

**Ursa Operating Company LLC**

**BR C-24O 32D-24-2-98**

**SHL: 647' FSL, 1329' FEL, Sec 24, T2S, R98W**

**BHL: 2686' FSL, 2133' FEL, Sec 24, T2S, R98W**

**Rio Blanco County, Colorado**

**Drilling Program**

**1. Formation Tops**

	<u>MD</u>	<u>TVD</u>
Green River	Surface	
Wasatch	1,994'	1,925'
Fort Union	4,736'	4,366'
Ohio Creek	6,235'	5,737'
Williams Fork	6,426'	5,927'
Top of Gas	6,426'	5,927'
Rollins	10,080'	9,581'
TD	10,430'	9,931'

**2. Depth to Oil, Gas, Water, or Minerals**

Williams Fork                      6,426' - 10,430'                      (Gas)

Fresh water is not expected in the Green River Formation. In general, fresh water does not exist below 500' in the Piceance Basin. Any fresh water that might be present will be protected with surface casing.

The "Top of Gas" formation top marks the top of the continuous over-pressured gas column. There are no valuable minerals or hydrocarbons anticipated above the "Top of Gas".

**3. Pressure Control**

Section                      BOP Description

Surface:                      - Properly lubricated and maintained rotating head (diverter).

Production:                      The BOP and related equipment shall meet the minimum requirements of Onshore Oil and Gas Order No. 2 for equipment and testing requirements, procedures, etc for a 5M system.

- A 5M BOP will consist of 2 ram preventers (a pipe ram and a blind ram) and an annular preventer (see attached diagram).
- BOP equipment will be 11" inside diameter and rated to 5,000 psi.
- The choke line will have a minimum diameter of 3" and will have 2 valves.
- The kill line will have a minimum diameter of 2" and will have 2 valves and a check valve.
- BOP connections subjected to well pressure will be flanged, welded, or clamped.
- The choke manifold will be rated to 5,000 psi and will contain 2 chokes (1 remote).
- The choke manifold will have a pressure gauge.
- The BOP will be tested prior to drilling out of the surface casing shoe. The BOP will then be tested at 30 day intervals until completion of drilling operations.
- A BOP test plug will be used. Rams will be tested to BOP working pressure. The annular preventer will be tested to at least 50% of rated working pressure.

- Safety valves for all connections in use will be present on the rig floor.
- A float sub will be used in the BHA of the drillstring.
- BOP rams will be function tested during trips. The annular will be functioned weekly.
- Well control drills will be held for each drilling crew on a weekly basis.

#### 4. Casing

Description	Interval		Weight (ppf)	Grade	Coup	Pore Press @ Shoe	MW @ Shoe	Frac Grad @ Shoe	Safety Factors		
	Top	Bottom (MD)							Burst	Collapse	Tension
Conductor 16	0'	60'	55	H-40	weld	--	--	--	--	--	--
									--	--	--
Surface 9 5/8	0'	3,763'	36	J-55	STC	8.33	8.5	13.0	3,520	2,020	394,000
									1.60	1.69	2.91
Production 4 1/2	0'	10,430'	13.5	P-110	LTC	9.0	9.5	--	12,410	10,670	338,000
									3.40	2.73	2.40

#### Assumptions:

Surface casing MASP = (frac gradient + 1.0 ppg) - (gas gradient)

Production casing MASP = (reservoir pressure) - (gas gradient)

All collapse calculations assume fully evacuated casing with a gas gradient

All tension calculations assume air weight of casing

Gas gradient = 0.1 psi/ft

All casing shall be new.

All casing strings shall have a minimum of 1 centralizer on each of the bottom 3 joints.

#### 5. Cement

Job	Hole Size	Fill	Slurry Description	ft <sup>3</sup>	OH excess	Weight (ppg)	Yield (ft <sup>3</sup> /sk)
				sacks			
Conductor	24	60'	Class A Cement	131	25%	15.6	1.18
				111			
Surface Stage 1	13 1/2	2,069'	HAL VariCem Cement (Type I/II) w/ 0.25 lb/sk LCM additives	1416	40%	12.5	1.94
				730			
Surface Stage 2	13 1/2	1,694'	HAL VariCem Cement (Type I/II) w/ 0.25 lb/sk LCM additives	1242	50%	12.3	2.45
				507			
Production Lead	8 3/4	2,663'	HAL NeoCem Cement System	941	15%	12.5	2.015
				467			
Production Tail	8 3/4	2,774'	HAL NeoCem Cement System	980	15%	13.0	2.07
				473			
Production Tail	7 7/8	1,430'	HAL NeoCem Cement System	375	15%	13.0	2.07
				181			

For the surface cement job, a stage cementing tool will be placed at 1694'. The first stage will be pumped into place and allowed to set before pumping the second stage.

The surface casing will be cemented to surface. In the event that cement does not reach surface during the primary cement job, a remedial job will be performed.

The production hole will be tapered from 8-3/4" hole size to 7-7/8" hole size at approximately 9,000' MD.

## 6. Type and Characteristics of Proposed Circulating Medium

<u>Interval</u>	<u>Description</u>
Surface - 3,763'	A fresh water based mud system will be utilized.  Anticipated maximum mud weight is 9.0 ppg.
3,763' - TD	A fresh water based mud system will be utilized. In order to control formation pressure the system will be weighted with additions of bentonite, and if conditions warrant, with barite.  Anticipated maximum mud weight is 10 ppg.

## 7. Logging, Coring, and Testing

Logging: A pulsed neutron log will be run in the production casing from PBTD to the top of the William's Fork formation. A cement bond log and gamma ray log will be run from PBTD to the top of cement.

Cores: There are no cores planned for this well.

DST: There are no DST's planned for this well.

## 8. Anticipated Abnormal Pressure or Temperature

Maximum anticipated bottomhole pressure will be approximately equal to total depth (feet) multiplied by a 0.47 psi/ft gradient.

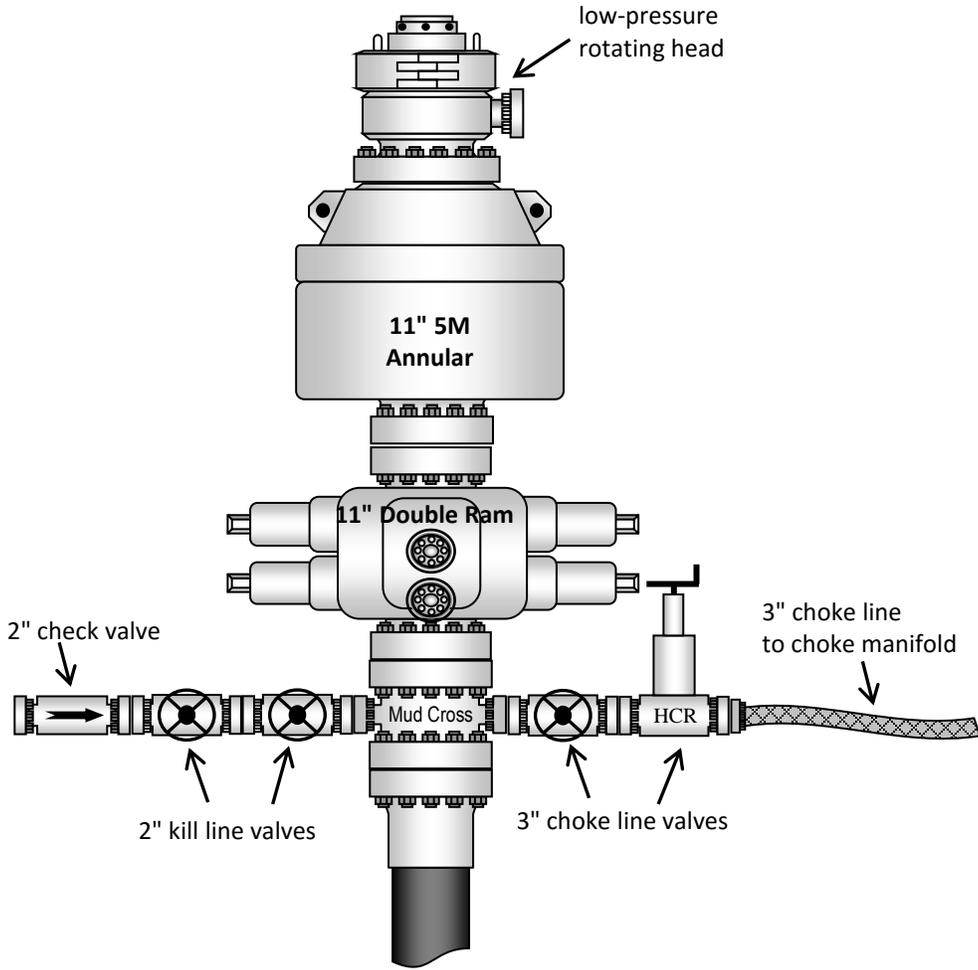
$$9,931' \times 0.47 \text{ psi/ft} = 4648 \text{ psi}$$

No abnormal pressure or temperature is expected. No H<sub>2</sub>S is expected.

## 9. Other Aspects

This is planned as a directional "S" well. A directional plan is included.

### 5M BOP stack configuration



### 5M choke manifold configuration

