

# HALLIBURTON

iCem<sup>®</sup> Service

**PDC ENERGY - EBUS**

**Thistle Down 31G-332 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 31G-332** 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 45 bbls of 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**

*The Road to Excellence Starts with Safety*

<b>Sold To #:</b> 304535		<b>Ship To #:</b> 0003819718		<b>Quote #:</b> 0022519822		<b>Sales Order #:</b> 0905397148				
<b>Customer:</b> PDC ENERGY-EBUS				<b>Customer Rep:</b> TONY BARRIENTOS						
<b>Well Name:</b> THISTLE DOWN			<b>Well #:</b> 31G-332		<b>API/UWI #:</b> 05-123-45257-00					
<b>Field:</b> WATTENBERG		<b>City (SAP):</b> KERSEY		<b>County/Parish:</b> WELD		<b>State:</b> COLORADO				
<b>Legal Description:</b> NE SW-31-5N-64W-1504FSL-1357FWL										
<b>Contractor:</b> ENSIGN DRLG				<b>Rig/Platform Name/Num:</b> ENSIGN 152						
<b>Job BOM:</b> 7523 7523										
<b>Well Type:</b> HORIZONTAL OIL										
<b>Sales Person:</b> HALAMERICA/HX38199				<b>Srvc Supervisor:</b> Vitali Neverdasov						
<b>Job</b>										
<b>Formation Name</b>										
<b>Formation Depth (MD)</b>		<b>Top</b>				<b>Bottom</b>				
<b>Form Type</b>						<b>BHST</b>				
<b>Job depth MD</b>		12979ft		<b>Job Depth TVD</b>		6912				
<b>Water Depth</b>				<b>Wk Ht Above Floor</b>						
<b>Perforation Depth (MD)</b>		<b>From</b>				<b>To</b>				
<b>Well Data</b>										
<b>Description</b>	<b>New / Used</b>	<b>Size in</b>	<b>ID in</b>	<b>Weight lbm/ft</b>	<b>Thread</b>	<b>Grade</b>	<b>Top MD ft</b>	<b>Bottom MD ft</b>	<b>Top TVD ft</b>	<b>Bottom TVD ft</b>
Casing		9.625	8.921	36			0	2565		0
Casing	0	5.5	4.778	20	BUTTRESS	P-110	0	12979	0	6912
Open Hole Section			8.5				2565	6912	2565	6912
Open Hole Section			8.5				6912	12983	2565	6912
<b>Tools and Accessories</b>										
<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>	<b>Depth ft</b>		<b>Type</b>	<b>Size in</b>	<b>Qty</b>	<b>Make</b>	
Guide Shoe	5.5					Top Plug	5.5	1	WHED	
Float Shoe	5.5	1	N/A	12979		Bottom Plug	5.5	1	WHED	
Float Collar	5.5	1	N/A	12964		SSR plug set	5.5			
Insert Float	5.5					Plug Container	5.5	1	HES	
Stage Tool	5.5					Centralizers	5.5	178	N/A	
<b>Fluid Data</b>										
<b>Stage/Plug #: 1</b>										
<b>Fluid #</b>	<b>Stage Type</b>	<b>Fluid Name</b>	<b>Qty</b>	<b>Qty UoM</b>	<b>Mixing Density lbm/gal</b>	<b>Yield ft3/sack</b>	<b>Mix Fluid Gal</b>	<b>Rate bbl/min</b>	<b>Total Mix Fluid Gal</b>	
1	12.5 lb/gal Tuned Spacer III	Tuned Spacer III	150	bbl	12.5	2.72		6		

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	Gasstop B1	GASSTOP (TM) SYSTEM	1040	sack	13.2	1.55		5	7.73
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	890	sack	14.4	1.7		6.5	7.29
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	20	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		266	bbl	8.34			7	
Cement Left In Pipe		Amount	0 ft		Reason			WET SHOE	
Comment : 150 BBLS OF SPACER BACK TO SURFACE. 45 BBLS OF CEMENT BACK TO SURFACE. ESTIMATED TOP OF TAIL @ 6374'. Original on location time was @ 04:00. Cement crew was not available till 04:15. On location time was changed to 07:00 , RTP @ 09:00.									

## 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	1/10/2019	04:00:00	USER				Original on location time was @ 04:00. Cement crew was not available till 04:15. On location time was changed to 07:00 , RTP @ 09:00
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	1/10/2019	07:00:00	USER				Journey management meeting held prior to departure
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	1/10/2019	07:15:00	USER				Called Journey
Event	4	Arrive at Location from Service Center	Arrive at Location from Service Center	1/10/2019	08:00:00	USER				32 MILES. Discussed numbers and job procedures with Customer. Rig is circulating since 04:30. Containment arrived @ 08:10.
Event	5	Safety Meeting - Pre Rig-Up	Safety Meeting - Pre Rig-Up	1/10/2019	08:30:00	USER				JSA to discuss the hazards of rig-up
Event	6	Rig-Up Equipment	Rig-Up Equipment	1/10/2019	08:35:00	USER				Rig-up all surface lines, roll FDP water tank.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	1/10/2019	11:45:00	USER	8.21	0.00	27.00	With all essential personnel, to discuss the hazards of pumping the job, and pump schedule.
Event	8	Start Job	Start Job	1/10/2019	12:09:28	COM4	8.23	0.00	31.00	
Event	9	Drop Bottom Plug	Drop Bottom Plug	1/10/2019	12:21:00	USER	8.22	0.00	65.00	LOAD AND DROP BOTTOM PLUG.
Event	10	Test Lines	Test Lines	1/10/2019	12:29:00	USER	8.16	0.10	4243.00	Load line with 3 bbls of water. Test lines @ 4992 psi
Event	11	Pump Spacer	Pump Spacer	1/10/2019	12:40:10	USER	12.43	4.40	432.00	BATCH/ WEIGHT/ PUMP 150 BBLS OF TUNED SPACER @ 12.5 PPG.
Event	12	Check Weight	Check Weight	1/10/2019	12:42:13	COM4				
Event	13	Check Weight	Check Weight	1/10/2019	12:43:31	COM4	12.48	6.00	471.00	

Event	14	Pump Lead Cement	Pump Lead Cement	1/10/2019	13:14:19	USER	13.16	4.00	186.00	BATCH/ WEIGH/ PUMP 1040 SKS (287.1 BBLS) OF GASSTOP CEMENT USING FDP WATER @ 13.2 ppg, verified with pressurized scales
Event	15	Check Weight	Check Weight	1/10/2019	13:19:25	COM4	13.16	4.90	353.00	
Event	16	Pump Tail Cement	Pump Tail Cement	1/10/2019	14:20:36	USER	14.36	5.40	543.00	WEIGHT/ PUMP 890 SKS (269.5 BBLS) OF ELASTICEM @ 14.4 ppg, verified with pressurized scales.
Event	17	Check Weight	Check Weight	1/10/2019	14:23:36	COM4	14.47	6.80	711.00	
Event	18	Shutdown	Shutdown	1/10/2019	15:08:40	USER	14.62	0.00	52.00	Finished pumping cement
Event	19	Clean Lines	Clean Lines	1/10/2019	15:13:11	USER	14.55	0.00	50.00	Wash pumps and lines
Event	20	Drop Top Plug	Drop Top Plug	1/10/2019	15:21:00	USER	8.16	4.30	80.00	LOAD AND DROP TOP PLUG.
Event	21	Pump Displacement - Start	Pump Displacement - Start	1/10/2019	15:25:00	USER	8.17	0.00	33.00	286 BBLS OF FRESH WATER. FIRST 20 BBLS WITH MMCR. REMAINING WITH BIOCID. LAST 10 BBLS FRESH WATER
Event	22	Bump Plug	Bump Plug	1/10/2019	16:09:00	USER	8.23	4.80	2666.00	@500 psi over final circulating pressure of 2680 psi.
Event	23	Pump Water	Pump Water	1/10/2019	16:15:00	USER	8.24	0.00	3229.00	Open wet shoe sub @ 3980 psi, and pump 5 bbl wet shoe
Event	24	Check Floats	Check Floats	1/10/2019	16:19:00	USER	8.23	4.00	2477.00	Floats held. 2 bbls back
Event	25	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	1/10/2019	16:25:00	USER	8.17	0.00	14.00	JSA to discuss the hazards of rig-down
Event	26	End Job	End Job	1/10/2019	16:54:50	COM4	0.01	0.00	7.00	