

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

PDC Fern 11W-314

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 **Fern 11W-314** 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 6bbls 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 #: 3791916	Quote #: 0022422835	Sales Order #: 0904750915							
Customer: PDC ENERGY-EBUS		Customer Rep: Chris McMullen								
Well Name: FERN	Well #: 11W-314	API/UWI #: 05-123-44587-00								
Field: WATTENBERG	City (SAP): GREELEY	County/Parish: WELD	State: COLORADO							
Legal Description: NW NW-11-5N-65W-381FNL-688FWL										
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 152								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HX38199		Srv Supervisor: Nicholas Peterson								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type	BHST									
Job depth MD	15,277'	Job Depth TVD	7,445							
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	1637		
Casing	0	5.5	4.778	20	BTC	HCP110	0	15277	0	0
Open Hole Section			8.5				1637	15280		7445
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make		
Guide Shoe	5.5	1	WEATH	15,277	Top Plug	5.5	1	WEATH		
					Bottom Plug	5.5	1	WEATH		
Wet Shoe Sub	5.5	1	WEATH	15,243	SSR plug set					
Insert Float					Plug Container	5.5	1	HES		
Stage Tool					Centralizers	5.5		WEATH		
Fluid Data										
Stage/Plug #: 1										
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
1	Mud Flush III (Powder)	Mud Flush III	20	bbl	8.4			3	840	
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
2	CLEANSPECER III	CLEANSPECER III	100	bbl	12	2.27	12.4	6		

last updated on 4/3/2018 4:32:01 PM

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Cementing Job Summary

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	ElastiCem Tail	ELASTICEM (TM) SYSTEM	1,865	sack	13.2	1.57	7.53	8	14,043
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	MMCR Displacement	MMCR Displacement	30	bbl	8.34			10	
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
5	Fresh Water	Biocide/ Stayfil	270	bbl	8.33			8	
Cement Left In Pipe		Amount	0'		Reason			Wet Shoe	
Mix Water:		pH 7.0	Mix Water Chloride:		0 ppm		Mix Water Temperature:		63 °F
Cement Temperature:		## °F	Plug Displaced by:		8.33 lb/gal		Disp. Temperature:		63 °F
Plug Bumped?		Yes	Bump Pressure:		2,653 psi		Floats Held?		Yes
Cement Returns:		0 bbl	Returns Density:		8.4 lb/gal		Returns Temperature:		## °F
Comment: Pumped 20 bbls Mud Flush III, 100 bbls Clean Spacer III, 521.5 bbls Cement, 339 bbls Fresh water displacement. 6 bbls 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	4/2/2018	22:00:00	USER				CREW CALLED OUT AT 22:00, REQUESTED ON LOCATION 03:00. CREW PICKED UP CEMENT, CHEMICALS, AND PLUG CONTAINER FROM FT. LUPTON, CO. BULK 660 10867098, Bulk 660 11633848, AND PUMP 11189145.
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/3/2018	01:30:00	USER				DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW.
Event	3	Crew Leave Yard	Crew Leave Yard	4/3/2018	02:00:00	USER				STARTED JOURNEY MANAGEMENT.
Event	4	Arrive at Location from Service Center	Arrive at Location	4/3/2018	02:45:00	USER				END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625" 36 LB/FT @ 1,637', 5.5" CASING: 20 LB/FT TOTAL 15,277', 8.5" HOLE, TD 15,280', 34' SHOE TRAC, TVD- 7,445'. PUMP FRESH WATER DISPLACEMENT WITH MMCR FIRST 20 BBLs. PUMP 5 BBL WET SHOE. RIG CIRCULATED 2 BOTTOMS UP.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	4/3/2018	03:00:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	4/3/2018	03:15:00	USER				CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.
Event	7	Rig-Up Completed	Rig-Up Completed	4/3/2018	04:45:00	USER				
Event	8	Safety Meeting - Pre Job	Safety Meeting - Pre Job	4/3/2018	05:00:00	USER	0.00	0.00	24.00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
Event	9	Start Job	Start Job	4/3/2018	05:34:31	COM5	8.07	0.00	23.00	BEGIN RECORDING JOB DATA.
Event	10	Test Lines	Test Lines	4/3/2018	05:36:26	COM5	7.96	2.00	8.00	PRESSURE TESTED IRON TO 6,000 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 900 PSI, 5TH GEAR STALL OUT @ 1,730 PSI.

Event	11	Pump Spacer 1	Pump Spacer 1	4/3/2018	05:45:41	COM5	8.29	0.00	9.00	PUMP 40 BBLS OF MUD FLUSH @ 8.4 LBS/GAL WITH 10 GALS D-AIR. PUMP RATE 3 BBLS/MIN @ 530 PSI.
Event	12	Drop Bottom Plug	Drop Bottom Plug	4/3/2018	05:52:34	USER	8.14	3.10	635.00	PLUG LEFT CONTAINER, VERIFIED BY TOOL HAND.
Event	13	Pump Spacer 2	Pump Spacer 2	4/3/2018	05:59:58	COM5	11.40	4.00	779.00	PUMP 100 BBLS OF CLEAN SPACER III @ 12.0 LB/GAL. 10 GALS D- AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES. HOS CALCULATED @ 2,215.42', TOS CALCULATED @ 282.72'. PUMP RATE 8 BBLS/MIN @ 1,140 PSI.
Event	14	Pump Lead Cement	Pump Lead Cement	4/3/2018	06:18:19	COM5	13.13	6.50	964.00	PUMPED 1,865 SKS OF ELASTICEM WITH CBL @ 13.2 LB/GAL, 1.57 FT3/SK, 7.53 GAL/SK. 521.5 BBLS, HOC CALCULATED @ 12,781.86', TOC CALCULATED @ 2,498.14'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 8 BBLS/MIN 980 PSI.
Event	15	Shutdown	Shutdown	4/3/2018	07:29:23	USER	13.03	0.00	217.00	SHUTDOWN WASH PUMPS AND LINES WITH 8 BBLS FRESH WATER, BLEW AIR BACK FROM MANIFOLD ON PLUG CONTAINER WITH RIG.
Event	16	Drop Top Plug	Drop Top Plug	4/3/2018	07:38:27	COM5	8.89	0.00	6.00	PLUG LEFT CONTAINER, VERIFIED BY TOOL HAND.
Event	17	Pump Displacement	Pump Displacement	4/3/2018	07:40:08	COM5	8.27	0.00	7.00	BEGIN CALCULATED DISPLACEMENT OF 339 BBLS WITH FRESH WATER. PUMPED THE FIRST 30 BBLS WITH MMCR, PUMPED UNTIL 300 BBLS AWAY WITH BIOCID, MUD FLUSH TO SURFACE 333 BBLS AWAY, 6 BBLS MUD FLUSH TO SURFACE.
Event	18	Bump Plug	Bump Plug	4/3/2018	08:29:59	COM5	8.29	4.10	2653.00	PLUG BUMPED AT CALCULATED DISPLACEMENT. 2,653 PSI PRESSURED 500 PSI OVER BUMP.
Event	19	Shift Tool - Lower	Shift Tool - Lower	4/3/2018	08:36:12	USER	8.35	0.00	4320.00	SHIFTED TOOL @ 4,340 PSI FOLLOWED BY 5 BBL WET SHOE.
Event	20	Check Floats	Check Floats	4/3/2018	08:38:10	USER	8.28	0.00	1972.00	FLOATS HELD GOT 3 BBLS BACK.
Event	21	End Job	End Job	4/3/2018	08:39:41	COM5				STOP RECORDING JOB DATA.
Event	22	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	4/3/2018	08:45:00	USER				DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	23	Rig-Down Equipment	Rig-Down Equipment	4/3/2018	09:00:00	USER				RIG DOWN BULK AND MIXING EQUIPMENT.
Event	24	Rig-Down Completed	Rig-Down Completed	4/3/2018	10:30:00	USER				ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL,

AND LOCATION WAS CLEAN.

Event	25	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/3/2018	10:45:00	USER	DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	26	Depart Location	Depart Location	4/3/2018	11:00:00	USER	THANK YOU FOR USING HALLIBURTON - NICK PETERSON AND CREW.