

HALLIBURTON

iCem[®] Service

ANADARKO PETROLEUM CORP - EBUS

Date: Monday, March 16, 2015

GRISWOLD 3N-11HZ

Job Date: Tuesday, March 10, 2015

Sincerely,
Joshua Prudhomme

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Griswold 3N-11HZ** cement **Production Liner** 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 Time:	3/10/2015	17:00:00	MTN
Arrived On Location At:	3/10/2015	20:10:00	MTN
Job Started At:	3/10/2015	23:34:44	MTN
Job Completed At:	3/11/2015	02:20:41	MTN

1.2 Planned Pumping Schedule

The Road to Excellence Starts with Safety											
Sold To #: 300466			Ship To #: 3642201			Primary Sales Order #: 0902203160					
Customer: ANADARKO PETROLEUM CORP - EBUS						Job Purpose: 7525 CMT PRODUCTION LINER BOM					
Well Name: GRISWOLD				Well #: 3N-11HZ			API/UWI #: 05-123-40996-00				
Field: WATTENBERG			City: IONE			Country/Parish: WELD			State/Prov: COLORADO		
Legal Description:											
Rig Name & Number / Phone Number: ENSIGN 145 / 970-812-0016									Location: LAND		
myCem id #: 173776			Job Criticality Status: GREEN					Facts Request id #: 2216592			
Contacts											
Type	Name			Email			Phone				
PROPOSAL CONTACT	Aaron Rubinstein										
Account Rep	Nicholas Wilson			Nicholas.Wilson@halliburton.com			+13037203334				
Service Coordinator	Mark Dean			Chris.Dean@Halliburton.com			+13035068462				
PPE, Safety Huddles, JSA's, HOC & Near Miss Reporting, BBP Observations											
Distance/Mileage(1 way) Srvc:			30 mile			Distance/Mileage(1 way) Mtls:			30 mile		
						Rqstd Job Start Date/Time:			03/03/2015		
HSE Information											
H2S Present:			Unknown			CO2 Present:			Unknown		
Drive Safely. Lights On for Safety. Wear Seat Belts. Observe all HES / Customer Safety Policies.											
Directions:											
CR 10 & CR 31. E 1.3 mi. NE 800'. E 2/10 Into											
Instruction											
Bring 100# of Sugar and 10 GAL MMCR											
General Equipment											
3rd Party / Inventory Items											
SAP Number		Description				Quantity		UoM		Pricing Enabled	
100003781		CHEM, MICRO MATRIX RETARDER, 5 GAL				10		GAL		Yes	
Job Info / Well Data											
Job Depth (MD) ft		Job Depth (TVD) ft		Well Fluid Type		Well Fluid Weight lbm/gal		Displacement Fluid		Displ Fluid Weight lbm/gal	
11929				Water Based Mud				Displacement		10.5	
BHST degF		BHCT degF		Log Temp degF				Time Since Circ Stopped HH:MM:SS			
Job Tubulars/Tools											
Description	Size in	Weight lbm/ft	ID in	Thread	Grade	Top MD ft	Btm MD ft	Top TVD ft	Btm TVD ft	Shoe Jnt ft	% Excess
7" Intermediate	7	26	6.276		HCP110	0	7717				

Casing											
6 1/8" Open Hole			6.125			7717	11929				15
4" Drill Pipe	4	14	3.34			0	6719				
4 1/2" Production Liner	4.5	11.6	4		HCP110	6719	11929				

Mud conditioning plan

The condition of the drilling fluid is one of the most important variables in achieving a cement barrier. Prior to cementing, circulate the mud at the planned highest displacement rate for the cement job for at least 2 bottoms-up until the well is clean, mud is free of gas and pump pressures have stabilized.

Materials

Stage/Plug #: 1

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density lbm/gal	Yield ft3/sack	Water Req Gal/sack	Rate bbl/min	Total Mix Fluid Gal/sack	Surface Batch Mixing Time
1	11.5 lb/gal Tuned Spacer III		40	bbl	11.5	3.81	24.5	4		

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density lbm/gal	Yield ft3/sack	Water Req Gal/sack	Rate bbl/min	Total Mix Fluid Gal/sack	Surface Batch Mixing Time hr
2	Lead Cement	EXPANDACEM (TM) SYSTEM	400	sack	13.8	1.68	7.72	6	7.72	

Fluid #	Fluid Name	Package/SBM/Material Name	Rqstd Del Qty	UOM	Density lbm/gal	Yield ft3/sack	Water Req Gal/sack	Rate bbl/min	Total Mix Fluid Gal/sack	Surface Batch Mixing Time
3	Displacement		155.2	bbl	8.33					

Caution: Displacement quantities and densities are estimates ONLY! Do not use them for the actual job.

Packaged Materials

SAP #	Material	Qty	UOM	Comments
	FRESH WATER	4532	Gal	

1.3 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	44
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	9.6
4	Actual mud Plastic Viscosity (PV)	cP	
5	Actual mud Yield Point (YP)	lb _f /100ft ²	
6	Actual mud 30 min Gel Strength	lb _f /100ft ²	
7	Time circulated before job	HH:MM	1:00
8	Mud volume circulated	bbls	
9	Rate at which well was circulated	bpm	
10	Pipe movement during hole circulation	Y/N	
11	Rig pressure while circulating	psi	
12	Time from end mud circulation to start of job	HH:MM	0:15
13	Pipe movement during cementing	Y/N	N
14	Calculated displacement	bbls	155.2
15	Job displaced by	Rig/HES	HES
16	Annular flow before job	Y/N	N
17	Annular flow after job	Y/N	N
18	Length of rat hole	ft	10
19	Units of gas detected while circulating	units	
20	Was lost circulation experienced at any time?	Y/N	N

1.4 Water Field Test

Item	Recorded 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	140	ppm	3000 ppm	Can shorten thickening time of cement
Sulfates	<20	ppm	1500 ppm	Will greatly decrease the strength of cement
Total Hardness	8	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 \geq 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	69.5	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

Submitted Respectfully by:

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)	DH Density (ppg)	PS Pump Press (psi)	Recirc Density (ppg)	Comments
Event	1	Call Out	Call Out	3/10/2015	17:00:00	USER					
Event	2	Crew Leave Yard	Crew Leave Yard	3/10/2015	20:00:00	USER					
Event	3	Arrive At Loc	Arrive At Loc	3/10/2015	20:10:00	USER					RIG WAS RUNNING DRILL PIPE UPON ARRIVAL
Event	4	Rig-up Lines	Rig-up Lines	3/10/2015	20:20:00	USER					PRE RIG UP JSA W/ CREW
Event	5	Rig-Up Completed	Rig-Up Completed	3/10/2015	21:30:00	USER					
Event	6	Pre-Job Safety Meeting	Pre-Job Safety Meeting	3/10/2015	23:15:00	USER					JSA W/ ALL INVOLVED PERSONNEL
Event	7	Start Job	Start Job	3/10/2015	23:34:44	COM5	0.00	8.51	148.00	11.79	
Event	8	Pump Spacer 1	Pump Spacer 1	3/10/2015	23:54:02	COM5	0.00	8.50	-1.00	11.31	PUMPED 40 BBLS OF 11.5 TUNED SPACER AT 4 BPM AT 64 PSI
Event	9	Pump Cement	Pump Cement	3/11/2015	00:06:23	COM5	4.60	13.68	854.00	13.54	PUMPED 400 SKS OR 119.6 BBLS OF 13.8 EXPANDACEM AT 5 BPM AT 190 PSI
Event	10	Check Weight	Check weight	3/11/2015	00:16:25	COM5	5.10	14.03	467.00	13.77	
Event	11	Check Weight	Check weight	3/11/2015	00:19:42	COM5	5.20	13.80	505.00	13.63	
Event	12	Shutdown	Shutdown	3/11/2015	00:38:29	COM5	0.90	8.68	-3.00	7.69	
Event	13	Drop Plug	Drop Plug	3/11/2015	00:43:19	COM5	0.00	8.42	-6.00	7.84	DART DROPPED BY SCHLUMBERGER TOOL HAND
Event	14	Pump Displacement	Pump Displacement	3/11/2015	00:43:40	COM5	2.90	8.39	53.00	7.84	PUMPED 155.2 BBLS OF H2O AT 5 BPM AT 1914 PSI, DART LANDED AT 56.5 BBLS AWAY
Event	15	Bump Plug	Bump Plug	3/11/2015	01:19:12	COM5	0.00	8.35	2840.00	8.26	BUMPED PLUG AT 2.5 BPM AT 1931 PSI
Event	16	Other	Other	3/11/2015	01:22:00	USER	0.00	8.30	3.00	0.37	CHECKED FLOATS AND THEY HELD GOT

											2 BBLS BACK TO TRUCK
Event	17	Pressure Up Well	Pressure Up Well	3/11/2015	01:38:16	COM5	0.00	8.35	2492.00	0.37	2500 PSI BACKSIDE TEST FOR 10 MIN
Event	18	Sting out	Sting out	3/11/2015	01:54:00	USER	1.50	8.34	1016.00	0.37	PRESSURED UP TO 1500 PSI BEFORE STINGING OUT OF LINER
Event	19	Clean Hole	Clean Hole	3/11/2015	01:55:15	COM5	1.90	8.35	1115.00	0.37	ROLLED HOLE AT 7 BPM AT 1786 PSI, GOT SPACER BACK AT 98 BBLS AWAY, NO CMT BACK TO SURFACE PUMPED A TOTAL OF 175 BBLS
Event	20	End Job	End Job	3/11/2015	02:20:41	COM5	0.00	8.32	19.00	8.68	

