

# HALLIBURTON

iCem<sup>®</sup> Service

**PDC ENERGY EBUS**

Date: Wednesday, March 14, 2018

**Fern 11U-334 Production**

Job Date: Wednesday, February 28, 2018

Sincerely,

**Julia Nichols**

## Legal Notice

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## 1.0 Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Fern 11U-334** 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.

**No cement or spacer returned to surface.**

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 [Fort Lupton]**

**HALLIBURTON**

*Cementing Job Summary*

*The Road to Excellence Starts with Safety*

Sold To #: 304535		Ship To #: 3791974		Quote #:		Sales Order #: 0904668046																																																										
Customer: PDC ENERGY-EBUS				Customer Rep: Chris																																																												
Well Name: FERN			Well #: 11U-334			API/UWI #: 05-123-44580-00																																																										
Field: WATTENBERG		City (SAP): GREELEY		County/Parish: WELD			State: COLORADO																																																									
Legal Description: NW NW-11-5N-85W-291FNL-689FWL																																																																
Contractor:				Rig/Platform Name/Num: Ensign 152																																																												
Job BOM: 7523 7523																																																																
Well Type: HORIZONTAL OIL																																																																
Sales Person: HALAMERICA\HX38199					Srcv Supervisor: Steven Markovich																																																											
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Form Type																																																																
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**HALLIBURTON**

*Cementing Job Summary*

2	CLEANSPACE R III	CLEANSPACER III	50	bbl	12	2.27			
0 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
3	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	1837	sack	13.2	1.57		6	7.52
7.52 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
4	MMCR Displacement	MMCR Displacement	50	bbl	8.34				
0.25 gal/bbl		MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)							
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
5	Displacement fluid		281	bbl	8.34				
<p><b>Comment</b> Pumped plug at 331bbls away, final lifting pressure was 2607psi. Kicked in pumps at 2bbls/min to shear WSS, WSS sheered at 4004psi then brought up rate to 4bbl/min and pumped a 5bbl wet shoe. Choked floats and after 1.5bbls back floats held. Estimated Top of Cement 2429' Estimated Top of Spacer 1267'</p>									

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density <i>(ppg)</i>	DS Pump Press <i>(psi)</i>	Comb Pump Rate <i>(bbl/min)</i>	Comments
Event	1	Call Out	Call Out	2/27/2018	22:00:00	USER				Job called out with an on location time of 03:00
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/28/2018	01:30:00	USER				JSA with HES crew on driving safety and route to rig.
Event	3	Arrive at Location from Service Center	Arrive at Location from Service Center	2/28/2018	02:45:00	USER				Arrived on location, rig was circulating. Rig was going to circulate till 04:30.
Event	4	Safety Meeting - Assessment of Location	Safety Meeting - Assessment of Location	2/28/2018	02:55:00	USER				JSA and Hazard hunt with HES crew.
Event	5	Rig-Up Equipment	Rig-Up Equipment	2/28/2018	03:00:00	USER				Rigged up HES lines and equipment.
Event	6	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/28/2018	04:45:00	USER	0.02	31.00	0.00	Safety meeting with HES and rig crew on job safety and procedure.
Event	7	Start Job	Start Job	2/28/2018	05:07:25	COM4	8.41	44.00	0.00	TD 15027' TP 15017' WSS 15014' 5 1/2" 20# production casing, 8 1/2" open hole 9 5/8" 36# surface casing at 1633'
Event	8	Test Lines	Test Lines	2/28/2018	05:14:11	COM4	8.61	4628.00	0.00	Set kick outs to 500psi and check kick outs, then bring pressure up to 4500psi and hold.
Event	9	Pump Spacer 1	Pump Spacer 1	2/28/2018	05:16:36	COM4	8.45	61.00	0.00	Pump 50bbbls of Mud Flush. Pumped at 4bbl/min 594psi.
Event	10	Pump Spacer 2	Pump Spacer 2	2/28/2018	05:36:34	COM4	12.35	789.00	4.00	Pump 50bbbls of 12ppg 2.27yield Tuned Spacer. Pumped at 4bbl/min 805psi.
Event	11	Check Weight	Check weight	2/28/2018	05:37:34	COM4	12.43	797.00	3.90	Weight verified by pressurized scales.
Event	12	Pump Lead Cement	Pump Lead Cement	2/28/2018	05:48:48	COM4	13.34	540.00	3.50	Pump 513bbbls (1837sks) of 13.2ppg 1.57yield cement. Pumped at 7bbl/min 635psi.
Event	13	Check Weight	Check weight	2/28/2018	05:49:32	COM4	13.37	569.00	4.80	Weight verified by pressurized scales.
Event	14	Check Weight	Check weight	2/28/2018	05:58:06	COM4	13.22	444.00	6.80	Weight verified by pressurized scales.
Event	15	Check Weight	Check weight	2/28/2018	06:23:23	COM4	13.27	480.00	7.00	Weight verified by pressurized scales.

Event	16	Check Weight	Check weight	2/28/2018	06:25:28	COM4	13.24	461.00	7.00	Weight verified by pressurized scales.
Event	17	Shutdown	Shutdown	2/28/2018	07:08:04	COM4	14.13	67.00	0.00	Shutdown and clean pumps and lines.
Event	18	Drop Top Plug	Drop Top Plug	2/28/2018	07:25:58	COM4	-1.10	51.00	2.50	Plug loaded and dropped in front of company rep and tool hand.
Event	19	Pump Displacement	Pump Displacement	2/28/2018	07:26:01	COM4	-1.10	51.00	2.50	Pump 331bbls of H2O. First 50bbls with MMCR then added biocide and clay web the rest of displacement. Pumped at 7.5bbl/min and slowed rate with pressure increase.
Event	20	Bump Plug	Bump Plug	2/28/2018	08:16:16	COM4	8.31	2634.00	4.00	Bumped plug at 331bbls away, final lifting pressure was 2607psi. Brought pressure 500psi over and held.
Event	21	Other	Other	2/28/2018	08:20:01	USER	8.32	3038.00	0.00	Kicked in pumps at 2bbl/min to shear WSS. WSS sheered at 4004psi. Picked up rate to 4bbl/min and pumped a 5bbl wet shoe.
Event	22	End Job	End Job	2/28/2018	08:23:22	COM4	8.23	57.00	0.00	Thank you Steve Markovich and Crew.