

## District I

1625 N French Dr, Hobbs, NM 88240

## District II

1301 W Grand Avenue, Artesia, NM 88210

## District III

1000 Rio Brazos Road, Aztec, NM 87410

## District IV

1220 S St Francis Dr, Santa Fe, NM 87505

## State of New Mexico

Energy Minerals and Natural Resources

Form C-101

May 27, 2004

RECEIVED

JUL 30 2010

HOBBSOCD

## Oil Conservation Division

1220 South St. Francis Dr.

Santa Fe, NM 87505

Submit to appropriate District Office

☐ AMENDED REPORT

## APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

|                                                                                             |                               |                           |
|---------------------------------------------------------------------------------------------|-------------------------------|---------------------------|
| Operator Name and Address<br>Mack Energy Corporation<br>P.O. Box 960 Artesia, NM 88211-0960 |                               | OGRID Number<br>013837    |
| Property Code<br>38054                                                                      | Property Name<br>Cherry State | API Number<br>30-25-29780 |
| Proposed Pool 1<br>Anderson Ranch; Wolfcamp, West                                           |                               | Proposed Pool 2           |

## 7 Surface Location

| UL or lot no | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|--------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| E            | 9       | 16S      | 32E   |         | 1982          | North            | 662           | West           | Lea    |

## 8 Proposed Bottom Hole Location If Different From Surface

| UL or lot no | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|--------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| H            | 9       | 16S      | 32E   |         | 1980          | North            | 330           | East           | Lea    |

## Additional Well Information

|                                                        |                                                                                         |                                              |                                                                                                                                                                                |                                           |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 11 Work Type Code<br>ReEntry                           | 12 Well Type Code<br>O                                                                  | " Cable/Rotary<br>Rotary                     | 14 Lease Type Code<br>S                                                                                                                                                        | 15 Ground Level Elevation<br>4346         |
| 16 Multiple<br>No                                      | " Proposed Depth<br>13969                                                               | " Formation<br>Wolfcamp                      | 17 Contractor                                                                                                                                                                  | 18 Spud Date<br>8/10/2010                 |
| Depth to Groundwater 65'                               |                                                                                         | Distance from nearest fresh water well 1000' |                                                                                                                                                                                | Distance from nearest surface water 1000' |
| Pit                                                    | Liner. Synthetic <input type="checkbox"/> _____mils thick Clay <input type="checkbox"/> | Pit Volume _____bbls                         | Drilling Method -<br>Fresh Water <input checked="" type="checkbox"/> Brine <input type="checkbox"/> Diesel/Oil-based <input type="checkbox"/> Gas/Air <input type="checkbox"/> |                                           |
| Closed-Loop System <input checked="" type="checkbox"/> |                                                                                         |                                              |                                                                                                                                                                                |                                           |

## 21 Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC    |
|-----------|-------------|--------------------|---------------|-----------------|------------------|
| 17 1/2    | 13 3/8      | 54.5               | 525           | 700             | Surface-In place |
| 12 1/4    | 9 5/8       | 36                 | 4400          | 2350            | Surface-In place |
| 8 3/4     | 7           | 28                 | 10995         | 1495            | 5600-In place    |
| 6 1/8     | 4 1/2       | 11.6               | 13969         | 630             | Surface          |

2. Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone.

Describe the blowout prevention program, if any. Use additional sheets if necessary.  
Mack energy proposes to cut hole in 7" casing at 9400', drill horizontally to 13969'. Run 4 1/2 casing from surface to TD. 0-9000' set using ECP and FO cementer @ 9000' and cementing back to surface w/630sx Class C. 9000-13969' set using Peak Completion Packer System.

**Permit Expires 2 Years From Approval  
Date Unless Drilling Underway**

*Re-Entry*

|                                                                                                                                                                                                                                                                                                                                                                   |                      |                                                          |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------|--|
| I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that the drilling pit will be constructed according to NMOCD guidelines <input checked="" type="checkbox"/> a general permit <input type="checkbox"/> , or an (attached) alternative OCD-approved plan. <input type="checkbox"/> |                      | OIL CONSERVATION DIVISION                                |  |
| Signature <i>Jerry W. Sherrell</i>                                                                                                                                                                                                                                                                                                                                |                      | Approved by. <i>[Signature]</i>                          |  |
| Printed name Jerry W. Sherrell                                                                                                                                                                                                                                                                                                                                    |                      | Title: PETROLEUM ENGINEER                                |  |
| Title Production Clerk                                                                                                                                                                                                                                                                                                                                            |                      | Approval Date: AUG 03 2010                               |  |
| E-mail Address: jerrys@mec.com                                                                                                                                                                                                                                                                                                                                    |                      | Expiration Date:                                         |  |
| Date: 7/28/10                                                                                                                                                                                                                                                                                                                                                     | Phone: (575)748-1288 | Conditions of Approval Attached <input type="checkbox"/> |  |

# RECEIVED

DISTRICT I  
1625 N. FRENCH DR., HOBBS, NM 88240

JUL 30 2010

State of New Mexico  
Energy, Minerals and Natural Resources Department

DISTRICT II  
1301 W. GRAND AVENUE, ARTESIA, NM 88210

HOBBSOCD

OIL CONSERVATION DIVISION  
1220 SOUTH ST. FRANCIS DR.  
Santa Fe, New Mexico 87505

Form C-102  
Revised October 12, 2005  
Submit to Appropriate District Office  
State Lease - 4 Copies  
Fee Lease - 3 Copies

DISTRICT III  
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV  
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

## WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

|                                   |                                                 |                                                    |
|-----------------------------------|-------------------------------------------------|----------------------------------------------------|
| API Number<br><b>30-025-29780</b> | Pool Code<br><b>1923</b> ✓                      | Pool Name<br><b>Anderson Ranch; Wolfcamp, West</b> |
| Property Code<br><b>38054</b>     | Property Name<br><b>CHERRY STATE</b>            | Well Number<br><b>1H</b>                           |
| OGRID No.<br><b>013837</b>        | Operator Name<br><b>MACK ENERGY CORPORATION</b> | Elevation<br><b>4346'</b>                          |

### Surface Location

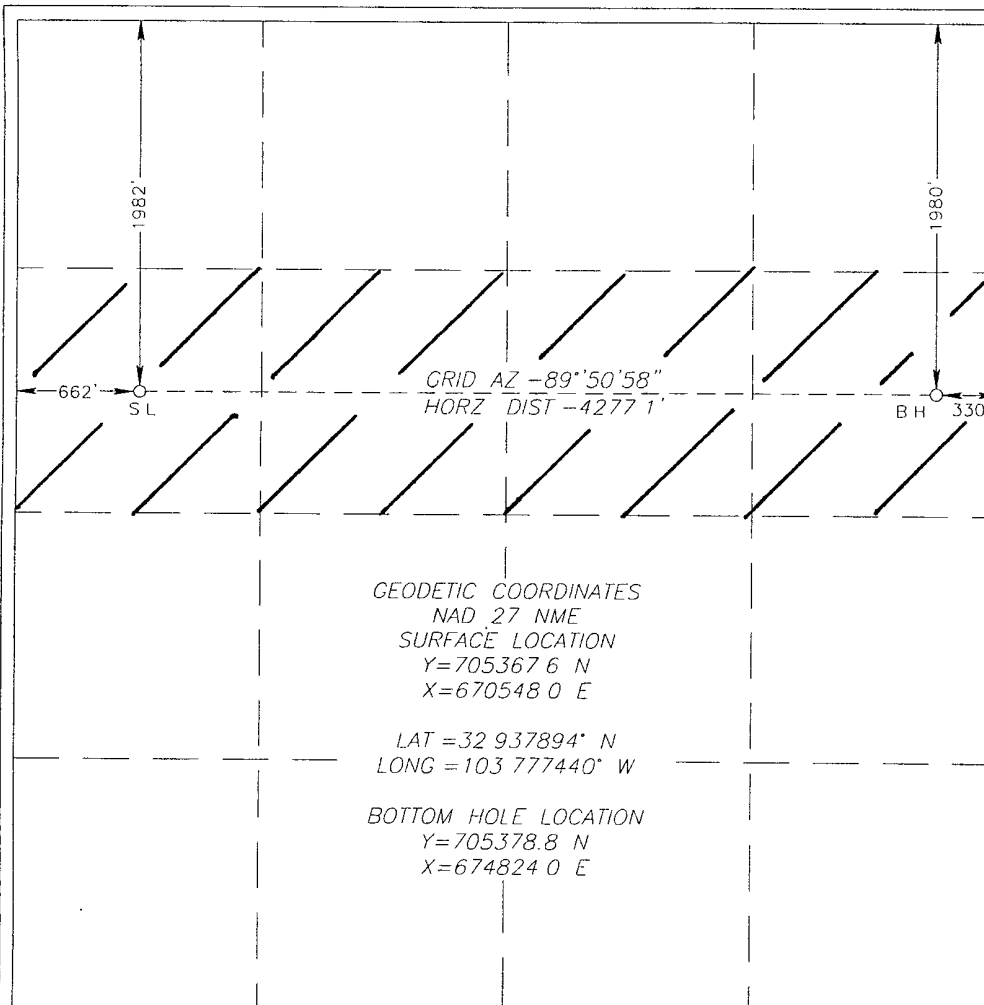
| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| E             | 9       | 16-S     | 32-E  |         | 1982          | NORTH            | 662           | WEST           | LEA    |

### Bottom Hole Location If Different From Surface

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| H             | 9       | 16-S     | 32-E  |         | 1980          | NORTH            | 330           | EAST           | LEA    |

| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |
|-----------------|-----------------|--------------------|-----------|
| 160             |                 |                    |           |

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



### OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division

*Jerry W. Sherrell* 7/28/10  
Signature Date

Jerry W. Sherrell  
Printed Name

### SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

RONALD J. EIDSON  
NEW MEXICO  
Professional Surveyor  
3239  
Date Surveyed  
Signature & Seal of Professional Surveyor  
7/22/2010

Certificate No. RONALD EIDSON 3239

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JUL 30 2010

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## **Mack Energy**

Lea County  
Cherry State  
#1H  
OH

Plan: Plan #1

## **Pathfinder X & Y Planning Report**

26 July, 2010

# **PATHFINDER**



# Pathfinder

## Pathfinder X & Y Planning Report



|                  |              |                                     |                                       |
|------------------|--------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | Mack Energy  | <b>Local Co-ordinate Reference:</b> | Well #1H                              |
| <b>Project:</b>  | Lea County   | <b>TVD Reference:</b>               | WELL @ 4364.00ft (Original Well Elev) |
| <b>Site:</b>     | Cherry State | <b>MD Reference:</b>                | WELL @ 4364.00ft (Original Well Elev) |
| <b>Well:</b>     | #1H          | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH           | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | Plan #1      | <b>Database:</b>                    | Midland Database                      |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     |                                      | Lea County    |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |         |              |                |                   |                   |
|-----------------------|---------|--------------|----------------|-------------------|-------------------|
| Site                  |         | Cherry State |                |                   |                   |
| Site Position:        |         | Northing:    | 705,367.600 ft | Latitude:         | 32° 56' 16.418 N  |
| From:                 | Map     | Easting:     | 670,548.000 ft | Longitude:        | 103° 46' 38.784 W |
| Position Uncertainty: | 0.00 ft | Slot Radius: | "              | Grid Convergence: | 0.30 °            |

|                      |         |                     |           |                |             |                   |
|----------------------|---------|---------------------|-----------|----------------|-------------|-------------------|
| Well                 | #1H     |                     |           |                |             |                   |
| Well Position        | +N/-S   | 0.00 ft             | Northing: | 705,367.600 ft | Latitude:   | 32° 56' 16.418 N  |
|                      | +E/-W   | 0.00 ft             | Easting:  | 670,548.000 ft | Longitude:  | 103° 46' 38.784 W |
| Position Uncertainty | 0.00 ft | Wellhead Elevation: | ft        | Ground Level:  | 4,346.00 ft |                   |

|           |            |             |                    |                  |                        |
|-----------|------------|-------------|--------------------|------------------|------------------------|
| Wellbore  | OH         |             |                    |                  |                        |
| Magnetics | Model Name | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|           | IGRF200510 | 09/26/2010  | 7.81               | 60.85            | 49,120                 |

|                   |                  |         |               |           |
|-------------------|------------------|---------|---------------|-----------|
| Design            |                  | Plan #1 |               |           |
| Audit Notes:      |                  |         |               |           |
| Version:          | Phase:           | PLAN    | Tie On Depth: | 0.00      |
| Vertical Section: | Depth From (TVD) | +N/-S   | +E/-W         | Direction |
|                   | (ft)             | (ft)    | (ft)          | (°)       |
|                   | 0.00             | 0.00    | 0.00          | 89.85     |

| Survey Tool Program |            | Date              | 07/26/2010 |                |  |
|---------------------|------------|-------------------|------------|----------------|--|
| From<br>(ft)        | To<br>(ft) | Survey (Wellbore) | Tool Name  | Description    |  |
| 0.00                | 13,969.30  | Plan #1 (OH)      | MWD        | MWD - Standard |  |



# Pathfinder

## Pathfinder X & Y Planning Report



|           |              |                              |                                       |
|-----------|--------------|------------------------------|---------------------------------------|
| Company:  | Mack Energy  | Local Co-ordinate Reference: | Well #1H                              |
| Project:  | Lea County   | TVD Reference:               | WELL @ 4364.00ft (Original Well Elev) |
| Site:     | Cherry State | MD Reference:                | WELL @ 4364.00ft (Original Well Elev) |
| Well:     | #1H          | North Reference:             | Grid                                  |
| Wellbore: | OH           | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | Plan #1      | Database:                    | Midland Database                      |

| Planned Survey |            |            |             |               |             |             |               |                   |                  |                 |  |
|----------------|------------|------------|-------------|---------------|-------------|-------------|---------------|-------------------|------------------|-----------------|--|
| MD<br>(ft)     | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V-Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |  |
| 0.00           | 0.00       | 0.00       | 0.00        | -4,364.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 100.00         | 0.00       | 0.00       | 100.00      | -4,264.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 200.00         | 0.00       | 0.00       | 200.00      | -4,164.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 300.00         | 0.00       | 0.00       | 300.00      | -4,064.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 400.00         | 0.00       | 0.00       | 400.00      | -3,964.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 500.00         | 0.00       | 0.00       | 500.00      | -3,864.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 600.00         | 0.00       | 0.00       | 600.00      | -3,764.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 700.00         | 0.00       | 0.00       | 700.00      | -3,664.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 800.00         | 0.00       | 0.00       | 800.00      | -3,564.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 900.00         | 0.00       | 0.00       | 900.00      | -3,464.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,000.00       | 0.00       | 0.00       | 1,000.00    | -3,364.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,100.00       | 0.00       | 0.00       | 1,100.00    | -3,264.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,200.00       | 0.00       | 0.00       | 1,200.00    | -3,164.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,300.00       | 0.00       | 0.00       | 1,300.00    | -3,064.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,400.00       | 0.00       | 0.00       | 1,400.00    | -2,964.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,500.00       | 0.00       | 0.00       | 1,500.00    | -2,864.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,600.00       | 0.00       | 0.00       | 1,600.00    | -2,764.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,700.00       | 0.00       | 0.00       | 1,700.00    | -2,664.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,800.00       | 0.00       | 0.00       | 1,800.00    | -2,564.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 1,900.00       | 0.00       | 0.00       | 1,900.00    | -2,464.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,000.00       | 0.00       | 0.00       | 2,000.00    | -2,364.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,100.00       | 0.00       | 0.00       | 2,100.00    | -2,264.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,200.00       | 0.00       | 0.00       | 2,200.00    | -2,164.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,300.00       | 0.00       | 0.00       | 2,300.00    | -2,064.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,400.00       | 0.00       | 0.00       | 2,400.00    | -1,964.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,500.00       | 0.00       | 0.00       | 2,500.00    | -1,864.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |
| 2,600.00       | 0.00       | 0.00       | 2,600.00    | -1,764.00     | 0.00        | 0.00        | 0.00          | 0.00              | 705,367.60       | 670,548.00      |  |



# Pathfinder

## Pathfinder X & Y Planning Report



Company: Mack Energy  
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Design: Plan #1

Local Co-ordinate Reference: Well #1H  
TVD Reference: WELL @ 4364.00ft (Original Well Elev)  
MD Reference: WELL @ 4364.00ft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: Midland Database

### Planned Survey

| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|
| 2,700.00   | 0.00       | 0.00       | 2,700.00    | -1,664.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 2,800.00   | 0.00       | 0.00       | 2,800.00    | -1,564.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 2,900.00   | 0.00       | 0.00       | 2,900.00    | -1,464.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,000.00   | 0.00       | 0.00       | 3,000.00    | -1,364.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,100.00   | 0.00       | 0.00       | 3,100.00    | -1,264.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,200.00   | 0.00       | 0.00       | 3,200.00    | -1,164.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,300.00   | 0.00       | 0.00       | 3,300.00    | -1,064.00     | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,400.00   | 0.00       | 0.00       | 3,400.00    | -964.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,500.00   | 0.00       | 0.00       | 3,500.00    | -864.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,600.00   | 0.00       | 0.00       | 3,600.00    | -764.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,700.00   | 0.00       | 0.00       | 3,700.00    | -664.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,800.00   | 0.00       | 0.00       | 3,800.00    | -564.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 3,900.00   | 0.00       | 0.00       | 3,900.00    | -464.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,000.00   | 0.00       | 0.00       | 4,000.00    | -364.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,100.00   | 0.00       | 0.00       | 4,100.00    | -264.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,200.00   | 0.00       | 0.00       | 4,200.00    | -164.00       | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,300.00   | 0.00       | 0.00       | 4,300.00    | -64.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,400.00   | 0.00       | 0.00       | 4,400.00    | 36.00         | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,500.00   | 0.00       | 0.00       | 4,500.00    | 136.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,600.00   | 0.00       | 0.00       | 4,600.00    | 236.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,700.00   | 0.00       | 0.00       | 4,700.00    | 336.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,800.00   | 0.00       | 0.00       | 4,800.00    | 436.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 4,900.00   | 0.00       | 0.00       | 4,900.00    | 536.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,000.00   | 0.00       | 0.00       | 5,000.00    | 636.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,100.00   | 0.00       | 0.00       | 5,100.00    | 736.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,200.00   | 0.00       | 0.00       | 5,200.00    | 836.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,300.00   | 0.00       | 0.00       | 5,300.00    | 936.00        | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |



# Pathfinder

## Pathfinder X & Y Planning Report



Company: Mack Energy  
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Design: Plan #1

Local Co-ordinate Reference: Well #1H  
TVD Reference: WELL @ 4364.00ft (Original Well Elev)  
MD Reference: WELL @ 4364.00ft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: Midland Database

### Planned Survey

| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|
| 5,400.00   | 0.00       | 0.00       | 5,400.00    | 1,036.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,500.00   | 0.00       | 0.00       | 5,500.00    | 1,136.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,600.00   | 0.00       | 0.00       | 5,600.00    | 1,236.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,700.00   | 0.00       | 0.00       | 5,700.00    | 1,336.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,800.00   | 0.00       | 0.00       | 5,800.00    | 1,436.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 5,900.00   | 0.00       | 0.00       | 5,900.00    | 1,536.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,000.00   | 0.00       | 0.00       | 6,000.00    | 1,636.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,100.00   | 0.00       | 0.00       | 6,100.00    | 1,736.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,200.00   | 0.00       | 0.00       | 6,200.00    | 1,836.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,300.00   | 0.00       | 0.00       | 6,300.00    | 1,936.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,400.00   | 0.00       | 0.00       | 6,400.00    | 2,036.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,500.00   | 0.00       | 0.00       | 6,500.00    | 2,136.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,600.00   | 0.00       | 0.00       | 6,600.00    | 2,236.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,700.00   | 0.00       | 0.00       | 6,700.00    | 2,336.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,800.00   | 0.00       | 0.00       | 6,800.00    | 2,436.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 6,900.00   | 0.00       | 0.00       | 6,900.00    | 2,536.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,000.00   | 0.00       | 0.00       | 7,000.00    | 2,636.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,100.00   | 0.00       | 0.00       | 7,100.00    | 2,736.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,200.00   | 0.00       | 0.00       | 7,200.00    | 2,836.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,300.00   | 0.00       | 0.00       | 7,300.00    | 2,936.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,400.00   | 0.00       | 0.00       | 7,400.00    | 3,036.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,500.00   | 0.00       | 0.00       | 7,500.00    | 3,136.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,600.00   | 0.00       | 0.00       | 7,600.00    | 3,236.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,700.00   | 0.00       | 0.00       | 7,700.00    | 3,336.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,800.00   | 0.00       | 0.00       | 7,800.00    | 3,436.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 7,900.00   | 0.00       | 0.00       | 7,900.00    | 3,536.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |
| 8,000.00   | 0.00       | 0.00       | 8,000.00    | 3,636.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |



# Pathfinder

## Pathfinder X & Y Planning Report



|           |              |                              |                                       |
|-----------|--------------|------------------------------|---------------------------------------|
| Company:  | Mack Energy  | Local Co-ordinate Reference: | Well #1H                              |
| Project:  | Lea County   | TVD Reference:               | WELL @ 4364.00ft (Original Well Elev) |
| Site:     | Cherry State | MD Reference:                | WELL @ 4364.00ft (Original Well Elev) |
| Well:     | #1H          | North Reference:             | Grid                                  |
| Wellbore: | OH           | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | Plan #1      | Database:                    | Midland Database                      |

| Planned Survey |            |            |             |               |             |             |                |                   |                  |                 |  |
|----------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|--|
| MD<br>(ft)     | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |  |
| 8,100.00       | 0.00       | 0.00       | 8,100.00    | 3,736.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,200.00       | 0.00       | 0.00       | 8,200.00    | 3,836.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,300.00       | 0.00       | 0.00       | 8,300.00    | 3,936.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,400.00       | 0.00       | 0.00       | 8,400.00    | 4,036.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,500.00       | 0.00       | 0.00       | 8,500.00    | 4,136.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,600.00       | 0.00       | 0.00       | 8,600.00    | 4,236.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,700.00       | 0.00       | 0.00       | 8,700.00    | 4,336.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,800.00       | 0.00       | 0.00       | 8,800.00    | 4,436.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 8,900.00       | 0.00       | 0.00       | 8,900.00    | 4,536.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,000.00       | 0.00       | 0.00       | 9,000.00    | 4,636.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,100.00       | 0.00       | 0.00       | 9,100.00    | 4,736.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,200.00       | 0.00       | 0.00       | 9,200.00    | 4,836.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,300.00       | 0.00       | 0.00       | 9,300.00    | 4,936.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,363.00       | 0.00       | 0.00       | 9,363.00    | 4,999.00      | 0.00        | 0.00        | 0.00           | 0.00              | 705,367.60       | 670,548.00      |  |
| 9,400.00       | 3.67       | 89.85      | 9,399.97    | 5,035.97      | 0.00        | 1.19        | 1.19           | 9.92              | 705,367.60       | 670,549.19      |  |
| 9,450.00       | 8.63       | 89.85      | 9,449.67    | 5,085.67      | 0.02        | 6.54        | 6.54           | 9.92              | 705,367.62       | 670,554.54      |  |
| 9,500.00       | 13.59      | 89.85      | 9,498.72    | 5,134.72      | 0.04        | 16.18       | 16.18          | 9.92              | 705,367.64       | 670,564.18      |  |
| 9,550.00       | 18.56      | 89.85      | 9,546.75    | 5,182.75      | 0.08        | 30.02       | 30.02          | 9.92              | 705,367.68       | 670,578.02      |  |
| 9,600.00       | 23.52      | 89.85      | 9,593.40    | 5,229.40      | 0.13        | 47.96       | 47.96          | 9.92              | 705,367.73       | 670,595.96      |  |
| 9,650.00       | 28.48      | 89.85      | 9,638.33    | 5,274.33      | 0.18        | 69.87       | 69.87          | 9.92              | 705,367.78       | 670,617.87      |  |
| 9,700.00       | 33.44      | 89.85      | 9,681.19    | 5,317.19      | 0.25        | 95.58       | 95.58          | 9.92              | 705,367.85       | 670,643.58      |  |
| 9,750.00       | 38.40      | 89.85      | 9,721.67    | 5,357.67      | 0.33        | 124.91      | 124.91         | 9.92              | 705,367.93       | 670,672.91      |  |
| 9,800.00       | 43.36      | 89.85      | 9,759.46    | 5,395.46      | 0.41        | 157.62      | 157.62         | 9.92              | 705,368.01       | 670,705.62      |  |
| 9,850.00       | 48.33      | 89.85      | 9,794.28    | 5,430.28      | 0.51        | 193.49      | 193.49         | 9.92              | 705,368.11       | 670,741.49      |  |
| 9,900.00       | 53.29      | 89.85      | 9,825.87    | 5,461.87      | 0.61        | 232.22      | 232.22         | 9.92              | 705,368.21       | 670,780.22      |  |
| 9,950.00       | 58.25      | 89.85      | 9,853.99    | 5,489.99      | 0.72        | 273.55      | 273.55         | 9.92              | 705,368.32       | 670,821.55      |  |
| 10,000.00      | 63.21      | 89.85      | 9,878.43    | 5,514.43      | 0.83        | 317.15      | 317.15         | 9.92              | 705,368.43       | 670,865.15      |  |



# Pathfinder

## Pathfinder X & Y Planning Report



Company: Mack Energy  
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Design: Plan #1

Local Co-ordinate Reference: Well #1H  
TVD Reference: WELL @ 4364.00ft (Original Well Elev)  
MD Reference: WELL @ 4364.00ft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: Midland Database

### Planned Survey

| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|
| 10,050.00  | 68.17      | 89.85      | 9,899.00    | 5,535.00      | 0.95        | 362.70      | 362.70         | 9.92              | 705,368.55       | 670,910.70      |
| 10,100.00  | 73.13      | 89.85      | 9,915.56    | 5,551.56      | 1.07        | 409.86      | 409.87         | 9.92              | 705,368.67       | 670,957.86      |
| 10,150.00  | 78.09      | 89.85      | 9,927.98    | 5,563.98      | 1.20        | 458.28      | 458.28         | 9.92              | 705,368.80       | 671,006.28      |
| 10,200.00  | 83.06      | 89.85      | 9,936.17    | 5,572.17      | 1.33        | 507.59      | 507.59         | 9.92              | 705,368.93       | 671,055.59      |
| 10,250.00  | 88.02      | 89.85      | 9,940.06    | 5,576.06      | 1.46        | 557.42      | 557.42         | 9.92              | 705,369.06       | 671,105.42      |
| 10,291.55  | 92.14      | 89.85      | 9,940.00    | 5,576.00      | 1.57        | 598.96      | 598.96         | 9.92              | 705,369.17       | 671,146.96      |
| 10,300.00  | 92.14      | 89.85      | 9,939.68    | 5,575.68      | 1.59        | 607.41      | 607.41         | 0.01              | 705,369.19       | 671,155.41      |
| 10,323.04  | 92.14      | 89.85      | 9,938.82    | 5,574.82      | 1.65        | 630.43      | 630.43         | 0.01              | 705,369.25       | 671,178.43      |
| 10,400.00  | 92.14      | 89.85      | 9,935.95    | 5,571.95      | 1.85        | 707.34      | 707.34         | 0.00              | 705,369.45       | 671,255.34      |
| 10,500.00  | 92.14      | 89.85      | 9,932.21    | 5,568.21      | 2.11        | 807.27      | 807.27         | 0.00              | 705,369.71       | 671,355.27      |
| 10,600.00  | 92.14      | 89.85      | 9,928.47    | 5,564.47      | 2.38        | 907.20      | 907.20         | 0.00              | 705,369.98       | 671,455.20      |
| 10,692.86  | 92.14      | 89.85      | 9,925.00    | 5,561.00      | 2.62        | 1,000.00    | 1,000.00       | 0.00              | 705,370.22       | 671,548.00      |
| TGT1(CS#1) |            |            |             |               |             |             |                |                   |                  |                 |
| 10,700.00  | 92.00      | 89.85      | 9,924.74    | 5,560.74      | 2.64        | 1,007.13    | 1,007.13       | 2.00              | 705,370.24       | 671,555.13      |
| 10,774.67  | 90.51      | 89.85      | 9,923.11    | 5,559.11      | 2.83        | 1,081.78    | 1,081.78       | 2.00              | 705,370.43       | 671,629.78      |
| 10,800.00  | 90.51      | 89.85      | 9,922.89    | 5,558.89      | 2.90        | 1,107.11    | 1,107.11       | 0.00              | 705,370.50       | 671,655.11      |
| 10,900.00  | 90.51      | 89.85      | 9,922.00    | 5,558.00      | 3.16        | 1,207.10    | 1,207.11       | 0.00              | 705,370.76       | 671,755.10      |
| 11,000.00  | 90.51      | 89.85      | 9,921.12    | 5,557.12      | 3.42        | 1,307.10    | 1,307.10       | 0.00              | 705,371.02       | 671,855.10      |
| 11,100.00  | 90.51      | 89.85      | 9,920.24    | 5,556.24      | 3.68        | 1,407.09    | 1,407.10       | 0.00              | 705,371.28       | 671,955.09      |
| 11,200.00  | 90.51      | 89.85      | 9,919.35    | 5,555.35      | 3.95        | 1,507.09    | 1,507.09       | 0.00              | 705,371.55       | 672,055.09      |
| 11,300.00  | 90.51      | 89.85      | 9,918.47    | 5,554.47      | 4.21        | 1,607.08    | 1,607.09       | 0.00              | 705,371.81       | 672,155.08      |
| 11,400.00  | 90.51      | 89.85      | 9,917.59    | 5,553.59      | 4.47        | 1,707.08    | 1,707.09       | 0.00              | 705,372.07       | 672,255.08      |
| 11,500.00  | 90.51      | 89.85      | 9,916.70    | 5,552.70      | 4.73        | 1,807.08    | 1,807.08       | 0.00              | 705,372.33       | 672,355.08      |
| 11,600.00  | 90.51      | 89.85      | 9,915.82    | 5,551.82      | 4.99        | 1,907.07    | 1,907.08       | 0.00              | 705,372.59       | 672,455.07      |
| 11,692.93  | 90.51      | 89.85      | 9,915.00    | 5,551.00      | 5.24        | 1,999.99    | 2,000.00       | 0.00              | 705,372.84       | 672,547.99      |
| TGT2(CS#1) |            |            |             |               |             |             |                |                   |                  |                 |
| 11,700.00  | 90.65      | 89.85      | 9,914.93    | 5,550.93      | 5.25        | 2,007.07    | 2,007.07       | 2.00              | 705,372.85       | 672,555.07      |



# Pathfinder

## Pathfinder X & Y Planning Report



Company: Mack Energy  
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Design: Plan #1

Local Co-ordinate Reference: Well #1H  
TVD Reference: WELL @ 4364.00ft (Original Well Elev)  
MD Reference: WELL @ 4364.00ft (Original Well Elev)  
North Reference: Gnd  
Survey/Calculation Method: Minimum Curvature  
Database: Midland Database

### Planned Survey

| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|
| 11,725.44  | 91.16      | 89.85      | 9,914.53    | 5,550.53      | 5.32        | 2,032.50    | 2,032.51       | 2.00              | 705,372.92       | 672,580.50      |
| 11,800.00  | 91.16      | 89.85      | 9,913.02    | 5,549.02      | 5.52        | 2,107.05    | 2,107.06       | 0.00              | 705,373.12       | 672,655.05      |
| 11,900.00  | 91.16      | 89.85      | 9,911.01    | 5,547.01      | 5.78        | 2,207.03    | 2,207.04       | 0.00              | 705,373.38       | 672,755.03      |
| 12,000.00  | 91.16      | 89.85      | 9,908.99    | 5,544.99      | 6.04        | 2,307.01    | 2,307.02       | 0.00              | 705,373.64       | 672,855.01      |
| 12,100.00  | 91.16      | 89.85      | 9,906.97    | 5,542.97      | 6.30        | 2,406.99    | 2,406.99       | 0.00              | 705,373.90       | 672,954.99      |
| 12,200.00  | 91.16      | 89.85      | 9,904.95    | 5,540.95      | 6.56        | 2,506.97    | 2,506.97       | 0.00              | 705,374.16       | 673,054.97      |
| 12,300.00  | 91.16      | 89.85      | 9,902.93    | 5,538.93      | 6.82        | 2,606.95    | 2,606.95       | 0.00              | 705,374.42       | 673,154.95      |
| 12,400.00  | 91.16      | 89.85      | 9,900.92    | 5,536.92      | 7.09        | 2,706.92    | 2,706.93       | 0.00              | 705,374.69       | 673,254.92      |
| 12,500.00  | 91.16      | 89.85      | 9,898.90    | 5,534.90      | 7.35        | 2,806.90    | 2,806.91       | 0.00              | 705,374.95       | 673,354.90      |
| 12,600.00  | 91.16      | 89.85      | 9,896.88    | 5,532.88      | 7.61        | 2,906.88    | 2,906.89       | 0.00              | 705,375.21       | 673,454.88      |
| 12,693.13  | 91.16      | 89.85      | 9,895.00    | 5,531.00      | 7.85        | 2,999.99    | 3,000.00       | 0.00              | 705,375.45       | 673,547.99      |
| TGT3(CS#1) |            |            |             |               |             |             |                |                   |                  |                 |
| 12,708.09  | 90.86      | 89.85      | 9,894.74    | 5,530.74      | 7.89        | 3,014.95    | 3,014.96       | 2.00              | 705,375.49       | 673,562.95      |
| 12,800.00  | 90.86      | 89.85      | 9,893.36    | 5,529.36      | 8.13        | 3,106.85    | 3,106.86       | 0.00              | 705,375.73       | 673,654.85      |
| 12,900.00  | 90.86      | 89.85      | 9,891.87    | 5,527.87      | 8.40        | 3,206.84    | 3,206.85       | 0.00              | 705,376.00       | 673,754.84      |
| 13,000.00  | 90.86      | 89.85      | 9,890.37    | 5,526.37      | 8.66        | 3,306.83    | 3,306.84       | 0.00              | 705,376.26       | 673,854.83      |
| 13,100.00  | 90.86      | 89.85      | 9,888.87    | 5,524.87      | 8.92        | 3,406.82    | 3,406.83       | 0.00              | 705,376.52       | 673,954.82      |
| 13,200.00  | 90.86      | 89.85      | 9,887.38    | 5,523.38      | 9.18        | 3,506.80    | 3,506.82       | 0.00              | 705,376.78       | 674,054.80      |
| 13,300.00  | 90.86      | 89.85      | 9,885.88    | 5,521.88      | 9.44        | 3,606.79    | 3,606.81       | 0.00              | 705,377.04       | 674,154.79      |
| 13,400.00  | 90.86      | 89.85      | 9,884.39    | 5,520.39      | 9.70        | 3,706.78    | 3,706.79       | 0.00              | 705,377.30       | 674,254.78      |
| 13,500.00  | 90.86      | 89.85      | 9,882.89    | 5,518.89      | 9.97        | 3,806.77    | 3,806.78       | 0.00              | 705,377.57       | 674,354.77      |
| 13,600.00  | 90.86      | 89.85      | 9,881.39    | 5,517.39      | 10.23       | 3,906.76    | 3,906.77       | 0.00              | 705,377.83       | 674,454.76      |
| 13,693.24  | 90.86      | 89.85      | 9,880.00    | 5,516.00      | 10.47       | 3,999.99    | 4,000.00       | 0.00              | 705,378.07       | 674,547.99      |
| TGT4(CS#1) |            |            |             |               |             |             |                |                   |                  |                 |
| 13,702.42  | 91.04      | 89.85      | 9,879.85    | 5,515.85      | 10.50       | 4,009.17    | 4,009.18       | 2.00              | 705,378.10       | 674,557.17      |
| 13,800.00  | 91.04      | 89.85      | 9,878.08    | 5,514.08      | 10.75       | 4,106.73    | 4,106.74       | 0.00              | 705,378.35       | 674,654.73      |
| 13,900.00  | 91.04      | 89.85      | 9,876.26    | 5,512.26      | 11.02       | 4,206.71    | 4,206.73       | 0.00              | 705,378.62       | 674,754.71      |



# Pathfinder

## Pathfinder X & Y Planning Report



Company: Mack Energy  
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Design: Plan #1

Local Co-ordinate Reference: Well #1H  
TVD Reference: WELL @ 4364.00ft (Original Well Elev)  
MD Reference: WELL @ 4364.00ft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: Midland Database

### Planned Survey

| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|
| 13,969.30  | 91.04      | 89.85      | 9,875.00    | 5,511.00      | 11.20       | 4,276.00    | 4,276.01       | 0.00              | 705,378.80       | 674,824.00      |
| PBHL(CS#1) |            |            |             |               |             |             |                |                   |                  |                 |

### Targets

| Target Name<br>- hit/miss target<br>- Shape        | Dip Angle<br>(°) | Dip Dir.<br>(°) | TVD<br>(ft) | +N/-S<br>(ft) | +E/-W<br>(ft) | Northing<br>(ft) | Easting<br>(ft) | Latitude         | Longitude         |
|----------------------------------------------------|------------------|-----------------|-------------|---------------|---------------|------------------|-----------------|------------------|-------------------|
| TGT1(CS#1)<br>- plan hits target center<br>- Point | 0.00             | 0.00            | 9,925.00    | 2.62          | 1,000.00      | 705,370.218      | 671,547.997     | 32° 56' 16.391 N | 103° 46' 27.050 W |
| TGT2(CS#1)<br>- plan hits target center<br>- Point | 0.00             | 0.00            | 9,915.00    | 5.24          | 1,999.99      | 705,372.836      | 672,547.993     | 32° 56' 16.364 N | 103° 46' 15.317 W |
| TGT3(CS#1)<br>- plan hits target center<br>- Point | 0.00             | 0.00            | 9,895.00    | 7.85          | 2,999.99      | 705,375.454      | 673,547.990     | 32° 56' 16.337 N | 103° 46' 3.583 W  |
| PBHL(CS#1)<br>- plan hits target center<br>- Point | 0.00             | 0.00            | 9,875.00    | 11.20         | 4,276.00      | 705,378.800      | 674,824.000     | 32° 56' 16.302 N | 103° 45' 48.611 W |
| TGT4(CS#1)<br>- plan hits target center<br>- Point | 0.00             | 0.00            | 9,880.00    | 10.47         | 3,999.99      | 705,378.072      | 674,547.986     | 32° 56' 16.310 N | 103° 45' 51.849 W |

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



Azimuths to Grid North  
True North: -0.30°  
Magnetic North: 7.51°

Magnetic Field  
Strength: 49120.2snT  
Dip Angle: 60.85°  
Date: 09/26/2010  
Model: IGRF200510

# PATHFINDER

## WELL DETAILS #1H

Ground Elevation... 4346.00  
RKB Elevation WELL @ 4364.00ft (Original Well Elev)  
Rig Name Original Well Elev

| +N/-S | +E/-W | Northing   | Easting    | Latitude         | Longitude         | Slot |
|-------|-------|------------|------------|------------------|-------------------|------|
| 0.00  | 0.00  | 705367.600 | 670548.000 | 32° 56' 16.418 N | 103° 46' 38.784 W |      |

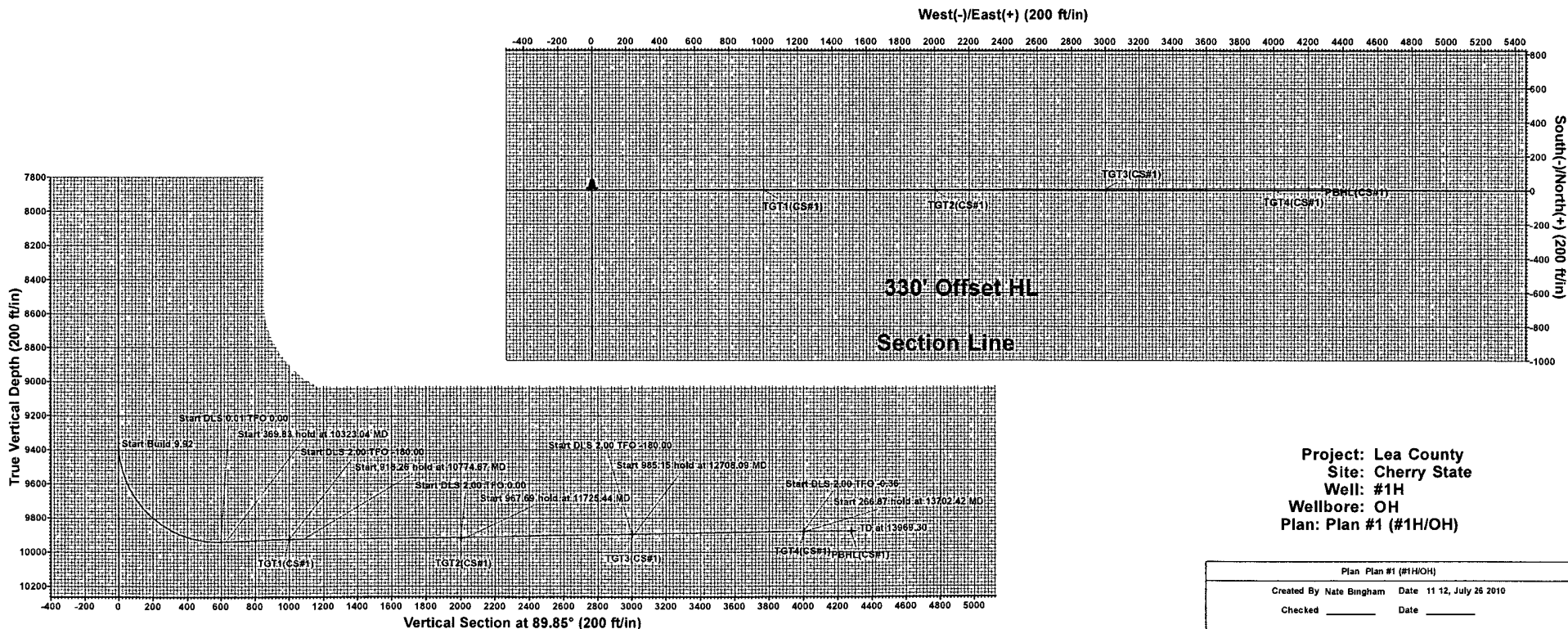
## SECTION DETAILS

| Sec | MD       | Inc   | Azi   | TVD     | +N/-S | +E/-W   | DLeg | TFace  | VSec    | Target     |
|-----|----------|-------|-------|---------|-------|---------|------|--------|---------|------------|
| 1   | 0.00     | 0.00  | 0.00  | 0.00    | 0.00  | 0.00    | 0.00 | 0.00   | 0.00    |            |
| 2   | 8363.00  | 0.00  | 0.00  | 8363.00 | 0.00  | 0.00    | 0.00 | 0.00   | 0.00    |            |
| 3   | 10291.55 | 92.14 | 89.85 | 9940.00 | 1.57  | 598.96  | 9.92 | 89.85  | 598.96  |            |
| 4   | 10291.59 | 92.14 | 89.85 | 9940.00 | 1.57  | 599.00  | 0.00 | 0.00   | 599.00  |            |
| 5   | 10692.86 | 92.14 | 89.85 | 9925.00 | 2.62  | 1000.00 | 0.00 | 0.00   | 1000.00 | TGT1(CS#1) |
| 6   | 10774.55 | 90.51 | 89.85 | 9923.11 | 2.83  | 1081.66 | 2.00 | 180.00 | 1081.66 |            |
| 7   | 11692.93 | 90.51 | 89.85 | 9915.00 | 5.24  | 1999.99 | 0.00 | 0.00   | 2000.00 | TGT2(CS#1) |
| 8   | 11725.43 | 91.16 | 89.85 | 9914.53 | 5.32  | 2032.50 | 2.00 | 0.00   | 2032.50 |            |
| 9   | 12693.13 | 91.16 | 89.85 | 9895.00 | 7.65  | 2899.99 | 0.00 | 0.00   | 3000.00 | TGT3(CS#1) |
| 10  | 12708.09 | 90.86 | 89.85 | 9894.74 | 7.89  | 3014.95 | 2.00 | 180.00 | 3014.96 |            |
| 11  | 13693.24 | 90.86 | 89.85 | 9880.00 | 10.47 | 3999.99 | 0.00 | 0.00   | 4000.00 | TGT4(CS#1) |
| 12  | 13702.42 | 91.04 | 89.85 | 9879.85 | 10.50 | 4009.17 | 2.00 | -0.36  | 4009.18 |            |
| 13  | 13969.30 | 91.04 | 89.85 | 9875.00 | 11.20 | 4276.00 | 0.00 | 0.00   | 4276.01 | PBHL(CS#1) |

PROJECT DETAILS: Lea County  
Geodetic System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: New Mexico East 3001  
System Datum: Mean Sea Level  
Local North: Grid

## WELLBORE TARGET DETAILS

| Name       | TVD     | +N/-S | +E/-W   | Shape |
|------------|---------|-------|---------|-------|
| PBHL(CS#1) | 9875.00 | 11.20 | 4276.00 | Point |
| TGT4(CS#1) | 9880.00 | 10.47 | 3999.99 | Point |
| TGT3(CS#1) | 9895.00 | 7.85  | 2999.99 | Point |
| TGT2(CS#1) | 9915.00 | 5.24  | 1999.99 | Point |
| TGT1(CS#1) | 9925.00 | 2.62  | 1000.00 | Point |



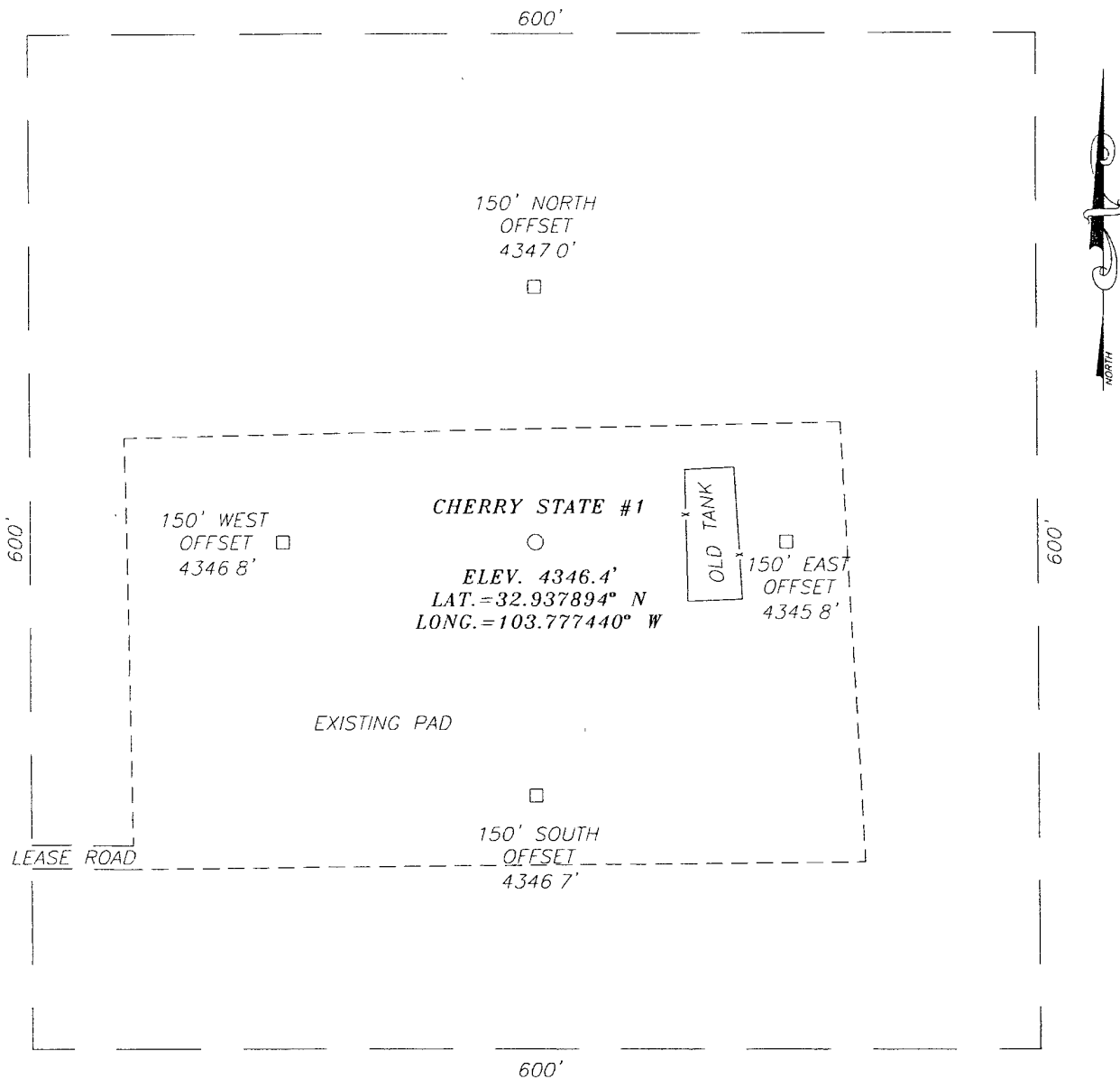
Project: Lea County  
Site: Cherry State  
Well: #1H  
Wellbore: OH  
Plan: Plan #1 (#1H/OH)

Plan Plan #1 (#1H/OH)

Created By Nate Bingham Date 11/12, July 26 2010

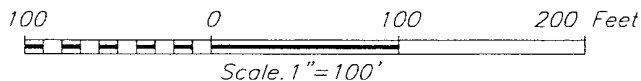
Checked \_\_\_\_\_ Date \_\_\_\_\_

**SECTION 9, TOWNSHIP 16 SOUTH, RANGE 32 EAST, N.M.P.M.,**  
 LEA COUNTY, NEW MEXICO



**DIRECTIONS TO LOCATION**

FROM THE INTERSECTION OF ST HWY. #249 AND  
 CO RD. L121 (ARIES RD), GO NORTH APPROX  
 0.1 MILE. VEER RIGHT AND GO EAST APPROX. 0.8  
 MILES TO EXSTING WELL PAD.



**MACK ENERGY CORPORATION**

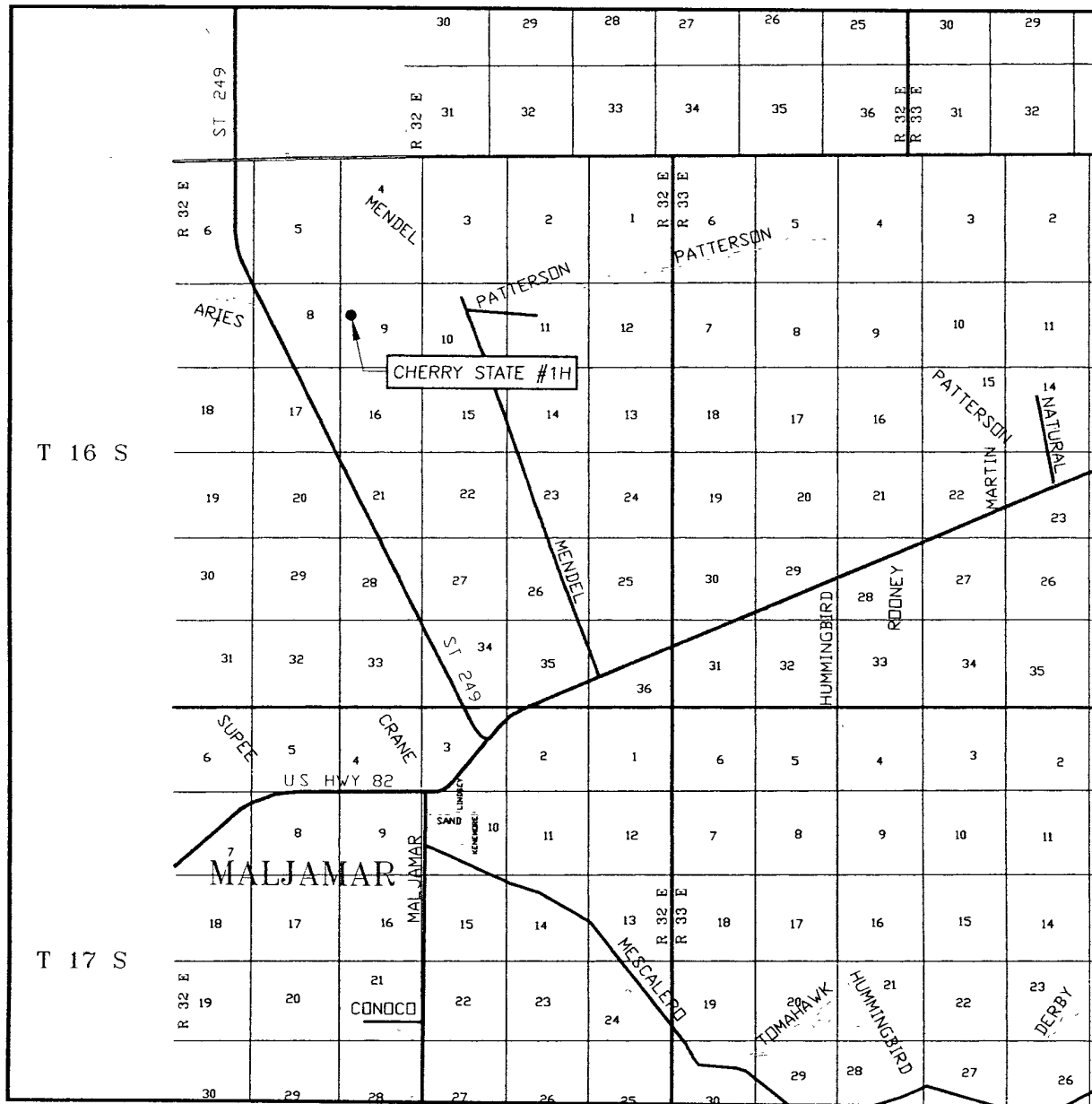
CHERRY STATE #1H WELL  
 LOCATED 1982 FEET FROM THE NORTH LINE  
 AND 662 FEET FROM THE WEST LINE OF SECTION 9,  
 TOWNSHIP 16 SOUTH, RANGE 32 EAST, N.M.P.M.,  
 LEA COUNTY, NEW MEXICO.

|                        |                     |
|------------------------|---------------------|
| Survey Date: 7/15/10   | Sheet 1 of 1 Sheets |
| W O Number. 10.11 0990 | Dr By LA            |
| Date 7/22/10           | 10110990            |
|                        | Scale. 1"=100'      |



PROVIDING SURVEYING SERVICES  
 SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
 412 N DAL PASO  
 HOBBS, N.M. 88240  
 (575) 393-3117

# VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 9 TWP. 16-S RGE 32-E

SURVEY N M P M

COUNTY LEA STATE NEW MEXICO

DESCRIPTION 1982' FNL & 662' FWL

ELEVATION 4346'

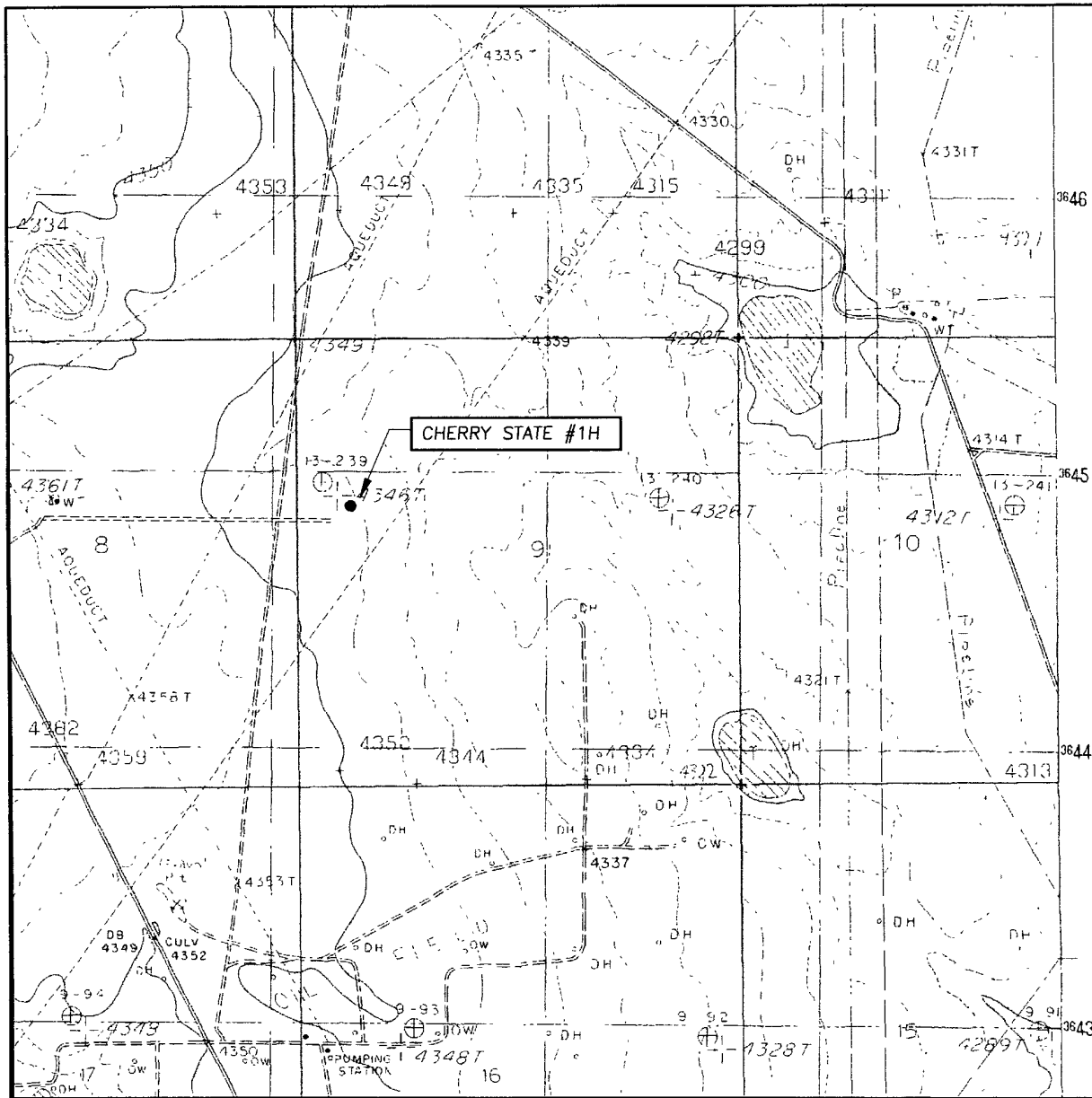
OPERATOR MACK ENERGY CORPORATION

LEASE CHERRY STATE



PROVIDING SURVEYING SERVICES  
SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
412 N. DAL PASO  
HOBBS, N M 88240  
(575) 393-3117

# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:

MALJAMAR NE, N.M. - 10'

SUPPLEMENTAL CONTOUR INTERVAL - 5'

SEC. 9 TWP. 16-S RGE. 32-E

SURVEY N.M.P.M

COUNTY LEA STATE NEW MEXICO

DESCRIPTION 1982' FNL & 662' FWL

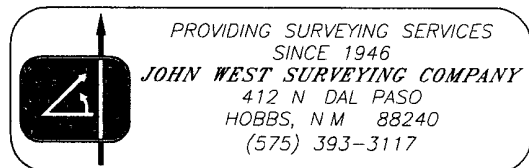
ELEVATION 4346'

OPERATOR MACK ENERGY CORPORATION

LEASE CHERRY STATE

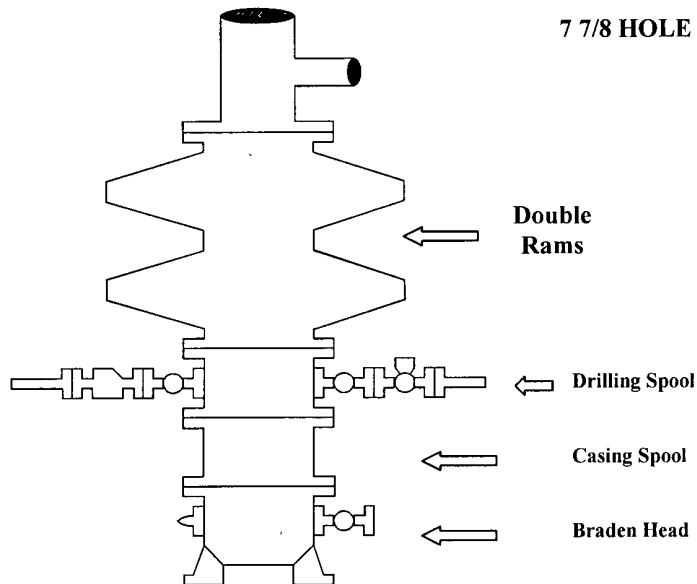
U.S.G.S. TOPOGRAPHIC MAP

MALJAMAR NE, N.M.

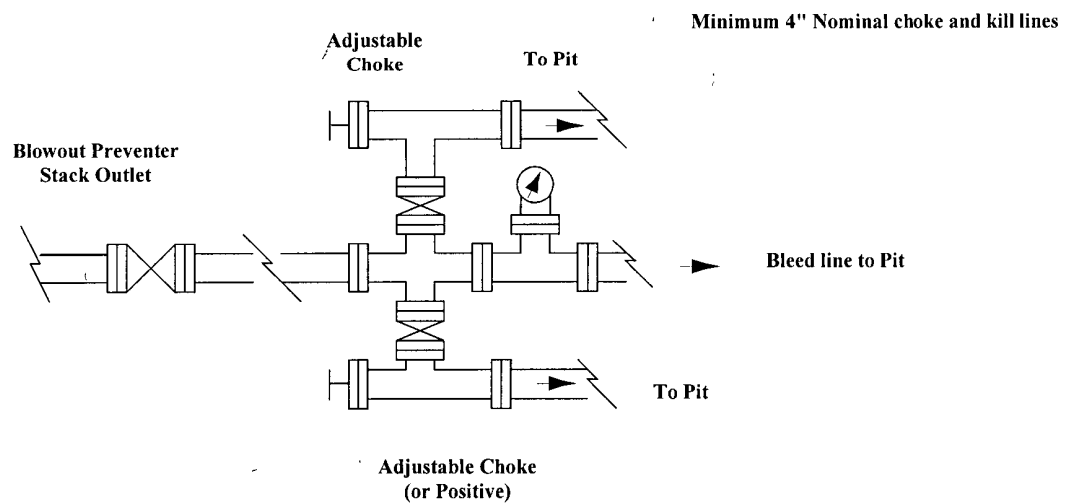


# Mack Energy Corporation

## Exhibit #1-A BOPE Schematic



Choke Manifold Requirement (3000 psi WP)  
No Annular Required



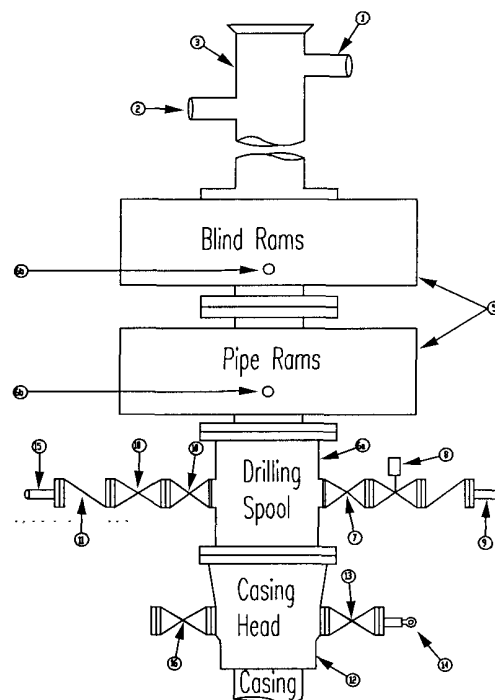
**Mack Energy Corporation**  
**Minimum Blowout Preventer Requirements**  
 3000 psi Working Pressure  
 3 MWP  
 EXHIBIT #1-A

**Stack Requirements**

| NO | Items                                                                          | Min. I.D. | Min. Nominal |
|----|--------------------------------------------------------------------------------|-----------|--------------|
| 1  | Flowline                                                                       |           | 2"           |
| 2  | Fill up line                                                                   |           | 2"           |
| 3  | Drilling nipple                                                                |           |              |
| 4  | Annular preventer                                                              |           |              |
| 5  | Two single or one dual hydraulically operated rams                             |           |              |
| 6a | Drilling spool with 2" min kill line and 3" min choke line outlets             |           | 2" Choke     |
| 6b | 2" min kill line and 3" min. choke line outlets in ram (Alternate to 6a above) |           |              |
| 7  | Valve Gate Plug                                                                | 3 1/8     |              |
| 8  | Gate valve-power operated                                                      | 3 1/8     |              |
| 9  | Line to choke manifold                                                         |           | 3"           |
| 10 | Valve Gate Plug                                                                | 2 1/16    |              |
| 11 | Check valve                                                                    | 2 1/16    |              |
| 12 | Casing head                                                                    |           |              |
| 13 | Valve Gate Plug                                                                | 1 13/16   |              |
| 14 | Pressure gauge with needle valve                                               |           |              |
| 15 | Kill line to rig mud pump manifold                                             |           | 2"           |

**OPTIONAL**

|    |               |         |  |
|----|---------------|---------|--|
| 16 | Flanged Valve | 1 13/16 |  |
|----|---------------|---------|--|



**CONTRACTOR'S OPTION TO FURNISH.**

- 1 All equipment and connections above bradenhead or casinghead Working pressure of preventers to be 3000 psi minimum
- 2 Automatic accumulator (80 gallon, minimum) capable of closing BOP in 30 seconds or less and, holding them closed against full rated working pressure
- 3 BOP controls, to be located near drillers' position.
- 4 Kelly equipped with Kelly cock.
- 5 Inside blowout preventer or its equivalent on derrick floor at all times with proper threads to fit pipe being used.
- 6 Kelly saver-sub equipped with rubber casing protector at all times.
- 7 Plug type blowout preventer tester
- 8 Extra set pipe rams to fit drill pipe in use on location at all times.
- 9 Type RX ring gaskets in place of Type R.

**MEC TO FURNISH.**

- 1 Bradenhead or casing head and side valves.
- 2 Wear bushing. If required

**GENERAL NOTES:**

- 1 Deviations from this drawing may be made only with the express permission of MEC's Drilling Manager.
- 2 All connections, valves, fittings, piping, etc., subject to well or pump pressure must be flanged (suitable clamp connections acceptable) and have minimum working pressure equal to rated working pressure of preventers up through choke valves must be full opening and suitable for high pressure mud service
3. Controls to be of standard design and each marked, showing opening and closing position
4. Chokes will be positioned so as not to hamper or delay changing of choke beans. Replaceable parts for adjustable choke, or bean sizes, retainers, and choke wrenches to be conveniently located for immediate use.
5. All valves to be equipped with handwheels or handles ready for immediate use.
6. Choke lines must be suitably anchored.
7. Handwheels and extensions to be connected and ready for use
- 8 Valves adjacent to drilling spool to be kept open Use outside valves except for emergency
9. All seamless steel control piping (2000 psi working pressure) to have flexible joints to avoid stress Hoses will be permitted.
- 10 Casinghead connections shall not be used except in case of emergency
11. Do not use kill line for routine fill up operations

# Mack Energy Corporation

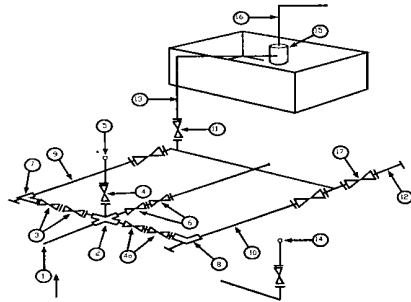
Exhibit #1-A

## MINIMUM CHOKE MANIFOLD

3,000, 5,000, and 10,000 PSI Working Pressure

3 M will be used or greater

3 MWP - 5 MWP - 10 MWP



Mud Pit

Reserve Pit

\* Location of separator optional

Below Substructure

### Minimum requirements

| No. |                                                  | 3,000 MWP |         |        | 5,000 MWP |         |        | 10,000 MWP |         |        |
|-----|--------------------------------------------------|-----------|---------|--------|-----------|---------|--------|------------|---------|--------|
|     |                                                  | I.D.      | NOMINAL | Rating | I.D.      | Nominal | Rating | I.D.       | Nominal | Rating |
| 1   | Line from drilling Spool                         |           | 3"      | 3,000  |           | 3"      | 5,000  |            | 3"      | 10,000 |
| 2   | Cross 3" x 3" x 3" x 2"                          |           |         | 3,000  |           |         | 5,000  |            |         |        |
| 2   | Cross 3" x 3" x 3" x 2"                          |           |         |        |           |         |        |            |         | 10,000 |
| 3   | Valve Gate Plug                                  | 3 1/8     |         | 3,000  | 3 1/8     |         | 5,000  | 3 1/8      |         | 10,000 |
| 4   | Valve Gate Plug                                  | 1 13/16   |         | 3,000  | 1 13/16   |         | 5,000  | 1 13/16    |         | 10,000 |
| 4a  | Valves (1)                                       | 2 1/16    |         | 3,000  | 2 1/16    |         | 5,000  | 2 1/16     |         | 10,000 |
| 5   | Pressure Gauge                                   |           |         | 3,000  |           |         | 5,000  |            |         | 10,000 |
| 6   | Valve Gate Plug                                  | 3 1/8     |         | 3,000  | 3 1/8     |         | 5,000  | 3 1/8      |         | 10,000 |
| 7   | Adjustable Choke (3)                             | 2"        |         | 3,000  | 2"        |         | 5,000  | 2"         |         | 10,000 |
| 8   | Adjustable Choke                                 | 1"        |         | 3,000  | 1"        |         | 5,000  | 2"         |         | 10,000 |
| 9   | Line                                             |           | 3"      | 3,000  |           | 3"      | 5,000  |            | 3"      | 10,000 |
| 10  | Line                                             |           | 2"      | 3,000  |           | 2"      | 5,000  |            | 2"      | 10,000 |
| 11  | Valve Gate Plug                                  | 3 1/8     |         | 3,000  | 3 1/8     |         | 5,000  | 3 1/8      |         | 10,000 |
| 12  | Line                                             |           | 3"      | 1,000  |           | 3"      | 1,000  |            | 3"      | 2,000  |
| 13  | Line                                             |           | 3"      | 1,000  |           | 3"      | 1,000  |            | 3"      | 2,000  |
| 14  | Remote reading compound Standpipe pressure quage |           |         | 3,000  |           |         | 5,000  |            |         | 10,000 |
| 15  | Gas Separator                                    |           | 2' x 5' |        |           | 2' x 5' |        |            | 2' x 5' |        |
| 16  | Line                                             |           | 4"      | 1,000  |           | 4"      | 1,000  |            | 4"      | 2,000  |
| 17  | Valve Gate Plug                                  | 3 1/8     |         | 3,000  | 3 1/8     |         | 5,000  | 3 1/8      |         | 10,000 |

- (1) Only one required in Class 3M
- (2) Gate valves only shall be used for Class 10 M
- (3) Remote operated hydraulic choke required on 5,000 psi and 10,000 psi for drilling.

### EQUIPMENT SPECIFICATIONS AND INSTALLATION INSTRUCTION

1. All connections in choke manifold shall be welded, studded, flanged or Cameron clamp of comparable rating
2. All flanges shall be API 6B or 6BX and ring gaskets shall be API RX or BX. Use only BX for 10 MWP.
3. All lines shall be securely anchored.
4. Chokes shall be equipped with tungsten carbide seats and needles, and replacements shall be available.
5. Choke manifold pressure and standpipe pressure gauges shall be available at the choke manifold to assist in regulating chokes. As an alternate with automatic chokes, a choke manifold pressure gauge shall be located on the rig floor in conjunction with the standpipe pressure gauge.
6. Line from drilling spool to choke manifold should be as straight as possible. Lines downstream from chokes shall make turns by large bends or 90 degree bends using bull plugged tees