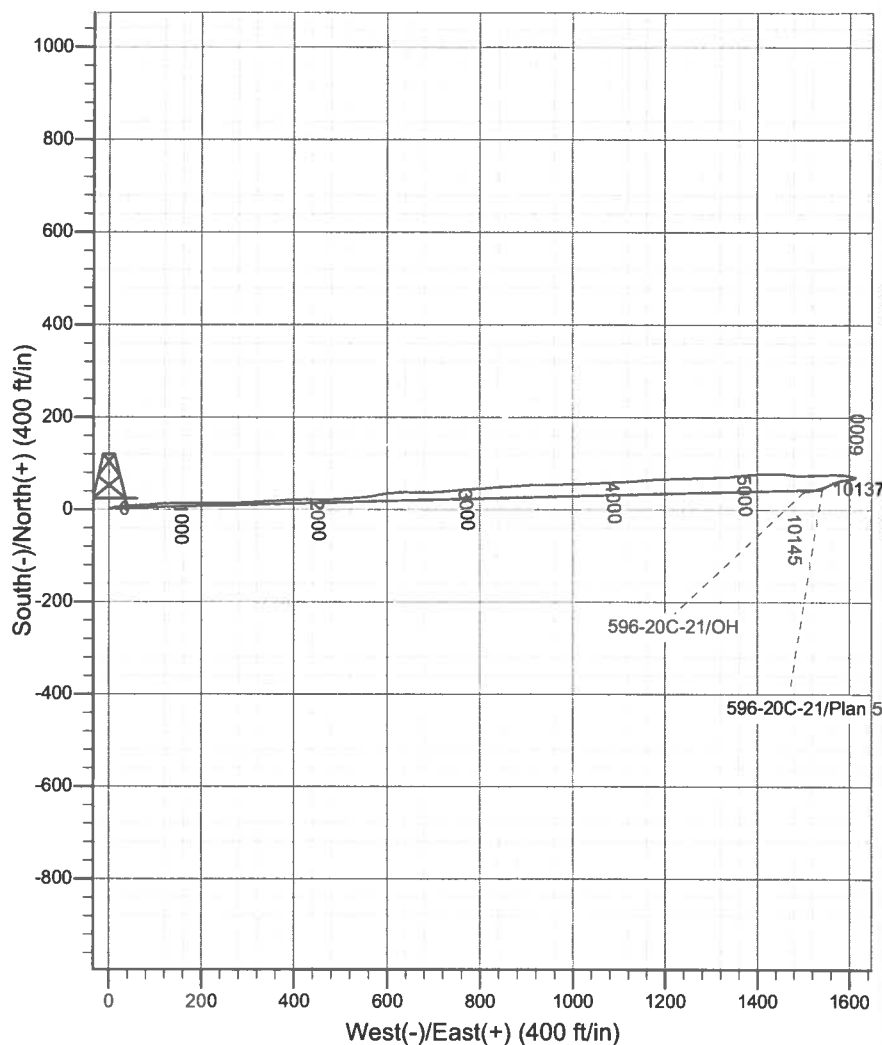
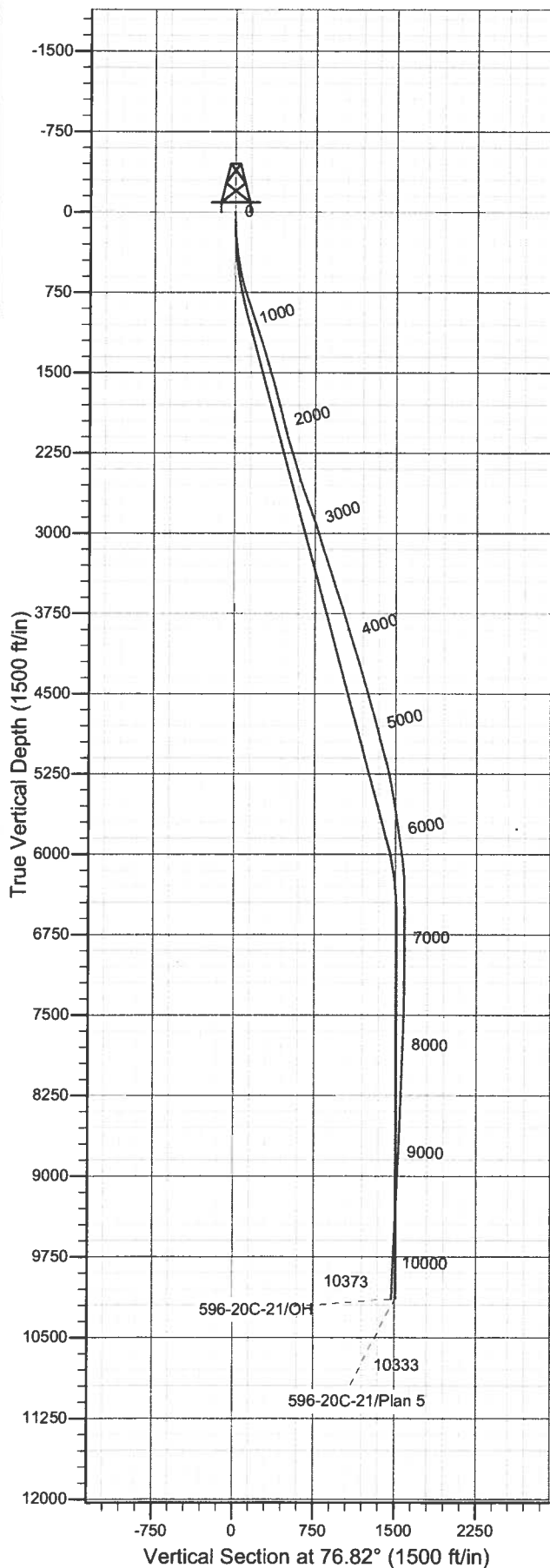




Scientific Drilling
Rocky Mountain Operations

Project: Garfield County, CO NAD 83
Site: 596-20C Pad
Well: 596-20C-21
Wellbore: OH
Design: OH

Marathon Oil Co.



WELL DETAILS: 596-20C-21

Ground Level GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
 Northing Easting Latitude Longitude
 1654397.94 2239104.02 39° 35' 56.629 N 108° 12' 2.332 W J

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well 596-20C-21 - Slot J, True North
 Vertical (TVD) Reference: GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
 Section (VS) Reference: Slot - J(0.00N, 0.00E)
 Measured Depth Reference: GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
 Calculation Method: Minimum Curvature
 Local North: True
 Location: Sec 20 T5S R96W

PROJECT DETAILS: Garfield County, CO NAD 83

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Central Zone

Design: OH (596-20C-21/OH)

Created By: Julie Cruse Date: 2009-07-28



Scientific Drilling
Rocky Mountain Operations

Marathon Oil Co.

Garfield County, CO NAD 83

596-20C Pad

596-20C-21 - Slot J

OH

Design: OH

Standard Survey Report

28 July, 2009

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-20C-21 - Slot J
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Site:	596-20C Pad	MD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Well:	596-20C-21	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi User Db

Project	Garfield County, CO NAD 83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		596-20C Pad, Sec 20 T5S R96W			
Site Position:		Northing:	1,654,410.33 ft	Latitude:	39° 35' 56.751 N
From:	Map	Easting:	2,239,102.35 ft	Longitude:	108° 12' 2.358 W
Position Uncertainty:	0.00 ft	Slot Radius:	in	Grid Convergence:	-1.70 °

Well	596-20C-21 - Slot J, 2075' FSL 435' FEL					
Well Position	+N/-S	0.00 ft	Northing:	1,654,397.94 ft	Latitude:	39° 35' 56.629 N
	+E/-W	0.00 ft	Easting:	2,239,104.02 ft	Longitude:	108° 12' 2.332 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,264.00 ft

Wellbore	OH
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2008-04-24	10.85	65.88	52,667

Design	OH			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	76.82

Survey Program		Date	2009-07-28		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
34.00	137.75	Slot J Conductor Gyro Survey (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
182.00	2,233.00	Survey #2 - 14 3/4" Hole (OH)	MWD SDI	MWD - Standard ver 1.0.1	
2,311.00	10,373.00	Survey #3 - 7 7/8" Hole (OH)	MWD SDI	MWD - Standard ver 1.0.1	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Bulld Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34.00	0.35	324.93	34.00	0.08	-0.06	-0.04	1.03	1.03	0.00
44.00	0.61	30.16	44.00	0.16	-0.05	-0.01	5.62	2.60	652.30
54.00	0.70	22.97	54.00	0.26	0.00	0.06	1.22	0.90	-71.90
64.00	0.87	24.37	64.00	0.38	0.06	0.14	1.71	1.70	14.00
74.00	0.96	27.06	74.00	0.53	0.12	0.24	1.00	0.90	26.90
84.00	1.00	31.81	84.00	0.68	0.21	0.36	0.91	0.40	47.50
94.00	1.06	38.61	93.99	0.82	0.31	0.49	1.36	0.60	68.00
104.00	1.07	45.71	103.99	0.96	0.44	0.64	1.32	0.10	71.00
114.00	1.31	61.53	113.99	1.08	0.60	0.83	4.05	2.40	158.20
124.00	0.95	57.12	123.99	1.18	0.77	1.02	3.70	-3.60	-44.10

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-20C-21 - Slot J
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Site:	596-20C Pad	MD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Well:	596-20C-21	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Buird Rate (°/100ft)	Turn Rate (°/100ft)
134.00	0.97	60.87	133.99	1.27	0.92	1.18	0.66	0.20	37.50
137.75	1.07	66.93	137.74	1.29	0.98	1.25	3.92	2.67	161.60
Last SDI Gyro Survey									
182.00	2.86	65.57	181.96	1.91	2.36	2.74	4.05	4.05	-3.07
First MWD Survey									
213.00	3.94	71.87	212.90	2.56	4.08	4.56	3.68	3.48	20.32
244.00	4.87	72.97	243.81	3.28	6.35	6.93	3.01	3.00	3.55
275.00	5.50	72.70	274.68	4.11	9.03	9.73	2.03	2.03	-0.87
305.00	5.72	77.19	304.54	4.87	11.86	12.65	1.64	0.73	14.97
336.00	6.14	75.92	335.37	5.61	14.97	15.86	1.42	1.35	-4.10
366.00	6.88	83.88	365.18	6.20	18.31	19.24	3.88	2.47	26.53
397.00	7.66	86.07	395.93	6.53	22.22	23.13	2.67	2.52	7.06
427.00	8.47	87.11	425.64	6.78	26.42	27.27	2.74	2.70	3.47
458.00	9.43	85.92	456.26	7.08	31.24	32.03	3.15	3.10	-3.84
489.00	10.33	86.03	486.80	7.45	36.54	37.28	2.90	2.90	0.35
581.00	11.70	87.37	577.10	8.45	54.09	54.59	1.51	1.49	1.46
673.00	16.07	87.05	666.39	9.54	76.14	76.30	4.75	4.75	-0.35
764.00	18.97	84.66	753.16	11.56	103.45	103.36	3.28	3.19	-2.63
856.00	18.35	88.88	840.33	13.24	132.82	132.34	1.61	-0.67	4.59
948.00	17.69	90.49	927.82	13.40	161.27	160.08	0.90	-0.72	1.75
1,040.00	18.86	89.54	1,015.17	13.40	190.12	188.17	1.31	1.27	-1.03
1,134.00	18.93	88.68	1,104.11	13.87	220.56	217.91	0.31	0.07	-0.91
1,229.00	18.06	91.05	1,194.20	13.96	250.69	247.27	1.21	-0.92	2.49
1,323.00	16.63	87.31	1,283.93	14.32	278.69	274.62	1.93	-1.52	-3.98
1,418.00	16.60	87.16	1,374.96	15.63	305.83	301.33	0.06	-0.03	-0.16
1,512.00	16.86	86.77	1,464.98	17.06	332.85	327.97	0.30	0.28	-0.41
1,606.00	16.05	85.93	1,555.13	18.76	359.42	354.23	0.90	-0.86	-0.89
1,699.00	14.48	86.61	1,644.85	20.36	383.85	378.38	1.70	-1.69	0.73
1,792.00	16.16	88.42	1,734.54	21.40	408.40	402.52	1.88	1.81	1.95
1,887.00	14.39	90.26	1,826.18	21.71	433.42	426.95	1.93	-1.86	1.94
1,981.00	14.26	92.79	1,917.26	21.09	456.66	449.44	0.68	-0.14	2.69
2,076.00	14.31	86.37	2,009.33	21.27	480.07	472.27	1.67	0.05	-6.76
2,170.00	14.76	83.63	2,100.32	23.33	503.56	495.62	0.87	0.48	-2.91
2,233.00	17.14	85.78	2,160.89	24.91	520.80	512.76	3.89	3.78	3.41
Last Survey in 14 3/4" Hole									
2,311.00	17.53	87.38	2,235.35	26.29	544.00	535.66	0.79	0.50	2.05
First Survey in 7 7/8" Hole									
2,405.00	16.27	77.57	2,325.31	29.77	571.00	562.75	3.31	-1.34	-10.44
2,500.00	16.40	82.80	2,416.48	34.32	597.31	589.39	1.55	0.14	5.51
2,594.00	16.99	85.91	2,506.52	36.96	624.17	616.15	1.14	0.63	3.31
2,689.00	19.71	91.98	2,596.69	37.40	654.03	645.33	3.50	2.86	6.39
2,783.00	19.71	89.87	2,685.18	36.88	685.73	676.07	0.76	0.00	-2.24
2,878.00	20.02	83.46	2,774.54	38.77	717.91	707.83	2.31	0.33	-6.75
2,973.00	19.30	85.14	2,864.00	41.96	749.71	739.52	0.96	-0.76	1.77
3,067.00	18.30	86.60	2,952.98	44.15	779.92	769.44	1.18	-1.06	1.55
3,161.00	16.75	85.21	3,042.62	46.15	808.15	797.38	1.71	-1.65	-1.48
3,255.00	16.19	85.79	3,132.76	48.25	834.72	823.73	0.62	-0.60	0.62
3,349.00	19.36	86.73	3,222.26	50.10	863.35	852.03	3.39	3.37	1.00
3,444.00	18.18	85.17	3,312.21	52.24	893.84	882.20	1.35	-1.24	-1.64
3,538.00	18.42	90.25	3,401.46	53.41	923.30	911.16	1.72	0.26	5.40
3,633.00	17.47	89.01	3,491.84	53.59	952.57	939.70	1.08	-1.00	-1.31
3,726.00	18.90	86.15	3,580.19	54.85	981.56	968.21	1.81	1.54	-3.08
3,820.00	18.21	90.10	3,669.31	55.84	1,011.44	997.52	1.53	-0.73	4.20
3,914.00	16.82	86.64	3,758.95	56.62	1,039.70	1,025.22	1.85	-1.48	-3.68

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-20C-21 - Slot J
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Site:	596-20C Pad	MD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Well:	596-20C-21	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,007.00	17.58	86.71	3,847.79	58.21	1,067.16	1,052.32	0.82	0.82	0.08
4,101.00	16.49	87.96	3,937.67	59.50	1,094.66	1,079.39	1.22	-1.16	1.33
4,195.00	18.02	85.98	4,027.43	60.99	1,122.50	1,106.84	1.74	1.63	-2.11
4,289.00	16.66	84.11	4,117.16	63.40	1,150.41	1,134.56	1.56	-1.45	-1.99
4,381.00	16.96	88.12	4,205.23	65.19	1,176.94	1,160.80	1.30	0.33	4.36
4,476.00	15.47	87.41	4,296.45	66.22	1,203.45	1,186.84	1.58	-1.57	-0.75
4,570.00	16.90	88.75	4,386.72	67.08	1,229.63	1,212.53	1.57	1.52	1.43
4,664.00	15.71	87.76	4,476.94	67.88	1,256.01	1,238.40	1.30	-1.27	-1.05
4,758.00	16.44	88.31	4,567.27	68.77	1,282.02	1,263.93	0.79	0.78	0.59
4,853.00	16.10	87.68	4,658.46	69.70	1,308.62	1,290.04	0.40	-0.36	-0.66
4,948.00	14.68	86.31	4,750.05	71.00	1,333.79	1,314.85	1.54	-1.49	-1.44
5,042.00	13.82	83.34	4,841.16	73.07	1,356.83	1,337.75	1.20	-0.91	-3.16
5,137.00	14.42	84.74	4,933.29	75.47	1,379.88	1,360.74	0.73	0.63	1.47
5,232.00	15.47	87.36	5,025.08	77.14	1,404.32	1,384.91	1.31	1.11	2.76
5,327.00	15.42	90.19	5,116.65	77.68	1,429.61	1,409.66	0.80	-0.05	2.98
5,421.00	12.90	91.48	5,207.78	77.37	1,452.60	1,431.97	2.70	-2.68	1.37
5,516.00	10.51	100.05	5,300.81	75.58	1,471.73	1,450.20	3.10	-2.52	9.02
5,611.00	9.67	90.06	5,394.35	74.06	1,488.24	1,465.93	2.04	-0.88	-10.52
5,705.00	10.17	89.38	5,486.94	74.15	1,504.44	1,481.71	0.55	0.53	-0.72
5,800.00	9.15	88.19	5,580.59	74.47	1,520.37	1,497.30	1.09	-1.07	-1.25
5,894.00	8.11	84.74	5,673.53	75.32	1,534.45	1,511.20	1.24	-1.11	-3.67
5,989.00	9.50	90.35	5,767.41	75.89	1,548.96	1,525.46	1.72	1.46	5.91
6,083.00	8.62	89.02	5,860.23	75.96	1,563.76	1,539.88	0.96	-0.94	-1.41
6,178.00	8.20	87.69	5,954.21	76.35	1,577.65	1,553.50	0.49	-0.44	-1.40
6,272.00	6.75	99.19	6,047.42	75.74	1,589.80	1,565.19	2.21	-1.54	12.23
6,366.00	6.18	103.55	6,140.82	73.67	1,600.17	1,574.82	0.80	-0.61	4.64
6,460.00	3.81	107.06	6,234.45	71.57	1,608.08	1,582.04	2.54	-2.52	3.73
6,555.00	0.51	100.04	6,329.37	70.57	1,611.51	1,585.15	3.48	-3.47	-7.39
6,649.00	0.11	34.69	6,423.37	70.57	1,611.98	1,585.60	0.51	-0.43	-69.52
6,744.00	0.30	305.16	6,518.37	70.79	1,611.83	1,585.51	0.34	0.20	-94.24
6,837.00	0.15	325.15	6,611.37	71.03	1,611.56	1,585.30	0.18	-0.16	21.49
6,932.00	0.26	272.79	6,706.37	71.14	1,611.27	1,585.05	0.22	0.12	-55.12
7,026.00	0.81	89.97	6,800.37	71.15	1,611.72	1,585.49	1.14	0.59	188.49
7,121.00	0.50	131.05	6,895.36	70.88	1,612.71	1,586.38	0.57	-0.33	43.24
7,216.00	0.27	226.29	6,990.36	70.46	1,612.86	1,586.43	0.62	-0.24	100.25
7,310.00	0.56	211.29	7,084.36	69.91	1,612.46	1,585.92	0.33	0.31	-15.96
7,405.00	0.87	234.50	7,179.35	69.09	1,611.63	1,584.93	0.44	0.33	24.43
7,499.00	0.89	245.92	7,273.34	68.38	1,610.38	1,583.55	0.19	0.02	12.15
7,593.00	1.40	248.78	7,367.32	67.67	1,608.65	1,581.70	0.55	0.54	3.04
7,688.00	1.28	254.47	7,462.30	66.96	1,606.54	1,579.49	0.19	-0.13	5.99
7,782.00	1.48	264.15	7,556.27	66.56	1,604.32	1,577.23	0.33	0.21	10.30
7,875.00	1.21	262.48	7,649.24	66.31	1,602.15	1,575.07	0.29	-0.29	-1.80
7,970.00	1.90	258.46	7,744.21	65.86	1,599.62	1,572.49	0.73	0.73	-4.23
8,064.00	2.07	260.81	7,838.15	65.28	1,596.41	1,569.24	0.20	0.18	2.50
8,159.00	2.40	256.32	7,933.08	64.53	1,592.79	1,565.54	0.39	0.35	-4.73
8,252.00	2.00	263.32	8,026.01	63.89	1,589.28	1,561.98	0.52	-0.43	7.53
8,347.00	1.97	261.23	8,120.95	63.44	1,586.02	1,558.71	0.08	-0.03	-2.20
8,441.00	2.10	266.54	8,214.89	63.09	1,582.71	1,555.40	0.24	0.14	5.65
8,535.00	1.80	263.99	8,308.84	62.83	1,579.52	1,552.24	0.33	-0.32	-2.71
8,630.00	2.25	249.78	8,403.78	62.03	1,576.29	1,548.91	0.71	0.47	-14.96
8,724.00	2.40	250.58	8,497.70	60.74	1,572.70	1,545.12	0.16	0.16	0.85
8,817.00	2.65	247.98	8,590.61	59.29	1,568.87	1,541.06	0.30	0.27	-2.80
8,912.00	2.68	245.90	8,685.51	57.56	1,564.81	1,536.71	0.11	0.03	-2.19
9,005.00	2.81	245.75	8,778.40	55.73	1,560.74	1,532.33	0.14	0.14	-0.16

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-20C-21 - Slot J
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Site:	596-20C Pad	MD Reference:	GL 8264' & RKB 24' @ 8288.00ft (H&P 324)
Well:	596-20C-21	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,100.00	2.45	237.97	8,873.30	53.70	1,556.90	1,528.13	0.53	-0.38	-8.19
9,194.00	2.46	252.09	8,967.22	52.01	1,553.27	1,524.22	0.64	0.01	15.02
9,288.00	2.42	239.22	9,061.13	50.38	1,549.65	1,520.31	0.58	-0.04	-13.69
9,381.00	2.67	247.69	9,154.04	48.55	1,545.96	1,516.30	0.48	0.27	9.11
9,476.00	2.84	253.83	9,248.93	47.06	1,541.65	1,511.77	0.36	0.18	6.46
9,570.00	2.78	257.13	9,342.82	45.90	1,537.19	1,507.16	0.18	-0.06	3.51
9,663.00	2.76	255.89	9,435.71	44.85	1,532.82	1,502.67	0.07	-0.02	-1.33
9,758.00	2.65	256.22	9,530.60	43.77	1,528.47	1,498.19	0.12	-0.12	0.35
9,852.00	2.98	260.91	9,624.49	42.87	1,523.95	1,493.58	0.43	0.35	4.99
9,947.00	2.42	261.38	9,719.39	42.18	1,519.53	1,489.11	0.59	-0.59	0.49
10,041.00	2.41	258.99	9,813.30	41.50	1,515.62	1,485.16	0.11	-0.01	-2.54
10,136.00	2.17	267.02	9,908.23	41.03	1,511.87	1,481.39	0.42	-0.25	8.45
10,230.00	2.08	258.32	10,002.16	40.59	1,508.42	1,477.94	0.36	-0.10	-9.26
10,324.00	2.20	269.25	10,096.10	40.22	1,504.95	1,474.47	0.45	0.13	11.63
10,373.00	2.20	269.25	10,145.06	40.20	1,503.06	1,472.63	0.00	0.00	0.00

Projection to TD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
596-20C-21 PBHL	0.00	0.00	10,137.00	360.14	1,537.80	1,654,712.21	2,240,651.84	39° 36' 0.188 N	108° 11' 42.685 W
- actual wellpath misses target center by 321.78ft at 10363.45ft MD (10135.52 TVD, 40.20 N, 1503.43 E)									
- Rectangle (sides W100.00 H200.00 D0.00)									
596-20C-21 PBHL 2	0.00	0.00	10,137.00	44.01	1,541.47	1,654,396.11	2,240,646.11	39° 35' 57.063 N	108° 11' 42.639 W
- actual wellpath misses target center by 38.25ft at 10363.47ft MD (10135.54 TVD, 40.20 N, 1503.43 E)									
- Rectangle (sides W100.00 H200.00 D0.00)									

Checked By: _____ Approved By: _____ Date: _____