



Pro Directional

Survey Report

30-015-45092

JUL 03 2018 PRO DIRECTIONAL

Company: Marathon Oil
Project: Eddy County, NM

Site: Rick Deckard State 25-28-4 (12-14-15-18)

Well: TB #14H

Wellbore: OH

Design: Prelim Plan B

Local Co-ordinate Reference: DISTRICT II ARTESIA O.C.D.

TVD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))

MD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))

North Reference: Grid

Survey Calculation Method: Minimum Curvature

Database: WellPlanner1

Project	Eddy County, NM		
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	Rick Deckard State 25-28-4 (12-14-15-18)				
Site Position:		Northing:	419,495.00 usft	Latitude:	32.153070
From:	Map	Easting:	576,032.96 usft	Longitude:	-104.087653
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.13 °

TB #14H						
Well Position	+N/-S	0.00 usft	Northing:	419,495.00 usft	Latitude:	32.153070
	+E/-W	0.00 usft	Easting:	576,123.01 usft	Longitude:	-104.087362
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,963.00 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	6/7/2018	7.20	59.90	47,973.90

Design	Prelim Plan B			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	359.78

Survey Tool Program		Date	6/25/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	1,850.00	Prelim Plan B (OH)	MWD+IFR1	OWSG MWD + IFR1	
1,850.00	5,400.00	Prelim Plan B (OH)	MWD+IFR1	OWSG MWD + IFR1	
5,400.00	10,000.00	Prelim Plan B (OH)	MWD+IFR1	OWSG MWD + IFR1	
10,000.00	14,470.34	Prelim Plan B (OH)	MWD+IFR1	OWSG MWD + IFR1	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
[RickDeckard#14H]FTP									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00

Company: Marathon Oil
Project: Eddy County, NM

Site: Rick Deckard State 25-28-4 (12-14-15-18)

Well: TB #14H
Wellbore: OH
Design: Prelim Plan B

Local Co-ordinate Reference: Well TB #14H
TVD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
MD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned 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)
4,700.00	10.00	114.71	4,651.89	-235.98	512.77	-237.95	0.00	0.00	0.00
4,800.00	10.00	114.71	4,750.37	-243.24	528.55	-245.27	0.00	0.00	0.00
4,900.00	10.00	114.71	4,848.85	-250.50	544.32	-252.59	0.00	0.00	0.00
5,000.00	10.00	114.71	4,947.33	-257.76	560.09	-259.91	0.00	0.00	0.00
5,100.00	10.00	114.71	5,045.81	-265.02	575.87	-267.23	0.00	0.00	0.00
5,200.00	10.00	114.71	5,144.29	-272.28	591.64	-274.55	0.00	0.00	0.00
5,300.00	10.00	114.71	5,242.77	-279.54	607.42	-281.87	0.00	0.00	0.00
5,400.00	10.00	114.71	5,341.25	-286.80	623.19	-289.19	0.00	0.00	0.00
5,500.00	10.00	114.71	5,439.73	-294.06	638.97	-296.51	0.00	0.00	0.00
5,600.00	10.00	114.71	5,538.22	-301.32	654.74	-303.83	0.00	0.00	0.00
5,700.00	10.00	114.71	5,636.70	-308.58	670.52	-311.15	0.00	0.00	0.00
5,800.00	10.00	114.71	5,735.18	-315.84	686.29	-318.47	0.00	0.00	0.00
5,900.00	10.00	114.71	5,833.66	-323.10	702.06	-325.79	0.00	0.00	0.00
6,000.00	10.00	114.71	5,932.14	-330.36	717.84	-333.11	0.00	0.00	0.00
6,100.00	10.00	114.71	6,030.62	-337.62	733.61	-340.43	0.00	0.00	0.00
6,200.00	10.00	114.71	6,129.10	-344.88	749.39	-347.75	0.00	0.00	0.00
6,300.00	10.00	114.71	6,227.58	-352.14	765.16	-355.07	0.00	0.00	0.00
6,400.00	10.00	114.71	6,326.06	-359.40	780.94	-362.40	0.00	0.00	0.00
6,500.00	10.00	114.71	6,424.54	-366.66	796.71	-369.72	0.00	0.00	0.00
6,600.00	10.00	114.71	6,523.02	-373.92	812.49	-377.04	0.00	0.00	0.00
6,700.00	10.00	114.71	6,621.50	-381.18	828.26	-384.36	0.00	0.00	0.00
6,800.00	10.00	114.71	6,719.99	-388.44	844.04	-391.68	0.00	0.00	0.00
6,900.00	10.00	114.71	6,818.47	-395.70	859.81	-399.00	0.00	0.00	0.00
7,000.00	10.00	114.71	6,916.95	-402.96	875.58	-406.32	0.00	0.00	0.00
7,094.32	10.00	114.71	7,009.84	-409.80	890.46	-413.22	0.00	0.00	0.00
7,100.00	9.89	114.71	7,015.43	-410.21	891.35	-413.63	2.00	-2.00	0.00
7,200.00	7.89	114.71	7,114.22	-416.67	905.39	-420.15	2.00	-2.00	0.00
7,300.00	5.89	114.71	7,213.50	-421.68	916.28	-425.20	2.00	-2.00	0.00
7,400.00	3.89	114.71	7,313.13	-425.25	924.02	-428.79	2.00	-2.00	0.00
7,500.00	1.89	114.71	7,413.00	-427.35	928.59	-430.91	2.00	-2.00	0.00
7,594.32	0.00	0.00	7,507.30	-428.00	930.00	-431.57	2.00	-2.00	0.00
7,600.00	0.00	0.00	7,512.98	-428.00	930.00	-431.57	0.00	0.00	0.00
7,700.00	0.00	0.00	7,612.98	-428.00	930.00	-431.57	0.00	0.00	0.00
7,800.00	0.00	0.00	7,712.98	-428.00	930.00	-431.57	0.00	0.00	0.00
7,900.00	0.00	0.00	7,812.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,000.00	0.00	0.00	7,912.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,100.00	0.00	0.00	8,012.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,200.00	0.00	0.00	8,112.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,300.00	0.00	0.00	8,212.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,400.00	0.00	0.00	8,312.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,500.00	0.00	0.00	8,412.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,600.00	0.00	0.00	8,512.98	-428.00	930.00	-431.57	0.00	0.00	0.00

Company: Marathon Oil
Project: Eddy County, NM

Site: Rick Deckard State 25-28-4 (12-14-15-18)

Well: TB #14H
Wellbore: OH
Design: Prelim Plan B

Local Co-ordinate Reference: Well TB #14H
TVD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
MD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned 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)
8,700.00	0.00	0.00	8,612.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,800.00	0.00	0.00	8,712.98	-428.00	930.00	-431.57	0.00	0.00	0.00
8,900.00	0.00	0.00	8,812.98	-428.00	930.00	-431.57	0.00	0.00	0.00
9,000.00	0.00	0.00	8,912.98	-428.00	930.00	-431.57	0.00	0.00	0.00
9,100.00	0.00	0.00	9,012.98	-428.00	930.00	-431.57	0.00	0.00	0.00
9,187.02	0.00	0.00	9,100.00	-428.00	930.00	-431.57	0.00	0.00	0.00
[RickDeckard#14H]KOP									
9,200.00	1.43	359.78	9,112.98	-427.84	930.00	-431.41	11.00	11.00	0.00
9,250.00	6.93	359.78	9,162.83	-424.20	929.99	-427.77	11.00	11.00	0.00
9,300.00	12.43	359.78	9,212.10	-415.80	929.95	-419.36	11.00	11.00	0.00
9,350.00	17.93	359.78	9,260.33	-402.71	929.90	-406.28	11.00	11.00	0.00
9,400.00	23.43	359.78	9,307.09	-385.06	929.84	-388.63	11.00	11.00	0.00
9,450.00	28.93	359.78	9,351.95	-363.01	929.75	-366.58	11.00	11.00	0.00
9,500.00	34.43	359.78	9,394.48	-336.77	929.65	-340.33	11.00	11.00	0.00
9,550.00	39.93	359.78	9,434.31	-306.56	929.54	-310.13	11.00	11.00	0.00
9,600.00	45.43	359.78	9,471.05	-272.68	929.41	-276.25	11.00	11.00	0.00
9,650.00	50.93	359.78	9,504.38	-235.44	929.27	-239.00	11.00	11.00	0.00
9,700.00	56.43	359.78	9,533.98	-195.17	929.11	-198.73	11.00	11.00	0.00
9,750.00	61.93	359.78	9,559.59	-152.25	928.95	-155.81	11.00	11.00	0.00
9,800.00	67.43	359.78	9,580.97	-107.07	928.78	-110.63	11.00	11.00	0.00
9,850.00	72.93	359.78	9,597.92	-60.05	928.60	-63.61	11.00	11.00	0.00
9,900.00	78.43	359.78	9,610.28	-11.62	928.41	-15.19	11.00	11.00	0.00
9,950.00	83.93	359.78	9,617.95	37.77	928.23	34.20	11.00	11.00	0.00
10,000.00	89.43	359.78	9,620.84	87.66	928.04	84.10	11.00	11.00	0.00
10,005.19	90.00	359.78	9,620.87	92.85	928.02	89.29	11.00	11.00	0.00
10,100.00	90.00	359.78	9,620.87	187.66	927.65	184.10	0.00	0.00	0.00
10,200.00	90.00	359.78	9,620.88	287.66	927.27	284.10	0.00	0.00	0.00
10,300.00	90.00	359.78	9,620.88	387.66	926.89	384.10	0.00	0.00	0.00
10,400.00	90.00	359.78	9,620.88	487.66	926.51	484.10	0.00	0.00	0.00
10,500.00	90.00	359.78	9,620.89	587.66	926.13	584.10	0.00	0.00	0.00
10,600.00	90.00	359.78	9,620.89	687.66	925.75	684.10	0.00	0.00	0.00
10,700.00	90.00	359.78	9,620.89	787.66	925.37	784.10	0.00	0.00	0.00
10,800.00	90.00	359.78	9,620.89	887.66	924.99	884.10	0.00	0.00	0.00
10,900.00	90.00	359.78	9,620.90	987.66	924.61	984.10	0.00	0.00	0.00
11,000.00	90.00	359.78	9,620.90	1,087.66	924.23	1,084.10	0.00	0.00	0.00
11,100.00	90.00	359.78	9,620.90	1,187.66	923.84	1,184.10	0.00	0.00	0.00
11,200.00	90.00	359.78	9,620.91	1,287.66	923.46	1,284.10	0.00	0.00	0.00
11,300.00	90.00	359.78	9,620.91	1,387.65	923.08	1,384.10	0.00	0.00	0.00
11,400.00	90.00	359.78	9,620.91	1,487.65	922.70	1,484.10	0.00	0.00	0.00
11,500.00	90.00	359.78	9,620.91	1,587.65	922.32	1,584.10	0.00	0.00	0.00
11,600.00	90.00	359.78	9,620.92	1,687.65	921.94	1,684.10	0.00	0.00	0.00
11,700.00	90.00	359.78	9,620.92	1,787.65	921.56	1,784.10	0.00	0.00	0.00

Company: Marathon Oil
Project: Eddy County, NM

Site: Rick Deckard State 25-28-4 (12-14-15-18)

Well: TB #14H
Wellbore: OH
Design: Prelim Plan B

Local Co-ordinate Reference: Well TB #14H
TVD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
MD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Planned 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)
11,800.00	90.00	359.78	9,620.92	1,887.65	921.18	1,884.10	0.00	0.00	0.00
11,900.00	90.00	359.78	9,620.93	1,987.65	920.80	1,984.10	0.00	0.00	0.00
12,000.00	90.00	359.78	9,620.93	2,087.65	920.41	2,084.10	0.00	0.00	0.00
12,100.00	90.00	359.78	9,620.93	2,187.65	920.03	2,184.10	0.00	0.00	0.00
12,200.00	90.00	359.78	9,620.94	2,287.65	919.65	2,284.10	0.00	0.00	0.00
12,300.00	90.00	359.78	9,620.94	2,387.65	919.27	2,384.10	0.00	0.00	0.00
12,400.00	90.00	359.78	9,620.94	2,487.65	918.89	2,484.10	0.00	0.00	0.00
12,500.00	90.00	359.78	9,620.94	2,587.65	918.51	2,584.10	0.00	0.00	0.00
12,600.00	90.00	359.78	9,620.95	2,687.65	918.13	2,684.10	0.00	0.00	0.00
12,700.00	90.00	359.78	9,620.95	2,787.64	917.75	2,784.10	0.00	0.00	0.00
12,800.00	90.00	359.78	9,620.95	2,887.64	917.37	2,884.10	0.00	0.00	0.00
12,900.00	90.00	359.78	9,620.96	2,987.64	916.99	2,984.10	0.00	0.00	0.00
13,000.00	90.00	359.78	9,620.96	3,087.64	916.60	3,084.10	0.00	0.00	0.00
13,100.00	90.00	359.78	9,620.96	3,187.64	916.22	3,184.10	0.00	0.00	0.00
13,200.00	90.00	359.78	9,620.96	3,287.64	915.84	3,284.10	0.00	0.00	0.00
13,300.00	90.00	359.78	9,620.97	3,387.64	915.46	3,384.10	0.00	0.00	0.00
13,400.00	90.00	359.78	9,620.97	3,487.64	915.08	3,484.10	0.00	0.00	0.00
13,500.00	90.00	359.78	9,620.97	3,587.64	914.70	3,584.10	0.00	0.00	0.00
13,600.00	90.00	359.78	9,620.98	3,687.64	914.32	3,684.10	0.00	0.00	0.00
13,700.00	90.00	359.78	9,620.98	3,787.64	913.94	3,784.10	0.00	0.00	0.00
13,800.00	90.00	359.78	9,620.98	3,887.64	913.56	3,884.10	0.00	0.00	0.00
13,900.00	90.00	359.78	9,620.98	3,987.64	913.18	3,984.10	0.00	0.00	0.00
14,000.00	90.00	359.78	9,620.99	4,087.64	912.79	4,084.10	0.00	0.00	0.00
14,100.00	90.00	359.78	9,620.99	4,187.63	912.41	4,184.10	0.00	0.00	0.00
14,200.00	90.00	359.78	9,620.99	4,287.63	912.03	4,284.10	0.00	0.00	0.00
14,300.00	90.00	359.78	9,621.00	4,387.63	911.65	4,384.10	0.00	0.00	0.00
14,400.00	90.00	359.78	9,621.00	4,487.63	911.27	4,484.10	0.00	0.00	0.00
14,426.34	90.00	359.78	9,621.00	4,513.97	911.17	4,510.44	0.00	0.00	0.00
[RickDeckard#14H]LTP/BHL									
14,471.34	90.00	359.78	9,621.00	4,558.97	911.00	4,555.44	0.00	0.00	0.00

Company: Marathon Oil
Project: Eddy County, NM
Site: Rick Deckard State 25-28-4 (12-14-15-18)
Well: TB #14H
Wellbore: OH
Design: Prelim Plan B

Local Co-ordinate Reference: Well TB #14H
TVD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
MD Reference: Well @ 2988.00usft (GL: 2963' + KB: 25' (Prec594))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
[RickDeckard#14H]FTP - hit/miss target - Shape - plan misses target center by 950.39usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	-199.69	929.17	419,295.31	577,052.18	32.152515	-104.084361
[RickDeckard#14H]KOP - plan hits target center - Point	0.00	0.00	9,100.00	-428.00	930.00	419,067.00	577,053.01	32.151887	-104.084360
[RickDeckard#14H]LTP/I - plan hits target center - Point	0.00	0.00	9,621.00	4,513.97	911.17	424,008.97	577,034.18	32.165473	-104.084384

Checked By: _____ Approved By: _____ Date: _____



Marathon Oil
Eddy County, NM
Rick Deckard State 25-28-4 (12-14-15-18)
TB #14H
Prelim Plan B
GL: 2963' + KB: 25' (Prec594)

US State Plane 1927 (East solution)
NAD 1927 (NADCON CONUS)
Clarke 1866
New Mexico East 3001
Mean Sea Level

RKB Elevation: Well @ 2968.00ft (GL: 2963' + KB: 25' (Prec594))

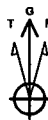
N/S	E/W	Northing	Easting	Latitude	Longitude	Spot
0.00	0.00	419495.00	576123.01	32.153070	-104.087362	

SECTION DETAILS

Sec	MD	Inc	Art	TVD	N/S	E/W	Diag	VSec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00
3	1700.00	10.00	114.71	1697.47	-18.20	39.54	2.00	-18.35
4	7094.32	10.00	114.71	7009.84	-409.80	690.46	0.00	-413.22
5	7594.32	0.00	0.00	7507.30	-428.00	930.00	2.00	-431.57
6	9187.02	0.00	0.00	9100.00	-428.00	930.00	0.00	-431.57
7	10005.19	90.00	359.78	9820.87	92.85	928.02	11.00	89.29
8	14426.34	90.00	359.78	9821.00	4513.97	911.17	0.00	4510.44
9	14471.34	90.00	359.78	9821.00	4558.97	911.00	0.00	4558.44

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	N/S	E/W	Northing	Easting
[RickDeckard#14H]FTP	0.00	-199.69	929.17	419295.31	577052.18
[RickDeckard#14H]KOP	9100.00	-428.00	930.00	419087.00	577053.01
[RickDeckard#14H]TP/BHL	9621.00	4513.97	911.17	424008.97	577034.18

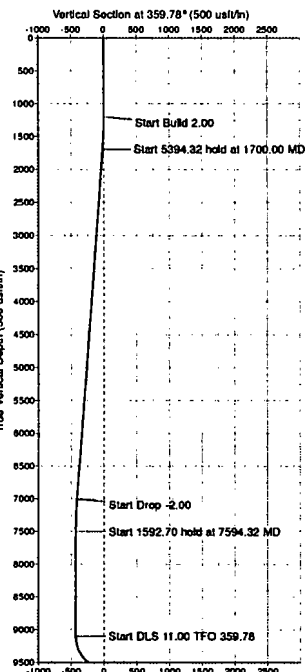


Azimuths to Grid North
True North: -5.13°
Magnetic North: 7.07°
Magnetic Field
Strength: 47873.9nT
Dir Angle: 58.90°
Date: 9/7/2018
Model: HDGM

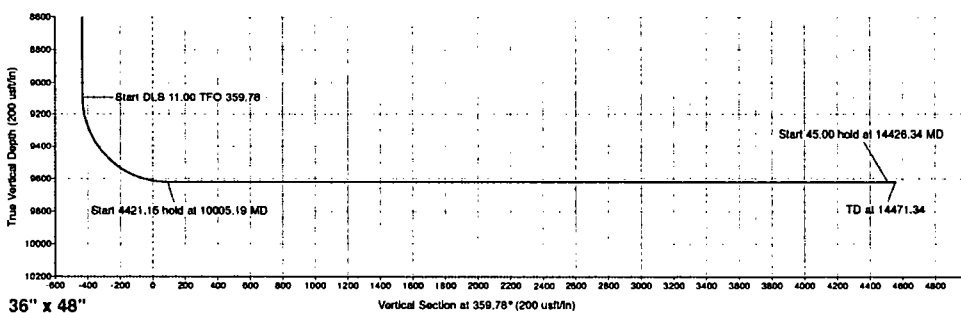
Azimuth Corrections

Total Magnetic Corr. (M to G): 7.07°

Declination (M to T): 7.20° East



Target Line: 9621' TVD @ 0° VS: 90° INC



36" x 48"

Vertical Section at 359.78° (200 uft/in)

