

# HALLIBURTON

iCem<sup>®</sup> Service

## ENCANA OIL & GAS (USA) INC. - EBUS

**For:**

Date: Thursday, July 17, 2014

**Vogl-Geist 2B-5H-E267**

Case 1

Sincerely,

**Sebastian Estensoro**

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## **1.1 Executive Summary**

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Halliburton appreciates the opportunity to perform the cementing services on **Vogl Geist 2B-5H-E267 cement Production** 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**

	<b>Date</b>	<b>Time</b>	<b>Time Zone</b>
<b>Called Out</b>	4/27/14	1300	MST
<b>On Location</b>	4/27/14	1600	MST
<b>Job Started</b>	4/27/14	2241	MST
<b>Job Completed</b>	4/28/14	0047	MST
<b>Departed Location</b>	4/28/14	0200	MST

1.2 Cementing Job Summary

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**Cementing Job Summary**

*The Road to Excellence Starts with Safety*

Sold To #: 340078		Ship To #: 3113299		Quote #:		Sales Order #: 0901297622				
Customer: ENCANA OIL & GAS (USA) INC. - EBUS				Customer Rep:						
Well Name: VOGL-GEIST			Well #: 2B-5 H-E267			API/UWI #: 05-123-37816-00				
Field: WATTENBERG		City (SAP): LON		County/Parish: WELD		State: COLORADO				
Legal Description: SW NW-5-2N-67W-2602FNL-331FWL										
Contractor: Kevin Bergeron				Rig/Platform Name/Num: H&P 522						
Job BOM: 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB50180				Srvc Supervisor:						
Job										
Formation Name										
Formation Depth (MD)		Top			Bottom					
Form Type					BHST					
Job depth MD		14464ft			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		7	6.276	26		N-80	0	7622	0	7130
Casing		4.5	3.92	13.5		P-110	0	14464	0	7130
Open Hole Section			6.125				7622	14464		
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make		
Guide Shoe	4.5			14464	Top Plug	4.5	1	Blackhawk		
Float Shoe	4.5	1		14386.4	Bottom Plug	4.5		HES		
Float Collar	4.5	1		14385	SSR plug set	4.5		HES		
Insert Float	4.5				Plug Container	4.5	1	Blackhawk		
Stage Tool	4.5				Centralizers	4.5	35	HES		
Miscellaneous Materials										
Gelling Agt		Conc		Surfactant		Conc	Acid Type	Qty	Conc	
Treatment Fld		Conc		Inhibitor		Conc	Sand Type	Size	Qty	
Fluid Data										
Stage/Plug #: 1										
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
1	13 lb/gal Tuned Spacer III	Tuned Spacer III	30	bbl	13	8.93				
		235.92 lbm/bbl								
		33.90 gal/bbl								
BARITE, BULK (100003681)										
FRESH WATER										

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***Cementing Job Summary***

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
2	ExpandaCem B2	EXPANDACEM (TM) SYSTEM	550	sack	13.8	1.67		4	7.72
7.72 Gal		FRESH WATER							
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
3	Fresh Water	Fresh Water	214	bbl	8.3				
Cement Left In Pipe		Amount	ft	Reason			Shoe Joint		
Comment									

### **1.3 Planned Pumping Schedule**

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- 1. Fill Lines with Water**
  - a. Density = 8.33ppg
  - b. Volume = 2bbl
- 2. Pressure Test Lines to 5000psi**
- 3. Pump Tuned Spacer**
  - a. Density = 13 lb/gal
  - b. Volume = 3 bbl
  - c. Rate = 2 bpm
- 4. Drop Bottom Plug**
- 5. Pump ExpandaCem**
  - a. Density = 13.8
  - b. Yield = 1.67
  - c. Water Requirement = 7.72
  - d. Volume = 550 sks (163 bbls)
  - e. Rate = 4 bpm
- 6. Drop Top Plug**
- 7. Start Displacement**
- 8. Pump Displacement MMCR Water**
  - a. Density = 8.33 lb/gal
  - b. Volume = 214 bbls
  - c. Rate = 6 bpm
9. Land Plug – Anticipated Final Circulation Pressure 1460 psi

**Calculated Total Displacement = 214 bbls**

**1.4 Job Overview**

		<b>Units</b>	<b>Description</b>
<b>1</b>	Surface temperature at time of job	°F	
<b>2</b>	Mud type (OBM, WBM, SBM, Water, Brine)	-	
<b>3</b>	Actual mud density	lb/gal	
<b>4</b>	Time circulated before job	HH:MM	
<b>5</b>	Mud volume circulated	Bbls	
<b>6</b>	Rate at which well was circulated	Bpm	
<b>7</b>	Pipe movement during hole circulation	Y/N	
<b>8</b>	Rig pressure while circulating	Psi	
<b>9</b>	Time from end mud circulation to start of job	HH:MM	
<b>10</b>	Pipe movement during cementing	Y/N	
<b>11</b>	Calculated displacement	Bbls	
<b>12</b>	Job displaced by	Rig/HES	
<b>13</b>	Annular before job)?	Y/N	
<b>14</b>	Annular flow after job	Y/N	
<b>15</b>	Length of rat hole	Ft	
<b>16</b>	Units of gas detected while circulating	Units	
<b>17</b>	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		°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

**Submitted Respectfully by:** \_\_\_\_\_

**1.6 Job Event Log**

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	PS Pump Press (psi)	Comb Pump Rate (bbl/min)	DH Density (ppg)	Comment
Event	1	Call Out	Call Out	4/27/2014	13:00:12	USER				called cement crew for encana oil&gas vogl=geist 2b-5h-e267
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/27/2014	15:20:11	USER				discussed route, weather, other traffic, and following distance
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	4/27/2014	15:30:42	USER				called journey and departed for location
Event	4	Arrive At Loc	Arrive At Loc	4/27/2014	16:00:23	USER				ended journey and talked with company rep on volumes rates depths and pressures
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	4/27/2014	16:30:54	USER				discussed team lifting hand placement swing path pinch points
Event	6	Rig-Up Equipment	Rig-Up Equipment	4/27/2014	16:35:23	USER				spot pump and rig up bulk line ground line and water
Event	7	Wait on Customer or Customer Sub-Contractor Equip - Start Time	Wait on Customer or Customer Sub-Contractor Equip - Start Time	4/27/2014	17:30:23	USER				wait for rig and casing crews to finish running casing
Event	8	Pre-Job Safety Meeting	Pre-Job Safety Meeting	4/27/2014	21:45:23	USER	50.00	0.00	9.01	discussed with rig and cement crews on job procedures
Event	9	Rig-Up Completed	Rig-Up Completed	4/27/2014	22:39:35	USER	45.00	0.00	0.78	tied stand pipe into blackhawk cement head
Event	10	Prime Pumps	Prime Pumps	4/27/2014	22:41:23	USER	55.00	1.00	8.47	primed pump and filled lines ready for pressure test
Event	11	Test Lines	Test Lines	4/27/2014	22:48:05	COM1	369.00	0.00	8.35	pressure test pump and lines to
Event	12	Pump Spacer 1	Pump Spacer 1	4/27/2014	22:53:59	COM1	214.00	2.00	13.00	pump 30 bbls tuned spacer III @ 13 ppg
Event	13	Pump Tail Cement	Pump Tail Cement	4/27/2014	23:07:45	COM1	158.00	4.00	13.80	pump 163 bbls (550sks) 13.8 ppg slurry, y: 1.67 ft3/sk w: 7.72 gal/sk
Event	14	Shutdown	Shutdown	4/27/2014	23:48:17	COM1	65.00	0.00	13.80	shutdown to clean lines and for blackhawk hand to drop plug
Event	15	Clean Lines	Clean Lines	4/27/2014	23:48:55	COM1	36.00	0.00	8.33	cleaned pump and lines to haul off pit
Event	16	Pump Water	Pump Water	4/27/2014	23:53:12	USER	52.00	1.80	8.80	pump 3 bbls sugar water ahead of plug
Event	17	Drop Top Plug	Drop Top Plug	4/27/2014	23:55:53	COM1				blackhawk hand dropped wiper plug
Event	18	Pump Water	Pump Water	4/27/2014	23:58:45	USER	46.00	2.00	8.56	pump .5 bbls sugar water
Event	19	Drop Ball	Drop Ball	4/27/2014	23:59:25	USER	46.00	0.00	8.59	blackhawk hand dropped two foam wiper balls

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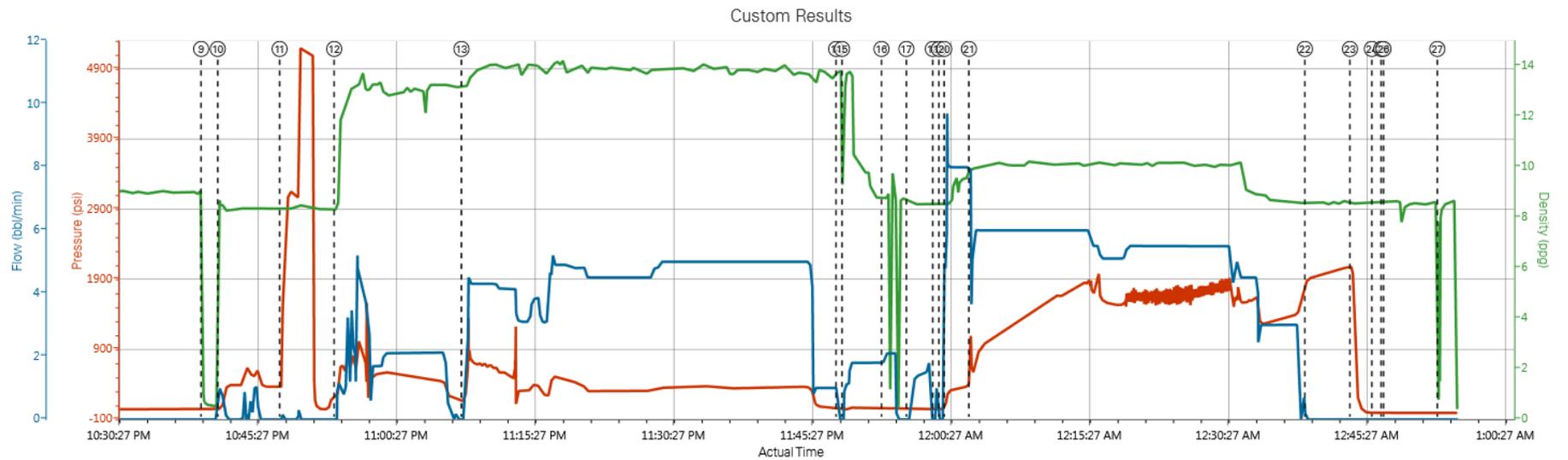
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Case 1

Event	20	Pump Displacement	Pump Displacement	4/27/2014	23:59:59	COM1	214.00	7.40	8.31	pump 6 bbls sugar water 188 bbls brine and 20 bbls water
Event	21	Displ Reached Cmnt	Displ Reached Cmnt	4/28/2014	00:02:39	USER	629.00	4.20	8.33	with 30 bbls displacement reached cement
Event	22	Bump Plug	Bump Plug	4/28/2014	00:39:00	COM1				bumped plug with 1460 psi and took pressure to 1894 psi
Event	23	Check Floats	Check Floats	4/28/2014	00:43:53	USER	2035.00	0.00	8.56	checked floats with 2076 psi floats held with 1.5 bbls back
Event	24	End Job	End Job	4/28/2014	00:46:14	COM1				
Event	25	End Job	End Job	4/28/2014	00:47:15	USER	-5.00	0.00	8.67	job completed
Event	26	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	4/28/2014	00:47:30	USER	-5.00	0.00	8.62	discussed team lifting hand placement swing path pinch points
Event	27	Rig-Down Equipment	Rig-Down Equipment	4/28/2014	00:53:20	USER	-5.00	0.00	3.90	rig down iron and water hoses
Event	28	Rig-Up Completed	Rig-Up Completed	4/28/2014	01:50:02	USER				rig down complete, walk around vehicle
Event	29	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/28/2014	01:55:36	USER				discussed route, weather, other traffic, and following distance
Event	30	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	4/28/2014	02:00:00	USER				thank you for using halliburton energy services

## 2.0 Custom Graphs

### 2.1 Custom Graph



PS Pump Press (psi) DH Density (ppg) Comb Pump Rate (bbl/min)

- |                                                        |                                                                             |                                |                                    |                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------|------------------------------------|-----------------------------------------------------------------|
| ① Call Out n/a;n/a;n/a                                 | ⑦ Wait on Customer or Customer Sub-Contractor Equip - StartTime n/a;n/a;n/a | ⑭ Pump Tail Cement 158;13.26;0 | ⑲ Drop Ball 46;8.59;0              | 25 End Job -5;8.67;0                                            |
| ② Pre-Convoy Safety Meeting n/a;n/a;n/a                | ⑧ Pre-Job Safety Meeting 50;9.01;0                                          | ⑮ Shutdown 65;13.73;0          | 20 Pump Displacement 214;8.61;7.4  | 26 Pre-Rig Down Safety Meeting -5;8.62;0                        |
| ③ Depart from Service Center or Other Site n/a;n/a;n/a | ⑨ Rig-Up Completed 45;0.78;0                                                | ⑯ Clean Lines 36;11.91;1.2     | 21 Displ Reached Cmmt 629;9.91;4.2 | 27 Rig-Down Equipment -5;3.9;0                                  |
| ④ Arrive At Loc n/a;n/a;n/a                            | ⑩ Prime Pumps 55;8.47;1                                                     | ⑰ Pump Water 52;8.8;1.8        | 22 Bump Plug 1895.21;8.56;0        | 28 Rig-Up Completed n/a;n/a;n/a                                 |
| ⑤ Pre-Rig Up Safety Meeting n/a;n/a;n/a                | ⑪ Test Lines 369;8.35;0                                                     | ⑱ Drop Top Plug 52;8.71;0      | 23 Check Floats 2035;8.56;0        | 29 Pre-Convoy Safety Meeting n/a;n/a;n/a                        |
| ⑥ Rig-Up Equipment n/a;n/a;n/a                         | ⑫ Pump Spacer 1 214;8.32;0                                                  | ⑳ Pump Water 46;8.56;0         | 24 End Job -5;8.55;0               | 30 Depart Location for Service Center or Other Site n/a;n/a;n/a |

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### 3.0 Appendix

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