Black Hills Plateau Production
Winter Flats 15-43-99
Bronco Flats Field
NESE 1693' FSL & 1171' FEL SECTION 15, T9S – R99W
Mesa County, Colorado

DRILLING PROGRAM

1) ESTIMATED TOPS OF GEOLOGICAL MARKERS:

GL: 6,375' (Un-graded), KB: 6,390' (estimated)

Formation	Measured Depth	True Vertical Depth	Subsea Depth
Wasatch	Surface	Same	Surface
Mesaverde	200'	200'	6,190'
Cameo Coal & Sand	1,890'	1,890'	4,500'
Rollins Sandstone	2,130'	2,130'	4,260'
Cozzette Sandstone	2,300'	2,300'	4,090'
Corcoran Sandstone	2,495'	2,495'	3,895'
Mancos Shale	2,785'	2,785'	3,605'
Dakota Silt	6,805'	6,805'	(415)'
Dakota Sand	6,845'	6,845'	(455)'
Cedar Mountain Sand	6,930'	6,930'	(540)'
Morrison	7,010'	7,010'	(620)'
TD	7,400'	7,400'	(1,010)'

2) ANTICIPATED FORMATIONS FOR WATER, OIL, GAS AND OTHER MINERALS:

Formation	Mineral	Depth
Mesaverde Sandstone	Gas or Water	200'
Cameo Coal	Gas or Water	1,890'
Rollins Sandstone	Oil, Gas, or Water	2,130'
Cozzette Sandstone	Oil, Gas, or Water	2,300'
Corcoran Sandstone	Oil, Gas, or Water	2,495'
Dakota Sand	Oil, Gas, or Water	6,845'
Cedar Mountain Sandstone	Oil, Gas, or Water	6,930'

No other formations are expected to produce oil, gas, or fresh water in measurable quantities.

3) OPERATOR'S MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL:

Please reference enclosed 3M BOP Diagram.

The blowout preventor assembly shall consist of one blind ram preventor, one pipe ram preventor and an annular preventor. All will be hydraulically operated. The BOP pipe and blind rams will be hydraulically tested to 100 % of working pressure (if isolated from the surface casing with a test plug) or to 70% (2,464 psig) of the internal yield of the surface casing after nippling up. The annular preventor will be tested to 50% of its' working pressure rating for 10 minutes or until provisions for the test are met. The pipe rams and blind rams will be function tested on each trip out of the hole, but not more than once per day. All such checks will be noted on the daily Tour Sheets.

Accessories to the BOPE include an upper and lower kelly cock, a sub on the floor with a full opening valve to be stabbed into the drill string when the kelly is not in the drill string, a drill pipe float (except for lost circulation conditions), and a choke manifold with a pressure rating equivalent to the BOP stack. An accumulator with a minimum of 1.5 times the volume of fluid necessary to close all BOP equipment will be part of the BOP system.

Remote controls capable of both opening and closing all preventors will be readily accessible to the driller. A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed as part of the system. The BOP will be kept in good mechanical working order. Checks and inspections will be recorded on daily Tour Sheets.

Primary BOP actuating control will be located either in the doghouse or on the rig floor.

Sufficient mud volume and weight material will be maintained on location to overcome any flows.

AUXILIARY EQUIPMENT:

a) A Kelly Cock will be kept in the drill string at all times.
b) A float will be used at the bit at all times (except for lost circulation drilling condition).
c) A full-opening drill pipe stabbing valve (inside BOP) with proper drill pipe connection will be on the rig floor at all times.
d) The drilling fluids systems will be visually monitored at all times.

4) CASING PROGRAM:

Conductor Pipe

- 20” hole size drilled.
- 16”, 65 #/ft H-40 set at +/- 40 ft. Cemented to surface with redi-mix cement.

9-5/8" SURFACE CASING PROGRAM

						Make-up Torque (ft-lb)		
Interval	Weight	Grade	Coupling	I.D.	Drift	Minimum	Optimum	Maximum
0’ to 2,100’	36 #/ft	K-55	LT&C	8.921”	8.765”	2,960	3,940	4,930

SURFACE CASING DESIGN

		API RATING / SAFETY FACTOR			
				Tension	Tension
Interval	Description	Collapse (psi)a	Burst (psi)b	Body (M Lbs)c	Cplng (M Lbs)c
0’ to 2,100’	9-5/8", 36.0 #/ft, K-55, LTC	2,020. / 1.107	3,520. / 1.51	564 / 2.35	489 / 2.03

a) based on full casing evacuation with 9.0 ppg formation gradient on backside
b) based on 9.0 ppg gradient to surface, with no fluid on backside (backside evacuated) and 500 psi applied surface pressure
c) based on casing string weight in air (75,600 lbs) with 100,000 lbs of over-pull applied. Buoyed weight of casing string in 9.0 ppg mud = 71,436. lbs

5-1/2" PRODUCTION CASING PROGRAM

						Make-up Torque (ft-lb)		
Interval	Weight	Grade	Coupling	I.D.	Drift	Minimum	Optimum	Maximum
0’ to 7,400’	17 #/ft	L-80	LT&C	4.892”	4.767”	2,560	3410	4,260

PRODUCTION CASING DESIGN

		API RATING / SAFETY FACTOR			
				Tension	Tension
Interval	Description	Collapse (psi)a	Burst (psi)b	Body (M Lbs)c	Cplng (M Lbs)c
0’ to 7,400’	5-1/2", 17.0 #/ft, L-80, LTC	6,290. / 1.40	7,740. / 1.46	397 / 1.56	338 / 1.33

a) based on full evacuation with 9.5 ppg formation gradient on backside, pipe evacuated
b) based on 9.5 ppg gradient to surface, with no fluid on backside (backside evacuated), and 800 psi applied surface pressure
c) based on casing string weight in air (125,800 lbs), with 100,000 lbs of over-pull applied. Buoyed weight of casing string in 9.5 ppg mud = 789,764 lbs

All casing will be new or reconditioned and tested to meet or exceed API standards.

The surface casing will have centralizers on the bottom three joints of casing and then every other collar for 10 joints. The production casing will have a minimum of one centralizer per joint starting with the shoe joint and extending for 200’ and then one centralizer every 4th joint thereafter in remainder of cemented zone.

5) CEMENTING PROGRAM:

9-5/8" Surface Casing

Cement to surface as follows:

- 40 bbl fresh water spacer / 20 bbl pre-flush.
- *Lead:* 450 sx of Standard Cement with 2% bentonite, 0.125 lb/sx Poly-E-Flake and 1% $CaCl_2$. Cement to be mixed at 14.80 lb/gall with 6.42 gall/sx water and have a yield of 1.36 ft^3/sx. Calculated fill is 600'.
- *Tail:* 720 sx of Rockies Lite with ¼ lb/sx Poly-E-Flake. Cement to be mixed at 12.70 lb/gall with 11.78 gall/sx water and have a yield of 2.13 ft^3/sx. Calculated fill is 1,500'.
- Cement volumes to cover from 2,100 feet to surface with 100% excess cement in a 12 1/4" x 9-5/8" hole size.
- If cement is not circulated to surface, a top job using Class "G" with 2% $CaCl_2$ will be used to top out to surface.

5-1/2" Production Casing

Cement as follows:

- 20 bbl 2% KCL water spacer followed by a 30 bbl reactive spacer (Super Flush 100 mixed at 11.7 lb/gall)
- *1st Stage:* 240 sx of 50/50 Poz Premium with 1% Bentonite, 0.5% Halad-R9, 5 lb/sx Gilsonite, 0.25 lb/sx Kwik Seal, 0.2% Super CBL and 0.2% CFR-3. Cement to be mixed at 13.1 lb/gall with 6.92 gall/sx water and have a yield of 1.50 ft^3/sx.
- Cement volumes to cover 1,500 ft with 35% excess. Estimated TOC is 5,900'.
- DV-Tool to be placed +/- 50 feet into the Mancos Shale. Estimated DV-Tool placement of +/- 2,835' MD.
- 20 bbl 2% KCL water spacer followed by a 30 bbl reactive spacer (Super Flush 100 mixed at 11.7 lb/gall)
- *2nd Stage:* 230 sx of 50/50 Poz Premium with 1% Bentonite, 0.5% Halad-R9, 5 lb/sx Gilsonite, 0.25 lb/sx Kwik Seal, 0.2% Super CBL and 0.2% CFR-3. Cement to be mixed at 13.1 lb/gall with 6.92 gall/sx water and have a yield of 1.50 ft^3/sx. Calculated fill is 1,400 ft.
- Cement volumes to cover from DV-Tool to 1,300 ft (1,375 ft of cement coverage) with 35% excess in a 7-7/8" x 5-1/2" hole size.

All waiting on cement (WOC) times will be adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

6) MUD PROGRAM:

Types and characteristics of the proposed mud system:

The well will be drilled to TD with a combination of fresh water (surface), LSND, and brine water. The applicable depths and properties of this system are as follows:

Depth	Type	Weight (ppg)	Viscosity (sec)	Water loss (cc)
0 to 800’	FW	± 8.4	NC	NC
800’ to 4,590’	LSND	± 9.0-9.2	35 to 60	8 to 10
4,459’ to TD	Brine Water	± 9.2-9.4	30 to 50	4 to 8

Sufficient mud materials to maintain mud properties, to control lost circulation and to contain “kick” will be available at well site.

7) TESTING, LOGGING, AND CORE PROGRAMS:

Cores: None

DST's: None

Surveys: MWD surveys during build and drop portions of well plan. Single shot surveys every 500’ throughout the remainder of drilling operations. See attached well plan.

Mud Logger: Base of surface casing (BSC) to TD.

Logging Program: DIL-SP-GR; TD to BSC, GR to surface.
CNL-FDC, GR and Caliper; TD to BSC.
GR-CCL-CBL-VDL will be ran from PBTD to 500’ above indicated TOC during completion.

8) ANTICIPATED ABNORMAL PRESSURES OR TEMPERATURES:

No abnormal pressures or temperatures are anticipated. No H_2S gas is anticipated.

Maximum bottom hole pressure equals approximately 3000 psi based on a pressure gradient of 0.35 in the Dakota / Cedar Mountain interval at TD. Maximum anticipated surface pressure equals approximately 1,118 psig (BHP minus the pressure of a partially evacuated hole at 0.22 psi/ft).

9) ANTICIPATED STARTING DATE AND DURATION:

Dirt work start up: Upon Approval

Spud:	As soon as rig is available
Duration:	
Drilling	30 days
Completion	30 days