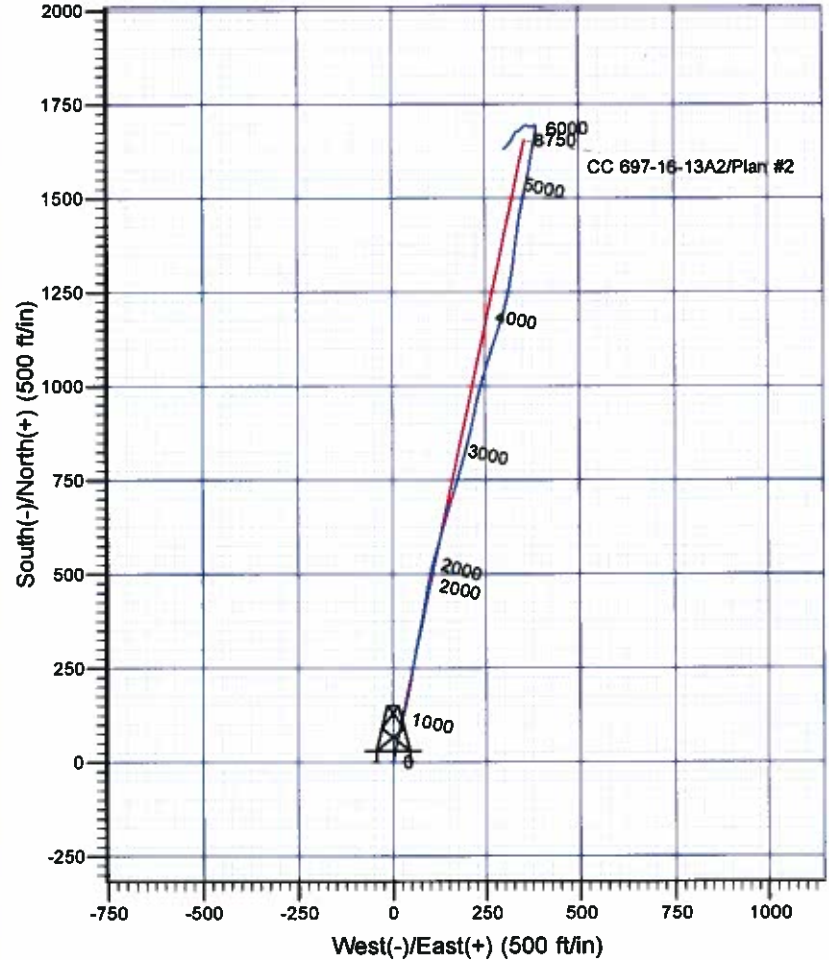
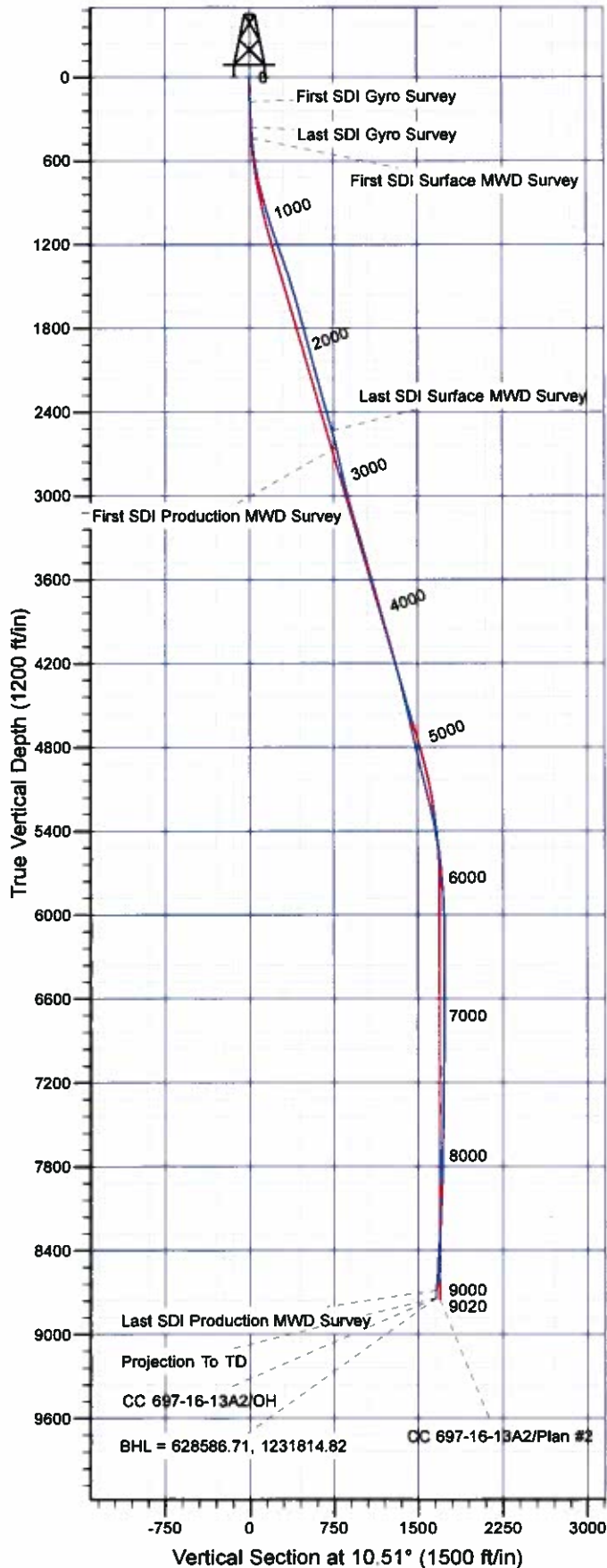




# Scientific Drilling

Rocky Mountain Operations

Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Cascade Creek 697-16-28 Pad  
 Well: CC 697-16-13A2  
 Wellbore: OH  
 Design: OH



## Well Details: CC 697-16-13A2

TVD Reference: GL 8297' & RKB 30' @ 8327.00ft (H&P 353) Level: 8297.00						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	628586.10	1231483.28	39° 31' 23.491 N	108° 13' 29.143 W	C

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-16-13A2 - Slot C, True North  
 Vertical (TVD) Reference: GL 8297' & RKB 30' @ 8327.00ft (H&P 353)  
 Section (VS) Reference: Slot - C(0.00N, 0.00E)  
 Measured Depth Reference: GL 8297' & RKB 30' @ 8327.00ft (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

Plan: OH

16:38, August 22 2011  
 Created By: Janis Cooke

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 697-16-28 Pad**

**CC 697-16-13A2 - Slot C**

**OH**

**Design: OH**

## **Standard Survey Report**

**22 August, 2011**





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-13A2 - Slot C
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-16-28 Pad	<b>MD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Well:</b>	CC 697-16-13A2	<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

<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 697-16-28 Pad, Sec. 16 T6N R97W		
<b>Site Position:</b>		<b>Northing:</b>	626,970.66 usft
<b>From:</b>	Map	<b>Easting:</b>	1,231,458.32 usft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	0.000 in
		<b>Latitude:</b>	39° 31' 23.545 N
		<b>Longitude:</b>	108° 13' 29.208 W
		<b>Grid Convergence:</b>	-1.72 °

<b>Well</b>	CC 697-16-13A2 - Slot C		
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>
			<b>Latitude:</b>
			<b>Longitude:</b>
			<b>Ground Level:</b>

<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	02/04/2011	10.48	65.74	52,285

<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00	10.51	

<b>Survey Program</b>	<b>Date</b>	08/22/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.00	358.00	Survey #1 - Gyro Survey (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
436.00	2,659.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,784.00	9,020.00	Survey #3 - Production MWD (OH)	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
175.00	1.41	4.57	174.98	2.15	0.17	2.14	0.81	0.81	0.00
<b>First SDI Gyro Survey</b>									
267.00	3.34	21.09	266.90	5.78	1.23	5.90	2.20	2.10	17.96
358.00	4.93	16.79	357.66	11.99	3.31	12.40	1.78	1.75	-4.73
<b>Last SDI Gyro Survey</b>									
436.00	5.54	4.75	435.34	18.95	4.59	19.47	1.61	0.78	-15.44
<b>First SDI Surface MWD Survey</b>									



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-13A2 - Slot C
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-16-28 Pad	<b>MD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Well:</b>	CC 697-16-13A2	<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)
529.00	8.27	7.56	527.65	30.06	5.84	30.62	2.96	2.94	3.02
622.00	11.87	12.74	619.21	46.03	8.83	46.86	3.99	3.87	5.57
716.00	14.86	13.89	710.65	67.16	13.86	68.56	3.19	3.18	1.22
808.00	17.06	14.68	799.10	91.67	20.11	93.80	2.40	2.39	0.86
897.00	19.35	13.80	883.64	118.62	26.94	121.55	2.59	2.57	-0.99
990.00	20.66	13.18	971.03	149.56	34.35	153.32	1.43	1.41	-0.67
1,083.00	22.34	11.87	1,057.55	182.83	41.73	187.38	1.88	1.81	-1.41
1,177.00	23.39	10.99	1,144.17	218.63	48.96	223.90	1.17	1.12	-0.94
1,272.00	24.71	10.02	1,230.92	256.70	56.01	262.61	1.45	1.39	-1.02
1,366.00	22.95	10.72	1,316.90	294.06	62.84	300.59	1.90	-1.87	0.74
1,461.00	22.86	10.37	1,404.41	330.41	69.61	337.56	0.17	-0.09	-0.37
1,556.00	20.93	11.25	1,492.55	365.20	76.24	372.98	2.06	-2.03	0.93
1,650.00	19.97	9.91	1,580.63	397.48	82.28	405.82	1.14	-1.02	-1.43
1,744.00	18.47	8.35	1,669.39	428.03	87.20	436.76	1.69	-1.60	-1.66
1,839.00	18.47	10.81	1,759.50	457.70	92.21	466.84	0.82	0.00	2.59
1,933.00	19.17	12.92	1,848.47	487.37	98.45	497.15	1.04	0.74	2.24
2,028.00	20.40	15.29	1,937.86	518.55	106.31	529.24	1.55	1.29	2.49
2,122.00	18.64	16.70	2,026.46	548.74	114.95	560.50	1.94	-1.87	1.50
2,217.00	18.55	16.79	2,116.50	577.75	123.67	590.62	0.10	-0.09	0.09
2,311.00	18.47	15.56	2,205.63	606.41	131.99	620.31	0.42	-0.09	-1.31
2,406.00	19.61	15.64	2,295.44	636.26	140.32	651.18	1.20	1.20	0.08
2,501.00	20.22	15.82	2,384.75	667.40	149.10	683.41	0.65	0.64	0.19
2,595.00	19.96	18.11	2,473.04	698.28	158.51	715.48	0.88	-0.28	2.44
2,659.00	19.52	18.54	2,533.28	718.80	165.31	736.90	0.72	-0.69	0.67
<b>Last SDI Surface MWD Survey</b>									
2,784.00	16.54	16.21	2,652.13	755.70	176.92	775.29	2.45	-2.38	-1.86
<b>First SDI Production MWD Survey</b>									
2,879.00	15.46	15.04	2,743.44	780.91	183.98	801.37	1.19	-1.14	-1.23
2,973.00	14.68	16.41	2,834.21	804.44	190.59	825.71	0.91	-0.83	1.46
3,068.00	16.18	13.18	2,925.79	828.87	197.01	850.91	1.82	1.58	-3.40
3,162.00	18.51	14.15	3,015.51	856.10	203.65	878.88	2.50	2.48	1.03
3,257.00	21.19	13.62	3,104.85	887.41	211.38	911.08	2.83	2.82	-0.56
3,351.00	19.35	13.80	3,193.03	919.05	219.10	943.60	1.96	-1.96	0.19
3,446.00	20.49	11.16	3,282.34	950.65	226.07	975.94	1.53	1.20	-2.78
3,540.00	19.70	12.74	3,370.62	982.24	232.75	1,008.22	1.02	-0.84	1.68
3,635.00	18.99	17.49	3,460.26	1,012.60	240.92	1,039.57	1.82	-0.75	5.00
3,729.00	19.96	18.46	3,548.88	1,042.41	250.60	1,070.64	1.09	1.03	1.03
3,823.00	19.35	16.96	3,637.41	1,072.53	260.22	1,102.00	0.84	-0.65	-1.60
3,918.00	18.99	16.00	3,727.14	1,102.44	269.07	1,133.03	0.50	-0.38	-1.01
4,012.00	19.52	20.21	3,815.89	1,131.88	278.72	1,163.73	1.58	0.56	4.48
4,107.00	19.61	16.70	3,905.40	1,162.04	288.78	1,195.23	1.24	0.09	-3.69
4,201.00	20.05	17.58	3,993.83	1,192.51	298.18	1,226.90	0.57	0.47	0.94
4,296.00	19.87	15.29	4,083.12	1,223.61	307.36	1,259.15	0.84	-0.19	-2.41
4,390.00	20.31	8.09	4,171.42	1,255.18	313.87	1,291.37	2.67	0.47	-7.66



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-13A2 - Slot C
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-16-28 Pad	<b>MD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Well:</b>	CC 697-16-13A2	<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)
4,485.00	17.76	10.63	4,261.22	1,285.75	318.86	1,322.34	2.82	-2.68	2.67
4,579.00	17.23	7.21	4,350.87	1,313.65	323.25	1,350.58	1.23	-0.56	-3.64
4,674.00	16.53	8.44	4,441.78	1,340.98	327.00	1,378.13	0.83	-0.74	1.29
4,768.00	17.15	7.56	4,531.75	1,367.94	330.79	1,405.33	0.71	0.66	-0.94
4,863.00	16.80	8.96	4,622.61	1,395.39	334.77	1,433.05	0.57	-0.37	1.47
4,957.00	15.65	6.86	4,712.86	1,421.40	338.40	1,459.28	1.37	-1.22	-2.23
5,052.00	14.77	7.29	4,804.54	1,446.13	341.47	1,484.16	0.93	-0.93	0.45
5,146.00	15.92	14.15	4,895.19	1,470.52	346.14	1,508.99	2.28	1.22	7.30
5,241.00	17.76	11.60	4,986.11	1,497.35	352.24	1,536.48	2.09	1.94	-2.68
5,335.00	17.94	11.25	5,075.59	1,525.59	357.94	1,565.29	0.22	0.19	-0.37
5,430.00	16.36	11.34	5,166.36	1,553.06	363.43	1,593.30	1.66	-1.66	0.09
5,524.00	16.18	11.51	5,256.60	1,578.87	368.65	1,619.63	0.20	-0.19	0.18
5,619.00	13.98	10.72	5,348.32	1,603.12	373.42	1,644.35	2.33	-2.32	-0.83
5,713.00	11.96	10.20	5,439.92	1,623.87	377.26	1,665.44	2.15	-2.15	-0.55
5,808.00	9.41	11.16	5,533.26	1,641.18	380.51	1,683.05	2.69	-2.68	1.01
5,903.00	7.47	10.81	5,627.23	1,654.86	383.17	1,697.00	2.04	-2.04	-0.37
5,997.00	6.60	11.43	5,720.52	1,666.16	385.38	1,708.51	0.93	-0.93	0.66
6,092.00	5.10	10.72	5,815.02	1,675.66	387.25	1,718.19	1.58	-1.58	-0.75
6,186.00	4.66	2.29	5,908.68	1,683.58	388.18	1,726.15	0.89	-0.47	-8.97
6,281.00	2.90	358.15	6,003.47	1,689.84	388.26	1,732.31	1.87	-1.85	-4.36
6,375.00	0.97	331.44	6,097.42	1,692.92	387.80	1,735.26	2.21	-2.05	-28.41
6,470.00	0.88	256.20	6,192.41	1,693.45	386.71	1,735.58	1.19	-0.09	-79.20
6,565.00	0.79	273.25	6,287.40	1,693.31	385.35	1,735.20	0.28	-0.09	17.95
6,659.00	0.97	232.82	6,381.39	1,692.87	384.07	1,734.53	0.67	0.19	-43.01
6,754.00	1.67	239.15	6,476.36	1,691.67	382.24	1,733.02	0.75	0.74	6.66
6,848.00	2.64	258.75	6,570.30	1,690.55	378.94	1,731.31	1.28	1.03	20.85
6,943.00	3.17	273.78	6,665.17	1,690.29	374.17	1,730.19	0.97	0.56	15.82
7,037.00	3.69	282.92	6,759.01	1,691.14	368.63	1,730.01	0.80	0.55	9.72
7,132.00	2.55	282.39	6,853.86	1,692.28	363.58	1,730.21	1.20	-1.20	-0.56
7,227.00	1.76	273.87	6,948.80	1,692.83	360.06	1,730.11	0.90	-0.83	-8.97
7,322.00	0.97	239.24	7,043.77	1,692.52	357.92	1,729.41	1.17	-0.83	-36.45
7,416.00	1.49	221.92	7,137.75	1,691.20	356.42	1,727.84	0.67	0.55	-18.43
7,511.00	0.97	241.08	7,232.73	1,689.89	354.89	1,726.28	0.69	-0.55	20.17
7,605.00	0.62	245.30	7,326.72	1,689.30	353.73	1,725.48	0.38	-0.37	4.49
7,699.00	1.67	231.86	7,420.70	1,688.24	352.19	1,724.16	1.15	1.12	-14.30
7,794.00	1.93	211.03	7,515.65	1,686.01	350.28	1,721.62	0.74	0.27	-21.93
7,888.00	2.11	217.44	7,609.59	1,683.28	348.41	1,718.59	0.31	0.19	6.82
7,983.00	2.02	229.22	7,704.53	1,680.80	346.08	1,715.73	0.46	-0.09	12.40
8,078.00	1.58	233.79	7,799.48	1,678.93	343.75	1,713.47	0.49	-0.46	4.81
8,172.00	2.73	256.46	7,893.42	1,677.64	340.53	1,711.61	1.50	1.22	24.12
8,267.00	2.64	249.08	7,988.31	1,676.33	336.29	1,709.55	0.38	-0.09	-7.77
8,361.00	3.34	219.02	8,082.19	1,673.43	332.54	1,706.01	1.80	0.74	-31.98
8,456.00	3.87	207.69	8,177.00	1,668.44	329.31	1,700.52	0.93	0.56	-11.93



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-16-13A2 - Slot C
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-16-28 Pad	<b>MD Reference:</b>	GL 8297' & RKB 30' @ 8327.00ft (H&P 353)
<b>Well:</b>	CC 697-16-13A2	<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)
8,550.00	4.48	206.81	8,270.75	1,662.36	326.18	1,693.96	0.65	0.65	-0.94
8,645.00	4.75	206.72	8,365.45	1,655.53	322.74	1,686.63	0.28	0.28	-0.09
8,739.00	4.57	216.39	8,459.14	1,649.04	318.77	1,679.52	0.86	-0.19	10.29
8,834.00	4.92	222.19	8,553.81	1,642.97	313.78	1,672.65	0.62	0.37	6.11
8,929.00	4.84	223.68	8,648.47	1,637.06	308.28	1,665.83	0.16	-0.08	1.57
8,966.00	5.01	224.65	8,685.33	1,634.78	306.07	1,663.18	0.51	0.46	2.62
<b>Last SDI Production MWD Survey</b>									
9,020.00	5.01	224.65	8,739.12	1,631.42	302.75	1,659.28	0.00	0.00	0.00
<b>Projection To TD - BHL = 628586.71, 1231814.82</b>									

## Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
175.00	174.98	2.15	0.17	First SDI Gyro Survey
358.00	357.66	11.99	3.31	Last SDI Gyro Survey
436.00	435.34	18.95	4.59	First SDI Surface MWD Survey
2,659.00	2,533.28	718.80	165.31	Last SDI Surface MWD Survey
2,784.00	2,652.13	755.70	176.92	First SDI Production MWD Survey
8,966.00	8,685.33	1,634.78	306.07	Last SDI Production MWD Survey
9,020.00	8,739.12	1,631.42	302.75	Projection To TD
9,020.00	8,739.12	1,631.42	302.75	BHL = 628586.71, 1231814.82

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