

HALLIBURTON

iCem[®] Service

TERRA ENERGY PARTNERS

Rock Springs District, Colorado

For: Terra

Date: Saturday, July 20, 2019

RWF 514-8 Production

API#05-045-24034

Sincerely,
Grand Junction Cement Engineering

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 | 7.19.2019 | | MST |
| On Location | 7.19.2019 | | MST |
| Job Started | 7.20.2019 | | MST |
| Job Completed | 7.20.2019 | | MST |
| Departed Location | 7.20.2019 | | MST |

1.2 Job Overview

| | | Units | Description |
|----|--|---------|-------------|
| 1 | Surface temperature at time of job | °F | |
| 2 | Mud type (OBM, WBM, SBM, Water, Brine) | lb/gal | |
| 3 | Actual mud density | lb/gal | 12.9 PPG |
| 4 | Time circulated before job | HH:MM | 3:00 |
| 5 | Mud volume circulated | Bbls | |
| 6 | Rate at which well was circulated | Bpm | 10 BPM |
| 7 | Pipe movement during hole circulation | Y/N | YES |
| 8 | Rig pressure while circulating | Psi | 980 PSI |
| 9 | Time from end mud circulation to start of job | HH:MM | 0:10 |
| 10 | Pipe movement during cementing | Y/N | YES |
| 11 | Calculated displacement | Bbls | 142.5 |
| 12 | Job displaced by | Rig/HES | HES |
| 13 | Annular flow before job | Y/N | |
| 14 | Annular flow after job | Y/N | YES |
| 15 | Length of rat hole | Ft | |
| 16 | Units of gas detected while circulating | Units | 900 |
| 17 | Was lost circulation experienced at any time ? | Y/N | YES |

Lost Circulation Details

RETURNS PRIOR TO JOB AND DURING MOST OF THE JOB

1.3 Squeeze Job Information

| | | Units | Description |
|---|--|---------|-------------|
| 1 | Was the well full prior to cementing? | Y/N | |
| 2 | Injection Rate #1 & Pressure | psi/bpm | |
| 3 | Injection Rate #2 & Pressure | psi/bpm | |
| 4 | Injection Rate #3 & Pressure | psi/bpm | |
| 5 | Initial ISIP | psi | |
| 6 | Density of fluid used for Initial ISIP | lb/gal | |
| 7 | Final ISIP | psi | |
| 8 | Density of displacement fluid | lb/gal | |

1.4 Plug Job Information

| | | Units | Description |
|---|--|--------|-------------|
| 1 | Density of well fluid exiting well prior to job | lb/gal | |
| 2 | Density of well fluid entering well prior to job | lb/gal | |

| | | | |
|---|---|----------|--|
| 3 | Was the well full prior to cementing? | Y/N | |
| 4 | How many joints of workstring pulled wet? | # Joints | |
| 5 | Depth of workstring for circulation after the plug? | ft | |
| 6 | Calculated Plug Height (workstring out) | ft | |

1.5 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 |
| Sulfates | | ppm | 1500 ppm | Will greatly decrease the strength of cement |
| Total Hardness | | ppm | 500 mg/L | High concentrations will accelerate the set of the cement |
| Calcium | | ppm | 500 ppm | High concentrations will accelerate the set of the cement |
| Total Alkalinity | | ppm | 1000 ppm | Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3). |
| Potassium | | ppm | 5000 ppm | High concentrations will shorten the pump time of cement (indicates the presence of chlorides, therefore if Potassium levels are measured as high, so should the chlorides) |
| Iron | | ppm | 300 ppm | High concentrations will accelerate the set of the cement |
| Temperature | | °F | 50-80 °F | High temps will accelerate; Low temps may risk freezing in cold weather |
| Magnesium | | ppm | 300 ppm | High concentrations will accelerate the set of the cement Calculation Method: Subtract tested "Calcium" value from "Total Hardness" value. |

2.0 Real-Time Job Summary

2.1 Job Event Log

| Type | Seq. No. | Activity | 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 | Other | Call Out | 7/19/2019 | 15:00:00 | USER | | | | | REQUESTED ON LOCATION @ 1700 |
| Event | 2 | Pre-Convoy Safety Meeting | Pre-Convoy Safety Meeting | 7/19/2019 | 15:30:00 | USER | | | | | ALL HES PRESENT |
| Event | 3 | Crew Leave Yard | Crew Leave Yard | 7/19/2019 | 15:40:00 | USER | | | | | 1 F550, 1 PUMP TRUCK, 1 660 BULK TURCK & 1 TRANSPORT |
| Event | 4 | Arrive at Location from Service Center | Arrive at Location from Service Center | 7/19/2019 | 17:00:00 | USER | | | | | RIG RUNNING CASING |
| Event | 5 | Assessment Of Location Safety Meeting | Assessment Of Location Safety Meeting | 7/19/2019 | 17:10:00 | USER | | | | | MET WITH COMP REP, , AND WENT OVER NUMBERS AND JOB PROCEDURE. WALKED AROUND LOCATION AND COLLECTED WATER SAMPLE (PH- 7, CHLORIDES- 0, TEMP- 68F). COMP REP WAS OFFERED SDS FOR ALL CHEMICLES USED BY HES. |
| Event | 6 | Pre-Rig Up Safety Meeting | Safety Meeting - Pre Rig-Up | 7/19/2019 | 19:30:00 | USER | | | | | ALL HES PRESENT |
| Event | 7 | Rig-Up Equipment | Rig-Up Equipment | 7/19/2019 | 19:40:00 | USER | | | | | HES RIGGED UP EQUIPMENT WITHOUT ENTERING RED ZONE. |
| Event | 8 | Pre-Job Safety Meeting | Pre-Job Safety Meeting | 7/20/2019 | 01:30:00 | USER | | | | | ALL HES AND RIG CREW PRESENT |
| Event | 9 | Start Job | Start Job | 7/20/2019 | 02:09:00 | COM2 | | | | | TD 9077', TP 9066.72', SJ 30.07', OH 8.75'', CSG 4.5'' |

11.6#, MUD 12.7 PPG. RIG
CIRCULATED WELL @ 10
BPM WITH 980 PSI FOR
APPROX 3 HRS.

| | | | | | | | | | | | |
|-------|----|-------------------|-------------------|-----------|----------|------|---------|-------|------|--------|---|
| Event | 10 | Prime Pumps | Prime Pumps | 7/20/2019 | 02:10:00 | USER | 340.00 | 8.33 | 2.00 | 2.00 | 8.33 PPG FRESH WATER |
| Event | 11 | Test Lines | Test Lines | 7/20/2019 | 02:15:37 | COM2 | 5217.00 | 8.33 | 0.50 | 0.50 | ALL LINES HELD PRESSURE AT 5217 PSI |
| Event | 12 | Pump Spacer 1 | Pump Spacer 1 | 7/20/2019 | 02:18:27 | COM2 | 480.00 | 8.33 | 4.00 | 10.00 | 8.33 PPG FRESH WATER (10 BBL) |
| Event | 13 | Pump Spacer 2 | Pump Spacer 2 | 7/20/2019 | 02:21:20 | COM2 | 730.00 | 8.34 | 4.00 | 20.00 | 8.4 PPG MUDFLUSH III (20 BBL) |
| Event | 14 | Pump Lead Cement | Pump Lead Cement | 7/20/2019 | 02:27:52 | COM2 | 835.00 | 13.00 | 8.00 | 355.00 | NEOCEM CEMENT 1120 SKS (355 BBLs), 13.0 PPG, 1.75 FT3/SK, 7.85 GAL/SK |
| Event | 15 | Other | Other | 7/20/2019 | 02:47:33 | USER | | | | | LOST PRIME ON DR SD HT400, SLOWED RATE AND PRIMED PUMP. |
| Event | 16 | Pump Tail Cement | Pump Tail Cement | 7/20/2019 | 03:38:23 | COM2 | 700.00 | 14.00 | 8.00 | 149.00 | NEOCEM CEMENT 485 SKS (149 BBLs), 14.2 PPG, 1.73 FT3/SK, 7.78 GAL/SK |
| Event | 17 | Shutdown | Shutdown | 7/20/2019 | 04:03:37 | USER | | | | | END OF CMT, WHILE SHUT DOWN GAS TO SURFACE AT FLARE STACK |
| Event | 18 | Clean Lines | Clean Lines | 7/20/2019 | 04:05:37 | USER | | | | | WASH UP PUMPS AND LINES TO CELLAR |
| Event | 19 | Drop Top Plug | Drop Top Plug | 7/20/2019 | 04:14:04 | USER | | | | | PLUG WENT, VERIFIED BY CO REP. |
| Event | 20 | Pump Displacement | Pump Displacement | 7/20/2019 | 04:14:50 | COM2 | 2560.00 | 8.33 | 8.00 | 132.50 | 8.34 PPG FRESH WATER (141 BBLs) 3 BAGS BE6, 1 GAL MMCR & 14 SKS KCL |
| Event | 21 | Slow Rate | Slow Rate | 7/20/2019 | 04:29:29 | USER | 1858.00 | 8.33 | 4.00 | 10.00 | SLOW RATE TO 4 BPM PER CO REP TO LAND PLUG |

| | | | | | | | | | | | |
|-------|----|--|--|-----------|----------|------|---------|------|------|--------|--|
| Event | 22 | Bump Plug | Bump Plug | 7/20/2019 | 04:30:55 | USER | 2670.00 | 8.33 | 4.00 | 142.50 | LAND PLUG AT 1858 PSI, BROUGHT UP TO 2670 PSI |
| Event | 23 | Check Floats | Check Floats | 7/20/2019 | 04:33:45 | USER | 2723.00 | 8.33 | 0.00 | 142.50 | FLOATS HELD, 1.5 BBL BACK TO TRUCK |
| Event | 24 | End Job | End Job | 7/20/2019 | 04:35:35 | COM2 | | | | | RETURNS LOST PRIOR TO DISPLACEMENT, WHILE SHUT DOWN TO CLEAN LINES GAS TO SURFACE AT FLARE STACK, FOAM CMT RETURNS 30 BBL INTO DISP, GAS STOPPED AT FLARE STACK 100 BBL INTO DISP, GAS TO SURFACE AT FLARE STACK 125 BBL INTO DISP, BUMPED PLUG AND SHUT IN ANNULAR WITH APROX 100 PSI ON BAGS, PIPE WAS RECIPROCATED DURING THE JOB, 10 BOXES OF WELL LIFE AND 300# SUGAR USED. |
| Event | 25 | Post-Job Safety Meeting (Pre Rig-Down) | Post-Job Safety Meeting (Pre Rig-Down) | 7/20/2019 | 04:37:00 | USER | | | | | ALL HES PRESENT |
| Event | 26 | Rig-Down Equipment | Rig-Down Equipment | 7/20/2019 | 05:00:00 | USER | | | | | ALL HES PRESENT |
| Event | 27 | Pre-Convoy Safety Meeting | Pre-Convoy Safety Meeting | 7/20/2019 | 05:45:00 | USER | | | | | ALL HES PRESENT |
| Event | 28 | Crew Leave Location | Crew Leave Location | 7/20/2019 | 06:00:00 | USER | | | | | THANK YOU FOR CHOOSING HALLIBURTON CEMENT, CHRIS SMITH AND CREW |

3.0 Attachments

3.1 CHART.png



