



Operator: Encana Oil & Gas (USA) Inc.
Well Name: LOWER HORSE DRAW D
Lease Number: 2217
Unit Number: COC096A
Location: NWNE Sec.35 -T2S -R103W
Field: Lower Horse Draw
County, State: Rio Blanco, CO
API Number: 05-103-08214-0000
Diagram Date: As of June 21, 2011

Plug and Abandonment Procedure

June 23, 2011

Prepared by: Nicholas Ronan 720-876-3838

Attachments:

Attachment 1 – Current Wellbore Diagram
Attachment 2 – Proposed Wellbore Diagram

API Number: 05-103-08214-0000

KB Elevation: 6,710 ft

GL Elevation: 6,700 ft

PBTD: 5,225 ft MD

TD: 5,225 ft MD

Surface Casing: 10 – 3/4" OD, 40.5 lb/ft, set at 94 ft, K-55

Surface Casing OD	10 3/4	in.
Surface Casing ID	10.050	in.
Surface Casing Drift	9.894	in.
Surface Hole size	14 3/4	in.
Surface Casing COLLAPSE (100%)	1,580	psi
Surface Casing BURST (100%)	3,130	psi
Surface Casing JOINT YIELD	450,000	lbs

Production Casing: 7 – 5/8" OD, 26.4 lb/ft, set at 2,450 ft, K-55

Production Casing OD	7 5/8	in.
Production Casing ID	6.969	in.
Production Casing Drift	6.844	in.
Production Hole size	9 7/8	in.
Production Casing COLLAPSE (100%)	2,890	psi
Production Casing BURST (100%)	4,140	psi
Production Casing JOINT YIELD	342,000	lbs

OUTER Tubing: 2-7/8" OD, 6.5 lb/ft, set 5,225 ft., J-55

Tubing OD	2 7/8	in.
Tubing ID	2.441	in.
Tubing Drift	2.347	in.
Tubing COLLAPSE (100%)	7,680	psi
Tubing BURST (100%)	7,260	psi
Tubing JOINT YIELD	99,660	lbs

INNER Tubing (coil): 1-1/4" OD, ASSUMED WEAKEST POSSIBLE STRING: 1.082 lb/ft set 5,100 ft

Tubing OD	1 1/4	in.
Tubing ID	1.076	in.
Tubing Drift	1.076	in.
Tubing Torsional Yield	580	lbs/ft
Tubing Internal Yield	9,180	psi
Pipe Body Yield	22,250	lbs

Safety

Safety meetings are to be held with all service company personnel prior to each job. Wellsite supervisor 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 Wellcore.

Regulations

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.

*****Please note Chemical Inventory on Wellcore Report. Note amount of chemicals pumped downhole and amount stored on location each evening.***

JOB OBJECTIVE

The LOWER HORSE DRAW D 2217 is a vertical well OPEN HOLE completed in the Mancos B, Frontier, and Dakota in May, 1979. The well has not produced since December, 2005. The well has very low production potential; therefore the **LOWER HORSE DRAW D 2217 will be plugged and abandoned.**

PROCEDURE

Rig Up and Pull Tubing

1. Notify State of Colorado and BLM (White River Field Office) at least 48 hours prior to start of operations.
2. Hold a pre-job safety meeting. Discuss all aspects of the procedure with any involved personnel. Identify and address any safety concerns before the job begins.
3. MIRU pulling unit. Blow down well and kill well as needed with produced water. ND production tree. NU BOPs.
4. TOOH with 1-1/4" COIL TUBING. TOOH with 2-7/8" OD, 6.5 lb/ft, J-55 tubing.

Isolate Open Hole

Open Hole Cement Plugs = $[0.2485 \text{ ft}^3/\text{ft} * 150 \text{ ft} / 1.15 \text{ ft}^3/\text{sk}] = 32.41 \text{ sks}$
TOTAL SACKS NEEDED With 10% Excess = $32.41 \text{ sks} * 1.10 = 36 \text{ sks}$

5. TIH with workstring tubing. Tag PBTD.
6. Circulate hole with produced water. Pump 150 ft balanced plug with 36 sks of Class G cement.
7. Wait on cement for 4 hours. Tag cement top. CEMENT TOP MUST NOT BE DEEPER THAN 5,115 ft.
Pump more cement as needed.
8. TOOH to 4,952 ft (top of the Frontier formation).
9. Circulate hole with produced water. Pump 150 ft balanced plug with 36 sks of Class G cement.
10. Wait on cement for 4 hours. Tag cement top. CEMENT TOP MUST NOT BE DEEPER THAN 4,852 ft.
Pump more cement as needed.
11. TOOH to 3,025 ft (top of the Mancos B formation).
12. Circulate hole with produced water. Pump 150 ft balanced plug with 36 sks of Class G cement.
13. Wait on cement for 4 hours. Tag cement top. CEMENT TOP MUST NOT BE DEEPER THAN 2,925 ft.
Pump more cement as needed.
14. Circulate hole with produced water. POOH with tubing.

15. TIH with wireline and set CICR in 7-5/8" casing at 2,375 ft (Must be placed at least 50 ft above the Production shoe set at 2,450 ft). Verify that the CICR will not be placed within 5 ft of a collar.
16. RDMO wireline unit.
17. TIH with workstring tubing. Circulate hole with produced water.

$$\text{Open Hole Cement} = [0.2485 \text{ ft}^3/\text{ft} * 150 \text{ ft} / 1.15 \text{ ft}^3/\text{sk}] = \mathbf{32.41 \text{ sks}}$$

$$\text{Casing Cement} = [0.2649 \text{ ft}^3/\text{ft} * [2450 - 2375] \text{ ft} / 1.15 \text{ ft}^3/\text{sk}] = \mathbf{17.28 \text{ sks}}$$

$$\text{TOTAL SACKS NEEDED With 10\% Excess} = (32.41 \text{ sks} + 17.28 \text{ sks}) * 1.10 = \mathbf{55 \text{ sks}}$$

18. Sting into CICR and pump 55 sks of Class G cement under the CICR.
19. Sting out of CICR. Spot 50 ft (13 sks) of class G cement on top of CICR set at 2,375 ft.

$$\text{Casing Cement} = [0.2649 \text{ ft}^3/\text{ft} * 50 \text{ ft} / 1.15 \text{ ft}^3/\text{sk}] = 11.52 \text{ sks}$$

$$\text{With 110\% Excess} = 11.52 \text{ sks} * 1.1690 = 12.67 \text{ sks} = \mathbf{13 \text{ sks}}$$

20. Wait on cement for 4 hours. Tag cement top. Pump more cement as needed to ensure at least 50 ft of cement is on top of the CICR set at 2,375 ft.
21. Pressure test production casing to 300 psig surface pressure for at least 15 minutes.
Contact Nicholas Ronan (720-876-3838) or Mitch Steinke (303-918-3844) if the casing fails the pressure test.
22. Circulate hole with produced water. POOH with tubing.

Cement Annulus across Surface Casing Shoe

23. TIH with wireline and perforate 4 squeeze holes at 150 ft. POOH with perforating gun. Verify all shots fired. RDMO wireline unit.
24. TIH with workstring tubing to 150 ft. Ensure tubing/production casing annulus is shut-in and production/surface casing annulus is open to atmosphere. Establish injection with produced water into the 4 squeeze holes. Ensure annulus circulation is established to surface.
25. Squeeze 150 ft (31 sks) of Class G cement into annular space through perforations at 150 ft. Annular plug must extend minimum of 50 ft above and below the surface casing shoe at 94 ft.

$$\text{Annular Cement} = [150 \text{ ft} * 0.2338 \text{ ft}^3/\text{ft} / 1.15 \text{ ft}^3/\text{sk}] = 30.49 \text{ sks} = \mathbf{31 \text{ sks}}$$

Cement Plug in Casing from CIBP to Surface

26. Pump 150 ft of Class G cement (35 sks) in casing up to the surface. Casing plug must extend a minimum of 50 ft above and below the surface casing shoe at 94 ft.

$$\text{Casing Cement} = [150 \text{ ft} * 0.2649 \text{ ft}^3/\text{ft} / 1.15 \text{ ft}^3/\text{sk}] = 34.55 \text{ sks} = \mathbf{35 \text{ sks}}$$

27. Wait on cement for four hours.
28. Top off annulus and casing as needed to bring cement to surface.
29. ND BOP. RDMO pulling unit.

30. Cut off anchors.
31. Cut off all casing at the base of the cellar or 4 ft below final restored ground level; whichever is deeper.
32. Weld on metal plate at least 1/4" thick and dry hole marker.
33. Restore surface location.
34. Ensure that cement tickets are mailed (or scanned and emailed) to the Denver office for subsequent reporting.