

HALLIBURTON

iCem[®] Service

PDC ENERGY EBUS

Date: Wednesday, March 07, 2018

FERN 11U-204 PRODUCTION

Job Date: Wednesday, February 14, 2018

Sincerely,
Julia Nichols

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Fern 11U-204** 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 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]

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*Cementing Job Summary**The Road to Excellence Starts with Safety*

Sold To #: 304535	Ship To #: 3792019	Quote #:	Sales Order #: 0904641229							
Customer: PDC ENERGY-EBUS		Customer Rep: .								
Well Name: FERN	Well #: 11U-204	API/UWI #: 05-123-44588-00								
Field: WATTENBERG	City (SAP): GREELEY	County/Parish: WELD	State: COLORADO							
Legal Description: NW NW-11-5N-85W-261FNL-889FWL										
Contractor:		Rig/Platform Name/Num: Ensign 152								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HX38199		Srvc Supervisor: Jordan Larue								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type		BHST								
Job depth MD	14964ft	Job Depth TVD	8726							
Water Depth		Wk Ht Above Floor	4							
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	1633	0	
Casing	0	5.5	4.778	20	BUTTRESS	HCP110	0	14960	0	
Open Hole Section			8.5				1633	14964		
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5	1	WF	14960		Top Plug	5.5	1	WF	
Float Shoe	5.5					Bottom Plug	5.5		HES	
Float Collar	5.5	1	WF	14925		SSR plug set	5.5		HES	
Insert Float	5.5	1	WF	14926		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	Mud Flush III (Powder)	Mud Flush III	50	bbl	8.4			5		
42 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	

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Cementing Job Summary

2	CLEANSPLACE R III	CLEANSPACER III	50	bbl	12	2.27	12.4	5	
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/mi n	Total Mix Fluid Gal
3	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	1818	sack	13.2	1.57	7.52	7	7.52
7.52 Gal		FRESH WATER							
0.40 %		HALAD(R)-344, 50 LB (100003670)							
0.35 %		HR-5, 50 LB SK (100005050)							
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
4	MMCR Displacement	MMCR Displacement	50	bbl	8.34			8	
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/mi n	Total Mix Fluid Gal
5	Displacement fluid	H2O-BIocide	282	bbl	8.34			8	
Cement Left In Pipe		Amount	0 ft			Reason		WET Shoe Joint	
Mix Water:		pH 7	Mix Water Chloride:			200 ppm	Mix Water Temperature:		72 °F °C
Cement Temperature:		## °F °C	Plug Displaced by:			## lb/gal kg/m3 XXXX	Disp. Temperature:		## °F °C
Plug Bumped?		Yes	Bump Pressure:			2750 psi MPa	Floats Held?		Yes 1.5BBLs BACK
Cement Returns:		## bbl m3	Returns Density:			## lb/gal kg/m3	Returns Temperature:		## °F °C
Comment BUMPED ON CALC... EST TOP CMT 2513'									

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Driv-Side Pump Pressure (psi)	Downhole Density (ppg)	Combined Pump Rate (bbl/min)	Comments
Event	1	Call Out	Call Out	2/14/2018	17:00:00	USER				REQUESTED LOC TIME 1000
Event	2	Arrive at Location from Service Center	Arrive at Location from Service Center	2/14/2018	21:55:00	USER				CHECK IN WITH CO MAN
Event	3	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	2/14/2018	22:00:00	USER				RIG CIRC ON BOTTOM
Event	4	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/14/2018	22:05:00	USER				REVIEW JSA DISCUSS HAZARDS
Event	5	Rig-Up Equipment	Rig-Up Equipment	2/14/2018	22:10:00	USER				NO ACCIDENTS OR INJURIES
Event	6	Start Job	Start Job	2/14/2018	23:24:47	COM10	1.00	0.00	0.00	START JOB
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/14/2018	23:30:00	USER	207.00	8.20	6.50	REVIEW JSA, PUMP SCHEDULE AND RETURNS
Event	8	Test Lines	Test Lines	2/14/2018	23:52:46	COM10	4505.00	8.31	0.00	4600 TEST GOOD
Event	9	Pump Spacer 1	Pump Spacer 1	2/14/2018	23:57:44	COM10	550.00	8.58	4.10	50 BBLS MUDFFLUSH SCALED @ 8.4#
Event	10	Pump Spacer 2	Pump Spacer 2	2/15/2018	00:11:25	COM10	814.00	12.17	4.00	50 BBLS CLEAN SPACER III SCALED @12#
Event	11	Pump Cement	Pump Cement	2/15/2018	00:27:32	COM10	779.00	13.47	4.90	1818 SKS SCALED @ 13.2#
Event	12	Comment	Comment	2/15/2018	00:40:00	USER	163.00	13.52	0.00	STOPPED TO CLEAR SUCTION ON PUMPS
Event	13	Comment	Comment	2/15/2018	00:49:40	USER	2.00	14.69	0.00	START BACK UP SUCTION CLEAR
Event	14	Check Weight	Check weight	2/15/2018	01:00:25	COM10	512.00	13.21	7.60	13.2#
Event	15	Clean Lines	Clean Lines	2/15/2018	02:19:41	COM10	7.00	22.35	0.00	AIR... THEN WASHED PUMPS AND LINES
Event	16	Drop Top Plug	Drop Top Plug	2/15/2018	02:32:52	COM10	4.00	7.98	0.00	PLUG WENT
Event	17	Pump Displacement	Pump Displacement	2/15/2018	02:32:53	COM10	4.00	7.98	0.00	332 BBLS 1ST 50 BBLS MMCR... LAST 280 BBLS BIO CIDE... FINAL LIFT PSI 2250... EST TOP CMT 2513'...
Event	18	Bump Plug	Bump Plug	2/15/2018	03:20:07	COM10	2428.00	7.97	0.00	2750 psi HELD FOR 30 SEC

Event	19	Other	Other	2/15/2018	03:26:34	COM10	1937.00	8.09	4.40	BURST WEST SHOE SUB 3850 PSI
Event	20	Other	Other	2/15/2018	03:27:34	COM10	1715.00	8.05	0.40	PUMPED 5 BBL WET SHOE 4 BPM 1800 PSI
Event	21	Other	Other	2/15/2018	03:30:19	COM10	-5.00	8.07	0.00	CHECK FLOATS FLOATS HELD 1.5 BBLS BACK
Event	22	End Job	End Job	2/15/2018	03:30:25	COM10	-5.00	8.07	0.00	END JOB
Event	23	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	2/15/2018	03:45:00	USER				REVIEW JSA DISCUSS HAZARDS
Event	24	Rig-Down Equipment	Rig-Down Equipment	2/15/2018	03:55:00	USER				NO ACCIDENTS OR INJURIES
Event	25	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/15/2018	05:00:00	USER				DISCUSS JM AND DIRECTIONS CALL FOR ROAD CONDITIONS
Event	26	Crew Leave Location	Crew Leave Location	2/15/2018	05:30:00	USER				SLEEP ON LEASE RD