

HALLIBURTON

iCem® Service

NOBLE ENERGY INC-EBUS

Ft. Lupton District, Colorado

Guttersen State C36-765 Production

Job Date: Wednesday, April 19, 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 C36-765 - 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 8.58 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 440 bbl. of treated freshwater displacement. Plug was landed at 2,375 psi and bumped to 3,020 psi. Pressure was bled off and 6 bbl. of fluid was returned to the truck. Approximately 53 bbl. of spacer was returned to surface indicating a top of cement around 1083'.

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 #:	05-123-49290-00
City, County:	Kersey

Job Times		
	Date (mm/dd/yyyy)	Time (hh:mm)
Requested Time On Location:	04/19/2023	14:00
Called Out Time:	04/19/2023	08:00
Arrived On Location:	04/19/2023	13:00
Job Started:	04/19/2023	17:10
Job Completed:	04/19/2023	21:53
Departed Location:	04/20/2023	0:00

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	33
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	10.2
4	Casing set depth (shoe)	ft	19,829.6
5	TVD	ft	6,721
6	Float collar depth	ft	19,822.6
7	Length of rate hole	ft	14'
8	Previous casing shoe depth	ft	1,930
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	450

12	Mud circulation pressure at start of cement	psi	260
13	Annual flow before the start of job	Y/N	N
14	Pipe movement during cement job	Y/N	Y
15	Calculated displacement	bbls	460
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	100
18	Fluid returns to surface	Spacer/Cement, bbls	Spacer/68 BBLs
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	2,375 @ 2 bbls/min
20	Number of Centralizers	-	253
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	65	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)
Spacer Fluid	11.5	120	3.88	24.65	174	4,245
Cap Cement	13.2	40	1.59	8.07	140	1,130
Lead Cement	13.2	208	1.68	8.1	694	5,622
Tail Cement	13.2	524	2.05	9.83	1434	14,096
Top Plug						
Displacement Fluid	8.33	460				

2.0 Real-Time Job Summary

2.1 Job Event Log

Seq No.	Activity	Date	Time	Comments
1	Call Out	4/19/2023	08:00:00	CREW CALLED OUT @ 08:00 APRIL 19, 2023. REQUESTED ON LOCATION 14:00. CREW PICKED UP CEMENT, CHEMICALS, FROM FT. LUPTON, CO. 100 LBS OF SUGAR, 10-GALS MMCR, 60-GALS D-AIR, 15-GALS MC MX 820-6, 25-GALS BELLACIDE. PUMP 12632040 BULK 660 10867521 AND P/U 12992452.
2	Crew Leave Shop	4/19/2023	12:00:00	CREW DEPARTED YARD TO LOCATION.
3	Arrive at Location from Service Center	4/19/2023	13:00:00	END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING- 9.625" 36 LB/FT @ 1,930', 5.5" CASING: 17 LB/FT TOTAL 19,829.6', TD 19,843', OH 8.5", SHOE TRAC-7.', TVD- 6,721', CITADEL FLOAT EQUIPMENT, 253 CENTRALIZERS FROM 19,748' TO 981', FLOAT COLLAR @ 19,822.6' AND BALL SEAT @ 19,812'. DISPLACE WITH TREATED WATER MAX PRESSURE 3,500 PSI PUMPING AND 5,000 TO BURST WITH CRT.
4	Pre-Rig Up Safety Meeting	4/19/2023	13:15:00	HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.
5	Rig-Up Equipment	4/19/2023	13:30:00	CREW STAGED EQUIPMENT, RIGGED UP BULK, IRON AND WATER HOSES TO PERFORM JOB.
6	Pre-Job Safety Meeting	4/19/2023	16:20:00	MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS.
7	Start Job	4/19/2023	17:07:34	BEGIN RECORDING JOB DATA.
8	Test Lines	4/19/2023	17:10:19	PRESSURE TESTED IRON TO 7,500 PSI. KICKOUTS SET @ 500 PSI, KICKED OUT @ 1,600 PSI, 5TH GEAR STALL OUT @ 1,850 PSI.
9	Pressure Test	4/19/2023	17:18:37	PRESSURE TEST RIG MANUAL VALVE TO 2,000 PSI.

10	Drop Bottom Plug	4/19/2023	17:21:13	PLUG LOADED IN CASING BY DSR.
11	Pump Spacer 1	4/19/2023	17:23:58	PUMP 120 BBLS OF TUNED PRIME @ 11.5 LB/GAL, 3.88 FT3/SK, 24.45 GAL/SK. INJECTED 15 GALLONS D-AIR ON THE FLY, DRY SURFACTANTS MIXED IN WITH BLEND. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 7 BBLS/MIN @ 634 PSI.
12	Drop Bottom Plug	4/19/2023	17:45:07	PLUG LOADED IN CASING BY DSR.
13	Pump Cap Cement	4/19/2023	17:48:31	PUMPED 140 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.59 FT3/SK, 8.07 GAL/SK. 39.64 BBLS, HOC CALCULATED @ 828', TOC CALCULATED @ 1,083'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 8 BBLS/MIN @ 1,107 PSI.
14	Pump Lead Cement	4/19/2023	17:54:48	PUMPED 694 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.68 FT3/SK, 8.1 GAL/SK. 207.65 BBLS, HOL CALCULATED @ 5,086', TOL CALCULATED @ 1,911'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 9 BBLS/MIN @ 866 PSI.
15	Check Weight	4/19/2023	17:59:11	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
16	Pump Tail Cement	4/19/2023	18:20:09	PUMP 1434 SKS OF NEOCEM @ 13.2 LB/GAL, 2.05 FT3/SK, 9.83 GAL/SK, 523,66 BBLS. HOT CALCULATED @ 12,832', TOT CALCULATED @ 6,997'. DENSITY VERIFIED BY PRESSURIZED MUD SCALES. PUMP RATE 9 BBLS/MIN @ 1,500 PSI.
17	Check Weight	4/19/2023	18:55:48	DENSITY VERIFIED BY PRESSURIZED MUD SCALES.
18	Shutdown	4/19/2023	19:29:49	SHUTDOWN TO SWAP OVER AND CLEAN PUMPS AND LINES.
19	Clean Lines	4/19/2023	19:35:03	CLEANED PUMPS AND LINES WITH 20 BBLS FRESH WATER VERIFIED AT WASH UP TANK WITH DSR.
20	Drop Top Plug	4/19/2023	19:43:53	PLUG LOADED BY DSR.
21	Pump Displacement	4/19/2023	19:46:01	BEGIN CALCULATED DISPLACEMENT OF 460 BBLS. THE FIRST 20 BBLS WITH MMCR, PUMPED 400 BBLS WITH BIOCIDES AND INHIBITOR. PUMP RATE 9 BBLS/MIN @ 2,900 PSI, SLOWED RATE TO 7 BBLS/MIN @ 170 BBLS AWAY. SLOWED RATE TO 5 BBLS/MIN @ 380 BBLS AWAY. SPACER TO SURFACE @ 392 BBLS AWAY, 68 BBLS SPACER TO SURFACE. SLOWED RATE TO 3 BBLS/MIN @ 430 BBLS AWAY. SLOWED RATE TO 2 BBLS/MIN @ 440 BBLS AWAY.
22	Bump Plug	4/19/2023	20:59:11	PLUG BUMPED AT CALCULATED DISPLACEMENT. 2,375 PSI PRESSURED OVER BUMP TO 3,020 PSI.

23	Check Floats	4/19/2023	21:05:54	RELEASED PRESSURE, FLOATS HELD WITH 6 BBLS BACK.
24	Pump Water	4/19/2023	21:08:38	PUMPED 6 BBLS FRESH WATER TO LAND PLUG AND RUPTURE DISC FOR WET SHOE.
25	Shift Tool - Lower	4/19/2023	21:15:30	PLUG RUPTURED @ 4,006 PSI. FOLLOWED BY 5 BBL WET SHOE.
26	Check Floats	4/19/2023	21:21:14	CHECK FLOATS AFTER PUMPING WET SHOE. FLOATS HELD GETTING 4.5 BBLS BACK.
27	Other	4/19/2023	21:23:39	BEGIN 30 MINUTE END FLOW TEST.
28	End Job	4/19/2023	21:53:47	STOP 30 MIN FLOW TEST .5 BBLS MEASURED BACK.
29	Safety Meeting - Pre Rig-Down	4/19/2023	22:00:00	DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION SPECIFIC HAZARDS, PINCH POINTS RIGGING DOWN/RACKING UP IRON AND HOSES.
30	Rig-Down Equipment	4/19/2023	22:00:00	RIG DOWN BULK AND MIXING EQUIPMENT.
31	Rig-Down Completed	4/19/2023	22:30:00	ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL AND LOCATION WAS CLEAN.
32	Crew Leave Location	4/20/2023	00:00:00	THANK YOU FOR USING HALLIBURTON – NICK PETERSON AND CREW.

3.0 Attachments

3.1 Real Time iCem Job Chart

