

**NM OIL CONSERVATION**  
ARTESIA DISTRICT

JUN 09 2014

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## **Apache Corporation**

Eddy County, NM (NAD27 NME)

MJ State

#4 API # 30-015-41961

SL: 1200' FNL + 1140' FWL U.L.D 02-18S-27E Lot: 4

WB1/Job #1410348

Design: Surveys (Capstar 120)

## **Standard Survey Report**

13 March, 2014

# Survey Report

|                  |                             |                                     |                                |
|------------------|-----------------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | Apache Corporation          | <b>Local Co-ordinate Reference:</b> | Well #4                        |
| <b>Project:</b>  | Eddy County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB @ 3595.00usft (Capstar 120) |
| <b>Site:</b>     | MJ State                    | <b>MD Reference:</b>                | KB @ 3595.00usft (Capstar 120) |
| <b>Well:</b>     | #4                          | <b>North Reference:</b>             | Grid                           |
| <b>Wellbore:</b> | WB1/Job #1410348            | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Surveys (Capstar 120)       | <b>Database:</b>                    | Compass 5000 GCR DB            |

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Eddy County, NM (NAD27 NME)          |                      |                |
| <b>Map System:</b> | US State Plane 1927 (Exact solution) | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | NAD 1927 (NADCON CONUS)              |                      |                |
| <b>Map Zone:</b>   | New Mexico East 3001                 |                      |                |

|                              |           |                          |                     |
|------------------------------|-----------|--------------------------|---------------------|
| <b>Site</b>                  | MJ State  |                          |                     |
| <b>Site Position:</b>        |           | <b>Northing:</b>         | 647,482.70 usft     |
| <b>From:</b>                 | Map       | <b>Easting:</b>          | 524,494.70 usft     |
| <b>Position Uncertainty:</b> | 0.00 usft | <b>Slot Radius:</b>      | 13-3/16 "           |
|                              |           | <b>Latitude:</b>         | 32° 46' 47.98527 N  |
|                              |           | <b>Longitude:</b>        | 104° 15' 13.08526 W |
|                              |           | <b>Grid Convergence:</b> | 0.04 °              |

|                             |           |                            |                                  |
|-----------------------------|-----------|----------------------------|----------------------------------|
| <b>Well</b>                 | #4        |                            |                                  |
| <b>Well Position</b>        | +N/-S     | 0.00 usft                  | <b>Northing:</b> 647,482.70 usft |
|                             | +E/-W     | 0.00 usft                  | <b>Easting:</b> 524,494.70 usft  |
| <b>Position Uncertainty</b> | 0.00 usft | <b>Wellhead Elevation:</b> | usft                             |
|                             |           | <b>Latitude:</b>           | 32° 46' 47.98527 N               |
|                             |           | <b>Longitude:</b>          | 104° 15' 13.08526 W              |
|                             |           | <b>Ground Level:</b>       | 3,584.00 usft                    |

|                  |                   |                    |                                   |
|------------------|-------------------|--------------------|-----------------------------------|
| <b>Wellbore</b>  | WB1/Job #1410348  |                    |                                   |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b>            |
|                  | BGGM2013          | 02/24/14           | 7.73                              |
|                  |                   |                    | <b>Dip Angle (°)</b> 60.50        |
|                  |                   |                    | <b>Field Strength (nT)</b> 48,577 |

|                          |                                |                      |                             |
|--------------------------|--------------------------------|----------------------|-----------------------------|
| <b>Design</b>            | Surveys (Capstar 120)          |                      |                             |
| <b>Audit Notes:</b>      |                                |                      |                             |
| <b>Version:</b>          | 1.0                            | <b>Phase:</b>        | ACTUAL                      |
|                          |                                | <b>Tie On Depth:</b> | 0.00                        |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b>  | <b>+E/-W (usft)</b>         |
|                          | 0.00                           | 0.00                 | 0.00                        |
|                          |                                |                      | <b>Direction (°)</b> 322.93 |

|                       |                  |                                      |                  |                                  |
|-----------------------|------------------|--------------------------------------|------------------|----------------------------------|
| <b>Survey Program</b> | <b>Date</b>      | 03/13/14                             |                  |                                  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>             | <b>Tool Name</b> | <b>Description</b>               |
| 100.00                | 300.00           | Gyrodata Survey (WB1/Job #1410348)   | NS-GYRO-MS       | North sensing gyrocompassing m/s |
| 340.00                | 4,001.00         | Phoenix MWD Survey (WB1/Job #141034) | MWD              | MWD - Standard                   |

|                                 |                        |                    |                              |                     |                     |                                |                                |                               |                              |
|---------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|
| <b>Survey</b>                   |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| <b>Measured Depth (usft)</b>    | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Vertical Section (usft)</b> | <b>Dogleg Rate (°/100usft)</b> | <b>Build Rate (°/100usft)</b> | <b>Turn Rate (°/100usft)</b> |
| 0.00                            | 0.00                   | 0.00               | 0.00                         | 0.00                | 0.00                | 0.00                           | 0.00                           | 0.00                          | 0.00                         |
| 100.00                          | 0.25                   | 94.74              | 100.00                       | -0.02               | 0.22                | -0.15                          | 0.25                           | 0.25                          | 0.00                         |
| 200.00                          | 0.40                   | 134.11             | 200.00                       | -0.28               | 0.69                | -0.64                          | 0.26                           | 0.15                          | 39.37                        |
| 300.00                          | 0.34                   | 128.10             | 300.00                       | -0.71               | 1.17                | -1.27                          | 0.07                           | -0.06                         | -6.01                        |
| <b>Tie In to Gyro Survey</b>    |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| 340.00                          | 0.30                   | 154.20             | 340.00                       | -0.87               | 1.31                | -1.49                          | 0.37                           | -0.10                         | 65.25                        |
| <b>First Phoenix MWD Survey</b> |                        |                    |                              |                     |                     |                                |                                |                               |                              |
| 400.00                          | 0.50                   | 315.60             | 399.99                       | -0.83               | 1.19                | -1.38                          | 1.32                           | 0.33                          | 269.00                       |
| 460.00                          | 0.70                   | 317.90             | 459.99                       | -0.37               | 0.76                | -0.75                          | 0.34                           | 0.33                          | 3.83                         |

# Survey Report

|                  |                             |                                     |                                |
|------------------|-----------------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | Apache Corporation          | <b>Local Co-ordinate Reference:</b> | Well #4                        |
| <b>Project:</b>  | Eddy County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB @ 3595.00usft (Capstar 120) |
| <b>Site:</b>     | MJ State                    | <b>MD Reference:</b>                | KB @ 3595.00usft (Capstar 120) |
| <b>Well:</b>     | #4                          | <b>North Reference:</b>             | Grid                           |
| <b>Wellbore:</b> | WB1/Job #1410348            | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Surveys (Capstar 120)       | <b>Database:</b>                    | Compass 5000 GCR DB            |

| Survey                          |                 |             |                       |              |              |                         |                         |                        |                       |
|---------------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft)           | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 519.00                          | 2.10            | 323.20      | 518.97                | 0.77         | -0.12        | 0.69                    | 2.38                    | 2.37                   | 8.98                  |
| 635.00                          | 3.60            | 334.60      | 634.83                | 5.76         | -2.96        | 6.38                    | 1.38                    | 1.29                   | 9.83                  |
| 720.00                          | 4.00            | 332.30      | 719.64                | 10.79        | -5.48        | 11.92                   | 0.50                    | 0.47                   | -2.71                 |
| 806.00                          | 5.00            | 325.40      | 805.37                | 16.53        | -9.01        | 18.62                   | 1.32                    | 1.16                   | -8.02                 |
| 891.00                          | 6.50            | 327.80      | 889.94                | 23.65        | -13.67       | 27.12                   | 1.79                    | 1.76                   | 2.82                  |
| 976.00                          | 7.80            | 318.60      | 974.28                | 32.05        | -20.05       | 37.66                   | 2.03                    | 1.53                   | -10.82                |
| 1,061.00                        | 7.10            | 318.60      | 1,058.57              | 40.32        | -27.34       | 48.65                   | 0.82                    | -0.82                  | 0.00                  |
| 1,147.00                        | 6.30            | 319.10      | 1,143.98              | 47.87        | -33.94       | 58.66                   | 0.93                    | -0.93                  | 0.58                  |
| 1,232.00                        | 7.60            | 320.10      | 1,228.35              | 55.71        | -40.60       | 68.93                   | 1.54                    | 1.53                   | 1.18                  |
| 1,318.00                        | 6.70            | 320.80      | 1,313.68              | 63.96        | -47.42       | 79.62                   | 1.05                    | -1.05                  | 0.81                  |
| 1,403.00                        | 8.00            | 321.80      | 1,397.98              | 72.45        | -54.21       | 90.49                   | 1.54                    | 1.53                   | 1.18                  |
| 1,489.00                        | 7.80            | 321.70      | 1,483.17              | 81.74        | -61.53       | 102.31                  | 0.23                    | -0.23                  | -0.12                 |
| 1,574.00                        | 7.40            | 321.50      | 1,567.42              | 90.55        | -68.51       | 113.55                  | 0.47                    | -0.47                  | -0.24                 |
| 1,660.00                        | 7.30            | 322.60      | 1,652.71              | 99.22        | -75.28       | 124.55                  | 0.20                    | -0.12                  | 1.28                  |
| 1,745.00                        | 7.50            | 322.50      | 1,737.00              | 107.91       | -81.94       | 135.49                  | 0.24                    | 0.24                   | -0.12                 |
| 1,830.00                        | 7.30            | 322.30      | 1,821.30              | 116.59       | -88.62       | 146.44                  | 0.24                    | -0.24                  | -0.24                 |
| 1,916.00                        | 7.10            | 322.80      | 1,906.62              | 125.14       | -95.17       | 157.22                  | 0.24                    | -0.23                  | 0.58                  |
| 2,001.00                        | 6.90            | 323.90      | 1,990.98              | 133.45       | -101.36      | 167.58                  | 0.28                    | -0.24                  | 1.29                  |
| 2,086.00                        | 6.70            | 324.00      | 2,075.39              | 141.59       | -107.28      | 177.64                  | 0.24                    | -0.24                  | 0.12                  |
| 2,171.00                        | 8.30            | 324.20      | 2,159.66              | 150.58       | -113.78      | 188.73                  | 1.88                    | 1.88                   | 0.24                  |
| 2,257.00                        | 8.20            | 325.20      | 2,244.77              | 160.65       | -120.91      | 201.07                  | 0.20                    | -0.12                  | 1.16                  |
| 2,342.00                        | 8.10            | 324.40      | 2,328.91              | 170.49       | -127.86      | 213.11                  | 0.18                    | -0.12                  | -0.94                 |
| 2,427.00                        | 8.00            | 324.80      | 2,413.07              | 180.20       | -134.75      | 225.01                  | 0.13                    | -0.12                  | 0.47                  |
| 2,513.00                        | 7.10            | 321.70      | 2,498.32              | 189.26       | -141.50      | 236.30                  | 1.15                    | -1.05                  | -3.60                 |
| 2,598.00                        | 6.90            | 321.10      | 2,582.69              | 197.35       | -147.96      | 246.66                  | 0.25                    | -0.24                  | -0.71                 |
| 2,684.00                        | 6.60            | 320.50      | 2,668.09              | 205.19       | -154.35      | 256.76                  | 0.36                    | -0.35                  | -0.70                 |
| 2,769.00                        | 6.40            | 319.90      | 2,752.55              | 212.58       | -160.51      | 266.37                  | 0.25                    | -0.24                  | -0.71                 |
| 2,854.00                        | 6.20            | 319.70      | 2,837.03              | 219.70       | -166.53      | 275.68                  | 0.24                    | -0.24                  | -0.24                 |
| 2,939.00                        | 5.00            | 324.40      | 2,921.63              | 226.22       | -171.65      | 283.97                  | 1.51                    | -1.41                  | 5.53                  |
| 3,025.00                        | 2.90            | 317.90      | 3,007.42              | 230.88       | -175.29      | 289.88                  | 2.49                    | -2.44                  | -7.56                 |
| 3,110.00                        | 2.60            | 314.30      | 3,092.32              | 233.82       | -178.11      | 293.93                  | 0.41                    | -0.35                  | -4.24                 |
| 3,196.00                        | 0.60            | 326.30      | 3,178.28              | 235.56       | -179.76      | 296.31                  | 2.35                    | -2.33                  | 13.95                 |
| 3,281.00                        | 0.40            | 338.90      | 3,263.28              | 236.21       | -180.11      | 297.04                  | 0.27                    | -0.24                  | 14.82                 |
| 3,366.00                        | 0.40            | 320.40      | 3,348.28              | 236.71       | -180.41      | 297.62                  | 0.15                    | 0.00                   | -21.76                |
| 3,452.00                        | 0.50            | 330.60      | 3,434.28              | 237.27       | -180.79      | 298.29                  | 0.15                    | 0.12                   | 11.86                 |
| 3,537.00                        | 0.40            | 306.70      | 3,519.27              | 237.77       | -181.21      | 298.95                  | 0.25                    | -0.12                  | -28.12                |
| 3,622.00                        | 0.40            | 291.90      | 3,604.27              | 238.06       | -181.72      | 299.48                  | 0.12                    | 0.00                   | -17.41                |
| 3,708.00                        | 0.30            | 329.70      | 3,690.27              | 238.36       | -182.11      | 299.97                  | 0.29                    | -0.12                  | 43.95                 |
| 3,793.00                        | 0.40            | 352.00      | 3,775.27              | 238.85       | -182.26      | 300.45                  | 0.20                    | 0.12                   | 26.24                 |
| 3,879.00                        | 0.40            | 359.60      | 3,861.27              | 239.45       | -182.31      | 300.95                  | 0.06                    | 0.00                   | 8.84                  |
| 3,951.00                        | 0.40            | 6.30        | 3,933.26              | 239.95       | -182.28      | 301.33                  | 0.06                    | 0.00                   | 9.31                  |
| <b>Final Phoenix MWD Survey</b> |                 |             |                       |              |              |                         |                         |                        |                       |
| 4,001.00                        | 0.40            | 6.30        | 3,983.26              | 240.30       | -182.24      | 301.59                  | 0.00                    | 0.00                   | 0.00                  |
| <b>Projection to TD</b>         |                 |             |                       |              |              |                         |                         |                        |                       |

# Survey Report

|                  |                             |                                     |                                |
|------------------|-----------------------------|-------------------------------------|--------------------------------|
| <b>Company:</b>  | Apache Corporation          | <b>Local Co-ordinate Reference:</b> | Well #4                        |
| <b>Project:</b>  | Eddy County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB @ 3595.00usft (Capstar 120) |
| <b>Site:</b>     | MJ State                    | <b>MD Reference:</b>                | KB @ 3595.00usft (Capstar 120) |
| <b>Well:</b>     | #4                          | <b>North Reference:</b>             | Grid                           |
| <b>Wellbore:</b> | WB1/Job #1410348            | <b>Survey Calculation Method:</b>   | Minimum Curvature              |
| <b>Design:</b>   | Surveys (Capstar 120)       | <b>Database:</b>                    | Compass 5000 GCR DB            |

| Survey                      |                    |                |                             |                 |                 |                               |                               |                              |                             |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|                             |                    |                |                             |                 |                 |                               |                               |                              |                             |

| Design Annotations          |                             |                   |                 |                          |  |
|-----------------------------|-----------------------------|-------------------|-----------------|--------------------------|--|
| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 |                          |  |
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) | Comment                  |  |
| 300.00                      | 300.00                      | -0.71             | 1.17            | Tie In to Gyro Survey    |  |
| 340.00                      | 340.00                      | -0.87             | 1.31            | First Phoenix MWD Survey |  |
| 3,951.00                    | 3,933.26                    | 239.95            | -182.28         | Final Phoenix MWD Survey |  |
| 4,001.00                    | 3,983.26                    | 240.30            | -182.24         | Projection to TD         |  |