



An Operating Unit of Smith International, Inc.

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## ***DIRECTIONAL SURVEY REPORT***

30-025-29780

**MACK ENERGY**

***CHERRY STATE #1H – ST1***

***LEA COUNTY, NEW MEXICO***

**PREPARED BY: FRANCISCO SINISTERRA**

Pathfinder Energy Services, Inc.  
6213 W. Interstate 20 • Midland, TX • 79706  
(432) 681-6000

Pathfinder

6213 W. Interstate 20  
Midland, Texas. 79706  
Tel. 432.687.1647  
Fax 432.687.1544



DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:  
A) JOHN OVERTON
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 12-07-10 TO 01-01-11
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: LEA COUNTY, NM
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

MACK ENERGY  
CHERRY STATE #1H – ST1  
LEA COUNTY, NM  
RIG: SILVER OAK 7

9. SURVEY CERTIFIED FROM: 8909 TO 13874 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 4275.09 FEET ON A BEARING OF 89.96 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 13930 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

  
\_\_\_\_\_  
FRANCISCO SINISTERRA  
M/LWD SERVICE COORDINATOR

# PathFinder Energy Services, Inc.

## BHL Report

Page 01/01  
Tie-in Date: 12/07/2010  
Date Completed: 01/01/2011

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
Rig:SILVEROAK 7  
PathFinder Office Supervisor: FRANCISCO SINISTERRA  
PathFinder Field Engineers:JOHN OVERTON  
DAVID BAKER  
DEREK BOYD

Survey Horiz. Reference:WELLHEAD  
Ref Coordinates: LAT:32.56.16.4184 N LON:103.46.38.7840 W  
GRID Reference:NAD27 new mexico east Transverse Mercator  
Ref GRID Coord: X: 670547.9900 Y: 705367.6800  
North Aligned To:GRID NORTH  
Total Magnetic Correction: 7.50° EAST TO GRID  
Vertical Section Plane: 89.85  
Survey Vert. Reference: 19.00' Kelly Bushing To Ground  
Altitude:4346.00' Ground To MSL

|                       |                |             |
|-----------------------|----------------|-------------|
| Measured Depth        | 13930.00       | (feet)      |
| Inclination           | 93.53          | (deg)       |
| Azimuth               | 90.30          | (deg)       |
| True Vertical Depth   | 9874.07        | (feet)      |
| Vertical Section      | 4275.08        | (feet)      |
| Survey X cord         | 674823.08      | (feet)      |
| Survey Y cord         | 705370.62      | (feet)      |
| Survey Lat            | 32.93783930 N  | (deg)       |
| Survey Lon            | 103.76350610 W | (deg)       |
| Rectangular Corr. N/S | 2.94 N         | (feet)      |
| Rectangular Corr. E/W | 4275.09 E      | (feet)      |
| Closure Distance      | 4275.09        | (feet)      |
| Direction of Closure  | 89.96          | (deg)       |
| Dogleg Severity       | 0.00           | (deg/100ft) |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
Rig:SILVEROAK 7

PathFinder Office Supervisor: FRANCISCO SINISTERRA  
PathFinder Field Engineers: JOHN OVERTON

JEFF HULL  
DAVE PHILLIPS

DAVID BAKER  
DEREK BOYD

Survey Calculations by RX5 V6.03C using Minimum Curvature

Survey Horiz. Reference:WELLHEAD  
Ref Coordinates: LAT:32.56.16.4184 N LON:103.46.38.7840 W  
GRID Reference:NAD27 new mexico east Transverse Mercator  
Ref GRID Coord: X: 670547.9900 Y: 705367.6800  
North Aligned To:GRID NORTH  
Total Magnetic Correction: 7.50°EAST TO GRID  
Vertical Section Plane: 89.85  
Survey Vert. Reference: 19.00' Kelly Bushing To Ground  
Altitude:4346.00' Ground To MSL

| Measured<br>Depth<br>(ft)       | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL               |                 | Closure      |              | DLS  |
|---------------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|---------------------|-----------------|--------------|--------------|------|
|                                 |               |                        |             |                          |                             | Rectangular<br>(ft) | Offsets<br>(ft) | Dist<br>(ft) | Dir<br>(deg) |      |
| THE FOLLOWING ARE GYRO SURVEYS. |               |                        |             |                          |                             |                     |                 |              |              |      |
| 100.00                          | 0.28          | 43.96                  | 100.00      | 0.00                     | 0.17                        | 0.18 N              | 0.17 E          | 0.25@        | 43.76        | 0.00 |
| 200.00                          | 0.26          | 58.18                  | 200.00      | 100.00                   | 0.54                        | 0.47 N              | 0.53 E          | 0.71@        | 48.36        | 0.07 |
| 300.00                          | 0.52          | 314.17                 | 300.00      | 100.00                   | 0.40                        | 0.91 N              | 0.40 E          | 1.00@        | 23.79        | 0.64 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 400.00                          | 0.58          | 267.43                 | 399.99      | 100.00                   | -0.43                       | 1.20 N              | 0.43 W          | 1.28@        | 340.36       | 0.44 |
| 500.00                          | 0.72          | 266.91                 | 499.99      | 100.00                   | -1.56                       | 1.15 N              | 1.56 W          | 1.94@        | 306.29       | 0.14 |
| 600.00                          | 0.40          | 333.67                 | 599.98      | 100.00                   | -2.34                       | 1.43 N              | 2.34 W          | 2.74@        | 301.32       | 0.67 |
| 700.00                          | 0.20          | 314.05                 | 699.98      | 100.00                   | -2.62                       | 1.86 N              | 2.63 W          | 3.22@        | 305.33       | 0.22 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 800.00                          | 0.19          | 313.57                 | 799.98      | 100.00                   | -2.87                       | 2.10 N              | 2.87 W          | 3.55@        | 306.14       | 0.01 |
| 900.00                          | 0.33          | 323.23                 | 899.98      | 100.00                   | -3.16                       | 2.44 N              | 3.16 W          | 4.00@        | 307.66       | 0.15 |
| 1000.00                         | 0.37          | 316.85                 | 999.98      | 100.00                   | -3.55                       | 2.91 N              | 3.56 W          | 4.59@        | 309.27       | 0.06 |
| 1100.00                         | 0.13          | 321.97                 | 1099.98     | 100.00                   | -3.84                       | 3.23 N              | 3.85 W          | 5.03@        | 310.04       | 0.24 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 1200.00                         | 0.07          | 33.72                  | 1199.98     | 100.00                   | -3.87                       | 3.37 N              | 3.88 W          | 5.14@        | 310.98       | 0.13 |
| 1300.00                         | 0.21          | 292.63                 | 1299.98     | 100.00                   | -4.01                       | 3.49 N              | 4.02 W          | 5.33@        | 311.01       | 0.23 |
| 1400.00                         | 0.36          | 304.40                 | 1399.97     | 100.00                   | -4.44                       | 3.74 N              | 4.45 W          | 5.81@        | 310.08       | 0.16 |
| 1500.00                         | 0.58          | 260.41                 | 1499.97     | 100.00                   | -5.19                       | 3.84 N              | 5.21 W          | 6.47@        | 306.38       | 0.41 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 1600.00                         | 0.56          | 257.08                 | 1599.97     | 100.00                   | -6.17                       | 3.64 N              | 6.18 W          | 7.17@        | 300.51       | 0.04 |
| 1700.00                         | 0.53          | 244.75                 | 1699.96     | 100.00                   | -7.07                       | 3.34 N              | 7.08 W          | 7.82@        | 295.24       | 0.12 |
| 1800.00                         | 0.80          | 258.71                 | 1799.95     | 100.00                   | -8.17                       | 3.00 N              | 8.18 W          | 8.71@        | 290.15       | 0.31 |
| 1900.00                         | 0.65          | 245.32                 | 1899.95     | 100.00                   | -9.37                       | 2.63 N              | 9.38 W          | 9.74@        | 285.65       | 0.23 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 2000.00                         | 0.65          | 246.48                 | 1999.94     | 100.00                   | -10.41                      | 2.16 N              | 10.41 W         | 10.64@       | 281.74       | 0.01 |
| 2100.00                         | 0.74          | 264.99                 | 2099.93     | 100.00                   | -11.57                      | 1.88 N              | 11.58 W         | 11.73@       | 279.23       | 0.24 |
| 2200.00                         | 1.04          | 268.53                 | 2199.92     | 100.00                   | -13.12                      | 1.80 N              | 13.13 W         | 13.25@       | 277.82       | 0.31 |
| 2300.00                         | 1.11          | 260.07                 | 2299.90     | 100.00                   | -14.98                      | 1.61 N              | 14.99 W         | 15.08@       | 276.14       | 0.17 |
|                                 |               |                        |             |                          |                             |                     |                 |              |              |      |
| 2400.00                         | 1.04          | 256.90                 | 2399.89     | 100.00                   | -16.82                      | 1.24 N              | 16.83 W         | 16.87@       | 274.21       | 0.09 |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) (ft) |         | Closure<br>Dist Dir<br>(ft) (deg) |        | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|-------------------------------------------|---------|-----------------------------------|--------|-------------------|
| 2500.00                   | 0.63          | 275.06                 | 2499.87     | 100.00                   | -18.26                      | 1.08 N                                    | 18.26 W | 18.29@                            | 273.39 | 0.48              |
| 2600.00                   | 0.67          | 262.97                 | 2599.87     | 100.00                   | -19.38                      | 1.06 N                                    | 19.39 W | 19.41@                            | 273.13 | 0.14              |
| 2700.00                   | 0.41          | 250.73                 | 2699.86     | 100.00                   | -20.30                      | 0.87 N                                    | 20.30 W | 20.32@                            | 272.45 | 0.28              |
| 2800.00                   | 0.19          | 271.44                 | 2799.86     | 100.00                   | -20.81                      | 0.76 N                                    | 20.81 W | 20.82@                            | 272.08 | 0.24              |
| 2900.00                   | 0.42          | 289.65                 | 2899.86     | 100.00                   | -21.32                      | 0.88 N                                    | 21.32 W | 21.34@                            | 272.37 | 0.25              |
| 3000.00                   | 0.46          | 250.24                 | 2999.86     | 100.00                   | -22.04                      | 0.87 N                                    | 22.04 W | 22.06@                            | 272.26 | 0.30              |
| 3100.00                   | 0.26          | 259.29                 | 3099.86     | 100.00                   | -22.64                      | 0.69 N                                    | 22.64 W | 22.65@                            | 271.75 | 0.21              |
| 3200.00                   | 0.45          | 292.94                 | 3199.85     | 100.00                   | -23.22                      | 0.80 N                                    | 23.23 W | 23.24@                            | 271.98 | 0.27              |
| 3300.00                   | 0.61          | 284.50                 | 3299.85     | 100.00                   | -24.10                      | 1.09 N                                    | 24.10 W | 24.13@                            | 272.59 | 0.18              |
| 3400.00                   | 0.45          | 270.42                 | 3399.85     | 100.00                   | -25.01                      | 1.23 N                                    | 25.01 W | 25.04@                            | 272.81 | 0.20              |
| 3500.00                   | 0.28          | 289.16                 | 3499.84     | 100.00                   | -25.63                      | 1.31 N                                    | 25.64 W | 25.67@                            | 272.92 | 0.21              |
| 3600.00                   | 0.60          | 324.34                 | 3599.84     | 100.00                   | -26.17                      | 1.81 N                                    | 26.17 W | 26.23@                            | 273.97 | 0.41              |
| 3700.00                   | 0.48          | 288.26                 | 3699.84     | 100.00                   | -26.87                      | 2.37 N                                    | 26.87 W | 26.98@                            | 275.04 | 0.35              |
| 3800.00                   | 0.15          | 258.27                 | 3799.84     | 100.00                   | -27.39                      | 2.48 N                                    | 27.40 W | 27.51@                            | 275.16 | 0.36              |
| 3900.00                   | 0.33          | 301.40                 | 3899.83     | 100.00                   | -27.77                      | 2.60 N                                    | 27.77 W | 27.90@                            | 275.35 | 0.24              |
| 4000.00                   | 0.35          | 264.20                 | 3999.83     | 100.00                   | -28.32                      | 2.72 N                                    | 28.32 W | 28.45@                            | 275.48 | 0.22              |
| 4100.00                   | 0.09          | 19.70                  | 4099.83     | 100.00                   | -28.59                      | 2.76 N                                    | 28.60 W | 28.73@                            | 275.51 | 0.40              |
| 4200.00                   | 0.29          | 270.08                 | 4199.83     | 100.00                   | -28.82                      | 2.84 N                                    | 28.83 W | 28.97@                            | 275.62 | 0.33              |
| 4300.00                   | 0.04          | 290.10                 | 4299.83     | 100.00                   | -29.11                      | 2.85 N                                    | 29.11 W | 29.25@                            | 275.59 | 0.25              |
| 4400.00                   | 0.29          | 275.89                 | 4399.83     | 100.00                   | -29.39                      | 2.89 N                                    | 29.40 W | 29.54@                            | 275.61 | 0.25              |
| 4500.00                   | 0.18          | 321.95                 | 4499.83     | 100.00                   | -29.74                      | 3.04 N                                    | 29.75 W | 29.90@                            | 275.83 | 0.21              |
| 4600.00                   | 0.19          | 266.38                 | 4599.83     | 100.00                   | -30.00                      | 3.15 N                                    | 30.01 W | 30.17@                            | 275.99 | 0.17              |
| 4700.00                   | 0.32          | 301.39                 | 4699.83     | 100.00                   | -30.40                      | 3.28 N                                    | 30.41 W | 30.59@                            | 276.16 | 0.20              |
| 4800.00                   | 0.15          | 273.28                 | 4799.83     | 100.00                   | -30.77                      | 3.44 N                                    | 30.78 W | 30.97@                            | 276.37 | 0.20              |
| 4900.00                   | 0.33          | 278.34                 | 4899.83     | 100.00                   | -31.19                      | 3.49 N                                    | 31.20 W | 31.39@                            | 276.38 | 0.18              |
| 5000.00                   | 0.35          | 294.97                 | 4999.83     | 100.00                   | -31.75                      | 3.66 N                                    | 31.76 W | 31.97@                            | 276.57 | 0.10              |
| 5100.00                   | 0.35          | 259.22                 | 5099.82     | 100.00                   | -32.33                      | 3.73 N                                    | 32.34 W | 32.55@                            | 276.58 | 0.21              |
| 5200.00                   | 0.69          | 251.25                 | 5199.82     | 100.00                   | -33.20                      | 3.48 N                                    | 33.21 W | 33.39@                            | 275.98 | 0.35              |
| 5300.00                   | 0.61          | 252.15                 | 5299.81     | 100.00                   | -34.28                      | 3.12 N                                    | 34.28 W | 34.43@                            | 275.20 | 0.08              |
| 5400.00                   | 0.53          | 227.14                 | 5399.81     | 100.00                   | -35.12                      | 2.64 N                                    | 35.13 W | 35.23@                            | 274.30 | 0.26              |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) (ft) |         | Closure<br>Dist Dir<br>(ft) (deg) |        | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|-------------------------------------------|---------|-----------------------------------|--------|-------------------|
| 5500.00                   | 0.62          | 226.13                 | 5499.80     | 100.00                   | -35.85                      | 1.95 N                                    | 35.86 W | 35.91@                            | 273.12 | 0.09              |
| 5600.00                   | 0.57          | 253.48                 | 5599.80     | 100.00                   | -36.72                      | 1.44 N                                    | 36.73 W | 36.75@                            | 272.24 | 0.28              |
| 5700.00                   | 0.47          | 262.06                 | 5699.79     | 100.00                   | -37.61                      | 1.24 N                                    | 37.61 W | 37.63@                            | 271.89 | 0.13              |
| 5800.00                   | 0.45          | 249.39                 | 5799.79     | 100.00                   | -38.38                      | 1.04 N                                    | 38.38 W | 38.40@                            | 271.56 | 0.10              |
| 5900.00                   | 0.51          | 239.36                 | 5899.79     | 100.00                   | -39.13                      | 0.68 N                                    | 39.13 W | 39.14@                            | 270.99 | 0.10              |
| 6000.00                   | 0.58          | 246.56                 | 5999.78     | 100.00                   | -39.98                      | 0.25 N                                    | 39.98 W | 39.98@                            | 270.36 | 0.10              |
| 6100.00                   | 0.54          | 245.38                 | 6099.78     | 100.00                   | -40.87                      | 0.15 S                                    | 40.87 W | 40.87@                            | 269.79 | 0.04              |
| 6200.00                   | 0.35          | 246.65                 | 6199.77     | 100.00                   | -41.58                      | 0.46 S                                    | 41.58 W | 41.58@                            | 269.36 | 0.19              |
| 6300.00                   | 0.26          | 192.21                 | 6299.77     | 100.00                   | -41.91                      | 0.81 S                                    | 41.91 W | 41.92@                            | 268.90 | 0.29              |
| 6400.00                   | 0.36          | 191.85                 | 6399.77     | 100.00                   | -42.03                      | 1.34 S                                    | 42.02 W | 42.04@                            | 268.18 | 0.10              |
| 6500.00                   | 0.43          | 196.61                 | 6499.77     | 100.00                   | -42.20                      | 2.00 S                                    | 42.19 W | 42.24@                            | 267.28 | 0.08              |
| 6600.00                   | 0.33          | 210.64                 | 6599.77     | 100.00                   | -42.46                      | 2.61 S                                    | 42.45 W | 42.53@                            | 266.48 | 0.14              |
| 6700.00                   | 0.09          | 188.69                 | 6699.77     | 100.00                   | -42.61                      | 2.94 S                                    | 42.61 W | 42.71@                            | 266.06 | 0.25              |
| 6800.00                   | 0.20          | 129.07                 | 6799.77     | 100.00                   | -42.49                      | 3.12 S                                    | 42.48 W | 42.60@                            | 265.80 | 0.17              |
| 6900.00                   | 0.20          | 152.91                 | 6899.77     | 100.00                   | -42.28                      | 3.39 S                                    | 42.27 W | 42.40@                            | 265.42 | 0.08              |
| 7000.00                   | 0.35          | 145.77                 | 6999.77     | 100.00                   | -42.03                      | 3.80 S                                    | 42.02 W | 42.19@                            | 264.84 | 0.15              |
| 7100.00                   | 0.37          | 158.30                 | 7099.76     | 100.00                   | -41.74                      | 4.35 S                                    | 41.73 W | 41.95@                            | 264.05 | 0.08              |
| 7200.00                   | 0.32          | 180.18                 | 7199.76     | 100.00                   | -41.62                      | 4.93 S                                    | 41.61 W | 41.90@                            | 263.24 | 0.14              |
| 7300.00                   | 0.28          | 199.37                 | 7299.76     | 100.00                   | -41.70                      | 5.44 S                                    | 41.69 W | 42.04@                            | 262.57 | 0.11              |
| 7400.00                   | 0.32          | 123.27                 | 7399.76     | 100.00                   | -41.55                      | 5.82 S                                    | 41.54 W | 41.94@                            | 262.02 | 0.37              |
| 7500.00                   | 0.64          | 116.31                 | 7499.76     | 100.00                   | -40.82                      | 6.22 S                                    | 40.80 W | 41.27@                            | 261.33 | 0.32              |
| 7600.00                   | 1.15          | 126.08                 | 7599.74     | 100.00                   | -39.51                      | 7.06 S                                    | 39.49 W | 40.12@                            | 259.86 | 0.53              |
| 7700.00                   | 1.76          | 134.44                 | 7699.71     | 100.00                   | -37.61                      | 8.73 S                                    | 37.58 W | 38.58@                            | 256.93 | 0.64              |
| 7800.00                   | 2.05          | 138.94                 | 7799.65     | 100.00                   | -35.34                      | 11.15 S                                   | 35.31 W | 37.03@                            | 252.47 | 0.33              |
| 7900.00                   | 2.23          | 143.15                 | 7899.58     | 100.00                   | -33.01                      | 14.06 S                                   | 32.97 W | 35.84@                            | 246.91 | 0.24              |
| 8000.00                   | 2.23          | 144.72                 | 7999.51     | 100.00                   | -30.73                      | 17.20 S                                   | 30.68 W | 35.17@                            | 240.72 | 0.06              |
| 8100.00                   | 2.24          | 142.60                 | 8099.43     | 100.00                   | -28.42                      | 20.34 S                                   | 28.37 W | 34.91@                            | 234.36 | 0.08              |
| 8200.00                   | 2.17          | 142.82                 | 8199.36     | 100.00                   | -26.10                      | 23.40 S                                   | 26.04 W | 35.01@                            | 228.05 | 0.07              |
| 8300.00                   | 2.06          | 136.86                 | 8299.29     | 100.00                   | -23.73                      | 26.22 S                                   | 23.67 W | 35.32@                            | 222.06 | 0.25              |
| 8400.00                   | 2.14          | 137.57                 | 8399.22     | 100.00                   | -21.25                      | 28.91 S                                   | 21.18 W | 35.84@                            | 216.22 | 0.08              |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft)                 | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) |          | Closure<br>Dist Dir<br>(ft) (deg) |        | DLS<br>(dg/100ft) |
|-------------------------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|--------------------------------------|----------|-----------------------------------|--------|-------------------|
| 8489.00                                   | 2.60          | 134.37                 | 8488.15     | 89.00                    | -18.70                      | 31.55 S                              | 18.61 W  | 36.63@                            | 210.54 | 0.54              |
| 8500.00                                   | 2.49          | 134.37                 | 8499.14     | 11.00                    | -18.35                      | 31.89 S                              | 18.26 W  | 36.75@                            | 209.80 | 1.00              |
| 8600.00                                   | 2.75          | 133.75                 | 8599.03     | 100.00                   | -15.07                      | 35.07 S                              | 14.98 W  | 38.13@                            | 203.13 | 0.26              |
| 8700.00                                   | 2.93          | 133.63                 | 8698.91     | 100.00                   | -11.50                      | 38.49 S                              | 11.39 W  | 40.14@                            | 196.49 | 0.18              |
| ** TIED INTO GYRO SURVEY @ 8778' MD.      |               |                        |             |                          |                             |                                      |          |                                   |        |                   |
| 8778.00                                   | 2.85          | 128.29                 | 8776.81     | 78.00                    | -8.54                       | 41.07 S                              | 8.43 W   | 41.93@                            | 191.60 | 0.36              |
| THE FOLLOWING ARE PATHFINDER MWD SURVEYS. |               |                        |             |                          |                             |                                      |          |                                   |        |                   |
| 8909.00                                   | 7.56          | 95.22                  | 8907.32     | 111.00                   | 1.68                        | 44.06 S                              | 1.79 E   | 44.10@                            | 177.67 | 4.86              |
| 8973.00                                   | 7.74          | 95.50                  | 8970.75     | 32.00                    | 10.11                       | 44.84 S                              | 10.23 E  | 45.99@                            | 167.15 | 0.59              |
| 9005.00                                   | 7.83          | 101.82                 | 9002.46     | 32.00                    | 14.39                       | 45.49 S                              | 14.51 E  | 47.75@                            | 162.31 | 2.69              |
| 9037.00                                   | 7.74          | 94.65                  | 9034.16     | 32.00                    | 18.67                       | 46.11 S                              | 18.79 E  | 49.79@                            | 157.83 | 3.05              |
| 9069.00                                   | 8.18          | 85.65                  | 9065.86     | 32.00                    | 23.09                       | 46.11 S                              | 23.21 E  | 51.62@                            | 153.28 | 4.12              |
| 9100.00                                   | 8.62          | 81.71                  | 9096.52     | 31.00                    | 27.59                       | 45.61 S                              | 27.71 E  | 53.36@                            | 148.72 | 2.34              |
| 9132.00                                   | 8.53          | 81.42                  | 9128.17     | 32.00                    | 32.31                       | 44.91 S                              | 32.43 E  | 55.39@                            | 144.17 | 0.31              |
| 9164.00                                   | 7.83          | 83.08                  | 9159.84     | 32.00                    | 36.82                       | 44.29 S                              | 36.94 E  | 57.67@                            | 140.18 | 2.31              |
| 9196.00                                   | 7.21          | 84.92                  | 9191.57     | 32.00                    | 40.98                       | 43.85 S                              | 41.10 E  | 60.10@                            | 136.86 | 2.08              |
| 9228.00                                   | 7.39          | 84.13                  | 9223.31     | 32.00                    | 45.03                       | 43.46 S                              | 45.15 E  | 62.67@                            | 133.91 | 0.64              |
| 9260.00                                   | 7.30          | 84.83                  | 9255.04     | 32.00                    | 49.11                       | 43.07 S                              | 49.22 E  | 65.40@                            | 131.19 | 0.40              |
| 9292.00                                   | 7.39          | 84.83                  | 9286.78     | 32.00                    | 53.18                       | 42.70 S                              | 53.29 E  | 68.29@                            | 128.70 | 0.28              |
| 9321.00                                   | 7.30          | 82.43                  | 9315.54     | 29.00                    | 56.87                       | 42.29 S                              | 56.98 E  | 70.96@                            | 126.58 | 1.10              |
| 9353.00                                   | 7.30          | 82.74                  | 9347.28     | 32.00                    | 60.90                       | 41.77 S                              | 61.01 E  | 73.94@                            | 124.39 | 0.12              |
| 9384.00                                   | 7.39          | 84.48                  | 9378.03     | 31.00                    | 64.84                       | 41.33 S                              | 64.95 E  | 76.98@                            | 122.47 | 0.77              |
| 9416.00                                   | 7.47          | 86.69                  | 9409.76     | 32.00                    | 68.96                       | 41.01 S                              | 69.07 E  | 80.33@                            | 120.70 | 0.93              |
| 9448.00                                   | 7.47          | 87.31                  | 9441.49     | 32.00                    | 73.12                       | 40.79 S                              | 73.23 E  | 83.82@                            | 119.12 | 0.25              |
| 9480.00                                   | 7.91          | 89.32                  | 9473.20     | 32.00                    | 77.40                       | 40.67 S                              | 77.51 E  | 87.53@                            | 117.68 | 1.61              |
| 9512.00                                   | 10.46         | 87.55                  | 9504.79     | 32.00                    | 82.50                       | 40.52 S                              | 82.61 E  | 92.01@                            | 116.13 | 8.02              |
| 9543.00                                   | 13.89         | 86.12                  | 9535.09     | 31.00                    | 89.03                       | 40.14 S                              | 89.14 E  | 97.76@                            | 114.24 | 11.11             |
| 9575.00                                   | 17.15         | 85.53                  | 9565.92     | 32.00                    | 97.57                       | 39.52 S                              | 97.68 E  | 105.37@                           | 112.03 | 10.20             |
| 9607.00                                   | 20.14         | 87.32                  | 9596.23     | 32.00                    | 107.78                      | 38.89 S                              | 107.88 E | 114.68@                           | 109.82 | 9.51              |
| 9639.00                                   | 23.74         | 89.46                  | 9625.91     | 32.00                    | 119.73                      | 38.57 S                              | 119.83 E | 125.89@                           | 107.84 | 11.52             |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) |          | Closure<br>Dist Dir<br>(ft) (deg) |        | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|--------------------------------------|----------|-----------------------------------|--------|-------------------|
| 9671.00                   | 27.08         | 89.80                  | 9654.81     | 32.00                    | 133.46                      | 38.49 S                              | 133.56 E | 139.00@                           | 106.07 | 10.45             |
| 9703.00                   | 30.34         | 90.29                  | 9682.87     | 32.00                    | 148.83                      | 38.50 S                              | 148.93 E | 153.83@                           | 104.49 | 10.21             |
| 9735.00                   | 33.33         | 90.11                  | 9710.06     | 32.00                    | 165.71                      | 38.56 S                              | 165.81 E | 170.23@                           | 103.09 | 9.35              |
| 9767.00                   | 36.58         | 89.92                  | 9736.28     | 32.00                    | 184.04                      | 38.56 S                              | 184.14 E | 188.13@                           | 101.83 | 10.16             |
| 9799.00                   | 40.45         | 90.92                  | 9761.32     | 32.00                    | 203.96                      | 38.72 S                              | 204.06 E | 207.70@                           | 100.74 | 12.25             |
| 9831.00                   | 44.76         | 92.17                  | 9784.86     | 32.00                    | 225.61                      | 39.31 S                              | 225.71 E | 229.11@                           | 99.88  | 13.72             |
| 9863.00                   | 49.15         | 92.86                  | 9806.70     | 32.00                    | 248.96                      | 40.34 S                              | 249.07 E | 252.31@                           | 99.20  | 13.81             |
| 9894.00                   | 52.58         | 93.24                  | 9826.26     | 31.00                    | 272.96                      | 41.62 S                              | 273.07 E | 276.23@                           | 98.67  | 11.11             |
| 9926.00                   | 53.90         | 93.27                  | 9845.41     | 32.00                    | 298.56                      | 43.08 S                              | 298.67 E | 301.76@                           | 98.21  | 4.12              |
| 9958.00                   | 56.19         | 92.83                  | 9863.75     | 32.00                    | 324.74                      | 44.47 S                              | 324.86 E | 327.89@                           | 97.80  | 7.24              |
| 9990.00                   | 59.27         | 90.72                  | 9880.83     | 32.00                    | 351.78                      | 45.30 S                              | 351.90 E | 354.80@                           | 97.34  | 11.12             |
| 10021.00                  | 62.61         | 88.53                  | 9895.89     | 31.00                    | 378.87                      | 45.11 S                              | 378.99 E | 381.66@                           | 96.79  | 12.42             |
| 10053.00                  | 65.86         | 85.71                  | 9909.80     | 32.00                    | 407.65                      | 43.66 S                              | 407.76 E | 410.09@                           | 96.11  | 12.89             |
| 10085.00                  | 70.08         | 84.83                  | 9921.80     | 32.00                    | 437.21                      | 41.21 S                              | 437.32 E | 439.25@                           | 95.38  | 13.43             |
| 10117.00                  | 73.42         | 84.66                  | 9931.82     | 32.00                    | 467.47                      | 38.43 S                              | 467.58 E | 469.15@                           | 94.70  | 10.45             |
| 10149.00                  | 78.26         | 86.59                  | 9939.64     | 32.00                    | 498.41                      | 36.06 S                              | 498.50 E | 499.80@                           | 94.14  | 16.22             |
| 10181.00                  | 81.43         | 88.26                  | 9945.29     | 32.00                    | 529.87                      | 34.65 S                              | 529.96 E | 531.10@                           | 93.74  | 11.16             |
| 10213.00                  | 83.80         | 88.70                  | 9949.40     | 32.00                    | 561.59                      | 33.81 S                              | 561.68 E | 562.70@                           | 93.44  | 7.53              |
| 10260.00                  | 86.92         | 88.10                  | 9953.20     | 47.00                    | 608.42                      | 32.50 S                              | 608.51 E | 609.37@                           | 93.06  | 6.76              |
| 10293.00                  | 88.99         | 87.95                  | 9954.38     | 33.00                    | 641.38                      | 31.37 S                              | 641.46 E | 642.23@                           | 92.80  | 6.29              |
| 10324.00                  | 89.72         | 88.12                  | 9954.73     | 31.00                    | 672.36                      | 30.30 S                              | 672.44 E | 673.13@                           | 92.58  | 2.42              |
| 10356.00                  | 90.39         | 88.26                  | 9954.70     | 32.00                    | 704.35                      | 29.29 S                              | 704.43 E | 705.04@                           | 92.38  | 2.14              |
| 10388.00                  | 89.89         | 88.27                  | 9954.62     | 32.00                    | 736.34                      | 28.32 S                              | 736.41 E | 736.96@                           | 92.20  | 1.56              |
| 10420.00                  | 89.89         | 88.14                  | 9954.68     | 32.00                    | 768.32                      | 27.32 S                              | 768.40 E | 768.88@                           | 92.04  | 0.41              |
| 10452.00                  | 90.11         | 88.20                  | 9954.68     | 32.00                    | 800.31                      | 26.30 S                              | 800.38 E | 800.81@                           | 91.88  | 0.71              |
| 10484.00                  | 89.72         | 88.02                  | 9954.73     | 32.00                    | 832.29                      | 25.24 S                              | 832.36 E | 832.75@                           | 91.74  | 1.34              |
| 10515.00                  | 89.05         | 87.54                  | 9955.06     | 31.00                    | 863.27                      | 24.04 S                              | 863.34 E | 863.67@                           | 91.60  | 2.66              |
| 10547.00                  | 89.61         | 87.53                  | 9955.43     | 32.00                    | 895.24                      | 22.67 S                              | 895.31 E | 895.59@                           | 91.45  | 1.75              |
| 10579.00                  | 88.54         | 87.79                  | 9955.95     | 32.00                    | 927.22                      | 21.36 S                              | 927.27 E | 927.52@                           | 91.32  | 3.44              |
| 10611.00                  | 89.16         | 87.83                  | 9956.59     | 32.00                    | 959.19                      | 20.14 S                              | 959.24 E | 959.46@                           | 91.20  | 1.94              |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) (ft) |           | Closure<br>Dist Dir<br>(ft) (deg) |       | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|-------------------------------------------|-----------|-----------------------------------|-------|-------------------|
| 10643.00                  | 89.44         | 87.79                  | 9956.98     | 32.00                    | 991.17                      | 18.92 S                                   | 991.22 E  | 991.40@                           | 91.09 | 0.88              |
| 10675.00                  | 89.83         | 87.76                  | 9957.19     | 32.00                    | 1023.14                     | 17.67 S                                   | 1023.19 E | 1023.35@                          | 90.99 | 1.22              |
| 10707.00                  | 89.66         | 88.44                  | 9957.33     | 32.00                    | 1055.13                     | 16.61 S                                   | 1055.18 E | 1055.31@                          | 90.90 | 2.19              |
| 10738.00                  | 89.83         | 88.83                  | 9957.47     | 31.00                    | 1086.12                     | 15.87 S                                   | 1086.17 E | 1086.28@                          | 90.84 | 1.37              |
| 10770.00                  | 90.45         | 88.89                  | 9957.39     | 32.00                    | 1118.12                     | 15.24 S                                   | 1118.16 E | 1118.26@                          | 90.78 | 1.95              |
| 10802.00                  | 90.11         | 89.25                  | 9957.23     | 32.00                    | 1150.11                     | 14.72 S                                   | 1150.15 E | 1150.25@                          | 90.73 | 1.55              |
| 10834.00                  | 88.66         | 89.90                  | 9957.58     | 32.00                    | 1182.11                     | 14.48 S                                   | 1182.15 E | 1182.24@                          | 90.70 | 4.96              |
| 10866.00                  | 88.26         | 90.26                  | 9958.44     | 32.00                    | 1214.10                     | 14.52 S                                   | 1214.14 E | 1214.23@                          | 90.69 | 1.68              |
| 10898.00                  | 88.71         | 90.40                  | 9959.28     | 32.00                    | 1246.09                     | 14.71 S                                   | 1246.13 E | 1246.21@                          | 90.68 | 1.47              |
| 10929.00                  | 88.77         | 90.31                  | 9959.96     | 31.00                    | 1277.08                     | 14.90 S                                   | 1277.12 E | 1277.21@                          | 90.67 | 0.35              |
| 10961.00                  | 88.99         | 90.38                  | 9960.59     | 32.00                    | 1309.07                     | 15.09 S                                   | 1309.11 E | 1309.20@                          | 90.66 | 0.72              |
| 10993.00                  | 89.33         | 90.57                  | 9961.06     | 32.00                    | 1341.06                     | 15.36 S                                   | 1341.11 E | 1341.20@                          | 90.66 | 1.22              |
| 11025.00                  | 89.55         | 90.56                  | 9961.37     | 32.00                    | 1373.06                     | 15.67 S                                   | 1373.11 E | 1373.19@                          | 90.65 | 0.69              |
| 11057.00                  | 89.83         | 90.50                  | 9961.54     | 32.00                    | 1405.06                     | 15.97 S                                   | 1405.10 E | 1405.19@                          | 90.65 | 0.89              |
| 11089.00                  | 88.82         | 90.57                  | 9961.92     | 32.00                    | 1437.05                     | 16.27 S                                   | 1437.10 E | 1437.19@                          | 90.65 | 3.16              |
| 11120.00                  | 88.15         | 90.36                  | 9962.74     | 31.00                    | 1468.04                     | 16.52 S                                   | 1468.09 E | 1468.18@                          | 90.64 | 2.27              |
| 11152.00                  | 88.26         | 90.37                  | 9963.74     | 32.00                    | 1500.02                     | 16.72 S                                   | 1500.07 E | 1500.16@                          | 90.64 | 0.35              |
| 11184.00                  | 88.54         | 90.34                  | 9964.64     | 32.00                    | 1532.01                     | 16.92 S                                   | 1532.06 E | 1532.15@                          | 90.63 | 0.88              |
| 11216.00                  | 88.77         | 90.41                  | 9965.39     | 32.00                    | 1564.00                     | 17.13 S                                   | 1564.05 E | 1564.14@                          | 90.63 | 0.75              |
| 11247.00                  | 88.94         | 90.36                  | 9966.01     | 31.00                    | 1594.99                     | 17.34 S                                   | 1595.04 E | 1595.14@                          | 90.62 | 0.57              |
| 11279.00                  | 89.27         | 90.56                  | 9966.51     | 32.00                    | 1626.98                     | 17.60 S                                   | 1627.04 E | 1627.13@                          | 90.62 | 1.20              |
| 11311.00                  | 90.06         | 89.87                  | 9966.70     | 32.00                    | 1658.98                     | 17.72 S                                   | 1659.04 E | 1659.13@                          | 90.61 | 3.28              |
| 11343.00                  | 90.22         | 89.67                  | 9966.62     | 32.00                    | 1690.98                     | 17.59 S                                   | 1691.04 E | 1691.13@                          | 90.60 | 0.80              |
| 11375.00                  | 90.28         | 89.81                  | 9966.48     | 32.00                    | 1722.98                     | 17.44 S                                   | 1723.03 E | 1723.12@                          | 90.58 | 0.48              |
| 11407.00                  | 90.50         | 89.76                  | 9966.26     | 32.00                    | 1754.98                     | 17.32 S                                   | 1755.03 E | 1755.12@                          | 90.57 | 0.71              |
| 11439.00                  | 90.56         | 89.75                  | 9965.96     | 32.00                    | 1786.98                     | 17.19 S                                   | 1787.03 E | 1787.11@                          | 90.55 | 0.19              |
| 11471.00                  | 90.67         | 89.77                  | 9965.62     | 32.00                    | 1818.98                     | 17.05 S                                   | 1819.03 E | 1819.11@                          | 90.54 | 0.35              |
| 11502.00                  | 91.01         | 89.92                  | 9965.17     | 31.00                    | 1849.98                     | 16.97 S                                   | 1850.03 E | 1850.10@                          | 90.53 | 1.20              |
| 11534.00                  | 92.02         | 90.57                  | 9964.32     | 32.00                    | 1881.96                     | 17.11 S                                   | 1882.01 E | 1882.09@                          | 90.52 | 3.75              |
| 11566.00                  | 89.50         | 87.93                  | 9963.90     | 32.00                    | 1913.95                     | 16.69 S                                   | 1914.00 E | 1914.08@                          | 90.50 | 11.40             |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) (ft) |           | Closure<br>Dist Dir<br>(ft) (deg) |       | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|-------------------------------------------|-----------|-----------------------------------|-------|-------------------|
| 11598.00                  | 88.71         | 87.06                  | 9964.39     | 32.00                    | 1945.92                     | 15.29 S                                   | 1945.97 E | 1946.03@                          | 90.45 | 3.67              |
| 11630.00                  | 89.05         | 87.03                  | 9965.02     | 32.00                    | 1977.88                     | 13.64 S                                   | 1977.92 E | 1977.97@                          | 90.40 | 1.07              |
| 11662.00                  | 89.94         | 87.36                  | 9965.30     | 32.00                    | 2009.84                     | 12.07 S                                   | 2009.88 E | 2009.92@                          | 90.34 | 2.97              |
| 11694.00                  | 90.34         | 87.88                  | 9965.22     | 32.00                    | 2041.82                     | 10.74 S                                   | 2041.85 E | 2041.88@                          | 90.30 | 2.05              |
| 11725.00                  | 90.39         | 87.60                  | 9965.03     | 31.00                    | 2072.79                     | 9.52 S                                    | 2072.83 E | 2072.85@                          | 90.26 | 0.92              |
| 11757.00                  | 90.28         | 87.61                  | 9964.84     | 32.00                    | 2104.77                     | 8.18 S                                    | 2104.80 E | 2104.81@                          | 90.22 | 0.35              |
| 11789.00                  | 90.28         | 87.39                  | 9964.68     | 32.00                    | 2136.74                     | 6.79 S                                    | 2136.77 E | 2136.78@                          | 90.18 | 0.69              |
| 11821.00                  | 91.12         | 87.50                  | 9964.29     | 32.00                    | 2168.71                     | 5.36 S                                    | 2168.73 E | 2168.74@                          | 90.14 | 2.65              |
| 11852.00                  | 90.45         | 87.87                  | 9963.87     | 31.00                    | 2199.69                     | 4.11 S                                    | 2199.70 E | 2199.71@                          | 90.11 | 2.47              |
| 11884.00                  | 91.06         | 88.63                  | 9963.45     | 32.00                    | 2231.67                     | 3.13 S                                    | 2231.69 E | 2231.69@                          | 90.08 | 3.05              |
| 11916.00                  | 91.40         | 89.34                  | 9962.76     | 32.00                    | 2263.66                     | 2.57 S                                    | 2263.67 E | 2263.68@                          | 90.06 | 2.46              |
| 11948.00                  | 90.73         | 88.65                  | 9962.16     | 32.00                    | 2295.65                     | 2.01 S                                    | 2295.66 E | 2295.66@                          | 90.05 | 3.01              |
| 11979.00                  | 88.94         | 87.63                  | 9962.25     | 31.00                    | 2326.63                     | 1.00 S                                    | 2326.64 E | 2326.65@                          | 90.02 | 6.64              |
| 12011.00                  | 90.50         | 88.05                  | 9962.41     | 32.00                    | 2358.61                     | 0.21 N                                    | 2358.62 E | 2358.62@                          | 89.99 | 5.05              |
| 12043.00                  | 91.40         | 88.15                  | 9961.88     | 32.00                    | 2390.59                     | 1.27 N                                    | 2390.60 E | 2390.60@                          | 89.97 | 2.83              |
| 12075.00                  | 91.57         | 88.03                  | 9961.05     | 32.00                    | 2422.57                     | 2.33 N                                    | 2422.57 E | 2422.57@                          | 89.94 | 0.65              |
| 12107.00                  | 91.29         | 88.99                  | 9960.25     | 32.00                    | 2454.55                     | 3.17 N                                    | 2454.55 E | 2454.55@                          | 89.93 | 3.12              |
| 12138.00                  | 91.40         | 89.51                  | 9959.52     | 31.00                    | 2485.54                     | 3.57 N                                    | 2485.54 E | 2485.54@                          | 89.92 | 1.71              |
| 12170.00                  | 91.46         | 89.34                  | 9958.73     | 32.00                    | 2517.53                     | 3.89 N                                    | 2517.53 E | 2517.53@                          | 89.91 | 0.56              |
| 12202.00                  | 91.51         | 89.07                  | 9957.90     | 32.00                    | 2549.51                     | 4.34 N                                    | 2549.51 E | 2549.52@                          | 89.90 | 0.86              |
| 12234.00                  | 91.46         | 88.93                  | 9957.07     | 32.00                    | 2581.50                     | 4.89 N                                    | 2581.50 E | 2581.50@                          | 89.89 | 0.46              |
| 12266.00                  | 92.19         | 89.20                  | 9956.05     | 32.00                    | 2613.48                     | 5.42 N                                    | 2613.48 E | 2613.48@                          | 89.88 | 2.43              |
| 12298.00                  | 92.35         | 89.36                  | 9954.78     | 32.00                    | 2645.45                     | 5.82 N                                    | 2645.45 E | 2645.45@                          | 89.87 | 0.71              |
| 12330.00                  | 92.46         | 89.46                  | 9953.44     | 32.00                    | 2677.42                     | 6.15 N                                    | 2677.42 E | 2677.43@                          | 89.87 | 0.46              |
| 12361.00                  | 92.80         | 89.46                  | 9952.01     | 31.00                    | 2708.39                     | 6.44 N                                    | 2708.38 E | 2708.39@                          | 89.86 | 1.10              |
| 12393.00                  | 93.03         | 89.89                  | 9950.39     | 32.00                    | 2740.35                     | 6.62 N                                    | 2740.34 E | 2740.35@                          | 89.86 | 1.52              |
| 12425.00                  | 93.08         | 89.47                  | 9948.68     | 32.00                    | 2772.30                     | 6.80 N                                    | 2772.30 E | 2772.30@                          | 89.86 | 1.32              |
| 12457.00                  | 92.41         | 90.19                  | 9947.15     | 32.00                    | 2804.27                     | 6.89 N                                    | 2804.26 E | 2804.27@                          | 89.86 | 3.07              |
| 12489.00                  | 92.13         | 90.19                  | 9945.88     | 32.00                    | 2836.24                     | 6.79 N                                    | 2836.23 E | 2836.24@                          | 89.86 | 0.87              |
| 12521.00                  | 92.41         | 90.21                  | 9944.61     | 32.00                    | 2868.22                     | 6.68 N                                    | 2868.21 E | 2868.22@                          | 89.87 | 0.88              |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft) | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets<br>(ft) (ft) |           | Closure<br>Dist Dir<br>(ft) (deg) |       | DLS<br>(dg/100ft) |
|---------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|-------------------------------------------|-----------|-----------------------------------|-------|-------------------|
| 12553.00                  | 92.63         | 90.14                  | 9943.21     | 32.00                    | 2900.18                     | 6.58 N                                    | 2900.18 E | 2900.18@                          | 89.87 | 0.72              |
| 12585.00                  | 91.62         | 90.40                  | 9942.02     | 32.00                    | 2932.16                     | 6.43 N                                    | 2932.15 E | 2932.16@                          | 89.87 | 3.26              |
| 12617.00                  | 90.90         | 90.47                  | 9941.32     | 32.00                    | 2964.15                     | 6.19 N                                    | 2964.15 E | 2964.15@                          | 89.88 | 2.26              |
| 12646.00                  | 91.01         | 90.38                  | 9940.83     | 29.00                    | 2993.15                     | 5.97 N                                    | 2993.14 E | 2993.15@                          | 89.89 | 0.49              |
| 12678.00                  | 91.46         | 90.13                  | 9940.14     | 32.00                    | 3025.14                     | 5.83 N                                    | 3025.13 E | 3025.14@                          | 89.89 | 1.61              |
| 12710.00                  | 91.57         | 89.97                  | 9939.30     | 32.00                    | 3057.13                     | 5.80 N                                    | 3057.12 E | 3057.13@                          | 89.89 | 0.61              |
| 12742.00                  | 92.97         | 90.36                  | 9938.03     | 32.00                    | 3089.10                     | 5.71 N                                    | 3089.09 E | 3089.10@                          | 89.89 | 4.54              |
| 12773.00                  | 93.75         | 90.84                  | 9936.21     | 31.00                    | 3120.04                     | 5.38 N                                    | 3120.04 E | 3120.04@                          | 89.90 | 2.95              |
| 12805.00                  | 93.86         | 91.00                  | 9934.09     | 32.00                    | 3151.97                     | 4.87 N                                    | 3151.96 E | 3151.97@                          | 89.91 | 0.61              |
| 12837.00                  | 93.81         | 91.33                  | 9931.95     | 32.00                    | 3183.89                     | 4.22 N                                    | 3183.89 E | 3183.89@                          | 89.92 | 1.04              |
| 12869.00                  | 93.75         | 91.49                  | 9929.84     | 32.00                    | 3215.81                     | 3.44 N                                    | 3215.81 E | 3215.81@                          | 89.94 | 0.53              |
| 12901.00                  | 93.75         | 91.63                  | 9927.75     | 32.00                    | 3247.72                     | 2.57 N                                    | 3247.73 E | 3247.73@                          | 89.95 | 0.44              |
| 12933.00                  | 93.86         | 91.81                  | 9925.62     | 32.00                    | 3279.63                     | 1.61 N                                    | 3279.64 E | 3279.64@                          | 89.97 | 0.66              |
| 12965.00                  | 93.70         | 92.12                  | 9923.51     | 32.00                    | 3311.54                     | 0.51 N                                    | 3311.55 E | 3311.55@                          | 89.99 | 1.09              |
| 12997.00                  | 93.53         | 91.12                  | 9921.50     | 32.00                    | 3343.46                     | 0.39 S                                    | 3343.48 E | 3343.48@                          | 90.01 | 3.16              |
| 13029.00                  | 94.20         | 90.56                  | 9919.34     | 32.00                    | 3375.39                     | 0.86 S                                    | 3375.40 E | 3375.40@                          | 90.01 | 2.73              |
| 13061.00                  | 93.70         | 89.39                  | 9917.14     | 32.00                    | 3407.31                     | 0.84 S                                    | 3407.32 E | 3407.32@                          | 90.01 | 3.97              |
| 13093.00                  | 93.02         | 88.80                  | 9915.26     | 32.00                    | 3439.25                     | 0.34 S                                    | 3439.26 E | 3439.26@                          | 90.01 | 2.81              |
| 13125.00                  | 93.25         | 89.03                  | 9913.51     | 32.00                    | 3471.20                     | 0.27 N                                    | 3471.21 E | 3471.21@                          | 90.00 | 1.02              |
| 13157.00                  | 93.42         | 89.10                  | 9911.65     | 32.00                    | 3503.14                     | 0.79 N                                    | 3503.15 E | 3503.15@                          | 89.99 | 0.57              |
| 13189.00                  | 93.47         | 89.11                  | 9909.73     | 32.00                    | 3535.08                     | 1.29 N                                    | 3535.09 E | 3535.09@                          | 89.98 | 0.16              |
| 13221.00                  | 91.74         | 89.25                  | 9908.27     | 32.00                    | 3567.05                     | 1.74 N                                    | 3567.05 E | 3567.05@                          | 89.97 | 5.42              |
| 13253.00                  | 90.78         | 89.07                  | 9907.57     | 32.00                    | 3599.03                     | 2.21 N                                    | 3599.04 E | 3599.04@                          | 89.96 | 3.05              |
| 13285.00                  | 90.62         | 89.22                  | 9907.18     | 32.00                    | 3631.03                     | 2.69 N                                    | 3631.04 E | 3631.04@                          | 89.96 | 0.68              |
| 13317.00                  | 90.90         | 89.20                  | 9906.75     | 32.00                    | 3663.02                     | 3.13 N                                    | 3663.03 E | 3663.03@                          | 89.95 | 0.88              |
| 13348.00                  | 91.68         | 89.73                  | 9906.05     | 31.00                    | 3694.02                     | 3.42 N                                    | 3694.02 E | 3694.02@                          | 89.95 | 3.04              |
| 13380.00                  | 91.62         | 89.74                  | 9905.13     | 32.00                    | 3726.00                     | 3.57 N                                    | 3726.01 E | 3726.01@                          | 89.95 | 0.19              |
| 13413.00                  | 91.46         | 89.79                  | 9904.25     | 33.00                    | 3758.99                     | 3.70 N                                    | 3758.99 E | 3759.00@                          | 89.94 | 0.51              |
| 13444.00                  | 92.91         | 89.91                  | 9903.06     | 31.00                    | 3789.97                     | 3.79 N                                    | 3789.97 E | 3789.97@                          | 89.94 | 4.69              |
| 13476.00                  | 93.70         | 90.12                  | 9901.22     | 32.00                    | 3821.91                     | 3.78 N                                    | 3821.92 E | 3821.92@                          | 89.94 | 2.55              |

# PathFinder Energy Services, Inc.

## Survey Report

MACK ENERGY CORPORATION  
CHERRY STATE #1H ST1  
LEA COUNTY, NM  
RIG:SILVEROAK 7

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| Measured<br>Depth<br>(ft)               | Incl<br>(deg) | Drift<br>Dir.<br>(deg) | TVD<br>(ft) | Course<br>Length<br>(ft) | Vertical<br>Section<br>(ft) | TOTAL<br>Rectangular Offsets |           | Closure<br>Dist Dir |       | DLS<br>(dg/100ft) |
|-----------------------------------------|---------------|------------------------|-------------|--------------------------|-----------------------------|------------------------------|-----------|---------------------|-------|-------------------|
|                                         |               |                        |             |                          |                             | (ft)                         | (ft)      | (ft)                | (deg) |                   |
| 13508.00                                | 93.53         | 90.07                  | 9899.20     | 32.00                    | 3853.85                     | 3.72 N                       | 3853.85 E | 3853.86@            | 89.94 | 0.55              |
| 13540.00                                | 93.36         | 90.47                  | 9897.28     | 32.00                    | 3885.79                     | 3.57 N                       | 3885.80 E | 3885.80@            | 89.95 | 1.36              |
| 13571.00                                | 93.25         | 90.56                  | 9895.49     | 31.00                    | 3916.74                     | 3.30 N                       | 3916.74 E | 3916.74@            | 89.95 | 0.46              |
| 13603.00                                | 93.14         | 90.75                  | 9893.71     | 32.00                    | 3948.68                     | 2.93 N                       | 3948.69 E | 3948.69@            | 89.96 | 0.68              |
| 13635.00                                | 92.91         | 90.89                  | 9892.02     | 32.00                    | 3980.63                     | 2.47 N                       | 3980.64 E | 3980.64@            | 89.96 | 0.84              |
| 13667.00                                | 93.36         | 89.96                  | 9890.27     | 32.00                    | 4012.59                     | 2.24 N                       | 4012.59 E | 4012.59@            | 89.97 | 3.22              |
| 13699.00                                | 93.59         | 89.46                  | 9888.33     | 32.00                    | 4044.53                     | 2.40 N                       | 4044.53 E | 4044.53@            | 89.97 | 1.72              |
| 13731.00                                | 93.47         | 89.64                  | 9886.36     | 32.00                    | 4076.47                     | 2.65 N                       | 4076.47 E | 4076.47@            | 89.96 | 0.68              |
| 13763.00                                | 93.31         | 89.60                  | 9884.47     | 32.00                    | 4108.41                     | 2.86 N                       | 4108.42 E | 4108.42@            | 89.96 | 0.52              |
| 13795.00                                | 93.47         | 89.76                  | 9882.57     | 32.00                    | 4140.35                     | 3.04 N                       | 4140.36 E | 4140.36@            | 89.96 | 0.71              |
| 13827.00                                | 93.87         | 89.76                  | 9880.53     | 32.00                    | 4172.29                     | 3.17 N                       | 4172.29 E | 4172.29@            | 89.96 | 1.25              |
| 13859.00                                | 93.58         | 89.93                  | 9878.45     | 32.00                    | 4204.22                     | 3.26 N                       | 4204.23 E | 4204.23@            | 89.96 | 1.05              |
| 13874.00                                | 93.53         | 90.30                  | 9877.52     | 15.00                    | 4219.19                     | 3.23 N                       | 4219.20 E | 4219.20@            | 89.96 | 2.48              |
| STRAIGHT PROJECTED TO BIT AT 13930' MD. |               |                        |             |                          |                             |                              |           |                     |       |                   |
| 13930.00                                | 93.53         | 90.30                  | 9874.07     | 56.00                    | 4275.08                     | 2.94 N                       | 4275.09 E | 4275.09@            | 89.96 | 0.00              |

\*\* The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.



A Schlumberger Company

## TIE-IN SURVEY INFORMATION SHEET

### CLIENT INFORMATION

|                           |                                |            |     |
|---------------------------|--------------------------------|------------|-----|
| CLIENT:                   | MACK ENERGY                    |            |     |
| LEASE / WELL No.:         | CHERRY STATE                   | #1H ST1    |     |
| WELL LOCATION:            | ANDERSON RANCH; WOLFCAMP, WEST |            |     |
| COUNTY / STATE / COUNTRY: | LEA                            | NEW MEXICO | USA |
| RIG:                      | SILVER OAK # 7                 |            |     |
| API WELL No:              | 30-025-29780                   |            |     |
| JOB No:                   | 700000984 WT-WT                |            |     |
| P.O. / AFE No.            |                                |            |     |
| DIRECTIONAL COMPANY:      | PATHFINDER                     |            |     |

### WELL SITE INFORMATION

|                                  |                                                                                                        |                 |                   |
|----------------------------------|--------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| TOTAL MAGNETIC CORRECTION (TMC): |                                                                                                        |                 |                   |
| On Wall Plat:                    | 7.49                                                                                                   | LWD Calculated: | 7.5               |
| Agreed Upon:                     |                                                                                                        | 7.49            |                   |
| X =                              | 670547.994200                                                                                          | Feet            | Y = 705367.679900 |
| Feet                             |                                                                                                        |                 |                   |
| SITE LATITUDE:                   | 32.937894 N                                                                                            | SITE LONGITUDE: | 103.77744 W       |
| GRID SYSTEM:                     | TRUE <input type="checkbox"/> UTM <input type="checkbox"/> LAMBERT <input checked="" type="checkbox"/> | ZONE:           | NEW MEXICO EAST   |
| PROPOSED DRIFT DIRECTION:        | 89.85                                                                                                  |                 |                   |
| KELLY BUSHING ELEVATION:         | 4364'                                                                                                  |                 |                   |
| ALTITUDE:                        | 4346                                                                                                   | Feet            | WATER DEPTH:      |
|                                  |                                                                                                        | Feet            |                   |

### TIE-IN SURVEY

|                                    |                                                                                                                            |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| MEASURED DEPTH:                    | 8778'                                                                                                                      |
| DRIFT ANGLE:                       | 2.85°                                                                                                                      |
| DRIFT DIRECTION:                   | 128.29°                                                                                                                    |
| TRUE VERTICAL DEPTH:               | 8776.81'                                                                                                                   |
| VERTICAL SECTION:                  | -8.54'                                                                                                                     |
| RECTANGULAR COORDINATE ( N / S ) : | -41.07'                                                                                                                    |
| RECTANGULAR COORDINATE ( E / W ) : | -8.43'                                                                                                                     |
| CLOSURE DISTANCE / DIRECTION:      |                                                                                                                            |
| SURVEY CALCULATION METHOD:         | AA <input type="checkbox"/> MC <input checked="" type="checkbox"/> RC <input type="checkbox"/> BT <input type="checkbox"/> |
| SOURCE OF TIE-IN DATA ( COMPANY ): | UNKNOWN                                                                                                                    |
| COPY OF TIE-IN SURVEY REPORT       | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO                                                        |

### WELL PLAN

|                |       |              |        |
|----------------|-------|--------------|--------|
| KICKOFF DEPTH: | 8808' | TOTAL DEPTH: | 13927' |
| KICKOFF ANGLE: | 2.85° | MAX ANGLE:   | 91.04° |

PES Engineers:

Jeff Hull

\*\*Signature of both field engineers required if applicable

David Phillips

Directional Driller: Monnie

DATE: 5-Dec-2010

## PathFinder Energy Services, Inc.

### Magnetic & Grid Calculations

MACK ENERGY CORPORATION  
CHERRY STATE #1H  
LEA COUNTY, NEW MEXICO  
Rig:SILVER OAK #7

Thu Dec 02 14:39:25 2010

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### Coordinates

Latitude: 32.937894 N (32 deg. 56 min. 16.4176 sec.)  
Longitude: 103.777440 W (-103 deg. 46 min. 38.7839 sec.)  
Elevation: 4364.00 feet.  
Calculation Date: Dec/02/2010 -

---

### Magnetic Calculations

Model: IGRF2010  
Dip Angle: 60.8245 degrees  
Total Magnetic Field: 0.49071 gauss  
Magnetic Declination: 7.800642 degrees  
Horizontal Intensity: 0.239212 gauss  
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.800642 Degr

---

### Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east  
Ellipsoid: Clarke 1866  
X: 670548.0000 feet  
Y: 705367.6000 feet  
True to Grid: (convergence) -0.302262 degrees  
Magnetic to Grid: 7.498380 degrees  
To Convert a Magnetic Dir. to a GRID dir. Add 7.498380 Degr.

# PathFinder Energy Services, Inc.

## Magnetic & Grid Calculations

MACK ENERGY  
CHERRY STATE #1H ORIGINAL WB  
WOLFCAMP

*field copy*

Mon Dec 06 08:49:19 2010

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### Coordinates

Latitude: 32.937894 N ( 32 deg. 56 min. 16.4184 sec.)  
Longitude: 103.777440 W (-103 deg. 46 min. 38.7840 sec.)  
Elevation: 4364.00 feet.  
Calculation Date: Dec/05/2010

---

### Magnetic Calculations

Model: IGRF2010  
Dip Angle: 60.8243 degrees  
Total Magnetic Field: 0.49070 gauss  
Magnetic Declination: 7.799634 degrees  
Horizontal Intensity: 0.239210 gauss  
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.799634 Degs

---

### Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east  
Ellipsoid: Clarke 1866  
X: 670547.9942 feet  
Y: 705367.6799 feet  
True to Grid: (convergence) -0.302262 degrees  
Magnetic to Grid: 7.497371 degrees  
To Convert a Magnetic Dir. to a GRID dir. Add 7.497371 Degs.