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Directional Survey



# Marathon Oil

## Marathon Oil

Eddy County, NM

Fiddle Fee 24-28-23 (3-4-7-8)

WD #4H 30-013-45036

OH

Design: MWD 173'-15311' PTB 15381'

NM OIL CONSERVATION  
ARTESIA DISTRICT

DEC 13 2018

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## Standard Survey Report

10 September, 2018



PRODIRECTIONAL

**Company:** Marathon Oil  
**Project:** Eddy County, NM  
**Site:** Fiddle Fee 24-28-23 (3-4-7-8)  
**Well:** WD #4H  
**Wellbore:** OH  
**Design:** MWD 173'-15311' PTB 15381'

**Local Co-ordinate Reference:** Well WD #4H  
**TVD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**MD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Eddy County, NM                      |                      |                |
| <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>                  | Fiddle Fee 24-28-23 (3-4-7-8) |                     |                 |                                 |
| <b>Site Position:</b>        |                               | <b>Northing:</b>    | 438,692.25 usft | <b>Latitude:</b> 32.205799      |
| <b>From:</b>                 | Map                           | <b>Easting:</b>     | 582,820.53 usft | <b>Longitude:</b> -104.065567   |
| <b>Position Uncertainty:</b> | 0.00 usft                     | <b>Slot Radius:</b> | 13-3/16 "       | <b>Grid Convergence:</b> 0.14 ° |

|                             |           |                            |                  |                                    |
|-----------------------------|-----------|----------------------------|------------------|------------------------------------|
| <b>Well</b>                 | WD #4H    |                            |                  |                                    |
| <b>Well Position</b>        | +N/-S     | 0.00 usft                  | <b>Northing:</b> | 438,662.25 usft                    |
|                             | +E/-W     | 0.00 usft                  | <b>Easting:</b>  | 582,820.53 usft                    |
| <b>Position Uncertainty</b> | 0.00 usft | <b>Wellhead Elevation:</b> | usft             | <b>Ground Level:</b> 2,995.00 usft |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | OH                |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | HDGM              | 7/4/2018           | 7.18                   | 59.98                | 47,983.40                  |

|                          |                                |                     |                     |                           |
|--------------------------|--------------------------------|---------------------|---------------------|---------------------------|
| <b>Design</b>            | MWD 173'-15311' PTB 15381'     |                     |                     |                           |
| <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> | <b>Direction (°)</b>      |
|                          | 0.00                           | 0.00                | 0.00                | 90.70                     |

|                       |                       |                          |                  |                    |
|-----------------------|-----------------------|--------------------------|------------------|--------------------|
| <b>Survey Program</b> | <b>Date</b> 9/10/2018 |                          |                  |                    |
| <b>From (usft)</b>    | <b>To (usft)</b>      | <b>Survey (Wellbore)</b> | <b>Tool Name</b> | <b>Description</b> |
| 173.00                | 15,381.00             | Survey #1 (OH)           | MWD+IFR1         | OWSG MWD + IFR1    |

| Survey                |                 |             |                       |              |              |                         |                         |                       |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|-----------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Buid Rate (°/100usft) | Turn Rate (°/100usft) |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                  | 0.00                  |
| [FiddleFee#4H]FTP     |                 |             |                       |              |              |                         |                         |                       |                       |
| 173.00                | 0.20            | 336.50      | 173.00                | 0.28         | -0.12        | -0.12                   | 0.12                    | 0.12                  | 0.00                  |
| 235.00                | 0.20            | 333.70      | 235.00                | 0.47         | -0.21        | -0.22                   | 0.02                    | 0.00                  | -4.52                 |
| 329.00                | 0.20            | 351.40      | 329.00                | 0.78         | -0.31        | -0.32                   | 0.07                    | 0.00                  | 18.83                 |
| 505.00                | 0.40            | 36.60       | 505.00                | 1.58         | 0.01         | -0.01                   | 0.17                    | 0.11                  | 25.68                 |
| 608.00                | 0.40            | 57.20       | 607.99                | 2.06         | 0.53         | 0.50                    | 0.14                    | 0.00                  | 20.00                 |
| 701.00                | 1.00            | 181.50      | 700.99                | 1.43         | 0.78         | 0.76                    | 1.36                    | 0.65                  | 133.66                |
| 795.00                | 2.50            | 173.80      | 794.94                | -1.43        | 0.98         | 1.00                    | 1.61                    | 1.60                  | -8.19                 |

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**Local Co-ordinate Reference:** Well WD #4H  
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**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

### Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 888.00                | 2.10            | 188.40      | 887.87                | -5.13        | 0.95         | 1.01                    | 0.76                    | -0.43                  | 15.70                 |
| 978.00                | 2.00            | 186.40      | 977.81                | -8.33        | 0.53         | 0.64                    | 0.14                    | -0.11                  | -2.22                 |
| 1,069.00              | 1.60            | 189.50      | 1,068.77              | -11.16       | 0.15         | 0.28                    | 0.45                    | -0.44                  | 3.41                  |
| 1,159.00              | 1.50            | 173.80      | 1,158.73              | -13.57       | 0.07         | 0.23                    | 0.48                    | -0.11                  | -17.44                |
| 1,249.00              | 2.20            | 191.20      | 1,248.69              | -16.43       | -0.14        | 0.06                    | 0.99                    | 0.78                   | 19.33                 |
| 1,338.00              | 4.60            | 190.20      | 1,337.52              | -21.62       | -1.11        | -0.84                   | 2.70                    | 2.70                   | -1.12                 |
| 1,428.00              | 6.20            | 191.20      | 1,427.12              | -29.94       | -2.69        | -2.32                   | 1.78                    | 1.78                   | 1.11                  |
| 1,518.00              | 8.20            | 185.50      | 1,516.41              | -41.10       | -4.25        | -3.75                   | 2.36                    | 2.22                   | -6.33                 |
| 1,607.00              | 9.50            | 182.60      | 1,604.35              | -54.75       | -5.19        | -4.52                   | 1.54                    | 1.46                   | -3.26                 |
| 1,697.00              | 9.10            | 185.10      | 1,693.16              | -69.26       | -6.16        | -5.31                   | 0.63                    | -0.44                  | 2.78                  |
| 1,786.00              | 9.20            | 190.60      | 1,781.03              | -83.27       | -8.09        | -7.08                   | 0.99                    | 0.11                   | 6.18                  |
| 1,876.00              | 9.30            | 192.90      | 1,869.86              | -97.43       | -11.04       | -9.85                   | 0.43                    | 0.11                   | 2.56                  |
| 1,965.00              | 9.70            | 193.60      | 1,957.64              | -111.72      | -14.41       | -13.04                  | 0.47                    | 0.45                   | 0.79                  |
| 2,055.00              | 10.20           | 197.70      | 2,046.29              | -126.69      | -18.61       | -17.07                  | 0.96                    | 0.56                   | 4.56                  |
| 2,144.00              | 10.80           | 202.40      | 2,133.80              | -141.90      | -24.19       | -22.45                  | 1.17                    | 0.67                   | 5.28                  |
| 2,234.00              | 10.60           | 198.80      | 2,222.24              | -157.53      | -30.07       | -28.14                  | 0.78                    | -0.22                  | -4.00                 |
| 2,324.00              | 10.60           | 197.30      | 2,310.70              | -173.27      | -35.20       | -33.08                  | 0.31                    | 0.00                   | -1.67                 |
| 2,413.00              | 11.00           | 198.40      | 2,398.12              | -189.15      | -40.31       | -38.00                  | 0.51                    | 0.45                   | 1.24                  |
| 2,503.00              | 10.90           | 202.30      | 2,486.49              | -205.17      | -46.25       | -43.74                  | 0.83                    | -0.11                  | 4.33                  |
| 2,544.00              | 10.60           | 203.80      | 2,526.77              | -212.20      | -49.24       | -46.65                  | 1.00                    | -0.73                  | 3.66                  |
| 2,671.00              | 9.90            | 201.30      | 2,651.74              | -233.06      | -57.92       | -55.07                  | 0.65                    | -0.55                  | -1.97                 |
| 2,761.00              | 10.00           | 203.10      | 2,740.39              | -247.46      | -63.80       | -60.77                  | 0.36                    | 0.11                   | 2.00                  |
| 2,850.00              | 9.90            | 202.50      | 2,828.05              | -261.64      | -69.76       | -66.56                  | 0.16                    | -0.11                  | -0.67                 |
| 2,939.00              | 9.80            | 202.40      | 2,915.74              | -275.71      | -75.57       | -72.20                  | 0.11                    | -0.11                  | -0.11                 |
| 3,029.00              | 9.70            | 200.60      | 3,004.44              | -289.89      | -81.16       | -77.61                  | 0.36                    | -0.11                  | -2.00                 |
| 3,118.00              | 9.80            | 200.10      | 3,092.15              | -304.02      | -86.40       | -82.68                  | 0.15                    | 0.11                   | -0.56                 |
| 3,208.00              | 10.10           | 198.50      | 3,180.80              | -318.69      | -91.54       | -87.64                  | 0.45                    | 0.33                   | -1.78                 |
| 3,297.00              | 10.40           | 200.00      | 3,268.38              | -333.64      | -96.76       | -92.68                  | 0.45                    | 0.34                   | 1.69                  |
| 3,386.00              | 10.50           | 197.90      | 3,355.90              | -348.91      | -102.00      | -97.73                  | 0.44                    | 0.11                   | -2.36                 |
| 3,477.00              | 10.10           | 200.10      | 3,445.44              | -364.29      | -107.29      | -102.83                 | 0.62                    | -0.44                  | 2.42                  |
| 3,566.00              | 9.50            | 198.30      | 3,533.14              | -378.59      | -112.28      | -107.65                 | 0.76                    | -0.67                  | -2.02                 |
| 3,656.00              | 9.40            | 196.10      | 3,621.92              | -392.71      | -116.65      | -111.84                 | 0.42                    | -0.11                  | -2.44                 |
| 3,746.00              | 9.50            | 195.40      | 3,710.69              | -406.93      | -120.66      | -115.68                 | 0.17                    | 0.11                   | -0.78                 |
| 3,838.00              | 9.80            | 197.50      | 3,801.39              | -421.72      | -125.03      | -119.87                 | 0.50                    | 0.33                   | 2.28                  |
| 3,924.00              | 9.70            | 195.60      | 3,886.15              | -435.67      | -129.18      | -123.85                 | 0.39                    | -0.12                  | -2.21                 |
| 4,014.00              | 10.60           | 201.30      | 3,974.74              | -450.69      | -134.23      | -128.71                 | 1.50                    | 1.00                   | 6.33                  |
| 4,103.00              | 11.50           | 211.20      | 4,062.10              | -465.91      | -141.80      | -136.09                 | 2.36                    | 1.01                   | 11.12                 |
| 4,193.00              | 11.00           | 212.50      | 4,150.37              | -480.82      | -151.06      | -145.17                 | 0.62                    | -0.56                  | 1.44                  |
| 4,282.00              | 10.80           | 211.50      | 4,237.77              | -495.09      | -159.98      | -153.92                 | 0.31                    | -0.22                  | -1.12                 |
| 4,372.00              | 11.00           | 211.40      | 4,326.14              | -509.61      | -168.86      | -162.62                 | 0.22                    | 0.22                   | -0.11                 |
| 4,462.00              | 11.20           | 211.60      | 4,414.46              | -524.39      | -177.91      | -171.49                 | 0.23                    | 0.22                   | 0.22                  |
| 4,552.00              | 9.50            | 215.30      | 4,502.99              | -537.89      | -186.78      | -180.20                 | 2.03                    | -1.89                  | 4.11                  |

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| 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 4,641.00              | 6.50            | 216.00      | 4,591.12              | -547.97      | -193.99      | -187.28                 | 3.37                    | -3.37                  | 0.79                  |
| 4,731.00              | 6.10            | 212.30      | 4,680.57              | -556.13      | -199.54      | -192.73                 | 0.63                    | -0.44                  | -4.11                 |
| 4,820.00              | 5.30            | 223.90      | 4,769.13              | -563.09      | -204.92      | -198.02                 | 1.57                    | -0.90                  | 13.03                 |
| 4,910.00              | 4.10            | 246.20      | 4,858.84              | -567.38      | -210.74      | -203.80                 | 2.40                    | -1.33                  | 24.78                 |
| 4,999.00              | 3.70            | 264.90      | 4,947.63              | -568.92      | -216.52      | -209.55                 | 1.49                    | -0.45                  | 21.01                 |
| 5,089.00              | 1.80            | 284.20      | 5,037.53              | -568.83      | -220.78      | -213.81                 | 2.32                    | -2.11                  | 21.44                 |
| 5,178.00              | 1.00            | 301.00      | 5,126.50              | -568.09      | -222.80      | -215.84                 | 1.00                    | -0.90                  | 18.88                 |
| 5,268.00              | 1.00            | 301.90      | 5,216.49              | -567.27      | -224.14      | -217.19                 | 0.02                    | 0.00                   | 1.00                  |
| 5,358.00              | 0.70            | 286.40      | 5,306.48              | -566.70      | -225.33      | -218.39                 | 0.42                    | -0.33                  | -17.22                |
| 5,448.00              | 1.00            | 297.30      | 5,396.47              | -566.18      | -226.56      | -219.62                 | 0.38                    | 0.33                   | 12.11                 |
| 5,537.00              | 1.30            | 278.70      | 5,485.45              | -565.68      | -228.25      | -221.32                 | 0.53                    | 0.34                   | -20.90                |
| 5,627.00              | 1.50            | 281.00      | 5,575.42              | -565.30      | -230.41      | -223.49                 | 0.23                    | 0.22                   | 2.56                  |
| 5,717.00              | 1.20            | 276.70      | 5,665.40              | -564.96      | -232.50      | -225.58                 | 0.35                    | -0.33                  | -4.78                 |
| 5,806.00              | 1.30            | 269.10      | 5,754.38              | -564.87      | -234.44      | -227.52                 | 0.22                    | 0.11                   | -8.54                 |
| 5,896.00              | 1.10            | 274.00      | 5,844.36              | -564.82      | -236.32      | -229.40                 | 0.25                    | -0.22                  | 5.44                  |
| 5,986.00              | 1.10            | 300.20      | 5,934.34              | -564.33      | -237.93      | -231.02                 | 0.55                    | 0.00                   | 29.11                 |
| 6,076.00              | 0.90            | 273.30      | 6,024.33              | -563.85      | -239.38      | -232.48                 | 0.56                    | -0.22                  | -29.89                |
| 6,165.00              | 1.10            | 269.60      | 6,113.31              | -563.82      | -240.93      | -234.03                 | 0.24                    | 0.22                   | -4.16                 |
| 6,255.00              | 1.30            | 261.80      | 6,203.29              | -563.97      | -242.81      | -235.90                 | 0.29                    | 0.22                   | -8.67                 |
| 6,345.00              | 1.20            | 270.50      | 6,293.27              | -564.11      | -244.76      | -237.85                 | 0.24                    | -0.11                  | 9.67                  |
| 6,434.00              | 1.50            | 268.20      | 6,382.25              | -564.14      | -246.86      | -239.95                 | 0.34                    | 0.34                   | -2.58                 |
| 6,524.00              | 1.20            | 276.30      | 6,472.22              | -564.07      | -248.97      | -242.06                 | 0.39                    | -0.33                  | 9.00                  |
| 6,614.00              | 1.00            | 30.70       | 6,562.21              | -563.29      | -249.51      | -242.61                 | 2.06                    | -0.22                  | 127.11                |
| 6,703.00              | 1.40            | 337.70      | 6,651.20              | -561.62      | -249.52      | -242.64                 | 1.27                    | 0.45                   | -59.55                |
| 6,793.00              | 2.00            | 330.80      | 6,741.16              | -559.23      | -250.71      | -243.86                 | 0.70                    | 0.67                   | -7.67                 |
| 6,882.00              | 0.50            | 9.10        | 6,830.13              | -557.49      | -251.40      | -244.57                 | 1.84                    | -1.69                  | 43.03                 |
| 6,972.00              | 2.70            | 160.90      | 6,920.11              | -559.11      | -250.65      | -243.80                 | 3.50                    | 2.44                   | 168.67                |
| 7,062.00              | 3.30            | 163.70      | 7,009.98              | -563.60      | -249.23      | -242.32                 | 0.69                    | 0.67                   | 3.11                  |
| 7,151.00              | 1.80            | 158.30      | 7,098.89              | -567.35      | -247.99      | -241.04                 | 1.71                    | -1.69                  | -6.07                 |
| 7,241.00              | 1.50            | 163.50      | 7,188.85              | -569.80      | -247.13      | -240.15                 | 0.37                    | -0.33                  | 5.78                  |
| 7,331.00              | 0.70            | 192.20      | 7,278.84              | -571.46      | -246.92      | -239.92                 | 1.05                    | -0.89                  | 31.89                 |
| 7,421.00              | 0.50            | 158.30      | 7,368.83              | -572.37      | -246.89      | -239.88                 | 0.44                    | -0.22                  | -37.67                |
| 7,511.00              | 0.30            | 128.60      | 7,458.83              | -572.88      | -246.56      | -239.54                 | 0.31                    | -0.22                  | -33.00                |
| 7,601.00              | 1.00            | 163.80      | 7,548.82              | -573.78      | -246.15      | -239.13                 | 0.86                    | 0.78                   | 39.11                 |
| 7,691.00              | 0.20            | 15.60       | 7,638.82              | -574.38      | -245.89      | -238.86                 | 1.31                    | -0.89                  | -164.67               |
| 7,780.00              | 0.30            | 21.40       | 7,727.82              | -574.02      | -245.77      | -238.73                 | 0.12                    | 0.11                   | 6.52                  |
| 7,870.00              | 0.30            | 19.10       | 7,817.82              | -573.57      | -245.60      | -238.58                 | 0.01                    | 0.00                   | -2.56                 |
| 7,959.00              | 0.30            | 33.90       | 7,906.82              | -573.16      | -245.40      | -238.38                 | 0.09                    | 0.00                   | 16.63                 |
| 8,049.00              | 0.30            | 38.40       | 7,996.82              | -572.78      | -245.12      | -238.10                 | 0.03                    | 0.00                   | 5.00                  |
| 8,138.00              | 0.50            | 102.10      | 8,085.81              | -572.68      | -244.59      | -237.58                 | 0.51                    | 0.22                   | 71.57                 |
| 8,228.00              | 0.70            | 96.40       | 8,175.81              | -572.82      | -243.66      | -236.65                 | 0.23                    | 0.22                   | -6.33                 |
| 8,318.00              | 0.60            | 54.00       | 8,265.80              | -572.61      | -242.74      | -235.72                 | 0.53                    | -0.11                  | -47.11                |

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### 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) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 8,407.00                    | 0.30               | 70.70          | 8,354.80                    | -572.26         | -242.14         | -235.13                       | 0.36                          | -0.34                        | 18.76                       |
| 8,497.00                    | 0.30               | 24.60          | 8,444.80                    | -571.96         | -241.82         | -234.81                       | 0.26                          | 0.00                         | -51.22                      |
| 8,586.00                    | 1.00               | 343.90         | 8,533.79                    | -571.01         | -241.94         | -234.94                       | 0.90                          | 0.79                         | -45.73                      |
| 8,676.00                    | 0.90               | 10.80          | 8,623.78                    | -569.56         | -242.02         | -235.05                       | 0.50                          | -0.11                        | 29.89                       |
| 8,766.00                    | 0.30               | 74.30          | 8,713.78                    | -568.80         | -241.66         | -234.70                       | 0.90                          | -0.67                        | 70.56                       |
| 8,855.00                    | 0.60               | 128.10         | 8,802.78                    | -569.02         | -241.07         | -234.10                       | 0.55                          | 0.34                         | 60.45                       |
| 8,945.00                    | 0.70               | 128.20         | 8,892.77                    | -569.65         | -240.27         | -233.29                       | 0.11                          | 0.11                         | 0.11                        |
| 9,034.00                    | 0.70               | 137.40         | 8,981.76                    | -570.39         | -239.47         | -232.49                       | 0.13                          | 0.00                         | 10.34                       |
| 9,124.00                    | 1.00               | 151.10         | 9,071.75                    | -571.48         | -238.72         | -231.72                       | 0.40                          | 0.33                         | 15.22                       |
| 9,213.00                    | 1.00               | 152.10         | 9,160.74                    | -572.85         | -237.98         | -230.97                       | 0.02                          | 0.00                         | 1.12                        |
| 9,303.00                    | 1.00               | 150.70         | 9,250.73                    | -574.23         | -237.23         | -230.20                       | 0.03                          | 0.00                         | -1.56                       |
| 9,393.00                    | 1.10               | 133.30         | 9,340.71                    | -575.50         | -236.22         | -229.17                       | 0.37                          | 0.11                         | -19.33                      |
| 9,483.00                    | 1.40               | 137.00         | 9,430.69                    | -576.90         | -234.84         | -227.78                       | 0.35                          | 0.33                         | 4.11                        |
| 9,594.00                    | 1.20               | 141.90         | 9,541.66                    | -578.81         | -233.20         | -226.11                       | 0.21                          | -0.18                        | 4.41                        |
| 9,689.00                    | 1.30               | 73.00          | 9,636.64                    | -579.28         | -231.55         | -224.46                       | 1.49                          | 0.11                         | -72.53                      |
| 9,784.00                    | 1.90               | 50.50          | 9,731.61                    | -577.96         | -229.31         | -222.23                       | 0.90                          | 0.63                         | -23.68                      |
| 9,878.00                    | 1.60               | 57.20          | 9,825.56                    | -576.26         | -227.00         | -219.95                       | 0.39                          | -0.32                        | 7.13                        |
| 9,944.72                    | 6.95               | 83.72          | 9,892.07                    | -575.31         | -222.20         | -215.16                       | 8.35                          | 8.03                         | 39.75                       |
| [FiddleFee#4H]KOP           |                    |                |                             |                 |                 |                               |                               |                              |                             |
| 9,973.00                    | 9.30               | 85.60          | 9,920.07                    | -574.95         | -218.22         | -211.18                       | 8.35                          | 8.29                         | 6.64                        |
| 10,067.00                   | 14.80              | 72.90          | 10,011.98                   | -570.83         | -199.15         | -192.17                       | 6.46                          | 5.85                         | -13.51                      |
| 10,160.00                   | 24.80              | 68.70          | 10,099.37                   | -560.23         | -169.55         | -162.70                       | 10.85                         | 10.75                        | -4.52                       |
| 10,255.00                   | 34.10              | 76.10          | 10,182.04                   | -546.56         | -125.03         | -118.34                       | 10.50                         | 9.79                         | 7.79                        |
| 10,349.00                   | 42.40              | 81.90          | 10,255.81                   | -535.74         | -67.95          | -61.40                        | 9.61                          | 8.83                         | 6.17                        |
| 10,444.00                   | 49.60              | 87.50          | 10,321.79                   | -529.64         | 0.01            | 6.48                          | 8.68                          | 7.58                         | 5.89                        |
| 10,538.00                   | 56.30              | 89.60          | 10,378.40                   | -527.80         | 74.96           | 81.40                         | 7.35                          | 7.13                         | 2.23                        |
| 10,633.00                   | 67.70              | 93.40          | 10,422.94                   | -530.14         | 158.65          | 165.11                        | 12.51                         | 12.00                        | 4.00                        |
| 10,728.00                   | 78.80              | 93.40          | 10,450.27                   | -535.53         | 249.32          | 255.84                        | 11.68                         | 11.68                        | 0.00                        |
| 10,822.00                   | 87.40              | 88.30          | 10,461.56                   | -536.87         | 342.51          | 349.04                        | 10.61                         | 9.15                         | -5.43                       |
| 10,917.00                   | 89.90              | 91.10          | 10,463.80                   | -536.37         | 437.46          | 443.98                        | 3.95                          | 2.63                         | 2.95                        |
| 11,012.00                   | 89.90              | 91.30          | 10,463.97                   | -538.36         | 532.44          | 538.98                        | 0.21                          | 0.00                         | 0.21                        |
| 11,107.00                   | 88.00              | 87.60          | 10,465.71                   | -537.45         | 627.40          | 633.92                        | 4.38                          | -2.00                        | -3.89                       |
| 11,201.00                   | 91.20              | 92.80          | 10,466.37                   | -537.78         | 721.35          | 727.87                        | 6.49                          | 3.40                         | 5.53                        |
| 11,296.00                   | 85.80              | 90.60          | 10,468.85                   | -540.60         | 816.24          | 822.78                        | 6.14                          | -5.68                        | -2.32                       |
| 11,390.00                   | 84.60              | 90.70          | 10,476.72                   | -541.66         | 909.90          | 916.45                        | 1.28                          | -1.28                        | 0.11                        |
| 11,484.00                   | 87.20              | 91.80          | 10,483.44                   | -543.71         | 1,003.63        | 1,010.19                      | 3.00                          | 2.77                         | 1.17                        |
| 11,579.00                   | 91.40              | 93.00          | 10,484.60                   | -547.69         | 1,098.51        | 1,105.12                      | 4.60                          | 4.42                         | 1.26                        |
| 11,673.00                   | 91.60              | 92.30          | 10,482.14                   | -552.03         | 1,192.38        | 1,199.04                      | 0.77                          | 0.21                         | -0.74                       |
| 11,768.00                   | 91.50              | 91.70          | 10,479.57                   | -555.35         | 1,287.29        | 1,293.98                      | 0.64                          | -0.11                        | -0.63                       |
| 11,863.00                   | 85.10              | 85.50          | 10,482.39                   | -553.04         | 1,382.12        | 1,388.77                      | 9.38                          | -6.74                        | -6.53                       |
| 11,957.00                   | 86.00              | 88.90          | 10,489.68                   | -548.46         | 1,475.71        | 1,482.30                      | 3.73                          | 0.96                         | 3.62                        |
| 12,051.00                   | 88.30              | 93.40          | 10,494.36                   | -550.35         | 1,569.55        | 1,576.15                      | 5.37                          | 2.45                         | 4.79                        |

**Company:** Marathon Oil  
**Project:** Eddy County, NM  
**Site:** Fiddle Fee 24-28-23 (3-4-7-8)  
**Well:** WD #4H  
**Wellbore:** OH  
**Design:** MWD 173'-15311' PTB 15381'

**Local Co-ordinate Reference:** Well WD #4H  
**TVD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**MD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

### Survey

| Measured Depth (usft)                                             | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-------------------------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 12,146.00                                                         | 91.70           | 96.40       | 10,494.36             | -558.46      | 1,664.17     | 1,670.87                | 4.77                    | 3.58                   | 3.16                  |
| 12,240.00                                                         | 88.80           | 97.80       | 10,493.95             | -570.08      | 1,757.44     | 1,764.27                | 3.43                    | -3.09                  | 1.49                  |
| 12,335.00                                                         | 90.20           | 96.30       | 10,494.78             | -581.74      | 1,851.71     | 1,858.68                | 2.16                    | 1.47                   | -1.58                 |
| 12,430.00                                                         | 89.20           | 95.10       | 10,495.27             | -591.17      | 1,946.24     | 1,953.32                | 1.64                    | -1.05                  | -1.26                 |
| 12,524.00                                                         | 90.00           | 92.50       | 10,495.93             | -597.40      | 2,040.02     | 2,047.17                | 2.89                    | 0.85                   | -2.77                 |
| 12,619.00                                                         | 87.30           | 92.80       | 10,498.17             | -601.79      | 2,134.88     | 2,142.08                | 2.86                    | -2.84                  | 0.32                  |
| 12,713.00                                                         | 88.30           | 94.20       | 10,501.78             | -607.53      | 2,228.64     | 2,235.89                | 1.83                    | 1.06                   | 1.49                  |
| 12,808.00                                                         | 85.20           | 88.80       | 10,507.17             | -610.01      | 2,323.40     | 2,330.68                | 6.55                    | -3.26                  | -5.68                 |
| 12,903.00                                                         | 84.10           | 87.50       | 10,516.02             | -606.96      | 2,417.94     | 2,425.17                | 1.79                    | -1.16                  | -1.37                 |
| 12,997.00                                                         | 95.10           | 89.50       | 10,516.68             | -604.51      | 2,511.75     | 2,518.95                | 11.89                   | 11.70                  | 2.13                  |
| 13,092.00                                                         | 90.80           | 89.60       | 10,511.79             | -603.76      | 2,606.60     | 2,613.78                | 4.53                    | -4.53                  | 0.11                  |
| 13,187.00                                                         | 89.10           | 91.60       | 10,511.88             | -604.76      | 2,701.59     | 2,708.78                | 2.76                    | -1.79                  | 2.11                  |
| 13,282.00                                                         | 87.60           | 90.30       | 10,514.61             | -606.33      | 2,796.53     | 2,803.73                | 2.09                    | -1.58                  | -1.37                 |
| 13,376.00                                                         | 83.80           | 90.10       | 10,521.66             | -606.66      | 2,890.25     | 2,897.45                | 4.05                    | -4.04                  | -0.21                 |
| 13,471.00                                                         | 83.60           | 88.10       | 10,532.08             | -605.18      | 2,984.66     | 2,991.83                | 2.10                    | -0.21                  | -2.11                 |
| 13,566.00                                                         | 88.00           | 88.70       | 10,539.04             | -602.53      | 3,079.34     | 3,086.47                | 4.67                    | 4.63                   | 0.63                  |
| 13,661.00                                                         | 87.70           | 87.60       | 10,542.60             | -599.47      | 3,174.23     | 3,181.31                | 1.20                    | -0.32                  | -1.16                 |
| 13,755.00                                                         | 89.30           | 89.20       | 10,545.06             | -596.84      | 3,268.15     | 3,275.20                | 2.41                    | 1.70                   | 1.70                  |
| 13,849.00                                                         | 88.80           | 88.60       | 10,546.62             | -595.04      | 3,362.12     | 3,369.14                | 0.83                    | -0.53                  | -0.64                 |
| 13,944.00                                                         | 87.70           | 90.60       | 10,549.52             | -594.38      | 3,457.07     | 3,464.07                | 2.40                    | -1.16                  | 2.11                  |
| 14,039.00                                                         | 88.00           | 88.60       | 10,553.09             | -593.71      | 3,551.99     | 3,558.98                | 2.13                    | 0.32                   | -2.11                 |
| 14,134.00                                                         | 87.20           | 88.30       | 10,557.07             | -591.15      | 3,646.87     | 3,653.82                | 0.90                    | -0.84                  | -0.32                 |
| 14,228.00                                                         | 88.30           | 88.50       | 10,560.76             | -588.52      | 3,740.76     | 3,747.67                | 1.19                    | 1.17                   | 0.21                  |
| 14,323.00                                                         | 88.30           | 86.80       | 10,563.58             | -584.63      | 3,835.64     | 3,842.49                | 1.79                    | 0.00                   | -1.79                 |
| 14,417.00                                                         | 89.40           | 84.70       | 10,565.46             | -577.67      | 3,929.35     | 3,936.12                | 2.52                    | 1.17                   | -2.23                 |
| 14,512.00                                                         | 93.00           | 87.90       | 10,563.47             | -571.54      | 4,024.11     | 4,030.79                | 5.07                    | 3.79                   | 3.37                  |
| 14,607.00                                                         | 90.50           | 90.50       | 10,560.57             | -570.21      | 4,119.04     | 4,125.70                | 3.80                    | -2.63                  | 2.74                  |
| 14,702.00                                                         | 90.60           | 93.60       | 10,559.66             | -573.61      | 4,213.96     | 4,220.65                | 3.26                    | 0.11                   | 3.26                  |
| 14,796.00                                                         | 85.70           | 89.50       | 10,562.69             | -576.16      | 4,307.83     | 4,314.55                | 6.79                    | -5.21                  | -4.36                 |
| 14,891.00                                                         | 87.70           | 92.00       | 10,568.16             | -577.40      | 4,402.65     | 4,409.38                | 3.37                    | 2.11                   | 2.63                  |
| 14,986.00                                                         | 85.60           | 90.70       | 10,573.71             | -579.63      | 4,497.45     | 4,504.20                | 2.60                    | -2.21                  | -1.37                 |
| 15,081.00                                                         | 88.80           | 92.10       | 10,578.35             | -581.95      | 4,592.30     | 4,599.07                | 3.68                    | 3.37                   | 1.47                  |
| 15,175.00                                                         | 89.80           | 91.60       | 10,579.50             | -584.99      | 4,686.24     | 4,693.04                | 1.19                    | 1.06                   | -0.53                 |
| 15,270.00                                                         | 87.30           | 90.50       | 10,581.91             | -586.73      | 4,781.19     | 4,788.00                | 2.87                    | -2.63                  | -1.16                 |
| 15,311.00                                                         | 88.30           | 91.10       | 10,583.48             | -587.30      | 4,822.15     | 4,828.97                | 2.84                    | 2.44                   | 1.46                  |
| <b>Last Survey: 15311' MD, 10583' TVD - [FiddleFee#4H]LTP/BHL</b> |                 |             |                       |              |              |                         |                         |                        |                       |
| 15,381.00                                                         | 88.30           | 91.10       | 10,585.56             | -588.64      | 4,892.11     | 4,898.93                | 0.00                    | 0.00                   | 0.00                  |
| <b>PTB: 15381' MD, 10586' TVD</b>                                 |                 |             |                       |              |              |                         |                         |                        |                       |



Professional Directional  
Survey Report



**Company:** Marathon Oil  
**Project:** Eddy County, NM  
**Site:** Fiddle Fee 24-28-23 (3-4-7-8)  
**Well:** WD #4H  
**Wellbore:** OH  
**Design:** MWD 173'-15311' PTB 15381'

**Local Co-ordinate Reference:** Well WD #4H  
**TVD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**MD Reference:** Well @ 3022.00usft (GL: 2995' + KB: 27' (Prec582))  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

| Design Annotations          |                             |                   |                 |                                    |
|-----------------------------|-----------------------------|-------------------|-----------------|------------------------------------|
| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                            |
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                    |
| 15,311.00                   | 10,583.48                   | -587.30           | 4,822.15        | Last Survey: 15311' MD, 10583' TVD |
| 15,381.00                   | 10,585.56                   | -588.64           | 4,892.11        | PTB: 15381' MD, 10586' TVD         |

Marathon Oil  
Eddy County, NM  
Fiddle Fee 24-28-23 (3-4-7-8)  
WD 84H  
Plan #3  
GL: 2995' + KB: 27' (Prec562)

US State Plane 1927 (Exact solution)  
NAD 1983 (NAD83) CONUS  
Datum 1983  
New Mexico East 3001  
Mean Sea Level

RKB Elevation: Well @ 3022.00ft (GL: 2995' + KB: 27' (Prec562))

| •NI-S | •EI-W | North     | East      | Latitude  | Longitude   | Spot |
|-------|-------|-----------|-----------|-----------|-------------|------|
| 0.00  | 0.00  | 438662.25 | 582620.53 | 32.205718 | -104.065567 |      |

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name                  | TVD      | •NI-S   | •EI-W   | North     | East      |
|-----------------------|----------|---------|---------|-----------|-----------|
| [FiddleFee#4H]FTP     | 0.00     | -668.25 | 61.68   | 438095.90 | 582852.22 |
| [FiddleFee#4H]XOP     | 9891.50  | -563.00 | -218.00 | 438099.25 | 582802.53 |
| [FiddleFee#4H]LTP/BHL | 10578.75 | -625.08 | 4847.44 | 438037.16 | 587687.97 |



Azimuth to Grid North  
True North -0.14°  
Magnetic North 7.04°  
Magnetic Field  
Strength 4780.00 nT  
Dip Angle 58.86°  
Date 7/4/2018  
Model MAGM

Azimuth Corrections

Total Magnetic Corr. (M to G): 7.04°

Declination (M to T): 7.18° East

SECTION DETAILS

| Sec | MD       | Inc   | Azi    | TVD      | •NI-S   | •EI-W   | Orig  | VSed    |
|-----|----------|-------|--------|----------|---------|---------|-------|---------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00     | 0.00    | 0.00    | 0.00  | 0.00    |
| 2   | 500.00   | 0.00  | 0.00   | 500.00   | 0.00    | 0.00    | 0.00  | 0.00    |
| 3   | 700.00   | 2.00  | 160.00 | 699.98   | -3.48   | 0.00    | 1.00  | 0.04    |
| 4   | 1200.33  | 2.00  | 160.00 | 1200.00  | -20.95  | 0.00    | 0.00  | 0.28    |
| 5   | 1608.56  | 9.98  | 202.17 | 1605.89  | -60.91  | -13.37  | 2.00  | -12.63  |
| 6   | 4486.37  | 9.98  | 202.17 | 4439.83  | -522.64 | -201.63 | 0.00  | -185.23 |
| 7   | 4985.48  | 0.00  | 0.00   | 4938.50  | -563.00 | -218.00 | 2.00  | -211.11 |
| 8   | 9944.48  | 0.00  | 0.00   | 9895.50  | -563.00 | -218.00 | 0.00  | -211.11 |
| 9   | 10930.41 | 88.60 | 90.70  | 10468.29 | -560.85 | 340.68  | 10.00 | 347.81  |
| 10  | 15338.67 | 88.60 | 90.70  | 10578.75 | -625.08 | 4847.44 | 0.00  | 4854.71 |
| 11  | 15383.67 | 88.60 | 90.70  | 10579.83 | -625.64 | 4882.42 | 0.00  | 4899.70 |

West(-)/East(+) (300 usft/in)

