

HALLIBURTON

iCem® Service

NOBLE ENERGY INC-EBUS

Ft. Lupton District, Colorado

Booth C35-735 Production

Job Date: Monday, January 30, 2023

Sincerely,

Meghan Van Zyl

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 **Booth C35-735 – Production**. 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.

Job was pumped per design with an average cement density of 13.17 ppg at 8.55 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 441 bbl. of treated freshwater displacement. Plug was landed at 2,450 psi and bumped to 2,950 psi. Pressure was bled off and 6 bbl. of fluid was returned to the truck. Approximately 69 bbl. of spacer was returned to surface indicating a top of cement around 1,019’.

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 Rockies Cement Team

1.2 Job Overview

Job Details	
API #:	05-123-48926
City, County:	Kersey, Co

Job Times		
	Date (mm/dd/yyyy)	Time (hh:mm)
Requested Time On Location:	01/30/2023	07:00
Called Out Time:	01/30/2023	03:30
Arrived On Location:	01/30/2023	09:00
Job Started:	01/30/2023	11:15
Job Completed:	01/30/2023	15:55
Departed Location:	01/30/2023	17:35

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	3
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	10.2
4	Casing set depth (shoe)	ft	19916
5	TVD	ft	6722
6	Float collar depth	ft	19909
7	Length of rate hole	ft	14.5
8	Previous casing shoe depth	ft	1957
9	Pre-job mud circulation time	hh:mm	2:30
10	Pre-job mud circulation rate	bpm	11
11	Pre-job mud circulation volume	bbls	950

12	Mud circulation pressure at start of cement	psi	300
13	Annual flow before the start of job	Y/N	YES
14	Pipe movement during cement job	Y/N	YES
15	Calculated displacement	bbls	462
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	100
18	Fluid returns to surface	Spacer/Cement, bbls	69 SPACER
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	2450
20	Number of Centralizers	-	243
21	Number of bottom plugs	-	3

1.3 Water Field Test

	Recorded Value	Unit	Acceptable Limit	Potential Problems if Values Exceed the Limit
pH	7.0		6.0 - 8.0	Chemicals in water can cause severe retardation
Temperature	70	F	60 - 80 F	Can can pre-mature setting of cement
Chlorides	200	ppm	3000 ppm	Can shorten thickening time

1.4 Actual Pump Schedule

	Density (ppg)	Volume (bbls)	Yield (ft3/sk)	Water Requirement (gal/sk)	Bulk Sacks (sks)	Total Water (gals)
Spacer Fluid	11.5	120	3.88	24.45		4246
Cap Cement	13.2	39.4	1.59	8.07	140	1129
Lead Cement	13.2	211.0	1.68	8.1	708	5734
Tail Cement	13.2	527.0	2.05	9.83	1150	14214
Top Plug	1					
Displacement Fluid	8.33	461.88				

2.0 Real-Time Job Summary

2.1 Job Event Log

Seq No.	Activity	Date	Time	Dwnhole Density (ppg)	Cmb Pump Rate (bbl/min)	Pump B Pressure (psi)	Cmb Stg Total (bbl)	Comments
1	Call Out	1/30/2023	03:30:00					Crew called out at 0330 on 1/30/2023 while finishing up current job they were on. Crew requested on location time of 0700 on 1/30/2023.
2	Safety Meeting	1/30/2023	05:55:00					Pre convoy safety meeting discussed route to location and hazards of driving during freezing temps.
3	Crew Leave Yard	1/30/2023	06:00:00					Crew Leaves yard in convoy at 0600 hrs.
4	Arrive At Loc	1/30/2023	09:00:00					Crew arrived on location at 0900 hrs. Meet with costumer TD 19930', 8.5 OH, TP 19915.5 5.5' 17#, FC 19908.5', TVD 6722', P/C 1957' 9.625 36#, OBM WEIGHT 10.2 PPG.
5	Safety Meeting - Pre Rig-Up	1/30/2023	09:15:00					Discuss hazards around rig up area.
6	Rig-Up Completed	1/30/2023	10:30:00	-0.76	0.00	-0.76	109.55	Rig up completed.
7	Safety Meeting - Pre Job	1/30/2023	10:45:00	7.60	1.60	41.50	119.18	Pre job safety meeting discussed all hazards prior to job and reviewed job procedure.
8	Start Job	1/30/2023	11:15:26	8.35	4.00	120.39	1.82	Start recording data.
9	Test Lines	1/30/2023	11:20:43	8.09	0.00	225.70	3.23	Pressure tested HES lines to 5500 psi, Tested rigs IBOP to 1400 psi.
10	Drop Bottom Plug	1/30/2023	11:28:30	8.01	0.00	21.09	3.43	1st bottom plug verified by DSR.

11	Pump Spacer 1	1/30/2023	11:32:30	7.95	1.63	25.93	0.09	Pumped 120 bbls of Tuned Prime spacer @11.5ppg,3.88ft3,24.45 gal/sack. Pre calculated mix gallons were 4246 gal. Estimated 69 bbls to surface. Average rate was 6 bpm with 700 psi on the line.
12	Shutdown	1/30/2023	11:55:05	11.38	0.00	247.01	133.69	Shutdown to drop 2nd bottom plug.
13	Drop Bottom Plug	1/30/2023	11:57:24	11.33	0.00	47.75	133.69	2nd bottom plug verified by DSR.
14	Pump Cap Cement	1/30/2023	11:58:48	11.31	0.00	46.40	0.00	Pumped 39 bbls (140 SKS) of EconoCem cap @13.2ppg,1.59ft3,8.07gal/sack. Pre calculated mix gallons were 1129 gal. Average rate was 5 bpm with 650 psi on the line. Pre calculated HOCC=1841.78, TOCC=1019.24'.
15	Pump Lead Cement	1/30/2023	12:06:56	13.01	6.37	281.60	0.05	Pumped 211 BBL (708 SKS) of ElastiCem lead @13.2ppg,1.68ft3,8.1gal/sack. Pre calculated mix gallons were 5734 gal. Average rate was 9bpm with 1500 psi on the line. Pre calculated HOLC=7013.34', TOLC=1841.78'.
16	Pump Tail Cement	1/30/2023	12:32:23	12.99	7.50	857.19	0.19	Pumped 527 bbls (1446 sks) of NeoCem tail @13.2ppg,2.05ft3,9.83gal/sack. Pre calculated mix water was 14214 gal. Average rate was 8.5 ppg with 2000 psi on the line. Pre calculated HOTC=12916.66', TOTC=7013.34'.
17	Check Weight	1/30/2023	13:05:04	13.31	9.15	2073.46	298.25	Weight verified by mud scales.
18	Shutdown	1/30/2023	13:35:31	13.16	0.00	169.13	557.46	Shutdown swapped over to wash up pit.
19	Clean Lines	1/30/2023	13:44:13	13.10	0.00	45.56	0.00	Washed pumps and lines with 25 bbls of water.
20	Drop Bottom Plug	1/30/2023	13:57:22	7.91	0.00	26.31	26.63	3rd bottom plug verified by DSR.
21	Drop Top Plug	1/30/2023	13:59:35	7.94	0.00	25.13	29.62	Top Plug verified by DSR.

22	Pump Displacement	1/30/2023	14:01:38	7.92	0.00	26.47	0.00	Pumped 3 bbls of green dye & MMCR water then shutdown and dropped top plug and continued into the 461 bbls of freshwater displacement with first 40 bbls having 20 gal of MMCR in it and 10 gal of MC MX 820-6&20 gal of Bellacide 300W threw out displacement.
23	Bump Plug	1/30/2023	14:57:44	8.27	0.00	3067.33	454.02	FCP @2bpm was 2450 psi bumped up to 2950 psi.
24	Check Floats	1/30/2023	15:02:32	8.24	0.00	3169.62	0.00	6 bbls back to pump truck floats holding.
25	Pressure Up Well	1/30/2023	15:08:08	7.98	0.00	-0.22	0.00	Pressured up to burst bottom plug & pump 3 bbl. wet shoe. Burst @3650 psi.
26	Bump Plug	1/30/2023	15:13:35	8.98	0.00	3136.95	8.72	FCP @2bpm was 2700 psi bumped up to 3200 psi.
27	Check Floats	1/30/2023	15:18:18	8.97	0.00	3222.55	8.72	6.5 bbls back to pump truck floats holding.
28	Other	1/30/2023	15:20:52	8.59	0.00	0.47	8.72	Begin 30-minute inflow test. .5 bbl. gained after 30 minutes. Total of 69 bbls of spacer to surface.
29	End Job	1/30/2023	15:50:22	8.43	0.00	-0.96	0.00	
30	Safety Meeting - Pre Rig-Down	1/30/2023	16:00:00					Discuss blow down and any new hazards that could have come up during job.
31	Rig-Down Completed	1/30/2023	17:15:00					Rig down completed.
32	Pre-Convoy Safety Meeting	1/30/2023	17:30:00					Fit for duty check and check road conditions.
33	Crew Leave Location	1/30/2023	17:35:00					Crew departs location. Thank you for using Halliburton

3.0 Attachments

3.1 Real Time iCem Job Chart

