

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

Challenger 3N Production

Sincerely,
Meghan Jacobs

Legal Notice

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Challenger 3N** 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.

Approximately 100 bbls of spacer were 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

The Road to Excellence Starts with Safety

Sold To #: 304535		Ship To #: 3839665		Quote #:		Sales Order #: 0905474226					
Customer: PDC ENERGY-EBUS				Customer Rep: Tony B							
Well Name: CHALLENGER			Well #: 3N		API/UWI #: 05-123-45889-00						
Field: WATTENBERG		City (SAP): KERSEY		County/Parish: WELD		State: COLORADO					
Legal Description: SE NW-8-4N-64W-1358FNL-2431FWL											
Contractor: ENSIGN DRLG				Rig/Platform Name/Num: ENSIGN 152							
Job BOM: 7523 7523											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\HX38199				Srv Supervisor: Nicholas Cummins							
Job											
Formation Name											
Formation Depth (MD)		Top	1629ft		Bottom	14040ft					
Form Type				BHST							
Job depth MD		13582ft		Job Depth TVD		6814					
Water Depth				Wk Ht Above Floor		4ft					
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	1629			
Casing		5.5	4.778	20			0	13582		0	
Open Hole Section			8.5				1629	6700			
Open Hole Section			8.5				6700	14213			
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	5.5	1	WTHR	13582		Top Plug	5.5	1	WTHR		
Float Shoe	5.5					Bottom Plug	5.5	1	WTHR		
Float Collar	5.5	1	WTHR	13553		SSR plug set	5.5				
Insert Float	5.5					Plug Container	5.5	1	HES		
Stage Tool	5.5					Centralizers	5.5	198			
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	12.5 lb/gal Tuned Spacer III	Tuned Spacer III	150	bbl	12.5	2.72	16.8	6		
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	Gasstop B1	GASSTOP (TM) SYSTEM	625	sack	13.2	1.55	7.61	8		
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	ElastiCem	ELASTICEM (TM) SYSTEM	1043	sack	14.4	1.7	7.3	8		
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	20	bbl	8.34			8		
0.50 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		280	bbl	8.34			8		
Cement Left In Pipe		Amount	0 ft		Reason			Wet Shoe		
Mix Water:		pH 7	Mix Water Chloride:			<300 ppm		Mix Water Temperature:		65 °F
Cement Temperature:		64 °F	Plug Displaced by:			8.33 lb/gal		Disp. Temperature:		65 °F
Plug Bumped?		Yes	Bump Pressure:			2359 psi		Floats Held?		Yes
Cement Returns:		0 bbl	Returns Density:			12.5 lb/gal		Returns Temperature:		## °F
Comment										

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Comments
Event	1	Call Out	Call Out	2/11/2019	18:00:00	USER				The crew was called out on 2/11/19 at 1800. The customer requested HES on location at 2200 on 2/11/19, RTP 0200.
Event	2	Depart from Service Center or Other Site	Depart from Service Center or Other Site	2/11/2019	20:45:00	USER				The crew held a pre journey safety meeting discussing the route and potential hazards while driving The supervisor called in a journey. The crew departed service center.
Event	3	Arrive at Location from Service Center	Arrive at Location from Service Center	2/11/2019	21:05:00	USER				The crew arrived on location safely. The rig was still running casing. The supervisor met with the Company man and received numbers. TD 14,040', TP 13,582' 5 1/2" 20# P-110, FC 13,533', PC 1,629' 9 5/8" 36# J-55, TVD 6,814', OH 8 1/2", Mud 8.5 ppg.
Event	4	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	2/11/2019	21:15:00	USER				Crew discussed all potential hazards on location.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/11/2019	22:30:00	USER				Crew held a safety meeting discussing the rig up procedure. Also all potential hazards associated with rigging up all HES equipment and lines.
Event	6	Rig-Up Equipment	Rig-Up Equipment	2/11/2019	22:40:00	USER				The crew rigged up all HES equipment and lines.
Event	7	Rig-Up Completed	Rig-Up Completed	2/12/2019	02:00:00	USER				Rig up completed, no one got hurt.
Event	8	Safety Meeting - Pre Job	Safety Meeting - Pre Job	2/12/2019	14:30:00	USER	-2.00	0.00	0.00	The crew and all personal involved with cement job discussed all potential hazards associated with job. Followed by the job procedure to ensure everyone understood the plan of action
Event	9	Start Job	Start Job	2/12/2019	15:19:08	COM1	-7.00	8.65	0.00	Started recording data from 11360070.
Event	10	Other	Fill Lines	2/12/2019	15:20:03	COM1	-5.00	8.64	0.00	We filled lines with 3 bbls of water at 3 bpm, pressure was at 170 psi.
Event	11	Test Lines	Test Lines	2/12/2019	15:25:25	COM1	162.00	8.62	0.00	We pressure tested all HES lines to 6,500 psi. The pressure test passed.

Event	12	Pump Spacer 1	Pump Spacer 1	2/12/2019	15:36:55	COM1	382.00	12.43	1.60	We pumped 150 bbls of spacer at 6 bpm, pressure was at 650 psi. 12.5 ppg 2.72 yield 16.8 gal/sk. We verified density using pressurized scales.
Event	13	Drop Bottom Plug	Drop Bottom Plug	2/12/2019	16:02:40	COM1	82.00	12.37	2.80	Tool hand and driller watched bottom plug drop.
Event	14	Pump Lead Cement	Pump Lead Cement	2/12/2019	16:05:17	COM1	225.00	13.44	4.50	We pumped 173 bbls (625sks) of lead cement at 8 bpm, pressure at 560 psi. 13.2 ppg 1.55 yield 7.61 gal/sk. We used pressurized scales to verify density.
Event	15	Pump Tail Cement	Pump Tail Cement	2/12/2019	16:31:43	COM1	723.00	14.39	7.60	We pumped 316 bbls (1043 sks) of tail cement at 8 bpm, pressure was at 780 psi. 14.4 ppg 1.70 yield 7.30 gal/sk. We used pressurized scales to verify density.
Event	16	Shutdown	Shutdown	2/12/2019	17:17:26	COM1	42.00	14.92	0.00	Shutdown to load top plug and blow air from the rig floor to wash up tank. Then washed pumps and lines to wash up tank.
Event	17	Drop Top Plug	Drop Top Plug	2/12/2019	17:28:53	COM1	-2.00	-0.45	0.00	Company man, Tool hand, and Driller witnessed plug drop.
Event	18	Pump Displacement	Pump Displacement	2/12/2019	17:28:57	COM1	-3.00	-0.46	0.00	
Event	19	Bump Plug	Bump Plug	2/12/2019	18:38:38	COM1	2760.00	8.14	0.00	We bumped the plug, final circulating pressure was 2,359 psi. We pressured up to 2,900 before shutting down for a 5 min casing test.
Event	20	Other	Pressure up	2/12/2019	18:46:11	COM1	3552.00	8.15	1.70	We pressured up to 3,826 psi at 2 bpm to shift wet shoe sub. The proceeded to pump a 6 bbl wet shoe at 3.4 bpm.
Event	21	Other	Check Floats	2/12/2019	18:49:41	COM1	93.00	8.12	0.00	Released pressure to check floats, floats held 2 bbls back.
Event	22	End Job	End Job	2/12/2019	18:50:59	COM1	0.00	8.11	0.00	We estimated 100 bbls of spacer to surface. Estimated TOC 2,020'.
Event	23	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	2/12/2019	18:55:00	USER	225.00	8.06	9.30	Crew held a safety meeting discussing the rig down procedure. Also all potential hazards associated with rigging down all HES equipment and lines.
Event	24	Rig-Down Equipment	Rig-Down Equipment	2/12/2019	19:00:00	USER	3.00	8.10	0.00	The crew rigged down all HES equipment and lines.
Event	25	Rig-Down Completed	Rig-Down Completed	2/12/2019	20:45:00	USER				Rig down completed no one got hurt.
Event	26	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/12/2019	21:00:00	USER				The crew held a pre journey safety meeting discussing the route and potential hazards while driving The supervisor called in a journey.

Event	27	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	2/12/2019	21:05:00	USER	Nick Cummins and crew would like to thank you for your business, and choosing Halliburton Cement! Please feel free to call if you have any questions.
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