



Job Number: SVGJ-180018 - API: 05-123-26138

Company: PDC

Lease/Well: Heyde 31-26

Location: Weld County, CO

Rig Name: N/A

RKB: 0'

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

State/Country: Colorado/USA

Declination: 8.18°

Grid: East To True North

File name: C:\WINSER~1\2018\PDC\GJ\HEYDE\3126.SVY

Date/Time: 19-Feb-18 / 10:03

Curve Name: Surface - 6800' M.D. (Rate Gyro)

Lat: 40.20175 Long: -104.51697

MS Energy

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 | .63 | 244.13 | 100.00 | -.24 | -.49 | -.24 | .55 | 244.13 | .63 |
| 200.00 | .44 | 260.52 | 199.99 | -.54 | -1.37 | -.54 | 1.47 | 248.35 | .24 |
| 300.00 | .46 | 301.64 | 299.99 | -.40 | -2.09 | -.40 | 2.13 | 259.27 | .32 |
| 400.00 | .65 | 309.77 | 399.99 | .18 | -2.87 | .18 | 2.87 | 273.55 | .21 |
| 500.00 | .66 | 308.67 | 499.98 | .90 | -3.75 | .90 | 3.86 | 283.50 | .02 |
| 600.00 | .84 | 301.37 | 599.97 | 1.64 | -4.83 | 1.64 | 5.10 | 288.78 | .20 |
| 700.00 | .73 | 301.87 | 699.96 | 2.36 | -5.99 | 2.36 | 6.44 | 291.49 | .11 |
| 800.00 | .79 | 336.53 | 799.95 | 3.33 | -6.81 | 3.33 | 7.58 | 296.05 | .46 |
| 900.00 | .80 | 335.93 | 899.94 | 4.60 | -7.37 | 4.60 | 8.69 | 301.96 | .01 |
| 1000.00 | .82 | 337.23 | 999.93 | 5.90 | -7.93 | 5.90 | 9.88 | 306.63 | .03 |
| 1100.00 | .88 | 340.38 | 1099.92 | 7.28 | -8.47 | 7.28 | 11.16 | 310.69 | .08 |
| 1200.00 | .99 | 333.89 | 1199.91 | 8.78 | -9.10 | 8.78 | 12.65 | 313.96 | .15 |

| 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 | .98 | 332.58 | 1299.89 | 10.31 | -9.88 | 10.31 | 14.28 | 316.23 | .02 |
| 1400.00 | 1.08 | 327.84 | 1399.88 | 11.87 | -10.77 | 11.87 | 16.03 | 317.77 | .13 |
| 1500.00 | 1.10 | 325.73 | 1499.86 | 13.46 | -11.82 | 13.46 | 17.91 | 318.72 | .04 |
| 1600.00 | 1.11 | 324.60 | 1599.84 | 15.04 | -12.92 | 15.04 | 19.83 | 319.35 | .02 |
| 1700.00 | .99 | 322.12 | 1699.82 | 16.51 | -14.01 | 16.51 | 21.66 | 319.69 | .13 |
| 1800.00 | .93 | 319.16 | 1799.81 | 17.81 | -15.07 | 17.81 | 23.33 | 319.77 | .08 |
| 1900.00 | .73 | 318.14 | 1899.80 | 18.90 | -16.03 | 18.90 | 24.78 | 319.70 | .20 |
| 2000.00 | .53 | 318.22 | 1999.79 | 19.72 | -16.76 | 19.72 | 25.88 | 319.64 | .20 |
| 2100.00 | .33 | 269.98 | 2099.79 | 20.06 | -17.35 | 20.06 | 26.53 | 319.14 | .40 |
| 2200.00 | .52 | 232.84 | 2199.79 | 19.79 | -18.00 | 19.79 | 26.75 | 317.70 | .33 |
| 2300.00 | .66 | 223.47 | 2299.78 | 19.10 | -18.76 | 19.10 | 26.77 | 315.51 | .17 |
| 2400.00 | .83 | 214.92 | 2399.78 | 18.08 | -19.57 | 18.08 | 26.65 | 312.74 | .20 |
| 2500.00 | .80 | 207.80 | 2499.77 | 16.87 | -20.31 | 16.87 | 26.41 | 309.72 | .11 |
| 2600.00 | 1.02 | 194.33 | 2599.75 | 15.39 | -20.86 | 15.39 | 25.92 | 306.43 | .31 |
| 2700.00 | 1.30 | 199.53 | 2699.73 | 13.46 | -21.46 | 13.46 | 25.33 | 302.10 | .30 |
| 2800.00 | 1.35 | 196.29 | 2799.71 | 11.26 | -22.17 | 11.26 | 24.87 | 296.93 | .09 |
| 2900.00 | 1.32 | 199.87 | 2899.68 | 9.05 | -22.89 | 9.05 | 24.61 | 291.57 | .09 |
| 3000.00 | 1.20 | 204.22 | 2999.65 | 7.01 | -23.71 | 7.01 | 24.73 | 286.47 | .15 |
| 3100.00 | 1.00 | 208.78 | 3099.64 | 5.29 | -24.56 | 5.29 | 25.12 | 282.16 | .22 |
| 3200.00 | .45 | 218.97 | 3199.63 | 4.22 | -25.23 | 4.22 | 25.58 | 279.50 | .56 |
| 3300.00 | .11 | 218.18 | 3299.63 | 3.84 | -25.53 | 3.84 | 25.82 | 278.55 | .34 |
| 3400.00 | .04 | 184.12 | 3399.63 | 3.73 | -25.60 | 3.73 | 25.87 | 278.29 | .08 |
| 3500.00 | .13 | 198.38 | 3499.63 | 3.59 | -25.63 | 3.59 | 25.88 | 277.96 | .09 |
| 3600.00 | .44 | 216.06 | 3599.62 | 3.17 | -25.90 | 3.17 | 26.09 | 276.98 | .32 |
| 3700.00 | .62 | 226.65 | 3699.62 | 2.49 | -26.52 | 2.49 | 26.63 | 275.36 | .20 |
| 3800.00 | .74 | 233.30 | 3799.61 | 1.73 | -27.43 | 1.73 | 27.48 | 273.61 | .14 |
| 3900.00 | .77 | 238.45 | 3899.60 | .99 | -28.52 | .99 | 28.53 | 271.99 | .07 |
| 4000.00 | .78 | 240.50 | 3999.60 | .31 | -29.68 | .31 | 29.68 | 270.59 | .03 |
| 4100.00 | .75 | 240.42 | 4099.59 | -.35 | -30.84 | -.35 | 30.85 | 269.34 | .03 |
| 4200.00 | .76 | 240.85 | 4199.58 | -1.00 | -31.99 | -1.00 | 32.01 | 268.21 | .01 |
| 4300.00 | .51 | 245.82 | 4299.57 | -1.50 | -32.98 | -1.50 | 33.01 | 267.39 | .26 |
| 4400.00 | .41 | 253.67 | 4399.57 | -1.79 | -33.73 | -1.79 | 33.77 | 266.97 | .12 |
| 4500.00 | .54 | 267.74 | 4499.56 | -1.91 | -34.54 | -1.91 | 34.59 | 266.84 | .17 |
| 4600.00 | .68 | 258.06 | 4599.56 | -2.05 | -35.59 | -2.05 | 35.65 | 266.71 | .17 |

| 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 | 1.08 | 244.82 | 4699.55 | -2.57 | -37.03 | -2.57 | 37.12 | 266.03 | .45 |
| 4800.00 | 1.40 | 237.00 | 4799.52 | -3.64 | -38.90 | -3.64 | 39.07 | 264.66 | .36 |
| 4900.00 | 1.46 | 248.75 | 4899.49 | -4.76 | -41.12 | -4.76 | 41.39 | 263.39 | .30 |
| 5000.00 | 1.40 | 287.80 | 4999.46 | -4.85 | -43.47 | -4.85 | 43.74 | 263.63 | .96 |
| 5100.00 | 1.32 | 290.41 | 5099.44 | -4.08 | -45.71 | -4.08 | 45.89 | 264.90 | .10 |
| 5200.00 | 1.19 | 294.16 | 5199.41 | -3.25 | -47.74 | -3.25 | 47.85 | 266.10 | .15 |
| 5300.00 | .89 | 310.11 | 5299.40 | -2.33 | -49.28 | -2.33 | 49.33 | 267.30 | .41 |
| 5400.00 | .86 | 338.06 | 5399.38 | -1.13 | -50.15 | -1.13 | 50.16 | 268.71 | .42 |
| 5500.00 | 1.04 | 356.92 | 5499.37 | .47 | -50.48 | .47 | 50.48 | 270.54 | .36 |
| 5600.00 | 1.44 | 8.97 | 5599.35 | 2.62 | -50.33 | 2.62 | 50.40 | 272.98 | .48 |
| 5700.00 | 1.78 | 15.19 | 5699.31 | 5.36 | -49.73 | 5.36 | 50.02 | 276.15 | .38 |
| 5800.00 | 1.40 | 12.17 | 5799.27 | 8.05 | -49.07 | 8.05 | 49.72 | 279.32 | .39 |
| 5900.00 | .49 | 353.67 | 5899.25 | 9.67 | -48.86 | 9.67 | 49.80 | 281.20 | .95 |
| 6000.00 | .44 | 218.10 | 5999.25 | 9.80 | -49.14 | 9.80 | 50.11 | 281.27 | .86 |
| 6100.00 | 1.11 | 186.64 | 6099.24 | 8.53 | -49.49 | 8.53 | 50.22 | 279.78 | .77 |
| 6200.00 | 1.40 | 176.26 | 6199.22 | 6.35 | -49.52 | 6.35 | 49.93 | 277.31 | .37 |
| 6300.00 | 1.28 | 172.07 | 6299.19 | 4.02 | -49.29 | 4.02 | 49.45 | 274.67 | .15 |
| 6400.00 | .70 | 161.83 | 6399.18 | 2.34 | -48.94 | 2.34 | 49.00 | 272.73 | .60 |
| 6500.00 | .49 | 143.72 | 6499.17 | 1.41 | -48.50 | 1.41 | 48.52 | 271.67 | .28 |
| 6600.00 | .41 | 117.56 | 6599.17 | .90 | -47.93 | .90 | 47.94 | 271.08 | .22 |
| 6700.00 | .37 | 77.37 | 6699.17 | .81 | -47.30 | .81 | 47.30 | 270.98 | .27 |
| Last Survey Depth Recorded | | | | | | | | | |
| 6800.00 | .18 | 97.49 | 6799.17 | .86 | -46.83 | .86 | 46.83 | 271.05 | .21 |