

# HALLIBURTON

iCem<sup>®</sup> Service

**NOBLE ENERGY INC-EBUS**

**Gig-Em State Y9-751 Production**

Job Date: Sunday, March 12, 2023

Sincerely,

**Meghan Van Zyl**

## Legal Notice

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## 1.0 Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **Gig-Em State Y9-751 - 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 13.22 ppg at 5.99 bbl/min. Cement was displaced with 20 bbl. of treated water with retarder and 388 bbl. of treated freshwater displacement. Plug was landed at 2,200 psi and bumped to 2,700 psi. Pressure was bled off and 5.5 bbl. of fluid was returned to the truck. Approximately 25 bbl. of spacer was returned to surface indicating a top of cement around 1073'.

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 #:	05-123-51836-00
City, County:	Keenesburg, Weld

Job Times		
	Date (mm/dd/yyyy)	Time (hh:mm)
Requested Time On Location:	3/11/2023	1845
Called Out Time:	3/11/2023	1245
Arrived On Location:	3/11/2023	1717
Job Started:	3/11/2023	2022
Job Completed:	3/12/2023	0151
Departed Location:	3/12/2023	0330

	Description	Units	Value
1	Surface temperature at the time of the job	degree F	35
2	Mud type (OBM, WBM, Synthetic, Water, Brine)	-	OBM
3	Mud density	ppg	10.8
4	Casing set depth (shoe)	ft	17595.44
5	TVD	ft	6893
6	Float collar depth	ft	17588.4
7	Length of rate hole	ft	12.5
8	Previous casing shoe depth	ft	2054
9	Pre-job mud circulation time	hh:mm	01:50
10	Pre-job mud circulation rate	bpm	11.9
11	Pre-job mud circulation volume	bbls	900

12	Mud circulation pressure at start of cement	psi	1586
13	Annual flow before the start of job	Y/N	Y
14	Pipe movement during cement job	Y/N	Y
15	Calculated displacement	bbls	408
16	Job displaced by	Rig/HES	HES
17	Estimated returns % during job	%	100
18	Fluid returns to surface	Spacer/Cement, bbls	25/0
19	Final circulation pressure, rate prior to plug bump	psi @ bpm	2200/2
20	Number of Centralizers	-	219
21	Number of bottom plugs	-	2

## 1.3 Water Field Test

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	Recorded Value	Unit	Acceptable Limit	Potential Problems if Values Exceed the Limit
<b>pH</b>	7		6.0 - 8.0	Chemicals in water can cause severe retardation
<b>Temperature</b>	62	F	60 - 80 F	Can pre-mature setting of cement
<b>Chlorides</b>	LESS 200	ppm	3000 ppm	Can shorten thickening time

## 1.4 Actual Pump Schedule

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	Density (ppg)	Volume (bbls)	Yield (ft <sup>3</sup> /sk)	Water Requirement (gal/sk)	Bulk Sacks (sks)	Total Water (gals)
<b>Spacer Fluid</b>	11.5	120	3.88	24.45		4246
<b>Cap Cement</b>	13.2	39.65	1.59	8.07	140	1130
<b>Lead Cement</b>	13.2	233.38	1.68	8.1	780	6318
<b>Tail Cement</b>	13.2	408.19	2.05	9.83	1118	1099
<b>Top Plug</b>						
<b>Displacement Fluid</b>	8.33	408				

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

Seq No.	Activity	Date	Time	Comments
1	Call Out	3/11/2023	12:45:00	CREW CALLED OUT 3/11/2023 1245 HRS. REQUESTED ON LOCATION 3/11/2023 1845 HRS.
2	Pre-Convoy Safety Meeting	3/11/2023	15:30:00	DISCUSS ROUTE AND HAZARDS OF DRIVING
3	Crew Leave Yard	3/11/2023	16:00:00	CREW LEAVES YARD
4	Arrive At Loc	3/11/2023	17:17:00	ARRIVE AT LOCATION. MEET WITH CUSTOMER TD 17608', 17# P-110 SHOE 17595.44', F/C 17588.4', 8.5" HOLE, TVD 6893, 36# J-55 SHOE 2054', OBM 10.8 PPG,
5	Pre-Rig Up Safety Meeting	3/11/2023	17:35:00	DISCUSS RIG-UP AND ANY HAZARDS THAT MAY EXIST
6	Rig-Up Equipment	3/11/2023	17:40:00	RIG-UP EQUIPMENT
7	Pre-Job Safety Meeting	3/11/2023	20:00:00	DISCUSS JOB PROCEDURES AND HAZARDS OF JOB, PRESSURE AND HAZARDS OF HES EQUIPMENT. RIG CIRCULATES SURF TO SURF 11.9 BPM/970 PSI.
8	Start Job	3/11/2023	20:01:10	
9	Start Job	3/11/2023	20:22:12	BEGIN RECORDING DATA
10	Test Lines	3/11/2023	20:24:22	TEST HES LINES 6000 PSI
11	Test Lines	3/11/2023	20:47:17	TEST RIG MANUAL VALVE 1700 PSI
12	Drop Bottom Plug	3/11/2023	20:57:43	CITADEL 1000 PSI PLUG BY KYLE

13	Pump Spacer 1	3/11/2023	20:59:35	120 BBLs TUNED PRIME SPACER. 11.5 PPG, 3.88 YIELD, 24.45 GAL/SACK. MIX D-AIR ON FLY. 50 GALLONS TOTAL JOB
14	Shutdown	3/11/2023	21:30:03	SHUTDOWN
15	Drop Bottom Plug	3/11/2023	21:35:57	CITADEL 1000 PSI BOTTOM PLUG BY KYLE
16	Pump Cap Cement	3/11/2023	21:36:01	140 SACKS ECONOCEM CAP CEMENT. 39.65 BBLs. 13.2 PPG, 1.59 YIELD, 8.07 GAL/SACK. TOCC=1073' PRE-JOB CALCULATIONS
17	Pump Lead Cement	3/11/2023	21:43:14	780 SACKS ELASTICEM LEAD CEMENT. 233.38 BBLs. 13.2 PPG, 1.68 YIELD, 8.1 GAL/SACK. TOLC=1901' PRE-JOB CALCULATIONS.
18	Pump Tail Cement	3/11/2023	22:30:06	1118 SACKS NEOCEM TAIL CEMENT. 13.2 PPG, 2.05 YIELD, 9.83 GAL/SACK. TOTC=7594' PRE-JOB CALCULATIONS
19	Shutdown	3/11/2023	23:48:08	SHUTDOWN
20	Clean Lines	3/11/2023	23:56:16	CLEAN PUMPS AND LINES. APPROX 25 BBLs.
21	Shutdown	3/12/2023	00:03:25	SHUTDOWN
22	Drop Top Plug	3/12/2023	00:08:50	CITADEL 2250 PSI TOP PLUG BY KYLE
23	Pump Displacement	3/12/2023	00:08:53	408 BBLs FRESH WATER DISPLACEMENT. 1ST 20 BBLs HAS 10 GAL. MICRO MATRIX CEMENT RETARDER. REMAINING HAS 20 GALLONS BELLACIDE 300W AND 10 GALLONS MC MX 820-6.
24	Bump Plug	3/12/2023	00:59:59	FCP 2200 PSI/2 BPM, BUMP PRESSURE 2700 PSI. APPROX 25 BBLs SPACER TO SURFACE
25	Check Floats	3/12/2023	01:04:27	FLOATS HOLD, 5.5 BBLs BACK
26	Pressure Up Well	3/12/2023	01:07:24	PRESSURE UP WELL AT 1 BPM TO RUPTURE DISC. DISC RUPTURES AT 3700 PSI. PUMP 5 BBL WET SHOE AT 1 BPM
27	Other	3/12/2023	01:21:04	START 30 MINUTE IN-FLOW TEST

28	End Job	3/12/2023	01:51:23	.5 BBLs BACK OVER 30 MINUTES. STOP RECORDING DATA. FLUSH RIG STACK W/100 LBS SUGAR. APPROX 30 BBLs
29	Pre-Rig Down Safety Meeting	3/12/2023	02:00:00	DISCUSS HAZARDS OF RIG-DOWN AND ANY OTHER HAZARDS THAT MAY EXIST
30	Rig-Down Equipment	3/12/2023	02:05:00	RIG-DOWN EQUIPMENT
31	Rig-Down Completed	3/12/2023	03:00:00	RIG-DOWN COMPLETED
32	Crew Leave Location	3/12/2023	03:30:00	CREW DEPARTS LOCATION. THANK YOU FOR CHOOSING HALLIBURTON.

3.0 Attachments

3.1 Real Time iCem Job Chart

