



# Scientific Drilling

Rocky Mountain Operations

Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 697-08-53 Pad



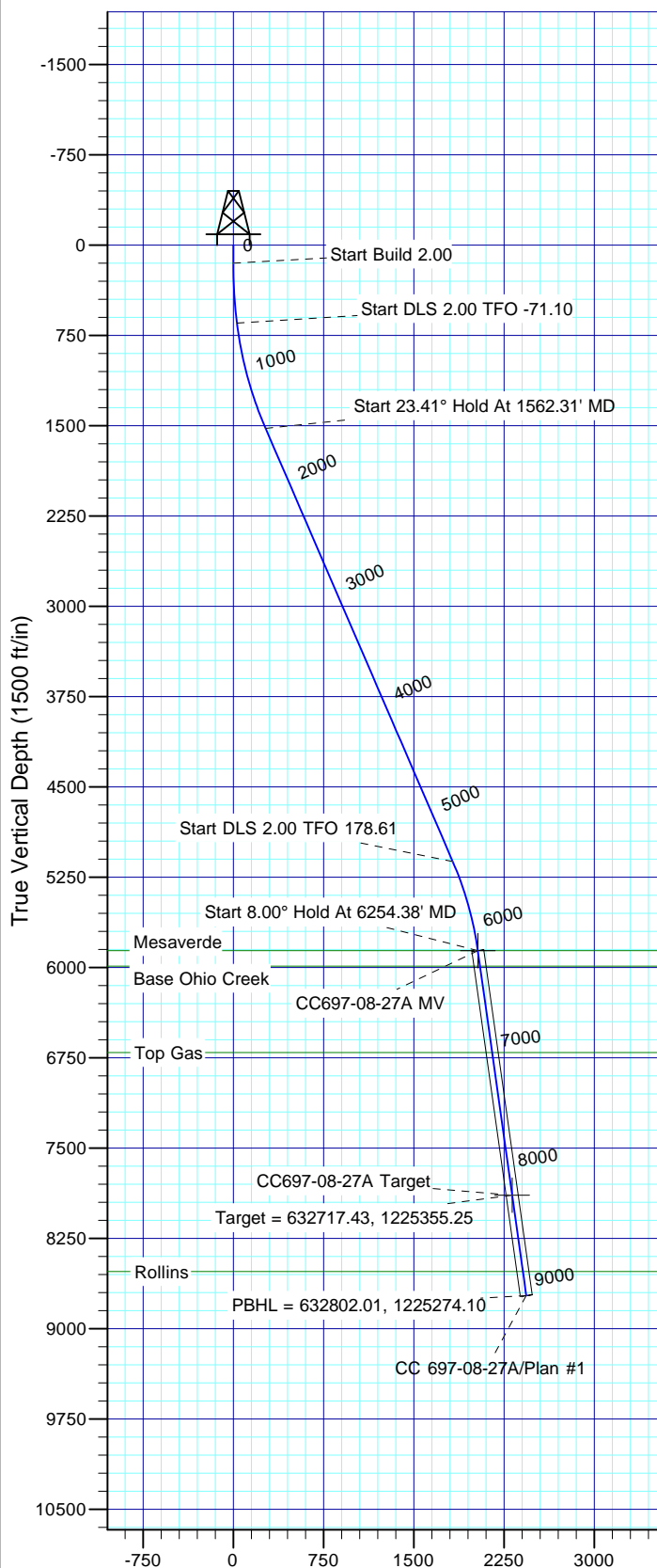
## Well Details: CC 697-08-27A

TVD Reference: GL 8411' & RKB 30' @ 8441.00ft (H&P) Ground Level: 8411.00

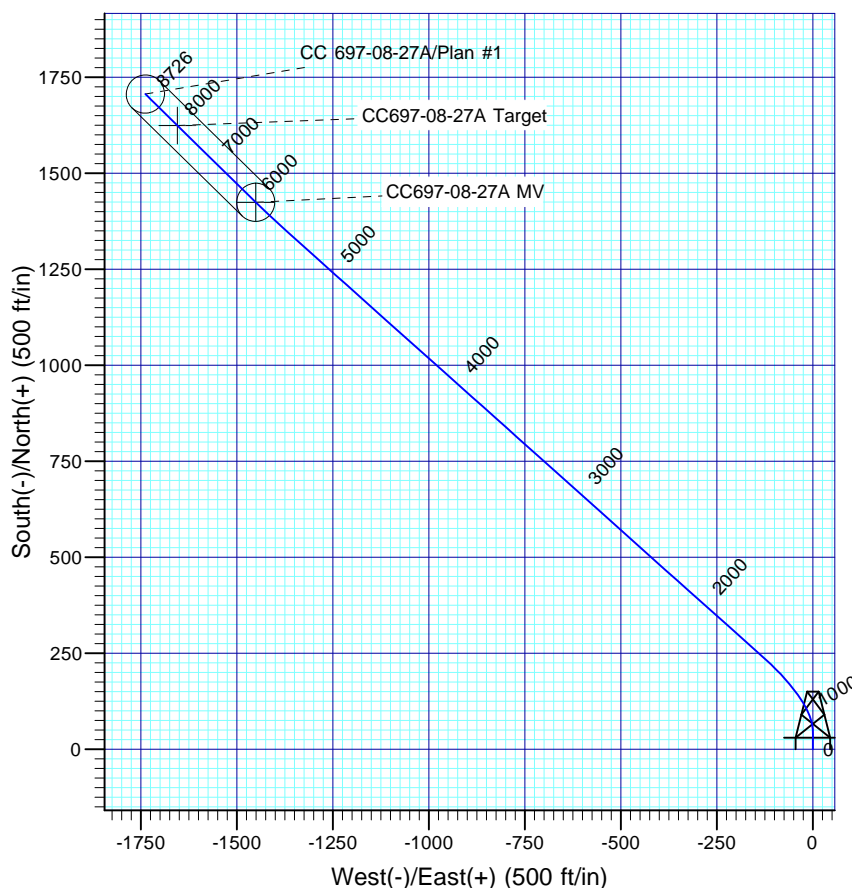
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	631044.38	1226960.43	39° 32' 2.453 N	108° 14' 28.150 W	G

**T M** Azimuths to True North  
Magnetic North: 10.54°

Magnetic Field  
Strength: 52328.8snT  
Dip Angle: 65.76°  
Date: 9/1/2010  
Model: IGRF2005-10



Vertical Section at 314.46° (1500 ft/in)



## FORMATION TOP DETAILS

TVDPath	MDPath	Formation
5861.00	6254.38	Mesaverde
5989.00	6383.64	Base Ohio Creek
6706.00	7107.69	Top Gas
8526.00	8945.57	Rollins

## Plan: Plan #1

**2:47, September 02 2010**  
**Created By: Rex Hall**

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

CC 697-08-27A				Slot	G
NAD83	NAD83	NAD27	NAD27		
CO. CENTRAL	CO. CENTRAL	CO. CENTRAL	CO. CENTRAL		
NORTH (FEET)	EAST (FEET)	NORTH (FEET)	EAST (FEET)		
SHL	1631053.79	2226800.05	631044.38	1226960.43	
Top Gas	1632606.60	2225310.24	632597.16	1225470.64	
BHL	1632811.45	2225113.70	632802.01	1225274.10	

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	
3	650.00	10.00	0.00	647.47	43.52	0.00	2.00	0.00	30.48	
4	1562.31	23.41	311.79	1522.71	245.22	-136.28	2.00	-71.10	269.02	
5	5483.21	23.41	311.79	5120.85	1283.42	-1297.74	0.00	0.00	1825.17	
6	6254.38	8.00	314.46	5861.00	1423.95	-1451.19	2.00	178.61	2033.12	CC697-08-27A MV
7	8305.34	8.00	314.46	7892.00	1623.87	-1654.93	0.00	0.00	2318.56	CC697-08-27A Target
8	9147.54	8.00	314.46	8726.00	1705.96	-1738.59	0.00	0.00	2435.77	



# **OXY USA RMAT**

**Garfield County, CO NAD27  
Cascade Creek 697-08-53 Pad  
CC 697-08-27A - Slot G**

**OH**

**Plan: Plan #1**

## **Standard Planning Report**

**01 September, 2010**



<b>Database:</b>	Rockies-R5000.1	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-27A - Slot G
<b>Company:</b>	OXY USA RMAT	<b>TVD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Project:</b>	Garfield County, CO NAD27	<b>MD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 697-08-27A	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

<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 697-08-27A - Slot G				
Well Position	+N/-S	208.41 ft	Northing:	631,044.38 usft	Latitude:	39° 32' 2.453 N
	+E/-W	56.75 ft	Easting:	1,226,960.43 usft	Longitude:	108° 14' 28.150 W
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	8,411.00 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	9/1/2010	10.54	65.76	52,329

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<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	314.46

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00	
650.00	10.00	0.00	647.47	43.52	0.00	2.00	2.00	0.00	0.00	
1,562.31	23.41	311.79	1,522.71	245.22	-136.28	2.00	1.47	-5.28	-71.10	
5,483.21	23.41	311.79	5,120.85	1,283.42	-1,297.74	0.00	0.00	0.00	0.00	
6,254.38	8.00	314.46	5,861.00	1,423.95	-1,451.19	2.00	-2.00	0.35	178.61	CC697-08-27A MV
8,305.34	8.00	314.46	7,892.00	1,623.87	-1,654.93	0.00	0.00	0.00	0.00	CC697-08-27A Targe
9,147.54	8.00	314.46	8,726.00	1,705.96	-1,738.59	0.00	0.00	0.00	0.00	

<b>Database:</b>	Rockies-R5000.1	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-27A - Slot G
<b>Company:</b>	OXY USA RMAT	<b>TVD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Project:</b>	Garfield County, CO NAD27	<b>MD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 697-08-27A	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

Planned 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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
200.00	1.00	0.00	200.00	0.44	0.00	0.31	2.00	2.00	0.00
300.00	3.00	0.00	299.93	3.93	0.00	2.75	2.00	2.00	0.00
400.00	5.00	0.00	399.68	10.90	0.00	7.64	2.00	2.00	0.00
500.00	7.00	0.00	499.13	21.35	0.00	14.96	2.00	2.00	0.00
600.00	9.00	0.00	598.15	35.27	0.00	24.70	2.00	2.00	0.00
650.00	10.00	0.00	647.47	43.52	0.00	30.48	2.00	2.00	0.00
<b>Start DLS 2.00 TFO -71.10</b>									
700.00	10.37	354.74	696.68	52.34	-0.41	36.95	2.00	0.73	-10.53
800.00	11.33	345.40	794.90	70.81	-3.71	52.25	2.00	0.96	-9.33
900.00	12.54	337.67	892.74	90.36	-10.31	70.65	2.00	1.21	-7.73
1,000.00	13.92	331.37	990.09	110.96	-20.20	92.13	2.00	1.39	-6.30
1,100.00	15.45	326.24	1,086.83	132.59	-33.37	116.68	2.00	1.52	-5.13
1,200.00	17.06	322.03	1,182.83	155.23	-49.80	144.26	2.00	1.62	-4.21
1,300.00	18.75	318.55	1,277.98	178.85	-69.47	174.84	2.00	1.69	-3.48
1,400.00	20.50	315.63	1,372.17	203.41	-92.35	208.38	2.00	1.74	-2.92
1,500.00	22.28	313.15	1,465.28	228.89	-118.43	244.84	2.00	1.79	-2.48
1,562.31	23.41	311.79	1,522.71	245.22	-136.28	269.02	2.00	1.81	-2.18
<b>Start 23.41° Hold At 1562.31' MD</b>									
1,600.00	23.41	311.79	1,557.29	255.20	-147.44	283.98	0.00	0.00	0.00
1,700.00	23.41	311.79	1,649.06	281.68	-177.06	323.67	0.00	0.00	0.00
1,800.00	23.41	311.79	1,740.83	308.16	-206.69	363.36	0.00	0.00	0.00
1,900.00	23.41	311.79	1,832.60	334.64	-236.31	403.04	0.00	0.00	0.00
2,000.00	23.41	311.79	1,924.37	361.12	-265.93	442.73	0.00	0.00	0.00
2,100.00	23.41	311.79	2,016.13	387.60	-295.55	482.42	0.00	0.00	0.00
2,200.00	23.41	311.79	2,107.90	414.07	-325.18	522.11	0.00	0.00	0.00
2,300.00	23.41	311.79	2,199.67	440.55	-354.80	561.80	0.00	0.00	0.00
2,400.00	23.41	311.79	2,291.44	467.03	-384.42	601.49	0.00	0.00	0.00
2,500.00	23.41	311.79	2,383.21	493.51	-414.04	641.18	0.00	0.00	0.00
2,600.00	23.41	311.79	2,474.97	519.99	-443.67	680.86	0.00	0.00	0.00
2,700.00	23.41	311.79	2,566.74	546.47	-473.29	720.55	0.00	0.00	0.00
2,800.00	23.41	311.79	2,658.51	572.94	-502.91	760.24	0.00	0.00	0.00
2,900.00	23.41	311.79	2,750.28	599.42	-532.53	799.93	0.00	0.00	0.00
3,000.00	23.41	311.79	2,842.05	625.90	-562.16	839.62	0.00	0.00	0.00
3,100.00	23.41	311.79	2,933.82	652.38	-591.78	879.31	0.00	0.00	0.00
3,200.00	23.41	311.79	3,025.58	678.86	-621.40	919.00	0.00	0.00	0.00
3,300.00	23.41	311.79	3,117.35	705.34	-651.02	958.68	0.00	0.00	0.00
3,400.00	23.41	311.79	3,209.12	731.82	-680.65	998.37	0.00	0.00	0.00
3,500.00	23.41	311.79	3,300.89	758.29	-710.27	1,038.06	0.00	0.00	0.00
3,600.00	23.41	311.79	3,392.66	784.77	-739.89	1,077.75	0.00	0.00	0.00
3,700.00	23.41	311.79	3,484.42	811.25	-769.51	1,117.44	0.00	0.00	0.00
3,800.00	23.41	311.79	3,576.19	837.73	-799.13	1,157.13	0.00	0.00	0.00
3,900.00	23.41	311.79	3,667.96	864.21	-828.76	1,196.82	0.00	0.00	0.00
4,000.00	23.41	311.79	3,759.73	890.69	-858.38	1,236.50	0.00	0.00	0.00
4,100.00	23.41	311.79	3,851.50	917.17	-888.00	1,276.19	0.00	0.00	0.00
4,200.00	23.41	311.79	3,943.27	943.64	-917.62	1,315.88	0.00	0.00	0.00
4,300.00	23.41	311.79	4,035.03	970.12	-947.25	1,355.57	0.00	0.00	0.00
4,400.00	23.41	311.79	4,126.80	996.60	-976.87	1,395.26	0.00	0.00	0.00
4,500.00	23.41	311.79	4,218.57	1,023.08	-1,006.49	1,434.95	0.00	0.00	0.00
4,600.00	23.41	311.79	4,310.34	1,049.56	-1,036.11	1,474.64	0.00	0.00	0.00

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<b>Company:</b>	OXY USA RMAT	<b>TVD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Project:</b>	Garfield County, CO NAD27	<b>MD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 697-08-27A	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

Planned 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)
4,700.00	23.41	311.79	4,402.11	1,076.04	-1,065.74	1,514.32	0.00	0.00	0.00
4,800.00	23.41	311.79	4,493.88	1,102.51	-1,095.36	1,554.01	0.00	0.00	0.00
4,900.00	23.41	311.79	4,585.64	1,128.99	-1,124.98	1,593.70	0.00	0.00	0.00
5,000.00	23.41	311.79	4,677.41	1,155.47	-1,154.60	1,633.39	0.00	0.00	0.00
5,100.00	23.41	311.79	4,769.18	1,181.95	-1,184.23	1,673.08	0.00	0.00	0.00
5,200.00	23.41	311.79	4,860.95	1,208.43	-1,213.85	1,712.77	0.00	0.00	0.00
5,300.00	23.41	311.79	4,952.72	1,234.91	-1,243.47	1,752.46	0.00	0.00	0.00
5,400.00	23.41	311.79	5,044.48	1,261.39	-1,273.09	1,792.14	0.00	0.00	0.00
5,483.21	23.41	311.79	5,120.85	1,283.42	-1,297.74	1,825.17	0.00	0.00	0.00
<b>Start DLS 2.00 TFO 178.61</b>									
5,500.00	23.07	311.81	5,136.27	1,287.83	-1,302.68	1,831.79	2.00	-2.00	0.12
5,600.00	21.08	311.95	5,228.94	1,312.92	-1,330.66	1,869.33	2.00	-2.00	0.14
5,700.00	19.08	312.12	5,322.86	1,335.90	-1,356.16	1,903.62	2.00	-2.00	0.16
5,800.00	17.08	312.32	5,417.92	1,356.75	-1,379.14	1,934.63	2.00	-2.00	0.20
5,900.00	15.08	312.57	5,514.00	1,375.43	-1,399.58	1,962.30	2.00	-2.00	0.25
6,000.00	13.08	312.90	5,610.99	1,391.94	-1,417.45	1,986.62	2.00	-2.00	0.33
6,100.00	11.08	313.34	5,708.77	1,406.24	-1,432.73	2,007.54	2.00	-2.00	0.44
6,200.00	9.09	313.98	5,807.22	1,418.32	-1,445.40	2,025.05	2.00	-2.00	0.64
6,254.38	8.00	314.46	5,861.00	1,423.95	-1,451.19	2,033.12	2.00	-2.00	0.88
<b>Start 8.00° Hold At 6254.38' MD - Mesaverde</b>									
6,300.00	8.00	314.46	5,906.17	1,428.40	-1,455.72	2,039.47	0.00	0.00	0.00
6,383.64	8.00	314.46	5,989.00	1,436.55	-1,464.03	2,051.11	0.00	0.00	0.00
<b>Base Ohio Creek</b>									
6,400.00	8.00	314.46	6,005.20	1,438.14	-1,465.66	2,053.39	0.00	0.00	0.00
6,500.00	8.00	314.46	6,104.23	1,447.89	-1,475.59	2,067.31	0.00	0.00	0.00
6,600.00	8.00	314.46	6,203.25	1,457.64	-1,485.52	2,081.22	0.00	0.00	0.00
6,700.00	8.00	314.46	6,302.28	1,467.39	-1,495.46	2,095.14	0.00	0.00	0.00
6,800.00	8.00	314.46	6,401.31	1,477.13	-1,505.39	2,109.06	0.00	0.00	0.00
6,900.00	8.00	314.46	6,500.33	1,486.88	-1,515.33	2,122.98	0.00	0.00	0.00
7,000.00	8.00	314.46	6,599.36	1,496.63	-1,525.26	2,136.89	0.00	0.00	0.00
7,100.00	8.00	314.46	6,698.39	1,506.38	-1,535.19	2,150.81	0.00	0.00	0.00
7,107.69	8.00	314.46	6,706.00	1,507.13	-1,535.96	2,151.88	0.00	0.00	0.00
<b>Top Gas</b>									
7,200.00	8.00	314.46	6,797.41	1,516.12	-1,545.13	2,164.73	0.00	0.00	0.00
7,300.00	8.00	314.46	6,896.44	1,525.87	-1,555.06	2,178.64	0.00	0.00	0.00
7,400.00	8.00	314.46	6,995.47	1,535.62	-1,564.99	2,192.56	0.00	0.00	0.00
7,500.00	8.00	314.46	7,094.49	1,545.37	-1,574.93	2,206.48	0.00	0.00	0.00
7,600.00	8.00	314.46	7,193.52	1,555.11	-1,584.86	2,220.40	0.00	0.00	0.00
7,700.00	8.00	314.46	7,292.55	1,564.86	-1,594.79	2,234.31	0.00	0.00	0.00
7,800.00	8.00	314.46	7,391.57	1,574.61	-1,604.73	2,248.23	0.00	0.00	0.00
7,900.00	8.00	314.46	7,490.60	1,584.35	-1,614.66	2,262.15	0.00	0.00	0.00
8,000.00	8.00	314.46	7,589.63	1,594.10	-1,624.60	2,276.06	0.00	0.00	0.00
8,100.00	8.00	314.46	7,688.66	1,603.85	-1,634.53	2,289.98	0.00	0.00	0.00
8,200.00	8.00	314.46	7,787.68	1,613.60	-1,644.46	2,303.90	0.00	0.00	0.00
8,300.00	8.00	314.46	7,886.71	1,623.34	-1,654.40	2,317.82	0.00	0.00	0.00
8,305.34	8.00	314.46	7,892.00	1,623.87	-1,654.93	2,318.56	0.00	0.00	0.00
<b>Target = 632717.43, 1225355.25</b>									
8,400.00	8.00	314.46	7,985.74	1,633.09	-1,664.33	2,331.73	0.00	0.00	0.00
8,500.00	8.00	314.46	8,084.76	1,642.84	-1,674.26	2,345.65	0.00	0.00	0.00
8,600.00	8.00	314.46	8,183.79	1,652.59	-1,684.20	2,359.57	0.00	0.00	0.00
8,700.00	8.00	314.46	8,282.82	1,662.33	-1,694.13	2,373.49	0.00	0.00	0.00
8,800.00	8.00	314.46	8,381.84	1,672.08	-1,704.06	2,387.40	0.00	0.00	0.00
8,900.00	8.00	314.46	8,480.87	1,681.83	-1,714.00	2,401.32	0.00	0.00	0.00

<b>Database:</b>	Rockies-R5000.1	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-27A - Slot G
<b>Company:</b>	OXY USA RMAT	<b>TVD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Project:</b>	Garfield County, CO NAD27	<b>MD Reference:</b>	GL 8411' & RKB 30' @ 8441.00ft (H&P)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>North Reference:</b>	True
<b>Well:</b>	CC 697-08-27A	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #1		

Planned 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)
8,945.57	8.00	314.46	8,526.00	1,686.27	-1,718.52	2,407.66	0.00	0.00	0.00
<b>Rollins</b>									
9,000.00	8.00	314.46	8,579.90	1,691.58	-1,723.93	2,415.24	0.00	0.00	0.00
9,100.00	8.00	314.46	8,678.92	1,701.32	-1,733.87	2,429.15	0.00	0.00	0.00
9,147.54	8.00	314.46	8,726.00	1,705.96	-1,738.59	2,435.77	0.00	0.00	0.00
<b>PBHL = 632802.01, 1225274.10</b>									

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
CC697-08-27A MV - plan hits target center - Point	-8.00	314.46	5,861.00	1,423.95	-1,451.19	632,511.46	1,225,552.86	39° 32' 16.526 N	108° 14' 46.673 W
CC697-08-27A Target - plan hits target center - Circle (radius 50.00)	-8.00	314.46	7,892.00	1,623.87	-1,654.93	632,717.43	1,225,355.25	39° 32' 18.502 N	108° 14' 49.274 W

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,254.38	5,861.00	Mesaverde		0.00	
6,383.64	5,989.00	Base Ohio Creek		0.00	
7,107.69	6,706.00	Top Gas		0.00	
8,945.57	8,526.00	Rollins		0.00	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
150.00	150.00	0.00	0.00	Start Build 2.00
650.00	647.47	43.52	0.00	Start DLS 2.00 TFO -71.10
1,562.31	1,522.71	245.22	-136.28	Start 23.41° Hold At 1562.31' MD
5,483.21	5,120.85	1,283.42	-1,297.74	Start DLS 2.00 TFO 178.61
6,254.38	5,861.00	1,423.95	-1,451.19	Start 8.00° Hold At 6254.38' MD
8,305.34	7,892.00	1,623.87	-1,654.93	Target = 632717.43, 1225355.25
9,147.54	8,726.00	1,705.96	-1,738.59	PBHL = 632802.01, 1225274.10