

HALLIBURTON

iCem[®] Service

ANADARKO PETROLEUM CORP - EBUS

For:

Date: Friday, June 27, 2014

Black Tiger 15N-27HZ

Case 1

Sincerely,

DEVIN BIRCHELL

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Black Tiger 15N-27HZ** 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]

1.2 Cementing Job Summary

Sold To #: 300466		Ship To #: 3476049		Quote #:		Sales Order #: 0901460094	
Customer: ANADARKO PETROLEUM CORP - EBUS				Customer Rep: Bob Porter			
Well Name: BLACK TIGER			Well #: 15N-27HZ		API/UWI #: 05-123-39400-00		
Field: WATTENBERG		City (SAP): IONE		County/Parish: WELD		State: COLORADO	
Legal Description: SW SE-22-2N-67W-300FSL-1442FEL							
Contractor:				Rig/Platform Name/Num:			
Job BOM: 7521							
Well Type: HORIZONTAL GAS							
Sales Person: HALAMERICA\HX23209				Srvc Supervisor: Devin Birchell			

Job

Formation Name			
Formation Depth (MD)	Top		Bottom
Form Type			BHST
Job depth MD	1759ft		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	1748		0
Open Hole Section			13.5				0	1759		0

Tools and Accessories

Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make
Guide Shoe	9.625					Top Plug	9.625	1	HES
Float Shoe	9.625	1		1748		Bottom Plug	9.625		HES
Float Collar	9.625	1		1708		SSR plug set	9.625		HES
Insert Float	9.625					Plug Container	9.625	1	HES
	9.625					Centralizers	9.625	12	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	Mud Flush III (Powder)	Mud Flush III	12	bbl	8.4				
42 gal/bbl									
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	Lead Cement	SWIFTCEM (TM) SYSTEM	680	sack	14.2	1.54		6	7.64
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	Displacement	Displacement	132	bbl	8.33				
		Amount	43 ft						
Comment									

1.4 Planned Pumping Schedule

1. Fill Lines with Water

- a. Density = 8.3
- b. Volume = 2

2. Pressure Test Lines to 2980psi**3. Pump X Spacer**

- a. Density = 8.3 lb/gal
- b. Volume = 10 bbl
- c. Rate = 2.5 bpm

4. Pump X Spacer

- a. Density =8.4 lb/gal
- b. Volume = 12 bbl
- c. Rate =2.5 bpm

5. Pump X Spacer

- a. Density = 8.3 lb/gal
- b. Volume =10 bbl
- c. Rate =4 bpm

6. Drop Bottom Plug**7. Pump X (Lead)**

- a. Density =14.2
- b. Yield =1.54
- c. Water Requirement = 7.64
- d. Volume = 680 sks (186.5 bbls)
- e. Rate =4.5 bpm

8. Drop Top Plug**9. Start Displacement****10. Pump Displacement Water**

- a. Density =8.3 lb/gal
- b. Volume =132 bbls
- c. Rate = 5 bpm

11. Land Plug – Anticipated Final Circulation Pressure X psi

Calculated Total Displacement = 132 bbls

1.5 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	65
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	Wbm
3	Actual mud density	lb/gal	
4	Time circulated before job	HH:MM	30
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	:20
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	132
12	Job displaced by	Rig/HES	Hes
13	Annular before job)?	Y/N	
14	Annular flow after job	Y/N	
15	Length of rat hole	Ft	11
16	Units of gas detected while circulating	Units	
17	Was lost circulation experienced at any time ?	Y/N	n

Lost Circulation Details

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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		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	0	ppm	300 ppm	High concentrations will accelerate the set of the cement
Temperature	64	°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)	PS Pmp Stg Tot (bbl)	Comment
Event	1	Start Job	Start Job	6/26/2014	18:00:21	COM1					
Event	2	Call Out	Call Out	6/26/2014	19:30:24	USER					called cement crew for anadarko black tiger 15n-27hz surface
Event	3	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/26/2014	23:55:12	USER					discussed route weather other traffic following distance
Event	4	Depart from Service Center or Other Site	Depart from Service Center or Other Site	6/27/2014	00:10:24	USER					called journey, gate checked and departed for location
Event	5	Arrive At Loc	Arrive At Loc	6/27/2014	00:30:21	USER					ended journey, talked with company rep on volumes rates depths and pressures
Event	6	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	6/27/2014	00:40:45	USER					discussed spotting equipment hand placement pinch points
Event	7	Rig-Up Equipment	Rig-Up Equipment	6/27/2014	00:45:21	USER					spot pump and rig up water hoses and iron to red zone
Event	8	Wait on Customer or Customer Sub-Contractor Equip - Start Time	Wait on Customer or Customer Sub-Contractor Equip - Start Time	6/27/2014	01:30:12	USER	15.00	2.39	0.00	0.0	wait for rig crew to finish running casing
Event	9	Pre-Job Safety Meeting	Pre-Job Safety Meeting	6/27/2014	02:40:12	USER	18.00	11.37	0.00	0.0	discussed job procedures with rig and cement crews
Event	10	Rig-Up Completed	Rig-Up Completed	6/27/2014	02:50:12	USER	18.00	8.35	0.00	0.0	loaded plug and rigged up cement head to casing, rigged up stand pipe
Event	11	Prime Pumps	Prime Pumps	6/27/2014	02:53:27	USER	33.00	8.20	0.00	0.1	primed pump and lines for pressure test
Event	12	Test Lines	Test Lines	6/27/2014	02:55:09	COM1	38.00	8.36	0.00	1.7	test pump and lines to 2980 psi
Event	13	Pump Spacer 1	Pump Spacer 1	6/27/2014	02:56:38	COM1	33.00	8.34	0.00	1.8	pump 10 bbls fresh water spacer

Event	14	Pump Spacer 2	Pump Spacer 2	6/27/2014	03:01:15	COM1	59.00	8.33	2.50	10.2	pump 12 bbls mud flush III spacer
Event	15	Pump Spacer 1	Pump Spacer 1	6/27/2014	03:06:03	COM1	60.00	8.34	2.50	0.0	pump 10 bbls fresh water spacer
Event	16	Pump Lead Cement	Pump Lead Cement	6/27/2014	03:08:47	COM1	94.00	8.34	4.30	10.4	pump 186.5 bbls (680 sks) 14.2 ppg slurry, γ:1.54 ft3/sk w: 7.64 gal/sk
Event	17	Shutdown	Shutdown	6/27/2014	03:53:55	COM1	34.00	2.78	0.00		shutdown to clean pump and lines and to drop top plug
Event	18	Clean Lines	Clean Lines	6/27/2014	03:54:33	COM1	6.00	1.11	0.00		cleaned pump and lines on top of plug
Event	19	Drop Top Plug	Drop Top Plug	6/27/2014	03:56:51	COM1	4.00	1.08	0.00		dropped top plug and start displacement
Event	20	Pump Displacement	Pump Displacement	6/27/2014	03:56:56	COM1	4.00	1.07	0.00	197.6	pump 132 bbls fresh water displacement
Event	21	Displ Reached Cmnt	Displ Reached Cmnt	6/27/2014	04:06:44	USER	54.00	7.71	4.90	23.9	displacement reach cement with 34 bbls away
Event	22	Spacer Returns to Surface	Spacer Returns to Surface	6/27/2014	04:15:45	USER	396.00	7.68	4.90	68.6	spacer returns to surface with 76 bbls displacement away (10 bbls water 12 bbls mud flush 10 bbls water)
Event	23	Cement Returns to Surface	Cement Returns to Surface	6/27/2014	04:21:36	USER	609.00	7.68	5.00	57.6	cement returns to surfac with 108 bbls displacement away (24 bbls)
Event	24	Bump Plug	Bump Plug	6/27/2014	04:28:09	COM1	1213.00	7.72	0.00	82.1	with 132 bbls bumped plug with 648 psi and took pressure to 1221 psi
Event	25	Check Floats	Check Floats	6/27/2014	04:29:59	USER	1249.00	7.71	0.00	82.1	checked floats, floats held with 1 bbls back to truck
Event	26	Post-Job Safety Meeting (Pre Rig-Down)	Post-Job Safety Meeting (Pre Rig-Down)	6/27/2014	04:33:07	USER	12.00	7.66	0.00	82.1	discussed hand placement pinch points swing path team lifting
Event	27	End Job	End Job	6/27/2014	04:35:59	COM1	11.00	-0.76	0.00		
Event	28	Rig-Down Equipment	Rig-Down Equipment	6/27/2014	04:36:12	USER	11.00	-0.75	0.00	82.1	rig down water hoses and all iron
Event	29	Rig-Down Completed	Rig-Down Completed	6/27/2014	05:10:54	USER					rig down complete, walk

							around to ensure everthing is properly put away
Event	30	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	6/27/2014	05:15:21	USER	discussed route weather other traffic fallowing distance
Event	31	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	6/27/2014	05:20:41	USER	thank you for using halliburton energy services

2.0 Custom Graphs

2.1 Custom Graph



