

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

Ft. Lupton District, COLORADO

For: VAUGHN

Date: Tuesday, January 15, 2019

THISTLE DOWN

WELD

PDC THISTLE DOWN 31G-402 PRODUCTION SO 905410292

Job Date: Tuesday, January 15, 2019

Sincerely,

SAM CARPENTER

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The Road to Excellence Starts with Safety

Sold To #: 304535	Ship To #: 3835189	Quote #:	Sales Order #: 0905410292
Customer: PDC ENERGY-EBUS		Customer Rep: VAUGHN	
Well Name: THISTLE DOWN		Well #: 31G-402	API/UWI #: 05-123-45746-00
Field: WATTENBERG	City (SAP): KERSEY	County/Parish: WELD	State: COLORADO
Legal Description: NE SW-31-5N-64W-1519FSL-1357FWL			
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 152	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HX38199		Srvc Supervisor: Lance Carpenter	

Job

Formation Name	
Formation Depth (MD)	Top Bottom
Form Type	BHST
Job depth MD	12856ft Job Depth TVD 7705
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	2562		
Casing		5.5	4.778	20			0	12856		
Open Hole Section			8.5				2562	6700		
Open Hole Section			8.5				6700	12863		

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	5.5			12856	Top Plug	5.5	1	
Float Shoe	5.5				Bottom Plug	5.5	1	
Float Collar	5.5			12842	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

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	12.5 lb/gal Tuned Spacer III	Tuned Spacer III	150	bbl	12.5	2.72	16.8		

205.69 lbm/bbl		BARITE, BULK (100003681)							
34.60 gal/bbl		FRESH WATER							
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		6	7.73
5.13 Gal		FRESH WATER							
0.10 Gal		D-AIR 3000L, TOTETANK (101396181)							
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	876	sack	14.4	1.7		8	7.29
0.50 %		HR-5, 50 LB SK (100005050)							
7.32 Gal		FRESH WATER							
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				
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		265	bbl	8.34				
Cement Left In Pipe		Amount	14 ft		Reason			Shoe Joint	
Mix Water:		pH 7	Mix Water Chloride: 150 ppm		Mix Water Temperature:			68 °F °C	
Cement Temperature:		## °F °C		Plug Displaced by: ## lb/gal kg/m3 XXXX		Disp. Temperature:			## °F °C
Plug Bumped?		Yes		Bump Pressure: 2420 psi MPa		Floats Held?			Yes
Cement Returns:		## bbl m3		Returns Density: 13 lb/gal kg/m3		Returns Temperature:			## °F °C
Comment JOB WENT WELL. ALL 150 BBL SPACER TO SURFACE AND 30 BBL CEMENT TO SURFACE. BUMP PLUG FINAL CIRCULATING PRESSURE 2420 AT 3 BPM. TOOK TO 2900 PSI AND HELD FOR 5 MINUTES. PRESSURED UP TO 3850 TO OPEN WET SHOE SUB AND PUMPED 5 BBL. FULL RETURNS THROUGHOUT THE JOB. TOP OF TAIL 6200'									

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	Check Floats	Call Out	1/15/2019	00:00:00	USER					CREW CALLED OUT WHILE ON ANOTHER LOCATION. ON LOCATION TIME 0930
Event	2	Depart Shop for Location	Depart Shop for Location	1/15/2019	07:30:00	USER					CREW HAS JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING ROUTE, CONVOY ORDER, FOLLOWING DISTANCE AND DEPARTS FOR LOCATION
Event	3	Arrive At Loc	Arrive At Loc	1/15/2019	08:30:00	USER					CREW ARRIVES AT LOCATION. SPILL CONTAINMENT NOT ARRIVED YET. RIG RIH CASING 10800'.
Event	4	Comment	Comment	1/15/2019	09:30:00	USER					SPILL CONTAINMENT ARRIVES. CREW HAS PRE RIG UP SAFETY MEETING DISCUSSING ROLES, HAZARDS, OTHER OPERATIONS AND BEGIN SPOTTING EQUIPMENT AND RIGGING UP
Event	5	Casing on Bottom	Casing on Bottom	1/15/2019	10:45:00	USER					CASING ON BOTTOM. RIG BEGINS CIRCULATION. CIRCULATED 10 BPM AT 800 PSI, FULL RETURNS
Event	6	Comment	Comment	1/15/2019	13:45:00	USER	15.00	8.42	0.00	32.80	CREW RIGGED UP TO THE FLOOR. WAITING ON SAFETY MEETING TO BEGIN. LATEX MIXED UP AND SHEARED FOR 1 HOUR

Event	7	Safety Meeting - Pre Job	Safety Meeting - Pre Job	1/15/2019	14:45:00	USER	13.00	8.41	0.00	32.80	CREW, RIG CREW AND CUSTOMER REP HAVE PRE JOB SAFETY MEETING DISCUSSING HAZARDS, JOB PROCEEDURE, RED ZONES, ROLES AND RESPONSIBILITES
Event	8	Start Job	Start Job	1/15/2019	14:56:53	COM6	22.00	8.41	0.00	32.80	START JOB
Event	9	Test Lines	Test Lines	1/15/2019	15:08:57	COM6	12.00	8.57	0.00	32.80	FILL LINES WITH 3 BBL WATER. TEST HES LINES TO 4500 PSI. HOLD FOR 5 MINUTES. TEST GOOD.
Event	10	Pump Spacer 1	Pump Spacer 1	1/15/2019	15:21:56	COM6	43.00	8.49	0.00	0.00	PUMP 150 BBL 12.5# TUNED SPACER 1.55 YIELD 16.8 GAL
Event	11	Drop Bottom Plug	Drop Bottom Plug	1/15/2019	15:45:44	COM6	142.00	12.10	4.00	137.20	LAUNCHED BOTTOM PLUG ON THE FLY AT END OF SPACER. SLOWED RATE TO 4 BPM
Event	12	Pump Lead Cement	Pump Lead Cement	1/15/2019	15:46:45	COM6	158.00	12.50	3.90	141.20	PUMP 287 BBL GASSTOP 13.2# 1.55 YIELD 7.73 GAL 1040 SACKS
Event	13	Pump Tail Cement	Pump Tail Cement	1/15/2019	16:29:36	COM6	214.00	13.72	4.00	311.30	PUMP 265 BBL ELASTICEM 14.4# 1.7 YIELD 7.29 GAL 876 SACKS
Event	14	Check Weight	Check Weight	1/15/2019	16:33:11	COM6	717.00	14.21	8.00	27.20	
Event	15	Shutdown	Shutdown	1/15/2019	17:10:38	USER	71.00	14.29	0.00	277.90	SHUTDOWN. BLOW DOWN LINES TO THE PIT. WASH PUMP TO THE PIT.
Event	16	Drop Top Plug	Drop Top Plug	1/15/2019	17:30:56	COM6	18.00	9.01	0.00	293.40	DROP TOP PLUG
Event	17	Pump Displacement	Pump Displacement	1/15/2019	17:32:24	COM6	14.00	8.36	0.00	293.40	PUMP 285 BBL WATER DISPLACEMENT 8.34# WITH MMCR IN THE FIRST 20 BBL AND BIOCIDIE IN ALL EXCEPT THE LAST 10 BBL

Event	18	Other	Other	1/15/2019	17:36:11	USER	106.00	8.34	4.90	17.00	CAUGHT CEMENT AT 18 BBL AWAY. PICKED RATE UP TO 8 BPM
Event	19	Slow Rate	Slow Rate	1/15/2019	18:15:02	USER	2733.00	8.38	5.50	261.20	SLOW RATE TO 3 BPM TO BUMP AT 260 AWAY
Event	20	Bump Plug	Bump Plug	1/15/2019	18:20:08	COM6	2852.00	8.37	0.80	277.50	BUMP PLUG. FINAL CIRCULATING PRESSURE 2420 PSI. TOOK TO 2900 PSI AND HELD FOR 5 MINUTES
Event	21	Other	Other	1/15/2019	18:26:26	USER	3065.00	8.37	0.00	277.50	OPEN WET SHOE SUB AT 3850 PSI. PUMP 5 BBL WET SHOE
Event	22	Check Floats	Check Floats	1/15/2019	18:29:52	USER	1989.00	8.36	0.00	283.90	CHECK FLOATS. FLOATS HELD. 2 BBL BACK
Event	23	Safety Meeting - Pre Rig-Down	Safety Meeting - Pre Rig-Down	1/15/2019	18:35:00	USER	11.00	8.32	0.00	283.90	CREW HAS PRE RIG DOWN SAFETY MEETING DISCUSSING HAZARDS, RIG OPERATIONS, ROLES AND BEGIN RIGGING DOWN EQUIPMENT
Event	24	Depart Location	Depart Location	1/15/2019	20:00:00	USER					CREW DEPARTS FROM LOCATION AFTER HAVING JOURNEY MANAGEMENT SAFETY MEETING DISCUSSING HOURS OF SERVICE, FOLLOWING DISTANCES, CONVOY ORDER AND ROUTE