



Scientific
Drilling

Directional Survey Certification

7327 West Barton Road
Casper, WY 82604
(307)-472-6621 Fax (307) 472-5439

Operator	OXY USA RMAT
Well Name & No.	Cascade Creek 697-10-42B
County & State	Garfield County, CO
SDI Job No.	42DEF10121382
Rig	H&P 353

I, Rex Hall, having personal knowledge of all the facts, hereby
certify that the attached directional survey run from a measured depth of 0 feet to a
measured depth of 9204 feet is true and correct as determined from all available records.


Signature

24-Feb-11
Date

Rex Hall
Grand Junction Drilling Engineer
Scientific Drilling - Rocky Mountain District

OXY USA RMAT

**Garfield County, CO NAD27
Cascade Creek 697-15-01 Pad
CC 697-10-42B - Slot R**

OH

Design: OH

Standard Survey Report

24 February, 2011

Scientific Drilling International

Survey Report

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-10-42B - Slot R
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-10-42B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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 697-15-01 Pad, Sec 15 T6S R97W		
Site Position:		Northing:	629,156.97 usft
From:	Map	Easting:	1,234,961.93 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	39° 31' 46.180 N
		Longitude:	108° 12' 45.350 W
		Grid Convergence:	-1.71 °

Well	CC 697-10-42B - Slot R		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty	0.00 ft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			Dip Angle
			Field Strength
	IGRF2010	2010/11/24	10.52
			65.74
			52,277

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			8.56

Survey Program	Date	2011/02/24		
From	To	Survey (Wellbore)	Tool Name	Description
(ft)	(ft)			
248.00	2,660.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
2,787.00	9,204.00	Survey #2 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate
(ft)			(ft)			(ft)	(°/100ft)	(°/100ft)	(°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
248.00	1.76	357.71	247.96	3.81	-0.15	3.74	0.71	0.71	0.00
First SDI MWD Survey									
340.00	3.71	3.02	339.85	8.19	-0.05	8.09	2.14	2.12	5.77
432.00	4.71	19.08	431.61	14.73	1.34	14.77	1.67	1.09	17.46
525.00	5.89	3.56	524.21	23.10	2.88	23.28	1.99	1.27	-16.69
617.00	6.42	359.16	615.68	32.96	3.10	33.05	0.77	0.58	-4.78
710.00	7.83	1.54	707.96	44.49	3.20	44.47	1.55	1.52	2.56
802.00	7.47	13.75	799.15	56.57	4.79	56.65	1.81	-0.39	13.27
897.00	6.86	13.23	893.41	68.09	7.55	68.45	0.65	-0.64	-0.55

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Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-10-42B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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)
991.00	8.18	9.27	986.60	80.15	9.91	80.74	1.51	1.40	-4.21
1,086.00	9.23	8.13	1,080.50	94.37	12.08	95.11	1.12	1.11	-1.20
1,180.00	11.08	8.39	1,173.02	110.77	14.46	111.68	1.97	1.97	0.28
1,275.00	12.31	9.54	1,266.05	129.78	17.48	130.94	1.32	1.29	1.21
1,370.00	12.66	5.93	1,358.80	150.13	20.23	151.46	0.90	0.37	-3.80
1,464.00	13.81	7.25	1,450.31	171.50	22.71	172.97	1.26	1.22	1.40
1,559.00	13.45	6.81	1,542.63	193.72	25.45	195.35	0.39	-0.38	-0.46
1,653.00	14.51	6.37	1,633.85	216.28	28.05	218.04	1.13	1.13	-0.47
1,748.00	16.27	8.39	1,725.44	241.27	31.32	243.25	1.94	1.85	2.13
1,842.00	16.71	9.27	1,815.57	267.64	35.41	269.93	0.54	0.47	0.94
1,937.00	17.94	10.77	1,906.26	295.49	40.35	298.21	1.38	1.29	1.58
2,031.00	18.38	10.59	1,995.58	324.28	45.78	327.48	0.47	0.47	-0.19
2,126.00	18.11	10.24	2,085.80	353.53	51.15	357.21	0.31	-0.28	-0.37
2,220.00	19.08	10.06	2,174.89	383.04	56.44	387.17	1.03	1.03	-0.19
2,315.00	19.70	10.06	2,264.50	414.09	61.95	418.70	0.65	0.65	0.00
2,409.00	18.82	9.36	2,353.24	444.65	67.18	449.70	0.97	-0.94	-0.74
2,504.00	19.79	8.39	2,442.90	475.68	72.02	481.10	1.08	1.02	-1.02
2,598.00	19.61	8.30	2,531.40	507.04	76.62	512.79	0.19	-0.19	-0.10
2,660.00	18.99	7.07	2,589.91	527.34	79.36	533.28	1.20	-1.00	-1.98
Last Survey in 14 3/4" Hole									
2,787.00	18.02	5.53	2,710.35	567.40	83.80	573.55	0.86	-0.76	-1.21
First SDI Production MWD Survey									
2,882.00	16.35	3.79	2,801.10	595.37	86.10	601.55	1.84	-1.76	-1.83
2,976.00	15.38	7.51	2,891.52	620.93	88.60	627.20	1.49	-1.03	3.96
3,071.00	15.92	9.25	2,983.00	646.28	92.34	652.83	0.75	0.57	1.83
3,165.00	16.04	10.36	3,073.37	671.78	96.75	678.70	0.35	0.13	1.18
3,260.00	18.73	10.60	3,164.02	699.69	101.92	707.07	2.83	2.83	0.25
3,354.00	19.08	8.31	3,252.95	729.73	106.91	737.51	0.87	0.37	-2.44
3,449.00	18.99	8.84	3,342.76	760.36	111.53	768.50	0.21	-0.09	0.56
3,543.00	19.61	8.05	3,431.47	791.10	116.09	799.56	0.72	0.66	-0.84
3,638.00	19.79	10.16	3,520.91	822.71	121.16	831.58	0.77	0.19	2.22
3,732.00	19.61	10.86	3,609.41	853.87	126.94	863.25	0.32	-0.19	0.74
3,827.00	20.14	10.95	3,698.75	885.58	133.05	895.52	0.56	0.56	0.09
3,921.00	20.31	11.04	3,786.96	917.48	139.25	927.99	0.18	0.18	0.10
4,016.00	18.82	11.74	3,876.47	948.67	145.52	959.76	1.59	-1.57	0.74
4,110.00	21.28	12.62	3,964.77	980.16	152.34	991.92	2.64	2.62	0.94
4,205.00	21.54	8.67	4,053.22	1,014.23	158.73	1,026.55	1.54	0.27	-4.16
4,299.00	20.75	8.84	4,140.89	1,047.74	163.89	1,060.46	0.84	-0.84	0.18
4,394.00	19.08	9.55	4,230.20	1,079.68	169.05	1,092.82	1.78	-1.76	0.75
4,488.00	19.26	9.02	4,318.99	1,110.14	174.03	1,123.68	0.27	0.19	-0.56
4,583.00	18.38	8.49	4,408.91	1,140.43	178.70	1,154.33	0.94	-0.93	-0.56
4,677.00	17.32	8.93	4,498.38	1,168.91	183.06	1,183.14	1.14	-1.13	0.47
4,772.00	18.11	10.16	4,588.88	1,197.42	187.86	1,212.04	0.92	0.83	1.29

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Survey Report

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Project:	Garfield County, CO NAD27	TVD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-10-42B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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)	
4,867.00	17.59	10.25	4,679.30	1,226.08	193.02	1,241.15	0.55	-0.55	0.09	
4,961.00	16.36	8.14	4,769.21	1,253.16	197.42	1,268.59	1.46	-1.31	-2.24	
5,055.00	17.67	9.55	4,859.09	1,280.34	201.66	1,296.09	1.46	1.39	1.50	
5,150.00	18.82	8.67	4,949.31	1,309.70	206.37	1,325.83	1.24	1.21	-0.93	
5,245.00	16.36	7.88	5,039.87	1,338.11	210.51	1,354.54	2.60	-2.59	-0.83	
5,339.00	17.67	10.34	5,129.75	1,365.26	214.89	1,382.03	1.59	1.39	2.62	
5,434.00	16.27	10.07	5,220.61	1,392.55	219.80	1,409.75	1.48	-1.47	-0.28	
5,528.00	15.04	10.51	5,311.12	1,417.50	224.33	1,435.10	1.31	-1.31	0.47	
5,623.00	14.25	9.11	5,403.04	1,441.17	228.43	1,459.11	0.91	-0.83	-1.47	
5,717.00	13.54	6.91	5,494.29	1,463.52	231.58	1,481.68	0.94	-0.76	-2.34	
5,811.00	14.16	10.07	5,585.55	1,485.76	234.92	1,504.18	1.04	0.66	3.36	
5,906.00	13.81	9.55	5,677.74	1,508.38	238.83	1,527.13	0.39	-0.37	-0.55	
6,000.00	12.66	9.98	5,769.24	1,529.59	242.48	1,548.64	1.23	-1.22	0.46	
6,095.00	11.70	9.81	5,862.10	1,549.34	245.92	1,568.68	1.01	-1.01	-0.18	
6,190.00	10.38	9.37	5,955.34	1,567.27	248.96	1,586.87	1.39	-1.39	-0.46	
6,284.00	9.50	7.70	6,047.93	1,583.32	251.38	1,603.09	0.99	-0.94	-1.78	
6,379.00	10.73	8.84	6,141.45	1,599.82	253.79	1,619.78	1.31	1.29	1.20	
6,473.00	9.85	12.80	6,233.94	1,616.31	256.91	1,636.55	1.20	-0.94	4.21	
6,568.00	8.53	12.01	6,327.72	1,631.13	260.18	1,651.68	1.40	-1.39	-0.83	
6,663.00	8.71	12.27	6,421.64	1,645.05	263.17	1,665.89	0.19	0.19	0.27	
6,757.00	9.50	11.57	6,514.46	1,659.60	266.24	1,680.74	0.85	0.84	-0.74	
6,852.00	7.74	11.48	6,608.38	1,673.55	269.09	1,694.96	1.85	-1.85	-0.09	
6,946.00	8.18	9.55	6,701.48	1,686.35	271.46	1,707.97	0.55	0.47	-2.05	
7,041.00	10.55	10.95	6,795.20	1,701.56	274.23	1,723.42	2.51	2.49	1.47	
7,135.00	9.32	9.90	6,887.79	1,717.50	277.17	1,739.63	1.32	-1.31	-1.12	
7,230.00	8.79	8.23	6,981.61	1,732.27	279.54	1,754.58	0.62	-0.56	-1.76	
7,324.00	7.47	5.68	7,074.66	1,745.46	281.17	1,767.86	1.46	-1.40	-2.71	
7,419.00	6.95	5.85	7,168.91	1,757.32	282.37	1,779.77	0.55	-0.55	0.18	
7,513.00	6.60	11.57	7,262.25	1,768.27	284.03	1,790.85	0.81	-0.37	6.09	
7,608.00	7.83	12.62	7,356.50	1,779.93	286.54	1,802.75	1.30	1.29	1.11	
7,703.00	8.88	5.15	7,450.49	1,793.55	288.61	1,816.53	1.59	1.11	-7.86	
7,797.00	7.65	2.25	7,543.52	1,807.03	289.51	1,829.99	1.38	-1.31	-3.09	
7,892.00	8.62	8.49	7,637.56	1,820.39	290.81	1,843.40	1.38	1.02	6.57	
7,986.00	8.88	7.52	7,730.47	1,834.55	292.80	1,857.69	0.32	0.28	-1.03	
8,081.00	7.65	4.36	7,824.48	1,848.12	294.24	1,871.33	1.38	-1.29	-3.33	
8,175.00	6.60	0.32	7,917.75	1,859.77	294.74	1,882.92	1.24	-1.12	-4.30	
8,270.00	6.33	4.01	8,012.15	1,870.45	295.14	1,893.54	0.52	-0.28	3.88	
8,364.00	6.86	9.46	8,105.53	1,881.16	296.42	1,904.32	0.87	0.56	5.80	
8,459.00	5.89	9.81	8,199.94	1,891.56	298.19	1,914.87	1.02	-1.02	0.37	
8,553.00	4.04	16.14	8,293.58	1,899.49	299.93	1,922.97	2.05	-1.97	6.73	
8,648.00	3.69	20.18	8,388.37	1,905.57	301.91	1,929.28	0.47	-0.37	4.25	
8,743.00	2.81	7.52	8,483.21	1,910.75	303.27	1,934.61	1.19	-0.93	-13.33	
8,837.00	1.41	352.58	8,577.15	1,914.18	303.43	1,938.02	1.59	-1.49	-15.89	
8,932.00	0.70	287.63	8,672.13	1,915.52	302.72	1,939.24	1.35	-0.75	-68.37	

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Well:	CC 697-10-42B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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)	
9,026.00	1.14	225.67	8,766.12	1,915.04	301.51	1,938.58	1.08	0.47	-65.91	
9,121.00	2.20	223.38	8,861.08	1,913.05	299.58	1,936.33	1.12	1.12	-2.41	
9,147.00	2.37	220.48	8,887.06	1,912.28	298.89	1,935.47	0.79	0.65	-11.15	
Last SDI Production MWD Survey										
9,204.00	2.37	220.48	8,944.01	1,910.49	297.36	1,933.47	0.00	0.00	0.00	
Projection To TD - BHL = 631089.95, 1235360.28										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
248.00	247.96	3.81	-0.15	First SDI MWD Survey	
2,660.00	2,589.91	527.34	79.36	Last Survey in 14 3/4" Hole	
2,787.00	2,710.35	567.40	83.80	First SDI Production MWD Survey	
9,147.00	8,887.06	1,912.28	298.89	Last SDI Production MWD Survey	
9,204.00	8,944.01	1,910.49	297.36	Projection To TD	
9,204.00	8,944.01	1,910.49	297.36	BHL = 631089.95, 1235360.28	

Checked By: _____ Approved By: _____ Date: _____