



Pro Directional Survey Report

NM OIL CONSERVATION
ARTESIA DISTRICT
JAN 05 2018
PRODIRECTIONAL

Company:	Marathon Oil	Local Coordinates Reference:	RECEIVED
Project:	Eddy County, NM	TVD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Site:	Sterling State 23-27-20	MD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Well:	TB #4H	North Arrow:	Grid
Wellbore:	OH	Survey Calculated:	Minimum Curvature
Design:	Prelim Plan A	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		

Sterling State 23-27-20			
Site Position:	Northing: 467,254.93 usft	Latitude:	32.284538
From: Map	Easting: 538,802.63 usft	Longitude:	-104.207772
Position Uncertainty: 0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence:	0.07 °

Well	TB #4H					
Well Position	+N/-S	0.00 usft	Northing:	467,254.93 usft	Latitude:	32.284538
	+E/-W	0.00 usft	Easting:	538,802.63 usft	Longitude:	-104.207772
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,181.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Rock Strength
			(°)	(°)	(psi)
	HDGM	12/27/2017	7.40	60.03	48,024.50

Design:	Prelim Plan A			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	N/A	RAW	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	359.74

Survey Tool Program:		Date: 12/27/2017		
From (m)	To (m)	Survey Wellbore	Tool Name	Description
0.00	13,563.66	Prelim Plan A (OH)	MWD+IFR1	OWSG MWD + IFR1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Asimuth (°)	Vertical Depth (usft)	N/A (usft)	RAW (usft)	Vertical Section (usft)	Depth Rate (°/100usft)	Bulk 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	
[SterlingST#4H]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	
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	

Company	Marathon Oil	Local Co-ordinate Reference	Well TB #4H
Project	Eddy County, NM	TVD Reference	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Site	Sterling State 23-27-20	MD Reference	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Well	TB #4H	North Reference	Grid
Wellbore	OH	Survey Calculation Method	Minimum Curvature
Design	Prelim Plan A	Database	WellPlanner1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/E (usft)	+S/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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	0.75	239.43	1,600.00	-0.33	-0.56	-0.33	0.75	0.75	0.00
1,700.00	1.50	239.43	1,699.98	-1.33	-2.25	-1.32	0.75	0.75	0.00
1,800.00	2.25	239.43	1,799.92	-3.00	-5.07	-2.97	0.75	0.75	0.00
1,900.00	3.00	239.43	1,899.82	-5.32	-9.01	-5.28	0.75	0.75	0.00
2,000.00	3.75	239.43	1,999.64	-8.32	-14.08	-8.25	0.75	0.75	0.00
2,100.00	4.50	239.43	2,099.38	-11.98	-20.28	-11.88	0.75	0.75	0.00
2,200.00	5.25	239.43	2,199.02	-16.30	-27.59	-16.17	0.75	0.75	0.00
2,300.00	6.00	239.43	2,298.54	-21.28	-36.03	-21.12	0.75	0.75	0.00
2,400.00	6.75	239.43	2,397.92	-26.93	-45.59	-26.72	0.75	0.75	0.00
2,500.00	7.50	239.43	2,497.15	-33.24	-56.27	-32.98	0.75	0.75	0.00
2,600.00	8.25	239.43	2,596.20	-40.20	-68.07	-39.89	0.75	0.75	0.00
2,700.00	9.00	239.43	2,695.07	-47.83	-80.98	-47.46	0.75	0.75	0.00
2,800.00	9.75	239.43	2,793.73	-56.11	-95.01	-55.68	0.75	0.75	0.00
2,833.33	10.00	239.43	2,826.57	-59.02	-99.93	-58.57	0.75	0.75	0.00
2,900.00	10.00	239.43	2,892.23	-64.91	-109.90	-64.41	0.00	0.00	0.00
3,000.00	10.00	239.43	2,990.71	-73.74	-124.85	-73.17	0.00	0.00	0.00
3,100.00	10.00	239.43	3,089.19	-82.57	-139.80	-81.93	0.00	0.00	0.00
3,200.00	10.00	239.43	3,187.67	-91.40	-154.76	-90.70	0.00	0.00	0.00
3,300.00	10.00	239.43	3,286.15	-100.23	-169.71	-99.46	0.00	0.00	0.00
3,400.00	10.00	239.43	3,384.63	-109.06	-184.66	-108.22	0.00	0.00	0.00
3,500.00	10.00	239.43	3,483.11	-117.89	-199.61	-116.99	0.00	0.00	0.00
3,600.00	10.00	239.43	3,581.59	-126.72	-214.56	-125.75	0.00	0.00	0.00
3,700.00	10.00	239.43	3,680.07	-135.55	-229.51	-134.51	0.00	0.00	0.00
3,800.00	10.00	239.43	3,778.56	-144.38	-244.47	-143.27	0.00	0.00	0.00
3,900.00	10.00	239.43	3,877.04	-153.22	-259.42	-152.04	0.00	0.00	0.00
4,000.00	10.00	239.43	3,975.52	-162.05	-274.37	-160.80	0.00	0.00	0.00
4,100.00	10.00	239.43	4,074.00	-170.88	-289.32	-169.56	0.00	0.00	0.00
4,200.00	10.00	239.43	4,172.48	-179.71	-304.27	-178.32	0.00	0.00	0.00
4,300.00	10.00	239.43	4,270.96	-188.54	-319.23	-187.09	0.00	0.00	0.00
4,400.00	10.00	239.43	4,369.44	-197.37	-334.18	-195.85	0.00	0.00	0.00
4,500.00	10.00	239.43	4,467.92	-206.20	-349.13	-204.61	0.00	0.00	0.00
4,600.00	10.00	239.43	4,566.40	-215.03	-364.08	-213.38	0.00	0.00	0.00
4,700.00	10.00	239.43	4,664.88	-223.86	-379.03	-222.14	0.00	0.00	0.00
4,800.00	10.00	239.43	4,763.36	-232.69	-393.98	-230.90	0.00	0.00	0.00

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Well:	TB #4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	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)
4,900.00	10.00	239.43	4,861.84	-241.52	-408.94	-239.66	0.00	0.00	0.00
5,000.00	10.00	239.43	4,960.32	-250.35	-423.89	-248.43	0.00	0.00	0.00
5,100.00	10.00	239.43	5,058.81	-259.18	-438.84	-257.19	0.00	0.00	0.00
5,200.00	10.00	239.43	5,157.29	-268.01	-453.79	-265.95	0.00	0.00	0.00
5,300.00	10.00	239.43	5,255.77	-276.85	-468.74	-274.72	0.00	0.00	0.00
5,400.00	10.00	239.43	5,354.25	-285.68	-483.69	-283.48	0.00	0.00	0.00
5,500.00	10.00	239.43	5,452.73	-294.51	-498.65	-292.24	0.00	0.00	0.00
5,600.00	10.00	239.43	5,551.21	-303.34	-513.60	-301.00	0.00	0.00	0.00
5,700.00	10.00	239.43	5,649.69	-312.17	-528.55	-309.77	0.00	0.00	0.00
5,800.00	10.00	239.43	5,748.17	-321.00	-543.50	-318.53	0.00	0.00	0.00
5,900.00	10.00	239.43	5,846.65	-329.83	-558.45	-327.29	0.00	0.00	0.00
6,000.00	10.00	239.43	5,945.13	-338.66	-573.41	-336.05	0.00	0.00	0.00
6,100.00	10.00	239.43	6,043.61	-347.49	-588.36	-344.82	0.00	0.00	0.00
6,200.00	10.00	239.43	6,142.09	-356.32	-603.31	-353.58	0.00	0.00	0.00
6,300.00	10.00	239.43	6,240.57	-365.15	-618.26	-362.34	0.00	0.00	0.00
6,400.00	10.00	239.43	6,339.06	-373.98	-633.21	-371.11	0.00	0.00	0.00
6,500.00	10.00	239.43	6,437.54	-382.81	-648.16	-379.87	0.00	0.00	0.00
6,600.00	10.00	239.43	6,536.02	-391.64	-663.12	-388.63	0.00	0.00	0.00
6,700.00	10.00	239.43	6,634.50	-400.47	-678.07	-397.39	0.00	0.00	0.00
6,800.00	10.00	239.43	6,732.98	-409.31	-693.02	-406.16	0.00	0.00	0.00
6,900.00	10.00	239.43	6,831.46	-418.14	-707.97	-414.92	0.00	0.00	0.00
7,000.00	10.00	239.43	6,929.94	-426.97	-722.92	-423.68	0.00	0.00	0.00
7,100.00	10.00	239.43	7,028.42	-435.80	-737.87	-432.44	0.00	0.00	0.00
7,200.00	10.00	239.43	7,126.90	-444.63	-752.83	-441.21	0.00	0.00	0.00
7,300.00	10.00	239.43	7,225.38	-453.46	-767.78	-449.97	0.00	0.00	0.00
7,400.00	10.00	239.43	7,323.86	-462.29	-782.73	-458.73	0.00	0.00	0.00
7,500.00	10.00	239.43	7,422.34	-471.12	-797.68	-467.50	0.00	0.00	0.00
7,542.43	10.00	239.43	7,464.13	-474.87	-804.03	-471.21	0.00	0.00	0.00
7,600.00	8.85	239.43	7,520.92	-479.66	-812.14	-475.97	2.00	-2.00	0.00
7,700.00	6.85	239.43	7,619.98	-486.61	-823.90	-482.86	2.00	-2.00	0.00
7,800.00	4.85	239.43	7,719.45	-491.79	-832.67	-488.00	2.00	-2.00	0.00
7,900.00	2.85	239.43	7,819.22	-495.20	-838.45	-491.39	2.00	-2.00	0.00
8,000.00	0.85	239.43	7,919.17	-496.84	-841.23	-493.02	2.00	-2.00	0.00
8,042.43	0.00	0.00	7,961.59	-497.00	-841.50	-493.18	2.00	-2.00	0.00
8,100.00	0.00	0.00	8,019.16	-497.00	-841.50	-493.18	0.00	0.00	0.00
8,200.00	0.00	0.00	8,119.16	-497.00	-841.50	-493.18	0.00	0.00	0.00
8,300.00	0.00	0.00	8,219.16	-497.00	-841.50	-493.18	0.00	0.00	0.00
8,373.84	0.00	0.00	8,293.00	-497.00	-841.50	-493.18	0.00	0.00	0.00
[SterlingST#4H]KOP									
8,400.00	2.62	359.74	8,319.16	-496.40	-841.50	-492.58	10.00	10.00	0.00
8,450.00	7.62	359.74	8,368.94	-491.95	-841.52	-488.12	10.00	10.00	0.00
8,500.00	12.62	359.74	8,418.15	-483.17	-841.56	-479.34	10.00	10.00	0.00

Company:	Marathon Oil	Local Co-ordinate Reference:	Well TB #4H
Project:	Eddy County, NM	TVD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Site:	Sterling State 23-27-20	MD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Well:	TB #4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/E/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,550.00	17.62	359.74	8,466.40	-470.13	-841.62	-466.31	10.00	10.00	0.00	
8,600.00	22.62	359.74	8,513.34	-452.94	-841.70	-449.12	10.00	10.00	0.00	
8,650.00	27.62	359.74	8,558.60	-431.72	-841.80	-427.90	10.00	10.00	0.00	
8,700.00	32.62	359.74	8,601.83	-406.64	-841.91	-402.82	10.00	10.00	0.00	
8,750.00	37.62	359.74	8,642.72	-377.89	-842.04	-374.07	10.00	10.00	0.00	
8,800.00	42.62	359.74	8,680.94	-345.68	-842.19	-341.86	10.00	10.00	0.00	
8,850.00	47.62	359.74	8,716.21	-310.27	-842.35	-306.44	10.00	10.00	0.00	
8,900.00	52.62	359.74	8,748.27	-271.91	-842.52	-268.09	10.00	10.00	0.00	
8,950.00	57.62	359.74	8,776.85	-230.91	-842.71	-227.09	10.00	10.00	0.00	
9,000.00	62.62	359.74	8,801.76	-187.57	-842.91	-183.75	10.00	10.00	0.00	
9,050.00	67.62	359.74	8,822.79	-142.23	-843.11	-138.40	10.00	10.00	0.00	
9,100.00	72.62	359.74	8,839.79	-95.23	-843.33	-91.40	10.00	10.00	0.00	
9,150.00	77.62	359.74	8,852.63	-46.92	-843.55	-43.09	10.00	10.00	0.00	
9,200.00	82.62	359.74	8,861.21	2.32	-843.77	6.15	10.00	10.00	0.00	
9,250.00	87.62	359.74	8,865.46	52.12	-844.00	55.95	10.00	10.00	0.00	
9,272.81	89.90	359.74	8,865.96	74.93	-844.10	78.76	10.00	10.00	0.00	
9,300.00	89.90	359.74	8,866.01	102.12	-844.23	105.95	0.00	0.00	0.00	
9,400.00	89.90	359.74	8,866.18	202.12	-844.68	205.95	0.00	0.00	0.00	
9,500.00	89.90	359.74	8,866.36	302.11	-845.14	305.95	0.00	0.00	0.00	
9,600.00	89.90	359.74	8,866.54	402.11	-845.59	405.95	0.00	0.00	0.00	
9,700.00	89.90	359.74	8,866.72	502.11	-846.05	505.95	0.00	0.00	0.00	
9,800.00	89.90	359.74	8,866.90	602.11	-846.50	605.95	0.00	0.00	0.00	
9,900.00	89.90	359.74	8,867.08	702.11	-846.96	705.95	0.00	0.00	0.00	
10,000.00	89.90	359.74	8,867.26	802.11	-847.41	805.95	0.00	0.00	0.00	
10,100.00	89.90	359.74	8,867.44	902.11	-847.87	905.94	0.00	0.00	0.00	
10,200.00	89.90	359.74	8,867.61	1,002.11	-848.32	1,005.94	0.00	0.00	0.00	
10,300.00	89.90	359.74	8,867.79	1,102.10	-848.78	1,105.94	0.00	0.00	0.00	
10,400.00	89.90	359.74	8,867.97	1,202.10	-849.23	1,205.94	0.00	0.00	0.00	
10,500.00	89.90	359.74	8,868.15	1,302.10	-849.69	1,305.94	0.00	0.00	0.00	
10,600.00	89.90	359.74	8,868.33	1,402.10	-850.14	1,405.94	0.00	0.00	0.00	
10,700.00	89.90	359.74	8,868.51	1,502.10	-850.60	1,505.94	0.00	0.00	0.00	
10,800.00	89.90	359.74	8,868.69	1,602.10	-851.05	1,605.94	0.00	0.00	0.00	
10,900.00	89.90	359.74	8,868.87	1,702.10	-851.51	1,705.94	0.00	0.00	0.00	
11,000.00	89.90	359.74	8,869.05	1,802.10	-851.96	1,805.94	0.00	0.00	0.00	
11,100.00	89.90	359.74	8,869.22	1,902.09	-852.42	1,905.94	0.00	0.00	0.00	
11,200.00	89.90	359.74	8,869.40	2,002.09	-852.87	2,005.94	0.00	0.00	0.00	
11,300.00	89.90	359.74	8,869.58	2,102.09	-853.33	2,105.94	0.00	0.00	0.00	
11,400.00	89.90	359.74	8,869.76	2,202.09	-853.78	2,205.94	0.00	0.00	0.00	
11,500.00	89.90	359.74	8,869.94	2,302.09	-854.24	2,305.94	0.00	0.00	0.00	
11,600.00	89.90	359.74	8,870.12	2,402.09	-854.69	2,405.94	0.00	0.00	0.00	
11,700.00	89.90	359.74	8,870.30	2,502.09	-855.15	2,505.94	0.00	0.00	0.00	
11,800.00	89.90	359.74	8,870.48	2,602.09	-855.60	2,605.94	0.00	0.00	0.00	

Company:	Marathon Oil	Local Coordinate Reference:	Well TB #4H
Project:	Eddy County, NM	TVD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Site:	Sterling State 23-27-20	MD Reference:	Well @ 3207.50usft (GL: 3181' + KB: 26.5' (H&P480))
Well:	TB #4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Prelim Plan A	Database:	WellPlanner1

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/E (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,900.00	89.90	359.74	8,870.65	2,702.09	-856.06	2,705.94	0.00	0.00	0.00
12,000.00	89.90	359.74	8,870.83	2,802.08	-856.51	2,805.94	0.00	0.00	0.00
12,100.00	89.90	359.74	8,871.01	2,902.08	-856.97	2,905.94	0.00	0.00	0.00
12,200.00	89.90	359.74	8,871.19	3,002.08	-857.42	3,005.94	0.00	0.00	0.00
12,300.00	89.90	359.74	8,871.37	3,102.08	-857.88	3,105.94	0.00	0.00	0.00
12,400.00	89.90	359.74	8,871.55	3,202.08	-858.33	3,205.94	0.00	0.00	0.00
12,500.00	89.90	359.74	8,871.73	3,302.08	-858.79	3,305.94	0.00	0.00	0.00
12,600.00	89.90	359.74	8,871.91	3,402.08	-859.24	3,405.94	0.00	0.00	0.00
12,700.00	89.90	359.74	8,872.08	3,502.08	-859.70	3,505.94	0.00	0.00	0.00
12,800.00	89.90	359.74	8,872.26	3,602.07	-860.15	3,605.94	0.00	0.00	0.00
12,900.00	89.90	359.74	8,872.44	3,702.07	-860.61	3,705.94	0.00	0.00	0.00
13,000.00	89.90	359.74	8,872.62	3,802.07	-861.06	3,805.94	0.00	0.00	0.00
13,100.00	89.90	359.74	8,872.80	3,902.07	-861.52	3,905.94	0.00	0.00	0.00
13,200.00	89.90	359.74	8,872.98	4,002.07	-861.97	4,005.94	0.00	0.00	0.00
13,300.00	89.90	359.74	8,873.16	4,102.07	-862.43	4,105.94	0.00	0.00	0.00
13,400.00	89.90	359.74	8,873.34	4,202.07	-862.88	4,205.94	0.00	0.00	0.00
13,500.00	89.90	359.74	8,873.52	4,302.07	-863.34	4,305.94	0.00	0.00	0.00
13,564.20	89.90	359.74	8,873.63	4,366.26	-863.63	4,370.13	0.00	0.00	0.00
[SterlingST#4H]BHL									

Design Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	N/E (usft)	E/W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
[SterlingST#4H]FTP	- plan misses target center by 883.81usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)	0.00	0.01	0.00	-267.17	-842.46	466,987.76	537,960.17	32.283806	-104.210500
	- Point									
[SterlingST#4H]KOP	- plan hits target center	0.00	0.00	8,293.00	-497.00	-841.50	466,757.93	537,961.13	32.283175	-104.210497
	- Point									
[SterlingST#4H]BHL	- plan hits target center	0.00	0.00	8,873.63	4,366.26	-863.63	471,621.19	537,939.00	32.296544	-104.210551
	- Point									

Checked By: _____	Approved By: _____	Date: _____
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