

NM OIL CONSERVATION ARTESIA DISTRICT



Pro Directional
Survey Report

JAN 16 2019



Company: Marathon Oil
Project: Eddy County, NM

Site: Mazer Rackham 20 WA Fed

Well: No. 5H
Wellbore: Pilot
Design: Pilot- Prelim Plan B

Local Co-ordinate Reference: Well No. 5H
TVD Reference: Well @ 2897.00usft (GL: 2872' + KB: 25' (PD594))
MD Reference: Well @ 2897.00usft (GL: 2872' + KB: 25' (PD594))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

RECEIVED

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	Mazer Rackham 20 WA Fed			
Site Position:		Northing:	375,810.18 usft	Latitude: 32.032778
From:	Map	Easting:	603,395.73 usft	Longitude: -103.999675
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.18 °

Well	No. 5H			
Well Position	+N/-S	0.00 usft	Northing:	375,810.09 usft
	+E/-W	0.00 usft	Easting:	603,425.73 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft
			Ground Level:	2,872.00 usft

Wellbore	Pilot					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength	
			(°)	(°)	(nT)	
	HDGM	1/4/2019	6.90	59.68	47,852.10	

Design	Pilot- Prelim Plan B					
Audit Notes:						
Version:	Phase:	PLAN	Tie On Depth:	0.00		
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction		
	(usft)	(usft)	(usft)	(°)		
	0.00	0.00	0.00	178.88		

Survey Tool Program	Date 1/7/2019				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
0.00	1,850.00	Pilot- Prelim Plan B (Pilot)	MWD+IFR1	OWSG MWD + IFR1	
1,850.00	5,400.00	Pilot- Prelim Plan B (Pilot)	MWD+IFR1	OWSG MWD + IFR1	
5,400.00	12,993.23	Pilot- Prelim Plan B (Pilot)	MWD+IFR1	OWSG MWD + IFR1	

Planned Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
[MazerRack#5H]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
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00



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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)
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	2.00	353.42	1,899.98	1.73	-0.20	-1.74	2.00	2.00	0.00
2,000.00	4.00	353.42	1,999.84	6.93	-0.80	-6.95	2.00	2.00	0.00
2,100.00	6.00	353.42	2,099.45	15.59	-1.80	-15.62	2.00	2.00	0.00
2,200.00	8.00	353.42	2,198.70	27.70	-3.19	-27.75	2.00	2.00	0.00
2,300.00	10.00	353.42	2,297.47	43.24	-4.99	-43.33	2.00	2.00	0.00
2,400.00	10.00	353.42	2,395.95	60.49	-6.98	-60.61	0.00	0.00	0.00
2,500.00	10.00	353.42	2,494.43	77.74	-8.97	-77.90	0.00	0.00	0.00
2,600.00	10.00	353.42	2,592.91	94.99	-10.96	-95.18	0.00	0.00	0.00
2,700.00	10.00	353.42	2,691.39	112.24	-12.95	-112.47	0.00	0.00	0.00
2,800.00	10.00	353.42	2,789.87	129.49	-14.93	-129.76	0.00	0.00	0.00
2,900.00	10.00	353.42	2,888.35	146.74	-16.92	-147.04	0.00	0.00	0.00
3,000.00	10.00	353.42	2,986.83	163.99	-18.91	-164.33	0.00	0.00	0.00
3,100.00	10.00	353.42	3,085.31	181.24	-20.90	-181.61	0.00	0.00	0.00
3,200.00	10.00	353.42	3,183.79	198.49	-22.89	-198.90	0.00	0.00	0.00
3,300.00	10.00	353.42	3,282.27	215.74	-24.88	-216.19	0.00	0.00	0.00
3,400.00	10.00	353.42	3,380.75	232.99	-26.87	-233.47	0.00	0.00	0.00
3,500.00	10.00	353.42	3,479.23	250.24	-28.86	-250.76	0.00	0.00	0.00
3,600.00	10.00	353.42	3,577.72	267.49	-30.85	-268.04	0.00	0.00	0.00
3,700.00	10.00	353.42	3,676.20	284.74	-32.84	-285.33	0.00	0.00	0.00
3,800.00	10.00	353.42	3,774.68	301.99	-34.83	-302.62	0.00	0.00	0.00
3,900.00	10.00	353.42	3,873.16	319.24	-36.82	-319.90	0.00	0.00	0.00
4,000.00	10.00	353.42	3,971.64	336.49	-38.81	-337.19	0.00	0.00	0.00
4,100.00	10.00	353.42	4,070.12	353.74	-40.80	-354.47	0.00	0.00	0.00
4,200.00	10.00	353.42	4,168.60	370.99	-42.79	-371.76	0.00	0.00	0.00
4,300.00	10.00	353.42	4,267.08	388.25	-44.78	-389.05	0.00	0.00	0.00
4,400.00	10.00	353.42	4,365.56	405.50	-46.77	-406.33	0.00	0.00	0.00
4,500.00	10.00	353.42	4,464.04	422.75	-48.76	-423.62	0.00	0.00	0.00
4,600.00	10.00	353.42	4,562.52	440.00	-50.75	-440.90	0.00	0.00	0.00
4,700.00	10.00	353.42	4,661.00	457.25	-52.74	-458.19	0.00	0.00	0.00

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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)
4,800.00	10.00	353.42	4,759.48	474.50	-54.73	-475.48	0.00	0.00	0.00
4,900.00	10.00	353.42	4,857.97	491.75	-56.72	-492.76	0.00	0.00	0.00
5,000.00	10.00	353.42	4,956.45	509.00	-58.71	-510.05	0.00	0.00	0.00
5,100.00	10.00	353.42	5,054.93	526.25	-60.70	-527.33	0.00	0.00	0.00
5,200.00	10.00	353.42	5,153.41	543.50	-62.69	-544.62	0.00	0.00	0.00
5,300.00	10.00	353.42	5,251.89	560.75	-64.68	-561.91	0.00	0.00	0.00
5,400.00	10.00	353.42	5,350.37	578.00	-66.67	-579.19	0.00	0.00	0.00
5,500.00	10.00	353.42	5,448.85	595.25	-68.65	-596.48	0.00	0.00	0.00
5,600.00	10.00	353.42	5,547.33	612.50	-70.64	-613.76	0.00	0.00	0.00
5,700.00	10.00	353.42	5,645.81	629.75	-72.63	-631.05	0.00	0.00	0.00
5,800.00	10.00	353.42	5,744.29	647.00	-74.62	-648.34	0.00	0.00	0.00
5,900.00	10.00	353.42	5,842.77	664.25	-76.61	-665.62	0.00	0.00	0.00
6,000.00	10.00	353.42	5,941.25	681.50	-78.60	-682.91	0.00	0.00	0.00
6,100.00	10.00	353.42	6,039.73	698.75	-80.59	-700.20	0.00	0.00	0.00
6,200.00	10.00	353.42	6,138.22	716.00	-82.58	-717.48	0.00	0.00	0.00
6,300.00	10.00	353.42	6,236.70	733.25	-84.57	-734.77	0.00	0.00	0.00
6,400.00	10.00	353.42	6,335.18	750.50	-86.56	-752.05	0.00	0.00	0.00
6,500.00	10.00	353.42	6,433.66	767.76	-88.55	-769.34	0.00	0.00	0.00
6,523.24	10.00	353.42	6,456.54	771.76	-89.01	-773.36	0.00	0.00	0.00
6,600.00	8.46	353.42	6,532.31	784.00	-90.42	-785.62	2.00	-2.00	0.00
6,700.00	6.46	353.42	6,631.46	796.90	-91.91	-798.55	2.00	-2.00	0.00
6,800.00	4.46	353.42	6,731.00	806.36	-93.00	-808.03	2.00	-2.00	0.00
6,900.00	2.46	353.42	6,830.81	812.37	-93.70	-814.04	2.00	-2.00	0.00
7,000.00	0.46	353.42	6,930.77	814.91	-93.99	-816.59	2.00	-2.00	0.00
7,023.24	0.00	0.00	6,954.01	815.00	-94.00	-816.68	2.00	-2.00	0.00
7,100.00	0.00	0.00	7,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,200.00	0.00	0.00	7,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,300.00	0.00	0.00	7,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,400.00	0.00	0.00	7,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,500.00	0.00	0.00	7,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,600.00	0.00	0.00	7,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,700.00	0.00	0.00	7,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,800.00	0.00	0.00	7,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
7,900.00	0.00	0.00	7,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,000.00	0.00	0.00	7,930.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,100.00	0.00	0.00	8,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,200.00	0.00	0.00	8,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,300.00	0.00	0.00	8,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,400.00	0.00	0.00	8,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,500.00	0.00	0.00	8,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,600.00	0.00	0.00	8,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,700.00	0.00	0.00	8,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00

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Wellbore: Pilot

Design: Pilot- Prelim Plan B

Local Co-ordinate Reference:

TVD Reference:

MD Reference:

North Reference:

Survey Calculation Method:

Database:

Well No. 5H

Well @ 2897.00usft (GL: 2872' + KB: 25' (PD594))

Well @ 2897.00usft (GL: 2872' + KB: 25' (PD594))

Grid

Minimum Curvature

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)
8,800.00	0.00	0.00	8,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
8,900.00	0.00	0.00	8,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,000.00	0.00	0.00	8,930.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,100.00	0.00	0.00	9,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,200.00	0.00	0.00	9,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,300.00	0.00	0.00	9,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,400.00	0.00	0.00	9,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,500.00	0.00	0.00	9,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,600.00	0.00	0.00	9,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,700.00	0.00	0.00	9,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,800.00	0.00	0.00	9,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
9,900.00	0.00	0.00	9,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,000.00	0.00	0.00	9,930.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,100.00	0.00	0.00	10,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,154.38	0.00	0.00	10,085.15	815.00	-94.00	-816.68	0.00	0.00	0.00
[MazerRack#5H]LTP/BHL									
10,200.00	0.00	0.00	10,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,300.00	0.00	0.00	10,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,400.00	0.00	0.00	10,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,500.00	0.00	0.00	10,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,600.00	0.00	0.00	10,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,700.00	0.00	0.00	10,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,800.00	0.00	0.00	10,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
10,900.00	0.00	0.00	10,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,000.00	0.00	0.00	10,930.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,100.00	0.00	0.00	11,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,200.00	0.00	0.00	11,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,300.00	0.00	0.00	11,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,400.00	0.00	0.00	11,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,500.00	0.00	0.00	11,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,600.00	0.00	0.00	11,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,700.00	0.00	0.00	11,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,800.00	0.00	0.00	11,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
11,900.00	0.00	0.00	11,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,000.00	0.00	0.00	11,930.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,100.00	0.00	0.00	12,030.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,200.00	0.00	0.00	12,130.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,300.00	0.00	0.00	12,230.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,400.00	0.00	0.00	12,330.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,500.00	0.00	0.00	12,430.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,600.00	0.00	0.00	12,530.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,700.00	0.00	0.00	12,630.77	815.00	-94.00	-816.68	0.00	0.00	0.00

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Wellbore: Pilot
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MD Reference: Well @ 2897.00usft (GL: 2872' + KB: 25' (PD594))
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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)
12,800.00	0.00	0.00	12,730.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,900.00	0.00	0.00	12,830.77	815.00	-94.00	-816.68	0.00	0.00	0.00
12,993.23	0.00	0.00	12,924.00	815.00	-94.00	-816.68	0.00	0.00	0.00

[MazerRack#5H]PilotBHL

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
[MazerRack#5H]FTP - plan misses target center by 641.21usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	634.91	-89.68	376,445.00	603,336.05	32.034523	-103.999862
[MazerRack#5H]LTP/BH - plan misses target center by 4781.90usft at 10154.38usft MD (10085.15 TVD, 815.00 N, -94.00 E) - Point	0.00	0.00	10,085.15	-3,965.98	-0.12	371,844.11	603,425.61	32.021875	-103.999618
[MazerRack#5H]PilotBH - plan hits target center - Point	0.00	0.00	12,924.00	815.00	-94.00	376,625.09	603,331.73	32.035019	-103.999874

Checked By: _____ Approved By: _____ Date: _____