



## **PDC Energy**

**Weld County, CO  
Sec 21, T5N, R65W  
Elbert 11N**

**Wellbore #1**

**Design: Wellbore #1**

## **QES Survey Report**

**14 June, 2017**





Project: Weld County, CO  
Site: Sec 21, T5N, R65W  
Well: Elbert 11N  
Wellbore: Wellbore #1  
Design: Wellbore #1  
Latitude: 40.383050  
Longitude: -104.675250  
Ground Level: 4638.0  
RKB @ 4661.0usft (Ensign #160)



#### PROJECT DETAILS: Weld County, CO

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Northern Zone  
System Datum: Mean Sea Level

#### REFERENCE INFORMATION

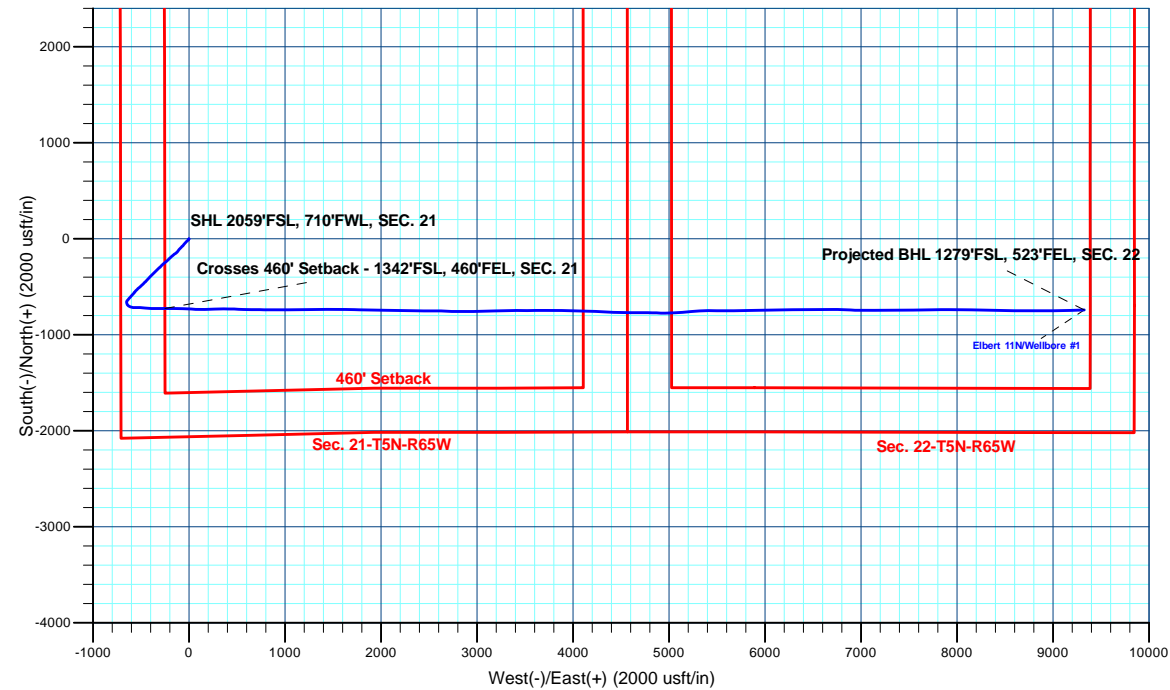
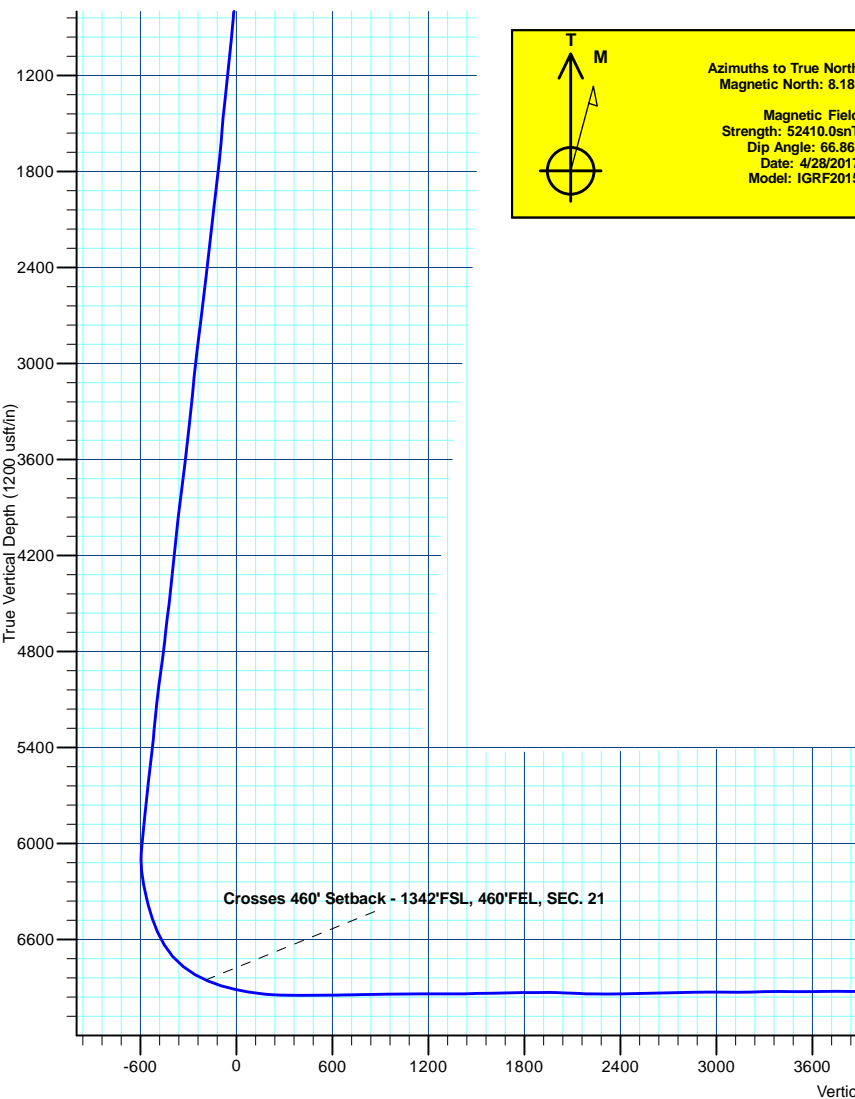
Co-ordinate (N/E) Reference: Well Elbert 11N, True North  
Vertical (TVD) Reference: RKB @ 4661.0usft (Ensign #160)  
Section (VS) Reference: Slot - (0.0N, 0.0E)  
Measured Depth Reference: RKB @ 4661.0usft (Ensign #160)  
Calculation Method: Minimum Curvature

#### WELL DETAILS: Elbert 11N

|               |             |
|---------------|-------------|
| Ground Level: | 4638.0      |
| Easting       | 3229755.54  |
| Latitude      | 40.383050   |
| Longitude     | -104.675250 |

#### ANNOTATIONS

| MD      | Inc   | Azi    | TVD    | +N/-S  | +E/-W  | VSe@eparture | Annotation  |
|---------|-------|--------|--------|--------|--------|--------------|---|
| 311.0   | 0.40  | 175.90 | 311.0  | -1.1   | 0.1    | 0.2          | First MWD Survey @ 311.0' MD / TVD                |
| 7085.8  | 65.94 | 89.09  | 6853.3 | -725.0 | -250.5 | -192.1       | Crosses 460' Setback - 1342'FSL, 460'FEL, SEC. 21 |
| 16677.0 | 91.20 | 88.90  | 6860.0 | -741.8 | 9324.5 | 9354.0       | Projected BHL 1279'FSL, 523'FEL, SEC. 22          |



|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

|                    |                           |                      |                |
|--------------------|---------------------------|----------------------|----------------|
| <b>Project</b>     | Weld County, CO           |                      |                |
| <b>Map System:</b> | US State Plane 1983       | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | North American Datum 1983 |                      |                |
| <b>Map Zone:</b>   | Colorado Northern Zone    |                      |                |

|                       |     |                   |              |              |            |             |                   |      |   |
|-----------------------|-----|-------------------|--------------|--------------|------------|-------------|-------------------|------|---|
| Site                  |     | Sec 21, T5N, R65W |              |              |            |             |                   |      |   |
| Site Position:        |     | Northing:         | 1,383,603.36 | usft         | Latitude:  | 40.383460   |                   |      |   |
| From:                 | Map | Easting:          | 3,229,751.36 | usft         | Longitude: | -104.675260 |                   |      |   |
| Position Uncertainty: |     | 0.0               | usft         | Slot Radius: | 13-3/16    | "           | Grid Convergence: | 0.53 | ° |

|                      |            |          |                     |                   |               |              |
|----------------------|------------|----------|---------------------|-------------------|---------------|--------------|
| Well                 | Elbert 11N |          |                     |                   |               |              |
| Well Position        | +N/-S      | 0.0 usft | Northing:           | 1,383,454.03 usft | Latitude:     | 40.383050    |
|                      | +E/-W      | 0.0 usft | Easting:            | 3,229,755.54 usft | Longitude:    | -104.675250  |
| Position Uncertainty |            | 0.0 usft | Wellhead Elevation: | 0.0 usft          | Ground Level: | 4,638.0 usft |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | Wellbore #1       |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2015          | 4/28/2017          | 8.18                   | 66.86                | 52,410                     |

|                          |                                |                     |                     |                      |     |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|-----|
| <b>Design</b>            | Wellbore #1                    |                     |                     |                      |     |
| <b>Audit Notes:</b>      |                                |                     |                     |                      |     |
| <b>Version:</b>          | 1.0                            | <b>Phase:</b>       | ACTUAL              | <b>Tie On Depth:</b> | 0.0 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Direction (°)</b> |     |
|                          | 0.0                            | 0.0                 | 0.0                 | 94.56                |     |

|                       |                  |                           |                  |                    |  |
|-----------------------|------------------|---------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>      | 6/14/2017                 |                  |                    |  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>  | <b>Tool Name</b> | <b>Description</b> |  |
| 311.0                 | 16,677.0         | MWD Surveys (Wellbore #1) | MWD default      | MWD - Standard     |  |

|   |                        |                    |                              |                     |                     |                                |                                |                               |                              |
|---|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|
| <b>Survey</b>                             |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| <b>Measured Depth (usft)</b>              | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Vertical Section (usft)</b> | <b>Dogleg Rate (°/100usft)</b> | <b>Build Rate (°/100usft)</b> | <b>Turn Rate (°/100usft)</b> |
| 0.0                                       | 0.00                   | 0.00               | 0.0                          | 0.0                 | 0.0                 | 0.0                            | 0.00                           | 0.00                          | 0.00                         |
| <b>First MWD Survey @ 311.0' MD / TVD</b> |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| 311.0                                     | 0.40                   | 175.90             | 311.0                        | -1.1                | 0.1                 | 0.2                            | 0.13                           | 0.13                          | 0.00                         |
| 401.0                                     | 1.40                   | 204.90             | 401.0                        | -2.4                | -0.4                | -0.2                           | 1.19                           | 1.11                          | 32.22                        |
| 490.0                                     | 2.90                   | 220.20             | 489.9                        | -5.1                | -2.3                | -1.9                           | 1.79                           | 1.69                          | 17.19                        |
| 580.0                                     | 3.20                   | 218.20             | 579.8                        | -8.8                | -5.3                | -4.6                           | 0.35                           | 0.33                          | -2.22                        |
| 670.0                                     | 4.20                   | 227.40             | 669.6                        | -13.0               | -9.3                | -8.2                           | 1.29                           | 1.11                          | 10.22                        |
| 760.0                                     | 5.80                   | 229.30             | 759.3                        | -18.2               | -15.2               | -13.7                          | 1.79                           | 1.78                          | 2.11                         |
| 849.0                                     | 7.40                   | 227.00             | 847.7                        | -25.1               | -22.8               | -20.7                          | 1.82                           | 1.80                          | -2.58                        |
| 1,029.0                                   | 9.40                   | 220.90             | 1,025.7                      | -44.1               | -40.9               | -37.2                          | 1.21                           | 1.11                          | -3.39                        |
| 1,119.0                                   | 9.60                   | 221.60             | 1,114.5                      | -55.2               | -50.7               | -46.1                          | 0.26                           | 0.22                          | 0.78                         |

|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 1,208.0               | 10.00           | 220.50      | 1,202.2               | -66.7        | -60.6        | -55.1                   | 0.50                    | 0.45                   | -1.24                 |
| 1,297.0               | 9.90            | 227.20      | 1,289.9               | -77.7        | -71.2        | -64.8                   | 1.30                    | -0.11                  | 7.53                  |
| 1,387.0               | 9.30            | 224.00      | 1,378.6               | -88.2        | -82.0        | -74.7                   | 0.89                    | -0.67                  | -3.56                 |
| 1,477.0               | 8.90            | 219.80      | 1,467.5               | -98.8        | -91.5        | -83.3                   | 0.86                    | -0.44                  | -4.67                 |
| 1,567.0               | 8.40            | 219.50      | 1,556.4               | -109.2       | -100.1       | -91.1                   | 0.56                    | -0.56                  | -0.33                 |
| 1,588.0               | 8.30            | 218.80      | 1,577.2               | -111.6       | -102.0       | -92.8                   | 0.68                    | -0.48                  | -3.33                 |
| 1,775.0               | 9.60            | 219.60      | 1,761.9               | -134.1       | -120.4       | -109.4                  | 0.70                    | 0.70                   | 0.43                  |
| 1,864.0               | 9.70            | 234.10      | 1,849.7               | -144.2       | -131.2       | -119.3                  | 2.73                    | 0.11                   | 16.29                 |
| 1,954.0               | 9.30            | 233.40      | 1,938.5               | -153.0       | -143.2       | -130.6                  | 0.46                    | -0.44                  | -0.78                 |
| 2,044.0               | 8.80            | 231.60      | 2,027.3               | -161.6       | -154.4       | -141.1                  | 0.64                    | -0.56                  | -2.00                 |
| 2,134.0               | 8.90            | 227.70      | 2,116.3               | -170.6       | -165.0       | -150.9                  | 0.68                    | 0.11                   | -4.33                 |
| 2,224.0               | 10.20           | 227.40      | 2,205.0               | -180.7       | -176.0       | -161.1                  | 1.45                    | 1.44                   | -0.33                 |
| 2,314.0               | 9.90            | 227.40      | 2,293.6               | -191.3       | -187.6       | -171.8                  | 0.33                    | -0.33                  | 0.00                  |
| 2,404.0               | 9.10            | 226.10      | 2,382.4               | -201.5       | -198.4       | -181.7                  | 0.92                    | -0.89                  | -1.44                 |
| 2,492.0               | 9.10            | 226.10      | 2,469.3               | -211.1       | -208.4       | -191.0                  | 0.00                    | 0.00                   | 0.00                  |
| 2,581.0               | 9.90            | 231.60      | 2,557.1               | -220.8       | -219.5       | -201.2                  | 1.36                    | 0.90                   | 6.18                  |
| 2,760.0               | 10.10           | 228.60      | 2,733.4               | -240.7       | -243.3       | -223.4                  | 0.31                    | 0.11                   | -1.68                 |
| 2,849.0               | 9.90            | 228.30      | 2,821.0               | -251.0       | -254.9       | -234.1                  | 0.23                    | -0.22                  | -0.34                 |
| 2,939.0               | 9.70            | 228.40      | 2,909.7               | -261.1       | -266.3       | -244.7                  | 0.22                    | -0.22                  | 0.11                  |
| 3,029.0               | 9.50            | 227.70      | 2,998.4               | -271.2       | -277.5       | -255.1                  | 0.26                    | -0.22                  | -0.78                 |
| 3,119.0               | 8.70            | 226.10      | 3,087.3               | -280.9       | -287.9       | -264.7                  | 0.93                    | -0.89                  | -1.78                 |
| 3,209.0               | 7.80            | 222.50      | 3,176.4               | -290.1       | -296.9       | -272.9                  | 1.15                    | -1.00                  | -4.00                 |
| 3,298.0               | 9.60            | 229.30      | 3,264.3               | -299.4       | -306.6       | -281.9                  | 2.33                    | 2.02                   | 7.64                  |
| 3,477.0               | 8.70            | 224.00      | 3,441.1               | -318.9       | -327.4       | -301.0                  | 0.69                    | -0.50                  | -2.96                 |
| 3,567.0               | 10.40           | 227.70      | 3,529.8               | -329.2       | -338.1       | -310.8                  | 2.01                    | 1.89                   | 4.11                  |
| 3,657.0               | 10.60           | 226.70      | 3,618.3               | -340.4       | -350.1       | -322.0                  | 0.30                    | 0.22                   | -1.11                 |
| 3,746.0               | 10.60           | 225.40      | 3,705.8               | -351.7       | -361.9       | -332.8                  | 0.27                    | 0.00                   | -1.46                 |
| 3,836.0               | 10.80           | 224.20      | 3,794.2               | -363.6       | -373.7       | -343.6                  | 0.33                    | 0.22                   | -1.33                 |
| 3,926.0               | 10.60           | 223.20      | 3,882.7               | -375.7       | -385.2       | -354.1                  | 0.30                    | -0.22                  | -1.11                 |
| 4,016.0               | 10.00           | 224.70      | 3,971.2               | -387.3       | -396.4       | -364.3                  | 0.73                    | -0.67                  | 1.67                  |
| 4,106.0               | 9.20            | 225.80      | 4,060.0               | -397.8       | -407.0       | -374.1                  | 0.91                    | -0.89                  | 1.22                  |
| 4,196.0               | 9.70            | 223.70      | 4,148.7               | -408.3       | -417.4       | -383.7                  | 0.67                    | 0.56                   | -2.33                 |
| 4,286.0               | 9.60            | 223.30      | 4,237.5               | -419.3       | -427.8       | -393.1                  | 0.13                    | -0.11                  | -0.44                 |
| 4,466.0               | 9.10            | 221.80      | 4,415.1               | -440.8       | -447.6       | -411.1                  | 0.31                    | -0.28                  | -0.83                 |
| 4,557.0               | 10.60           | 229.30      | 4,504.7               | -451.6       | -458.7       | -421.4                  | 2.17                    | 1.65                   | 8.24                  |
| 4,647.0               | 9.90            | 228.40      | 4,593.3               | -462.2       | -470.8       | -432.6                  | 0.80                    | -0.78                  | -1.00                 |
| 4,737.0               | 9.30            | 224.90      | 4,682.0               | -472.5       | -481.7       | -442.6                  | 0.93                    | -0.67                  | -3.89                 |
| 4,827.0               | 10.50           | 224.90      | 4,770.7               | -483.4       | -492.7       | -452.7                  | 1.33                    | 1.33                   | 0.00                  |
| 4,917.0               | 11.20           | 227.90      | 4,859.1               | -495.1       | -504.9       | -464.0                  | 1.00                    | 0.78                   | 3.33                  |
| 5,007.0               | 10.90           | 227.70      | 4,947.4               | -506.7       | -517.7       | -475.8                  | 0.34                    | -0.33                  | -0.22                 |
| 5,097.0               | 10.50           | 228.30      | 5,035.8               | -517.9       | -530.1       | -487.3                  | 0.46                    | -0.44                  | 0.67                  |
| 5,187.0               | 9.70            | 226.00      | 5,124.4               | -528.6       | -541.7       | -498.0                  | 1.00                    | -0.89                  | -2.56                 |
| 5,278.0               | 8.90            | 223.70      | 5,214.3               | -539.0       | -552.1       | -507.5                  | 0.97                    | -0.88                  | -2.53                 |

|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

| Survey   |                 |             |                       |              |              |                         |                         |                        |                       |
|--|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft)                                    | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 5,368.0  | 8.50            | 221.10      | 5,303.2               | -549.0       | -561.3       | -515.8                  | 0.62                    | -0.44                  | -2.89                 |
| 5,457.0  | 9.80            | 222.30      | 5,391.1               | -559.6       | -570.7       | -524.4                  | 1.48                    | 1.46                   | 1.35                  |
| 5,546.0  | 11.50           | 219.60      | 5,478.5               | -572.0       | -581.4       | -534.1                  | 1.99                    | 1.91                   | -3.03                 |
| 5,636.0  | 11.10           | 221.20      | 5,566.8               | -585.5       | -592.9       | -544.4                  | 0.56                    | -0.44                  | 1.78                  |
| 5,725.0  | 10.70           | 222.50      | 5,654.2               | -598.0       | -604.1       | -554.6                  | 0.53                    | -0.45                  | 1.46                  |
| 5,815.0  | 9.80            | 220.40      | 5,742.8               | -610.0       | -614.7       | -564.3                  | 1.08                    | -1.00                  | -2.33                 |
| 5,905.0  | 9.40            | 221.40      | 5,831.5               | -621.4       | -624.5       | -573.1                  | 0.48                    | -0.44                  | 1.11                  |
| 5,995.0  | 9.80            | 221.60      | 5,920.2               | -632.6       | -634.5       | -582.2                  | 0.45                    | 0.44                   | 0.22                  |
| 6,113.0  | 9.90            | 212.40      | 6,036.5               | -648.7       | -646.6       | -593.0                  | 1.34                    | 0.08                   | -7.80                 |
| 6,203.0  | 13.00           | 175.20      | 6,124.8               | -665.3       | -649.9       | -594.9                  | 8.70                    | 3.44                   | -41.33                |
| 6,293.0  | 13.40           | 149.70      | 6,212.5               | -684.4       | -643.8       | -587.3                  | 6.43                    | 0.44                   | -28.33                |
| 6,382.0  | 14.30           | 121.40      | 6,299.0               | -699.1       | -629.2       | -571.6                  | 7.60                    | 1.01                   | -31.80                |
| 6,472.0  | 15.30           | 111.40      | 6,386.1               | -709.2       | -608.6       | -550.3                  | 3.04                    | 1.11                   | -11.11                |
| 6,561.0  | 18.50           | 95.50       | 6,471.2               | -714.8       | -583.6       | -524.9                  | 6.29                    | 3.60                   | -17.87                |
| 6,650.0  | 24.20           | 87.30       | 6,554.1               | -715.3       | -551.3       | -492.7                  | 7.22                    | 6.40                   | -9.21                 |
| 6,740.0  | 31.00           | 93.80       | 6,633.9               | -716.0       | -509.7       | -451.1                  | 8.25                    | 7.56                   | 7.22                  |
| 6,830.0  | 40.60           | 95.90       | 6,706.8               | -720.6       | -457.3       | -398.6                  | 10.75                   | 10.67                  | 2.33                  |
| 6,920.0  | 51.40           | 92.00       | 6,769.2               | -724.8       | -392.8       | -334.0                  | 12.39                   | 12.00                  | -4.33                 |
| 7,010.0  | 60.80           | 89.60       | 6,819.3               | -725.8       | -318.2       | -259.5                  | 10.68                   | 10.44                  | -2.67                 |
| <b>Crosses 460' Setback - 1342'FSL, 460'FEL, SEC. 21</b> |                 |             |                       |              |              |                         |                         |                        |                       |
| 7,085.8  | 65.94           | 89.09       | 6,853.3               | -725.0       | -250.5       | -192.1                  | 6.80                    | 6.78                   | -0.67                 |
| 7,100.0  | 66.90           | 89.00       | 6,859.0               | -724.8       | -237.5       | -179.1                  | 6.80                    | 6.78                   | -0.64                 |
| 7,190.0  | 72.70           | 90.40       | 6,890.1               | -724.3       | -153.1       | -95.0                   | 6.61                    | 6.44                   | 1.56                  |
| 7,280.0  | 78.40           | 92.40       | 6,912.5               | -726.5       | -66.0        | -8.0                    | 6.69                    | 6.33                   | 2.22                  |
| 7,370.0  | 80.30           | 93.80       | 6,929.1               | -731.3       | 22.3         | 80.4                    | 2.61                    | 2.11                   | 1.56                  |
| 7,460.0  | 84.60           | 90.30       | 6,941.0               | -734.5       | 111.5        | 169.5                   | 6.14                    | 4.78                   | -3.89                 |
| 7,550.0  | 87.60           | 88.20       | 6,947.1               | -733.3       | 201.2        | 258.9                   | 4.07                    | 3.33                   | -2.33                 |
| 7,640.0  | 90.10           | 89.00       | 6,948.9               | -731.1       | 291.2        | 348.4                   | 2.92                    | 2.78                   | 0.89                  |
| 7,730.0  | 89.80           | 89.70       | 6,949.0               | -730.1       | 381.2        | 438.0                   | 0.85                    | -0.33                  | 0.78                  |
| 7,819.0  | 90.10           | 92.40       | 6,949.1               | -731.7       | 470.2        | 526.8                   | 3.05                    | 0.34                   | 3.03                  |
| 7,909.0  | 91.10           | 91.30       | 6,948.1               | -734.6       | 560.1        | 616.7                   | 1.65                    | 1.11                   | -1.22                 |
| 7,998.0  | 91.50           | 90.80       | 6,946.1               | -736.2       | 649.1        | 705.5                   | 0.72                    | 0.45                   | -0.56                 |
| 8,088.0  | 90.50           | 91.20       | 6,944.5               | -737.8       | 739.0        | 795.4                   | 1.20                    | -1.11                  | 0.44                  |
| 8,177.0  | 90.90           | 89.70       | 6,943.4               | -738.5       | 828.0        | 884.1                   | 1.74                    | 0.45                   | -1.69                 |
| 8,266.0  | 91.20           | 89.40       | 6,941.8               | -737.8       | 917.0        | 972.8                   | 0.48                    | 0.34                   | -0.34                 |
| 8,356.0  | 90.30           | 90.30       | 6,940.6               | -737.6       | 1,007.0      | 1,062.5                 | 1.41                    | -1.00                  | 1.00                  |
| 8,446.0  | 90.30           | 90.40       | 6,940.2               | -738.1       | 1,097.0      | 1,152.2                 | 0.11                    | 0.00                   | 0.11                  |
| 8,536.0  | 90.00           | 89.70       | 6,939.9               | -738.2       | 1,187.0      | 1,241.9                 | 0.85                    | -0.33                  | -0.78                 |
| 8,625.0  | 90.10           | 89.00       | 6,939.8               | -737.2       | 1,276.0      | 1,330.6                 | 0.79                    | 0.11                   | -0.79                 |
| 8,715.0  | 90.70           | 88.50       | 6,939.2               | -735.2       | 1,366.0      | 1,420.1                 | 0.87                    | 0.67                   | -0.56                 |
| 8,805.0  | 91.10           | 89.20       | 6,937.8               | -733.4       | 1,455.9      | 1,509.6                 | 0.90                    | 0.44                   | 0.78                  |
| 8,895.0  | 91.60           | 90.10       | 6,935.7               | -732.9       | 1,545.9      | 1,599.3                 | 1.14                    | 0.56                   | 1.00                  |
| 8,985.0  | 90.60           | 91.70       | 6,934.0               | -734.3       | 1,635.9      | 1,689.1                 | 2.10                    | -1.11                  | 1.78                  |

|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 9,075.0               | 90.40           | 92.40       | 6,933.2               | -737.5       | 1,725.8      | 1,779.0                 | 0.81                    | -0.22                  | 0.78                  |
| 9,165.0               | 91.00           | 91.00       | 6,932.1               | -740.2       | 1,815.8      | 1,868.9                 | 1.69                    | 0.67                   | -1.56                 |
| 9,254.0               | 89.20           | 90.60       | 6,931.9               | -741.4       | 1,904.8      | 1,957.7                 | 2.07                    | -2.02                  | -0.45                 |
| 9,344.0               | 87.70           | 91.30       | 6,934.3               | -742.9       | 1,994.7      | 2,047.5                 | 1.84                    | -1.67                  | 0.78                  |
| 9,434.0               | 87.80           | 90.30       | 6,937.9               | -744.1       | 2,084.6      | 2,137.2                 | 1.12                    | 0.11                   | -1.11                 |
| 9,524.0               | 89.00           | 90.40       | 6,940.4               | -744.7       | 2,174.6      | 2,226.9                 | 1.34                    | 1.33                   | 0.11                  |
| 9,614.0               | 90.80           | 91.50       | 6,940.5               | -746.2       | 2,264.6      | 2,316.7                 | 2.34                    | 2.00                   | 1.22                  |
| 9,704.0               | 90.60           | 91.70       | 6,939.4               | -748.7       | 2,354.5      | 2,406.6                 | 0.31                    | -0.22                  | 0.22                  |
| 9,794.0               | 91.00           | 90.80       | 6,938.2               | -750.7       | 2,444.5      | 2,496.4                 | 1.09                    | 0.44                   | -1.00                 |
| 9,885.0               | 91.80           | 89.70       | 6,936.0               | -751.1       | 2,535.5      | 2,587.2                 | 1.49                    | 0.88                   | -1.21                 |
| 9,974.0               | 90.60           | 91.20       | 6,934.1               | -751.8       | 2,624.4      | 2,675.9                 | 2.16                    | -1.35                  | 1.69                  |
| 10,064.0              | 91.00           | 91.70       | 6,932.8               | -754.0       | 2,714.4      | 2,765.8                 | 0.71                    | 0.44                   | 0.56                  |
| 10,154.0              | 92.20           | 91.20       | 6,930.3               | -756.3       | 2,804.3      | 2,855.6                 | 1.44                    | 1.33                   | -0.56                 |
| 10,244.0              | 89.90           | 89.00       | 6,928.7               | -756.5       | 2,894.3      | 2,945.3                 | 3.54                    | -2.56                  | -2.44                 |
| 10,334.0              | 89.30           | 89.00       | 6,929.3               | -754.9       | 2,984.3      | 3,034.9                 | 0.67                    | -0.67                  | 0.00                  |
| 10,422.0              | 90.00           | 88.70       | 6,929.9               | -753.1       | 3,072.3      | 3,122.4                 | 0.87                    | 0.80                   | -0.34                 |
| 10,512.0              | 90.90           | 88.70       | 6,929.1               | -751.1       | 3,162.2      | 3,212.0                 | 1.00                    | 1.00                   | 0.00                  |
| 10,602.0              | 91.80           | 88.30       | 6,927.0               | -748.7       | 3,252.2      | 3,301.4                 | 1.09                    | 1.00                   | -0.44                 |
| 10,692.0              | 89.70           | 89.60       | 6,925.8               | -747.1       | 3,342.2      | 3,391.0                 | 2.74                    | -2.33                  | 1.44                  |
| 10,782.0              | 89.50           | 89.90       | 6,926.5               | -746.7       | 3,432.2      | 3,480.7                 | 0.40                    | -0.22                  | 0.33                  |
| 10,872.0              | 90.30           | 89.90       | 6,926.6               | -746.5       | 3,522.2      | 3,570.4                 | 0.89                    | 0.89                   | 0.00                  |
| 10,962.0              | 91.40           | 89.40       | 6,925.3               | -746.0       | 3,612.1      | 3,660.0                 | 1.34                    | 1.22                   | -0.56                 |
| 11,052.0              | 89.70           | 90.40       | 6,924.4               | -745.8       | 3,702.1      | 3,749.7                 | 2.19                    | -1.89                  | 1.11                  |
| 11,142.0              | 89.60           | 91.00       | 6,925.0               | -746.9       | 3,792.1      | 3,839.5                 | 0.68                    | -0.11                  | 0.67                  |
| 11,232.0              | 90.70           | 90.30       | 6,924.7               | -748.0       | 3,882.1      | 3,929.3                 | 1.45                    | 1.22                   | -0.78                 |
| 11,322.0              | 92.20           | 89.70       | 6,922.5               | -748.0       | 3,972.1      | 4,019.0                 | 1.79                    | 1.67                   | -0.67                 |
| 11,413.0              | 91.90           | 92.20       | 6,919.2               | -749.5       | 4,063.0      | 4,109.7                 | 2.77                    | -0.33                  | 2.75                  |
| 11,502.0              | 92.40           | 92.60       | 6,915.9               | -753.2       | 4,151.9      | 4,198.6                 | 0.72                    | 0.56                   | 0.45                  |
| 11,592.0              | 90.00           | 92.70       | 6,914.0               | -757.3       | 4,241.7      | 4,288.5                 | 2.67                    | -2.67                  | 0.11                  |
| 11,682.0              | 90.40           | 92.40       | 6,913.7               | -761.4       | 4,331.7      | 4,378.5                 | 0.56                    | 0.44                   | -0.33                 |
| 11,772.0              | 90.80           | 92.00       | 6,912.7               | -764.8       | 4,421.6      | 4,468.4                 | 0.63                    | 0.44                   | -0.44                 |
| 11,862.0              | 91.40           | 91.20       | 6,911.0               | -767.3       | 4,511.5      | 4,558.3                 | 1.11                    | 0.67                   | -0.89                 |
| 11,951.0              | 91.30           | 90.80       | 6,908.9               | -768.9       | 4,600.5      | 4,647.1                 | 0.46                    | -0.11                  | -0.45                 |
| 12,041.0              | 91.80           | 90.10       | 6,906.5               | -769.6       | 4,690.5      | 4,736.8                 | 0.96                    | 0.56                   | -0.78                 |
| 12,131.0              | 90.30           | 90.30       | 6,904.8               | -769.9       | 4,780.4      | 4,826.5                 | 1.68                    | -1.67                  | 0.22                  |
| 12,221.0              | 90.20           | 91.80       | 6,904.4               | -771.5       | 4,870.4      | 4,916.3                 | 1.67                    | -0.11                  | 1.67                  |
| 12,311.0              | 90.80           | 90.40       | 6,903.6               | -773.3       | 4,960.4      | 5,006.2                 | 1.69                    | 0.67                   | -1.56                 |
| 12,401.0              | 90.80           | 86.80       | 6,902.4               | -771.1       | 5,050.3      | 5,095.7                 | 4.00                    | 0.00                   | -4.00                 |
| 12,491.0              | 90.70           | 85.50       | 6,901.2               | -765.0       | 5,140.1      | 5,184.7                 | 1.45                    | -0.11                  | -1.44                 |
| 12,580.0              | 90.80           | 85.20       | 6,900.0               | -757.8       | 5,228.8      | 5,272.5                 | 0.36                    | 0.11                   | -0.34                 |
| 12,670.0              | 90.20           | 86.10       | 6,899.3               | -751.0       | 5,318.6      | 5,361.4                 | 1.20                    | -0.67                  | 1.00                  |
| 12,760.0              | 90.30           | 89.90       | 6,898.9               | -747.8       | 5,408.5      | 5,450.8                 | 4.22                    | 0.11                   | 4.22                  |
| 12,850.0              | 91.30           | 90.60       | 6,897.6               | -748.2       | 5,498.5      | 5,540.6                 | 1.36                    | 1.11                   | 0.78                  |
| 12,940.0              | 89.90           | 90.10       | 6,896.7               | -748.8       | 5,588.5      | 5,630.3                 | 1.65                    | -1.56                  | -0.56                 |

|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

| Survey  |                 |             |                       |              |              |                         |                         |                        |                       |
|---|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft)                           | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 13,029.0  | 90.20           | 89.20       | 6,896.6               | -748.2       | 5,677.5      | 5,719.0                 | 1.07                    | 0.34                   | -1.01                 |
| 13,119.0  | 90.80           | 88.90       | 6,895.8               | -746.8       | 5,767.5      | 5,808.6                 | 0.75                    | 0.67                   | -0.33                 |
| 13,209.0  | 90.40           | 88.50       | 6,894.9               | -744.7       | 5,857.4      | 5,898.1                 | 0.63                    | -0.44                  | -0.44                 |
| 13,299.0  | 90.40           | 88.20       | 6,894.2               | -742.1       | 5,947.4      | 5,987.6                 | 0.33                    | 0.00                   | -0.33                 |
| 13,388.0  | 89.60           | 90.10       | 6,894.2               | -740.8       | 6,036.4      | 6,076.2                 | 2.32                    | -0.90                  | 2.13                  |
| 13,478.0  | 90.20           | 89.40       | 6,894.4               | -740.4       | 6,126.4      | 6,165.8                 | 1.02                    | 0.67                   | -0.78                 |
| 13,568.0  | 91.20           | 89.20       | 6,893.3               | -739.3       | 6,216.4      | 6,255.5                 | 1.13                    | 1.11                   | -0.22                 |
| 13,658.0  | 89.30           | 90.30       | 6,892.9               | -738.9       | 6,306.3      | 6,345.1                 | 2.44                    | -2.11                  | 1.22                  |
| 13,748.0  | 89.30           | 89.20       | 6,894.0               | -738.5       | 6,396.3      | 6,434.8                 | 1.22                    | 0.00                   | -1.22                 |
| 13,838.0  | 89.30           | 88.90       | 6,895.1               | -737.0       | 6,486.3      | 6,524.4                 | 0.33                    | 0.00                   | -0.33                 |
| 13,928.0  | 91.70           | 88.90       | 6,894.3               | -735.3       | 6,576.3      | 6,613.9                 | 2.67                    | 2.67                   | 0.00                  |
| 14,018.0  | 90.60           | 90.10       | 6,892.5               | -734.5       | 6,666.3      | 6,703.6                 | 1.81                    | -1.22                  | 1.33                  |
| 14,109.0  | 90.10           | 91.70       | 6,892.0               | -735.9       | 6,757.3      | 6,794.4                 | 1.84                    | -0.55                  | 1.76                  |
| 14,199.0  | 91.10           | 92.40       | 6,891.0               | -739.2       | 6,847.2      | 6,884.3                 | 1.36                    | 1.11                   | 0.78                  |
| 14,289.0  | 91.40           | 91.30       | 6,889.0               | -742.1       | 6,937.1      | 6,974.2                 | 1.27                    | 0.33                   | -1.22                 |
| 14,378.0  | 91.60           | 90.10       | 6,886.7               | -743.2       | 7,026.1      | 7,062.9                 | 1.37                    | 0.22                   | -1.35                 |
| 14,469.0  | 91.80           | 89.70       | 6,884.0               | -743.0       | 7,117.0      | 7,153.6                 | 0.49                    | 0.22                   | -0.44                 |
| 14,558.0  | 90.20           | 90.10       | 6,882.5               | -742.8       | 7,206.0      | 7,242.3                 | 1.85                    | -1.80                  | 0.45                  |
| 14,648.0  | 90.30           | 90.60       | 6,882.1               | -743.4       | 7,296.0      | 7,332.0                 | 0.57                    | 0.11                   | 0.56                  |
| 14,738.0  | 90.80           | 89.60       | 6,881.2               | -743.6       | 7,386.0      | 7,421.7                 | 1.24                    | 0.56                   | -1.11                 |
| 14,828.0  | 90.80           | 88.50       | 6,880.0               | -742.1       | 7,476.0      | 7,511.3                 | 1.22                    | 0.00                   | -1.22                 |
| 14,917.0  | 89.30           | 89.60       | 6,879.9               | -740.6       | 7,565.0      | 7,599.9                 | 2.09                    | -1.69                  | 1.24                  |
| 15,007.0  | 89.20           | 89.40       | 6,881.1               | -739.8       | 7,655.0      | 7,689.5                 | 0.25                    | -0.11                  | -0.22                 |
| 15,097.0  | 89.40           | 89.40       | 6,882.2               | -738.9       | 7,745.0      | 7,779.2                 | 0.22                    | 0.22                   | 0.00                  |
| 15,186.0  | 90.00           | 88.70       | 6,882.6               | -737.4       | 7,833.9      | 7,867.8                 | 1.04                    | 0.67                   | -0.79                 |
| 15,276.0  | 90.20           | 90.60       | 6,882.5               | -736.8       | 7,923.9      | 7,957.4                 | 2.12                    | 0.22                   | 2.11                  |
| 15,366.0  | 90.80           | 90.80       | 6,881.7               | -737.9       | 8,013.9      | 8,047.2                 | 0.70                    | 0.67                   | 0.22                  |
| 15,455.0  | 91.40           | 90.30       | 6,880.0               | -738.8       | 8,102.9      | 8,136.0                 | 0.88                    | 0.67                   | -0.56                 |
| 15,545.0  | 90.40           | 91.30       | 6,878.6               | -740.0       | 8,192.9      | 8,225.8                 | 1.57                    | -1.11                  | 1.11                  |
| 15,635.0  | 91.20           | 91.30       | 6,877.3               | -742.1       | 8,282.8      | 8,315.6                 | 0.89                    | 0.89                   | 0.00                  |
| 15,725.0  | 91.90           | 90.60       | 6,874.9               | -743.6       | 8,372.8      | 8,405.4                 | 1.10                    | 0.78                   | -0.78                 |
| 15,815.0  | 91.40           | 91.30       | 6,872.3               | -745.1       | 8,462.7      | 8,495.2                 | 0.96                    | -0.56                  | 0.78                  |
| 15,904.0  | 90.40           | 91.30       | 6,870.9               | -747.1       | 8,551.7      | 8,584.0                 | 1.12                    | -1.12                  | 0.00                  |
| 15,994.0  | 90.60           | 90.40       | 6,870.1               | -748.4       | 8,641.7      | 8,673.8                 | 1.02                    | 0.22                   | -1.00                 |
| 16,084.0  | 91.00           | 89.70       | 6,868.8               | -748.5       | 8,731.7      | 8,763.6                 | 0.90                    | 0.44                   | -0.78                 |
| 16,174.0  | 90.20           | 90.40       | 6,867.9               | -748.6       | 8,821.7      | 8,853.3                 | 1.18                    | -0.89                  | 0.78                  |
| 16,264.0  | 90.80           | 89.90       | 6,867.1               | -748.8       | 8,911.7      | 8,943.0                 | 0.87                    | 0.67                   | -0.56                 |
| 16,354.0  | 91.50           | 89.20       | 6,865.3               | -748.1       | 9,001.7      | 9,032.6                 | 1.10                    | 0.78                   | -0.78                 |
| 16,443.0  | 90.10           | 88.70       | 6,864.1               | -746.5       | 9,090.6      | 9,121.2                 | 1.67                    | -1.57                  | -0.56                 |
| 16,534.0  | 91.20           | 88.90       | 6,863.0               | -744.6       | 9,181.6      | 9,211.7                 | 1.23                    | 1.21                   | 0.22                  |
| <b>Projected BHL 1279'FSL, 523'FEL, SEC. 22</b> |                 |             |                       |              |              |                         |                         |                        |                       |
| 16,677.0  | 91.20           | 88.90       | 6,860.0               | -741.8       | 9,324.5      | 9,354.0                 | 0.00                    | 0.00                   | 0.00                  |



## Survey Report



|                  |                   |                                     |                                |
|------------------|-------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | PDC Energy        | <b>Local Co-ordinate Reference:</b> | Well Elbert 11N                |
| <b>Project:</b>  | Weld County, CO   | <b>TVD Reference:</b>               | RKB @ 4661.0usft (Ensign #160) |
| <b>Site:</b>     | Sec 21, T5N, R65W | <b>MD Reference:</b>                | RKB @ 4661.0usft (Ensign #160) |
| <b>Well:</b>     | Elbert 11N        | <b>North Reference:</b>             | True                           |
| <b>Wellbore:</b> | Wellbore #1       | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Wellbore #1       | <b>Database:</b>                    | EDM5002                        |

### Design Annotations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment   |
|-----------------------------|-----------------------------|-------------------|-----------------|---|
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |   |
| 311.0                       | 311.0                       | -1.1              | 0.1             | First MWD Survey @ 311.0' MD / TVD                |
| 7,085.8                     | 6,853.3                     | -725.0            | -250.5          | Crosses 460' Setback - 1342'FSL, 460'FEL, SEC. 21 |
| 16,677.0                    | 6,860.0                     | -741.8            | 9,324.5         | Projected BHL 1279'FSL, 523'FEL, SEC. 22          |

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_