



Job Number: SVGJ-160001
 Company: PDC
 Lease/Well: McIntosh 43-23
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.36°
 Grid: East To True North
 File name: S:\2016SU~1\PDC\MCINTOSH\4323.SVY
 Date/Time: 06-Jan-16 / 08:23
 Curve Name: Surface - 6700' 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

| 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 | |
| .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 100.00 | .23 | 235.57 | 100.00 | -.11 | -.17 | -.11 | .20 | 235.57 | .23 |
| 200.00 | .16 | 183.91 | 200.00 | -.37 | -.34 | -.37 | .50 | 222.92 | .18 |
| 300.00 | .22 | 152.54 | 300.00 | -.68 | -.26 | -.68 | .72 | 201.16 | .12 |
| 400.00 | .15 | 189.96 | 400.00 | -.98 | -.20 | -.98 | .99 | 191.35 | .14 |
| 500.00 | .21 | 205.88 | 500.00 | -1.27 | -.30 | -1.27 | 1.30 | 193.23 | .08 |
| 600.00 | .22 | 213.85 | 600.00 | -1.59 | -.49 | -1.59 | 1.67 | 196.94 | .03 |
| 700.00 | .24 | 220.55 | 700.00 | -1.91 | -.73 | -1.91 | 2.05 | 200.86 | .03 |
| 800.00 | .26 | 213.97 | 800.00 | -2.26 | -.99 | -2.26 | 2.47 | 203.69 | .03 |
| 900.00 | .28 | 196.49 | 899.99 | -2.68 | -1.19 | -2.68 | 2.93 | 203.88 | .08 |
| 1000.00 | .22 | 190.69 | 999.99 | -3.10 | -1.29 | -3.10 | 3.36 | 202.60 | .07 |
| 1100.00 | .20 | 199.45 | 1099.99 | -3.46 | -1.39 | -3.46 | 3.73 | 201.84 | .04 |
| 1200.00 | .22 | 223.80 | 1199.99 | -3.76 | -1.58 | -3.76 | 4.08 | 202.75 | .09 |

| 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 | |
| 1300.00 | .26 | 221.65 | 1299.99 | -4.07 | -1.86 | -4.07 | 4.47 | 204.57 | .04 |
| 1400.00 | .28 | 221.52 | 1399.99 | -4.42 | -2.17 | -4.42 | 4.93 | 206.18 | .02 |
| 1500.00 | .57 | 214.13 | 1499.99 | -5.02 | -2.61 | -5.02 | 5.66 | 207.53 | .29 |
| 1600.00 | .84 | 204.92 | 1599.98 | -6.09 | -3.20 | -6.09 | 6.88 | 207.73 | .29 |
| 1700.00 | .88 | 200.80 | 1699.97 | -7.48 | -3.78 | -7.48 | 8.38 | 206.85 | .07 |
| 1800.00 | .88 | 201.23 | 1799.96 | -8.91 | -4.33 | -8.91 | 9.91 | 205.95 | .01 |
| 1900.00 | .89 | 201.19 | 1899.94 | -10.35 | -4.89 | -10.35 | 11.45 | 205.31 | .01 |
| 2000.00 | .84 | 207.43 | 1999.93 | -11.72 | -5.51 | -11.72 | 12.95 | 205.18 | .11 |
| 2100.00 | .81 | 212.81 | 2099.92 | -12.97 | -6.23 | -12.97 | 14.39 | 205.67 | .08 |
| 2200.00 | .87 | 221.24 | 2199.91 | -14.13 | -7.12 | -14.13 | 15.82 | 206.73 | .14 |
| 2300.00 | .92 | 221.15 | 2299.90 | -15.31 | -8.14 | -15.31 | 17.34 | 208.02 | .05 |
| 2400.00 | .85 | 228.80 | 2399.89 | -16.40 | -9.23 | -16.40 | 18.82 | 209.37 | .14 |
| 2500.00 | .47 | 224.14 | 2499.88 | -17.18 | -10.08 | -17.18 | 19.92 | 210.38 | .38 |
| 2600.00 | .16 | 257.40 | 2599.88 | -17.51 | -10.50 | -17.51 | 20.41 | 210.94 | .35 |
| 2700.00 | .19 | 256.94 | 2699.88 | -17.58 | -10.79 | -17.58 | 20.63 | 211.56 | .03 |
| 2800.00 | .18 | 248.11 | 2799.88 | -17.67 | -11.10 | -17.67 | 20.87 | 212.14 | .03 |
| 2900.00 | .04 | 231.86 | 2899.88 | -17.75 | -11.28 | -17.75 | 21.03 | 212.42 | .14 |
| 3000.00 | .08 | 262.43 | 2999.88 | -17.78 | -11.37 | -17.78 | 21.11 | 212.60 | .05 |
| 3100.00 | .13 | 136.56 | 3099.88 | -17.88 | -11.36 | -17.88 | 21.18 | 212.44 | .19 |
| 3200.00 | .87 | 15.94 | 3199.87 | -17.23 | -11.08 | -17.23 | 20.48 | 212.74 | .94 |
| 3300.00 | 1.96 | 16.32 | 3299.84 | -14.86 | -10.39 | -14.86 | 18.13 | 214.96 | 1.09 |
| 3400.00 | 2.50 | 46.07 | 3399.77 | -11.70 | -8.34 | -11.70 | 14.37 | 215.46 | 1.26 |
| 3500.00 | 2.64 | 63.62 | 3499.67 | -9.17 | -4.70 | -9.17 | 10.30 | 207.16 | .80 |
| 3600.00 | 2.54 | 70.69 | 3599.57 | -7.41 | -.55 | -7.41 | 7.43 | 184.23 | .33 |
| 3700.00 | 2.37 | 76.86 | 3699.48 | -6.21 | 3.56 | -6.21 | 7.15 | 150.19 | .31 |
| 3800.00 | 2.69 | 71.01 | 3799.38 | -4.97 | 7.79 | -4.97 | 9.24 | 122.56 | .41 |
| 3900.00 | 2.93 | 68.70 | 3899.26 | -3.28 | 12.39 | -3.28 | 12.82 | 104.84 | .27 |
| 4000.00 | 1.71 | 70.20 | 3999.18 | -1.85 | 16.17 | -1.85 | 16.28 | 96.52 | 1.22 |
| 4100.00 | .53 | 134.43 | 4099.16 | -1.67 | 17.91 | -1.67 | 17.99 | 95.32 | 1.55 |
| 4200.00 | .55 | 232.17 | 4199.15 | -2.28 | 17.86 | -2.28 | 18.01 | 97.29 | .81 |
| 4300.00 | 1.90 | 273.68 | 4299.13 | -2.47 | 15.83 | -2.47 | 16.02 | 98.88 | 1.53 |
| 4400.00 | 2.51 | 277.53 | 4399.06 | -2.08 | 12.00 | -2.08 | 12.18 | 99.83 | .63 |
| 4500.00 | 2.35 | 284.34 | 4498.97 | -1.28 | 7.84 | -1.28 | 7.95 | 99.30 | .33 |
| 4600.00 | 2.07 | 299.77 | 4598.89 | .12 | 4.29 | .12 | 4.29 | 88.40 | .65 |

| 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 | |
| 4700.00 | 2.30 | 303.06 | 4698.82 | 2.11 | 1.04 | 2.11 | 2.35 | 26.24 | .26 |
| 4800.00 | 2.51 | 290.36 | 4798.73 | 3.97 | -2.69 | 3.97 | 4.80 | 325.83 | .57 |
| 4900.00 | 2.24 | 287.65 | 4898.65 | 5.32 | -6.61 | 5.32 | 8.49 | 308.84 | .29 |
| 5000.00 | 2.25 | 290.40 | 4998.57 | 6.60 | -10.31 | 6.60 | 12.24 | 302.62 | .11 |
| 5100.00 | 1.83 | 293.33 | 5098.51 | 7.92 | -13.62 | 7.92 | 15.75 | 300.17 | .43 |
| 5200.00 | .90 | 292.12 | 5198.48 | 8.84 | -15.81 | 8.84 | 18.12 | 299.22 | .93 |
| 5300.00 | .27 | 316.06 | 5298.47 | 9.31 | -16.70 | 9.31 | 19.12 | 299.13 | .66 |
| 5400.00 | .51 | 23.71 | 5398.47 | 9.89 | -16.69 | 9.89 | 19.40 | 300.65 | .48 |
| 5500.00 | .54 | 70.57 | 5498.47 | 10.45 | -16.06 | 10.45 | 19.16 | 303.05 | .42 |
| 5600.00 | .80 | 101.94 | 5598.46 | 10.46 | -14.94 | 10.46 | 18.24 | 305.01 | .44 |
| 5700.00 | 1.06 | 99.59 | 5698.45 | 10.16 | -13.34 | 10.16 | 16.77 | 307.30 | .26 |
| 5800.00 | 1.16 | 96.01 | 5798.43 | 9.90 | -11.42 | 9.90 | 15.12 | 310.93 | .12 |
| 5900.00 | .94 | 68.18 | 5898.41 | 10.10 | -9.65 | 10.10 | 13.97 | 316.30 | .55 |
| 6000.00 | .98 | 45.67 | 5998.40 | 11.01 | -8.28 | 11.01 | 13.77 | 323.04 | .38 |
| 6100.00 | 1.22 | 29.27 | 6098.38 | 12.53 | -7.15 | 12.53 | 14.43 | 330.30 | .39 |
| 6200.00 | 1.30 | 21.77 | 6198.35 | 14.51 | -6.21 | 14.51 | 15.79 | 336.84 | .18 |
| 6300.00 | 1.30 | 33.90 | 6298.33 | 16.51 | -5.15 | 16.51 | 17.29 | 342.66 | .27 |
| 6400.00 | 1.67 | 3.04 | 6398.30 | 18.91 | -4.44 | 18.91 | 19.42 | 346.77 | .87 |
| 6500.00 | .80 | 306.12 | 6498.28 | 20.77 | -4.93 | 20.77 | 21.35 | 346.65 | 1.40 |
| 6600.00 | .66 | 190.67 | 6598.27 | 20.62 | -5.60 | 20.62 | 21.37 | 344.80 | 1.24 |
| Last Survey Depth Recorded | | | | | | | | | |
| 6700.00 | 1.00 | 137.13 | 6698.26 | 19.41 | -5.11 | 19.41 | 20.07 | 345.24 | .81 |