

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS-EBUS**

Rock Springs District, Colorado

### **For: H&P 318**

Date: Thursday, October 10, 2019

### **GM-514-8 Surface**

API# 05-045-24094

TEP - GM-514-8 - 906030281

Job Date: Thursday, October 10, 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-514-8 - 906030281-SURFACE.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

## 1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	43
2	Mud type (OBM, WBM, SBM, Water, Brine)	lb/gal	WBM
3	Actual mud density	lb/gal	9.1
4	Time circulated before job	HH:MM	00:30
5	Mud volume circulated	Bbls	300 BBL
6	Rate at which well was circulated	Bpm	10 BBL/MIN
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	300 PSI
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	75.6
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	7
16	Units of gas detected while circulating	Units	N
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	62	°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	10/9/2019	18:30:00	USER					REQUESTED ON LOCATION TIME 22:30
Event	2	Pre-Convoy Safety Meeting	10/9/2019	20:00:00	USER					WITH HES, JSA COMPLETED, 1 IRON TRUCK, 1 ELITE CEMENTING UNIT, 1 660 BULK TRUCK
Event	3	Arrive At Loc	10/9/2019	22:00:00	USER					RIG RUNNING CASING, UPON HES ARRIVAL
Event	4	Assessment Of Location Safety Meeting	10/9/2019	22:10:00	USER					WITH HES, JSA COMPLETED, SDS OFFERED FOR ALL HES MATERIALS
Event	5	Pre-Rig Up Safety Meeting	10/9/2019	22:30:00	USER					WITH HES, 1 LINE RAN TO THE FLOOR, 1 9.625 IN QUICK-LATCH PLUG CONTAINER
Event	6	Rig-Up Equipment	10/9/2019	22:40:00	USER					
Event	7	Comment	10/9/2019	22:50:00	USER					TD 1027 FT, TP 1020.1 FT, 9.625 IN 36 LB/FT J-55, HOLE 13.5 IN, SHOE 43.9 FT
Event	8	Water Test	10/9/2019	23:39:44	USER					TEMP 62 DEG F, PH 7.0, CHLOR 0
Event	9	Comment	10/9/2019	23:39:47	USER					RIG CIRCULATION, 300 BBL, 10 BBL/MIN, 135 PSI, MWT 9.1 LB/GAL WBM, PIPE WAS STATIC, RAT HOLE LENGTH 7 FT
Event	10	Pre-Job Safety Meeting	10/10/2019	00:30:00	USER					WITH HES, TEP, AND H&P 318
Event	11	Start Job	10/10/2019	01:29:40	COM5					
Event	12	Fill Lines	10/10/2019	01:30:47	USER	14.00	9.31	2.00	0.80	5 BBL FRESH WATER, RETURNS AT 4 BBL AWAY
Event	13	Test Lines	10/10/2019	01:35:29	USER	3706.00	9.36	0.00	5.10	LOW TEST AT 790 PSI, HIGH TEST AT 3706 PSI, PRESSURE HOLDING
Event	14	Pump Fresh Water Spacer	10/10/2019	01:39:11	USER	47.00	9.28	2.00	0.60	20 BBL FRESH WATER
Event	15	Pump Lead Cement	10/10/2019	01:47:21	USER	259.00	12.24	4.10	0.80	MIXED AT 12.3 LB/GAL, 125 SKS (VARICEM), 2.38 FT3/SK, 11.74 GAL/SK, DENSITY VERIFIED USING PRESSURIZED MUD SCALES

Event	16	Pump Cement	10/10/2019	01:55:22	USER	597.00	12.93	8.00	6.50	MIXED AT 13.5 LB/GAL, (VARICEM) 150 SKS, 2.11 FT3/SK, 11.74 GAL/SK, DENSITY VERIFIED USING PRESSURIZED MUD SCALES
Event	17	Shutdown	10/10/2019	02:00:00	USER	391.00	13.00	6.00	41.00	
Event	18	Drop Top Plug	10/10/2019	02:05:00	USER	9.00	13.81	0.00	64.00	PLUG LAUNCHED, CUSTOMER WITNESSED
Event	19	Pump Displacement	10/10/2019	02:06:28	USER	161.00	11.27	3.90	65.00	FRESH WATER
Event	20	Slow Rate	10/10/2019	02:15:44	USER	250.00	8.31	2.10	69.60	SLOWED AT 65 BBL AWAY TO 2 BBL/MIN
Event	21	Bump Plug	10/10/2019	02:18:45	USER	251.00	8.31	2.10	75.90	PLUG BUMPED AT CALCULATED DISPLACEMENT, 250 PSI
Event	22	Check Floats	10/10/2019	02:20:01	USER	1068.00	8.33	0.00	76.20	FLOATS HOLDING, .5 BBL RETURNED TO THE TRUCK
Event	23	End Job	10/10/2019	02:25:00	USER					GOOD CIRCULATION, NO ADD HOURS, RIG USED THE HES TOP PLUG RIG USED 50 LBS SUGAR
Event	24	Pre-Rig Down Safety Meeting	10/10/2019	02:30:00	USER					WITH HES, JSA COMPLETED
Event	25	Rig Down Lines	10/10/2019	02:35:00	USER					
Event	26	Pre-Convoy Safety Meeting	10/10/2019	02:50:00	USER					WITH HES, JSA COMPLETED
Event	27	Comment	10/10/2019	03:00:00	USER					SPACER 20 BBL FRESH WATER, LEAD CEMENT 52.9 BBL, TAIL CEMENT 56.4 BBL, FINAL DISPLACEMENT 75.6 BBL, 26 BBL CEMENT CIRCULATED TO SURFACE, TOP OF TAIL 411.1 FT
Event	28	Crew Leave Location	10/10/2019	03:15:00	USER					THANKS FOR USING HALLIBURTON, JOHN KEANE AND CREW

## 3.0 Attachments

### 3.1 TEP - GM-514-8 - 906030281-SURFACE.png

