

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS-EBUS**

Rock Springs District, WY

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

Date: Sunday, December 22, 2019

### **Federal RWF 43-11 Production**

Garfield, Rulison

API# 05-045-24277

Job Date: Saturday, December 21, 2019

Sincerely,

**Rock Springs Engineering**

## Legal Notice

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### Disclaimer:

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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 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**

	<b>Date</b>	<b>Time</b>	<b>Time Zone</b>
<b>Called Out</b>	12/20/2019	1800	MST
<b>On Location</b>	12/21/2019	0500	MST
<b>Job Started</b>	12/21/2019	0800	MST
<b>Job Completed</b>	12/21/2019	1000	MST
<b>Departed Location</b>	12/21/2019	1100	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	13
4	Time circulated before job	HH:MM	1:00
5	Mud volume circulated	Bbls	1000
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	Y
8	Rig pressure while circulating	Psi	800
9	Time from end mud circulation to start of job	HH:MM	00:10
10	Pipe movement during cementing	Y/N	Y
11	Calculated displacement	Bbls	141.5
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	300
17	Was lost circulation experienced at any time ?	Y/N	N

## 1.3 Planned Pumping Schedule

Description	Stage No.	Density (ppg)	Rate (bbl/min)	Yield (ft <sup>3</sup> /sack)	Water Req. (gal/sack)	Volume (bbl)	Bulk Cement (sacks)	Duration (min)
10 lb/gal Base Production Mud	1	10.00	8.00			0.00		0.00
Water	2	8.33	6.00			10.00		1.67
Mud Flush	3	8.40	6.00			20.00		3.33
ThermaCem TEP Deep Tail (2591582/1)	4	13.30	8.00	1.79	8.50	399.48	1250.00	49.93
Top Plug/Start Displacement								
Water	5-1	8.33	10.00			120.00		12.00
Water	5-2	8.33	4.00			23.19		5.80
Total:						572.67		72.73

1.4 Water Analysis Report

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**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 (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	PS Pmp Stg Tot (bbl)	Comments
Event	1	Call Out	12/20/2019	17:00:00	USER					CREW CALLED OUT TO H&P 318 FOR TERRA ENERGY PRODUCTION JOB. REQUESTED ON LOCATION AT 0500.
Event	2	Pre-Convoy Safety Meeting	12/20/2019	18:00:00	USER					ALL HAZARDS ASSOCIATED WITH DRIVING TO LOCATION DISCUSSED AMONG CREW MEMBERS
Event	3	Crew Leave Yard	12/20/2019	18:30:00	USER					
Event	4	Arrive At Location	12/21/2019	05:00:00	USER					RIG HAD FINISHED RUNNING CASING AND BEGAN TO CIRCULATE UPON HES ARRIVAL
Event	5	Assessment Of Location Safety Meeting	12/21/2019	05:05:00	USER					ASSESMENT OF LOCATION PERFORMED BY ALL CREW MEMBERS
Event	6	Spot Equipment	12/21/2019	05:10:00	USER					SPOT EQUIPMENT
Event	7	Pre-Rig Up Safety Meeting	12/21/2019	05:20:00	USER					ALL HAZARDS ASSOCIATED WITH RIG UP DISCUSSED AMONG THE CREW
Event	8	Rig-Up Equipment	12/21/2019	05:30:00	USER					1-ELITE RCM PUMP TRUCK, 2-1,700 FT3 SILOS, 1-660 FT3 BULK TRUCK, 1-IRON TRUCK
Event	9	Rig-Up Completed	12/21/2019	07:15:00	USER					
Event	10	Check Weight	12/21/2019	07:20:00	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	12/21/2019	07:30:00	USER					ALL HAZARDS ASSOCIATED WITH PUMPING THE JOB DISCUSSED AMONG ALL HES AND RIG CREW MEMBERS.
Event	12	Start Job	12/21/2019	08:00:00	USER					
Event	15	Pump Water Ahead	12/21/2019	08:03:53	USER	665.55	8.93	1.97	0.21	PUMPED 5 BBL OF FRESH WATER AHEAD TO PRIME LINES. PUMPED AT 2 BPM WITH 600 PSI
Event	17	Shutdown	12/21/2019	08:05:51	USER	404.92	9.00	1.59	2.30	SHUTDOWN TO LINE OUT VALVES FOR PRESSURE TEST.

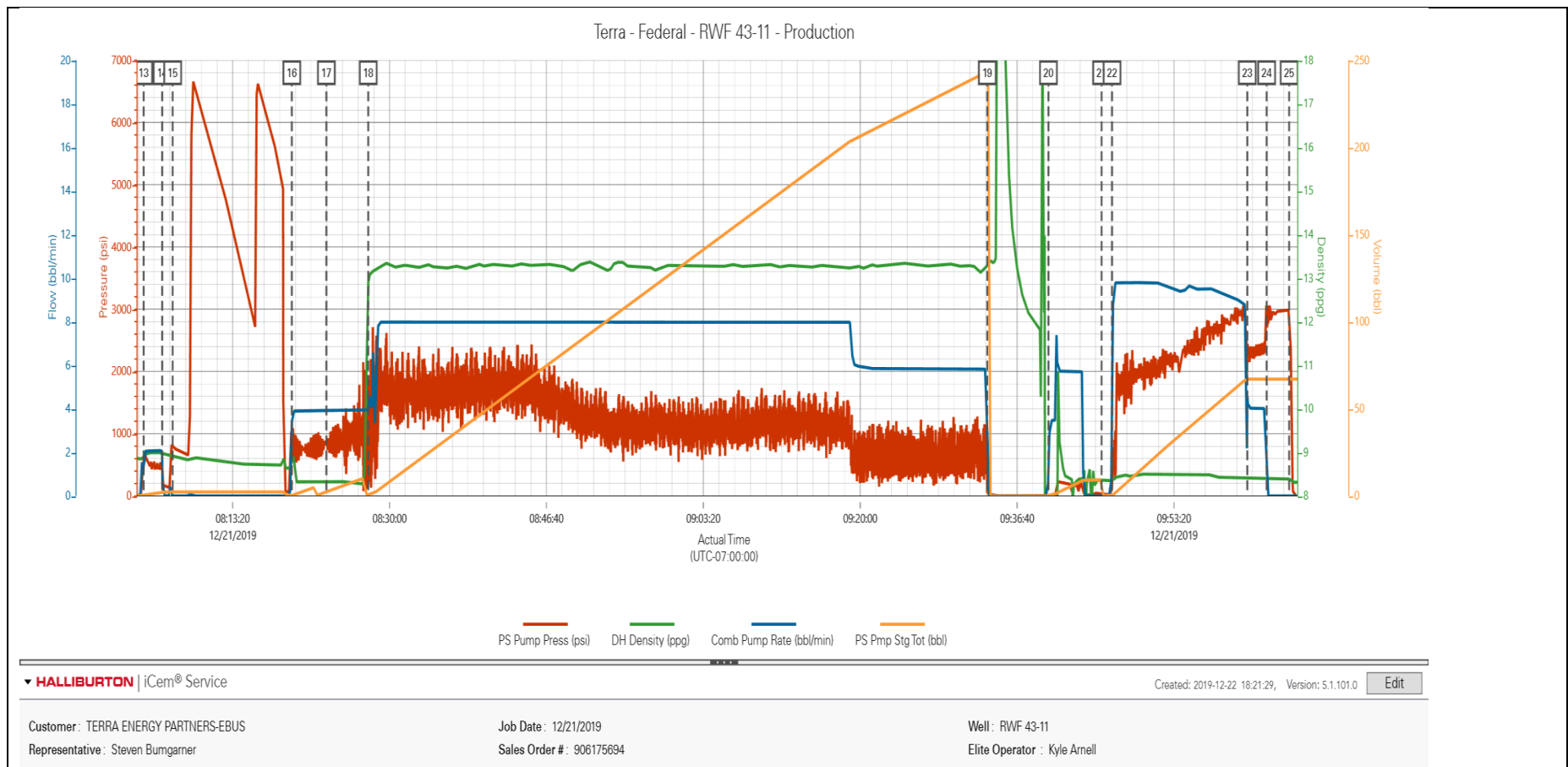
Event	21	Pressure Test	12/21/2019	08:06:57	USER	786.49	8.92	0.00	2.31	SET KICKOUTS TO 500 PSI FOR LOW TEST TO ENSURE KICKOUTS FUNCTIONING PROPERLY. BROUGHT PRESSURE UP TO 6,600 PSI FOR HIGH TEST. DURING OUR FIRST PRESSURE TEST WE HAD AN ISSUE WITH OUR LO TORC GOING TO THE PIT. AFTER REPLACING THE LO TORC WE CONDUCTED A SECOND PRESSURE TEST THAT WAS AN IMPROVEMENT BUT STILL FELL OFF SLOWLY. WE HAD NO MORE LO TORCS TO REPLACE IT WITH SO WE CHECKED ALL IRON THOROUGHLY TO MAKE SURE THERE WERE NO LEAKS AND CONTINUED WITH THE JOB.
Event	25	Pump Water	12/21/2019	08:19:37	USER	999.31	8.79	3.43	0.24	PUMP 10 BBL H2O SPACER. PUMPED AT 4 BPM WITH 800 PSI.
Event	42	Pump Mud Flush III Spacer	12/21/2019	08:23:17	USER	804.31	8.33	3.95	2.39	PUMP 20 BBL MUD FLUSH III SPACER. PUMPED AT 4 BPM WITH 900 PSI. USED 80 LBS MUD FLUSH III FOR SPACER.
Event	47	Pump Primary Cement	12/21/2019	08:27:44	USER	178.98	12.85	3.94	0.77	PUMP 398.5 BBL THERMACEM CEMENT. 1250 SKS AT 13.3 PPG, 1.79 FT3/SK, 8.5 GAL/SK. PUMPED AT 8 BPM WITH 1,500 PSI.
Event	91	Shutdown	12/21/2019	09:33:30	USER	23.36	13.26	0.07	243.71	SHUTDOWN TO CLEAN PUMPS AND LINES AND DROP TOP PLUG.
Event	97	Clean Lines	12/21/2019	09:40:00	USER	5.54	-0.01	1.69	0.05	WASH PUMPS AND LINES TO THE PIT
Event	99	Drop Top Plug	12/21/2019	09:45:39	USER	29.92	8.36	0.00	0.00	DROP HES TOP PLUG. PLUG LAUNCHED. WITNESSED BY CUSTOMER REP.
Event	102	Pump KCL H2O Displacement	12/21/2019	09:46:45	USER	273.67	8.34	3.10	0.09	PUMP 131.5 BBL KCL H2O DISPLACEMENT. PUMPED AT 10 BPM WITH 2,700 PSI.
Event	103	Slow Rate	12/21/2019	10:01:07	USER	2346.52	8.40	4.72	67.06	SLOW RATE TO 4 BPM 10 BBL PRIOR TO CALCULATED DISPLACEMENT.
Event	104	Bump Plug	12/21/2019	10:03:10	USER	2732.78	8.41	0.00	67.06	PLUG BUMPED AT 4 BPM. FCP-2,400 PSI. BROUGHT PRESSURE UP TO 2,980 PSI. TOTAL DISPLACEMENT-141.5 BBL
Event	105	Check Floats	12/21/2019	10:05:34	USER	2977.47	8.39	0.00	67.06	FLOATS HOLDING. RETURNED 1.5 BBL FLUID TO TRUCK.
Event	106	End Job	12/21/2019	10:10:00	USER					PIPE WAS RECIPRICATED DURING JOB. GOOD CIRCULATION THROUGHOUT JOB.
Event	107	Pre-Rig Down Safety Meeting	12/21/2019	10:11:00	USER					ALL HAZARDS ASSOCIATED WITH RIG DOWN DISCUSSED AMONG THE CREW
Event	108	Rig-Down Equipment	12/21/2019	10:15:00	USER					
Event	109	Rig-Down Completed	12/21/2019	11:00:00	USER					



Event	110	Pre-Convoy Safety Meeting	12/21/2019	11:01:00	USER	ALL HAZARDS ASSOCIATED WITH DRIVING FROM LOCATION DISCUSSED AMONG CREW MEMBERS
Event	111	Crew Leave Location	12/21/2019	11:10:00	USER	
Event	112	Well Info	12/21/2019	11:11:00	USER	TD-9,169', TP-9,163.49' SHOE-32.07', HOLE-8 3/4", MUD- 13 PPG WBM, CSG-4 1/2" 11.6 LB/FT P-110, PREV CSG SET AT 1,042' 9 5/8" 36 LB/FT
Event	113	Rig Info	12/21/2019	11:12:00	USER	RIG ON BOTTOM AT 0530. CIRCULATED AT 10 BPM WITH 800 PSI. 1000 BBL CIRCULATED. GAS- 350 UNITS
Event	114	Job Info	12/21/2019	11:13:00	USER	CALCULATED TOP OF CEMENT-1,887.44'. USED 80 LBS MUD FLUSH III, AND 10 GALLONS D-AIR FOR JOB. USED HES TOP PLUG. USED 2 GALLON MMCR. USED 3 POUNDS BE-6.
Event	115	Comment	12/21/2019	11:14:00	USER	THANK YOU FOR USING HALLIBURTON CEMENT DEPARTMENT. ZACHARY CRUTCHMAN AND CREW.

## 3.0 Attachments

### 3.1 Terra Federal RWF 43-11 Production - With Events.png



## 3.2 Terra Federal RWF 43-11 PProduction - Without Events.png

