



Scientific Drilling

OXY USA RMAT

Garfield County, CO NAD27

Cascade Creek 609-14 Pad

CC 697-08-54A - Slot G

OH

Design: OH

Standard Survey Report

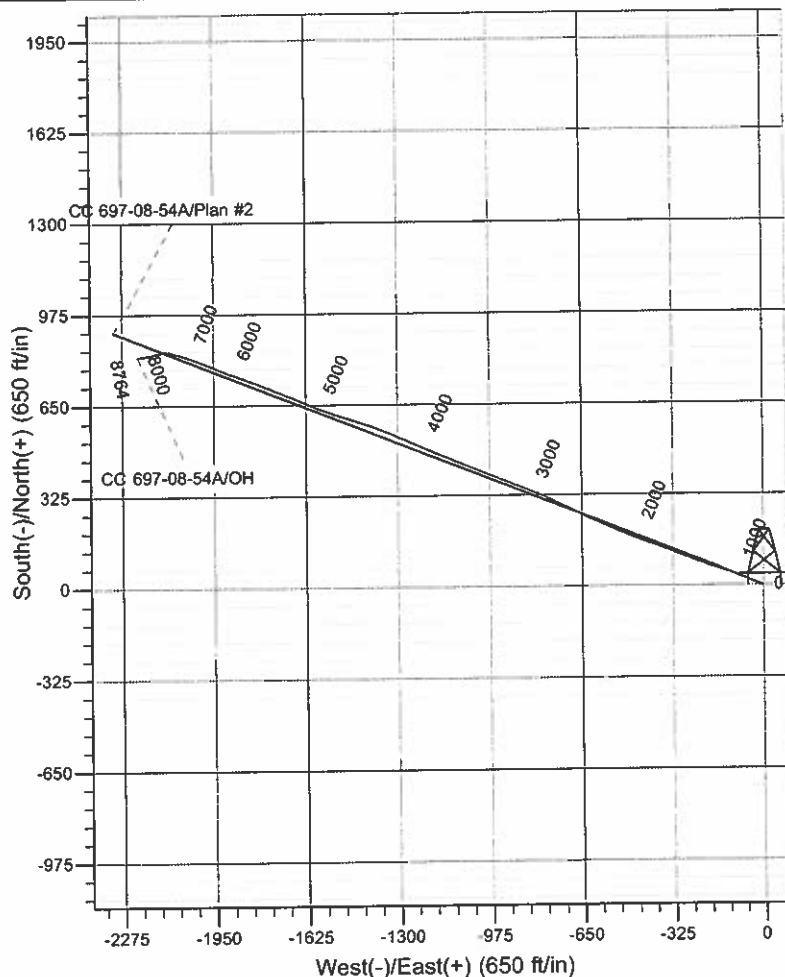
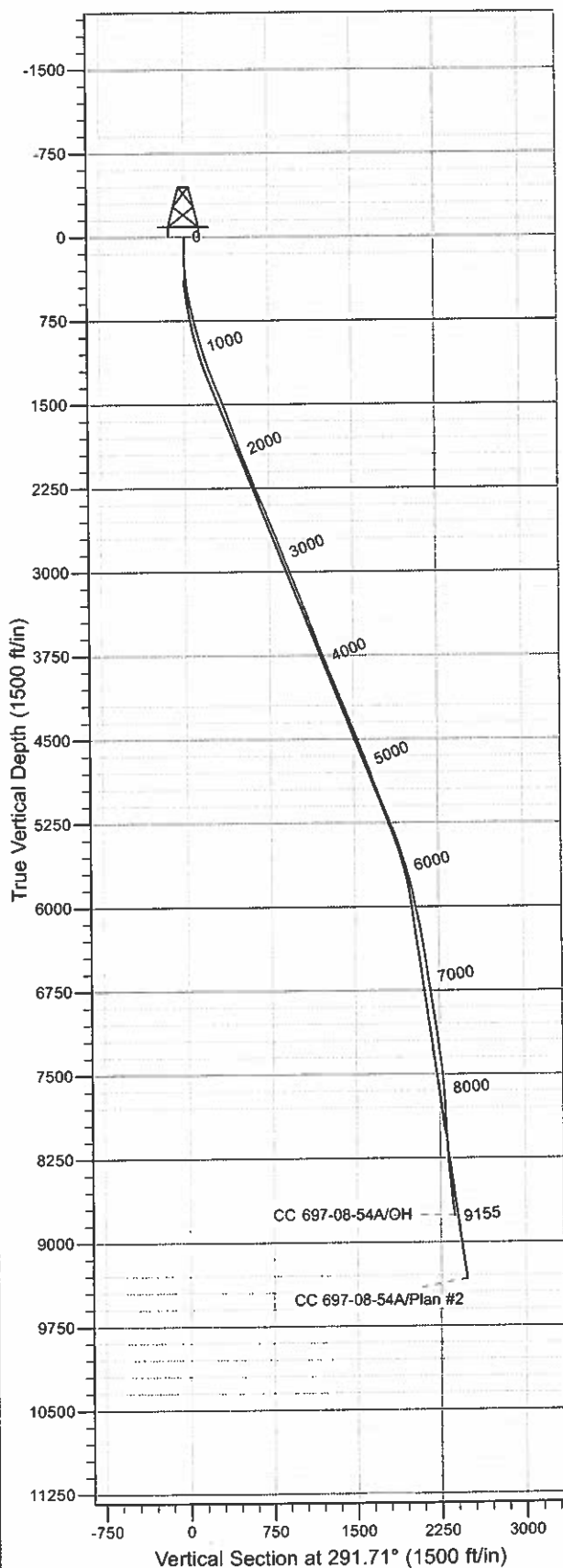
02 November, 2010





Scientific Drilling

Project: Garfield County, CO NAD27
Site: Cascade Creek 609-14 Pad
Well: CC 697-08-54A
Wellbore: OH
Design: OH



WELL DETAILS: CC 697-08-54A

Ground Level: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Northing: 629750.16 Easting: 1229344.06 Latitude: 39° 31' 50.377 N Longitude: 108° 13' 57.244 W G

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-08-54A - Slot G, True North
Vertical (TVD) Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Section (VS) Reference: Slot - G(0.00N, 0.00E)
Measured Depth Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Calculation Method: Minimum Curvature
Local North: True
Location: Sec 9 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 (CC 697-08-54A/OH)

Created By: Julie Cruse Date: 2010-11-02



Scientific Drilling Survey Report



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-08-54A - Slot G
Project:	Garfield County, CO NAD27	TVD Reference:	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Site:	Cascade Creek 609-14 Pad	MD Reference:	GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Well:	CC 697-08-54A	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 609-14 Pad, Sec 9 T6S R97W		
Site Position:		Northing:	629,789.23 usft
From:	Map	Easting:	1,229,350.88 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	39° 31' 50.765 N
		Longitude:	108° 13' 57.172 W
		Grid Convergence:	-1.72 °

Well	CC 697-08-54A - Slot G		
Well Position	+N-S	0.00 ft	Northing: 629,750.16 usft
	+E-W	0.00 ft	Easting: 1,229,344.06 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 31' 50.377 N
		Longitude:	108° 13' 57.244 W
		Ground Level:	8,393.00 ft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	2009-12-08	10.66
			Dip Angle (°) 65.76
			Field Strength (nT) 52,371

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)
	0.00	0.00	0.00
			Direction (°) 291.71

Survey Program	Date 2010-11-02		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
89.00	551.00	Survey #1 - Surface Wireline Gyro (OH)	Standard Keeper 103
617.00	2,660.00	Survey #2 - Surface MWD (OH)	MWD-SDI
2,787.00	9,155.00	Survey #3 - Production (OH)	MWD-SDI
			Description
			Standard Wireline Keeper ver 1.0.3
			MWD - Standard ISCWSA
			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	
89.00	0.52	119.89	89.00	-0.20	0.35	-0.40	0.58	0.58	0.00	
First SDI Surface Wireline Gyro Survey										
120.00	0.04	109.36	120.00	-0.27	0.48	-0.55	1.55	-1.55	-33.97	
151.00	0.13	130.15	151.00	-0.30	0.52	-0.59	0.30	0.29	67.06	
182.00	0.57	280.49	182.00	-0.30	0.39	-0.48	2.21	1.42	484.97	
213.00	1.46	285.79	212.99	-0.16	-0.14	0.07	2.88	2.87	17.10	
243.00	2.41	286.70	242.98	0.12	-1.11	1.08	3.17	3.17	3.03	
274.00	3.30	286.82	273.94	0.57	-2.59	2.61	2.87	2.87	0.39	



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Wellbore: OH
Design: OH

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TVD Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
MD Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
305.00	4.20	286.47	304.87	1.15	-4.53	4.63	2.90	2.90	-1.13
336.00	4.80	288.23	335.77	1.88	-6.85	7.06	1.99	1.94	5.68
366.00	5.60	290.32	365.65	2.78	-9.42	9.78	2.74	2.67	6.97
397.00	6.46	289.61	396.48	3.89	-12.48	13.03	2.78	2.77	-2.29
428.00	7.37	291.63	427.25	5.21	-15.97	16.76	3.04	2.94	6.52
459.00	8.13	292.10	457.97	6.77	-19.85	20.94	2.46	2.45	1.52
489.00	8.97	293.20	487.64	8.48	-23.96	25.40	2.85	2.80	3.67
551.00	10.29	293.30	548.76	12.58	-33.49	35.77	2.13	2.13	0.16
Last SDI Surface Wireline Gyro Survey									
617.00	11.53	293.88	613.57	17.58	-44.94	48.25	1.89	1.88	0.88
First SDI Surface MWD Survey									
709.00	14.20	292.75	703.25	25.67	-63.75	68.73	2.91	2.90	-1.23
801.00	15.12	290.76	792.25	34.29	-85.38	92.01	1.14	1.00	-2.16
895.00	14.95	290.24	883.04	42.83	-108.22	116.39	0.23	-0.18	-0.55
987.00	16.44	288.13	971.60	50.98	-131.73	141.24	1.73	1.62	-2.29
1,082.00	18.55	288.30	1,062.20	59.91	-158.85	169.75	2.22	2.22	0.18
1,176.00	20.66	287.78	1,150.75	69.67	-188.84	201.22	2.25	2.24	-0.55
1,271.00	20.58	290.41	1,239.67	80.61	-220.45	234.63	0.98	-0.08	2.77
1,366.00	21.54	290.32	1,328.32	92.49	-252.46	268.76	1.01	1.01	-0.09
1,461.00	21.37	291.91	1,416.74	105.01	-284.87	303.51	0.64	-0.18	1.67
1,555.00	22.34	292.43	1,503.98	118.21	-317.27	338.50	1.05	1.03	0.55
1,650.00	20.66	291.82	1,592.37	131.33	-349.52	373.31	1.78	-1.77	-0.64
1,744.00	18.73	289.36	1,680.87	142.50	-379.16	404.98	2.23	-2.05	-2.62
1,839.00	18.73	288.92	1,770.83	152.50	-407.98	435.45	0.15	0.00	-0.46
1,934.00	20.31	291.82	1,860.37	163.58	-437.71	467.18	1.95	1.66	3.05
2,028.00	21.37	293.23	1,948.22	176.40	-468.60	500.61	1.25	1.13	1.50
2,123.00	23.57	292.70	2,036.01	190.56	-502.03	536.91	2.33	2.32	-0.56
2,218.00	21.37	292.17	2,123.79	204.42	-535.59	573.21	2.33	-2.32	-0.56
2,313.00	20.84	293.66	2,212.42	217.73	-567.09	607.41	0.79	-0.56	1.57
2,407.00	22.69	294.19	2,299.71	231.87	-598.95	642.24	1.98	1.97	0.56
2,502.00	23.39	294.19	2,387.13	247.11	-632.86	679.38	0.74	0.74	0.00
2,597.00	23.65	296.21	2,474.24	263.25	-667.16	717.22	0.89	0.27	2.13
2,660.00	22.86	297.27	2,532.12	274.44	-689.38	741.99	1.42	-1.25	1.68
Last Survey in 14 3/4" Hole									
2,787.00	21.46	297.95	2,649.74	296.63	-731.83	789.64	1.12	-1.10	0.54
First Survey in 7 7/8" Hole									
2,882.00	22.77	295.75	2,737.75	312.76	-763.74	825.26	1.63	1.38	-2.32
2,977.00	21.46	292.15	2,825.76	327.30	-796.40	860.98	1.98	-1.38	-3.79
3,072.00	21.63	292.06	2,914.12	340.43	-828.72	895.86	0.18	0.18	-0.09
3,166.00	21.81	292.06	3,001.45	353.50	-860.96	930.65	0.19	0.19	0.00
3,261.00	22.34	292.15	3,089.49	366.93	-894.04	966.35	0.56	0.56	0.09
3,356.00	21.63	291.18	3,177.58	380.07	-927.09	1,001.92	0.84	-0.75	-1.02
3,450.00	20.75	290.65	3,265.22	392.20	-958.82	1,035.89	0.96	-0.94	-0.56
3,545.00	21.98	292.94	3,353.69	405.06	-990.94	1,070.49	1.56	1.29	2.41



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North Reference: True
Survey Calculation Method: Minimum Curvature
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)	Buid Rate (°/100ft)	Turn Rate (°/100ft)
3,640.00	21.54	292.68	3,441.92	418.72	-1,023.41	1,105.70	0.47	-0.46	-0.27
3,735.00	20.05	292.15	3,530.73	431.58	-1,054.58	1,139.43	1.58	-1.57	-0.56
3,829.00	21.72	292.59	3,618.55	444.34	-1,085.57	1,172.93	1.78	1.78	0.47
3,924.00	21.02	292.06	3,707.02	457.49	-1,117.59	1,207.55	0.76	-0.74	-0.56
4,019.00	22.34	293.29	3,795.30	471.03	-1,149.97	1,242.63	1.47	1.39	1.29
4,113.00	21.46	292.85	3,882.52	484.77	-1,182.22	1,277.69	0.95	-0.94	-0.47
4,208.00	22.51	293.73	3,970.61	498.84	-1,214.88	1,313.23	1.16	1.11	0.93
4,303.00	21.46	293.73	4,058.70	513.15	-1,247.44	1,348.78	1.11	-1.11	0.00
4,397.00	23.13	293.20	4,145.67	527.34	-1,280.15	1,384.42	1.79	1.78	-0.56
4,492.00	21.63	293.55	4,233.51	541.69	-1,313.36	1,420.57	1.59	-1.58	0.37
4,587.00	22.42	291.36	4,321.58	555.28	-1,346.28	1,456.19	1.20	0.83	-2.31
4,682.00	21.10	291.27	4,409.81	568.09	-1,379.09	1,491.41	1.39	-1.39	-0.09
4,776.00	22.25	289.42	4,497.16	580.14	-1,411.64	1,526.11	1.42	1.22	-1.97
4,871.00	21.81	288.55	4,585.22	591.74	-1,445.34	1,561.70	0.58	-0.46	-0.92
4,966.00	20.66	287.14	4,673.77	602.29	-1,478.08	1,596.03	1.32	-1.21	-1.48
5,060.00	21.02	288.11	4,761.62	612.42	-1,509.95	1,629.39	0.53	0.38	1.03
5,155.00	19.96	287.58	4,850.61	622.61	-1,541.60	1,662.57	1.13	-1.12	-0.56
5,250.00	20.22	291.71	4,939.83	633.58	-1,572.32	1,695.16	1.52	0.27	4.35
5,345.00	22.25	293.12	5,028.38	646.72	-1,604.11	1,729.56	2.20	2.14	1.48
5,439.00	22.16	292.94	5,115.41	660.62	-1,636.81	1,765.07	0.12	-0.10	-0.19
5,534.00	22.25	293.03	5,203.36	674.64	-1,669.86	1,800.97	0.10	0.09	0.09
5,629.00	22.25	293.47	5,291.29	688.84	-1,702.91	1,836.93	0.18	0.00	0.46
5,723.00	20.75	292.68	5,378.75	702.35	-1,734.60	1,871.36	1.63	-1.60	-0.84
5,818.00	18.99	290.92	5,468.09	714.35	-1,764.57	1,903.65	1.96	-1.85	-1.85
5,913.00	16.88	291.01	5,558.47	724.82	-1,791.88	1,932.90	2.22	-2.22	0.09
6,008.00	15.30	290.48	5,649.74	734.15	-1,816.50	1,959.22	1.67	-1.66	-0.56
6,102.00	13.89	289.95	5,740.71	742.34	-1,838.73	1,982.90	1.51	-1.50	-0.56
6,197.00	13.10	289.60	5,833.08	749.84	-1,859.59	2,005.06	0.84	-0.83	-0.37
6,292.00	13.01	289.42	5,925.63	757.01	-1,879.82	2,026.50	0.10	-0.09	-0.19
6,386.00	12.31	291.97	6,017.34	764.28	-1,899.09	2,047.09	0.95	-0.74	2.71
6,481.00	11.43	293.55	6,110.31	771.83	-1,917.11	2,066.63	0.99	-0.93	1.66
6,576.00	10.02	292.76	6,203.65	778.78	-1,933.36	2,084.30	1.49	-1.48	-0.83
6,671.00	8.53	291.27	6,297.40	784.54	-1,947.55	2,099.61	1.59	-1.57	-1.57
6,765.00	8.00	293.82	6,390.43	789.71	-1,960.03	2,113.12	0.69	-0.56	2.71
6,860.00	8.09	292.50	6,484.49	794.94	-1,972.25	2,126.41	0.22	0.09	-1.39
6,955.00	8.53	291.88	6,578.50	800.12	-1,984.96	2,140.14	0.47	0.46	-0.65
7,050.00	8.71	291.01	6,672.42	805.33	-1,998.22	2,154.38	0.23	0.19	-0.92
7,144.00	8.97	291.62	6,765.31	810.58	-2,011.67	2,168.82	0.29	0.28	0.65
7,239.00	8.53	288.90	6,859.20	815.59	-2,025.23	2,183.27	0.64	-0.46	-2.86
7,334.00	8.71	289.51	6,953.13	820.27	-2,038.67	2,197.49	0.21	0.19	0.64
7,429.00	7.91	288.37	7,047.13	824.73	-2,051.66	2,211.20	0.86	-0.84	-1.20
7,523.00	7.47	286.79	7,140.28	828.54	-2,063.64	2,223.75	0.52	-0.47	-1.68
7,618.00	7.65	287.05	7,234.46	832.18	-2,075.60	2,236.20	0.19	0.19	0.27



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7,713.00	8.09	285.91	7,328.56	835.86	-2,088.07	2,249.16	0.49	0.46	-1.20
7,807.00	7.30	280.81	7,421.72	838.80	-2,100.30	2,261.60	1.11	-0.84	-5.43
7,902.00	5.45	283.89	7,516.13	841.01	-2,110.61	2,272.00	1.98	-1.95	3.24
7,997.00	4.48	281.95	7,610.77	842.86	-2,118.62	2,280.12	1.04	-1.02	-2.04
8,091.00	3.69	270.79	7,704.53	843.66	-2,125.24	2,286.57	1.19	-0.84	-11.87
8,186.00	2.20	251.46	7,799.40	843.13	-2,130.02	2,290.82	1.86	-1.57	-20.35
8,281.00	2.90	227.20	7,894.31	840.91	-2,133.52	2,293.24	1.34	0.74	-25.54
8,376.00	3.52	253.21	7,989.17	838.44	-2,138.07	2,296.56	1.65	0.65	27.38
8,471.00	4.75	256.82	8,083.92	836.70	-2,144.69	2,302.07	1.32	1.29	3.80
8,565.00	5.28	256.20	8,177.56	834.78	-2,152.68	2,308.78	0.57	0.56	-0.66
8,660.00	5.80	257.87	8,272.11	832.73	-2,161.62	2,316.33	0.57	0.55	1.76
8,755.00	6.51	259.10	8,366.57	830.70	-2,171.60	2,324.85	0.76	0.75	1.29
8,850.00	6.68	258.84	8,460.94	828.61	-2,182.31	2,334.03	0.18	0.18	-0.27
8,944.00	6.77	261.39	8,554.29	826.73	-2,193.15	2,343.40	0.33	0.10	2.71
9,039.00	7.30	261.04	8,648.58	824.95	-2,204.65	2,353.43	0.56	0.56	-0.37
9,097.00	7.30	259.89	8,706.11	823.73	-2,211.92	2,359.73	0.25	0.00	-1.98
Last SDI MWD Survey									
9,155.00	7.30	259.89	8,763.64	822.43	-2,219.17	2,365.99	0.00	0.00	0.00
BHL = 630638.96 ft N, 1227150.63 ft E - Projection to TD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
9,097.00	8,706.11	823.73	-2,211.92	Last SDI MWD Survey
9,155.00	8,763.64	822.43	-2,219.17	BHL = 630638.96 ft N, 1227150.63 ft E
9,155.00	8,763.64	822.43	-2,219.17	Projection to TD

Checked By: _____ Approved By: _____ Date: _____