



ConocoPhillips

Arapahoe County, Colorado

Cottonwood Creek 4-65 27-28 4BH

Design A

Ground Level: 5749.50
Surface Location Latitude: 39° 40' 6.470 N
Surface Location Longitude: 104° 38' 45.420 W
North Reference: True
25' RKB @ 5774.50ft (25' RKB)

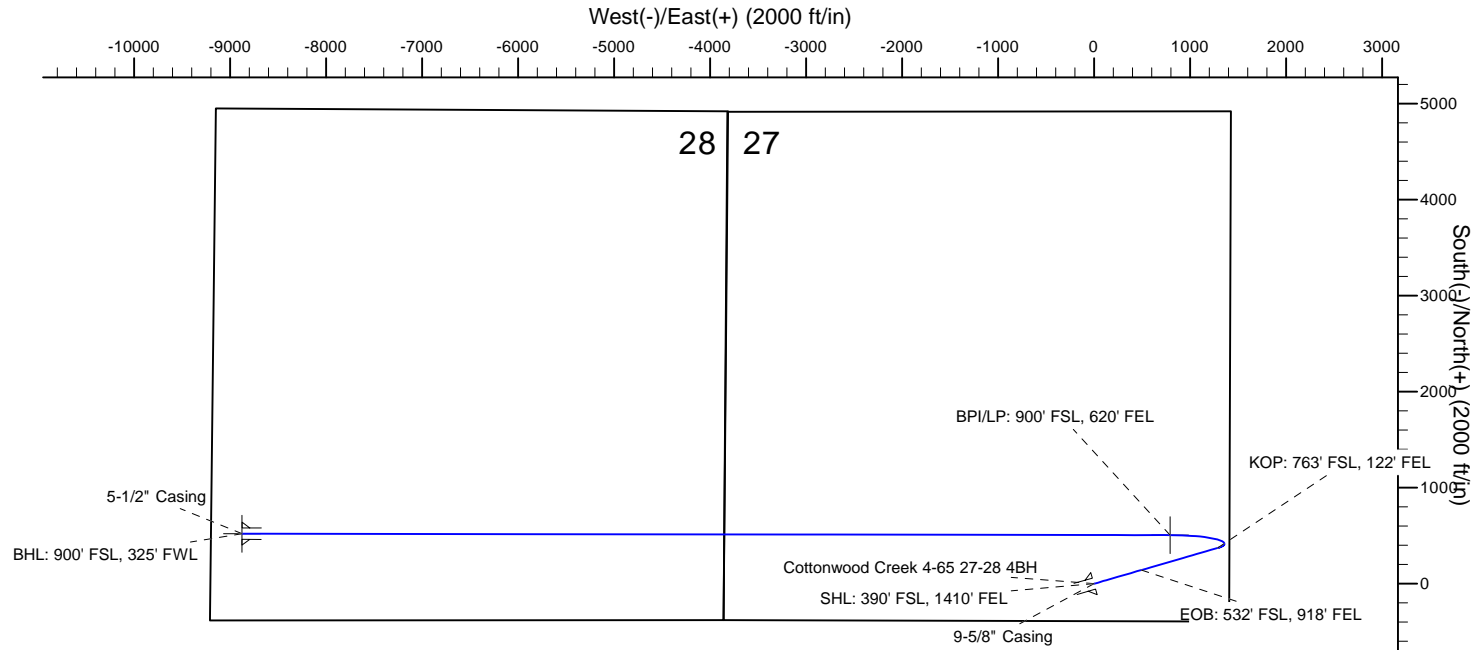
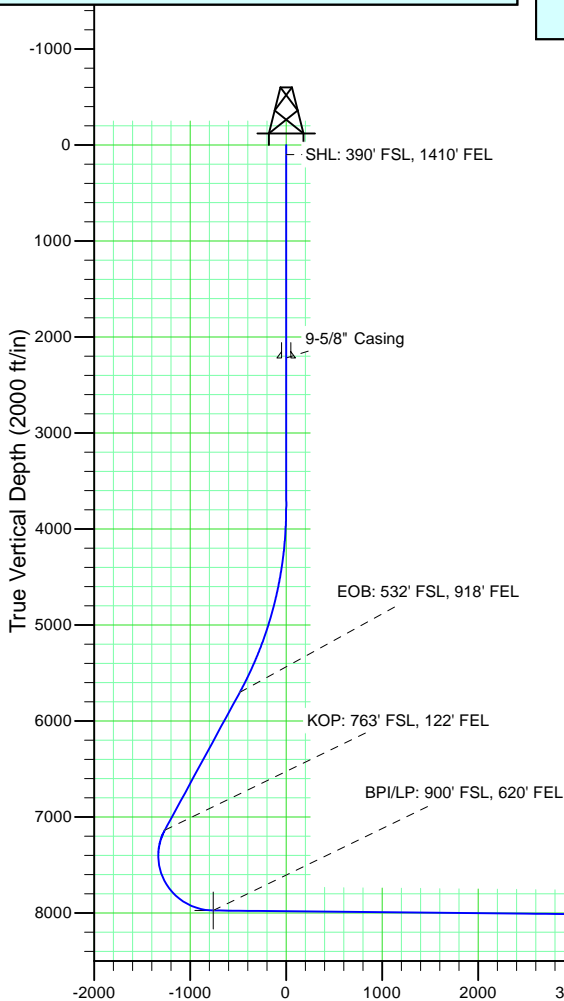
North American Datum 1983
GRS 1980
US State Plane 1983
Colorado Central Zone

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
3792.40	0.00	0.00	3792.40	0.00	0.00	0.00	0.00
5792.39	30.00	73.86	5702.25	142.28	491.56	1.50	-482.38
7449.77	30.00	73.86	7137.59	372.68	1287.58	0.00	-1263.52
8630.97	89.42	270.08	7975.00	506.95	790.87	10.00	-759.80
16954.18	89.42	270.08	8059.00	519.18	-7531.91	0.00	7549.39
18298.18	89.42	270.08	8072.56	521.15	-8875.84	0.00	8891.13

Casing Depths

TVD	MD	Name	Size
2218.00	2218.00	9-5/8" Casing	9-5/8
8072.56	18298.18	5-1/2" Casing	5-1/2



Wellbore Targets

Name	TVD	Latitude	Longitude
Cottonwood Creek 4-65 27-28 4BH BPI	7975.00	39° 40' 11.480 N	104° 38' 35.306 W
Cottonwood Creek 4-65 27-28 4BH BHL	8072.56	39° 40' 11.605 N	104° 40' 38.927 W

ConocoPhillips RBU Gold Data

Niobrara Central Zone

Cottonwood Creek

Cottonwood Creek 4-65 27-28 4BH

Cottonwood Creek 4-65 27-28 4BH

Plan: Design A

Standard Planning Report

26 February, 2018

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

Project	Niobrara Central Zone, Colorado Central Zone, FIPS Zone: 0502		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 4BH					
Well Position	+N-S	-4,947.34 ft	Northing:	1,669,496.793 usft	Latitude:	39° 40' 6.470 N
	+E-W	9,150.02 ft	Easting:	3,240,419.201 usft	Longitude:	104° 38' 45.420 W
Position Uncertainty		2.00 ft	Wellhead Elevation:	5,749.50 ft	Ground Level:	5,749.50 ft

Wellbore	Cottonwood Creek 4-65 27-28 4BH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2017	12/1/2018	8.14	66.28	51,836.29674786

Design	Design A				
Audit Notes:					
Version:	0	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	273.36	

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Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

Plan Survey Tool Program		Date 2/26/2018			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	2,218.00	Design A (Cottonwood Creek 4-6Gyro-BM-MS)	Gyro - bat/mem drop m/s	
2	2,218.00	3,792.40	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	
3	3,792.40	5,792.39	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	
4	5,792.39	7,449.77	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	
5	7,449.77	8,630.97	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	
6	8,630.97	16,954.18	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	
7	16,954.18	18,298.18	Design A (Cottonwood Creek 4-6MWD+IFR_No SAG)	MWD + IFR (No SAG) corre	

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	
3,792.40	0.00	0.00	3,792.40	0.00	0.00	0.00	0.00	0.00	0.00	
5,792.39	30.00	73.86	5,702.25	142.28	491.56	1.50	1.50	0.00	73.86	
7,449.77	30.00	73.86	7,137.59	372.68	1,287.58	0.00	0.00	0.00	0.00	
8,630.97	89.42	270.08	7,975.00	506.95	790.87	10.00	5.03	-13.87	-161.53	
16,954.18	89.42	270.08	8,059.00	519.18	-7,531.91	0.00	0.00	0.00	0.00	
18,298.18	89.42	270.08	8,072.56	521.15	-8,875.84	0.00	0.00	0.00	0.00	

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Planning Report

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Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

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
SHL: 390' FSL, 1410' FEL									
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
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
1,801.00	0.00	0.00	1,801.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Top									
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
2,018.00	0.00	0.00	2,018.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Top - Fox Hills Base									
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
2,218.00	0.00	0.00	2,218.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface Casing - 9-5/8" Casing									
2,300.00	0.00	0.00	2,300.00	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
2,500.00	0.00	0.00	2,500.00	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
2,700.00	0.00	0.00	2,700.00	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
2,900.00	0.00	0.00	2,900.00	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
3,100.00	0.00	0.00	3,100.00	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
3,300.00	0.00	0.00	3,300.00	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
3,500.00	0.00	0.00	3,500.00	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
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,792.40	0.00	0.00	3,792.40	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.11	73.86	3,800.00	0.00	0.01	-0.01	1.50	1.50	0.00
3,900.00	1.61	73.86	3,899.99	0.42	1.46	-1.43	1.50	1.50	0.00
4,000.00	3.11	73.86	3,999.90	1.57	5.42	-5.32	1.50	1.50	0.00
4,100.00	4.61	73.86	4,099.67	3.44	11.89	-11.67	1.50	1.50	0.00
4,200.00	6.11	73.86	4,199.23	6.04	20.87	-20.48	1.50	1.50	0.00
4,300.00	7.61	73.86	4,298.51	9.36	32.35	-31.75	1.50	1.50	0.00
4,400.00	9.11	73.86	4,397.44	13.41	46.32	-45.46	1.50	1.50	0.00
4,500.00	10.61	73.86	4,495.96	18.17	62.78	-61.60	1.50	1.50	0.00

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

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)
4,600.00	12.11	73.86	4,594.00	23.65	81.70	-80.18	1.50	1.50	0.00
4,700.00	13.61	73.86	4,691.48	29.84	103.09	-101.16	1.50	1.50	0.00
4,800.00	15.11	73.86	4,788.36	36.74	126.92	-124.55	1.50	1.50	0.00
4,900.00	16.61	73.86	4,884.54	44.34	153.18	-150.31	1.50	1.50	0.00
5,000.00	18.11	73.86	4,979.98	52.63	181.84	-178.44	1.50	1.50	0.00
5,100.00	19.61	73.86	5,074.61	61.62	212.90	-208.92	1.50	1.50	0.00
5,200.00	21.11	73.86	5,168.36	71.30	246.32	-241.72	1.50	1.50	0.00
5,300.00	22.61	73.86	5,261.16	81.65	282.10	-276.82	1.50	1.50	0.00
5,400.00	24.11	73.86	5,352.96	92.68	320.19	-314.21	1.50	1.50	0.00
5,500.00	25.61	73.86	5,443.69	104.36	360.58	-353.84	1.50	1.50	0.00
5,600.00	27.11	73.86	5,533.28	116.71	403.23	-395.70	1.50	1.50	0.00
5,700.00	28.61	73.86	5,621.69	129.70	448.12	-439.75	1.50	1.50	0.00
5,792.39	30.00	73.86	5,702.25	142.28	491.56	-482.38	1.50	1.50	0.00
EOB: 532' FSL, 918' FEL									
5,800.00	30.00	73.86	5,708.84	143.34	495.22	-485.97	0.00	0.00	0.00
5,900.00	30.00	73.86	5,795.44	157.24	543.25	-533.10	0.00	0.00	0.00
6,000.00	30.00	73.86	5,882.05	171.14	591.28	-580.23	0.00	0.00	0.00
6,100.00	30.00	73.86	5,968.65	185.04	639.30	-627.36	0.00	0.00	0.00
6,200.00	30.00	73.86	6,055.25	198.94	687.33	-674.49	0.00	0.00	0.00
6,300.00	30.00	73.86	6,141.85	212.84	735.36	-721.62	0.00	0.00	0.00
6,400.00	30.00	73.86	6,228.46	226.74	783.39	-768.75	0.00	0.00	0.00
6,500.00	30.00	73.86	6,315.06	240.65	831.42	-815.88	0.00	0.00	0.00
6,600.00	30.00	73.86	6,401.66	254.55	879.45	-863.01	0.00	0.00	0.00
6,700.00	30.00	73.86	6,488.27	268.45	927.48	-910.15	0.00	0.00	0.00
6,800.00	30.00	73.86	6,574.87	282.35	975.50	-957.28	0.00	0.00	0.00
6,900.00	30.00	73.86	6,661.47	296.25	1,023.53	-1,004.41	0.00	0.00	0.00
7,000.00	30.00	73.86	6,748.07	310.15	1,071.56	-1,051.54	0.00	0.00	0.00
7,100.00	30.00	73.86	6,834.68	324.05	1,119.59	-1,098.67	0.00	0.00	0.00
7,200.00	30.00	73.86	6,921.28	337.95	1,167.62	-1,145.80	0.00	0.00	0.00
7,300.00	30.00	73.86	7,007.88	351.86	1,215.65	-1,192.93	0.00	0.00	0.00
7,400.00	30.00	73.86	7,094.48	365.76	1,263.67	-1,240.06	0.00	0.00	0.00
7,449.77	30.00	73.86	7,137.59	372.68	1,287.58	-1,263.52	0.00	0.00	0.00
KOP: 763' FSL, 122' FEL									
7,500.00	25.28	70.13	7,182.07	379.82	1,309.74	-1,285.23	10.00	-9.39	-7.41
7,550.00	20.72	64.89	7,228.09	387.20	1,327.80	-1,302.82	10.00	-9.13	-10.49
7,600.00	16.39	56.94	7,275.49	394.81	1,341.73	-1,316.28	10.00	-8.65	-15.90
7,650.00	12.56	43.94	7,323.91	402.58	1,351.42	-1,325.50	10.00	-7.66	-26.00
7,700.00	9.82	22.10	7,372.97	410.45	1,356.81	-1,330.41	10.00	-5.48	-43.68
7,750.00	9.21	351.73	7,422.31	418.37	1,357.84	-1,330.98	10.00	-1.23	-60.75
7,800.00	11.07	325.04	7,471.56	426.27	1,354.51	-1,327.19	10.00	3.73	-53.38
7,850.00	14.49	308.35	7,520.33	434.09	1,346.84	-1,319.08	10.00	6.84	-33.38
7,900.00	18.63	298.41	7,568.25	441.78	1,334.90	-1,306.71	10.00	8.27	-19.89
7,950.00	23.10	292.08	7,614.97	449.27	1,318.78	-1,290.18	10.00	8.94	-12.65
8,000.00	27.74	287.75	7,660.12	456.51	1,298.59	-1,269.60	10.00	9.29	-8.67
8,050.00	32.49	284.58	7,703.36	463.44	1,274.50	-1,245.14	10.00	9.49	-6.33
8,100.00	37.29	282.15	7,744.36	470.02	1,246.68	-1,216.99	10.00	9.61	-4.86
8,144.88	41.64	280.39	7,779.00	475.57	1,218.71	-1,188.74	10.00	9.68	-3.93
Niobrara Top									
8,150.00	42.13	280.21	7,782.82	476.18	1,215.35	-1,185.35	10.00	9.71	-3.55
8,200.00	47.00	278.59	7,818.43	481.89	1,180.74	-1,150.46	10.00	9.74	-3.22
8,250.00	51.89	277.22	7,850.92	487.10	1,143.12	-1,112.60	10.00	9.78	-2.75
8,300.00	56.80	276.02	7,880.06	491.77	1,102.77	-1,072.05	10.00	9.81	-2.40
8,350.00	61.71	274.94	7,905.61	495.86	1,060.01	-1,029.12	10.00	9.83	-2.15

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

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)
8,400.00	66.63	273.97	7,927.39	499.35	1,015.16	-984.14	10.00	9.84	-1.96
8,450.00	71.56	273.06	7,945.22	502.20	968.55	-937.45	10.00	9.86	-1.82
8,500.00	76.49	272.20	7,958.98	504.40	920.54	-889.40	10.00	9.86	-1.72
8,528.78	79.33	271.72	7,965.00	505.36	892.43	-861.27	10.00	9.87	-1.66
D Chalk Top									
8,550.00	81.43	271.38	7,968.55	505.93	871.51	-840.36	10.00	9.87	-1.63
8,600.00	86.36	270.58	7,973.86	506.77	821.82	-790.70	10.00	9.87	-1.60
8,630.97	89.42	270.08	7,975.00	506.95	790.87	-759.80	10.00	9.87	-1.59
BPI/LP: 900' FSL, 620' FEL									
8,700.00	89.42	270.08	7,975.70	507.05	721.84	-690.88	0.00	0.00	0.00
8,800.00	89.42	270.08	7,976.71	507.20	621.85	-591.05	0.00	0.00	0.00
8,900.00	89.42	270.08	7,977.71	507.34	521.85	-491.22	0.00	0.00	0.00
9,000.00	89.42	270.08	7,978.72	507.49	421.86	-391.39	0.00	0.00	0.00
9,100.00	89.42	270.08	7,979.73	507.64	321.86	-291.56	0.00	0.00	0.00
9,200.00	89.42	270.08	7,980.74	507.78	221.87	-191.72	0.00	0.00	0.00
9,300.00	89.42	270.08	7,981.75	507.93	121.88	-91.89	0.00	0.00	0.00
9,400.00	89.42	270.08	7,982.76	508.08	21.88	7.94	0.00	0.00	0.00
9,500.00	89.42	270.08	7,983.77	508.22	-78.11	107.77	0.00	0.00	0.00
9,600.00	89.42	270.08	7,984.78	508.37	-178.11	207.60	0.00	0.00	0.00
9,700.00	89.42	270.08	7,985.78	508.52	-278.10	307.43	0.00	0.00	0.00
9,800.00	89.42	270.08	7,986.79	508.66	-378.10	407.26	0.00	0.00	0.00
9,900.00	89.42	270.08	7,987.80	508.81	-478.09	507.10	0.00	0.00	0.00
10,000.00	89.42	270.08	7,988.81	508.96	-578.09	606.93	0.00	0.00	0.00
10,100.00	89.42	270.08	7,989.82	509.10	-678.08	706.76	0.00	0.00	0.00
10,200.00	89.42	270.08	7,990.83	509.25	-778.08	806.59	0.00	0.00	0.00
10,300.00	89.42	270.08	7,991.84	509.40	-878.07	906.42	0.00	0.00	0.00
10,400.00	89.42	270.08	7,992.85	509.54	-978.07	1,006.25	0.00	0.00	0.00
10,500.00	89.42	270.08	7,993.85	509.69	-1,078.06	1,106.08	0.00	0.00	0.00
10,600.00	89.42	270.08	7,994.86	509.84	-1,178.06	1,205.92	0.00	0.00	0.00
10,700.00	89.42	270.08	7,995.87	509.98	-1,278.05	1,305.75	0.00	0.00	0.00
10,800.00	89.42	270.08	7,996.88	510.13	-1,378.05	1,405.58	0.00	0.00	0.00
10,900.00	89.42	270.08	7,997.89	510.28	-1,478.04	1,505.41	0.00	0.00	0.00
11,000.00	89.42	270.08	7,998.90	510.42	-1,578.04	1,605.24	0.00	0.00	0.00
11,100.00	89.42	270.08	7,999.91	510.57	-1,678.03	1,705.07	0.00	0.00	0.00
11,200.00	89.42	270.08	8,000.92	510.72	-1,778.03	1,804.90	0.00	0.00	0.00
11,300.00	89.42	270.08	8,001.92	510.86	-1,878.02	1,904.74	0.00	0.00	0.00
11,400.00	89.42	270.08	8,002.93	511.01	-1,978.02	2,004.57	0.00	0.00	0.00
11,500.00	89.42	270.08	8,003.94	511.16	-2,078.01	2,104.40	0.00	0.00	0.00
11,600.00	89.42	270.08	8,004.95	511.30	-2,178.01	2,204.23	0.00	0.00	0.00
11,700.00	89.42	270.08	8,005.96	511.45	-2,278.00	2,304.06	0.00	0.00	0.00
11,800.00	89.42	270.08	8,006.97	511.60	-2,378.00	2,403.89	0.00	0.00	0.00
11,900.00	89.42	270.08	8,007.98	511.74	-2,477.99	2,503.73	0.00	0.00	0.00
12,000.00	89.42	270.08	8,008.99	511.89	-2,577.98	2,603.56	0.00	0.00	0.00
12,100.00	89.42	270.08	8,010.00	512.04	-2,677.98	2,703.39	0.00	0.00	0.00
12,200.00	89.42	270.08	8,011.00	512.18	-2,777.97	2,803.22	0.00	0.00	0.00
12,300.00	89.42	270.08	8,012.01	512.33	-2,877.97	2,903.05	0.00	0.00	0.00
12,400.00	89.42	270.08	8,013.02	512.48	-2,977.96	3,002.88	0.00	0.00	0.00
12,500.00	89.42	270.08	8,014.03	512.62	-3,077.96	3,102.71	0.00	0.00	0.00
12,600.00	89.42	270.08	8,015.04	512.77	-3,177.95	3,202.55	0.00	0.00	0.00
12,700.00	89.42	270.08	8,016.05	512.92	-3,277.95	3,302.38	0.00	0.00	0.00
12,800.00	89.42	270.08	8,017.06	513.06	-3,377.94	3,402.21	0.00	0.00	0.00
12,900.00	89.42	270.08	8,018.07	513.21	-3,477.94	3,502.04	0.00	0.00	0.00
13,000.00	89.42	270.08	8,019.07	513.36	-3,577.93	3,601.87	0.00	0.00	0.00
13,100.00	89.42	270.08	8,020.08	513.50	-3,677.93	3,701.70	0.00	0.00	0.00

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

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)	
13,200.00	89.42	270.08	8,021.09	513.65	-3,777.92	3,801.53	0.00	0.00	0.00	
13,300.00	89.42	270.08	8,022.10	513.79	-3,877.92	3,901.37	0.00	0.00	0.00	
13,400.00	89.42	270.08	8,023.11	513.94	-3,977.91	4,001.20	0.00	0.00	0.00	
13,500.00	89.42	270.08	8,024.12	514.09	-4,077.91	4,101.03	0.00	0.00	0.00	
13,600.00	89.42	270.08	8,025.13	514.23	-4,177.90	4,200.86	0.00	0.00	0.00	
13,700.00	89.42	270.08	8,026.14	514.38	-4,277.90	4,300.69	0.00	0.00	0.00	
13,800.00	89.42	270.08	8,027.14	514.53	-4,377.89	4,400.52	0.00	0.00	0.00	
13,900.00	89.42	270.08	8,028.15	514.67	-4,477.89	4,500.35	0.00	0.00	0.00	
14,000.00	89.42	270.08	8,029.16	514.82	-4,577.88	4,600.19	0.00	0.00	0.00	
14,100.00	89.42	270.08	8,030.17	514.97	-4,677.88	4,700.02	0.00	0.00	0.00	
14,200.00	89.42	270.08	8,031.18	515.11	-4,777.87	4,799.85	0.00	0.00	0.00	
14,300.00	89.42	270.08	8,032.19	515.26	-4,877.87	4,899.68	0.00	0.00	0.00	
14,400.00	89.42	270.08	8,033.20	515.41	-4,977.86	4,999.51	0.00	0.00	0.00	
14,500.00	89.42	270.08	8,034.21	515.55	-5,077.85	5,099.34	0.00	0.00	0.00	
14,600.00	89.42	270.08	8,035.21	515.70	-5,177.85	5,199.17	0.00	0.00	0.00	
14,700.00	89.42	270.08	8,036.22	515.85	-5,277.84	5,299.01	0.00	0.00	0.00	
14,800.00	89.42	270.08	8,037.23	515.99	-5,377.84	5,398.84	0.00	0.00	0.00	
14,900.00	89.42	270.08	8,038.24	516.14	-5,477.83	5,498.67	0.00	0.00	0.00	
15,000.00	89.42	270.08	8,039.25	516.29	-5,577.83	5,598.50	0.00	0.00	0.00	
15,100.00	89.42	270.08	8,040.26	516.43	-5,677.82	5,698.33	0.00	0.00	0.00	
15,200.00	89.42	270.08	8,041.27	516.58	-5,777.82	5,798.16	0.00	0.00	0.00	
15,300.00	89.42	270.08	8,042.28	516.73	-5,877.81	5,898.00	0.00	0.00	0.00	
15,400.00	89.42	270.08	8,043.29	516.87	-5,977.81	5,997.83	0.00	0.00	0.00	
15,500.00	89.42	270.08	8,044.29	517.02	-6,077.80	6,097.66	0.00	0.00	0.00	
15,600.00	89.42	270.08	8,045.30	517.17	-6,177.80	6,197.49	0.00	0.00	0.00	
15,700.00	89.42	270.08	8,046.31	517.31	-6,277.79	6,297.32	0.00	0.00	0.00	
15,800.00	89.42	270.08	8,047.32	517.46	-6,377.79	6,397.15	0.00	0.00	0.00	
15,900.00	89.42	270.08	8,048.33	517.61	-6,477.78	6,496.98	0.00	0.00	0.00	
16,000.00	89.42	270.08	8,049.34	517.75	-6,577.78	6,596.82	0.00	0.00	0.00	
16,100.00	89.42	270.08	8,050.35	517.90	-6,677.77	6,696.65	0.00	0.00	0.00	
16,200.00	89.42	270.08	8,051.36	518.05	-6,777.77	6,796.48	0.00	0.00	0.00	
16,300.00	89.42	270.08	8,052.36	518.19	-6,877.76	6,896.31	0.00	0.00	0.00	
16,400.00	89.42	270.08	8,053.37	518.34	-6,977.76	6,996.14	0.00	0.00	0.00	
16,500.00	89.42	270.08	8,054.38	518.49	-7,077.75	7,095.97	0.00	0.00	0.00	
16,600.00	89.42	270.08	8,055.39	518.63	-7,177.75	7,195.80	0.00	0.00	0.00	
16,700.00	89.42	270.08	8,056.40	518.78	-7,277.74	7,295.64	0.00	0.00	0.00	
16,800.00	89.42	270.08	8,057.41	518.93	-7,377.74	7,395.47	0.00	0.00	0.00	
16,900.00	89.42	270.08	8,058.42	519.07	-7,477.73	7,495.30	0.00	0.00	0.00	
16,954.18	89.42	270.08	8,059.00	519.18	-7,531.91	7,549.39	0.00	0.00	0.00	
17,000.00	89.42	270.08	8,059.46	519.25	-7,577.72	7,595.13	0.00	0.00	0.00	
17,100.00	89.42	270.08	8,060.47	519.39	-7,677.72	7,694.96	0.00	0.00	0.00	
17,200.00	89.42	270.08	8,061.48	519.54	-7,777.71	7,794.79	0.00	0.00	0.00	
17,300.00	89.42	270.08	8,062.49	519.69	-7,877.71	7,894.63	0.00	0.00	0.00	
17,400.00	89.42	270.08	8,063.50	519.83	-7,977.70	7,994.46	0.00	0.00	0.00	
17,500.00	89.42	270.08	8,064.51	519.98	-8,077.70	8,094.29	0.00	0.00	0.00	
17,600.00	89.42	270.08	8,065.52	520.13	-8,177.69	8,194.12	0.00	0.00	0.00	
17,700.00	89.42	270.08	8,066.52	520.27	-8,277.69	8,293.95	0.00	0.00	0.00	
17,800.00	89.42	270.08	8,067.53	520.42	-8,377.68	8,393.78	0.00	0.00	0.00	
17,900.00	89.42	270.08	8,068.54	520.57	-8,477.68	8,493.61	0.00	0.00	0.00	
18,000.00	89.42	270.08	8,069.55	520.71	-8,577.67	8,593.45	0.00	0.00	0.00	
18,100.00	89.42	270.08	8,070.56	520.86	-8,677.67	8,693.28	0.00	0.00	0.00	
18,200.00	89.42	270.08	8,071.57	521.01	-8,777.66	8,793.11	0.00	0.00	0.00	
18,298.18	89.42	270.08	8,072.56	521.15	-8,875.84	8,891.12	0.00	0.00	0.00	
BHL: 900' FSL, 325' FWL - 5-1/2" Casing										

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Cottonwood Creek 4-65 27-28 4BH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5774.50ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5774.50ft (25' RKB)
Site:	Cottonwood Creek	North Reference:	True
Well:	Cottonwood Creek 4-65 27-28 4BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Cottonwood Creek 4-65 27-28 4BH		
Design:	Design A		

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)

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Cottonwood Creek 4-65 27-28 4BH - hit/miss target - Shape - Point	0.00	0.00	7,975.00	506.95	790.87	1,670,011.147	3,241,205.257	39° 40' 11.480 N	104° 38' 35.306 W
Cottonwood Creek 4-65 27-28 4BH - plan hits target center - Point	0.00	0.00	8,072.56	521.15	-8,875.84	1,669,934.472	3,231,539.005	39° 40' 11.605 N	104° 40' 38.927 W

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
2,218.00	2,218.00	9-5/8" Casing	9-5/8	12-1/4	
18,298.18	8,072.56	5-1/2" Casing	5-1/2	8-1/2	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,801.00	1,801.00	Fox Hills Top		0.00	
2,018.00	2,018.00	Pierre Top - Fox Hills Base		0.00	
2,218.00	2,218.00	Surface Casing		0.00	
8,144.88	7,779.00	Niobrara Top		0.00	
8,528.78	7,965.00	D Chalk Top		0.00	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
100.00	100.00	0.00	0.00	SHL: 390' FSL, 1410' FEL
5,792.39	5,702.25	142.28	491.56	EOB: 532' FSL, 918' FEL
7,449.77	7,137.59	372.68	1,287.58	KOP: 763' FSL, 122' FEL
8,630.97	7,975.00	506.95	790.87	BPI/LP: 900' FSL, 620' FEL
18,298.18	8,072.56	521.15	-8,875.84	BHL: 900' FSL, 325' FWL