HALLIBURTON

iCem® Service

PDC ENERGY-EBUS

Date: Tuesday, May 08, 2018

Barr 11L-301 Production

Job Date: Sunday, April 29, 2018

Sincerely,

Julia Nichols

Legal Notice

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Barr 11L-301** 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 spacer or cement 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 #:** 3832751	**Quote #:** 0022435878	**Sales Order #:** 0904816375
Customer: PDC ENERGY-EBUS		**Customer Rep:**	
Well Name: BARR	**Well #:** 11L-301		**API/UWI #:** 05-123-45682-00
Field: WATTENBERG	**City (SAP):** KERSEY	**County/Parish:** WELD	**State:** COLORADO
Legal Description: SE SE-11-5N-65W-244FSL-394FEL			
Contractor: ENSIGN DRLG		**Rig/Platform Name/Num:** ENSIGN 152	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HX38199		**Srvc Supervisor:** Nicholas Peterson	

Job

Formation Name			
Formation Depth (MD)	**Top**	**Bottom**	
Form Type		**BHST**	
Job depth MD	12,365'	**Job Depth TVD**	6,800'
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	1671		
Casing		5.5	4.778	20			0	12365		0
Open Hole Section			8.5				1671	12368		0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	5.5	1	WEATH	12,365		Top Plug	5.5	1	WEATH
Float Shoe	5.5	1	WEATH	12,335		Bottom Plug	5.5	1	WEATH
						Plug Container	5.5	1	HES
						Centralizers	5.5	182	WEATH

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	Flush	Mud Flush III	50	bbl	8.4			4	2,100

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	Spacer	Tuned Spacer III	100	bbl	11.1	4.5	29.4	5	3,668

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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	Lead	HALCEM (TM) SYSTEM	815	sack	15.6	1.18	5.15	5	4,197

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	ElastiCem	ELASTICEM (TM) SYSTEM	770	sack	14.4	1.7	7.3	6	5,621

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	MMCR	MMCR Displacement	30	bbl	8.34			5	
0.4170 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
6	Displacement	Fresh Water	0	bbl	8.34			8	

Cement Left In Pipe	**Amount**	0 ft	**Reason**		Wet Shoe
Mix Water:	pH 7.0	**Mix Water Chloride:**	0 ppm	**Mix Water Temperature:**	72 °F
Cement Temperature:	## °F	**Plug Displaced by:**	8.33 lb/gal	**Disp. Temperature:**	72 °F
Plug Bumped?	Yes	**Bump Pressure:**	2,450 psi	**Floats Held?**	Yes
Cement Returns:	0 bbl	**Returns Density:**	## lb/gal	**Returns Temperature:**	## °F

Comment: Pumped 50 bbls Mud Flush, 100 bbls Tuned Spacer, 171 bbls Lead, 233 bbls Tail. Pumped 274 bbls Displacement no mud flush back 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)	PS Pump Press (psi)	Comments
Event	1	Call Out	Call Out	4/29/2018	07:00:00	USER				CREW CALLED OUT AT 07:00, REQUESTED ON LOCATION 12:00. CREW PICKED UP CEMENT, CHEMICALS, AND PLUG CONTAINER FROM FT. LUPTON, CO. BULK 660 10784082, BACK UP AIR 11633848, AND PUMP 11189145.
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/29/2018	10:15:00	USER				DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW.
Event	3	Crew Leave Yard	Crew Leave Yard	4/29/2018	10:30:00	USER				STARTED JOURNEY MANAGEMENT.
Event	4	Arrive at Location from Service Center	Arrive at Location	4/29/2018	11:15:00	USER				END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625” 36 LB/FT @ 1,670', 5.5" CASING: 20 LB/FT TOTAL 12,365’, 8.5" HOLE, TD 12,338', 27.67 SHOE TRAC, TVD- 6,800’. PUMP FRESH WATER DISPLACEMENT WITH MMCR FIRST 30 BBLS. CASING LANDED @ 15:00 04/29/2018. RIG CIRCULATED 2 BOTTOMS UP.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	4/29/2018	11:30:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	4/29/2018	11:45:00	USER				CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.
Event	7	Rig-Up Completed	Rig-Down Completed	4/29/2018	13:00:00	USER				WAITED ON RIG TO FINISH RUNNING CASING.
Event	8	Safety Meeting - Pre Job	Safety Meeting - Pre Job	4/29/2018	17:30:00	USER	8.01	0.00	11.00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
Event	9	Start Job	Start Job	4/29/2018	17:54:45	COM5				BEGIN RECORDING JOB DATA.
Event	10	Test Lines	Test Lines	4/29/2018	18:00:18	COM5	8.17	0.00	5854.00	PRESSURE TESTED IRON TO 6,000 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 1,600 PSI, 5TH GEAR STALL OUT @ 1,940 PSI.
Event	11	Pump Spacer 1	Pump Spacer 1	4/29/2018	18:03:47	COM5	8.16	3.90	323.00	PUMP 50 BBLS OF MUD FLUSH @ 8.4 LBS/GAL. HOMF

										CALCULATED @ 251.84', TOMF CALCULATED @ SURFACE. CALCULATED TO GET 38 BBLS MUD FLUSH TO SURFACE. PUMP RATE @ 4 BBLS/MIN @ 380 PSI.
Event	12	Pump Spacer 2	Pump Spacer 2	4/29/2018	18:16:21	COM5	9.48	3.90	574.00	PUMP 100 BBLS OF TUNED SPACER III @ 11.1 LB/GAL, 5 GALS D-AIR. HOTS CALCULATED @ 2,204.15' TOTS CALCULATED @ 251.84'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 5 BBLS/MIN @ 640 PSI.
Event	13	Pump Lead Cement	Pump Lead Cement	4/29/2018	18:38:01	COM5	15.63	5.30	949.00	PUMPED 815 SKS OF HALCEM @ 15.6 LB/GAL, 1.18 FT3/SK, 5.15 GAL/SK. 171.28 BBLS, HOL CALCULATED @ 4,198.04', TOL CALCULATED @ 2,455.99. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 5 BBLS/MIN 423 PSI.
Event	14	Pump Tail Cement	Pump Tail Cement	4/29/2018	19:15:27	COM5	14.57	3.10	209.00	PUMP 770 SKS OF ELASTICEM @ 14.4 LB/GAL, 1.7 FT3/SK, 7.3 GAL/SK, 233.13 BBLS. HOT CALCULATED @ 5,713.97', TOT CALCULATED @ 6,654.03'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 6 BBLS/MIN @ 503 PSI.
Event	15	Shutdown	Shutdown	4/29/2018	19:56:30	USER	13.83	4.00	220.00	SHUTDOWN FOR RIG TO BLOW AIR BACK.
Event	16	Clean Lines	Clean Lines	4/29/2018	20:00:20	USER	18.67	0.00	2.00	CLEANED PUMPS AND LINES WITH 10 BBLS FRESH WATER.
Event	17	Drop Top Plug	Drop Top Plug	4/29/2018	20:11:26	COM5				PLUG LEFT CONTAINER, VERIFIED BY CO. MAN.
Event	18	Pump Displacement	Pump Displacement	4/29/2018	20:14:00	COM5	8.04	0.00	1.00	BEGIN CALCULATED DISPLACEMENT OF 274 BBLS WITH FRESH WATER. PUMPED THE FIRST 30 BBLS WITH MMCR, PUMPED 184 BBLS WITH BIOCIDE, AND STAYFIL.
Event	19	Bump Plug	Bump Plug	4/29/2018	21:00:01	COM5	8.39	1.60	2569.00	PLUG BUMPED AT CALCULATED DISPLACEMENT. 2,353 PSI PRESSURED 500 PSI OVER BUMP.
Event	20	Shift Tool - Lower	Shift Tool - Lower	4/29/2018	21:05:07	USER	8.42	2.00	3014.00	SHIFTED TOOL @ 3,612 PSI, PUMPED 5 BBL WET SHOE.
Event	21	Check Floats	Check Floats	4/29/2018	21:06:46	USER	8.36	0.00	2005.00	FLOATS HELD GOT 2 BBLS BACK.
Event	22	End Job	End Job	4/29/2018	21:08:25	COM5	8.33	0.00	2.00	STOP RECORDING JOB DATA.
Event	23	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	4/29/2018	21:15:00	USER				DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	24	Rig-Down Equipment	Rig-Down Equipment	4/29/2018	21:30:00	USER				RIG DOWN BULK AND MIXING EQUIPMENT.

Event	25	Rig-Down Completed	Rig-Down Completed	4/29/2018	22:30:00	USER		ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL, AND LOCATION WAS CLEAN.
Event	26	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	4/29/2018	22:45:00	USER		DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	27	Depart Location	Depart Location	4/29/2018	23:00:00	USER		THANK YOU FOR USING HALLIBURTON - NICK PETERSON AND CREW.