

# HALLIBURTON

iCem<sup>®</sup> Service

**PDC ENERGY - EBUS**

**Thistle Down 31i-212 Production**

Sincerely,  
**Meghan Jacobs**

## Legal Notice

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## 1.0 Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Thistle Down 31i-212** 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 85 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**

## HALLIBURTON

## Cementing Job Summary

*The Road to Excellence Starts with Safety*

Sold To #: 304535	Ship To #: 3825735	Quote #: 0022519423	Sales Order #: 0905325254							
Customer: PDC ENERGY-EBUS		Customer Rep: Chris McMullen								
Well Name: THISTLE DOWN		Well #: 31i-212	API/UWI #: 05-123-45455-00							
Field: WATTENBERG	City (SAP): KERSEY	County/Parish: WELD	State: COLORADO							
Legal Description: NE SW-31-5N-64W-1399FSL-1357FWL										
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 152								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HX38199		Srvc Supervisor: Adam Covington								
<b>Job</b>										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type	BHST									
Job depth MD	12352ft	Job Depth TVD								
Water Depth	Wk Ht Above Floor									
Perforation Depth (MD)	From	To								
<b>Well Data</b>										
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	1672		0
Casing		5.5	4.778	20			0	12352		6892
Open Hole Section			8.5				1672	6892	0	0
Open Hole Section			8.5				6892	12355	0	0
<b>Tools and Accessories</b>										
Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make		
Guide Shoe	5.5			12352	Top Plug	5.5	1	WTF		
Float Shoe	5.5				Bottom Plug	5.5	1	WTF		
Float Collar	5.5				SSR plug set	5.5		HES		
Insert Float	5.5				Plug Container	5.5		HES		
Stage Tool	5.5				Centralizers	5.5	172	HES		
<b>Fluid Data</b>										
Stage/Plug #: 1										
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /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	2.74		4		
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
2	Gasstop B1	GASSTOP (TM) SYSTEM	615	sack	13.2	1.55		6	7.61	

last updated on 12/10/2018 2:28:15 PM

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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/mi n	Total Mix Fluid Gal
3	ElastiCem	ELASTICEM (TM) SYSTEM	890	sack	14.4	1.7		6	7.3
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	20	bbl	8.34			9	
0.3330 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		253	bbl	8.34			9	
Cement Left In Pipe			Amount	Reason		Shoe Joint			
			34 ft						
Comment 85 BBLs OF SPACER TO SURFACE. PUMPED 273 BBLs OF DISPLACEMENT. FIRST 20 BBLs HAD MMCR THROUGHOUT. THE REST OF DISPLACEMENT HAD BIOCIDES PROVIDED BY THE CO. MAN. DECREASED RATE AS PRESSURE CLIMBED.									

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	PS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Comments
Event	1	Call Out	Call Out	12/5/2018	16:00:00	USER				CREW WAS CALLED OUT BY COORDINATOR FOR AN ON LOCATION TIME OF 2200
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	12/5/2018	19:50:00	USER				MET WITH ALL HES CREW MEMBERS, DISCUSSED DIRECTIONS, SPEEDS AND NIGHT DRIVING.
Event	3	Depart Shop for Location	Depart Shop for Location	12/5/2018	20:00:00	USER				CREW LEFT YARD. JOURNEY MANAGMENT WAS MADE.
Event	4	Arrive At Loc	Arrive At Loc	12/5/2018	21:00:00	USER				ARRIVED AT LOCATION. PERFORMED A HAZARD HUNT, TALKED TO COMPANY MAN AND GOT NUMBERS. DISCUSSED WHERE TO SPOT EQUIPMENT.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	12/5/2018	21:10:00	USER				MET WITH HES CREW MEMBERS. DISCUSSED PINCH POINTS, TEAM LIFTS AND GETTING OUT OF THE WAY OF THE LOADER.
Event	6	Start Job	Start Job	12/6/2018	00:06:14	COM4	304.00	8.22	9.80	STARTED TO MIX AND RECIRC LATEX WATER.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	12/6/2018	01:15:00	USER	0.00	8.17	0.00	MET WITH ALL HES CREW MEMBERS AND DISCUSSED TEAM LIFTS, PINCH POINTS AND TO STAY OUT OF THE LOADERS WAY.
Event	8	Drop Bottom Plug	Drop Bottom Plug	12/6/2018	01:32:33	COM4	-4.00	8.19	0.00	ADAM COVINGTON DROPPED NON HALLIBURTON 5.5" BOTTOM PLUG. WEATHERFORD HAND AND CO. MAN WITNESSED.
Event	9	Start Job	Start Job	12/6/2018	01:33:01	COM4	-4.00	8.19	0.00	FILLED LINES WITH 3 BBLS OF FRESH WATER. 3 BPM, 300 PSI.
Event	10	Test Lines	Test Lines	12/6/2018	01:36:47	COM4	115.00	8.29	0.00	PERFORMED A 6500 PSI PRESSURE TEST AFTER PERFORMING A 500 PSI KICKOUT TEST AND A 5TH GEAR STALL. HELD FOR 5 MINUTES AS PER CO. MAN.
Event	11	Pump Spacer 1	Pump Spacer 1	12/6/2018	01:48:22	COM4	466.00	12.25	2.70	PUMPED 150 BBLS OF 12.5#, 2.74y, 16.9wr TUNED SPACER III AT 3 BPM, 220 PSI.

Event	12	Check Weight	Check Weight	12/6/2018	01:59:34	COM4	310.00	12.50	4.60	USED PRESSURIZED MUD SCALES TO WEIGH UP SPACER. SPACER WEIGHED UP AT 12.5#
Event	13	Pump Lead Cement	Pump Lead Cement	12/6/2018	02:21:28	COM4	300.00	13.08	5.30	PUMPED 170 BBLS (615 SKS) 13.2#, 1.55y, 7.61wr GASSTOP LEAD CEMENT AT 6 BPM, 430 PSI. USED 1538 GALLONS OF FDP LATEX AND 62 GALLONS OF D-AIR MIXED INTO THE MIX WATER.
Event	14	Check Weight	Check Weight	12/6/2018	02:28:40	COM4	453.00	13.26	6.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 13.2#.
Event	15	Check Weight	Check Weight	12/6/2018	02:44:32	COM4	421.00	13.23	6.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 13.2#.
Event	16	Pump Tail Cement	Pump Tail Cement	12/6/2018	02:51:35	COM4	406.00	13.34	6.00	PUMPED 269 BBLS (890 SKS) AT 14.4#, 1.7y, 7.3wr ELASTICEM TAIL CEMENT AT 6 BPM, 550 PSI.
Event	17	Check Weight	Check Weight	12/6/2018	02:59:24	COM4	517.00	14.50	5.90	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGH UP AT 14.4#.
Event	18	Check Weight	Check Weight	12/6/2018	03:14:44	COM4	559.00	14.36	6.00	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 14.4#.
Event	19	Check Weight	Check Weight	12/6/2018	03:35:57	COM4	559.00	14.39	6.20	USED PRESSURIZED MUD SCALES TO WEIGH UP CEMENT. CEMENT WEIGHED UP AT 14.4#
Event	20	Shutdown	Shutdown	12/6/2018	03:43:47	COM4	127.00	14.77	0.00	SHUTDOWN TO WASH PUMPS AND LINES, TO BLOW DOWN AND TO LOAD 5.5" TOP PLUG.
Event	21	Drop Top Plug	Drop Top Plug	12/6/2018	03:57:42	COM4	15.00	0.00	0.00	ADAM COVINGTON DROPPED NON HALLIBURTON 5.5" TOP PLUG. CO. MAN AND WEATHERFORD HAND WITNESSED.
Event	22	Pump Displacement	Pump Displacement	12/6/2018	03:57:45	COM4	15.00	0.00	0.00	PUMPED 273 BBLS OF DISPLACEMENT. FIRST 20 BBLS HAD MMCR THROUGHOUT. THE REST OF DISPLACEMENT HAD BIOCIDES PROVIDED BY THE CO. MAN. DECREASED RATE AS PRESSURE CLIMBED.
Event	23	Bump Plug	Bump Plug	12/6/2018	04:37:02	COM4	2816.00	8.24	0.00	BUMPED NON HALLIBURTON 5.5" TOP PLUG AT 4 BPM, FCP-2450 PSI. BUMPED TO 2950 PSI. HELD FOR A MINUTE TO MAKE SURE PRESSURE WASN'T BLEEDING OFF.
Event	24	Other	Other	12/6/2018	04:38:48	USER	3595.00	8.26	2.00	SHIFTED SLEEVE AT 4060 PSI, 2 BPM. THEN IMMEDIATELY STARTED PUMPING A 5 BBL WET SHOE AT 4 BPM. 2553 PSI.

Event	25	Check Floats	Check Floats	12/6/2018	04:39:26	USER	2534.00	8.25	4.10	BLEMISHED PRESSURE BACK TO THE TRUCK. WHEN WE DID THAT WE GOT 2 BBLS OF WATER BACK AND THEN STOPPED. INDICATING THAT THE FLOATS HELD.
Event	26	End Job	End Job	12/6/2018	04:42:57	COM4	32.00	8.17	0.00	TD-12,355' TP-12,352' 5.5" 20#, WSS-12,317' PC-1672' 9 5/8" 36#. TVD-6,892' MUD WEIGHT 10.5#. WATER-53 DEGREES, CHLORIDES-0 SULFATES-0 PH-7. 85 BBL OF SPACER BACK TO SURFACE.
Event	27	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	12/6/2018	05:00:00	USER	19.00	8.17	0.00	MET WITH CREW AND DISCUSSED OVER HEAD LOADS, UNEVEN SURFACES AND SWING PATHS.
Event	28	Depart Location Safety Meeting	Depart Location Safety Meeting	12/6/2018	07:00:00	USER				MET WITH HES CREW MEMBERS AND DISCUSSED DIRECTIONS, HOURS OF SERVICE AND ROAD CONDITIONS.
Event	29	Call Out	Depart Location	12/6/2018	07:15:00	USER				THANK YOU FOR CHOOSING HALLIBURTON.