

# **ConocoPhillips RBU Gold Data**

**Niobrara Central Zone**

**Cottonwood Creek**

**Cottonwood Creek 4-65 27-28 4AH**

**Cottonwood Creek 4-65 27-28 4AH**

**Plan: Cottonwood Creek 4-65 27-28 4AH**

## **Standard Planning Report**

**22 August, 2017**

# ConocoPhillips

## Planning Report

<b>Database:</b>	EDT 14 Central Planning	<b>Local Co-ordinate Reference:</b>	Well Cottonwood Creek 4-65 27-28 4AH
<b>Company:</b>	ConocoPhillips RBU Gold Data	<b>TVD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Project:</b>	Niobrara Central Zone	<b>MD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Site:</b>	Cottonwood Creek	<b>North Reference:</b>	True
<b>Well:</b>	Cottonwood Creek 4-65 27-28 4AH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

<b>Project</b>	Niobrara Central Zone, Colorado Central Zone, FIPS Zone: 0502		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		Using geodetic scale factor

Site		Cottonwood Creek				
Site Position:		Northing:	1,674,361.118 usft	Latitude:	39° 40' 55.380 N	
From:	Lat/Long	Easting:	3,231,224.950 usft	Longitude:	104° 40' 42.431 W	
Position Uncertainty:		0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.52 °

Well	Cottonwood Creek 4-65 27-28 4AH					
Well Position	+N/-S	-4,907.87 ft	Northing:	1,669,536.266 usft	Latitude:	39° 40' 6.860 N
	+E/-W	9,150.01 ft	Easting:	3,240,418.830 usft	Longitude:	104° 38' 45.420 W
Position Uncertainty		2.00 ft	Wellhead Elevation:		Ground Level:	5,749.50 ft

<b>Wellbore</b>	Cottonwood Creek 4-65 27-28 4AH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2017	8/1/2018	8.17	66.29	51,875.42204016

Design	Cottonwood Creek 4-65 27-28 4AH			
Audit Notes:	JM 8/3/2017 Rev B			
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	275.13

Plan Survey Tool Program		Date	8/22/2017		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	2,221.00	Cottonwood Creek 4-65 27-28 4A	Gyro-BM-MS	Gyro - bat/mem drop m/s
2	2,221.00	7,446.03	Cottonwood Creek 4-65 27-28 4A	MWD+IFR1+MS_CoP	Fixed:v2:Eagleford, crustal dec
3	7,446.03	18,364.65	Cottonwood Creek 4-65 27-28 4A	MWD+IFR1+MS_CoP	Fixed:v2:Eagleford, crustal dec

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<b>Site:</b>	Cottonwood Creek	<b>North Reference:</b>	True
<b>Well:</b>	Cottonwood Creek 4-65 27-28 4AH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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	
2,321.00	0.00	0.00	2,321.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,766.15	21.68	66.00	3,731.92	109.88	246.77	1.50	1.50	0.00	66.00	
7,446.03	21.68	66.00	7,151.56	662.77	1,488.51	0.00	0.00	0.00	0.00	
8,539.98	89.68	270.06	7,908.00	785.22	952.42	10.00	6.22	-14.25	-154.39	Cottonwood Creek 4-f
18,364.65	89.68	270.06	7,963.00	795.85	-8,872.09	0.00	0.00	0.00	0.00	Cottonwood Creek 4-f

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<b>Well:</b>	Cottonwood Creek 4-65 27-28 4AH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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
200.00	0.00	0.00	200.00	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
400.00	0.00	0.00	400.00	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
600.00	0.00	0.00	600.00	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
800.00	0.00	0.00	800.00	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
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
SL 430' FSL 1410' FEL									
1,100.00	0.00	0.00	1,100.00	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
1,300.00	0.00	0.00	1,300.00	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
1,500.00	0.00	0.00	1,500.00	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
1,700.00	0.00	0.00	1,700.00	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
1,900.00	0.00	0.00	1,900.00	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
2,100.00	0.00	0.00	2,100.00	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
2,221.00	0.00	0.00	2,221.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface									
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,321.00	0.00	0.00	2,321.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 1.50									
2,400.00	1.19	66.00	2,399.99	0.33	0.75	-0.71	1.50	1.50	0.00
2,500.00	2.69	66.00	2,499.93	1.71	3.83	-3.66	1.50	1.50	0.00
2,600.00	4.19	66.00	2,599.75	4.14	9.30	-8.90	1.50	1.50	0.00
2,700.00	5.69	66.00	2,699.38	7.64	17.16	-16.41	1.50	1.50	0.00
2,800.00	7.19	66.00	2,798.75	12.20	27.40	-26.20	1.50	1.50	0.00
2,900.00	8.69	66.00	2,897.79	17.82	40.01	-38.26	1.50	1.50	0.00
3,000.00	10.19	66.00	2,996.43	24.48	54.99	-52.58	1.50	1.50	0.00
3,100.00	11.69	66.00	3,094.61	32.20	72.32	-69.15	1.50	1.50	0.00
3,200.00	13.19	66.00	3,192.26	40.96	91.99	-87.96	1.50	1.50	0.00
3,300.00	14.69	66.00	3,289.32	50.75	113.99	-109.00	1.50	1.50	0.00
3,400.00	16.19	66.00	3,385.71	61.58	138.30	-132.24	1.50	1.50	0.00
3,500.00	17.69	66.00	3,481.37	73.43	164.91	-157.69	1.50	1.50	0.00
3,600.00	19.19	66.00	3,576.23	86.29	193.80	-185.31	1.50	1.50	0.00
3,700.00	20.69	66.00	3,670.24	100.16	224.94	-215.09	1.50	1.50	0.00
3,766.15	21.68	66.00	3,731.92	109.88	246.78	-235.97	1.50	1.50	0.00
Start 3679.89 hold at 3766.15 MD									
3,800.00	21.68	66.00	3,763.38	114.97	258.20	-246.89	0.00	0.00	0.00
3,900.00	21.68	66.00	3,856.30	129.99	291.94	-279.16	0.00	0.00	0.00
4,000.00	21.68	66.00	3,949.23	145.01	325.69	-311.43	0.00	0.00	0.00
4,100.00	21.68	66.00	4,042.16	160.04	359.43	-343.69	0.00	0.00	0.00
4,200.00	21.68	66.00	4,135.09	175.06	393.17	-375.96	0.00	0.00	0.00
4,300.00	21.68	66.00	4,228.02	190.09	426.92	-408.23	0.00	0.00	0.00
4,400.00	21.68	66.00	4,320.94	205.11	460.66	-440.49	0.00	0.00	0.00
4,500.00	21.68	66.00	4,413.87	220.14	494.41	-472.76	0.00	0.00	0.00
4,600.00	21.68	66.00	4,506.80	235.16	528.15	-505.03	0.00	0.00	0.00

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<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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	21.68	66.00	4,599.73	250.19	561.89	-537.29	0.00	0.00	0.00
4,800.00	21.68	66.00	4,692.66	265.21	595.64	-569.56	0.00	0.00	0.00
4,900.00	21.68	66.00	4,785.58	280.24	629.38	-601.83	0.00	0.00	0.00
5,000.00	21.68	66.00	4,878.51	295.26	663.13	-634.09	0.00	0.00	0.00
5,100.00	21.68	66.00	4,971.44	310.29	696.87	-666.36	0.00	0.00	0.00
5,200.00	21.68	66.00	5,064.37	325.31	730.61	-698.63	0.00	0.00	0.00
5,300.00	21.68	66.00	5,157.30	340.34	764.36	-730.89	0.00	0.00	0.00
5,400.00	21.68	66.00	5,250.22	355.36	798.10	-763.16	0.00	0.00	0.00
5,500.00	21.68	66.00	5,343.15	370.39	831.84	-795.43	0.00	0.00	0.00
5,600.00	21.68	66.00	5,436.08	385.41	865.59	-827.69	0.00	0.00	0.00
5,700.00	21.68	66.00	5,529.01	400.44	899.33	-859.96	0.00	0.00	0.00
5,800.00	21.68	66.00	5,621.93	415.46	933.08	-892.23	0.00	0.00	0.00
5,900.00	21.68	66.00	5,714.86	430.48	966.82	-924.49	0.00	0.00	0.00
6,000.00	21.68	66.00	5,807.79	445.51	1,000.56	-956.76	0.00	0.00	0.00
6,100.00	21.68	66.00	5,900.72	460.53	1,034.31	-989.03	0.00	0.00	0.00
6,200.00	21.68	66.00	5,993.65	475.56	1,068.05	-1,021.29	0.00	0.00	0.00
6,300.00	21.68	66.00	6,086.57	490.58	1,101.80	-1,053.56	0.00	0.00	0.00
6,400.00	21.68	66.00	6,179.50	505.61	1,135.54	-1,085.83	0.00	0.00	0.00
6,500.00	21.68	66.00	6,272.43	520.63	1,169.28	-1,118.09	0.00	0.00	0.00
6,600.00	21.68	66.00	6,365.36	535.66	1,203.03	-1,150.36	0.00	0.00	0.00
6,700.00	21.68	66.00	6,458.29	550.68	1,236.77	-1,182.62	0.00	0.00	0.00
6,800.00	21.68	66.00	6,551.21	565.71	1,270.51	-1,214.89	0.00	0.00	0.00
6,900.00	21.68	66.00	6,644.14	580.73	1,304.26	-1,247.16	0.00	0.00	0.00
7,000.00	21.68	66.00	6,737.07	595.76	1,338.00	-1,279.42	0.00	0.00	0.00
7,100.00	21.68	66.00	6,830.00	610.78	1,371.75	-1,311.69	0.00	0.00	0.00
7,200.00	21.68	66.00	6,922.93	625.81	1,405.49	-1,343.96	0.00	0.00	0.00
7,300.00	21.68	66.00	7,015.85	640.83	1,439.23	-1,376.22	0.00	0.00	0.00
7,400.00	21.68	66.00	7,108.78	655.86	1,472.98	-1,408.49	0.00	0.00	0.00
7,446.00	21.68	66.00	7,151.53	662.77	1,488.50	-1,423.33	0.00	0.00	0.00
<b>KOP 1093' FSL 79' FWL</b>									
7,446.03	21.68	66.00	7,151.56	662.77	1,488.51	-1,423.34	0.00	0.00	0.00
<b>Start DLS 10.00 TFO -154.39</b>									
7,450.00	21.32	65.53	7,155.25	663.37	1,489.84	-1,424.61	9.99	-8.99	-11.88
7,500.00	16.96	57.99	7,202.48	671.01	1,504.30	-1,438.34	10.00	-8.71	-15.08
7,550.00	13.06	45.80	7,250.78	678.82	1,514.55	-1,447.84	10.00	-7.81	-24.37
7,600.00	10.15	25.34	7,299.77	686.74	1,520.49	-1,453.05	10.00	-5.83	-40.92
7,650.00	9.21	355.77	7,349.09	694.72	1,522.08	-1,453.92	10.00	-1.87	-59.14
7,700.00	10.79	328.10	7,398.36	702.69	1,519.31	-1,450.45	10.00	3.15	-55.34
7,750.00	14.05	310.27	7,447.20	710.59	1,512.20	-1,442.67	10.00	6.53	-35.66
7,800.00	18.11	299.65	7,495.24	718.36	1,500.81	-1,430.62	10.00	8.12	-21.25
7,850.00	22.54	292.94	7,542.12	725.94	1,485.21	-1,414.42	10.00	8.86	-13.41
7,900.00	27.17	288.38	7,587.48	733.29	1,465.54	-1,394.17	10.00	9.24	-9.12
7,950.00	31.89	285.07	7,630.98	740.32	1,441.94	-1,370.03	10.00	9.46	-6.61
8,000.00	36.69	282.55	7,672.28	747.01	1,414.59	-1,342.19	10.00	9.59	-5.05
8,050.00	41.53	280.53	7,711.06	753.29	1,383.70	-1,310.86	10.00	9.67	-4.03
8,100.00	46.39	278.87	7,747.05	759.11	1,349.49	-1,276.28	10.00	9.73	-3.32
8,150.00	51.28	277.46	7,779.95	764.44	1,312.25	-1,238.70	10.00	9.77	-2.82
8,200.00	56.18	276.23	7,809.52	769.23	1,272.24	-1,198.42	10.00	9.80	-2.46
8,250.00	61.09	275.14	7,835.54	773.45	1,229.77	-1,155.74	10.00	9.82	-2.19
8,300.00	66.01	274.14	7,857.81	777.06	1,185.16	-1,110.99	10.00	9.84	-1.99
8,350.00	70.93	273.21	7,876.15	780.03	1,138.76	-1,064.51	10.00	9.85	-1.85
8,400.00	75.87	272.34	7,890.43	782.35	1,090.91	-1,016.65	10.00	9.86	-1.74
8,450.00	80.80	271.51	7,900.54	784.00	1,041.99	-967.78	10.00	9.87	-1.67

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<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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)
8,500.00	85.73	270.70	7,906.40	784.95	992.36	-918.26	10.00	9.87	-1.62
8,539.00	89.58	270.08	7,907.99	785.22	953.40	-879.43	10.00	9.87	-1.60
<b>BPI 1217' FSL 460' FEL</b>									
8,539.98	89.68	270.06	7,908.00	785.22	952.42	-878.46	9.96	9.83	-1.59
<b>Start 9824.67 hold at 8539.98 MD</b>									
8,600.00	89.68	270.06	7,908.34	785.28	892.40	-818.67	0.00	0.00	0.00
8,700.00	89.68	270.06	7,908.90	785.39	792.40	-719.06	0.00	0.00	0.00
8,800.00	89.68	270.06	7,909.46	785.50	692.40	-619.46	0.00	0.00	0.00
8,900.00	89.68	270.06	7,910.02	785.61	592.41	-519.85	0.00	0.00	0.00
9,000.00	89.68	270.06	7,910.58	785.72	492.41	-420.24	0.00	0.00	0.00
9,100.00	89.68	270.06	7,911.14	785.82	392.41	-320.63	0.00	0.00	0.00
9,200.00	89.68	270.06	7,911.70	785.93	292.41	-221.02	0.00	0.00	0.00
9,300.00	89.68	270.06	7,912.25	786.04	192.41	-121.42	0.00	0.00	0.00
9,400.00	89.68	270.06	7,912.81	786.15	92.41	-21.81	0.00	0.00	0.00
9,500.00	89.68	270.06	7,913.37	786.26	-7.58	77.80	0.00	0.00	0.00
9,600.00	89.68	270.06	7,913.93	786.37	-107.58	177.41	0.00	0.00	0.00
9,700.00	89.68	270.06	7,914.49	786.47	-207.58	277.02	0.00	0.00	0.00
9,800.00	89.68	270.06	7,915.05	786.58	-307.58	376.63	0.00	0.00	0.00
9,900.00	89.68	270.06	7,915.61	786.69	-407.58	476.23	0.00	0.00	0.00
10,000.00	89.68	270.06	7,916.17	786.80	-507.58	575.84	0.00	0.00	0.00
10,100.00	89.68	270.06	7,916.73	786.91	-607.57	675.45	0.00	0.00	0.00
10,200.00	89.68	270.06	7,917.29	787.01	-707.57	775.06	0.00	0.00	0.00
10,300.00	89.68	270.06	7,917.85	787.12	-807.57	874.67	0.00	0.00	0.00
10,400.00	89.68	270.06	7,918.41	787.23	-907.57	974.27	0.00	0.00	0.00
10,500.00	89.68	270.06	7,918.97	787.34	-1,007.57	1,073.88	0.00	0.00	0.00
10,600.00	89.68	270.06	7,919.53	787.45	-1,107.57	1,173.49	0.00	0.00	0.00
10,700.00	89.68	270.06	7,920.09	787.56	-1,207.56	1,273.10	0.00	0.00	0.00
10,800.00	89.68	270.06	7,920.65	787.66	-1,307.56	1,372.71	0.00	0.00	0.00
10,900.00	89.68	270.06	7,921.21	787.77	-1,407.56	1,472.31	0.00	0.00	0.00
11,000.00	89.68	270.06	7,921.77	787.88	-1,507.56	1,571.92	0.00	0.00	0.00
11,100.00	89.68	270.06	7,922.33	787.99	-1,607.56	1,671.53	0.00	0.00	0.00
11,200.00	89.68	270.06	7,922.89	788.10	-1,707.56	1,771.14	0.00	0.00	0.00
11,300.00	89.68	270.06	7,923.45	788.21	-1,807.55	1,870.75	0.00	0.00	0.00
11,400.00	89.68	270.06	7,924.01	788.31	-1,907.55	1,970.36	0.00	0.00	0.00
11,500.00	89.68	270.06	7,924.57	788.42	-2,007.55	2,069.96	0.00	0.00	0.00
11,600.00	89.68	270.06	7,925.13	788.53	-2,107.55	2,169.57	0.00	0.00	0.00
11,700.00	89.68	270.06	7,925.69	788.64	-2,207.55	2,269.18	0.00	0.00	0.00
11,800.00	89.68	270.06	7,926.25	788.75	-2,307.55	2,368.79	0.00	0.00	0.00
11,900.00	89.68	270.06	7,926.81	788.85	-2,407.54	2,468.40	0.00	0.00	0.00
12,000.00	89.68	270.06	7,927.37	788.96	-2,507.54	2,568.00	0.00	0.00	0.00
12,100.00	89.68	270.06	7,927.93	789.07	-2,607.54	2,667.61	0.00	0.00	0.00
12,200.00	89.68	270.06	7,928.49	789.18	-2,707.54	2,767.22	0.00	0.00	0.00
12,300.00	89.68	270.06	7,929.05	789.29	-2,807.54	2,866.83	0.00	0.00	0.00
12,400.00	89.68	270.06	7,929.61	789.40	-2,907.54	2,966.44	0.00	0.00	0.00
12,500.00	89.68	270.06	7,930.17	789.50	-3,007.54	3,066.04	0.00	0.00	0.00
12,600.00	89.68	270.06	7,930.73	789.61	-3,107.53	3,165.65	0.00	0.00	0.00
12,700.00	89.68	270.06	7,931.29	789.72	-3,207.53	3,265.26	0.00	0.00	0.00
12,800.00	89.68	270.06	7,931.85	789.83	-3,307.53	3,364.87	0.00	0.00	0.00
12,900.00	89.68	270.06	7,932.41	789.94	-3,407.53	3,464.48	0.00	0.00	0.00
13,000.00	89.68	270.06	7,932.97	790.04	-3,507.53	3,564.09	0.00	0.00	0.00
13,100.00	89.68	270.06	7,933.53	790.15	-3,607.53	3,663.69	0.00	0.00	0.00
13,200.00	89.68	270.06	7,934.09	790.26	-3,707.52	3,763.30	0.00	0.00	0.00
13,300.00	89.68	270.06	7,934.65	790.37	-3,807.52	3,862.91	0.00	0.00	0.00
13,400.00	89.68	270.06	7,935.21	790.48	-3,907.52	3,962.52	0.00	0.00	0.00

# ConocoPhillips

## Planning Report

<b>Database:</b>	EDT 14 Central Planning	<b>Local Co-ordinate Reference:</b>	Well Cottonwood Creek 4-65 27-28 4AH
<b>Company:</b>	ConocoPhillips RBU Gold Data	<b>TVD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Project:</b>	Niobrara Central Zone	<b>MD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Site:</b>	Cottonwood Creek	<b>North Reference:</b>	True
<b>Well:</b>	Cottonwood Creek 4-65 27-28 4AH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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)
13,500.00	89.68	270.06	7,935.77	790.59	-4,007.52	4,062.13	0.00	0.00	0.00
13,600.00	89.68	270.06	7,936.33	790.69	-4,107.52	4,161.73	0.00	0.00	0.00
13,700.00	89.68	270.06	7,936.89	790.80	-4,207.52	4,261.34	0.00	0.00	0.00
13,800.00	89.68	270.06	7,937.45	790.91	-4,307.51	4,360.95	0.00	0.00	0.00
13,900.00	89.68	270.06	7,938.01	791.02	-4,407.51	4,460.56	0.00	0.00	0.00
14,000.00	89.68	270.06	7,938.57	791.13	-4,507.51	4,560.17	0.00	0.00	0.00
14,100.00	89.68	270.06	7,939.13	791.24	-4,607.51	4,659.77	0.00	0.00	0.00
14,200.00	89.68	270.06	7,939.69	791.34	-4,707.51	4,759.38	0.00	0.00	0.00
14,300.00	89.68	270.06	7,940.25	791.45	-4,807.51	4,858.99	0.00	0.00	0.00
14,400.00	89.68	270.06	7,940.81	791.56	-4,907.50	4,958.60	0.00	0.00	0.00
14,500.00	89.68	270.06	7,941.37	791.67	-5,007.50	5,058.21	0.00	0.00	0.00
14,600.00	89.68	270.06	7,941.93	791.78	-5,107.50	5,157.82	0.00	0.00	0.00
14,700.00	89.68	270.06	7,942.48	791.88	-5,207.50	5,257.42	0.00	0.00	0.00
14,800.00	89.68	270.06	7,943.04	791.99	-5,307.50	5,357.03	0.00	0.00	0.00
14,900.00	89.68	270.06	7,943.60	792.10	-5,407.50	5,456.64	0.00	0.00	0.00
15,000.00	89.68	270.06	7,944.16	792.21	-5,507.49	5,556.25	0.00	0.00	0.00
15,100.00	89.68	270.06	7,944.72	792.32	-5,607.49	5,655.86	0.00	0.00	0.00
15,200.00	89.68	270.06	7,945.28	792.43	-5,707.49	5,755.46	0.00	0.00	0.00
15,300.00	89.68	270.06	7,945.84	792.53	-5,807.49	5,855.07	0.00	0.00	0.00
15,400.00	89.68	270.06	7,946.40	792.64	-5,907.49	5,954.68	0.00	0.00	0.00
15,500.00	89.68	270.06	7,946.96	792.75	-6,007.49	6,054.29	0.00	0.00	0.00
15,600.00	89.68	270.06	7,947.52	792.86	-6,107.48	6,153.90	0.00	0.00	0.00
15,700.00	89.68	270.06	7,948.08	792.97	-6,207.48	6,253.51	0.00	0.00	0.00
15,800.00	89.68	270.06	7,948.64	793.07	-6,307.48	6,353.11	0.00	0.00	0.00
15,900.00	89.68	270.06	7,949.20	793.18	-6,407.48	6,452.72	0.00	0.00	0.00
16,000.00	89.68	270.06	7,949.76	793.29	-6,507.48	6,552.33	0.00	0.00	0.00
16,100.00	89.68	270.06	7,950.32	793.40	-6,607.48	6,651.94	0.00	0.00	0.00
16,200.00	89.68	270.06	7,950.88	793.51	-6,707.48	6,751.55	0.00	0.00	0.00
16,300.00	89.68	270.06	7,951.44	793.62	-6,807.47	6,851.15	0.00	0.00	0.00
16,400.00	89.68	270.06	7,952.00	793.72	-6,907.47	6,950.76	0.00	0.00	0.00
16,500.00	89.68	270.06	7,952.56	793.83	-7,007.47	7,050.37	0.00	0.00	0.00
16,600.00	89.68	270.06	7,953.12	793.94	-7,107.47	7,149.98	0.00	0.00	0.00
16,700.00	89.68	270.06	7,953.68	794.05	-7,207.47	7,249.59	0.00	0.00	0.00
16,800.00	89.68	270.06	7,954.24	794.16	-7,307.47	7,349.19	0.00	0.00	0.00
16,900.00	89.68	270.06	7,954.80	794.27	-7,407.46	7,448.80	0.00	0.00	0.00
17,000.00	89.68	270.06	7,955.36	794.37	-7,507.46	7,548.41	0.00	0.00	0.00
17,100.00	89.68	270.06	7,955.92	794.48	-7,607.46	7,648.02	0.00	0.00	0.00
17,200.00	89.68	270.06	7,956.48	794.59	-7,707.46	7,747.63	0.00	0.00	0.00
17,300.00	89.68	270.06	7,957.04	794.70	-7,807.46	7,847.24	0.00	0.00	0.00
17,400.00	89.68	270.06	7,957.60	794.81	-7,907.46	7,946.84	0.00	0.00	0.00
17,500.00	89.68	270.06	7,958.16	794.91	-8,007.45	8,046.45	0.00	0.00	0.00
17,600.00	89.68	270.06	7,958.72	795.02	-8,107.45	8,146.06	0.00	0.00	0.00
17,700.00	89.68	270.06	7,959.28	795.13	-8,207.45	8,245.67	0.00	0.00	0.00
17,800.00	89.68	270.06	7,959.84	795.24	-8,307.45	8,345.28	0.00	0.00	0.00
17,900.00	89.68	270.06	7,960.40	795.35	-8,407.45	8,444.88	0.00	0.00	0.00
18,000.00	89.68	270.06	7,960.96	795.46	-8,507.45	8,544.49	0.00	0.00	0.00
18,100.00	89.68	270.06	7,961.52	795.56	-8,607.44	8,644.10	0.00	0.00	0.00
18,200.00	89.68	270.06	7,962.08	795.67	-8,707.44	8,743.71	0.00	0.00	0.00
18,299.00	89.68	270.06	7,962.63	795.78	-8,806.44	8,842.32	0.00	0.00	0.00
<b>EPI 1217' FSL 460' FWL</b>									
18,300.00	89.68	270.06	7,962.64	795.78	-8,807.44	8,843.32	0.00	0.00	0.00
18,364.00	89.68	270.06	7,963.00	795.85	-8,871.44	8,907.07	0.00	0.00	0.00
<b>BHL 1217' FSL 325' FWL</b>									
18,364.65	89.68	270.06	7,963.00	795.85	-8,872.09	8,907.71	0.00	0.00	0.00

# ConocoPhillips

## Planning Report

<b>Database:</b>	EDT 14 Central Planning	<b>Local Co-ordinate Reference:</b>	Well Cottonwood Creek 4-65 27-28 4AH
<b>Company:</b>	ConocoPhillips RBU Gold Data	<b>TVD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Project:</b>	Niobrara Central Zone	<b>MD Reference:</b>	27' RKB @ 5776.50ft (27' RKB)
<b>Site:</b>	Cottonwood Creek	<b>North Reference:</b>	True
<b>Well:</b>	Cottonwood Creek 4-65 27-28 4AH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Cottonwood Creek 4-65 27-28 4AH		
<b>Design:</b>	Cottonwood Creek 4-65 27-28 4AH		

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)
TD at 18364.65									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Cottonwood Creek 4-65	0.00	0.00	7,908.00	785.22	952.42	1,670,330.390	3,241,363.814	39° 40' 14.620 N	104° 38' 33.240 W
- plan hits target center									
- Point									
Cottonwood Creek 4-65	0.00	0.00	7,963.00	795.85	-8,872.09	1,670,248.663	3,231,539.805	39° 40' 14.710 N	104° 40' 38.880 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
2,221.00	2,221.00	Surface	9-5/8	12-1/4	
18,364.65	7,963.00	Production	5-1/2	8-1/2	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,000.00	1,000.00	0.00	0.00	SL 430' FSL 1410' FEL	
2,321.00	2,321.00	0.00	0.00	Start Build 1.50	
3,766.15	3,731.92	109.88	246.78	Start 3679.89 hold at 3766.15 MD	
7,446.00	7,151.53	662.77	1,488.50	KOP 1093' FSL 79' FWL	
7,446.03	7,151.56	662.77	1,488.51	Start DLS 10.00 TFO -154.39	
8,539.00	7,907.99	785.22	953.40	BPI 1217' FSL 460' FEL	
8,539.98	7,908.00	785.22	952.42	Start 9824.67 hold at 8539.98 MD	
18,299.00	7,962.63	795.78	-8,806.44	EPI 1217' FSL 460' FWL	
18,364.00	7,963.00	795.85	-8,871.44	BHL 1217' FSL 325' FWL	
18,364.65	7,963.00	795.85	-8,872.09	TD at 18364.65	





ConocoPhillips

Arapahoe County, Colorado

## Cottonwood Creek 4-65 27-28 4AH

Ground Level: 5749.50  
Surface Location Latitude: 39° 40' 6.860 N  
Surface Location Longitude: 104° 38' 45.420 W  
North Reference: True  
27' RKB @ 5776.50ft (27' RKB)

North American Datum 1983  
GRS 1980  
US State Plane 1983  
Colorado Central Zone

### Well Profile Data

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2321.00	0.00	0.00	2321.00	0.00	0.00	0.00	0.00
3766.15	21.68	66.00	3731.92	109.88	246.77	1.50	-235.97
7446.03	21.68	66.00	7151.56	662.77	1488.51	0.00	-1423.34
8539.98	89.68	270.06	7908.00	785.22	952.42	10.00	-878.46
18364.65	89.68	270.06	7963.00	795.85	-8872.09	0.00	8907.71

