



## **SGU 8507C-23 L24 496**

**SHL \_\_\_\_ Section 24, T4S, R96W**  
**BHL \_\_\_\_ Section 23, T4S, R96W**

**Garfield County, Colorado**

### **SimOps Deepening Procedure**

**November 12, 2013**

Production Engineer:	Jay Bazile
Production/Completions Group Lead:	Jerry Dietz
Completion Engineer:	Sally Grady
Drilling Engineer:	Andrew Baltes
Drilling Group Lead:	James Jmieff
North Piceance Interim Team Lead:	Chris Weege

API Number: 05045211550000

Spud Date: May 28, 2013

GL Elevation: 8,180 ft  
KB Elevation: 8,210 ft

TD: 12,954 ft MD  
PBSD: 8,674 ft MD 4 1/2 shoe @ 8,702' MD

Surface Casing: 14 3/4" hole, 9 5/8" OD, 36 lb/ft, J-55, set at 3,360 ft.

Surface Casing Properties: ID: 8.921"  
Drift ID: 8.765"  
Collapse: 2,020 psig  
Burst: 3,520 psig  
Joint Yield Strength: 394,000 lb  
Capacity: 0.0773 BBL/ft  
Capacity 9 5/8" casing x 14 3/4" hole: 0.1214 BBL/ft

Production Casing: 8 3/4" hole to 10,038' (6,678'), 7 7/8" hole to 12,954' (2,916') MD TD.  
4 1/2" OD, 13.50 #/ft, P-110, BTC set at 8,702 ft MD.

Production Casing Properties: ID: 3.920"  
Drift ID: 3.795"  
Collapse: 10,690 psig  
Burst: 12,420 psig  
Joint Yield Strength: 422,000 lb  
Capacity: 0.0149 BBL/ft  
Capacity 4 1/2" casing x 8 3/4" hole: 0.0547 BBL/ft

Proposed work string: 2 7/8" 10.4# S135 HT-PAC drill pipe.

Workstring properties: Tube ID: 2.151"  
Connection ID: 1.500"  
Connection drift: 1.375"  
Connection OD: 3.125"  
Connection Yield: 214,200#  
Make up Torque: 4,300 ft/#  
Maximum Torque: 5,100 ft/#  
Collapse: 25,600 psig  
Burst: 27,200 psig  
Joint Yield Strength (see connection yield) 299,700 lb  
Torsional yield (tube) 20,800#  
Torsional yield (connection) 7,600#  
Displacement: 0.0035 BBL/ft  
Capacity: 0.00445 BBL/ft  
Annular Capacity 2 7/8 DP x 4 1/2" 13.50# casing: 0.0069 BBL/ft

Cement: Surface cement at 0 ft (300 bbls of cement observed at surface).  
4-1/2" 13.50# cement at 0 ft ( 214 bbls of cement observed at surface)  
- CBL 10-28-2013 TOC 3300' +/-.

### Objective

Deepen well to original Drillers TD of 12,954' MD. Run 3 1/2" 9.2# P110 ULT-FJ production liner & cement. Prepare for completion frac operations.

3 1/2" Liner Properties:	ID:	2.992"
	Drift ID:	2.867"
	Collapse:	13,530 psig
	Burst:	13,970 psig
	Joint Yield Strength:	284,900 lb

### Background

The 8507C-23 well reached TD at 12,954' MD on September 10, 2013. 4-1/2" 11.6# P110 BTC casing was ran in the hole until reaching a depth of 10,039' MD. Once reaching 10,039', the decision to lay down casing was made due unstable wellbore conditions in the Molina Member of the Wasatch G Formation. A cleanout assembly was picked up after successfully laying down casing in attempt to clean out the wellbore in the Molina Member. After 17 days of washing and reaming (Sept. 12<sup>th</sup> –Sept. 27<sup>th</sup>) we were unable to clean out past 8,840' MD. Verbal approval was received from regulatory agencies to land casing at the top of gas and cement to surface. 4-1/2" 13.5# P110 VAroughneck production casing was successfully ran and landed at 8,702' MD (top of gas ~ 8,700' MD). Casing was cemented with 214 bbls of good cement to surface. CBL was ran on 10-28-2013 to ensure good cement bond.

### Safety

This is a SimOps location. Safety meetings are to be held with all location supervisory personnel prior to each tour. Well site supervisor(s) must notify contractors as to known hazards of which the contractors may be unaware. Well site supervisor must ensure that all workers are aware of their responsibilities and duties under the EH&S guidelines. All safety meetings will be recorded on the EnCana daily completion reports in WellView, as well as Daily SimOps workbook.

### Regulations

All notifications to regulatory agencies will be primarily email with phone follow up. All verbal notifications and approval from government regulatory agencies will be recorded on the EnCana daily report. The name of the individual contacted and the subject matter of approval or notification will be recorded. Operations will not commence until a sundry has been approved from regulatory agencies or until verbal approval has been given for the proposed plan.

## Well Deepening Program:

### Stage 1: Prespud Safety/SimOps meeting. MIRU, NU BOPE, run flow lines and flare lines:

1. Hold pre-spud safety & SimOps meeting with Drilling Coordinator, Completion Coordinator, Workover Coordinator, Drilling Engineer, Completion Engineer, Workover Supervisors, Safety Supervisors, Drilling Rig Toolpusher, Workover Contractor representatives, rental company representatives, and flowback.
2. Prepare location with rig mats around 07C-23 wellhead.
3. Skid Patterson 326 from Quad 8 to the 07C-23. NU BOPE .
4. Pressure test all BOPE, flow lines and choke manifold to 250 psi low, 5000 psi high test. 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.
5. RU rig floor and pipe handling equipment.

### Stage 2: RIHW workstring, mud up, drillout FC & shoe. Wash/redrill 4 1/8" x 8 3/4" open hole.

1. MI 2 7/8" 10.40# S135 workstring. Unload onto racks & layout for tally
2. Tally & RIHW 3 3/4" cone bit or junk mill, XO, 6-3 1/8" drill collars, XO, 2 7/8" drill pipe. Tag FC 8,650' MD +/-.
3. Establish circulation rate of 110-130 gal/min. Maintain 250 ft/min annular velocity. Drill out cement, float collar, shoe jt, float shoe with 10.5 PPG mud (see production casing detail in WellView, match original drilling weight up schedule). Maintain mud properties as; Vis 40-70, PV 15-45, YP 15-45, WL 4-10, PH 8-10. Add Mil-Lube as needed to reduce torque & drag in casing.
4. Drill/wash 50' into open hole to 8,750' +/- or through cement and circulate bottoms up. Shut down pumps and check well for flow/pressure. If necessary, calculate new mud weight and raise weight in pits. Displace hole volume & check for flow/pressure. Circulate & kill well for trip.
5. Mix & pump 30 bbl trip pill at 1/2-1 ppg above kill weight. POOH with DP & BHA keeping hole filled with kill weight mud. **(CRITICAL IMPORTANT) Monitor trip speed and take care as not to swab in gas bubble while POOH with 3 1/8" BHA inside 4 1/2" 13.50# csg. Calculate pipe displacement volumes prior to trip. Be sure to monitor fill volumes while POOH for possible kick detection.**
6. RIHW 4 1/8" bi-center bit, drill collars, XO, 2 7/8" drill pipe. **(CRITICAL IMPORTANT) Monitor trip speed and take care as not to surge well with 3 1/8" BHA inside 4 1/2" 13.50# csg. Calculate pipe displacement volumes prior to trip Be sure to monitor displacement volumes while TIH for possible kick detection.**
7. Establish circulation rate of 130-160 gal/min. Note maximum circulating pressure of 4000 psi on standpipe. Calculate annular velocity in both open and cased hole at max pressure and rate. Consult Drilling Coordinator if max pressures are at 4000 psi. Maintain mud properties as; Vis 40-70, PV 15-45, YP 15-45, WL 4-10, PH 8-10. Add Mil-Lube as needed to reduce torque & drag in casing.
8. Wash/drill to TD @ 12,954' KB. Use caution from top of Cameo Coal @ 12,495' MD. Beware of packoff issues at 4 1/2" shoe @ 8,702'. Monitor returns at shaker. Be prepared for gas kicks. Report abnormal pit gain immediately to Drilling Representative for potential SimOps well control situation.
9. Short trip to casing shoe. **(CRITICAL IMPORTANT) Monitor trip speed and take care as not to swab in gas bubble while POOH with 3 1/8" BHA inside 4 1/2" 13.50# csg. Calculate pipe displacement volumes prior to trip. Be sure to monitor fill volumes while POOH for possible kick detection.**

10. Condition mud for trip out of hole. Pump trip pill at ½-1# above KMW, POOH with drill pipe. Use caution as bit re-enters 4 ½” casing @ 8,702’. Keep hole full while POOH. Stop at 5000’, 2500’, and 1000’ for flow checks. **(CRITICAL IMPORTANT) Monitor trip speed and take care as not to swab in gas bubble while POOH with 3 1/8” BHA inside 4 ½” 11.6# csg. Calculate pipe displacement volumes prior to trip. Be sure to monitor fill volumes while POOH for possible kick detection.**

### **Stage 3: Run production liner.**

1. Run in hole with liner assembly as: guide shoe, shoe joint, 4700’ 3 ½” 9.2# P110 ULT-FJ liner ran into previous casing string, marker jt. 1500’ from TD, liner on-off tool, XO, work string to surface. Centralize 12 jts below liner on-off tool. **(CRITICAL IMPORTANT) Monitor trip speed and take care as not to surge well with 3 ½” liner and 3 1/8” drill string inside 4 ½” 13.5# csg. Calculate pipe displacement volumes prior to trip. Be sure to monitor displacement volumes while TIH for possible kick detection.**
2. Tag TD and circulate 2x times **hole volume** minimum. DO NOT EXCEED 2 BPM while circulating. Reciprocate slowly (30 ft/min) if needed to help with bridging at casing shoe.

### **Stage 4: Cement liner**

1. MI pumping service and cement with calculated volume of 13.0# TXI tail cement. Calculated volume will assume 8-3/4” hole from 8,072’ -10,038’ and 7-7/8” hole from 10,038’ to 12,954’. Cement volumes will be calculated at 25% excess in open hole. Cement will be calculated to pump 200’ of cement above liner top in previous casing.
2. Drop plug and displace liner volume with water and working string volume with drilling mud. DO NOT EXCEED 2 BPM while displacing. Slow rate to 1 BPM as plug passes liner ON-OFF tool. DO NOT EXCEED 1500 psi displacement pressure. Bump plug to 500 psi over differential. Release pressure and check for flow back.
3. Release ON-OFF tool per service company procedure. Circulate 1.5 times annular volume with drilling mud once releasing from liner hanger.
4. POOH LDDP & BHA. Keep hole full. **(CRITICAL IMPORTANT) BHA IS 3 ½” OD. Monitor trip speed and take care as not to swab in gas bubble while POOH with DP & BHA. Monitor fill volumes while POOH for possible kick detection. Do not allow hydrostatic in well to drop as liner top cement integrity is of critical importance due to liner top being above geologic top of gas.**
5. Nipple down BOPE. Skid well onto quad 7 to continue drilling operations.
6. Wait 48-72 hrs. RUN CBL.
7. Evaluate CBL
8. Frac per recommendation.

**Please contact Andrew Baltes at 307-851-9350 with any questions regarding this procedure.**