

# HALLIBURTON

iCem<sup>®</sup> Service

## **TERRA ENERGY PARTNERS-EBUS**

**For: Darrell Leatherman**

Date: Tuesday, December 31, 2019

**RWF 443-11**

4 ½" Production Casing

Post Job Report

Job Date: Tuesday, December 31, 2019

Sincerely,

**Jason Ertl**

## 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 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	12/30/2019	20:00	MST
On Location	12/31/2019	04:00	MST
Job Started	12/31/2019	13:30	MST
Job Complete	12/31/2019	16:00	MST
Depart Location	12/31/2019	1700	MST

## 1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	22
2	Mud type (OBM, WBM, SBM, Water, Brine)	lb/gal	WBM
3	Actual mud density	lb/gal	12.8
4	Time circulated before job	HH:MM	2:00
5	Mud volume circulated	Bbls	1200
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	15:00
10	Pipe movement during cementing	Y/N	Y
11	Calculated displacement	Bbls	142.3
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	1500
17	Was lost circulation experienced at any time ?	Y/N	N

## 1.3 Planned Pump 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	1.7943	8.498	391.49	1225.00	48.94
Top Plug/Start Displacement								
Water	5-1	8.33	10.00			104.00		10.40
Water	5-2	8.33	4.00			40.00		10.00
<b>Total:</b>						<b>565.49</b>		<b>74.34</b>

\*Pump schedule may include additional rows for displacement if "Automatic Rate Adjustment" was enabled and ECDs approached the fracture gradient.

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	64	°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

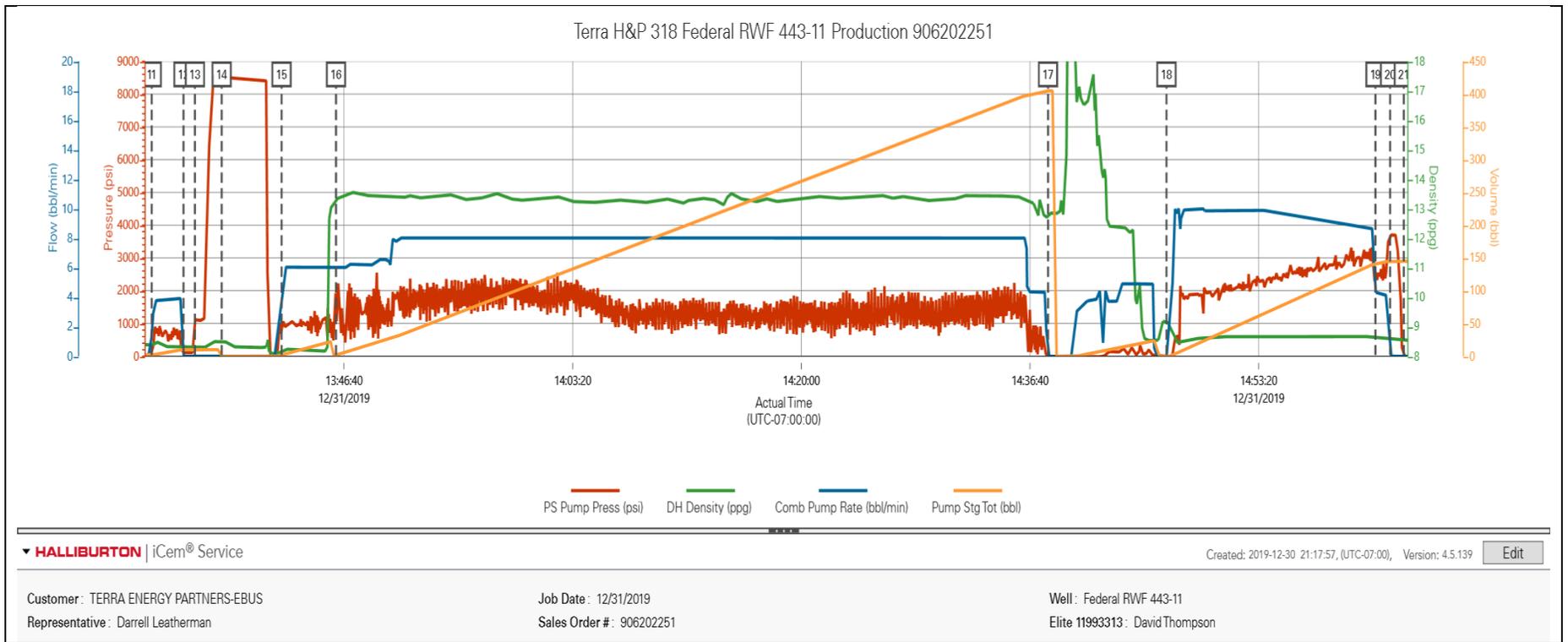
Type	Seq. No.	Graph Label	Date	Time	Source	PS Pump Press <i>(psi)</i>	DH Density <i>(ppg)</i>	Comb Pump Rate <i>(bbl/min)</i>	Pump Stg Tot <i>(bbl)</i>	Comments
Event	1	Call Out	12/30/2019	20:00:00	USER					Crew requested on location at 04:00 on 12/31/2019
Event	2	Pre-Convoy Safety Meeting	12/30/2019	23:00:00	USER					Talked with HES crew about the hazards of driving to location.
Event	3	Depart from Service Center or Other Site	12/30/2019	23:15:00	USER					Crew departs for location.
Event	4	Arrive At Loc	12/31/2019	04:00:00	USER					Well Info: TD_ 9216' Total Pipe_9209' 4 1/2" 11.6 lb/ft Shoe Track_31 Previous Casing_ 1041' of 9 5/8" 36lb/ft Open Hole_ 8 3/4 Well fluid_ 12.8 lb/gal WBM
Event	5	Assessment Of Location Safety Meeting	12/31/2019	04:05:00	USER					Talked with HES crew about the hazards of spotting in equipment.
Event	6	Pre-Rig Up Safety Meeting	12/31/2019	04:10:00	USER					Talked with HES crew about the hazards of rigging up Bulk, Water and Iron lines.
Event	7	Rig-Up Equipment	12/31/2019	04:15:00	USER					Rig-up Equipment and check mud scales on 8.33 lb/gal water.
Event	8	Casing on Bottom	12/31/2019	11:30:00	USER					Rig circulated at bpm with 800 psi no losses and 1500 units of gas.
Event	9	Pre-Job Safety Meeting	12/31/2019	12:30:00	USER					We talked with HES and rig crews about the hazards of rigging up the floor, and pumping the job.
Event	10	Rig-Up Completed	12/31/2019	13:15:00	USER					Rig-up completed

Event	11	Start Job	12/31/2019	13:32:39	USER	36.01	8.41	1.40	2.03	Start job, pump 5 bbls water ahead to fill lines.
Event	12	Shutdown	12/31/2019	13:34:58	USER	121.33	8.32	0.00	10.10	Shutdown to line out valves for pressure test.
Event	13	Pressure Test	12/31/2019	13:35:48	USER	1111.34	8.32	0.00	10.11	Low pressure kick out test to 500 psi.
Event	14	Pressure Test	12/31/2019	13:37:45	USER	8493.34	8.49	0.00	0.00	Pressure test HES iron to 8000 psi. Good test no leaks.
Event	15	Pump Mud Flush	12/31/2019	13:42:07	USER	852.59	8.15	3.56	1.03	Mix and pump 20 bbls Mud Flush spacer at 6 bpm.
Event	16	Pump Cement	12/31/2019	13:46:05	USER	1365.41	13.30	6.05	2.21	Mix and pump 1225 sacks of ThermaCem cement at 13.3lb/gal 1.79 cuft/sack and 8.5 gals/sack at 8 bpm.
Event	17	Shutdown	12/31/2019	14:37:59	USER	-0.55	12.81	0.00	404.81	Shutdown / wash pumps and lines to the pit.
Event	18	Pump Displacement	12/31/2019	14:46:37	USER	-14.61	9.14	0.00	0.00	Pump 142.3 bbls displacement at 10 bpm. MMCR in first 10 bbls, BE-6 in first 30 bbls and KCL in first 120 bbls.
Event	19	Slow Rate	12/31/2019	15:01:51	USER	2429.49	8.61	4.41	141.19	Slow rate last 10 bbls to 4 bpm.
Event	20	Bump Plug	12/31/2019	15:02:55	USER	3562.94	8.63	0.00	145.06	Bump plug, bring pressure 500 psi over FPC of 2900.
Event	21	Check Floats	12/31/2019	15:03:55	USER	-3.36	8.55	0.00	145.06	Floats held with 2 bbls back.
Event	22	Pre-Rig Down Safety Meeting	12/31/2019	15:30:00	USER					Talked with HES and rig crew about the hazards of rigging down
Event	23	Rig-Down Equipment	12/31/2019	15:35:00	USER					Start rigging down.
Event	24	Rig-Down Completed	12/31/2019	16:00:00	USER					
Event	25	Pre-Convoy Safety Meeting	12/31/2019	16:30:00	USER					Talked with HES crew about the hazards of drivng off location.

Event	26	Crew Leave Location	12/31/2019	16:35:00	USER	HES crew left location.
Event	27	Job Complete	12/31/2019	17:00:00	USER	This job was completed safely by Jason Ertl and Crew. Est. top of Cement at 2078'. Est top of Mud Flush at 1712'. Thanks for choosing Halliburton Cementing.

3.0 Attachments

3.1 Terra H&P 318 Federal RWF 443-11 Production 906202251.png



3.2 Terra H&P 318 Federal RWF 443-11 Production 906202251.png

