



**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 697-08-29C</u>
County & State	<u>Garfield County, CO</u>
SDI Job No.	<u>42DEF10111201</u>
Rig	<u>H&P 330</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 9056 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 608-43-31 Pad

Cascade Creek 697-08-29C - Slot F

OH

Design: OH

Standard Survey Report

09 December, 2010

Scientific Drilling International

Survey Report

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Cascade Creek 697-08-29C - Slot F
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-29C	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 608-43-31 Pad, Sec 8 T6S R97W		
Site Position:		Northing:	39.54 usft
From:	Map	Easting:	-108.24 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	37° 37' 28.115 N
		Longitude:	112° 24' 37.715 W
		Grid Convergence:	-4.36 °

Well	Cascade Creek 697-08-29C - Slot F		
Well Position	+N/-S	0.00 ft	Northing: 631,742.46 usft
	+E/-W	0.00 ft	Easting: 1,228,127.24 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 32' 9.697 N
		Longitude:	108° 14' 13.533 W
		Ground Level:	8,479.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	11/10/2010	10.52	65.75	52,311

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	288.39	

Survey Program	Date	12/9/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
250.00	2,700.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,788.00	9,056.00	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	
250.00	2.00	294.66	249.95	1.82	-3.96	4.34	0.80	0.80	0.00	
First SDI Surface MWD Survey										
343.00	3.62	294.10	342.83	3.70	-8.12	8.87	1.74	1.74	-0.60	
435.00	6.60	290.98	434.46	6.78	-15.71	17.05	3.25	3.24	-3.39	
527.00	8.97	286.94	525.60	10.76	-27.51	29.50	2.64	2.58	-4.39	
619.00	8.62	283.68	616.52	14.48	-41.07	43.54	0.66	-0.38	-3.54	
712.00	9.50	285.18	708.36	18.14	-55.25	58.15	0.98	0.95	1.61	
804.00	10.11	289.05	799.02	22.76	-70.21	73.80	0.98	0.66	4.21	
897.00	11.96	291.15	890.30	28.90	-86.91	91.59	2.04	1.99	2.26	

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Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-29C	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)
989.00	14.42	291.07	979.86	36.46	-106.50	112.56	2.67	2.67	-0.09
1,084.00	16.53	287.29	1,071.42	44.73	-130.44	137.89	2.46	2.22	-3.98
1,178.00	19.52	285.97	1,160.79	53.03	-158.31	166.96	3.21	3.18	-1.40
1,273.00	20.49	287.55	1,250.06	62.41	-189.43	199.44	1.17	1.02	1.66
1,368.00	18.82	287.29	1,339.52	71.98	-219.91	231.39	1.76	-1.76	-0.27
1,463.00	20.49	286.41	1,428.98	81.23	-250.50	263.33	1.79	1.76	-0.93
1,558.00	19.52	289.13	1,518.25	91.13	-281.44	295.82	1.41	-1.02	2.86
1,652.00	19.08	290.63	1,606.97	101.69	-310.66	326.87	0.71	-0.47	1.60
1,747.00	18.20	292.21	1,696.99	112.77	-338.92	357.19	1.07	-0.93	1.66
1,842.00	16.09	292.03	1,787.76	123.32	-364.87	385.14	2.22	-2.22	-0.19
1,936.00	17.23	291.77	1,877.81	133.37	-389.87	412.04	1.22	1.21	-0.28
2,031.00	18.55	290.28	1,968.22	143.82	-417.11	441.19	1.47	1.39	-1.57
2,126.00	19.26	289.22	2,058.09	154.22	-446.08	471.96	0.83	0.75	-1.12
2,221.00	20.84	289.84	2,147.33	165.11	-476.78	504.52	1.68	1.66	0.65
2,315.00	17.59	288.96	2,236.08	175.40	-505.94	535.44	3.47	-3.46	-0.94
2,410.00	18.99	289.22	2,326.28	185.16	-534.12	565.25	1.48	1.47	0.27
2,505.00	21.19	290.80	2,415.50	196.34	-564.77	597.87	2.39	2.32	1.66
2,600.00	21.63	292.12	2,503.94	209.03	-597.04	632.49	0.69	0.46	1.39
2,700.00	20.66	293.53	2,597.21	223.02	-630.29	668.46	1.10	-0.97	1.41
Last Survey in 14 3/4" Hole									
2,788.00	19.96	294.93	2,679.74	235.55	-658.14	698.84	0.97	-0.80	1.59
First SDI Production MWD Survey									
2,883.00	19.96	293.18	2,769.03	248.76	-687.75	731.11	0.63	0.00	-1.84
2,978.00	19.08	291.86	2,858.57	260.93	-717.07	762.77	1.04	-0.93	-1.39
3,072.00	18.38	292.74	2,947.59	272.38	-745.00	792.88	0.80	-0.74	0.94
3,167.00	18.73	292.03	3,037.65	283.89	-772.95	823.04	0.44	0.37	-0.75
3,262.00	20.05	289.13	3,127.27	294.95	-802.47	854.55	1.72	1.39	-3.05
3,357.00	21.19	289.48	3,216.18	306.01	-834.05	888.00	1.21	1.20	0.37
3,451.00	20.58	288.87	3,304.00	317.02	-865.70	921.50	0.69	-0.65	-0.65
3,546.00	20.22	289.13	3,393.04	327.80	-897.01	954.62	0.39	-0.38	0.27
3,641.00	19.87	289.66	3,482.29	338.61	-927.72	987.17	0.42	-0.37	0.56
3,735.00	18.82	289.84	3,570.98	349.13	-957.03	1,018.30	1.12	-1.12	0.19
3,830.00	19.26	289.31	3,660.78	359.51	-986.23	1,049.29	0.50	0.46	-0.56
3,925.00	19.35	288.52	3,750.44	369.69	-1,015.94	1,080.69	0.29	0.09	-0.83
4,020.00	18.03	288.34	3,840.43	379.32	-1,044.82	1,111.13	1.39	-1.39	-0.19
4,114.00	17.23	286.50	3,930.01	387.85	-1,071.98	1,139.59	1.04	-0.85	-1.96
4,209.00	16.27	287.99	4,020.98	395.96	-1,098.13	1,166.96	1.11	-1.01	1.57
4,304.00	14.86	291.24	4,112.50	404.48	-1,122.14	1,192.44	1.74	-1.48	3.42
4,398.00	14.51	290.72	4,203.43	413.01	-1,144.39	1,216.25	0.40	-0.37	-0.55
4,493.00	13.37	292.56	4,295.63	421.44	-1,165.66	1,239.09	1.29	-1.20	1.94
4,588.00	11.87	295.02	4,388.33	429.78	-1,184.66	1,259.75	1.68	-1.58	2.59
4,683.00	10.02	297.04	4,481.60	437.67	-1,200.88	1,277.63	1.99	-1.95	2.13
4,778.00	9.32	302.14	4,575.25	445.52	-1,214.75	1,293.27	1.16	-0.74	5.37

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Survey Report

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Project:	Garfield County, CO NAD27	TVD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Site:	Cascade Creek 608-43-31 Pad	MD Reference:	GL 8479' & RKB 30' @ 8509.00ft (H&P)
Well:	Cascade Creek 697-08-29C	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)	
4,872.00	8.00	300.56	4,668.18	452.90	-1,226.83	1,307.06	1.43	-1.40	-1.68	
4,967.00	7.56	302.05	4,762.30	459.58	-1,237.82	1,319.60	0.51	-0.46	1.57	
5,061.00	6.42	302.05	4,855.60	465.65	-1,247.52	1,330.71	1.21	-1.21	0.00	
5,156.00	5.36	300.56	4,950.10	470.72	-1,255.84	1,340.21	1.13	-1.12	-1.57	
5,250.00	5.72	311.28	5,043.66	476.05	-1,263.14	1,348.82	1.16	0.38	11.40	
5,345.00	4.92	324.20	5,138.26	482.47	-1,269.08	1,356.49	1.51	-0.84	13.60	
5,440.00	3.17	319.98	5,233.02	487.79	-1,273.15	1,362.03	1.87	-1.84	-4.44	
5,534.00	1.41	308.73	5,326.94	490.50	-1,275.73	1,365.33	1.92	-1.87	-11.97	
5,629.00	0.18	273.58	5,421.93	491.24	-1,276.79	1,366.57	1.33	-1.29	-37.00	
5,724.00	0.44	215.39	5,516.93	490.96	-1,277.15	1,366.82	0.40	0.27	-61.25	
5,818.00	0.53	234.11	5,610.92	490.41	-1,277.71	1,367.18	0.19	0.10	19.91	
5,913.00	0.70	240.53	5,705.92	489.86	-1,278.57	1,367.82	0.19	0.18	6.76	
6,008.00	0.88	245.10	5,800.91	489.27	-1,279.74	1,368.74	0.20	0.19	4.81	
6,103.00	0.35	231.65	5,895.90	488.78	-1,280.63	1,369.43	0.57	-0.56	-14.16	
6,198.00	0.53	293.53	5,990.90	488.78	-1,281.26	1,370.03	0.50	0.19	65.14	
6,292.00	1.32	285.71	6,084.89	489.25	-1,282.70	1,371.54	0.85	0.84	-8.32	
6,387.00	0.88	295.11	6,179.87	489.85	-1,284.41	1,373.36	0.50	-0.46	9.89	
6,482.00	0.97	65.80	6,274.86	490.49	-1,284.34	1,373.49	1.77	0.09	137.57	
6,576.00	0.35	69.58	6,368.86	490.92	-1,283.34	1,372.68	0.66	-0.66	4.02	
6,671.00	0.26	285.27	6,463.86	491.08	-1,283.28	1,372.67	0.61	-0.09	-151.91	
6,765.00	0.62	314.01	6,557.85	491.49	-1,283.85	1,373.35	0.44	0.38	30.57	
6,860.00	0.88	309.61	6,652.85	492.31	-1,284.78	1,374.49	0.28	0.27	-4.63	
6,955.00	0.53	286.14	6,747.84	492.89	-1,285.77	1,375.61	0.47	-0.37	-24.71	
7,050.00	0.62	284.83	6,842.83	493.15	-1,286.69	1,376.56	0.10	0.09	-1.38	
7,144.00	1.32	268.92	6,936.82	493.26	-1,288.26	1,378.09	0.79	0.74	-16.93	
7,239.00	0.70	294.41	7,031.81	493.48	-1,289.88	1,379.70	0.79	-0.65	26.83	
7,333.00	0.88	93.23	7,125.80	493.67	-1,289.69	1,379.57	1.65	0.19	168.96	
7,428.00	0.35	145.08	7,220.80	493.39	-1,288.79	1,378.64	0.76	-0.56	54.58	
7,523.00	0.44	250.20	7,315.80	493.03	-1,288.97	1,378.69	0.66	0.09	110.65	
7,618.00	0.97	257.32	7,410.79	492.73	-1,290.10	1,379.66	0.56	0.56	7.49	
7,712.00	1.67	256.26	7,504.76	492.23	-1,292.20	1,381.51	0.75	0.74	-1.13	
7,807.00	0.62	253.89	7,599.74	491.76	-1,294.04	1,383.10	1.11	-1.11	-2.49	
7,901.00	0.26	110.01	7,693.74	491.55	-1,294.33	1,383.31	0.90	-0.38	-153.06	
7,996.00	0.35	172.24	7,788.74	491.19	-1,294.09	1,382.96	0.34	0.09	65.51	
8,091.00	0.44	235.70	7,883.74	490.69	-1,294.35	1,383.06	0.44	0.09	66.80	
8,186.00	0.70	261.71	7,978.73	490.40	-1,295.23	1,383.80	0.38	0.27	27.38	
8,280.00	1.23	258.02	8,072.72	490.11	-1,296.78	1,385.18	0.57	0.56	-3.93	
8,375.00	1.41	263.56	8,167.69	489.77	-1,298.94	1,387.12	0.23	0.19	5.83	
8,470.00	1.49	268.65	8,262.66	489.61	-1,301.34	1,389.34	0.16	0.08	5.36	
8,565.00	0.88	276.56	8,357.64	489.66	-1,303.29	1,391.22	0.66	-0.64	8.33	
8,659.00	0.79	291.07	8,451.63	489.98	-1,304.62	1,392.57	0.24	-0.10	15.44	
8,754.00	0.97	282.10	8,546.62	490.38	-1,306.01	1,394.03	0.24	0.19	-9.44	
8,849.00	1.93	275.95	8,641.59	490.72	-1,308.39	1,396.39	1.02	1.01	-6.47	
8,943.00	2.46	274.98	8,735.52	491.06	-1,311.98	1,399.90	0.57	0.56	-1.03	

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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)	
8,998.00	2.90	272.87	8,790.46	491.23	-1,314.54	1,402.39	0.82	0.80	-3.84	
Last SDI Production MWD Survey										
9,056.00	2.90	272.87	8,848.39	491.38	-1,317.47	1,405.21	0.00	0.00	0.00	
Projection To TD - BHL = 632273.30, 1226825.18										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
250.00	249.95	1.82	-3.96	First SDI Surface MWD Survey	
2,700.00	2,597.21	223.02	-630.29	Last Survey in 14 3/4" Hole	
2,788.00	2,679.74	235.55	-658.14	First SDI Production MWD Survey	
8,998.00	8,790.46	491.23	-1,314.54	Last SDI Production MWD Survey	
9,056.00	8,848.39	491.38	-1,317.47	Projection To TD	
9,056.00	8,848.39	491.38	-1,317.47	BHL = 632273.30, 1226825.18	

Checked By: _____ Approved By: _____ Date: _____