

# HALLIBURTON

iCem<sup>®</sup> Service

## **NOBLE ENERGY INC-EBUS**

Date: Thursday, December 14, 2017

### **Bison Ridge Y22-726 Production**

Job Date: Tuesday, December 12, 2017

Sincerely,

Adam McKay

## Legal Notice

---

### Disclaimer:

All information in this report is provided subject to the terms and conditions which govern the services provided by Halliburton. Halliburton personnel use their best efforts in gathering information and their best judgment in interpreting it, but any interpretation, research, analysis or recommendation furnished by Halliburton are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and empirical relationships and assumptions are not infallible, and with respect to which professionals in the industry may differ. Accordingly, HALLIBURTON IS UNABLE TO GUARANTEE THE ACCURACY OF ANY CHART INTERPRETATION, RESEARCH ANALYSIS, OR JOB RECOMMENDATION and any interpretation or recommendation is not for use of or reliance upon by any third party. The customer has full responsibility for any of its decisions which are based on the information provided in this report.

Table of Contents

---

1.0    Cementing Job Summary ..... 4

    1.1    Executive Summary .....4

2.0    Real-Time Job Summary ..... 7

    2.1    Job Event Log .....7

3.0    Attachments..... 9

    3.1    Bison Ridge Y22-726 Production -Custom Results.png .....9

## 1.0 Cementing Job Summary

---

### 1.1 Executive Summary

---

Halliburton appreciates the opportunity to perform the cementing services on the **Bison Ridge Y22-726** 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]**

HALLIBURTON

*Cementing Job Summary**The Road to Excellence Starts with Safety*

Sold To #: 345242		Ship To #: 3822218		Quote #:		Sales Order #: 0904493673				
Customer: NOBLE ENERGY INC - EBUS				Customer Rep: Jim Turner						
Well Name: BISON RIDGE		Well #: Y22-726		API/UWI #: 05-123-45375-00						
Field: WATTENBERG		City (SAP): KEENESBURG		County/Parish: WELD		State: COLORADO				
Legal Description: NW SE-10-2N-64W-2230FSL-2023FEL										
Contractor: Noble				Rig/Platform Name/Num: H&P 524						
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB70026				Srv Supervisor: Steven Markovich						
<b>Job</b>										
Formation Name										
Formation Depth (MD)		Top		Bottom						
Form Type				BHST		230 degF				
Job depth MD		17090ft		Job Depth TVD						
Water Depth				Wk Ht Above Floor						
Perforation Depth (MD)		From		To						
<b>Well Data</b>										
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	2030	0	0
Casing	0	5.5	4.778	20	BTC	P-110	0	17090	0	0
Open Hole Section			8.5				2030	17100	0	0
<b>Tools and Accessories</b>										
Type	Size in	Qty	Make	Depth ft		Type	Size in	Qty	Make	
Guide Shoe	5.5			17090		Top Plug	5.5		HES	
Float Shoe	5.5					Bottom Plug	5.5		HES	
Float Collar	5.5					SSR plug set	5.5		HES	
Insert Float	5.5					Plug Container	5.5		HES	
Stage Tool	5.5					Centralizers	5.5		HES	
<b>Fluid Data</b>										
Stage/Plug #: 1										
Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft <sup>3</sup> /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		
34.70 gal/bbl		FRESH WATER								

## HALLIBURTON

## 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							
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	562	sack	13.2	1.6		6	7.69
7.69 Gal		FRESH WATER							
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	1168	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	356	bbl	8.33				
Cement Left In Pipe		Amount	40 ft		Reason			Shoe Joint	
Comment Bumped plug at 376bbls away, final lifting pressure was 2471psi took 500psi over and held. After 4bbls back floats held. Estimated Top of Tail Cement 6710' Estimated Top of Lead Cement 22785' Estimated Top of Lead Cement 1779' Estimated Top of Spacer 109'									

## 2.0 Real-Time Job Summary

## 2.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DH Density (ppg)	DS Pump Press (psi)	Comb Pump Rate (bbl/min)	Comments
Event	1	Call Out	Call Out	12/12/2017	14:00:00	USER				Job called out with an on location time of 20:30
Event	2	Pre-Convoy Safety Meeting	Pre-Convoy Safety Meeting	12/12/2017	18:30:00	USER				JSA with HES crew on driving safety and route to rig.
Event	3	Arrive at Rig	Arrive at Rig	12/12/2017	19:15:00	USER				Arrived on location, rig still running casing.
Event	4	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	12/12/2017	19:30:00	USER				JSA and hazard hunt with HES crew.
Event	5	Rig-Up Equipment	Rig-Up Equipment	12/12/2017	19:45:00	USER				Rigged up HES lines and equipment.
Event	6	Pre-Job Safety Meeting	Pre-Job Safety Meeting	12/12/2017	22:30:00	USER				JSA with HES and rig crew on job safety and procedure.
Event	7	Start Job	Start Job	12/12/2017	22:49:35	COM4				TD 17100' TP 17090' FC 17050' 5 1/2" 20# production casing, 8 1/2" open hole 9 5/8 36# surface casing at 2030'
Event	8	Other	Other	12/12/2017	22:52:36	COM4				Fill lines.
Event	9	Test Lines	Test Lines	12/12/2017	22:56:08	COM4	8.39	3321.00		Test rigs 4" and IBOP. Set kick outs to 500 psi and tested the kick outs then brought pressure up to 3000psi and held.
Event	10	Test Lines	Test Lines	12/12/2017	23:05:39	COM4	8.41	4696.00		Set kick outs to 500 psi and tested the kick outs then brought pressure up to 4500psi and held.
Event	11	Check Weight	Check weight	12/12/2017	23:11:40	COM4				Weight verified by pressurized scales.
Event	12	Drop Bottom Plug	Drop Bottom Plug	12/12/2017	23:14:00	USER				Plug loaded into casing by company rep.
Event	13	Pump Spacer 1	Pump Spacer 1	12/12/2017	23:14:24	COM4	11.37	304.00	3.00	Pump 80bbls of 11.5ppg 3.73yield Tuned Spacer. Added 50 gallons of Musol A and Dual Spacer B on the fly. Pumped at 3bbl/min 120psi.
Event	14	Check Weight	Check weight	12/12/2017	23:26:05	COM4				Weight verified by pressurized scales.
Event	15	Shutdown	Shutdown	12/12/2017	23:39:23	COM4				Shutdown
Event	16	Drop Bottom Plug	Drop Bottom Plug	12/12/2017	23:40:56	COM4				Drop Bottom plug. Plug loaded into casing by company rep.

Event	17	Check Weight	Check weight	12/12/2017	23:44:21	COM4				Weight verified by pressurized scales.
Event	18	Pump Lead Cement	Pump Lead Cement	12/12/2017	23:46:57	COM4	13.25	673.00	8.00	Pump 41.94bbls (150sks) of 13.2ppg 1.57yield Lead Cement. Pumped at 8bbl/min 690psi.
Event	19	Pump Cement	Pump Cement	12/12/2017	23:53:01	COM4	13.25	657.00	8.00	Pump 160.15bbls (562sks) of 13.2ppg 1.6yield Lead Cement 2. Pumped at 8bbl/min 646psi.
Event	20	Check Weight	Check weight	12/12/2017	23:54:40	COM4	13.23	663.00	8.00	Weight verified by pressurized scales.
Event	21	Check Weight	Check weight	12/13/2017	00:01:07	COM4	13.23	632.00	8.00	Weight verified by pressurized scales.
Event	22	Pump Tail Cement	Pump Tail Cement	12/13/2017	00:13:13	COM4	13.26	640.00	8.00	Pump 424.36bbls (1168sks) of 13.2ppg 2.04yield Tail Cement . Pumped at 8bbl/min 685psi.
Event	23	Check Weight	Check weight	12/13/2017	00:14:20	COM4	13.17	820.00	8.00	Weight verified by pressurized scales.
Event	24	Check Weight	Check weight	12/13/2017	00:35:04	COM4	13.21	892.00	8.00	Weight verified by pressurized scales.
Event	25	Check Weight	Check weight	12/13/2017	00:55:51	COM4	13.17	905.00	8.00	Weight verified by pressurized scales.
Event	26	Shutdown	Shutdown	12/13/2017	01:07:26	COM4	13.46	209.00	0.10	Shutdown and clean pumps and lines.
Event	27	Drop Top Plug	Drop Top Plug	12/13/2017	01:19:22	COM4				Plug loaded into casing by company rep.
Event	28	Pump Displacement	Pump Displacement	12/13/2017	01:21:23	COM4	8.10	448.00	9.00	Pump 376bbls of H2O. First 20bbls with MMCR then 356bbls of H2O with biocide. Pumped at 9bbl/min and slowed rate with pressure increase.
Event	29	Bump Plug	Bump Plug	12/13/2017	02:07:55	COM4	8.29	1991.00	3.00	Bumped plug at 376bbls away. Final lift pressure was 2471psi, took pressure 500psi over and held. Opened release line to check floats and after 4bbls back floats held.
Event	30	End Job	End Job	12/13/2017	02:15:30	COM4				Thank you Steve Markovich and crew.



3.0 Attachments

3.1 Bison Ridge Y22-726 Production -Custom Results.png

