

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

J Clark 5N 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 **J Clark 5N** 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 50bbls of 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 [Ft. Lupton]

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 304535	Ship To #: 3870496	Quote #: 0022474897	Sales Order #: 0905051797							
Customer: PDC ENERGY-EBUS		Customer Rep: Chris McMullen								
Well Name: J CLARK	Well #: 5N	API/UWI #: 05-123-46694-00								
Field: WATTENBERG	City (SAP): GREELEY	County/Parish: WELD	State: COLORADO							
Legal Description: NW NE-14-5N-65W-550FNL-2114FEL										
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 152								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HX38199		Srv Supervisor: Nicholas Roles								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type	BHST									
Job depth MD	12314ft	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		9.625	8.921	36			0	1675		1675
Casing		5.5	4.778	20			0	12314		6872
Open Hole Section			8.5				1675	6333	1675	6333
Open Hole Section			8.5				6333	12322	6333	6872
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5			12314		Top Plug	5.5	1	WTH	
Float Shoe	5.5					Bottom Plug	5.5	1	WTH	
Float Collar	5.5					SSR plug set	5.5		HES	
Insert Float	5.5					Plug Container	5.5	1	HES	
Stage Tool	5.5					Centralizers	5.5		HES	
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	11.1 lb/gal Tuned Spacer III	Tuned Spacer III	150	bbl	11.1	4.5		8		
Fluid #										
2	HalCem	HALCEM (TM) SYSTEM	815	sack	15.6	1.18		8	5.15	

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Cementing Job Summary

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	808	sack	14.4	1.7		8	7.3		
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	30	bbl	8.34			5			
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	Water	242	bbl	8.34			8			
Cement Left In Pipe		Amount	34 ft		Reason				Shoe Joint		
Mix Water:		pH 6	Mix Water Chloride:			0 ppm		Mix Water Temperature:		68 °F °C	
Cement Temperature:		## °F	Plug Displaced by:			8.33 lb/gal		Disp. Temperature:		68 °F °C	
Plug Bumped?		Yes	Bump Pressure:			3100 psi MPa		Floats Held?		Yes	
Spacer Returns:		50 bbl m3	Returns Density:			## lb/gal kg/m3		Returns Temperature:		## °F °C	
Comment Got 50bbbls Spacer to surface.											

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	Comments
Event	1	Call Out	Call Out	8/9/2018	10:00:00	USER				Called out by Service Coordinator for O/L at 1700
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	8/9/2018	15:15:00	USER				Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive.
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	8/9/2018	15:30:00	USER				Journey Management prior to departure
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	8/9/2018	16:00:00	USER				Upon arrival met with company man to discuss job details and calculations, performed hazard hunt and site assessment.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	8/9/2018	16:15:00	USER				Discussed rigging up hazards and procedure according to HMS.
Event	6	Other	Other	8/9/2018	16:30:00	USER				Water test- PH-6, Chlor-0, Temp-85.
Event	7	Safety Meeting - Pre Job	Safety Meeting - Pre Job	8/9/2018	20:00:00	USER	8.48	0.00	-1.00	Held safety meeting with all job associated personnel to discuss job procedure, hazards and stop work authority.
Event	8	Start Job	Start Job	8/9/2018	20:25:43	COM4	8.09	0.00	-1.00	TD-12322', TP-12314' 5.5" 20#, FC-12299, SEAT-12279', TVD-6872', OH-8.5", SURF-1675' 9.625" 36#, MUD-8.5#
Event	9	Test Lines	Test Lines	8/9/2018	20:28:36	COM4	8.34	0.00	61.00	Pumped 5bbls fresh water to fill lines, closed manifold and performed 500psi k/o function test, proceeded to perform 5th gear stall at 1450psi, continued to bring pressure up to 5000psi. Pressure stabilized and held with no leaks.
Event	10	Pump Spacer 1	Pump Spacer 1	8/9/2018	20:38:23	COM4	11.20	3.90	443.00	Pumped 150bbls of 11.1# 4.5y 29.4g/s Tuned Spacer at 5bpm 643psi.
Event	11	Check Weight	Check Weight	8/9/2018	20:49:26	COM4	11.08	8.10	717.00	Weight verified with pressurized mud scales.

Event	12	Drop Bottom Plug	Drop Bottom Plug	8/9/2018	20:54:40	COM4	11.15	8.10	733.00	Dropped by HES supervisor, witnessed by company man.
Event	13	Pump Lead Cement	Pump Lead Cement	8/9/2018	20:58:12	COM4	15.54	8.10	867.00	Pumped 815sks or 171bbbls 15.6# 1.18y 5.15g/s Halcem at 8bpm 630psi.
Event	14	Check Weight	Check Weight	8/9/2018	21:05:28	COM4	15.60	8.00	518.00	Weight verified with pressurized mud scales.
Event	15	Check Weight	Check Weight	8/9/2018	21:18:22	COM4	15.46	7.90	667.00	Weight verified with pressurized mud scales.
Event	16	Pump Tail Cement	Pump Tail Cement	8/9/2018	21:23:37	COM4	14.77	7.90	580.00	Pumped 808sks or 244bbbls 14.4# 1.7y 7.3g/s Elasticem at 8bpm 710psi
Event	17	Check Weight	Check Weight	8/9/2018	21:32:51	COM4	14.40	7.90	589.00	Weight verified with pressurized mud scales.
Event	18	Shutdown	Shutdown	8/9/2018	21:59:07	COM4	13.77	0.00	16.00	Rig blew down iron to wash up pit, once clean, pumped 10bbbls fresh water to clean through pumps and lines.
Event	19	Drop Top Plug	Drop Top Plug	8/9/2018	22:08:05	COM4	7.90	0.00	15.00	Dropped by HES supervisor, witnessed by company man.
Event	20	Pump Displacement	Pump Displacement	8/9/2018	22:08:10	COM4	8.07	0.00	8.00	Pumped 272bbbls fresh water with 15g MMCR in first 30bbbls, 5g biocide throughout.
Event	21	Bump Plug	Bump Plug	8/9/2018	22:56:06	COM4	8.48	0.00	3052.00	Slowed down to 3bpm at 240bbbls away. final circulating pressure-2600psi, bump pressure-3100psi
Event	22	Pressure Up Well	Pressure Up Well	8/9/2018	22:57:45	COM4	8.48	0.00	3113.00	Pressured up to sheer at 4200psi, continued to pump 5bbbls at 4bpm 2700psi.
Event	23	Check Floats	Check Floats	8/9/2018	23:00:18	USER	8.46	0.00	2369.00	Released pressure and got 2bbbls back to pump. Floats held.
Event	24	End Job	End Job	8/9/2018	23:02:05	COM4				Got 50bbbls spacer to surface.
Event	25	Safety Meeting - Pre Rig-Down	Safety Meeting - Pre Rig-Down	8/9/2018	23:15:00	USER	8.42	5.50	118.00	All HSE present. Discussed red zone areas and trapped pressure hazards. Watch for suspended loads and rig down procedures, including hand placement, lifting techniques, and swing radius.
Event	26	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	8/10/2018	01:00:00	USER				Pre journey management prior to departure.
Event	27	Pre-Convoy Safety	Pre-Convoy Safety	8/10/2018	04:50:00	USER				All HSE present and fit to drive. Aware of directions

Meeting

Meeting

and hazards.
