

HALLIBURTON

iCem[®] Service

Encana Oil & Gas (USA) INC. - EBUS

For: Charlie Parker

Date: Wednesday, September 10, 2014

Encana Vogl-Geist 2D-5H-F267

Vogl-Geist 2D-5H-F267

Sincerely,
Sheldon Cotts

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Vogl-Geist 2D-5H-F267** 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

| | Date | Time | Time Zone |
|-----------------------------------|---------|-------|-----------|
| Requested Time On Location | 5/22/14 | 05:00 | MST |
| Call Out | 5/22/14 | 00:00 | MST |
| On Location | 5/22/14 | 04:00 | MST |
| Job Started | 5/22/14 | 08:10 | MST |
| Job Completed | 5/22/14 | 12:08 | MST |
| Depart Location | 5/22/14 | 14:00 | 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 #: 3191324 | | Quote #: | | Sales Order #: 0901350657 | | | | |
| Customer: ENCANA OIL & GAS (USA) INC. - EBUS | | | | Customer Rep: CHARLIE PARKER | | | | | | |
| Well Name: VOGL-GEIST | | | Well #: 2D-5 H-F267 | | | API/UWI #: 05-123-37783-00 | | | | |
| Field: WATTENBERG | | City (SAP): FIR | | County/Parish: WELD | | | State: COLORADO | | | |
| Legal Description: SW NW-5-2N-67W-2597FNL-2353FWL | | | | | | | | | | |
| Contractor: | | | | Rig/Platform Name/Num: H&P 278 | | | | | | |
| Job BOM: 7523 | | | | | | | | | | |
| Well Type: HORIZONTAL OIL | | | | | | | | | | |
| Sales Person: HALAMERICA\HB50180 | | | | | Srvc Supervisor: Christopher Pickell | | | | | |
| Job | | | | | | | | | | |
| Formation Name | | | | | | | | | | |
| Formation Depth (MD) | | Top | | | Bottom | | | | | |
| Form Type | | | | | | | | | | |
| BHST | | | | | | | | | | |
| Job depth MD | | 14488ft | | | Job Depth TVD | | 7179 ft | | | |
| 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 | 6.368 | 23 | | N-80 | 0 | 7641 | 0 | 7179 |
| Casing | | 4.5 | 3.92 | 13.5 | | P-110 | 0 | 14488 | 0 | 7179 |
| Open Hole Section | | | 6.125 | | | | 7641 | 14510 | | |
| Tools and Accessories | | | | | | | | | | |
| Type | Size in | Qty | Make | Depth ft | Type | Size in | Qty | Make | | |
| Guide Shoe | 4.5 | | | | Top Plug | 4.5 | 1 | HES | | |
| Float Shoe | 4.5 | 1 | HES | 14483.2 | Bottom Plug | 4.5 | | HES | | |
| Float Collar | 4.5 | 1 | HES | 14481.9 | SSR plug set | 4.5 | | HES | | |
| Insert Float | 4.5 | 1 | HES | 14480.2 | Plug Container | 4.5 | | HES | | |
| RSI Tool | 4.5 | 1 | HES | 14432.3 | Centralizers | 4.5 | 30 | 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 ft3/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 | | | | |
| 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 | |

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Cementing Job Summary

| | | | | | | | | | |
|----------------------------|-------------------|---------------------------|------------|----------------|---------------------------------------|--------------------------------------|------------------------------|------------------------------|------------------------------------|
| 2 | ExpandaCem B2 | EXPANDACEM (TM) SYSTEM | 545 | 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 ft³/sack | Mix Fluid Gal | Rate bbl/mi n | Total Mix Fluid Gal |
| 3 | Fresh Water | Fresh Water | 218.5 | bbl | 8.3 | | | | |
| Cement Left In Pipe | | Amount | ft | Reason | | | Shoe Joint | | |
| Comment | | | | | | | | | |

1.3 Job Event Log

| Type | Seq. No. | Activity | Graph Label | Date | Time | Source | DH Density (ppg) | PS Pump Press (psi) | Comb Pump Rate (bbl/min) | Comb Pump Total | Comment |
|-------|----------|--------------------------|--------------------------|-----------|----------|--------|------------------|---------------------|--------------------------|-----------------|--|
| Event | 1 | Call Out | Call Out | 5/22/2014 | 00:00:00 | USER | | | | | Crew called out 0000 to be on location at 0500. Crew was Christopher Pickell, Kendall Broom, Keaton Simmons, Jay Gleeson, James Wiley. |
| Event | 2 | Depart Shop for Location | Depart Shop for Location | 5/22/2014 | 03:30:00 | USER | | | | | Safety meeting held for journey. Left they yard for H&P 278 |
| Event | 3 | Arrive At Loc | Arrive At Loc | 5/22/2014 | 04:00:00 | USER | | | | | Arrive at location 1 hour early. Rig had 9 joints left to run |
| Event | 4 | Rig-up Lines | Rig-up Lines | 5/22/2014 | 04:15:00 | USER | | | | | Hazard hunt performed. Rig up planned and excuted. |
| Event | 5 | Safety Meeting - Pre Job | Safety Meeting - Pre Job | 5/22/2014 | 07:30:00 | USER | | | | | Safety meeting held with rig crew to discuss job safety and procedure. |
| Event | 6 | Start Job | Start Job | 5/22/2014 | 08:10:31 | COM5 | | | | | Blackhawk rotating, reciprocating plug container used on job |
| Event | 7 | Test Lines | Test Lines | 5/22/2014 | 08:16:47 | COM5 | 8.33 | 4500 | 1 | 2 | Pressure test lines to 4500 psi. Checked for visible leaks and pressure loss |
| Event | 8 | Pump Spacer 1 | Pump Spacer 1 | 5/22/2014 | 08:21:17 | COM5 | 13 | 750 | 4 | 32 | Pump 30 bbl Tuned Spacer 13 ppg 8.93 cuft/sk 33.9 gal/sk. Deck engine began to shut off at random times while pumping spacer |
| Event | 9 | Pump Cement | Pump Cement | 5/22/2014 | 08:29:06 | COM5 | 13.8 | 1150 | 8 | 194 | Pump 162 bbl Expandacem cement 525 sks 13.8 ppg 1.67 cuft/sk 7.72 gal/sk |
| Event | 10 | Shutdown | Shutdown | 5/22/2014 | 08:58:53 | COM5 | | | | | |
| Event | 11 | Clean Lines | Clean Lines | 5/22/2014 | 08:59:14 | COM5 | | | | | Wash pumps and lines to wash out |

| | | | | | | | | | | | |
|-------|----|--------------------|--------------------|-----------|----------|------|------|---------|------|-------|--|
| Event | 12 | Pump Spacer 1 | Pump Spacer 1 | 5/22/2014 | 09:06:01 | COM5 | 8.33 | 15 | 2.60 | 197 | Pump 3 bbl MMCR water |
| Event | 13 | Shutdown | Shutdown | 5/22/2014 | 09:07:05 | COM5 | | | | | Shutdown for blackhawk to hand to drop plug |
| Event | 14 | Drop Top Plug | Drop Top Plug | 5/22/2014 | 09:07:12 | COM5 | | | | | Plug dropped by blackhawk hand and confirmed dropped by indicator once displacement began |
| Event | 15 | Pump Displacement | Pump Displacement | 5/22/2014 | 09:08:02 | COM5 | 9.5 | 1885 | 6 | 415.5 | Pumped 1/4 bbl MMCR water to launch plug. Wiper balls were dropped and pumped 6.75 bbl MMCR water behind them followed by 193 bbl of brine water and finishing with 18.5 bbl fresh water for a total of 218.5 bbl displacement |
| Event | 16 | Displ Reached Cmnt | Displ Reached Cmnt | 5/22/2014 | 09:12:47 | COM5 | | | | | Displacement reached cement with 22 bbl away |
| Event | 17 | Bump Plug | Bump Plug | 5/22/2014 | 09:51:48 | COM5 | 8.33 | 1855.00 | 3 | | Calculated pressure to land was 800. Plug landed with 1450 psi going 500 psi over to 1855. Pressure fell off immediately to 1250 and continued to drop. |
| Event | 18 | Other | Check Floats | 5/22/2014 | 09:53:08 | COM5 | | 1026.00 | | | Pressure was held for a minute and a half then released at 1026 psi. Floats held, 1 bbl back to tanks. Informed company man we may have a problem having lost over 800 psi. Was determined it could have been the position of the pipe while reciprocating at time of landing plug |
| Event | 19 | Other | Casing Test | 5/22/2014 | 09:56:34 | COM5 | 8.33 | 1553.00 | 2 | 417.5 | Attempted to pressure up to 2500 psi for a 30 minute casing test. Pressure |

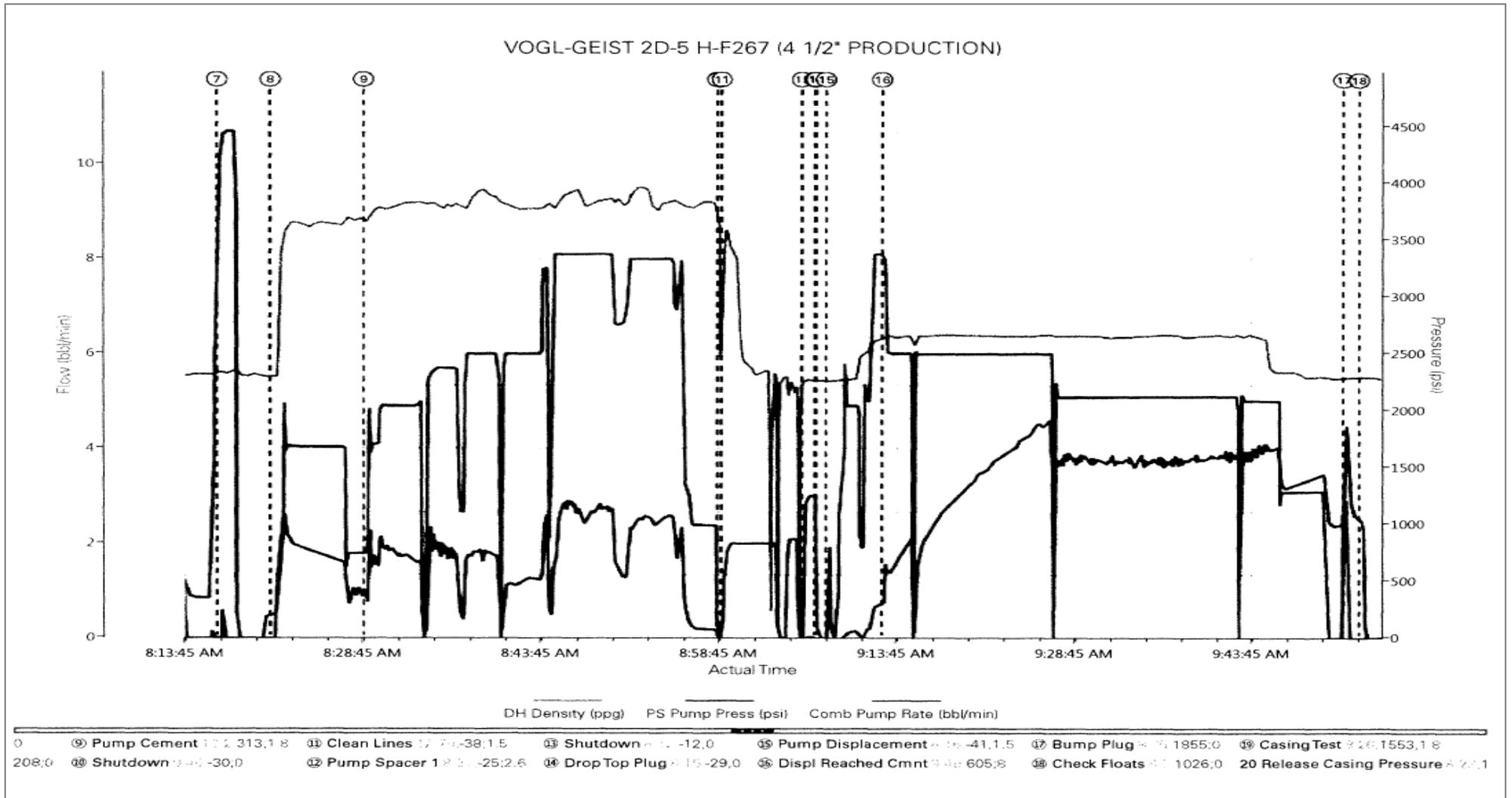
| | | | | | | | | | | | |
|-------|----|-------------------------|-------------------------|-----------|----------|------|------|---------|---|-------|---|
| | | | | | | | | | | | wouldnt exceed 1650 after 2 bbl had been pumped in. Pumps were shutdown. |
| Event | 20 | Release Casing Pressure | Release Casing Pressure | 5/22/2014 | 10:01:21 | USER | | 1087.00 | | | Discussion was held with company rep about possible reasoning why we couldnt pressure up the casing. Casing pressure was released after leveling off at 1087 |
| Event | 21 | Other | Casing Test | 5/22/2014 | 10:13:52 | COM5 | 8.33 | 1772.00 | 2 | 420.5 | After discussing the company rep it was decided possible the very airated brine water could be the cause and more fluid would need to be pumped to achieve the compression needed for 2500 psi. 3 bbl was pumped and 1650 psi was achieved. After shutting down psi leveled off at 1100 |
| Event | 22 | Other | Casing Test | 5/22/2014 | 10:16:30 | COM5 | 8.33 | 1696.00 | 2 | 422.5 | Pumped 1 bbl pressuring up to 1750. After shutting down psi leveled off at 1223. |
| Event | 23 | Other | Casing Test | 5/22/2014 | 10:20:13 | COM5 | 8.33 | 1703.00 | 2 | 423.5 | Pumped 1 bbl pressuring up to 1750. After shutting down psi leveled off at 1243. |
| Event | 24 | Other | Release Casing Pressure | 5/22/2014 | 10:21:57 | COM5 | | 1239.00 | | | Pressure was released and 3/4 bbl came back to tanks |
| Event | 25 | Other | Casing Test | 5/22/2014 | 10:25:20 | COM5 | 8.33 | 1386.00 | 2 | 424 | Pumped 1/2 bbl pressuring up to 1386. Deck engine quit while attempting to pressure up |
| Event | 26 | Other | Casing Test | 5/22/2014 | 10:26:32 | COM5 | 8.33 | 1867.00 | 2 | 424.5 | Restarted engine and pumped 1/2 bbl pressuring up to 1867 psi. Leveled off at 1305. Flow was seen at shakers |

| | | | | | | | | | | | |
|-------|----|-----------------|-------------------------|-----------|----------|------|------|---------|---|-------|--|
| Event | 27 | Other | Casing Test | 5/22/2014 | 10:31:01 | COM5 | 8.33 | 1789.00 | 2 | 425.5 | Pump 1 bbl pressuring up to 1789. Leveled off at 1337. Customer was informed and further pumping could be harmful to the integrity of the cement and possible create micro annulus or cement window. Pumping anymore fluid was ruled out. Flow as seen at shakers |
| Event | 28 | Other | Release Casing Pressure | 5/22/2014 | 10:35:58 | COM5 | | 1337.00 | | | Casing pressure was released, 3/4 bbl back to tanks |
| Event | 29 | Other | Meet with company man | 5/22/2014 | 10:37:41 | USER | | | | | Possible reasons for not being able to achieve casing test were discussed with customer. All possibilities were ruled out other than possible casing collar leak. Release line was shut and psi was monitored on the truck for 15 minutes. 5 psi was gained, likely due to thermal expansion. It was determined nothing further could be done today and HES crew was released from location. |
| Event | 30 | End Job | End Job | 5/22/2014 | 12:08:34 | COM5 | | | | | Good returns throughout the job. Deck engine stopped 5 times while pumping. 4 times not while pumping |
| Event | 31 | Rig Down Lines | Rig Down Lines | 5/22/2014 | 12:10:00 | USER | | | | | Safety meeting was held for rig down. Rigged down all equipment. |
| Event | 32 | Depart Location | Depart Location | 5/22/2014 | 14:00:00 | USER | | | | | Safety meeting was held for jounery. Left location for the yard |

1.4 Planned Pumping Schedule

1. **Fill Lines with Water**
 - a. Density = 8.33 lb/gal
 - b. Volume = 2 bbls
2. **Pressure Test Lines to 4500psi**
3. **Pump Tuned Spacer III**
 - a. Density = 13 lb/gal
 - b. Volume = 30 bbl
 - c. Rate = 4 bpm
4. **Pump ExpandaCem (Primary)**
 - a. Density = 13.8 lb/gal
 - b. Yield = 1.67 ft³/sk
 - c. Water Requirement = 7.72 gal/sk
 - d. Volume = 545 sks (162 bbls)
 - e. Rate = 6.0 bpm
5. **Drop Top Plug**
6. **Start Displacement**
7. **Pump Displacement Water**
 - a. Density = 8.33 lb/gal
 - b. Volume = 218.5 bbls
 - c. Rate = 5.0 bpm
8. **Land Plug – Anticipated Final Circulation Pressure 800 psi**

2.0 Custom Graph



Insert Planned Pump Schedule from Proposal or actual Job Procedure built for job