

Kirkpatrick Oil Company Inc  
**B&B Farms 1-19H**  
260' FNL 660' FEL (NE/4 NE/4)  
BHL: ±630' FSL ±660' FEL (SE/4 SE/4)  
Sec. 19 T11S R44W  
Kit Carson County, Colorado  
Surface: Fee  
Mineral Lease: Fee

**DRILLING PROGRAM**

Please contact Mr. Bob Blevins at 405-767-3627, if there are any questions or concerns regarding this Drilling Program.

SURFACE ELEVATION – 4,268' (Un-graded ground elevation)

SURFACE FORMATION – Dakota – Fresh water possible

ESTIMATED FORMATION TOPS

<b>Formation</b>	<b>TVD</b>
Dakota	2,120'
St Charles	3,360'
Neva	3,950'
L-KC	4,520'
Marmaton	4,850'
Cherokee	4,991'
Atoka	5,017'
Morrow	5,242'
Morrow Sand	5,320'
Keyes Lime	5,361'
Mississippian	5,387'
Spergen Dolomite	5,412'
<b>Total Depth</b>	<b>9,536'</b>

*All fresh water and prospectively valuable minerals encountered during drilling will be recorded by depth and protected.*

CASING/CEMENT PROGRAM

Total Measured Depth (MD)	Hole Diameter	Casing Diameter	Casing Weight and Grade	Cement
0' - 350'	12-1/4"	9-5/8"	J-55 36# ST&C	To surface ( $\pm 180$ sxs Class C*)
0' - 5,270'	8-3/4"	7"	P-110 23# LT&C	TD- 350' ( $\pm 150$ sxs Class C)
0' - 8,725'	6-1/8"	4-1/2"	P-110 11.6# LT&C	TD to $\pm 8,725$ ( $\pm 445$ sxs 50:50 POZ)**

\* Cement volume calculated with 100% excess.

\*\* Cement volume calculated with 30% excess.

Yields	Surface:	Class C yield = 1.35 ft <sup>3</sup> /sx (14.8 ppg)
	Production:	Class C yield = 1.54 ft <sup>3</sup> /sx (14.8 ppg)
	Intermediate	50:50 Poz yield = 1.24 ft <sup>3</sup> /sx (14.3 ppg)

Cement additives – (Note: Some additives are Baker Hughes proprietary products. If another cement contractor is used, these blends and products may vary slightly).

PRESSURE CONTROL

- See attached blowout preventer diagram.

BOPs and choke manifold will be installed and pressure tested before drilling out of surface casing (subsequent pressure test will be performed whenever pressure seals are broken), and then will be checked daily as to mechanical operating condition. BOPs will be pressure tested at least once every 30 days. Ram type preventers and related pressure control equipment will be pressure tested to related working pressure of the stack assembly if a test plug is used. If a plug is not used, the stack assembly will be tested to the rated working pressure of the stack assembly or 70% of the minimum internal yield of the casing, whichever is less. Annular type preventers will be pressure tested to 50% of their working pressure. All casing strings will be pressure tested to 0.22 psi/ft or 1,500 psi, whichever is greater, not to exceed 70% of the internal yield.

A manual locking device (i.e. hand wheels) or automatic locking devices shall be installed on the BOP stack. Remote controls capable of both opening and closing all preventers shall be readily accessible to the driller.

The BOP equipment will be tested after any repairs to the equipment. Pipe rams, blind rams and annular preventer will be activated on each trip and weekly BOP drills will be conducted with each crew. All tests, maintenance, and BOP drills will be documented on rig "tower sheets".

*A remote accumulator will be used.*

MUD PROGRAM (MD)

0'	-	400'	Native, Gel/lime premix sweeps M.W.: 8.6 – 9.1 ppg Visc.: 28 – 36 WL: nc LCM: As needed Solids: <8% YP: 2-15
400'	-	KOP	Low Solids, non-dispersed M.W.: 8.7 – 9.3 ppg Visc.: 38 - 65 WL: nc- 15 LCM: As needed Solids: <8% YP: 13-20
KOP	-	LP	Low Solids, non-dispersed M.W.: 8.7 – 9.3 ppg Visc.: 38 – 65 WL: 15-10 LCM: As needed Solids: <8% YP: 13-20
LP	-	TD	Water & Polymer sweeps WT: 8.5 -8.8 VISC: 28-36 LCM: As needed

*Sufficient mud materials to maintain mud properties, control lost circulation and to contain a “kick” will be available on location.*

AUXILIARY EQUIPMENT

- A. Upper Kelly cock; lower Kelly cock will be installed while drilling and tested at the time of the BOP test.
- B. Inside BOP or stabbing valve with handle (available on rig floor).
- C. Safety valve(s) and subs to fit all string connections in use.
- D. Mud monitoring will be with a pit level indicator, and visual observation.

LOGGING, CORING TESTING PROGRAM

- |    |                            |  |
|----|----------------------------|--|
| A. | Pilot Hole Logging (Vert): | Triple Combo: Gamma Ray, Density Neutron, Induction              |
|    | Horizontal Logging:        | Gamma Ray (MWD)  |
| B. | Coring:                    | Sidewall cores may be drilled into the Niobrara/J-Sand.          |
| C. | Testing:                   | None planned – Drill Stem tests may be run on shows of interest. |

ABNORMAL CONDITIONS

- A. Pressures: No abnormal conditions are anticipated.  
Anticipated BHP gradient: 0.45 psi/ft
- B. Temperatures: No abnormal conditions are anticipated.
- C. H<sub>2</sub>S: None Anticipated.
- D. Estimated bottomhole pressure: 4,291 psi

ANTICIPATED START DATE

Upon Approval

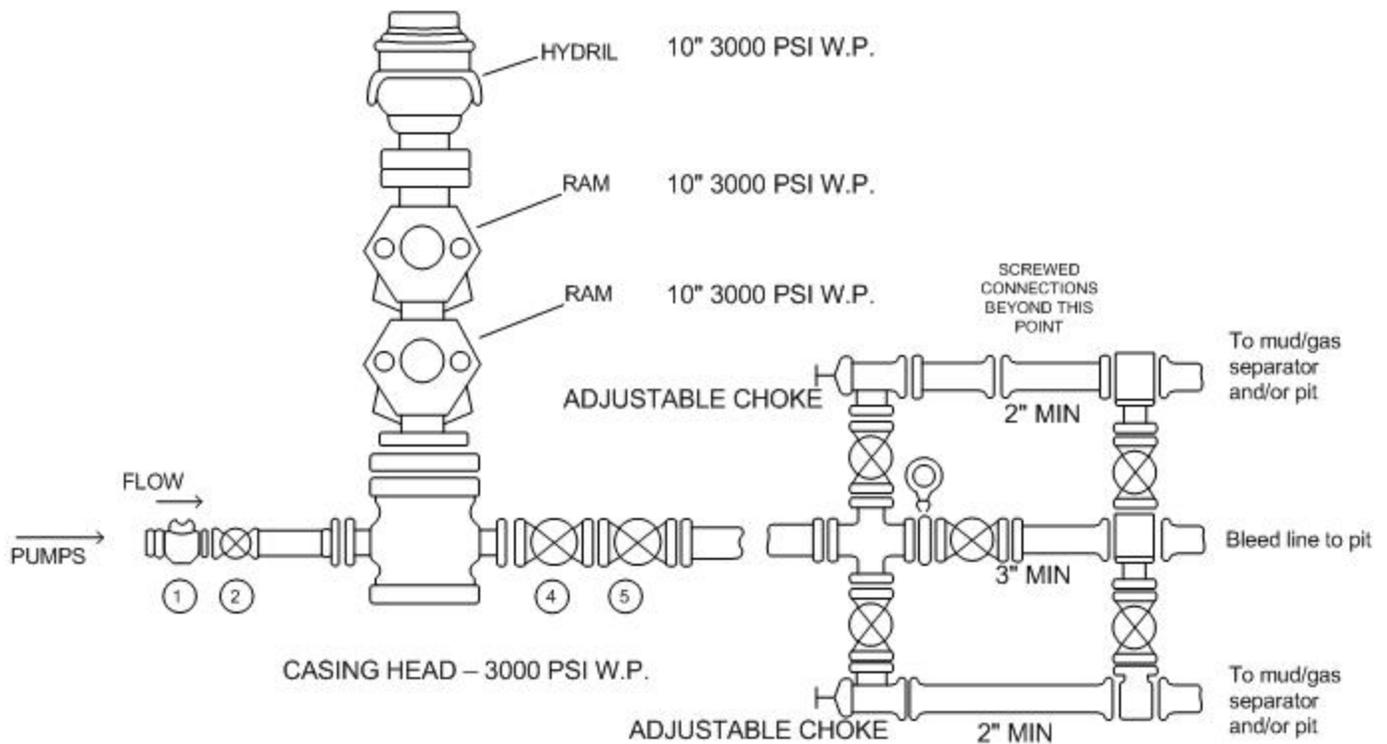
COMPLETION

The location pad will be sufficient size to accommodate all completion equipment activities and equipment. A string of 2-3/8", 4.7#, N-80, EUE 8rnd will be run as production tubing, or a sting of 2-7/8" 6.5# J-55 or N-80 EUE 8rd will be run as a pumping string. A Sundry Notice (SN) will be submitted with a revised completion program if warranted.

# MINIMUM BOP Requirements

3000 PSI W.P.

FILL LINE ABOVE THE UPPERMOST PREVENTER



## KILL LINE

- Valve #1 – Flanged check valve  
Full working pressure of BOP
- Valve #2 – Flanged, minimum 2" bore  
Full working pressure of BOP

## CHOKE LINE

- Valves #4 & 5 – Flanged minimum 3" bore  
Full working pressure of BOP
- (Note: An HCR can be used instead of Valve # 5)

## GENERAL RULES AND RECOMMENDATIONS

All lines to manifold are to be at right angles (90 deg.). No 45 deg. angles are to be used.  
Blind flanges are to be used for blanking.  
All studs and nuts are to be installed on all flanges.

Kirkpatrick Oil Company, Inc  
 B&B Farms 1-19H  
 260' FNL 660' FEL (NE/4 NE/4)  
 BHL: ±630' FSL ±660' FEL (SE/4 SE/4)  
 Sec. 19 T11S R44W  
 Kit Carson County, Colorado  
 Surface: Fee  
 Mineral Lease: Fee

**SURFACE CASING AND CENTRALIZER DESIGN**

Proposed Total Depth: 9,536 '  
 Proposed Depth of Surface Casing: 350 '  
 Estimated Pressure Gradient: 0.45 psi/ft  
 Bottom Hole Pressure at 9,536 '  
     0.45 psi/ft x 9,536 ' = 4,291 psi  
 Hydrostatic Head of gas/oil mud: 0.22 psi/ft  
     0.22 psi/ft x 9,536 ' = 2,098 psi

Maximum Design Surface Pressure

Bottom Hole Pressure – Hydrostatic Head =  
 ( 0.45 psi/ft x 9,536 ' ) – ( 0.22 psi/ft x 9,536 ' ) =  
     4,291 psi – 2,098 psi = 2,193 psi

Casing Strengths

9-5/8" J-55 36# ST&C

Wt.	Tension (lbs)	Burst (psi)	Collapse (psi)
36 #	394,000	3,520	2,020

Safety Factors

Tension (Dry): 1.8      Burst: 1.0      Collapse: 1.125

Tension (Dry): 36 # / ft x 350 ' = 12,600 #  
 Safety Factor =  $\frac{394,000}{12,600}$  = 31.27      ok

Burst: Safety Factor =  $\frac{3,520 \text{ psi}}{2,193 \text{ psi}}$  = 1.60      ok

Collapse: Hydrostatic = 0.052 x 9.0 ppg x 350 ' = 164 psi  
 Safety Factor =  $\frac{2,020 \text{ psi}}{164 \text{ psi}}$  = 12.33      ok

Use 350 ' 9-5/8" J-55 36# ST&C

Use 3,000 psi minimum casinghead and BOP's

Centralizers

8 Total  
 1 near surface at 160'  
 3 -1 each at middle of bottom joint, second joint, third joint  
 4 -1 each at every other joint ±80' spacing

Total centralized ± 600 ' ( -250 ' – 350 ' )

Note that field experience indicates that additional centralizers greatly increase the chance of "sticking" the surface casing prior to reaching surface casing total depth.