



**Scientific Drilling**  
Rocky Mountain Operations

Project: Garfield County, CO NAD 83

Site: 596-33A Pad

Well: 596-33A-18B

Wellbore: OH

Design: Plan #1



**Marathon Oil Co.**

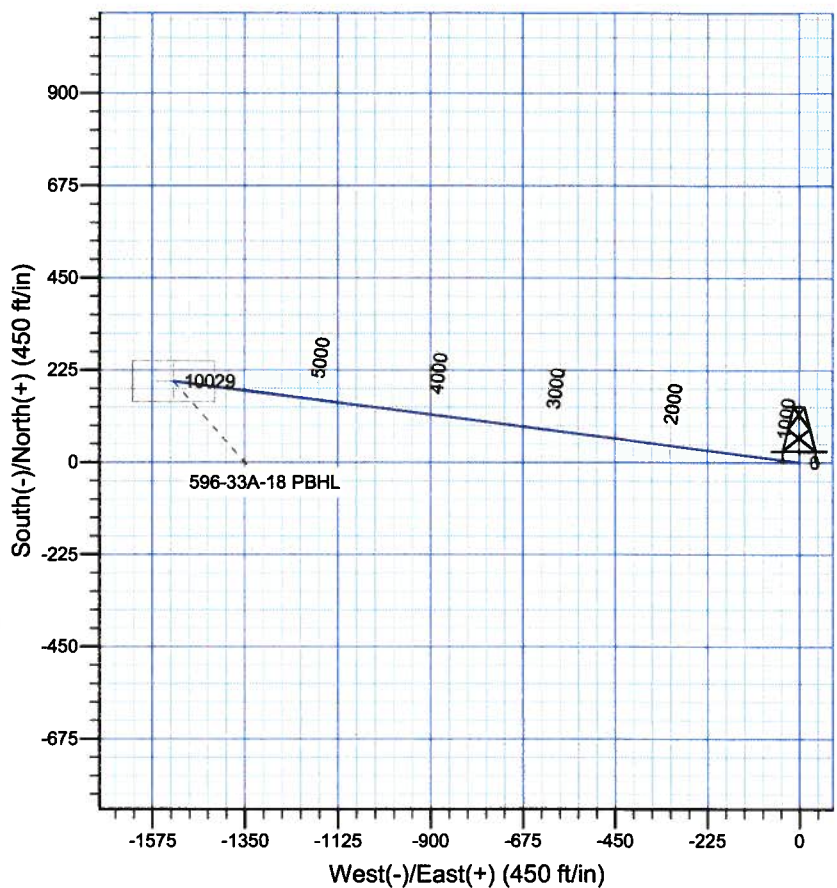
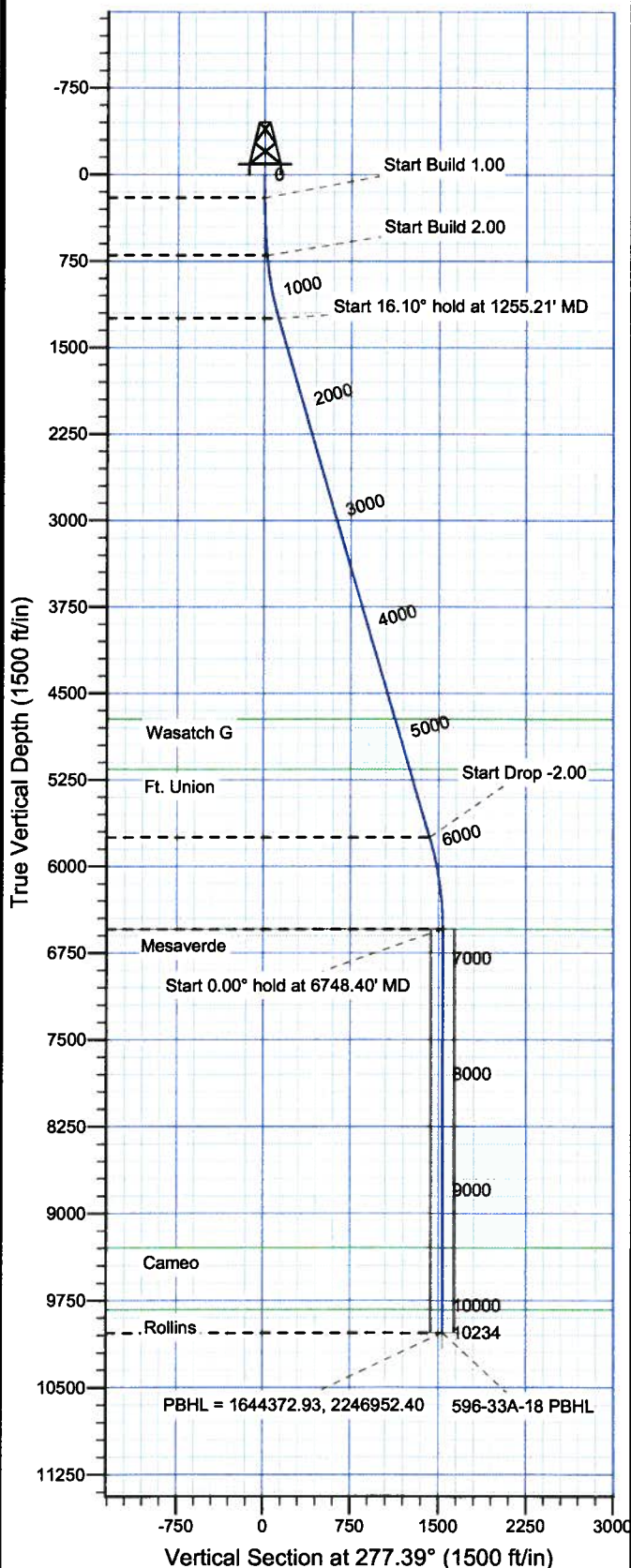


Azimuths to True North  
Magnetic North: 10.65°

Magnetic Field  
Strength: 52460.1nT  
Dip Angle: 65.83°  
Date: 8/25/2009  
Model: IGRF200510

WELL DETAILS: 596-33A-18B

+N/-S	+E/-W	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)	8110.00	Slot
0.00	0.00	Northing	Longitude	K
		1644130.63	108° 9' 58.887 W	
		Easting		
		2248469.28		
		Latitude		
		39° 34' 17.932 N		



#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4723.00	4875.96	Wasatch G
5158.00	5328.73	Ft. Union
6543.00	6748.40	Mesaverde
9294.00	9499.40	Cameo
9829.00	10034.40	Rollins

Plan: Plan #1 (596-33A-18/OH)

Created By: Rex Hall Date: 2009-08-28

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

System Datum: Mean Sea Level  
Local North: True

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	
3	700.00	5.00	277.39	699.37	2.81	-21.62	1.00	277.39	21.80	596-33A-18 PBHL
4	1255.21	16.10	277.39	1244.33	15.87	-122.29	2.00	0.00	123.32	
5	5943.19	16.10	277.39	5748.35	183.21	-1411.86	0.00	0.00	1423.70	
6	6748.40	0.00	0.00	6543.00	197.68	-1523.34	2.00	180.00	1536.11	
7	10234.40	0.00	0.00	10029.00	197.68	-1523.34	0.00	0.00	1536.11	596-33A-18 PBHL

# **Marathon Oil Co.**

**Garfield County, CO NAD 83**

**596-33A Pad**

**596-33A-18B Slot K**

**OH**

**Plan: Plan #1**

## **Standard Planning Report**

**28 August, 2009**

# Scientific Drilling International

## Planning Report

<b>Database:</b>	EDM 2003.16 Multi-User Db	<b>Local Co-ordinate Reference:</b>	Well 596-33A-18 Slot K
<b>Company:</b>	Marathon Oil Co.	<b>TVD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Project:</b>	Garfield County, CO NAD 83	<b>MD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Site:</b>	596-33A Pad	<b>North Reference:</b>	True
<b>Well:</b>	596-33A-18B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

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

<b>Site</b>	596-33A Pad, Sec 33 T5S R96W		
<b>Site Position:</b>		<b>Northing:</b>	1,644,179.10 ft
<b>From:</b>	Map	<b>Easting:</b>	2,248,412.04 ft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	in
		<b>Latitude:</b>	39° 34' 18.394 N
		<b>Longitude:</b>	108° 9' 59.636 W
		<b>Grid Convergence:</b>	-1.68 °

<b>Well</b>	596-33A-18B Slot K, 2639' FSL & 453' FEL		
<b>Well Position</b>	+N/-S	0.00 ft	<b>Northing:</b> 1,644,130.63 ft
	+E/-W	0.00 ft	<b>Easting:</b> 2,248,469.28 ft
<b>Position Uncertainty</b>	0.00 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	39° 34' 17.932 N
		<b>Longitude:</b>	108° 9' 58.887 W
		<b>Ground Level:</b>	8,110.00 ft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF200510	8/25/2009	10.65	65.83	52,460

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>
	(ft)	(ft)	(ft)	(°)
	0.00	0.00	0.00	277.39

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	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	
700.00	5.00	277.39	699.37	2.81	-21.62	1.00	1.00	0.00	277.39	596-33A-18 PBHL
1,255.21	16.10	277.39	1,244.33	15.87	-122.29	2.00	2.00	0.00	0.00	
5,943.19	16.10	277.39	5,748.35	183.21	-1,411.86	0.00	0.00	0.00	0.00	
6,748.40	0.00	0.00	6,543.00	197.68	-1,523.34	2.00	-2.00	0.00	180.00	
10,234.40	0.00	0.00	10,029.00	197.68	-1,523.34	0.00	0.00	0.00	0.00	596-33A-18 PBHL



# Scientific Drilling International

## Planning Report

<b>Database:</b>	EDM 2003.16 Multi-User Db	<b>Local Co-ordinate Reference:</b>	Well 596-33A-18 Slot K
<b>Company:</b>	Marathon Oil Co.	<b>TVD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Project:</b>	Garfield County, CO NAD 83	<b>MD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Site:</b>	596-33A Pad	<b>North Reference:</b>	True
<b>Well:</b>	596-33A-18 B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

### Planned 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
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
<b>Start Build 1.00</b>									
300.00	1.00	277.39	299.99	0.11	-0.87	0.87	1.00	1.00	0.00
400.00	2.00	277.39	399.96	0.45	-3.46	3.49	1.00	1.00	0.00
500.00	3.00	277.39	499.86	1.01	-7.79	7.85	1.00	1.00	0.00
600.00	4.00	277.39	599.68	1.80	-13.84	13.96	1.00	1.00	0.00
700.00	5.00	277.39	699.37	2.81	-21.62	21.80	1.00	1.00	0.00
<b>Start Build 2.00</b>									
800.00	7.00	277.39	798.81	4.15	-31.99	32.26	2.00	2.00	0.00
900.00	9.00	277.39	897.83	5.94	-45.79	46.17	2.00	2.00	0.00
1,000.00	11.00	277.39	996.31	8.18	-63.01	63.54	2.00	2.00	0.00
1,100.00	13.00	277.39	1,094.12	10.85	-83.62	84.33	2.00	2.00	0.00
1,200.00	15.00	277.39	1,191.14	13.97	-107.61	108.52	2.00	2.00	0.00
1,255.21	16.10	277.39	1,244.33	15.87	-122.29	123.32	2.00	2.00	0.00
<b>Start 16.10° hold at 1255.21' MD</b>									
1,300.00	16.10	277.39	1,287.36	17.47	-134.61	135.74	0.00	0.00	0.00
1,400.00	16.10	277.39	1,383.44	21.04	-162.12	163.48	0.00	0.00	0.00
1,500.00	16.10	277.39	1,479.52	24.61	-189.63	191.22	0.00	0.00	0.00
1,600.00	16.10	277.39	1,575.59	28.18	-217.14	218.96	0.00	0.00	0.00
1,700.00	16.10	277.39	1,671.67	31.75	-244.65	246.70	0.00	0.00	0.00
1,800.00	16.10	277.39	1,767.74	35.32	-272.15	274.44	0.00	0.00	0.00
1,900.00	16.10	277.39	1,863.82	38.89	-299.66	302.17	0.00	0.00	0.00
2,000.00	16.10	277.39	1,959.90	42.46	-327.17	329.91	0.00	0.00	0.00
2,100.00	16.10	277.39	2,055.97	46.03	-354.68	357.65	0.00	0.00	0.00
2,200.00	16.10	277.39	2,152.05	49.60	-382.19	385.39	0.00	0.00	0.00
2,300.00	16.10	277.39	2,248.12	53.17	-409.69	413.13	0.00	0.00	0.00
2,400.00	16.10	277.39	2,344.20	56.74	-437.20	440.87	0.00	0.00	0.00
2,500.00	16.10	277.39	2,440.28	60.30	-464.71	468.61	0.00	0.00	0.00
2,600.00	16.10	277.39	2,536.35	63.87	-492.22	496.34	0.00	0.00	0.00
2,700.00	16.10	277.39	2,632.43	67.44	-519.72	524.08	0.00	0.00	0.00
2,800.00	16.10	277.39	2,728.50	71.01	-547.23	551.82	0.00	0.00	0.00
2,900.00	16.10	277.39	2,824.58	74.58	-574.74	579.56	0.00	0.00	0.00
3,000.00	16.10	277.39	2,920.65	78.15	-602.25	607.30	0.00	0.00	0.00
3,100.00	16.10	277.39	3,016.73	81.72	-629.76	635.04	0.00	0.00	0.00
3,200.00	16.10	277.39	3,112.81	85.29	-657.26	662.78	0.00	0.00	0.00
3,300.00	16.10	277.39	3,208.88	88.86	-684.77	690.51	0.00	0.00	0.00
3,400.00	16.10	277.39	3,304.96	92.43	-712.28	718.25	0.00	0.00	0.00
3,500.00	16.10	277.39	3,401.03	96.00	-739.79	745.99	0.00	0.00	0.00
3,600.00	16.10	277.39	3,497.11	99.57	-767.30	773.73	0.00	0.00	0.00
3,700.00	16.10	277.39	3,593.19	103.14	-794.80	801.47	0.00	0.00	0.00
3,800.00	16.10	277.39	3,689.26	106.71	-822.31	829.21	0.00	0.00	0.00
3,900.00	16.10	277.39	3,785.34	110.28	-849.82	856.94	0.00	0.00	0.00
4,000.00	16.10	277.39	3,881.41	113.85	-877.33	884.68	0.00	0.00	0.00
4,100.00	16.10	277.39	3,977.49	117.42	-904.83	912.42	0.00	0.00	0.00
4,200.00	16.10	277.39	4,073.57	120.99	-932.34	940.16	0.00	0.00	0.00
4,300.00	16.10	277.39	4,169.64	124.56	-959.85	967.90	0.00	0.00	0.00
4,400.00	16.10	277.39	4,265.72	128.13	-987.36	995.64	0.00	0.00	0.00
4,500.00	16.10	277.39	4,361.79	131.70	-1,014.87	1,023.38	0.00	0.00	0.00
4,600.00	16.10	277.39	4,457.87	135.27	-1,042.37	1,051.11	0.00	0.00	0.00
4,700.00	16.10	277.39	4,553.94	138.84	-1,069.88	1,078.85	0.00	0.00	0.00
4,800.00	16.10	277.39	4,650.02	142.41	-1,097.39	1,106.59	0.00	0.00	0.00

# Scientific Drilling International

## Planning Report

<b>Database:</b>	EDM 2003.16 Multi-User Db	<b>Local Co-ordinate Reference:</b>	Well 596-33A-188 Slot K
<b>Company:</b>	Marathon Oil Co.	<b>TVD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Project:</b>	Garfield County, CO NAD 83	<b>MD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Site:</b>	596-33A Pad	<b>North Reference:</b>	True
<b>Well:</b>	596-33A-188	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

### Planned 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)
4,875.96	16.10	277.39	4,723.00	145.12	-1,118.29	1,127.66	0.00	0.00	0.00
<b>Wasatch G</b>									
4,900.00	16.10	277.39	4,746.10	145.98	-1,124.90	1,134.33	0.00	0.00	0.00
5,000.00	16.10	277.39	4,842.17	149.55	-1,152.41	1,162.07	0.00	0.00	0.00
5,100.00	16.10	277.39	4,938.25	153.12	-1,179.91	1,189.81	0.00	0.00	0.00
5,200.00	16.10	277.39	5,034.32	156.69	-1,207.42	1,217.55	0.00	0.00	0.00
5,300.00	16.10	277.39	5,130.40	160.26	-1,234.93	1,245.28	0.00	0.00	0.00
5,328.73	16.10	277.39	5,158.00	161.28	-1,242.83	1,253.25	0.00	0.00	0.00
<b>Ft. Union</b>									
5,400.00	16.10	277.39	5,226.48	163.82	-1,262.44	1,273.02	0.00	0.00	0.00
5,500.00	16.10	277.39	5,322.55	167.39	-1,289.95	1,300.76	0.00	0.00	0.00
5,600.00	16.10	277.39	5,418.63	170.96	-1,317.45	1,328.50	0.00	0.00	0.00
5,700.00	16.10	277.39	5,514.70	174.53	-1,344.96	1,356.24	0.00	0.00	0.00
5,800.00	16.10	277.39	5,610.78	178.10	-1,372.47	1,383.98	0.00	0.00	0.00
5,900.00	16.10	277.39	5,706.86	181.67	-1,399.98	1,411.72	0.00	0.00	0.00
5,943.19	16.10	277.39	5,748.35	183.21	-1,411.86	1,423.70	0.00	0.00	0.00
<b>Start Drop -2.00</b>									
6,000.00	14.97	277.39	5,803.08	185.17	-1,426.95	1,438.91	2.00	-2.00	0.00
6,100.00	12.97	277.39	5,900.12	188.28	-1,450.88	1,463.05	2.00	-2.00	0.00
6,200.00	10.97	277.39	5,997.94	190.95	-1,471.45	1,483.78	2.00	-2.00	0.00
6,300.00	8.97	277.39	6,096.43	193.17	-1,488.61	1,501.09	2.00	-2.00	0.00
6,400.00	6.97	277.39	6,195.46	194.96	-1,502.36	1,514.95	2.00	-2.00	0.00
6,500.00	4.97	277.39	6,294.91	196.30	-1,512.67	1,525.35	2.00	-2.00	0.00
6,600.00	2.97	277.39	6,394.67	197.19	-1,519.53	1,532.27	2.00	-2.00	0.00
6,700.00	0.97	277.39	6,494.60	197.63	-1,522.93	1,535.70	2.00	-2.00	0.00
6,748.40	0.00	0.00	6,543.00	197.68	-1,523.34	1,536.11	2.00	-2.00	0.00
<b>Start 0.00° hold at 6748.40' MD - Mesaverde</b>									
6,800.00	0.00	0.00	6,594.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
6,900.00	0.00	0.00	6,694.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,000.00	0.00	0.00	6,794.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,100.00	0.00	0.00	6,894.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,200.00	0.00	0.00	6,994.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,300.00	0.00	0.00	7,094.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,400.00	0.00	0.00	7,194.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,500.00	0.00	0.00	7,294.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,600.00	0.00	0.00	7,394.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,700.00	0.00	0.00	7,494.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,800.00	0.00	0.00	7,594.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
7,900.00	0.00	0.00	7,694.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,000.00	0.00	0.00	7,794.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,100.00	0.00	0.00	7,894.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,200.00	0.00	0.00	7,994.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,300.00	0.00	0.00	8,094.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,400.00	0.00	0.00	8,194.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,500.00	0.00	0.00	8,294.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,600.00	0.00	0.00	8,394.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,700.00	0.00	0.00	8,494.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,800.00	0.00	0.00	8,594.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
8,900.00	0.00	0.00	8,694.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,000.00	0.00	0.00	8,794.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,100.00	0.00	0.00	8,894.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,200.00	0.00	0.00	8,994.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,300.00	0.00	0.00	9,094.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00

# Scientific Drilling International

## Planning Report

<b>Database:</b>	EDM 2003.16 Multi-User Db	<b>Local Co-ordinate Reference:</b>	Well 596-33A-18 Slot K
<b>Company:</b>	Marathon Oil Co.	<b>TVD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Project:</b>	Garfield County, CO NAD 83	<b>MD Reference:</b>	GL 8110' & RKB 24' @ 8134.00ft (H&P 324)
<b>Site:</b>	596-33A Pad	<b>North Reference:</b>	True
<b>Well:</b>	596-33A-18B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

### Planned 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)
9,400.00	0.00	0.00	9,194.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,499.40	0.00	0.00	9,294.00	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
<b>Cameo</b>									
9,500.00	0.00	0.00	9,294.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,600.00	0.00	0.00	9,394.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,700.00	0.00	0.00	9,494.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,800.00	0.00	0.00	9,594.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
9,900.00	0.00	0.00	9,694.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
10,000.00	0.00	0.00	9,794.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
10,034.40	0.00	0.00	9,829.00	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
<b>Rollins</b>									
10,100.00	0.00	0.00	9,894.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
10,200.00	0.00	0.00	9,994.60	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
10,234.40	0.00	0.00	10,029.00	197.68	-1,523.34	1,536.11	0.00	0.00	0.00
<b>PBHL = 1644372.93, 2246952.40 - 596-33A-18 PBHL - 596-33A-18 PBHL</b>									

### Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
596-33A-18 PBHL	0.00	0.00	10,029.00	197.68	-1,523.34	1,644,372.93	2,246,952.40	39° 34' 19.885 N	108° 10' 18.341 W
- hit/miss target									
- Shape									
- plan hits target center - Rectangle (sides W100.00 H200.00 D0.00)									

### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,875.96	4,723.00	Wasatch G		0.00	
5,328.73	5,158.00	Ft. Union		0.00	
6,748.40	6,543.00	Mesaverde		0.00	
9,499.40	9,294.00	Cameo		0.00	
10,034.40	9,829.00	Rollins		0.00	

### Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.00	200.00	0.00	0.00	Start Build 1.00
700.00	699.37	2.81	-21.62	Start Build 2.00
1,255.21	1,244.33	15.87	-122.29	Start 16.10° hold at 1255.21' MD
5,943.19	5,748.35	183.21	-1,411.86	Start Drop -2.00
6,748.40	6,543.00	197.68	-1,523.34	Start 0.00° hold at 6748.40' MD
10,234.40	10,029.00	197.68	-1,523.34	PBHL = 1644372.93, 2246952.40