



April 9, 2018

Devon Energy Production Company, LP  
Well: Thistle Unit 110H  
County/Parish: Lea County, NM

LEAM MWD: (OH) from 240' MD – 17,145' MD  
Projection; 17,203' MD

This Borehole Survey taken between 03/22/2018 and 04/05/2018 had been conducted and calculated according to the highest professional standards and complies with all known State and Federal requirements.

Reviewed and Approved:

Date: April 9, 2018



## Survey Certification Form

State of New Mexico

Lea County

I, Randy W. Rakowitz, certify that; I am employed by LEAM Drilling Services, that I did on the day(s) of 03/22/2018 through 04/05/2018, conduct or supervise the taking of MWD Survey from a depth of 240' MD to 17,203' MD; that the data is true, correct, complete and within the limitations of the tools as set forth by LEAM Drilling Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Devon Energy Production Company, LP for the Thistle Unit 110H in Lea County, New Mexico; and that I reviewed this report and find that it conforms to the principals and procedures as set forth by LEAM Drilling Services.

A handwritten signature in black ink, appearing to be 'Randy W. Rakowitz', is written over a horizontal line.

Randy W. Rakowitz  
MWD Operations Coordinator

# LEAM Drilling Services

## Survey Report

**Company:** Devon Energy  
**Project:** Lea County, NM (NAD-83)  
**Site:** Thistle Unit Sec 22-27 Trac Pad  
**Well:** Thistle Unit 110H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well Thistle Unit 110H  
**TVD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**MD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 MULTI User DB

**Project:** Lea County, NM (NAD-83)  
**Map System:** US State Plane 1983  
**Geo Datum:** North American Datum 1983  
**Map Zone:** New Mexico Eastern Zone

**System Datum:** Mean Sea Level

**Site:** Thistle Unit Sec 22-27 Trac Pad

**Site Position:** Northing: 472,548.43 usft Latitude: 32° 17' 48.4331 N  
**From:** Map Easting: 777,932.69 usft Longitude: 103° 34' 3.4563 W  
**Position Uncertainty:** 0.00 usft Slot Radius: 13-3/16 " Grid Convergence: 0.41 °

**Well:** Thistle Unit 110H

**Well Position:** +N-S 0.00 usft Northing: 472,469.06 usft Latitude: 32° 17' 47.5777 N  
 +E-W 0.00 usft Easting: 778,923.14 usft Longitude: 103° 33' 51.9242 W  
**Position Uncertainty:** 0.00 usft Wellhead Elevation: 0.00 usft Ground Level: 3,711.40 usft

**Wellbore:** OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|-----------|------------|-------------|-----------------|---------------|---------------------|
|           | HDGM       | 1/17/2018   | 6.82            | 60.07         | 48,121              |

**Design:** OH

**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        | 181.14        |

**Survey Program** Date: 4/9/2018

| From (usft) | To (usft) | Survey (Wellbore) | Tool Name     | Description     |
|-------------|-----------|-------------------|---------------|-----------------|
| 240.00      | 9,053.00  | Survey #1 (OH)    | LEAM MWD+HDGM | MWD+HDGM        |
| 9,152.00    | 17,145.00 | Survey #2 (OH)    | MWD+IFR1      | OWSG MWD + IFR1 |
| 17,203.00   | 17,203.00 | Survey #3 (OH)    | Project       | Projection      |

**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                  |
| 240.00                | 0.40            | 75.00       | 240.00                | 0.22        | 0.81        | -0.23                   | 0.17                    | 0.17                   | 0.00                  |
| 330.00                | 0.50            | 87.10       | 330.00                | 0.32        | 1.50        | -0.35                   | 0.15                    | 0.11                   | 13.44                 |
| 421.00                | 0.40            | 107.20      | 420.99                | 0.24        | 2.20        | -0.29                   | 0.20                    | -0.11                  | 22.09                 |
| 514.00                | 0.30            | 114.60      | 513.99                | 0.05        | 2.74        | -0.10                   | 0.12                    | -0.11                  | 7.96                  |
| 605.00                | 0.40            | 41.30       | 604.99                | 0.19        | 3.16        | -0.25                   | 0.47                    | 0.11                   | -80.55                |
| 697.00                | 0.40            | 54.60       | 696.99                | 0.61        | 3.64        | -0.69                   | 0.10                    | 0.00                   | 14.46                 |
| 788.00                | 0.40            | 48.10       | 787.99                | 1.01        | 4.13        | -1.09                   | 0.05                    | 0.00                   | -7.14                 |
| 879.00                | 0.50            | 45.30       | 878.98                | 1.50        | 4.65        | -1.59                   | 0.11                    | 0.11                   | -3.08                 |

# LEAM Drilling Services

## Survey Report

**Company:** Devon Energy  
**Project:** Lea County, NM (NAD-83)  
**Site:** Thistle Unit Sec 22-27 Trac Pad  
**Well:** Thistle Unit 110H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well Thistle Unit 110H  
**TVD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**MD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 MULTI 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 970.00                | 0.80            | 71.50       | 969.98                | 1.98         | 5.54         | -2.09                   | 0.46                    | 0.33                   | 28.79                 |
| 1,061.00              | 0.50            | 60.80       | 1,060.97              | 2.38         | 6.48         | -2.51                   | 0.35                    | -0.33                  | -11.76                |
| 1,152.00              | 0.50            | 59.70       | 1,151.97              | 2.77         | 7.17         | -2.91                   | 0.01                    | 0.00                   | -1.21                 |
| 1,242.00              | 0.70            | 36.30       | 1,241.96              | 3.41         | 7.84         | -3.57                   | 0.35                    | 0.22                   | -26.00                |
| 1,334.00              | 0.90            | 40.40       | 1,333.95              | 4.42         | 8.64         | -4.59                   | 0.23                    | 0.22                   | 4.46                  |
| 1,424.00              | 0.70            | 30.90       | 1,423.94              | 5.43         | 9.38         | -5.61                   | 0.27                    | -0.22                  | -10.56                |
| 1,516.00              | 0.50            | 76.20       | 1,515.94              | 6.00         | 10.06        | -6.20                   | 0.54                    | -0.22                  | 49.24                 |
| 1,611.00              | 0.50            | 353.60      | 1,610.94              | 6.51         | 10.41        | -6.72                   | 0.69                    | 0.00                   | -86.95                |
| 1,707.00              | 0.80            | 11.90       | 1,706.93              | 7.59         | 10.51        | -7.79                   | 0.38                    | 0.31                   | 19.06                 |
| 1,801.00              | 0.80            | 21.90       | 1,800.92              | 8.84         | 10.89        | -9.05                   | 0.15                    | 0.00                   | 10.64                 |
| 1,896.00              | 0.70            | 346.60      | 1,895.91              | 10.02        | 11.00        | -10.23                  | 0.49                    | -0.11                  | -37.16                |
| 1,992.00              | 0.70            | 325.30      | 1,991.91              | 11.07        | 10.53        | -11.28                  | 0.27                    | 0.00                   | -22.19                |
| 2,086.00              | 0.50            | 294.20      | 2,085.90              | 11.71        | 9.83         | -11.90                  | 0.40                    | -0.21                  | -33.09                |
| 2,182.00              | 0.20            | 299.00      | 2,181.90              | 11.96        | 9.30         | -12.15                  | 0.31                    | -0.31                  | 5.00                  |
| 2,277.00              | 0.60            | 331.00      | 2,276.90              | 12.48        | 8.91         | -12.65                  | 0.47                    | 0.42                   | 33.68                 |
| 2,373.00              | 0.10            | 54.10       | 2,372.90              | 12.97        | 8.74         | -13.14                  | 0.62                    | -0.52                  | 86.56                 |
| 2,468.00              | 0.60            | 279.10      | 2,467.89              | 13.09        | 8.31         | -13.26                  | 0.71                    | 0.53                   | -142.11               |
| 2,562.00              | 0.20            | 237.10      | 2,561.89              | 13.08        | 7.69         | -13.23                  | 0.50                    | -0.43                  | -44.68                |
| 2,658.00              | 0.50            | 274.00      | 2,657.89              | 13.02        | 7.13         | -13.16                  | 0.38                    | 0.31                   | 38.44                 |
| 2,753.00              | 0.40            | 253.40      | 2,752.89              | 12.96        | 6.40         | -13.08                  | 0.20                    | -0.11                  | -21.68                |
| 2,848.00              | 0.30            | 54.40       | 2,847.89              | 13.01        | 6.28         | -13.13                  | 0.73                    | -0.11                  | 169.47                |
| 2,944.00              | 0.40            | 144.80      | 2,943.89              | 12.88        | 6.58         | -13.01                  | 0.52                    | 0.10                   | 94.17                 |
| 3,040.00              | 0.30            | 165.50      | 3,039.88              | 12.36        | 6.94         | -12.50                  | 0.17                    | -0.10                  | 21.56                 |
| 3,135.00              | 0.40            | 294.40      | 3,134.88              | 12.26        | 6.70         | -12.39                  | 0.67                    | 0.11                   | 135.68                |
| 3,231.00              | 0.30            | 138.10      | 3,230.88              | 12.21        | 6.56         | -12.34                  | 0.71                    | -0.10                  | -162.81               |
| 3,327.00              | 0.30            | 263.50      | 3,326.88              | 11.99        | 6.48         | -12.12                  | 0.56                    | 0.00                   | 130.63                |
| 3,422.00              | 0.40            | 192.80      | 3,421.88              | 11.64        | 6.16         | -11.76                  | 0.43                    | 0.11                   | -74.42                |
| 3,518.00              | 0.40            | 327.10      | 3,517.88              | 11.60        | 5.90         | -11.71                  | 0.77                    | 0.00                   | 139.90                |
| 3,614.00              | 1.40            | 315.10      | 3,613.87              | 12.71        | 4.89         | -12.80                  | 1.05                    | 1.04                   | -12.50                |
| 3,709.00              | 2.20            | 319.70      | 3,708.82              | 14.92        | 2.89         | -14.98                  | 0.86                    | 0.84                   | 4.84                  |
| 3,805.00              | 3.20            | 317.20      | 3,804.71              | 18.29        | -0.12        | -18.29                  | 1.05                    | 1.04                   | -2.60                 |
| 3,900.00              | 3.60            | 313.20      | 3,899.54              | 22.28        | -4.09        | -22.19                  | 0.49                    | 0.42                   | -4.21                 |
| 3,996.00              | 4.70            | 310.00      | 3,995.29              | 26.87        | -9.30        | -26.68                  | 1.17                    | 1.15                   | -3.33                 |
| 4,091.00              | 5.70            | 312.70      | 4,089.90              | 32.57        | -15.75       | -32.25                  | 1.08                    | 1.05                   | 2.84                  |
| 4,187.00              | 5.50            | 311.80      | 4,185.44              | 38.87        | -22.69       | -38.41                  | 0.23                    | -0.21                  | -0.94                 |
| 4,283.00              | 4.80            | 311.60      | 4,281.05              | 44.60        | -29.12       | -44.02                  | 0.73                    | -0.73                  | -0.21                 |
| 4,378.00              | 4.40            | 313.00      | 4,375.75              | 49.73        | -34.76       | -49.03                  | 0.44                    | -0.42                  | 1.47                  |
| 4,474.00              | 5.00            | 313.90      | 4,471.42              | 55.14        | -40.47       | -54.33                  | 0.63                    | 0.63                   | 0.94                  |
| 4,569.00              | 6.20            | 307.90      | 4,565.97              | 61.16        | -47.50       | -60.21                  | 1.40                    | 1.26                   | -6.32                 |
| 4,665.00              | 6.10            | 307.90      | 4,661.42              | 67.48        | -55.61       | -66.36                  | 0.10                    | -0.10                  | 0.00                  |
| 4,760.00              | 5.20            | 305.60      | 4,755.95              | 73.09        | -63.10       | -71.82                  | 0.98                    | -0.95                  | -2.42                 |
| 4,856.00              | 4.20            | 308.10      | 4,851.63              | 77.79        | -69.40       | -76.39                  | 1.06                    | -1.04                  | 2.60                  |
| 4,952.00              | 4.70            | 308.10      | 4,947.34              | 82.39        | -75.26       | -80.87                  | 0.52                    | 0.52                   | 0.00                  |

# LEAM Drilling Services

## Survey Report

Company: Devon Energy  
Project: Lea County, NM (NAD-83)  
Site: Thistle Unit Sec 22-27 Trac Pad  
Well: Thistle Unit 110H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well Thistle Unit 110H  
TVD Reference: 3711.4' GE + 23.5' KB @ 3734.90usft  
MD Reference: 3711.4' GE + 23.5' KB @ 3734.90usft  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM 5000.1 MULTI 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 5,047.00              | 4.90            | 312.30      | 5,042.01              | 87.52        | -81.32       | -85.88                  | 0.43                    | 0.21                   | 4.42                  |
| 5,143.00              | 5.60            | 312.50      | 5,137.60              | 93.44        | -87.81       | -91.68                  | 0.73                    | 0.73                   | 0.21                  |
| 5,238.00              | 5.40            | 312.50      | 5,232.17              | 99.59        | -94.52       | -97.69                  | 0.21                    | -0.21                  | 0.00                  |
| 5,433.00              | 4.90            | 309.30      | 5,426.38              | 111.07       | -107.73      | -108.90                 | 0.30                    | -0.26                  | -1.64                 |
| 5,527.00              | 4.80            | 309.90      | 5,520.04              | 116.13       | -113.86      | -113.84                 | 0.12                    | -0.11                  | 0.64                  |
| 5,623.00              | 4.70            | 305.50      | 5,615.71              | 120.99       | -120.14      | -118.58                 | 0.39                    | -0.10                  | -4.58                 |
| 5,718.00              | 5.00            | 306.30      | 5,710.37              | 125.70       | -126.65      | -123.16                 | 0.32                    | 0.32                   | 0.84                  |
| 5,813.00              | 5.40            | 309.70      | 5,804.98              | 131.01       | -133.42      | -128.33                 | 0.53                    | 0.42                   | 3.58                  |
| 5,909.00              | 5.00            | 308.60      | 5,900.59              | 136.51       | -140.17      | -133.69                 | 0.43                    | -0.42                  | -1.15                 |
| 6,004.00              | 5.30            | 309.20      | 5,995.20              | 141.86       | -146.80      | -138.91                 | 0.32                    | 0.32                   | 0.63                  |
| 6,099.00              | 6.10            | 310.70      | 6,089.73              | 147.93       | -154.03      | -144.83                 | 0.86                    | 0.84                   | 1.58                  |
| 6,195.00              | 6.40            | 313.20      | 6,185.16              | 154.92       | -161.80      | -151.67                 | 0.42                    | 0.31                   | 2.60                  |
| 6,290.00              | 6.20            | 312.00      | 6,279.59              | 161.97       | -169.47      | -158.57                 | 0.25                    | -0.21                  | -1.26                 |
| 6,385.00              | 5.60            | 304.60      | 6,374.09              | 168.04       | -177.10      | -164.48                 | 1.02                    | -0.63                  | -7.79                 |
| 6,481.00              | 4.80            | 295.80      | 6,469.69              | 172.45       | -184.57      | -168.74                 | 1.17                    | -0.83                  | -9.17                 |
| 6,574.00              | 4.10            | 293.70      | 6,562.41              | 175.48       | -191.12      | -171.64                 | 0.77                    | -0.75                  | -2.26                 |
| 6,670.00              | 3.70            | 289.80      | 6,658.19              | 177.90       | -197.17      | -173.95                 | 0.50                    | -0.42                  | -4.06                 |
| 6,765.00              | 2.40            | 286.10      | 6,753.05              | 179.49       | -201.97      | -175.44                 | 1.38                    | -1.37                  | -3.89                 |
| 6,861.00              | 1.10            | 300.70      | 6,849.01              | 180.52       | -204.69      | -176.41                 | 1.42                    | -1.35                  | 15.21                 |
| 6,956.00              | 0.80            | 310.90      | 6,943.99              | 181.31       | -205.85      | -177.18                 | 0.55                    | -0.53                  | 10.74                 |
| 7,051.00              | 0.70            | 310.00      | 7,038.99              | 182.01       | -206.67      | -177.86                 | 0.11                    | 0.11                   | -0.95                 |
| 7,146.00              | 0.50            | 307.90      | 7,133.98              | 182.64       | -207.44      | -178.48                 | 0.21                    | -0.21                  | -2.21                 |
| 7,241.00              | 0.40            | 321.50      | 7,228.98              | 183.15       | -207.98      | -178.98                 | 0.15                    | -0.11                  | 14.32                 |
| 7,337.00              | 0.30            | 317.80      | 7,324.98              | 183.60       | -208.35      | -179.42                 | 0.11                    | -0.10                  | -3.85                 |
| 7,432.00              | 0.40            | 0.30        | 7,419.98              | 184.12       | -208.52      | -179.93                 | 0.28                    | 0.11                   | 44.74                 |
| 7,528.00              | 0.40            | 49.40       | 7,515.98              | 184.67       | -208.26      | -180.49                 | 0.35                    | 0.00                   | 51.15                 |
| 7,623.00              | 0.60            | 85.40       | 7,610.97              | 184.93       | -207.52      | -180.76                 | 0.38                    | 0.21                   | 37.89                 |
| 7,718.00              | 0.50            | 120.40      | 7,705.97              | 184.76       | -206.66      | -180.61                 | 0.36                    | -0.11                  | 36.84                 |
| 7,813.00              | 0.40            | 106.00      | 7,800.96              | 184.46       | -205.99      | -180.32                 | 0.16                    | -0.11                  | -15.16                |
| 7,908.00              | 0.40            | 122.80      | 7,895.96              | 184.18       | -205.39      | -180.06                 | 0.12                    | 0.00                   | 17.68                 |
| 8,004.00              | 0.50            | 141.30      | 7,991.96              | 183.68       | -204.85      | -179.56                 | 0.18                    | 0.10                   | 19.27                 |
| 8,099.00              | 0.50            | 176.10      | 8,086.96              | 182.94       | -204.56      | -178.83                 | 0.31                    | 0.00                   | 36.63                 |
| 8,195.00              | 1.00            | 215.10      | 8,182.95              | 181.84       | -205.01      | -177.72                 | 0.72                    | 0.52                   | 40.63                 |
| 8,291.00              | 1.10            | 213.70      | 8,278.93              | 180.38       | -206.00      | -176.25                 | 0.11                    | 0.10                   | -1.46                 |
| 8,386.00              | 1.40            | 204.90      | 8,373.91              | 178.57       | -207.00      | -174.42                 | 0.37                    | 0.32                   | -9.26                 |
| 8,482.00              | 1.10            | 231.80      | 8,469.89              | 176.94       | -208.22      | -172.76                 | 0.68                    | -0.31                  | 28.02                 |
| 8,577.00              | 1.30            | 298.40      | 8,564.87              | 176.89       | -209.88      | -172.68                 | 1.40                    | 0.21                   | 70.11                 |
| 8,672.00              | 1.50            | 287.40      | 8,659.84              | 177.77       | -212.02      | -173.52                 | 0.35                    | 0.21                   | -11.58                |
| 8,768.00              | 0.90            | 338.30      | 8,755.82              | 178.85       | -213.49      | -174.57                 | 1.21                    | -0.63                  | 53.02                 |
| 8,864.00              | 0.90            | 323.70      | 8,851.81              | 180.16       | -214.22      | -175.86                 | 0.24                    | 0.00                   | -15.21                |
| 8,959.00              | 0.90            | 307.40      | 8,946.80              | 181.21       | -215.25      | -176.89                 | 0.27                    | 0.00                   | -17.16                |
| 9,053.00              | 0.80            | 279.80      | 9,040.79              | 181.77       | -216.49      | -177.43                 | 0.44                    | -0.11                  | -29.36                |
| 9,152.00              | 4.70            | 171.00      | 9,139.68              | 177.88       | -216.53      | -173.54                 | 5.07                    | 3.94                   | -109.90               |

# LEAM Drilling Services

## Survey Report

Company: Devon Energy  
Project: Lea County, NM (NAD-83)  
Site: Thistle Unit Sec 22-27 Trac Pad  
Well: Thistle Unit 110H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well Thistle Unit 110H  
TVD Reference: 3711.4' GE + 23.5' KB @ 3734.90usft  
MD Reference: 3711.4' GE + 23.5' KB @ 3734.90usft  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM 5000.1 MULTI User DB

### Survey

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 9,199.00                    | 10.70              | 178.20         | 9,186.24                    | 171.61          | -216.09         | -167.28                       | 12.91                         | 12.77                        | 15.32                       |
| 9,246.00                    | 15.70              | 179.10         | 9,231.98                    | 160.89          | -215.86         | -156.56                       | 10.65                         | 10.64                        | 1.91                        |
| 9,294.00                    | 20.00              | 179.30         | 9,277.66                    | 146.18          | -215.65         | -141.86                       | 8.96                          | 8.96                         | 0.42                        |
| 9,342.00                    | 23.50              | 179.60         | 9,322.24                    | 128.39          | -215.49         | -124.08                       | 7.30                          | 7.29                         | 0.63                        |
| 9,390.00                    | 27.90              | 179.80         | 9,365.48                    | 107.58          | -215.38         | -103.28                       | 9.17                          | 9.17                         | 0.42                        |
| 9,437.00                    | 31.20              | 179.10         | 9,406.36                    | 84.41           | -215.15         | -80.11                        | 7.06                          | 7.02                         | -1.49                       |
| 9,485.00                    | 36.40              | 179.30         | 9,446.23                    | 57.72           | -214.78         | -53.43                        | 10.84                         | 10.83                        | 0.42                        |
| 9,532.00                    | 41.20              | 179.60         | 9,482.85                    | 28.28           | -214.50         | -24.00                        | 10.22                         | 10.21                        | 0.64                        |
| 9,580.00                    | 46.70              | 180.30         | 9,517.39                    | -5.02           | -214.49         | 9.29                          | 11.50                         | 11.46                        | 1.46                        |
| 9,628.00                    | 51.40              | 181.00         | 9,548.84                    | -41.26          | -214.90         | 45.53                         | 9.85                          | 9.79                         | 1.46                        |
| 9,676.00                    | 55.80              | 180.50         | 9,577.32                    | -79.88          | -215.40         | 84.15                         | 9.20                          | 9.17                         | -1.04                       |
| 9,723.00                    | 60.50              | 178.50         | 9,602.12                    | -119.79         | -215.04         | 124.05                        | 10.63                         | 10.00                        | -4.26                       |
| 9,771.00                    | 64.80              | 177.30         | 9,624.17                    | -162.39         | -213.47         | 166.60                        | 9.23                          | 8.96                         | -2.50                       |
| 9,819.00                    | 69.60              | 178.00         | 9,642.76                    | -206.59         | -211.66         | 210.76                        | 10.09                         | 10.00                        | 1.46                        |
| 9,867.00                    | 73.80              | 179.40         | 9,657.83                    | -252.13         | -210.63         | 256.28                        | 9.18                          | 8.75                         | 2.92                        |
| 9,915.00                    | 76.00              | 179.40         | 9,670.33                    | -298.47         | -210.15         | 302.59                        | 4.58                          | 4.58                         | 0.00                        |
| 9,962.00                    | 78.40              | 179.40         | 9,680.75                    | -344.30         | -209.67         | 348.40                        | 5.11                          | 5.11                         | 0.00                        |
| 10,010.00                   | 82.80              | 180.30         | 9,688.58                    | -391.64         | -209.55         | 395.73                        | 9.35                          | 9.17                         | 1.88                        |
| 10,130.00                   | 87.40              | 180.00         | 9,698.83                    | -511.17         | -209.86         | 515.24                        | 3.84                          | 3.83                         | -0.25                       |
| 10,226.00                   | 89.60              | 178.90         | 9,701.34                    | -607.13         | -208.94         | 611.16                        | 2.56                          | 2.29                         | -1.15                       |
| 10,321.00                   | 89.30              | 178.40         | 9,702.26                    | -702.09         | -206.70         | 706.07                        | 0.61                          | -0.32                        | -0.53                       |
| 10,416.00                   | 88.70              | 178.20         | 9,703.91                    | -797.04         | -203.88         | 800.94                        | 0.67                          | -0.63                        | -0.21                       |
| 10,512.00                   | 91.10              | 179.10         | 9,704.08                    | -893.00         | -201.62         | 896.84                        | 2.67                          | 2.50                         | 0.94                        |
| 10,607.00                   | 90.90              | 179.10         | 9,702.42                    | -987.98         | -200.13         | 991.76                        | 0.21                          | -0.21                        | 0.00                        |
| 10,702.00                   | 90.40              | 179.60         | 9,701.35                    | -1,082.96       | -199.05         | 1,086.71                      | 0.74                          | -0.53                        | 0.53                        |
| 10,798.00                   | 90.00              | 179.80         | 9,701.01                    | -1,178.96       | -198.55         | 1,182.68                      | 0.47                          | -0.42                        | 0.21                        |
| 10,893.00                   | 89.80              | 180.70         | 9,701.18                    | -1,273.96       | -198.96         | 1,277.67                      | 0.97                          | -0.21                        | 0.95                        |
| 10,989.00                   | 88.50              | 180.80         | 9,702.60                    | -1,369.94       | -200.22         | 1,373.65                      | 1.36                          | -1.35                        | 0.10                        |
| 11,084.00                   | 89.40              | 181.50         | 9,704.34                    | -1,464.90       | -202.12         | 1,468.63                      | 1.20                          | 0.95                         | 0.74                        |
| 11,180.00                   | 90.00              | 181.00         | 9,704.84                    | -1,560.88       | -204.22         | 1,564.63                      | 0.81                          | 0.63                         | -0.52                       |
| 11,275.00                   | 91.10              | 179.30         | 9,703.93                    | -1,655.87       | -204.47         | 1,659.61                      | 2.13                          | 1.16                         | -1.79                       |
| 11,371.00                   | 91.40              | 178.90         | 9,701.84                    | -1,751.83       | -202.96         | 1,755.52                      | 0.52                          | 0.31                         | -0.42                       |
| 11,466.00                   | 91.50              | 178.40         | 9,699.43                    | -1,846.78       | -200.72         | 1,850.40                      | 0.54                          | 0.11                         | -0.53                       |
| 11,561.00                   | 90.80              | 178.50         | 9,697.53                    | -1,941.72       | -198.15         | 1,945.28                      | 0.74                          | -0.74                        | 0.11                        |
| 11,657.00                   | 90.20              | 178.70         | 9,696.69                    | -2,037.69       | -195.81         | 2,041.18                      | 0.66                          | -0.63                        | 0.21                        |
| 11,753.00                   | 90.00              | 178.90         | 9,696.52                    | -2,133.67       | -193.80         | 2,137.10                      | 0.29                          | -0.21                        | 0.21                        |
| 11,848.00                   | 89.30              | 180.00         | 9,697.10                    | -2,228.66       | -192.88         | 2,232.06                      | 1.37                          | -0.74                        | 1.16                        |
| 11,944.00                   | 90.60              | 178.50         | 9,697.19                    | -2,324.65       | -191.63         | 2,328.00                      | 2.07                          | 1.35                         | -1.56                       |
| 12,039.00                   | 90.70              | 178.90         | 9,696.11                    | -2,419.61       | -189.47         | 2,422.91                      | 0.43                          | 0.11                         | 0.42                        |
| 12,135.00                   | 90.30              | 179.60         | 9,695.27                    | -2,515.60       | -188.22         | 2,518.85                      | 0.84                          | -0.42                        | 0.73                        |
| 12,231.00                   | 90.40              | 180.00         | 9,694.68                    | -2,611.60       | -187.88         | 2,614.82                      | 0.43                          | 0.10                         | 0.42                        |
| 12,326.00                   | 89.50              | 179.60         | 9,694.77                    | -2,706.60       | -187.55         | 2,709.79                      | 1.04                          | -0.95                        | -0.42                       |
| 12,422.00                   | 90.40              | 180.10         | 9,694.85                    | -2,802.60       | -187.30         | 2,805.77                      | 1.07                          | 0.94                         | 0.52                        |
| 12,517.00                   | 89.80              | 180.00         | 9,694.69                    | -2,897.60       | -187.38         | 2,900.75                      | 0.64                          | -0.63                        | -0.11                       |

# LEAM Drilling Services

## Survey Report

**Company:** Devon Energy  
**Project:** Lea County, NM (NAD-83)  
**Site:** Thistle Unit Sec 22-27 Trac Pad  
**Well:** Thistle Unit 110H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well Thistle Unit 110H  
**TVD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**MD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 MULTI 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 12,613.00             | 91.00           | 180.10      | 9,694.02              | -2,993.59    | -187.46      | 2,996.73                | 1.25                    | 1.25                   | 0.10                  |
| 12,708.00             | 91.90           | 180.30      | 9,691.61              | -3,088.56    | -187.80      | 3,091.68                | 0.97                    | 0.95                   | 0.21                  |
| 12,804.00             | 92.20           | 179.60      | 9,688.18              | -3,184.50    | -187.71      | 3,187.60                | 0.79                    | 0.31                   | -0.73                 |
| 12,899.00             | 90.10           | 180.70      | 9,686.27              | -3,279.47    | -187.96      | 3,282.56                | 2.50                    | -2.21                  | 1.16                  |
| 12,994.00             | 89.60           | 179.60      | 9,686.52              | -3,374.47    | -188.21      | 3,377.55                | 1.27                    | -0.53                  | -1.16                 |
| 13,090.00             | 89.20           | 179.30      | 9,687.52              | -3,470.46    | -187.29      | 3,473.50                | 0.52                    | -0.42                  | -0.31                 |
| 13,185.00             | 88.50           | 179.60      | 9,689.43              | -3,565.43    | -186.38      | 3,568.44                | 0.80                    | -0.74                  | 0.32                  |
| 13,281.00             | 89.90           | 180.00      | 9,690.77              | -3,661.42    | -186.04      | 3,664.40                | 1.52                    | 1.46                   | 0.42                  |
| 13,377.00             | 89.30           | 178.90      | 9,691.44              | -3,757.41    | -185.12      | 3,760.35                | 1.31                    | -0.63                  | -1.15                 |
| 13,473.00             | 89.10           | 178.90      | 9,692.78              | -3,853.39    | -183.28      | 3,856.27                | 0.21                    | -0.21                  | 0.00                  |
| 13,568.00             | 89.10           | 178.90      | 9,694.27              | -3,948.36    | -181.45      | 3,951.19                | 0.00                    | 0.00                   | 0.00                  |
| 13,664.00             | 88.40           | 179.30      | 9,696.37              | -4,044.32    | -179.95      | 4,047.10                | 0.84                    | -0.73                  | 0.42                  |
| 13,759.00             | 90.20           | 179.30      | 9,697.53              | -4,139.30    | -178.79      | 4,142.04                | 1.89                    | 1.89                   | 0.00                  |
| 13,855.00             | 89.70           | 178.00      | 9,697.61              | -4,235.27    | -176.52      | 4,237.95                | 1.45                    | -0.52                  | -1.35                 |
| 13,950.00             | 89.70           | 177.80      | 9,698.11              | -4,330.21    | -173.04      | 4,332.79                | 0.21                    | 0.00                   | -0.21                 |
| 14,045.00             | 90.70           | 178.70      | 9,697.78              | -4,425.16    | -170.14      | 4,427.67                | 1.42                    | 1.05                   | 0.95                  |
| 14,141.00             | 90.00           | 177.80      | 9,697.19              | -4,521.11    | -167.21      | 4,523.55                | 1.19                    | -0.73                  | -0.94                 |
| 14,236.00             | 90.00           | 178.00      | 9,697.19              | -4,616.05    | -163.73      | 4,618.39                | 0.21                    | 0.00                   | 0.21                  |
| 14,331.00             | 89.00           | 178.90      | 9,698.02              | -4,711.01    | -161.16      | 4,713.28                | 1.42                    | -1.05                  | 0.95                  |
| 14,426.00             | 89.50           | 178.40      | 9,699.27              | -4,805.97    | -158.92      | 4,808.18                | 0.74                    | 0.53                   | -0.53                 |
| 14,522.00             | 91.10           | 182.20      | 9,698.76              | -4,901.95    | -159.42      | 4,904.15                | 4.29                    | 1.67                   | 3.96                  |
| 14,617.00             | 90.70           | 181.90      | 9,697.27              | -4,996.88    | -162.82      | 4,999.13                | 0.53                    | -0.42                  | -0.32                 |
| 14,711.00             | 89.80           | 181.20      | 9,696.86              | -5,090.84    | -165.36      | 5,093.12                | 1.21                    | -0.96                  | -0.74                 |
| 14,807.00             | 89.60           | 181.70      | 9,697.36              | -5,186.81    | -167.79      | 5,189.12                | 0.56                    | -0.21                  | 0.52                  |
| 14,902.00             | 90.90           | 181.50      | 9,696.95              | -5,281.77    | -170.45      | 5,284.11                | 1.38                    | 1.37                   | -0.21                 |
| 14,998.00             | 91.50           | 179.60      | 9,694.94              | -5,377.74    | -171.37      | 5,380.08                | 2.08                    | 0.63                   | -1.98                 |
| 15,092.00             | 91.10           | 177.80      | 9,692.80              | -5,471.69    | -169.24      | 5,473.97                | 1.96                    | -0.43                  | -1.91                 |
| 15,187.00             | 87.90           | 178.40      | 9,693.63              | -5,566.62    | -166.09      | 5,568.82                | 3.43                    | -3.37                  | 0.63                  |
| 15,282.00             | 86.80           | 177.30      | 9,698.03              | -5,661.45    | -162.53      | 5,663.56                | 1.64                    | -1.16                  | -1.16                 |
| 15,376.00             | 88.80           | 178.40      | 9,701.63              | -5,755.30    | -159.00      | 5,757.33                | 2.43                    | 2.13                   | 1.17                  |
| 15,471.00             | 88.90           | 178.70      | 9,703.54              | -5,850.25    | -156.60      | 5,852.21                | 0.33                    | 0.11                   | 0.32                  |
| 15,566.00             | 88.40           | 176.80      | 9,705.78              | -5,945.15    | -152.87      | 5,947.02                | 2.07                    | -0.53                  | -2.00                 |
| 15,662.00             | 86.00           | 178.20      | 9,710.47              | -6,040.94    | -148.69      | 6,042.70                | 2.89                    | -2.50                  | 1.46                  |
| 15,757.00             | 85.10           | 179.60      | 9,717.84              | -6,135.63    | -146.87      | 6,137.34                | 1.75                    | -0.95                  | 1.47                  |
| 15,853.00             | 86.90           | 179.80      | 9,724.54              | -6,231.39    | -146.37      | 6,233.07                | 1.89                    | 1.88                   | 0.21                  |
| 15,948.00             | 87.10           | 181.40      | 9,729.51              | -6,326.25    | -147.36      | 6,327.93                | 1.70                    | 0.21                   | 1.68                  |
| 16,044.00             | 90.20           | 181.40      | 9,731.77              | -6,422.18    | -149.71      | 6,423.89                | 3.23                    | 3.23                   | 0.00                  |
| 16,139.00             | 90.20           | 181.20      | 9,731.44              | -6,517.16    | -151.86      | 6,518.89                | 0.21                    | 0.00                   | -0.21                 |
| 16,235.00             | 90.70           | 180.70      | 9,730.68              | -6,613.14    | -153.45      | 6,614.89                | 0.74                    | 0.52                   | -0.52                 |
| 16,331.00             | 90.40           | 180.80      | 9,729.76              | -6,709.13    | -154.71      | 6,710.88                | 0.33                    | -0.31                  | 0.10                  |
| 16,426.00             | 90.90           | 180.10      | 9,728.69              | -6,804.12    | -155.46      | 6,805.87                | 0.91                    | 0.53                   | -0.74                 |
| 16,521.00             | 91.90           | 180.00      | 9,726.36              | -6,899.09    | -155.54      | 6,900.82                | 1.06                    | 1.05                   | -0.11                 |
| 16,617.00             | 91.50           | 180.10      | 9,723.52              | -6,995.05    | -155.62      | 6,996.76                | 0.43                    | -0.42                  | 0.10                  |

# LEAM Drilling Services

## Survey Report

**Company:** Devon Energy  
**Project:** Lea County, NM (NAD-83)  
**Site:** Thistle Unit Sec 22-27 Trac Pad  
**Well:** Thistle Unit 110H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well Thistle Unit 110H  
**TVD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**MD Reference:** 3711.4' GE + 23.5' KB @ 3734.90usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 MULTI User DB

### Survey

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N-S<br>(usft) | +E-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------|--------------------|----------------|-----------------------------|----------------|----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 16,713.00                   | 90.70              | 180.00         | 9,721.67                    | -7,091.03      | -155.71        | 7,092.72                      | 0.84                          | -0.83                        | -0.10                       |
| 16,808.00                   | 86.50              | 178.90         | 9,723.99                    | -7,185.97      | -154.80        | 7,187.63                      | 4.57                          | -4.42                        | -1.16                       |
| 16,904.00                   | 85.60              | 177.80         | 9,730.61                    | -7,281.70      | -152.04        | 7,283.29                      | 1.48                          | -0.94                        | -1.15                       |
| 17,000.00                   | 88.80              | 178.20         | 9,735.30                    | -7,377.52      | -148.69        | 7,379.02                      | 3.36                          | 3.33                         | 0.42                        |
| 17,095.00                   | 90.10              | 178.50         | 9,736.21                    | -7,472.47      | -145.96        | 7,473.90                      | 1.40                          | 1.37                         | 0.32                        |
| 17,145.00                   | 89.90              | 178.40         | 9,736.21                    | -7,522.45      | -144.61        | 7,523.84                      | 0.45                          | -0.40                        | -0.20                       |
| 17,203.00                   | 89.90              | 178.40         | 9,736.31                    | -7,580.43      | -142.99        | 7,581.77                      | 0.00                          | 0.00                         | 0.00                        |
| Projection                  |                    |                |                             |                |                |                               |                               |                              |                             |