

HALLIBURTON

iCem[®] Service

PDC ENERGY-EBUS

Date: Wednesday, September 20, 2017

Josephine 190-204 Production

Job Date: Monday, September 04, 2017

Sincerely,
Bryce Hinsch

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Josephine 190-204** 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 20 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]

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 304535	Ship To #: 3797102	Quote #:	Sales Order #: 0904270849
Customer: PDC ENERGY-EBUS		Customer Rep:	
Well Name: JOSEPHINE	Well #: 190-204	API/UWI #: 05-123-44681-00	
Field: WATTENBERG	City (SAP): KERSEY	County/Parish: WELD	State: COLORADO
Legal Description: SW NE-19-5N-64W-1849FNL-2214FEL			
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 158	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\H139013		Svc Supervisor:	

Job

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type			BHST
Job depth MD	12902ft		Job Depth TVD
Water Depth			Wk Ht Above Floor 4
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	1649		0
Casing		5.5	4.778	20			0	12902		0
Open Hole Section			8.5				1675	12904		0

Tools and Accessories									
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	5.5		KLX	12902		Top Plug	5.5		HES
Float Shoe	5.5					Bottom Plug	5.5	1	KLX
Float Collar	5.5					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	Mud Flush III (Powder)	Mud Flush III	50	bbl	8.4					
42 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	

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Cementing Job Summary

2	12.0 lb/gal Tuned Spacer III	Tuned Spacer III	50	bbbl	12	3.16			
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 ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	ElastiCem Cap	ELASTICEM (TM) SYSTEM	150	sack	13.2	1.57		5	7.52
7.52 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	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	1922	sack	13.2	1.57		6	7.53
7.53 Gal		FRESH WATER							
61.10 lbm		TYPE I / II CEMENT, BULK (101439798)							
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		286	bbbl	8.33				
Cement Left In Pipe	Amount	33 ft		Reason	Shoe Joint				

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	DH Density (ppg)	Comments
Event	1	Call Out	Call Out	9/4/2017	05:30:00	USER				called out to be on location at 1000.
Event	2	Arrive At Loc	Arrive At Loc	9/4/2017	11:24:00	USER				cementer late to location due to paperwork issue on pickup that was sorted out by the shop. All crew arrived on location. Rig still running casing.
Event	3	Assessment Of Location Safety Meeting	Assessment Of Location	9/4/2017	11:27:00	USER				Met with company rep to go over job. TD 12904, 8.5 OH 20%xs. 5.5 20# casing 12905.19, PC 9.625 36# set at 1649. KLX plug hand on lcoation for wet shoe system.
Event	4	Safety Meeting - Pre Rig-Up	Safety Meeting - Pre Rig-Up	9/4/2017	11:29:00	USER				Discuss rig up plan, taking breaks and staying hydrated.
Event	5	Rig-Up Equipment	Rig-Up Equipment	9/4/2017	11:38:00	USER				
Event	6	Rig-Up Completed	Rig-Up Completed	9/4/2017	13:30:00	USER				rig still running in casing.
Event	7	Other	Other	9/4/2017	14:51:54	USER	0.00	-160.00	8.30	Rig on bottom, rigging down casing crew.
Event	8	Safety Meeting - Pre Job	Safety Meeting - Pre Job	9/4/2017	16:00:00	USER	0.00	-162.00	8.30	ALL HES, Rig and Company Personnel. Discuss job procedure, SWA, and any contingency plans. Rig will be running through choke during cementing. and bypass during circulation.

Event	9	Test Lines	Test Lines	9/4/2017	16:58:13	COM4	0.00	4913.00	8.47	Test kickouts 500 PSI total test 5000 PSI.
Event	10	Pump Spacer 1	Pump Spacer 1	9/4/2017	17:01:08	COM4	2.40	168.00	8.28	50 BBLS MudFlush 4 BPM 660 PSI.
Event	11	Pump Spacer 2	Pump Spacer 2	9/4/2017	17:12:50	COM4	2.50	585.00	8.85	50 BBLS Tuned SPacer 12 PPG 4 BPM, 683 PSI.
Event	12	Pump Cap Cement	Pump Cap Cement	9/4/2017	17:21:20	COM4	5.10	647.00	12.09	150 SKS 13.2 PPG, 42 BBL 7 BPM 1000 PSI.
Event	13	Pump Cement	Pump Cement	9/4/2017	17:29:13	COM4	4.20	338.00	12.92	1922 SKS 13.2 PPG, 537 BBLS, 7 BPM, 454 PSI.
Event	14	Shutdown	Shutdown	9/4/2017	18:59:19	COM4	0.00	-10.00	13.69	
Event	15	Clean Lines	Clean Lines	9/4/2017	18:59:22	COM4	0.00	-14.00	13.70	Wash up to pit.
Event	16	Drop Plug	Drop Plug	9/4/2017	19:11:17	COM4	0.00	-40.00	8.27	THird party double top plug.
Event	17	Pump Displacement	Pump Displacement	9/4/2017	19:11:19	COM4	0.00	-40.00	8.27	286 BBLS Calculated displacement, 4 BPM until we catch cement then raise it to 8 BPM.
Event	18	Bump Plug	Bump Plug	9/4/2017	19:56:23	COM4	0.00	2622.00	8.36	Reached Calculated displacement and got a bump, from 2300 PSI to 2520 PSI. Pressure fell slowly while we watched it after that.. Pumped into it to pump the 5 BBLS wet shoe.
Event	19	Other	Other	9/4/2017	20:03:41	USER	4.00	3451.00	8.39	Pressure increased to 4000 PSI and fell off good this time. Customer rep and tool hand confident tool was opened good at this time, and pumped 5 BBLS after this and shut down.
Event	20	Check Floats	Check Floats	9/4/2017	20:06:20	USER	0.00	393.00	8.31	got 2 BBLS back. Held.
Event	21	Pre-Rig Down Safety	Pre-Rig Down Safety	9/4/2017	20:10:00	USER	0.00	-38.00	8.27	Discuss sending stuff out

	Meeting	Meeting								
Event	22	Rig-Down Equipment	Rig-Down Equipment	9/4/2017	20:15:00	USER	8.80	59.00	8.29	the v-door, team lift, and trapped pressure.
Event	23	Rig-Down Completed	Rig-Down Completed	9/4/2017	22:00:00	USER				
Event	24	Safety Meeting - Departing Location	Safety Meeting - Departing Location	9/4/2017	22:30:00	USER				Discuss jounry management, Route home and DOT HOS.