



Azimuths to True North  
Magnetic North: 8.96°

Magnetic Field  
Strength: 53010.4snT  
Dip Angle: 66.90°  
Date: 9/5/2011  
Model: IGRF2010

|  |                              |                   |                     |                       |                          |                 |  |
|--|------------------------------|-------------------|---------------------|-----------------------|--------------------------|-----------------|--|
| DD<br>Loewen 12-32D<br>115397; LR<br>KBE @ 5021.0ft (Original Well Elev)<br>Ground Elevation 5000.0<br>North American Datum 1983<br>Well Loewen 12-32D, True North |                              |                   |                     |                       |                          |                 |  |
| Type<br>Target   | Target<br>Loewen 12-32D PBHL | Azimuth<br>231.82 | Origin Type<br>Slot | N/S<br>0.0            | E/W<br>0.0               | From TVD<br>0.0 |  |
| Name<br>Loewen 12-32D PBHL   | TVD<br>7150.0                | +N/-S<br>-642.8   | +E/-W<br>-817.3     | Latitude<br>40.271106 | Longitude<br>-105.033639 |                 |  |

# Cathedral Energy Services

## Survey Report - Geographic

|                  |                          |                                     |                                     |
|------------------|--------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | Apollo Operating, LLC    | <b>Local Co-ordinate Reference:</b> | Well Loewen 12-32D                  |
| <b>Project:</b>  | Weld County, CO          | <b>TVD Reference:</b>               | KBE @ 5021.0ft (Original Well Elev) |
| <b>Site:</b>     | Sec 32-T4N-R68W (Loewen) | <b>MD Reference:</b>                | KBE @ 5021.0ft (Original Well Elev) |
| <b>Well:</b>     | Loewen 12-32D            | <b>North Reference:</b>             | True                                |
| <b>Wellbore:</b> | DD                       | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | DD                       | <b>Database:</b>                    | USA EDM 5000 Multi Users DB         |

|                    |                           |                      |                |
|--------------------|---------------------------|----------------------|----------------|
| <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 32-T4N-R68W (Loewen) |              |                 |                   |             |
| Site Position:        |                          | Northing:    | 1,342,617.27 ft | Latitude:         | 40.272925   |
| From:                 | Lat/Long                 | Easting:     | 3,130,955.56 ft | Longitude:        | -105.030700 |
| Position Uncertainty: | 0.0 ft                   | Slot Radius: | 13.200 in       | Grid Convergence: | 0.30 °      |

|                      |               |        |                     |                 |               |             |
|----------------------|---------------|--------|---------------------|-----------------|---------------|-------------|
| Well                 | Loewen 12-32D |        |                     |                 |               |             |
| Well Position        | +N/-S         | 0.0 ft | Northing:           | 1,342,597.18 ft | Latitude:     | 40.272870   |
|                      | +E/-W         | 0.0 ft | Easting:            | 3,130,952.87 ft | Longitude:    | -105.030710 |
| Position Uncertainty |               | 0.0 ft | Wellhead Elevation: | ft              | Ground Level: | 5,000.0 ft  |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | DD                |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2010          | 9/5/2011           | 8.96                   | 66.90                | 53,010                     |

|                          |                              |                   |                   |                      |     |
|--------------------------|------------------------------|-------------------|-------------------|----------------------|-----|
| <b>Design</b>            | DD                           |                   |                   |                      |     |
| <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) (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b> | <b>Direction (°)</b> |     |
|                          | 0.0                          | 0.0               | 0.0               | 231.82               |     |

|                       |                |                          |                  |                    |  |
|-----------------------|----------------|--------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>    | 9/18/2011                |                  |                    |  |
| <b>From (ft)</b>      | <b>To (ft)</b> | <b>Survey (Wellbore)</b> | <b>Tool Name</b> | <b>Description</b> |  |
| 750.0                 | 7,525.0        | Survey #1 (DD)           | MWD              | Geolink MWD        |  |

|                            |                        |                    |                            |                   |                   |                          |                         |                 |                  |
|----------------------------|------------------------|--------------------|----------------------------|-------------------|-------------------|--------------------------|-------------------------|-----------------|------------------|
| <b>Survey</b>              |                        |                    |                            |                   |                   |                          |                         |                 |                  |
| <b>Measured Depth (ft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b> | <b>Map Northing (ft)</b> | <b>Map Easting (ft)</b> | <b>Latitude</b> | <b>Longitude</b> |
| 0.0                        | 0.00                   | 0.00               | 0.0                        | 0.0               | 0.0               | 1,342,597.18             | 3,130,952.87            | 40.272870       | -105.030710      |
| 750.0                      | 8.10                   | 316.90             | 747.5                      | 38.6              | -36.2             | 1,342,635.63             | 3,130,916.51            | 40.272976       | -105.030840      |
| 843.0                      | 8.30                   | 291.30             | 839.6                      | 45.9              | -46.9             | 1,342,642.80             | 3,130,905.73            | 40.272996       | -105.030878      |
| 938.0                      | 7.90                   | 284.10             | 933.6                      | 50.0              | -59.6             | 1,342,646.81             | 3,130,892.99            | 40.273007       | -105.030924      |
| 1,032.0                    | 7.40                   | 264.00             | 1,026.8                    | 50.9              | -71.9             | 1,342,647.69             | 3,130,880.70            | 40.273010       | -105.030968      |
| 1,126.0                    | 7.60                   | 251.20             | 1,120.0                    | 48.3              | -83.8             | 1,342,644.99             | 3,130,868.81            | 40.273003       | -105.031011      |
| 1,220.0                    | 8.26                   | 230.44             | 1,213.1                    | 42.0              | -94.9             | 1,342,638.63             | 3,130,857.75            | 40.272985       | -105.031050      |
| 1,314.0                    | 7.30                   | 236.90             | 1,306.3                    | 34.4              | -105.1            | 1,342,631.01             | 3,130,847.58            | 40.272965       | -105.031087      |
| 1,408.0                    | 9.10                   | 223.10             | 1,399.3                    | 25.7              | -115.2            | 1,342,622.27             | 3,130,837.54            | 40.272941       | -105.031123      |
| 1,503.0                    | 12.10                  | 218.80             | 1,492.7                    | 12.4              | -126.6            | 1,342,608.96             | 3,130,826.24            | 40.272904       | -105.031164      |
| 1,597.0                    | 14.20                  | 211.60             | 1,584.2                    | -5.1              | -138.8            | 1,342,591.39             | 3,130,814.11            | 40.272856       | -105.031208      |
| 1,690.0                    | 15.10                  | 211.30             | 1,674.2                    | -25.1             | -151.1            | 1,342,571.26             | 3,130,801.95            | 40.272801       | -105.031252      |

# Cathedral Energy Services

## Survey Report - Geographic

|                  |                          |                                     |                                     |
|------------------|--------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | Apollo Operating, LLC    | <b>Local Co-ordinate Reference:</b> | Well Loewen 12-32D                  |
| <b>Project:</b>  | Weld County, CO          | <b>TVD Reference:</b>               | KBE @ 5021.0ft (Original Well Elev) |
| <b>Site:</b>     | Sec 32-T4N-R68W (Loewen) | <b>MD Reference:</b>                | KBE @ 5021.0ft (Original Well Elev) |
| <b>Well:</b>     | Loewen 12-32D            | <b>North Reference:</b>             | True                                |
| <b>Wellbore:</b> | DD                       | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | DD                       | <b>Database:</b>                    | USA EDM 5000 Multi Users DB         |

| Survey              |                 |             |                     |            |            |                   |                  |           |             |
|---------------------|-----------------|-------------|---------------------|------------|------------|-------------------|------------------|-----------|-------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (ft) | Map Easting (ft) | Latitude  | Longitude   |
| 1,785.0             | 15.00           | 212.10      | 1,765.9             | -46.1      | -164.0     | 1,342,550.21      | 3,130,789.10     | 40.272744 | -105.031298 |
| 1,880.0             | 16.30           | 212.00      | 1,857.4             | -67.8      | -177.6     | 1,342,528.41      | 3,130,775.62     | 40.272684 | -105.031347 |
| 1,975.0             | 15.80           | 213.00      | 1,948.7             | -90.0      | -191.7     | 1,342,506.18      | 3,130,761.62     | 40.272623 | -105.031397 |
| 2,069.0             | 13.30           | 220.60      | 2,039.7             | -108.9     | -205.7     | 1,342,487.16      | 3,130,747.71     | 40.272571 | -105.031448 |
| 2,164.0             | 14.50           | 222.60      | 2,131.9             | -126.0     | -220.9     | 1,342,470.03      | 3,130,732.64     | 40.272524 | -105.031502 |
| 2,260.0             | 15.20           | 222.40      | 2,224.7             | -144.1     | -237.5     | 1,342,451.80      | 3,130,716.12     | 40.272475 | -105.031561 |
| 2,355.0             | 13.20           | 229.00      | 2,316.8             | -160.4     | -254.1     | 1,342,435.40      | 3,130,699.62     | 40.272430 | -105.031621 |
| 2,449.0             | 13.10           | 235.90      | 2,408.4             | -173.4     | -271.0     | 1,342,422.30      | 3,130,682.77     | 40.272394 | -105.031682 |
| 2,543.0             | 13.30           | 229.70      | 2,499.9             | -186.4     | -288.1     | 1,342,409.24      | 3,130,665.77     | 40.272359 | -105.031743 |
| 2,639.0             | 13.00           | 230.30      | 2,593.4             | -200.5     | -304.8     | 1,342,395.11      | 3,130,649.11     | 40.272320 | -105.031803 |
| 2,731.0             | 13.40           | 230.80      | 2,682.9             | -213.8     | -321.1     | 1,342,381.68      | 3,130,632.96     | 40.272283 | -105.031861 |
| 2,825.0             | 13.10           | 223.30      | 2,774.4             | -228.4     | -336.8     | 1,342,366.96      | 3,130,617.29     | 40.272243 | -105.031917 |
| 2,920.0             | 12.40           | 220.20      | 2,867.1             | -244.1     | -350.8     | 1,342,351.26      | 3,130,603.40     | 40.272200 | -105.031967 |
| 3,015.0             | 12.40           | 217.70      | 2,959.9             | -259.9     | -363.6     | 1,342,335.33      | 3,130,590.67     | 40.272157 | -105.032013 |
| 3,111.0             | 13.90           | 217.00      | 3,053.4             | -277.3     | -376.8     | 1,342,317.89      | 3,130,577.52     | 40.272109 | -105.032061 |
| 3,206.0             | 16.70           | 211.00      | 3,145.0             | -298.1     | -390.7     | 1,342,297.00      | 3,130,563.73     | 40.272052 | -105.032111 |
| 3,301.0             | 16.10           | 213.80      | 3,236.1             | -320.8     | -405.1     | 1,342,274.28      | 3,130,549.49     | 40.271990 | -105.032162 |
| 3,397.0             | 15.80           | 213.50      | 3,328.4             | -342.7     | -419.7     | 1,342,252.24      | 3,130,534.99     | 40.271929 | -105.032214 |
| 3,492.0             | 15.50           | 216.50      | 3,419.9             | -363.7     | -434.4     | 1,342,231.18      | 3,130,520.41     | 40.271872 | -105.032267 |
| 3,587.0             | 13.80           | 222.40      | 3,511.8             | -382.3     | -449.6     | 1,342,212.52      | 3,130,505.31     | 40.271821 | -105.032321 |
| 3,681.0             | 15.00           | 226.80      | 3,602.9             | -398.9     | -466.0     | 1,342,195.83      | 3,130,488.97     | 40.271775 | -105.032380 |
| 3,775.0             | 16.10           | 227.10      | 3,693.4             | -416.1     | -484.4     | 1,342,178.53      | 3,130,470.65     | 40.271728 | -105.032446 |
| 3,869.0             | 17.10           | 224.20      | 3,783.5             | -434.9     | -503.6     | 1,342,159.65      | 3,130,451.56     | 40.271676 | -105.032515 |
| 3,962.0             | 16.30           | 224.10      | 3,872.6             | -454.0     | -522.2     | 1,342,140.38      | 3,130,433.05     | 40.271624 | -105.032582 |
| 4,056.0             | 16.20           | 224.30      | 3,962.8             | -472.9     | -540.6     | 1,342,121.42      | 3,130,414.81     | 40.271572 | -105.032648 |
| 4,150.0             | 15.20           | 226.60      | 4,053.3             | -490.8     | -558.7     | 1,342,103.47      | 3,130,396.80     | 40.271523 | -105.032712 |
| 4,243.0             | 16.30           | 226.90      | 4,142.8             | -508.0     | -577.1     | 1,342,086.08      | 3,130,378.50     | 40.271476 | -105.032778 |
| 4,336.0             | 16.90           | 229.00      | 4,232.0             | -525.8     | -596.8     | 1,342,068.19      | 3,130,358.86     | 40.271427 | -105.032849 |
| 4,430.0             | 16.60           | 225.50      | 4,322.0             | -544.2     | -616.7     | 1,342,049.71      | 3,130,339.07     | 40.271376 | -105.032920 |
| 4,525.0             | 15.90           | 225.50      | 4,413.2             | -562.8     | -635.7     | 1,342,030.98      | 3,130,320.21     | 40.271325 | -105.032988 |
| 4,619.0             | 12.90           | 233.00      | 4,504.2             | -578.2     | -653.2     | 1,342,015.54      | 3,130,302.72     | 40.271283 | -105.033051 |
| 4,712.0             | 12.00           | 230.00      | 4,595.0             | -590.6     | -668.9     | 1,342,003.00      | 3,130,287.09     | 40.271249 | -105.033107 |
| 4,807.0             | 12.70           | 228.70      | 4,687.8             | -603.9     | -684.3     | 1,341,989.68      | 3,130,271.75     | 40.271212 | -105.033163 |
| 4,901.0             | 11.40           | 236.10      | 4,779.7             | -615.9     | -699.8     | 1,341,977.59      | 3,130,256.34     | 40.271180 | -105.033218 |
| 4,995.0             | 10.50           | 246.00      | 4,872.0             | -624.6     | -715.3     | 1,341,968.85      | 3,130,240.85     | 40.271156 | -105.033274 |
| 5,091.0             | 9.60            | 241.20      | 4,966.6             | -632.0     | -730.3     | 1,341,961.35      | 3,130,225.88     | 40.271135 | -105.033328 |
| 5,186.0             | 10.20           | 245.00      | 5,060.2             | -639.3     | -744.9     | 1,341,953.90      | 3,130,211.36     | 40.271115 | -105.033380 |
| 5,281.0             | 8.90            | 264.00      | 5,153.9             | -643.7     | -759.8     | 1,341,949.50      | 3,130,196.44     | 40.271103 | -105.033433 |
| 5,376.0             | 8.40            | 271.10      | 5,247.8             | -644.3     | -774.1     | 1,341,948.79      | 3,130,182.20     | 40.271102 | -105.033484 |
| 5,470.0             | 9.40            | 285.60      | 5,340.7             | -642.1     | -788.4     | 1,341,950.91      | 3,130,167.93     | 40.271108 | -105.033535 |
| 5,565.0             | 7.50            | 309.00      | 5,434.7             | -636.1     | -800.6     | 1,341,956.84      | 3,130,155.60     | 40.271124 | -105.033580 |
| 5,660.0             | 8.00            | 302.60      | 5,528.8             | -628.7     | -811.0     | 1,341,964.24      | 3,130,145.18     | 40.271145 | -105.033617 |
| 5,755.0             | 6.70            | 308.50      | 5,623.0             | -621.6     | -820.9     | 1,341,971.20      | 3,130,135.23     | 40.271164 | -105.033652 |
| 5,851.0             | 4.20            | 313.70      | 5,718.6             | -615.7     | -827.9     | 1,341,977.08      | 3,130,128.27     | 40.271180 | -105.033677 |
| 5,945.0             | 3.00            | 305.50      | 5,812.4             | -611.9     | -832.4     | 1,341,980.87      | 3,130,123.76     | 40.271190 | -105.033693 |
| 6,040.0             | 1.50            | 311.40      | 5,907.3             | -609.6     | -835.3     | 1,341,983.12      | 3,130,120.79     | 40.271197 | -105.033704 |
| 6,135.0             | 2.20            | 196.10      | 6,002.3             | -610.6     | -836.8     | 1,341,982.18      | 3,130,119.36     | 40.271194 | -105.033709 |
| 6,230.0             | 1.40            | 245.10      | 6,097.2             | -612.8     | -838.3     | 1,341,979.93      | 3,130,117.81     | 40.271188 | -105.033715 |
| 6,325.0             | 1.40            | 280.50      | 6,192.2             | -613.1     | -840.5     | 1,341,979.64      | 3,130,115.62     | 40.271187 | -105.033722 |
| 6,420.0             | 2.20            | 297.00      | 6,287.2             | -612.1     | -843.3     | 1,341,980.67      | 3,130,112.85     | 40.271190 | -105.033732 |
| 6,516.0             | 2.50            | 291.40      | 6,383.1             | -610.5     | -846.9     | 1,341,982.25      | 3,130,109.25     | 40.271194 | -105.033745 |
| 6,611.0             | 3.20            | 297.20      | 6,478.0             | -608.5     | -851.2     | 1,341,984.19      | 3,130,104.95     | 40.271200 | -105.033761 |
| 6,706.0             | 2.90            | 315.80      | 6,572.8             | -605.6     | -855.2     | 1,341,987.11      | 3,130,100.90     | 40.271208 | -105.033775 |
| 6,801.0             | 2.50            | 327.00      | 6,667.7             | -602.1     | -858.0     | 1,341,990.55      | 3,130,098.08     | 40.271217 | -105.033785 |
| 6,896.0             | 2.10            | 337.70      | 6,762.6             | -598.7     | -859.8     | 1,341,993.89      | 3,130,096.28     | 40.271227 | -105.033791 |

# Cathedral Energy Services

## Survey Report - Geographic

|                  |                          |                                     |                                     |
|------------------|--------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | Apollo Operating, LLC    | <b>Local Co-ordinate Reference:</b> | Well Loewen 12-32D                  |
| <b>Project:</b>  | Weld County, CO          | <b>TVD Reference:</b>               | KBE @ 5021.0ft (Original Well Elev) |
| <b>Site:</b>     | Sec 32-T4N-R68W (Loewen) | <b>MD Reference:</b>                | KBE @ 5021.0ft (Original Well Elev) |
| <b>Well:</b>     | Loewen 12-32D            | <b>North Reference:</b>             | True                                |
| <b>Wellbore:</b> | DD                       | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | DD                       | <b>Database:</b>                    | USA EDM 5000 Multi Users DB         |

| Survey                                   |                 |             |                     |            |            |                   |                  |           |             |
|--|-----------------|-------------|---------------------|------------|------------|-------------------|------------------|-----------|-------------|
| Measured Depth (ft)                      | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (ft) | Map Easting (ft) | Latitude  | Longitude   |
| 6,991.0                                  | 1.30            | 331.10      | 6,857.6             | -596.2     | -861.0     | 1,341,996.44      | 3,130,095.08     | 40.271234 | -105.033796 |
| 7,086.0                                  | 1.50            | 321.90      | 6,952.6             | -594.3     | -862.2     | 1,341,998.35      | 3,130,093.78     | 40.271239 | -105.033800 |
| 7,181.0                                  | 1.30            | 319.50      | 7,047.5             | -592.5     | -863.7     | 1,342,000.14      | 3,130,092.31     | 40.271244 | -105.033806 |
| 7,275.0                                  | 1.10            | 325.10      | 7,141.5             | -590.9     | -864.9     | 1,342,001.69      | 3,130,091.09     | 40.271248 | -105.033810 |
| 7,370.0                                  | 0.90            | 346.60      | 7,236.5             | -589.4     | -865.6     | 1,342,003.16      | 3,130,090.39     | 40.271252 | -105.033812 |
| 7,465.0                                  | 0.60            | 33.70       | 7,331.5             | -588.3     | -865.5     | 1,342,004.30      | 3,130,090.48     | 40.271255 | -105.033812 |
| <b>Last Cathedral Survey @ 7,465' MD</b> |                 |             |                     |            |            |                   |                  |           |             |
| 7,525.0                                  | 0.60            | 33.70       | 7,391.5             | -587.8     | -865.2     | 1,342,004.82      | 3,130,090.83     | 40.271257 | -105.033811 |
| <b>Projection to Bit @ 7,525'</b>        |                 |             |                     |            |            |                   |                  |           |             |

| Design Targets   |               |              |          |            |            |               |              |           |             |
|--|---------------|--------------|----------|------------|------------|---------------|--------------|-----------|-------------|
| Target Name  | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude  | Longitude   |
| - hit/miss target  |               |              |          |            |            |               |              |           |             |
| - Shape  |               |              |          |            |            |               |              |           |             |
| Loewen 12-32D PBHL   | 0.00          | 0.00         | 7,150.0  | -642.8     | -817.3     | 1,341,950.08  | 3,130,138.99 | 40.271106 | -105.033639 |
| - actual wellpath misses target center by 70.6ft at 7282.3ft MD (7148.8 TVD, -590.8 N, -865.0 E) |               |              |          |            |            |               |              |           |             |
| - Rectangle (sides W400.0 H400.0 D0.0)   |               |              |          |            |            |               |              |           |             |

| Design Annotations  |                     |                   |            |                                   |  |
|---------------------|---------------------|-------------------|------------|-----------------------------------|--|
| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            |                                   |  |
|                     |                     | +N/-S (ft)        | +E/-W (ft) | Comment                           |  |
| 7,465.0             | 7,331.5             | -588.3            | -865.5     | Last Cathedral Survey @ 7,465' MD |  |
| 7,525.0             | 7,391.5             | -587.8            | -865.2     | Projection to Bit @ 7,525'        |  |

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