



Scientific Drilling
Rocky Mountain Operations

OXY USA RMAT

Garfield County, CO NAD27
Cascade Creek 697-16A II Pad
697-17-64A
OH

Design: OH

Standard Survey Report

12 April, 2010



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well 697-17-64A
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8312' & RKB 30' @ 8342.00ft
Site:	Cascade Creek 697-16A II Pad	MD Reference:	GL 8312' & RKB 30' @ 8342.00ft
Well:	697-17-64A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 2003.16 Multi-User Db

Project	Garfield County, CO NAD27		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado Central 502		

Site	Cascade Creek 697-16A II Pad, Sec 16 T6S R97W				
Site Position:		Northing:	626,314.75 ft	Latitude:	39° 31' 16.584 N
From:	Map	Easting:	1,229,837.54 ft	Longitude:	108° 13' 49.631 W
Position Uncertainty:	0.00 ft	Slot Radius:	in	Grid Convergence:	-1.72 °

Well	697-17-64A					
Well Position	+N/-S	0.00 ft	Northing:	626,511.47 ft	Latitude:	39° 31' 18.490 N
	+E/-W	0.00 ft	Easting:	1,229,711.01 ft	Longitude:	108° 13' 51.320 W
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,312.00 ft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	11/5/2009	10.64	65.77	52,403

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	209.38	

Survey Program	Date 4/12/2010				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
129.00	2,691.00	Survey #1 - Surface (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,786.00	8,901.00	Survey #2 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	

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	
129.00	0.44	126.91	129.00	-0.30	0.40	0.06	0.34	0.34	0.00	
First SDI Surface MWD Survey										
221.00	2.05	204.76	220.98	-2.00	-0.01	1.75	2.18	1.75	84.62	
289.00	3.78	215.35	288.89	-4.94	-1.82	5.19	2.65	2.54	15.57	
350.00	4.24	212.87	349.74	-8.47	-4.20	9.44	0.81	0.75	-4.07	
443.00	3.12	205.70	442.54	-13.64	-7.17	15.40	1.30	-1.20	-7.71	
535.00	4.92	198.90	534.32	-19.63	-9.53	21.78	2.02	1.96	-7.39	
627.00	6.10	205.21	625.89	-27.78	-12.89	30.53	1.44	1.28	6.86	
720.00	5.26	214.60	718.43	-35.76	-17.42	39.71	1.34	-0.90	10.10	
812.00	5.56	220.27	810.02	-42.64	-22.69	48.28	0.67	0.33	6.16	
905.00	6.64	217.22	902.50	-50.35	-28.86	58.04	1.21	1.16	-3.28	

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Well: 697-17-64A
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 697-17-64A
TVD Reference: GL 8312' & RKB 30' @ 8342.00ft
MD Reference: GL 8312' & RKB 30' @ 8342.00ft
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)
998.00	7.27	213.64	994.81	-59.54	-35.37	69.23	0.82	0.68	-3.85
1,090.00	7.17	209.50	1,086.08	-69.38	-41.42	80.78	0.58	-0.11	-4.50
1,182.00	8.02	208.66	1,177.28	-80.01	-47.33	92.94	0.93	0.92	-0.91
1,277.00	9.41	207.08	1,271.18	-92.74	-54.04	107.32	1.48	1.46	-1.66
1,371.00	10.34	205.22	1,363.78	-107.21	-61.13	123.42	1.05	0.99	-1.98
1,465.00	10.64	206.76	1,456.21	-122.59	-68.64	140.50	0.44	0.32	1.64
1,560.00	11.03	206.39	1,549.52	-138.56	-76.62	158.34	0.42	0.41	-0.39
1,654.00	12.55	209.05	1,641.53	-155.55	-85.58	177.53	1.72	1.62	2.83
1,749.00	14.98	210.19	1,733.80	-175.19	-96.77	200.13	2.57	2.56	1.20
1,843.00	15.45	210.21	1,824.50	-196.51	-109.18	224.80	0.50	0.50	0.02
1,938.00	17.64	209.96	1,915.56	-219.92	-122.73	251.85	2.31	2.31	-0.26
2,032.00	19.82	208.46	2,004.58	-246.27	-137.44	282.03	2.37	2.32	-1.60
2,127.00	19.63	207.57	2,094.01	-274.58	-152.50	314.08	0.37	-0.20	-0.94
2,221.00	19.52	208.50	2,182.57	-302.37	-167.31	345.56	0.35	-0.12	0.99
2,316.00	19.51	208.63	2,272.12	-330.25	-182.48	377.30	0.05	-0.01	0.14
2,411.00	18.94	210.57	2,361.82	-357.44	-197.92	408.57	0.90	-0.60	2.04
2,505.00	17.65	211.20	2,451.07	-382.77	-213.06	438.07	1.39	-1.37	0.67
2,600.00	17.83	211.52	2,541.55	-407.49	-228.13	467.00	0.22	0.19	0.34
2,691.00	17.91	212.94	2,628.16	-431.11	-243.02	494.89	0.49	0.09	1.56
Last SDI Surface MWD Survey									
2,786.00	17.06	211.89	2,718.77	-455.20	-258.33	523.39	0.95	-0.89	-1.11
First SDI Production MWD Survey									
2,881.00	18.64	208.12	2,809.20	-480.42	-272.84	552.49	2.06	1.66	-3.97
2,976.00	19.87	208.73	2,898.88	-507.97	-287.76	583.81	1.31	1.29	0.64
3,070.00	20.22	207.94	2,987.19	-536.33	-303.05	616.03	0.47	0.37	-0.84
3,164.00	21.46	207.94	3,075.04	-565.87	-318.72	649.46	1.32	1.32	0.00
3,259.00	22.77	209.70	3,163.05	-597.20	-335.97	685.21	1.55	1.38	1.85
3,354.00	21.98	208.55	3,250.89	-628.78	-353.58	721.38	0.95	-0.83	-1.21
3,448.00	22.69	208.12	3,337.84	-660.22	-370.53	757.09	0.78	0.76	-0.46
3,543.00	21.98	207.85	3,425.71	-692.10	-387.47	793.18	0.76	-0.75	-0.28
3,637.00	22.77	209.43	3,512.64	-723.50	-404.63	828.96	1.06	0.84	1.68
3,732.00	21.81	210.22	3,600.54	-754.76	-422.54	864.99	1.06	-1.01	0.83
3,826.00	22.69	208.91	3,687.54	-785.72	-440.10	900.58	1.07	0.94	-1.39
3,921.00	21.98	208.82	3,775.41	-817.34	-457.53	936.68	0.75	-0.75	-0.09
4,015.00	23.13	211.19	3,862.22	-848.55	-475.57	972.73	1.56	1.22	2.52
4,110.00	22.42	211.02	3,949.81	-880.04	-494.57	1,009.48	0.75	-0.75	-0.18
4,204.00	21.46	210.84	4,037.00	-910.16	-512.62	1,044.59	1.02	-1.02	-0.19
4,299.00	23.13	212.07	4,124.90	-940.90	-531.44	1,080.61	1.83	1.76	1.29
4,393.00	22.07	211.37	4,211.68	-971.62	-550.43	1,116.70	1.16	-1.13	-0.74
4,488.00	20.05	212.07	4,300.33	-1,000.66	-568.37	1,150.81	2.14	-2.13	0.74
4,583.00	21.81	211.98	4,389.06	-1,029.43	-586.37	1,184.71	1.85	1.85	-0.09
4,677.00	23.39	210.40	4,475.84	-1,060.34	-605.06	1,220.81	1.80	1.68	-1.68
4,772.00	22.25	210.14	4,563.40	-1,092.16	-623.63	1,257.65	1.20	-1.20	-0.27
4,867.00	20.58	209.79	4,651.84	-1,122.21	-640.96	1,292.33	1.76	-1.76	-0.37
4,961.00	21.46	208.20	4,739.58	-1,151.70	-657.29	1,326.04	1.12	0.94	-1.69
5,056.00	19.87	208.03	4,828.47	-1,181.27	-673.09	1,359.56	1.67	-1.67	-0.18
5,150.00	21.02	210.75	4,916.55	-1,209.86	-689.22	1,392.39	1.59	1.22	2.89
5,245.00	20.66	210.84	5,005.33	-1,238.89	-706.53	1,426.17	0.38	-0.38	0.09
5,339.00	19.61	211.46	5,093.59	-1,266.58	-723.26	1,458.51	1.14	-1.12	0.66
5,434.00	18.82	211.28	5,183.29	-1,293.28	-739.54	1,489.76	0.83	-0.83	-0.19
5,528.00	17.85	211.37	5,272.52	-1,318.54	-754.91	1,519.31	1.03	-1.03	0.10
5,623.00	16.09	211.28	5,363.38	-1,342.22	-769.32	1,547.02	1.85	-1.85	-0.09
5,717.00	14.51	208.29	5,454.05	-1,363.73	-781.67	1,571.82	1.88	-1.68	-3.18
5,812.00	13.19	206.27	5,546.28	-1,383.93	-792.11	1,594.54	1.48	-1.39	-2.13

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Survey										
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5,907.00	11.61	208.64	5,639.06	-1,402.04	-801.49	1,614.92	1.75	-1.66	2.49	
6,002.00	9.85	204.86	5,732.40	-1,417.80	-809.49	1,632.58	1.99	-1.85	-3.98	
6,096.00	9.06	202.93	5,825.12	-1,431.91	-815.75	1,647.95	0.91	-0.84	-2.05	
6,191.00	8.35	202.31	5,919.03	-1,445.18	-821.28	1,662.23	0.75	-0.75	-0.65	
6,286.00	7.56	203.02	6,013.11	-1,457.32	-826.34	1,675.29	0.84	-0.83	0.75	
6,381.00	8.00	202.58	6,107.24	-1,469.17	-831.33	1,688.06	0.47	0.46	-0.46	
6,475.00	7.30	205.30	6,200.40	-1,480.61	-836.39	1,700.52	0.84	-0.74	2.89	
6,570.00	7.91	204.51	6,294.57	-1,492.02	-841.68	1,713.05	0.65	0.64	-0.83	
6,665.00	7.65	200.47	6,388.69	-1,503.89	-846.60	1,725.81	0.64	-0.27	-4.25	
6,759.00	8.55	201.75	6,481.75	-1,516.24	-851.38	1,738.92	0.98	0.96	1.36	
6,854.00	7.83	202.23	6,575.78	-1,528.79	-856.45	1,752.34	0.76	-0.76	0.51	
6,949.00	8.35	204.60	6,669.84	-1,541.05	-861.77	1,765.63	0.65	0.55	2.49	
7,043.00	7.65	201.70	6,762.92	-1,553.07	-866.92	1,778.63	0.86	-0.74	-3.09	
7,138.00	9.06	205.21	6,856.91	-1,565.71	-872.45	1,792.36	1.58	1.48	3.69	
7,233.00	8.62	206.71	6,950.78	-1,578.84	-878.83	1,806.93	0.52	-0.46	1.58	
7,328.00	8.00	204.42	7,044.79	-1,591.22	-884.77	1,820.63	0.74	-0.65	-2.41	
7,422.00	8.79	207.32	7,137.78	-1,603.56	-890.77	1,834.33	0.95	0.84	3.09	
7,517.00	8.44	207.85	7,231.71	-1,616.17	-897.35	1,848.55	0.38	-0.37	0.56	
7,612.00	7.39	204.78	7,325.80	-1,627.88	-903.17	1,861.61	1.19	-1.11	-3.23	
7,706.00	6.51	207.94	7,419.11	-1,638.08	-908.20	1,872.96	1.02	-0.94	3.36	
7,801.00	6.07	209.08	7,513.54	-1,647.23	-913.17	1,883.37	0.48	-0.46	1.20	
7,896.00	5.45	205.92	7,608.06	-1,655.67	-917.58	1,892.89	0.73	-0.65	-3.33	
7,991.00	4.57	208.29	7,702.69	-1,663.06	-921.35	1,901.18	0.95	-0.93	2.49	
8,086.00	4.13	206.53	7,797.42	-1,669.46	-924.67	1,908.38	0.48	-0.46	-1.85	
8,180.00	3.78	217.78	7,891.20	-1,674.93	-928.08	1,914.83	0.90	-0.37	11.97	
8,275.00	3.43	212.77	7,986.01	-1,679.80	-931.54	1,920.76	0.50	-0.37	-5.27	
8,370.00	3.34	207.15	8,080.84	-1,684.65	-934.34	1,926.37	0.36	-0.09	-5.92	
8,465.00	2.90	208.99	8,175.70	-1,689.22	-936.76	1,931.53	0.47	-0.46	1.94	
8,560.00	2.73	216.64	8,270.59	-1,693.13	-939.28	1,936.18	0.43	-0.18	8.05	
8,654.00	2.11	217.70	8,364.50	-1,696.30	-941.67	1,940.11	0.66	-0.66	1.13	
8,749.00	1.93	221.04	8,459.45	-1,698.89	-943.79	1,943.41	0.23	-0.19	3.52	
8,844.00	2.20	215.50	8,554.38	-1,701.58	-945.90	1,946.79	0.35	0.28	-5.83	
Last SDI Production MWD Survey										
8,901.00	2.20	215.50	8,611.34	-1,703.36	-947.17	1,948.97	0.00	0.00	0.00	
Projection To TD - BHL = 624837.35, 1228713.07										

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 Project: Garfield County, CO NAD27
 Site: Cascade Creek 697-16A II Pad
 Well: 697-17-64A
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well 697-17-64A
 TVD Reference: GL 8312' & RKB 30' @ 8342.00ft
 MD Reference: GL 8312' & RKB 30' @ 8342.00ft
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Database: EDM 2003.16 Multi-User Db

Targets
Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
697-17-64A WF Target	-8.00	209.38	7,750.00	-1,638.60	-922.48	624,901.34	1,228,739.70	39° 31' 2.294 N	108° 14' 3.091 W
- actual wellpath misses target center by 27.67ft at 8036.56ft MD (7748.12 TVD, -1666.20 N, -923.01 E) - Circle (radius 50.00)									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
129.00	129.00	-0.30	0.40	First SDI Surface MWD Survey
2,691.00	2,628.16	-431.11	-243.02	Last SDI Surface MWD Survey
2,786.00	2,718.77	-455.20	-258.33	First SDI Production MWD Survey
8,844.00	8,554.38	-1,701.58	-945.90	Last SDI Production MWD Survey
8,901.00	8,611.34	-1,703.36	-947.17	Projection To TD
8,901.00	8,611.34	-1,703.36	-947.17	BHL = 624837.35, 1228713.07

Checked By: _____ Approved By: _____ Date: _____