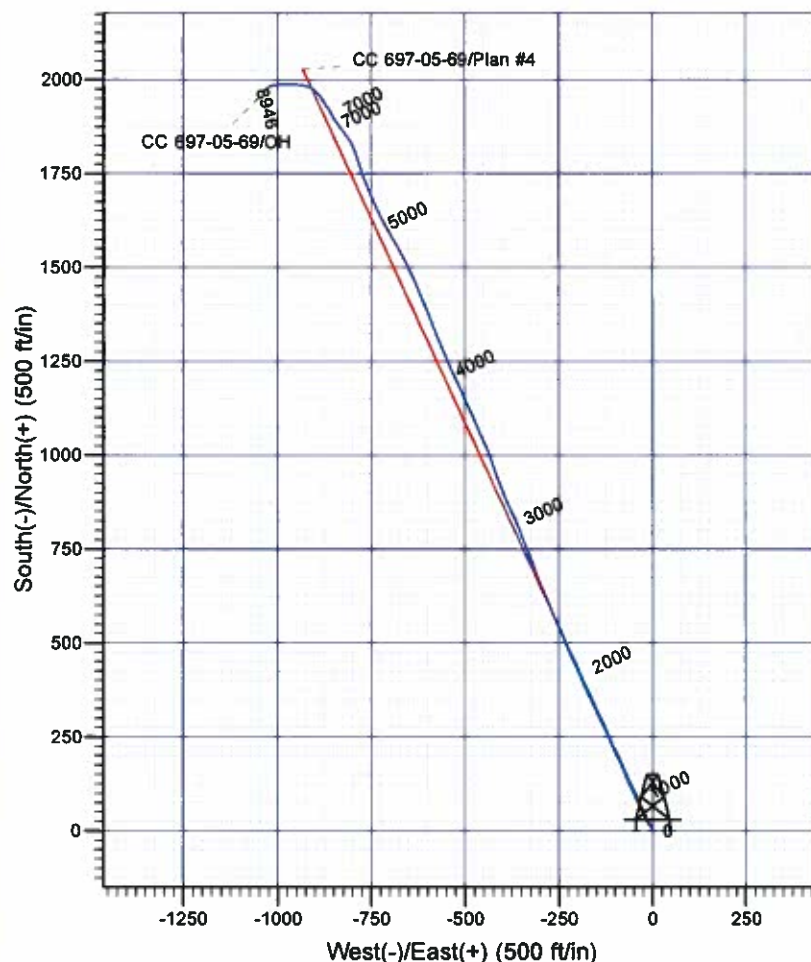
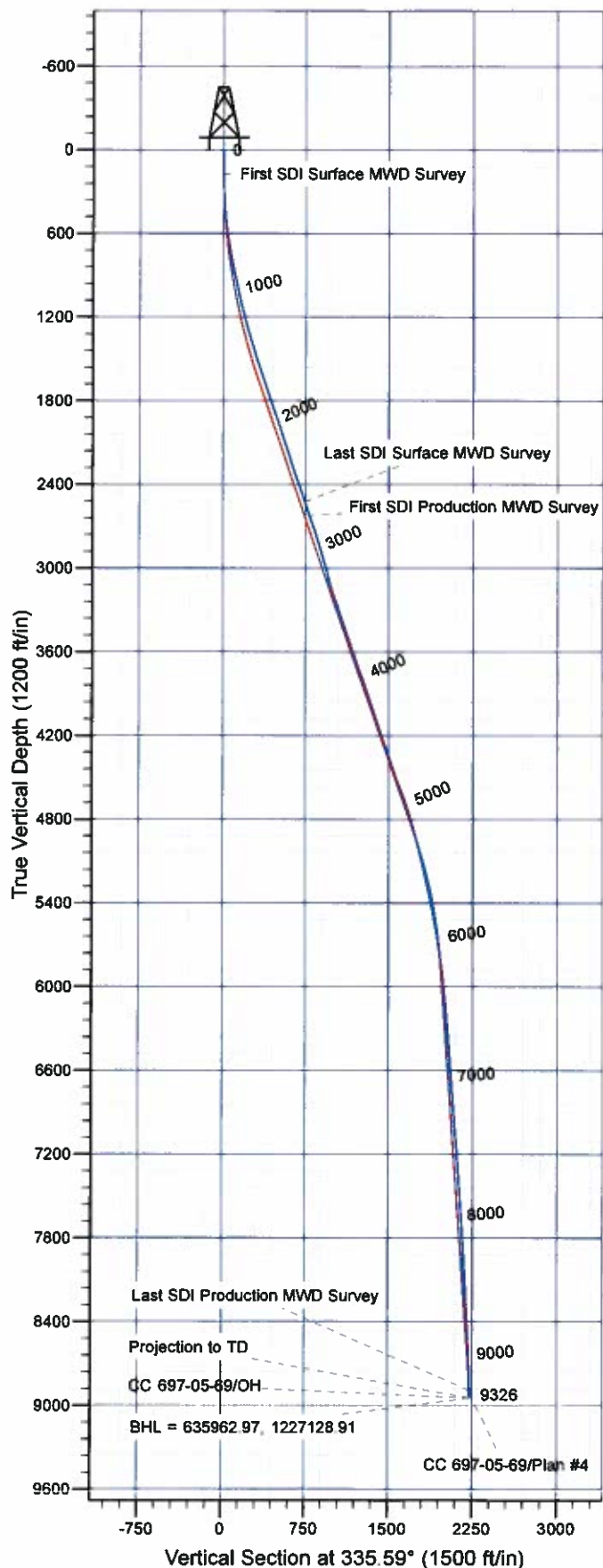




# Scientific Drilling

Rocky Mountain Operations

Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 608-41 Pad  
Well: CC 697-05-69  
Wellbore: OH  
Design: OH



## Well Details: CC 697-05-69

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	633950.37	1228089.80	39° 32' 31.498 N	108° 14' 14.859 W	P

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-05-69 - Slot P, True North  
Vertical (TVD) Reference: GL 8407' & RKB 30' @ 8437.00ft (H&P)  
Section (VS) Reference: Slot - P(0.00N, 0.00E)  
Measured Depth Reference: GL 8407' & RKB 30' @ 8437.00ft (H&P)  
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

9:17, July 29 2011  
Created By: Janie Cooke

# **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 608-41 Pad  
CC 697-05-69 - Slot P**

**OH**

**Design: OH**

## **Standard Survey Report**

**29 July, 2011**





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-69 - Slot P
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-05-69	<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 608-41 Pad, SECTION 8 T6S R97W				
<b>Site Position:</b>		<b>Northing:</b>	633,966.95 usft	<b>Latitude:</b>	39° 32' 31.685 N
<b>From:</b>	Map	<b>Easting:</b>	1,228,168.67 usft	<b>Longitude:</b>	108° 14' 13.859 W
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b>	-1.73 °

Well	CC 697-05-69 - Slot P					
Well Position	+N/-S	0.00 ft	Northing:	633,950.37 usft	Latitude:	39° 32' 31.498 N
	+E/-W	0.00 ft	Easting:	1,228,089.80 usft	Longitude:	108° 14' 14.859 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,407.00 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	10.63	65.78	52,399

<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		335.59

<b>Survey Program</b>	<b>Date</b>	7/29/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.00	2,656.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,763.00	9,326.00	Survey #2 - 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	1.23	350.42	174.99	1.85	-0.31	1.82	0.70	0.70	0.00	
<b>First SDI Surface MWD Survey</b>										
267.00	1.76	336.88	266.96	4.13	-1.03	4.18	0.89	0.58	-14.72	
359.00	2.99	325.28	358.87	7.40	-2.95	7.96	1.43	1.34	-12.61	
450.00	5.81	322.65	449.60	13.01	-7.10	14.78	3.11	3.10	-2.89	
542.00	9.06	329.41	540.81	22.95	-13.61	26.52	3.65	3.53	7.35	
634.00	11.26	333.63	631.37	37.24	-21.29	42.71	2.52	2.39	4.59	
708.00	12.84	332.77	703.73	51.02	-28.26	58.14	2.15	2.14	-1.16	
800.00	12.93	335.23	793.42	69.46	-37.25	78.64	0.60	0.10	2.67	



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-69 - Slot P
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-05-69	<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)
892.00	13.98	335.41	882.89	88.91	-46.19	100.05	1.14	1.14	0.20
984.00	14.42	335.76	972.08	109.46	-55.52	122.62	0.49	0.48	0.38
1,079.00	16.88	337.17	1,063.55	132.96	-65.73	148.24	2.62	2.59	1.48
1,173.00	19.70	337.08	1,152.79	160.14	-77.19	177.72	3.00	3.00	-0.10
1,268.00	18.73	335.50	1,242.50	188.76	-89.75	208.98	1.16	-1.02	-1.66
1,362.00	20.14	335.32	1,331.14	217.20	-102.77	240.26	1.50	1.50	-0.19
1,457.00	21.10	334.88	1,420.06	247.55	-116.86	273.71	1.02	1.01	-0.46
1,552.00	21.72	334.09	1,508.50	278.84	-131.80	308.38	0.72	0.65	-0.83
1,646.00	23.65	335.14	1,595.22	311.60	-147.33	344.63	2.10	2.05	1.12
1,741.00	22.69	334.62	1,682.56	345.44	-163.19	382.00	1.03	-1.01	-0.55
1,835.00	23.65	335.50	1,768.98	378.98	-178.78	418.99	1.09	1.02	0.94
1,930.00	23.83	336.11	1,855.94	413.86	-194.46	457.23	0.32	0.19	0.64
2,025.00	23.65	336.55	1,942.90	448.89	-209.81	495.47	0.27	-0.19	0.46
2,119.00	22.69	336.11	2,029.32	482.77	-224.66	532.46	1.04	-1.02	-0.47
2,214.00	22.07	336.81	2,117.16	515.93	-239.11	568.62	0.71	-0.65	0.74
2,308.00	22.69	337.43	2,204.08	548.90	-253.02	604.40	0.71	0.66	0.66
2,403.00	22.95	336.99	2,291.65	582.87	-267.29	641.23	0.33	0.27	-0.46
2,497.00	23.65	336.73	2,377.98	617.06	-281.90	678.40	0.75	0.74	-0.28
2,592.00	24.18	336.99	2,464.82	652.47	-297.04	716.90	0.57	0.56	0.27
2,656.00	23.65	337.87	2,523.33	676.43	-307.00	742.83	1.00	-0.83	1.38
Last SDI Surface MWD Survey									
2,763.00	23.26	339.51	2,621.49	716.10	-322.48	785.35	0.71	-0.36	1.53
First SDI Production MWD Survey									
2,858.00	23.21	339.10	2,708.78	751.16	-335.72	822.75	0.18	-0.05	-0.43
2,952.00	23.13	340.24	2,795.20	785.84	-348.57	859.64	0.48	-0.09	1.21
3,047.00	19.87	334.35	2,883.59	817.96	-361.87	894.39	4.11	-3.43	-6.20
3,141.00	19.70	336.81	2,972.04	846.93	-375.03	926.21	0.90	-0.18	2.62
3,236.00	18.55	335.85	3,061.80	875.44	-387.51	957.33	1.25	-1.21	-1.01
3,330.00	21.10	338.04	3,150.22	904.78	-399.96	989.19	2.83	2.71	2.33
3,425.00	24.45	340.77	3,237.80	939.21	-412.84	1,025.86	3.70	3.53	2.87
3,520.00	22.95	341.12	3,324.79	975.30	-425.30	1,063.88	1.59	-1.58	0.37
3,614.00	23.57	338.13	3,411.15	1,010.08	-438.24	1,100.90	1.42	0.66	-3.18
3,708.00	22.86	335.23	3,497.54	1,044.11	-452.89	1,137.94	1.43	-0.76	-3.09
3,803.00	22.60	335.76	3,585.16	1,077.51	-468.11	1,174.64	0.35	-0.27	0.56
3,897.00	23.65	336.99	3,671.61	1,111.33	-482.90	1,211.55	1.23	1.12	1.31
3,992.00	24.53	335.76	3,758.34	1,146.85	-498.44	1,250.32	1.07	0.93	-1.29
4,087.00	22.51	336.02	3,845.44	1,181.45	-513.93	1,288.23	2.13	-2.13	0.27
4,181.00	22.16	334.62	3,932.39	1,213.91	-528.84	1,323.95	0.68	-0.37	-1.49
4,275.00	22.86	335.93	4,019.23	1,246.60	-543.89	1,359.94	0.92	0.74	1.39
4,370.00	23.13	336.90	4,106.68	1,280.61	-558.74	1,397.04	0.49	0.28	1.02
4,465.00	23.57	338.48	4,193.90	1,315.44	-573.03	1,434.67	0.81	0.46	1.66
4,559.00	23.65	338.31	4,280.03	1,350.45	-586.89	1,472.27	0.11	0.09	-0.18
4,654.00	22.42	338.57	4,367.45	1,385.02	-600.55	1,509.40	1.30	-1.29	0.27





<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-69 - Slot P
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-05-69	<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)
4,749.00	22.69	337.69	4,455.19	1,418.83	-614.12	1,545.80	0.45	0.28	-0.93
4,843.00	25.76	336.20	4,540.90	1,454.30	-629.25	1,584.35	3.33	3.27	-1.59
4,937.00	24.45	335.14	4,626.02	1,490.64	-645.68	1,624.23	1.47	-1.39	-1.13
5,032.00	23.04	332.24	4,712.98	1,524.94	-662.60	1,662.45	1.93	-1.48	-3.05
5,126.00	20.31	330.40	4,800.32	1,555.40	-679.23	1,697.07	2.99	-2.90	-1.96
5,221.00	18.55	328.20	4,889.91	1,582.59	-695.34	1,728.48	2.01	-1.85	-2.32
5,315.00	17.50	331.63	4,979.30	1,607.73	-709.93	1,757.41	1.59	-1.12	3.65
5,410.00	16.36	331.72	5,070.18	1,632.08	-723.06	1,785.01	1.20	-1.20	0.09
5,504.00	16.09	336.20	5,160.44	1,655.66	-734.59	1,811.24	1.36	-0.29	4.77
5,599.00	15.30	336.29	5,251.90	1,679.18	-744.94	1,836.94	0.83	-0.83	0.09
5,694.00	15.48	336.11	5,343.49	1,702.25	-755.12	1,862.15	0.20	0.19	-0.19
5,788.00	13.98	338.84	5,434.40	1,724.31	-764.30	1,886.03	1.76	-1.60	2.90
5,882.00	12.93	341.21	5,525.82	1,744.85	-771.78	1,907.83	1.26	-1.12	2.52
5,977.00	12.22	342.00	5,618.54	1,764.48	-778.31	1,928.40	0.77	-0.75	0.83
6,072.00	10.38	341.47	5,711.69	1,782.16	-784.14	1,946.91	1.94	-1.94	-0.56
6,166.00	9.58	340.59	5,804.27	1,797.56	-789.43	1,963.12	0.87	-0.85	-0.94
6,261.00	9.15	340.33	5,898.01	1,812.13	-794.60	1,978.53	0.45	-0.45	-0.27
6,355.00	8.09	336.64	5,990.94	1,825.24	-799.74	1,992.59	1.27	-1.13	-3.93
6,450.00	6.60	330.84	6,085.16	1,836.15	-805.05	2,004.71	1.75	-1.57	-6.11
6,544.00	5.80	322.84	6,178.61	1,844.65	-810.55	2,014.73	1.25	-0.85	-8.51
6,639.00	5.45	320.64	6,273.16	1,851.96	-816.31	2,023.77	0.43	-0.37	-2.32
6,733.00	5.98	325.12	6,366.69	1,859.43	-821.94	2,032.90	0.74	0.56	4.77
6,828.00	5.63	319.06	6,461.20	1,867.01	-827.83	2,042.23	0.74	-0.37	-6.38
6,922.00	5.36	324.07	6,554.77	1,874.05	-833.42	2,050.96	0.59	-0.29	5.33
7,017.00	5.10	324.68	6,649.38	1,881.09	-838.47	2,059.45	0.28	-0.27	0.64
7,111.00	5.28	326.35	6,742.99	1,888.10	-843.28	2,067.82	0.25	0.19	1.78
7,206.00	5.45	325.21	6,837.57	1,895.44	-848.28	2,076.57	0.21	0.18	-1.20
7,300.00	5.28	330.05	6,931.16	1,902.86	-852.98	2,085.27	0.51	-0.18	5.15
7,395.00	5.80	333.83	7,025.72	1,910.95	-857.28	2,094.42	0.67	0.55	3.98
7,489.00	5.36	330.75	7,119.27	1,919.04	-861.52	2,103.54	0.57	-0.47	-3.28
7,584.00	5.36	322.66	7,213.86	1,926.44	-866.38	2,112.29	0.79	0.00	-8.52
7,678.00	4.48	323.81	7,307.51	1,932.90	-871.21	2,120.16	0.94	-0.94	1.22
7,773.00	4.75	327.94	7,402.20	1,939.23	-875.49	2,127.69	0.45	0.28	4.35
7,867.00	5.45	333.21	7,495.83	1,946.51	-879.57	2,136.01	0.90	0.74	5.61
7,962.00	5.19	324.60	7,590.42	1,954.04	-884.09	2,144.73	0.88	-0.27	-9.06
8,056.00	5.19	318.44	7,684.04	1,960.69	-889.38	2,152.97	0.59	0.00	-6.55
8,151.00	5.19	314.84	7,778.65	1,966.93	-895.27	2,161.09	0.34	0.00	-3.79
8,245.00	4.84	309.30	7,872.29	1,972.44	-901.36	2,168.62	0.64	-0.37	-5.89
8,340.00	4.75	299.11	7,966.96	1,976.89	-907.89	2,175.38	0.90	-0.09	-10.73
8,434.00	4.66	288.56	8,060.64	1,980.00	-914.91	2,181.11	0.92	-0.10	-11.22
8,528.00	5.45	286.36	8,154.28	1,982.47	-922.82	2,186.63	0.87	0.84	-2.34
8,623.00	6.86	281.79	8,248.73	1,984.90	-932.70	2,192.93	1.57	1.48	-4.81
8,717.00	7.47	275.91	8,342.00	1,986.68	-944.27	2,199.33	1.01	0.65	-6.26
8,811.00	7.83	272.57	8,435.16	1,987.60	-956.75	2,205.32	0.61	0.38	-3.55



<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-69 - Slot P
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Site:</b>	Cascade Creek 608-41 Pad	<b>MD Reference:</b>	GL 8407' & RKB 30' @ 8437.00ft (H&P)
<b>Well:</b>	CC 697-05-69	<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)
8,906.00	7.39	268.87	8,529.32	1,987.77	-969.32	2,210.67	0.69	-0.46	-3.89
9,001.00	7.30	269.93	8,623.54	1,987.64	-981.47	2,215.57	0.17	-0.09	1.12
9,095.00	7.65	267.12	8,716.75	1,987.32	-993.69	2,220.33	0.54	0.37	-2.99
9,190.00	7.21	262.90	8,810.95	1,986.26	-1,005.92	2,224.42	0.74	-0.46	-4.44
9,272.00	6.33	254.02	8,892.38	1,984.38	-1,015.37	2,226.62	1.66	-1.07	-10.83
<b>Last SDI Production MWD Survey</b>									
9,326.00	6.33	254.02	8,946.05	1,982.74	-1,021.09	2,227.49	0.00	0.00	0.00
<b>Projection to TD - BHL = 635962.97, 1227128.91</b>									

## Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
175.00	174.99	1.85	-0.31	First SDI Surface MWD Survey
2,656.00	2,523.33	676.43	-307.00	Last SDI Surface MWD Survey
2,763.00	2,621.49	716.10	-322.48	First SDI Production MWD Survey
9,272.00	8,892.38	1,984.38	-1,015.37	Last SDI Production MWD Survey
9,326.00	8,946.05	1,982.74	-1,021.09	Projection to TD
9,326.00	8,946.05	1,982.74	-1,021.09	BHL = 635962.97, 1227128.91

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