

# HALLIBURTON

iCem<sup>®</sup> Service

**PDC ENERGY - EBUS**

Ft. Lupton District, COLORADO

**For:**

Date: Thursday, December 20, 2018

**THISTLE DOWN**

WELD

Case 1

Sincerely,

## Legal Notice

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*The Road to Excellence Starts with Safety*

<b>Sold To #:</b> 304535	<b>Ship To #:</b> 3819719	<b>Quote #:</b> 0022519509	<b>Sales Order #:</b> 0905355052
<b>Customer:</b> PDC ENERGY-EBUS		<b>Customer Rep:</b> CHRIS	
<b>Well Name:</b> THISTLE DOWN		<b>Well #:</b> 31H-302	<b>API/UWI #:</b> 05-123-45258-00
<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-1444FSL-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> Lance Carpenter	

**Job**

<b>Formation Name</b>			
<b>Formation Depth (MD)</b>	<b>Top</b>		<b>Bottom</b>
<b>Form Type</b>	BHST		
<b>Job depth MD</b>	12487 FT	<b>Job Depth TVD</b>	6920
<b>Water Depth</b>		<b>Wk Ht Above Floor</b>	4
<b>Perforation Depth (MD)</b>	<b>From</b>		<b>To</b>

**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	1675		
Casing		5.5	4.778	20			0	12481		
Open Hole Section			8.5				1675	6700		
Open Hole Section			8.5				6700	12487		

**Tools and Accessories**

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	5.5			12481	Top Plug	5.5	1	WEATH
Float Shoe	5.5				Bottom Plug	5.5	1	WEATH
Float Collar	5.5			12467	SSR plug set	5.5		HES
Insert Float	5.5				Plug Container	5.5	1	HES
Stage Tool	5.5				Centralizers	5.5		HES

**Fluid Data**

<b>Stage/Plug #: 1</b>										
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	12.5 lb/gal Tuned Spacer III	Tuned Spacer III	150	bbl	12.5	2.74				
203.65 lbm/bbl		<b>BARITE, BULK (100003681)</b>								

34.60 gal/bbl		<b>FRESH WATER</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>
2	Gasstop B1	GASSTOP (TM) SYSTEM	615	sack	13.2	1.55		6	7.61
5.01 Gal		<b>FRESH WATER</b>							
0.10 Gal		<b>D-AIR 3000L, TOTETANK (101396181)</b>							
0.35 %		<b>HR-5, 50 LB SK (10005050)</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>
3	ElastiCem	ELASTICEM (TM) SYSTEM	830	sack	14.4	1.7		8	7.3
0.45 %		<b>HR-5, 50 LB SK (10005050)</b>							
7.30 Gal		<b>FRESH WATER</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>
4	MMCR Displacement	MMCR Displacement	20	bbl	8.34				
0.50 gal/bbl		<b>MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)</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>
5	Displacement fluid		276	bbl	8.34				
<b>Cement Left In Pipe</b>	<b>Amount</b>	45 ft			<b>Reason</b>			<b>Shoe Joint</b>	
Mix Water:	pH 7	Mix Water Chloride:	200 ppm		Mix Water Temperature:		65 °F °C		
Cement Temperature:	35 °F °C	Plug Displaced by:	8.34 lb/gal WATER		Disp. Temperature:		62 °F °C		
Plug Bumped?	Yes	Bump Pressure:	2200 psi		Floats Held?		Yes		
Cement Returns:	0 bbl	Returns Density:	12.5 lb/gal kg/m3		Returns Temperature:		## °F °C		
<b>Comment</b> JOB WENT WELL. PRESSURES CLOSE TO CALCULATED. SPACER RETURNS AT 220 BBL AWAY DISPLACEMENT SO CALCULATED. WET SHOE SUB OPENED AT 3750, 5 BBL WET SHOE PUMPED BEHIND. FLOATS HELD 2 BBL BACK.									

## 1.0 Real-Time Job Summary

### 1.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	Call Out	12/20/2018	04:00:00	USER					CREW CALLED OUT FOR JOB. ON LOCATION READY TO PUMP AT 1200
Event	2	Depart from Service Center or Other Site	Depart from Service Center or Other Site	12/20/2018	09:00:00	USER					CREW HAS JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING HAZARDS, ROUTE, CONVOY ORDER AND THEN DEPARTS FROM THE YARD FOR LOCATION
Event	3	Arrive At Loc	Arrive At Loc	12/20/2018	10:00:00	USER					CREW ARRIVES AT LOCATION. CASING JUST LANDED AND RIG BEGAN FILLING PIPE. CAUGHT CIRCULATION AT 1015 AND WANT TO CIRCULATE FOR 3 HOURS
Event	4	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	12/20/2018	10:15:00	USER					CREW HAS PRE RIG UP SAFETY MEETING DISCUSSING EQUIPMENT LAYOUT, HAZARDS, RIG OPERATIONS AND ROLES
Event	5	Pre-Job Safety Meeting	Pre-Job Safety Meeting	12/20/2018	13:20:00	USER	9.00	8.51	0.00	12.40	CREW, RIG CREW AND CUSTOMER REPS HAVE PRE JOB SAFETY MEETING DISCUSSING HAZARDS, ROLES, RED ZONES, JOB PROCEDURE, ETC
Event	6	Drop Bottom Plug	Start Job	12/20/2018	13:58:33	COM6	7.00	8.49	0.00	12.40	

Event	7	Test Lines	Test Lines	12/20/2018	13:58:38	COM6	7.00	8.49	0.00	12.40	FILL LINES AND PRESSURE TEST TO 4500 PSI FOR A FEW MINUTES
Event	8	Drop Bottom Plug	Drop Bottom Plug	12/20/2018	14:11:37	USER	7.00	8.47	0.00	15.50	DROP WEATHERFORD BOTTOM PLUG
Event	9	Pump Spacer 1	Pump Spacer 1	12/20/2018	14:14:28	COM6	9.00	8.46	0.00	15.50	PUMP 150 BBL 12.5# TUNED SPACER 2.74 YIELD 16.9 GAL
Event	10	Check Weight	Check Weight	12/20/2018	14:33:32	COM6	442.00	11.77	6.10	53.40	
Event	11	Pump Lead Cement	Pump Lead Cement	12/20/2018	14:52:49	COM6	312.00	13.57	6.00	168.10	PUMP 169 BBL GASSTOP 13.2# 1.55 YIELD 7.61 GAL 615 SKS
Event	12	Check Weight	Check Weight	12/20/2018	15:09:11	COM6	349.00	13.33	6.90	104.00	
Event	13	Check Weight	Check Weight	12/20/2018	15:10:21	COM6	369.00	13.64	6.90	112.10	
Event	14	Pump Tail Cement	Pump Tail Cement	12/20/2018	15:25:08	COM6	336.00	13.39	6.00	0.10	PUMP 251 BBL ELASTICEM 14.4# 1.7 YIELD 7.3 GAL 830 SKS
Event	15	Check Weight	Check Weight	12/20/2018	15:29:16	COM6	589.00	14.44	7.00	26.00	
Event	16	Shutdown	Shutdown	12/20/2018	15:59:11	USER	664.00	14.38	8.00	262.80	SHUTDOWN. BLOW LINES BACK TO PIT. WASH UP PUMPS TO THE PIT
Event	17	Drop Top Plug	Drop Top Plug	12/20/2018	16:14:05	COM6	11.00	8.62	0.00	273.70	DROP WEATHERFORD TOP PLUG
Event	18	Pump Displacement	Pump Displacement	12/20/2018	16:14:16	COM6	10.00	8.62	0.00	273.70	PUMP 276 BBL DISPLACEMENT. FIRST 20 BBLS MMCR. ALL BUT LAST 36 BBLS ADDED BIOCID
Event	19	Other	Other	12/20/2018	16:50:24	USER	2772.00	8.56	7.00	230.80	SPACER RETURNS TO SURFACE AT 220 BBL AWAY

Event	20	Slow Rate	Slow Rate	12/20/2018	16:54:00	USER	2704.00	8.56	7.00	256.10	SLOW RATE AT 250 BBL AWAY TO BUMP
Event	21	Bump Plug	Bump Plug	12/20/2018	16:58:07	USER	2837.00	8.56	0.00	266.90	BUMP PLUG AT 2200 PSI. TOOK TO 2800 FOR 3 MINUTES. CALCULATED DISPLACEMENT
Event	22	Other	Other	12/20/2018	16:59:31	USER	2998.00	8.56	1.70	267.10	OPEN WET SHOE SUB AT 3750 PSI. PUMP 5 BBL WATER BEHIND FOR WET SHOE
Event	23	Check Floats	Check Floats	12/20/2018	17:01:16	USER	2255.00	8.56	4.00	272.70	CHECK FLOATS. FLOATS HELD. 2 BBL BACK
Event	24	Post-Job Safety Meeting (Pre Rig-Down)	Post-Job Safety Meeting (Pre Rig-Down)	12/20/2018	17:05:00	USER	18.00	8.51	0.00	273.00	CREW HAS POST JOB SAFETY MEETING DISCUSSING RIG DOWN, HAZARDS, ROLES, ETC
Event	25	Depart Location	Depart Location	12/20/2018	18:30:00	USER					CREW IS RIGGED DOWN. HAS JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING ROUTE, HOURS OF SERVICE, HAZARDS AND DEPARTS LOCATION