

ConocoPhillips RBU Gold Data

Niobrara Central Zone

Grande

Grande 4-65 20-19 2DH

Grande 4-65 20-19 2DH

Plan: Design A

Standard Planning Report

15 September, 2018

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Grande 4-65 20-19 2DH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5689.40ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5689.40ft (25' RKB)
Site:	Grande	North Reference:	True
Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
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	Grande				
Site Position:		Northing:	1,679,554.079 usft	Latitude:	39° 41' 47.630 N
From:	Lat/Long	Easting:	3,220,569.758 usft	Longitude:	104° 42' 58.140 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.49 °

Well	Grande 4-65 20-19 2DH					
Well Position	+N/-S	-984.23 ft	Northing:	1,678,668.991 usft	Latitude:	39° 41' 37.878 N
	+E/-W	11,484.93 ft	Easting:	3,232,062.611 usft	Longitude:	104° 40' 31.217 W
Position Uncertainty		2.00 ft	Wellhead Elevation:	5,664.40 ft	Ground Level:	5,664.40 ft

Wellbore	Grande 4-65 20-19 2DH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2018	12/1/2018	8.14	66.28	51,851.27432151

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	262.38

Plan Survey Tool Program		Date	9/15/2018		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	2,199.00	Design A (Grande 4-65 20-19 2D)	Gyro-BM-MS	Gyro - bat/mem drop m/s
2	2,199.00	3,975.00	Design A (Grande 4-65 20-19 2D)	MWD+IFR_No SAG	MWD + IFR (No SAG) correctic
3	3,975.00	5,974.84	Design A (Grande 4-65 20-19 2D)	MWD+IFR_No SAG	MWD + IFR (No SAG) correctic
4	5,974.84	7,998.48	Design A (Grande 4-65 20-19 2D)	MWD+IFR_No SAG	MWD + IFR (No SAG) correctic
5	7,998.48	8,751.52	Design A (Grande 4-65 20-19 2D)	MWD+IFR_No SAG	MWD + IFR (No SAG) correctic
6	8,751.52	18,583.46	Design A (Grande 4-65 20-19 2D)	MWD+IFR_No SAG	MWD + IFR (No SAG) correctic

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Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5689.40ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5689.40ft (25' RKB)
Site:	Grande	North Reference:	True
Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
Design:	Design A		

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	
3,975.00	0.00	0.00	3,975.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,974.84	30.00	210.58	5,884.72	-440.52	-260.29	1.50	1.50	0.00	210.58	
7,998.48	30.00	210.58	7,637.29	-1,311.57	-774.97	0.00	0.00	0.00	0.00	
8,751.52	90.02	270.05	8,020.00	-1,501.47	-1,329.46	10.00	7.97	7.90	62.94	Grande 4-65 20-19 2D
18,583.46	90.02	270.05	8,017.00	-1,492.87	-11,161.40	0.00	0.00	0.00	0.00	Grande 4-65 20-19 2D

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Site:	Grande	North Reference:	True
Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
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: 984' FNL, 866' FWL									
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
1,762.00	0.00	0.00	1,762.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Top									
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
1,999.00	0.00	0.00	1,999.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Top - Fox Hills Base									
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
2,199.00	0.00	0.00	2,199.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface Casing - 9-5/8" Casing									
2,200.00	0.00	0.00	2,200.00	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
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
3,800.00	0.00	0.00	3,800.00	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
3,975.00	0.00	0.00	3,975.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.38	210.58	4,000.00	-0.07	-0.04	0.05	1.50	1.50	0.00
4,100.00	1.88	210.58	4,099.98	-1.76	-1.04	1.26	1.50	1.50	0.00
4,200.00	3.38	210.58	4,199.87	-5.70	-3.37	4.10	1.50	1.50	0.00
4,300.00	4.88	210.58	4,299.61	-11.90	-7.03	8.54	1.50	1.50	0.00
4,400.00	6.38	210.58	4,399.12	-20.33	-12.02	14.61	1.50	1.50	0.00
4,500.00	7.88	210.58	4,498.35	-31.01	-18.32	22.27	1.50	1.50	0.00

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Wellbore:	Grande 4-65 20-19 2DH		
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	9.38	210.58	4,597.21	-43.92	-25.95	31.55	1.50	1.50	0.00
4,700.00	10.88	210.58	4,695.65	-59.06	-34.90	42.42	1.50	1.50	0.00
4,800.00	12.38	210.58	4,793.60	-76.41	-45.15	54.88	1.50	1.50	0.00
4,900.00	13.88	210.58	4,890.99	-95.96	-56.70	68.92	1.50	1.50	0.00
5,000.00	15.38	210.58	4,987.74	-117.69	-69.54	84.53	1.50	1.50	0.00
5,100.00	16.88	210.58	5,083.81	-141.60	-83.67	101.70	1.50	1.50	0.00
5,200.00	18.38	210.58	5,179.11	-167.67	-99.07	120.43	1.50	1.50	0.00
5,300.00	19.88	210.58	5,273.59	-195.88	-115.74	140.68	1.50	1.50	0.00
5,400.00	21.38	210.58	5,367.17	-226.20	-133.66	162.47	1.50	1.50	0.00
5,500.00	22.88	210.58	5,459.81	-258.63	-152.82	185.75	1.50	1.50	0.00
5,600.00	24.38	210.58	5,551.42	-293.13	-173.20	210.53	1.50	1.50	0.00
5,700.00	25.88	210.58	5,641.96	-329.68	-194.80	236.79	1.50	1.50	0.00
5,800.00	27.38	210.58	5,731.35	-368.27	-217.60	264.50	1.50	1.50	0.00
5,900.00	28.88	210.58	5,819.54	-408.85	-241.58	293.65	1.50	1.50	0.00
5,974.84	30.00	210.58	5,884.72	-440.51	-260.29	316.39	1.50	1.50	0.00
EOB: 1425' FNL, 606' FWL									
6,000.00	30.00	210.58	5,906.51	-451.34	-266.68	324.17	0.00	0.00	0.00
6,100.00	30.00	210.58	5,993.12	-494.39	-292.12	355.08	0.00	0.00	0.00
6,200.00	30.00	210.58	6,079.72	-537.43	-317.55	386.00	0.00	0.00	0.00
6,300.00	30.00	210.58	6,166.32	-580.48	-342.99	416.91	0.00	0.00	0.00
6,400.00	30.00	210.58	6,252.93	-623.52	-368.42	447.83	0.00	0.00	0.00
6,500.00	30.00	210.58	6,339.53	-666.56	-393.85	478.74	0.00	0.00	0.00
6,600.00	30.00	210.58	6,426.14	-709.61	-419.29	509.66	0.00	0.00	0.00
6,700.00	30.00	210.58	6,512.74	-752.65	-444.72	540.57	0.00	0.00	0.00
6,800.00	30.00	210.58	6,599.35	-795.70	-470.15	571.49	0.00	0.00	0.00
6,900.00	30.00	210.58	6,685.95	-838.74	-495.59	602.40	0.00	0.00	0.00
7,000.00	30.00	210.58	6,772.56	-881.78	-521.02	633.32	0.00	0.00	0.00
7,100.00	30.00	210.58	6,859.16	-924.83	-546.45	664.24	0.00	0.00	0.00
7,200.00	30.00	210.58	6,945.77	-967.87	-571.89	695.15	0.00	0.00	0.00
7,300.00	30.00	210.58	7,032.37	-1,010.92	-597.32	726.07	0.00	0.00	0.00
7,400.00	30.00	210.58	7,118.97	-1,053.96	-622.75	756.98	0.00	0.00	0.00
7,500.00	30.00	210.58	7,205.58	-1,097.00	-648.19	787.90	0.00	0.00	0.00
7,600.00	30.00	210.58	7,292.18	-1,140.05	-673.62	818.81	0.00	0.00	0.00
7,700.00	30.00	210.58	7,378.79	-1,183.09	-699.05	849.73	0.00	0.00	0.00
7,800.00	30.00	210.58	7,465.39	-1,226.14	-724.49	880.64	0.00	0.00	0.00
7,900.00	30.00	210.58	7,552.00	-1,269.18	-749.92	911.56	0.00	0.00	0.00
7,998.48	30.00	210.58	7,637.29	-1,311.57	-774.97	942.00	0.00	0.00	0.00
KOP: 2296' FNL, 91' FWL									
8,000.00	30.07	210.85	7,638.60	-1,312.22	-775.35	942.48	9.99	4.56	17.76
8,050.00	32.64	219.10	7,681.32	-1,333.45	-790.29	960.09	10.00	5.14	16.51
8,100.00	35.67	226.19	7,722.71	-1,354.02	-809.33	981.69	10.00	6.07	14.18
8,150.00	39.06	232.26	7,762.45	-1,373.77	-832.32	1,007.10	10.00	6.78	12.12
8,200.00	42.72	237.46	7,800.26	-1,392.54	-859.09	1,036.12	10.00	7.32	10.42
8,231.58	45.14	240.39	7,823.00	-1,403.84	-877.86	1,056.22	10.00	7.67	9.26
Niobrara Top									
8,250.00	46.59	241.98	7,835.83	-1,410.21	-889.44	1,068.54	10.00	7.84	8.65
8,300.00	50.61	245.94	7,868.90	-1,426.63	-923.14	1,104.12	10.00	8.04	7.93
8,350.00	54.75	249.47	7,899.21	-1,441.67	-959.92	1,142.57	10.00	8.28	7.05
8,400.00	58.98	252.65	7,926.54	-1,455.23	-999.51	1,183.62	10.00	8.47	6.36
8,450.00	63.29	255.55	7,950.67	-1,467.20	-1,041.62	1,226.93	10.00	8.61	5.81
8,500.00	67.65	258.24	7,971.43	-1,477.49	-1,085.91	1,272.20	10.00	8.72	5.38
8,550.00	72.05	260.77	7,988.65	-1,486.02	-1,132.05	1,319.06	10.00	8.80	5.06
8,600.00	76.48	263.18	8,002.21	-1,492.73	-1,179.69	1,367.17	10.00	8.87	4.81

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Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5689.40ft (25' RKB)
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Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
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)	
8,638.01	79.87	264.94	8,010.00	-1,496.58	-1,216.69	1,404.36	10.00	8.91	4.65	
D Chalk Top										
8,650.00	80.94	265.49	8,012.00	-1,497.56	-1,228.47	1,416.16	10.00	8.92	4.58	
8,700.00	85.41	267.75	8,017.94	-1,500.48	-1,278.01	1,465.65	10.00	8.94	4.52	
8,751.52	90.02	270.05	8,020.00	-1,501.47	-1,329.46	1,516.78	10.00	8.95	4.46	
BPI/LP: 2482' FNL, 460' FEL										
8,800.00	90.02	270.05	8,019.99	-1,501.42	-1,377.94	1,564.83	0.00	0.00	0.00	
8,900.00	90.02	270.05	8,019.95	-1,501.34	-1,477.94	1,663.93	0.00	0.00	0.00	
9,000.00	90.02	270.05	8,019.92	-1,501.25	-1,577.94	1,763.04	0.00	0.00	0.00	
9,100.00	90.02	270.05	8,019.89	-1,501.16	-1,677.94	1,862.14	0.00	0.00	0.00	
9,200.00	90.02	270.05	8,019.86	-1,501.07	-1,777.94	1,961.25	0.00	0.00	0.00	
9,300.00	90.02	270.05	8,019.83	-1,500.99	-1,877.94	2,060.36	0.00	0.00	0.00	
9,400.00	90.02	270.05	8,019.80	-1,500.90	-1,977.94	2,159.46	0.00	0.00	0.00	
9,500.00	90.02	270.05	8,019.77	-1,500.81	-2,077.94	2,258.57	0.00	0.00	0.00	
9,600.00	90.02	270.05	8,019.74	-1,500.72	-2,177.94	2,357.67	0.00	0.00	0.00	
9,700.00	90.02	270.05	8,019.71	-1,500.64	-2,277.94	2,456.78	0.00	0.00	0.00	
9,800.00	90.02	270.05	8,019.68	-1,500.55	-2,377.94	2,555.88	0.00	0.00	0.00	
9,900.00	90.02	270.05	8,019.65	-1,500.46	-2,477.94	2,654.99	0.00	0.00	0.00	
10,000.00	90.02	270.05	8,019.62	-1,500.38	-2,577.94	2,754.10	0.00	0.00	0.00	
10,100.00	90.02	270.05	8,019.59	-1,500.29	-2,677.94	2,853.20	0.00	0.00	0.00	
10,200.00	90.02	270.05	8,019.56	-1,500.20	-2,777.94	2,952.31	0.00	0.00	0.00	
10,300.00	90.02	270.05	8,019.53	-1,500.11	-2,877.94	3,051.41	0.00	0.00	0.00	
10,400.00	90.02	270.05	8,019.50	-1,500.03	-2,977.94	3,150.52	0.00	0.00	0.00	
10,500.00	90.02	270.05	8,019.47	-1,499.94	-3,077.94	3,249.62	0.00	0.00	0.00	
10,600.00	90.02	270.05	8,019.44	-1,499.85	-3,177.94	3,348.73	0.00	0.00	0.00	
10,700.00	90.02	270.05	8,019.41	-1,499.76	-3,277.94	3,447.84	0.00	0.00	0.00	
10,800.00	90.02	270.05	8,019.38	-1,499.68	-3,377.94	3,546.94	0.00	0.00	0.00	
10,900.00	90.02	270.05	8,019.34	-1,499.59	-3,477.94	3,646.05	0.00	0.00	0.00	
11,000.00	90.02	270.05	8,019.31	-1,499.50	-3,577.94	3,745.15	0.00	0.00	0.00	
11,100.00	90.02	270.05	8,019.28	-1,499.41	-3,677.94	3,844.26	0.00	0.00	0.00	
11,200.00	90.02	270.05	8,019.25	-1,499.33	-3,777.94	3,943.36	0.00	0.00	0.00	
11,300.00	90.02	270.05	8,019.22	-1,499.24	-3,877.94	4,042.47	0.00	0.00	0.00	
11,400.00	90.02	270.05	8,019.19	-1,499.15	-3,977.94	4,141.58	0.00	0.00	0.00	
11,500.00	90.02	270.05	8,019.16	-1,499.06	-4,077.94	4,240.68	0.00	0.00	0.00	
11,600.00	90.02	270.05	8,019.13	-1,498.98	-4,177.94	4,339.79	0.00	0.00	0.00	
11,700.00	90.02	270.05	8,019.10	-1,498.89	-4,277.94	4,438.89	0.00	0.00	0.00	
11,800.00	90.02	270.05	8,019.07	-1,498.80	-4,377.94	4,538.00	0.00	0.00	0.00	
11,900.00	90.02	270.05	8,019.04	-1,498.71	-4,477.94	4,637.10	0.00	0.00	0.00	
12,000.00	90.02	270.05	8,019.01	-1,498.63	-4,577.94	4,736.21	0.00	0.00	0.00	
12,100.00	90.02	270.05	8,018.98	-1,498.54	-4,677.94	4,835.32	0.00	0.00	0.00	
12,200.00	90.02	270.05	8,018.95	-1,498.45	-4,777.94	4,934.42	0.00	0.00	0.00	
12,300.00	90.02	270.05	8,018.92	-1,498.36	-4,877.94	5,033.53	0.00	0.00	0.00	
12,400.00	90.02	270.05	8,018.89	-1,498.28	-4,977.94	5,132.63	0.00	0.00	0.00	
12,500.00	90.02	270.05	8,018.86	-1,498.19	-5,077.94	5,231.74	0.00	0.00	0.00	
12,600.00	90.02	270.05	8,018.83	-1,498.10	-5,177.94	5,330.84	0.00	0.00	0.00	
12,700.00	90.02	270.05	8,018.80	-1,498.02	-5,277.94	5,429.95	0.00	0.00	0.00	
12,800.00	90.02	270.05	8,018.76	-1,497.93	-5,377.94	5,529.06	0.00	0.00	0.00	
12,900.00	90.02	270.05	8,018.73	-1,497.84	-5,477.94	5,628.16	0.00	0.00	0.00	
13,000.00	90.02	270.05	8,018.70	-1,497.75	-5,577.94	5,727.27	0.00	0.00	0.00	
13,100.00	90.02	270.05	8,018.67	-1,497.67	-5,677.94	5,826.37	0.00	0.00	0.00	
13,200.00	90.02	270.05	8,018.64	-1,497.58	-5,777.94	5,925.48	0.00	0.00	0.00	
13,300.00	90.02	270.05	8,018.61	-1,497.49	-5,877.94	6,024.58	0.00	0.00	0.00	
13,400.00	90.02	270.05	8,018.58	-1,497.40	-5,977.94	6,123.69	0.00	0.00	0.00	
13,500.00	90.02	270.05	8,018.55	-1,497.32	-6,077.94	6,222.80	0.00	0.00	0.00	

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Grande 4-65 20-19 2DH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5689.40ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5689.40ft (25' RKB)
Site:	Grande	North Reference:	True
Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
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)	
13,600.00	90.02	270.05	8,018.52	-1,497.23	-6,177.94	6,321.90	0.00	0.00	0.00	
13,700.00	90.02	270.05	8,018.49	-1,497.14	-6,277.94	6,421.01	0.00	0.00	0.00	
13,800.00	90.02	270.05	8,018.46	-1,497.05	-6,377.94	6,520.11	0.00	0.00	0.00	
13,900.00	90.02	270.05	8,018.43	-1,496.97	-6,477.94	6,619.22	0.00	0.00	0.00	
14,000.00	90.02	270.05	8,018.40	-1,496.88	-6,577.94	6,718.32	0.00	0.00	0.00	
14,100.00	90.02	270.05	8,018.37	-1,496.79	-6,677.94	6,817.43	0.00	0.00	0.00	
14,200.00	90.02	270.05	8,018.34	-1,496.70	-6,777.94	6,916.54	0.00	0.00	0.00	
14,300.00	90.02	270.05	8,018.31	-1,496.62	-6,877.94	7,015.64	0.00	0.00	0.00	
14,400.00	90.02	270.05	8,018.28	-1,496.53	-6,977.94	7,114.75	0.00	0.00	0.00	
14,500.00	90.02	270.05	8,018.25	-1,496.44	-7,077.94	7,213.85	0.00	0.00	0.00	
14,600.00	90.02	270.05	8,018.22	-1,496.35	-7,177.94	7,312.96	0.00	0.00	0.00	
14,700.00	90.02	270.05	8,018.19	-1,496.27	-7,277.94	7,412.06	0.00	0.00	0.00	
14,800.00	90.02	270.05	8,018.15	-1,496.18	-7,377.94	7,511.17	0.00	0.00	0.00	
14,900.00	90.02	270.05	8,018.12	-1,496.09	-7,477.94	7,610.28	0.00	0.00	0.00	
15,000.00	90.02	270.05	8,018.09	-1,496.00	-7,577.94	7,709.38	0.00	0.00	0.00	
15,100.00	90.02	270.05	8,018.06	-1,495.92	-7,677.94	7,808.49	0.00	0.00	0.00	
15,200.00	90.02	270.05	8,018.03	-1,495.83	-7,777.94	7,907.59	0.00	0.00	0.00	
15,300.00	90.02	270.05	8,018.00	-1,495.74	-7,877.94	8,006.70	0.00	0.00	0.00	
15,400.00	90.02	270.05	8,017.97	-1,495.66	-7,977.94	8,105.80	0.00	0.00	0.00	
15,500.00	90.02	270.05	8,017.94	-1,495.57	-8,077.94	8,204.91	0.00	0.00	0.00	
15,600.00	90.02	270.05	8,017.91	-1,495.48	-8,177.94	8,304.02	0.00	0.00	0.00	
15,700.00	90.02	270.05	8,017.88	-1,495.39	-8,277.94	8,403.12	0.00	0.00	0.00	
15,800.00	90.02	270.05	8,017.85	-1,495.31	-8,377.94	8,502.23	0.00	0.00	0.00	
15,900.00	90.02	270.05	8,017.82	-1,495.22	-8,477.94	8,601.33	0.00	0.00	0.00	
16,000.00	90.02	270.05	8,017.79	-1,495.13	-8,577.94	8,700.44	0.00	0.00	0.00	
16,100.00	90.02	270.05	8,017.76	-1,495.04	-8,677.94	8,799.54	0.00	0.00	0.00	
16,200.00	90.02	270.05	8,017.73	-1,494.96	-8,777.94	8,898.65	0.00	0.00	0.00	
16,300.00	90.02	270.05	8,017.70	-1,494.87	-8,877.94	8,997.76	0.00	0.00	0.00	
16,400.00	90.02	270.05	8,017.67	-1,494.78	-8,977.94	9,096.86	0.00	0.00	0.00	
16,500.00	90.02	270.05	8,017.64	-1,494.69	-9,077.94	9,195.97	0.00	0.00	0.00	
16,600.00	90.02	270.05	8,017.61	-1,494.61	-9,177.94	9,295.07	0.00	0.00	0.00	
16,700.00	90.02	270.05	8,017.57	-1,494.52	-9,277.94	9,394.18	0.00	0.00	0.00	
16,800.00	90.02	270.05	8,017.54	-1,494.43	-9,377.94	9,493.28	0.00	0.00	0.00	
16,900.00	90.02	270.05	8,017.51	-1,494.34	-9,477.94	9,592.39	0.00	0.00	0.00	
17,000.00	90.02	270.05	8,017.48	-1,494.26	-9,577.94	9,691.50	0.00	0.00	0.00	
17,100.00	90.02	270.05	8,017.45	-1,494.17	-9,677.94	9,790.60	0.00	0.00	0.00	
17,200.00	90.02	270.05	8,017.42	-1,494.08	-9,777.94	9,889.71	0.00	0.00	0.00	
17,300.00	90.02	270.05	8,017.39	-1,493.99	-9,877.94	9,988.81	0.00	0.00	0.00	
17,400.00	90.02	270.05	8,017.36	-1,493.91	-9,977.94	10,087.92	0.00	0.00	0.00	
17,500.00	90.02	270.05	8,017.33	-1,493.82	-10,077.94	10,187.02	0.00	0.00	0.00	
17,600.00	90.02	270.05	8,017.30	-1,493.73	-10,177.94	10,286.13	0.00	0.00	0.00	
17,700.00	90.02	270.05	8,017.27	-1,493.64	-10,277.94	10,385.24	0.00	0.00	0.00	
17,800.00	90.02	270.05	8,017.24	-1,493.56	-10,377.94	10,484.34	0.00	0.00	0.00	
17,900.00	90.02	270.05	8,017.21	-1,493.47	-10,477.94	10,583.45	0.00	0.00	0.00	
18,000.00	90.02	270.05	8,017.18	-1,493.38	-10,577.94	10,682.55	0.00	0.00	0.00	
18,100.00	90.02	270.05	8,017.15	-1,493.29	-10,677.94	10,781.66	0.00	0.00	0.00	
18,200.00	90.02	270.05	8,017.12	-1,493.21	-10,777.94	10,880.76	0.00	0.00	0.00	
18,300.00	90.02	270.05	8,017.09	-1,493.12	-10,877.94	10,979.87	0.00	0.00	0.00	
18,400.00	90.02	270.05	8,017.06	-1,493.03	-10,977.94	11,078.98	0.00	0.00	0.00	
18,500.00	90.02	270.05	8,017.03	-1,492.95	-11,077.94	11,178.08	0.00	0.00	0.00	
18,583.46	90.02	270.05	8,017.00	-1,492.87	-11,161.40	11,260.79	0.00	0.00	0.00	
BHL: 2482' FNL, 325' FWL - 5-1/2" Casing										

ConocoPhillips

Planning Report

Database:	EDT 14 Central Planning	Local Co-ordinate Reference:	Well Grande 4-65 20-19 2DH
Company:	ConocoPhillips RBU Gold Data	TVD Reference:	25' RKB @ 5689.40ft (25' RKB)
Project:	Niobrara Central Zone	MD Reference:	25' RKB @ 5689.40ft (25' RKB)
Site:	Grande	North Reference:	True
Well:	Grande 4-65 20-19 2DH	Survey Calculation Method:	Minimum Curvature
Wellbore:	Grande 4-65 20-19 2DH		
Design:	Design A		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
Grande 4-65 20-19 2DH	0.00	0.00	8,017.00	-1,492.87	-11,161.40	1,677,074.883	3,220,915.361	39° 41' 23.100 N	104° 42' 53.993 W
- plan hits target center									
- Point									
Grande 4-65 20-19 2DH	0.00	0.00	8,020.00	-1,501.47	-1,329.46	1,677,155.537	3,230,746.849	39° 41' 23.039 N	104° 40' 48.223 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(ft)	(ft)			(")	(")
2,199.00	2,199.00	9-5/8" Casing		9-5/8	12-1/4
18,583.46	8,017.00	5-1/2" Casing		5-1/2	8-1/2

Formations					
Measured Depth	Vertical Depth	Name		Lithology	Dip
(ft)	(ft)				(°)
1,762.00	1,762.00	Fox Hills Top			0.00
1,999.00	1,999.00	Pierre Top - Fox Hills Base			0.00
2,199.00	2,199.00	Surface Casing			0.00
8,231.58	7,823.00	Niobrara Top			0.00
8,638.01	8,010.00	D Chalk Top			0.00

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
100.00	100.00	0.00	0.00	SHL: 984' FNL, 866' FWL
5,974.84	5,884.72	-440.51	-260.29	EOB: 1425' FNL, 606' FWL
7,998.48	7,637.29	-1,311.57	-774.97	KOP: 2296' FNL, 91' FWL
8,751.52	8,020.00	-1,501.47	-1,329.46	BPI/LP: 2482' FNL, 460' FEL
18,583.46	8,017.00	-1,492.87	-11,161.40	BHL: 2482' FNL, 325' FWL