

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS-EBUS

Rock Springs District, Colorado

For: Garrett Wade

Date: Wednesday, November 27, 2019

RWF-23-12

Garfield, RWF-23-12

TEP-RWF-23-12

Job Date: Thursday, November 28, 2019

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	11-27-2019	13:00	MST
On Location	11-27-2019	16:30	MST
Job Started	11-27-2019	19:00	MST
Job Complete	11-27-2019	20:40	MST
Depart Location	11-27-2019	21:50	MST

1.2 Job Overview

		Units	Description
1	Surface temperature at time of job	°F	34
2	Mud type (OBM, WBM, SBM, Water, Brine)	lb/gal	WBM
3	Actual mud density	lb/gal	9.6
4	Time circulated before job	HH:MM	00:30
5	Mud volume circulated	Bbls	300
6	Rate at which well was circulated	Bpm	10
7	Pipe movement during hole circulation	Y/N	N
8	Rig pressure while circulating	Psi	250
9	Time from end mud circulation to start of job	HH:MM	00:05
10	Pipe movement during cementing	Y/N	N
11	Calculated displacement	Bbls	77
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	7
16	Units of gas detected while circulating	Units	0
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)
TEP Surface Mud	1	8.40	4.00			0.00		0.00
Fresh Water Spacer	2	8.33	8.00			20.00		2.50
VariCem GJ1 Lead Q3 2018 2500622/1	3	12.30	8.00	2.3787	13.772	52.96	125.00	6.62
VariCem GJ1 Tail Q3 2018 2500623/1	4	12.80	8.00	2.1124	11.779	56.44	150.00	7.05
Top Plug/Start Displacement								
Fresh Water Displacement	5-1	8.33	10.00			55.50		5.55
Fresh Water Displacement	5-2	8.33	2.00			20.00		10.00
Total:						204.90		31.72

*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	72	°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	11/27/2019	13:00:00	USER					REQUESTED ON LOCATION TIME 17:00
Event	2	Pre-Convoy Safety Meeting	11/27/2019	15:00:00	USER					WITH HES, JSA COMPLETED, 1 IRON TRUCK, 1 ELITE CEMENTING UNIT, 1 660 BULK TRUCK
Event	3	Arrive At Loc	11/27/2019	16:00:00	USER					RIG RUNNING CASING UPON HES ARRIVAL
Event	4	Assessment Of Location Safety Meeting	11/27/2019	16:30:00	USER					WITH HES, JSA COMPLETED, SDS OFFERED FOR ALL HES MATERIALS
Event	5	Pre-Rig Up Safety Meeting	11/27/2019	16:45:00	USER					WITH HES, 1 LINE RAN TO THE FLOOR, 1 9.625 IN QUICK-LATCH PLUG CONTAINER
Event	6	Rig-Up Equipment	11/27/2019	17:00:00	USER					
Event	7	Water Test	11/27/2019	18:00:00	USER	-1.00	0.05	0.00	0.00	TEMP 75 DEG F, PH 7.0, CHLOR 0
Event	8	Comment	11/27/2019	18:10:00	USER	-2.00	0.05	0.00	0.00	TD 1051FT, TP 1044.3 9.625 IN 36 LB/FT J-55, HOLE 8.75 IN, SHOE 44.5 FT
Event	9	Comment	11/27/2019	18:20:00	USER	-2.00	0.06	0.00	0.00	RIG CIRCULATION, 300 BBL, 10 BBL/MIN, 220 PSI, MWT9.6 LB/GAL WBM, PIPE WAS STATIC, RAT HOLE LENGTH 7 FT
Event	10	Pre-Job Safety Meeting	11/27/2019	19:00:00	USER	5.00	8.49	0.00	15.20	WITH HES, TEP, AND H&P 318
Event	11	Start Job	11/27/2019	19:40:02	COM6	1.00	8.50	0.00	0.00	
Event	12	Fill Lines	11/27/2019	19:41:44	USER	96.00	8.88	2.00	2.70	5 BBL FRESH WATER

Event	13	Test Lines	11/27/2019	19:45:19	USER	3080.00	8.85	0.00	4.90	LOW TEST AT 1580 PSI, HIGH TEST AT 5120 PSI, PRESSURE HOLDING
Event	14	Pump Fresh Water Spacer	11/27/2019	19:48:31	USER	40.00	8.68	0.00	0.00	20 BBL FRESH WATER
Event	15	Pump Lead Cement	11/27/2019	19:57:23	USER	247.00	11.94	4.00	1.70	MIXED AT 12.3 LBGAL, 125 SKS, (VARICEM), 2.38 FT3/SK, 13.74 GAL/SK, DENSITY VERIFIED USING PRESSURIZED MUD SCALES
Event	16	Pump Tail Cement	11/27/2019	20:05:17	USER	620.00	12.81	8.00	2.90	MIXED AT 12.8 LB/GAL, 150 SKS, (VARICEM), 2.11 FT3/SK, 11.74 GAL/SK, DENSITY VERIFIED USING PRESSURIZED MUD SCALES
Event	17	Shutdown	11/27/2019	20:12:53	USER	397.00	12.86	6.00	57.70	
Event	18	Drop Top Plug	11/27/2019	20:14:37	USER	3.00	13.25	0.00	57.90	PLUG LAUNCHED, CUSTOMER WITNESSED
Event	19	Pump Displacement	11/27/2019	20:18:17	USER	159.00	8.34	4.10	2.80	FRESH WATER
Event	20	Slow Rate	11/27/2019	20:26:55	USER	271.00	8.19	2.00	67.90	SLOWED AT 67 BBL AWAY TO 2 BBL/MIN
Event	21	Bump Plug	11/27/2019	20:30:25	USER	260.00	8.20	2.00	74.90	PLUG BUMPED AT CALCULATED DISPLACEMENT, 280 PSI
Event	22	Check Floats	11/27/2019	20:32:09	USER	128.00	8.16	0.00	75.80	FLOATS HOLDING, PRESSURE HOLDING, .5 BBL RETURNED TO THE TANKS
Event	23	End Job	11/27/2019	20:40:00	USER	4.00	8.11	0.00	75.80	GOOD CIRCULATION, NO ADD HOURS, RIG DID NOT USE SUGAR, RIG USED TOP PLUG
Event	24	Pre-Rig Down Safety Meeting	11/27/2019	21:07:18	USER					WITH HES, JSA COMPLETED
Event	25	Rig Down Lines	11/27/2019	21:10:00	USER					
Event	26	Pre-Convoy Safety Meeting	11/27/2019	21:15:00	USER					WITH HES, JSA COMPLETED
Event	27	Comment	11/27/2019	21:30:00	USER					SPACER 20 BBL FRESH WATER, LEAD CEMENT 53 BBL, TAIL CEMENT 56 BBL, FINAL DISPLACEMENT 77 BBL, 20 BBL CEMENT CIRCULATED TO SURFACE, TOP OF CEMENT 435 FT

Event	28	Crew Leave Location	11/27/2019	21:50:00	USER	THANKS FOR USING HALLIBURTON, JOHN KEANE AND CREW
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3.0 Attachments

3.1 TEP - RWF-23-12 - SURFACE.png

