



Job Number: SVGJ-140920

Company: PDC

Lease/Well: Avey 31-9

Location: Weld County, CO

Rig Name: MS Wireline

RKB: 0'

G.L. or M.S.L.: GL

State/Country: Colorado/USA

Declination: 8.43°

Grid: East To True North

File name: Y:\WINSER~1\2014SU~1\PDC\GJ\AVEY\319.SVY

Date/Time: 29-Jul-14 / 16:23

Curve Name: Surface - 7800' 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 | 1.22 | 4.63 | 99.99 | 1.06 | .09 | 1.06 | 1.06 | 4.63 | 1.22 |
| 200.00 | .85 | 4.35 | 199.98 | 2.86 | .23 | 2.86 | 2.87 | 4.56 | .37 |
| 300.00 | .65 | 9.28 | 299.97 | 4.16 | .38 | 4.16 | 4.18 | 5.16 | .21 |
| 400.00 | .51 | 11.90 | 399.96 | 5.16 | .56 | 5.16 | 5.19 | 6.19 | .14 |
| 500.00 | .42 | 3.10 | 499.96 | 5.96 | .67 | 5.96 | 6.00 | 6.42 | .11 |
| 600.00 | .38 | 24.41 | 599.96 | 6.63 | .83 | 6.63 | 6.68 | 7.12 | .15 |
| 700.00 | .25 | 64.50 | 699.96 | 7.02 | 1.16 | 7.02 | 7.12 | 9.39 | .25 |
| 800.00 | .24 | 108.93 | 799.95 | 7.05 | 1.56 | 7.05 | 7.22 | 12.45 | .19 |
| 900.00 | .16 | 240.15 | 899.95 | 6.91 | 1.63 | 6.91 | 7.10 | 13.30 | .37 |

| 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 | .19 | 254.18 | 999.95 | 6.80 | 1.35 | 6.80 | 6.93 | 11.26 | .05 |
| 1100.00 | .64 | 336.74 | 1099.95 | 7.26 | .97 | 7.26 | 7.33 | 7.63 | .64 |
| 1200.00 | .53 | 326.07 | 1199.95 | 8.16 | .49 | 8.16 | 8.18 | 3.47 | .15 |
| 1300.00 | .60 | 320.01 | 1299.94 | 8.95 | -.10 | 8.95 | 8.95 | 359.36 | .09 |
| 1400.00 | .70 | 320.74 | 1399.93 | 9.82 | -.82 | 9.82 | 9.85 | 355.21 | .10 |
| 1500.00 | .61 | 331.88 | 1499.93 | 10.76 | -1.46 | 10.76 | 10.86 | 352.27 | .16 |
| 1600.00 | .36 | 324.92 | 1599.92 | 11.49 | -1.89 | 11.49 | 11.64 | 350.65 | .26 |
| 1700.00 | .33 | 307.80 | 1699.92 | 11.92 | -2.30 | 11.92 | 12.14 | 349.08 | .11 |
| 1800.00 | .41 | 269.69 | 1799.92 | 12.10 | -2.89 | 12.10 | 12.44 | 346.58 | .25 |
| 1900.00 | .46 | 283.88 | 1899.92 | 12.19 | -3.63 | 12.19 | 12.72 | 343.40 | .12 |
| 2000.00 | .41 | 260.62 | 1999.92 | 12.23 | -4.38 | 12.23 | 12.99 | 340.31 | .18 |
| 2100.00 | .52 | 242.69 | 2099.91 | 11.96 | -5.13 | 11.96 | 13.02 | 336.78 | .18 |
| 2200.00 | .63 | 240.65 | 2199.91 | 11.48 | -6.01 | 11.48 | 12.96 | 332.36 | .11 |
| 2300.00 | .72 | 242.08 | 2299.90 | 10.92 | -7.05 | 10.92 | 13.00 | 327.16 | .09 |
| 2400.00 | .67 | 244.08 | 2399.89 | 10.37 | -8.13 | 10.37 | 13.18 | 321.91 | .06 |
| 2500.00 | .73 | 217.55 | 2499.89 | 9.61 | -9.04 | 9.61 | 13.20 | 316.74 | .33 |
| 2600.00 | 1.10 | 208.58 | 2599.87 | 8.26 | -9.89 | 8.26 | 12.89 | 309.87 | .40 |
| 2700.00 | 1.51 | 211.19 | 2699.85 | 6.29 | -11.03 | 6.29 | 12.70 | 299.70 | .41 |
| 2800.00 | 1.52 | 215.28 | 2799.81 | 4.08 | -12.48 | 4.08 | 13.13 | 288.11 | .11 |
| 2900.00 | 1.65 | 217.35 | 2899.77 | 1.86 | -14.12 | 1.86 | 14.24 | 277.49 | .14 |
| 3000.00 | 1.48 | 231.98 | 2999.74 | -.08 | -16.01 | -.08 | 16.01 | 269.70 | .43 |
| 3100.00 | 1.28 | 236.42 | 3099.71 | -1.50 | -17.96 | -1.50 | 18.02 | 265.23 | .23 |
| 3200.00 | 1.09 | 237.98 | 3199.69 | -2.62 | -19.70 | -2.62 | 19.87 | 262.42 | .19 |
| 3300.00 | 1.22 | 231.08 | 3299.67 | -3.79 | -21.33 | -3.79 | 21.67 | 259.92 | .19 |
| 3400.00 | 1.25 | 223.45 | 3399.64 | -5.25 | -22.91 | -5.25 | 23.50 | 257.09 | .17 |
| 3500.00 | 1.14 | 216.61 | 3499.62 | -6.84 | -24.25 | -6.84 | 25.20 | 254.24 | .18 |
| 3600.00 | 1.24 | 209.56 | 3599.60 | -8.58 | -25.38 | -8.58 | 26.79 | 251.32 | .18 |
| 3700.00 | 1.42 | 211.30 | 3699.57 | -10.58 | -26.56 | -10.58 | 28.59 | 248.27 | .18 |
| 3800.00 | 1.43 | 215.99 | 3799.54 | -12.65 | -27.93 | -12.65 | 30.67 | 245.63 | .12 |

| 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 | 1.35 | 233.36 | 3899.51 | -14.36 | -29.61 | -14.36 | 32.91 | 244.12 | .43 |
| 4000.00 | 1.52 | 257.45 | 3999.48 | -15.36 | -31.85 | -15.36 | 35.36 | 244.26 | .62 |
| 4100.00 | 1.99 | 299.38 | 4099.44 | -14.79 | -34.66 | -14.79 | 37.68 | 246.89 | 1.33 |
| 4200.00 | 1.12 | 253.07 | 4199.40 | -14.22 | -37.11 | -14.22 | 39.74 | 249.03 | 1.46 |
| 4300.00 | 1.41 | 235.00 | 4299.38 | -15.21 | -39.05 | -15.21 | 41.91 | 248.71 | .49 |
| 4400.00 | 1.65 | 226.08 | 4399.34 | -16.92 | -41.10 | -16.92 | 44.44 | 247.62 | .34 |
| 4500.00 | 2.15 | 227.60 | 4499.29 | -19.18 | -43.52 | -19.18 | 47.56 | 246.21 | .50 |
| 4600.00 | 2.09 | 225.01 | 4599.22 | -21.74 | -46.19 | -21.74 | 51.05 | 244.80 | .11 |
| 4700.00 | 2.25 | 221.58 | 4699.15 | -24.49 | -48.79 | -24.49 | 54.59 | 243.34 | .21 |
| 4800.00 | 2.12 | 224.58 | 4799.08 | -27.28 | -51.39 | -27.28 | 58.18 | 242.04 | .17 |
| 4900.00 | 2.21 | 219.84 | 4899.01 | -30.08 | -53.92 | -30.08 | 61.74 | 240.85 | .20 |
| 5000.00 | 2.36 | 224.84 | 4998.93 | -33.02 | -56.61 | -33.02 | 65.53 | 239.75 | .25 |
| 5100.00 | 2.35 | 220.97 | 5098.84 | -36.03 | -59.40 | -36.03 | 69.47 | 238.76 | .16 |
| 5200.00 | 2.65 | 221.26 | 5198.75 | -39.31 | -62.27 | -39.31 | 73.64 | 237.74 | .30 |
| 5300.00 | 2.50 | 228.44 | 5298.65 | -42.50 | -65.43 | -42.50 | 78.02 | 237.00 | .36 |
| 5400.00 | 2.56 | 227.12 | 5398.55 | -45.46 | -68.70 | -45.46 | 82.38 | 236.50 | .08 |
| 5500.00 | 2.82 | 236.96 | 5498.44 | -48.32 | -72.40 | -48.32 | 87.04 | 236.28 | .53 |
| 5600.00 | 2.32 | 231.44 | 5598.34 | -50.93 | -76.04 | -50.93 | 91.52 | 236.19 | .56 |
| 5700.00 | 1.52 | 237.60 | 5698.28 | -52.90 | -78.74 | -52.90 | 94.86 | 236.11 | .83 |
| 5800.00 | .98 | 262.86 | 5798.26 | -53.72 | -80.71 | -53.72 | 96.95 | 236.35 | .76 |
| 5900.00 | .71 | 270.40 | 5898.25 | -53.82 | -82.18 | -53.82 | 98.23 | 236.78 | .29 |
| 6000.00 | .87 | 276.37 | 5998.24 | -53.73 | -83.55 | -53.73 | 99.34 | 237.26 | .18 |
| 6100.00 | .96 | 294.39 | 6098.22 | -53.30 | -85.07 | -53.30 | 100.39 | 237.93 | .30 |
| 6200.00 | .77 | 297.60 | 6198.21 | -52.64 | -86.43 | -52.64 | 101.20 | 238.66 | .20 |
| 6300.00 | 1.02 | 294.02 | 6298.20 | -51.97 | -87.84 | -51.97 | 102.06 | 239.39 | .26 |
| 6400.00 | 1.02 | 306.36 | 6398.18 | -51.08 | -89.37 | -51.08 | 102.94 | 240.25 | .22 |
| 6500.00 | .76 | 316.34 | 6498.17 | -50.07 | -90.54 | -50.07 | 103.47 | 241.06 | .30 |
| 6600.00 | .82 | 300.71 | 6598.16 | -49.23 | -91.62 | -49.23 | 104.00 | 241.75 | .22 |
| 6700.00 | .82 | 308.20 | 6698.15 | -48.42 | -92.79 | -48.42 | 104.67 | 242.45 | .11 |

| 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 | |
| 6800.00 | .75 | 290.39 | 6798.14 | -47.75 | -93.97 | -47.75 | 105.40 | 243.06 | .25 |
| 6900.00 | .69 | 304.86 | 6898.14 | -47.18 | -95.08 | -47.18 | 106.14 | 243.61 | .19 |
| 7000.00 | .45 | 290.30 | 6998.13 | -46.69 | -95.94 | -46.69 | 106.70 | 244.05 | .28 |
| 7100.00 | .65 | 297.57 | 7098.13 | -46.30 | -96.81 | -46.30 | 107.31 | 244.44 | .21 |
| 7200.00 | .37 | 290.17 | 7198.12 | -45.92 | -97.62 | -45.92 | 107.88 | 244.81 | .29 |
| 7300.00 | .92 | 275.51 | 7298.12 | -45.73 | -98.72 | -45.73 | 108.80 | 245.14 | .57 |
| 7400.00 | .78 | 307.71 | 7398.10 | -45.24 | -100.06 | -45.24 | 109.81 | 245.67 | .49 |
| 7500.00 | .92 | 299.51 | 7498.09 | -44.43 | -101.29 | -44.43 | 110.61 | 246.32 | .19 |
| 7600.00 | .70 | 314.59 | 7598.08 | -43.60 | -102.43 | -43.60 | 111.32 | 246.94 | .30 |
| 7700.00 | .62 | 302.84 | 7698.08 | -42.88 | -103.32 | -42.88 | 111.86 | 247.46 | .16 |

| | | | | | | | | | |
|-----------------------------------|-----|--------|---------|--------|---------|--------|--------|--------|-----|
| Last Survey Depth Recorded | | | | | | | | | |
| 7800.00 | .82 | 304.75 | 7798.07 | -42.18 | -104.36 | -42.18 | 112.56 | 247.99 | .20 |