



Marathon Oil

NM OIL CONSERVATION
ARTESIA DISTRICT

FEB 20 2018

RECEIVED

Marathon Oil

Eddy County, NM

Fiddle Fee 23 X

No. 1H

OH

30-015-44094

Design: Gyros/MWD 87' - 14357' PTB 14421'

Survey Report

27 July, 2017



PRODIRECTIONAL



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 1H
Project:	Eddy County, NM	TVD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Site:	Fiddle Fee 23 X	MD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Well:	No. 1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Gyros/MWD 87' - 14357' PTB 14421'	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		Fiddle Fee 23 X			
Site Position:		Northing:		438,728.26	usft
From:	Map	Easting:		587,493.10	usft
Position Uncertainty:	0.00	Slot Radius:		13-3/16	"
		Latitude:		32.205865°N	
		Longitude:		104.050459°W	
		Grid Convergence:		0.15	°

Well		No. 1H				
Well Position	+N/-S	0.00 usft	Northing:	438,723.98 usft	Latitude:	32.205851°N
	+E/-W	0.00 usft	Easting:	587,803.08 usft	Longitude:	104.049457°W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,948.00 usft	

Wellbore		OH			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/4/2017	7.25	60.05	48,108.10

Design		Gyros/MWD 87' - 14357' PTB 14421'			
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)	
	0.00	0.00	0.00	270.70	



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 1H
Project:	Eddy County, NM	TVD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Site:	Fiddle Fee 23 X	MD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Well:	No. 1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Gyros/MWD 87' - 14357' PTB 14421'	Database:	WellPlanner1

Survey Program		Date 7/27/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
86.60	525.00	Gyros (OH)	GYRO-NS-CT	OWSG XYZ Accel with XY Static and Continuous Gyro
602.00	14,421.00	ProMWD (OH)	MWD+HDGM	OWSG MWD + HRGM

MD (usft)	Inc (")	Azi (azimuth) (")	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (")	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	438,723.98	587,803.08
86.60	0.84	258.64	86.60	0.62	-0.13	-0.62	0.63	258.64	438,723.85	587,802.46
159.50	1.68	261.48	159.48	2.20	-0.39	-2.20	2.24	260.00	438,723.59	587,800.88
251.90	2.12	269.82	251.83	5.24	-0.59	-5.25	5.29	263.54	438,723.39	587,797.83
343.60	2.20	273.85	343.46	8.70	-0.48	-8.70	8.72	266.83	438,723.50	587,794.38
436.10	1.86	284.67	435.90	11.93	0.02	-11.93	11.93	270.08	438,724.00	587,791.15
525.00	0.62	287.36	524.78	13.79	0.53	-13.78	13.79	272.19	438,724.51	587,789.30
602.00	0.50	302.70	601.78	14.47	0.83	-14.46	14.49	273.29	438,724.81	587,788.62
694.00	0.30	309.90	693.78	15.00	1.20	-14.99	15.03	274.59	438,725.18	587,788.09
786.00	0.80	296.00	785.77	15.77	1.64	-15.75	15.83	275.94	438,725.62	587,787.33
878.00	1.00	298.00	877.76	17.06	2.30	-17.03	17.19	277.68	438,726.28	587,786.05
969.00	1.10	294.10	968.75	18.57	3.03	-18.53	18.78	279.28	438,727.01	587,784.55
1,060.00	0.70	287.40	1,059.73	19.90	3.55	-19.86	20.17	280.14	438,727.53	587,783.22
1,151.00	0.80	296.00	1,150.73	21.01	4.00	-20.96	21.34	280.79	438,727.98	587,782.12
1,243.00	1.00	275.40	1,242.71	22.39	4.35	-22.34	22.76	281.03	438,728.33	587,780.74
1,338.00	1.00	284.70	1,337.70	24.02	4.64	-23.96	24.41	280.96	438,728.62	587,779.12
1,432.00	1.20	281.80	1,431.68	25.78	5.05	-25.72	26.21	281.11	438,729.03	587,777.36
1,526.00	1.20	284.80	1,525.66	27.70	5.50	-27.64	28.18	281.26	438,729.48	587,775.44
1,621.00	1.10	269.10	1,620.64	29.58	5.74	-29.51	30.06	281.01	438,729.72	587,773.57
1,715.00	0.90	262.20	1,714.63	31.21	5.63	-31.14	31.65	280.24	438,729.61	587,771.94
1,809.00	0.80	259.20	1,808.62	32.58	5.41	-32.52	32.97	279.44	438,729.39	587,770.56



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Fiddle Fee 23 X
Well: No. 1H
Wellbore: OH
Design: Gyros/MWD 87' - 14357' PTB 14421'

Local Co-ordinate Reference: Well No. 1H
TVD Reference: Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
MD Reference: Well @ 2973.00usft (GL: 2948' + KB: 25' (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 (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
1,904.00	0.10	296.00	1,903.62	33.31	5.32	-33.25	33.67	279.09	438,729.30	587,769.83	
1,998.00	0.90	96.20	1,997.61	32.65	5.27	-32.59	33.01	279.19	438,729.25	587,770.49	
2,093.00	1.40	95.00	2,092.59	30.75	5.09	-30.69	31.11	279.42	438,729.07	587,772.39	
2,187.00	2.20	98.10	2,186.55	27.81	4.74	-27.76	28.16	279.69	438,728.72	587,775.32	
2,282.00	2.80	111.30	2,281.46	23.83	3.64	-23.79	24.07	278.69	438,727.62	587,779.29	
2,376.00	3.40	112.70	2,375.32	19.10	1.73	-19.08	19.16	275.17	438,725.71	587,784.00	
2,470.00	3.10	112.50	2,469.17	14.16	-0.32	-14.16	14.16	268.70	438,723.66	587,788.92	
2,565.00	1.80	109.40	2,564.08	10.36	-1.80	-10.38	10.53	260.17	438,722.18	587,792.70	
2,655.00	1.40	108.10	2,654.04	7.97	-2.61	-8.00	8.42	251.93	438,721.37	587,795.08	
2,750.00	1.20	101.10	2,749.02	5.88	-3.16	-5.92	6.71	241.90	438,720.82	587,797.16	
2,844.00	1.20	100.00	2,843.00	3.94	-3.52	-3.99	5.32	228.54	438,720.46	587,799.09	
2,938.00	1.20	101.40	2,936.98	2.00	-3.89	-2.05	4.40	207.83	438,720.09	587,801.03	
3,033.00	1.30	104.00	3,031.95	-0.02	-4.35	-0.03	4.35	180.42	438,719.63	587,803.05	
3,127.00	2.50	128.10	3,125.90	-2.69	-5.87	2.62	6.43	155.97	438,718.11	587,805.70	
3,221.00	3.50	138.50	3,219.77	-6.24	-9.28	6.13	11.12	146.56	438,714.70	587,809.21	
3,316.00	4.80	148.80	3,314.52	-10.29	-14.85	10.11	17.97	145.76	438,709.13	587,813.19	
3,410.00	6.20	157.50	3,408.09	-14.37	-22.91	14.09	26.90	148.40	438,701.07	587,817.17	
3,505.00	6.10	157.60	3,502.54	-18.37	-32.31	17.98	36.98	150.91	438,691.67	587,821.06	
3,600.00	5.70	157.30	3,597.04	-22.23	-41.33	21.72	46.69	152.28	438,682.65	587,824.80	
3,694.00	6.50	166.80	3,690.51	-25.36	-50.82	24.74	56.52	154.04	438,673.16	587,827.82	
3,788.00	7.70	179.20	3,783.79	-26.80	-62.30	26.04	67.52	157.31	438,661.68	587,829.12	
3,883.00	8.70	169.00	3,877.82	-28.42	-75.72	27.50	80.56	160.04	438,648.26	587,830.58	
3,977.00	8.20	169.00	3,970.80	-31.23	-89.28	30.14	94.22	161.35	438,634.70	587,833.22	
4,072.00	8.10	169.00	4,064.84	-33.96	-102.50	32.71	107.59	162.30	438,621.48	587,835.79	
4,167.00	8.20	158.50	4,158.89	-37.87	-115.37	36.47	121.00	162.46	438,608.61	587,839.55	
4,261.00	7.80	157.70	4,251.97	-42.90	-127.51	41.34	134.04	162.03	438,596.47	587,844.42	
4,356.00	7.90	156.90	4,346.08	-48.05	-139.48	46.35	146.98	161.62	438,584.50	587,849.43	



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Fiddle Fee 23 X
Well: No. 1H
Wellbore: OH
Design: Gyros/MWD 87' - 14357' PTB 14421'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 1H
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Grid
 Minimum Curvature
 WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
4,450.00	8.00	158.40	4,439.18	-53.14	-151.50	51.29	159.95	161.30	438,572.48	587,854.37
4,545.00	8.00	156.70	4,533.26	-58.34	-163.72	56.34	173.14	161.01	438,560.26	587,859.42
4,639.00	8.00	158.10	4,626.34	-63.51	-175.80	61.37	186.20	160.76	438,548.18	587,864.45
4,734.00	7.90	159.10	4,720.43	-68.46	-188.03	66.17	199.33	160.61	438,535.95	587,869.25
4,828.00	7.70	158.40	4,813.56	-73.22	-199.92	70.79	212.08	160.50	438,524.06	587,873.87
4,923.00	7.80	163.40	4,907.69	-77.56	-212.01	74.97	224.88	160.53	438,511.97	587,878.05
5,017.00	7.80	169.90	5,000.82	-80.65	-224.41	77.91	237.55	160.85	438,499.57	587,880.99
5,112.00	7.30	167.30	5,095.00	-83.26	-236.64	80.37	249.92	161.24	438,487.34	587,883.45
5,206.00	7.60	172.30	5,188.21	-85.55	-248.63	82.52	261.96	161.64	438,475.35	587,885.60
5,301.00	7.60	173.60	5,282.37	-87.24	-261.10	84.06	274.29	162.15	438,462.88	587,887.14
5,395.00	7.60	175.30	5,375.55	-88.60	-273.47	85.26	286.45	162.68	438,450.51	587,888.34
5,490.00	6.90	182.40	5,469.79	-89.02	-285.43	85.54	297.97	163.32	438,438.55	587,888.62
5,584.00	6.50	184.60	5,563.15	-88.49	-296.38	84.87	308.29	164.02	438,427.60	587,887.95
5,678.00	7.30	181.40	5,656.47	-88.05	-307.65	84.30	318.99	164.68	438,416.33	587,887.38
5,773.00	7.10	182.40	5,750.72	-87.81	-319.55	83.91	330.38	165.29	438,404.43	587,886.99
5,867.00	7.60	179.50	5,843.95	-87.76	-331.57	83.72	341.98	165.83	438,392.41	587,886.80
5,962.00	7.00	179.10	5,938.17	-88.06	-343.64	83.86	353.73	166.29	438,380.34	587,886.94
6,056.00	6.60	181.40	6,031.51	-88.15	-354.77	83.82	364.54	166.71	438,369.21	587,886.90
6,151.00	8.20	184.60	6,125.72	-87.62	-366.98	83.15	376.28	167.23	438,357.00	587,886.23
6,246.00	7.40	188.20	6,219.84	-86.36	-379.79	81.73	388.48	167.86	438,344.19	587,884.81
6,340.00	6.30	190.80	6,313.17	-84.67	-390.85	79.90	398.93	168.45	438,333.13	587,882.98
6,435.00	5.30	197.40	6,407.68	-82.49	-400.15	77.61	407.61	169.02	438,323.83	587,880.69
6,530.00	6.10	192.70	6,502.21	-80.18	-409.27	75.19	416.11	169.59	438,314.71	587,878.27
6,624.00	6.10	189.40	6,595.68	-78.39	-419.06	73.28	425.42	170.08	438,304.92	587,876.36
6,719.00	6.10	189.30	6,690.14	-76.87	-429.03	71.64	434.97	170.52	438,294.95	587,874.72
6,813.00	6.20	174.70	6,783.61	-76.65	-439.01	71.30	444.76	170.78	438,284.97	587,874.38
6,908.00	7.50	166.90	6,877.93	-78.67	-450.16	73.18	456.07	170.77	438,273.82	587,876.26

Company: Marathon Oil
Project: Eddy County, NM
Site: Fiddle Fee 23 X
Well: No. 1H
Wellbore: OH
Design: Gyros/MWD 87' - 14357' PTB 14421'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 1H
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Grid
 Minimum Curvature
 WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
7,002.00	4.40	175.50	6,971.41	-80.46	-459.73	74.85	465.78	170.75	438,264.25	587,877.93
7,097.00	4.70	178.30	7,066.11	-80.95	-467.25	75.25	473.27	170.85	438,256.73	587,878.33
7,192.00	4.60	177.30	7,160.80	-81.34	-474.95	75.55	480.92	170.96	438,249.03	587,878.63
7,286.00	6.80	175.00	7,254.33	-82.12	-484.26	76.21	490.22	171.06	438,239.72	587,879.29
7,381.00	6.30	170.80	7,348.71	-83.57	-495.01	77.53	501.04	171.10	438,228.97	587,880.61
7,476.00	5.10	169.70	7,443.24	-85.28	-504.31	79.12	510.48	171.08	438,219.67	587,882.20
7,570.00	4.90	164.80	7,536.88	-87.17	-512.29	80.92	518.64	171.02	438,211.69	587,884.00
7,665.00	6.60	160.10	7,631.40	-90.21	-521.34	83.84	528.04	170.86	438,202.64	587,886.92
7,760.00	6.90	151.10	7,725.74	-94.95	-531.47	88.46	538.78	170.55	438,192.51	587,891.54
7,854.00	6.80	150.60	7,819.07	-100.53	-541.26	93.92	549.35	170.16	438,182.72	587,897.00
7,949.00	5.90	148.80	7,913.49	-105.93	-550.34	99.21	559.21	169.78	438,173.64	587,902.29
8,043.00	4.80	168.10	8,007.09	-109.34	-558.32	102.52	567.66	169.59	438,165.66	587,905.60
8,137.00	5.10	188.40	8,100.74	-109.64	-566.30	102.72	575.54	169.72	438,157.68	587,905.80
8,232.00	4.80	192.70	8,195.39	-108.24	-574.36	101.23	583.21	170.00	438,149.62	587,904.31
8,327.00	4.00	193.00	8,290.11	-106.71	-581.46	99.61	589.93	170.28	438,142.52	587,902.69
8,421.00	2.70	195.20	8,383.95	-105.46	-586.79	98.30	594.97	170.49	438,137.19	587,901.38
8,516.00	2.00	170.70	8,478.87	-105.19	-590.59	97.98	598.66	170.58	438,133.39	587,901.06
8,610.00	1.30	159.70	8,572.83	-105.85	-593.21	98.61	601.35	170.56	438,130.77	587,901.69
8,704.00	2.20	139.30	8,666.78	-107.43	-595.58	100.16	603.94	170.45	438,128.40	587,903.24
8,799.00	3.00	143.80	8,761.69	-110.13	-598.97	102.82	607.73	170.26	438,125.01	587,905.90
8,893.00	1.90	164.10	8,855.60	-112.05	-602.45	104.70	611.48	170.14	438,121.53	587,907.78
8,987.00	1.40	169.60	8,949.56	-112.72	-605.08	105.33	614.18	170.12	438,118.90	587,908.41
9,082.00	6.20	255.20	9,044.36	-107.99	-607.53	100.58	615.80	170.60	438,116.45	587,903.66
9,177.00	15.40	269.70	9,137.59	-90.39	-608.91	82.96	614.54	172.24	438,115.07	587,886.04
9,271.00	24.10	271.60	9,225.98	-58.67	-608.44	51.24	610.59	175.19	438,115.54	587,854.32
9,366.00	31.50	273.30	9,309.96	-14.42	-606.47	7.01	606.51	179.34	438,117.51	587,810.09
9,460.00	37.00	269.70	9,387.64	38.44	-605.20	-45.84	606.93	184.33	438,118.78	587,757.24



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Fiddle Fee 23 X
Well: No. 1H
Wellbore: OH
Design: Gyros/MWD 87' - 14357' PTB 14421'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 1H
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Grid
 Minimum Curvature
 WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
9,555.00	45.60	266.30	9,458.95	100.99	-607.54	-108.42	617.14	190.12	438,116.44	587,694.66	
9,603.00	47.80	270.20	9,491.87	135.87	-608.59	-143.32	625.24	193.25	438,115.39	587,659.76	
9,649.00	51.70	269.40	9,521.59	170.97	-608.72	-178.42	634.33	196.34	438,115.26	587,624.66	
9,756.00	66.50	264.40	9,576.41	262.26	-613.98	-269.78	670.64	203.72	438,110.00	587,533.30	
9,851.00	80.10	259.80	9,603.66	351.97	-626.58	-359.66	722.47	209.86	438,097.40	587,443.42	
9,882.00	80.10	258.00	9,608.99	381.87	-632.46	-389.62	742.84	211.63	438,091.52	587,413.46	
9,914.00	81.70	258.90	9,614.05	412.74	-638.79	-420.58	764.81	213.36	438,085.19	587,382.50	
9,977.00	90.70	262.30	9,618.22	474.56	-649.03	-482.52	808.75	216.63	438,074.95	587,320.56	
10,071.00	89.50	265.90	9,618.06	567.92	-658.69	-576.01	875.02	221.17	438,065.29	587,227.07	
10,164.00	88.70	265.80	9,619.52	660.57	-665.42	-668.75	943.41	225.14	438,058.56	587,134.33	
10,259.00	93.80	268.50	9,617.45	755.33	-670.14	-763.57	1,015.94	228.73	438,053.84	587,039.51	
10,353.00	92.30	267.80	9,612.45	849.10	-673.17	-857.39	1,090.08	231.86	438,050.81	586,945.69	
10,448.00	90.70	266.40	9,609.96	943.87	-677.98	-952.23	1,168.93	234.55	438,046.00	586,850.85	
10,542.00	90.10	268.00	9,609.30	1,037.69	-682.57	-1,046.11	1,249.10	236.88	438,041.41	586,756.97	
10,637.00	89.10	267.50	9,609.97	1,132.56	-686.30	-1,141.03	1,331.53	238.97	438,037.68	586,662.05	
10,731.00	90.50	270.10	9,610.29	1,226.50	-688.27	-1,235.00	1,413.84	240.87	438,035.71	586,568.08	
10,826.00	91.70	270.20	9,608.47	1,321.48	-688.02	-1,329.98	1,497.40	242.65	438,035.96	586,473.10	
10,921.00	92.80	270.00	9,604.74	1,416.40	-687.85	-1,424.91	1,582.25	244.23	438,036.13	586,378.17	
11,015.00	91.70	269.50	9,601.05	1,510.31	-688.26	-1,518.83	1,667.50	245.62	438,035.72	586,284.25	
11,110.00	91.00	269.20	9,598.81	1,605.26	-689.34	-1,613.80	1,754.86	246.87	438,034.64	586,189.28	
11,205.00	90.70	270.80	9,597.40	1,700.24	-689.34	-1,708.78	1,842.59	248.03	438,034.64	586,094.30	
11,299.00	92.80	274.30	9,594.53	1,794.12	-685.16	-1,802.63	1,928.45	249.19	438,038.82	586,000.45	
11,394.00	92.80	274.10	9,589.89	1,888.83	-678.21	-1,897.26	2,014.84	250.33	438,045.77	585,905.82	
11,488.00	91.60	274.90	9,586.28	1,982.55	-670.84	-1,990.90	2,100.88	251.38	438,053.14	585,812.18	
11,583.00	89.80	273.50	9,585.12	2,077.36	-663.89	-2,085.63	2,188.74	252.34	438,060.09	585,717.45	
11,678.00	91.40	273.20	9,584.13	2,172.25	-658.34	-2,180.46	2,277.68	253.20	438,065.64	585,622.62	
11,772.00	92.50	273.50	9,580.93	2,266.10	-652.85	-2,274.24	2,366.09	253.98	438,071.13	585,528.84	



Professional Directional Survey Report



Company: Marathon Oil
Project: Eddy County, NM
Site: Fiddle Fee 23 X
Well: No. 1H
Wellbore: OH
Design: Gyros/MWD 87' - 14357' PTB 14421'

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well No. 1H
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
 Grid
 Minimum Curvature
 WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
11,867.00	91.30	274.30	9,577.78	2,360.89	-646.39	-2,368.97	2,455.57	254.74	438,077.59	585,434.11
11,961.00	89.80	272.70	9,576.88	2,454.77	-640.65	-2,462.78	2,544.75	255.42	438,083.33	585,340.30
12,056.00	89.50	270.40	9,577.46	2,549.75	-638.08	-2,557.74	2,636.13	255.99	438,085.90	585,245.34
12,150.00	90.70	270.30	9,577.29	2,643.75	-637.51	-2,651.74	2,727.29	256.48	438,086.47	585,151.34
12,245.00	89.80	269.40	9,576.88	2,738.74	-637.76	-2,746.73	2,819.80	256.93	438,086.22	585,056.35
12,339.00	89.90	269.40	9,577.12	2,832.71	-638.74	-2,840.73	2,911.65	257.33	438,085.24	584,962.35
12,433.00	91.10	269.50	9,576.30	2,926.68	-639.64	-2,934.72	3,003.62	257.70	438,084.34	584,868.36
12,528.00	91.00	268.70	9,574.56	3,021.63	-641.13	-3,029.69	3,096.78	258.05	438,082.85	584,773.39
12,623.00	93.60	270.80	9,570.75	3,116.53	-641.55	-3,124.60	3,189.78	258.40	438,082.43	584,678.48
12,717.00	91.70	269.50	9,566.40	3,210.42	-641.31	-3,218.49	3,281.76	258.73	438,082.67	584,584.59
12,812.00	89.50	270.20	9,565.41	3,305.39	-641.55	-3,313.48	3,375.02	259.04	438,082.43	584,489.60
12,906.00	93.10	270.70	9,563.28	3,399.35	-640.82	-3,407.44	3,467.17	259.35	438,083.16	584,395.64
13,001.00	93.40	270.90	9,557.89	3,494.20	-639.49	-3,502.27	3,560.18	259.65	438,084.49	584,300.81
13,095.00	91.70	272.70	9,553.71	3,588.08	-636.54	-3,596.13	3,652.03	259.96	438,087.44	584,206.95
13,190.00	90.10	273.00	9,552.22	3,683.00	-631.82	-3,691.00	3,744.68	260.29	438,092.16	584,112.08
13,284.00	87.40	272.60	9,554.27	3,776.91	-627.23	-3,784.85	3,836.47	260.59	438,096.75	584,018.23
13,379.00	88.20	272.50	9,557.91	3,871.79	-623.01	-3,879.69	3,929.39	260.88	438,100.97	583,923.39
13,473.00	90.30	270.90	9,559.14	3,965.76	-620.22	-3,973.63	4,021.74	261.13	438,103.76	583,829.45
13,568.00	90.80	269.00	9,558.23	4,060.74	-620.30	-4,068.62	4,115.63	261.33	438,103.68	583,734.46
13,663.00	91.30	264.30	9,556.49	4,155.46	-625.85	-4,163.41	4,210.19	261.45	438,098.13	583,639.67
13,757.00	90.60	265.90	9,554.93	4,248.99	-633.88	-4,257.05	4,303.99	261.53	438,090.10	583,546.03
13,852.00	92.60	266.10	9,552.28	4,343.63	-640.50	-4,351.78	4,398.66	261.63	438,083.48	583,451.30
13,946.00	94.50	267.30	9,546.46	4,437.22	-645.90	-4,445.44	4,492.12	261.73	438,078.08	583,357.64
14,041.00	94.60	269.50	9,538.92	4,531.84	-648.55	-4,540.10	4,586.19	261.87	438,075.43	583,262.98
14,135.00	94.40	269.10	9,531.55	4,625.52	-649.69	-4,633.80	4,679.12	262.02	438,074.29	583,169.28
14,230.00	94.60	268.60	9,524.09	4,720.17	-651.59	-4,728.49	4,773.17	262.15	438,072.39	583,074.59
14,324.00	94.80	268.30	9,516.39	4,813.79	-654.13	-4,822.14	4,866.30	262.27	438,069.85	582,980.94



Professional Directional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 1H
Project:	Eddy County, NM	TVD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Site:	Fiddle Fee 23 X	MD Reference:	Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))
Well:	No. 1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Gyros/MWD 87' - 14357' PTB 14421'	Database:	WellPlanner1

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)	
14,357.00	94.80	268.30	9,513.63	4,846.64	-655.10	-4,855.01	4,899.01	262.32	438,068.88	582,948.07	
Last Survey: 14357' MD, 9513.63' TVD											
14,421.00	94.80	268.30	9,508.27	4,910.36	-656.99	-4,918.75	4,962.44	262.39	438,066.99	582,884.33	
PTB: 14421' MD											

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,357.00	9,513.63	-655.10	-4,855.01	Last Survey: 14357' MD, 9513.63' TVD
14,421.00	9,508.27	-656.99	-4,918.75	PTB: 14421' MD



Marathon Oil
Eddy County, NM
Fiddle Fee 23 X
No. 1H
Plan #3 - FINAL PVA
GL: 2948' + KB: 25' (H&P480)

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

RKB Elevation: Well @ 2973.00usft (GL: 2948' + KB: 25' (H&P480))

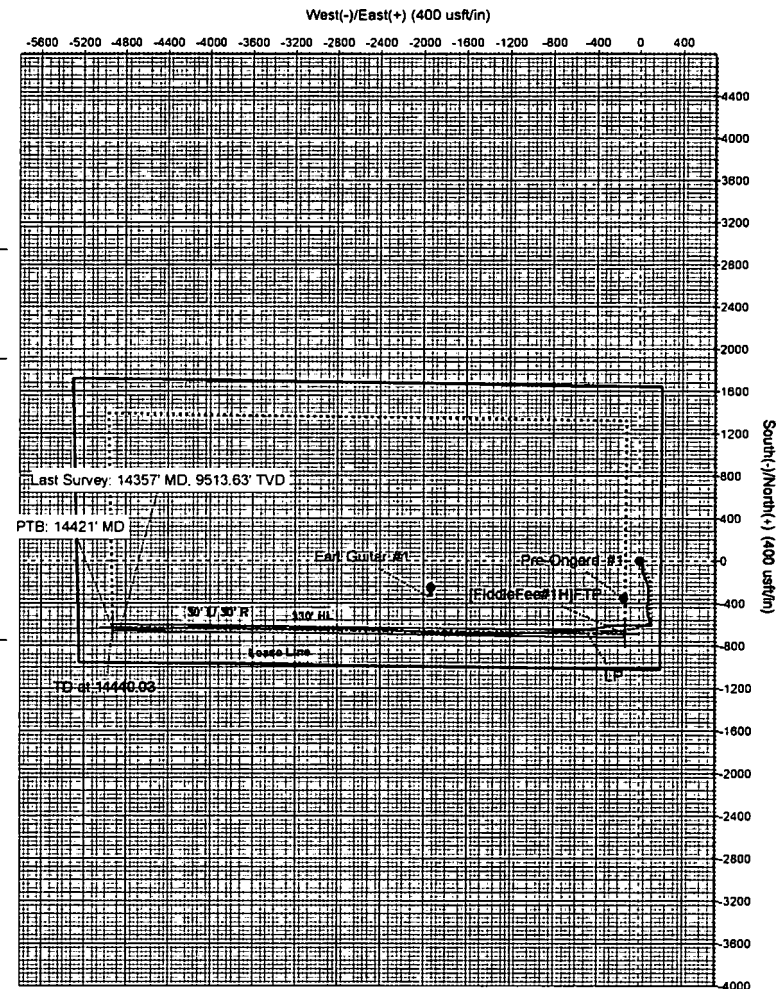
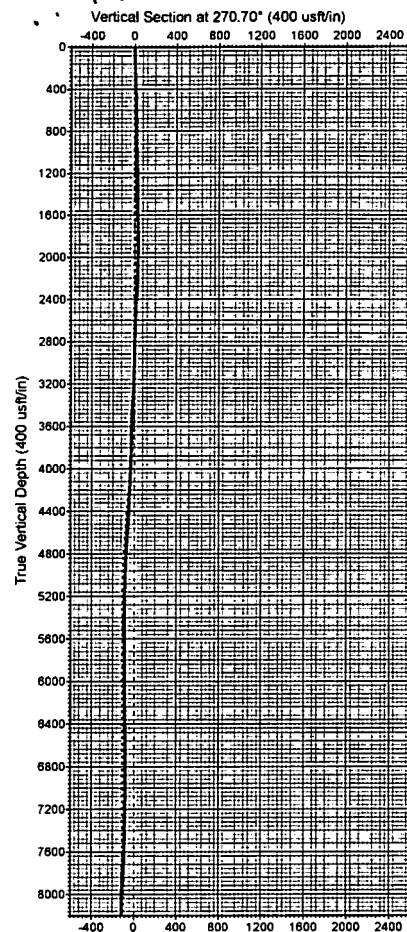
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	438723.98	587803.08	32.205851°N	104.049457°W	

SECTION DETAILS

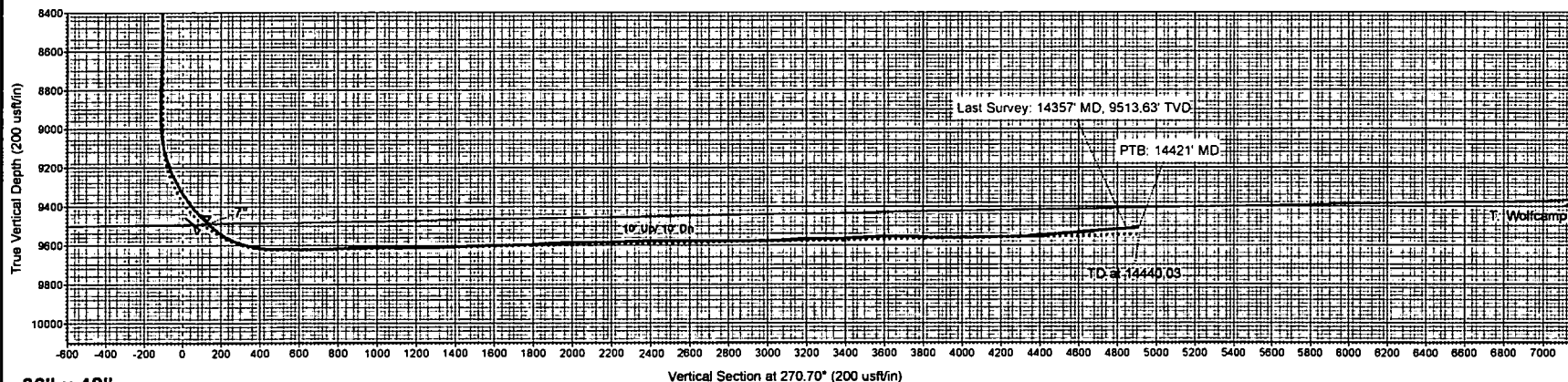
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSeet
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3000.00	0.00	0.00	3000.00	0.00	0.00	0.00	0.00
3	4066.67	8.00	150.00	4083.20	-64.39	37.17	0.75	-37.86
4	4754.87	8.00	150.00	4744.51	-147.31	85.05	0.00	-86.84
5	5174.24	8.00	180.50	5160.19	-201.81	99.40	1.00	-101.86
6	7754.24	8.00	180.50	7715.08	-568.87	96.27	0.00	-103.11
7	8154.24	0.00	0.00	8113.78	-588.75	96.02	2.00	-103.21
8	9080.48	0.00	0.00	9040.00	-588.75	96.02	0.00	-103.21
9	9380.48	30.00	250.25	9326.48	-614.89	23.78	10.00	-31.28
10	9792.32	70.00	264.00	9586.55	-672.20	-278.72	10.00	270.49
11	10012.36	91.00	270.70	9822.70	-681.79	-494.19	10.00	485.82
12	14440.03	91.00	270.70	9545.25	-628.08	-4920.86	0.00	4912.82

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
FiddleFee#1HJFTP	0.00	-588.82	-135.11	438037.16	587687.97
FiddleFee#1HJLP/BHL	9545.25	-628.08	-4920.86	438095.90	582882.22



Target Line: 9631' TVD @ 0° VS: 91° INC



Azimuths to Grid North
True North: -0.15°
Magnetic North: 7.10°

Magnetic Field
Strength: 48108.1nT
Dip Angle: 60.05°
Date: 7/4/2017
Model: HDGM

Azimuth Corrections

Total Magnetic Corr. (M to G): 7.10°

Declination (M to T): 7.25° East

36" x 48"