



Scientific Drilling

OXY USA RMAT

Garfield County, CO NAD27
Cascade Creek 609-14 Pad
CC 697-08-64A - Slot E

OH

Design: OH

Standard Survey Report

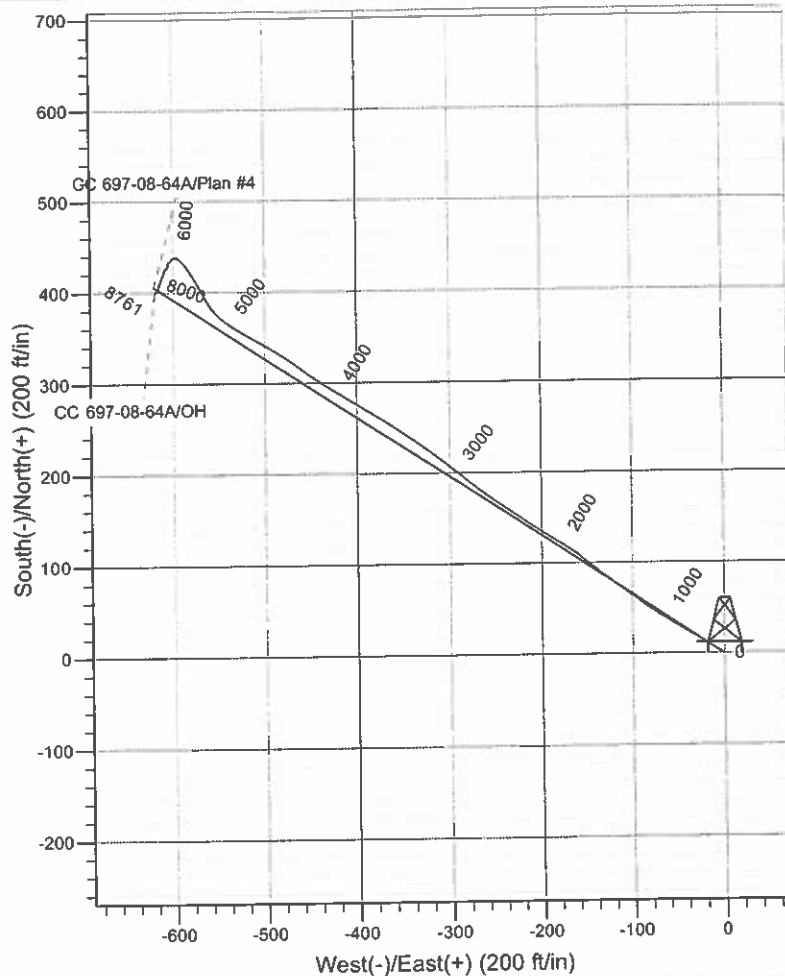
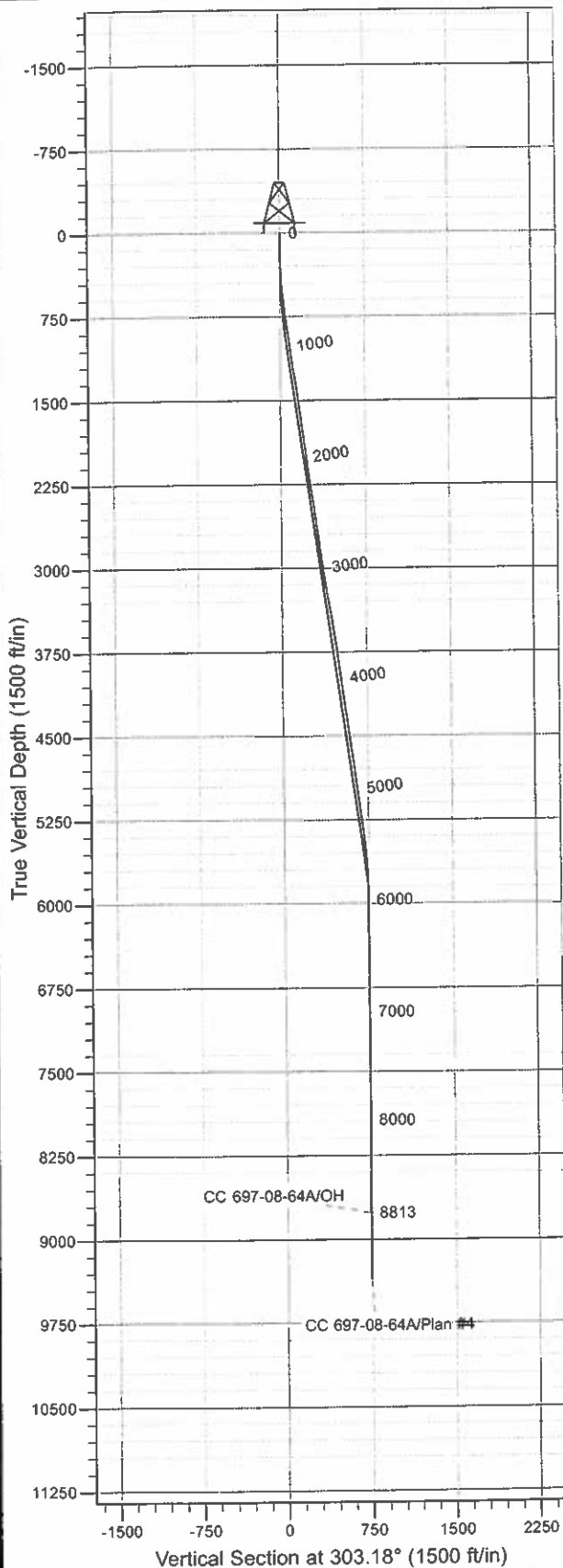
26 October, 2010





Scientific Drilling

Project: Garfield County, CO NAD27
Site: Cascade Creek 609-14 Pad
Well: CC 697-08-64A
Wellbore: OH
Design: OH



WELL DETAILS: CC 697-08-64A

Ground Level: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)	
North	East
0.00	0.00
629757.79	1229344.05
39° 31' 50.452 N	108° 13' 57.247 W
E	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-08-64A - Slot E, True North
Vertical (TVD) Reference: GL 8393' & RKB 30' @ 8423.00ft (H&P 330)
Section (VS) Reference: Slot - E(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 697-08-64A/OH)

Created By: Julie Cruse Date: 2010-10-26



Scientific Drilling Survey Report



Company: OXY USA RMAT
Project: Garfield County, CO NAD27
Site: Cascade Creek 609-14 Pad
Well: CC 697-08-64A
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
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

Project: Garfield County, CO NAD27
Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: Colorado Central 502
System Datum: Mean Sea Level

Site: Cascade Creek 609-14 Pad, Sec 9 T6S R97W

Site Position: Northing: 629,789.23 usft Latitude: 39° 31' 50.765 N
From: Map Easting: 1,229,350.88 usft Longitude: 108° 13' 57.172 W
Position Uncertainty: 0.00 ft Slot Radius: 13.200 in Grid Convergence: -1.72 °

Well: CC 697-08-64A - Slot E, 176' FSL 263' FWL

Well Position: +N/-S 0.00 ft Northing: 629,757.79 usft Latitude: 39° 31' 50.452 N
+E/-W 0.00 ft Easting: 1,229,344.05 usft Longitude: 108° 13' 57.247 W
Position Uncertainty: 0.00 ft Wellhead Elevation: ft Ground Level: 8,393.00 ft

Wellbore: OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2008-06-24	10.84	65.80	52,521

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	303.18

Survey Program: Date 2010-10-26

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
245.00	2,660.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
2,787.00	8,813.00	Survey #2 - Production (OH)	MWD-SDI	MWD - Standard ISCWSA

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Bulld 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
245.00	1.16	306.86	244.98	1.49	-1.98	2.47	0.47	0.47	0.00
First SDI MWD Survey									
338.00	2.01	298.52	337.95	2.83	-4.17	5.04	0.94	0.91	-8.97
430.00	2.82	302.36	429.86	4.81	-7.50	8.91	0.90	0.88	4.17
522.00	4.84	301.84	521.65	8.07	-12.71	15.05	2.20	2.20	-0.57
615.00	6.68	304.56	614.18	13.21	-20.50	24.39	2.00	1.98	2.92
707.00	8.27	301.84	705.40	19.74	-30.53	36.35	1.77	1.73	-2.96
799.00	8.88	298.68	796.37	26.64	-42.38	50.04	0.84	0.66	-3.43
893.00	8.27	299.82	889.32	33.48	-54.61	64.03	0.67	-0.65	1.21

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-08-64A - Slot E
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 697-08-64A	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)	
985.00	7.74	304.12	980.42	40.24	-65.48	76.83	0.87	-0.58	4.67	
1,080.00	7.65	302.63	1,074.57	47.24	-76.10	89.54	0.23	-0.09	-1.57	
1,174.00	8.71	305.62	1,167.61	54.76	-87.15	102.91	1.21	1.13	3.18	
1,269.00	9.85	307.29	1,261.36	63.87	-99.47	118.20	1.23	1.20	1.76	
1,364.00	9.23	303.77	1,355.05	73.03	-112.26	133.93	0.90	-0.65	-3.71	
1,458.00	7.56	305.79	1,448.04	80.84	-123.55	147.64	1.80	-1.78	2.15	
1,553.00	7.56	307.38	1,542.21	88.29	-133.58	160.12	0.22	0.00	1.67	
1,648.00	7.65	308.34	1,636.38	96.00	-143.51	172.65	0.16	0.09	1.01	
1,742.00	7.65	309.57	1,729.54	103.87	-153.24	185.10	0.17	0.00	1.31	
1,837.00	7.12	306.59	1,823.75	111.41	-162.84	197.26	0.69	-0.56	-3.14	
1,932.00	7.21	300.87	1,918.01	117.98	-172.68	209.09	0.76	0.09	-6.02	
2,026.00	8.09	301.40	2,011.18	124.45	-183.39	221.60	0.94	0.94	0.56	
2,121.00	7.91	302.98	2,105.25	131.49	-194.58	234.82	0.30	-0.19	1.66	
2,216.00	8.18	303.16	2,199.32	138.75	-205.72	248.11	0.29	0.28	0.19	
2,310.00	8.71	303.51	2,292.30	146.33	-217.26	261.92	0.57	0.56	0.37	
2,405.00	8.44	303.51	2,386.23	154.15	-229.07	276.08	0.28	-0.28	0.00	
2,500.00	7.65	304.56	2,480.30	161.59	-240.09	289.38	0.85	-0.83	1.11	
2,595.00	7.30	304.56	2,574.49	168.60	-250.27	301.73	0.37	-0.37	0.00	
2,660.00	8.09	304.74	2,638.91	173.55	-257.42	310.43	1.22	1.22	0.28	
Last Survey in 12 1/4" Hole										
2,787.00	8.62	308.85	2,764.56	184.61	-272.18	328.84	0.63	0.42	3.24	
First Survey in 7 7/8" Hole										
2,882.00	7.65	308.32	2,858.60	193.00	-282.69	342.22	1.02	-1.02	-0.56	
2,977.00	8.00	310.43	2,952.72	201.21	-292.68	355.07	0.48	0.37	2.22	
3,072.00	8.09	306.56	3,046.78	209.48	-303.08	368.31	0.58	0.09	-4.07	
3,166.00	9.50	309.46	3,139.68	218.35	-314.38	382.62	1.57	1.50	3.09	
3,261.00	9.94	305.24	3,233.31	228.06	-327.13	398.61	0.88	0.46	-4.44	
3,356.00	9.94	304.10	3,326.89	237.39	-340.62	415.00	0.21	0.00	-1.20	
3,450.00	10.11	305.07	3,419.45	246.68	-354.09	431.36	0.25	0.18	1.03	
3,545.00	8.88	302.78	3,513.15	255.44	-367.08	447.02	1.35	-1.29	-2.41	
3,640.00	8.44	301.90	3,607.07	263.09	-379.16	461.33	0.48	-0.46	-0.93	
3,735.00	8.18	301.99	3,701.07	270.36	-390.81	475.05	0.27	-0.27	0.09	
3,829.00	7.56	300.50	3,794.18	277.04	-401.81	487.92	0.69	-0.66	-1.59	
3,924.00	8.09	302.08	3,888.30	283.76	-412.86	500.84	0.60	0.56	1.66	
4,019.00	7.47	302.34	3,982.42	290.61	-423.74	513.70	0.65	-0.65	0.27	
4,113.00	8.27	303.66	4,075.54	297.63	-434.53	526.57	0.87	0.85	1.40	
4,208.00	7.65	301.99	4,169.62	304.77	-445.58	539.72	0.70	-0.65	-1.76	
4,303.00	8.44	306.65	4,263.69	312.28	-456.54	553.01	1.08	0.83	4.91	
4,397.00	7.56	306.30	4,356.77	320.06	-467.06	566.07	0.94	-0.94	-0.37	
4,492.00	8.27	304.01	4,450.87	327.58	-477.76	579.14	0.82	0.75	-2.41	
4,587.00	7.56	302.78	4,544.96	334.78	-488.68	592.22	0.77	-0.75	-1.29	
4,682.00	7.74	299.71	4,639.11	341.34	-499.49	604.85	0.47	0.19	-3.23	
4,776.00	8.27	297.60	4,732.20	347.61	-510.98	617.90	0.64	0.56	-2.24	



Scientific Drilling Survey Report



Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-08-64A - Slot E
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 697-08-64A	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Buidl Rate (°/100ft)	Turn Rate (°/100ft)
4,871.00	8.53	301.82	4,826.18	354.49	-523.02	631.74	0.70	0.27	4.44
4,966.00	8.18	302.26	4,920.17	361.81	-534.72	645.54	0.37	-0.37	0.46
5,060.00	7.12	308.41	5,013.34	369.00	-544.94	658.03	1.42	-1.13	6.54
5,155.00	8.00	316.58	5,107.51	377.46	-554.10	670.33	1.46	0.93	8.60
5,250.00	8.35	329.50	5,201.55	388.20	-562.14	682.94	1.96	0.37	13.60
5,345.00	8.71	331.61	5,295.50	400.48	-569.06	695.45	0.50	0.38	2.22
5,439.00	7.56	328.71	5,388.56	412.02	-575.66	707.29	1.30	-1.22	-3.09
5,534.00	6.24	328.89	5,482.87	421.78	-581.57	717.58	1.39	-1.39	0.19
5,629.00	4.66	322.73	5,577.43	429.27	-586.58	725.87	1.77	-1.66	-6.48
5,723.00	3.25	312.28	5,671.21	434.11	-590.86	732.10	1.68	-1.50	-11.12
5,818.00	2.02	309.90	5,766.11	436.99	-594.14	736.42	1.30	-1.29	-2.51
5,913.00	0.53	289.60	5,861.08	438.21	-595.84	738.51	1.61	-1.57	-21.37
6,007.00	0.44	281.69	5,955.08	438.43	-596.60	739.27	0.12	-0.10	-8.41
6,102.00	0.44	268.24	6,050.07	438.50	-597.32	739.91	0.11	0.00	-14.16
6,197.00	0.62	268.33	6,145.07	438.47	-598.20	740.63	0.19	0.19	0.09
6,292.00	0.88	248.73	6,240.06	438.19	-599.39	741.48	0.38	0.27	-20.63
6,386.00	0.97	228.25	6,334.05	437.40	-600.66	742.10	0.36	0.10	-21.79
6,481.00	1.06	220.61	6,429.04	436.20	-601.83	742.43	0.17	0.09	-8.04
6,576.00	1.14	224.74	6,524.02	434.86	-603.07	742.73	0.12	0.08	4.35
6,671.00	1.32	230.10	6,619.00	433.48	-604.57	743.24	0.22	0.19	5.64
6,765.00	1.32	221.84	6,712.97	431.98	-606.13	743.71	0.20	0.00	-8.79
6,860.00	0.26	115.05	6,807.96	431.08	-606.66	743.67	1.49	-1.12	-112.41
6,955.00	0.26	128.85	6,902.96	430.85	-606.30	743.24	0.07	0.00	14.53
7,050.00	0.44	138.52	6,997.96	430.44	-605.89	742.67	0.20	0.19	10.18
7,144.00	0.44	180.00	7,091.96	429.81	-605.65	742.13	0.33	0.00	44.13
7,239.00	0.53	203.38	7,186.95	429.04	-605.82	741.85	0.23	0.09	24.61
7,334.00	0.88	220.87	7,281.95	428.09	-606.48	741.87	0.43	0.37	18.41
7,429.00	1.14	217.27	7,376.93	426.78	-607.53	742.04	0.28	0.27	-3.79
7,523.00	1.06	224.21	7,470.92	425.42	-608.70	742.27	0.17	-0.09	7.38
7,618.00	1.06	207.60	7,565.90	424.01	-609.72	742.35	0.32	0.00	-17.48
7,713.00	1.14	188.17	7,660.88	422.29	-610.26	741.87	0.40	0.08	-20.45
7,807.00	1.32	196.70	7,754.86	420.33	-610.70	741.17	0.27	0.19	9.07
7,902.00	1.06	200.21	7,849.84	418.46	-611.32	740.66	0.28	-0.27	3.69
7,997.00	0.88	202.15	7,944.83	416.96	-611.90	740.32	0.19	-0.19	2.04
8,091.00	1.23	199.42	8,038.81	415.34	-612.51	739.94	0.38	0.37	-2.90
8,186.00	1.23	214.54	8,133.79	413.54	-613.42	739.73	0.34	0.00	15.92
8,281.00	1.23	200.30	8,228.77	411.74	-614.36	739.52	0.32	0.00	-14.99
8,376.00	0.88	192.39	8,323.75	410.07	-614.87	739.04	0.40	-0.37	-8.33
8,471.00	0.79	189.49	8,418.74	408.71	-615.13	738.51	0.10	-0.09	-3.05
8,565.00	1.49	194.24	8,512.72	406.89	-615.54	737.86	0.75	0.74	5.05
8,660.00	2.02	215.77	8,607.68	404.33	-616.82	737.53	0.88	0.56	22.66
8,755.00	2.29	211.99	8,702.61	401.36	-618.81	737.57	0.32	0.28	-3.98
Last SDI MWD Survey									
8,813.00	2.29	211.99	8,760.56	399.40	-620.03	737.52	0.00	0.00	0.00

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well CC 697-08-64A - Slot E
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 697-08-64A	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)
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Projection to TD - BHL = 630175.65 ft N, 1228736.31 ft E

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
245.00	244.98	1.49	-1.98	First SDI MWD Survey
2,660.00	2,638.91	173.55	-257.42	Last Survey in 12 1/4" Hole
2,787.00	2,764.56	184.61	-272.18	First Survey in 7 7/8" Hole
8,755.00	8,702.61	401.36	-618.81	Last SDI MWD Survey
8,813.00	8,760.56	399.40	-620.03	Projection to TD
8,813.00	8,760.56	399.40	-620.03	BHL = 630175.65 ft N, 1228736.31 ft E

Checked By: _____	Approved By: _____	Date: _____
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