

HALLIBURTON

iCem[®] Service

PDC ENERGY-EBUS

Date: Thursday, February 21, 2019

Challenger 2N Production

Job Date: Thursday, February 07, 2019

Sincerely,

Bryce Hinsch

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 2N** 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 54 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 #: 3839596	Quote #:	Sales Order #: 0905464529
Customer: PDC ENERGY-EBUS		Customer Rep: Chris McMullin	
Well Name: CHALLENGER		Well #: 2N	API/UWI #: 05-123-45891-00
Field: WATTENBERG	City (SAP): KERSEY	County/Parish: WELD	State: COLORADO
Legal Description: SE NW-8-4N-64W-1343FNL-2431FWL			
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 152	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HX38199		Srvc Supervisor: Kamereon White	

Job

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type	BHST		
Job depth MD	14213ft		Job Depth TVD
Water Depth			Wk Ht Above Floor 5
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	1678		0
Casing		5.5	4.778	20			0	14193		0
Open Hole Section			8.5				1678	6904	0	0
Open Hole Section			8.5				6904	14193	0	0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
					Top Plug	5.5	1	WTHR
Float Shoe	5.5	1		14193	Bottom Plug	5.5	1	WTHR
Float Collar	5.5	1		14165				
					Plug Container	5.5	1	HES
					Centralizers	5.5	201	

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			

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		6	7.61	
3	ElastiCem	ELASTICEM (TM) SYSTEM	1064	sack	14.4	1.7		8	7.3	
4	MMCR Displacement	MMCR Displacement	20	bbl	8.34					
0.50 gal/bbl		MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)								
5	Displacement fluid		294	bbl	8.34					
Cement Left In Pipe		Amount	28 ft	Reason			Shoe Joint			
Mix Water:		pH 7	Mix Water Chloride: < 400 ppm			Mix Water Temperature: 74 °F				
		Plug Displaced by:			8.33 lb/gal					
Plug Bumped?		Yes	Bump Pressure:			3250 psi			Floats Held?	Yes
Spacer Returns:		54 bbl	Returns Density:			12.5 lb/gal				
Comment										

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	Call Out	2/6/2019	05:30:00	USER					Crew called out and was requested to be on location @ 11:00.
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	2/6/2019	10:00:00	USER					Crew discussed the route of travel and supervisor called in a journey. Had to get approval because of the weather.
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	2/6/2019	10:20:00	USER					Crew left the yard.
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	2/6/2019	11:15:00	USER					Crew arrived on location early and the rig was running casing.
Event	5	Safety Meeting - Assessment of Location	Safety Meeting - Assessment of Location	2/6/2019	11:30:00	USER					Spotting in trucks and supervisor met with the customer and got the well information. TD-14,200' TP-14,193' SJ-28' FC-14,165' Cas-5.5" 20# P110 PC-9.625" 36# Set @ 1678' Mud Weight-10.7 ppg WBM, Wet Shoe- 5 Bbls TVD-6904' OH-8.5."
Event	6	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/6/2019	11:40:00	USER					Discussed rig up procedure and signed the JSA.
Event	7	Rig-Up Equipment	Rig-Up Equipment	2/6/2019	11:50:00	USER					Rigged up all HES equipment and lines.
Event	8	Casing on Bottom	Casing on Bottom	2/6/2019	13:00:00	USER					Casing on Bottom with the landing joint. The rig

											circulated 4 bottoms up it took 3:45 @ 10.5 bpm.
Event	9	Rig-Up Completed	Rig-Up Completed	2/6/2019	13:00:00	USER					All HES equipment and lines rigged up safely.
Event	10	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/6/2019	18:30:00	USER	5.00	8.06	0.00	0.30	Discussed the job procedure and pressures with all personnel involved with the cement job.
Event	11	Other	Other	2/6/2019	18:40:00	USER	5.00	8.07	0.00	0.30	First attempt to fill lines, after we broke the rigs hose off from circulating the well, we tied our line up to the manifold and the pump was primed up and ready to pump. When i opened the bottom valve to start filling the lines, the WBM hydrostatic fed back through our standpipe all the way to the wash up tank.
Event	12	Other	Other	2/6/2019	18:45:00	USER	7.00	8.74	0.00	0.40	Attempted to thaw pump truck and iron using rig heater and steam line.
Event	13	Other	Other	2/6/2019	19:00:00	USER	11.00	8.74	0.00	0.40	The Halliburton rep went and talked to the customer about possible issues, and discussed proper procedures to get this issue resolved, We ended up rigging down HES line to rig up the rigs hose to continue to circulate the well while we resolved the issues.
Event	14	Other	Other	2/6/2019	19:30:00	USER	5.00	8.98	0.00	0.50	Co.man verified 1500 bbls of fresh water on location.
Event	15	Other	Other	2/7/2019	00:26:00	USER	81.00	8.38	0.00	232.20	The vac truck showed up to

											start pulling the Latex out of the the Latex upright.
Event	16	Other	Other	2/7/2019	03:00:00	USER					Rigged all the un frozen iron back up to the rig floor.
Event	17	Other	Other	2/7/2019	04:00:00	USER					The soft side trailer with the New Latex showed up on location.
Event	18	Other	Other	2/7/2019	04:15:00	USER					Started mixing up Latex in the Latex Upright tank.
Event	19	Other	Other	2/7/2019	05:00:00	USER					Vac truck completed his tasks for Halliburton and sucked the wash up tank out for the cement job.
Event	20	Start Job	Start Job	2/7/2019	06:23:47	COM4	2.00	0.02	0.00	281.20	Started recording data.
Event	21	Prime Pumps	Prime Pumps	2/7/2019	06:41:02	COM4	2.00	4.27	0.00	281.20	Primed pumps and lines.
Event	22	Other	Other	2/7/2019	06:46:42	COM4	0.00	17.70	0.80	289.40	Filled the lines with 2 bbls of water 3 bpm 110 psi.
Event	23	Test Lines	Test Lines	2/7/2019	06:48:53	COM4	4188.00	8.59	0.00	291.10	Tested to 4500 psi and held for 30 sec due to the sub zero tempatures. No leaks.
Event	24	Pump Spacer 1	Pump Spacer 1	2/7/2019	06:53:05	COM4	121.00	8.50	0.00	291.10	Pumped 150 bbls of tuned spacer III @ 12.5 ppg 2.72 yield 16.8 gal/sk 6 bpm 450 psi.
Event	25	Check Weight	Check Weight	2/7/2019	06:55:18	COM4	274.00	10.85	1.90	3.60	Checked the weight of the tuned spacer with the pressurized mud scales, scaled @ 12.5 ppg.
Event	26	Drop Bottom Plug	Drop Bottom Plug	2/7/2019	07:18:57	COM4	375.00	12.54	6.20	141.50	Dropped the bottom plug on the fly @ 140 bbls gone into spacer.
Event	27	Pump Lead Cement	Pump Lead Cement	2/7/2019	07:24:39	COM4	320.00	13.42	5.00	162.00	Pumped 173 bbls of Latex lead cement @ 13.2 ppg 1.55 yield 7.61 Gal/sk (625

Event	Time	Activity	Notes	Date	Time	Location	Volume	Pressure	Flow	Weight	Description
											sks) 6 bpm 640 psi.
Event	28	Check Weight	Check Weight	2/7/2019	07:24:46	COM4	324.00	13.44	5.00	0.60	Checked the weight of the Latex Lead Cement with the pressurized mud scales, scaled @ 13.2 ppg.
Event	29	Check Weight	Check Weight	2/7/2019	07:29:05	COM4	623.00	13.38	7.20	29.80	Checked the weight of the Latex Lead Cement with the pressurized mud scales, scaled @ 13.3 ppg.
Event	30	Pump Tail Cement	Pump Tail Cement	2/7/2019	08:06:24	COM4	730.00	14.64	6.20	24.70	Pumped 322 bbls of Tail Cement @ 8 bpm 870 psi. 14.4 ppg, 1.7 yield 7.3 gal/sk (1064 sks).
Event	31	Check Weight	Check Weight	2/7/2019	08:13:42	COM4	406.00	14.57	4.10	56.80	Checked the weight of the Tail Cement with the pressurized mud scales, scaled @ 14.4 ppg.
Event	32	Shutdown	Shutdown	2/7/2019	09:04:16	COM4	80.00	7.63	3.00	372.30	Shutdown to wash pumps and lines to the wash up tank.
Event	33	Drop Top Plug	Drop Top Plug	2/7/2019	09:10:18	COM4	68.00	7.65	0.00	376.20	The Customer, Weatherford, Halliburton rep witnessed the top plug being loaded and dropped.
Event	34	Pump Displacement	Pump Displacement	2/7/2019	09:10:23	COM4	66.00	7.68	0.00	376.20	Pumped 314 bbls of water for displacement with the first 20 bbls with MMCR and then we used SASWAW 3025 Water Treatment that the rig supplied for the remainder of displacement and left the last 20 bbls fresh.
Event	35	Displ Reached Cement	Displ Reached Cement	2/7/2019	09:15:02	COM4	1126.00	7.76	9.50	21.80	@ 22 bbls into displacement we caught the plug.
Event	36	Bump Plug	Bump Plug	2/7/2019	10:13:15	COM4	3245.00	8.28	0.00	341.40	Bumped the plug on

											calculated displacement, The final circulating psi was 2850 psi and took 500 psi over to 3250 psi and shutdown the pump.
Event	37	Other	Other	2/7/2019	10:14:16	COM4	3358.00	8.27	0.00	341.40	Pressured up to rupture the disk and to shift the wet shoe sub,it shifted @ 4200 psi and pumped a 5 bbl wet shoe.
Event	38	Other	Other	2/7/2019	10:15:14	COM4	3194.00	8.31	4.80	343.30	Checked the floats and the floats held, we got 3 bbls back.
Event	39	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	2/7/2019	10:20:00	USER	22.00	8.17	0.00	348.00	Crew held a safety meeting discussing the rig down and flush stack procedure. Also all potential hazards associated with rigging down all HES equipment and lines.
Event	40	Rig Down Lines	Rig Down Lines	2/7/2019	10:25:00	USER	21.00	5.64	0.00	348.00	The crew rigged down all HES equipment and lines.
Event	41	Rig-Down Completed	Rig-Down Completed	2/7/2019	11:30:00	USER					Rig down completed no one got hurt.
Event	42	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/7/2019	11:50:00	USER					The crew held a pre journey safety meeting discussing the route and potential hazards while driving. The supervisor called in a journey.
Event	43	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	2/7/2019	12:00:00	USER					Kamereon White and crew would like to thank you for your business and choosing Halliburton Cement. If you have any questions please feel free to call.