

HALLIBURTON

iCem[®] Service

ANADARKO PETROLEUM CORP - EBUS

Date: Thursday, February 12, 2015

Butterball 36N-10HZ

Sincerely,
Joshua Prudhomme

Table of Contents

1.1	Executive Summary	3
1.2	Cementing Job Summary	4
1.3	Planned Pumping Schedule	6
1.4	Job Overview	7
1.5	Water Field Test	8
1.6	Job Event Log	9
2.0	Custom Graphs	10

2.1	Custom Graph	10
------------	---------------------	-----------

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Butterball 36N-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
On Location	2/12/2015	05:10:00	MST
Job Started	2/12/2015	07:56:45	MST
Job Completed	2/12/2015	09:04:50	MST

1.2 Cementing Job Summary

Sold To #: 300466		Ship To #: 3642194		Quote #:		Sales Order #: 0902127421					
Customer: ANADARKO PETROLEUM CORP - EBUS				Customer Rep: Anadarko Rep							
Well Name: BUTTERBALL			Well #: 36N-10H			API/UWI #: 05-123-40987-00					
Field: WATTENBERG		City (SAP): IONE		County/Parish: WELD		State: COLORADO					
Legal Description: NW NE-10-2N-67W-687FNL-1489FEL											
Contractor: ADVANCED ENERGY				Rig/Platform Name/Num: ADVANCED 10							
Job BOM: 7521											
Well Type: HORIZONTAL GAS											
Sales Person: HALAMERICA\HB60191				Srvc Supervisor: Nathan McBride							
Job											
Formation Name											
Formation Depth (MD)		Top			Bottom						
Form Type					BHST						
Job depth MD		850ft			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		J-55	0	850			
Open Hole Section			13.5				0	850			
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	9.625			850		Top Plug	9.625		HES		
Float Shoe	9.625					Bottom Plug	9.625		HES		
Float Collar	9.625					SSR plug set	9.625		HES		
Insert Float	9.625					Plug Container	9.625		HES		
Stage Tool	9.625					Centralizers	9.625		HES		
Miscellaneous Materials											
Gelling Agt		Conc		Surfactant		Conc	Acid Type		Qty	Conc	
Treatment Fld		Conc		Inhibitor		Conc	Sand Type		Size	Qty	
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 Data											
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 ft³/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	Lead Cement	SWIFTCEM (TM) SYSTEM	428	sack	14.2	1.54		6	7.66
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	Displacement	84.8	bbl	8.33				
Cement Left In Pipe		Amount	42 ft		Reason		Shoe Joint		
Comment									

1.3 Planned Pumping Schedule

- 1. Fill Lines with Water**
 - a. Density = 8.33 lb/gal
 - b. Volume = 2 bbl
- 2. Pressure Test Lines to 2450psi**
- 3. Pump Fresh Water Spacer**
 - a. Density = 8.33 lb/gal
 - b. Volume = 20 bbl
 - c. Rate = 5 bpm
- 4. Pump SwiftCem (Lead)**
 - a. Density = 14.2 lb/gal
 - b. Yield = 1.54 ft³/sk
 - c. Water Requirement = 7.66 gal/sk
 - d. Volume = 428 sks (117.38 bbls)
 - e. Rate = 5 bpm
- 5. Drop Top Plug**
- 6. Start Displacement**
- 7. Pump Displacement Water**
 - a. Density = 8.33 lb/gal
 - b. Volume = 84.8 bbls
 - c. Rate = 6 bpm
- 8. Calculated Total Displacement = 84.8 bbls**

1.4 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	42
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	8.9
4	Time circulated before job	HH:MM	1:00
5	Mud volume circulated	Bbls	330
6	Rate at which well was circulated	Bpm	5.5
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	280
9	Time from end mud circulation to start of job	HH:MM	0:15
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	84.8
12	Job displaced by	Rig/HES	HESN
13	Annular before job)?	Y/N	N
14	Annular flow after job	Y/N	N
15	Length of rat hole	Ft	7
16	Units of gas detected while circulating	Units	
17	Was lost circulation experienced at any time ?	Y/N	N

1.5 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	200	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness		ppm	500 mg/L	High concentrations will accelerate the set of the cement
Calcium		ppm	500 ppm	High concentrations will accelerate the set of the cement
Total Alkalinity		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3).
Bicarbonates		ppm	1000 ppm	Cement is greatly retarded to the point where it may not set up at all
Potassium		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	PASS	ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature	65	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by: _____

1.6 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	PS Pump Press (psi)	Comment
Event	1	Arrive at Location from Service Center	Arrive at Location from Service Center	2/12/2015	05:10:00	USER				Requested on location 0530 rig still running casing
Event	2	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	2/12/2015	05:20:00	USER				Discuss Muster area and rig layout
Event	3	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/12/2015	05:30:00	USER				Discuss fluid sources and rig up layout
Event	4	Rig-Up Equipment	Rig-Up Equipment	2/12/2015	05:40:00	USER				Rig Up to redzone
Event	5	Casing on Bottom	Casing on Bottom	2/12/2015	07:00:00	USER				
Event	6	Circulate Well	Circulate Well	2/12/2015	07:10:00	USER				
Event	7	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/12/2015	07:30:00	USER				
Event	8	Start Job	Start Job	2/12/2015	07:56:45	COM7	0.00	8.56	-3.00	
Event	9	Test Lines	Test Lines	2/12/2015	08:01:28	COM7	0.40	8.37	121.00	2450psi
Event	10	Pump Spacer 1	Fresh Water Ahead	2/12/2015	08:01:53	COM7	0.00	8.33	12.00	10bbls Fresh Water
Event	11	Pump Spacer	Fresh Water w/ Dye	2/12/2015	08:04:14	USER	5.00	8.40	78.00	10bbls FW w/ Dye
Event	12	Pump Cement	Pump Cement	2/12/2015	08:10:19	COM7	2.00	12.21	22.00	117.4bbls Cement @ 14.2ppg
Event	13	Drop Top Plug	Drop Top Plug	2/12/2015	08:34:29	USER	0.00	-0.07	-21.00	
Event	14	Pump Displacement	Pump Displacement	2/12/2015	08:35:42	COM7	1.00	1.66	-22.00	84.8 Fresh Water
Event	15	Cement Returns to Surface	Cement Returns to Surface	2/12/2015	08:51:47	USER	5.00	8.04	401.00	70bbls Displaced 14.8bbls to Pit
Event	16	Bump Plug	Bump Plug	2/12/2015	08:57:44	USER	0.00	8.05	847.00	
Event	17	Check Floats	Check Floats	2/12/2015	09:03:22	USER	0.00	8.06	600.00	1bbls Back
Event	18	End Job	End Job	2/12/2015	09:04:50	COM7	0.00	8.03	-30.00	

2.0 Custom Graphs

2.1 Custom Graph

