30-025-43884



# McElvain Energy

**Lea County, NM (NAD 83)**
**EK 31 BS2 Federal Com**
**#1H**

**OH**

**Design: OH Surveys 125'-14752' PTB 14796'**

# Standard Survey Report

**29 September, 2017**

PRODIRECTIONAL

# Pro Directional
Survey Report

PRODIRECTIONAL

| | | | |
|---|---|---|---|
| **Company:** | McElvain Energy | **Local Co-ordinate Reference:** | Well #1H |
| **Project:** | Lea County, NM (NAD 83) | **TVD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Site:** | EK 31 BS2 Federal Com | **MD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Well:** | #1H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH Surveys 125'-14752' PTB 14796' | **Database:** | WellPlanner1 |

**Project** Lea County, NM (NAD 83)

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | |
| **Map Zone:** | New Mexico Eastern Zone | | |

**Site** EK 31 BS2 Federal Com

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 623,478.10 usft | **Latitude:** | 32.7118023 |
| **From:** | Map | **Easting:** | 768,752.30 usft | **Longitude:** | -103.5939484 |
| **Position Uncertainty:** | 0.00 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.40 ° |

**Well** #1H

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.00 usft | **Northing:** | 623,478.10 usft | **Latitude:** | 32.7118023 |
| | **+E/-W** | 0.00 usft | **Easting:** | 768,752.30 usft | **Longitude:** | -103.5939484 |
| **Position Uncertainty** | | 0.00 usft | **Wellhead Elevation:** | usft | **Ground Level:** | 3,894.00 usft |

**Wellbore** OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | HDGM | 9/8/2017 | 6.72 | 60.77 | 48,352.20 |

**Design** OH Surveys 125'-14752' PTB 14796'

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | 1.0 | **Phase:** | ACTUAL | **Tie On Depth:** | 0.00 |

| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
|---|---|---|---|---|
| | 0.00 | 0.00 | 0.00 | 180.00 |

**Survey Program** **Date** 9/29/2017

| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 125.00 | 1,725.00 | VES Gyro (OH) | GYRO-NS-CT | OWSG XYZ Accel with XY Static and Continuous |
| 1,910.00 | 14,796.00 | ProMWD #1 (OH) | MWD+HDGM | OWSG MWD + HRGM |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 125.00 | 0.27 | 225.35 | 125.00 | -0.21 | -0.21 | 0.21 | 0.22 | 0.22 | 0.00 |
| 225.00 | 0.53 | 177.54 | 225.00 | -0.83 | -0.36 | 0.83 | 0.40 | 0.26 | -47.81 |
| 325.00 | 0.57 | 177.14 | 324.99 | -1.79 | -0.31 | 1.79 | 0.04 | 0.04 | -0.40 |
| 425.00 | 0.25 | 170.67 | 424.99 | -2.51 | -0.25 | 2.51 | 0.32 | -0.32 | -6.47 |
| 525.00 | 0.17 | 161.07 | 524.99 | -2.86 | -0.17 | 2.86 | 0.09 | -0.08 | -9.60 |
| 625.00 | 0.24 | 200.44 | 624.99 | -3.20 | -0.19 | 3.20 | 0.15 | 0.07 | 39.37 |
| 725.00 | 0.59 | 167.62 | 724.99 | -3.90 | -0.16 | 3.90 | 0.41 | 0.35 | -32.82 |

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| **Site:** | EK 31 BS2 Federal Com | **MD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Well:** | #1H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH Surveys 125'-14752' PTB 14796' | **Database:** | WellPlanner1 |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 825.00 | 0.60 | 153.22 | 824.98 | -4.87 | 0.19 | 4.87 | 0.15 | 0.01 | -14.40 |
| 925.00 | 0.56 | 202.55 | 924.98 | -5.79 | 0.24 | 5.79 | 0.49 | -0.04 | 49.33 |
| 1,025.00 | 0.56 | 169.81 | 1,024.97 | -6.72 | 0.14 | 6.72 | 0.32 | 0.00 | -32.74 |
| 1,125.00 | 0.47 | 164.41 | 1,124.97 | -7.59 | 0.33 | 7.59 | 0.10 | -0.09 | -5.40 |
| 1,225.00 | 0.47 | 178.69 | 1,224.96 | -8.40 | 0.45 | 8.40 | 0.12 | 0.00 | 14.28 |
| 1,325.00 | 0.43 | 178.73 | 1,324.96 | -9.18 | 0.47 | 9.18 | 0.04 | -0.04 | 0.04 |
| 1,425.00 | 0.27 | 176.26 | 1,424.96 | -9.79 | 0.49 | 9.79 | 0.16 | -0.16 | -2.47 |
| 1,525.00 | 0.09 | 122.18 | 1,524.96 | -10.07 | 0.58 | 10.07 | 0.23 | -0.18 | -54.08 |
| 1,625.00 | 0.20 | 139.17 | 1,624.96 | -10.25 | 0.76 | 10.25 | 0.12 | 0.11 | 16.99 |
| 1,725.00 | 0.10 | 158.99 | 1,724.96 | -10.46 | 0.90 | 10.46 | 0.11 | -0.10 | 19.82 |
| 1,910.00 | 0.00 | 249.30 | 1,909.96 | -10.61 | 0.96 | 10.61 | 0.05 | -0.05 | 0.00 |
| 2,004.00 | 0.30 | 29.70 | 2,003.96 | -10.40 | 1.08 | 10.40 | 0.32 | 0.32 | 0.00 |
| 2,099.00 | 0.30 | 106.30 | 2,098.96 | -10.25 | 1.44 | 10.25 | 0.39 | 0.00 | 80.63 |
| 2,193.00 | 0.00 | 106.90 | 2,192.96 | -10.32 | 1.68 | 10.32 | 0.32 | -0.32 | 0.00 |
| 2,288.00 | 0.30 | 57.90 | 2,287.96 | -10.19 | 1.89 | 10.19 | 0.32 | 0.32 | 0.00 |
| 2,382.00 | 0.50 | 64.20 | 2,381.95 | -9.88 | 2.47 | 9.88 | 0.22 | 0.21 | 6.70 |
| 2,477.00 | 0.30 | 61.60 | 2,476.95 | -9.58 | 3.06 | 9.58 | 0.21 | -0.21 | -2.74 |
| 2,571.00 | 0.60 | 76.00 | 2,570.95 | -9.34 | 3.75 | 9.34 | 0.34 | 0.32 | 15.32 |
| 2,666.00 | 1.00 | 72.00 | 2,665.94 | -8.97 | 5.03 | 8.97 | 0.42 | 0.42 | -4.21 |
| 2,760.00 | 1.20 | 68.00 | 2,759.92 | -8.34 | 6.72 | 8.34 | 0.23 | 0.21 | -4.26 |
| 2,855.00 | 0.30 | 121.00 | 2,854.91 | -8.10 | 7.85 | 8.10 | 1.10 | -0.95 | 55.79 |
| 2,949.00 | 0.20 | 132.30 | 2,948.91 | -8.34 | 8.19 | 8.34 | 0.12 | -0.11 | 12.02 |
| 3,044.00 | 0.10 | 102.70 | 3,043.91 | -8.47 | 8.39 | 8.47 | 0.13 | -0.11 | -31.16 |
| 3,138.00 | 0.20 | 92.40 | 3,137.91 | -8.49 | 8.63 | 8.49 | 0.11 | 0.11 | -10.96 |
| 3,233.00 | 0.30 | 145.90 | 3,232.91 | -8.70 | 8.94 | 8.70 | 0.25 | 0.11 | 56.32 |
| 3,327.00 | 0.10 | 67.80 | 3,326.91 | -8.88 | 9.15 | 8.88 | 0.31 | -0.21 | -83.09 |
| 3,422.00 | 0.20 | 66.30 | 3,421.91 | -8.78 | 9.38 | 8.78 | 0.11 | 0.11 | -1.58 |
| 3,516.00 | 0.10 | 321.90 | 3,515.91 | -8.65 | 9.48 | 8.65 | 0.26 | -0.11 | -111.06 |
| 3,611.00 | 0.00 | 343.80 | 3,610.91 | -8.58 | 9.43 | 8.58 | 0.11 | -0.11 | 0.00 |
| 3,705.00 | 0.30 | 11.70 | 3,704.91 | -8.34 | 9.48 | 8.34 | 0.32 | 0.32 | 0.00 |
| 3,800.00 | 0.40 | 13.00 | 3,799.91 | -7.78 | 9.61 | 7.78 | 0.11 | 0.11 | 1.37 |
| 3,895.00 | 0.20 | 344.40 | 3,894.91 | -7.29 | 9.64 | 7.29 | 0.26 | -0.21 | -30.11 |
| 3,989.00 | 0.30 | 44.40 | 3,988.91 | -6.96 | 9.76 | 6.96 | 0.28 | 0.11 | 63.83 |
| 4,084.00 | 0.80 | 248.20 | 4,083.90 | -7.03 | 9.32 | 7.03 | 1.14 | 0.53 | -164.42 |
| 4,179.00 | 1.50 | 248.90 | 4,178.88 | -7.72 | 7.55 | 7.72 | 0.74 | 0.74 | 0.74 |
| 4,273.00 | 1.30 | 247.90 | 4,272.85 | -8.57 | 5.41 | 8.57 | 0.21 | -0.21 | -1.06 |
| 4,367.00 | 1.20 | 248.60 | 4,366.83 | -9.33 | 3.51 | 9.33 | 0.11 | -0.11 | 0.74 |
| 4,462.00 | 1.30 | 246.80 | 4,461.81 | -10.11 | 1.59 | 10.11 | 0.11 | 0.11 | -1.89 |
| 4,557.00 | 1.10 | 244.90 | 4,556.79 | -10.92 | -0.23 | 10.92 | 0.21 | -0.21 | -2.00 |
| 4,651.00 | 0.40 | 266.30 | 4,650.78 | -11.33 | -1.37 | 11.33 | 0.79 | -0.74 | 22.77 |
| 4,745.00 | 0.10 | 43.30 | 4,744.78 | -11.29 | -1.64 | 11.29 | 0.51 | -0.32 | 145.74 |
| 4,840.00 | 0.30 | 284.70 | 4,839.78 | -11.17 | -1.83 | 11.17 | 0.38 | 0.21 | -124.84 |

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**Survey**

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|---|---|---|---|---|---|---|---|---|---|
| 5,015.00 | 0.10 | 25.10 | 5,014.78 | -10.91 | -2.21 | 10.91 | 0.19 | -0.11 | 57.37 |
| 5,110.00 | 0.00 | 136.20 | 5,109.78 | -10.84 | -2.17 | 10.84 | 0.11 | -0.11 | 0.00 |
| 5,204.00 | 0.10 | 148.50 | 5,203.78 | -10.91 | -2.13 | 10.91 | 0.11 | 0.11 | 0.00 |
| 5,298.00 | 0.20 | 235.60 | 5,297.78 | -11.07 | -2.22 | 11.07 | 0.23 | 0.11 | 92.66 |
| 5,392.00 | 0.20 | 237.40 | 5,391.78 | -11.25 | -2.49 | 11.25 | 0.01 | 0.00 | 1.91 |
| 5,486.00 | 0.10 | 7.20 | 5,485.78 | -11.26 | -2.62 | 11.26 | 0.29 | -0.11 | 138.09 |
| 5,580.00 | 0.10 | 75.70 | 5,579.78 | -11.16 | -2.53 | 11.16 | 0.12 | 0.00 | 72.87 |
| 5,674.00 | 0.20 | 354.20 | 5,673.78 | -10.97 | -2.47 | 10.97 | 0.22 | 0.11 | -86.70 |
| 5,768.00 | 0.20 | 289.10 | 5,767.78 | -10.76 | -2.64 | 10.76 | 0.23 | 0.00 | -69.26 |
| 5,862.00 | 0.10 | 185.80 | 5,861.78 | -10.78 | -2.80 | 10.78 | 0.26 | -0.11 | -109.89 |
| 5,956.00 | 0.10 | 226.80 | 5,955.78 | -10.92 | -2.87 | 10.92 | 0.07 | 0.00 | 43.62 |
| 6,051.00 | 0.20 | 332.00 | 6,050.78 | -10.83 | -3.01 | 10.83 | 0.26 | 0.11 | 110.74 |
| 6,145.00 | 0.10 | 29.40 | 6,144.78 | -10.62 | -3.05 | 10.62 | 0.18 | -0.11 | 61.06 |
| 6,239.00 | 1.20 | 220.90 | 6,238.77 | -11.29 | -3.65 | 11.29 | 1.38 | 1.17 | -179.26 |
| 6,333.00 | 0.20 | 277.50 | 6,332.76 | -12.01 | -4.46 | 12.01 | 1.17 | -1.06 | 60.21 |
| 6,427.00 | 0.30 | 193.80 | 6,426.76 | -12.23 | -4.68 | 12.23 | 0.36 | 0.11 | -89.04 |
| 6,521.00 | 0.30 | 210.30 | 6,520.76 | -12.68 | -4.86 | 12.68 | 0.09 | 0.00 | 17.55 |
| 6,615.00 | 0.00 | 76.50 | 6,614.76 | -12.89 | -4.99 | 12.89 | 0.32 | -0.32 | 0.00 |
| 6,709.00 | 0.10 | 219.00 | 6,708.76 | -12.96 | -5.04 | 12.96 | 0.11 | 0.11 | 0.00 |
| 6,803.00 | 0.30 | 142.60 | 6,802.76 | -13.22 | -4.94 | 13.22 | 0.31 | 0.21 | -81.28 |
| 6,897.00 | 0.30 | 148.20 | 6,896.76 | -13.62 | -4.66 | 13.62 | 0.03 | 0.00 | 5.96 |
| 6,991.00 | 0.30 | 247.00 | 6,990.76 | -13.93 | -4.76 | 13.93 | 0.48 | 0.00 | 105.11 |
| 7,085.00 | 0.20 | 245.60 | 7,084.76 | -14.09 | -5.13 | 14.09 | 0.11 | -0.11 | -1.49 |
| 7,179.00 | 0.40 | 260.70 | 7,178.75 | -14.21 | -5.61 | 14.21 | 0.23 | 0.21 | 16.06 |
| 7,273.00 | 0.30 | 253.20 | 7,272.75 | -14.33 | -6.17 | 14.33 | 0.12 | -0.11 | -7.98 |
| 7,367.00 | 0.40 | 204.50 | 7,366.75 | -14.70 | -6.54 | 14.70 | 0.32 | 0.11 | -51.81 |
| 7,461.00 | 0.50 | 218.80 | 7,460.75 | -15.32 | -6.93 | 15.32 | 0.16 | 0.11 | 15.21 |
| 7,556.00 | 0.40 | 250.40 | 7,555.75 | -15.76 | -7.50 | 15.76 | 0.28 | -0.11 | 33.26 |
| 7,650.00 | 0.60 | 337.00 | 7,649.74 | -15.41 | -8.00 | 15.41 | 0.75 | 0.21 | 92.13 |
| 7,744.00 | 0.80 | 330.10 | 7,743.74 | -14.39 | -8.52 | 14.39 | 0.23 | 0.21 | -7.34 |
| 7,839.00 | 0.80 | 336.20 | 7,838.73 | -13.21 | -9.12 | 13.21 | 0.09 | 0.00 | 6.42 |
| 7,933.00 | 0.50 | 317.00 | 7,932.72 | -12.31 | -9.67 | 12.31 | 0.39 | -0.32 | -20.43 |
| 8,027.00 | 0.80 | 278.40 | 8,026.72 | -11.91 | -10.60 | 11.91 | 0.55 | 0.32 | -41.06 |
| 8,122.00 | 2.20 | 217.00 | 8,121.68 | -13.27 | -12.35 | 13.27 | 2.05 | 1.47 | -64.63 |
| 8,216.00 | 3.30 | 196.00 | 8,215.58 | -17.31 | -14.18 | 17.31 | 1.57 | 1.17 | -22.34 |
| 8,311.00 | 6.10 | 189.60 | 8,310.25 | -24.92 | -15.78 | 24.92 | 2.99 | 2.95 | -6.74 |
| 8,406.00 | 5.90 | 188.60 | 8,404.73 | -34.73 | -17.35 | 34.73 | 0.24 | -0.21 | -1.05 |
| 8,500.00 | 4.90 | 186.90 | 8,498.31 | -43.49 | -18.55 | 43.49 | 1.08 | -1.06 | -1.81 |
| 8,594.00 | 4.30 | 188.00 | 8,592.01 | -50.96 | -19.53 | 50.96 | 0.65 | -0.64 | 1.17 |
| 8,689.00 | 3.50 | 183.00 | 8,686.79 | -57.39 | -20.17 | 57.39 | 0.91 | -0.84 | -5.26 |
| 8,783.00 | 4.10 | 181.70 | 8,780.58 | -63.61 | -20.42 | 63.61 | 0.64 | 0.64 | -1.38 |
| 8,878.00 | 5.50 | 183.70 | 8,875.24 | -71.55 | -20.82 | 71.55 | 1.48 | 1.47 | 2.11 |

| | | | |
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**Survey**

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|---|---|---|---|---|---|---|---|---|---|
| 8,972.00 | 5.50 | 189.90 | 8,968.81 | -80.48 | -21.88 | 80.48 | 0.63 | 0.00 | 6.60 |
| 9,067.00 | 5.40 | 183.70 | 9,063.38 | -89.43 | -22.95 | 89.43 | 0.63 | -0.11 | -6.53 |
| 9,161.00 | 5.00 | 183.70 | 9,157.00 | -97.93 | -23.50 | 97.93 | 0.43 | -0.43 | 0.00 |
| 9,256.00 | 4.00 | 183.30 | 9,251.70 | -105.37 | -23.96 | 105.37 | 1.05 | -1.05 | -0.42 |
| 9,380.00 | 4.20 | 187.50 | 9,375.39 | -114.19 | -24.80 | 114.19 | 0.29 | 0.16 | 3.39 |
| 9,412.00 | 6.80 | 204.70 | 9,407.24 | -117.07 | -25.75 | 117.07 | 9.53 | 8.13 | 53.75 |
| 9,443.00 | 10.50 | 205.00 | 9,437.88 | -121.30 | -27.71 | 121.30 | 11.94 | 11.94 | 0.97 |
| 9,475.00 | 14.00 | 203.20 | 9,469.15 | -127.50 | -30.47 | 127.50 | 11.00 | 10.94 | -5.63 |
| 9,506.00 | 17.70 | 200.20 | 9,498.96 | -135.38 | -33.57 | 135.38 | 12.22 | 11.94 | -9.68 |
| 9,538.00 | 20.80 | 197.50 | 9,529.17 | -145.36 | -36.96 | 145.36 | 10.08 | 9.69 | -8.44 |
| 9,570.00 | 23.50 | 193.90 | 9,558.81 | -156.98 | -40.20 | 156.98 | 9.44 | 8.44 | -11.25 |
| 9,601.00 | 26.20 | 188.30 | 9,586.94 | -169.75 | -42.68 | 169.75 | 11.55 | 8.71 | -18.06 |
| 9,632.00 | 29.40 | 183.10 | 9,614.36 | -184.13 | -44.08 | 184.13 | 12.94 | 10.32 | -16.77 |
| 9,664.00 | 32.40 | 179.60 | 9,641.82 | -200.55 | -44.44 | 200.55 | 10.93 | 9.38 | -10.94 |
| 9,695.00 | 35.80 | 177.80 | 9,667.48 | -217.92 | -44.04 | 217.92 | 11.44 | 10.97 | -5.81 |
| 9,727.00 | 39.30 | 177.20 | 9,692.85 | -237.40 | -43.18 | 237.40 | 11.00 | 10.94 | -1.88 |
| 9,758.00 | 42.80 | 178.90 | 9,716.23 | -257.74 | -42.50 | 257.74 | 11.85 | 11.29 | 5.48 |
| 9,790.00 | 46.70 | 180.30 | 9,738.95 | -280.27 | -42.35 | 280.27 | 12.57 | 12.19 | 4.38 |
| 9,821.00 | 50.20 | 181.10 | 9,759.51 | -303.46 | -42.64 | 303.46 | 11.45 | 11.29 | 2.58 |
| 9,853.00 | 53.60 | 180.80 | 9,779.25 | -328.63 | -43.06 | 328.63 | 10.65 | 10.63 | -0.94 |
| 9,884.00 | 56.70 | 180.30 | 9,796.96 | -354.07 | -43.30 | 354.07 | 10.09 | 10.00 | -1.61 |
| 9,916.00 | 59.60 | 178.90 | 9,813.85 | -381.25 | -43.10 | 381.25 | 9.79 | 9.06 | -4.38 |
| 9,947.00 | 62.50 | 178.60 | 9,828.85 | -408.36 | -42.51 | 408.36 | 9.39 | 9.35 | -0.97 |
| 9,979.00 | 65.60 | 179.10 | 9,842.85 | -437.13 | -41.93 | 437.13 | 9.79 | 9.69 | 1.56 |
| 9,998.14 | 67.64 | 179.54 | 9,850.45 | -454.69 | -41.73 | 454.69 | 10.85 | 10.64 | 2.28 |
| **Sec. 31 330' HL Entry: 9998.14' MD, 9850.45' TVD** | | | | | | | | | |
| 10,010.00 | 68.90 | 179.80 | 9,854.84 | -465.71 | -41.66 | 465.71 | 10.85 | 10.65 | 2.22 |
| 10,042.00 | 72.30 | 180.50 | 9,865.47 | -495.89 | -41.74 | 495.89 | 10.82 | 10.63 | 2.19 |
| 10,073.00 | 75.10 | 181.70 | 9,874.17 | -525.63 | -42.32 | 525.63 | 9.77 | 9.03 | 3.87 |
| 10,105.00 | 77.40 | 181.70 | 9,881.77 | -556.70 | -43.24 | 556.70 | 7.19 | 7.19 | 0.00 |
| 10,136.00 | 80.10 | 181.00 | 9,887.82 | -587.09 | -43.95 | 587.09 | 8.99 | 8.71 | -2.26 |
| 10,168.00 | 83.20 | 179.80 | 9,892.47 | -618.75 | -44.17 | 618.75 | 10.37 | 9.69 | -3.75 |
| 10,231.00 | 87.30 | 177.90 | 9,897.68 | -681.50 | -42.91 | 681.50 | 7.17 | 6.51 | -3.02 |
| 10,308.00 | 87.70 | 177.60 | 9,901.04 | -758.37 | -39.89 | 758.37 | 0.65 | 0.52 | -0.39 |
| 10,402.00 | 89.50 | 177.90 | 9,903.34 | -852.27 | -36.20 | 852.27 | 1.94 | 1.91 | 0.32 |
| 10,497.00 | 88.60 | 177.10 | 9,904.91 | -947.16 | -32.06 | 947.16 | 1.27 | -0.95 | -0.84 |
| 10,591.00 | 89.40 | 177.00 | 9,906.55 | -1,041.02 | -27.22 | 1,041.02 | 0.86 | 0.85 | -0.11 |
| 10,686.00 | 87.80 | 177.00 | 9,908.87 | -1,135.86 | -22.25 | 1,135.86 | 1.68 | -1.68 | 0.00 |
| 10,781.00 | 88.30 | 177.40 | 9,912.11 | -1,230.69 | -17.61 | 1,230.69 | 0.67 | 0.53 | 0.42 |
| 10,875.00 | 89.10 | 177.40 | 9,914.24 | -1,324.57 | -13.35 | 1,324.57 | 0.85 | 0.85 | 0.00 |
| 10,969.00 | 88.20 | 178.00 | 9,916.45 | -1,418.47 | -9.58 | 1,418.47 | 1.15 | -0.96 | 0.64 |
| 11,063.00 | 88.00 | 178.20 | 9,919.57 | -1,512.36 | -6.46 | 1,512.36 | 0.30 | -0.21 | 0.21 |

| | | | |
|---|---|---|---|
| **Company:** | McElvain Energy | **Local Co-ordinate Reference:** | Well #1H |
| **Project:** | Lea County, NM (NAD 83) | **TVD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Site:** | EK 31 BS2 Federal Com | **MD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Well:** | #1H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH Surveys 125'-14752' PTB 14796' | **Database:** | WellPlanner1 |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 11,157.00 | 86.80 | 179.00 | 9,923.83 | -1,606.24 | -4.17 | 1,606.24 | 1.53 | -1.28 | 0.85 |
| 11,251.00 | 87.30 | 178.50 | 9,928.67 | -1,700.09 | -2.12 | 1,700.09 | 0.75 | 0.53 | -0.53 |
| 11,345.00 | 87.60 | 178.00 | 9,932.85 | -1,793.95 | 0.75 | 1,793.95 | 0.62 | 0.32 | -0.53 |
| 11,439.00 | 86.60 | 178.60 | 9,937.61 | -1,887.79 | 3.53 | 1,887.79 | 1.24 | -1.06 | 0.64 |
| 11,533.00 | 87.90 | 178.20 | 9,942.12 | -1,981.64 | 6.15 | 1,981.64 | 1.45 | 1.38 | -0.43 |
| 11,627.00 | 88.00 | 178.90 | 9,945.48 | -2,075.55 | 8.53 | 2,075.55 | 0.75 | 0.11 | 0.74 |
| 11,721.00 | 88.10 | 179.60 | 9,948.68 | -2,169.49 | 9.76 | 2,169.49 | 0.75 | 0.11 | 0.74 |
| 11,816.00 | 88.50 | 179.60 | 9,951.50 | -2,264.44 | 10.42 | 2,264.44 | 0.42 | 0.42 | 0.00 |
| 11,910.00 | 88.80 | 179.10 | 9,953.71 | -2,358.41 | 11.49 | 2,358.41 | 0.62 | 0.32 | -0.53 |
| 12,004.00 | 89.40 | 180.40 | 9,955.19 | -2,452.39 | 11.90 | 2,452.39 | 1.52 | 0.64 | 1.38 |
| 12,098.00 | 89.60 | 179.00 | 9,956.01 | -2,546.39 | 12.39 | 2,546.39 | 1.50 | 0.21 | -1.49 |
| 12,192.00 | 90.80 | 179.70 | 9,955.68 | -2,640.38 | 13.46 | 2,640.38 | 1.48 | 1.28 | 0.74 |
| 12,286.00 | 89.50 | 181.10 | 9,955.44 | -2,734.37 | 12.80 | 2,734.37 | 2.03 | -1.38 | 1.49 |
| 12,380.00 | 90.40 | 180.80 | 9,955.52 | -2,828.36 | 11.24 | 2,828.36 | 1.01 | 0.96 | -0.32 |
| 12,474.00 | 90.50 | 179.70 | 9,954.78 | -2,922.35 | 10.83 | 2,922.35 | 1.18 | 0.11 | -1.17 |
| 12,568.00 | 88.90 | 180.60 | 9,955.27 | -3,016.35 | 10.59 | 3,016.35 | 1.95 | -1.70 | 0.96 |
| 12,662.00 | 89.70 | 179.70 | 9,956.42 | -3,110.34 | 10.34 | 3,110.34 | 1.28 | 0.85 | -0.96 |
| 12,756.00 | 89.00 | 180.50 | 9,957.49 | -3,204.33 | 10.18 | 3,204.33 | 1.13 | -0.74 | 0.85 |
| 12,850.00 | 87.30 | 180.80 | 9,960.52 | -3,298.27 | 9.11 | 3,298.27 | 1.84 | -1.81 | 0.32 |
| 12,944.00 | 85.80 | 181.10 | 9,966.18 | -3,392.09 | 7.56 | 3,392.09 | 1.63 | -1.60 | 0.32 |
| 13,038.00 | 85.70 | 181.60 | 9,973.14 | -3,485.80 | 5.35 | 3,485.80 | 0.54 | -0.11 | 0.53 |
| 13,132.00 | 86.50 | 182.20 | 9,979.54 | -3,579.53 | 2.24 | 3,579.53 | 1.06 | 0.85 | 0.64 |
| 13,226.00 | 88.00 | 182.80 | 9,984.05 | -3,673.33 | -1.86 | 3,673.33 | 1.72 | 1.60 | 0.64 |
| 13,321.00 | 89.40 | 183.20 | 9,986.20 | -3,768.17 | -6.83 | 3,768.17 | 1.53 | 1.47 | 0.42 |
| 13,415.00 | 89.60 | 183.00 | 9,987.02 | -3,862.03 | -11.91 | 3,862.03 | 0.30 | 0.21 | -0.21 |
| 13,510.00 | 91.00 | 182.60 | 9,986.53 | -3,956.91 | -16.55 | 3,956.91 | 1.53 | 1.47 | -0.42 |
| 13,604.00 | 90.30 | 182.80 | 9,985.46 | -4,050.80 | -20.98 | 4,050.80 | 0.77 | -0.74 | 0.21 |
| 13,698.00 | 90.70 | 181.90 | 9,984.64 | -4,144.72 | -24.83 | 4,144.72 | 1.05 | 0.43 | -0.96 |
| 13,792.00 | 90.60 | 182.40 | 9,983.57 | -4,238.65 | -28.36 | 4,238.65 | 0.54 | -0.11 | 0.53 |
| 13,887.00 | 89.70 | 181.90 | 9,983.32 | -4,333.58 | -31.93 | 4,333.58 | 1.08 | -0.95 | -0.53 |
| 13,982.00 | 89.80 | 181.70 | 9,983.74 | -4,428.53 | -34.91 | 4,428.53 | 0.24 | 0.11 | -0.21 |
| 14,076.00 | 89.40 | 181.50 | 9,984.39 | -4,522.49 | -37.53 | 4,522.49 | 0.48 | -0.43 | -0.21 |
| 14,171.00 | 88.70 | 181.70 | 9,985.97 | -4,617.44 | -40.19 | 4,617.44 | 0.77 | -0.74 | 0.21 |
| 14,265.00 | 86.70 | 181.50 | 9,989.74 | -4,711.32 | -42.81 | 4,711.32 | 2.14 | -2.13 | -0.21 |
| 14,360.00 | 87.40 | 181.10 | 9,994.63 | -4,806.17 | -44.96 | 4,806.17 | 0.85 | 0.74 | -0.42 |
| 14,454.00 | 87.60 | 180.20 | 9,998.73 | -4,900.08 | -46.03 | 4,900.08 | 0.98 | 0.21 | -0.96 |
| 14,549.00 | 85.50 | 178.50 | 10,004.45 | -4,994.89 | -44.95 | 4,994.89 | 2.84 | -2.21 | -1.79 |
| 14,630.84 | 85.94 | 178.33 | 10,010.56 | -5,076.47 | -42.69 | 5,076.47 | 0.57 | 0.53 | -0.21 |
| **Sec. 31 330' HL Exit: 14630.84' MD, 10010.56' TVD** | | | | | | | | | |
| 14,643.00 | 86.00 | 178.30 | 10,011.41 | -5,088.59 | -42.33 | 5,088.59 | 0.57 | 0.53 | -0.21 |
| 14,738.00 | 86.20 | 178.10 | 10,017.88 | -5,183.33 | -39.36 | 5,183.33 | 0.30 | 0.21 | -0.21 |
| 14,752.00 | 86.30 | 178.40 | 10,018.79 | -5,197.29 | -38.93 | 5,197.29 | 2.25 | 0.71 | 2.14 |

# Pro Directional
Survey Report

PRODIRECTIONAL

| | | | |
|---|---|---|---|
| **Company:** | McElvain Energy | **Local Co-ordinate Reference:** | Well #1H |
| **Project:** | Lea County, NM (NAD 83) | **TVD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Site:** | EK 31 BS2 Federal Com | **MD Reference:** | Well @ 3919.00usft (GL:3894' + KB:25' (H&P 262)) |
| **Well:** | #1H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH Surveys 125'-14752' PTB 14796' | **Database:** | WellPlanner1 |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| **Last Survey: 14752.00' MD, 10018.79' TVD** | | | | | | | | | |
| 14,796.00 | 86.30 | 178.40 | 10,021.63 | -5,241.18 | -37.70 | 5,241.18 | 0.00 | 0.00 | 0.00 |
| **PTB: 14796.00' MD, 10021.63' TVD** | | | | | | | | | |

**Design Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 9,998.14 | 9,850.45 | -454.69 | -41.73 | Sec. 31 330' HL Entry: 9998.14' MD, 9850.45' TVD |
| 14,630.84 | 10,010.56 | -5,076.47 | -42.69 | Sec. 31 330' HL Exit: 14630.84' MD, 10010.56' TVD |
| 14,752.00 | 10,018.79 | -5,197.29 | -38.93 | Last Survey: 14752.00' MD, 10018.79' TVD |
| 14,796.00 | 10,021.63 | -5,241.18 | -37.70 | PTB: 14796.00' MD, 10021.63' TVD |

Checked By: _____ Approved By: _____ Date: _____

# Radial Cement Bond Gamma Ray CCL Log

Company Mcelvain Energy Inc.
Well EK 31 BS2 Federal Com #1H
Field EK Bone Spring
County Lea State New Mexico

Location: API # :

230' FNL & 660 FEL
Section 31

SEC TWP RGE

Other Services

Elevation

Permanent Datum Ground Level Elevation 3894'
Log Measured From KB 25' APD
Drilling Measured From KB

K.B. 3919'
D.F. 3918'
G.L. 3894'

| | | | |
|---|---|---|---|
| Date | 11/15/2017 | | |
| Run Number | One | | |
| Depth Driller | 14796' | | |
| Depth Logger | 10020' | | |
| Bottom Logged Interval | 10019' | | |
| Top Log Interval | 1800' | | |
| Open Hole Size | 7 5/8" | | |
| Type Fluid | Water | | |
| Density / Viscosity | - | | |
| Max. Recorded Temp. | - | | |
| Estimated Cement Top | | | |
| Time Well Ready | On Arrival | | |
| Time Logger on Bottom | See Log | | |
| Equipment Number | WL 821 | | |
| Location | Hobbs, New Mexico | | |
| Recorded By | R. Utajara | | |
| Witnessed By | Mr. Brian O Dell | | |

| Borehole Record | | | | Tubing Record | | | |
|---|---|---|---|---|---|---|---|
| Run Number | Bit | From | To | Size | Weight | From | To |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Casing Record | Size | Wgt/Ft | Top | Bottom |
|---|---|---|---|---|
| Surface String | 13 3/8" | 54.5# | Surface | 1820' |
| Prot. String | 9 5/8" | 40# | Surface | 4936' |
| Production String | 5 1/2" | 20# | Surface | 14776' |
| Liner | | | | |
| | | | Marker Joint | 9202'-9221' |

<<< Fold Here >>>



Comments

**********Thank you for using Capitan Corporation**********

Main Pass 5"=100'

| | | | | | | |
|---|---|---|---|---|---|---|
| S6 | -0.001 | 0.843 | 0.000 | 100.000 | 118.580 | 0.088 |
| S7 | -0.001 | 0.846 | 0.000 | 100.000 | 118.069 | 0.115 |
| S8 | -0.001 | 0.845 | 0.000 | 100.000 | 118.255 | 0.059 |

Internal Reference Calibration, performed Thu Sep 24 12:46:32 2015:

| | Raw (v) | | Calibrated (v) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| CAL | 0.000 | 0.000 | 0.877 | 0.876 | 1.000 | 0.000 |

Air Zero Calibration, performed Wed Nov 15 11:16:06 2017:

| | Raw (v) | Calibrated (v) | Results |
|---|---|---|---|
| | Zero | Zero | Offset |
| 3' | 0.000 | 0.000 | 0.000 |
| 5' | 0.000 | 0.000 | 0.000 |
| SUM | | | |
| S1 | 0.000 | 0.000 | 0.000 |
| S2 | 0.000 | 0.000 | 0.000 |
| S3 | 0.000 | 0.000 | 0.000 |
| S4 | 0.000 | 0.000 | 0.000 |
| S5 | 0.000 | 0.000 | 0.000 |
| S6 | 0.000 | 0.000 | 0.000 |
| S7 | 0.000 | 0.000 | 0.000 |
| S8 | 0.000 | 0.000 | 0.000 |

Temperature Calibration Report

Serial Number: FW1403-67
Tool Model: RBT-TEMP
Performed: Wed Jul 22 12:13:37 2015

| | Reference | | Reading | |
|---|---|---|---|---|
| Low Reference: | 0.00 | degF | 0.00 | degF |
| High Reference: | 1.00 | degF | 1.00 | degF |

Gain: 1.00
Offset: 0.00
Delta Spacing 5

| Sensor | Offset (ft) | Schematic | Description | Len (ft) | OD (in) | Wt (lb) |
|---|---|---|---|---|---|---|
| | |  | 1.4375CHD<br>Titan Cable Head 1 7/16 | 1.00 | 1.44 | 10.00 |
| TEMP | 11.12 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | RBT-RBT-TEMP (FW1403-67)<br>Probe 2.75" Radii Bond w/Temp Tool | 9.17 | 2.75 | 90.00 |
| WVF3FT | 8.97 | | | | |
| WVFCAL | 8.97 | | | | |
| WVFS1 | 8.97 | | | | |
| WVFS2 | 8.97 | | | | |
| WVFS3 | 8.97 | | | | |
| WVFS4 | 8.97 | | | | |
| WVFS5 | 8.97 | | | | |
| WVFS6 | 8.97 | | | | |
| WVFS7 | 8.97 | | | | |
| WVFS8 | 8.97 | | | | |
| WVF5FT | 7.97 | | | | |
| CCL | 3.88 | | | | |
| DCCL | 3.88 | | | | |
| GR | 2.54 | GR-Probe275dig (PROFW130211)<br>Probe Digital Gamma CCL | 4.78 | 2.75 | 57.00 |

| | |
|---|---|
| Dataset: | mcelvain_energy_ek_31_bs2_fed_com_1h.db: field/well/run1/pass7 |
| Total Length: | 14.95 ft |
| Total Weight: | 157.00 lb |
| O.D. | 2.75 in |

| | |
|---|---|
| Company | Mcelvain Energy Inc. |
| Well | EK 31 BS2 Federal Com #1H |
| Field | EK Bone Spring |
| County | Lea |
| State | New Mexico |

Capitan Corporation

Radial Cement Bond
Gamma Ray CCL
Log