

# DRILLING PLAN

<b>PROSPECT/FIELD</b>		NIOBRARA/ Denver Julesburg		<b>COUNTY/STATE</b>		Arapahoe Co., Colorado																																																	
<b>OWNERS</b>		CONOCOPHILLIPS		<b>LEASE</b>		Fee																																																	
<b>WELL NO.</b>	Grimm 34-4H	<b>FNL</b>		<b>FSL</b>		<b>FEL</b>																																																	
<b>LOCATION</b>	SESW 34 T4S-R64W	Surface Location:		260'		1448'																																																	
	NENW 34 T4S-R64W	Bottom Hole Location:		600'		1980'																																																	
<b>EST. T.D.</b>	0' MD			<b>GROUND ELEV.</b>		5,777' (est)	ungraded																																																
<b>PROGNOSIS:</b>				<b>LOGS:</b>																																																			
Based on 5,795' KB(est)				<table border="1"> <thead> <tr> <th>Type</th> <th>Interval</th> </tr> </thead> <tbody> <tr> <td>Open Hole:</td> <td></td> </tr> <tr> <td>MWD/GR:</td> <td>KOP to Int CSG shoe</td> </tr> <tr> <td>MWD/LWD: GR/RES/Imaging</td> <td>Int CSG shoe to TD</td> </tr> <tr> <td>Cased Hole:</td> <td></td> </tr> <tr> <td>CBL:</td> <td>Surface CSG shoe to TD</td> </tr> <tr> <td colspan="2"><b>DEVIATION:</b></td> </tr> <tr> <td>Int (Curve):</td> <td>Svy every 30'</td> </tr> <tr> <td>Prod:</td> <td>2" max. INC, 0.6" / 100' max DLS; svy every 90'</td> </tr> <tr> <td><b>DST'S:</b></td> <td>N/A</td> </tr> <tr> <td><b>CORES:</b></td> <td>N/A</td> </tr> <tr> <td><b>SAMPLES:</b></td> <td></td> </tr> <tr> <td>Mudlogging:</td> <td></td> </tr> <tr> <td>Two-Man Unit:</td> <td>KOP to TD</td> </tr> <tr> <td></td> <td>Dry samples every 10'</td> </tr> <tr> <td></td> <td>Wet samples every 30'</td> </tr> <tr> <td><b>BOP:</b></td> <td></td> </tr> <tr> <td></td> <td>COP Category 2 Well Control Requirements (Minimum)</td> </tr> <tr> <td>PD-522</td> <td>BOPE:</td> </tr> <tr> <td></td> <td>11"-5Mpsi Annular (Hydri GK)</td> </tr> <tr> <td></td> <td>11"-5Mpsi Pipe Ram (Cameron U)</td> </tr> <tr> <td></td> <td>11"-5Mpsi Blind Ram (Cameron U)</td> </tr> <tr> <td></td> <td>11"-5Mpsi Cross / Choke &amp; Kill Lines</td> </tr> <tr> <td></td> <td>11"-5Mpsi Pipe Ram (Cameron U)</td> </tr> </tbody> </table>				Type	Interval	Open Hole:		MWD/GR:	KOP to Int CSG shoe	MWD/LWD: GR/RES/Imaging	Int CSG shoe to TD	Cased Hole:		CBL:	Surface CSG shoe to TD	<b>DEVIATION:</b>		Int (Curve):	Svy every 30'	Prod:	2" max. INC, 0.6" / 100' max DLS; svy every 90'	<b>DST'S:</b>	N/A	<b>CORES:</b>	N/A	<b>SAMPLES:</b>		Mudlogging:		Two-Man Unit:	KOP to TD		Dry samples every 10'		Wet samples every 30'	<b>BOP:</b>			COP Category 2 Well Control Requirements (Minimum)	PD-522	BOPE:		11"-5Mpsi Annular (Hydri GK)		11"-5Mpsi Pipe Ram (Cameron U)		11"-5Mpsi Blind Ram (Cameron U)		11"-5Mpsi Cross / Choke & Kill Lines		11"-5Mpsi Pipe Ram (Cameron U)
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<b>MARKER</b>				<b>DATUM</b>																																																			
	<b>DEPTH TVD</b>																																																						
Fox Hills Aquifer	1,688			4,107																																																			
Pierre Shale (Fox Hill Base)	1,920			3,875																																																			
Surface Casing	2,120			3,675																																																			
Sharon Spring Shale	7,235			(1,440)																																																			
Niobrara	7,510			(1,715)																																																			
Niobrara B	7,580			(1,785)																																																			
Niobrara C Chalk	7,650			(1,855)																																																			
<b>Estimated BHP (psi):</b>																																																							
3779		0.49 psi/ft																																																					
<b>MUD:</b>	<b>Interval</b>	<b>Type</b>	<b>WT</b>	<b>Vis</b>	<b>MBT</b>	<b>LGS</b>	<b>WL</b>																																																
Surface:	0' - 2,120'	FW / Gel-Line Sweeps	8.40 - 9.00	28-50	NC	< 6%	NC																																																
Int (Curve):	7,129' - 7,947'	Integrate OBM	9.20-10.00	40-50		< 4%	< 6																																																
Production Lat #1:	7,947' - 11,873'	LSND	9.20-10.00	35-45	5-10	< 4%	< 4																																																
<b>CASING:</b>	<b>Size</b>	<b>Wt ppf/Grd/Con</b>	<b>Hole</b>	<b>Depth</b>	<b>Cement</b>	<b>WOC</b>	<b>Remarks</b>																																																
Surface:	9-5/8"	36 J55 STC	12-1/4"	2,120'	To Surface	6 hrs																																																	
Intermediate:	7"	26 L80 LTC	8-3/4"	7,947'	2,020'	6 hrs	100' above Surf Shoe																																																
Production Lat #1:	4 1/2"	11.6 P110 LTC	6-1/8"	11,873'	7,029'	6 hrs	100' above KOP																																																
<b>DIRECTIONAL PLAN</b>																																																							
	<b>MD</b>	<b>TVD</b>	<b>260' FSL</b>	<b>1448' FWL</b>	<b>34 T4S-R64W</b>	<b>AZ</b>																																																	
Surface:	N/A	N/A	260' FSL	1448' FWL	34 T4S-R64W	N/A	Survey Company: Weatherford																																																
Vertical KOP (90° curve):	7,129'	7,129'	260' FSL	1448' FWL	34 T4S-R64W	0	Curve Build Rate: 11° /100'																																																
End Build:	7,947'	7,650'	775' FSL	1523' FWL	34 T4S-R64W	8.3	Land curve at 90° inc. and 1.4° Az.																																																
7" Casing:	7,947'	7,650'	775' FSL	1523' FWL	34 T4S-R64W	8.3	Hold Az to TD:																																																
Tangent:	N/A	N/A	N/A	N/A	N/A	N/A																																																	
Turn:	N/A	N/A	N/A	N/A	N/A	N/A																																																	
TD:	11,873'	7,650'	600' FNL	1980' FWL	34 T4S-R64W	8.3																																																	
<b>Comments:</b>																																																							
MWD Surveys will be taken every 30' while building curve and every 90' while drilling lateral.																																																							
<b>Prep By:</b>	Ricardo Avila	<b>Date:</b>	1/13/11	<b>Doc:</b>	REV.0																																																		



**DRILLING PLAN**

<b>PROSPECT/FIELD</b>	NIOBRARA/ Denver Julesburg				<b>COUNTY/STATE</b>		Arapahoe Co., Colorado	
<b>OWNERS</b>	CONOCOPHILLIPS				<b>LEASE</b>		Fee	
<b>WELL NO.</b>	Grimm 34-4H				<b>FNL</b>	<b>FSL</b>	<b>FEL</b>	<b>FWL</b>
<b>LOCATION</b>	SESW	34 T4S-R64W	Surface Location:		260'		1448'	
	SESW	34 T4S-R64W	Bottom Hole Location:		260'		1448'	
<b>EST. T.D.</b>	8,180' MD				<b>GROUND ELEV.</b>		5,777' (est) ungraded	
<b>PROGNOSIS:</b>	Based on 5,795' KB(est)				<b>LOGS:</b>			
<b>MARKER</b>	<b>DEPTH TVD</b>			<b>DATUM</b>				
Fox Hills Aquifer	1,688			4,107	Open Hole:			
Pierre Shale (Fox Hill Base)	1,920			3,875	GR-MWD: Surface CSG shoe to 7,450'			
Surface Casing	2,120			3,675	GR/DENSITY/NEUTRON/SONIC SCANNER: Surface CSG shoe to TD			
Sharon Spring Shale	7,235			(1,440)	RI-SCANNER/DIELECTRIC SCANNER/ECS: 6,000' to TD			
Niobrara	7,510			(1,715)	OBMI: 6,000' to TD			
Niobrara B	7,580			(1,785)				
Niobrara C Chalk	7,650			(1,855)	<b>DEVIATION:</b>			
Niobrara D Chalk	7,712			(1,917)	Surf: 2" max. INC, 1" / 100' max. DLS; svy every 500' GYRO-TD			
Fort Hays Limestone	7,837			(2,042)	Int (Pilot Hole): 2" max. INC, 0.6" / 100' max DLS; svy every 90'			
Carlisle Shale	7,868			(2,073)				
Greenhorn	7,938			(2,143)	<b>DST'S:</b>			
Graneros Shale	8,106			(2,311)	N/A			
<b>Pilot Hole TD</b>	<b>8,180</b>			<b>(2,385)</b>	<b>CORES:</b>			
					4" Conventional Cores from 7,450' to 7,850'			
					<b>SAMPLES:</b>			
					Mudlogging:			
					Two-Man Unit: 6,000' to TD			
					Dry samples every 10'			
					Wet samples every 30'			
					<b>BOP:</b>			
					COP Category 2 Well Control Requirements (Minimum)			
					PD-522 BOPE: 11"-5Mpsi Annular (Townsend Type 90)			
					11"-5Mpsi Pipe Ram (Townsend Type 82)			
					11"-5Mpsi Blind Ram (Townsend Type 82)			
					11"-5Mpsi Cross / Choke & Kill Lines			
					11"-5Mpsi Pipe Ram (Townsend Type 82)			
<b>Estimated BHP (psi):</b>	4041	0.49 ps/ft						
<b>MUD:</b>	<b>Interval</b>	<b>Type</b>	<b>WT</b>	<b>Vis</b>	<b>MBT</b>	<b>LGS</b>	<b>WL</b>	<b>PH</b>
Surface:	0' - 2,120'	FW / Gel-Lime Sweeps	8.40 - 9.00	28-50	NC	< 6%	NC	8.0-8.5
Int (Pilot Hole):	2,120' - 8,180'	Integrate OBM	9.20-10.00	40-50		< 4%	< 6	(HpHt)
<b>CASING:</b>	<b>Size</b>	<b>Wt ppf/Grd/Con</b>	<b>Hole</b>	<b>Depth</b>	<b>Cement</b>	<b>WOC</b>	<b>Remarks</b>	
Surface:	9-5/8"	36 J55 STC	12-1/4"	2,120'	To Surface	6 hrs		
<b>OH Whipstock (cemented plug back):</b>								
Top at: 7,064' (+/- 65' above KOP)/ Bottom at: 7,079' with 2-7/8" tail pipe "cement stinger" from 7,079' to 8,147'								
Cemented in place with planned top of cement at: 6,864 (200' above top of whipstock)								
<b>DIRECTIONAL PLAN</b>								
(Vertical Hole)	<b>MD</b>	<b>TVD</b>	<b>AZ</b>					
Surface:	20	20	0	260' FSL	1448' FWL	34 T4S-R64W	Survey Company: Weatherford	
TD:	8,180'	8,180'	0	260' FSL	1448' FWL	34 T4S-R64W		
<b>Comments:</b>								
Surveys will be taken at 90' interval below surface casing when drilling vertical hole with PDC / Motor / MWD/GR until reach pilot hole TD @ +/- 8,100'								
<b>Prep By:</b>	Ricardo Avila	<b>Date:</b>	1/13/11	<b>Doc:</b>	REV.0			



Niobrara Prospect, Colorado  
CONOCO-PHILLIPS  
Well: Grimm 34-4H  
Loc: 34 T4S-R64W

**Surface Casing:**

Surface Casing Depth (Ft)	2,120
Surface Casing O.D. (in.)	9.625
Surface Casing ID (in)	8.921
Hole O.D. (in)	12.25
Excess (%)	125%
Calc. Volume Tail (Sx)	200
Yield Tail (Cu. Ft/Sx)	1.94
Yield Lead (Cu. Ft/Sx)	2.47
Shoe Joint (Ft)	40
Shoe Volume (Cu. Ft)	17.4
Shoe Volume (bb)	3.1
Tail feet of cement	500
Calculated Total Volume (Cu. Ft.)	1,528
Calc. Tail Volume (Cu. Ft.)	370
Calc. Lead Volume (Cu. Ft.)	1,141
Calc. Tail Volume (bb)	66
Calc. Lead Volume (bb)	203
Calc. Lead Volume (Sx)	470
Calc. Displacement Vol (bb)	161
Lead Weight (ppg)	12
Tail Weight (ppg)	13

**Intermediate Casing (Lead):**

Production Casing O.D. (in.)	7
Production Casing ID (in)	6.184
Hole O.D. (in)	8.75
Excess (%)	25%
Yield Lead (Cu. Ft/Sx)	2.23
Surface Shoe (Ft)	2,120
Top Lead (Ft) - 100ft above surface shoe	2,020
Base Lead (Ft) - 500ft above Niobrara Fm	7,010
Lead feet of cement	4,990
Calc. Lead Volume (Cu. Ft.)	935
Calc. Lead Volume (bb)	167
Calc. Lead Volume (Sx)	420
Lead Weight (ppg)	11.5

**Intermediate Casing (Tail):**

Production Casing Depth (Ft)	7,947
Production Casing O.D. (in.)	7
Production Casing ID (in)	6.184
Hole O.D. (in)	8.75
Excess (%)	25%
Yield Tail (Cu. Ft/Sx)	1.95
Shoe Joint (Ft)	80
Top Tail (Ft) - 500ft above Niobrara Fm	7,010
Tail feet of cement	937
Shoe Volume (Cu. Ft)	16.7
Shoe Volume (bb)	3.0
Calc. Tail Volume (Cu. Ft.)	133
Calc. Tail Volume (bb)	34
Calc. Tail Volume (Sx)	100
Calc. Displacement Vol (bb)	292
Tail Weight (ppg)	13

**Pilot Hole: Plug Back Cement Program:**

HelCem W10 + 35% Silica	8.75
Hole O.D. (in)	25%
Excess (%)	6864
Plug Top (ft)	8147
Plug Bottom (ft)	1.52
Yield Lead (Cu. Ft/Sx)	15.8
Lead Weight (ppg)	7.53
Whipstock OD (in)	7159
OH Whipstock Top (ft)	7187
Tubing OD (in)	2,875
2-7/8" tubing Bottom (ft)	8147
2-7/8" tubing Top (ft)	605
Calc. Cement Volume (Cu. Ft.)	398
Calc. Cement Volume (Sx)	108
Calc. Cement Volume (bb)	

**Liner (Lead):**

ExtendaCem	4.5
Liner O.D. (in.)	6.276
Casing ID (in)	6.125
Hole O.D. (in)	30%
Excess (%)	2.23
Yield Lead (Cu. Ft/Sx)	7029
Liner Top (Ft)	7947
Casing Shoe (Ft)	7947
Top Lead (Ft) - 100ft above KOP	7029
Base Lead (Ft) - Casing Shoe	7947
Lead feet of cement	918
Calc. Lead Volume (Cu. Ft.)	125
Calc. Lead Volume (bb)	22
Calc. Lead Volume (Sx)	55
Lead Weight (ppg)	11.5

**Liner (Tail):**

VancoemCem	4.5
Liner O.D. (in.)	6.276
Casing ID (in)	6.125
Hole O.D. (in)	30%
Excess (%)	1.95
Yield Lead (Cu. Ft/Sx)	7947
Casing Shoe (Ft)	7947
Liner Bottom (Ft)	11873
Top Tail (Ft) - Casing Shoe	7947
Base Tail (Ft) - Liner Bottom	11873
Tail feet of cement	3926
Calc. Lead Volume (Cu. Ft.)	481
Calc. Lead Volume (bb)	86
Calc. Lead Volume (Sx)	246
Lead Weight (ppg)	13

Placed as balanced plug