



**WELL DETAILS: 697-16-42A**

Ground Level: GL 8312' & RKB 30' @ 8342.00ft				
+N/-S	+E/-W	Northing	Easting	Latitude
0.00	0.00	626518.13	1229725.32	39° 31' 18.560 N
			Longitude	108° 13' 51.140 W

**REFERENCE INFORMATION**

Co-ordinate (N/E) Reference: Well 697-16-42A, True North  
 Vertical (TVD) Reference: GL 8312' & RKB 30' @ 8342.00ft  
 Section (VS) Reference: Slot - (0.00N, 0.00E)  
 Measured Depth Reference: GL 8312' & RKB 30' @ 8342.00ft  
 Calculation Method: Minimum Curvature  
 Local North: True  
 Location: Sec 16 T6S R97W

**PROJECT DETAILS: Garfield County, CO NAD27**

Geodetic System: US State Plane 1927 (Exact solution)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1866  
 Zone: Colorado Central 502

Design: OH (697-16-42A/OH)

Created By: Rex Hall Date: 2010-03-09



**Scientific Drilling**  
Rocky Mountain Operations

## **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 697-16A II Pad  
697-16-42A  
OH**

**Design: OH**

# **Standard Survey Report**

**09 March, 2010**



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well 697-16-42A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Site:</b>	Cascade Creek 697-16A II Pad	<b>MD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Well:</b>	697-16-42A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

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

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

<b>Well</b>	697-16-42A					
<b>Well Position</b>	+N/-S	0.00 ft	<b>Northing:</b>	626,518.13 ft	<b>Latitude:</b>	39° 31' 18.560 N
	+E/-W	0.00 ft	<b>Easting:</b>	1,229,725.32 ft	<b>Longitude:</b>	108° 13' 51.140 W
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	8,312.00 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	1/17/2008	10.88	65.81	52,578

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	168.39	

<b>Survey Program</b>	<b>Date</b>	3/9/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
158.00	2,694.00	Survey #1 - Surface (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,786.00	9,375.00	Survey #2 - Production (OH)	MWD-SDI	MWD - Standard ISCWSA	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
158.00	1.69	115.90	157.98	-1.02	2.10	1.42	1.07	1.07	0.00	
<b>First SDI Surface MWD Survey</b>										
251.00	2.33	144.82	250.92	-3.16	4.42	3.99	1.27	0.69	31.10	
351.00	2.75	146.84	350.82	-6.83	6.90	8.08	0.43	0.42	2.02	
443.00	3.13	137.95	442.70	-10.54	9.79	12.30	0.64	0.41	-9.66	
535.00	2.91	131.39	534.57	-13.95	13.23	16.33	0.44	-0.24	-7.13	
628.00	3.46	147.45	627.43	-17.88	16.51	20.84	1.12	0.59	17.27	
720.00	4.13	154.30	719.23	-23.21	19.44	26.64	0.88	0.73	7.45	
812.00	5.03	149.99	810.94	-29.68	22.89	33.68	1.05	0.98	-4.68	
906.00	5.36	151.08	904.55	-37.09	27.08	41.79	0.37	0.35	1.16	
998.00	5.56	152.07	996.13	-44.79	31.24	50.17	0.24	0.22	1.08	

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well 697-16-42A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Site:</b>	Cascade Creek 697-16A II Pad	<b>MD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Well:</b>	697-16-42A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)	
1,090.00	5.41	159.42	1,087.71	-52.79	34.85	58.73	0.78	-0.16	7.99	
1,182.00	5.47	172.94	1,179.30	-61.20	36.92	67.38	1.39	0.07	14.70	
1,277.00	6.78	173.98	1,273.76	-71.27	38.06	77.48	1.38	1.38	1.09	
1,371.00	7.10	170.73	1,367.07	-82.53	39.58	88.80	0.54	0.34	-3.46	
1,466.00	7.45	166.27	1,461.31	-94.30	41.99	100.83	0.70	0.37	-4.69	
1,560.00	6.27	169.68	1,554.63	-105.27	44.35	112.05	1.33	-1.26	3.63	
1,655.00	5.43	178.89	1,649.14	-114.87	45.37	121.65	1.32	-0.88	9.69	
1,749.00	6.20	186.10	1,742.65	-124.37	44.92	130.86	1.13	0.82	7.67	
1,844.00	6.72	183.12	1,837.05	-135.02	44.07	141.12	0.65	0.55	-3.14	
1,938.00	7.01	180.75	1,930.38	-146.24	43.69	152.05	0.43	0.31	-2.52	
2,033.00	7.08	177.94	2,024.66	-157.89	43.83	163.48	0.37	0.07	-2.96	
2,127.00	6.80	175.65	2,117.97	-169.23	44.46	174.72	0.42	-0.30	-2.44	
2,222.00	7.32	175.40	2,212.25	-180.87	45.37	186.30	0.55	0.55	-0.26	
2,316.00	7.09	173.63	2,305.51	-192.61	46.49	198.02	0.34	-0.24	-1.88	
2,411.00	6.27	170.99	2,399.86	-203.56	47.96	209.04	0.92	-0.86	-2.78	
2,505.00	6.16	169.79	2,493.31	-213.59	49.66	219.21	0.18	-0.12	-1.28	
2,600.00	5.21	167.32	2,587.84	-222.81	51.51	228.62	1.03	-1.00	-2.60	
2,694.00	4.96	167.17	2,681.47	-230.94	53.34	236.95	0.27	-0.27	-0.16	
<b>Last SDI Surface MWD Survey</b>										
2,786.00	5.01	161.01	2,773.13	-238.62	55.54	244.91	0.58	0.05	-6.70	
<b>First SDI Production MWD Survey</b>										
2,881.00	4.57	165.81	2,867.79	-246.21	57.81	252.81	0.63	-0.46	5.05	
2,975.00	4.75	173.50	2,961.48	-253.71	59.17	260.42	0.69	0.19	8.18	
3,070.00	6.07	179.12	3,056.06	-262.64	59.69	269.28	1.50	1.39	5.92	
3,164.00	5.98	180.26	3,149.54	-272.50	59.75	278.95	0.16	-0.10	1.21	
3,259.00	6.68	173.85	3,243.96	-282.94	60.32	289.29	1.05	0.74	-6.75	
3,353.00	6.60	173.23	3,337.33	-293.74	61.54	300.12	0.11	-0.09	-0.66	
3,448.00	6.24	164.88	3,431.74	-304.15	63.53	310.71	1.05	-0.38	-8.79	
3,542.00	5.72	162.77	3,525.23	-313.56	66.25	320.47	0.60	-0.55	-2.24	
3,677.00	5.28	159.96	3,659.60	-325.82	70.37	333.31	0.38	-0.33	-2.08	
3,731.00	5.54	165.85	3,713.36	-330.68	71.86	338.38	1.13	0.48	10.91	
3,826.00	5.28	162.42	3,807.94	-339.29	74.30	347.30	0.44	-0.27	-3.61	
3,921.00	4.57	158.47	3,902.59	-346.98	77.01	355.38	0.83	-0.75	-4.16	
4,015.00	5.72	169.01	3,996.21	-355.06	79.28	363.75	1.58	1.22	11.21	
4,110.00	6.60	168.49	4,090.66	-365.06	81.27	373.95	0.93	0.93	-0.55	
4,204.00	6.16	166.38	4,184.08	-375.26	83.54	384.39	0.53	-0.47	-2.24	
4,299.00	5.63	167.52	4,278.58	-384.76	85.74	394.14	0.57	-0.56	1.20	
4,393.00	5.28	164.62	4,372.15	-393.43	87.89	403.07	0.47	-0.37	-3.09	
4,488.00	4.75	159.52	4,466.79	-401.33	90.42	411.32	0.73	-0.56	-5.37	
4,582.00	4.40	151.79	4,560.49	-408.15	93.49	418.62	0.75	-0.37	-8.22	
4,677.00	4.13	158.20	4,655.23	-414.54	96.48	425.48	0.58	-0.28	6.75	
4,772.00	5.10	165.41	4,749.92	-421.80	98.82	433.06	1.19	1.02	7.59	
4,866.00	4.48	163.65	4,843.59	-429.37	100.90	440.89	0.68	-0.66	-1.87	
4,961.00	4.92	158.29	4,938.27	-436.72	103.45	448.60	0.65	0.46	-5.64	
5,055.00	5.36	159.17	5,031.89	-444.56	106.51	456.90	0.48	0.47	0.94	
5,150.00	5.19	162.16	5,126.49	-452.80	109.40	465.55	0.34	-0.18	3.15	
5,244.00	5.45	161.37	5,220.08	-461.08	112.13	474.21	0.29	0.28	-0.84	
5,339.00	3.69	147.22	5,314.78	-467.92	115.22	481.54	2.19	-1.85	-14.89	
5,434.00	3.52	150.38	5,409.59	-473.03	118.32	487.17	0.28	-0.18	3.33	
5,528.00	1.93	160.58	5,503.49	-477.03	120.27	491.48	1.76	-1.69	10.85	
5,623.00	0.88	76.46	5,598.46	-478.37	121.52	493.04	2.14	-1.11	-88.55	
5,717.00	0.97	85.34	5,692.45	-478.14	123.01	493.11	0.18	0.10	9.45	
5,812.00	0.70	90.09	5,787.44	-478.07	124.39	493.33	0.29	-0.28	5.00	
5,907.00	0.70	107.84	5,882.43	-478.25	125.52	493.73	0.23	0.00	18.68	

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well 697-16-42A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Site:</b>	Cascade Creek 697-16A II Pad	<b>MD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Well:</b>	697-16-42A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	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)
6,002.00	0.62	274.48	5,977.43	-478.39	125.56	493.87	1.38	-0.08	175.41
6,096.00	0.44	313.94	6,071.43	-478.10	124.80	493.43	0.42	-0.19	41.98
6,191.00	0.35	326.43	6,166.43	-477.60	124.37	492.86	0.13	-0.09	13.15
6,286.00	0.18	330.38	6,261.42	-477.23	124.14	492.45	0.18	-0.18	4.16
6,381.00	0.09	4.83	6,356.42	-477.03	124.07	492.24	0.12	-0.09	36.26
6,475.00	0.35	291.97	6,450.42	-476.85	123.81	492.01	0.36	0.28	-77.51
6,570.00	0.44	301.82	6,545.42	-476.55	123.23	491.60	0.12	0.09	10.37
6,665.00	0.09	210.50	6,640.42	-476.42	122.89	491.40	0.47	-0.37	-96.13
6,759.00	0.35	206.45	6,734.42	-476.74	122.72	491.68	0.28	0.28	-4.31
6,854.00	0.44	212.43	6,829.42	-477.31	122.40	492.17	0.10	0.09	6.29
6,949.00	1.06	212.08	6,924.41	-478.36	121.73	493.07	0.65	0.65	-0.37
7,043.00	0.62	247.15	7,018.40	-479.29	120.80	493.80	0.70	-0.47	37.31
7,138.00	0.53	201.62	7,113.39	-479.90	120.17	494.27	0.48	-0.09	-47.93
7,233.00	0.97	208.12	7,208.39	-481.02	119.63	495.25	0.47	0.46	6.84
7,328.00	0.35	116.98	7,303.38	-481.86	119.51	496.05	1.09	-0.65	-95.94
7,422.00	0.88	124.80	7,397.38	-482.40	120.35	496.75	0.57	0.56	8.32
7,517.00	0.88	138.43	7,492.36	-483.36	121.44	497.91	0.22	0.00	14.35
7,612.00	0.88	169.01	7,587.35	-484.63	122.06	499.28	0.49	0.00	32.19
7,706.00	1.06	198.10	7,681.34	-486.16	121.93	500.75	0.55	0.19	30.95
7,801.00	1.14	240.29	7,776.32	-487.46	120.83	501.81	0.84	0.08	44.41
7,896.00	0.44	310.52	7,871.32	-487.70	119.74	501.82	1.13	-0.74	73.93
7,991.00	0.44	287.14	7,966.31	-487.35	119.11	501.35	0.19	0.00	-24.61
8,086.00	1.06	244.77	8,061.31	-487.62	117.97	501.38	0.83	0.65	-44.60
8,180.00	0.88	192.48	8,155.29	-488.69	117.02	502.25	0.93	-0.19	-55.63
8,275.00	0.97	180.44	8,250.28	-490.21	116.86	503.70	0.22	0.09	-12.67
8,370.00	1.14	202.68	8,345.27	-491.89	116.49	505.27	0.46	0.18	23.41
8,465.00	1.23	219.29	8,440.25	-493.55	115.48	506.69	0.37	0.09	17.48
8,560.00	1.41	220.43	8,535.22	-495.23	114.08	508.05	0.19	0.19	1.20
8,654.00	1.76	222.01	8,629.18	-497.18	112.36	509.62	0.38	0.37	1.68
8,749.00	2.02	221.57	8,724.13	-499.52	110.27	511.49	0.27	0.27	-0.46
8,844.00	2.20	218.41	8,819.07	-502.20	108.03	513.66	0.23	0.19	-3.33
8,938.00	2.37	221.66	8,912.99	-505.06	105.62	515.98	0.23	0.18	3.46
9,033.00	2.29	223.77	9,007.91	-507.90	103.00	518.24	0.12	-0.08	2.22
9,128.00	2.11	223.24	9,102.84	-510.55	100.49	520.32	0.19	-0.19	-0.56
9,223.00	2.64	222.80	9,197.76	-513.42	97.80	522.60	0.56	0.56	-0.46
9,318.00	2.64	228.87	9,292.66	-516.47	94.67	524.95	0.29	0.00	6.39
<b>Last SDI Production MWD Survey</b>									
9,375.00	2.64	228.87	9,349.60	-518.20	92.69	526.25	0.00	0.00	0.00
<b>Projection To TD - BHL = 625997.38, 1229802.40</b>									

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<b>Site:</b>	Cascade Creek 697-16A II Pad	<b>MD Reference:</b>	GL 8312' & RKB 30' @ 8342.00ft
<b>Well:</b>	697-16-42A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 2003.16 Multi-User Db

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
697-16-42A Target	0.00	0.00	7,754.00	-486.16	97.23	626,029.27	1,229,807.90	39° 31' 13.755 N	108° 13' 49.899 W
- actual wellpath misses target center by 23.98ft at 7778.93ft MD (7754.26 TVD, -487.23 N, 121.19 E)									
- Circle (radius 50.00)									
CC 697-16-42A Target	0.00	0.00	7,805.00	-484.88	99.65	626,030.47	1,229,810.35	39° 31' 13.768 N	108° 13' 49.868 W
- actual wellpath misses target center by 20.93ft at 7829.91ft MD (7805.23 TVD, -487.68 N, 120.39 E)									
- Circle (radius 50.00)									
697-16-42A WF Target	0.00	0.00	7,805.00	-484.88	99.65	626,030.47	1,229,810.35	39° 31' 13.768 N	108° 13' 49.868 W
- actual wellpath misses target center by 20.93ft at 7829.91ft MD (7805.23 TVD, -487.68 N, 120.39 E)									
- Circle (radius 50.00)									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S	+E/-W	
		(ft)	(ft)	
158.00	157.98	-1.02	2.10	First SDI Surface MWD Survey
2,694.00	2,681.47	-230.94	53.34	Last SDI Surface MWD Survey
2,786.00	2,773.13	-238.62	55.54	First SDI Production MWD Survey
9,318.00	9,292.66	-516.47	94.67	Last SDI Production MWD Survey
9,375.00	9,349.60	-518.20	92.69	Projection To TD
9,375.00	9,349.60	-518.20	92.69	BHL = 625997.38, 1229802.40

Checked By: _____	Approved By: _____	Date: _____
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