



Coalmont # 3-13H

SHL: SW/SW Section 13-T7N-R81W

BHL: NE/NW Section 13-T7N-R81W

Jackson County, Colorado

DRILLING PLAN

1. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS & ANTICIPATED WATER, OIL, GAS OR MINERAL FORMATIONS:

Formation	TVD (ft)	MD (ft)	Hydrocarbon/Water Bearing Zones
Tertiary	0	0	
Midcoal	1097	1097	Gas
Suddeth Coal	2220	2220	Gas
Tertiary Base Unconformity	2939	2939	
Sussex Marker	3512	3512	
Sussex	3721	3721	
Shannon	4260	4260	
KOP (start build curve)	5780	5780	
Niobrara	5877	5878	Gas / Oil
Intermediate CSG (90°INC)	6257	6530	
Lateral TD (@ BHL)	6257	10596	

All shows of fresh water and minerals will be adequately protected and reported. Gas detection to be operational prior to drilling the Frontier.

2. PRESSURE CONTROL EQUIPMENT:

All well control equipment shall be in accordance with Onshore Order #2 for 5M systems. Well control equipment will be rigged up after setting surface casing.

The minimum specifications for pressure control equipment that will be provided are included on the attached schematic diagram showing size and pressure ratings.

- 5000# BOP with 4" or 4-1/2" Pipe Rams
- 5000# BOP with Blind Rams
- 5000# Annular

Auxiliary equipment to be used:

- Upper kelly cock with handle available.
- Stabbing Valve

The choke manifold will include appropriate valves and adjustable chokes. The kill line will have one check valve.

Ram type preventers will be pressure tested to full working pressure (utilizing a tester and test plug) at:

- Initial installation
- Whenever any seal subject to test pressure is broken
- following related repairs
- 30 day intervals

The annular preventer will be pressure tested to 50 percent of the rated working pressure.

All pressure tests shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.

Annular preventers shall be functionally operated at least weekly.

Pipe and blind rams shall be activated each trip.

A BOPE pit level drill will be conducted weekly for each drilling crew.

All tests and drills will be recorded in the drilling log.

The accumulator will have sufficient capacity to open the HCR valve, close all rams plus the annular preventer, and retain 200 psi above pre-charge pressure without the use of closing unit pumps. The system will have two independent power sources to close the preventers in accordance with 5M system requirements outlined in Onshore Order #2.

Remote controls shall be readily accessible to the driller. Master controls shall be at the accumulator.

3. CASING & CEMENTING PROGRAM:

A. The proposed casing program will be as follows:

Section	Measured Depth (ft)	Hole Size	Size	Grade	Weight	Thread	Condition
Surface	0 – 500	12 ¼	9 5/8	J-55	36.0	STC	New
Intermediate	0 – 6530	8 ¾	7	P110	23.0	LTC	New
Production*	5780 – 10596	6	4 ½	HC-P110	11.6	LTC	New

*4 ½” production string will be a liner, utilizing a liner hanger with pack-off assembly.

Size	Grade	Weight	Thread	Collapse	Burst	Pressure Gradient Collapse	Pressure Gradient Burst
9 5/8	J-55	36.0	STC	2020	3520	0.43	0.50
7	P110	23.0	LTC	5650	8720	0.50	0.50
4 ½	HC-P110	11.6	LTC	8650	10690	0.50	0.50

All casing strings below the conductor shall be pressure tested to 0.22 psi/ft. of casing string length or 1500 psi, whichever is greater, but not to exceed 70% minimum internal yield.

B. The proposed cementing program will be as follows:

Surface String: Top of cement - surface
Estimated volume: gauge hole + 50% excess

170 sx Type III Cement + 1% CaCl₂ + 0.25#/sx Cello flake @ 14.5 ppg, 1.41 ft³/sx.

Top Out (if required): Type III Cement + 2% CaCl₂ @ 14.5 ppg, 1.41 ft³/sx.

Intermediate String: Top of cement - 200' above the Midcoal formation.
Top of Tail cement - 400' above KOP
Estimated volume: gauge hole + 30% excess

Lead: 465 sx 35/65 Poz/G + additives @ 1.89 ft³/sx
Tail: 135 sx 50/50 Poz/G + additives @ 1.71 ft³/sx

Production Liner: Un-cemented with Swell Packers

OR

300 sx Premium Lite High Strength D @ 13.0 ppg, 1.82 ft³/sx.

Cement will be brought up to the top of the liner (within 100' of KOP). Estimated volume (gauge hole + 30% excess in open hole, 0% excess in 7" x 4-1/2" casing annulus).

Actual cement volumes used on the production liner will be calculated and adjusted based upon openhole caliper logs and/or gauge hole +30%.

OR

Open Hole completion without a 4 1/2" liner

After cementing, but before commencing any test, the casing string will stand cemented until cement has reached a compressive strength of 500 psi at the shoe. WOC times will be recorded in the drillers log.

