RIDGEVIEW 32-16-1
Fractured Niobrara Oil Well
Surface: 2105' FSL & 2289' FWL, Sec. 16, T6N, R91W
BHL: 787' FNL & 811' FEL, Sec. 16, T6N, R91W
Moffat Co., Co

EIGHT POINT DRILLING PLAN

1. ESTIMATED FORMATION TOPS: (based on a surface elev. of 6224')

Lewis Shale	Surface
Isles SS	1,645' MD/ TVD
Mancos	2,910' MD/ TVD
Niobrara	6,662' MD/ 6,355' TVD
TD	9,104' MD/ 7,534' TVD

2. ESTIMATED DEPTHS OF TOP AND BOTTOM OF WATER, OIL, GAS, OR OTHER MINERAL BEARING FORMATIONS AND PLAN FOR PROTECTION:

Possible Aquifers: Less than 880'

Oil Shale: None expected

Oil: Niobrara

Gas: None Expected

Protection of oil, gas, water, or other mineral bearing formations:
Protection shall be accomplished by cementing surface casing back to the surface and cementing intermediate casing back to surface using a diverter tool in the intermediate string. Well will be completed with a slotted liner in the Niobrara.

3. PRESSURE CONTROL EQUIPMENT:

For drilling 12 1/4" surface hole to 880':

No BOP equipment required. Rotating head will be utilized if a Surface Hole Drilling rig equipped to drill with air/air mist is used to preset surface casing

For drilling through 9 5/8" surface casing to TD:

Maximum anticipated surface pressure is <3,000 psi

Pressure control equipment shall be in accordance with COGCC minimum standards for 3000 psi equipment

A casing head with an 11" 5,000# flange will be welded onto the 9.625" surface casing.

BOP stack will consist of either 2 single gate or a double gate and annular preventer. The gate preventers will be equipped with pipe rams on bottom and blind rams on top. The

choke and kill lines will be connected to outlets between the bottom and top rams, utilizing either the ram body outlet or a drilling spool with side outlets. The BOP stack will be 11" or 13.625" bore, 3000 psi working pressure or greater. Please refer to attached schematic.

Test procedure and frequency shall be in accordance with COGCC minimum standards for 3000 psi equipment, per COGCC Oil & Gas Order #2

4. SUPPLEMENTAL DRILLING EQUIPMENT AND CASING INFORMATION:

Casing Information: All casing will be new pipe and tested to 1500 psi

Casing	Weight	Grade	Conn.	Stage	Centralizers
9 5/8"	36.0 #/ft	J-55	LTC	No	*
7"	23.0 #/ft	J-55	LTC	Yes	As Needed

*Centralizers will be placed 10' above shoe, on 1st, 3rd, 5th and last collars

Casing Design Information (9 5/8" casing @ 880'):

Collapse value for new pipe	2,020 psi	Actual Load	257 psi	S.F.	7.8
Burst value for new pipe	3,520 psi	Actual Load	2,348 psi	S.F.	1.5
Tension value for new pipe	453,000 #	Actual Load	19,800 #	S.F.	22.9

Casing Design Information (7" intermediate casing @ 6762' MD/ 6455' TVD) 100' Below the Top of Niobrara Formation.

Collapse value for new pipe	3,270 psi	Actual Load	1,582 psi	S.F.	2.1
Burst value for new pipe	4,360 psi	Actual Load	1,939 psi*	S.F.	2.2
Tension value for new pipe	313,000 #	Actual Load	146,740#	S.F.	2.1

Cement Information:

Casing **Cement**

9 5/8" Oilfield type cement circulated in place. 175 sxs of Type III,12.3#, 2.24 cf/sx LEAD then 80 sxs of Type III, 13.5#, 1.72 cf/sx TAIL + 50 sxs - 2% CaCl2 TOP OUT. Sufficient cement volume will be pumped to fill to surface. Estimates include 80% excess based upon gauge hole. Will pump a 20 bbl. water spacer ahead. **(Top of cement at surface, 0'.)**

7" Oilfield type cement circulated in place. Diverter tool run at 2500'+/-.

STAGE 1: 270 sxs of Type V, 35:65: Poz, 12.7#, 1.88 cf/sx LEAD then 250 sxs of Class G 50:50 Poz, 14.2#, 1.29 cf/sx TAIL.

STAGE 2: 120 sxs of Type V, 35:65: Poz, 12.7#, 1.88 cf/sx LEAD then 155 sxs of Class G 50:50 Poz, 14.2#, 1.29 cf/sx TAIL.

Calcs include 30% excess based upon gauge hole. Sufficient cement volume will be pumped to bring cement to surface. Will pump a 20 bbl spacer ahead. **(Top of cement at surface, 0'.)**

Drilling Equipment:

Surface Hole (0'-880')

Drilling of the surface hole will be with a Surface Hole drilling rig equipped to drill with air/air mist if the rig is available. Hole size will be in the 12 ¼".

Variance to Onshore Oil and Gas Order No. 2 III –E Special Drilling Operations which addresses additional drilling equipment required for drilling with air/gas is requested for the Surface Hole drilling rig which may be used to preset surface casing. To our knowledge, shallow gas has never been encountered on any well in this area. Consequently, the majority of the equipment specified in the Special Drilling Operations is not necessary to drill surface holes in this area. Auxiliary Equipment to be used is outlined in Section 8.

If the Surface Hole drilling rig is not available to preset the surface casing, a conventional rotary drilling rig will be used to drill the surface hole. A 12 1/4" hole will be drilled utilizing fresh water mud.

Intermediate Hole (880'-6,762') 100' Below the Top of Niobrara Formation.

Drilling below surface casing will be with conventional rotary equipment utilizing fresh water mud. Hole size will be 8 ¾".

Production Hole (6,762' – 9,104')

A 6 1/8" production hole will be drilled to TD using a separation package and oil based mud.

5. **CIRCULATING MEDIUM, MUD TYPE, MINIMUM QUANTITIES OF WEIGHT MATERIAL, AND MONITORING EQUIPMENT:**

Surface hole (0'-880')

Surface hole will be drilled with air/air mist if a Surface Hole drilling rig is utilized to preset surface casing prior to moving in and rigging up a conventional rotary drilling rig.

Mud circulating equipment and materials as specified in Onshore Order #2, III – E will not be kept on location due to the fact that the Surface Hole drilling rig equipped to drill with air/air mist is not equipped to circulate mud.

If a Surface Hole drilling rig is not utilized to preset the surface casing, a conventional rotary rig will be used to drill the surface hole. Water based drilling fluids consisting primarily of fresh water, bentonite, lignite, caustic, lime, soda ash, and polymers will be used. It is not intended to use oil in the mud; however, in the event it is used, oil concentration will be less than 4% by volume. Maximum anticipated mud weight is ± 9 0 ppg.

A minimum quantity of weighting material will be kept on location.

Intermediate Hole (880'-6,762')

Drilling below surface casing will be with water-based drilling fluids consisting primarily of fresh water, bentonite, lignite, caustic, lime, soda ash, and polymers. No chromates will be used. It is not intended to use oil in the mud, however, in the event it is used, oil concentration will be less than 4% by volume. Maximum anticipated mud weight is ±9.5 ppg.

A minimum quantity of weighting material will be kept on location.

PVT/Flow Show will be on location and operable base of surface casing to TD.

Production Hole (6,762'-9,104')

Drilling below intermediate casing will be with oil-based mud utilizing polymer viscosifiers for rheology control and oil wetting agents to aide in hole cleaning. Maximum anticipated mud weight is 7.0 ppg, and the maximum anticipated pore pressure is 6.7 ppg.

6. ANTICIPATED TYPE AND AMOUNT OF TESTING, LOGGING, AND CORING:

Logging:

Mud Logging	N/A on this well
Electric Logging	GR – Induction

Coring:

None planned but are possible.

Testing:

None planned but are possible.

7. EXPECTED BOTTOM HOLE PRESSURE AND ANY ANTICIPATED ABNORMAL PRESSURE, TEMPERATURES, OR OTHER HAZARDS (H2S, STEAM, ETC.) AND ASSOCIATED CONTINGENCY PLANS:

Subnormal pressure gradient to TD

MASP and casing design parameters determined using 0.35 psi/ft

Maximum expected BHP @ bottom of Niobrara ~2530 psi

Maximum expected BHT @ 7,534' TVD ~200ºF

8. OTHER:

Auxiliary Equipment

Conventional Rotary Drilling Rig
Geolograph
PVT-Flowmeter
Desilter
Desander
Full Opening Safety Valve
Upper Kelly Valve
Lower Kelly Valve

Surface Hole Rig Equipped to Drill with Air/Air Mist
Rotating Head
100' Blooie Discharge Line

Conventional Rotary Drilling Rig
Rotating Head
Geolograph
PVT-Flowmeter
Desilter
Desander
Full Opening Safety Valve
Upper Kelly Valve
Lower Kelly Valve
Separation Equipment
11" 5K annular + 11" 5K Double BOP

9. Completion

Well will be completing with a slotted liner and put on rod pump. No stimulation is planned.