

HALLIBURTON

iCem[®] Service

PDC ENERGY - EBUS

Date: Tuesday, June 13, 2017

Gillham 18Y-314 Production

Job Date: Wednesday, June 07, 2017

Sincerely,

Justin Lansdale

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.....	12
3.1	Job Chart.....	12
3.2	Lab Report	14

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Gillham 18Y-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.

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]

The Road to Excellence Starts with Safety

Sold To #: 304535	Ship To #: 3769849	Quote #:	Sales Order #: 0904078643
Customer: PDC ENERGY-EBUS		Customer Rep: Dean Haight	
Well Name: GILLHAM	Well #: 18Y-314	API/UWI #: 05-123-43914-00	
Field: WATTENBERG	City (SAP): GREELEY	County/Parish: WELD	State: COLORADO
Legal Description: SE SE-18-5N-64W-883FSL-414FEL			
Contractor: ENSIGN DRLG		Rig/Platform Name/Num: ENSIGN 158	
Job BOM: 7523 7523			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA/H139013		Srvc Supervisor: Nicholas Roles	

Job

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type	BHST		
Job depth MD	12052ft	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	1658		1658
Casing		5.5	4.778	20			0	12052		6800
Open Hole Section			8.5				1658	12052	1658	6800

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	5.5				Top Plug	5.5		HES
Float Shoe	5.5			12052	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			5	
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
2	12.0 lb/gal Tuned Spacer III	Tuned Spacer III	50	bbl	12	3.16		5	
35.35 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	13.2# ElastiCem	ELASTICEM (TM) SYSTEM	2110	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 ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	Displacement fluid		274	bbl	8.33			7	
Cement Left In Pipe		Amount	0ft	Reason				Wet Shoe	
Comment Got 26bbls cement to surface.									

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comments
Event	1	Call Out	Call Out	6/6/2017	18:30:00	USER	Crew call out for o/l at 0030
Event	2	Arrive at Location from Service Center	Arrive at Location from Service Center	6/6/2017	21:00:00	USER	Met with company man to discuss job details and procedure. Performed hazard hunt and site assessment.
Event	3	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/6/2017	21:45:00	USER	All crew aware of hazards and directions. All fit to drive.
Event	4	Depart from Service Center or Other Site	Depart from Service Center or Other Site	6/6/2017	22:00:00	USER	Started journey management.
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	6/6/2017	23:30:00	USER	All hse present. Discussed bulk and iron placement and all red zone areas. Caution taped high pressure zones.
Event	6	Other	Other	6/7/2017	01:30:00	USER	Water Test- PH-6 Chlo-0 Temp-60 Cement temp-70

Event	7	Safety Meeting - Pre Job	Safety Meeting - Pre Job	6/7/2017	03:30:00	USER	Discussed job associated hazards, contingencies and job procedure with all job associated personel.
Event	8	Start Job	Start Job	6/7/2017	03:56:52	COM4	TD-12052',TP-12049' 5.5" 20#,FC-12016', TVD-6800', OH-8.5", SURF-1658' 9.625" 36#,MUD-9.8#
Event	9	Test Lines	Test Lines	6/7/2017	04:00:51	COM4	Filled lines with 5bbls fresh water, closed manifold and performed 500psi k/o function test, proceeded with 5th gear stall at 1843psi, continued to bring pressure to 5000psi. Held with no leaks.
Event	10	Pump Spacer 1	Pump Spacer 1	6/7/2017	04:09:08	COM4	Pumped 50bbls fresh water with 200lbs of Mud Flush III at 5bpm 630psi.
Event	11	Pump Spacer 2	Pump Spacer 2	6/7/2017	04:20:43	COM4	Pumped 50bbls of Tuned Spacer III with 5g D-Air at 5bpm 640psi.
Event	12	Check Weight	Check Weight	6/7/2017	04:23:19	COM4	Weight verified with pressurized mud scales.
Event	13	Pump Lead Cement	Pump Lead Cement	6/7/2017	04:38:50	COM4	Pumped 2110sks or 590bbls of Elasticem at 13.2# 1.57y 7.54g/s at 8bpm 680psi.
Event	14	Standby - Other - see comments	Standby - Other - see comments	6/7/2017	04:41:49	USER	About 20bbls into cement, truck started to cavitate really bad, tried slowing rate on both sides of HT's and did not improve. Pumped at 8bbls a min according to flecs, however according to mix rate and flowmeter on water, calculated about 6-6.5bpm for cement with pressure anywhere

from 120psi-1120psi.

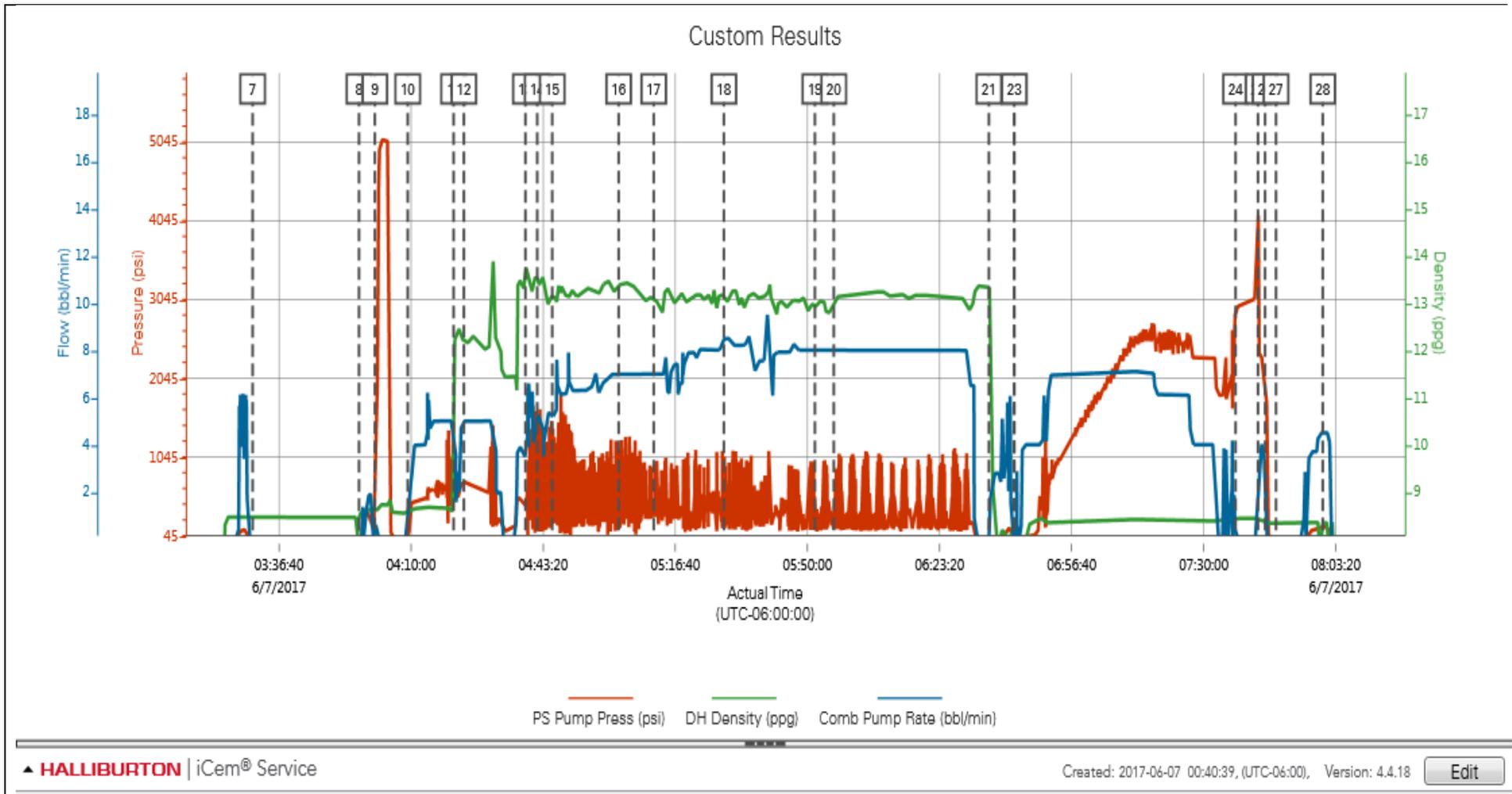
Event	15	Check Weight	Check Weight	6/7/2017	04:45:35	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	16	Check Weight	Check Weight	6/7/2017	05:02:22	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	17	Check Weight	Check Weight	6/7/2017	05:11:12	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	18	Check Weight	Check Weight	6/7/2017	05:28:55	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	19	Check Weight	Check Weight	6/7/2017	05:51:52	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	20	Check Weight	Check Weight	6/7/2017	05:56:37	COM4	Weight verified with pressurized mud scales.
<hr/>							
Event	21	Other	Other	6/7/2017	06:35:46	COM4	Weight verified with pressurized mud scales.
<hr/>							

Event	22	Drop Top Plug	Drop Top Plug	6/7/2017	06:42:07	COM4	Dropped by HES supervisor, witnessed by Weatherford tool hand and company man.
Event	23	Pump Displacement	Pump Displacement	6/7/2017	06:42:11	COM4	Pumped 274bbbls fresh water at 7bpm 2100psi. Calculated displacement was 266.7bbbls, pumped 8bbbls on top to bump plug.
Event	24	Bump Plug	Bump Plug	6/7/2017	07:38:01	COM4	Slowed rate to 4bpm at 245bbbls gone. Final circulating pressure-2273psi. Bumped at 2900psi, held for 5min casing test.
Event	25	Pressure Up Well	Pressure Up Well	6/7/2017	07:43:39	USER	After bump plug, pumped until plug set at 4117psi, continued to pump 5bbbls at 4bpm 2080psi for wet shoe.
Event	26	Check Floats	Check Floats	6/7/2017	07:45:28	USER	Released pressure and got 1.5bbbls fresh water back to truck, floats held.
Event	27	End Job	End Job	6/7/2017	07:48:12	COM4	Got 26bbbls cement to surface.
Event	28	Safety Meeting - Pre Rig-Down	Safety Meeting - Pre Rig-Down	6/7/2017	08:00:00	USER	All HSE present. Discussed red zone areas and trapped pressure hazards. Watch for suspended loads and rig down procedures, including hand placement, lifting techniques, and swing radius.
Event	29	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/7/2017	10:45:00	USER	All HSE present and fit to drive. Aware of directions and hazards.

Event	30	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	6/7/2017	11:00:00	USER	Pre journey managment prior to departure.
-------	----	--	--	----------	----------	------	---

3.0 Attachments

3.1 Job Chart



3.2 Lab Report

4.0 HALLIBURTON

Lab Results- Primary

Rockies, Brighton

Job Information

Request/Slurry	2391951/3	Rig Name	ENSIGN 158	Date	03/JUN/2017
Submitted By	Justin Lansdale	Job Type	Production Casing	Bulk Plant	Brighton
Customer	PDC Energy	Location	Weld	Well	Gillham 18Y-314

Well Information

Casing/Liner Size	5.5 in	Depth MD	12055 ft	BHST	101°C / 214°F
Hole Size	8.5 in	Depth TVD	6653 ft	BHCT	82°C / 180°F
Pressure	3966 psi				

Cement Information - Primary Design



Cement Properties

Slurry Density	13.2	lbm/gal
Slurry Yield	1.57	ft3/sack
Water Requirement	7.53	gal/sack

Operation Test Results Request ID 2391951/3

Thickening Time - ON-OFF-ON

04/JUN/2017

Test Temp (°F)	Pressure (psi)	Reached in (min)	30 Bc (hh:min)	50 Bc (hh:min)	70 Bc (hh:min)	100 Bc (hh:min)	Start Bc	Stirring before stop (mins)	Static Period (min)
180	3966	59	3:28	3:34	3:39	3:41	8.7	90	10