

# HALLIBURTON

iCem<sup>®</sup> Service

**EXTRACTION OIL & GAS**

**AD FED Library 20W-25-18 Production**

Sincerely,

**Meghan Jacobs**

## Legal Notice

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## Table of Contents

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|     |  |    |
|-----|--|----|
| 1.0 | Cementing Job Summary .....                          | 4  |
| 1.1 | Executive Summary .....                              | 4  |
| 2.0 | Real-Time Job Summary .....                          | 7  |
| 2.1 | Job Event Log .....                                  | 7  |
| 3.0 | Attachments.....                                     | 10 |
| 3.1 | AD Fed Library 20W-25-18 Production – Job Chart..... | 10 |

## 1.0 Cementing Job Summary

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### 1.1 Executive Summary

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Halliburton appreciates the opportunity to perform the cementing services on the **AD Fed Library 20W-25-18** cement **Production** casing 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.

**Approximately 64 bbls of cement were returned to surface.**

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 Fort Lupton**

*The Road to Excellence Starts with Safety*

|  |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
|--|-------------------|----------------------------|--------------------------|----------------------------|--|-----------------------------------|-------------------------------|-----------------------|----------------------|----------------------|----------------------------|
| <b>Sold To #:</b> 369404                                 |                   | <b>Ship To #:</b> 3809178  |                          | <b>Quote #:</b>            |  | <b>Sales Order #:</b> 0905854640  |                               |                       |                      |                      |                            |
| <b>Customer:</b> EXTRACTION OIL & GAS-EBUS               |                   |                            |                          |                            | <b>Customer Rep:</b> Hans Cary           |                                   |                               |                       |                      |                      |                            |
| <b>Well Name:</b> AD FED LIBRARY                         |                   |                            | <b>Well #:</b> 20W-25-18 |                            |  | <b>API/UWI #:</b> 05-123-45037-00 |                               |                       |                      |                      |                            |
| <b>Field:</b> WATTENBERG                                 |                   | <b>City (SAP):</b> GREELEY |                          | <b>County/Parish:</b> WELD |  |                                   | <b>State:</b> COLORADO        |                       |                      |                      |                            |
| <b>Legal Description:</b> NW SW-21-5N-65W-1828FSL-367FWL |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Contractor:</b> ENSIGN DRLG                           |                   |                            |                          |                            | <b>Rig/Platform Name/Num:</b> ENSIGN 147 |                                   |                               |                       |                      |                      |                            |
| <b>Job BOM:</b> 7523 7523                                |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Well Type:</b> HORIZONTAL OIL                         |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Sales Person:</b> HALAMERICA\HX38199                  |                   |                            |                          |                            | <b>Srv Supervisor:</b> Thomas Haas       |                                   |                               |                       |                      |                      |                            |
| <b>Job</b>   |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Formation Name</b>                                    |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Formation Depth (MD)</b>                              |                   | <b>Top</b>                 |                          |                            | <b>Bottom</b>                            |                                   |                               |                       |                      |                      |                            |
| <b>Form Type</b>   |                   |                            |                          |                            | <b>BHST</b>                              |                                   |                               |                       |                      |                      |                            |
| <b>Job depth MD</b>                                      |                   | 19793ft                    |                          |                            | <b>Job Depth TVD</b>                     |                                   | 7006                          |                       |                      |                      |                            |
| <b>Water Depth</b>                                       |                   |                            |                          |                            | <b>Wk Ht Above Floor</b>                 |                                   | 4                             |                       |                      |                      |                            |
| <b>Perforation Depth (MD)</b>                            |                   | <b>From</b>                |                          |                            | <b>To</b>                                |                                   |                               |                       |                      |                      |                            |
| <b>Well Data</b>   |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Description</b>                                       | <b>New / Used</b> | <b>Size in</b>             | <b>ID in</b>             | <b>Weight lbm/ft</b>       | <b>Thread</b>                            | <b>Grade</b>                      | <b>Top MD ft</b>              | <b>Bottom MD ft</b>   | <b>Top TVD ft</b>    | <b>Bottom TVD ft</b> |                            |
| Casing   | 0                 | 9.625                      | 8.921                    | 36                         |  |                                   | 0                             | 1633                  | 0                    | 1633                 |                            |
| Casing   | 0                 | 5.5                        | 4.892                    | 17                         |  |                                   | 0                             | 19793                 | 0                    | 7006                 |                            |
| Open Hole Section  |                   |                            | 8.375                    |                            |  |                                   | 1633                          | 7936                  | 1633                 | 7006                 |                            |
| Open Hole Section  |                   |                            | 8.5                      |                            |  |                                   | 7936                          | 19816                 | 0                    | 0                    |                            |
| <b>Tools and Accessories</b>                             |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Type</b>  | <b>Size in</b>    | <b>Qty</b>                 | <b>Make</b>              | <b>Depth ft</b>            |  | <b>Type</b>                       | <b>Size in</b>                | <b>Qty</b>            | <b>Make</b>          |                      |                            |
| <b>Float Shoe</b>  | 5.5               | 1                          | HES                      | 19793                      |  | <b>Bottom Plug</b>                | 5.5                           | 2                     | HES                  |                      |                            |
| <b>Float Collar</b>                                      | 5.5               | 1                          | HES                      | 19782                      |  | <b>Plug Container</b>             | 5.5                           | 1                     | HES                  |                      |                            |
| <b>Fluid Data</b>  |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Stage/Plug #:</b> 1                                   |                   |                            |                          |                            |  |                                   |                               |                       |                      |                      |                            |
| <b>Fluid #</b>   | <b>Stage Type</b> | <b>Fluid Name</b>          |                          |                            | <b>Qty</b>                               | <b>Qty UoM</b>                    | <b>Mixing Density lbm/gal</b> | <b>Yield ft3/sack</b> | <b>Mix Fluid Gal</b> | <b>Rate bbl/min</b>  | <b>Total Mix Fluid Gal</b> |

| 1  | FDP-C1337-18      | SBM FDP-C1337-18 CEMENT SPACER SYS                          | 50               | bbbl    | 12.5                   | 2.74           | 16.6          | 8            | 1701                |
|--|-------------------|---|------------------|---------|------------------------|----------------|---------------|--------------|---------------------|
| Fluid #  | Stage Type        | Fluid Name  | Qty              | Qty UoM | Mixing Density lbm/gal | Yield ft3/sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 2  | ElastiCem         | ELASTICEM (TM) SYSTEM                                       | 585              | sack    | 13.2                   | 1.59           | 7.92          | 8            | 4633                |
| Fluid #  | Stage Type        | Fluid Name  | Qty              | Qty UoM | Mixing Density lbm/gal | Yield ft3/sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 3  | GasStop           | ELASTICEM (TM) SYSTEM                                       | 615              | sack    | 13.2                   | 1.59           | 7.69          | 8            | 4729                |
| Fluid #  | Stage Type        | Fluid Name  | Qty              | Qty UoM | Mixing Density lbm/gal | Yield ft3/sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 4  | 13.2# ElastiCem   | ELASTICEM (TM) SYSTEM                                       | 2000             | sack    | 13.2                   | 1.59           | 7.89          | 8            | 15780               |
| Fluid #  | Stage Type        | Fluid Name  | Qty              | Qty UoM | Mixing Density lbm/gal | Yield ft3/sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 5  | MMCR Displacement | MMCR Displacement   | 20               | bbbl    | 8.33                   |                |               | 8            |                     |
| 0.50 gal/bbl   |                   | <b>MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781)</b> |                  |         |                        |                |               |              |                     |
| Fluid #  | Stage Type        | Fluid Name  | Qty              | Qty UoM | Mixing Density lbm/gal | Yield ft3/sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 6  | Displacement      | Displacement  | 439              | bbbl    | 8.33                   |                |               | 8            |                     |
| Cement Left In Pipe  | Amount            | N/A   |                  |         | Reason                 |                |               | Shoe Joint   |                     |
| Mix Water:   | pH 7              | Mix Water Chloride:   | <300 ppm         |         | Mix Water Temperature: | 76 °F          |               |              |                     |
| Cement Temperature:  | N/A               | Plug Displaced by:  | 8.33 lb/gal F.W. |         | Disp. Temperature:     | 74 °F          |               |              |                     |
| Plug Bumped?   | Yes               | Bump Pressure:  | #### psi         |         | Floats Held?           | Yes            |               |              |                     |
| Cement Returns:  | 64 bbl            | Returns Density:  | N/A              |         | Returns Temperature:   | N/A            |               |              |                     |
| <b>Comment</b> Plug bumped at calculated displacement, final circulating pressure of 2200 PSI, disk ruptured at 2940 psi, 5 bbl wet shoe, floats held,3 bbl back. 64 Bbl of cement to surface. |                   |   |                  |         |                        |                |               |              |                     |

## 2.0 Real-Time Job Summary

### 2.1 Job Event Log

| Type  | Seq. No. | Activity                  | Graph Label               | Date      | Time     | Source | DH Density<br><i>(ppg)</i> | Comb Pump Rate<br><i>(bbl/min)</i> | DS Pump Press<br><i>(psi)</i> | Comments  |
|-------|----------|---------------------------|---------------------------|-----------|----------|--------|----------------------------|------------------------------------|-------------------------------|---|
| Event | 1        | Call Out                  | Call Out                  | 7/29/2019 | 20:00:00 | USER   |                            |                                    |                               | CREW CALLED OUT AT 20:00 7/29/2019, REQUESTED ON LOCATION 01:00 7/30/2019. CREW PICKED UP CEMENT, CHEMICALS (40 GAL D-AIR, 10 GAL MMCR), 100 LBS SUGAR, AND PLUG CONTAINER FROM FORT LUPTON, CO. BULK 660: 11139326/11764054 Bulk 660: 10897853/10867098 CHEM: 12240040/120511659 PUMP ELITE: 11897034/11645460 |
| Event | 2        | Pre-Convoy Safety Meeting | Pre-Convoy Safety Meeting | 7/29/2019 | 21:15:00 | USER   |                            |                                    |                               | DISCUSSED ROUTES, HAZARDS, AND COMMUNICATION WITH CREW  |
| Event | 3        | Crew Leave Yard           | Crew Leave Yard           | 7/29/2019 | 21:30:00 | USER   |                            |                                    |                               | STARTED JOURNEY MANAGEMENT.   |
| Event | 4        | Arrive At Loc             | Arrive At Loc             | 7/29/2019 | 22:30:00 | USER   |                            |                                    |                               | END JOURNEY MANAGEMENT. MEET WITH CO. MAN TO DISCUSS JOB; SURFACE CASING: 9.625" 36# @ 1633', CASING: 5.5" 17# @ 19793', 11' SHOE JOINT, OPEN HOLE 8.75" FROM 1633 TO 7936', 8.5" FROM 7936' -19816', TVD @ 7006', 10.2 PPG WELL FLUID, FRESH WATER DISPLACEMENT.   |
| Event | 5        | Pre-Rig Up Safety Meeting | Pre-Rig Up Safety Meeting | 7/29/2019 | 22:45:00 | USER   |                            |                                    |                               | HAZARD HUNT. DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH LOCATION, RIG UP AND WEATHER.   |
| Event | 6        | Rig-Up Equipment          | Rig-Up Equipment          | 7/29/2019 | 22:50:00 | USER   |                            |                                    |                               | CREW STAGED EQUIPMENT AND RIGGED UP BULK, IRON, AND WATER HOSES TO PERFORM JOB.   |
| Event | 7        | Pre-Job Safety Meeting    | Pre-Job Safety Meeting    | 7/30/2019 | 05:00:00 | USER   | 8.33                       | 0.00                               | 1.00                          | MEETING WITH HALLIBURTON AND RIG PERSONNEL. COMMUNICATED POTENTIAL SAFETY HAZARDS AND JOB DETAILS. AIR LOCK SUB RUPTURED AT 2230 PSI, RIG CIRCULATED 11,000 STROKES AT 12.5 BBL/MIN 1350 PSI.   |
| Event | 8        | Start Job                 | Start Job                 | 7/30/2019 | 05:32:48 | COM4   | 8.33                       | 0.00                               | 3.00                          | START JOB DATA RECORDING.   |
| Event | 9        | Drop Bottom Plug          | Drop Bottom Plug          | 7/30/2019 | 05:33:38 | USER   | 9.22                       | 2.00                               | 316.00                        | PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.  |

|       |    |                           |                           |           |          |      |       |      |         |  |
|-------|----|---------------------------|---------------------------|-----------|----------|------|-------|------|---------|--|
| Event | 10 | Test Lines                | Test Lines                | 7/30/2019 | 05:34:11 | COM4 | 8.81  | 0.00 | 239.00  | PRESSURE TESTED LINES TO 4800 PSI, 500 PSI KICK OUT AT 530 PSI, 5TH GEAR STALL AT 1890 PSI.  |
| Event | 11 | Pump Spacer 1             | Pump Spacer 1             | 7/30/2019 | 05:37:48 | COM4 | 8.88  | 0.00 | 103.00  | PUMP 50 BBLs OF FDP SPACER @ 12.5 LB/GAL, ADDED 10 GAL D-AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.  |
| Event | 12 | Pump Cap Cement           | Pump Cap Cement           | 7/30/2019 | 05:45:16 | COM4 | 13.04 | 7.90 | 859.00  | PUMP 585 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.59 YIELD, 7.92 GAL/SK, 165.7 BBLs, CALCULATED TOC @ SURFACE, DENSITY VERIFIED BY PRESSURIZED MUD SCALES.  |
| Event | 13 | Pump Lead Cement          | Pump Lead Cement          | 7/30/2019 | 06:05:16 | COM4 | 13.27 | 8.60 | 636.00  | PUMP 615 SKS OF GASSTOP @ 13.2 LB/GAL, 1.59 YIELD, 7.69 GAL/SK, 174.1 BBLs, CALCULATED TOL 2231', MIX WATER MIXED WITH 1538 GAL OF LATEX AND 20 GAL D-AIR, DENSITY VERIFIED BY PRESSURIZED MUD SCALES. |
| Event | 14 | Pump Tail Cement          | Pump Tail Cement          | 7/30/2019 | 06:28:24 | COM4 | 12.93 | 8.50 | 640.00  | PUMP 2000 SKS OF ELASTICEM @ 13.2 LB/GAL, 1.59 YIELD, 7.69 GAL/SK, 566.4 BBLs, CALCULATED TOT @ 6100', DENSITY VERIFIED BY PRESSURIZED MUD SCALES.   |
| Event | 15 | Shutdown                  | Shutdown                  | 7/30/2019 | 07:41:31 | COM4 | 14.42 | 0.00 | 92.00   | SHUTDOWN TO DROP DOP PLUG, CLEAN PUMPS/LINES.  |
| Event | 16 | Drop Top Plug             | Drop Top Plug             | 7/30/2019 | 07:50:26 | COM4 | -0.41 | 0.00 | 11.00   | PLUG LEFT PLUG CONTAINER, VERIFIED BY COMPANY MAN.   |
| Event | 17 | Pump Displacement         | Pump Displacement         | 7/30/2019 | 07:50:29 | COM4 | -0.41 | 0.00 | 11.00   | BEGIN CALCULATED DISPLACEMENT OF 459 BBL FRESH WATER, 10 GAL MMCR IN FIRST 20 BBL.   |
| Event | 18 | Cement Returns to Surface | Cement Returns to Surface | 7/30/2019 | 08:39:27 | USER | 8.05  | 7.30 | 2664.00 | CEMENT RETURNED TO SURFACE 395 BBL INTO DISPLACEMENT 64 BBL OF CEMENT TO SURFACE.  |
| Event | 19 | Bump Plug                 | Bump Plug                 | 7/30/2019 | 08:45:59 | COM4 | 8.04  | 0.00 | 2202.00 | PLUG BUMPED AT CALCULATED DISPLACEMENT, FINAL CIRCULATING PRESSURE OF 2200 PSI.  |
| Event | 20 | Other                     | Rupture Plug              | 7/30/2019 | 08:47:23 | USER | 8.06  | 1.80 | 2708.00 | PRESSURED UP TO RUPTURE DISK, DISK RUPTURED AT 2940 PSI.   |
| Event | 21 | Other                     | Wet Shoe                  | 7/30/2019 | 08:48:05 | USER | 8.04  | 4.70 | 2316.00 | PUMP A 5 BBL WET SHOE.   |
| Event | 22 | Check Floats              | Check Floats              | 7/30/2019 | 08:50:01 | USER | 8.02  | 0.00 | 1690.00 | RELEASED PRESSURE BACK TO THE TRUCK, FLOATS HELD, RECEIVED 3 BBL BACK.   |

|       |    |                             |                             |           |          |      |      |      |       |   |
|-------|----|-----------------------------|-----------------------------|-----------|----------|------|------|------|-------|---|
| Event | 23 | End Job                     | End Job                     | 7/30/2019 | 08:50:54 | COM4 | 8.00 | 0.00 | 22.00 | END JOB DATA RECORDING.   |
| Event | 24 | Pre-Rig Down Safety Meeting | Pre-Rig Down Safety Meeting | 7/30/2019 | 13:00:00 | USER |      |      |       | DISCUSSED POSSIBLE HAZARDS ASSOCIATED WITH WEATHER, LOCATION AND RIGGING DOWN IRON AND HOSES. |
| Event | 25 | Rig-Down Completed          | Rig-Down Completed          | 7/30/2019 | 13:10:00 | USER |      |      |       | ALL HALLIBURTON ITEMS WERE STOWED FOR TRAVEL.   |
| Event | 26 | Pre-Convoy Safety Meeting   | Pre-Convoy Safety Meeting   | 7/30/2019 | 13:20:00 | USER |      |      |       | DISCUSSED ROUTES HAZARDS AND COMMUNICATION WITH CREW.   |
| Event | 27 | Crew Leave Location         | Crew Leave Location         | 7/30/2019 | 13:30:00 | USER |      |      |       | THANK YOU FOR USING HALLIBURTON - THOMAS HAAS AND CREW.                                       |

## 3.0 Attachments

### 3.1 AD Fed Library 20W-25-18 Production – Job Chart

