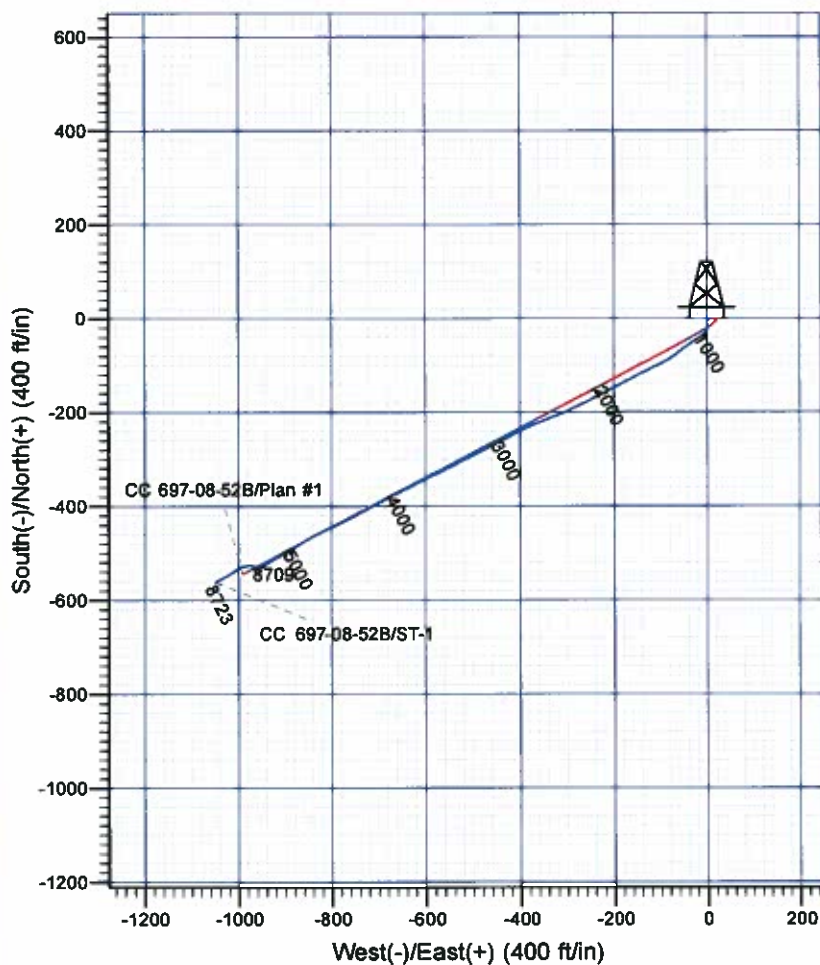
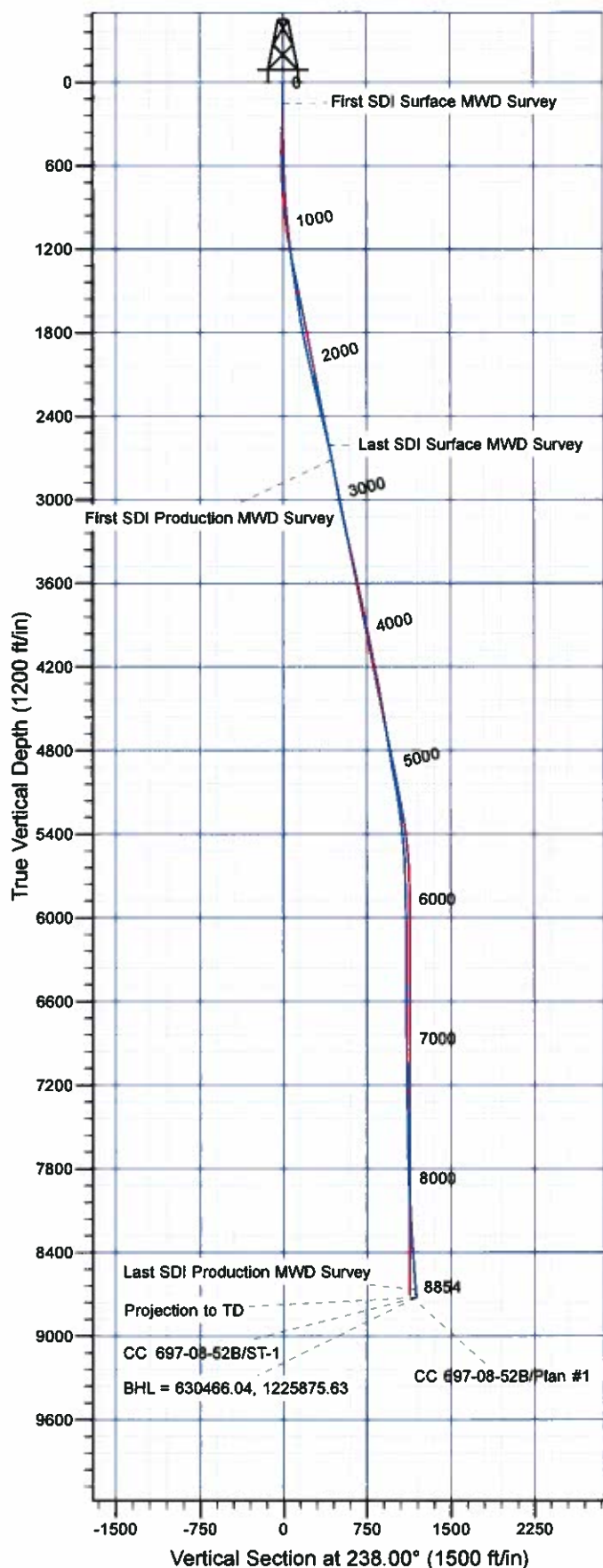




**Scientific Drilling**  
Rocky Mountain Operations

Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 697-08-53 Pad  
Well: CC 697-08-52B  
Wellbore: ST-1  
Design: ST-1



#### Well Details: CC 697-08-52B

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	630995.35	1226941.66	39° 32' 1.963 N	108° 14' 28.371 W	U

#### REFERENCE INFORMATION

Co-ordinate (NE) Reference: Well CC 697-08-52B - Slot U, True North  
Vertical (TVD) Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
Section (VS) Reference: Slot - U(0.00N, 0.00E)  
Measured Depth Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
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

Plan: ST-1

11:46, October 11 2011  
Created By: Janie Cooke

# **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 697-08-53 Pad  
CC 697-08-52B - Slot U**

**ST-1**

**Design: ST-1**

## **Standard Survey Report**

**11 October, 2011**





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-52B - Slot U
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-52B	<b>North Reference:</b>	True
<b>Wellbore:</b>	ST-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	ST-1	<b>Database:</b>	Rockies 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		

Site		Cascade Creek 697-08-53 Pad, Sec. 8 T6S R97W			
Site Position:		Northing:	630,837.78 usft	Latitude:	39° 32' 0.393 N
From:	Map	Easting:	1,226,897.42 usft	Longitude:	108° 14' 28.874 W
Position Uncertainty:	0.00 ft	Slot Radius:	0.000 in	Grid Convergence:	-1.73 °

Well	CC 697-08-52B - Slot U					
Well Position	+N/-S	0.00 ft	Northing:	630,995.35 usft	Latitude:	39° 32' 1.963 N
	+E/-W	0.00 ft	Easting:	1,226,941.66 usft	Longitude:	108° 14' 28.371 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,379.00 ft

<b>Wellbore</b>	ST-1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	09/10/2011	10.43	65.72	52,195

<b>Design</b>	ST-1				
<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		238.00

<b>Survey Program</b>	<b>Date</b> 10/11/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
154.00	2,655.00	Survey #1 - Surface MWD (ST-1)	MWD-SDI	MWD - Standard ISCWSA
2,766.00	8,854.00	Survey #2 - Production MWD (ST-1)	MWD-SDI	MWD - Standard ISCWSA

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
154.00	0.88	107.72	153.99	-0.36	1.13	-0.76	0.57	0.57	0.00	
<b>First SDI Surface MWD Survey</b>										
243.00	1.32	173.30	242.98	-1.59	1.90	-0.77	1.40	0.49	73.69	
332.00	1.14	190.97	331.96	-3.47	1.85	0.27	0.47	-0.20	19.85	
422.00	1.67	238.08	421.94	-5.05	0.56	2.19	1.36	0.59	52.34	
511.00	1.67	188.33	510.90	-7.01	-0.72	4.33	1.58	0.00	-55.90	
602.00	3.78	162.05	601.80	-11.18	0.01	5.92	2.64	2.32	-28.88	
694.00	5.36	176.64	693.50	-18.36	1.20	8.71	2.12	1.72	15.86	
786.00	6.07	203.89	785.06	-27.10	-0.52	14.80	3.02	0.77	29.62	



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-52B - Slot U
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-52B	<b>North Reference:</b>	True
<b>Wellbore:</b>	ST-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	ST-1	<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)
875.00	6.24	228.85	873.57	-34.58	-6.07	23.47	2.99	0.19	28.04
966.00	5.80	241.15	964.07	-40.05	-13.82	32.95	1.49	-0.48	13.52
1,060.00	7.39	238.43	1,057.44	-45.51	-23.14	43.74	1.72	1.69	-2.89
1,155.00	8.79	236.23	1,151.50	-52.75	-34.38	57.10	1.51	1.47	-2.32
1,250.00	9.50	233.59	1,245.29	-61.43	-46.72	72.17	0.87	0.75	-2.78
1,344.00	10.38	232.19	1,337.88	-71.23	-59.65	88.33	0.97	0.94	-1.49
1,439.00	10.29	234.74	1,431.34	-81.38	-73.34	105.32	0.49	-0.09	2.68
1,534.00	10.99	241.06	1,524.70	-90.66	-88.20	122.83	1.43	0.74	6.65
1,628.00	10.55	244.67	1,617.05	-98.67	-103.81	140.33	0.86	-0.47	3.84
1,723.00	11.43	244.49	1,710.31	-106.45	-120.17	158.32	0.93	0.93	-0.19
1,818.00	13.54	242.21	1,803.06	-115.69	-138.51	178.77	2.28	2.22	-2.40
1,913.00	15.21	242.73	1,895.08	-126.58	-159.42	202.28	1.76	1.76	0.55
2,007.00	15.83	242.03	1,985.65	-138.25	-181.71	227.36	0.69	0.66	-0.74
2,102.00	15.92	243.00	2,077.03	-150.24	-204.76	253.26	0.29	0.09	1.02
2,197.00	15.74	243.09	2,168.42	-161.99	-227.86	279.07	0.19	-0.19	0.09
2,291.00	16.44	243.09	2,258.74	-173.78	-251.09	305.02	0.74	0.74	0.00
2,386.00	16.62	243.35	2,349.82	-185.95	-275.22	331.94	0.20	0.19	0.27
2,480.00	16.97	246.43	2,439.81	-197.47	-299.81	358.90	1.02	0.37	3.28
2,575.00	17.23	247.92	2,530.61	-208.30	-325.56	386.47	0.54	0.27	1.57
2,655.00	16.00	248.98	2,607.27	-216.71	-346.83	408.97	1.58	-1.54	1.33
Last SDI Surface MWD Survey									
2,766.00	14.89	248.59	2,714.26	-227.40	-374.39	438.00	1.00	-1.00	-0.35
First SDI Production MWD Survey									
2,860.00	14.25	242.29	2,805.24	-237.19	-395.87	461.41	1.82	-0.68	-6.70
2,955.00	11.34	240.70	2,897.87	-247.20	-414.37	482.41	3.09	-3.06	-1.67
3,050.00	12.31	240.79	2,990.85	-256.72	-431.36	501.85	1.02	1.02	0.09
3,145.00	14.95	243.08	3,083.17	-267.21	-451.13	524.18	2.84	2.78	2.41
3,239.00	16.36	243.87	3,173.68	-278.53	-473.82	549.42	1.52	1.50	0.84
3,334.00	16.09	242.81	3,264.90	-290.44	-497.55	575.85	0.42	-0.28	-1.12
3,429.00	15.92	242.55	3,356.21	-302.46	-520.82	601.96	0.19	-0.18	-0.27
3,524.00	15.74	243.16	3,447.61	-314.28	-543.88	627.78	0.26	-0.19	0.64
3,618.00	15.12	243.16	3,538.22	-325.57	-566.19	652.69	0.66	-0.66	0.00
3,713.00	14.86	243.87	3,629.99	-336.53	-588.19	677.15	0.34	-0.27	0.75
3,807.00	14.51	242.72	3,720.92	-347.24	-609.47	700.87	0.48	-0.37	-1.22
3,902.00	14.33	243.08	3,812.93	-358.02	-630.53	724.44	0.21	-0.19	0.38
3,997.00	14.16	243.60	3,905.01	-368.51	-651.42	747.72	0.22	-0.18	0.55
4,091.00	13.81	242.29	3,996.22	-378.84	-671.66	770.35	0.50	-0.37	-1.39
4,186.00	13.89	242.37	4,088.46	-389.40	-691.80	793.02	0.09	0.08	0.08
4,281.00	14.16	242.02	4,180.63	-400.14	-712.16	815.99	0.30	0.28	-0.37
4,375.00	13.98	240.97	4,271.81	-411.04	-732.24	838.79	0.33	-0.19	-1.12
4,470.00	13.28	242.55	4,364.13	-421.64	-751.96	861.13	0.83	-0.74	1.66
4,565.00	12.84	243.87	4,456.67	-431.32	-771.12	882.51	0.56	-0.46	1.39
4,660.00	11.34	243.78	4,549.56	-440.09	-788.97	902.30	1.58	-1.58	-0.09





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-52B - Slot U
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-52B	<b>North Reference:</b>	True
<b>Wellbore:</b>	ST-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	ST-1	<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)
4,755.00	10.38	245.45	4,642.86	-447.78	-805.14	920.08	1.06	-1.01	1.76
4,849.00	11.08	244.92	4,735.22	-455.12	-821.02	937.45	0.75	0.74	-0.56
4,944.00	11.61	244.66	4,828.36	-463.08	-837.93	956.00	0.56	0.56	-0.27
5,039.00	12.66	238.24	4,921.24	-472.66	-855.42	975.91	1.80	1.11	-6.76
5,133.00	12.93	235.87	5,012.91	-483.98	-872.89	996.72	0.63	0.29	-2.52
5,228.00	11.78	239.74	5,105.71	-494.83	-890.06	1,017.04	1.49	-1.21	4.07
5,323.00	10.46	242.55	5,198.92	-503.69	-906.09	1,035.33	1.50	-1.39	2.96
5,417.00	9.06	242.02	5,291.56	-511.10	-920.20	1,051.21	1.49	-1.49	-0.56
5,512.00	7.56	235.61	5,385.56	-518.14	-931.96	1,064.92	1.85	-1.58	-6.75
5,607.00	5.63	238.95	5,479.93	-524.07	-941.11	1,075.83	2.07	-2.03	3.52
5,701.00	4.13	234.38	5,573.59	-528.42	-947.82	1,083.81	1.65	-1.60	-4.86
5,796.00	2.20	238.07	5,668.44	-531.38	-952.14	1,089.05	2.04	-2.03	3.88
5,891.00	1.67	247.91	5,763.38	-532.86	-954.97	1,092.24	0.66	-0.56	10.36
5,986.00	1.76	241.58	5,858.34	-534.08	-957.54	1,095.06	0.22	0.09	-6.66
6,081.00	2.02	246.94	5,953.29	-535.43	-960.36	1,098.17	0.33	0.27	5.64
6,175.00	1.58	262.06	6,047.24	-536.26	-963.17	1,100.99	0.68	-0.47	16.09
6,270.00	0.70	353.73	6,142.23	-535.86	-964.53	1,101.93	1.84	-0.93	96.49
6,364.00	0.88	351.97	6,236.22	-534.57	-964.70	1,101.39	0.19	0.19	-1.87
6,459.00	1.06	343.97	6,331.20	-533.01	-965.04	1,100.85	0.24	0.19	-8.42
6,554.00	0.97	342.83	6,426.19	-531.39	-965.52	1,100.41	0.10	-0.09	-1.20
6,649.00	0.97	335.36	6,521.18	-529.90	-966.09	1,100.10	0.13	0.00	-7.86
6,743.00	0.97	310.93	6,615.16	-528.65	-967.03	1,100.23	0.44	0.00	-25.99
6,838.00	0.79	300.73	6,710.15	-527.79	-968.20	1,100.76	0.25	-0.19	-10.74
6,932.00	1.14	286.58	6,804.14	-527.19	-969.65	1,101.68	0.45	0.37	-15.05
7,027.00	0.97	286.93	6,899.12	-526.69	-971.32	1,102.83	0.18	-0.18	0.37
7,122.00	0.97	290.54	6,994.11	-526.17	-972.85	1,103.85	0.06	0.00	3.80
7,217.00	0.97	282.63	7,089.10	-525.71	-974.38	1,104.91	0.14	0.00	-8.33
7,311.00	1.06	267.07	7,183.08	-525.58	-976.03	1,106.24	0.31	0.10	-16.55
7,406.00	0.88	254.68	7,278.07	-525.82	-977.61	1,107.70	0.29	-0.19	-13.04
7,501.00	0.88	249.58	7,373.06	-526.27	-979.00	1,109.12	0.08	0.00	-5.37
7,596.00	0.97	245.98	7,468.04	-526.85	-980.42	1,110.63	0.11	0.09	-3.79
7,690.00	1.58	258.90	7,562.02	-527.42	-982.41	1,112.63	0.71	0.65	13.74
7,785.00	1.76	259.07	7,656.98	-527.95	-985.13	1,115.21	0.19	0.19	0.18
7,879.00	1.58	257.67	7,750.94	-528.50	-987.82	1,117.78	0.20	-0.19	-1.49
7,974.00	2.20	258.63	7,845.89	-529.14	-990.88	1,120.72	0.65	0.65	1.01
8,069.00	2.81	251.43	7,940.80	-530.24	-994.88	1,124.69	0.72	0.64	-7.58
8,164.00	3.87	237.54	8,035.64	-532.71	-999.79	1,130.16	1.40	1.12	-14.62
8,258.00	3.96	236.40	8,129.42	-536.20	-1,005.17	1,136.58	0.13	0.10	-1.21
8,353.00	4.66	237.28	8,224.15	-540.11	-1,011.15	1,143.72	0.74	0.74	0.93
8,448.00	4.48	236.66	8,318.84	-544.23	-1,017.50	1,151.29	0.20	-0.19	-0.65
8,542.00	4.84	238.86	8,412.53	-548.30	-1,023.96	1,158.92	0.43	0.38	2.34
8,637.00	5.28	243.34	8,507.16	-552.33	-1,031.29	1,167.28	0.62	0.46	4.72
8,731.00	5.45	243.78	8,600.75	-556.25	-1,039.16	1,176.03	0.19	0.18	0.47
8,798.00	5.36	244.66	8,667.45	-558.99	-1,044.85	1,182.30	0.18	-0.13	1.31



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-52B - Slot U
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-52B	<b>North Reference:</b>	True
<b>Wellbore:</b>	ST-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	ST-1	<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 Production MWD Survey</b>									
8,854.00	5.36	244.66	8,723.21	-561.23	-1,049.57	1,187.50	0.00	0.00	0.00
<b>Projection to TD - BHL = 630466.04, 1225875.63</b>									

## Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
154.00	153.99	-0.36	1.13	First SDI Surface MWD Survey
2,655.00	2,607.27	-216.71	-346.83	Last SDI Surface MWD Survey
2,766.00	2,714.26	-227.40	-374.39	First SDI Production MWD Survey
8,798.00	8,667.45	-558.99	-1,044.85	Last SDI Production MWD Survey
8,854.00	8,723.21	-561.23	-1,049.57	Projection to TD
8,854.00	8,723.21	-561.23	-1,049.57	BHL = 630466.04, 1225875.63

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