



# **Laramie Energy, LLC**

**Mesa County, CO**

**Gunderson 0993 21-05 Pad**

**BCU 0993-21-05W**

**Wellbore #1**

**Design: Wellbore #1**

## **QES Survey Report**

**01 October, 2018**





# Survey Report



|                  |                          |                                     |                              |
|------------------|--------------------------|-------------------------------------|------------------------------|
| <b>Company:</b>  | Laramie Energy, LLC      | <b>Local Co-ordinate Reference:</b> | Well BCU 0993-21-05W         |
| <b>Project:</b>  | Mesa County, CO          | <b>TVD Reference:</b>               | Well @ 7287.0usft (H&P #522) |
| <b>Site:</b>     | Gunderson 0993 21-05 Pad | <b>MD Reference:</b>                | Well @ 7287.0usft (H&P #522) |
| <b>Well:</b>     | BCU 0993-21-05W          | <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>                    | EDM 5000.1 Single User Db    |

|                    |                           |                      |                |
|--------------------|---------------------------|----------------------|----------------|
| <b>Project</b>     | Mesa 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 Central Zone     |                      |                |

|                       |          |                          |                   |                   |             |
|-----------------------|----------|--------------------------|-------------------|-------------------|-------------|
| Site                  |          | Gunderson 0993 21-05 Pad |                   |                   |             |
| Site Position:        |          | Northing:                | 1,529,627.90 usft | Latitude:         | 39.265321   |
| From:                 | Lat/Long | Easting:                 | 2,354,508.90 usft | Longitude:        | -107.780117 |
| Position Uncertainty: | 0.0 usft | Slot Radius:             | 13-3/16 "         | Grid Convergence: | -1.44 °     |

|                      |                 |          |                     |                   |               |              |
|----------------------|-----------------|----------|---------------------|-------------------|---------------|--------------|
| Well                 | BCU 0993-21-05W |          |                     |                   |               |              |
| Well Position        | +N/-S           | 0.0 usft | Northing:           | 1,529,665.31 usft | Latitude:     | 39.265423    |
|                      | +E/-W           | 0.0 usft | Easting:            | 2,354,498.23 usft | Longitude:    | -107.780158  |
| Position Uncertainty |                 | 0.0 usft | Wellhead Elevation: | usft              | Ground Level: | 7,257.0 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> |
|                  | User Defined      | 9/18/2018          | 9.47                   | 65.43                | 51,381.90000000            |

|                          |                                |                     |                     |                      |     |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|-----|
| <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                 | 35.71                |     |

|                       |                  |                               |                  |                    |  |
|-----------------------|------------------|-------------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>      | 10/1/2018                     |                  |                    |  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>      | <b>Tool Name</b> | <b>Description</b> |  |
| 295.0                 | 7,733.0          | QES 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 @ 295.0' MD / 294.9' TVD</b> |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| 295.0                                            | 2.60                   | 62.30              | 294.9                        | 3.1                 | 5.9                 | 6.0                            | 0.88                           | 0.88                          | 0.00                         |
| 388.0                                            | 3.60                   | 59.90              | 387.8                        | 5.6                 | 10.3                | 10.5                           | 1.08                           | 1.08                          | -2.58                        |
| 481.0                                            | 6.00                   | 44.70              | 480.4                        | 10.5                | 16.3                | 18.0                           | 2.90                           | 2.58                          | -16.34                       |
| 573.0                                            | 6.70                   | 29.10              | 571.9                        | 18.6                | 22.3                | 28.1                           | 2.02                           | 0.76                          | -16.96                       |
| 667.0                                            | 7.30                   | 27.00              | 665.2                        | 28.7                | 27.6                | 39.4                           | 0.69                           | 0.64                          | -2.23                        |
| 758.0                                            | 7.60                   | 26.30              | 755.4                        | 39.2                | 32.9                | 51.1                           | 0.34                           | 0.33                          | -0.77                        |
| 851.0                                            | 7.60                   | 24.10              | 847.6                        | 50.4                | 38.2                | 63.2                           | 0.31                           | 0.00                          | -2.37                        |
| 944.0                                            | 8.30                   | 36.90              | 939.7                        | 61.4                | 44.7                | 75.9                           | 2.04                           | 0.75                          | 13.76                        |
| 1,038.0                                          | 9.00                   | 38.10              | 1,032.6                      | 72.6                | 53.3                | 90.0                           | 0.77                           | 0.74                          | 1.28                         |



# Survey Report



|                  |                          |                                     |                              |
|------------------|--------------------------|-------------------------------------|------------------------------|
| <b>Company:</b>  | Laramie Energy, LLC      | <b>Local Co-ordinate Reference:</b> | Well BCU 0993-21-05W         |
| <b>Project:</b>  | Mesa County, CO          | <b>TVD Reference:</b>               | Well @ 7287.0usft (H&P #522) |
| <b>Site:</b>     | Gunderson 0993 21-05 Pad | <b>MD Reference:</b>                | Well @ 7287.0usft (H&P #522) |
| <b>Well:</b>     | BCU 0993-21-05W          | <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>                    | EDM 5000.1 Single User Db    |

| 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) |
| 1,132.0               | 8.70            | 40.10       | 1,125.5               | 83.8         | 62.4         | 104.5                   | 0.46                    | -0.32                  | 2.13                  |
| 1,227.0               | 9.40            | 31.50       | 1,219.3               | 95.9         | 71.1         | 119.4                   | 1.60                    | 0.74                   | -9.05                 |
| 1,322.0               | 9.90            | 29.20       | 1,313.0               | 109.6        | 79.2         | 135.2                   | 0.66                    | 0.53                   | -2.42                 |
| 1,416.0               | 9.30            | 35.90       | 1,405.7               | 122.8        | 87.5         | 150.9                   | 1.35                    | -0.64                  | 7.13                  |
| 1,528.0               | 9.50            | 36.80       | 1,516.2               | 137.6        | 98.4         | 169.1                   | 0.22                    | 0.18                   | 0.80                  |
| 1,602.0               | 9.30            | 35.50       | 1,589.2               | 147.3        | 105.5        | 181.2                   | 0.39                    | -0.27                  | -1.76                 |
| 1,696.0               | 9.10            | 35.70       | 1,682.0               | 159.6        | 114.3        | 196.3                   | 0.22                    | -0.21                  | 0.21                  |
| 1,791.0               | 8.80            | 34.70       | 1,775.8               | 171.6        | 122.8        | 211.0                   | 0.36                    | -0.32                  | -1.05                 |
| 1,885.0               | 8.50            | 34.10       | 1,868.7               | 183.3        | 130.8        | 225.2                   | 0.33                    | -0.32                  | -0.64                 |
| 1,980.0               | 8.00            | 34.30       | 1,962.8               | 194.6        | 138.4        | 238.8                   | 0.53                    | -0.53                  | 0.21                  |
| 2,074.0               | 7.70            | 35.90       | 2,055.9               | 205.1        | 145.8        | 251.6                   | 0.39                    | -0.32                  | 1.70                  |
| 2,169.0               | 9.10            | 33.70       | 2,149.9               | 216.5        | 153.7        | 265.5                   | 1.51                    | 1.47                   | -2.32                 |
| 2,263.0               | 8.70            | 33.20       | 2,242.7               | 228.6        | 161.7        | 280.0                   | 0.43                    | -0.43                  | -0.53                 |
| 2,357.0               | 8.50            | 32.80       | 2,335.7               | 240.4        | 169.4        | 294.1                   | 0.22                    | -0.21                  | -0.43                 |
| 2,451.0               | 9.00            | 39.40       | 2,428.6               | 251.9        | 177.8        | 308.4                   | 1.19                    | 0.53                   | 7.02                  |
| 2,546.0               | 8.50            | 37.00       | 2,522.5               | 263.3        | 186.8        | 322.8                   | 0.65                    | -0.53                  | -2.53                 |
| 2,640.0               | 8.00            | 37.00       | 2,615.5               | 274.0        | 194.9        | 336.3                   | 0.53                    | -0.53                  | 0.00                  |
| 2,735.0               | 7.70            | 34.70       | 2,709.6               | 284.6        | 202.5        | 349.2                   | 0.46                    | -0.32                  | -2.42                 |
| 2,829.0               | 7.40            | 35.60       | 2,802.8               | 294.7        | 209.6        | 361.6                   | 0.34                    | -0.32                  | 0.96                  |
| 2,924.0               | 7.30            | 33.50       | 2,897.0               | 304.7        | 216.5        | 373.7                   | 0.30                    | -0.11                  | -2.21                 |
| 3,018.0               | 8.10            | 39.60       | 2,990.2               | 314.8        | 224.0        | 386.3                   | 1.22                    | 0.85                   | 6.49                  |
| 3,112.0               | 7.80            | 39.50       | 3,083.3               | 324.8        | 232.3        | 399.3                   | 0.32                    | -0.32                  | -0.11                 |
| 3,207.0               | 7.60            | 39.50       | 3,177.4               | 334.6        | 240.4        | 412.0                   | 0.21                    | -0.21                  | 0.00                  |
| 3,301.0               | 7.30            | 39.00       | 3,270.6               | 344.0        | 248.1        | 424.2                   | 0.33                    | -0.32                  | -0.53                 |
| 3,396.0               | 6.80            | 38.40       | 3,364.9               | 353.1        | 255.4        | 435.8                   | 0.53                    | -0.53                  | -0.63                 |
| 3,490.0               | 6.50            | 36.50       | 3,458.3               | 361.8        | 262.0        | 446.7                   | 0.40                    | -0.32                  | -2.02                 |
| 3,585.0               | 6.10            | 36.50       | 3,552.7               | 370.2        | 268.2        | 457.1                   | 0.42                    | -0.42                  | 0.00                  |
| 3,679.0               | 5.80            | 34.30       | 3,646.2               | 378.1        | 273.9        | 466.8                   | 0.40                    | -0.32                  | -2.34                 |
| 3,774.0               | 5.60            | 33.60       | 3,740.7               | 385.9        | 279.1        | 476.3                   | 0.22                    | -0.21                  | -0.74                 |
| 3,868.0               | 5.40            | 31.40       | 3,834.3               | 393.5        | 284.0        | 485.3                   | 0.31                    | -0.21                  | -2.34                 |
| 3,963.0               | 5.10            | 32.10       | 3,928.9               | 400.9        | 288.5        | 493.9                   | 0.32                    | -0.32                  | 0.74                  |
| 4,057.0               | 3.00            | 55.80       | 4,022.6               | 405.8        | 292.8        | 500.4                   | 2.81                    | -2.23                  | 25.21                 |
| 4,152.0               | 1.50            | 62.60       | 4,117.6               | 407.8        | 296.0        | 503.9                   | 1.60                    | -1.58                  | 7.16                  |
| 4,246.0               | 0.70            | 241.90      | 4,211.6               | 408.1        | 296.5        | 504.4                   | 2.34                    | -0.85                  | 190.74                |
| 4,341.0               | 0.50            | 249.10      | 4,306.6               | 407.7        | 295.6        | 503.6                   | 0.22                    | -0.21                  | 7.58                  |
| 4,436.0               | 0.20            | 246.30      | 4,401.6               | 407.5        | 295.1        | 503.1                   | 0.32                    | -0.32                  | -2.95                 |
| 4,530.0               | 0.70            | 260.00      | 4,495.6               | 407.3        | 294.4        | 502.5                   | 0.54                    | 0.53                   | 14.57                 |
| 4,625.0               | 0.70            | 264.90      | 4,590.5               | 407.1        | 293.2        | 501.7                   | 0.06                    | 0.00                   | 5.16                  |
| 4,719.0               | 0.70            | 235.50      | 4,684.5               | 406.8        | 292.2        | 500.8                   | 0.38                    | 0.00                   | -31.28                |
| 4,814.0               | 0.90            | 236.70      | 4,779.5               | 406.0        | 291.1        | 499.6                   | 0.21                    | 0.21                   | 1.26                  |
| 4,908.0               | 0.80            | 239.00      | 4,873.5               | 405.3        | 289.9        | 498.3                   | 0.11                    | -0.11                  | 2.45                  |
| 5,003.0               | 1.10            | 240.50      | 4,968.5               | 404.5        | 288.5        | 496.9                   | 0.32                    | 0.32                   | 1.58                  |
| 5,097.0               | 0.10            | 142.90      | 5,062.5               | 404.0        | 287.8        | 496.0                   | 1.19                    | -1.06                  | -103.83               |



# Survey Report



|                  |                          |                                     |                              |
|------------------|--------------------------|-------------------------------------|------------------------------|
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| <b>Project:</b>  | Mesa County, CO          | <b>TVD Reference:</b>               | Well @ 7287.0usft (H&P #522) |
| <b>Site:</b>     | Gunderson 0993 21-05 Pad | <b>MD Reference:</b>                | Well @ 7287.0usft (H&P #522) |
| <b>Well:</b>     | BCU 0993-21-05W          | <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>                    | EDM 5000.1 Single User Db    |

| 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) |  |
| 5,191.0                                     | 1.50            | 46.20       | 5,156.5               | 404.8        | 288.7        | 497.2                   | 1.61                    | 1.49                   | -102.87               |  |
| 5,286.0                                     | 1.60            | 53.80       | 5,251.5               | 406.4        | 290.7        | 499.7                   | 0.24                    | 0.11                   | 8.00                  |  |
| 5,380.0                                     | 1.40            | 42.10       | 5,345.4               | 408.0        | 292.5        | 502.1                   | 0.39                    | -0.21                  | -12.45                |  |
| 5,474.0                                     | 1.10            | 37.40       | 5,439.4               | 409.6        | 293.9        | 504.1                   | 0.34                    | -0.32                  | -5.00                 |  |
| 5,569.0                                     | 0.90            | 35.70       | 5,534.4               | 410.9        | 294.9        | 505.8                   | 0.21                    | -0.21                  | -1.79                 |  |
| 5,663.0                                     | 0.80            | 28.90       | 5,628.4               | 412.1        | 295.6        | 507.2                   | 0.15                    | -0.11                  | -7.23                 |  |
| 5,757.0                                     | 0.50            | 17.00       | 5,722.4               | 413.1        | 296.0        | 508.2                   | 0.35                    | -0.32                  | -12.66                |  |
| 5,852.0                                     | 0.40            | 10.40       | 5,817.4               | 413.8        | 296.2        | 508.9                   | 0.12                    | -0.11                  | -6.95                 |  |
| 5,946.0                                     | 0.40            | 354.00      | 5,911.4               | 414.4        | 296.2        | 509.4                   | 0.12                    | 0.00                   | -17.45                |  |
| 6,040.0                                     | 0.30            | 307.70      | 6,005.4               | 414.9        | 296.0        | 509.7                   | 0.31                    | -0.11                  | -49.26                |  |
| 6,135.0                                     | 0.50            | 312.20      | 6,100.4               | 415.4        | 295.5        | 509.7                   | 0.21                    | 0.21                   | 4.74                  |  |
| 6,229.0                                     | 0.70            | 308.20      | 6,194.4               | 416.0        | 294.8        | 509.8                   | 0.22                    | 0.21                   | -4.26                 |  |
| 6,323.0                                     | 0.90            | 319.60      | 6,288.3               | 416.9        | 293.8        | 510.0                   | 0.27                    | 0.21                   | 12.13                 |  |
| 6,418.0                                     | 1.00            | 318.20      | 6,383.3               | 418.1        | 292.8        | 510.4                   | 0.11                    | 0.11                   | -1.47                 |  |
| 6,512.0                                     | 0.10            | 295.50      | 6,477.3               | 418.7        | 292.2        | 510.5                   | 0.97                    | -0.96                  | -24.15                |  |
| 6,606.0                                     | 1.90            | 136.00      | 6,571.3               | 417.7        | 293.2        | 510.2                   | 2.12                    | 1.91                   | -169.68               |  |
| 6,700.0                                     | 1.70            | 126.20      | 6,665.3               | 415.7        | 295.4        | 510.0                   | 0.39                    | -0.21                  | -10.43                |  |
| 6,794.0                                     | 1.20            | 120.40      | 6,759.2               | 414.4        | 297.4        | 510.0                   | 0.55                    | -0.53                  | -6.17                 |  |
| 6,888.0                                     | 1.10            | 92.60       | 6,853.2               | 413.8        | 299.1        | 510.6                   | 0.60                    | -0.11                  | -29.57                |  |
| 6,982.0                                     | 0.90            | 109.10      | 6,947.2               | 413.6        | 300.7        | 511.3                   | 0.37                    | -0.21                  | 17.55                 |  |
| 7,076.0                                     | 0.80            | 159.90      | 7,041.2               | 412.7        | 301.6        | 511.2                   | 0.78                    | -0.11                  | 54.04                 |  |
| 7,171.0                                     | 1.10            | 179.90      | 7,136.2               | 411.2        | 301.9        | 510.1                   | 0.47                    | 0.32                   | 21.05                 |  |
| 7,265.0                                     | 1.30            | 198.80      | 7,230.2               | 409.3        | 301.5        | 508.3                   | 0.47                    | 0.21                   | 20.11                 |  |
| 7,359.0                                     | 1.60            | 207.30      | 7,324.1               | 407.1        | 300.6        | 506.0                   | 0.39                    | 0.32                   | 9.04                  |  |
| 7,453.0                                     | 1.30            | 215.00      | 7,418.1               | 405.0        | 299.4        | 503.6                   | 0.38                    | -0.32                  | 8.19                  |  |
| 7,547.0                                     | 1.00            | 208.90      | 7,512.1               | 403.5        | 298.4        | 501.7                   | 0.34                    | -0.32                  | -6.49                 |  |
| 7,641.0                                     | 0.90            | 215.60      | 7,606.1               | 402.1        | 297.5        | 500.2                   | 0.16                    | -0.11                  | 7.13                  |  |
| 7,673.0                                     | 0.90            | 215.90      | 7,638.1               | 401.7        | 297.2        | 499.7                   | 0.01                    | 0.00                   | 0.94                  |  |
| Projection to TD @ 7733.0' MD / 7698.1' TVD |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 7,733.0                                     | 0.90            | 215.90      | 7,698.1               | 401.0        | 296.7        | 498.7                   | 0.00                    | 0.00                   | 0.00                  |  |

| Design Annotations    |                       |                   |              |                                             |
|-----------------------|-----------------------|-------------------|--------------|---------------------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                     |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                             |
| 295.0                 | 294.9                 | 3.1               | 5.9          | First MWD Survey @ 295.0' MD / 294.9' TVD   |
| 7,733.0               | 7,698.1               | 401.0             | 296.7        | Projection to TD @ 7733.0' MD / 7698.1' TVD |

|                   |                    |             |
|-------------------|--------------------|-------------|
| Checked By: _____ | Approved By: _____ | Date: _____ |
|-------------------|--------------------|-------------|