



Well Details: CC 697-09-15B

TVD Reference: GL 8381' & RKB 30' @ 8411.00ft (H&P 353) @ Level: 8381.00							Slot B
+N/-S 0.00	+E/-W 0.00	Northing 631287.79	Easting 1232484.78	Latitude 39° 32' 6.499 N	Longitude 108° 13' 17.765 W		

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-09-15B - Slot B, True North  
 Vertical (TVD) Reference: GL 8381' & RKB 30' @ 8411.00ft (H&P 353)  
 Section (VS) Reference: Slot - B(0.00N, 0.00E)  
 Measured Depth Reference: GL 8381' & RKB 30' @ 8411.00ft (H&P 353)  
 Calculation Method: Minimum Curvature

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

System Datum: Mean Sea Level

# **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 609-33 Pad  
CC 697-09-15B - Slot B**

**OH**

**Design: OH**

## **Standard Survey Report**

**29 June, 2011**



# Scientific Drilling International, Inc.

## Survey Report



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-09-15B - Slot B
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 609-33 Pad	<b>MD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Well:</b>	CC 697-09-15B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockles Compass Server

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

<b>Site</b> Cascade Creek 609-33 Pad, Sec 9 T6S R67W					
<b>Site Position:</b>		<b>Northing:</b>	631,314.66 usft	<b>Latitude:</b>	39° 32' 6.734 N
<b>From:</b>	Map	<b>Easting:</b>	1,232,383.54 usft	<b>Longitude:</b>	108° 13' 19.067 W
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b>	-1.72 °

<b>Well</b> CC 697-09-15B - Slot B						
<b>Well Position</b>	<b>+N-S</b>	0.00 ft	<b>Northing:</b>	631,287.79 usft	<b>Latitude:</b>	39° 32' 6.499 N
	<b>+E-W</b>	0.00 ft	<b>Easting:</b>	1,232,484.78 usft	<b>Longitude:</b>	108° 13' 17.765 W
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	8,381.00 ft

<b>Wellbore</b> OH					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2005-10	12/31/2009	10.62	65.78	52,397

<b>Design</b> OH					
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N-S (ft)</b>	<b>+E-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00		20.78

<b>Survey Program</b>		<b>Date</b>	6/29/2011		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
112.00	633.00	Survey #1 - Gyro Survey (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
708.00	2,681.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,785.00	9,475.00	Survey #3 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	

<b>Survey</b>										
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	0.00
112.00	0.26	39.90	112.00	0.19	0.16	0.24	0.23	0.23	0.23	0.00
<b>First SDI Gyro Survey</b>										
173.00	0.79	33.40	173.00	0.65	0.48	0.78	0.87	0.87	0.87	-10.66
285.00	1.14	1.58	264.98	2.10	0.86	2.26	0.68	0.38	0.38	-34.59
358.00	1.85	39.29	357.95	4.18	1.83	4.56	1.27	0.76	0.76	40.55
449.00	2.90	10.72	448.88	7.58	3.19	8.22	1.71	1.15	1.15	-31.40
541.00	5.01	19.60	540.65	13.65	4.97	14.53	2.38	2.29	2.29	9.65
633.00	8.62	19.07	631.99	23.96	8.57	25.44	3.92	3.92	3.92	-0.58

**Scientific Drilling International, Inc.**  
Survey Report



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-09-15B - Slot B
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 609-33 Pad	<b>MD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Well:</b>	CC 697-09-15B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

**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)	
<b>Last SDI Gyro Survey</b>										
708.00	10.64	15.34	705.93	35.95	12.24	37.95	2.82	2.69	-4.97	
<b>First SDI Surface MWD Survey</b>										
800.00	12.93	17.42	795.98	53.96	17.57	56.69	2.53	2.49	2.26	
892.00	13.01	17.77	885.64	73.65	23.81	77.30	0.12	0.09	0.38	
983.00	14.60	16.63	974.01	94.39	30.22	98.97	1.77	1.75	-1.25	
1,078.00	16.71	17.42	1,065.48	118.90	37.74	124.55	2.23	2.22	0.83	
1,172.00	19.35	16.19	1,154.85	146.75	46.13	153.57	2.84	2.81	-1.31	
1,267.00	21.90	16.28	1,243.76	178.88	55.48	186.93	2.68	2.68	0.09	
1,362.00	21.46	19.27	1,332.04	212.29	66.19	221.96	1.25	-0.46	3.15	
1,456.00	22.34	21.73	1,419.26	245.12	78.48	257.01	1.35	0.94	2.62	
1,551.00	23.65	24.02	1,506.71	279.30	92.92	294.09	1.67	1.38	2.41	
1,645.00	23.48	24.98	1,592.87	313.49	108.50	331.59	0.45	-0.18	1.02	
1,740.00	21.98	23.84	1,680.49	346.91	123.68	368.22	1.65	-1.58	-1.20	
1,835.00	21.28	23.66	1,768.80	378.96	137.78	403.19	0.74	-0.74	-0.19	
1,929.00	21.46	21.99	1,856.34	410.53	151.07	437.42	0.68	0.19	-1.78	
2,024.00	21.98	21.64	1,944.59	443.17	164.13	472.57	0.56	0.55	-0.37	
2,118.00	21.28	22.43	2,031.97	475.29	177.13	507.21	0.81	-0.74	0.84	
2,213.00	21.19	20.06	2,120.52	507.35	189.59	541.61	0.91	-0.09	-2.49	
2,308.00	21.10	22.78	2,209.13	539.25	202.10	575.87	1.04	-0.09	2.86	
2,402.00	21.98	21.64	2,296.56	571.20	215.14	610.37	1.04	0.94	-1.21	
2,497.00	21.81	22.26	2,384.71	604.06	228.38	645.79	0.30	-0.18	0.65	
2,592.00	21.28	21.03	2,473.07	636.48	241.26	680.67	0.73	-0.56	-1.29	
2,681.00	21.46	21.11	2,555.96	666.74	252.92	713.10	0.20	0.20	0.09	
<b>Last SDI Surface MWD Survey</b>										
2,785.00	19.17	20.22	2,653.48	700.52	265.67	749.20	2.22	-2.20	-0.86	
<b>First SDI Production MWD Survey</b>										
2,879.00	20.14	19.95	2,742.00	730.21	276.53	780.82	1.04	1.03	-0.29	
2,974.00	20.84	21.01	2,830.99	761.36	288.17	814.07	0.83	0.74	1.12	
3,069.00	20.14	19.51	2,919.98	792.55	299.69	847.32	0.92	-0.74	-1.58	
3,163.00	21.54	17.23	3,007.83	824.29	310.20	880.72	1.72	1.49	-2.43	
3,258.00	21.98	19.51	3,096.06	857.71	321.31	915.91	1.00	0.46	2.40	
3,352.00	23.13	19.86	3,182.87	891.65	333.45	951.95	1.23	1.22	0.37	
3,447.00	23.92	18.63	3,269.98	927.45	345.95	989.86	0.98	0.83	-1.29	
3,542.00	24.27	20.57	3,356.70	963.98	358.96	1,028.63	0.91	0.37	2.04	
3,637.00	23.83	20.04	3,443.45	1,000.29	372.39	1,067.34	0.52	-0.46	-0.56	
3,731.00	22.42	20.48	3,529.90	1,034.93	385.17	1,104.26	1.51	-1.50	0.47	
3,826.00	23.39	19.86	3,617.41	1,069.63	397.92	1,141.23	1.05	1.02	-0.65	
3,921.00	22.34	21.01	3,704.94	1,104.22	410.80	1,178.14	1.20	-1.11	1.21	
4,016.00	20.58	21.09	3,793.35	1,138.66	423.28	1,212.89	1.85	-1.85	0.08	
4,110.00	21.90	21.89	3,880.96	1,168.34	435.76	1,246.94	1.44	1.40	0.85	
4,205.00	22.77	19.78	3,968.84	1,202.08	448.59	1,283.04	1.25	0.92	-2.22	
4,300.00	21.63	19.78	4,056.79	1,235.86	460.74	1,318.93	1.20	-1.20	0.00	
4,394.00	23.39	22.50	4,143.63	1,269.40	473.74	1,354.90	2.18	1.87	2.89	

# Scientific Drilling International, Inc.

## Survey Report



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-09-15B - Slot B
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 609-33 Pad	<b>MD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Well:</b>	CC 697-09-15B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

### 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)
4,489.00	22.91	22.55	4,230.98	1,303.90	488.05	1,392.23	0.51	-0.51	0.05
4,583.00	21.90	23.20	4,317.88	1,336.91	501.97	1,428.04	1.11	-1.07	0.69
4,678.00	22.86	24.79	4,405.73	1,369.95	516.69	1,464.15	1.19	1.01	1.67
4,773.00	21.28	24.70	4,493.77	1,402.37	531.63	1,499.76	1.66	-1.66	-0.09
4,867.00	21.81	20.83	4,581.20	1,434.19	544.97	1,534.24	1.61	0.56	-4.12
4,962.00	21.72	19.69	4,669.43	1,467.23	557.17	1,569.46	0.45	-0.09	-1.20
5,057.00	20.75	17.75	4,757.98	1,499.81	568.22	1,603.84	1.26	-1.02	-2.04
5,152.00	20.66	17.49	4,846.84	1,531.82	578.39	1,637.38	0.14	-0.09	-0.27
5,246.00	19.87	16.35	4,935.02	1,562.97	587.87	1,669.86	0.94	-0.84	-1.21
5,341.00	19.17	16.96	5,024.56	1,593.38	596.96	1,701.52	0.77	-0.74	0.64
5,436.00	20.40	23.29	5,113.96	1,623.51	608.06	1,733.63	2.60	1.29	6.66
5,530.00	20.05	23.91	5,202.17	1,653.29	621.07	1,766.09	0.44	-0.37	0.66
5,625.00	19.81	23.20	5,291.54	1,682.83	633.95	1,798.28	0.53	-0.46	-0.75
5,720.00	18.99	22.33	5,381.20	1,711.78	646.10	1,829.65	0.72	-0.65	-0.92
5,814.00	17.94	21.45	5,470.36	1,739.40	657.21	1,859.42	1.16	-1.12	-0.94
5,909.00	17.50	20.13	5,560.85	1,766.43	667.47	1,888.33	0.63	-0.46	-1.39
6,004.00	16.71	18.90	5,651.65	1,792.77	676.81	1,916.27	0.91	-0.83	-1.29
6,099.00	16.09	17.75	5,742.78	1,818.23	685.25	1,943.06	0.74	-0.85	-1.21
6,193.00	15.48	21.53	5,833.24	1,842.30	693.83	1,968.61	1.27	-0.65	4.02
6,288.00	14.25	22.24	5,925.06	1,864.92	702.90	1,992.98	1.31	-1.29	0.75
6,383.00	13.10	21.89	6,017.36	1,885.73	711.34	2,015.43	1.21	-1.21	-0.37
6,478.00	11.08	20.74	6,110.25	1,904.26	718.59	2,035.33	2.14	-2.13	-1.21
6,572.00	9.50	22.76	6,202.74	1,919.86	724.79	2,052.11	1.72	-1.68	2.15
6,667.00	9.06	21.53	6,296.49	1,934.05	730.57	2,067.43	0.51	-0.46	-1.29
6,762.00	7.03	19.60	6,390.55	1,946.48	735.27	2,080.72	2.16	-2.14	-2.03
6,856.00	7.12	24.00	6,483.84	1,957.22	739.56	2,092.29	0.58	0.10	4.68
6,951.00	6.33	25.49	6,578.18	1,967.33	744.21	2,103.39	0.85	-0.83	1.57
7,045.00	6.33	28.39	6,671.61	1,976.57	748.91	2,113.69	0.34	0.00	3.09
7,140.00	5.98	37.62	6,766.07	1,985.09	754.42	2,123.62	1.10	-0.37	9.72
7,235.00	6.24	37.09	6,860.53	1,993.13	760.55	2,133.31	0.28	0.27	-0.56
7,329.00	7.56	30.59	6,953.84	2,002.53	766.78	2,144.30	1.63	1.40	-6.91
7,424.00	7.91	28.48	7,047.98	2,013.66	773.08	2,156.94	0.47	0.37	-2.22
7,518.00	8.35	24.08	7,141.04	2,025.57	778.95	2,170.16	0.81	0.47	-4.68
7,613.00	9.15	23.73	7,234.93	2,038.79	784.80	2,184.59	0.84	0.84	-0.37
7,707.00	8.88	21.62	7,327.77	2,052.37	790.48	2,199.31	0.45	-0.29	-2.24
7,802.00	9.32	17.84	7,421.57	2,066.51	795.54	2,214.33	0.78	0.46	-3.98
7,897.00	9.15	19.16	7,515.34	2,080.97	800.38	2,229.56	0.29	-0.18	1.39
7,991.00	8.62	22.06	7,608.21	2,094.56	805.47	2,244.07	0.74	-0.56	3.09
8,086.00	8.97	27.60	7,702.10	2,107.72	811.58	2,258.55	0.96	0.37	5.83
8,181.00	8.88	28.13	7,795.95	2,120.75	818.47	2,273.17	0.13	-0.09	0.56
8,275.00	7.39	27.16	7,889.00	2,132.53	824.65	2,288.38	1.59	-1.59	-1.03
8,370.00	7.12	23.47	7,983.24	2,143.36	829.78	2,298.33	0.57	-0.28	-3.88
8,465.00	5.98	20.92	8,077.62	2,153.39	833.89	2,309.16	1.24	-1.20	-2.68

Scientific Drilling International, Inc.

Survey Report



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 897-09-15B - Slot B
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 609-33 Pad	<b>MD Reference:</b>	GL 8381' & RKB 30' @ 8411.00ft (H&P 353)
<b>Well:</b>	CC 697-09-15B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

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)	
8,559.00	5.72	14.68	8,171.13	2,162.49	836.83	2,318.71	0.73	-0.28	-6.64	
8,654.00	4.92	19.42	8,265.72	2,170.91	839.38	2,327.49	0.96	-0.84	4.99	
8,743.00	3.61	10.37	8,354.47	2,177.27	841.16	2,334.06	1.65	-1.47	-10.17	
8,843.00	2.81	354.90	8,454.32	2,182.81	841.51	2,339.37	1.17	-0.80	-15.47	
8,938.00	2.11	337.94	8,549.23	2,186.75	840.64	2,342.74	1.06	-0.74	-17.85	
9,032.00	2.29	316.41	8,643.16	2,189.71	838.70	2,344.83	0.89	0.19	-22.90	
9,127.00	1.85	302.78	8,738.10	2,191.92	836.10	2,345.96	0.69	-0.46	-14.35	
9,221.00	1.67	304.19	8,832.06	2,193.51	833.69	2,346.60	0.20	-0.19	1.50	
9,316.00	2.02	274.40	8,927.01	2,194.42	830.88	2,346.45	1.06	0.37	-31.36	
9,411.00	2.90	271.23	9,021.92	2,194.60	826.80	2,345.17	0.94	0.93	-3.34	
9,418.00	2.64	274.31	9,028.91	2,194.61	826.47	2,345.06	4.28	-3.71	44.00	
<b>Last SDI Production MWD Survey</b>										
9,475.00	2.64	274.31	9,085.85	2,194.81	823.85	2,344.32	0.00	0.00	0.00	
<b>Projection to TD - BHL = 633456.93, 1233374.00</b>										

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
112.00	112.00	0.19	0.16	First SDI Gyro Survey
633.00	631.99	23.96	8.57	Last SDI Gyro Survey
708.00	705.93	35.95	12.24	First SDI Surface MWD Survey
2,681.00	2,555.96	666.74	252.92	Last SDI Surface MWD Survey
2,785.00	2,653.48	700.52	265.67	First SDI Production MWD Survey
9,418.00	9,028.91	2,194.61	826.47	Last SDI Production MWD Survey
9,475.00	9,085.85	2,194.81	823.85	Projection to TD
9,475.00	9,085.85	2,194.81	823.85	BHL = 633456.93, 1233374.00

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_