

**Provide Signature Page for
Directional Survey**



Marathon Oil

30-015-44607

Eddy County, NM

Hermes Fee 23-28-30

WA #10H

OH

**NM OIL CONSERVATION
ARTESIA DISTRICT**

SEP 07 2018

RECEIVED

Design: Gyros/MWD 100'-14305' PTB 14364'

Survey Report

28 February, 2018





Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
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	Hermes Fee 23-28-30		
Site Position:		Northing:	461,896.31 usft
From:	Lat/Long	Easting:	565,002.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.2696947
		Longitude:	-104.1230282
		Grid Convergence:	0.11 °

Well	WA #10H		
Well Position	+N/-S	0.00 usft	Northing: 461,891.85 usft
	+E/-W	0.00 usft	Easting: 565,948.30 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32.2696773
		Longitude:	-104.1199666
		Ground Level:	3,123.50 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	User Defined	1/25/2018	(°) 7.38
			Dip Angle (°) 60.04
			Field Strength (nT) 47,994.10

Design	Gyros/MWD 100'-14305' PTB 14364'		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction (°) 359.71



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey Program		Date 2/28/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	500.00	Gyros (OH)	GYRO-NS-CT	OWSG XYZ Accel with XY Static and Continuous Gyro	
594.00	14,364.00	Survey #2 (OH)	MWD+IFR1	OWSG MWD + IFR1	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461,891.85	565,948.30
100.00	0.36	35.13	100.00	0.26	0.26	0.18	0.31	35.13	461,892.11	565,948.48
200.00	0.37	142.63	200.00	0.25	0.26	0.56	0.61	65.23	461,892.11	565,948.86
300.00	0.15	144.83	300.00	-0.11	-0.11	0.83	0.84	97.31	461,891.74	565,949.13
400.00	0.34	108.11	400.00	-0.31	-0.31	1.19	1.23	104.44	461,891.54	565,949.49
500.00	0.22	93.48	499.99	-0.42	-0.41	1.66	1.71	103.86	461,891.44	565,949.96
594.00	0.20	190.80	593.99	-0.59	-0.58	1.81	1.90	107.82	461,891.27	565,950.11
685.00	0.20	116.20	684.99	-0.82	-0.81	1.92	2.08	112.79	461,891.04	565,950.22
777.00	0.10	40.20	776.99	-0.83	-0.82	2.12	2.27	111.10	461,891.03	565,950.42
869.00	0.30	321.60	868.99	-0.58	-0.57	2.02	2.10	105.68	461,891.28	565,950.32
961.00	0.20	258.10	960.99	-0.42	-0.41	1.71	1.76	103.51	461,891.44	565,950.01
1,056.00	0.10	245.80	1,055.99	-0.49	-0.48	1.48	1.55	108.01	461,891.37	565,949.78
1,150.00	0.30	252.80	1,149.99	-0.59	-0.59	1.17	1.30	116.69	461,891.26	565,949.47
1,244.00	0.60	239.00	1,243.99	-0.91	-0.91	0.51	1.04	150.86	461,890.94	565,948.81
1,339.00	0.60	231.00	1,338.98	-1.48	-1.48	-0.30	1.51	191.60	461,890.37	565,948.00
1,434.00	0.90	233.50	1,433.98	-2.23	-2.24	-1.29	2.58	209.96	461,889.61	565,947.01
1,528.00	1.10	230.20	1,527.96	-3.24	-3.26	-2.58	4.15	218.37	461,888.59	565,945.72
1,623.00	1.20	228.10	1,622.94	-4.48	-4.50	-4.02	6.04	221.74	461,887.35	565,944.28
1,717.00	1.40	232.40	1,716.92	-5.83	-5.86	-5.66	8.15	224.00	461,885.99	565,942.64
1,812.00	1.10	191.80	1,811.90	-7.43	-7.46	-6.77	10.07	222.20	461,884.39	565,941.53
1,906.00	1.90	120.00	1,905.87	-9.10	-9.12	-5.60	10.71	211.55	461,882.73	565,942.70



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)	
2,001.00	3.00	112.60	2,000.78	-10.86	-10.87	-1.94	11.04	190.13	461,880.98	565,946.36	
2,095.00	3.40	114.00	2,094.64	-12.96	-12.95	2.87	13.26	167.48	461,878.90	565,951.17	
2,190.00	3.50	123.00	2,189.46	-15.71	-15.67	7.88	17.54	153.30	461,876.18	565,956.18	
2,284.00	4.20	127.80	2,283.25	-19.41	-19.34	13.01	23.31	146.08	461,872.51	565,961.31	
2,378.00	2.50	134.30	2,377.09	-22.97	-22.89	17.19	28.63	143.08	461,868.96	565,965.49	
2,473.00	1.40	139.30	2,472.03	-25.31	-25.21	19.43	31.83	142.37	461,866.64	565,967.73	
2,539.00	1.00	144.20	2,538.02	-26.39	-26.29	20.30	33.21	142.33	461,865.56	565,968.60	
2,655.00	1.00	158.00	2,654.00	-28.16	-28.05	21.27	35.20	142.83	461,863.80	565,969.57	
2,750.00	2.30	109.20	2,748.96	-29.56	-29.45	23.38	37.60	141.55	461,862.40	565,971.68	
2,844.00	3.50	100.20	2,842.84	-30.72	-30.57	27.98	41.45	137.53	461,861.28	565,976.28	
2,938.00	3.60	103.40	2,936.66	-31.94	-31.77	33.68	46.30	133.33	461,860.08	565,981.98	
3,033.00	3.60	108.60	3,031.47	-33.61	-33.41	39.41	51.66	130.29	461,858.44	565,987.71	
3,127.00	3.60	107.70	3,125.29	-35.48	-35.25	45.02	57.17	128.06	461,856.60	565,993.32	
3,221.00	3.60	112.00	3,219.10	-37.51	-37.25	50.56	62.80	126.38	461,854.60	565,998.86	
3,316.00	3.40	108.30	3,313.92	-39.54	-39.25	56.00	68.39	125.03	461,852.60	566,004.30	
3,410.00	3.30	114.50	3,407.76	-41.56	-41.25	61.11	73.73	124.02	461,850.60	566,009.41	
3,504.00	5.10	119.20	3,501.51	-44.75	-44.41	67.22	80.57	123.45	461,847.44	566,015.52	
3,598.00	8.10	115.40	3,594.88	-49.68	-49.29	76.85	91.30	122.67	461,842.56	566,025.15	
3,693.00	10.50	120.60	3,688.62	-57.03	-56.57	90.35	106.60	122.05	461,835.28	566,038.65	
3,787.00	11.00	123.70	3,780.97	-66.44	-65.90	105.19	124.13	122.07	461,825.95	566,053.49	
3,881.00	11.10	124.60	3,873.23	-76.63	-76.02	120.09	142.13	122.33	461,815.83	566,068.39	
3,975.00	11.30	122.80	3,965.44	-86.83	-86.15	135.28	160.38	122.49	461,805.70	566,083.58	
4,070.00	11.70	122.10	4,058.53	-97.07	-96.31	151.27	179.32	122.48	461,795.54	566,099.57	
4,164.00	11.80	122.10	4,150.56	-107.32	-106.48	167.48	198.46	122.45	461,785.37	566,115.78	
4,259.00	12.10	122.20	4,243.50	-117.88	-116.95	184.14	218.13	122.42	461,774.90	566,132.44	
4,353.00	11.20	121.40	4,335.57	-127.96	-126.95	200.27	237.11	122.37	461,764.90	566,148.57	
4,448.00	10.70	120.70	4,428.84	-137.35	-136.26	215.72	255.16	122.28	461,755.59	566,164.02	



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
4,542.00	10.00	118.50	4,521.31	-145.78	-144.61	230.40	272.02	122.11	461,747.24	566,178.70
4,637.00	9.20	120.50	4,614.98	-153.64	-152.40	244.19	287.85	121.97	461,739.45	566,192.49
4,731.00	8.70	120.60	4,707.83	-161.13	-159.83	256.79	302.47	121.90	461,732.02	566,205.09
4,826.00	8.00	119.90	4,801.82	-168.15	-166.79	268.70	316.26	121.83	461,725.06	566,217.00
4,920.00	7.10	120.40	4,895.01	-174.40	-172.99	279.38	328.60	121.76	461,718.86	566,227.68
5,015.00	6.50	121.00	4,989.34	-180.19	-178.73	289.06	339.85	121.73	461,713.12	566,237.36
5,109.00	5.90	121.20	5,082.79	-185.48	-183.97	297.75	350.00	121.71	461,707.88	566,246.05
5,204.00	5.70	121.40	5,177.30	-190.50	-188.96	305.95	359.60	121.70	461,702.89	566,254.25
5,298.00	7.00	116.50	5,270.72	-195.54	-193.95	315.06	369.97	121.62	461,697.90	566,263.36
5,393.00	7.30	112.30	5,364.99	-200.47	-198.82	325.83	381.70	121.39	461,693.03	566,274.13
5,487.00	7.30	111.90	5,458.22	-205.02	-203.31	336.90	393.49	121.11	461,688.54	566,285.20
5,582.00	7.10	111.20	5,552.47	-209.45	-207.69	347.97	405.24	120.83	461,684.16	566,296.27
5,676.00	8.40	120.90	5,645.62	-215.13	-213.32	359.28	417.83	120.70	461,678.53	566,307.58
5,770.00	8.30	123.10	5,738.62	-222.42	-220.55	370.85	431.48	120.74	461,671.30	566,319.15
5,865.00	8.00	124.10	5,832.66	-229.93	-228.00	382.07	444.93	120.83	461,663.85	566,330.37
5,959.00	7.40	124.20	5,925.81	-237.05	-235.07	392.49	457.50	120.92	461,656.78	566,340.79
6,054.00	7.00	127.20	6,020.07	-244.04	-242.01	402.17	469.36	121.04	461,649.84	566,350.47
6,148.00	6.20	130.90	6,113.44	-250.87	-248.79	410.56	480.06	121.21	461,643.06	566,358.86
6,242.00	6.00	133.20	6,206.91	-257.59	-255.48	417.98	489.88	121.43	461,636.37	566,366.28
6,337.00	4.00	130.40	6,301.54	-263.17	-261.03	424.13	498.01	121.61	461,630.82	566,372.43
6,431.00	1.80	128.60	6,395.42	-266.23	-264.07	427.78	502.72	121.69	461,627.78	566,376.08
6,525.00	1.90	110.40	6,489.37	-267.71	-265.54	430.39	505.71	121.67	461,626.31	566,378.69
6,620.00	1.20	97.50	6,584.33	-268.40	-266.22	432.85	508.17	121.59	461,625.63	566,381.15
6,714.00	1.60	172.10	6,678.31	-269.84	-267.64	434.01	509.90	121.66	461,624.21	566,382.31
6,809.00	1.90	188.20	6,773.27	-272.71	-270.52	433.97	511.38	121.94	461,621.33	566,382.27
6,903.00	2.10	194.10	6,867.21	-275.92	-273.73	433.33	512.54	122.28	461,618.12	566,381.63
6,997.00	2.40	185.40	6,961.14	-279.55	-277.36	432.72	513.98	122.66	461,614.49	566,381.02



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
7,092.00	2.20	206.50	7,056.06	-283.15	-280.97	431.72	515.10	123.06	461,610.88	566,380.02
7,186.00	2.70	251.40	7,149.99	-285.46	-283.29	428.82	513.94	123.45	461,608.56	566,377.12
7,281.00	3.90	299.60	7,244.84	-284.55	-282.41	423.89	509.35	123.67	461,609.44	566,372.19
7,375.00	3.80	297.40	7,338.63	-281.51	-279.40	418.34	503.06	123.74	461,612.45	566,366.64
7,470.00	3.60	292.50	7,433.43	-278.89	-276.81	412.79	497.01	123.84	461,615.04	566,361.09
7,564.00	3.00	284.60	7,527.28	-277.12	-275.06	407.68	491.79	124.01	461,616.79	566,355.98
7,659.00	1.90	294.20	7,622.19	-275.83	-273.79	403.84	487.90	124.14	461,618.06	566,352.14
7,754.00	1.80	293.00	7,717.14	-274.58	-272.56	401.03	484.88	124.20	461,619.29	566,349.33
7,848.00	1.90	288.90	7,811.09	-273.49	-271.48	398.20	481.93	124.28	461,620.37	566,346.50
7,943.00	1.90	290.00	7,906.04	-272.42	-270.43	395.23	478.89	124.38	461,621.42	566,343.53
8,037.00	0.70	263.60	8,000.01	-271.94	-269.96	393.19	476.95	124.47	461,621.89	566,341.49
8,131.00	0.20	245.60	8,094.01	-272.07	-270.09	392.47	476.43	124.53	461,621.76	566,340.77
8,226.00	0.10	128.30	8,189.01	-272.19	-270.21	392.39	476.42	124.55	461,621.64	566,340.69
8,320.00	0.10	224.40	8,283.01	-272.30	-270.32	392.39	476.49	124.56	461,621.53	566,340.69
8,415.00	0.30	255.60	8,378.01	-272.42	-270.44	392.09	476.32	124.60	461,621.41	566,340.39
8,509.00	0.50	203.60	8,472.01	-272.86	-270.88	391.69	476.23	124.67	461,620.97	566,339.99
8,604.00	0.50	183.10	8,567.01	-273.65	-271.67	391.50	476.53	124.76	461,620.18	566,339.80
8,698.00	0.70	199.10	8,661.00	-274.60	-272.62	391.29	476.90	124.87	461,619.23	566,339.59
8,793.00	1.10	225.90	8,755.99	-275.78	-273.81	390.45	476.89	125.04	461,618.04	566,338.75
8,887.00	1.60	238.50	8,849.96	-277.08	-275.12	388.68	476.20	125.29	461,616.73	566,336.98
8,982.00	1.80	240.90	8,944.92	-278.49	-276.54	386.25	475.04	125.60	461,615.31	566,334.55
9,076.00	2.00	236.30	9,038.87	-280.10	-278.17	383.59	473.84	125.95	461,613.68	566,331.89
9,170.00	2.80	34.60	9,132.84	-279.12	-277.19	383.53	473.21	125.86	461,614.66	566,331.83
9,217.00	7.80	22.30	9,179.62	-275.23	-273.29	385.40	472.46	125.34	461,618.56	566,333.70
9,265.00	13.30	18.40	9,226.79	-266.99	-265.03	388.38	470.19	124.31	461,626.82	566,336.68
9,312.00	18.60	13.30	9,271.97	-254.57	-252.59	391.81	466.17	122.81	461,639.26	566,340.11
9,359.00	23.60	5.90	9,315.81	-237.92	-235.93	394.50	459.67	120.88	461,655.92	566,342.80



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
9,406.00	28.10	4.60	9,358.10	-217.53	-215.53	396.36	451.17	118.54	461,676.32	566,344.66
9,453.00	32.50	5.70	9,398.67	-193.93	-191.92	398.50	442.31	115.72	461,699.93	566,346.80
9,500.00	37.10	4.70	9,437.25	-167.24	-165.21	400.92	433.63	112.40	461,726.64	566,349.22
9,548.00	42.90	5.20	9,474.01	-136.53	-134.49	403.59	425.41	108.43	461,757.36	566,351.89
9,595.00	49.00	5.70	9,506.67	-102.93	-100.87	406.80	419.12	103.93	461,790.98	566,355.10
9,642.00	54.50	4.60	9,535.76	-66.20	-64.13	410.10	415.08	98.89	461,827.72	566,358.40
9,689.00	60.00	0.80	9,561.18	-26.75	-24.67	411.92	412.66	93.43	461,867.18	566,360.22
9,737.00	66.00	0.30	9,582.96	15.99	18.08	412.33	412.72	87.49	461,909.93	566,360.63
9,784.00	72.00	2.40	9,599.80	59.83	61.92	413.38	417.99	81.48	461,953.77	566,361.68
9,831.00	78.20	2.60	9,611.88	105.17	107.28	415.36	428.99	75.52	461,999.13	566,363.66
9,878.00	83.90	0.60	9,619.19	151.55	153.66	416.65	444.08	69.76	462,045.51	566,364.95
9,898.00	85.70	359.80	9,621.00	171.47	173.58	416.72	451.42	67.39	462,065.43	566,365.02
9,954.00	91.70	357.70	9,622.27	227.42	229.52	415.49	474.68	61.08	462,121.37	566,363.79
10,049.00	91.40	358.10	9,619.70	322.34	324.43	412.01	524.41	51.78	462,216.28	566,360.31
10,144.00	91.00	357.30	9,617.71	417.26	419.33	408.20	585.20	44.23	462,311.18	566,356.50
10,238.00	89.60	357.70	9,617.22	511.18	513.23	404.10	653.23	38.22	462,405.08	566,352.40
10,333.00	89.10	355.80	9,618.30	606.04	608.07	398.72	727.14	33.25	462,499.92	566,347.02
10,427.00	88.90	356.30	9,619.94	699.84	701.83	392.24	804.00	29.20	462,593.68	566,340.54
10,522.00	87.50	357.20	9,622.92	794.66	796.63	386.86	885.60	25.90	462,688.48	566,335.16
10,616.00	86.40	356.70	9,627.92	888.42	890.36	381.87	968.80	23.21	462,782.21	566,330.17
10,711.00	85.50	358.80	9,634.63	983.12	985.04	378.15	1,055.13	21.00	462,876.89	566,326.45
10,805.00	89.70	359.90	9,638.57	1,077.01	1,078.93	377.08	1,142.93	19.26	462,970.78	566,325.38
10,900.00	92.50	359.70	9,636.75	1,171.98	1,173.91	376.75	1,232.88	17.79	463,065.76	566,325.05
10,995.00	92.60	359.20	9,632.52	1,266.89	1,268.81	375.84	1,323.30	16.50	463,160.66	566,324.14
11,090.00	92.40	359.50	9,628.38	1,361.80	1,363.71	374.76	1,414.27	15.37	463,255.56	566,323.06
11,184.00	90.40	358.50	9,626.08	1,455.76	1,457.66	373.12	1,504.66	14.36	463,349.51	566,321.42
11,279.00	91.90	0.00	9,624.17	1,550.73	1,552.63	371.88	1,596.54	13.47	463,444.48	566,320.18



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
11,374.00	90.60	358.00	9,622.10	1,645.69	1,647.59	370.22	1,688.67	12.66	463,539.44	566,318.52
11,468.00	91.30	357.30	9,620.54	1,739.62	1,741.49	366.37	1,779.61	11.88	463,633.34	566,314.67
11,563.00	93.90	0.50	9,616.23	1,834.49	1,836.36	364.54	1,872.19	11.23	463,728.21	566,312.84
11,657.00	94.20	2.20	9,609.59	1,928.21	1,930.09	366.75	1,964.63	10.76	463,821.94	566,315.05
11,752.00	91.20	4.00	9,605.12	2,022.93	2,024.83	371.88	2,058.70	10.41	463,916.68	566,320.18
11,846.00	88.30	4.60	9,605.53	2,116.61	2,118.56	378.93	2,152.18	10.14	464,010.41	566,327.23
11,941.00	90.00	1.60	9,606.94	2,211.42	2,213.39	384.07	2,246.47	9.84	464,105.24	566,332.37
12,035.00	84.70	357.50	9,611.28	2,305.27	2,307.24	383.34	2,338.86	9.43	464,199.09	566,331.64
12,130.00	85.60	357.80	9,619.31	2,399.86	2,401.82	379.46	2,431.61	8.98	464,293.67	566,327.76
12,224.00	90.80	356.50	9,622.27	2,493.69	2,495.62	374.78	2,523.60	8.54	464,387.47	566,323.08
12,319.00	90.50	1.40	9,621.19	2,588.65	2,590.57	373.04	2,617.29	8.19	464,482.42	566,321.34
12,413.00	91.40	2.60	9,619.63	2,682.56	2,684.50	376.32	2,710.74	7.98	464,576.35	566,324.62
12,508.00	89.00	1.10	9,619.30	2,777.48	2,779.44	379.39	2,805.21	7.77	464,671.29	566,327.69
12,603.00	88.80	1.00	9,621.12	2,872.44	2,874.40	381.13	2,899.56	7.55	464,766.25	566,329.43
12,697.00	87.60	0.40	9,624.07	2,966.37	2,968.35	382.28	2,992.86	7.34	464,860.20	566,330.58
12,792.00	89.00	359.50	9,626.89	3,061.33	3,063.30	382.20	3,087.05	7.11	464,955.15	566,330.50
12,887.00	87.00	357.10	9,630.21	3,156.23	3,158.19	379.38	3,180.89	6.85	465,050.04	566,327.68
12,981.00	91.40	1.70	9,631.52	3,250.17	3,252.13	378.40	3,274.07	6.64	465,143.98	566,326.70
13,076.00	93.40	5.10	9,627.54	3,344.87	3,346.86	384.03	3,368.82	6.55	465,238.71	566,332.33
13,170.00	88.40	2.50	9,626.07	3,438.58	3,440.60	390.25	3,462.66	6.47	465,332.45	566,338.55
13,265.00	91.50	1.90	9,626.15	3,533.48	3,535.52	393.90	3,557.39	6.36	465,427.37	566,342.20
13,359.00	90.20	1.50	9,624.75	3,627.41	3,629.47	396.68	3,651.08	6.24	465,521.32	566,344.98
13,454.00	89.00	0.60	9,625.42	3,722.38	3,724.45	398.43	3,745.70	6.11	465,616.30	566,346.73
13,549.00	89.40	1.40	9,626.74	3,817.35	3,819.42	400.08	3,840.32	5.98	465,711.27	566,348.38
13,643.00	88.30	359.50	9,628.63	3,911.31	3,913.39	400.82	3,933.87	5.85	465,805.24	566,349.12
13,738.00	90.70	0.30	9,629.46	4,006.30	4,008.38	400.66	4,028.36	5.71	465,900.23	566,348.96
13,832.00	88.40	358.30	9,630.20	4,100.29	4,102.36	399.51	4,121.77	5.56	465,994.21	566,347.81



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Hermes Fee 23-28-30
Well: WA #10H
Wellbore: OH
Design: Gyros/MWD 100'-14305' PTB 14364'

Local Co-ordinate Reference: Well WA #10H
TVD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
MD Reference: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance	Closure Azimuth	Northing (usft)	Easting (usft)
13,927.00	88.80	0.20	9,632.52	4,195.25	4,197.32	398.27	4,216.17	5.42	466,089.17	566,346.57
14,021.00	88.20	358.80	9,634.98	4,289.21	4,291.28	397.45	4,309.65	5.29	466,183.13	566,345.75
14,116.00	89.30	356.60	9,637.05	4,384.13	4,386.17	393.63	4,403.80	5.13	466,278.02	566,341.93
14,210.00	90.60	357.00	9,637.13	4,478.00	4,480.03	388.39	4,496.83	4.95	466,371.88	566,336.69
14,305.00	89.70	358.20	9,636.89	4,572.94	4,574.94	384.41	4,591.06	4.80	466,466.79	566,332.71
Last Survey: 14305' MD, 9637' TVD										
14,364.00	89.70	358.20	9,637.19	4,631.91	4,633.91	382.56	4,649.67	4.72	466,525.76	566,330.86
PTB: 14364' MD, 9637' TVD										

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,305.00	9,636.89	4,574.94	384.41	Last Survey: 14305' MD, 9637' TVD
14,364.00	9,637.19	4,633.91	382.56	PTB: 14364' MD, 9637' TVD

Checked By: _____ Approved By: _____ Date: _____



Marathon Oil
Eddy County, NM
Hermes Fee 23-28-30
WA #10H
Plan #4 - FINAL PVA
GL: 3123.5' + KB: 26.5' (H&P480)

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

RKB Elevation: Well @ 3150.00usft (GL: 3123.5' + KB: 26.5' (H&P480))

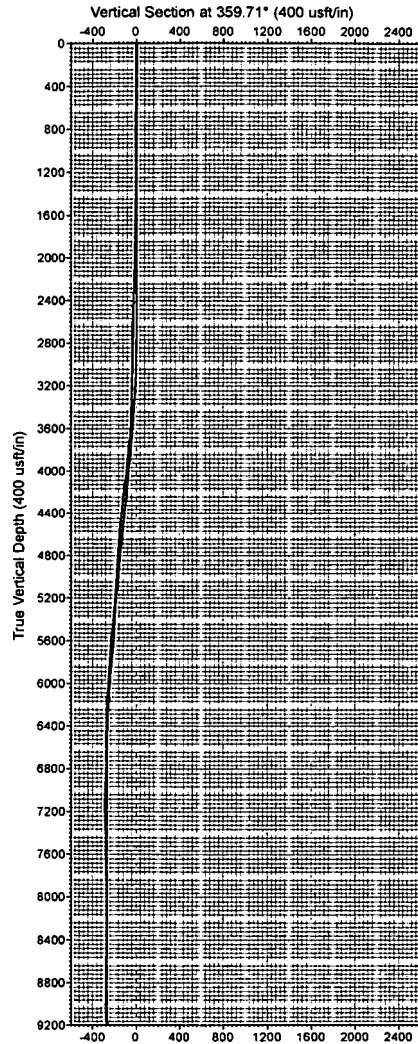
+N-S	+E-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	461891.85	565948.30	32.2696773	-104.1199668	

SECTION DETAILS

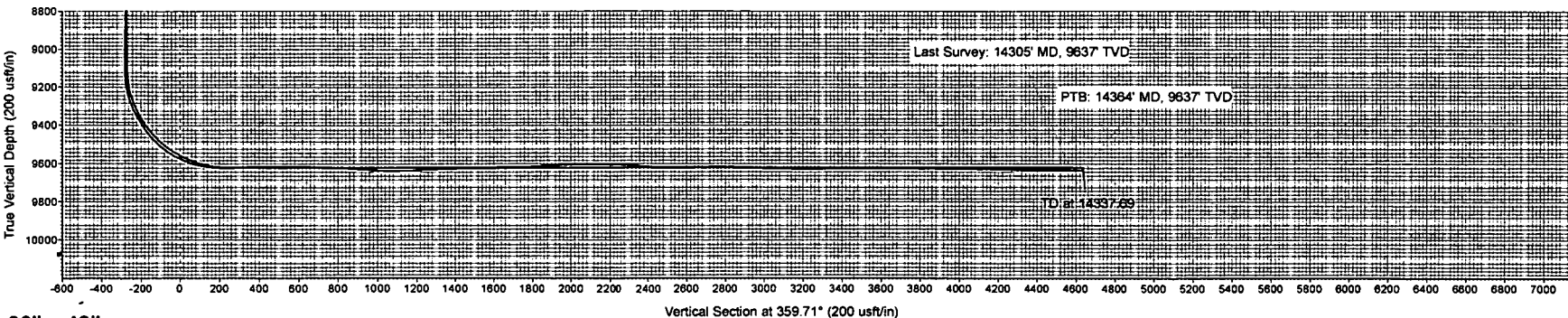
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dieg	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2600.00	0.00	0.00	2600.00	0.00	0.00	0.00	0.00
3	3933.33	10.00	123.33	3926.57	-63.78	96.97	0.75	-84.27
4	5582.80	10.00	123.33	5550.98	-221.17	336.27	0.00	-222.87
5	6582.80	0.00	0.00	6545.91	-269.00	409.00	1.00	-271.07
6	9137.89	0.00	0.00	9101.00	-269.00	409.00	0.00	-271.07
7	9956.05	90.00	359.71	9621.87	251.85	406.37	11.00	249.79
8	14292.69	90.00	359.71	9622.00	4588.43	384.51	0.00	4588.43
9	14337.69	90.00	359.71	9622.00	4633.43	384.28	0.00	4631.43

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

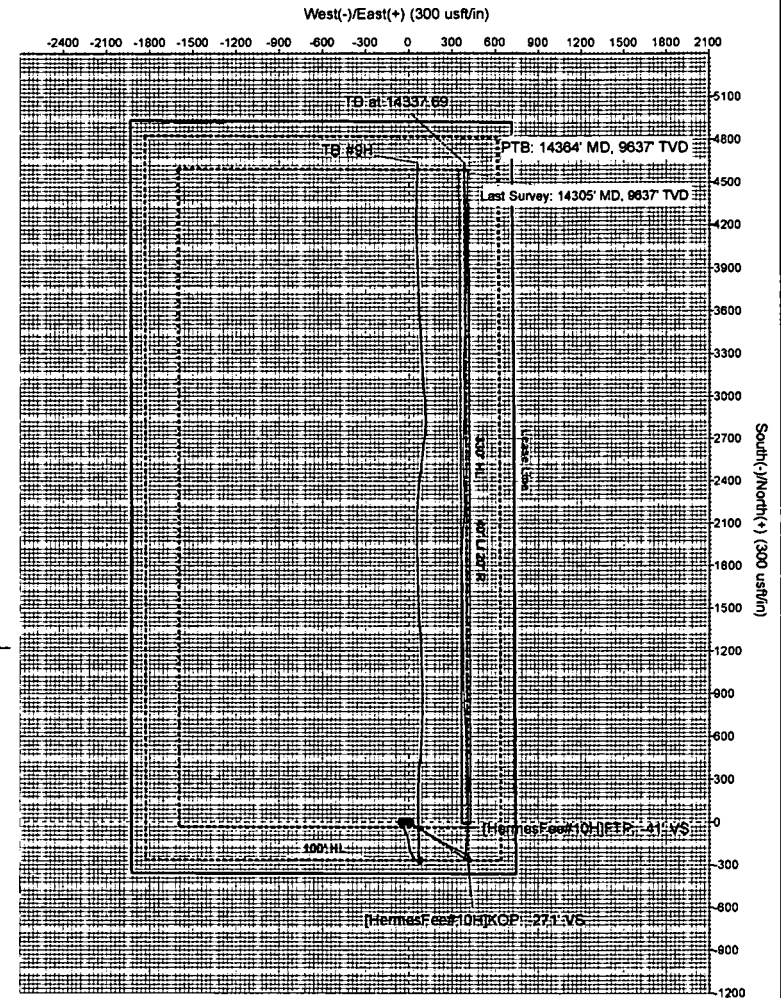
Name	TVD	+N-S	+E-W	Northing	Easting
[HermesFee#10H]FTP: -41' VS	-81.50	-39.41	408.27	461852.44	566356.57
[HermesFee#10H]KOP: -271' VS	9101.00	-269.00	409.00	461622.85	566357.30
[HermesFee#10H]LTP/BHL: 4588' VS	9622.00	4588.43	384.51	466460.28	566332.61



Target Line: 9622' TVD @ 0° VS: 90° INC



36" x 48"



Azimuths to Grid North
True North: -0.11°
Magnetic North: 7.27°
Magnetic Field
Strength: 47994.1nT
Dip Angle: 60.04°
Date: 1/25/2018
Model: USER DEFINED

Azimuth Corrections

Total Magnetic Corr. (M to G): 7.27°

Declination (M to T): 7.38° East