

HALLIBURTON

iCem[®] Service

NOBLE ENERGY INC-EBUS

Ft. Lupton District, Colorado

Booth C35-725 Production

Job Date: Monday, February 06, 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 C35-725 - 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 13.21 ppg at 8.74 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 444 bbl. of treated freshwater displacement. Plug was landed at 2,460 psi and bumped to 3,000 psi. Pressure was bled off and 6 bbl. of fluid was returned to the truck. Approximately 73 bbl. of spacer was returned to surface indicating a top of cement around 904'.

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 #:	05-132-48922
City, County:	Kersey, Weld Co

Job Times		
	Date (mm/dd/yyyy)	Time (hh:mm)
Requested Time On Location:	02/05/2023	23:30
Called Out Time:	02/05/2023	17:30
Arrived On Location:	02/05/2023	22:00
Job Started:	02/06/2023	4:06
Job Completed:	02/06/2023	9:11
Departed Location:	02/06/2023	10:45

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	20
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	9.9
4	Casing set depth (shoe)	ft	20051
5	TVD	ft	6729
6	Float collar depth	ft	20043
7	Length of rate hole	ft	11
8	Previous casing shoe depth	ft	1938
9	Pre-job mud circulation time	hh:mm	3:00
10	Pre-job mud circulation rate	bpm	11
11	Pre-job mud circulation volume	bbls	1000

12	Mud circulation pressure at start of cement	psi	250
13	Annual flow before the start of job	Y/N	YES
14	Pipe movement during cement job	Y/N	YES
15	Calculated displacement	bbls	464.99
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	100
18	Fluid returns to surface	Spacer/Cement, bbls	73 SPACER
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	2460
20	Number of Centralizers	-	246
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		6.0 - 8.0	Chemicals in water can cause severe retardation
Temperature	65	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	39.6	1.59	8.07	140	1130
Lead Cement	13.2	216.0	1.68	8.1	722	5848
Tail Cement	13.2	529.0	2.05	9.83	1450	14253
Top Plug	1					
Displacement Fluid	8.33	464.99				

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	2/5/2023	17:30:00					Crew called out at 1730 on 2/5/2023 for a requested-on location time of 2330 on 2/5/2023.
2	Safety Meeting	2/5/2023	20:50:00					Pre convoy safety meeting discussed route to location and hazards of driving.
3	Crew Leave Yard	2/5/2023	21:00:00					Crew Leaves yard in convoy at 2100 hrs.
4	Arrive At Loc	2/5/2023	22:00:00					Crew arrived on location at 2200 hrs. Meet with costumer TD 20061', 8.5 OH, TP 20050 5.5' 17#, FC 20043', TVD 6729', P/C 1938' 9.625 36#, OBM WEIGHT 9.9 PPG.
5	Safety Meeting - Pre Rig-Up	2/5/2023	23:25:00					Discuss hazards around rig up area.
6	Rig-Up Completed	2/6/2023	00:45:00					Rig up completed.
7	Safety Meeting - Pre Job	2/6/2023	03:30:00	0.00	0.03	-0.12	6.29	Pre job safety meeting discussed all hazards prior to job and reviewed job procedure.
8	Start Job	2/6/2023	04:06:08	8.20	0.00	-2.15	33.48	Start recording data
9	Test Lines	2/6/2023	04:08:56	8.33	0.00	201.16	3.05	Pressure tested HES lines to 5500 psi, 500 kick out test working. top pressure 5700 psi. Tested rig manual IBOP valve to 1700 psi.
10	Check Weight	2/6/2023	04:24:53	8.21	0.00	11.49	6.70	Weight verified by mud scales.

11	Drop Bottom Plug	2/6/2023	04:35:00	7.97	0.00	9.56	8.51	1st bottom plug verified by DSR.
12	Pump Spacer 1	2/6/2023	04:36:49	8.08	0.00	0.68	0.00	Pumped 120 bbls of Tuned prime spacer @11.5ppg,3.88ft3,24.45gal/sack. Pre calculated mix gallons was 4,246 gal. Average rate was 5 bpm with 600 psi on the line. Estimated 73 bbls of spacer back to surface.
13	Shutdown	2/6/2023	05:01:08	11.57	0.00	197.88	120.63	Shutdown to drop 2nd plug.
14	Drop Bottom Plug	2/6/2023	05:02:53	11.56	0.00	53.24	0.00	2nd bottom plug verified by DSR.
15	Pump Cap Cement	2/6/2023	05:04:08	11.54	0.00	50.88	0.00	Pumped 39.6 bbls (140 sks) of EconoCem cap @13.2ppg,1.59ft3,8.07gal/sack. Pre calculated mix gallons was 1,130 gal. Average rate was 6.5 bpm with 650 psi on the line. HOCC=1,801', TOCC=904'.
16	Check Weight	2/6/2023	05:08:22	13.23	5.90	636.89	19.69	Weight verified by mud scales.
17	Pump Lead Cement	2/6/2023	05:11:14	13.04	5.92	563.01	0.10	Pumped 216 bbls (722 sks) of ElastiCem lead @13.2ppg,1.68ft3,8.1gal/sack. Pre calculated mix gallons was 5,848 gal. Average rate was 9 bpm with 950 psi on the line. HOLC=7,095', TOLC=1801'.
18	Check Weight	2/6/2023	05:14:41	13.19	5.96	588.52	20.85	Weight verified by mud scales.
19	Pump Tail Cement	2/6/2023	05:37:41	12.98	9.36	991.49	0.08	Pumped 529 bbls (1,450 sks) of NeoCem tail @13.2ppg,2.05ft3,9.83gal/sack. Pre calculated mix gallons was 14,253 gal. Average rate was 9 bpm with 1600 psi on the line. HOTC=12,965', TOTC=7,095'.
20	Check Weight	2/6/2023	05:41:26	13.26	9.10	1417.26	34.48	Weight verified by mud scales.
21	Shutdown	2/6/2023	06:38:34	13.20	0.00	109.14	558.16	Shutdown to swap to wash up pit.
22	Clean Lines	2/6/2023	06:47:17	13.18	0.00	58.70	558.16	Cleaned pumps and lines with 25 bbls of fresh water.

23	Drop Bottom Plug	2/6/2023	07:07:37	7.59	0.00	26.29	26.32	3rd bottom plug verified by DSR.
24	Pump Displacement	2/6/2023	07:08:00	7.58	0.00	26.08	0.00	Pumped 3 bbls with green dye & MMCR water. shutdown to drop top plug. Continued into 464.99 bbls of freshwater displacement. first 20 bbls with 10 gal of MMCR, 25 gal of bellacide 330w & 15 gal of MC MX 820-6 threw out displacement.
25	Drop Top Plug	2/6/2023	07:10:00	8.37	0.00	31.21	2.50	Top plug verified by DSR.
26	Bump Plug	2/6/2023	08:15:28	8.65	0.00	2887.03	469.38	FCP @ 2 bpm was 2480 psi, bumped up to 3000 psi. held for 5 minutes.
27	Check Floats	2/6/2023	08:20:44	8.62	0.00	2979.29	469.38	6 bbls back to pump truck, floats are holding.
28	Other	2/6/2023	08:24:03	8.56	0.00	-2.52	469.38	Burst bottom plug @ 3700 psi & pumped 3 bbl wet shoe.
29	Bump Plug	2/6/2023	08:33:31	8.62	0.00	2870.48	478.13	FCP @ 1 bpm 2460 psi, bumped up to 2980 psi. Held pressure for 5 minutes.
30	Check Floats	2/6/2023	08:38:55	8.59	0.00	2945.58	478.13	6 bbls back to pump truck floats are holding.
31	Other	2/6/2023	08:41:20	8.51	0.00	0.56	478.13	Begin 30-minute inflow test. half bbl gained after 30-minute test.
32	End Job	2/6/2023	09:11:01	8.20	0.00	2.51	478.13	Stop recording data. total of 73 bbls of spacer to surface. Washed rig stack with 15 bbls of fresh water.
33	Safety Meeting - Pre Rig-Down	2/6/2023	09:15:00					Discuss blow down and any new hazards that could have come up during job.
34	Rig-Down Completed	2/6/2023	10:30:00					Rig down completed.
35	Pre-Convoy Safety Meeting	2/6/2023	10:45:00					Fit for duty check and check road conditions.
36	Crew Leave Location	2/6/2023	11:00:00					Crew departs location. Thank you for using Halliburton.

3.0 Attachments

3.1 Real Time iCem Job Chart

