



Gunnison Energy LLC
Drilling Program

Spadafora 1190 #20-21 H1
Surface Location: 920' FNL & 2,526' FWL, Sec 20 T11S R90W
Bottom Hole Location: 2005' FNL & 2,483' FWL, Sec. 28 T11S R90W
Gunnison County, Colorado
Federal Lease No's. COC 70004, 13483

Rev 7.0, April 6, 2016

Please contact Mr. Robert Downey at Gunnison Energy, (303) 296-4222 if there are any questions or concerns regarding this Drilling Program.

Gunnison Energy respectfully requests that all information regarding this well be kept confidential.

ANTICIPATED START DATE Summer 2016

SURFACE ELEVATION 8068.5 ft. GL- graded

SURFACE FORMATION Wasatch Formation

ESTIMATED FORMATION TOPS (TVD)

Formation	Depth	Fluids/Mins	
Alluvial Gravel	Not present	Fresh water	This system is not present in this pad area. Water table in domestic well in SWNW S20, 11S, 90W has a static water level of 128'
Wasatch	Surface	water	Shales, siltstones and lenticular sandstones
Ohio Creek	2,037	water	Buff sandstone
Mesaverde	2,135	Water/coal	Sandstone, siltstone coal.
Mesaverde	3,600	Nat gas	First gas
Rollins	4972	Nat gas	Sandstone, very fine to fine grnd, white, feldspathic
Cozzette	5,596	Nat gas	Sandstone, very fine to fine grnd, white, feldspathic to lithic, shaley
Corcoran	5,734	Nat gas	Sandstone, very fine to fine grnd, white, feldspathic to lithic, shaley
Mancos	5,793	Nat gas	Marine Shale, gray to black, silty calcareous, some silty sandstone
Niobrara, Mbr	8,651	Nat Gas	Marine Shale, gray to black, silty, calcareous, some silty sandstone

Primary Objective: Niobrara Member of Mancos Shale

Secondary Objective: This is a horizontal well no secondary objective

TOTAL DEPTH 16,359.5ft (MD), 8,763 ft TVD

HORIZONTAL WELL TRAJECTORY After setting the 13 3/8" casing string at 900', a 12-1/4" vertical hole will be drilled to 1,100'. From a KOP at 1,100' the 12-1/4" hole oriented at N85.23°E will be drilled with a build angle of 2.0° at 2° per hundred feet.. Hold angle and drill 12-1/4" hole to 5,100. After setting casing string at 1,100', cement; an 8-1/2" hole will be drilled with the same build angle to 8408.5'. Build and turn with a maximum dogleg of 9° per hundred feet MD. At 9,370.5' the well will be horizontal with an azimuth of 148.68° and a TVD of 8,885'. An azimuth of 148.68° and an inclination of 91° will be maintained to a MD of 16,359.5'.

MUD PROGRAM

1. Conductor: 0' to 120', 26" hole fresh water spud mud.
2. Surface: 120' to 900' (MD), 16" hole drilled Spud Mud, 8.7 ppg.
3. Intermediate: 900' to 5,100' (MD), 12-1/4" hole drilled with a Polymer/LSND mud
4. Horizontal section: 5,100' to 16,360' (MD), 8-1/2 "hole drilled with a 3% KCl/Polymer mud

Conductor	Weight, ppg	PH	Salinity, ppm	Fluid loss, cc	gels
Surface	8.5-8.6	7.1-7.2	400-600	Uncontrolled	8/12
Intermediate	8.6-9.8	7.2-10.8	600-850	8-12	3/4
Horizontal	9.6-10.2	10.8-11.2	30,000	3-5	6/11

The surface hole will be drilled with a high viscosity spud mud. The first intermediate section will be drilled with a polymer/ LSND system (M.W. 9.2 – 11.0 ppg, Vis - 32-36 sec, W.L. 6- 8). The horizontal section will be drilled with a 3% KCl/polymer mud (10.8 – 12.5 ppg, Vis – 45 – 58 sec, W.L. 4 – 6). The mud will be processed through a closed loop mud system. The hole will be treated for lost circulation. Notify Engineering of any significant mud losses. Sufficient mud materials to maintain mud properties, control lost circulation and to contain “kick” will be available at wellsite. MUD WEIGHT IS REQUIRED FOR WELLBORE STABILITY.

FORMATION PROTECTION

. There is no recorded water table in Quaternary deposits, as there are no Quaternary deposits. Wasatch Formation is present at the surface. The conductor pipe at 120 ft will limit losses. The Conductor pipe will be cemented to surface. The surface pipe will be cemented to surface and that will protect any zones from contamination to 900ft. First gas is seen at 3600 ft so it is not expected that any surface zones will be contaminated by channeling gas while cementing surface pipe. The intermediate pipe will be set to 7600 ft and cement without excess will be brought up to a depth of 900 ft. The planned cement top is 900 ft and it could result in cement to surface in the amount of of 10 bbls if no losses occur. There is a programmed 4600 ft cement overlap between the 4 ½ casing and the 7 inch casing. This overlap protects the gas in the Mancos Shale.

CASING PROGRAM

Casing	Hole Size	Casing Size	Weight	Grade	Casing Thread	Depth Set	Cement Top
Conductor	26	20"	94#	J-55	LTC	80'	Surface
Surface	17-1/2"	13-3/8"	54.5#	J-55	LTC	900'	Surface
Intermediate	12-1/4"	9-5/8 "	43.5#	P-110	LTC	5,100'	Surface
Horizontal Production	8-1/2"	5 1/2 "	20#	P-110	Premium Buttress	16,360'	3,000'

Casing	Tensile	Burst	Collapse	SF tensile	SF burst	SF collapse	Notes
Surface	453,000	3520	2,020	14.0	1.37	5.6	Burst calc 7100 ft gas less .12 gradient
Intermediate	693,000	6210	9,960	3.5	2.43	2.98	Burst calc 7100 ft gas less .12 gradient
Production	443,000	12410	10,670	1.9	1.37	3.20	Tensile weight in air plus 0.4 ff in horizontal 100,000 OP Burst: frac 9,000 psi

FLOAT EQUIPMENT

- SURFACE CASING: 13-3/8" Cement nose guide shoe with self-fill flapper float collar on top of second joint. Thread lock shoe and float collar. Run (1) standard centralizer on each of the bottom (3) joints of surface casing and every other joint to the surface. Cement to surface.
- INTERMEDIATE CASING: 9-5/8" A cement shoe, 2 joints and a float collar. Place a centralizer 10' above the shoe, one just below the float collar, one on every second joint through the curve section and every third joint to surface.
- PRODUCTION CASING: 5-1/2" A cement shoe with a float collar, centralizer above shoe, 1 joint between. Burst disc one joint above shoe Casing will be run with a buoyancy tool. Seventy (70) cemented sliding sleeves will be run every third joint (~100'), with centralizers.

CEMENTING PROGRAM (Note: Volumes and mixtures may be adjusted due to actual conditions.)

- CONDUCTOR: Cement to surface: approx. 200 sacks Class A cement pumped down annulus with 2 inch pipe.

2. **SURFACE**: Cement to surface: lead: 12.6 ppg, 0-700', tail: 15.8 ppg, 700-900' ft.

Proceed cement with 15 BBLs of water. Slurry: Lead – 128 sx Versachem™ cement , 25 % excess. Weight 12.8 ppg, 2.11 cu ft/ sx. Tail – 110 sx Neat Cement, Weight 15.8 lb/gal, 0% excess, 1.15 cu ft/sx. WOC 12 hours. Test csg to 1500 psi.

3. **INTERMEDIATE**: lead: 12.8 ppg, 900–4,000', tail 13.5 ppg 4,000-5,100'.

Proceed cement with 20 BBLs of water. Slurry: Lead - 480sx , 25% excess Versachem™. Weight 12.8 lb/gal, 2.11 cu ft/sx. Tail – 110 sx Thermacem™, 0% excess Weight 13.5 lb/gal, 1.51 cu ft/sx. WOC 12 hrs

4. **HORIZONTAL PRODUCTION**: lead: 13.5 ppg, 3,000 – 16,360'. [Subject to revision]

Proceed cement with 20 BBLs 12 ppg tuned spacer. Slurry: Lead – 800 sx Class H Thermacem, 25% excess, Weight 13.5 ppg, 1.51 cu ft/sx, displace with 2% KCl: WOC holding 1,500 psi 3 hours.

LOGGING, CORING TESTING PROGRAM

1. Logging: . Open hole logs, triple combo, will be run from surface to 5,100'. CBL will be run on intermediate casing prior to drilling the horizontal portion of the well. Section below intermediate casing will be logged while drilling with RSS (LWD); resistivity, neutron, density, spectral gamma ray, dipole sonic, fracture identification and dielectric logs.
2. Mudlogs: Mud log from bottom of surface casing to TD.
3. Coring: Cores will be taken in the upper Mancos portion of the well.
4. Testing: No DST's are planned. A DFIT will be run prior to the fracture stimulation.

ABNORMAL CONDITIONS

1. Pressures: **No abnormal conditions are anticipated.**
Cameo/Rollins, pressure gradient - 0.40 psi/ft
Cozzette/Corcoran pressure gradient - 0.43 psi/ft
Niobrara Mancos pressure gradient -0.47 psi/ft
2. Temperatures: 300-320 degrees F.
3. H₂S: None anticipated.
4. Estimated bottom hole pressure: 4,400 psi natural gas column.

COMPLETION PROGRAM

The production string will be cemented in place with cement to 3,000 ft. Casing will be pressure tested to a pressure just below the burst rating of the rupture disc in the shoe track. The fracture stimulation will be a 70 quality nitrogen foam frac conducted down the casing- CT annular space, starting with the toe sliding sleeve and ending with the last sliding sleeve at the heel. Sliding sleeves will be actuated by the CT pressure. There will be 70 sliding sleeves, and 70 frac stages. Treatment pressure will be limited to 9,000 psi at surface. All water that is pumped for fracture stimulation will be produced water that is stored in our lined storage ponds

PRESSURE CONTROL (See attached schematic diagram.)

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 preventors 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 meet or exceed BLM and COGCC standards. Annular type preventors will be pressure tested to 50% of their rated working pressure. All casing strings will be pressure tested to 0.22 psi/ft. or 1,500 psi, whichever is greater, not to exceed 70% of internal yield. A manual locking device (i.e. hand wheels) or automatic locking devices shall be installed on the BOP stack.

The BOP equipment will be tested after any repairs to the equipment. Pipe rams, blind rams and the annular preventor will be activated on each trip, and weekly BOP drills will be held with each crew. All tests, maintenance, and BOP drill information will be entered on rig "tower" sheet.

A 5M BOP system is proposed for this well.

Statement on Accumulator System and Location of Hydraulic Controls

The drilling rig has not been selected for this well. Selection will take place after approval of this application. Manual and/or hydraulic controls will be in compliance with requirements for 5,000 psi systems.

A remote accumulator will be used. Pressures, capacities, location of remote hydraulic and manual controls will be identified at the time of the supervised BOP test. 5M system accumulator shall have sufficient capacity to open the hydraulically-controlled choke line valve (if so equipped), close all rams plus the annular preventer, and retain a minimum of 200 psi above precharge on the closing manifold without the use of the closing pumps. This is a minimum requirement. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level shall be maintained at the manufacturer's recommendations. The 5M system shall have 2 independent power sources to close the preventer. Nitrogen bottles (3 minimum) may be 1 of the independent power sources and, if so, shall maintain a charge equal to the manufacturer's specifications.

AUXILIARY EQUIPMENT

1. Upper kelly cock & lower kelly cock in drill string
2. Inside BOP or stab-in valve (available on rig floor).
3. Mud monitoring will be with a flowing sensor, pit level indicator, or visually observed.
4. Closed loop mud system is to be used.