



Scientific Drilling
Rocky Mountain Operations

OXY USA RMAT •

Garfield County, CO NAD27
Cascade Creek 697-16A II Pad
697-16-25B
OH

Design: OH

Standard Survey Report

26 February, 2010



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well 697-16-25B
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:	697-16-25B	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	697-16-25B					
Well Position	+N/-S	0.00 ft	Northing:	626,529.42 ft	Latitude:	39° 31' 18.670 N
	+E/-W	0.00 ft	Easting:	1,229,720.17 ft	Longitude:	108° 13' 51.210 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)
	IGRF200510	1/17/2008	10.88	65.81	52,578

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	339.31	

Survey Program	Date	2/26/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
161.00	2,693.00	Survey #1 - Surface (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,786.00	9,375.00	Survey #2 - Production (OH)	MWD-SDI	MWD - Standard ISCWSA	

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	
161.00	0.67	322.81	161.00	0.75	-0.57	0.90	0.42	0.42	0.00	
First SDI Surface MWD Survey										
253.00	1.35	330.18	252.98	2.12	-1.43	2.49	0.75	0.74	8.01	
351.00	2.35	341.66	350.93	5.03	-2.64	5.64	1.08	1.02	11.71	
443.00	3.72	335.82	442.80	9.54	-4.46	10.50	1.52	1.49	-6.35	
535.00	3.71	346.45	534.61	15.16	-6.38	16.43	0.75	-0.01	11.55	
628.00	3.84	355.76	627.41	21.19	-7.31	22.40	0.67	0.14	10.01	
720.00	4.54	354.47	719.16	27.88	-7.89	28.87	0.77	0.76	-1.40	
812.00	4.97	351.70	810.84	35.45	-8.82	36.28	0.53	0.47	-3.01	
906.00	5.68	345.76	904.44	43.99	-10.55	44.88	0.96	0.76	-6.32	
998.00	5.90	340.31	995.97	52.86	-13.26	54.13	0.64	0.24	-5.92	

Company: OXY USA RMAT
Project: Garfield County, CO NAD27
Site: Cascade Creek 697-16A II Pad
Well: 697-16-25B
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 697-16-25B
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)
1,090.00	6.47	336.96	1,087.43	62.08	-16.88	64.04	0.73	0.62	-3.64
1,182.00	6.43	333.24	1,178.85	71.45	-21.23	74.34	0.46	-0.04	-4.04
1,277.00	6.25	330.41	1,273.27	80.69	-26.18	84.74	0.38	-0.19	-2.98
1,371.00	6.06	334.66	1,366.73	89.63	-30.83	94.74	0.53	-0.20	4.52
1,466.00	6.05	336.00	1,461.20	98.73	-35.01	104.74	0.15	-0.01	1.41
1,560.00	6.21	335.67	1,554.66	107.89	-39.12	114.75	0.17	0.17	-0.35
1,655.00	5.15	340.35	1,649.19	116.59	-42.67	124.15	1.22	-1.12	4.93
1,749.00	4.62	343.81	1,742.85	124.20	-45.15	132.14	0.64	-0.56	3.68
1,844.00	5.15	343.11	1,837.51	131.95	-47.45	140.21	0.56	0.56	-0.74
1,938.00	6.06	337.92	1,931.06	140.59	-50.54	149.38	1.11	0.97	-5.52
2,033.00	5.46	335.42	2,025.58	149.34	-54.31	158.90	0.68	-0.63	-2.63
2,127.00	5.75	339.67	2,119.13	157.83	-57.80	168.07	0.54	0.31	4.52
2,222.00	6.00	341.27	2,213.63	166.99	-61.05	177.79	0.31	0.26	1.68
2,316.00	5.79	340.78	2,307.13	176.12	-64.19	187.44	0.23	-0.22	-0.52
2,411.00	6.42	342.80	2,401.59	185.72	-67.34	197.53	0.70	0.66	2.13
2,505.00	6.32	343.68	2,495.01	195.70	-70.35	207.94	0.15	-0.11	0.94
2,600.00	6.04	339.27	2,589.46	205.40	-73.58	218.15	0.58	-0.29	-4.64
2,693.00	6.37	337.91	2,681.92	214.75	-77.26	228.20	0.39	0.35	-1.46
Last SDI Surface MWD Survey									
2,786.00	5.98	338.55	2,774.38	224.04	-80.97	238.20	0.43	-0.42	0.69
First SDI Production MWD Survey									
2,881.00	5.28	333.98	2,868.92	232.58	-84.70	247.50	0.87	-0.74	-4.81
2,975.00	5.63	341.10	2,962.49	240.83	-88.09	256.42	0.81	0.37	7.57
3,070.00	5.19	344.97	3,057.07	249.39	-90.71	265.35	0.60	-0.46	4.07
3,164.00	6.42	344.00	3,150.59	258.54	-93.26	274.82	1.31	1.31	-1.03
3,259.00	6.24	344.18	3,245.01	268.62	-96.13	285.26	0.19	-0.19	0.19
3,353.00	5.80	344.27	3,338.49	278.10	-98.81	295.08	0.47	-0.47	0.10
3,448.00	5.63	342.86	3,433.02	287.18	-101.49	304.51	0.23	-0.18	-1.48
3,542.00	5.54	344.09	3,526.57	295.95	-104.09	313.64	0.16	-0.10	1.31
3,637.00	5.36	342.33	3,621.14	304.58	-106.69	322.64	0.26	-0.19	-1.85
3,731.00	5.01	344.00	3,714.76	312.71	-109.16	331.11	0.41	-0.37	1.78
3,826.00	5.89	349.19	3,809.33	321.49	-111.22	340.05	1.06	0.93	5.46
3,921.00	5.80	350.77	3,903.83	331.01	-112.90	349.55	0.19	-0.09	1.66
4,015.00	5.72	354.37	3,997.36	340.36	-114.12	358.73	0.39	-0.09	3.83
4,110.00	5.98	346.73	4,091.86	349.89	-115.72	368.21	0.86	0.27	-8.04
4,204.00	5.80	346.99	4,185.37	359.29	-117.92	377.77	0.19	-0.19	0.28
4,299.00	5.54	345.94	4,279.90	368.41	-120.11	387.09	0.29	-0.27	-1.11
4,393.00	5.19	346.99	4,373.49	376.95	-122.17	395.81	0.39	-0.37	1.12
4,488.00	5.63	344.97	4,468.07	385.64	-124.35	404.70	0.50	0.46	-2.13
4,582.00	5.89	342.42	4,561.59	394.69	-127.00	414.11	0.39	0.28	-2.71
4,677.00	5.80	343.74	4,656.10	403.95	-129.81	423.76	0.17	-0.09	1.39
4,772.00	5.45	351.91	4,750.64	413.02	-131.79	432.95	0.92	-0.37	8.60
4,866.00	5.28	357.36	4,844.23	421.76	-132.62	441.42	0.57	-0.18	5.80
4,961.00	5.01	350.59	4,938.85	430.22	-133.50	449.64	0.70	-0.28	-7.13
5,055.00	4.84	349.89	5,032.50	438.18	-134.87	457.56	0.19	-0.18	-0.74
5,150.00	4.84	350.68	5,127.16	446.08	-136.22	465.43	0.07	0.00	0.83
5,244.00	4.57	347.34	5,220.85	453.64	-137.68	473.03	0.41	-0.29	-3.55
5,339.00	4.40	347.17	5,315.56	460.89	-139.32	480.38	0.18	-0.18	-0.18
5,434.00	3.25	356.84	5,410.34	467.13	-140.28	486.56	1.38	-1.21	10.18
5,528.00	3.34	357.89	5,504.19	472.53	-140.53	491.70	0.12	0.10	1.12
5,623.00	2.02	334.69	5,599.09	476.81	-141.34	495.99	1.77	-1.39	-24.42
5,717.00	0.62	28.65	5,693.06	478.75	-141.81	497.97	1.84	-1.49	57.40
5,812.00	0.79	8.70	5,788.05	479.85	-141.46	498.88	0.31	0.18	-21.00
5,907.00	0.62	353.23	5,883.05	481.01	-141.42	499.95	0.27	-0.18	-16.28

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Well:	697-16-25B	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)
6,002.00	0.53	356.22	5,978.04	481.96	-141.51	500.87	0.10	-0.09	3.15
6,096.00	0.79	350.51	6,072.04	483.03	-141.65	501.92	0.28	0.28	-6.07
6,191.00	0.62	347.34	6,167.03	484.18	-141.87	503.07	0.18	-0.18	-3.34
6,286.00	0.34	335.60	6,262.02	484.93	-142.10	503.86	0.31	-0.29	-12.36
6,381.00	0.44	298.56	6,357.02	485.37	-142.54	504.42	0.28	0.11	-38.99
6,475.00	0.53	278.00	6,451.02	485.60	-143.28	504.90	0.21	0.10	-21.87
6,570.00	0.44	264.20	6,546.02	485.62	-144.08	505.21	0.15	-0.09	-14.53
6,665.00	0.62	239.94	6,641.01	485.33	-144.89	505.22	0.30	0.19	-25.54
6,759.00	0.97	223.33	6,735.00	484.50	-145.88	504.78	0.44	0.37	-17.67
6,854.00	0.18	197.67	6,830.00	483.77	-146.47	504.32	0.85	-0.83	-27.01
6,949.00	0.26	156.09	6,925.00	483.43	-146.43	503.98	0.18	0.08	-43.77
7,043.00	0.53	163.83	7,018.99	482.82	-146.22	503.34	0.29	0.29	8.23
7,138.00	0.62	148.09	7,113.99	481.96	-145.83	502.39	0.19	0.09	-16.57
7,233.00	0.53	172.35	7,208.99	481.09	-145.50	501.46	0.27	-0.09	25.54
7,328.00	0.62	162.68	7,303.98	480.16	-145.29	500.52	0.14	0.09	-10.18
7,422.00	0.44	150.73	7,397.98	479.36	-144.96	499.66	0.22	-0.19	-12.71
7,517.00	0.18	289.60	7,492.98	479.09	-144.92	499.39	0.62	-0.27	146.18
7,612.00	0.53	281.51	7,587.97	479.23	-145.49	499.72	0.37	0.37	-8.52
7,706.00	0.62	295.05	7,681.97	479.53	-146.38	500.32	0.17	0.10	14.40
7,801.00	0.70	267.19	7,776.96	479.72	-147.43	500.87	0.34	0.08	-29.33
7,896.00	0.44	288.98	7,871.96	479.81	-148.35	501.28	0.35	-0.27	22.94
7,991.00	0.62	349.54	7,966.95	480.43	-148.79	502.02	0.59	0.19	63.75
8,086.00	0.53	321.15	8,061.95	481.28	-149.16	502.94	0.31	-0.09	-29.88
8,180.00	1.23	266.04	8,155.94	481.55	-150.44	503.64	1.09	0.74	-58.63
8,275.00	1.93	262.18	8,250.90	481.26	-153.04	504.29	0.74	0.74	-4.06
8,370.00	2.46	264.11	8,345.83	480.84	-156.65	505.17	0.56	0.56	2.03
8,465.00	1.23	248.55	8,440.78	480.25	-159.63	505.68	1.39	-1.29	-16.38
8,560.00	1.67	240.38	8,535.75	479.20	-161.78	505.45	0.51	0.46	-8.60
8,654.00	2.02	241.61	8,629.70	477.73	-164.43	505.01	0.37	0.37	1.31
8,749.00	2.29	236.60	8,724.64	475.89	-167.49	504.37	0.35	0.28	-5.27
8,844.00	2.37	235.28	8,819.56	473.73	-170.69	503.48	0.10	0.08	-1.39
8,938.00	2.37	236.78	8,913.48	471.56	-173.91	502.59	0.07	0.00	1.60
9,033.00	2.73	242.49	9,008.38	469.44	-177.56	501.89	0.46	0.38	6.01
9,128.00	2.99	231.15	9,103.27	466.84	-181.50	500.85	0.65	0.27	-11.94
9,223.00	3.17	230.27	9,198.13	463.60	-185.44	499.22	0.20	0.19	-0.93
9,318.00	3.25	231.50	9,292.98	460.25	-189.57	497.54	0.11	0.08	1.29
Last SDI Production MWD Survey									
9,375.00	3.25	231.50	9,349.89	458.24	-192.10	496.56	0.00	0.00	0.00
Projection To TD - BHL = 626993.22, 1229541.93									

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Site:	Cascade Creek 697-16A II Pad	MD Reference:	GL 8312' & RKB 30' @ 8342.00ft
Well:	697-16-25B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	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									
697-16-25B Target	0.00	0.00	7,750.00	452.91	-174.00	626,987.36	1,229,559.86	39° 31' 23.146 N	108° 13' 53.431 W
- actual wellpath misses target center by 37.97ft at 7774.28ft MD (7750.24 TVD, 479.72 N, -147.11 E)									
- Circle (radius 50.00)									
697-16-25B WF Target	0.00	0.00	7,773.00	454.28	-171.61	626,988.65	1,229,562.30	39° 31' 23.160 N	108° 13' 53.400 W
- actual wellpath misses target center by 35.13ft at 7797.25ft MD (7773.22 TVD, 479.72 N, -147.38 E)									
- Circle (radius 50.00)									
CC 697-16-25B Target #	0.00	0.00	7,774.00	454.28	-171.61	626,988.65	1,229,562.30	39° 31' 23.160 N	108° 13' 53.400 W
- actual wellpath misses target center by 35.12ft at 7798.25ft MD (7774.22 TVD, 479.72 N, -147.39 E)									
- Circle (radius 50.00)									

Checked By: _____ Approved By: _____ Date: _____