5)

#100 MD(9463.00) Inc(90.6) Azm(268.5) TVD(6953.56) DLS(2.3)

#101 MD(9557.00) Inc(90.2) Azm(267.8) TVD(6952.91) DLS(0.9)

#102 MD(9652.00) Inc(89.8) Azm(267.3) TVD(6952.91) DLS(0.7)

#103 MD(9746.00) Inc(90.3) Azm(268.9) TVD(6952.82) DLS(1.8)

#104 MD(9841.00) Inc(89.4) Azm(268.5) TVD(6953.07) DLS(1.0)

#105 MD(9936.00) Inc(90.7) Azm(268.7) TVD(6952.99) DLS(1.4)

#106 MD(10031.00) Inc(90.2) Azm(268.5) TVD(6952.24) DLS(0.6)

#107 MD(10126.00) Inc(89.9) Azm(268.2) TVD(6952.16) DLS(0.4)

#108 MD(10221.00) Inc(89.2) Azm(267.3) TVD(6952.91) DLS(1.2)

#109 MD(10315.00) Inc(90.2) Azm(269.4) TVD(6953.40) DLS(2.5)

#110 MD(10410.00) Inc(90.0) Azm(269.6) TVD(6953.23) DLS(0.3)

#111 MD(10505.00) Inc(90.5) Azm(269.3) TVD(6952.82) DLS(0.6)

#112 MD(10599.00) Inc(90.2) Azm(269.1) TVD(6952.25) DLS(0.4)

#113 MD(10694.00) Inc(92.8) Azm(269.4) TVD(6949.76) DLS(2.8)

#114 MD(10789.00) Inc(90.6) Azm(269.4) TVD(6946.94) DLS(2.3)

#115 MD(10884.00) Inc(90.3) Azm(269.1) TVD(6946.19) DLS(0.4)

#116 MD(10978.00) Inc(89.6) Azm(268.5) TVD(6946.28) DLS(1.0)

#117 MD(11073.00) Inc(90.7) Azm(268.5) TVD(6946.03)
DLS(1.2)

#118 MD(11168.00) Inc(90.7) Azm(267.8) TVD(6944.87)
DLS(0.7)

#119 MD(11263.00) Inc(90.7) Azm(267.8) TVD(6943.71)
DLS(0.0)

#120 MD(11358.00) Inc(90.1) Azm(267.1) TVD(6943.04)
DLS(1.0)

#121 MD(11453.00) Inc(90.8) Azm(268.9) TVD(6942.30)
DLS(2.0)

#122 MD(11547.00) Inc(90.4) Azm(268.0) TVD(6941.31)
DLS(1.0)

#123 MD(11642.00) Inc(90.7) Azm(270.8) TVD(6940.40)
DLS(3.0)

#124 MD(11737.00) Inc(91.0) Azm(270.1) TVD(6938.99)
DLS(0.8)

#125 MD(11832.00) Inc(90.7) Azm(268.5) TVD(6937.58)
DLS(1.7)

#126 MD(11927.00) Inc(90.3) Azm(268.0) TVD(6936.75)
DLS(0.7)

#127 MD(12021.00) Inc(90.1) Azm(270.0) TVD(6936.42)
DLS(2.1)

#128 MD(12116.00) Inc(89.8) Azm(268.4) TVD(6936.51)
DLS(1.7)

#129 MD(12211.00) Inc(89.8) Azm(268.0) TVD(6936.84)
DLS(0.4)

#130 MD(12306.00) Inc(90.2) Azm(267.5) TVD(6936.84)
DLS(0.7)

#131 MD(12401.00) Inc(89.9) Azm(269.6) TVD(6936.76)
DLS(2.2)

#132 MD(12496.00) Inc(90.3) Azm(269.4) TVD(6936.59)
DLS(0.5)

#133 MD(12590.00) Inc(90.0) Azm(268.9) TVD(6936.34)
DLS(0.6)

#134 MD(12685.00) Inc(90.2) Azm(268.7) TVD(6936.18)
DLS(0.3)

#135 MD(12780.00) Inc(90.4) Azm(268.5) TVD(6935.68)
DLS(0.3)

#136 MD(12875.00) Inc(90.6) Azm(268.4) TVD(6934.85)
DLS(0.2)

#137 MD(12969.00) Inc(90.0) Azm(268.5) TVD(6934.36)
DLS(0.6)

#138 MD(13064.00) Inc(90.0) Azm(268.0) TVD(6934.36)
DLS(0.5)

#139 MD(13159.00) Inc(90.7) Azm(267.8) TVD(6933.78)
DLS(0.8)

#140 MD(13253.00) Inc(90.3) Azm(266.8) TVD(6932.96)
DLS(1.1)

#141 MD(13348.00) Inc(90.6) Azm(266.8) TVD(6932.21)
DLS(0.3)

#142 MD(13443.00) Inc(90.5) Azm(268.5) TVD(6931.30)
DLS(1.8)

#143 MD(13538.00) Inc(89.7) Azm(267.5) TVD(6931.14)
DLS(1.3)

#144 MD(13633.00) Inc(90.4) Azm(269.8) TVD(6931.05)
DLS(2.5)

#145 MD(13728.00) Inc(90.0) Azm(268.9) TVD(6930.72)
DLS(1.0)

#146 MD(13823.00) Inc(89.7) Azm(268.0) TVD(6930.97)
DLS(1.0)

#147 MD(13917.00) Inc(89.1) Azm(267.5) TVD(6931.95)
DLS(0.8)

#148 MD(14012.00) Inc(90.1) Azm(268.7) TVD(6932.62)
DLS(1.6)

#149 MD(14107.00) Inc(90.3) Azm(268.9) TVD(6932.29)
DLS(0.3)

#150 MD(14202.00) Inc(90.4) Azm(268.5) TVD(6931.71)
DLS(0.4)

#151 MD(14296.00) Inc(90.7) Azm(267.7) TVD(6930.80)
DLS(0.9)

#152 MD(14391.00) Inc(90.7) Azm(267.0) TVD(6929.64)
DLS(0.7)

#153 MD(14486.00) Inc(89.9) Azm(268.9) TVD(6929.15)
DLS(2.2)

#154 MD(14581.00) Inc(90.3) Azm(268.7) TVD(6928.98)
DLS(0.5)

#155 MD(14675.00) Inc(90.0) Azm(267.5) TVD(6928.73)
DLS(1.3)

#156 MD(14770.00) Inc(90.5) Azm(267.8) TVD(6928.32)
DLS(0.6)

#157 MD(14865.00) Inc(90.7) Azm(267.1) TVD(6927.32)
DLS(0.8)

#158 MD(14960.00) Inc(91.1) Azm(267.0) TVD(6925.83)
DLS(0.4)

#159 MD(15054.00) Inc(90.0) Azm(268.2) TVD(6924.93)
DLS(1.7)

#160 MD(15149.00) Inc(90.1) Azm(267.7) TVD(6924.85)
DLS(0.5)

#161 MD(15244.00) Inc(90.3) Azm(267.3) TVD(6924.51)
DLS(0.5)

#162 MD(15338.00) Inc(90.7) Azm(267.3) TVD(6923.69)
DLS(0.4)

#163 MD(15433.00) Inc(91.0) Azm(266.8) TVD(6922.29)
DLS(0.6)

#164 MD(15528.00) Inc(89.1) Azm(267.3) TVD(6922.20)
DLS(2.1)

#165 MD(15623.00) Inc(89.9) Azm(267.8) TVD(6923.03)
DLS(1.0)

#166 MD(15717.00) Inc(89.2) Azm(266.6) TVD(6923.77)
DLS(1.5)

#167 MD(15809.00) Inc(88.8) Azm(267.3) TVD(6925.38)
DLS(0.9)

#168 MD(15904.00) Inc(90.5) Azm(268.7) TVD(6925.96)
DLS(2.3)

#169 MD(15999.00) Inc(89.8) Azm(269.1) TVD(6925.71)
DLS(0.8)

#170 MD(16094.00) Inc(91.8) Azm(269.3) TVD(6924.38)
DLS(2.1)

#171 MD(16189.00) Inc(92.9) Azm(267.3) TVD(6920.48)
DLS(2.4)

#172 MD(16283.00) Inc(91.5) Azm(266.3) TVD(6916.88)
DLS(1.8)

#173 MD(16378.00) Inc(90.3) Azm(265.9) TVD(6915.38)
DLS(1.3)

#174 MD(16473.00) Inc(90.5) Azm(266.3) TVD(6914.72)
DLS(0.5)

#175 MD(16568.00) Inc(90.7) Azm(268.2) TVD(6913.73)
DLS(2.0)

#176 MD(16663.00) Inc(90.3) Azm(266.6) TVD(6912.90)
DLS(1.7)

#177 MD(16757.00) Inc(90.1) Azm(267.1) TVD(6912.57)
DLS(0.6)

#178 MD(16852.00) Inc(89.8) Azm(267.5) TVD(6912.65)
DLS(0.5)

#179 MD(16947.00) Inc(91.8) Azm(266.1) TVD(6911.33)
DLS(2.6)

#180 MD(17042.00) Inc(89.3) Azm(266.8) TVD(6910.41)
DLS(2.7)

#181 MD(17137.00) Inc(90.7) Azm(265.4) TVD(6910.41)
DLS(2.1)

#182 MD(17232.00) Inc(90.2) Azm(266.3) TVD(6909.67)
DLS(1.1)

#183 MD(17326.00) Inc(89.7) Azm(266.1) TVD(6909.75)
DLS(0.6)

#184 MD(17421.00) Inc(90.0) Azm(267.1) TVD(6910.00)
DLS(1.1)

#185 MD(17516.00) Inc(89.7) Azm(266.3) TVD(6910.25)
DLS(0.9)

#186 MD(17597.00) Inc(89.3) Azm(266.1) TVD(6910.95)
DLS(0.6)