



02089246

API No. 05-045-15033

Scientific Drilling
Rocky Mountain Operations

Scientific Drilling

Survey Report

Company: Marathon Oil Co.
Project: Garfield County, CO NAD 83
Site: 697-12A Pad
Well: 697-12A-18
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 697-12A-18 - Slot J
TVD Reference: GL 8300' & RKB 24' @ 8324.00ft
MD Reference: GL 8300' & RKB 24' @ 8324.00ft
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Multi User DB

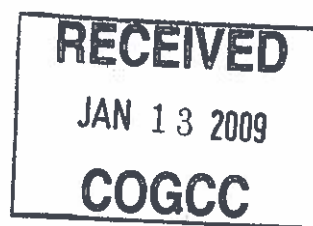
Survey

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)
5,997.00	4.07	138.14	5,929.53	-847.69	-36.37	848.45	1.51	-1.27	-10.04
6,092.00	4.08	134.99	6,024.29	-852.59	-31.73	853.12	0.24	0.01	-3.32
6,187.00	2.83	136.93	6,119.11	-856.70	-27.74	857.02	1.32	-1.32	2.04
6,282.00	1.09	91.32	6,214.06	-858.43	-25.23	858.63	2.33	-1.83	-48.01
6,376.49	0.83	73.83	6,308.54	-858.26	-23.67	858.38	0.41	-0.27	-18.51
697-12A-18									
6,376.64	0.83	73.83	6,308.69	-858.26	-23.67	858.38	0.00	0.00	0.00
697-12A-18									
6,378.00	0.83	73.47	6,310.05	-858.25	-23.65	858.37	0.45	-0.24	-26.54
6,473.00	0.27	8.52	6,405.04	-857.84	-22.96	857.92	0.80	-0.59	-68.37
6,568.00	0.38	263.34	6,500.04	-857.65	-23.24	857.75	0.55	0.12	-110.72
6,664.00	0.75	239.26	6,596.04	-858.01	-24.09	858.15	0.45	0.39	-25.08
6,759.00	1.04	240.55	6,691.02	-858.75	-25.38	858.95	0.31	0.31	1.36
6,854.00	1.07	237.70	6,786.01	-859.65	-26.88	859.93	0.06	0.03	-3.00
6,949.00	1.19	235.97	6,880.99	-860.68	-28.45	861.03	0.13	0.13	-1.82
7,044.00	1.69	245.67	6,975.96	-861.80	-30.54	862.26	0.58	0.53	10.21
7,139.00	1.84	245.90	7,070.91	-863.00	-33.21	863.59	0.16	0.16	0.24
7,235.00	2.09	245.16	7,166.86	-864.37	-36.21	865.10	0.26	0.26	-0.77
7,330.00	1.53	247.64	7,261.81	-865.58	-38.95	866.45	0.60	-0.59	2.61
7,425.00	1.60	232.07	7,356.77	-866.88	-41.17	867.85	0.45	0.07	-16.39
7,521.00	1.21	220.43	7,452.75	-868.47	-42.88	869.53	0.50	-0.41	-12.12
7,616.00	1.35	204.74	7,547.72	-870.25	-44.00	871.36	0.40	0.15	-16.52
7,712.00	1.54	213.07	7,643.69	-872.36	-45.18	873.53	0.29	0.20	8.68
7,807.00	1.39	238.84	7,738.66	-874.03	-46.86	875.27	0.70	-0.16	27.13
7,903.00	1.51	249.06	7,834.63	-875.08	-49.04	876.44	0.30	0.12	10.65
7,997.00	1.42	253.11	7,928.60	-875.86	-51.31	877.33	0.15	-0.10	4.31
8,093.00	1.11	248.20	8,024.58	-876.55	-53.31	878.12	0.34	-0.32	-5.11
8,188.00	0.74	246.82	8,119.56	-877.14	-54.73	878.77	0.39	-0.39	-1.45
8,284.00	0.69	230.13	8,215.56	-877.75	-55.74	879.43	0.22	-0.05	-17.39
8,379.00	0.67	243.50	8,310.55	-878.37	-56.68	880.09	0.17	-0.02	14.07
Last Survey in 8 3/4" Hole									
8,474.00	0.76	246.29	8,405.54	-878.87	-57.75	880.65	0.10	0.09	2.94
First Survey in 7 7/8" Hole									
8,570.00	0.75	251.42	8,501.53	-879.32	-58.93	881.16	0.07	-0.01	5.34
8,665.00	0.75	251.51	8,596.53	-879.72	-60.11	881.62	0.00	0.00	0.09
8,760.00	1.02	256.39	8,691.52	-880.11	-61.52	882.08	0.29	0.28	5.14
8,855.00	1.23	258.84	8,786.50	-880.51	-63.35	882.57	0.23	0.22	2.58
8,950.00	1.82	259.00	8,881.46	-881.00	-65.83	883.17	0.62	0.62	0.17
9,046.00	1.75	256.34	8,977.42	-881.63	-68.75	883.96	0.11	-0.07	-2.77
9,141.00	1.64	262.60	9,072.37	-882.15	-71.51	884.61	0.23	-0.12	6.59
9,236.00	1.95	261.55	9,167.33	-882.56	-74.45	885.17	0.33	0.33	-1.11
9,331.00	2.41	258.56	9,262.26	-883.20	-78.01	885.98	0.50	0.48	-3.15
9,427.00	2.70	264.24	9,358.16	-883.82	-82.24	886.81	0.40	0.30	5.92
9,522.00	2.95	265.71	9,453.05	-884.23	-86.90	887.45	0.27	0.26	1.55
9,618.00	2.89	263.56	9,548.92	-884.69	-91.77	888.15	0.13	-0.06	-2.24
9,713.00	3.02	254.16	9,643.80	-885.64	-96.56	889.34	0.53	0.14	-9.89
9,733.00	3.02	254.16	9,663.77	-885.93	-97.57	889.67	0.00	0.00	0.00

Projection to TD



Scientific Drilling
Rocky Mountain Operations



Marathon Oil Co.

Garfield County, CO NAD 83
697-12A Pad
697-12A-18 - Slot J
OH

Design: OH

Standard Survey Report

09 December, 2008

Scientific Drilling

Survey Report

Company:	Marathon Oil Co.	Local Co-ordinate Reference:	Well 697-12A-18 - Slot J
Project:	Garfield County, CO NAD 83	TVD Reference:	GL 8300' & RKB 24' @ 8324.00ft
Site:	697-12A Pad	MD Reference:	GL 8300' & RKB 24' @ 8324.00ft
Well:	697-12A-18	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	697-12A Pad, Sec 12 T6S R97W		
Site Position:		Northing:	1,632,738.77 ft
From:	Map	Easting:	2,248,220.00 ft
Position Uncertainty:	0.00 ft	Slot Radius:	in
		Latitude:	39° 32' 25.284 N
		Longitude:	108° 9' 57.857 W
		Grid Convergence:	-1.68 °

Well	697-12A-18 - Slot J, 1543' FNL 1854' FEL		
Well Position	+N/-S	0.00 ft	Northing: 1,632,745.95 ft
	+E/-W	0.00 ft	Easting: 2,248,230.24 ft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 32' 25.358 N
		Longitude:	108° 9' 57.729 W
		Ground Level:	8,300.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2008-06-06	10.80	65.83	52,561
	IGRF2005-10	2008-11-21	10.74	65.82	52,516

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	182.84

Survey Program	Date 2008-12-09				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
252.00	2,849.00	Survey #1 - 16" Hole (OH)	MWD	MWD - Standard	
2,948.00	8,379.00	Survey #2 - 8 3/4" Hole (OH)	MWD	MWD - Standard	
8,474.00	9,733.00	Survey #3 - 7 7/8" Hole (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	
252.00	1.15	191.09	251.98	-2.48	-0.49	2.50	0.46	0.46	0.00	
344.00	2.20	187.00	343.94	-5.14	-0.88	5.18	1.15	1.14	-4.45	
407.00	3.23	181.62	406.87	-8.11	-1.08	8.16	1.68	1.63	-8.54	
499.00	3.98	179.45	498.69	-13.90	-1.12	13.94	0.83	0.82	-2.36	
591.00	5.55	182.12	590.37	-21.54	-1.25	21.57	1.72	1.71	2.90	
683.00	6.64	180.08	681.85	-31.30	-1.43	31.33	1.21	1.18	-2.22	
775.00	7.57	181.49	773.14	-42.68	-1.59	42.71	1.03	1.01	1.53	
867.00	8.61	184.82	864.22	-55.60	-2.33	55.65	1.24	1.13	3.62	
959.00	9.39	183.44	955.09	-69.95	-3.36	70.03	0.88	0.85	-1.50	

Scientific Drilling

Survey Report

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Well: 697-12A-18
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 697-12A-18 - Slot J
TVD Reference: GL 8300' & RKB 24' @ 8324.00ft
MD Reference: GL 8300' & RKB 24' @ 8324.00ft
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)
1,051.00	10.35	181.08	1,045.73	-85.71	-3.96	85.80	1.13	1.04	-2.57
1,143.00	9.15	187.10	1,136.40	-101.23	-5.02	101.36	1.71	-1.30	6.54
1,232.00	8.62	189.20	1,224.33	-114.84	-6.96	115.04	0.70	-0.60	2.36
1,324.00	9.46	189.25	1,315.19	-129.11	-9.28	129.41	0.91	0.91	0.05
1,420.00	10.28	188.44	1,409.77	-145.37	-11.81	145.77	0.87	0.85	-0.84
1,515.00	9.26	186.40	1,503.39	-161.35	-13.90	161.84	1.13	-1.07	-2.15
1,610.00	9.42	185.09	1,597.13	-176.69	-15.44	177.24	0.28	0.17	-1.38
1,706.00	8.85	185.70	1,691.91	-191.86	-16.87	192.46	0.60	-0.59	0.64
1,801.00	9.21	189.30	1,785.73	-206.64	-18.83	207.31	0.71	0.38	3.79
1,896.00	9.74	192.22	1,879.44	-221.99	-21.76	222.80	0.75	0.56	3.07
1,992.00	8.88	185.95	1,974.17	-237.30	-24.25	238.21	1.38	-0.90	-6.53
2,087.00	8.57	183.92	2,068.07	-251.65	-25.49	252.61	0.46	-0.33	-2.14
2,182.00	7.69	187.03	2,162.12	-265.02	-26.75	266.02	1.04	-0.93	3.27
2,278.00	8.28	183.61	2,257.19	-278.30	-27.97	279.34	0.79	0.61	-3.56
2,373.00	8.30	184.85	2,351.20	-291.96	-28.98	293.03	0.19	0.02	1.31
2,468.00	8.08	186.88	2,445.23	-305.42	-30.36	306.55	0.38	-0.23	2.14
2,564.00	7.78	190.28	2,540.31	-318.51	-32.33	319.72	0.58	-0.31	3.54
2,659.00	8.05	192.35	2,634.41	-331.33	-34.90	332.66	0.41	0.28	2.18
2,754.00	9.20	191.65	2,728.33	-345.27	-37.86	346.72	1.22	1.21	-0.74
2,849.00	9.12	190.41	2,822.12	-360.11	-40.75	361.69	0.22	-0.08	-1.31
Last Survey in 16" Hole									
2,948.00	8.90	192.47	2,919.90	-375.31	-43.82	377.02	0.39	-0.22	2.08
First Survey in 8 3/4" Hole									
3,043.00	9.84	191.96	3,013.63	-390.42	-47.09	392.28	0.99	0.99	-0.54
3,139.00	9.48	191.21	3,108.27	-406.20	-50.33	408.20	0.40	-0.37	-0.78
3,234.00	10.02	187.50	3,201.89	-422.07	-52.93	424.18	0.87	0.57	-3.91
3,330.00	9.73	187.04	3,296.47	-438.40	-55.01	440.59	0.31	-0.30	-0.48
3,425.00	8.95	187.71	3,390.21	-453.69	-56.99	455.96	0.83	-0.82	0.71
3,520.00	9.88	184.10	3,483.93	-469.15	-58.56	471.47	1.16	0.98	-3.80
3,616.00	9.83	181.24	3,578.52	-485.56	-59.33	487.90	0.51	-0.05	-2.98
3,711.00	9.65	182.52	3,672.15	-501.62	-59.85	503.97	0.30	-0.19	1.35
3,807.00	10.35	183.16	3,766.69	-518.27	-60.68	520.64	0.74	0.73	0.67
3,902.00	10.11	181.70	3,860.18	-535.12	-61.40	537.51	0.37	-0.25	-1.54
3,997.00	10.96	180.93	3,953.58	-552.49	-61.79	554.87	0.91	0.89	-0.81
4,092.00	11.03	181.05	4,046.83	-570.60	-62.11	572.98	0.08	0.07	0.13
4,187.00	10.32	181.09	4,140.19	-588.20	-62.44	590.57	0.75	-0.75	0.04
4,282.00	9.98	181.44	4,233.70	-604.93	-62.80	607.30	0.36	-0.36	0.37
4,378.00	10.89	180.21	4,328.11	-622.32	-63.05	624.68	0.98	0.95	-1.28
4,473.00	10.49	180.35	4,421.46	-639.94	-63.13	642.28	0.42	-0.42	0.15
4,568.00	10.01	180.09	4,514.95	-656.85	-63.20	659.17	0.51	-0.51	-0.27
4,663.00	10.58	177.16	4,608.42	-673.81	-62.78	676.10	0.81	0.60	-3.08
4,759.00	10.42	177.53	4,702.81	-691.29	-61.97	693.51	0.18	-0.17	0.39
4,854.00	9.33	179.34	4,796.40	-707.57	-61.51	709.75	1.19	-1.15	1.91
4,949.00	10.16	185.16	4,890.03	-723.62	-62.17	725.81	1.35	0.87	6.13
5,045.00	10.64	181.40	4,984.46	-740.91	-63.15	743.13	0.87	0.50	-3.92
5,140.00	9.99	176.57	5,077.92	-757.90	-62.87	760.09	1.14	-0.68	-5.08
5,235.00	7.39	170.21	5,171.82	-772.15	-61.34	774.24	2.91	-2.74	-6.69
5,331.00	6.17	163.43	5,267.15	-783.18	-58.82	785.13	1.52	-1.27	-7.06
5,426.00	6.45	165.59	5,361.58	-793.24	-56.04	795.05	0.39	0.29	2.27
5,521.00	6.37	167.74	5,455.98	-803.56	-53.59	805.23	0.27	-0.08	2.26
5,616.00	6.48	169.48	5,550.39	-813.98	-51.49	815.53	0.24	0.12	1.83
5,712.00	6.23	161.33	5,645.80	-824.24	-48.83	825.65	0.97	-0.26	-8.49
5,807.00	5.74	155.81	5,740.28	-833.46	-45.24	834.68	0.80	-0.52	-5.81
5,902.00	5.28	147.68	5,834.84	-841.49	-40.95	842.48	0.95	-0.48	-8.56

Scientific Drilling

Survey Report

Company: Marathon Oil Co.
Project: Garfield County, CO NAD 83
Site: 697-12A Pad
Well: 697-12A-18
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 697-12A-18 - Slot J
TVD Reference: GL 8300' & RKB 24' @ 8324.00ft
MD Reference: GL 8300' & RKB 24' @ 8324.00ft
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Multi User DB

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
697-12A-18 - actual wellpath misses target center by 90.69ft at 6376.64ft MD (6308.68 TVD, -858.26 N, -23.67 E) - Rectangle (sides W100.00 H200.00 D3,260.00)	0.00	0.00	6,310.00	-888.51	-109.16	1,631,861.03	2,248,095.06	39° 32' 16.576 N	108° 9' 59.122 W

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,849.00	2,822.12	-360.11	-40.75	Last Survey in 16" Hole

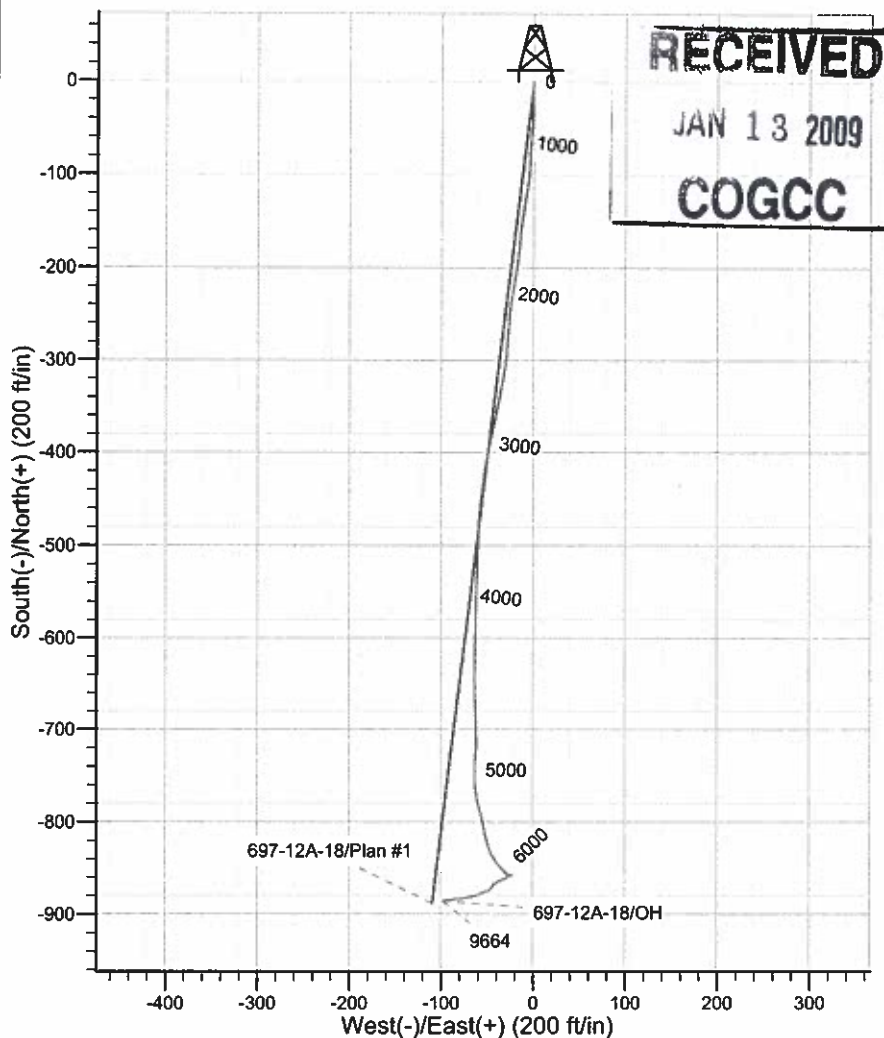
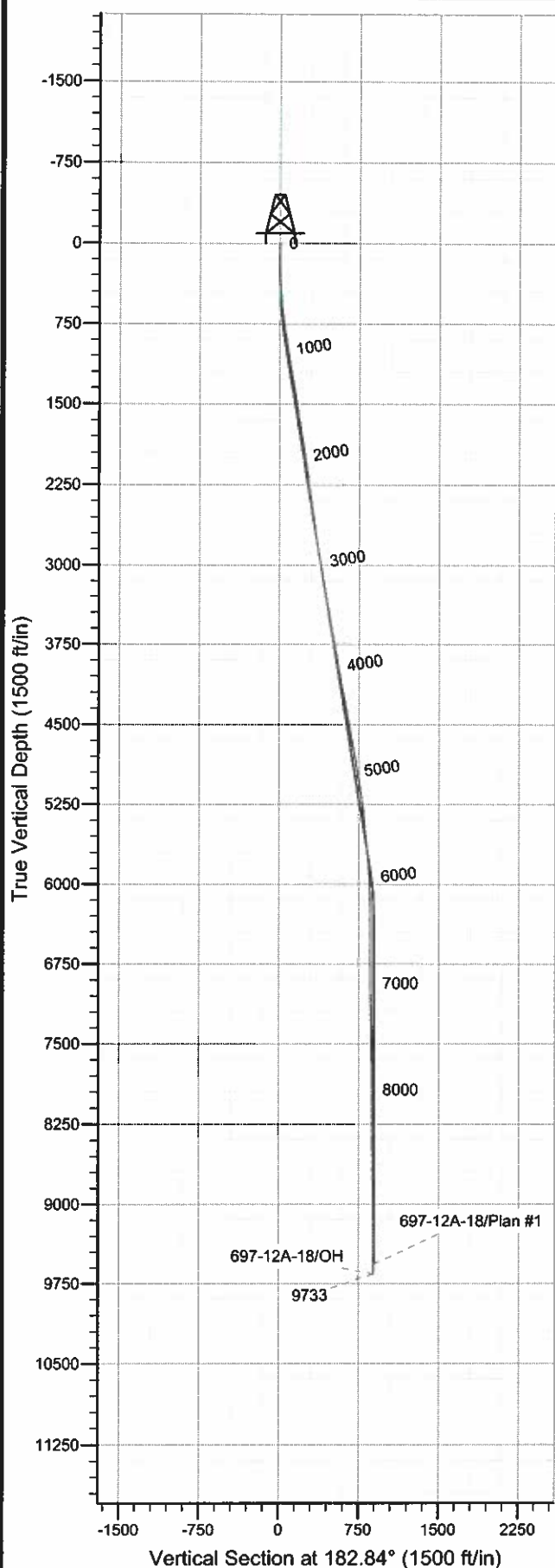
Checked By: _____ Approved By: _____ Date: _____



Scientific Drilling
Rocky Mountain Operations

Project: Garfield County, CO NAD 83
Site: 697-12A Pad
Well: 697-12A-18
Wellbore: OH
Design: OH

Marathon Oil Co.



RECEIVED
JAN 13 2009
COGCC

WELL DETAILS: 697-12A-18

Ground Level: GL 8300' & RKB 24' @ 8324.00ft
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1632745.95 2248230.24 39° 32' 25.358 N 108° 9' 57.729 W J

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well 697-12A-18 - Slot J, True North
Vertical (TVD) Reference: GL 8300' & RKB 24' @ 8324.00ft
Section (VS) Reference: Slot - J(0.00N, 0.00E)
Measured Depth Reference: GL 8300' & RKB 24' @ 8324.00ft
Calculation Method: Minimum Curvature
Local North: True
Location: Sec 12 T6S R97W

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 (697-12A-18/OH)

Created By: Gregg Detweiler Date: 2008-12-09