

HALLIBURTON

iCem[®] Service

NOBLE ENERGY INC - EBUS

United States of America

Date: Tuesday, December 12, 2017

Bison Ridge Y22-711 Production

Job Date: Thursday, December 07, 2017

Sincerely,

Adam McKay

Legal Notice

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Bison Ridge Y22-711** 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 [Ft. Lupton]

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Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 345242	Ship To #: 3822366	Quote #:	Sales Order #: 0904481408							
Customer: NOBLE ENERGY INC - EBUS		Customer Rep: JIM								
Well Name: BISON RIDGE	Well #: Y22-711	API/UWI #: 05-123-45377-00								
Field: WATTENBERG	City (SAP): KEENESBURG	County/Parish: WELD	State: COLORADO							
Legal Description: NW SE-10-2N-64W-2230FSL-1948FEL										
Contractor: Noble		Rig/Platform Name/Num: H&P 524								
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB70026		Srv Supervisor: Jordan Larue								
Job										
Formation Name										
Formation Depth (MD)	Top	Bottom								
Form Type		BHST	230 degF							
Job depth MD	17356	Job Depth TVD	7057							
Water Depth		Wk Ht Above Floor	4FT							
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	2059	0	2059
Casing	0	5.5	4.778	20	BTC	P-110	0	17346	0	7039
Open Hole Section			8.5				2059	17356	2059	7039
Tools and Accessories										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5	1	HES	17346		Top Plug	5.5	1	HES	
Float Shoe	5.5					Bottom Plug	5.5	2	HES	
Float Collar	5.5	1	HES	17304		SSR plug set	5.5		HES	
Insert Float	5.5	1	HES	17304		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 ft ³ /sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal	
1	11.5 lb/gal Tuned Spacer III	Tuned Spacer III	80	bbl	11.5	3.73		5		
0.60 gal/bbl		DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665)								
0.60 gal/bbl		MUSOL A, 330 GAL TOTE - (790828)								
149.34 lbm/bbl		BARITE, BULK (100003681)								
34.70 gal/bbl		FRESH WATER								

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Cementing Job Summary

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	ElastiCem	ELASTICEM (TM) SYSTEM	150	sack	13.2	1.57		6	7.53
7.53 Gal		FRESH WATER							
0.80 %		SCR-100 (100003749)							
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	ElastiCem w/ SCBL	ELASTICEM (TM) SYSTEM	617	sack	13.2	1.6		6	7.69
7.69 Gal		FRESH WATER							
0.40 %		SCR-100 (100003749)							
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	NeoCem NT1	NeoCem TM	1161	sack	13.2	2.04		6	9.75
9.75 Gal		FRESH WATER							
0.08 %		SCR-100 (100003749)							
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
5	MMCR Displacement	MMCR Displacement	20	bbl	8.33				
0.50 gal/bbl		MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)							
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
6	Displacement	Displacement	364	bbl	8.33				
Cement Left In Pipe		Amount	42 ft			Reason		Shoe Joint	
Mix Water:		pH 7	Mix Water Chloride: 400 ppm			Mix Water Temperature:		54 °F °C	
Cement Temperature:		## °F °C	Plug Displaced by: 8.34 lb/gal kg/m3 XXXX			Disp. Temperature:		## °F °C	
Plug Bumped?		Yes	Bump Pressure: 2100 psi MPa			Floats Held?		Yes 4BBLs BACK	
Cement Returns:		0 bbl m3	Returns Density: ## lb/gal kg/m3			Returns Temperature:		## °F °C	
Comment									

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Comments
Event	1	Call Out	Call Out	12/6/2017	18:00:00	USER				ON LOCATION TIME 0000
Event	2	Arrive At Loc	Arrive at location	12/6/2017	22:30:00	USER				RIG RUNNING CASING
Event	3	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	12/6/2017	23:00:00	USER				TALK TO CO REP... GET FIGURES DISCUSS JOB PROCEDURES AND RIG UP...
Event	4	Other	Well Info	12/6/2017	23:10:00	USER				TD 17356', TVD 7057', TP 17346', ST 42', OH 8.5", CS 5.5" 20 # P110, PC 9.625" 36# J55 2057', WF 9.4#OBM
Event	5	Other	Water Test	12/6/2017	23:20:00	USER				ph 7, cl <400, temp 56°F, TANN PASS... ALL 3 TANKS AVG 55 DEGREES
Event	6	Pre-Rig Up Safety Meeting	PRE RIG UP SAFETY MEETING	12/6/2017	23:30:00	USER				JSA COMPLETED... HANDS SIGN JSA ON CEMENTING PROGRAM
Event	7	Rig-Up Equipment	RIG UP EQUIPMENT	12/6/2017	23:40:00	USER				NO ACCIDENTS OR INJURIES
Event	8	Pre-Job Safety Meeting	Pre-Job Safety Meeting	12/7/2017	04:00:00	USER				JSA COMPLETED: ALL PERSONNEL SIGNED SIGN UP SHEET. REVIEW PUMP SCHEDULE AND WASH UP.
Event	9	Start Job	Start Job	12/7/2017	04:32:31	COM10				
Event	10	Test Lines	Test Lines	12/7/2017	05:01:20	COM10	7700.00	8.31		7500 PSI
Event	11	Drop Plug	Drop Plug	12/7/2017	05:07:42	USER				1ST HES BOTTOM PLUG BEFORE SPACER...
Event	12	Pump Spacer 1	Pump Spacer 1	12/7/2017	05:13:16	USER	447.00	11.58	5.50	2ND HES BOTTOM PLUG AFTER SPACER
Event	13	Drop Plug	Drop Plug	12/7/2017	05:27:10	COM10				80 BBL SPACER SCALED @ 11.5#
Event	14	Pump Lead Cement	Pump Lead Cement	12/7/2017	05:27:14	COM10	492.00	13.30	7.80	150 SKS SCALED @ 13.2# 41 BBLs
Event	15	Pump Cement	Pump Cement	12/7/2017	05:32:40	COM10				176 BBLs PUMPED/617 SKS SCALED @ 13.2#... SHUT DOWN WITH TOTAL 139 BBLs PUMPED OF LEAD AND 42BBLs CAP CMT PUMPED DUE TO ISSUE WITH CMT COMING OUT FLOW LINE...
Event	16	Comment	Comment	12/7/2017	05:44:00	USER	347.00	13.11	6.00	CO MAN HAD US SLOW RATE TO 6BPM SAID COULDN'T KEEP UP AT

SHAKERS...

Event	17	Comment	Comment	12/7/2017	05:46:18	USER	305.00	13.09	5.10	CO MAN HAD US SLOW TO 5BPM STILL OUTRUNNING AT SHAKERS...
Event	18	Other	Other	12/7/2017	06:01:10	COM10				@ 139 BBLS GONE SHUTDOWN CAUSE STARTED GETTING CMT BACK AT SHAKERS... CO MAN MADE A QUICK CALL AND TOLD US TO GET READY TO WASH UP INCASE CIRCULATE HOLE CLEAN... I WENT TO FLOOR AND DRILLER SAID VALVE WAS OPEN 2 TURNS AND 2" VALVE TO FLOW LINE OPEN... THE CALL WAS MADE TO PUMP REST CMT... KILL LINE CLOSED AND 2" TO FLOW LINE CLOSED... CO REP SAID KILL VALVE MUST HAVE SHOOK OPEN WHILE PUMPING...
Event	19	Pump Tail Cement	Pump Tail Cement	12/7/2017	06:30:32	COM10	725.00	13.35	8.10	1161 SACKS/422 BBLS TAIL CMT SCALED @ 13.2#
Event	20	Drop Top Plug	Drop Top Plug	12/7/2017	07:50:09	COM10				WASHED PUMPS AND LINES AND STUFFED TOP PLUG INTO CASING...
Event	21	Pump Displacement	Pump Displacement	12/7/2017	07:50:33	COM10	299.00	8.26	9.00	384 BBLS TOT PUMPED... 1ST 20BBLS MMCR AND LAST 364 BBLS W BIOCID... FINAL LIFT PSI @ 1500 PSI... HAD TO SHUT DOWN @ 220 BBLS GONE DUE TO VALVE LEAKING ON BACK PUMP... WAS BACK UP AND RUNNING IN 5MIN WITH VALVE REPLACED...
Event	22	Bump Plug	Bump Plug	12/7/2017	08:44:23	COM10	1456.00	8.19	3.10	2100 PSI FINAL BUMP PSI HELD FOR 5MIN...
Event	23	Check Floats	Check Floats	12/7/2017	08:51:52	USER				FLOATS HELD 4 BBLS BACK
Event	24	End Job	End Job	12/7/2017	08:53:03	COM10				EST... TOP OF CMT WORST CASE 6,096' ... HEIGHT OF CMT 11,250' CMT IN OPEN HOLE 459 BBLS... IF LOST THE 180BBLS CMT PUMPED BEFORE SHUT DOWN AND 80 BBLS SPACER...
Event	25	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	12/7/2017	09:00:00	USER				DISCUSS HAZARDS
Event	26	Rig-Down Equipment	Rig-Down Equipment	12/7/2017	09:15:00	USER				NO ACCIDENTS OR INJURIES
Event	27	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	12/7/2017	11:00:00	USER				REVIEW DIRECTIONS
Event	28	Crew Leave Location	Crew Leave Location	12/7/2017	11:15:00	USER				BULK HEADING BACK TO YARD AND PUMP CREW SLEEPING ON LOC

3.0 Attachments

3.1 Case 1-Custom Results.png

