



**Scientific
Drilling**

Directional Survey Certification

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

Operator	<u>OXY USA RMAT</u>
Well Name & No.	<u>Cascade Creek 697-15-11B</u>
County & State	<u>Garfield County, CO</u>
SDI Job No.	<u>42DEF10101070</u>
Rig	<u>H&P 353</u>

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 9165 feet is true and correct as determined from all available records.



Signature

15-Dec-10

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 697-15-11B - Slot K**

OH

Design: OH

Standard Survey Report

15 December, 2010

Scientific Drilling International

Survey Report

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-15-11B - Slot K
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 697-15-11B	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 697-15-11B - Slot K, 263' FNL 653' FWL		
Well Position	+N/-S	0.00 ft	Northing: 629,190.21 usft
	+E/-W	0.00 ft	Easting: 1,235,030.34 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 31' 46.529 N
		Longitude:	108° 12' 44.489 W
		Ground Level:	8,348.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	9/17/2010	10.52	65.76	52,326

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	132.84	

Survey Program	Date	12/15/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
249.00	2,505.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,599.00	9,165.00	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	
249.00	1.38	142.48	248.98	-2.38	1.83	2.96	0.55	0.55	0.00	
First SDI Surface MWD Survey										
341.00	3.03	129.03	340.91	-4.79	4.39	6.47	1.87	1.79	-14.62	
434.00	4.78	128.82	433.69	-8.77	9.32	12.79	1.88	1.88	-0.23	
526.00	5.89	130.58	525.29	-14.24	15.89	21.33	1.22	1.21	1.91	
618.00	8.09	131.29	616.60	-21.58	24.34	32.52	2.39	2.39	0.77	
712.00	10.46	130.67	709.36	-31.51	35.78	47.66	2.52	2.52	-0.66	
804.00	11.70	130.23	799.64	-42.98	49.24	65.33	1.35	1.35	-0.48	
899.00	11.70	130.06	892.67	-55.40	63.97	84.57	0.04	0.00	-0.18	

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Site:	Cascade Creek 697-15-01 Pad	MD Reference:	GL 8348' & RKB 30' @ 8378.00ft
Well:	CC 697-15-11B	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)
993.00	12.40	132.25	984.60	-68.32	78.73	104.18	0.89	0.74	2.33
1,088.00	12.75	131.90	1,077.32	-82.18	94.09	124.86	0.38	0.37	-0.37
1,182.00	13.98	134.01	1,168.77	-96.99	109.97	146.59	1.41	1.31	2.24
1,277.00	14.25	131.90	1,260.91	-112.77	126.93	169.75	0.61	0.28	-2.22
1,371.00	15.92	130.58	1,351.66	-128.89	145.33	194.20	1.81	1.78	-1.40
1,466.00	16.80	128.30	1,442.82	-145.87	166.00	220.91	1.15	0.93	-2.40
1,560.00	17.32	129.35	1,532.68	-163.17	187.48	248.42	0.64	0.55	1.12
1,655.00	18.11	130.76	1,623.18	-181.77	209.60	277.29	0.95	0.83	1.48
1,750.00	17.23	129.97	1,713.69	-200.45	231.57	306.10	0.96	-0.93	-0.83
1,844.00	16.44	131.99	1,803.66	-218.29	252.13	333.30	1.05	-0.84	2.15
1,939.00	16.80	132.60	1,894.70	-236.58	272.22	360.47	0.42	0.38	0.64
2,033.00	17.06	132.87	1,984.62	-255.15	292.33	387.85	0.29	0.28	0.29
2,127.00	16.97	133.13	2,074.51	-273.91	312.45	415.35	0.13	-0.10	0.28
2,222.00	17.59	132.25	2,165.22	-293.04	333.19	443.57	0.71	0.65	-0.93
2,316.00	17.67	132.78	2,254.80	-312.28	354.18	472.04	0.19	0.09	0.56
2,411.00	18.20	134.10	2,345.19	-332.40	375.41	501.29	0.70	0.56	1.39
2,505.00	18.91	135.68	2,434.30	-353.51	396.60	531.18	0.93	0.76	1.68
Last SDI Surface MWD Survey									
2,599.00	17.50	135.04	2,523.59	-374.41	417.23	560.52	1.51	-1.50	-0.68
First SDI Production MWD Survey									
2,695.00	16.62	138.21	2,615.37	-394.86	436.58	588.61	1.33	-0.92	3.30
2,789.00	17.06	131.26	2,705.35	-413.98	455.90	615.78	2.19	0.47	-7.39
2,883.00	15.48	125.55	2,795.59	-430.37	476.47	642.01	2.39	-1.68	-6.07
2,978.00	14.77	125.20	2,887.30	-444.72	496.69	666.59	0.75	-0.75	-0.37
3,072.00	14.07	125.20	2,978.33	-458.22	515.81	689.79	0.74	-0.74	0.00
3,167.00	15.48	129.68	3,070.19	-472.97	535.01	713.89	1.91	1.48	4.72
3,261.00	16.53	129.86	3,160.55	-489.55	554.93	739.77	1.12	1.12	0.19
3,356.00	17.32	130.30	3,251.43	-507.36	576.09	767.40	0.84	0.83	0.46
3,450.00	16.27	130.03	3,341.42	-524.88	596.84	794.53	1.12	-1.12	-0.29
3,544.00	16.44	130.38	3,431.62	-541.96	617.06	820.97	0.21	0.18	0.37
3,639.00	16.88	131.70	3,522.63	-559.85	637.60	848.19	0.61	0.46	1.39
3,733.00	17.32	136.27	3,612.48	-579.04	657.46	875.80	1.50	0.47	4.86
3,828.00	16.09	135.66	3,703.47	-598.67	676.44	903.07	1.31	-1.29	-0.64
3,923.00	16.44	134.43	3,794.67	-617.50	695.24	929.66	0.52	0.37	-1.29
4,017.00	18.91	136.01	3,884.22	-637.77	715.32	958.17	2.68	2.63	1.68
4,112.00	18.20	134.52	3,974.28	-659.25	736.59	988.37	0.90	-0.75	-1.57
4,206.00	18.55	132.58	4,063.49	-679.66	758.06	1,017.99	0.75	0.37	-2.06
4,301.00	18.82	130.38	4,153.49	-699.81	780.86	1,048.41	0.79	0.28	-2.32
4,395.00	17.32	129.33	4,242.85	-718.51	803.24	1,077.53	1.63	-1.60	-1.12
4,490.00	17.85	129.15	4,333.41	-736.66	825.47	1,106.17	0.56	0.56	-0.19
4,584.00	18.29	128.01	4,422.77	-754.84	848.26	1,135.25	0.60	0.47	-1.21
4,679.00	16.88	127.48	4,513.33	-772.41	870.95	1,163.83	1.49	-1.48	-0.56
4,774.00	17.32	128.89	4,604.13	-789.68	892.91	1,191.67	0.64	0.46	1.48

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Well:	CC 697-15-11B	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)	
4,868.00	18.55	131.00	4,693.56	-808.28	915.08	1,220.58	1.48	1.31	2.24	
4,962.00	16.36	128.98	4,783.23	-826.42	936.66	1,248.74	2.42	-2.33	-2.15	
5,057.00	15.48	129.07	4,874.58	-842.83	956.91	1,274.74	0.93	-0.93	0.09	
5,151.00	14.68	129.42	4,965.35	-858.30	975.85	1,299.14	0.86	-0.85	0.37	
5,246.00	14.25	133.90	5,057.34	-874.05	993.57	1,322.85	1.26	-0.45	4.72	
5,341.00	13.72	134.96	5,149.52	-890.12	1,009.97	1,345.80	0.62	-0.56	1.12	
5,435.00	11.87	139.00	5,241.19	-905.29	1,024.20	1,366.55	2.19	-1.97	4.30	
5,530.00	10.02	136.36	5,334.45	-918.65	1,036.31	1,384.52	2.02	-1.95	-2.78	
5,624.00	9.50	136.63	5,427.09	-930.20	1,047.28	1,400.42	0.56	-0.55	0.29	
5,718.00	7.74	135.13	5,520.03	-940.33	1,057.08	1,414.49	1.89	-1.87	-1.60	
5,813.00	6.24	132.93	5,614.32	-948.38	1,065.37	1,426.04	1.60	-1.58	-2.32	
5,907.00	4.57	135.48	5,707.90	-954.53	1,071.74	1,434.89	1.79	-1.78	2.71	
6,002.00	4.04	132.67	5,802.63	-959.50	1,076.85	1,442.02	0.60	-0.56	-2.96	
6,097.00	3.78	134.43	5,897.41	-963.96	1,081.55	1,448.50	0.30	-0.27	1.85	
6,191.00	3.78	132.32	5,991.20	-968.21	1,086.05	1,454.69	0.15	0.00	-2.24	
6,286.00	3.87	129.68	6,085.99	-972.37	1,090.84	1,461.02	0.21	0.09	-2.78	
6,380.00	3.34	129.24	6,179.81	-976.12	1,095.40	1,466.92	0.56	-0.56	-0.47	
6,475.00	3.08	131.70	6,274.66	-979.57	1,099.45	1,472.24	0.31	-0.27	2.59	
6,569.00	2.64	130.30	6,368.54	-982.65	1,102.98	1,476.92	0.47	-0.47	-1.49	
6,664.00	2.55	137.50	6,463.44	-985.63	1,106.08	1,481.22	0.36	-0.09	7.58	
6,759.00	2.02	142.69	6,558.37	-988.52	1,108.52	1,484.97	0.60	-0.56	5.46	
6,853.00	2.55	125.99	6,652.29	-991.06	1,111.22	1,488.68	0.90	0.56	-17.77	
6,948.00	2.46	138.29	6,747.20	-993.83	1,114.29	1,492.81	0.57	-0.09	12.95	
7,042.00	3.43	131.70	6,841.08	-997.20	1,117.73	1,497.63	1.09	1.03	-7.01	
7,137.00	3.34	136.71	6,935.91	-1,001.11	1,121.75	1,503.23	0.33	-0.09	5.27	
7,231.00	2.90	142.87	7,029.77	-1,005.00	1,125.06	1,508.31	0.59	-0.47	6.55	
7,326.00	4.13	134.25	7,124.59	-1,009.30	1,128.96	1,514.09	1.41	1.29	-9.07	
7,420.00	4.04	133.02	7,218.35	-1,013.92	1,133.81	1,520.79	0.13	-0.10	-1.31	
7,515.00	3.61	143.83	7,313.14	-1,018.62	1,138.02	1,527.07	0.88	-0.45	11.38	
7,609.00	3.25	137.77	7,406.98	-1,022.98	1,141.56	1,532.63	0.54	-0.38	-6.45	
7,704.00	2.90	136.01	7,501.84	-1,026.70	1,145.03	1,537.71	0.38	-0.37	-1.85	
7,799.00	3.52	136.36	7,596.69	-1,030.54	1,148.72	1,543.02	0.65	0.65	0.37	
7,893.00	3.61	135.04	7,690.51	-1,034.73	1,152.80	1,548.86	0.13	0.10	-1.40	
7,988.00	3.08	133.37	7,785.35	-1,038.60	1,156.77	1,554.40	0.57	-0.56	-1.76	
8,082.00	2.37	136.10	7,879.24	-1,041.73	1,159.95	1,558.87	0.77	-0.76	2.90	
8,177.00	2.46	145.50	7,974.15	-1,044.83	1,162.47	1,562.82	0.43	0.09	9.89	
8,271.00	2.46	143.22	8,068.07	-1,048.10	1,164.82	1,566.77	0.10	0.00	-2.43	
8,366.00	1.93	145.50	8,163.00	-1,051.06	1,166.95	1,570.34	0.57	-0.56	2.40	
8,460.00	1.23	167.39	8,256.96	-1,053.34	1,168.06	1,572.71	0.97	-0.74	23.29	
8,555.00	1.67	178.99	8,351.93	-1,055.72	1,168.31	1,574.51	0.55	0.46	12.21	
8,649.00	1.41	188.39	8,445.90	-1,058.24	1,168.16	1,576.11	0.38	-0.28	10.00	
8,744.00	1.41	201.64	8,540.87	-1,060.48	1,167.56	1,577.20	0.34	0.00	13.95	
8,839.00	1.76	219.15	8,635.83	-1,062.70	1,166.21	1,577.71	0.62	0.37	18.43	
8,933.00	2.37	227.15	8,729.77	-1,065.14	1,163.87	1,577.66	0.72	0.65	8.51	

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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)	
9,028.00	2.73	237.17	8,824.68	-1,067.70	1,160.53	1,576.95	0.60	0.38	10.55	
9,110.00	2.99	233.04	8,906.58	-1,070.05	1,157.18	1,576.09	0.40	0.32	-5.04	
Last SDI Production MWD Survey										
9,165.00	2.99	233.04	8,961.50	-1,071.77	1,154.89	1,575.58	0.00	0.00	0.00	
Projection To TD - BHL = 628084.44, 1236152.72										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
249.00	248.98	-2.38	1.83	First SDI Surface MWD Survey	
2,505.00	2,434.30	-353.51	396.60	Last SDI Surface MWD Survey	
2,599.00	2,523.59	-374.41	417.23	First SDI Production MWD Survey	
9,110.00	8,906.58	-1,070.05	1,157.18	Last SDI Production MWD Survey	
9,165.00	8,961.50	-1,071.77	1,154.89	Projection To TD	
9,165.00	8,961.50	-1,071.77	1,154.89	BHL = 628084.44, 1236152.72	

Checked By: _____ Approved By: _____ Date: _____