



WELL DETAILS: 596-30C-28

Ground Level: GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1646308.81 2236741.77 39° 34' 35.988 N 108° 12' 29.473 W O

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well 596-30C-28 - Slot O, True North
Vertical (TVD) Reference: GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Section (VS) Reference: Slot - O(0.00N, 0.00E)
Measured Depth Reference: GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Calculation Method: Minimum Curvature
Local North: True
Location: Sec 31 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 (596-30C-28/OH)

Created By: Julie Cruse Date: 2008-08-01

Marathon Oil Co.

Garfield County, CO NAD 83

596-31A Pad

596-30C-28 - Slot O

OH

Design: OH

Standard Survey Report

05 August, 2008

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-30C-28 - Slot O
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Site:	596-31A Pad	MD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Well:	596-30C-28	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		596-31A Pad, Sec 31 T5S R96W			
Site Position:		Northing:	1,646,256.33 ft	Latitude:	39° 34' 35.469 N
From:	Map	Easting:	2,236,740.33 ft	Longitude:	108° 12' 29.471 W
Position Uncertainty:	0.00 ft	Slot Radius:	in	Grid Convergence:	-1.71 °

Well	596-30C-28 - Slot O					
Well Position	+N/-S	0.00 ft	Northing:	1,646,308.81 ft	Latitude:	39° 34' 35.988 N
	+E/-W	0.00 ft	Easting:	2,236,741.77 ft	Longitude:	108° 12' 29.473 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,418.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2008/05/14	10.84	65.86	52,580

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	302.21	

Survey Program	Date	2008/08/05			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
76.00	420.00	Survey #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
534.00	2,911.00	Survey #2 (OH)	MWD	MWD - Standard	
2,989.00	10,021.00	Survey #3 (OH)	MWD	MWD - Standard	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
76.00	0.54	61.84	76.00	0.17	0.32	-0.18	0.71	0.71	0.00	
173.00	0.94	32.60	172.99	1.06	1.15	-0.41	0.55	0.41	-30.14	
234.00	1.64	5.18	233.98	2.35	1.50	-0.02	1.50	1.15	-44.95	
296.00	2.06	351.95	295.94	4.33	1.42	1.11	0.96	0.68	-21.34	
357.00	3.17	328.11	356.88	6.85	0.38	3.33	2.51	1.82	-39.08	
389.00	3.48	322.55	388.83	8.37	-0.68	5.04	1.40	0.97	-17.37	
420.00	4.31	318.23	419.76	9.99	-2.03	7.04	2.84	2.68	-13.94	
534.00	7.18	301.75	533.18	16.93	-10.94	18.29	2.88	2.52	-14.46	
568.00	8.06	303.34	566.88	19.36	-14.74	22.79	2.66	2.59	4.68	
593.00	8.41	302.58	591.62	21.31	-17.75	26.38	1.47	1.40	-3.04	

Scientific Drilling Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-30C-28 - Slot O
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Site:	596-31A Pad	MD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Well:	596-30C-28	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)
623.00	8.86	297.33	621.28	23.55	-21.65	30.88	3.06	1.57	-17.50
684.00	11.22	295.78	681.34	28.30	-31.18	41.47	3.86	3.84	-2.54
769.00	11.74	288.49	764.64	34.64	-46.83	58.09	1.81	0.61	-8.58
861.00	12.30	287.39	854.63	40.53	-65.06	76.65	0.66	0.61	-1.20
953.00	12.17	296.48	944.54	47.79	-83.09	95.78	2.10	-0.14	9.88
1,045.00	13.08	303.35	1,034.32	57.84	-100.47	115.83	1.91	0.99	7.47
1,139.00	14.40	307.28	1,125.63	70.76	-118.66	138.11	1.72	1.40	4.18
1,234.00	15.70	307.70	1,217.37	85.78	-138.23	162.68	1.37	1.37	0.44
1,328.00	17.52	306.13	1,307.45	101.90	-159.72	189.45	1.99	1.94	-1.67
1,422.00	18.93	303.16	1,396.73	118.58	-183.91	218.82	1.80	1.50	-3.16
1,517.00	20.00	302.95	1,486.30	135.85	-210.45	250.47	1.13	1.13	-0.22
1,611.00	20.79	303.97	1,574.41	153.92	-237.77	283.22	0.92	0.84	1.09
1,706.00	20.40	304.27	1,663.34	172.66	-265.44	316.62	0.43	-0.41	0.32
1,800.00	21.14	305.32	1,751.23	191.68	-292.81	349.91	0.88	0.79	1.12
1,895.00	21.82	307.21	1,839.63	212.27	-320.84	384.61	1.02	0.72	1.99
1,989.00	21.69	308.87	1,926.94	233.73	-348.28	419.27	0.67	-0.14	1.77
2,083.00	21.72	309.22	2,014.27	255.63	-375.28	453.78	0.14	0.03	0.37
2,178.00	21.62	309.43	2,102.56	277.86	-402.42	488.59	0.13	-0.11	0.22
2,272.00	22.84	309.14	2,189.57	300.38	-429.94	523.88	1.30	1.30	-0.31
2,366.00	22.06	307.26	2,276.45	322.58	-458.14	559.58	1.13	-0.83	-2.00
2,461.00	22.51	310.75	2,364.35	345.25	-486.12	595.33	1.47	0.47	3.67
2,555.00	22.74	308.41	2,451.12	368.29	-513.99	631.19	0.99	0.24	-2.49
2,650.00	24.60	304.04	2,538.13	390.77	-544.77	669.21	2.69	1.96	-4.60
2,744.00	24.21	303.02	2,623.73	412.22	-577.14	708.04	0.61	-0.41	-1.09
2,838.00	25.39	303.48	2,709.06	433.84	-610.11	747.46	1.27	1.26	0.49
2,911.00	24.95	304.72	2,775.13	451.24	-635.82	778.49	0.94	-0.60	1.70
2,989.00	24.56	305.49	2,845.96	470.03	-662.54	811.11	0.65	-0.50	0.99
3,052.00	24.15	305.17	2,903.36	485.05	-683.74	837.05	0.68	-0.65	-0.51
3,147.00	23.34	303.73	2,990.32	506.69	-715.27	875.27	1.05	-0.85	-1.52
3,241.00	22.19	301.78	3,076.99	526.38	-745.85	911.64	1.46	-1.22	-2.07
3,335.00	18.73	299.19	3,165.05	543.10	-774.13	944.47	3.80	-3.68	-2.76
3,430.00	17.16	298.46	3,255.43	557.22	-799.76	973.69	1.67	-1.65	-0.77
3,524.00	18.09	298.57	3,345.01	570.80	-824.77	1,002.09	0.99	0.99	0.12
3,619.00	21.86	294.50	3,434.29	585.20	-853.83	1,034.35	4.23	3.97	-4.28
3,713.00	20.74	296.30	3,521.86	599.83	-884.68	1,068.25	1.38	-1.19	1.91
3,807.00	21.18	298.95	3,609.65	615.42	-914.46	1,101.76	1.11	0.47	2.82
3,902.00	20.97	299.27	3,698.29	632.04	-944.31	1,135.87	0.25	-0.22	0.34
3,996.00	20.88	300.53	3,786.09	648.78	-973.41	1,169.41	0.49	-0.10	1.34
4,091.00	20.90	301.62	3,874.85	666.26	-1,002.42	1,203.28	0.41	0.02	1.15
4,185.00	20.71	302.10	3,962.72	683.88	-1,030.78	1,236.67	0.27	-0.20	0.51
4,279.00	20.83	301.99	4,050.61	701.57	-1,059.03	1,270.00	0.13	0.13	-0.12
4,374.00	21.46	302.37	4,139.21	719.82	-1,088.04	1,304.27	0.68	0.66	0.40
4,468.00	22.38	301.94	4,226.42	738.50	-1,117.75	1,339.36	0.99	0.98	-0.46
4,562.00	23.53	303.81	4,312.97	758.40	-1,148.52	1,376.01	1.45	1.22	1.99
4,657.00	21.98	302.91	4,400.58	778.62	-1,179.21	1,412.75	1.67	-1.63	-0.95
4,751.00	21.27	303.66	4,487.96	797.63	-1,208.17	1,447.38	0.81	-0.76	0.80
4,845.00	21.04	304.29	4,575.63	816.58	-1,236.30	1,481.29	0.34	-0.24	0.67
4,940.00	20.49	307.53	4,664.46	836.32	-1,263.58	1,514.89	1.34	-0.58	3.41
5,035.00	18.58	309.19	4,753.99	856.01	-1,288.49	1,546.47	2.09	-2.01	1.75
5,129.00	16.91	308.53	4,843.51	873.99	-1,310.80	1,574.93	1.79	-1.78	-0.70
5,223.00	16.17	305.69	4,933.62	890.15	-1,332.12	1,601.58	1.17	-0.79	-3.02
5,317.00	16.32	304.14	5,023.87	905.19	-1,353.69	1,627.84	0.49	0.16	-1.65
5,411.00	14.12	300.10	5,114.57	918.36	-1,374.54	1,652.50	2.60	-2.34	-4.30
5,506.00	13.02	295.82	5,206.92	928.83	-1,394.20	1,674.72	1.57	-1.16	-4.51

Scientific Drilling Survey Report

Company: Marathon Oil Co.
Project: Garfield County, CO NAD 83
Site: 596-31A Pad
Well: 596-30C-28
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 596-30C-28 - Slot O
TVD Reference: GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
MD Reference: GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
5,600.00	11.95	293.16	5,298.69	937.27	-1,412.68	1,694.86	1.29	-1.14	-2.83
5,695.00	11.40	294.81	5,391.73	945.08	-1,430.24	1,713.88	0.68	-0.58	1.74
5,790.00	10.82	293.75	5,484.95	952.61	-1,446.93	1,732.01	0.65	-0.61	-1.12
5,884.00	10.35	294.41	5,577.35	959.65	-1,462.69	1,749.10	0.52	-0.50	0.70
5,978.00	9.64	293.26	5,669.92	966.25	-1,477.61	1,765.24	0.78	-0.76	-1.22
6,072.00	9.15	303.36	5,762.67	973.47	-1,491.09	1,780.49	1.83	-0.52	10.74
6,167.00	8.71	304.47	5,856.51	981.69	-1,503.33	1,795.23	0.50	-0.46	1.17
6,260.00	8.27	304.88	5,948.50	989.51	-1,514.62	1,808.95	0.48	-0.47	0.44
6,355.00	7.69	304.45	6,042.57	997.01	-1,525.46	1,822.12	0.61	-0.61	-0.45
6,449.00	7.32	305.81	6,135.77	1,004.07	-1,535.51	1,834.39	0.44	-0.39	1.45
6,544.00	6.16	311.96	6,230.11	1,011.02	-1,544.21	1,845.45	1.44	-1.22	6.47
6,638.00	5.74	317.52	6,323.61	1,017.86	-1,551.13	1,854.95	0.76	-0.45	5.91
6,732.00	4.95	314.65	6,417.20	1,024.17	-1,557.19	1,863.45	0.89	-0.84	-3.05
6,826.00	4.54	310.31	6,510.88	1,029.43	-1,562.91	1,871.09	0.58	-0.44	-4.62
6,921.00	4.56	308.03	6,605.58	1,034.19	-1,568.75	1,878.57	0.19	0.02	-2.40
7,015.00	3.68	310.10	6,699.33	1,038.44	-1,574.01	1,885.28	0.95	-0.94	2.20
7,109.00	3.61	316.15	6,793.14	1,042.51	-1,578.36	1,891.14	0.42	-0.07	6.44
7,204.00	3.38	316.27	6,887.97	1,046.69	-1,582.37	1,896.76	0.24	-0.24	0.13
7,298.00	2.88	316.38	6,981.83	1,050.41	-1,585.92	1,901.73	0.53	-0.53	0.12
7,393.00	2.02	318.02	7,076.74	1,053.38	-1,588.68	1,905.66	0.91	-0.91	1.73
7,487.00	1.13	294.20	7,170.70	1,054.99	-1,590.64	1,908.17	1.16	-0.95	-25.34
7,581.00	1.23	259.15	7,264.68	1,055.18	-1,592.47	1,909.83	0.76	0.11	-37.29
7,676.00	1.68	240.73	7,359.65	1,054.31	-1,594.69	1,911.24	0.68	0.47	-19.39
7,770.00	2.13	247.25	7,453.60	1,052.96	-1,597.50	1,912.90	0.53	0.48	6.94
7,865.00	2.58	254.70	7,548.52	1,051.71	-1,601.19	1,915.35	0.57	0.47	7.84
7,959.00	2.83	251.27	7,642.42	1,050.41	-1,605.43	1,918.25	0.32	0.27	-3.65
8,054.00	2.62	244.24	7,737.31	1,048.71	-1,609.61	1,920.88	0.42	-0.22	-7.40
8,148.00	2.68	233.90	7,831.21	1,046.48	-1,613.32	1,922.83	0.51	0.06	-11.00
8,242.00	3.03	228.30	7,925.09	1,043.53	-1,616.95	1,924.33	0.48	0.37	-5.96
8,337.00	2.93	231.58	8,019.96	1,040.35	-1,620.72	1,925.83	0.21	-0.11	3.45
8,432.00	2.87	230.35	8,114.84	1,037.33	-1,624.46	1,927.37	0.09	-0.06	-1.29
8,526.00	3.26	234.24	8,208.71	1,034.26	-1,628.44	1,929.11	0.47	0.41	4.14
8,620.00	3.88	229.90	8,302.52	1,030.65	-1,633.04	1,931.08	0.72	0.66	-4.62
8,715.00	4.33	233.84	8,397.28	1,026.47	-1,638.39	1,933.38	0.56	0.47	4.15
8,809.00	4.67	232.80	8,490.99	1,022.06	-1,644.31	1,936.03	0.37	0.36	-1.11
8,903.00	5.32	236.27	8,584.63	1,017.33	-1,650.98	1,939.15	0.76	0.69	3.69
8,998.00	5.55	237.09	8,679.21	1,012.39	-1,658.50	1,942.88	0.26	0.24	0.86
9,092.00	5.57	236.27	8,772.76	1,007.38	-1,666.11	1,946.65	0.09	0.02	-0.87
9,187.00	4.78	241.38	8,867.38	1,002.93	-1,673.42	1,950.46	0.96	-0.83	5.38
9,281.00	4.74	240.73	8,961.05	999.15	-1,680.24	1,954.23	0.07	-0.04	-0.69
9,376.00	4.85	238.01	9,055.72	995.11	-1,687.07	1,957.85	0.27	0.12	-2.86
9,470.00	4.97	239.45	9,149.38	990.93	-1,693.95	1,961.44	0.18	0.13	1.53
9,564.00	5.15	239.64	9,243.01	986.73	-1,701.10	1,965.25	0.19	0.19	0.20
9,659.00	5.40	237.15	9,337.61	982.15	-1,708.53	1,969.10	0.36	0.26	-2.62
9,753.00	5.64	234.60	9,431.17	977.07	-1,716.01	1,972.72	0.37	0.26	-2.71
9,847.00	5.38	235.18	9,524.74	971.88	-1,723.40	1,976.20	0.28	-0.28	0.62
9,942.00	5.61	235.36	9,619.30	966.70	-1,730.87	1,979.77	0.24	0.24	0.19
10,021.00	5.61	235.36	9,697.92	962.31	-1,737.23	1,982.80	0.00	0.00	0.00

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 596-30C-28 - Slot O
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Site:	596-31A Pad	MD Reference:	GL 8418' & RKB 24' @ 8442.00ft (H&P 324)
Well:	596-30C-28	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi-User Db

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
596-30C-28 PBHL	0.00	0.00	9,735.00	1,013.48	-1,608.79	1,647,369.79	2,235,163.90	39° 34' 46.004 N	108° 12' 50.021 W
- actual wellpath misses target center by 143.14ft at 10021.00ft MD (9697.92 TVD, 962.31 N, -1737.23 E)									
- Rectangle (sides W100.00 H200.00 D0.00)									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
420.00	419.76	9.99	-2.03	Last SDI Gyro Survey
2,911.00	2,775.13	451.24	-635.82	Last Surface Survey
2,989.00	2,845.96	470.03	-662.54	First Survey in 7 7/8" Hole
10,021.00	9,697.92	962.31	-1,737.23	Projection to TD

Checked By: _____ Approved By: _____ Date: _____