HALLIBURTON

iCem® Service

ENCANA OIL & GAS (USA) INC. - EBUS

For: DENIS ELROD
Date: Monday, September 22, 2014

Frederiksen 1B-28H-H368

Surface

Sincerely,
CHRISTOPHER PICKELL

Table of Contents

FREDERIKSEN 1B-28H-H368

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Frederiksen 1B-28H-H368** cement **Surface** casing job. A pre-job safety meeting was held before the job where details of the job were discussed, potential safety hazards were reviewed, and environmental compliance procedures were outlined.

Halliburton maintains a continuous quality improvement process and appreciates any comments or suggestions that you may have. Halliburton again thanks you for the opportunity to perform service work on this well. We hope to be your solutions provider for future projects.

Respectfully,

Halliburton Brighton

Job Times

	Date	Time	Time Zone
Called Out			MST
On Location			MST
Job Started	5/18/14	1857	MST
Job Completed	5/18/14	2011	MST
Departed Location			MST

1.2 Cementing Job Summary

HALLIBURTON *Cementing Job Summary*

The Road to Excellence Starts with Safety

Sold To #: 340078	**Ship To #:** 3117313	**Quote #:**	**Sales Order #:** 0901354435
Customer: Encana		**Customer Rep:**	
Well Name: FREDERIKSEN	**Well #:** 1B-28H-H368		**API/UWI #:** 05-123-37667-00
Field: WATTENBERG	**City (SAP):** LON	**County/Parish:** WELD	**State:** COLORADO

Legal Description: SE NE-28-3N-68W-2260FNL-255FEL

Contractor: ENSIGN DRLG	**Rig/Platform Name/Num:** ENSIGN 135
Job BOM: 7521	
Well Type: HORIZONTAL GAS	
Sales Person: HALAMERICA\HX46524	**Srvc Supervisor:** Jason Gibbs

Job

Formation Name				
Formation Depth (MD)	**Top**		**Bottom**	
Form Type			**BHST**	
Job depth MD	868ft		**Job Depth TVD**	
Water Depth			**Wk Ht Above Floor**	
Perforation Depth (MD)	**From**		**To**	

Well Data

Description	New / Used	Size in	ID in	Weight lbm/ft	Thread	Grade	Top MD ft	Bottom MD ft	Top TVD ft	Bottom TVD ft
Casing		9.625	8.921	36			0	858		858

Fluid Data

Stage/Plug #: 1

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	Mud Flush III (Powder)	Mud Flush III	10	bbl	8.4				
42 gal/bbl		FRESH WATER							

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
2	SwiftCem B2	SWIFTCEM (TM) SYSTEM	290	sack	14.2	1.54		6	7.64
94 lbm		TYPE I / II CEMENT, BULK (101439798)							
7.64 Gal		FRESH WATER							

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	Displacement	Displacement	62	bbl	8.33				

Cement Left In Pipe	**Amount**		**Reason**	Shoe Joint

last updated on 5/18/2014 3:38:17 PM Page 1 of 2

1.3 Planned Pumping Schedule

1. **Fill Lines with Water**
    a. Density = 8.33ppg
    b. Volume = 2bbl
2. **Pressure Test Lines to 2500psi**
3. **Pump MudFlush Spacer**
    a. Density = 8.33 lb/gal
    b. Volume = 10 bbl
    c. Rate = X bpm
4. **Pump SwiftCem (Lead)**
    a. Density = 14.2
    b. Yield = 1.54
    c. Water Requirement = 7.64
    d. Volume = 290 sks (79.5 bbls)
    e. Rate = 6 bpm
5. **Drop Top Plug**
6. **Start Displacement**
7. **Pump Displacement Water**
    a. Density = 8.33 lb/gal
    b. Volume = 62 bbls
    c. Rate = X bpm

1.4 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	
3	Actual mud density	lb/gal	
4	Time circulated before job	HH:MM	
5	Mud volume circulated	Bbls	
6	Rate at which well was circulated	Bpm	
7	Pipe movement during hole circulation	Y/N	
8	Rig pressure while circulating	Psi	
9	Time from end mud circulation to start of job	HH:MM	
10	Pipe movement during cementing	Y/N	
11	Calculated displacement	Bbls	
12	Job displaced by	Rig/HES	
13	Annular before job)?	Y/N	
14	Annular flow after job	Y/N	
15	Length of rat hole	Ft	
16	Units of gas detected while circulating	Units	
17	Was lost circulation experienced at any time ?	Y/N	

1.5 Water Field Test

Item	Recorded Test Value	Units	Max. Acceptable Limit	Potential Problems in Exceeding Limit
pH		----	6.0 - 8.0	Chemicals in the water can cause severe retardation
Chlorides		ppm	3000 ppm	Can shorten thickening time of cement
Sulfates		ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness		ppm	500 mg/L	High concentrations will accelerate the set of the cement
Calcium		ppm	500 ppm	High concentrations will accelerate the set of the cement
Total Alkalinity		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3).
Bicarbonates		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all
Potassium		ppm	5000 ppm	High concentrations will shorten the pump time of cement (indicates the presence of chlorides, therefore if Potassium levels are measured as high, so should the chlorides)
Iron		ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature		^{o}F	50-80 ^{o}F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

1.6 Job Event Log

HALLIBURTON

ENCANA OIL & GAS (USA) INC. - EBUS
Frederiksen 1B-28H-H368
Case 1

1.6 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Recirc Density (ppg)	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	Comb Pump Total (bbl)	Comment
Event	1	Start Job	Start Job	5/18/2014	18:57:54	COM4	8.47	0.00	31.54	10.4	
Event	2	Test Lines	Test Lines	5/18/2014	19:12:02	COM4	8.49	0.00	33.51	12.2	
Event	3	Pump Spacer 1	Pump Spacer 1	5/18/2014	19:14:33	COM4	8.51	0.00	30.55	0.0	
Event	4	Pump Spacer 2	Pump Spacer 2	5/18/2014	19:20:29	COM4	12.56	2.87	55.19	11.1	
Event	5	Pump Cement	Pump Cement	5/18/2014	19:22:46	COM4	13.99	4.89	94.62	10.9	
Event	6	Shutdown	Shutdown	5/18/2014	19:39:02	COM4	9.07	0.00	25.63	80.5	
Event	7	Drop Top Plug	Drop Top Plug	5/18/2014	19:41:51	COM4	0.02	0.00	26.61	80.5	
Event	8	Pump Displacement	Pump Displacement	5/18/2014	19:41:54	COM4	0.02	0.00	26.61	80.5	
Event	9	Bump Plug	Bump Plug	5/18/2014	19:59:33	COM4	8.50	0.00	1003.35	67.0	
Event	10	Other	Other	5/18/2014	20:11:03	COM4	8.51	0.00	1020.11	67.0	
Event	11	End Job	End Job	5/18/2014	20:11:45	COM4	8.47	0.00	-4.93	67.0	

2.0 Appendix