

# DRILLING PLAN - Vertical Hole / Niobrara

PROSPECT/FIELD OPERATOR WELL NAME / No. LOCATION	Niobrara (exploration) / D-J Basin				COUNTY/STATE	Arapahoe / Colorado	
	ConocoPhillips						
	State of Colorado 36-1						
	NWSE 36 T3S-R64W	Surface Location:	2396' FSL	2600' FEL			
	NWSE 36 T3S-R64W	Bottom Hole Location:	2396' FSL	2600' FEL			
EST. T.D.	7,693' MD / TVD (pilot hole)				GROUND ELEVATION:	5,555' (est)	Finished Grade

<b>PROGNOSIS:</b>	Based on 5,579' RKB Elevation (est)		(H&P Rig 280)	<b>LOGS:</b>	<b>Type</b>	<b>Interval</b>
<b>FORMATION</b>	<b>DEPTH TVD</b>		<b>DATUM</b>	Open Hole:	Triple Combo / HNGS / RTScanner / SonicScanner	
Fox Hills Aquifer	1,429	Fresh Water	4,150	(pilot hole)	From 7,693' to 6,000'	
Pierre Shale	1,598		3,981	LWD-MWD:	GR/Sonic/Density/Neutron From 6,000' to Surface	
<b>Surface Casing</b>	<b>1,800</b>		<b>3,779</b>		MWD-GR From 1,800' to 7,050' (pick core point)	
Sharon Springs Shale	7,104		(1,525)	<b>DEVIATION:</b>		
Niobrara	7,140	Gas / Oil	(1,561)	Surf:	2.0° max., DLS 1°/100'; survey every 500' (Gyro at TD)	
Niobrara B	7,222	Gas / Oil	(1,643)	Pilot:	2.0° max., DLS 0.6/100'; survey every 90' (MWD-GR)	
Niobrara C Chalk	7,277	Gas / Oil	(1,698)	<b>DST'S:</b>		
Niobrara D Chalk	7,342	Gas / Oil	(1,763)	None Planned		
Fort Hays Limestone	7,475	Gas / Oil	(1,896)	<b>CORES:</b>		
Carlisle Shale	7,510	Gas / Oil	(1,931)	Conventional Core 7,050' to 7,693' (643' core interval)		
Greenhorn	7,568	Gas / Oil	(1,989)	<b>SAMPLES:</b>		
TD Pilot Hole	7,693		(2,114)	Mudlogging: (Two-Man Unit)	From 6,000' to TD (Weatherford Logging)	
					Dry samples every 10'	
					Wet samples every 30'	
				<b>BOP:</b>		
				11" x 5M psi (Rams & Annular) / Choke Manifold (two 2" wings) 5M psi		
				Stack Up Configuration:	Rotating Head	
					Annular	
					Pipe Rams	
					Blind Rams	
					Choke & Kill Valves / Lines	
					Pipe Rams	
				<b>WELLHEAD:</b>		
				SH2R Type "Multi-Bowl" Wellhead (GE Oil & Gas)		
				Upper Flange 11" x 5M psi (Drilling Spool)		
				Lower Flange 11" x 5M psi (Casing Head)		

<b>Max. Anticipated BHP:</b>	0.49 psi/ft	3,770 psi	9.4 ppg (EMW)	<b>Estimated BH Static Temperature (°F):</b>	210
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<b>MUD:</b>	<b>Interval</b>	<b>Type</b>	<b>Hole</b>	<b>WT</b>	<b>Vis</b>	<b>LGS %</b>	<b>WL</b>	<b>Remarks</b>
Surface:	0' - 1,800'	FW / Gel-Lime Sweeps	12-1/4"	8.4 - 9.0	28-45	< 6%	NC	Closed Loop (rig pits only)
Production:	1,800' - 7,693'	Oil Base Mud (Integrate)	8-3/4"	9.0 - 9.9	35-45	< 6%	<6 (HpHt)	Closed Loop (rig pits only)

<b>CASING:</b>	<b>Size</b>	<b>Wt ppf</b>	<b>Hole</b>	<b>Depth</b>	<b>Cement Top</b>	<b>Excess</b>	<b>WOC</b>	<b>Remarks</b>
Surface:	9-5/8"	36 # J55 STC	12-1/4"	1,800'	To Surface	140%	6 hrs	500' Tall Cement
Production	7"	26# P110 LTC	8-3/4"	7,693'	1700'	10%	6 hrs	Tall 500' above Niobrara

<b>CENTRALIZATION:</b>	
Surface Casing:	1/joint on bottom four joints; 1/4th joint to surface (bow-spring type) Cementing baskets placed at 120' and 1,600'
Production Casing:	1/joint on bottom two joints; 1/4th joint to 6,600'; 1/5th joint from 6,600' to surface (bow-spring type)

<b>DIRECTIONAL PLAN</b>	<b>MD</b>	<b>TVD (RKB elev.)</b>	<b>AZ</b>	
Surface:	0	0	2396' FSL	2600' FEL
Pilot Hole TD (vertical)	7,693'	7,693'	2396' FSL	2600' FEL
			NWSE 36 T3S-R64W	NWSE 36 T3S-R64W
			0.00	
				Survey Company: Halliburton Sperry GyroData

**Comments:**  
 Surveys will be taken at 90' intervals below surface casing when drilling vertical hole with a steerable BHA (Bent Motor / MWD).  
 Surveys (inclination only) will be taken at 500' intervals in the surface hole while drilling with non-steerable BHA.  
 A gyro survey will be obtained at surface hole casing point

<b>Prep By:</b>	Gary Hamilton	<b>Date:</b>	7/6/12	<b>Doc:</b>	REV 0
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