

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS-EBUS

Rock Springs District, CO

For: H&P 318

Date: Sunday, December 22, 2019

RWF 422-12 Surface

Garfield, Rulison

API# 05-045-24285

Job Date: Sunday, December 22, 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.....	10
3.1	Terra Federal RWF 422-12- With Events.png	10
3.2	Terra Federal RWF 422-12- Without Events.png	11

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	12/21/2019	1800	MST
On Location	12/21/2019	2345	MST
Job Started	12/22/2019	0230	MST
Job Completed	12/22/2019	0315	MST
Departed Location	12/22/2019	0430	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	24
2	Mud type (OBM, WBM, SBM, Water, Brine)	-	WBM
3	Actual mud density	lb/gal	9.5
4	Time circulated before job	HH:MM	00:32
5	Mud volume circulated	Bbls	320
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	200
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	77.33
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	10
16	Units of gas detected while circulating	Units	0
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	75	°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

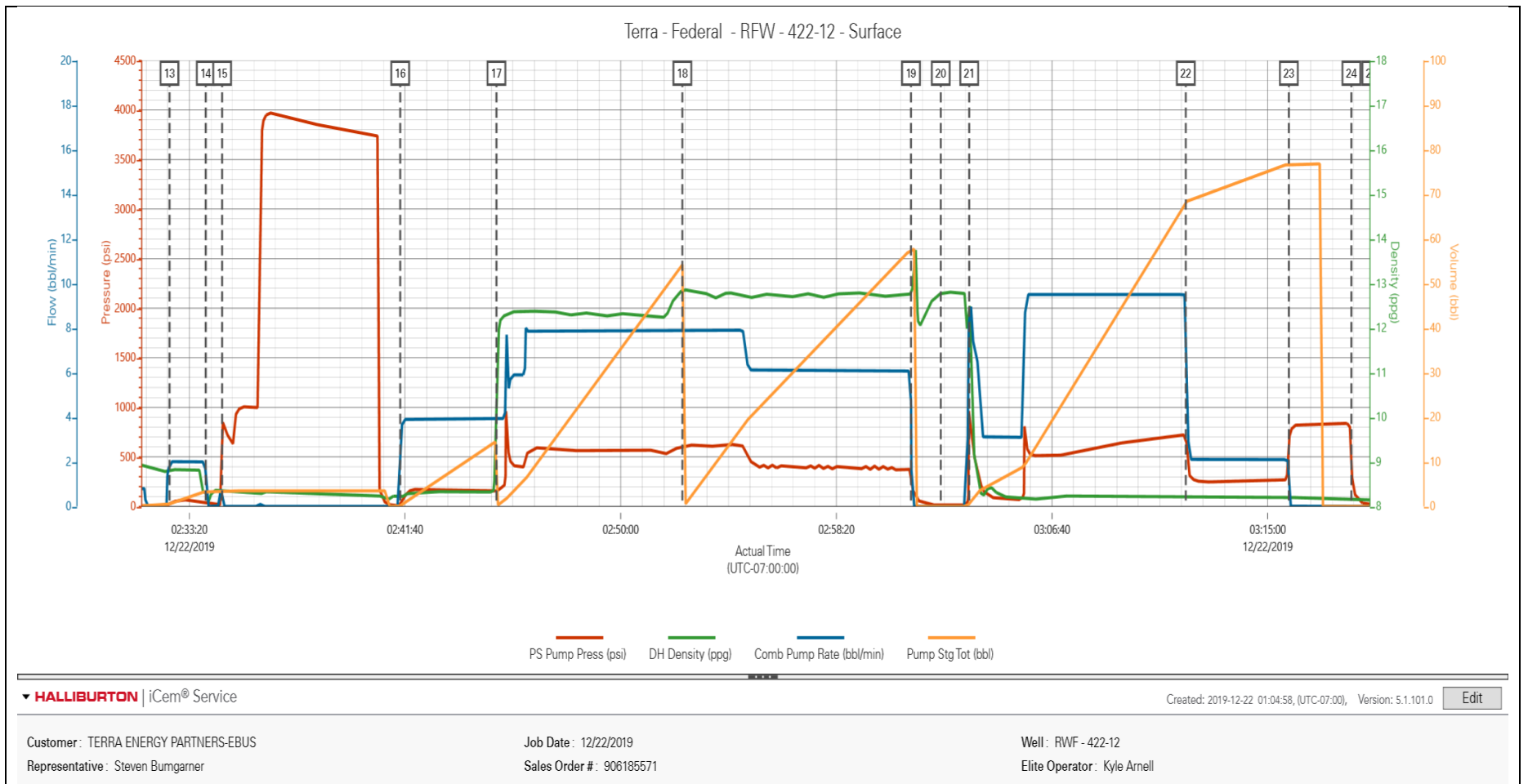
Type	Seq. No.	Graph Label	Date	Time	Source	PS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	12/21/2019	18:00:00	USER					CREW CALLED OUT TO H&P 318 FOR TEP SURFACE JOB. REQUESTED ON LOCATION AT 0000
Event	2	Pre-Convoy Safety Meeting	12/21/2019	23:30:00	USER					ALL HAZARDS ASSOCIATED WITH DRIVING TO LOCATION DISCUSSED AMONG THE CREW
Event	3	Crew Leave Yard	12/21/2019	23:40:00	USER					CREW LEFT THE STAGING AREA IN RIFLE CO
Event	4	Arrive At Location	12/21/2019	23:50:00	USER					RIG WAS RUNNING CASING UPON HES ARRIVAL
Event	5	Assessment Of Location Safety Meeting	12/21/2019	23:55:00	USER					ASSESMENT OF LOCATION PERFORMED BY ALL CREW MEMBERS
Event	6	Spot Equipment	12/22/2019	00:00:00	USER					SPOT EQUIPMENT
Event	7	Pre-Rig Up Safety Meeting	12/22/2019	00:05:00	USER					ALL HAZARDS ASSOCIATED WITH RIG-UP DISCUSSED AMONG THE CREW
Event	8	Rig-Up Equipment	12/22/2019	00:10:00	USER					1-ELITE RCM PUMP TRUCK, 1-660 FT3 BULK TRUCK, 1-IRON TRUCK
Event	9	Rig-Up Completed	12/22/2019	01:00:00	USER					RIG UP COMPLETED. WAIT FOR RIG TO FINISH RUNNING CASING.
Event	10	Check Weight	12/22/2019	01:01:00	USER					PRESSURIZED MUD SCALES CALIBRATED USING FRESH WATER PRIOR TO JOB. ALL FLUID DENSITIES VERIFIED USING PRSSURIZED MUD SCALES THROUGHOUT JOB
Event	11	Pre-Job Safety Meeting	12/22/2019	02:00:00	USER	1.00	0.00	0.00	1.40	ALL HAZARDS ASSOCIATED WITH PUMPING THE JOB DISCUSSED AMONG ALL HES AND RIG CREW MEMBERS
Event	12	Start Job	12/22/2019	02:25:00	USER	-5.00	8.51	0.00	0.00	
Event	13	Pump Water	12/22/2019	02:32:34	USER	25.00	8.76	1.80	0.60	PUMP 5 BBL H2O TO PRIME LINES. PUMPED 2 BPM WITH 100 PSI.
Event	14	Shutdown	12/22/2019	02:33:58	USER	47.00	8.33	1.10	3.40	SHUTDOWN TO LINE OUT VALVES FOR PRESSURE TEST.

Event	15	Pressure Test	12/22/2019	02:34:36	USER	861.00	8.30	0.00	3.40	SET KICKOUTS TO 500 PSI FOR LOW TEST TO ENSURE KICKOUTS FUNCTIONING PROPERLY. BROUGHT PRESSURE UP TO 4,000 PSI FOR HIGH TEST.
Event	16	Pump H2O Spacer	12/22/2019	02:41:29	USER	9.00	8.22	1.70	0.10	PUMP 15 BBL H2O SPACER. PUMPED AT 4 BPM WITH 200 PSI.
Event	17	Pump Lead Cement	12/22/2019	02:45:12	USER	152.00	10.57	3.90	0.10	PUMP 53 BBL VARICEM RS1 LEAD CEMENT. 125 SKS AT 12.3 PPG, 2.38 FT3/SK, 13.74 GAL/SK. PUMPED AT 8 BPM WITH 500 PSI.
Event	18	Pump Tail Cement	12/22/2019	02:52:23	USER	610.00	12.85	7.90	54.20	PUMP 56.4 BBL VARICEM RS1 TAIL CEMENT. 150 SKS AT 12.8 PPG, 2.11 FT3/SK, 11.74 GAL/SK. PUMPED AT 6 BPM WITH 400 PSI.
Event	19	Shutdown	12/22/2019	03:01:13	USER	340.00	12.76	4.70	57.70	SHUTDOWN TO DROP TOP PLUG.
Event	20	Drop Top Plug	12/22/2019	03:02:22	USER	12.00	12.78	0.00	0.00	DROP HES TOP PLUG. PLUG LAUNCHED. WITNESSED BY CUSTOMER REP.
Event	21	Pump Displacement	12/22/2019	03:03:28	USER	780.00	12.52	9.00	0.60	PUMP 67.33 BBL H2O DISPLACEMENT. PUMPED AT 10 BPM WITH 720 PSI.
Event	22	Slow Rate	12/22/2019	03:11:50	USER	717.00	8.21	9.40	68.20	SLOW RATE TO 2 BPM 10 BBL PRIOR TO CALCULATED DISPLACEMENT TO BUMP PLUG.
Event	23	Bump Plug	12/22/2019	03:15:49	USER	680.00	8.19	0.10	76.80	PLUG BUMPED AT 2 BPM. FCP-300 PSI. BROUGHT PRESSURE UP TO 800 PSI. TOTAL DISPLACEMENT-77.33 BBL
Event	24	Check Floats	12/22/2019	03:18:14	USER	451.00	8.17	0.00	0.00	FLOATS HOLDING. RETURNED .5 BBL FLUID TO TRUCK.
Event	25	End Job	12/22/2019	03:19:00	USER	14.00	8.15	0.00	0.00	PIPE WAS STATIC DURING JOB. GOOD CIRCULATION THROUGHOUT JOB.
Event	26	Pre-Rig Down Safety Meeting	12/22/2019	03:20:00	USER	11.00	8.13	0.00	0.00	ALL HAZARDS ASSOCIATED WITH RIGGING DOWN DISCUSSED AMONG THE CREW
Event	27	Rig-Down Equipment	12/22/2019	03:30:00	USER	3.00	-0.35	0.00	0.00	
Event	28	Rig-Down Completed	12/22/2019	04:15:00	USER					
Event	29	Pre-Convoy Safety Meeting	12/22/2019	04:16:00	USER					ALL HAZARDS ASSOCIATED WITH DRIVING FROM LOCATION DISCUSSED AMONG THE CREW
Event	30	Crew Leave Location	12/22/2019	04:30:00	USER					
Event	31	Well Info	12/22/2019	04:31:00	USER					TD-1,052', TP-1,044.96', SHOE-44.59', HOLE-13 1/2", MUD-9.5 PPG WBM, CSG-9 5/8" 36 LB/FT J-55

Event	32	Rig Info	12/22/2019	04:32:00	USER	RIG ON BOTTOM AT 0120. CIRCULATED AT 10 BPM WITH 200 PSI. 320 BBL CIRCULATED
Event	33	Job Info	12/22/2019	04:33:00	USER	CALCULATED TOP OF TAIL CEMENT-433.38'. RETURNED 15 BBL LEAD CEMENT TO SURFACE. USED TOP PLUG FOR THE JOB. RETURNED 100 LBS OF SUGAR TO THE BULK PLANT
Event	34	Comment	12/22/2019	04:34:00	USER	THANK YOU FOR USING HALLIBURTON CEMENT DEPARTMENT. ZACHARY CRUTCHMAN AND CREW.

3.0 Attachments

3.1 Terra Federal RWF 422-12- With Events.png



3.2 Terra Federal RWF 422-12- Without Events.png

