



Robert L. Bayless, Producer LLC

**DRILLING PROG.
FOSTER STATE #1
NIOBRARA**

MOFFAT COUNTY, COLORADO

SWNE Section 16 – 4N – 91W

Surface Loc: 1952' FNL & 2272' FEL (SWNE)

Bottomhole Loc: 2475' FSL & 2180' FEL (NWSE)

Surface Loc: 40.322076 N LAT, 107.612304 W LON

May 20, 2015

<u>ELEVATION:</u>	K.B. – 6,817'	G.L. – 6,806'	(KB = 11')
<u>CASING:</u>	9-5/8" 36# J-55	8.921" ID, 8.765"	From Surface – 575'
	ST&C	Drift	
	Burst: 3,520 psi	Collapse: 2,020 psi	Capacity: 0.0773 bbls/ft
<u>CASING:</u>	7" 23# J-55	6.366" ID, 6.241"	From Surface – 3,776'
	LTC	Drift	
	Burst: 4,360 psi	Collapse: 3,270 psi	Capacity: 0.0155 bbl/ft
<u>KOP:</u>	700 ' MD		
<u>TD:</u>	5,723' MD/5,489' TVD		

1. **SURFACE FORMATION**

Mancos Formation

2. **ESTIMATED TOPS OF GEOLOGIC MARKERS**

Mancos	Surface
Niobrara	3,716'
Fort Hayes	4,816'
Proposed TD	5,489'

3. **ESTIMATED DEPTHS OF ANTICIPATED WATER, OIL, GAS OR MINERALS**

Niobrara (Gas/Oil) 3,600'-Total Vertical Depth (3,834')

Water zones will be protected by setting 9-5/8" casing to at least 575' and circulating cement back to surface. All fresh water and prospectively valuable minerals encountered during drilling will be recorded by depth, and adequately protected. A sample will be taken of any water flow and furnished to COGCC for analysis, if requested. All water shows must be reported within one (1) business day after being encountered.

The following information is requested for water shows and samples where applicable:

Location & Sampled Interval	Date Sampled
Flow Rate	Temperature
Hardness	pH
Water Classification (State of Utah)	Dissolved Calcium (Ca) (mg/L)
Dissolved Iron (Fe) (mg/L)	Dissolved Sodium (Na) (mg/L)
Dissolved Magnesium (Mg) (mg/L)	Dissolved Carbonate (CO ₃) (mg/L)
Dissolved Bicarbonate (NaHCO ₃) (mg/L)	Dissolved Chloride (Cl) (mg/L)
Dissolved Sulfate (SO ₄) (mg/L)	Total Dissolved Solids (TDS) (mg/L)

4. **PROPOSED CASING PROGRAM**

A. Casing Design

CASING TYPE	INTERVAL (MD)	HOLE SIZE	CASING SIZE	WEIGHT (#/FT)	GRADE	THREAD
SURFACE	SURF - 575'	12-1/4"	9-5/8"	36	J-55	STC
INTERMEDIATE	SURF -3,776'	8-3/4"	7-0"	23	J-55	LTC

B. Cement Design

JOB	FILL	DESCRIPTION	SACKS	EXCESS	WEIGHT (PPG)	YIELD (FT ³ /SK)
Surface	575'	Class G w/ 2% CaCl ₂ , 0.25 #/sk Cello Flake	200	30%	15.8	1.17
Intermediate	3,776'	Prem Lite II w/ 3% KCl, 2% Bentonite (or eq. cement)	212	30%	11.0	3.49
Production	5,489'	Open Hole				

- **Waiting on Cement (WOC):** A minimum of four (4) hours shall elapse prior to attempting any pressure testing of the BOP equipment which would subject the surface casing cement to pressure, and a minimum of six (6) hours shall elapse before drilling out of the wiper plug, cement, or shoe is begun. WOC time shall be recorded in the Driller's Log. Compressive Strength shall be a minimum of 500 psi prior to drilling out.
- Cement volumes are based on gauge hole and will be revised as necessary (caliper data or mud log) to ensure coverage of all fresh water and hydrocarbon bearing formations.
- 9-5/8" Surface casing will be cemented to surface. Cement calculations were performed with 30% excess.
- 7" Intermediate casing will be cemented to surface. Cement calculations were performed with 30% excess.
- Surface casing may be pre-installed and cemented by a smaller conventional air/mist drilling rig.

5. MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL

All well control equipment shall be installed in accordance with Onshore Order #2 for 3M (3000 psi) systems.

Well control equipment will be rigged up after setting surface casing.

The BOP's and choke manifold will be installed and pressure tested before drilling out under surface casing (subsequent pressure test will be performed whenever pressure seals are broken), and then will be checked daily as to mechanical operating condition. BOP's will be pressure tested at least once every 30 days. Ram type preventers and related pressure control equipment will be pressure tested to rated 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 to 70% of the minimum internal yield of the casing, whichever is less. Annular type preventers will be pressure tested to 50% of their rated working pressure. All casing strings will be pressure tested to 0.22 psi/ft. or 1500 psi, whichever is greater, not to exceed 70% of internal yield.

6. PROPOSED MUD PROGRAM

From surface to 3,776' MD, a fresh water, or brine, system will be utilized. Hole stability will be accomplished with additions of KCl or a similar inhibitive substance. Anticipated maximum mud weight is 9.0 ppg. From 3,776' MD to TD air Nitrogen fresh water or brine Mist system will be utilized to protect formation damage and reduce lost circulation in the Niobrara formation. The anticipated Mist weight is 4.0 ppg. If necessary to control formation fluids or pressure, the system will be weighted with the reduction of nitrogen gas and the addition of more brine fluid and if pressure conditions warrant, with barite.

Sufficient inventory of mud materials to maintain mud properties, control lost circulation and to contain "kick" will be available at the well site while drilling. Mud will be checked hourly by rig personnel. Material to soak up possible oil or fuel spills will be on site. A mud logger, gas detector and flow sensor will be used. Pressure, volume and temperature will be monitored. It is not intended to use oil in the mud.

No chromate additives will be used in the mud system to ensure adequate protection of fresh water aquifers. No chemicals subject to reporting under SARA Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the drilling, testing, or completing of this well. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used produced, stored, transported, or disposed of in association with the drilling, testing, or completing of this well.

Hazardous substances specifically listed by the EPA as a hazardous waste or demonstrating a characteristic of a hazardous waste will not be used in drilling, testing, or completion operations.

7. AUXILIARY SAFETY EQUIPMENT TO BE USED

Discharge line will be laid a minimum of 150 feet away from wellbore. Line will be securely anchored. A flare with a pilot flame will be maintained on the end of the line at all times. A temporary flare pit will be constructed at the end of the discharge line. Operations of this equipment will be utilized during mist drilling only.

8. TESTING, LOGGING, AND CORING PROGRAMS

a. Logging Program

- i. No Logging is planned for this well.

b. Cores

- i. No coring is planned for this well.

c. *Drill Stem Tests*

- i. No DST's are planned. A DST may be run on an unexpected show of interest.

d. *Mud Logging*

- i. Mud logger will be present to TD.

9. ABNORMAL CONDITIONS

There is no abnormal pressure or temperature expected. Maximum anticipated bottom hole pressure will be approximately equal to total depth in feet multiplied by 0.45 psi/ft gradient.

10. ANTICIPATED STARTING DATE AND DURATION OF THE OPERATIONS

▪ **Drilling Operations**

- Start Date – July 15th, 2015
- Drilling Duration – 11 days
- Completion Duration – 2 days

▪ **Notification of Operations**

The Colorado Oil and Gas Conservation Commission (COGCC) office will be notified at least 24 hours prior to the commencement of spudding the well, of initiating pressure tests of the BOP and related equipment, and running casing and cementing of all casing strings. Notification will be made during regular work hours.

Existing location pad will be of sufficient size to accommodate all completion activities and equipment. All conditions of this approves plan will be applicable during all drilling and completion operations.



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May 26, 2015**

INTERMEDIATE CASING DESIGN

Proposed Total Vertical Depth:	3,542 ft	Proposed Depth of Surface Casing: 500 ft
Estimated Pressure Gradient:	0.42 psi/ft	
Bottom Hole Pressure at 3,542 ft		Hydrostatic Head of gas/oil mud: 0.22 psi/ft
0.42 psi/ft x 3,542 ft = 1,487 psi		0.22 psi/ft x 3,542 ft = 779 psi

Maximum Design Surface Pressure

Bottom Hole Pressure	–	Hydrostatic Head	=
(0.42 psi/ft x 3,542 ft)	–	(0.22 psi/ft x 3,542 ft)	=
1,487 psi	–	779 psi	= 708 psi

Intermediate Casing Strengths 7" J-55 23.0 #/ft LT&C

<u>Wt (#/ft)</u>	<u>Tension (lbs)</u>	<u>Burst (psi)</u>	<u>Collapse (psi)</u>
23.0	366,000	4,360	3,270

Safety Factors

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

Tension (Dry): Casing Weight: 23.0 #/ft x 3,542 ft = 81,466 lbs

Safety Factor: 366,000 lbs / 81,466 lbs = **4.49** **OK**

Burst: Safety Factor: 4,360 psi / 708 psi = **6.16** **OK**

Collapse: Hydrostatic: 0.052 x 9.0 ppg x 3,542 ft = 1,658 psi

Safety Factor: 3,270 psi / 1,658 psi = **1.97** **OK**

Use: 7" J-55 23.0 #/ft LT&C casing – “New Condition”