



Surprise Unit 3-09H

SHL: 521' FNL 1,726' FWL (NE/4 NW/4)

Sec. 9 T6N R80W

BHL: ±2,674' FNL ±555' FEL (SE/4 NE/4)

Sec. 17 T6N R80W

Jackson County, Colorado

Surface Ownership: Fee

SH Mineral Lease: Fee

Through Federal Mineral Lease: COC76295

Through State Mineral Lease: 9476.8

Through Mineral Lease: Fee

BH Federal Mineral Lease: COC76295

Surprise Federal Unit: COC75017X

Drilling Plan

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

Vertical Hole Section

Formation	TVD (ft.)	MD (ft.)	Hydrocarbon/Water Bearing Zones
KOP (anti collision)	200	200	
Midcoal	2462	2477	Gas
Suddeth Coal	3242	3263	Gas
Sussex	5742	5770	
Shannon	6042	6070	
KOP (start build curve)	7304	7333	
Niobrara	7412	7441	Gas / Oil
Landing Point (90°)	7782	8083	
TD	7782	15044	
Carlisle Shale	7792		

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

2. PRESSURE CONTROL EQUIPMENT:

All well control equipment shall be in accordance with Onshore Order #2 for 5M systems.

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

3000# BOP with 4" or 4-1/2" Pipe Rams
3000# BOP with Blind Rams
3000# Annular

Auxiliary equipment to be used

- Upper kelly cock the 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 a 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 test 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-charged 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 – 1,400	12-1/4"	9 – 5/8"	J – 55	36.0	STC	New
Production*	0 – 15,044	8-3/4"	5-1/2"	P-110	20.0	LTC	New

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 + 100% excess

800 sx Class G + additives @ 1.16 ft³/sx

Top Out (if needed)
100 sx Class G + additives @ 1.16 ft³/sx

Production String: Top of cement – 200' above Midcoal
Estimated volume: gauge hole + 15% excess
(if open hole logs are run, caliper + 5% excess will be used)

Lead: 600 sx Class G + additives @ 2.40 ft³/sx
Tail: 1200 sx Class G + additives @ 1.68 ft³/sx

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 driller's log.

4. DRILLING FLUIDS PROGRAM:

Interval (ft.)	Type	Weight (ppg)	Viscosity	Ph	Water Loss (cc)	Remarks
Surface	Spud	8.4-9.0	40 – 60	8 – 10	NC	WBM – gel & lime
Production	LSND	9.0-9.8	40 – 50	8 – 10	<6	WBM – polymer system

NC = no control

Sufficient quantities of mud material will be maintained on site or be readily accessible for the purpose of assuring well control. SPR will be recorded on daily drilling report after mudding up. Electronic/mechanical mud monitoring equipment will be utilized and will include a pit volume totalizer (PVT), stroke counter, and flow sensor as a minimum.

5. EVALUATION PROGRAM:

Logs (while drilling)	LWD-GR	Surface casing to TD
OH Logs:	None anticipated	
Cores:	None anticipated	
DST's	None anticipated	

6. ABNORMAL CONDITIONS:

No anticipated abnormal pressures or temperatures expected to be encountered No hydrogen sulfide expected

Anticipated bottom-hole pressure is approximately 4,358 psi (10.5 ppg EMW)

7. OTHER INFORMATION:

The anticipated starting date and duration of the drilling and completion operations will be as follows

Start Date	Upon Approval
Duration	60 Days

The well will be drilled from surface location to bottom hole location per attached directional plan. The proposed well path should not pose any collision or interference concerns with any existing wells along its proposed path.

Footage at top of productive zone: 900' FNL & 1612' FWL, Sec 9 T6N R80W

A completion rig will be used for completion operations. All conditions of this approved plan will be applicable during all operations conducted with the completion rig.



3000 psig BOPE Diagram

