

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS

Rock Springs District, Colorado

For: Steven Bumgarner

Date: Sunday, December 15, 2019

RWF 323-12

4 ½" Production Casing

Post Job Report

Job Date: Sunday, December 15, 2019

Sincerely,

Denny Elder

Legal Notice

Disclaimer:

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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	12/14/2019	14:00	MST
On Location	12/15/2019	03:00	MST
Job Started	12/15/2019	09:30	MST
Job Completed	12/15/2019	11:30	MST
Departed Location	12/15/2019	12:30	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	32
2	Mud type (OBM, WBM, SBM, Water, Brine)	lb/gal	Wbm
3	Actual mud density	lb/gal	12.9
4	Time circulated before job	HH:MM	02:00
5	Mud volume circulated	Bbls	500
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	No
8	Rig pressure while circulating	Psi	1100
9	Time from end mud circulation to start of job	HH:MM	00:15
10	Pipe movement during cementing	Y/N	Y
11	Calculated displacement	Bbls	142
12	Job displaced by	Rig/HES	HES
13	Annular flow before job	Y/N	NO
14	Annular flow after job	Y/N	NO
15	Length of rat hole	Ft	10
16	Units of gas detected while circulating	Units	900
17	Was lost circulation experienced at any time ?	Y/N	NO

1.3 Planned Pump Schedule

Description	Stage No.	Density (ppg)	Rate (bbl/min)	Yield (ft ³ /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	396.28	1240.00	49.54
Top Plug/Start Displacement								
Water	5-1	8.33	10.00			93.85		9.38
Water	5-2	8.33	4.00			50.00		12.50
Total:						570.13		76.42

*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

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	<200	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

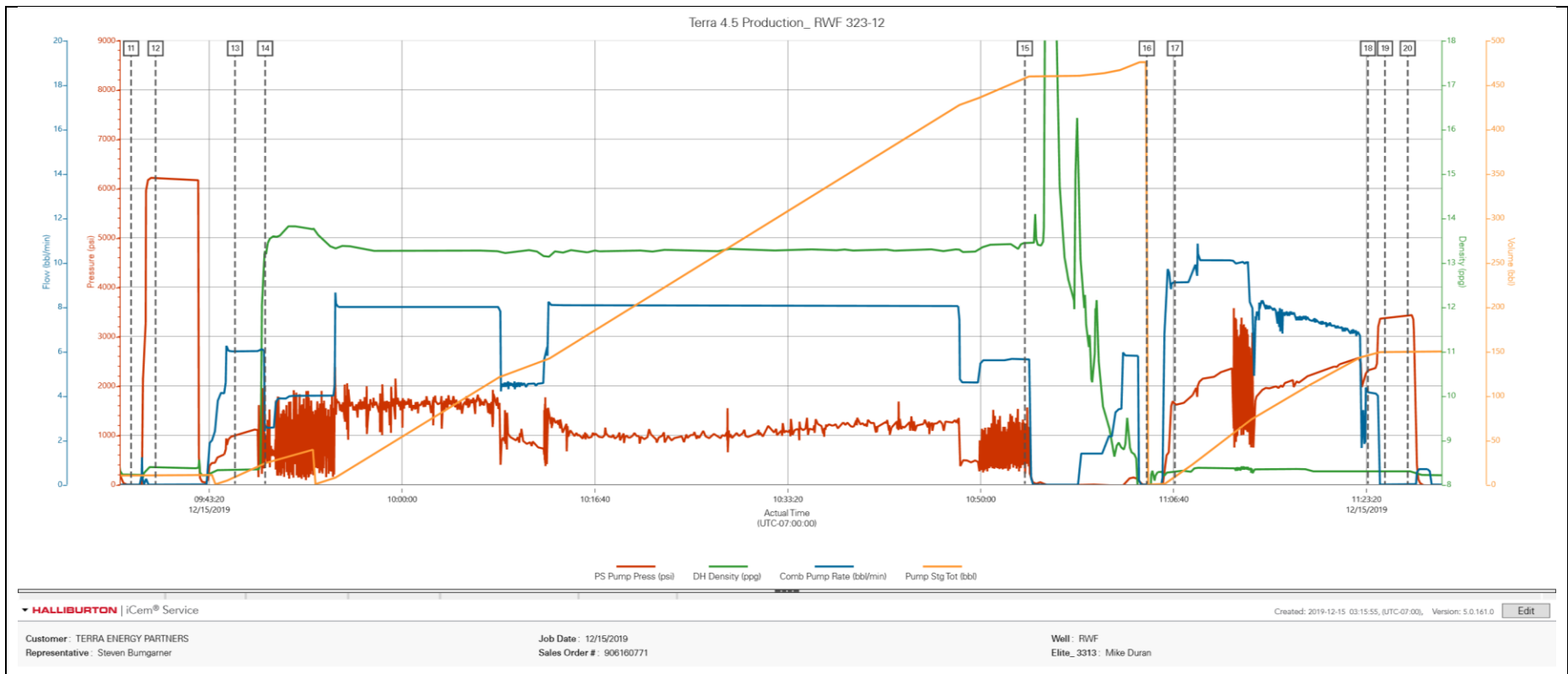
2.1 Job Event Log

Type	Seq. No.	Graph Label	Date	Time	Source	PS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	12/14/2019	14:00:00	USER					Crew requested on location at 03:00.
Event	2	Pre-Convoy Safety Meeting	12/14/2019	16:00:00	USER					
Event	3	Crew Leave Yard	12/14/2019	16:05:00	USER					
Event	4	Arrive At Loc	12/15/2019	03:00:00	USER					Well Info: TD_9212 Total Pipe_9205 4.5 in. 11.6 lb/ft, _P-110. Shoe Track_31.5 ft. Previous Casing_9.625 in. 36 lb/ft 1042 ft. Open Hole_8.75 in. Well fluid_12.9 wbm.
Event	5	Pre-Rig Up Safety Meeting	12/15/2019	03:05:00	USER					
Event	6	Rig-Up Equipment	12/15/2019	03:10:00	USER					
Event	7	Rig-Up Completed	12/15/2019	05:00:00	USER	1.00	0.01	0.00	0.00	
Event	8	Casing on Bottom	12/15/2019	07:00:00	USER	2.00	0.01	0.00	0.00	
Event	9	Pre-Job Safety Meeting	12/15/2019	06:30:00	USER	2.00	0.01	0.00	0.00	Discussed Job Procedure and JSA.
Event	10	Start Job	12/15/2019	08:35:01	COM4	16.00	8.26	0.70	0.10	
Event	11	Pump Water	12/15/2019	09:36:35	USER	-4.00	8.23	0.00	10.20	Pumped 10 bbls water spacer to fill lines.
Event	12	Test Lines	12/15/2019	09:38:42	USER	6219.00	8.39	0.00	10.30	Test lines to 6000 psi. No leaks.
Event	13	Pump Spacer	12/15/2019	09:45:34	USER	1013.00	8.35	6.00	8.80	Pumped 20 bbls mud flush.
Event	14	Pump Cement	12/15/2019	09:48:10	USER	463.00	13.23	2.60	24.30	Pumped 1240 sks ThermoCem at 13.3 lb/gal, 1.79 yd, 8.5 gal/sk. 8 bpm.

Event	15	Shutdown	12/15/2019	10:53:49	USER	209.00	13.42	5.60	457.50	Shutdown. Washed pumps and lines to the pit.
Event	16	Drop Top Plug	12/15/2019	11:04:21	USER	-16.00	-0.08	0.00	0.00	Dropped 4.5 in HWE top plug.
Event	17	Pump Displacement	12/15/2019	11:06:47	USER	1616.00	8.28	9.10	8.90	Pumped 142 bbls kcl water displacement. First 10 bbls had 1 gal mmcr. First 30 bbls had BE-6.
Event	18	Slow Rate	12/15/2019	11:23:28	USER	2320.00	8.30	4.20	145.60	Slowed rate to 4 bpm to bump the plug.
Event	19	Bump Plug	12/15/2019	11:24:56	USER	3385.00	8.31	0.00	149.20	Final circulating pressure was 2546 psi. Bumped to 3400 psi.
Event	20	Check Floats	12/15/2019	11:26:54	USER	3431.00	8.30	0.00	149.20	Check floats and they held. We got 2.5 bbls back.
Event	21	End Job	12/15/2019	11:46:38	COM4	-23.00	0.16	0.00	208.20	
Event	22	Pre-Rig Down Safety Meeting	12/15/2019	12:00:00	USER					Estimated top of cement at 1981 ft.
Event	23	Rig-Down Equipment	12/15/2019	12:05:00	USER					
Event	24	Rig-Down Completed	12/15/2019	12:45:00	USER					
Event	25	Pre-Convoy Safety Meeting	12/15/2019	12:50:00	USER					
Event	26	Crew Leave Location	12/15/2019	13:00:00	USER					This job was completed safely by Denny Elder and Crew. Thanks for choosing Halliburton Cementing.

3.0 Attachments

3.1 Terra 4.5 Production -Events.png



3.2 Terra 4.5 Production -No Events.png

