

HALLIBURTON

iCem[®] Service

PDC ENERGY-EBUS

Josephine 190-314 Production

Job Date: Monday, August 28, 2017

Sincerely,

Fort Lupton District Cement

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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 190-314** 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.

5 bbls of cement 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 #: 3797063		Quote #:		Sales Order #: 0904255727				
Customer: PDC ENERGY-EBUS				Customer Rep: PDC						
Well Name: JOSEPHINE			Well #: 190-314		API/UWI #: 05-123-44680-00					
Field: WATTENBERG		City (SAP): KERSEY		County/Parish: WELD		State: COLORADO				
Legal Description: SW NE-19-5N-64W-1834FNL-2149FEL										
Contractor: ENSIGN DRLG				Rig/Platform Name/Num: ENSIGN 158						
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA/H139013				Srvc Supervisor: Gared Findley						
Job										
Formation Name										
Formation Depth (MD)		Top		Bottom						
Form Type				BHST						
Job depth MD		12921ft		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	1675		1675
Casing		5.5	4.778	20			0	12925		0
Open Hole Section			8.5				1675	12929		0
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5			12925		Top Plug	5.5		HES	
Float Shoe	5.5					Bottom Plug	5.5		HES	
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	

last updated on 8/29/2017 4:17:07 AM

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Cementing Job Summary

2	12.0 lb/gal Tuned Spacer III	Tuned Spacer III	50	bbl	12	3.13			
35.30 gal/bbl		FRESH WATER							
178.42 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	2179	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 ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	Displacement fluid		286	bbl	8.33				
Cement Left in Pipe									
Amount	ft	Reason					Shoe Joint		
Comment									

2.0 Real-Time Job Summary

2.1 Job Event Log

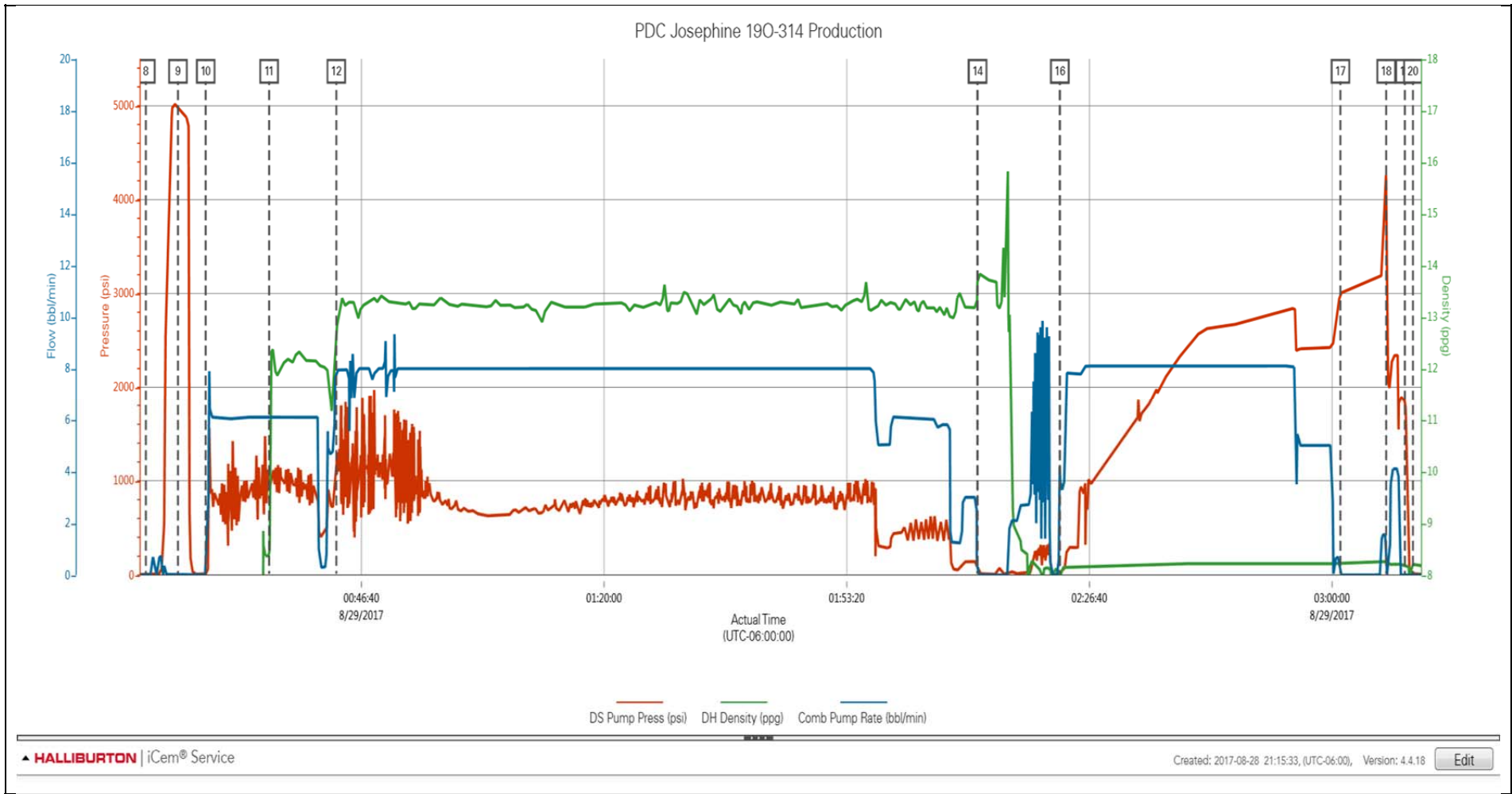
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DS Pump Press (psi)	DH Density (ppg)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	Call Out	8/28/2017	16:30:00	USER					Called out to be on location at 1730.
Event	2	Arrive At Loc	Arrive At Loc	8/28/2017	20:15:00	USER					Arrived at location. Rig Running Casing.
Event	3	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	8/28/2017	20:16:00	USER					Met with company reps to go over job. Weatherford hand on location to run plugs and wet shoe system. TD 12929 TP 12925.69 5.5 20#, pc 9.625 at 1675. 8.5 OH.
Event	4	Safety Meeting - Pre Rig-Up	Safety Meeting - Pre Rig-Up	8/28/2017	20:30:00	USER					Discuss rig up and spotting equipment plan. Met with third party to go over containment mats and pump for water.
Event	5	Rig-Up Equipment	Rig-Up Equipment	8/28/2017	20:31:00	USER					Run iron and hoses, Spot equipment.
Event	6	Rig-Up Completed	Rig-Up Completed	8/28/2017	22:55:00	USER	1.30	15.00	0.00	0.90	Everything rigged up except the standpipe, which we will do after safety meeting. Rig circulating on well.
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	8/28/2017	23:20:00	USER	0.00	-1.00	0.00	19.30	ALL HES RIG And Company personnel. Discuss job procedure, SWA and any contingency plans. Rig is finishing their circulation and then we will rig up head.

Event	8	Start Job	Start Job	8/29/2017	00:17:03	COM4	0.00	0.00	0.00	19.30	
Event	9	Test Lines	Test Lines	8/29/2017	00:21:28	COM4	0.00	4978.00	0.00	20.00	Test Kickouts 500 PSI total test 5000 PSI.
Event	10	Pump Spacer 1	Pump Spacer 1	8/29/2017	00:25:16	COM4	0.00	11.00	0.00	20.00	50 BBLS Mud Flush 6 BPM 850 PSI.
Event	11	Pump Spacer 2	Pump Spacer 2	8/29/2017	00:33:59	COM4	6.10	894.00	8.37	50.90	50 BBLS Tuned Spacer 12 PPG 6 BPM 1000 PSI.
Event	12	Pump Cement	Pump Cement	8/29/2017	00:43:13	COM4	7.90	1188.00	12.66	0.10	Pump 2179 SKS 609 BBLS 13.2 PPG elasticem, 8 BPM 1008 PSI.
Event	13	Shutdown	Shutdown	8/29/2017	02:11:16	COM4	0.00	85.00	13.63	658.40	
Event	14	Clean Lines	Clean Lines	8/29/2017	02:11:19	COM4	0.00	65.00	13.81	658.40	Wash lines to wash up pit.
Event	15	Pump Displacement	Pump Displacement	8/29/2017	02:22:35	COM4	4.20	24.00	7.29	0.00	Pump 286 BBLS FW, 1st 20 MMCR added, Third party biocide and cla-stay added.
Event	16	Drop Plug	Drop Plug	8/29/2017	02:22:37	COM4	4.20	36.00	7.52	0.20	Weatherford wet shoe system.
Event	17	Bump Plug	Bump Plug	8/29/2017	03:01:09	COM4	0.00	2991.00	8.23	282.70	Land plug at calculated, 2450 PSI take to 3000 PSI. Good returns throughout job, got back all of the mud flush and spacer and 5 BBLS cement back.
Event	18	Other	Other	8/29/2017	03:07:26	USER	0.00	4255.00	8.28	283.70	Pressure up and open wet shoe system at 4173 PSI. Pump 5 BBLS MCMR water past shoe.
Event	19	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	8/29/2017	03:10:00	USER	0.00	1856.00	8.20	288.50	Discuss using forklift on the standpipe and team lift heavy iron.
Event	20	Check Floats	Check Floats	8/29/2017	03:11:07	USER	0.00	4.00	8.21	288.50	2 BBLS Back. Held.
Event	21	Rig-Down Equipment	Rig-Down Equipment	8/29/2017	03:19:00	USER	0.70	3.00	8.13	289.30	

Event	22	Rig-Down Completed	Rig-Down Completed	8/29/2017	05:45:00	USER	
Event	23	Safety Meeting - Departing Location	Safety Meeting - Departing Location	8/29/2017	06:00:00	USER	Discuss Journey management and route home.

3.0 Job Chart

3.1 Job Chart



4.0 Lab Results

4.1 Lab Results

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Rockies, Brighton

Lab Results- Primary

Job Information

Request/Slurry	2412724/1	Rig Name	ENSIGN 158	Date	24/AUG/2017
Submitted By	Ryan Keeran	Job Type	Production Casing	Bulk Plant	Brighton
Customer	PDC Energy	Location	Weld	Well	Josephine 19O-314

Well Information

Casing/Liner Size	5.5 in	Depth MD	12947 ft	BHST	101°C / 213°F
Hole Size	8.5 in	Depth TVD	6709 ft	BHCT	82°C / 180°F
Pressure	3996 psi				

Cement Information - Primary Design

Cement Properties

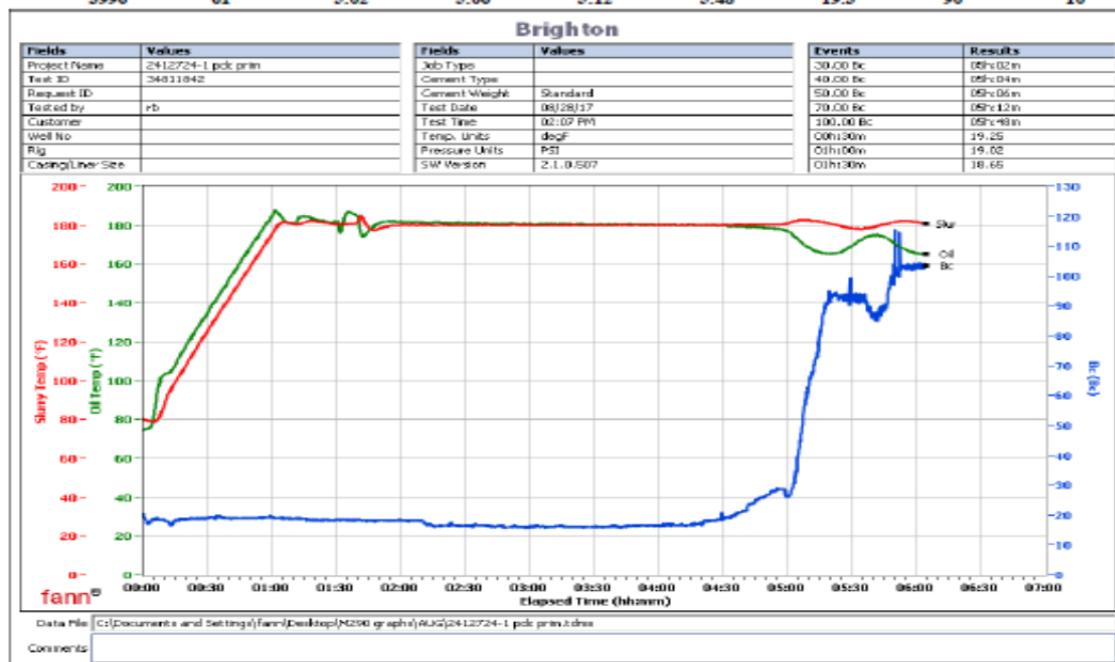
Slurry Density	13.2	lbm/gal
Slurry Yield	1.57	#3/sack
Water Requirement	7.53	gal/sack

Operation Test Results Request ID 2412724/1

Thickening Time - ON-OFF-ON

28/AUG/2017

Test Temp (°F)	Pressure (psi)	Reached in (min)	30 Bc (hh:mm)	50 Bc (hh:mm)	70 Bc (hh:mm)	100 Bc (hh:mm)	Start Bc	Stirring before stop (mins)	Static Period (min)
180	3996	61	5:02	5:06	5:12	5:48	19.3	90	10



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