

HALLIBURTON

iCem[®] Service

NOBLE ENERGY INC E-BUSINESS

Date: Thursday, December 28, 2017

Bison Ridge Y22-741 Production

Job Date: Saturday, December 23, 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 Y22-741** 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 #: 3822219		Quote #:		Sales Order #: 0904514469					
Customer: NOBLE ENERGY INC - EBUS				Customer Rep: Charles Collver							
Well Name: BISON RIDGE			Well #: Y22-741			API/UWI #: 05-123-45374-00					
Field: WATTENBERG		City (SAP): KEENESBURG		County/Parish: WELD			State: COLORADO				
Legal Description: NW SE-10-2N-64W-2230FSL-2098FEL											
Contractor: Noble					Rig/Platform Name/Num: H&P 524						
Job BOM: 7523 7523											
Well Type: HORIZONTAL OIL											
Sales Person: HALAMERICA\HB70026					Srv Supervisor: Bradley Hinkle						
Job											
Formation Name											
Formation Depth (MD)		Top			Bottom						
Form Type					BHST		230 degF				
Job depth MD		16753ft			Job Depth TVD		6935ft				
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	2054	0	2054	
Casing	0	5.5	4.778	20	BTC	P-110	0	16753	0	6935	
Open Hole Section			8.5				2054	16764	2054	6935	
Tools and Accessories											
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make		
Guide Shoe	5.5					Top Plug	5.5	1	HES		
Float Shoe	5.5	1	HES	16753		Bottom Plug	5.5	2	HES		
Float Collar	5.5	1	HES	16703		SSR plug set	5.5		HES		
Insert Float	5.5					Plug Container	5.5		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 ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	Spacer	Tuned Spacer III			80	bbl	11.5	3.73		5	
Fluid Data											
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

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Cementing Job Summary

2	1 st Lead Cement	ELASTICEM W/O CBL	150	sack	13.2	1.57		7.5	7.53
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft³/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
3	2 nd Lead Cement	ELASTICEM W/ CBL	550	sack	13.2	1.6		7.5	7.69
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft³/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
4	Tail Cement	NeoCem	1139	sack	13.2	2.04		8	9.75
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft³/sack	Mix Fluid Gal	Rate bbl/mi n	Total Mix Fluid Gal
5	Displacement	Fresh Water with MMCR	20	bbl	8.33			10	
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/mi n	Total Mix Fluid Gal
6	Displacement	Fresh Water with Aldacide	349	bbl	8.33			9	
Cement Left In Pipe	Amount	50 ft			Reason			Shoe Joint	
Mix Water:	pH 6	Mix Water Chloride:	0 ppm			Mix Water Temperature: 70 °F			
Cement Temperature:	## °F °C	Plug Displaced by:	## lb/gal kg/m ³ XXXX			Disp. Temperature: ## °F °C			
Plug Bumped?	Yes	Bump Pressure:	1937 psi			Floats Held? Yes			
Cement Returns:	## bbl m ³	Returns Density:	## lb/gal kg/m ³			Returns Temperature: ## °F °C			
Comment 20 bbls Tuned Spacer to surface. Estimated top of lead cement at 1252. Estimated top of tail cement at 6000.									

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	DS Pump Press <i>(psi)</i>	Comments
Event	1	Call Out	Call Out	12/23/2017	05:30:00	USER				Crew called for an on location of 1130. Crew was Bradley Hinkle, Kendall Broom, Todd Porter, Brandon Parker, Rebecca Defer, Sesar Mota.
Event	2	Depart Shop for Location	Depart Shop for Location	12/23/2017	09:00:00	USER				Pre-journey safety meeting.
Event	3	Arrive at Location from Service Center	Arrive at Location from Service Center	12/23/2017	10:00:00	USER				Sign in, perform a site assessment and pre-rig up safety meeting.
Event	4	Safety Meeting	Safety Meeting	12/23/2017	13:30:00	USER				Pre-job safety meeting with all personnel on location.
Event	5	Start Job	Start Job	12/23/2017	14:16:43	COM4				
Event	6	Test Lines	Test Lines	12/23/2017	14:30:57	COM4	8.88		3100.00	Pressure test rig's manual I-BOP to 3000 PSI with a 500 PSI electronic kick-out test.
Event	7	Test Lines	Test Lines	12/23/2017	14:37:17	USER	8.89		4531.00	Pressure test lines to 4500 PSI.
Event	8	Drop Bottom Plug	Drop Bottom Plug	12/23/2017	14:41:18	COM4				Bottom plug loaded directly into casing. Witnessed by customer.
Event	9	Pump Spacer 1	Pump Spacer 1	12/23/2017	14:41:39	COM4	11.35	4.40	454.00	Pump 80 bbls Tuned Spacer mixed at 11.5 ppg with surfactants added throughout. Density verified by pressurized scales.
Event	10	Drop Bottom Plug	Drop Bottom Plug	12/23/2017	14:59:11	COM4				Bottom plug loaded directly into casing. Witnessed by customer.
Event	11	Pump Lead Cement	Pump Lead Cement	12/23/2017	15:05:52	COM4	13.53	6.00	503.00	Pump 42 bbls (150 sacks, 1.57 yield, 7.52 gal/sk) ElastiCem without Super-CBL mixed at 13.2 ppg. Density verified by pressurized scales.
Event	12	Pump Lead Cement	Pump Lead Cement	12/23/2017	15:12:49	COM4	13.28	6.00	484.00	Pump 157 bbls (550 sacks, 1.6 yield, 7.69 gal/sk) ElastiCem with Super-CBL mixed at 13.2 ppg. Density verified by pressurized scales.
Event	13	Check Weight	Check weight	12/23/2017	15:17:44	COM4	13.42	7.50	708.00	Cement weighed at 13.3 ppg.
Event	14	Pump Tail Cement	Pump Tail Cement	12/23/2017	15:37:00	COM4	13.06	5.90	461.00	Pump 414 bbls (1139 sacks, 2.04 yield, 9.45 gal/sk) NeoCem mixed at 13.2 ppg. Density verified by pressurized scales.
Event	15	Check Weight	Check weight	12/23/2017	15:40:10	COM4	13.17	8.00	1008.00	Cement weighed 13 ppg.

Event	16	Check Weight	Check weight	12/23/2017	16:11:58	COM4	13.14	8.00	993.00	Cement weighed 13.2 ppg.
Event	17	Shutdown	Shutdown	12/23/2017	16:35:17	COM4				
Event	18	Clean Lines	Clean Lines	12/23/2017	16:39:39	USER				Rig blew down lines to wash up tank until clear. Wash pumps and lines until clean.
Event	19	Drop Top Plug	Drop Top Plug	12/23/2017	16:44:49	COM4				Top plug loaded directly into casing. Witnessed by customer.
Event	20	Pump Displacement	Pump Displacement	12/23/2017	16:46:06	COM4	8.42	9.80	503.00	Pump 369 bbls fresh water (first 20 bbls with MMCR) with Aldacide added throughout. 20 bbls Tuned Spacer to surface. Estimated top of lead cement at 1252. Estimated top of tail cement at 6000.
Event	21	Bump Plug	Bump Plug	12/23/2017	17:29:38	COM4	8.55	3.00	1966.00	Bump plug at 1937 psi and increased to 2475 psi. Held for five minutes.
Event	22	Check Floats	Check Floats	12/23/2017	17:33:37	USER				4 bbls back. Floats held.
Event	23	End Job	End Job	12/23/2017	17:35:07	COM4				
Event	24	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	12/23/2017	17:40:00	USER				Pre-rig down safety meeting.
Event	25	Depart Location for Service Center or Other Site	Depart Location for Service Center or Other Site	12/23/2017	19:30:00	USER				Pre-journey safety meeting.

3.0 Attachments

3.1 Bison Ridge Y22-741 Production.png

