

## HALLIBURTON

## Cementing Job Summary

*The Road to Excellence Starts with Safety*

Sold To #: 345242		Ship To #: 3723091		Quote #:		Sales Order #: 0904171732				
Customer: NOBLE ENERGY INC - EBUS				Customer Rep: Jim Turer						
Well Name: FREEDOM FEDERAL			Well #: LC21-635		API/UWI #: 05-123-42805-00					
Field: WILDCAT		City (SAP): KEOTA		County/Parish: WELD		State: COLORADO				
Legal Description: NW SW-22-9N-59W-1625FSL-400FWL										
Contractor: Noble				Rig/Platform Name/Num: H&P 524						
Job BOM: 7523 7523										
Well Type: HORIZONTAL OIL										
Sales Person: HALAMERICA\HB70026				Srcv Supervisor: Steven Markovich						
Job										
Formation Name										
Formation Depth (MD)		Top			Bottom					
Form Type					BHST		230 degF			
Job depth MD		11140ft			Job Depth TVD					
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			0	1930	0	1930
Casing	0	5.5	4.778	20		P-110	0	11140	0	6103
Open Hole Section			8.5				6103	11140	0	6103
Fluid Data										
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	3.78		5	
	34.60 gal/bbl	FRESH WATER								
	0.60 gal/bbl	DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665)								
	0.60 gal/bbl	MUSOL A, 330 GAL TOTE - (790828)								
	147.42 lbm/bbl	BARITE, BULK (100003681)								
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
2	ElastiCem	ELASTICEM (TM) SYSTEM		150	sack	13.2	1.57		6	7.54
	7.54 Gal	FRESH WATER								
	0.25 %	SCR-100 (100003749)								

**HALLIBURTON**

*Cementing Job Summary*

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	ElastiCem w/ SCBL	ELASTICEM (TM) SYSTEM	441	sack	13.2	1.6		6	7.69
0.22 %		SCR-100 (100003749)							
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/mi n	Total Mix Fluid Gal
4	NeoCem NT1	NeoCem TM	566	sack	13.2	2.04		5	9.75
9.75 Gal		FRESH WATER							
0.05 %		SCR-100 (100003749)							
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	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/mi n	Total Mix Fluid Gal
6	Displacement	Displacement	226	bbl	8.33				
<b>Comment</b> Estimated Top of Tail Cement 6122' Estimated Top of Lead Cement 2 3042' Estimated Top of Lead Cement 2015' Estimated top of Spacer 332'. Final lift pressure was 1504psi tokk 500psi over and held for 5 mins. Got back 3bbls of water and floats held.									

## 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	7/19/2017	18:00:00	USER				Job called out with an on location time of 00:00
Event	2	Arrive At Loc	Arrive At Loc	7/19/2017	23:30:00	USER				Arrived on location at 23:30. HES crew did hazard hunt and pre rig up JSA
Event	3	Start Job	Start Job	7/20/2017	04:13:00	COM4				TD 11149' TP 11140' FC 11097.4' 5 1/2 20# csg 8 1/2" openhole 9 5/8 36# surfcsg 1930'. Estimated top of Tail Cement 6122' Estimated top of Lead 2 3042' Estimated top of Lead 2015' Estimated top of Spacer 332'
Event	4	Other	Other	7/20/2017	04:14:24	COM4				Fill lines with 4bbls of fresh water at 2bbl/min.
Event	5	Drop Bottom Plug	Drop Bottom Plug	7/20/2017	04:15:39	COM4				Plug loaded into casing by company rep.
Event	6	Test Lines	Test Lines	7/20/2017	04:18:05	COM4	8.63	4475.00		500psi kick out test. kick outs worked, re set kick outs to 4000 psi and brought pressure up. Held for 3 mins.
Event	7	Check Weight	Check Weight	7/20/2017	04:22:02	COM4				Weight verified by pressurized scales.
Event	8	Pump Spacer 1	Pump Spacer 1	7/20/2017	04:24:59	COM4	11.74	119.00	2.00	Pump 80bbls of 11.5ppg 3.78yield Tune Spacer. Added 48 gallons of Musol A and Dual surf B on the fly. Pumped at 4bbl/min 140psi.
Event	9	Check Weight	Check Weight	7/20/2017	04:42:18	COM4				Weight verified by pressurized scales.
Event	10	Shutdown	Shutdown	7/20/2017	04:51:49	COM4				Pumped off spacer and pulled up CRT to load plug.
Event	11	Drop Bottom Plug	Drop Bottom Plug	7/20/2017	04:52:11	COM4				Plug loaded and dropped by company rep.
Event	12	Check Weight	Check Weight	7/20/2017	04:57:43	COM4				Weight verified by pressurized scales.
Event	13	Pump Lead Cement	Pump Lead Cement	7/20/2017	04:59:57	COM4	13.46	413.00	6.50	Pump 41.94bbls of 13.2ppg 1.57yield Lead Cement. Pumped at 6bbl/min 400psi
Event	14	Check Weight	Check Weight	7/20/2017	05:02:25	COM4	13.42	421.00	6.10	Weight verified by pressurized scales.
Event	15	Pump Cement	Pump Cement	7/20/2017	05:07:19	COM4	13.30	332.28	6.20	Pump 125.67bbls of 13.2ppg 1.6yield Lead Cement 2. Pumped at 8bbl/min 550psi

Event	16	Check Weight	Check Weight	7/20/2017	05:09:21	COM4	13.29	533.56	8.00	Weight verified by pressurized scales.
Event	17	Pump Tail Cement	Pump Tail Cement	7/20/2017	05:23:55	COM4	13.07	503.68	8.00	Pump 205.64bbls of 13.2ppg 2.04yield Tail Cement. Pumped at 8bbl/min 550psi.
Event	18	Check Weight	Check Weight	7/20/2017	05:25:41	COM4	13.04	616.00	8.00	Weight verified by pressurized scales.
Event	19	Check Weight	Check Weight	7/20/2017	05:29:34	COM4	13.19	669.98	8.00	Weight verified by pressurized scales.
Event	20	Shutdown	Shutdown	7/20/2017	05:52:55	COM4				Shutdown to clean pumps and lines.
Event	21	Drop Plug	Drop Plug	7/20/2017	05:58:47	COM4				Plug loaded and dropped by company rep.
Event	22	Pump Displacement	Pump Displacement	7/20/2017	06:11:24	COM4	8.32	336.00	8.50	Pump 246bbls of Fresh water. First 20bbls add MMCR and then 226bbls add biocide. Pumped at 8bbls/min then slowed down to 3bbls/min for last 20.
Event	23	Displ Reached Cement	Displ Reached Cement	7/20/2017	06:18:20	COM4				Reached cement.
Event	24	Bump Plug	Bump Plug	7/20/2017	06:45:25	COM4	8.35	1554.98	2.89	After displacing the calculated amount of 246bbls we bumped the plug. Final lift pressure was 1504psi, took 500psi over and held for 5 mins.
Event	25	Check Floats	Check Floats	7/20/2017	06:50:12	USER				Opened release line to check floats. After 3bbls of water back floats held.
Event	26	End Job	End Job	7/20/2017	06:52:19	COM4				Thank you Steve Markovich and Crew.