

Samson Resources Company

Lucero 32-7-11 #2

Directional Fruitland Coal Gas Well/Horizontal Re-entry

Surface: 258' FSL & 2127' FWL Sec. 11, T32N, R7W

Pilot Hole BHL: 818' FSL & 1688' FWL Sec. 11, T32N, R7W, 3250' TVD, 3673' MD

Lat #1 BHL: 660' FNL & 1980' FWL Sec. 11, T32N, R7W, 2769' TVD, 7126' MD

Lat #2 BHL: 660' FNL & 1980' FWL Sec. 11, T32N, R7W, 2705' TVD, 7064' MD

Lat: 37.02508N Long: 107.57598W

La Plata Co., CO

BLM DRILLING PLAN

1. ESTIMATED FORMATION TOPS:

Estimated Tops			Anticipated Minerals
	TVD	SS	
ELEV GL :	6303		
ELEV KB :	6315	(est.)	
Alluvium	Surface		Poss Water to 220'
San Jose	282	6021	None
Animas	1503	4812	None
Kirtland Sh.	1868	4447	None
Farmington SS.	2143	4172	None
Lower Kirtland	2463	3852	Possible Gas/Water
Up.Fruitland Coal	2738	3577	Gas/Water
Ignacio Seam	2850	3465	Gas/Water
Basal Coal Seam	2896	3419	Gas/Water
Inter-Tongue SS	2907	3408	Gas/Water
Inter-Tongue Coal	3029	3286	Gas/Water
Pictured Cliffs SS	3034	3281	Gas/Water
TVD TD=	3250	3065	
MD TD =	3673		

Formations						
	Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
	282.4	-6,033.3	San Jose		0.00	
	1,628.5	-4,812.3	Animas		0.00	
	2,055.7	-4,447.3	KS		0.00	
	2,377.6	-4,172.3	Farmington SS		0.00	
	2,752.1	-3,852.3	Lower KS		0.00	
	3,074.0	-3,577.3	Upper FC		0.00	
	3,205.1	-3,465.3	Main FC		0.00	
	3,258.9	-3,419.3	Basal FC		0.00	
	3,271.8	-3,408.3	IT SS		0.00	
	3,414.6	-3,286.3	IT Coal		0.00	
	3,420.5	-3,281.3	PC		0.00	

Please refer to the attached directional plans for inclination and azimuth details.

2. ESTIMATED DEPTHS OF ANTICIPATED MINERALS:

Estimated Tops			Anticipated Minerals
	TVD	SS	
ELEV GL :	6303		
ELEV KB :	6315	(est.)	
Alluvium	Surface		Poss Water to 220'
San Jose	282	6021	None
Animas	1503	4812	None
Kirtland Sh.	1868	4447	None
Farmington SS.	2143	4172	None
Lower Kirtland	2463	3852	Possible Gas/Water
Up.Fruitland Coal	2738	3577	Gas/Water
Ignacio Seam	2850	3465	Gas/Water
Basal Coal Seam	2896	3419	Gas/Water
Inter-Tongue SS	2907	3408	Gas/Water
Inter-Tongue Coal	3029	3286	Gas/Water
Pictured Cliffs SS	3034	3281	Gas/Water
TVD TD=	3250	3065	
MD TD =	3673		

Protection of oil, gas, water, or other mineral bearing formations:
Protection shall be accomplished by cementing surface casing and production casing back to the surface.

3. PRESSURE CONTROL EQUIPMENT:

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

A 2000 psig annular (hydrill) and single ram hydraulic BOP will be used (see attached diagram). Since maximum anticipated formation pressure is 1500 psig, accessories to the BOP will meet BLM requirements for a 2000 psig system. The accumulator system capacity will be sufficient to close all BOPE with a 50% safety factor. Fill line, kill line and line to the choke manifold will be 2".

BOPs will be function tested every 24 hours and will be recorded on an IADC log. Accessories to the BOPE will include upper and lower Kelly cocks with handles with a stabbing valve to fit drill pipe on the floor at all times, string float at bit, 3000 psig choke manifold with 2" adjustable and 2" positive chokes, and pressure gauge.

4. CASING AND CEMENTING PROGRAM:

Hole Size	Casing Size	Wt (#/ft)	Grade	Joint	Depth Set	Cement Depth
12-1/4"	8-5/8"	24	J-55	STC	350'	Surface
7-7/8"	5-1/2"	17	J-55	LTC	3673'	Surface
4-3/4"	2-7/8"	6.4	J-55	EUE	TD	Uncemented Liner

Casing	Top of Cmt	Type	Sacks	Weight	Yield
Surface	0'	CI B, 2% CaCl	265	15.8	1.17
Production	0'	Lead: PRB -2, Gas Migration Control	258	12.5	2.28
		Tail: PRB -2, Gas Migration Control	268	13.5	1.84

Surface Casing:

Fresh water sands are cased off with 8-5/8" casing (350' minimum or 50' below any known fresh water zone) and cement to surface (100% excess over gauge hole, 0.4127 ft³/ft).

Production Casing:

Casing will be run to cover all pay sections and cement to surface (Tail – 1673' of fill, Lead – 2000' of fill to surface, 70% excess over gauge hole. 0.1733 ft³/ft).

Cement equipment will include a guide shoe, float collar and 10 centralizers.

All casing strings will meet or exceed the following design safety factors:

- Burst = 1.00
- Collapse = 1.125
- Tension = 1.2 (including 100k over pull)

5. DRILLING FLUIDS PROGRAM:

A native fresh water based mud system will be used. Adequate amounts of lost circulation and weighting material will be on location if needed as well as sorbitive agents to handle potential spills of fuel or lubricants.

Hole Size	Type	Wt (ppg)	Vis (sec/qt)	Water Loss	Depth
12-1/4"	FW/Native	8.5	30-34	NC	0- SCP
7-7/8"	LSND	8.7 – 9.5	30-70	8 - 10	SCP-TD
4-3/4"	Produced Water	8.3 - 9.0	28 -34	NC	Horizontal Re-entry

Sufficient mud materials to build mud properties, control lost circulation and contain a blowout will be available at the well site during drilling operations.

6. ANTICIPATED TYPE AND AMOUNT OF TESTING, LOGGING, AND CORING:

Logging:

Mud logging
(Gas detector, 25' samples):

2500' to TD

Electric Logging:

Open hole logs are planned:

GR
High Resolution Induction/SP/CAL
Density/Neutron-
Image Log

TD to surface casing
TD to surface casing
TD to 2000'
None

Coring:

None planned.

Testing:

None planned.

7. EXPECTED BOTTOM HOLE PRESSURE AND ANY ANTICIPATED ABNORMAL PRESSURE, TEMPERATURES:

No abnormal pressures or temperatures are expected in this well. Maximum anticipated Fruitland reservoir pressure is 1500 psig with a normal temperature gradient. Maximum anticipated pressure at total depth in the Pictured Cliff reservoir is 1386 psig with a normal temperature gradient. No hydrogen sulfide gas or other potential hazards are anticipated. Any commercial or potentially hazardous preparations will be handled in an appropriate manner to minimize the potential for leaks or spills to the environment.

8. OPERATIONS:

The operation is expected to start soon after the permit is issued. Drilling operations are anticipated to last approximately 10 days for the pilot hole and 20 days for the re-entry horizontal drilling. The completion operations are expected to take approximately 10 days. All Fruitland Coal Seams will be perforated and fracture stimulated in two to three stages, using approximately 4,000 lbs of proppant per foot of perforation. Tubing will be run, and rod-pumping equipment installed. The well will be re-entered after frac operations are complete.

BOP Diagram – 2M System

