



Project: Orchard  
Site: NENW Sec16-T8S-R96W (C16OU)  
Well: Keinath Federal 10-10H  
Wellbore: HZ  
Design: Plan #4



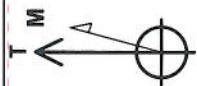
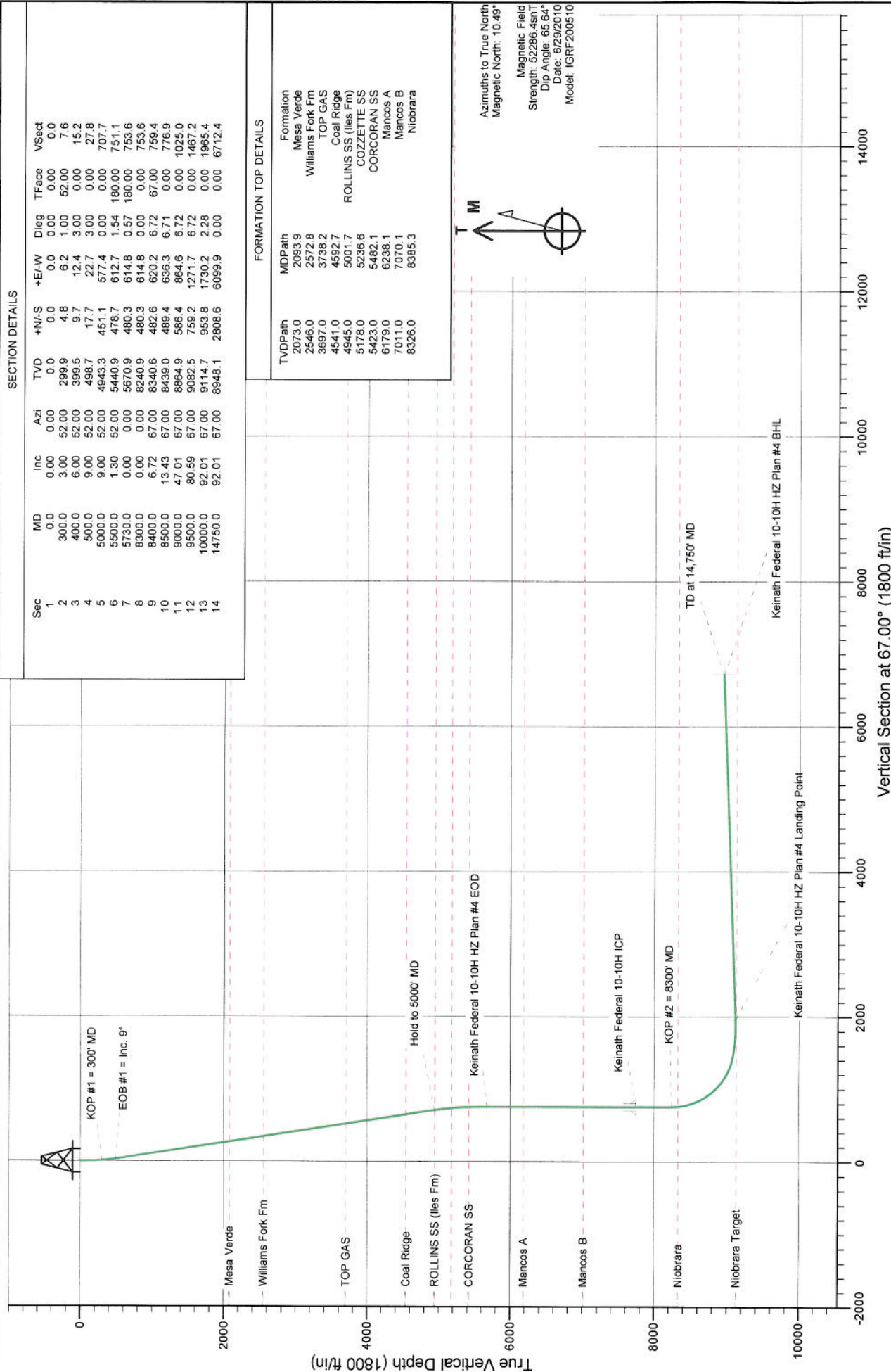
# CATHEDRAL

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Dleg	TFace	VSEct
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	300.0	3.00	52.00	299.9	4.8	6.2	1.00	52.00	7.6
3	400.0	6.00	52.00	399.5	9.7	12.4	3.00	0.00	15.2
4	500.0	9.00	52.00	498.7	17.7	22.7	3.00	0.00	27.8
5	5000.0	9.00	52.00	4943.3	451.1	577.4	0.00	0.00	707.7
6	5500.0	1.30	52.00	5440.9	478.7	612.7	1.54	180.00	751.1
7	5730.0	0.00	0.00	5670.9	480.3	614.8	0.57	180.00	753.6
8	8300.0	0.00	0.00	8240.9	480.3	614.8	0.00	0.00	753.6
9	8400.0	6.72	67.00	8340.6	482.6	620.2	6.72	67.00	759.4
10	8500.0	13.43	67.00	8439.0	489.4	636.3	6.71	0.00	776.9
11	9000.0	47.01	67.00	8864.9	586.4	864.6	6.72	0.00	1025.0
12	9500.0	80.59	67.00	9082.5	759.2	1271.7	6.72	0.00	1467.2
13	10000.0	92.01	67.00	9114.7	953.8	1730.2	2.28	0.00	1965.4
14	14750.0	92.01	67.00	8948.1	2808.6	6099.9	0.00	0.00	6712.4

## FORMATION TOP DETAILS

MDPath	Formation
2073.0	Mesa Verde
2546.0	Williams Fork Fm
3697.0	TOP GAS
4541.0	Coal Ridge
4945.0	ROLLINS SS (lies Fm)
5178.0	COZZETTE SS
5423.0	CORCORAN SS
6179.0	Mancos A
7011.0	Mancos B
8326.0	Niobrara



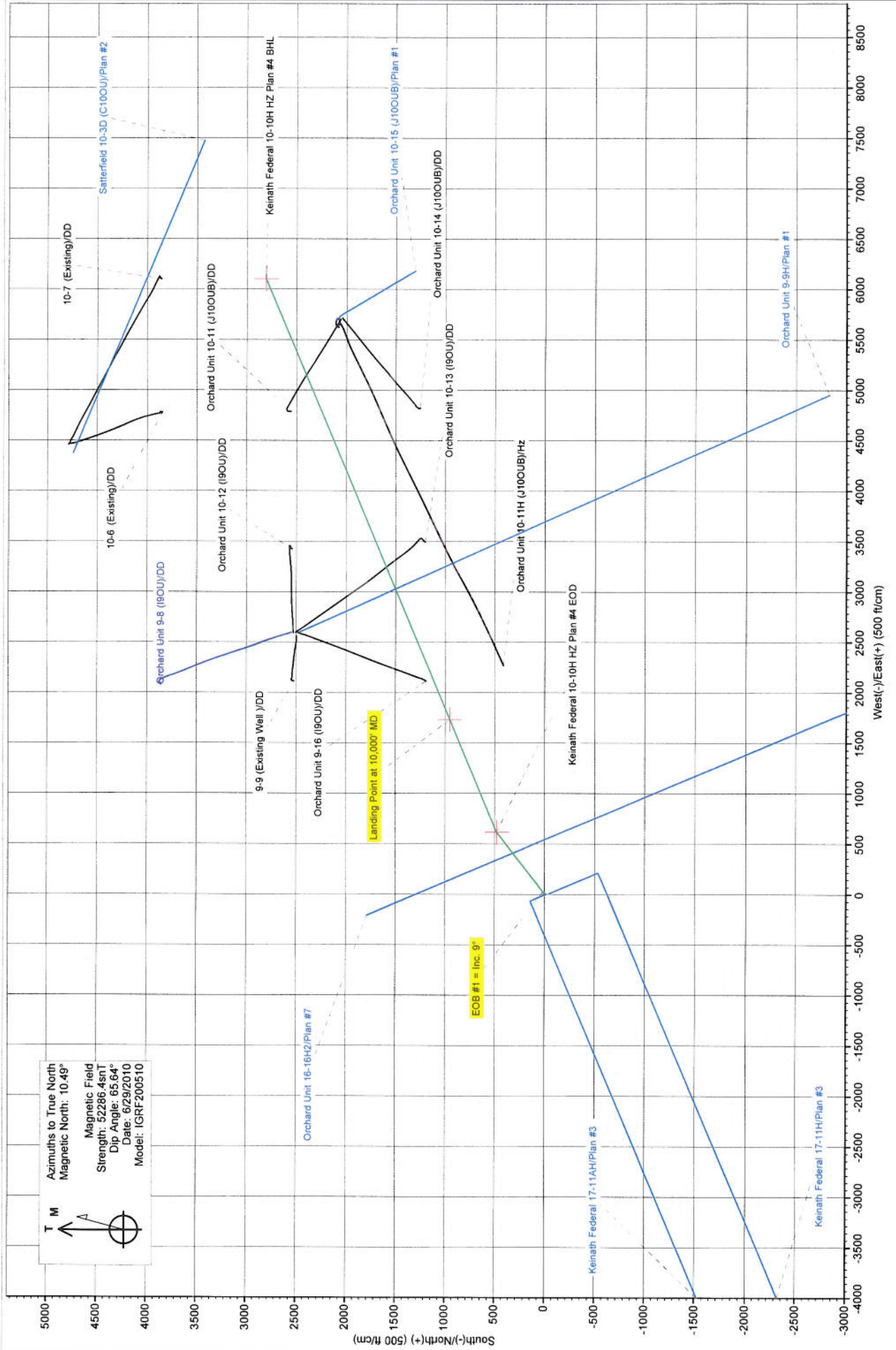
Azimuths to True North  
Magnetic North: 10.49°  
Magnetic Field  
Strength: 32286.45nT  
Dip Angle: 65.64°  
Date: 6/29/2010  
Model: IGRF200510



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Site: NENW Sec16-T8S-R96W (C16OU)  
Well: Keinath Federal 10-10H  
Wellbore: HZ  
Plan: Plan #4



CATHEDRAL





# Cathedral Energy Services

## Planning Report

Database: EDM 5000.1 US Multi Users DB  
Company: EnCana Oil & Gas (USA) Inc  
Project: Orchard  
Site: NENW Sec16-T8S-R96W (C16OU)  
Well: Keinath Federal 10-10H  
Wellbore: HZ  
Design: Plan #4

Local Co-ordinate Reference: Well Keinath Federal 10-10H  
TVD Reference: KBE @ 5789.0ft  
MD Reference: KBE @ 5789.0ft  
North Reference: True  
Survey Calculation Method: Minimum Curvature

Project: Orchard  
Map System: US State Plane 1983  
Geo Datum: North American Datum 1983  
Map Zone: Colorado Central Zone  
System Datum: Mean Sea Level

Site: NENW Sec16-T8S-R96W (C16OU)  
Site Position: Northing: 1,564,927.77 ft Latitude: 39.355256  
From: Lat/Long Easting: 2,260,675.21 ft Longitude: -108.115006  
Position Uncertainty: 0.0 ft Slot Radius: 13.200 in Grid Convergence: -1.65 °

Well: Keinath Federal 10-10H  
Well Position: +N/-S 0.0 ft Northing: 1,564,984.31 ft Latitude: 39.355422  
+E/-W 0.0 ft Easting: 2,260,819.85 ft Longitude: -108.114500  
Position Uncertainty: 0.0 ft Wellhead Elevation: ft Ground Level: 5,767.0 ft

Wellbore: HZ

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	6/29/2010	10.49	65.64	52,286

Design: Plan #4

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	67.00

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
300.0	3.00	52.00	299.9	4.8	6.2	1.00	1.00	0.00	52.00	
400.0	6.00	52.00	399.5	9.7	12.4	3.00	3.00	0.00	0.00	
500.0	9.00	52.00	498.7	17.7	22.7	3.00	3.00	0.00	0.00	
5,000.0	9.00	52.00	4,943.3	451.1	577.4	0.00	0.00	0.00	0.00	
5,500.0	1.30	52.00	5,440.9	478.7	612.7	1.54	-1.54	0.00	180.00	
5,730.0	0.00	0.00	5,670.9	480.3	614.8	0.57	-0.57	0.00	180.00	
8,300.0	0.00	0.00	8,240.9	480.3	614.8	0.00	0.00	0.00	0.00	
8,400.0	6.72	67.00	8,340.6	482.6	620.2	6.72	6.72	0.00	67.00	
8,500.0	13.43	67.00	8,439.0	489.4	636.3	6.71	6.71	0.00	0.00	
9,000.0	47.01	67.00	8,864.9	586.4	864.6	6.72	6.72	0.00	0.00	
9,500.0	80.59	67.00	9,082.5	759.2	1,271.7	6.72	6.72	0.00	0.00	
10,000.0	92.01	67.00	9,114.7	953.8	1,730.2	2.28	2.28	0.00	0.00	
14,750.0	92.01	67.00	8,948.1	2,808.6	6,099.9	0.00	0.00	0.00	0.00	

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TVD Reference: KBE @ 5789.0ft  
MD Reference: KBE @ 5789.0ft  
North Reference: True  
Survey Calculation Method: Minimum Curvature

### 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)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	1.00	52.00	100.0	0.5	0.7	0.8	1.00	1.00	
200.0	2.00	52.00	200.0	2.1	2.8	3.4	1.00	1.00	
300.0	3.00	52.00	299.9	4.8	6.2	7.6	1.00	1.00	KOP #1 = 300' MD
400.0	6.00	52.00	399.5	9.7	12.4	15.2	3.00	3.00	
500.0	9.00	52.00	498.7	17.7	22.7	27.8	3.00	3.00	EOB #1 = Inc. 9°
600.0	9.00	52.00	597.4	27.3	35.0	42.9	0.00	0.00	
700.0	9.00	52.00	696.2	37.0	47.3	58.0	0.00	0.00	
800.0	9.00	52.00	795.0	46.6	59.6	73.1	0.00	0.00	
900.0	9.00	52.00	893.8	56.2	72.0	88.2	0.00	0.00	
1,000.0	9.00	52.00	992.5	65.9	84.3	103.3	0.00	0.00	
1,100.0	9.00	52.00	1,091.3	75.5	96.6	118.4	0.00	0.00	
1,200.0	9.00	52.00	1,190.1	85.1	108.9	133.5	0.00	0.00	
1,300.0	9.00	52.00	1,288.8	94.7	121.3	148.7	0.00	0.00	
1,400.0	9.00	52.00	1,387.6	104.4	133.6	163.8	0.00	0.00	
1,500.0	9.00	52.00	1,486.4	114.0	145.9	178.9	0.00	0.00	
1,600.0	9.00	52.00	1,585.1	123.6	158.3	194.0	0.00	0.00	
1,700.0	9.00	52.00	1,683.9	133.3	170.6	209.1	0.00	0.00	
1,800.0	9.00	52.00	1,782.7	142.9	182.9	224.2	0.00	0.00	
1,900.0	9.00	52.00	1,881.4	152.5	195.2	239.3	0.00	0.00	
2,000.0	9.00	52.00	1,980.2	162.2	207.6	254.4	0.00	0.00	
2,093.9	9.00	52.00	2,073.0	171.2	219.1	268.6	0.00	0.00	Mesa Verde
2,100.0	9.00	52.00	2,079.0	171.8	219.9	269.5	0.00	0.00	
2,200.0	9.00	52.00	2,177.7	181.4	232.2	284.6	0.00	0.00	
2,300.0	9.00	52.00	2,276.5	191.1	244.5	299.8	0.00	0.00	
2,400.0	9.00	52.00	2,375.3	200.7	256.9	314.9	0.00	0.00	
2,500.0	9.00	52.00	2,474.1	210.3	269.2	330.0	0.00	0.00	
2,572.8	9.00	52.00	2,546.0	217.3	278.2	341.0	0.00	0.00	Williams Fork Fm
2,600.0	9.00	52.00	2,572.8	220.0	281.5	345.1	0.00	0.00	
2,700.0	9.00	52.00	2,671.6	229.6	293.9	360.2	0.00	0.00	
2,800.0	9.00	52.00	2,770.4	239.2	306.2	375.3	0.00	0.00	
2,900.0	9.00	52.00	2,869.1	248.8	318.5	390.4	0.00	0.00	
3,000.0	9.00	52.00	2,967.9	258.5	330.8	405.5	0.00	0.00	
3,100.0	9.00	52.00	3,066.7	268.1	343.2	420.6	0.00	0.00	
3,200.0	9.00	52.00	3,165.4	277.7	355.5	435.7	0.00	0.00	
3,300.0	9.00	52.00	3,264.2	287.4	367.8	450.9	0.00	0.00	
3,400.0	9.00	52.00	3,363.0	297.0	380.1	466.0	0.00	0.00	
3,500.0	9.00	52.00	3,461.7	306.6	392.5	481.1	0.00	0.00	
3,600.0	9.00	52.00	3,560.5	316.3	404.8	496.2	0.00	0.00	
3,700.0	9.00	52.00	3,659.3	325.9	417.1	511.3	0.00	0.00	
3,738.2	9.00	52.00	3,697.0	329.6	421.8	517.1	0.00	0.00	TOP GAS
3,800.0	9.00	52.00	3,758.0	335.5	429.5	526.4	0.00	0.00	
3,900.0	9.00	52.00	3,856.8	345.2	441.8	541.5	0.00	0.00	
4,000.0	9.00	52.00	3,955.6	354.8	454.1	556.6	0.00	0.00	
4,100.0	9.00	52.00	4,054.4	364.4	466.4	571.7	0.00	0.00	
4,200.0	9.00	52.00	4,153.1	374.0	478.8	586.9	0.00	0.00	
4,300.0	9.00	52.00	4,251.9	383.7	491.1	602.0	0.00	0.00	
4,400.0	9.00	52.00	4,350.7	393.3	503.4	617.1	0.00	0.00	
4,500.0	9.00	52.00	4,449.4	402.9	515.7	632.2	0.00	0.00	
4,592.7	9.00	52.00	4,541.0	411.9	527.2	646.2	0.00	0.00	Coal Ridge
4,600.0	9.00	52.00	4,548.2	412.6	528.1	647.3	0.00	0.00	
4,700.0	9.00	52.00	4,647.0	422.2	540.4	662.4	0.00	0.00	



# Cathedral Energy Services

## Planning Report

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MD Reference: KBE @ 5789.0ft  
North Reference: True  
Survey Calculation Method: Minimum Curvature

### 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)	Comments / Formations
4,800.0	9.00	52.00	4,745.7	431.8	552.7	677.5	0.00	0.00	
4,900.0	9.00	52.00	4,844.5	441.5	565.1	692.6	0.00	0.00	
5,000.0	9.00	52.00	4,943.3	451.1	577.4	707.7	0.00	0.00	Hold to 5000' MD
5,001.7	8.97	52.00	4,945.0	451.3	577.6	708.0	1.54	-1.54	ROLLINS SS (lles Fm)
5,100.0	7.46	52.00	5,042.2	459.9	588.7	721.6	1.54	-1.54	
5,200.0	5.92	52.00	5,141.6	467.1	597.8	732.8	1.54	-1.54	
5,236.6	5.36	52.00	5,178.0	469.3	600.7	736.3	1.54	-1.54	COZZETTE SS
5,300.0	4.38	52.00	5,241.2	472.6	604.9	741.5	1.54	-1.54	
5,400.0	2.84	52.00	5,340.9	476.5	609.9	747.6	1.54	-1.54	
5,482.1	1.58	52.00	5,423.0	478.4	612.4	750.6	1.54	-1.54	CORCORAN SS
5,500.0	1.30	52.00	5,440.9	478.7	612.7	751.1	1.54	-1.54	
5,600.0	0.73	52.00	5,540.9	479.8	614.1	752.8	0.57	-0.57	
5,700.0	0.17	52.00	5,640.9	480.3	614.7	753.5	0.57	-0.57	
5,730.0	0.00	0.00	5,670.9	480.3	614.8	753.6	0.57	-0.57	EOD at Inc. = 0°
5,800.0	0.00	0.00	5,740.9	480.3	614.8	753.6	0.00	0.00	
5,900.0	0.00	0.00	5,840.9	480.3	614.8	753.6	0.00	0.00	
6,000.0	0.00	0.00	5,940.9	480.3	614.8	753.6	0.00	0.00	
6,100.0	0.00	0.00	6,040.9	480.3	614.8	753.6	0.00	0.00	
6,200.0	0.00	0.00	6,140.9	480.3	614.8	753.6	0.00	0.00	
6,238.1	0.00	0.00	6,179.0	480.3	614.8	753.6	0.00	0.00	Mancos A
6,300.0	0.00	0.00	6,240.9	480.3	614.8	753.6	0.00	0.00	
6,400.0	0.00	0.00	6,340.9	480.3	614.8	753.6	0.00	0.00	
6,500.0	0.00	0.00	6,440.9	480.3	614.8	753.6	0.00	0.00	
6,600.0	0.00	0.00	6,540.9	480.3	614.8	753.6	0.00	0.00	
6,700.0	0.00	0.00	6,640.9	480.3	614.8	753.6	0.00	0.00	
6,800.0	0.00	0.00	6,740.9	480.3	614.8	753.6	0.00	0.00	
6,900.0	0.00	0.00	6,840.9	480.3	614.8	753.6	0.00	0.00	
7,000.0	0.00	0.00	6,940.9	480.3	614.8	753.6	0.00	0.00	
7,070.1	0.00	0.00	7,011.0	480.3	614.8	753.6	0.00	0.00	Mancos B
7,100.0	0.00	0.00	7,040.9	480.3	614.8	753.6	0.00	0.00	
7,200.0	0.00	0.00	7,140.9	480.3	614.8	753.6	0.00	0.00	
7,300.0	0.00	0.00	7,240.9	480.3	614.8	753.6	0.00	0.00	
7,400.0	0.00	0.00	7,340.9	480.3	614.8	753.6	0.00	0.00	
7,500.0	0.00	0.00	7,440.9	480.3	614.8	753.6	0.00	0.00	
7,600.0	0.00	0.00	7,540.9	480.3	614.8	753.6	0.00	0.00	
7,700.0	0.00	0.00	7,640.9	480.3	614.8	753.6	0.00	0.00	
7,800.0	0.00	0.00	7,740.9	480.3	614.8	753.6	0.00	0.00	Keinath Federal 10-10H ICP
7,900.0	0.00	0.00	7,840.9	480.3	614.8	753.6	0.00	0.00	
8,000.0	0.00	0.00	7,940.9	480.3	614.8	753.6	0.00	0.00	
8,100.0	0.00	0.00	8,040.9	480.3	614.8	753.6	0.00	0.00	
8,200.0	0.00	0.00	8,140.9	480.3	614.8	753.6	0.00	0.00	
8,300.0	0.00	0.00	8,240.9	480.3	614.8	753.6	0.00	0.00	KOP #2 = 8300' MD
8,385.3	5.73	67.00	8,326.0	482.0	618.7	757.8	6.72	6.72	Niobrara
8,400.0	6.72	67.00	8,340.6	482.6	620.2	759.4	6.72	6.72	
8,500.0	13.43	67.00	8,439.0	489.4	636.3	776.9	6.71	6.71	
8,600.0	20.15	67.00	8,534.7	500.7	662.8	805.8	6.72	6.72	
8,700.0	26.86	67.00	8,626.4	516.3	699.5	845.6	6.72	6.72	
8,800.0	33.58	67.00	8,712.7	535.9	745.8	895.9	6.72	6.72	
8,900.0	40.29	67.00	8,792.6	559.4	801.1	956.0	6.72	6.72	
9,000.0	47.01	67.00	8,864.9	586.4	864.6	1,025.0	6.72	6.72	
9,100.0	53.73	67.00	8,928.7	616.4	935.5	1,102.0	6.72	6.72	
9,200.0	60.44	67.00	8,983.0	649.2	1,012.7	1,185.9	6.72	6.72	

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9,300.0	67.16	67.00	9,027.1	684.3	1,095.2	1,275.5	6.72	6.72	
9,400.0	73.87	67.00	9,060.4	721.1	1,182.0	1,369.8	6.72	6.72	
9,500.0	80.59	67.00	9,082.5	759.2	1,271.7	1,467.2	6.72	6.72	
9,600.0	82.87	67.00	9,096.9	797.8	1,362.8	1,566.2	2.28	2.28	
9,700.0	85.16	67.00	9,107.3	836.7	1,454.3	1,665.6	2.28	2.28	
9,800.0	87.44	67.00	9,113.8	875.7	1,546.2	1,765.4	2.28	2.28	
9,900.0	89.73	67.00	9,116.3	914.7	1,638.2	1,865.4	2.28	2.28	
10,000.0	92.01	67.00	9,114.7	953.8	1,730.2	1,965.4	2.28	2.28	Landing Point at 10,000' MD
10,100.0	92.01	67.00	9,111.2	992.8	1,822.2	2,065.3	0.00	0.00	
10,200.0	92.01	67.00	9,107.7	1,031.9	1,914.2	2,165.2	0.00	0.00	
10,300.0	92.01	67.00	9,104.2	1,070.9	2,006.2	2,265.2	0.00	0.00	
10,400.0	92.01	67.00	9,100.7	1,110.0	2,098.2	2,365.1	0.00	0.00	
10,500.0	92.01	67.00	9,097.2	1,149.0	2,190.2	2,465.1	0.00	0.00	
10,600.0	92.01	67.00	9,093.7	1,188.1	2,282.2	2,565.0	0.00	0.00	
10,700.0	92.01	67.00	9,090.2	1,227.1	2,374.2	2,664.9	0.00	0.00	
10,800.0	92.01	67.00	9,086.7	1,266.2	2,466.2	2,764.9	0.00	0.00	
10,900.0	92.01	67.00	9,083.2	1,305.2	2,558.2	2,864.8	0.00	0.00	
11,000.0	92.01	67.00	9,079.7	1,344.3	2,650.2	2,964.7	0.00	0.00	
11,100.0	92.01	67.00	9,076.2	1,383.3	2,742.2	3,064.7	0.00	0.00	
11,200.0	92.01	67.00	9,072.7	1,422.4	2,834.2	3,164.6	0.00	0.00	
11,300.0	92.01	67.00	9,069.1	1,461.4	2,926.1	3,264.6	0.00	0.00	
11,400.0	92.01	67.00	9,065.6	1,500.5	3,018.1	3,364.5	0.00	0.00	
11,500.0	92.01	67.00	9,062.1	1,539.5	3,110.1	3,464.4	0.00	0.00	
11,600.0	92.01	67.00	9,058.6	1,578.6	3,202.1	3,564.4	0.00	0.00	
11,700.0	92.01	67.00	9,055.1	1,617.6	3,294.1	3,664.3	0.00	0.00	
11,800.0	92.01	67.00	9,051.6	1,656.7	3,386.1	3,764.3	0.00	0.00	
11,900.0	92.01	67.00	9,048.1	1,695.7	3,478.1	3,864.2	0.00	0.00	
12,000.0	92.01	67.00	9,044.6	1,734.8	3,570.1	3,964.1	0.00	0.00	
12,100.0	92.01	67.00	9,041.1	1,773.8	3,662.1	4,064.1	0.00	0.00	
12,200.0	92.01	67.00	9,037.6	1,812.9	3,754.1	4,164.0	0.00	0.00	
12,300.0	92.01	67.00	9,034.1	1,851.9	3,846.1	4,263.9	0.00	0.00	
12,400.0	92.01	67.00	9,030.6	1,891.0	3,938.1	4,363.9	0.00	0.00	
12,500.0	92.01	67.00	9,027.1	1,930.0	4,030.1	4,463.8	0.00	0.00	
12,600.0	92.01	67.00	9,023.6	1,969.1	4,122.1	4,563.8	0.00	0.00	
12,700.0	92.01	67.00	9,020.0	2,008.1	4,214.1	4,663.7	0.00	0.00	
12,800.0	92.01	67.00	9,016.5	2,047.2	4,306.1	4,763.6	0.00	0.00	
12,900.0	92.01	67.00	9,013.0	2,086.2	4,398.0	4,863.6	0.00	0.00	
13,000.0	92.01	67.00	9,009.5	2,125.3	4,490.0	4,963.5	0.00	0.00	
13,100.0	92.01	67.00	9,006.0	2,164.3	4,582.0	5,063.5	0.00	0.00	
13,200.0	92.01	67.00	9,002.5	2,203.4	4,674.0	5,163.4	0.00	0.00	
13,300.0	92.01	67.00	8,999.0	2,242.4	4,766.0	5,263.3	0.00	0.00	
13,400.0	92.01	67.00	8,995.5	2,281.5	4,858.0	5,363.3	0.00	0.00	
13,500.0	92.01	67.00	8,992.0	2,320.5	4,950.0	5,463.2	0.00	0.00	
13,600.0	92.01	67.00	8,988.5	2,359.6	5,042.0	5,563.1	0.00	0.00	
13,700.0	92.01	67.00	8,985.0	2,398.6	5,134.0	5,663.1	0.00	0.00	
13,800.0	92.01	67.00	8,981.5	2,437.7	5,226.0	5,763.0	0.00	0.00	
13,900.0	92.01	67.00	8,978.0	2,476.7	5,318.0	5,863.0	0.00	0.00	
14,000.0	92.01	67.00	8,974.5	2,515.8	5,410.0	5,962.9	0.00	0.00	
14,100.0	92.01	67.00	8,970.9	2,554.8	5,502.0	6,062.8	0.00	0.00	
14,200.0	92.01	67.00	8,967.4	2,593.9	5,594.0	6,162.8	0.00	0.00	
14,300.0	92.01	67.00	8,963.9	2,632.9	5,686.0	6,262.7	0.00	0.00	
14,400.0	92.01	67.00	8,960.4	2,672.0	5,778.0	6,362.7	0.00	0.00	



# Cathedral Energy Services

## Planning Report

**Database:** EDM 5000.1 US Multi Users DB  
**Company:** EnCana Oil & Gas (USA) Inc  
**Project:** Orchard  
**Site:** NENW Sec16-T8S-R96W (C16OU)  
**Well:** Keinath Federal 10-10H  
**Wellbore:** HZ  
**Design:** Plan #4

**Local Co-ordinate Reference:** Well Keinath Federal 10-10H  
**TVD Reference:** KBE @ 5789.0ft  
**MD Reference:** KBE @ 5789.0ft  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature

### 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)	Comments / Formations
14,500.0	92.01	67.00	8,956.9	2,711.0	5,870.0	6,462.6	0.00	0.00	
14,600.0	92.01	67.00	8,953.4	2,750.1	5,961.9	6,562.5	0.00	0.00	
14,700.0	92.01	67.00	8,949.9	2,789.1	6,053.9	6,662.5	0.00	0.00	
14,750.0	92.01	67.00	8,948.1	2,808.6	6,099.9	6,712.4	0.00	0.00	TD at 14,750' MD

### Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Keinath Federal 10-10H - plan misses target center by 2.0ft at 10000.0ft MD (9114.7 TVD, 953.8 N, 1730.2 E) - Point	0.00	0.00	9,116.7	953.8	1,730.2	1,565,887.94	2,262,576.80	39.358041	-108.108381
Keinath Federal 10-10H - plan misses target center by 2.0ft at 14749.9ft MD (8948.1 TVD, 2808.6 N, 6099.9 E) - Point	0.00	0.00	8,950.1	2,808.6	6,099.9	1,567,616.26	2,266,998.08	39.363131	-108.092925
Keinath Federal 10-10H - plan hits target center - Point	0.00	0.00	5,672.9	480.3	614.8	1,565,446.75	2,261,448.19	39.356741	-108.112326

### Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
7,800.0	7,740.9	Keinath Federal 10-10H ICP		

### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,093.9	2,073.0	Mesa Verde			
2,572.8	2,546.0	Williams Fork Fm			
3,738.2	3,697.0	TOP GAS			
4,592.7	4,541.0	Coal Ridge			
5,001.7	4,945.0	ROLLINS SS (Iles Fm)			
5,236.6	5,178.0	COZZETTE SS			
5,482.1	5,423.0	CORCORAN SS			
6,238.1	6,179.0	Mancos A			
7,070.1	7,011.0	Mancos B			
8,385.3	8,326.0	Niobrara			

# Cathedral Energy Services

## Planning Report

**Database:** EDM 5000.1 US Multi Users DB  
**Company:** EnCana Oil & Gas (USA) Inc  
**Project:** Orchard  
**Site:** NENW Sec16-T8S-R96W (C16OU)  
**Well:** Keinath Federal 10-10H  
**Wellbore:** HZ  
**Design:** Plan #4

**Local Co-ordinate Reference:** Well Keinath Federal 10-10H  
**TVD Reference:** KBE @ 5789.0ft  
**MD Reference:** KBE @ 5789.0ft  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature

### Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
300.0	299.9	4.8	6.2	KOP #1 = 300' MD
500.0	498.7	17.7	22.7	EOB #1 = Inc. 9°
5,000.0	4,943.3	451.1	577.4	Hold to 5000' MD
5,730.0	5,670.9	480.3	614.8	EOD at Inc. = 0°
8,300.0	8,240.9	480.3	614.8	KOP #2 = 8300' MD
10,000.0	9,114.7	953.8	1,730.2	Landing Point at 10,000' MD
14,750.0	8,948.1	2,808.6	6,099.9	TD at 14,750' MD