

HALLIBURTON

iCem[®] Service

ANADARKO PETROLEUM CORP - EBUS

For:

Date: Saturday, February 14, 2015

Butterball 37N-10HZ Surface

Case 1

Sincerely,

Derek Trier

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Butterball 37N-10HZ** cement **Surface** 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 [Brighton]

Job Times

	Date	Time	Time Zone
Called Out	2/13/2015	2030	MTN
On Location		0035	
Job Started		0317	
Job Completed		0446	
Departed Location		0550	

1.2 Cementing Job Summary

Sold To #: 300466		Ship To #: 3642195		Quote #:		Sales Order #: 0902127708				
Customer: ANADARKO PETROLEUM CORP - EBUS					Customer Rep: Randy Case					
Well Name: BUTTERBALL			Well #: 37N-10HZ			API/UWI #: 05-123-40991-00				
Field: WATTENBERG		City (SAP): IONE		County/Parish: WELD			State: COLORADO			
Legal Description: NW NE-10-2N-67W-627FNL-1489FEL										
Contractor: ADVANCED ENERGY					Rig/Platform Name/Num: ADVANCED 10					
Job BOM: 7521										
Well Type: HORIZONTAL GAS										
Sales Person: HALAMERICA\HB60191					Srvc Supervisor: Devin Birchell					
Job										
Formation Name										
Formation Depth (MD)		Top			Bottom					
Form Type					BHST					
Job depth MD		1148ft			Job Depth TVD					
Water Depth					Wk Ht Above Floor					
Perforation Depth (MD)					To					
Well Data										
	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		J-55	0	1138		
Open Hole Section			13.5				0	1148		
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	9.625	1				Top Plug	9.625	1	HES	
Float Shoe	9.625	1		1138		Bottom Plug	9.625		HES	
Float Collar	9.625	1		1096		SSR plug set	9.625		HES	
Insert Float	9.625	1				Plug Container	9.625	1	HES	
	9.625	1				Centralizers	9.625	1	HES	
Miscellaneous Materials										
Gelling Agt		Conc		Surfactant		Conc		Acid Type	Qty	
Treatment Fld		Conc				Conc		Sand Type		
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	Fresh Water Spacer	Fresh Water Spacer	10	bbl	8.33				
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
2	Fresh Water Spacer with Red Dye	Fresh Water Spacer with Red Dye	10	bbl	8.33				
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	Lead Cement	SWIFTCEM (TM) SYSTEM	437	sack	14.2	1.54		6	7.66
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	Displacement	85	bbl	8.33				
		Amount	42 ft						
Comment									

1.4 Planned Pumping Schedule

- 1. Fill Lines with Water**
 - a. Density = 8.3 lb/gal
 - b. Volume = 2 bbl
- 2. Pressure Test Lines to 2720 psi**
- 3. Pump Fresh Water Spacer**
 - a. Density = 8.33 lb/gal
 - b. Volume = 10 bbl
 - c. Rate = 3 bpm
- 4. Pump X Spacer**
 - a. Density = 8.3 lb/gal
 - b. Volume = 10 bbl
 - c. Rate = 3 bpm
- 5. Pump X Spacer**
 - a. Density = 8.3 lb/gal
 - b. Volume = 10 bbl
 - c. Rate = 3 bpm
- 6. Pump X (Tail)**
 - a. Density = 14.2 lb/gal
 - b. Yield = 1.54 ft³/sk
 - c. Water Requirement = 7.66 gal/sk
 - d. Volume = 437 sks (120 bbls)
 - e. Rate = 5 bpm
- 7. Drop Top Plug**
- 8. Start Displacement**
- 9. Pump Displacement Water**
 - a. Density = 8.33 lb/gal
 - b. Volume = 85 bbls
 - c. Rate = 5 bpm

Calculated Total Displacement = 85 bbls

1.5 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	34
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	Wbm
3	Actual mud density	lb/gal	
4	Time circulated before job	HH:MM	
5	Mud volume circulated	Bbls	
6	Rate at which well was circulated	Bpm	
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	
9	Time from end mud circulation to start of job	HH:MM	00:20
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	85.4
12	Job displaced by	Rig/HES	HES
13	Annular before job)?	Y/N	N
14	Annular flow after job	Y/N	N
15	Length of rat hole	Ft	10
16	Units of gas detected while circulating	Units	0
17	Was lost circulation experienced at any time ?	Y/N	N

1.6 Water Field Test

Item	Recorded Test Value	Units	Max. Acceptable Limit	Potential Problems in Exceeding Limit
pH	7	----	6.0 - 8.0	Chemicals in the water can cause severe retardation
Chlorides	0	ppm	3000 ppm	Can shorten thickening time of cement
Sulfates	0	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness	0	ppm	500 mg/L	High concentrations will accelerate the set of the cement
Calcium	0	ppm	500 ppm	High concentrations will accelerate the set of the cement
Total Alkalinity	0	ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3).
Bicarbonates	0	ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all
Potassium	0	ppm	5000 ppm	High concentrations will shorten the pump time of cement (indicates the presence of chlorides, therefore if Potassium levels are measured as high, so should the chlorides)
Iron	0	ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature	56	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

1.7 Job Event Log

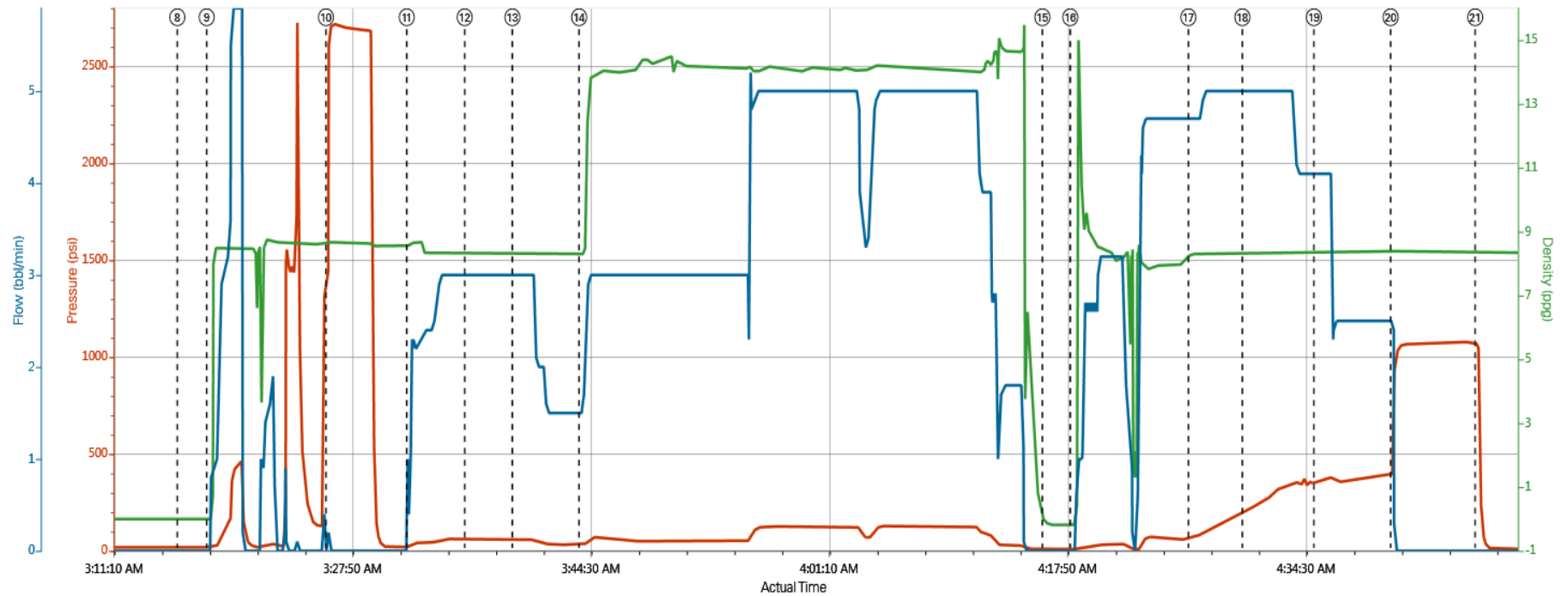
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Truck 1 Pr (psi)	Truck 1 Dens (ppg)	Truck 1 Slry Rt (bbl/min)	Comment
Event	1	Call Out	Call Out	2/13/2015	20:30:14	USER				called cement crew out for anadarko butterball37n-10hz
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/13/2015	23:45:12	USER				discussed route weather other traffic and fallowing distance
Event	3	Depart from Service Center or Other Site	Depart from Service Center or Other Site	2/14/2015	00:05:12	USER				called journey and departed for location
Event	4	Arrive At Loc	Arrive At Loc	2/14/2015	00:35:12	USER				ended journey and talked to company rep
Event	5	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/14/2015	00:45:45	USER				discussed equipment spotting hand placement team lifting
Event	6	Rig-Up Equipment	Rig-Up Equipment	2/14/2015	00:50:12	USER				spot pump and rig up water hoses and run iron to red zone
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/14/2015	02:50:12	USER	20.00	0.00	0.00	discussed job procedures with rig and cement crews
Event	8	Rig-Up Completed	Rig-Up Completed	2/14/2015	03:15:45	USER	19.00	0.00	0.00	loaded plug and conected cement head to casing
Event	9	Prime Pumps	Prime Pumps	2/14/2015	03:17:48	USER	19.00	0.00	0.00	filled pump and lines ready for pressure test
Event	10	Pressure Test	Pressure Test	2/14/2015	03:26:08	USER	2508.00	8.63	0.20	test pump and lines to 2720 psi
Event	11	Pump Spacer 1	Pump Spacer 1	2/14/2015	03:31:47	COM1	23.00	8.57	1.00	pump 10 bbls fresh water spacer
Event	12	Pump Spacer 2	Pump Spacer 2	2/14/2015	03:35:50	COM1	61.00	8.33	3.00	pump 10 bbls fresh water spacer with red dye
Event	13	Pump Spacer 1	Pump Spacer 1	2/14/2015	03:39:10	COM1	59.00	8.31	3.00	pump 10 bbls fresh water spacer
Event	14	Pump Cement	Pump Cement	2/14/2015	03:43:50	COM1	32.00	8.30	1.50	pump 120 bbls (437 sks) 14.2 ppg slurry y: 1.54 ft3/sk w: 7.66 gal/sk
Event	15	Drop Top Plug	Drop Top Plug	2/14/2015	04:16:13	COM1	9.00	-0.08	0.00	dropped top plug with company rep witnessing and washed up on plug
Event	16	Pump Displacement	Pump Displacement	2/14/2015	04:18:10	USER	9.00	-0.18	0.00	pump 85.4 bbls fresh water displacement
Event	17	Displ Reached Cmnt	Displ Reached Cmnt	2/14/2015	04:26:25	USER	66.00	8.30	4.70	displacement reach cement with 34 bbls away
Event	18	Spacer Returns to Surface	Spacer Returns to Surface	2/14/2015	04:30:12	USER	204.00	8.33	5.00	with 45 bbls displacement away dyed spacer returns to surface

Event	19	Cement Returns to Surface	Cement Returns to Surface	2/14/2015	04:35:12	USER	365.00	8.35	4.10	with 69 bbls displacement away cement returns to surface
Event	20	Bump Plug	Bump Plug	2/14/2015	04:40:33	COM1	668.00	8.38	2.50	bumped plug with 396 psi and took pressure to 980 psi
Event	21	Check Floats	Check Floats	2/14/2015	04:46:28	USER	1066.00	8.37	0.00	checked floats, floats held with 1 bbls back
Event	22	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	2/14/2015	04:50:12	USER	9.00	8.34	0.00	discuss hand placemnet team lifting swing path pinch points
Event	23	Rig-Down Equipment	Rig-Down Equipment	2/14/2015	04:55:21	USER	7.00	-0.09	0.00	rig down all iron and hoses
Event	24	Rig-Down Completed	Rig-Down Completed	2/14/2015	05:40:12	USER				walk around to ensure everything is properly put away
Event	25	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	2/14/2015	05:45:01	USER				discussed route weather other traffic and fallowing distance
Event	26	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	2/14/2015	05:50:14	USER				thank you for using halliburton energy services

2.0 Custom Graphs

2.1 Custom Graph

Custom Results



PS Pump Press (psi) DH Density (ppg) Comb Pump Rate (bbbl/min)

- ① Call Out n/a;n/a;n/a ③ Depart from Service Center or Other Site n/a;n/a;n/a ⑤ Pre-Rig Up Safety Meeting n/a;n/a;n/a ⑦ Pre-Job Safety Meeting 20;0;0 ⑨ Prime Pumps 19;0;0 ⑪ Pump Spacer 1 23;8.57;1 ⑬ Pump Spacer 1 58;8.31;3 ⑮ Drop Top Plug 9;-0.08;0
- ② Pra-Convoy Safety Meeting n/a;n/a;n/a ④ Arrive At Loc n/a;n/a;n/a ⑥ Rig-Up Equipment n/a;n/a;n/a ⑧ Rig-Up Completed 19;0;0 ⑩ Pressura Test 2508;8.63;0.2 ⑫ Pump Spacer 2 61;8.33;3 ⑭ Pump Cement 32;8.3;1.5 ⑯ Pump Displacement 9;-

