



Job Number: SVGJ-141377
 Company: PDC
 Lease/Well: Wells Ranch 23-1
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.19°
 Grid: East To True North
 File name: S:\2014SU-1\PDC\GJ\WELLSR-1\231.SVY
 Date/Time: 09-Dec-14 / 08:52
 Curve Name: Surface - 4058' M.D. (Rate Gyro)

MS SURVEY

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane .00

Vertical Section Referenced to Wellhead

Rectangular Coordinates Referenced to Wellhead

| <i>Measured Depth FT</i> | <i>Incl Angle Deg</i> | <i>Drift Direction Deg</i> | <i>True Vertical Depth</i> | <i>N-S FT</i> | <i>E-W FT</i> | <i>Vertical Section FT</i> | <i>C L O S U R E</i> | | <i>Dogleg Severity Deg/100</i> |
|----------------------------------|-------------------------------|------------------------------------|------------------------------------|-------------------|-------------------|------------------------------------|------------------------|--------------------------|----------------------------------------|
| | | | | | | | <i>Distance FT</i> | <i>Direction Deg</i> | |
| .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 100.00 | .53 | 88.64 | 100.00 | .01 | .46 | .01 | .46 | 88.64 | .53 |
| 200.00 | .32 | 64.74 | 200.00 | .14 | 1.18 | .14 | 1.19 | 83.16 | .27 |
| 300.00 | .15 | 104.10 | 300.00 | .23 | 1.56 | .23 | 1.57 | 81.65 | .23 |
| 400.00 | .10 | 328.84 | 399.99 | .27 | 1.64 | .27 | 1.66 | 80.60 | .23 |
| 500.00 | .08 | 66.80 | 499.99 | .37 | 1.66 | .37 | 1.70 | 77.31 | .14 |
| 600.00 | .11 | 16.43 | 599.99 | .49 | 1.75 | .49 | 1.82 | 74.26 | .09 |
| 700.00 | .25 | 339.43 | 699.99 | .79 | 1.70 | .79 | 1.87 | 65.09 | .18 |
| 800.00 | .40 | 319.92 | 799.99 | 1.26 | 1.40 | 1.26 | 1.88 | 47.96 | .18 |
| 900.00 | .47 | 300.38 | 899.99 | 1.74 | .82 | 1.74 | 1.92 | 25.28 | .16 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | True Vertical Depth | N-S FT | E-W FT | Vertical Section FT | C L O S U R E | | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 1000.00 | .50 | 304.76 | 999.99 | 2.19 | .11 | 2.19 | 2.19 | 2.80 | .05 |
| 1100.00 | .64 | 310.49 | 1099.98 | 2.80 | -.68 | 2.80 | 2.88 | 346.44 | .15 |
| 1200.00 | .61 | 297.01 | 1199.98 | 3.41 | -1.58 | 3.41 | 3.75 | 335.19 | .15 |
| 1300.00 | .66 | 310.94 | 1299.97 | 4.03 | -2.48 | 4.03 | 4.73 | 328.32 | .16 |
| 1400.00 | .62 | 297.53 | 1399.96 | 4.65 | -3.40 | 4.65 | 5.76 | 323.85 | .15 |
| 1500.00 | .59 | 313.93 | 1499.96 | 5.26 | -4.25 | 5.26 | 6.76 | 321.07 | .18 |
| 1600.00 | .67 | 301.47 | 1599.95 | 5.92 | -5.12 | 5.92 | 7.83 | 319.17 | .16 |
| 1700.00 | .32 | 320.39 | 1699.95 | 6.44 | -5.80 | 6.44 | 8.67 | 318.03 | .38 |
| 1800.00 | .35 | 342.35 | 1799.95 | 6.95 | -6.07 | 6.95 | 9.23 | 318.88 | .13 |
| 1900.00 | .25 | 5.66 | 1899.94 | 7.46 | -6.14 | 7.46 | 9.66 | 320.55 | .16 |
| 2000.00 | .39 | 116.60 | 1999.94 | 7.52 | -5.81 | 7.52 | 9.51 | 322.31 | .53 |
| 2100.00 | .77 | 110.75 | 2099.94 | 7.13 | -4.88 | 7.13 | 8.64 | 325.62 | .38 |
| 2200.00 | .59 | 118.74 | 2199.93 | 6.65 | -3.80 | 6.65 | 7.66 | 330.25 | .20 |
| 2300.00 | .68 | 117.68 | 2299.93 | 6.12 | -2.82 | 6.12 | 6.74 | 335.25 | .09 |
| 2400.00 | .66 | 112.55 | 2399.92 | 5.63 | -1.77 | 5.63 | 5.90 | 342.58 | .06 |
| 2500.00 | .30 | 119.44 | 2499.91 | 5.28 | -1.01 | 5.28 | 5.37 | 349.22 | .36 |
| 2600.00 | .25 | 161.74 | 2599.91 | 4.94 | -.71 | 4.94 | 4.99 | 351.84 | .20 |
| 2700.00 | .15 | 156.27 | 2699.91 | 4.61 | -.59 | 4.61 | 4.65 | 352.74 | .10 |
| 2800.00 | .10 | 247.81 | 2799.91 | 4.46 | -.62 | 4.46 | 4.50 | 352.14 | .18 |
| 2900.00 | .12 | 250.81 | 2899.91 | 4.39 | -.80 | 4.39 | 4.47 | 349.74 | .02 |
| 3000.00 | .19 | 319.72 | 2999.91 | 4.49 | -1.00 | 4.49 | 4.60 | 347.41 | .18 |
| 3100.00 | .74 | 352.52 | 3099.91 | 5.25 | -1.19 | 5.25 | 5.39 | 347.21 | .59 |
| 3200.00 | 1.28 | 353.58 | 3199.89 | 7.00 | -1.40 | 7.00 | 7.14 | 348.68 | .54 |
| 3300.00 | 1.45 | 355.31 | 3299.86 | 9.37 | -1.63 | 9.37 | 9.52 | 350.13 | .17 |
| 3400.00 | 1.12 | 332.40 | 3399.84 | 11.50 | -2.19 | 11.50 | 11.71 | 349.24 | .60 |
| 3500.00 | 1.28 | 327.49 | 3499.82 | 13.31 | -3.24 | 13.31 | 13.70 | 346.32 | .19 |
| 3600.00 | 1.28 | 324.58 | 3599.79 | 15.16 | -4.49 | 15.16 | 15.81 | 343.51 | .06 |
| 3700.00 | 1.47 | 328.20 | 3699.76 | 17.16 | -5.81 | 17.16 | 18.12 | 341.30 | .21 |
| 3800.00 | 1.46 | 325.25 | 3799.73 | 19.30 | -7.21 | 19.30 | 20.60 | 339.51 | .08 |

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | True Vertical Depth | N-S FT | E-W FT | Vertical Section FT | C L O S U R E | | Dogleg Severity Deg/100 |
|-----------------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 3900.00 | 1.49 | 327.39 | 3899.70 | 21.44 | -8.64 | 21.44 | 23.12 | 338.05 | .06 |
| 4000.00 | 1.67 | 326.74 | 3999.66 | 23.75 | -10.14 | 23.75 | 25.83 | 336.89 | .18 |
| Last Survey Depth Recorded | | | | | | | | | |
| 4058.00 | 1.46 | 321.66 | 4057.64 | 25.04 | -11.06 | 25.04 | 27.37 | 336.17 | .43 |