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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Mab 15-8HZ** 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.

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

| | | | | | | | | | | | |
|--|-------------------|---|-----------------------|---|-----------------------------------|----------------------------------|-------------------------------|-----------------------|----------------------|----------------------|----------------------------|
| Sold To #: 300466 | | Ship To #: 0003932092 | | Quote #: 0022570938 | | Sales Order #: 0905641049 | | | | | |
| Customer: ANADARKO PETROLEUM CORP-EBUS | | | | Customer Rep: | | | | | | | |
| Well Name: MAB | | | Well #: 15-8HZ | | API/UWI #: 05-123-49243-00 | | | | | | |
| Field: WATTENBERG | | City (SAP): IONE | | County/Parish: WELD | | State: COLORADO | | | | | |
| Legal Description: SW SE-15-1N-66W-593FSL-2171FEL | | | | | | | | | | | |
| Contractor: | | | | Rig/Platform Name/Num: Akita 522 | | | | | | | |
| Job BOM: 7523 7523 | | | | | | | | | | | |
| Well Type: HORIZONTAL GAS | | | | | | | | | | | |
| Sales Person: HALAMERICA\HX41066 | | | | Srv Supervisor: Nicholas Roles | | | | | | | |
| Job | | | | | | | | | | | |
| Formation Name | | | | | | | | | | | |
| Formation Depth (MD) | | Top | | Bottom | | 18948' | | | | | |
| Form Type | | | | BHST | | | | | | | |
| Job depth MD | | 18937ft | | Job Depth TVD | | 7465' | | | | | |
| Water Depth | | | | Wk Ht Above Floor | | | | | | | |
| Perforation Depth (MD) | | From | | To | | | | | | | |
| Well Data | | | | | | | | | | | |
| Description | New / Used | Size in | ID in | Weight lbm/ft | Thread | Grade | Top MD ft | Bottom MD ft | Top TVD ft | Bottom TVD ft | |
| Casing | | 9.625 | 8.921 | 36 | | J-55 | 0 | 1939 | 0 | 1939 | |
| Casing | | 5.5 | 4.892 | 17 | LTC | HCP110 | 0 | 18937 | 0 | 7465 | |
| Open Hole Section | | | 7.875 | | | | 1939 | 18978 | 1939 | 7465 | |
| Tools and Accessories | | | | | | | | | | | |
| Type | Size in | Qty | Make | Depth ft | | Type | Size in | Qty | Make | | |
| Guide Shoe | 5.5 | | | 18937 | | Top Plug | 5.5 | 1 | WTF | | |
| Float Shoe | 5.5 | | | | | Bottom Plug | 5.5 | 1 | WTF | | |
| Float Collar | 5.5 | | | 18923 | | SSR plug set | 5.5 | | HES | | |
| Insert Float | 5.5 | | | | | Plug Container | 5.5 | 1 | HES | | |
| Stage Tool | 5.5 | | | | | Centralizers | 5.5 | | HES | | |
| Fluid Data | | | | | | | | | | | |
| Stage/Plug #: 1 | | | | | | | | | | | |
| 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 |
| 1 | FDP-C1337-18 | SBM FDP-C1337-18 CEMENT SPACER SYS | | | 80 | bbl | 10.5 | 6.14 | | 6 | |
| 0.75 gal/bbl | | MUSOL(R) A, 5 GAL PAIL (100064220) | | | | | | | | | |
| 91.40 lbm/bbl | | BARITE, BULK (100003681) | | | | | | | | | |

| | | | | | | | | | |
|---|------------------------|--|---------------------|---------|---------------------------|-------------------|------------------------|-----------------|------------------------|
| 0.75 gal/bbl | | DUAL SPACER SURFACTANT B, 5 GAL PAIL (100003665) | | | | | | | |
| | | | | | | | | | |
| 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 | Gasstop B1 | GASSTOP (TM) SYSTEM | 640 | sack | 13.2 | 1.56 | | 8 | 7.61 |
| 0.10 Gal | | D-AIR 3000L, 5 GAL PAIL (101007444) | | | | | | | |
| 0.87 % | | SCR-100 (100003749) | | | | | | | |
| 5.01 Gal | | FRESH WATER | | | | | | | |
| | | | | | | | | | |
| 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 | EconoCem | ECONOCEM (TM) SYSTEM | 1180 | sack | 13.5 | 1.68 | | 8 | 7.99 |
| 0.10 % | | SA-1015, 50 LB SACK (102077046) | | | | | | | |
| 7.99 Gal | | FRESH WATER | | | | | | | |
| 0.29 % | | HR-5, 50 LB SK (100005050) | | | | | | | |
| | | | | | | | | | |
| 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 | Biocide Water and MMCR | Biocide Water and MMCR | 20 | bbl | 8.34 | | | 10 | |
| 0.50 gal/bbl | | MICRO MATRIX CEMENT RETARDER, 5 GAL PAIL (100003781) | | | | | | | |
| | | | | | | | | | |
| 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 | Biocide Water | Biocide Water | 420 | bbl | 8.34 | | | 10 | |
| | | | | | | | | | |
| | | | | | | | | | |
| Cement Left In Pipe | | Amount | 0 ft | | Reason | | | Wet Shoe | |
| Mix Water: | | pH 06 | Mix Water Chloride: | | 0 ppm | | Mix Water Temperature: | | 60 °F °C |
| Cement Temperature: | | 62 °F °C | Plug Displaced by: | | 8.33 lb/gal | | Disp. Temperature: | | 60 °F °C |
| Plug Bumped? | | Yes | Bump Pressure: | | 2850 psi MPa | | Floats Held? | | Yes |
| Cement Returns: | | 0 bbl m3 | Returns Density: | | ## lb/gal kg/m3 | | Returns Temperature: | | ## °F °C |
| Comment Got 0bbls spacer back to pits. Estimated TOT-7513', TOL-1818', TOS-148' | | | | | | | | | |

2.0 Real-Time Job Summary

2.1 Job Event Log

| Type | Seq. No. | Activity | Graph Label | Date | Time | Source | Comments |
|-------|----------|--|--|-----------|----------|--------|---|
| Event | 1 | Call Out | Call Out | 4/24/2019 | 08:00:00 | USER | Called out by Service Coordinator for O/L at 2200 |
| Event | 2 | Pre-Convoy Safety Meeting | Pre-Convoy Safety Meeting | 4/24/2019 | 09:45:00 | USER | Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive. |
| Event | 3 | Depart from Service Center or Other Site | Depart from Service Center or Other Site | 4/24/2019 | 10:00:00 | USER | Journey Management prior to departure |
| Event | 4 | Arrive at Location from Service Center | Arrive at Location from Service Center | 4/24/2019 | 10:30:00 | USER | Upon arrival met with company man to discuss job details and calculations, performed hazard hunt and site assessment. |
| Event | 5 | Pre-Rig Up Safety Meeting | Pre-Rig Up Safety Meeting | 4/24/2019 | 10:45:00 | USER | Discussed rigging up hazards and procedure according to HMS. |
| Event | 6 | Other | Other | 4/24/2019 | 11:00:00 | USER | Water test- PH-6, Chlor-0, Temp-65. Cement temp-70. |
| Event | 7 | Pre-Job Safety Meeting | Pre-Job Safety Meeting | 4/24/2019 | 12:45:00 | USER | Held safety meeting with all job associated personnel to discuss job procedure, hazards and stop work authority. |
| Event | 8 | Start Job | Start Job | 4/24/2019 | 14:32:33 | COM4 | TD-18948', TP-18937' 5.5" 17#, WS-18923', TVD-7465', OH-7.875", SURF-1939' 9.625" 36#, MUD-9.3# |

| | | | | | | | |
|-------|----|------------------|------------------|-----------|----------|------|--|
| Event | 9 | Test Lines | Test Lines | 4/24/2019 | 14:34:48 | COM4 | Pumped 5bbls fresh water to fill lines, shutdown, closed manifold, performed 500psi k/o function test, continued with 5th gear stall at 2100psi, proceeded to bring pressure to 6500psi. Pressure stabilized and held with no leaks. |
| Event | 10 | Pump Spacer 1 | Pump Spacer 1 | 4/24/2019 | 14:55:34 | COM4 | Pumped 80bbls of 10.5# 6.14Y 39.4g/s FDP Spacer with 60g Musol A, 60g Dual Spacer B and 20g D-Air at 6bpm 328psi. |
| Event | 11 | Pump Lead Cement | Pump Lead Cement | 4/24/2019 | 15:08:38 | COM4 | Pumped 640sk or 178bbls of 13.2# 1.56y 7.61g/s Gasstop with 1600g of Latex and 64G of D-Air at 8bpm 850psi. |
| Event | 12 | Drop Bottom Plug | Drop Bottom Plug | 4/24/2019 | 15:09:06 | COM4 | Dropped by HES supervisor, witnessed by company man. |
| Event | 13 | Check Weight | Check Weight | 4/24/2019 | 15:21:51 | COM4 | Weight verified with pressurized mud scales. |
| Event | 14 | Pump Tail Cement | Pump Tail Cement | 4/24/2019 | 15:34:35 | COM4 | Pumped 1180sk or 353bbls of 13.5# 1.68Y 7.99G/S Econocem at 8bpm 805psi. |
| Event | 15 | Check Weight | Check Weight | 4/24/2019 | 15:39:32 | COM4 | Weight verified with pressurized mud scales. |
| Event | 16 | Check Weight | Check Weight | 4/24/2019 | 15:52:15 | COM4 | Weight verified with pressurized mud scales. |
| Event | 17 | Shutdown | Shutdown | 4/24/2019 | 16:26:45 | COM4 | Shutdown, rig blew down iron with air, followed with 5bbls fresh water through pumps and lines. |
| Event | 18 | Drop Top Plug | Drop Top Plug | 4/24/2019 | 16:39:22 | COM4 | Dropped by HES supervisor, witnessed by company man. |

| | | | | | | | |
|-------|----|--|--|-----------|----------|------|--|
| Event | 19 | Pump Displacement | Pump Displacement | 4/24/2019 | 16:39:26 | COM4 | Pumped 440bbls fresh water with 10g MMCR in first 20bbls, followed with 5g biocide throughout at 10bpm. |
| Event | 20 | Bump Plug | Bump Plug | 4/24/2019 | 17:37:40 | COM4 | Slowed down at 410bbls away to 3bpm, Final Circulating Pressure 2350psi, Bump Pressure- 2850psi. Once pressure lined out brought pressure up to 3000psi and held for 15min test. |
| Event | 21 | Pressure Up Well | Pressure Up Well | 4/24/2019 | 17:42:57 | COM4 | Pressured up with fresh water to psi to sheer pins and pumped 3bbls at _bpm _psi, for wet shoe. |
| Event | 22 | Other | Other | 4/24/2019 | 17:46:21 | COM4 | Released pressure and got 3bbls back to truck. |
| Event | 23 | End Job | End Job | 4/24/2019 | 17:47:41 | COM4 | Got 0bbls spacer back to pits. Estimated TOT-7513', TOL-1818', TOS-148' |
| Event | 24 | Pre-Rig Down Safety Meeting | Pre-Rig Down Safety Meeting | 4/24/2019 | 17:50:00 | USER | Discussed rigging down hazards and procedure according to HMS with all HES personnel |
| Event | 25 | Safety Meeting - Departing Location | Safety Meeting - Departing Location | 4/24/2019 | 18:48:38 | USER | Held meeting with all personnel in convoy to discuss directions and hazards associated with drive, all fit to drive. |
| Event | 26 | Depart Location for Service Center or Other Site | Depart Location for Service Center or Other Site | 4/24/2019 | 19:00:00 | USER | Pre journey management prior to departure. |

3.0 Attachments

3.1 Job Chart

Custom Results

