

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS

For: Darrall Leatherman

RWF 422-12

4 ½" Production Casing

Post Job Report

Job Date: Thursday, December 26, 2019

Sincerely,

Jason Ertl

Legal Notice

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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	12/25/2019	11:30	MST
On Location	12/25/2019	23:30	MST
Job Started	12/26/2019	03:30	MST
Job Completed	12/26/2019	10:00	MST
Departed Location	12/26/2019	11:00	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	29
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	1000
6	Rate at which well was circulated	Bpm	9
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	0:05
10	Pipe movement during cementing	Y/N	Y
11	Calculated displacement	Bbls	139.1
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	9000
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 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	391.49	1225.00	48.94
Top Plug/Start Displacement								
Water	5-1	8.33	10.00			100.36		10.04
Water	5-2	8.33	4.00			40.00		10.00
Total:						561.85		73.97

*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	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	DH Density (ppg)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	DS Pump Press (psi)	Comments
Event	1	Call Out	12/25/2019	11:30:02	USER					Called out, requested on location at 23:30
Event	2	Pre-Convoy Safety Meeting	12/25/2019	16:00:00	USER					Talked with HES crew about the hazards of driving to location.
Event	3	Depart from Service Center or Other Site	12/25/2019	16:16:10	USER					Crew departs for location.
Event	4	Arrive At Loc	12/25/2019	23:00:00	USER					Well Info: TD_ 9015' Total Pipe_9009' 4 1/2" 11.6 lb/ft Shoe Track_35.3 Previous Casing_ 1042' 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	12/25/2019	23:05:00	USER					Talked with HES crew about the hazards of spotting in equipment.
Event	6	Pre-Rig Up Safety Meeting	12/25/2019	23:10:00	USER					Talked with HES crew about the hazards of rigging up Bulk, Water and Iron lines.
Event	7	Rig-Up Equipment	12/25/2019	23:15:00	USER					Rig-up Equipment and check mud scales on 8.33 lb/gal water.
Event	8	Casing on Bottom	12/26/2019	03:30:00	USER					Rig circulated at 9 bpm with 730 psi 9000 units of gas and no losses.
Event	9	Pre-Job Safety Meeting	12/26/2019	03:40:00	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	12/26/2019	04:40:00	USER					Rig-up completed
Event	11	Start Job	12/26/2019	04:45:41	USER	8.70	1.19	0.20	50.90	Start job, pump 10 bbls water ahead to fill lines.
Event	12	Shutdown	12/26/2019	04:49:34	USER	8.32	0.00	10.17	97.77	Shutdown to line out valves for pressure test.
Event	13	Pressure Test	12/26/2019	04:51:27	USER	8.28	0.00	10.18	1008.16	Low pressure kick out test to 500 psi.

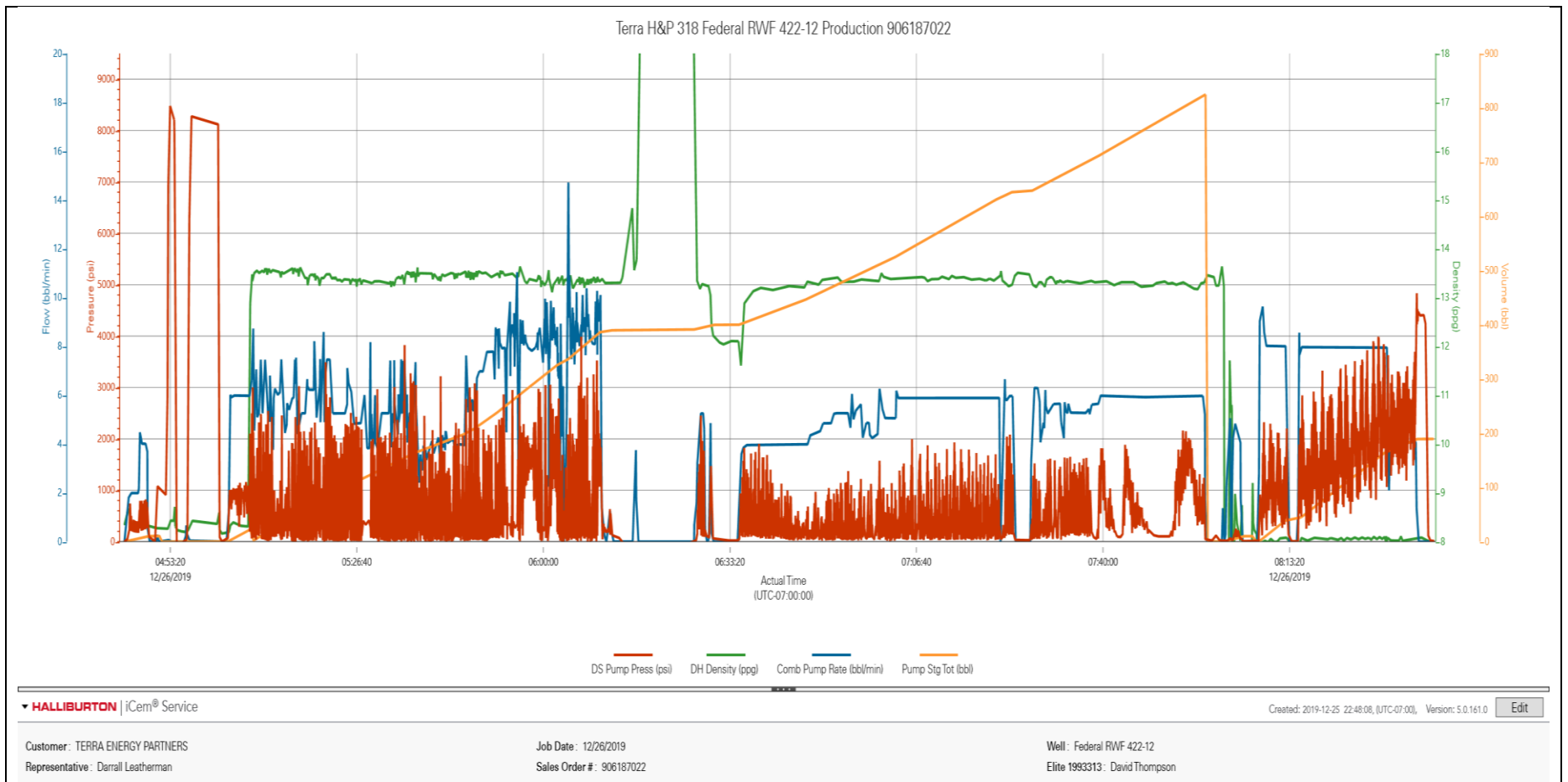
Event	14	Pressure Test	12/26/2019	04:57:13	USER	8.43	0.00	0.20	8276.40	Pressure test HES iron to 8000 psi. Good test no leaks.
Event	15	Pump Mud Flush	12/26/2019	05:04:26	USER	8.40	5.99	3.34	799.71	Mix and pump 20 bbls mud flush at 8.4 lb/gal at 4 bpm.
Event	16	Pump Cement	12/26/2019	05:08:03	USER	13.49	6.63	1.21	46.89	Mix and pump 1225 sacks of ThermaCem cement at 13.3 lb/gal, 1.79 cuft/sack and 8.5 gals/sacks at 6 bpm.
Event	17	Shutdown	12/26/2019	06:10:32	USER	13.38	0.68	388.71	-6.55	Shutdown due to pumps surging and casing the iron to start leaking.
Event	18	Pump Cement	12/26/2019	06:27:07	USER	16.20	1.37	391.21	5.03	Attempt to pump remaining cement at 8 bpm.
Event	19	Shutdown	12/26/2019	06:30:01	USER	12.64	4.27	399.62	948.17	Cement bulk line packed off.
Event	20	Pump Cement	12/26/2019	06:35:12	USER	11.68	2.89	400.23	186.91	Attempt to pump remaining cement at 6 bpm.
Event	21	Shutdown	12/26/2019	07:24:33	USER	13.51	0.00	645.84	27.53	Shutdown due to leak caused by surging iron.
Event	22	Pump Cement	12/26/2019	07:27:35	USER	13.27	6.27	648.06	50.03	Pump remaining cement at 5 bpm.
Event	23	Shutdown	12/26/2019	07:58:37	USER	13.46	0.00	0.00	26.60	Shutdown / Wash pumps and lines to the cellar.
Event	24	Shutdown	12/26/2019	08:04:40	USER	8.14	0.06	10.08	27.53	Shutdown / Drop top plug.
Event	25	Pump Displacement	12/26/2019	08:07:59	USER	7.93	8.97	0.90	162.54	Pump displacement. (1st 10 bbls w/mmcr, 1st 30 bbls with BE-6, and first 120 bbls with KCL).
Event	26	Shutdown	12/26/2019	08:13:28	USER	8.03	0.00	41.60	15.35	Shutdown due to leak caused by surging pumps.
Event	27	Pump Displacement	12/26/2019	08:14:55	USER	7.91	1.47	41.70	12.53	Pump remaining displacement. at 7 bpm
Event	28	Slow Rate	12/26/2019	08:30:56	USER	8.15	8.01	168.77	3629.47	Slow to 4 bpm last 20 bbls to land the plug.
Event	29	Bump Plug	12/26/2019	08:36:08	USER	8.08	0.00	189.32	4397.29	Bump plug. Bring pressure 500 psi over FCP of 4701 psi.
Event	30	Check Floats	12/26/2019	08:38:26	USER	8.00	0.00	189.32	17.22	Floats held with 2 bbls back to the truck.
Event	31	Pre-Rig Down Safety Meeting	12/26/2019	08:45:00	USER					Talked with HES rig crew about the hazards of rigging down.
Event	32	Rig-Down Equipment	12/26/2019	09:00:00	USER					Start rigging down
Event	33	Rig-Down Completed	12/26/2019	10:29:04	USER					Rig-down completed
Event	34	Pre-Convoy Safety Meeting	12/26/2019	10:30:00	USER					Talked with HES crew about the hazards of driving off location.
Event	35	Crew Leave Location	12/26/2019	10:35:00	USER					HES crew left location.

Event	36	Job Complete	12/26/2019	11:00:00	USER
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Job Completed. Est. top of Cement at 1880'. Est top of Mud Flush at 1514'. Thanks for choosing Halliburton Cementing.

3.0 Attachments

3.1 Terra H&P 318 Federal RWF 422-12 Production .png



3.2 Terra H&P 318 Federal RWF 422-12 Production .png

