



Project: Garfield County, CO NAD27
 Site: Cascade Creek 697-09-61
 Well: 697-09-HN1
 Wellbore: OH
 Design: Plan #5

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
 Local North: True



WELL DETAILS: 697-09-HN1

PROJECT DETAILS: Garfield County, CO NAD83

Geodetic System: US State Plane 1983 (Exact solution)
 Datum: NAD 1983 (NADCON CONUS)
 Northing: 1629830.878
 Easting: 2231924.557
 Latitude: 39° 31' 51.81351"
 Longitude: 108° 13' 24.60458"

GL 8279' @ 8279.00ft
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.00 0.00 629821.48 1232084.85 39° 31' 51.895 N 108° 13' 22.306 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	211608.00	0.00	0.00	11608.00	0.00	0.00	0.00	0.00	0.00	
3	13117.75	90.58	228.42	12562.88	-640.19	-721.64	6.00	228.42	767.77	
4	13693.66	90.58	228.42	12557.00	-1022.36	-1152.43	0.00	0.00	1226.10	CC 697-09-HN1 LP
5	14500.72	91.60	180.00	12540.63	-1736.54	-1473.63	6.00	-88.38	1988.94	
6	18144.09	91.60	180.00	12438.90	-5378.49	-1473.63	0.00	0.00	5562.02	CC 697-09-HN1 PBHL

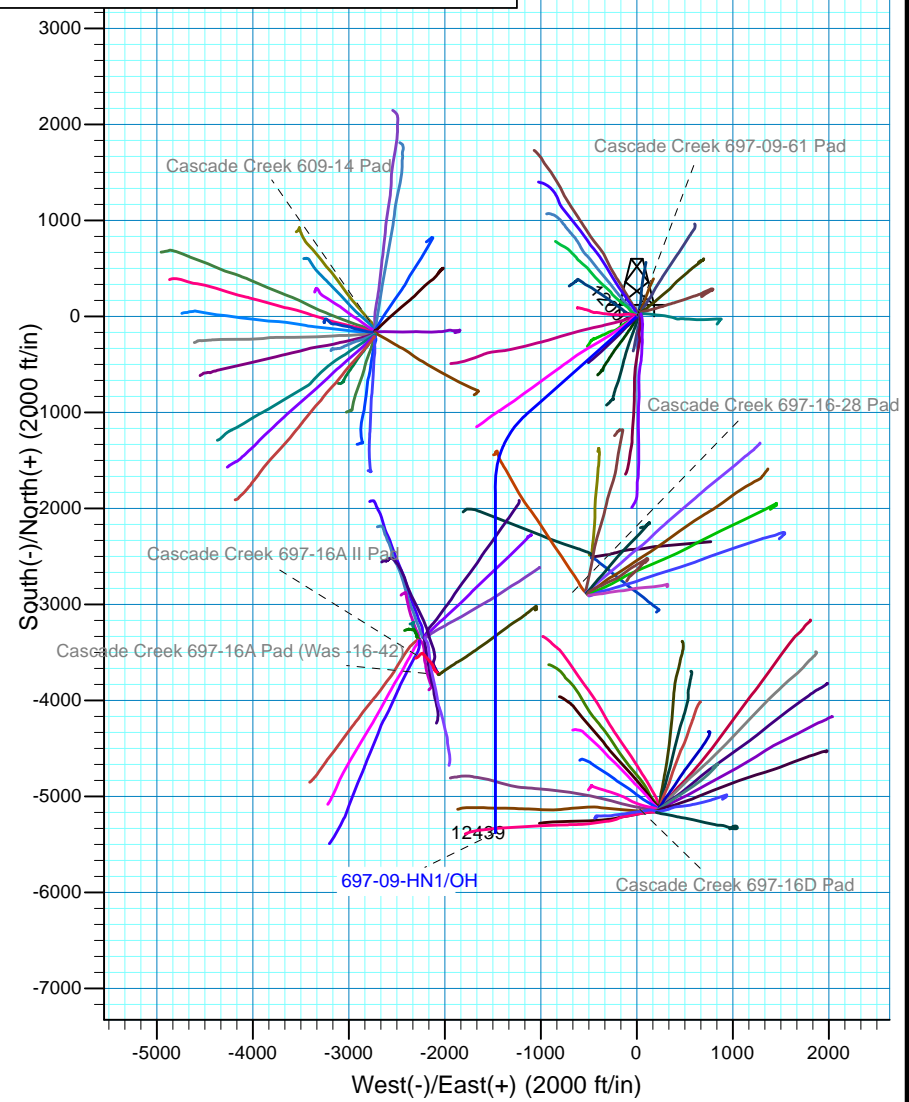
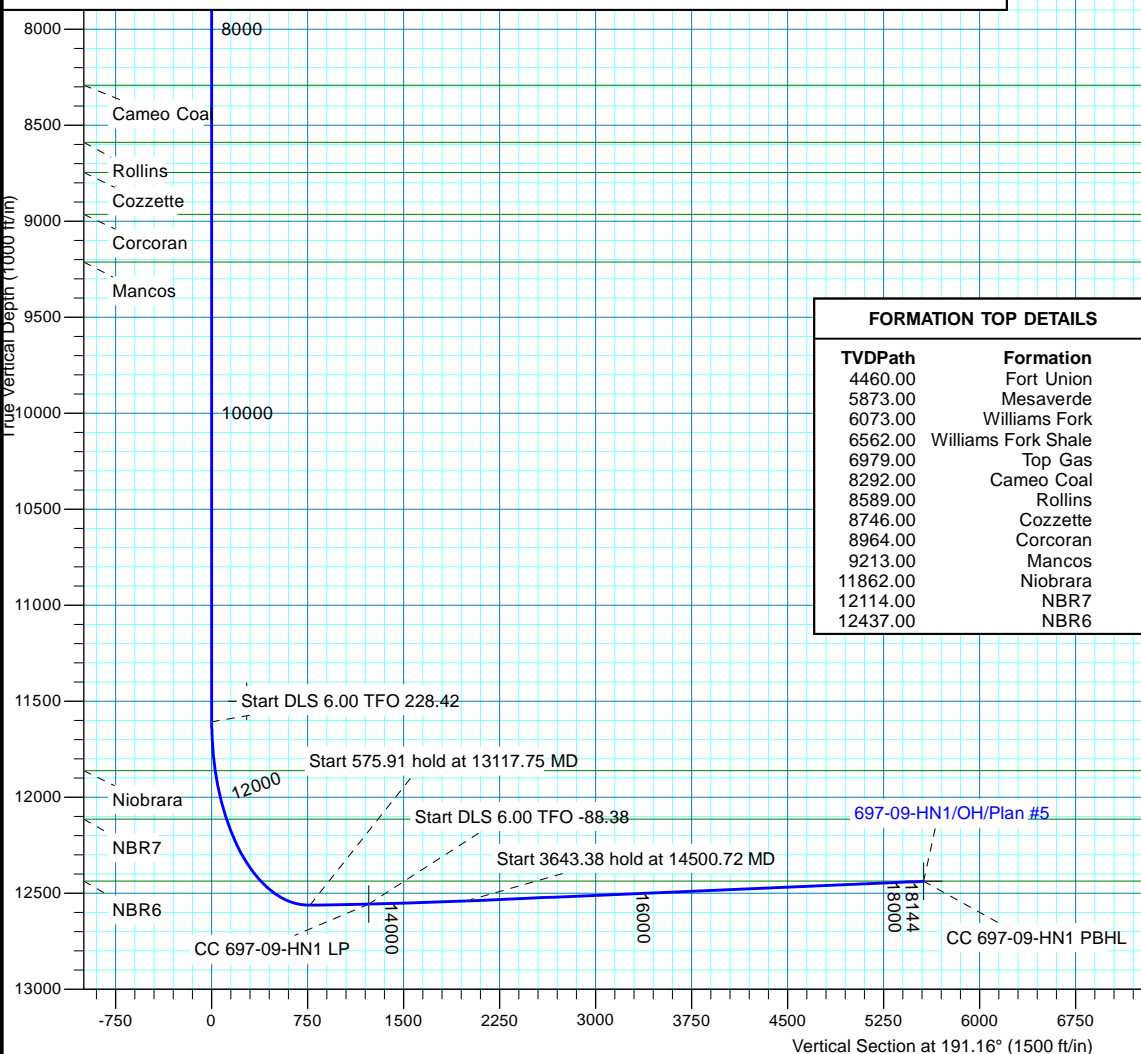
Plan: Plan #5 (697-09-HN1/OH)

Created By: Janie Collins Date: 18:32, January 22 2014



Azimuths to True North
 Magnetic North: 10:19

Magnetic Field
 Strength: 51881.3nT
 Dip Angle: 65.65°
 Date: 1/16/2014
 Model: BGGM2013





OXY USA RMAT

**Garfield County, CO NAD27
Cascade Creek 697-09-61 Pad
697-09-HN1**

OH

Plan: Plan #5

Standard Planning Report

22 January, 2014





Database:	Grand Junction District	Local Co-ordinate Reference:	Well 697-09-HN1
Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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

Site	Cascade Creek 697-09-61 Pad, Sec 9 T6S R97W				
Site Position:	Northing:	629,845.32 usft	Latitude:	39° 31' 52.143 N	
From: Map	Easting:	1,232,129.39 usft	Longitude:	108° 13' 21.747 W	
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.72 °

Well	697-09-HN1					
Well Position	+N/-S	-25.16 ft	Northing:	629,821.49 usft	Latitude:	39° 31' 51.895 N
	+E/-W	-43.81 ft	Easting:	1,232,084.85 usft	Longitude:	108° 13' 22.306 W
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	8,279.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	1/16/2014	10.19	65.65	51,882

Design	Plan #5			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	191.16

Plan Sections										
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	
11,608.00	0.00	0.00	11,608.00	0.00	0.00	0.00	0.00	0.00	0.00	
13,117.75	90.58	228.42	12,562.88	-640.19	-721.64	6.00	6.00	-8.72	228.42	
13,693.66	90.58	228.42	12,557.00	-1,022.36	-1,152.43	0.00	0.00	0.00	0.00	CC 697-09-HN1 LP
14,500.72	91.60	180.00	12,540.63	-1,736.54	-1,473.63	6.00	0.13	-6.00	-88.38	
18,144.09	91.60	180.00	12,438.90	-5,378.49	-1,473.63	0.00	0.00	0.00	0.00	CC 697-09-HN1 PBH



Database:	Grand Junction District	Local Co-ordinate Reference:	Well 697-09-HN1
Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,460.00	0.00	0.00	4,460.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fort Union										
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



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Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)	
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5,873.00	0.00	0.00	5,873.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mesaverde										
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,073.00	0.00	0.00	6,073.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Williams Fork										
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,562.00	0.00	0.00	6,562.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Williams Fork Shale										
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,979.00	0.00	0.00	6,979.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Top Gas										
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,292.00	0.00	0.00	8,292.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cameo Coal										
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,589.00	0.00	0.00	8,589.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollins										
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,746.00	0.00	0.00	8,746.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cozette										
8,800.00	0.00	0.00	8,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,964.00	0.00	0.00	8,964.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



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Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)	
Corcoran										
9,000.00	0.00	0.00	9,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,100.00	0.00	0.00	9,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,213.00	0.00	0.00	9,213.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mancos										
9,300.00	0.00	0.00	9,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9,900.00	0.00	0.00	9,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000.00	0.00	0.00	10,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,100.00	0.00	0.00	10,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,200.00	0.00	0.00	10,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,300.00	0.00	0.00	10,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,400.00	0.00	0.00	10,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,500.00	0.00	0.00	10,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,600.00	0.00	0.00	10,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,700.00	0.00	0.00	10,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,800.00	0.00	0.00	10,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,900.00	0.00	0.00	10,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,000.00	0.00	0.00	11,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,100.00	0.00	0.00	11,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,200.00	0.00	0.00	11,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,300.00	0.00	0.00	11,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,400.00	0.00	0.00	11,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,500.00	0.00	0.00	11,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CC 697-09-HN1Turn										
11,600.00	0.00	0.00	11,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11,608.00	0.00	0.00	11,608.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 6.00 TFO 228.42										
11,700.00	5.52	228.42	11,699.86	-2.94	-3.31	3.52	6.00	6.00	0.00	0.00
11,800.00	11.52	228.42	11,798.71	-12.77	-14.39	15.31	6.00	6.00	0.00	0.00
11,865.09	15.43	228.42	11,862.00	-22.83	-25.73	27.38	6.00	6.00	0.00	0.00
Niobrara										
11,900.00	17.52	228.42	11,895.47	-29.40	-33.14	35.26	6.00	6.00	0.00	0.00
12,000.00	23.52	228.42	11,989.08	-52.65	-59.35	63.14	6.00	6.00	0.00	0.00
12,100.00	29.52	228.42	12,078.52	-82.27	-92.73	98.66	6.00	6.00	0.00	0.00
12,141.29	32.00	228.42	12,114.00	-96.28	-108.53	115.47	6.00	6.00	0.00	0.00
NBR7										
12,200.00	35.52	228.42	12,162.80	-117.93	-132.93	141.43	6.00	6.00	0.00	0.00
12,300.00	41.52	228.42	12,241.01	-159.24	-179.50	190.97	6.00	6.00	0.00	0.00
12,400.00	47.52	228.42	12,312.27	-205.75	-231.92	246.75	6.00	6.00	0.00	0.00
12,500.00	53.52	228.42	12,375.83	-256.95	-289.64	308.15	6.00	6.00	0.00	0.00
12,600.00	59.52	228.42	12,430.96	-312.27	-352.00	374.51	6.00	6.00	0.00	0.00
12,612.03	60.24	228.42	12,437.00	-319.18	-359.79	382.79	6.00	6.00	0.00	0.00
NBR6										
12,700.00	65.52	228.42	12,477.09	-371.12	-418.34	445.08	6.00	6.00	0.00	0.00
12,800.00	71.52	228.42	12,513.69	-432.85	-487.92	519.11	6.00	6.00	0.00	0.00
12,900.00	77.52	228.42	12,540.37	-496.77	-559.98	595.77	6.00	6.00	0.00	0.00
13,000.00	83.52	228.42	12,556.83	-562.20	-633.73	674.24	6.00	6.00	0.00	0.00



Database:	Grand Junction District	Local Co-ordinate Reference:	Well 697-09-HN1
Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)	
13,100.00	89.52	228.42	12,562.90	-628.41	-708.36	753.64	6.00	6.00	0.00	
13,117.75	90.58	228.42	12,562.88	-640.19	-721.64	767.77	6.00	6.00	0.00	
Start 575.91 hold at 13117.75 MD										
13,200.00	90.58	228.42	12,562.04	-694.77	-783.16	833.23	0.00	0.00	0.00	
13,300.00	90.58	228.42	12,561.02	-761.13	-857.97	912.81	0.00	0.00	0.00	
13,400.00	90.58	228.42	12,560.00	-827.49	-932.77	992.40	0.00	0.00	0.00	
13,500.00	90.58	228.42	12,558.98	-893.85	-1,007.57	1,071.98	0.00	0.00	0.00	
13,600.00	90.58	228.42	12,557.96	-960.21	-1,082.37	1,151.57	0.00	0.00	0.00	
13,693.66	90.58	228.42	12,557.00	-1,022.36	-1,152.43	1,226.10	0.00	0.00	0.00	
Start DLS 6.00 TFO -88.38 - CC 697-09-HN1 LP										
13,700.00	90.60	228.04	12,556.93	-1,026.59	-1,157.16	1,231.16	6.00	0.17	-6.00	
13,800.00	90.76	222.04	12,555.75	-1,097.21	-1,227.89	1,314.14	6.00	0.17	-6.00	
13,900.00	90.92	216.05	12,554.28	-1,174.83	-1,290.84	1,402.48	6.00	0.16	-6.00	
14,000.00	91.07	210.05	12,552.55	-1,258.60	-1,345.34	1,495.21	6.00	0.15	-6.00	
14,100.00	91.20	204.05	12,550.57	-1,347.60	-1,390.78	1,591.33	6.00	0.14	-6.00	
14,200.00	91.32	198.05	12,548.36	-1,440.87	-1,426.67	1,689.78	6.00	0.12	-6.00	
14,300.00	91.43	192.05	12,545.96	-1,537.37	-1,452.61	1,789.47	6.00	0.11	-6.00	
14,400.00	91.52	186.04	12,543.37	-1,636.05	-1,468.32	1,889.33	6.00	0.09	-6.00	
14,500.00	91.60	180.04	12,540.65	-1,735.82	-1,473.63	1,988.24	6.00	0.08	-6.00	
14,500.72	91.60	180.00	12,540.63	-1,736.54	-1,473.63	1,988.94	6.00	0.07	-6.00	
Start 3643.38 hold at 14500.72 MD										
14,600.00	91.60	180.00	12,537.85	-1,835.78	-1,473.63	2,086.31	0.00	0.00	0.00	
14,700.00	91.60	180.00	12,535.06	-1,935.74	-1,473.63	2,184.38	0.00	0.00	0.00	
14,800.00	91.60	180.00	12,532.27	-2,035.70	-1,473.63	2,282.45	0.00	0.00	0.00	
14,900.00	91.60	180.00	12,529.48	-2,135.67	-1,473.63	2,380.52	0.00	0.00	0.00	
15,000.00	91.60	180.00	12,526.69	-2,235.63	-1,473.63	2,478.59	0.00	0.00	0.00	
15,100.00	91.60	180.00	12,523.89	-2,335.59	-1,473.63	2,576.66	0.00	0.00	0.00	
15,200.00	91.60	180.00	12,521.10	-2,435.55	-1,473.63	2,674.74	0.00	0.00	0.00	
15,300.00	91.60	180.00	12,518.31	-2,535.51	-1,473.63	2,772.81	0.00	0.00	0.00	
15,400.00	91.60	180.00	12,515.52	-2,635.47	-1,473.63	2,870.88	0.00	0.00	0.00	
15,500.00	91.60	180.00	12,512.73	-2,735.43	-1,473.63	2,968.95	0.00	0.00	0.00	
15,600.00	91.60	180.00	12,509.93	-2,835.39	-1,473.63	3,067.02	0.00	0.00	0.00	
15,700.00	91.60	180.00	12,507.14	-2,935.35	-1,473.63	3,165.09	0.00	0.00	0.00	
15,800.00	91.60	180.00	12,504.35	-3,035.31	-1,473.63	3,263.16	0.00	0.00	0.00	
15,900.00	91.60	180.00	12,501.56	-3,135.28	-1,473.63	3,361.23	0.00	0.00	0.00	
16,000.00	91.60	180.00	12,498.76	-3,235.24	-1,473.63	3,459.30	0.00	0.00	0.00	
16,100.00	91.60	180.00	12,495.97	-3,335.20	-1,473.63	3,557.37	0.00	0.00	0.00	
16,200.00	91.60	180.00	12,493.18	-3,435.16	-1,473.63	3,655.44	0.00	0.00	0.00	
16,300.00	91.60	180.00	12,490.39	-3,535.12	-1,473.63	3,753.51	0.00	0.00	0.00	
16,400.00	91.60	180.00	12,487.60	-3,635.08	-1,473.63	3,851.58	0.00	0.00	0.00	
16,500.00	91.60	180.00	12,484.80	-3,735.04	-1,473.63	3,949.65	0.00	0.00	0.00	
16,600.00	91.60	180.00	12,482.01	-3,835.00	-1,473.63	4,047.72	0.00	0.00	0.00	
16,700.00	91.60	180.00	12,479.22	-3,934.96	-1,473.63	4,145.79	0.00	0.00	0.00	
16,800.00	91.60	180.00	12,476.43	-4,034.93	-1,473.63	4,243.86	0.00	0.00	0.00	
16,900.00	91.60	180.00	12,473.63	-4,134.89	-1,473.63	4,341.93	0.00	0.00	0.00	
17,000.00	91.60	180.00	12,470.84	-4,234.85	-1,473.63	4,440.00	0.00	0.00	0.00	
17,100.00	91.60	180.00	12,468.05	-4,334.81	-1,473.63	4,538.07	0.00	0.00	0.00	
17,200.00	91.60	180.00	12,465.26	-4,434.77	-1,473.63	4,636.14	0.00	0.00	0.00	
17,300.00	91.60	180.00	12,462.47	-4,534.73	-1,473.63	4,734.21	0.00	0.00	0.00	
17,400.00	91.60	180.00	12,459.67	-4,634.69	-1,473.63	4,832.28	0.00	0.00	0.00	
17,500.00	91.60	180.00	12,456.88	-4,734.65	-1,473.63	4,930.35	0.00	0.00	0.00	
17,600.00	91.60	180.00	12,454.09	-4,834.61	-1,473.63	5,028.42	0.00	0.00	0.00	
17,700.00	91.60	180.00	12,451.30	-4,934.57	-1,473.63	5,126.49	0.00	0.00	0.00	



Database:	Grand Junction District	Local Co-ordinate Reference:	Well 697-09-HN1
Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

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)	
17,800.00	91.60	180.00	12,448.51	-5,034.54	-1,473.63	5,224.57	0.00	0.00	0.00	
17,900.00	91.60	180.00	12,445.71	-5,134.50	-1,473.63	5,322.64	0.00	0.00	0.00	
18,000.00	91.60	180.00	12,442.92	-5,234.46	-1,473.63	5,420.71	0.00	0.00	0.00	
18,100.00	91.60	180.00	12,440.13	-5,334.42	-1,473.63	5,518.78	0.00	0.00	0.00	
18,144.09	91.60	180.00	12,438.90	-5,378.49	-1,473.63	5,562.02	0.00	0.00	0.00	
TD at 18144.09 - CC 697-09-HN1 PBHL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
CC 697-09-HN1Turn - hit/miss target - Shape	0.00	358.28	11,500.00	-80.00	-1,000.00	629,771.49	1,231,082.90	39° 31' 51.104 N	108° 13' 35.069 W	- plan misses target center by 1003.19ft at 11500.00ft MD (11500.00 TVD, 0.00 N, 0.00 E) - Point
CC 697-09-HN1 PBHL - plan misses target center by 327.83ft at 18144.09ft MD (12438.90 TVD, -5378.49 N, -1473.63 E) - Point	0.00	0.00	12,438.00	-5,441.95	-1,152.00	624,416.52	1,230,770.29	39° 30' 58.108 N	108° 13' 37.006 W	
CC 697-09-HN1 LP - plan hits target center - Point	0.00	358.28	12,557.00	-1,022.36	-1,152.43	628,834.12	1,230,902.30	39° 31' 41.790 N	108° 13' 37.014 W	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,460.00	4,460.00	Fort Union		0.00		
5,873.00	5,873.00	Mesaverde		0.00		
6,073.00	6,073.00	Williams Fork		0.00		
6,562.00	6,562.00	Williams Fork Shale		0.00		
6,979.00	6,979.00	Top Gas		0.00		
8,292.00	8,292.00	Cameo Coal		0.00		
8,589.00	8,589.00	Rollins		0.00		
8,746.00	8,746.00	Cozzette		0.00		
8,964.00	8,964.00	Corcoran		0.00		
9,213.00	9,213.00	Mancos		0.00		
11,865.09	11,862.00	Niobrara		0.00		
12,141.29	12,114.00	NBR7		0.00		
12,612.03	12,437.00	NBR6		0.00		



Database:	Grand Junction District	Local Co-ordinate Reference:	Well 697-09-HN1
Company:	OXY USA RMAT	TVD Reference:	GL 8279' @ 8279.00ft
Project:	Garfield County, CO NAD27	MD Reference:	GL 8279' @ 8279.00ft
Site:	Cascade Creek 697-09-61 Pad	North Reference:	True
Well:	697-09-HN1	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #5		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,608.00	11,608.00	0.00	0.00	Start DLS 6.00 TFO 228.42
13,117.75	12,562.88	-640.19	-721.64	Start 575.91 hold at 13117.75 MD
13,693.66	12,557.00	-1,022.36	-1,152.43	Start DLS 6.00 TFO -88.38
14,500.72	12,540.63	-1,736.54	-1,473.63	Start 3643.38 hold at 14500.72 MD
18,144.09	12,438.90	-5,378.49	-1,473.63	TD at 18144.09