HALLIBURTON

iCem® Service

NOBLE ENERGY INC

Ft. Lupton District, Colorado

Guttersen State C36-775 Production

Job Date: Thursday, April 13, 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 **Guttersen State C36-775** - **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 13.18 ppg at 8.7 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 400 bbl. of treated freshwater displacement. Plug was landed at 1,850 psi and bumped to 2,500 psi. Pressure was bled off and 1.5 bbl. of fluid was returned to the truck. Approximately 40 bbl. of interface was returned to surface indicating a top of cement around 2728'.

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 #:	05-123-49076
City, County:	Kersey, Weld

Job Times		
	Date (mm/dd/yyyy)	**Time (hh:mm)**
Requested Time On Location:	04/12/2023	21:30
Called Out Time:	04/12/2023	15:30
Arrived On Location:	04/12/2023	20:50
Job Started:	04/13/2023	01:35
Job Completed:	04/13/2023	07:19
Departed Location:	04/13/2023	09:30

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	60
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	10.0
4	Casing set depth (shoe)	ft	18,101.6’
5	TVD	ft	6,772’
6	Float collar depth	ft	18,094.6’
7	Length of rate hole	ft	1,817.4’
8	Previous casing shoe depth	ft	1,928’
9	Pre-job mud circulation time	hh:mm	3:00
10	Pre-job mud circulation rate	bpm	12
11	Pre-job mud circulation volume	bbls	1504 bbls

12	Mud circulation pressure at start of cement	psi	500 psi
13	Annual flow before the start of job	Y/N	No
14	Pipe movement during cement job	Y/N	No
15	Calculated displacement	bbls	420 bbls
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	84%
18	Fluid returns to surface	Spacer/Cement, bbls	0 bbls / 0 bbls
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	1,800 psi
20	Number of Centralizers	-	219
21	Number of bottom plugs	-	2

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	60	F	60 - 80 F	Can can pre-mature setting of cement
Chlorides	0	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)
Bottom Plug	1 / 1000 psi burst disk					
Spacer Fluid	11.5	120	3.881	24.45	174	4,245
Bottom Plug	1 / 1000 psi burst disk					
Cap Cement	13.2	40	1.6	7.91	140	1,107
Lead Cement	13.2	212	1.68	8.1	708	5,735
Tail Cement	13.2	448	2.05	9.83	1229	12,081
Top Plug	1 / 2500 Latch down burst disk					
Displacement Fluid	8.33	420				

2.0 Real-Time Job Summary

2.1 Job Event Log

Seq. No.	Activity	Date	Time	Comments
1	Call Out	4/12/2023	15:30:00	Crew was called out 15:30 for an on-location time of 21:30 pm.
2	Depart Yard Safety Meeting	4/12/2023	19:30:00	Held a pre convoy safety meeting and 5 checks to go discussion with crew.
3	Crew Leave Yard	4/12/2023	19:45:00	Cement crew mobilized all equipment and supplies and departed the yard for the well site location.
4	Arrive at Location from Service Center	4/12/2023	20:50:00	Arrived at location and crew signed in at the sign in shack. Check in with the Company Man Rickey Willey and discussed job processes and well bore schematics. MD: 8.5” OH was drilled to 19,919’, TP: 5.5” 17# set @ 18,101.6’ Float Collar Set @ 18,094.6’, TVD: 6,772’, PC: 9.625” 36# Set @ 1,928’, Mud: 10 ppg,
5	Assessment Of Location Safety Meeting	4/12/2023	21:05:00	Crew held 5 checks to go and assessed the location and work area for applicable hazards.
6	Safety Meeting - Pre Rig-Up	4/12/2023	21:15:00	Crew rigged up all line, hoses, pump trucks, bulk vessels, and high-pressure discharge iron.
7	Rig-Up Equipment	4/12/2023	21:20:00	Held a JSA with HES crew about rigging up safety. Set the expectations for SQ and designated roles and responsibilities.
8	Pre-Job Safety Meeting	4/13/2023	01:00:00	Held a safety meeting with all HES and involved third party personnel.
9	Start Job	4/13/2023	01:35:15	Pumped 3 bbls of fresh at 3 bbl/min to fill lines.
10	Test Lines	4/13/2023	01:38:14	Pressure tested lines to 7,000 psi and held pressure feel off at 20 psi per second. Walked the line and found a leak at the bottom of the standpipe. Replaced rubber gasket and fixed the leak.
11	Resolving Operational or Procedure Concerns - Start Time	4/13/2023	01:42:06	Pressured back up and pressure feel off. Began trouble shooting where the leak was.

12	Resolving Operational or Procedure Concerns - End Time	4/13/2023	02:27:08	The one-inch low torch valve was determined to be washed out. Replaced the one-inch valve and completed a successful pressure test.
13	Pressure Test	4/13/2023	02:27:48	Pressure tested HSE lines to 7,000 psi. Pressure held and test was good.
14	Pressure Test	4/13/2023	02:36:03	Pressure tested the IBop valve to 1,800 psi and Pressure held.
15	Drop Bottom Plug	4/13/2023	02:42:57	Bled off pressure, stung out of the casing and the customer loaded and dropped the bottom plug. HES and Company Retentive both witnessed the plug drop.
16	Pump Spacer	4/13/2023	02:43:41	Mixed and pumped 120bbls (173 sks) of Tuned Prim Spacer at 6 bbl/min with a density of 11.5 ppg, yield of 3.881 Cu/sk.
17	Check Weight	4/13/2023	02:57:29	Spacer weight up at 11.5 ppg.
18	Shutdown	4/13/2023	03:08:49	Shutdown to load and drop the second bottom plug.
19	Drop Bottom Plug	4/13/2023	03:13:58	The customer loaded and dropped the bottom plug. HES and Company Retentive both witnessed the plug drop.
20	Pump Cap Cement	4/13/2023	03:15:04	Mixed and pumped 40 bbls (140 sks) of cap cement at 9 bbl/min with a density of 13.2, yield of 1.6 cu/sk, and water requirement of 7.91 gsl/sk. Density was verified by pressurized scales.
21	Check Weight	4/13/2023	03:18:24	Cement weighed up at 13.2 ppg Density was verified by pressurized scales.
22	Pump Lead Cement	4/13/2023	03:20:26	Mixed and pumped 212 bbls (708 sks) of lead cement at 9 bbl/min with a density of 13.2, yield of 1.68 cu/sk, and water requirement of 8.1 gsl/sk. Density was verified by pressurized scales.
23	Pump Tail Cement	4/13/2023	03:46:26	Mixed and pumped 449 bbls (1229 sks) of cap cement at 9 bbl/min with a density of 13.2, yield of 2.05 cu/sk, and water requirement of 9.83 gsl/sk. Density was verified by pressurized scales.
24	Check Weight	4/13/2023	03:51:33	Cement weighed up at 13.2 ppg Density was verified by pressurized scales.
25	Shutdown	4/13/2023	04:41:48	Shutdown to wash pumps and lines.

26	Clean Lines	4/13/2023	04:48:02	The rig lined up their valves. Pumped 16 bbls of fresh water until lines were and pumps were clean.
27	Drop Top Plug	4/13/2023	05:01:19	Shutdown to load and drop the Top plug. The customer loaded and dropped the bottom plug. HES and Company Retentive both witnessed the plug drop.
28	Pump Displacement	4/13/2023	05:01:42	Pumped 420 bbls of fresh water with MMCR in the first 20 bbls and Bellacisde and MC MX 820-6 throughout the rest of displacement.
29	Bump Plug	4/13/2023	05:55:50	Bump the plug 500 psi over 1,850. Final bump pressure was 2,500 psi. Held for 5 minutes and pressure rose up to 2,660 psi.
30	Check Floats	4/13/2023	06:02:57	Bled off pressure to check floats. Floats held. 4.5 bbls flowed back to the truck.
31	Pressure Up Annulus	4/13/2023	06:05:51	Pumped 5 bbls at 1 bbl/min to bust the top plug. Rupture disk was at 2,500 psi. Dick ruptured at 1,725 psi. Pressure increases was not high enough to signal the disk had ruptured. Pumped 10 bbls of fresh water at 1 bbl/min to over displace by 5 bbls per Chevron and Company Man. Returned no spacer to surface and 1 bbl of interface.
32	Pressure Up	4/13/2023	06:14:46	Company Mam called Chevron Higher ups and Had Halliburton pump another 15 bbls of fresh water over displacement. Returned 15 more bbls of interface. Company Man was instructed to over displace 10 more bbls. Returned another 10 bbls of interface.
33	Check Floats	4/13/2023	06:45:19	Bled off pressure to check floats. Checked floats for 30 minutes. 1.5 bbls flowed back to the truck.
34	End Job	4/13/2023	07:19:38	Estimated tops of Spacer and cements based on an estimated 40 bbls of interface and differential pressure is TOS 104', TOC: 2,728', TOL: 3,706', TOT: 8,898'.
35	Safety Meeting - Pre Rig-Down	4/13/2023	07:39:37	Crew held a pre rig down safety meeting.
36	Rig-Down Equipment	4/13/2023	07:46:02	Crew rigged down iron and stowed away all tool, iron, and equipment.
37	Depart Location Safety Meeting	4/13/2023	07:59:18	Crew held a departing location safety meeting. Discussed rout of travel.
38	Depart from Service Center or Other Site	4/13/2023	09:00:00	Crew left location. Cement crew started their mandatory ten hour reset.

3.0 Attachments

3.1 Real Time iCem Job Chart