



Job Number: SVGJ-150332
 Company: PDC
 Lease/Well: Sater 19BU
 Location: Weld County, CO
 Rig Name: MS Slickline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.34°
 Grid: East To True North
 File name: S:\2015SU~1\PDC\GJ\SATER\19BU.SVY
 Date/Time: 16-Dec-15 / 15:07
 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

| <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 | .54 | 219.96 | 100.00 | -.36 | -.30 | -.36 | .47 | 219.96 | .54 |
| 200.00 | .41 | 192.34 | 200.00 | -1.07 | -.68 | -1.07 | 1.27 | 212.46 | .26 |
| 300.00 | .12 | 193.15 | 299.99 | -1.52 | -.78 | -1.52 | 1.71 | 207.17 | .29 |
| 400.00 | .18 | 242.39 | 399.99 | -1.70 | -.95 | -1.70 | 1.94 | 209.10 | .14 |
| | | | | | | | | | |
| 500.00 | .13 | 198.69 | 499.99 | -1.88 | -1.12 | -1.88 | 2.19 | 210.82 | .12 |
| 600.00 | .51 | 301.41 | 599.99 | -1.75 | -1.54 | -1.75 | 2.33 | 221.22 | .55 |
| 700.00 | .59 | 288.95 | 699.99 | -1.35 | -2.40 | -1.35 | 2.76 | 240.59 | .14 |
| 800.00 | .51 | 280.77 | 799.98 | -1.10 | -3.33 | -1.10 | 3.51 | 251.64 | .11 |
| 900.00 | .48 | 293.34 | 899.98 | -.86 | -4.15 | -.86 | 4.24 | 258.35 | .11 |
| | | | | | | | | | |
| 1000.00 | .76 | 274.82 | 999.97 | -.63 | -5.20 | -.63 | 5.23 | 263.05 | .34 |
| 1100.00 | .60 | 264.74 | 1099.97 | -.63 | -6.38 | -.63 | 6.41 | 264.39 | .20 |
| 1200.00 | .81 | 276.09 | 1199.96 | -.60 | -7.60 | -.60 | 7.63 | 265.49 | .25 |

| 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 | .79 | 261.24 | 1299.95 | -.63 | -8.99 | -.63 | 9.01 | 266.00 | .21 |
| 1400.00 | .84 | 275.89 | 1399.94 | -.66 | -10.40 | -.66 | 10.42 | 266.37 | .21 |
| 1500.00 | .90 | 266.29 | 1499.93 | -.63 | -11.91 | -.63 | 11.93 | 266.95 | .16 |
| 1600.00 | .76 | 245.05 | 1599.92 | -.96 | -13.29 | -.96 | 13.33 | 265.85 | .34 |
| 1700.00 | .58 | 247.50 | 1699.91 | -1.44 | -14.36 | -1.44 | 14.43 | 264.28 | .18 |
| 1800.00 | .46 | 270.50 | 1799.91 | -1.63 | -15.23 | -1.63 | 15.32 | 263.90 | .24 |
| 1900.00 | .60 | 299.66 | 1899.90 | -1.37 | -16.09 | -1.37 | 16.15 | 265.15 | .30 |
| 2000.00 | .49 | 346.69 | 1999.90 | -.69 | -16.64 | -.69 | 16.66 | 267.62 | .45 |
| 2100.00 | .54 | 14.50 | 2099.89 | .18 | -16.62 | .18 | 16.62 | 270.63 | .25 |
| 2200.00 | .80 | 32.19 | 2199.89 | 1.23 | -16.13 | 1.23 | 16.18 | 274.36 | .33 |
| 2300.00 | 1.07 | 30.09 | 2299.87 | 2.63 | -15.29 | 2.63 | 15.52 | 279.75 | .27 |
| 2400.00 | .98 | 14.44 | 2399.86 | 4.26 | -14.61 | 4.26 | 15.22 | 286.27 | .29 |
| 2500.00 | .98 | 2.20 | 2499.84 | 5.95 | -14.36 | 5.95 | 15.55 | 292.49 | .21 |
| 2600.00 | .88 | 359.84 | 2599.83 | 7.57 | -14.33 | 7.57 | 16.21 | 297.83 | .11 |
| 2700.00 | .88 | 8.70 | 2699.82 | 9.10 | -14.22 | 9.10 | 16.88 | 302.60 | .14 |
| 2800.00 | .95 | 8.00 | 2799.81 | 10.68 | -13.99 | 10.68 | 17.60 | 307.35 | .07 |
| 2900.00 | 1.09 | 7.57 | 2899.79 | 12.44 | -13.75 | 12.44 | 18.54 | 312.14 | .14 |
| 3000.00 | 1.18 | 6.44 | 2999.77 | 14.41 | -13.51 | 14.41 | 19.75 | 316.84 | .09 |
| 3100.00 | .52 | 335.59 | 3099.76 | 15.84 | -13.58 | 15.84 | 20.87 | 319.40 | .78 |
| 3200.00 | .46 | 281.19 | 3199.76 | 16.33 | -14.16 | 16.33 | 21.62 | 319.07 | .45 |
| 3300.00 | .65 | 284.43 | 3299.75 | 16.55 | -15.10 | 16.55 | 22.41 | 317.62 | .19 |
| 3400.00 | .58 | 284.29 | 3399.75 | 16.82 | -16.14 | 16.82 | 23.31 | 316.17 | .07 |
| 3500.00 | .30 | 279.52 | 3499.74 | 16.99 | -16.89 | 16.99 | 23.96 | 315.16 | .28 |
| 3600.00 | .16 | 287.90 | 3599.74 | 17.07 | -17.28 | 17.07 | 24.29 | 314.65 | .14 |
| 3700.00 | .12 | 303.27 | 3699.74 | 17.17 | -17.50 | 17.17 | 24.52 | 314.45 | .05 |
| 3800.00 | .18 | 344.04 | 3799.74 | 17.38 | -17.63 | 17.38 | 24.76 | 314.59 | .12 |
| 3900.00 | .25 | 11.05 | 3899.74 | 17.75 | -17.64 | 17.75 | 25.02 | 315.18 | .12 |
| 4000.00 | .32 | 27.49 | 3999.74 | 18.21 | -17.47 | 18.21 | 25.23 | 316.19 | .11 |
| 4100.00 | .32 | 40.60 | 4099.74 | 18.67 | -17.15 | 18.67 | 25.35 | 317.42 | .07 |
| 4200.00 | .28 | 11.34 | 4199.74 | 19.12 | -16.92 | 19.12 | 25.53 | 318.49 | .16 |
| 4300.00 | .50 | 306.99 | 4299.73 | 19.62 | -17.23 | 19.62 | 26.11 | 318.72 | .46 |
| 4400.00 | .93 | 295.79 | 4399.73 | 20.24 | -18.30 | 20.24 | 27.29 | 317.87 | .45 |
| 4500.00 | 1.54 | 298.67 | 4499.70 | 21.24 | -20.21 | 21.24 | 29.32 | 316.41 | .61 |
| 4600.00 | 2.34 | 306.02 | 4599.64 | 23.08 | -23.04 | 23.08 | 32.62 | 315.05 | .84 |

| 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 | 3.00 | 310.98 | 4699.54 | 26.00 | -26.67 | 26.00 | 37.25 | 314.27 | .70 |
| 4800.00 | 3.27 | 310.43 | 4799.39 | 29.56 | -30.82 | 29.56 | 42.70 | 313.81 | .27 |
| 4900.00 | 3.46 | 310.62 | 4899.21 | 33.38 | -35.28 | 33.38 | 48.57 | 313.41 | .19 |
| 5000.00 | 3.39 | 309.51 | 4999.04 | 37.22 | -39.85 | 37.22 | 54.53 | 313.05 | .10 |
| 5100.00 | 2.98 | 306.71 | 5098.88 | 40.66 | -44.22 | 40.66 | 60.07 | 312.60 | .44 |
| 5200.00 | 2.34 | 306.59 | 5198.77 | 43.43 | -47.94 | 43.43 | 64.68 | 312.17 | .64 |
| 5300.00 | 1.78 | 304.23 | 5298.71 | 45.52 | -50.86 | 45.52 | 68.26 | 311.83 | .57 |
| 5400.00 | 1.36 | 301.22 | 5398.67 | 47.01 | -53.16 | 47.01 | 70.96 | 311.48 | .43 |
| 5500.00 | 1.02 | 301.66 | 5498.65 | 48.09 | -54.93 | 48.09 | 73.01 | 311.20 | .34 |
| 5600.00 | 1.14 | 300.08 | 5598.63 | 49.06 | -56.55 | 49.06 | 74.86 | 310.94 | .12 |
| 5700.00 | .97 | 286.07 | 5698.61 | 49.79 | -58.23 | 49.79 | 76.61 | 310.53 | .31 |
| 5800.00 | .59 | 304.54 | 5798.60 | 50.31 | -59.46 | 50.31 | 77.89 | 310.24 | .45 |
| 5900.00 | .20 | 343.78 | 5898.60 | 50.77 | -59.94 | 50.77 | 78.55 | 310.27 | .45 |
| 6000.00 | .27 | 61.22 | 5998.60 | 51.06 | -59.78 | 51.06 | 78.61 | 310.50 | .30 |
| 6100.00 | .51 | 70.69 | 6098.60 | 51.32 | -59.15 | 51.32 | 78.31 | 310.94 | .25 |
| 6200.00 | .58 | 91.97 | 6198.59 | 51.45 | -58.23 | 51.45 | 77.70 | 311.46 | .21 |
| 6300.00 | 1.12 | 95.41 | 6298.58 | 51.34 | -56.75 | 51.34 | 76.52 | 312.13 | .54 |
| 6400.00 | 1.40 | 104.86 | 6398.56 | 50.93 | -54.59 | 50.93 | 74.66 | 313.01 | .35 |
| 6500.00 | 1.56 | 139.62 | 6498.53 | 49.58 | -52.53 | 49.58 | 72.23 | 313.35 | .90 |
| 6600.00 | 1.25 | 135.27 | 6598.50 | 47.77 | -50.88 | 47.77 | 69.79 | 313.19 | .33 |
| Last Survey Depth Recorded | | | | | | | | | |
| 6700.00 | 2.23 | 84.41 | 6698.45 | 47.18 | -48.18 | 47.18 | 67.43 | 314.40 | 1.74 |