

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS-EBUS

Rock Springs District, Colorado

For: H&P 318

Date: Wednesday, October 30, 2019

GM 44-8 Production

API# 05-045-24089

Job Date: Wednesday, October 30, 2019

Sincerely,
Rock Springs Engineering

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	4
1.1	Executive Summary	4
1.2	Job Overview	5
1.3	Water Analysis Report	6
2.0	Real-Time Job Summary	7
2.1	Job Event Log	7
3.0	Attachments.....	9
3.1	TEP-GM 44-8 - PRODUCTION.png	9

1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services for this cementing services job. 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.

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, Rock Springs

Job Times

	Date	Time	Time Zone
Called Out	10-30-2019	04:00	MST
On Location	10-30-2019	06:00	MST
Job Started	10-30-2019	11:30	MST
Job Complete	10-30-2019	13:30	MST
Depart Location	10-30-2019	15:15	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	15
2	Mud type (OBM, WBM, SBM, Water, Brine)	lb/gal	WBM
3	Actual mud density	lb/gal	9.8
4	Time circulated before job	HH:MM	1:30
5	Mud volume circulated	Bbls	900
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	Y
8	Rig pressure while circulating	Psi	1500
9	Time from end mud circulation to start of job	HH:MM	00:10
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	114.6
12	Job displaced by	Rig/HES	HES
13	Annular flow before job	Y/N	N
14	Annular flow after job	Y/N	N
15	Length of rat hole	Ft	4
16	Units of gas detected while circulating	Units	59
17	Was lost circulation experienced at any time ?	Y/N	N

1.3 Water Analysis Report

CEMENT MIX WATER REQUIREMENTS

Item	Recorded Test Value	Units	Max. Acceptable Limit	Potential Problems in Exceeding Limit
pH	7	----	6.0 - 8.0	Chemicals in the water can cause severe retardation
Chlorides	0	ppm	3000 ppm	Can shorten thickening time of cement
Temperature	82	°F	50-80 °F	High temps will accelerate; Low temps may risk freezing in cold weather

2.0 Real-Time Job Summary

2.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	PS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Job Called In	10/30/2019	04:00:00	USER					REQUESTED ON LOCATION TIME 06:00
Event	2	Safety Meeting	10/30/2019	04:30:00	USER					WITH HES, 1 IRON TRUCK, 1 ELITE CEMENTING UNIT, 1 660 BULK TRUCK
Event	3	Arrive at Rig	10/30/2019	06:00:00	USER					RIG RUNNING CASING, UPON HES ARRIVAL
Event	4	Assessment Of Location Safety Meeting	10/30/2019	06:40:00	USER					WITH HES, JSA COMPLETED, SDS OFFERED FOR ALL HES MATERIALS
Event	5	Safety Meeting - Pre Rig-Up	10/30/2019	07:00:00	USER					WITH HES, JSA COMPLETED
Event	6	Rig-Up Equipment	10/30/2019	07:10:00	USER					1 LINE RAN TO THE FLOOR, 1 LINE RAN TO THE PIT, 1 4.5 IN. HPCH, WASH-UP MANIFOLD ON THE GROUND
Event	7	Other	10/30/2019	07:30:00	USER					TD 7432FT, TP 7428.86 FT, HOLE 8.75 IN, CSG 4.5 IN 11.6 LB/FT L-80, SHOE 30.52 FT, SURFACE SET AT 1041 FT, 9.625 IN 32.3 LB FT L-80
Event	8	Other	10/30/2019	07:40:00	USER					RIG CIRCULATION, 1500 PSI, 10 BBBL/MIN, 900 BBL, PIPE WAS RECIPROCATED, RATE HOLE LENGTH 4 FT, MWT 9.8 LB/GAL WBM
Event	9	Other	10/30/2019	07:45:00	USER					WATER TEST PH 7. CHLOR 0, TEMP 82 DEG F
Event	10	Pre-Job Safety Meeting	10/30/2019	11:00:00	USER					WITH HES, TEP, AND H&P 318
Event	11	Fill Lines	10/30/2019	11:36:11	USER	396.57	8.62	2.12	3.05	PRIMED LINES WITH 5 BBL FRESH WATER
Event	12	Test Lines	10/30/2019	11:43:04	USER	5573.87	8.23	0	5.04	LOW TEST AT 680 PSI, HGH TEST AT 5573 PSI, PRESSURE HOLDING
Event	13	Pump Fresh Water	10/30/2019	11:48:10	USER	342.68	8.24	2.02	0.90	20 BBL FRESH WATER
Event	14	Mud Flush III Spacer	10/30/2019	11:53:29	USER	334.73	8.24	2.02	0.74	USED 80 LBS MUD FLUSH III, 20 BBL

Event	15	Pump Lead Cement	10/30/2019	12:00:00	USER	250.18	12.06	3.92	2.00	MIXED AT 12.3 LB/GAL, 370 SKS, (NEOCEM), 2.21 FT3/SK, 11.57 GAL/SK, DENSITY VERIFEID USING PRESSURIZED MUD SCALES, USED 10 GAL D-AIR
Event	16	Pump Tail Cement	10/30/2019	12:20:26	USER	565.62	12.56	6.09	1.54	MIXED AT 12.5 LB/GAL, 520 SKS, (NEOCEM), 2.11FT3/SK, 10.78 GAL/SK, DENSITY VERIFEID USING PRESSURIZED MUD SCALES
Event	17	Mud Cup Sample Pulled	10/30/2019	12:25:08	RTD Import	692.44	12.68	6.10	30.18	Mud Cup Sample Pulled
Event	18	Shutdown	10/30/2019	12:54:26	USER	882.06	12.44	6.00	207.78	
Event	19	Clean Lines	10/30/2019	13:02:52	USER	10.52	15.41	2.86	209.30	WASHED PUMPS AND LINES TO TEH RESERVE PIT
Event	20	Drop Top Plug	10/30/2019	13:06:28	USER	6.42	7.96	0.00	0.00	LUG LAUNCHED, CUSTOMER WITNESSED
Event	21	Pump Displacement	10/30/2019	13:10:00	USER	508.07	7.97	9.85	8.65	FRESH WATER, KCL, 3 LBS BE-6, 1 GAL MMCR ADDED
Event	22	Slow Rate	10/30/2019	13:20:19	USER	1293.68	8.23	4.01	110.18	SLOWED AT 104BBL AWAY TO 4 BBL/MIN
Event	23	Bump Plug	10/30/2019	13:21:56	USER	1287.46	8.24	3.99	116.64	PLUG BUMPED AT CALCULATED DISPLACEMENT, 1150 PSI,
Event	24	Check Floats	10/30/2019	13:23:56	USER	1986.14	8.23	0.00	118.06	FLOATS HOLDING, 1.5 BBL RETURNED TO THE TRUCK
Event	25	End Job	10/30/2019	13:40:00	USER					GOOD CIRCULATION, RIG USED 1 GAL MMCR, THE TOP PLUG, 3 LBS BE-6, AND 20 LBS MUD FLUSH, NO ADD HOURS
Event	26	Pre-Rig Down Safety Meeting	10/30/2019	13:50:00	USER					WITH HES
Event	27	Rig Down Lines	10/30/2019	14:00:00	USER					
Event	28	Pre-Convoy Safety Meeting	10/30/2019	14:50:00	USER					WITH HES
Event	29	Comment	10/30/2019	15:00:00	USER					SPACER 20 BBL MUD FLUSH, 10 BBL FRESH WATER, LEAD CEMENT 145.6 BBL, TAIL CEMENT 195.4 BBL, FINAL DISPLACEMENT 114.6 BBL, TOP OF TAIL CEMENT 3856 FT, TOP OF LEAD CEMENT 1185 FT
Event	30	Crew Leave Location	10/30/2019	15:15:00	USER					THANKS FOR USING HALLIBURTON, JOHN KEANE AND CREW

3.0 Attachments

3.1 TEP-GM 44-8 - PRODUCTION.png

