

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS-EBUS

Rock Springs District, Colorado

For: Craig Borgstede

Date: Thursday, February 13, 2020

RWF 531-12

4 ½ Production Casing

Post Job Report

Job Date: Thursday, February 13, 2020

Sincerely,

John Keane

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	02-13-2020	03:00	MST
On Location	02-13-2020	11:00	MST
Job Started	02-13-2020	16:10	MST
Job Complete	02-13-2020	18:15	MST
Depart Location	02-13-2020	19:30	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	45
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	01:30
5	Mud volume circulated	Bbls	900
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	1175
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	140.3
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	530
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	394.68	1235.00	49.34
Top Plug/Start Displacement								
Water	5-1	8.33	10.00			111.87		11.19
Water	5-2	8.33	4.00			30.00		7.50
Total:						566.56		73.02

*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	30	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)	Pump Stg Tot (bbl)	Comments
Event	1	Job Called In	2/13/2020	03:00:00	USER					REQUESTED ON LOCATION TIME 21:00
Event	2	Safety Meeting	2/13/2020	04:30:00	USER					WITH HES, 1 IRON TRUCK, 1 ELITE CEMENTING UNIT, 1 660 BULK TRUCK
Event	3	Arrive at Rig	2/13/2020	11:00:00	USER					RIG RUNNING CASING, UPON HES ARRIVAL
Event	4	Assessment Of Location Safety Meeting	2/13/2020	11:15:00	USER					WITH HES, JSA COMPLETED, SDS OFFERED FOR ALL HES MATERIALS
Event	5	Safety Meeting - Pre Rig-Up	2/13/2020	11:40:00	USER					WITH HES, JSA COMPLETED
Event	6	Rig-Up Equipment	2/13/2020	12:00:00	USER					1 LINE RAN TO THE FLOOR, 1 LINE RAN TO THE PIT, 1 4.5 IN PLUG CONTAINER, WASH-UP MANIFOLD ON THE GROUND
Event	7	Other	2/13/2020	13:37:41	USER	0.00	0.03	0.00	0.80	TD 9090 FT, TP 9080 FT, HOLE 8.75 IN, CSG 4.5 IN 11.6 LB/FT P-110, SHOE 31.17 FT, SURFACE SET AT 1042 FT, 9.625 IN 36 LB FT J-55
Event	8	Other	2/13/2020	13:38:42	USER	0.00	0.03	0.00	0.80	RIG CIRCULATION, 1175 PSI, 10 BBBL/MIN, 900 BBL, PIPE WAS RECIPROCATED, RATE HOLE LENGTH 10 FT, MWT 12.8 LB/GAL WBM
Event	9	Other	2/13/2020	13:39:00	USER	0.00	0.03	0.00	0.80	WATER TEST PH 7. CHLOR 0, TEMP 75 DEG F
Event	10	Pre-Job Safety Meeting	2/13/2020	15:00:00	USER	0.00	8.31	0.00	0.80	WITH HES, TEP, AND H&P 318
Event	11	Fill Lines	2/13/2020	16:04:09	USER	441.00	8.35	2.10	1.60	PRIMED LINES WITH 5 BBL FRESH WATER
Event	12	Test Lines	2/13/2020	16:13:43	USER	5812.00	8.44	0.00	5.00	LOW TEST AT 500 PSI, HGH TEST AT 5780 PSI, PRESSURE HOLDING
Event	13	Pump Fresh Water	2/13/2020	16:20:29	USER	623.00	8.35	3.50	5.70	10 BBL FRESH WATER
Event	14	Mud Flush III Spacer	2/13/2020	16:23:13	USER	621.00	8.38	4.00	1.40	USED 80 LBS MUD FLUSH III, 20 BBL
Event	15	Pump Tail Cement	2/13/2020	16:29:25	USER	1409.00	13.18	4.00	1.10	MIXED AT 13.3 LB/GAL, 1235 SKS, (THERMACEM), 1.79 FT3/SK, 8.5 GAL/SK, DENSITY VERIFEID USING PRESSURIZED MUD SCALES, USED 5 GAL D-AIR

Event	16	Shutdown	2/13/2020	17:38:28	USER	199.00	13.44	4.00	486.40	
Event	17	Clean Lines	2/13/2020	17:45:37	USER	5.00	8.72	5.50	10.10	WASHED PUMPS AND LINES TO THE RESERVE PIT
Event	18	Drop Top Plug	2/13/2020	17:48:44	USER	-10.00	8.55	0.00	21.10	LUG LAUNCHED, CUSTOMER WITNESSED
Event	19	Pump Displacement	2/13/2020	17:51:18	USER	85.00	8.39	4.00	1.60	FRESH WATER, KCL, 3 LBS BE-6, 2 GAL MMCR ADDED
Event	20	Slow Rate	2/13/2020	18:05:54	USER	2204.00	8.38	4.20	133.10	SLOWED AT 130 BBL AWAY TO 4 BBL/MIN
Event	21	Bump Plug	2/13/2020	18:07:32	USER	2261.00	8.38	4.00	139.70	PLUG BUMPED AT CALCULATED DISPLACEMENT, 2238 PSI,
Event	22	Check Floats	2/13/2020	18:10:18	USER	3162.00	8.36	0.00	0.00	FLOATS HOLDING, 2.0 BBL RETURNED TO THE TRUCK
Event	23	End Job	2/13/2020	18:15:00	USER	-4.00	8.29	0.00	1.80	GOOD CIRCULATION, RIG USED 2 GAL MMCR, THE TOP PLUG, 3 LBS BE-6, AND 20 LBS MUD FLUSH, NO ADD HOURS
Event	24	Pre-Rig Down Safety Meeting	2/13/2020	18:20:00	USER	-10.00	8.27	0.00	1.80	WITH HES
Event	25	Rig Down Lines	2/13/2020	18:30:00	USER	-10.00	0.02	0.00	48.00	
Event	26	Pre-Convoy Safety Meeting	2/13/2020	19:10:00	USER					WITH HES
Event	27	Comment	2/13/2020	19:20:00	USER					SPACER 10 BBL FRESH WATER, 20 BBL MUD FLUSH , TAIL CEMENT 393.7 BBL, FINAL DISPLACEMENT 140.3 BBL, TOP OF TAIL CEMENT 1892 FT
Event	28	Crew Leave Location	2/13/2020	19:30:00	USER					THANKS FOR USING HALLIBURTON, JOHN KEANE AND CREW

3.0 Attachments

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