



Job Number: SVGJ-140880
 Company: PDC
 Lease/Well: Ottenhoff 41-29
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.34°
 Grid: East To True North
 File name: Y:\WINSER~1\2014SU~1\PDC\GJ\OTTENH~1\4129.SVY
 Date/Time: 17-Jul-14 / 09:32
 Curve Name: Surface - 6842' 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 | .36 | 248.02 | 100.00 | -.12 | -.29 | -.12 | .31 | 248.02 | .36 |
| 200.00 | .19 | 105.23 | 200.00 | -.28 | -.42 | -.28 | .51 | 236.60 | .52 |
| 300.00 | .14 | 130.85 | 300.00 | -.40 | -.17 | -.40 | .44 | 202.94 | .09 |
| 400.00 | .90 | 138.95 | 399.99 | -1.07 | .44 | -1.07 | 1.16 | 157.82 | .76 |
| 500.00 | .86 | 126.74 | 499.98 | -2.12 | 1.56 | -2.12 | 2.63 | 143.68 | .19 |
| 600.00 | 1.24 | 129.78 | 599.96 | -3.26 | 2.99 | -3.26 | 4.42 | 137.46 | .38 |
| 700.00 | 1.29 | 94.29 | 699.94 | -4.03 | 4.94 | -4.03 | 6.38 | 129.22 | .77 |
| 800.00 | 1.65 | 97.66 | 799.91 | -4.31 | 7.49 | -4.31 | 8.64 | 119.91 | .37 |
| 900.00 | 1.67 | 100.48 | 899.87 | -4.77 | 10.35 | -4.77 | 11.40 | 114.72 | .08 |

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|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 1000.00 | 1.34 | 95.60 | 999.83 | -5.15 | 12.95 | -5.15 | 13.93 | 111.67 | .35 |
| 1100.00 | 1.51 | 107.17 | 1099.80 | -5.65 | 15.37 | -5.65 | 16.38 | 110.18 | .33 |
| 1200.00 | 1.23 | 107.39 | 1199.77 | -6.36 | 17.65 | -6.36 | 18.76 | 109.81 | .28 |
| 1300.00 | 1.49 | 104.09 | 1299.74 | -7.00 | 19.94 | -7.00 | 21.13 | 109.33 | .27 |
| 1400.00 | .96 | 98.83 | 1399.72 | -7.44 | 22.03 | -7.44 | 23.25 | 108.66 | .54 |
| 1500.00 | 1.22 | 102.68 | 1499.70 | -7.80 | 23.89 | -7.80 | 25.14 | 108.09 | .27 |
| 1600.00 | 1.20 | 106.67 | 1599.68 | -8.34 | 25.94 | -8.34 | 27.24 | 107.82 | .09 |
| 1700.00 | 1.19 | 88.30 | 1699.66 | -8.61 | 27.98 | -8.61 | 29.27 | 107.10 | .38 |
| 1800.00 | 1.39 | 83.92 | 1799.63 | -8.45 | 30.22 | -8.45 | 31.38 | 105.62 | .22 |
| 1900.00 | 1.28 | 89.14 | 1899.61 | -8.30 | 32.54 | -8.30 | 33.59 | 104.31 | .16 |
| 2000.00 | 1.54 | 81.75 | 1999.58 | -8.09 | 34.99 | -8.09 | 35.91 | 103.02 | .32 |
| 2100.00 | 1.30 | 72.06 | 2099.55 | -7.55 | 37.40 | -7.55 | 38.15 | 101.41 | .34 |
| 2200.00 | 1.55 | 79.04 | 2199.52 | -6.94 | 39.81 | -6.94 | 40.41 | 99.90 | .30 |
| 2300.00 | 1.71 | 78.52 | 2299.47 | -6.39 | 42.60 | -6.39 | 43.07 | 98.53 | .16 |
| 2400.00 | 1.74 | 83.45 | 2399.43 | -5.92 | 45.57 | -5.92 | 45.95 | 97.40 | .15 |
| 2500.00 | 1.46 | 73.88 | 2499.39 | -5.39 | 48.30 | -5.39 | 48.60 | 96.37 | .39 |
| 2600.00 | 1.57 | 81.66 | 2599.36 | -4.84 | 50.88 | -4.84 | 51.11 | 95.43 | .23 |
| 2700.00 | 1.21 | 69.28 | 2699.33 | -4.27 | 53.22 | -4.27 | 53.39 | 94.58 | .47 |
| 2800.00 | .60 | 78.96 | 2799.31 | -3.79 | 54.72 | -3.79 | 54.85 | 93.97 | .63 |
| 2900.00 | .58 | 95.05 | 2899.31 | -3.74 | 55.74 | -3.74 | 55.87 | 93.84 | .17 |
| 3000.00 | .44 | 50.03 | 2999.30 | -3.54 | 56.54 | -3.54 | 56.65 | 93.58 | .41 |
| 3100.00 | .65 | 60.39 | 3099.30 | -3.01 | 57.33 | -3.01 | 57.41 | 93.01 | .23 |
| 3200.00 | .60 | 43.27 | 3199.29 | -2.35 | 58.18 | -2.35 | 58.23 | 92.31 | .19 |
| 3300.00 | .35 | 41.62 | 3299.29 | -1.74 | 58.74 | -1.74 | 58.77 | 91.70 | .25 |
| 3400.00 | .69 | 22.96 | 3399.29 | -.96 | 59.18 | -.96 | 59.19 | 90.93 | .38 |
| 3500.00 | .15 | 111.02 | 3499.28 | -.45 | 59.54 | -.45 | 59.54 | 90.43 | .70 |
| 3600.00 | .42 | 166.00 | 3599.28 | -.85 | 59.75 | -.85 | 59.75 | 90.82 | .36 |
| 3700.00 | .69 | 165.63 | 3699.28 | -1.79 | 59.98 | -1.79 | 60.01 | 91.71 | .27 |
| 3800.00 | .92 | 168.37 | 3799.27 | -3.16 | 60.30 | -3.16 | 60.38 | 93.00 | .23 |

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|-------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 3900.00 | .89 | 168.81 | 3899.26 | -4.71 | 60.61 | -4.71 | 60.79 | 94.44 | .03 |
| 4000.00 | 1.13 | 21.25 | 3999.25 | -4.55 | 61.12 | -4.55 | 61.29 | 94.26 | 1.94 |
| 4100.00 | 2.27 | 359.51 | 4099.20 | -1.65 | 61.46 | -1.65 | 61.48 | 91.54 | 1.29 |
| 4200.00 | 3.38 | 352.41 | 4199.08 | 3.25 | 61.05 | 3.25 | 61.14 | 86.95 | 1.16 |
| 4300.00 | 3.93 | 344.98 | 4298.88 | 9.48 | 59.77 | 9.48 | 60.52 | 80.98 | .72 |
| 4400.00 | 3.66 | 337.46 | 4398.66 | 15.74 | 57.66 | 15.74 | 59.77 | 74.73 | .57 |
| 4500.00 | 3.14 | 336.82 | 4498.48 | 21.21 | 55.36 | 21.21 | 59.28 | 69.04 | .52 |
| 4600.00 | 2.07 | 336.68 | 4598.38 | 25.38 | 53.57 | 25.38 | 59.28 | 64.65 | 1.07 |
| 4700.00 | 1.67 | 342.08 | 4698.33 | 28.43 | 52.40 | 28.43 | 59.62 | 61.52 | .44 |
| 4800.00 | 1.22 | 343.08 | 4798.29 | 30.83 | 51.64 | 30.83 | 60.15 | 59.16 | .45 |
| 4900.00 | .45 | 15.00 | 4898.28 | 32.23 | 51.44 | 32.23 | 60.70 | 57.93 | .87 |
| 5000.00 | .62 | 25.48 | 4998.28 | 33.10 | 51.77 | 33.10 | 61.45 | 57.41 | .20 |
| 5100.00 | .83 | 88.55 | 5098.27 | 33.61 | 52.73 | 33.61 | 62.53 | 57.49 | .78 |
| 5200.00 | 1.45 | 100.60 | 5198.25 | 33.39 | 54.70 | 33.39 | 64.08 | 58.60 | .66 |
| 5300.00 | 1.12 | 87.28 | 5298.23 | 33.21 | 56.92 | 33.21 | 65.89 | 59.74 | .44 |
| 5400.00 | 1.23 | 81.36 | 5398.21 | 33.41 | 58.95 | 33.41 | 67.76 | 60.46 | .16 |
| 5500.00 | 1.43 | 118.18 | 5498.18 | 32.98 | 61.11 | 32.98 | 69.45 | 61.64 | .86 |
| 5600.00 | 1.17 | 118.75 | 5598.15 | 31.90 | 63.11 | 31.90 | 70.72 | 63.18 | .26 |
| 5700.00 | 1.49 | 119.12 | 5698.13 | 30.78 | 65.14 | 30.78 | 72.05 | 64.71 | .32 |
| 5800.00 | 1.28 | 128.16 | 5798.10 | 29.46 | 67.15 | 29.46 | 73.33 | 66.31 | .30 |
| 5900.00 | 1.06 | 109.65 | 5898.08 | 28.46 | 68.90 | 28.46 | 74.55 | 67.56 | .43 |
| 6000.00 | 1.10 | 121.53 | 5998.06 | 27.64 | 70.59 | 27.64 | 75.81 | 68.61 | .23 |
| 6100.00 | .71 | 113.72 | 6098.05 | 26.89 | 71.98 | 26.89 | 76.84 | 69.51 | .41 |
| 6200.00 | .91 | 103.67 | 6198.04 | 26.46 | 73.32 | 26.46 | 77.94 | 70.16 | .24 |
| 6300.00 | .76 | 130.48 | 6298.03 | 25.84 | 74.59 | 25.84 | 78.94 | 70.90 | .41 |
| 6400.00 | .65 | 108.87 | 6398.02 | 25.22 | 75.63 | 25.22 | 79.73 | 71.56 | .29 |
| 6500.00 | .98 | 121.81 | 6498.01 | 24.59 | 76.90 | 24.59 | 80.73 | 72.27 | .38 |
| 6600.00 | 1.22 | 126.81 | 6597.99 | 23.50 | 78.48 | 23.50 | 81.92 | 73.33 | .26 |
| 6700.00 | 1.25 | 125.94 | 6697.97 | 22.22 | 80.21 | 22.22 | 83.23 | 74.51 | .04 |

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|----------------------------|----------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|----------------|------------------|-------------------------------|
| | | | | | | | Distance FT | Direction Deg | |
| 6800.00 | 2.10 | 117.39 | 6797.92 | 20.74 | 82.72 | 20.74 | 85.28 | 75.93 | .88 |
| Last Survey Depth Recorded | | | | | | | | | |
| 6842.00 | 2.21 | 113.20 | 6839.89 | 20.07 | 84.15 | 20.07 | 86.51 | 76.59 | .46 |