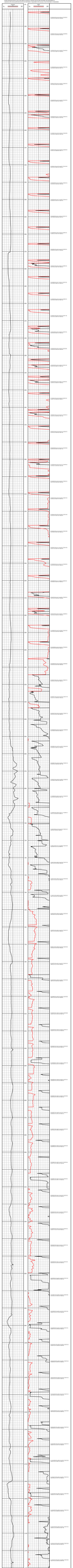

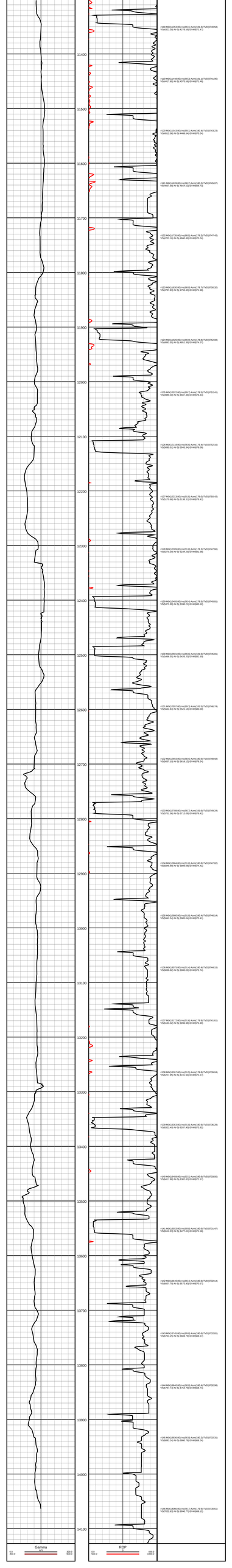

ENSIGN

# Ottenhoff 29U-343

MD
2":100’

**Company:** Petroleum Development Corp.
**Well Name:** Ottenhoff 29U-343
**API:** 051234364400
**County/Parish:** Weld
**State:** Colorado
**Country:** United States
**Job number:** 161-131
**Field:** Wattenburg
**Rig Id:** Ensign 161
**Survey Company:** Ensign Directional Services
**Operator:** Petroleum Development Corp.
**Company Man:** Brady Sharp / John Falton

**Daylight DD:** Zach Gentry
**Swing Shift DD:** Tony Callow
**Night DD:** Eric Mays
**Daylight MWD:** Justin Klatt
**Night MWD:** Ryan Prue

**Log measurements:** Gamma, ROP
**Depth measured from:** 1650 ft
**Maximum temperature:** 205

| | Depth | Date |
|---|---|---|
| Start: | 0 ft | 7-13-2018 |
| End: | 14126 ft | 7-17-2018 |

| Casing | Depth | Size |
|---|---|---|
| Surface: | 1650 ft | 9 5/8" |
| Intermediate: | | |

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

**Elevations**
**KB:** 23 ft
**GL:** 4662 ft
**DF:** 4685 ft

| Run | Bit Size | Offsets | | Depths | | Dates | |
|---|---|---|---|---|---|---|---|
| | | Gamma | Survey | Start | End | Start | End |
| 1 | 12.25" | | | 0 ft | 1650 ft | 7-13-2018 | 7-14-2018 |
| 2 | 8.5" | 62.46 ft | 57.63 ft | 1650 ft | 14126 ft | 7-15-2018 | 7-17-2018 |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |

Ensign Directional Services 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.

#24 MD(2352.00) Inc(14.9) Azm(51.4) TVD(2299.04)
VS(-220.23) N/-S(255.53) E/-W(358.09)

#25 MD(2447.00) Inc(14.4) Azm(49.6) TVD(2390.95)
VS(-233.67) N/-S(270.80) E/-W(376.63)

#26 MD(2543.00) Inc(16.4) Azm(52.8) TVD(2483.50)
VS(-247.63) N/-S(286.74) E/-W(396.52)

#27 MD(2639.00) Inc(15.5) Azm(50.9) TVD(2575.81)
VS(-261.86) N/-S(303.02) E/-W(417.27)

#28 MD(2734.00) Inc(15.5) Azm(50.2) TVD(2667.35)
VS(-276.05) N/-S(319.15) E/-W(436.87)

#29 MD(2830.00) Inc(15.3) Azm(50.3) TVD(2759.91)
VS(-290.41) N/-S(335.45) E/-W(456.47)

#30 MD(2925.00) Inc(15.7) Azm(54.6) TVD(2851.45)
VS(-303.88) N/-S(350.91) E/-W(476.59)

#31 MD(3021.00) Inc(15.6) Azm(54.4) TVD(2943.90)
VS(-316.84) N/-S(365.94) E/-W(497.68)

#32 MD(3116.00) Inc(14.9) Azm(52.6) TVD(3035.55)
VS(-329.71) N/-S(380.80) E/-W(517.77)

#33 MD(3212.00) Inc(13.6) Azm(50.7) TVD(3128.59)
VS(-342.52) N/-S(395.44) E/-W(536.31)

#34 MD(3308.00) Inc(12.3) Azm(48.4) TVD(3222.15)
VS(-354.83) N/-S(409.30) E/-W(552.69)

#35 MD(3404.00) Inc(10.7) Azm(48.6) TVD(3316.22)
VS(-366.09) N/-S(422.07) E/-W(567.02)

#36 MD(3500.00) Inc(9.7) Azm(44.9) TVD(3410.70)
VS(-376.49) N/-S(433.69) E/-W(579.41)

#37 MD(3595.00) Inc(9.0) Azm(43.0) TVD(3504.44)
VS(-386.51) N/-S(444.79) E/-W(590.13)

#38 MD(3691.00) Inc(8.5) Azm(41.9) TVD(3599.32)
VS(-396.30) N/-S(455.57) E/-W(599.99)

#39 MD(3787.00) Inc(9.4) Azm(34.7) TVD(3694.16)
VS(-407.09) N/-S(467.29) E/-W(609.19)

#40 MD(3882.00) Inc(9.7) Azm(35.2) TVD(3787.84)
VS(-419.09) N/-S(480.21) E/-W(618.22)

#41 MD(3978.00) Inc(9.3) Azm(35.4) TVD(3882.52)
VS(-431.09) N/-S(493.14) E/-W(627.38)

#42 MD(4074.00) Inc(8.4) Azm(31.9) TVD(3977.38)
VS(-442.53) N/-S(505.42) E/-W(635.58)

#43 MD(4168.00) Inc(6.2) Azm(39.4) TVD(4070.62)
VS(-451.59) N/-S(515.17) E/-W(642.43)

#44 MD(4264.00) Inc(6.2) Azm(48.2) TVD(4166.06)
VS(-458.33) N/-S(522.63) E/-W(649.58)

#45 MD(4360.00) Inc(5.0) Azm(60.2) TVD(4261.60)
VS(-463.13) N/-S(528.17) E/-W(657.08)

#46 MD(4455.00) Inc(3.5) Azm(81.1) TVD(4356.34)
VS(-465.01) N/-S(530.67) E/-W(663.54)

#47 MD(4551.00) Inc(2.8) Azm(94.6) TVD(4452.20)
VS(-464.77) N/-S(530.94) E/-W(668.77)

#48 MD(4647.00) Inc(1.8) Azm(122.1) TVD(4548.12)
VS(-463.44) N/-S(529.95) E/-W(672.38)

#49 MD(4743.00) Inc(1.8) Azm(121.4) TVD(4644.07)
VS(-461.62) N/-S(528.36) E/-W(674.95)

#50 MD(4838.00) Inc(1.5) Azm(114.3) TVD(4739.03)
VS(-460.10) N/-S(527.07) E/-W(677.35)

#51 MD(4934.00) Inc(0.8) Azm(174.4) TVD(4835.02)
VS(-458.81) N/-S(525.89) E/-W(678.56)

#52 MD(5030.00) Inc(0.8) Azm(163.2) TVD(4931.01)
VS(-457.48) N/-S(524.58) E/-W(678.82)

#53 MD(5126.00) Inc(0.9) Azm(139.3) TVD(5027.00)
VS(-456.21) N/-S(523.37) E/-W(679.51)

#54 MD(5222.00) Inc(0.6) Azm(136.6) TVD(5122.99)
VS(-455.20) N/-S(522.43) E/-W(680.35)

#55 MD(5318.00) Inc(1.0) Azm(143.7) TVD(5218.98)
VS(-454.08) N/-S(521.39) E/-W(681.19)

#56 MD(5413.00) Inc(1.1) Azm(129.4) TVD(5313.96)
VS(-452.73) N/-S(520.14) E/-W(682.38)

#57 MD(5509.00) Inc(1.4) Azm(117.0) TVD(5409.94)
VS(-451.45) N/-S(519.03) E/-W(684.14)

#58 MD(5605.00) Inc(1.1) Azm(95.2) TVD(5505.92)
VS(-450.65) N/-S(518.41) E/-W(686.10)

#59 MD(5700.00) Inc(0.7) Azm(348.1) TVD(5600.91)
VS(-451.05) N/-S(518.90) E/-W(686.89)

#60 MD(5796.00) Inc(0.6) Azm(285.7) TVD(5696.91)
VS(-451.82) N/-S(519.61) E/-W(686.29)

#61 MD(5892.00) Inc(0.9) Azm(258.8) TVD(5792.90)
VS(-451.93) N/-S(519.59) E/-W(685.06)

#62 MD(5988.00) Inc(0.9) Azm(233.1) TVD(5888.89)
VS(-451.46) N/-S(519.00) E/-W(683.72)

#63 MD(6083.00) Inc(0.9) Azm(205.9) TVD(5983.88)
VS(-450.43) N/-S(517.88) E/-W(682.80)

#64 MD(6178.00) Inc(5.1) Azm(182.7) TVD(6078.73)
VS(-445.61) N/-S(512.99) E/-W(682.27)

#65 MD(6274.00) Inc(10.6) Azm(178.3) TVD(6173.79)
VS(-432.57) N/-S(499.89) E/-W(682.33)

#66 MD(6370.00) Inc(16.3) Azm(182.9) TVD(6267.12)
VS(-410.41) N/-S(477.59) E/-W(681.91)

#67 MD(6465.00) Inc(22.0) Azm(179.9) TVD(6356.83)
VS(-379.48) N/-S(446.45) E/-W(681.27)

#68 MD(6561.00) Inc(28.8) Azm(182.0) TVD(6443.50)
VS(-338.60) N/-S(405.31) E/-W(680.49)

#69 MD(6657.00) Inc(40.8) Azm(183.1) TVD(6522.19)
VS(-284.46) N/-S(350.68) E/-W(677.98)

#70 MD(6752.00) Inc(48.9) Azm(180.6) TVD(6589.49)
VS(-218.06) N/-S(283.78) E/-W(675.92)

#71 MD(6848.00) Inc(60.4) Azm(176.7) TVD(6644.95)
VS(-140.10) N/-S(205.66) E/-W(677.95)

#72 MD(6943.00) Inc(68.0) Azm(177.1) TVD(6686.27)
VS(-54.71) N/-S(120.32) E/-W(682.57)

#73 MD(7039.00) Inc(72.8) Azm(179.4) TVD(6718.47)
VS(35.50) N/-S(29.96) E/-W(685.30)

#74 MD(7134.00) Inc(77.2) Azm(180.9) TVD(6743.05)
VS(126.80) N/-S(-61.78) E/-W(685.05)

#75 MD(7230.00) Inc(85.3) Azm(179.9) TVD(6757.64)
VS(221.10) N/-S(-156.58) E/-W(684.39)

#76 MD(7325.00) Inc(88.4) Azm(179.4) TVD(6762.86)
VS(315.57) N/-S(-251.42) E/-W(684.97)

#77 MD(7421.00) Inc(89.8) Azm(180.4) TVD(6764.37)
VS(411.13) N/-S(-347.41) E/-W(685.14)

#78 MD(7526.00) Inc(90.0) Azm(180.2) TVD(6764.55)
VS(515.60) N/-S(-452.40) E/-W(684.59)

#79 MD(7622.00) Inc(90.1) Azm(179.2) TVD(6764.47)
VS(611.21) N/-S(-548.40) E/-W(685.10)

#80 MD(7718.00) Inc(90.9) Azm(179.0) TVD(6763.63)
VS(706.90) N/-S(-644.38) E/-W(686.60)

#81 MD(7814.00) Inc(91.2) Azm(178.7) TVD(6761.87)
VS(802.61) N/-S(-740.35) E/-W(688.53)

#82 MD(7909.00) Inc(90.0) Azm(180.2) TVD(6760.88)
VS(897.25) N/-S(-835.33) E/-W(689.44)

#83 MD(8005.00) Inc(90.0) Azm(180.8) TVD(6760.88)
VS(992.73) N/-S(-931.33) E/-W(688.60)

#84 MD(8100.00) Inc(90.0) Azm(180.8) TVD(6760.88)
VS(1087.16) N/-S(-1026.32) E/-W(687.28)

#85 MD(8196.00) Inc(90.9) Azm(180.9) TVD(6760.12)
VS(1182.57) N/-S(-1122.31) E/-W(685.85)

#86 MD(8292.00) Inc(91.3) Azm(180.4) TVD(6758.28)
VS(1278.01) N/-S(-1218.28) E/-W(684.76)

#87 MD(8388.00) Inc(89.3) Azm(180.6) TVD(6757.78)
VS(1373.48) N/-S(-1314.27) E/-W(683.93)

#88 MD(8484.00) Inc(88.8) Azm(180.6) TVD(6759.37)
VS(1468.93) N/-S(-1410.25) E/-W(682.92)

#89 MD(8579.00) Inc(89.4) Azm(180.6) TVD(6760.86)
VS(1563.39) N/-S(-1505.24) E/-W(681.93)

#90 MD(8675.00) Inc(88.8) Azm(179.9) TVD(6762.37)
VS(1658.90) N/-S(-1601.22) E/-W(681.51)

#91 MD(8770.00) Inc(89.2) Azm(179.9) TVD(6764.03)
VS(1753.46) N/-S(-1696.21) E/-W(681.67)

#92 MD(8866.00) Inc(89.3) Azm(179.5) TVD(6765.28)
VS(1849.06) N/-S(-1792.20) E/-W(682.18)

#93 MD(8962.00) Inc(89.2) Azm(178.7) TVD(6766.54)
VS(1944.75) N/-S(-1888.18) E/-W(683.68)

#94 MD(9057.00) Inc(90.4) Azm(179.9) TVD(6766.87)
VS(2039.42) N/-S(-1983.17) E/-W(684.84)

#95 MD(9153.00) Inc(91.2) Azm(179.9) TVD(6765.53)
VS(2134.99) N/-S(-2079.16) E/-W(685.01)

#96 MD(9249.00) Inc(91.5) Azm(179.5) TVD(6763.27)
VS(2230.57) N/-S(-2175.13) E/-W(685.51)

#97 MD(9345.00) Inc(91.9) Azm(179.4) TVD(6760.42)
VS(2326.17) N/-S(-2271.08) E/-W(686.44)

#98 MD(9440.00) Inc(91.8) Azm(178.7) TVD(6757.35)
VS(2420.83) N/-S(-2366.02) E/-W(688.01)

#99 MD(9536.00) Inc(92.1) Azm(178.5) TVD(6754.09)
VS(2516.53) N/-S(-2461.93) E/-W(690.35)

#100 MD(9631.00) Inc(89.3) Azm(180.4) TVD(6752.93)
VS(2611.16) N/-S(-2556.91) E/-W(691.26)

#101 MD(9727.00) Inc(89.5) Azm(180.4) TVD(6753.93)
VS(2706.65) N/-S(-2652.90) E/-W(690.59)

#102 MD(9822.00) Inc(89.3) Azm(179.5) TVD(6754.93)
VS(2801.22) N/-S(-2747.89) E/-W(690.68)

#103 MD(9918.00) Inc(90.4) Azm(180.9) TVD(6755.18)
VS(2896.75) N/-S(-2843.89) E/-W(690.34)

#104 MD(10014.00) Inc(90.6) Azm(180.6) TVD(6754.34)
VS(2992.18) N/-S(-2939.88) E/-W(689.09)

#105 MD(10109.00) Inc(90.5) Azm(180.1) TVD(6753.43)
VS(3086.68) N/-S(-3034.87) E/-W(688.51)

#106 MD(10205.00) Inc(90.8) Azm(178.8) TVD(6752.34)
VS(3182.32) N/-S(-3130.86) E/-W(689.43)

#107 MD(10300.00) Inc(90.2) Azm(179.9) TVD(6751.51)
VS(3276.98) N/-S(-3225.85) E/-W(690.50)

#108 MD(10396.00) Inc(91.5) Azm(180.4) TVD(6750.09)
VS(3372.50) N/-S(-3321.83) E/-W(690.25)

#109 MD(10491.00) Inc(90.5) Azm(181.6) TVD(6748.43)
VS(3466.88) N/-S(-3416.80) E/-W(688.60)

#110 MD(10587.00) Inc(91.5) Azm(181.5) TVD(6746.75)
VS(3562.15) N/-S(-3512.75) E/-W(686.00)

#111 MD(10683.00) Inc(89.9) Azm(180.8) TVD(6745.58)
VS(3657.50) N/-S(-3608.72) E/-W(684.07)

#112 MD(10779.00) Inc(90.4) Azm(180.1) TVD(6745.33)
VS(3752.98) N/-S(-3704.72) E/-W(683.32)

#113 MD(10875.00) Inc(90.4) Azm(181.3) TVD(6744.66)
VS(3848.42) N/-S(-3800.70) E/-W(682.15)

#114 MD(10970.00) Inc(90.0) Azm(181.3) TVD(6744.33)
VS(3942.76) N/-S(-3895.68) E/-W(679.99)

#115 MD(11066.00) Inc(90.5) Azm(181.1) TVD(6743.91)
VS(4038.11) N/-S(-3991.66) E/-W(677.98)

#116 MD(11162.00) Inc(91.0) Azm(180.9) TVD(6742.65)
VS(4133.49) N/-S(-4087.63) E/-W(676.31)

#117 MD(11257.00) Inc(91.2) Azm(180.6) TVD(6740.83)
VS(4227.91) N/-S(-4182.61) E/-W(675.06)

#118 MD(11353.00) Inc(89.1) Azm(181.3) TVD(6740.58)
VS(4323.30) N/-S(-4278.59) E/-W(673.47)

#119 MD(11448.00) Inc(89.3) Azm(181.1) TVD(6741.90)
VS(4417.65) N/-S(-4373.56) E/-W(671.48)

#120 MD(11543.00) Inc(89.1) Azm(180.4) TVD(6743.23)
VS(4512.08) N/-S(-4468.54) E/-W(670.24)

#121 MD(11639.00) Inc(88.7) Azm(180.2) TVD(6745.07)
VS(4607.58) N/-S(-4564.52) E/-W(669.73)

#122 MD(11735.00) Inc(88.5) Azm(179.2) TVD(6747.42)
VS(4703.16) N/-S(-4660.49) E/-W(670.24)

#123 MD(11830.00) Inc(88.0) Azm(178.7) TVD(6750.32)
VS(4797.83) N/-S(-4755.43) E/-W(671.98)

#124 MD(11926.00) Inc(89.9) Azm(178.8) TVD(6752.08)
VS(4893.55) N/-S(-4851.39) E/-W(674.07)

#125 MD(12022.00) Inc(89.7) Azm(178.5) TVD(6752.41)
VS(4989.30) N/-S(-4947.36) E/-W(676.33)

#126 MD(12118.00) Inc(90.6) Azm(179.4) TVD(6752.16)
VS(5085.01) N/-S(-5043.34) E/-W(678.09)

#127 MD(12213.00) Inc(91.5) Azm(179.0) TVD(6750.42)
VS(5179.68) N/-S(-5138.31) E/-W(679.42)

#128 MD(12309.00) Inc(91.8) Azm(178.3) TVD(6747.66)
VS(5275.39) N/-S(-5234.25) E/-W(681.68)

#129 MD(12405.00) Inc(90.4) Azm(179.5) TVD(6745.81)
VS(5371.09) N/-S(-5330.21) E/-W(683.52)

#130 MD(12501.00) Inc(89.6) Azm(181.6) TVD(6745.81)
VS(5466.55) N/-S(-5426.20) E/-W(682.60)

#131 MD(12597.00) Inc(89.3) Azm(181.5) TVD(6746.74)
VS(5561.83) N/-S(-5522.16) E/-W(680.00)

#132 MD(12693.00) Inc(88.5) Azm(180.6) TVD(6748.58)
VS(5657.19) N/-S(-5618.12) E/-W(678.24)

#133 MD(12788.00) Inc(90.7) Azm(181.6) TVD(6749.24)
VS(5751.56) N/-S(-5713.09) E/-W(676.42)

#134 MD(12884.00) Inc(91.0) Azm(180.8) TVD(6747.82)
VS(5846.90) N/-S(-5809.06) E/-W(674.41)

#135 MD(12980.00) Inc(91.0) Azm(180.4) TVD(6746.14)
VS(5942.34) N/-S(-5905.04) E/-W(673.41)

#136 MD(13075.00) Inc(91.4) Azm(180.4) TVD(6744.15)
VS(6036.82) N/-S(-6000.02) E/-W(672.74)

#137 MD(13172.00) Inc(91.6) Azm(179.9) TVD(6741.61)
VS(6133.32) N/-S(-6096.98) E/-W(672.49)

#138 MD(13267.00) Inc(91.5) Azm(178.8) TVD(6739.04)
VS(6227.95) N/-S(-6191.94) E/-W(673.57)

#139 MD(13363.00) Inc(91.8) Azm(180.9) TVD(6736.28)
VS(6323.49) N/-S(-6287.90) E/-W(673.82)

#140 MD(13458.00) Inc(92.1) Azm(180.6) TVD(6733.05)
VS(6417.88) N/-S(-6382.83) E/-W(672.57)

#141 MD(13553.00) Inc(89.8) Azm(180.6) TVD(6731.47)
VS(6512.33) N/-S(-6477.81) E/-W(671.58)

#142 MD(13649.00) Inc(89.4) Azm(180.6) TVD(6732.14)
VS(6607.79) N/-S(-6573.80) E/-W(670.57)

#143 MD(13745.00) Inc(89.8) Azm(180.6) TVD(6732.81)
VS(6703.25) N/-S(-6669.79) E/-W(669.57)

#144 MD(13840.00) Inc(90.0) Azm(180.4) TVD(6732.98)
VS(6797.73) N/-S(-6764.79) E/-W(668.74)

#145 MD(13936.00) Inc(90.8) Azm(180.2) TVD(6732.31)
VS(6893.24) N/-S(-6860.78) E/-W(668.24)

#146 MD(14066.00) Inc(90.7) Azm(179.9) TVD(6730.61)
VS(7022.63) N/-S(-6990.77) E/-W(668.12)