HALLIBURTON

iCem® Service

NOBLE ENERGY INC-EBUS

Ft. Lupton District, Colorado

Foose State A17-675 Production

Job Date: Thursday, November 23, 2023

Sincerely,

Meghan Van Zyl

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. iCem 3D Displacement results are used to understand how fluids intermix during a cement job. Simulation and 3D displacement results are not intended as and should not be used as a replacement for bond logs in determining top of cement. Current 3D model calculations are known to model more volume than the input volume for standard cases due to known calculation improvements required. For rotational cases, the modeled volume will be impacted by the same calculations impacting the standard cases, as well as additional constraints imposed to make the calculation time required operationally feasible. Therefore, until further notice, 3D displacement results should not be used for replacement of a bond log, or used as an identifier of top of cement. 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

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Foose State A17-675 - 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 13.2 ppg at 6.17 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 391 bbl. of treated freshwater displacement. Plug was landed at 2470 psi and pressured up to 3000 psi. Approximately 61 bbl. of spacer was returned to surface indicating a top of cement around 954'.

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 #:	05-123-52157
City, County:	Kersey, Weld
SO#:	908995985

Job Times		
	Date (mm/dd/yyyy)	**Time (hh:mm)**
Requested Time On Location:	11/22/2023	22:00
Called Out Time:	11/22/2023	16:00
Arrived On Location:	11/22/2023	20:00
Job Started:	11/23/2023	2:49
Job Completed:	11/23/2023	7:55
Departed Location:	11/23/2023	10:00

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	37
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	10.6
4	Casing set depth (shoe)	ft	17756
5	TVD	ft	6855
6	Float collar depth	ft	17749
7	Length of rate hole	ft	12
8	Previous casing shoe depth	ft	1960
9	Pre-job mud circulation time	hh:mm	2:00
10	Pre-job mud circulation rate	bpm	10

11	Pre-job mud circulation volume	bbls	900
12	Mud circulation pressure at start of cement	psi	300
13	Annual flow before the start of job	Y/N	Y
14	Pipe movement during cement job	Y/N	Y
15	Calculated displacement	bbls	411
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	100
18	Fluid returns to surface	Spacer/Cement, bbls	61 spacer
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	2470
20	Number of Centralizers	-	216
21	Number of bottom plugs	-	2
22	Number of trucks used preparing/during job	-	4
23	Add hours? If Yes, put #	Y/N and hours	N
24	NPT? If Yes, put #	Y/N and hours	N

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	12	120	2.29	14.04	294	4130
Cap Cement	13.2	40	1.59	7.98	140	1117
Lead Cement	13.2	233	1.66	7.82	787	6154
Tail Cement	13.2	419	1.98	9.51	1189	11307
Top Plug	1					
Displacement Fluid	8.33	411				

2.0 Real-Time Job Summary

2.1 Job Event Log

Seq. No.	Activity	Date	Time	Comments
1	Call Out	11/22/2023	16:00:00	Crew called out at 1600 on 11/22/2023 for a requested-on location time of 2200 on 11/22/2023.
2	Safety Meeting	11/22/2023	18:45:00	Pre convoy safety meeting discussed route to location and hazards of driving during holiday weekend.
3	Crew Leave Yard	11/22/2023	19:00:00	Crew Leaves yard in convoy at 1900 hrs.
4	Arrive At Loc	11/22/2023	20:00:00	Crew arrived on location at 2000 hrs. Meet with costumer TD 17768', 8.5 OH, TP 17756' 5.5' 17#, FC 17749', TVD 6855', P/C 1960' 9.625 36#, OBM WEIGHT 10.6 PPG.
5	Safety Meeting - Pre Rig-Up	11/22/2023	21:00:00	Discuss hazards around rig up area.
6	Rig-Up Completed	11/23/2023	00:30:00	Rig up completed.
7	Safety Meeting - Pre Job	11/23/2023	02:30:00	Pre job safety meeting discussed all hazards prior to job and reviewed job procedure.
8	Start Job	11/23/2023	02:49:39	Start recording data.
9	Test Lines	11/23/2023	02:51:49	Pressure tested HES lines to 6500 psi & rig IBOP to 1800 psi.
10	Drop Bottom Plug	11/23/2023	03:08:59	1st bottom plug verified by DSR.
11	Pump Spacer	11/23/2023	03:12:47	Pumped 120 bbls (294 sks) of Tuned Prime Spacer @12ppg/2.29ft3/14.04gal/sack. Mix gallons was 4130 gallons. Average rate was 6bpm with 500 psi. 61 bbls to surface.
12	Check Weight	11/23/2023	03:13:09	Weight verified by mud scales.
13	Check Weight	11/23/2023	03:30:03	Weight verified by mud scales.
14	Drop Bottom Plug	11/23/2023	03:42:33	2nd bottom plug verified by DSR.

15	Pump Cap Cement	11/23/2023	03:42:42	Pumped 40 bbls (140 sks) of EconoCem Cap cement @13.2ppg/1.59ft3/7.98gal/sack. Mix gallons was 1117 gallons. Average rate was 3bpm with 300 psi on the line. TOCC= 954'.
16	Check Weight	11/23/2023	03:48:57	Weight verified by mud scales.
17	Pump Lead Cement	11/23/2023	03:56:25	Pumped 233 bbls (787 sks) of ElastiCem Lead cement W13.2ppg/1.66ft3/7.82gal/sack. Mix gallons was 6154 gallons. Average rate was 7.5bpm with 1100 psi. TOLC= 1789'.
18	Check Weight	11/23/2023	03:59:42	Weight verified by mud scales.
19	Check Weight	11/23/2023	04:15:22	Weight verified by mud scales.
20	Check Weight	11/23/2023	04:25:06	Weight verified by mud scales.
21	Pump Tail Cement	11/23/2023	04:32:26	Pumped 419 bbls (1189 sks) of NeoCem Tail cement @13.2ppg/1.98ft3/9.51gal/sack. Mix gallons was 11307 gallons. Average rate was 7.5 bpm with 1800 psi on the line. TOTC = 7499'.
22	Check Weight	11/23/2023	04:37:11	Weight verified by mud scales.
23	Check Weight	11/23/2023	04:42:16	Weight verified by mud scales.
24	Slow Rate	11/23/2023	05:01:10	Slow rate due to poor delivery after silo swap.
25	Check Weight	11/23/2023	05:11:06	Weight verified by mud scales.
26	Shutdown	11/23/2023	05:41:13	Shutdown to swap over to wash up tank.
27	Clean Lines	11/23/2023	05:44:00	Washed pumps & lines with 30 bbls of freshwater.
28	Drop Plug	11/23/2023	05:59:03	Top plug verified by DSR.
29	Pump Displacement	11/23/2023	05:59:40	Pumped 411 bbls of freshwater displacement with 10 gallons of MMCR in first 20 bbls. MC MX 820-6 & Bellacide 300w threw out the remainder of displacement.
30	Bump Plug	11/23/2023	07:02:16	FCP@2bpm was 2470 psi, bumped up to 3000 psi.
31	Other	11/23/2023	07:07:38	5.5 bbls back to pump truck floats holding.
32	Other	11/23/2023	07:10:31	No clear burst highest pressure was 2570 psi @1bpm, pumped additional 4 bbls.

33	Other	11/23/2023	07:21:36	4.5 bbls back to pump truck.
34	Other	11/23/2023	07:23:21	Begin 30 minutes Inflow test.
35	End Job	11/23/2023	07:55:38	.5 bbl gained after 30 minutes. Stop recording data. Washed rig stack with 10 bbls of freshwater.
36	Safety Meeting - Pre Rig-Down	11/23/2023	08:30:00	Discuss blow down and any new hazards that could have come up during job.
37	Rig-Down Completed	11/23/2023	09:30:00	Rig down completed.
38	Pre-Convoy Safety Meeting	11/23/2023	09:45:00	Fit for duty check and check road conditions.
39	Crew Leave Location	11/23/2023	10:00:00	Crew departs location. Thank you for using Halliburton.

3.0 Attachments

3.1 Real Time iCem Job Chart