

HALLIBURTON

iCem[®] Service

PDC ENERGY-EBUS

Date: Friday, July 07, 2017

Josephine 19M-404 Production

Job Date: Monday, July 03, 2017

Sincerely,

Julia Nichols

Legal Notice

Disclaimer:

All information in this report is provided subject to the terms and conditions which govern the services provided by Halliburton. Halliburton personnel use their best efforts in gathering information and their best judgment in interpreting it, but any interpretation, research, analysis or recommendation furnished by Halliburton are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and empirical relationships and assumptions are not infallible, and with respect to which professionals in the industry may differ. Accordingly, HALLIBURTON IS UNABLE TO GUARANTEE THE ACCURACY OF ANY CHART INTERPRETATION, RESEARCH ANALYSIS, OR JOB RECOMMENDATION and any interpretation or recommendation is not for use of or reliance upon by any third party. The customer has full responsibility for any of its decisions which are based on the information provided in this report.

Table of Contents

1.0	Cementing Job Summary	4
1.1	Executive Summary	4
2.0	Real-Time Job Summary	7
2.1	Job Event Log	7
3.0	Attachments.....	10
3.1	Custom Results – Job Chart with Events	10
3.2	Custom Results – Job Chart without Events.....	11
3.3	Lab Report	12

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Josephine 19M-404** 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 80 barrels 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 [Ft. Lupton]

HALLIBURTON

Cementing Job Summary

1The Road to Excellence Starts with Safety

Sold To #: 304535	Ship To #: 3797060	Quote #:	Sales Order #: 0904129879
Customer: PDC ENERGY-EBUS		Customer Rep:	
Well Name: JOSEPHINE	Well #: 19M-404	API/UWI #: 05-123-44674-00	
Field: WATTENBERG	City (SAP): KERSEY	County/Parish: WELD	State: COLORADO
Legal Description: SW NE-19-5N-64W-1699FNL-2150FEL			
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 158	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA/H139013		Srvc Supervisor:	
Job			

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type			BHST
Job depth MD	13154ft		Job Depth TVD
Water Depth			Wk Ht Above Floor
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	1665		1665
Casing		5.5	4.778	20			0	13154		6893
Open Hole Section			0.5				1665	13167	1665	6893

Tools and Accessories									
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	5.5	1	WEATH	13154		Top Plug	5.5	1	WEATH
Float Shoe	5.5	1	WEATH	13154		Bottom Plug			
Float Collar						SSR plug set			
Insert Float	5.5	1	WEATH	13122		Plug Container	5.5	1	HES
Stage Tool						Centralizers	5.5	240	WEATH

Fluid Data										
Stage/Plug #: 1										
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
1	Mud Flush III (Powder)	Mud Flush III	50	bbbl	8.4			4		
42 gal/bbl		FRESH WATER								
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	

HALLIBURTON

Cementing Job Summary

2	12.0 lb/gal Tuned Spacer III	Tuned Spacer III	50	bbl	12	3.16		4	
35.20 gal/bbl		FRESH WATER							
176.58 lbm/bbl		BARITE, BULK (100003681)							
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	2135	sack	13.2	1.57		8	7.53
61.10 lbm		TYPE I / II CEMENT, BULK (101439798)							
7.53 Gal		FRESH WATER							
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	Displacement fluid		284	bbl	8.33			8	
Cement Left In Pipe	Amount	ft	Reason					Shoe Joint	
Mix Water:	pH 7.0		Mix Water Chloride:	0		Mix Water Temperature:	75 °F		
Cement Temperature:	## °F		Plug Displaced by:	8.33 lb/gal		Disp. Temperature:	75 °F		
Plug Bumped?	Yes		Bump Pressure:	psi		Floats Held?	Yes		
Cement Returns:	80 bbl		Returns Density:	13.2 lb/gal		Returns Temperature:	## °F		
Comment:80 BBLs CEMENT TO SURFACE.									

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	DS Pump Press <i>(psi)</i>	Comments
Event	1	Call Out	Call Out	7/2/2017	23:30:00	USER				CREW CALLED OUT AT 23:30, REQUESTED ON LOCATION 06:30. CREW PICKED UP CEMENT, CHEMICALS, AND PLUG CONTAINER FROM FT. LUPTON, CO. BULK 660 11566182, AND PUMP 11512092.
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	7/3/2017	03:00:00	USER				DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.
Event	3	Crew Leave Yard	Crew Leave Yard	7/3/2017	03:30:00	USER				STARTED JOURNEY MANAGEMENT.
Event	4	Arrive at Location from Service Center	Arrive at Location	7/3/2017	06:00:00	USER				END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625" 36 LB/FT @ 1,665', 5.5" CASING: 20 LB/FT TOTAL 13,154', 8.5" HOLE, TD 13,167', 31.64 SHOE TRAC, TVD- 6,893'. PUMP FRESH WATER DISPLACEMENT WITH MMCR. CASING LANDED @ 06:00 07/03/2017. RIG CIRCULATED 2 BOTTOMS UP.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	7/3/2017	06:15:00	USER				HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
Event	6	Rig-Up Equipment	Rig-Up Equipment	7/3/2017	06:30:00	USER				CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.
Event	7	Safety Meeting - Pre Job	Safety Meeting - Pre Job	7/3/2017	09:00:00	USER	8.48	9.80	271.00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
Event	8	Start Job	Start Job	7/3/2017	09:16:22	COM4	8.47	0.00	-8.00	BEGIN RECORDING JOB DATA.
Event	9	Test Lines	Test Lines	7/3/2017	09:25:45	COM4	8.55	0.00	4836.00	PRESSURE TESTED IRON TO 5000 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 800 PSI, 5TH GEAR STALL OUT @ 2000 PSI.
Event	10	Pump Spacer 1	Pump Spacer 1	7/3/2017	09:32:23	COM4	8.54	3.00	456.00	PUMP 50 BBLS OF MUD FLUSH @ 8.4 LBS/GAL.
Event	11	Check Weight	Check Weight	7/3/2017	09:45:52	COM4	8.70	4.60	703.00	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.

Event	12	Pump Spacer 2	Pump Spacer 2	7/3/2017	09:46:33	COM4	12.06	4.70	636.00	PUMP 50 BBLS OF TUNED SPACER @ 12.0 LB/GAL, 5 GALLONS D-AIR. DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	13	Check Weight	Check Weight	7/3/2017	09:55:31	COM4	12.62	3.20	357.00	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	14	Pump Lead Cement	Pump Lead Cement	7/3/2017	09:55:45	COM4	13.06	4.60	504.00	PUMP 2135 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.57 FT3/SK, 7.53 GAL/SK, 647.31 BBLS. HOT CALCULATED @ 13,154', TOT CALCULATED @ SURFACE. CALCULATED TO GET 99 BBLS CEMENT BACK TO SURFACE. DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	15	Check Weight	Check Weight	7/3/2017	10:18:24	COM4	13.19	7.50	351.00	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
Event	16	Shutdown	Shutdown	7/3/2017	11:31:53	USER	13.03	3.20	80.00	SHUTDOWN TO LINE UP MANIFOLD TO WASH PUMPS AND LINES AND BLOW AIR DOWN TO WASH UP PIT.
Event	17	Clean Lines	Clean Lines	7/3/2017	11:41:18	USER	24.49	0.00	-26.00	WASHED PUMPS AND LINES BEFORE DISPLACING TOP PLUG.
Event	18	Drop Top Plug	Drop Top Plug	7/3/2017	11:47:07	COM4				PLUG LEFT CONTAINER, VERIFIED BY CO. MAN.
Event	19	Pump Displacement	Pump Displacement	7/3/2017	11:50:02	COM4	8.07	0.00	-26.00	BEGIN CALCULATED DISPLACEMENT OF 292 BBLS WITH FRESH WATER. PUMPED THE FIRST 20 BBLS WITH MMCR, PUMPED UNTIL 280 AWAY WITH BIOCID, AND CLAYFILL. CEMENT TO SURFACE 204 BBLS AWAY, 80 BBLS CEMENT TO SURFACE.
Event	20	Bump Plug	Bump Plug	7/3/2017	12:36:33	COM4	8.07	5.10	2414.00	PLUG BUMPED AT CALCULATED DISPLACEMENT. 2753 PSI PRESSURED 1000 PSI OVER BUMP.
Event	21	Pressure Up	Pressure Up	7/3/2017	12:44:18	USER	8.10	0.00	3457.00	PRESSURED UP TO 4220 TO SHIFT DISC AND OPEN PORTS TO PUMP 5 BBLS WET SHOE.
Event	22	Pump Water	Pump Water	7/3/2017	12:45:24	USER	8.11	0.00	2171.00	PUMPED 5 BBLS WATER FOR WET SHOE @ 4 BBLS/MIN.
Event	23	Check Floats	Check Floats	7/3/2017	12:47:02	USER	8.06	0.00	2035.00	FLOATS HELD GOT 2 BBLS BACK TO PUMP.
Event	24	End Job	End Job	7/3/2017	12:48:12	COM4				STOP RECORDING JOB DATA.
Event	25	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	7/3/2017	13:00:00	USER				DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES.
Event	26	Rig-Down Completed	Rig-Down Completed	7/3/2017	14:30:00	USER				ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL, AND LOCATION WAS CLEAN.
Event	27	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	7/3/2017	15:00:00	USER				DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW.

Event	28	Depart Location	Depart Location	7/3/2017	15:30:00	USER
-------	----	-----------------	-----------------	----------	----------	------

THANK YOU FOR USING HALLIBURTON - NICK PETERSON AND
CREW.

3.0 Attachments

3.1 Custom Results – Job Chart with Events



3.2 Custom Results – Job Chart without Events



