

HALLIBURTON

iCem[®] Service

PDC ENERGY-EBUS

Date: Monday, December 31, 2018

Thistle Down 31H-202 Production

Job Date: Wednesday, December 26, 2018

Sincerely,

Bryce Hinsch

Legal Notice

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1.0 Cementing Job Summary

1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **Thistle Down 31H-202** 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 10 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

| | | | |
|--|--------------------|-----------------------------------|----------------------------|
| Sold To #: 304535 | Ship To #: 3819577 | Quote #: 0022519817 | Sales Order #: 0905369680 |
| Customer: PDC ENERGY-EBUS | | Customer Rep: Chris McMullen | |
| Well Name: THISTLE DOWN | | Well #: 31H-202 | API/UWI #: 05-123-45254-00 |
| Field: WATTENBERG | City (SAP): KERSEY | County/Parish: WELD | State: COLORADO |
| Legal Description: NE SW-31-5N-64W-1459FSL-1357FWL | | | |
| Contractor: ENSIGN DRLG | | Rig/Platform Name/Num: ENSIGN 152 | |
| Job BOM: 7523 7523 | | | |
| Well Type: HORIZONTAL OIL | | | |
| Sales Person: HALAMERICA/HX38199 | | Srvc Supervisor: Luke Kosakewich | |

Job

| | | | |
|------------------------|---------|-------------------|--------|
| Formation Name | | | |
| Formation Depth (MD) | Top | | Bottom |
| Form Type | BHST | | |
| Job depth MD | 12854ft | Job Depth TVD | 6845ft |
| 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 | | | 0 | 2518 | 0 | 2518 |
| Casing | | 5.5 | 4.778 | 20 | | | 0 | 12848 | 0 | 6845 |
| Open Hole Section | | | 8.5 | | | | 2518 | 6373 | 2518 | 6373 |
| Open Hole Section | | | 8.5 | | | | 6373 | 12854 | 6373 | 6845 |

Tools and Accessories

| Type | Size in | Qty | Make | Depth ft | Type | Size in | Qty | Make |
|--------------|---------|-----|-------------|----------|----------------|---------|-----|-------------|
| Guide Shoe | | | | | Top Plug | 5.5 | 1 | Weatherford |
| Float Shoe | 5.5 | 1 | Weatherford | 12848 | Bottom Plug | 5.5 | 1 | Weatherford |
| Wet Shoe Sub | 5.5 | 1 | Weatherford | 12814 | SSR plug set | | | |
| Insert Float | | | | | Plug Container | 5.5 | 1 | HES |
| Stage Tool | | | | | Centralizers | 5.5 | 178 | |

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 | 12.5 lb/gal Tuned Spacer III | Tuned Spacer III | 150 | bbl | 12.5 | 2.72 | | 5 | | |

| 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 | 980 | sack | 13.2 | 1.55 | | 8 | 7.73 |
| 3 | ElastiCem | ELASTICEM (TM) SYSTEM | 875 | sack | 14.4 | 1.7 | | 7 | 7.3 |
| 4 | MMCR Displacement | MMCR Displacement | 20 | bbl | 8.34 | | | 8 | |
| 5 | Displacement fluid | Fresh Water W Packer Fluid | 264.2 | bbl | 8.34 | | | 8 | |
| Cement Left In Pipe | | | | | | | | | |
| Amount | | ft | | Reason | | | | Wet Shoe | |
| Mix Water: pH 7 | | Mix Water Chloride: 0 ppm | | | | Mix Water Temperature: 59 °F | | | |
| Plug Bumped? Yes | | Bump Pressure: 2,600 psi | | | | Floats Held? Yes | | | |
| <p>Comment Bumped the plug 500 psi. over 2,500 psi. at 3 bpm. Final pressure was 3,100 psi. Held for a minute. Pressure held.</p> <p>Pressured up the well to 4,027 psi. to shift the sleeve. Pumped 5 bbls. of fresh water at 4 bpm. for a wet shoe. Bled off pressure to check floats. Floats held. Got 2 bbls. of fluid back to the truck. Circulated 150 bbls. of spacer and 10 bbls of cement to surface. Estimated TOT at 5,947'</p> | | | | | | | | | |

2.0 Real-Time Job Summary

2.1 Job Event Log

| Type | Seq. No. | Activity | Graph Label | Date | Time | Source | DS Pump Press <i>(psi)</i> | Comb Pump Rate <i>(bbl/min)</i> | DH Density <i>(ppg)</i> | Pump Stg Tot <i>(bbl)</i> | Comments |
|-------|----------|--|--|------------|----------|--------|-------------------------------|------------------------------------|----------------------------|------------------------------|---|
| Event | 1 | Call Out | Call Out | 12/25/2018 | 08:15:00 | USER | | | | | Crew was called out at 08:15 for a ready to pump cement job time of 15:00. |
| Event | 2 | Depart Yard Safety Meeting | Depart Yard Safety Meeting | 12/25/2018 | 13:15:00 | USER | | | | | Crew held a pre journey safety meeting and JSA. |
| Event | 3 | Depart Shop for Location | Depart Shop for Location | 12/25/2018 | 13:30:00 | USER | | | | | Started journey management with dispatch and left location. |
| Event | 4 | Arrive at Location from Service Center | Arrive at Location from Service Center | 12/25/2018 | 14:15:00 | USER | | | | | Crew performed a site assessment, safety meeting and hazard hunt on location. Checked in with the customer and discussed the job procedures, rig up and well bore schematics. The rig was running casing. |
| Event | 5 | Other | Other | 12/25/2018 | 14:20:00 | USER | | | | | Well bore: MD: 12,854', TP: 5.5" 20# set at 12,848', FC: 12,814', WSS: 12,914, TVD: 6,845', SC: 9.625" 36 # set at 2,518', OH: 8.5". Mud # 10.5 ppg. Water test: PH: 7, Chlorides: 0, Temp: 59 Degrees. |
| Event | 6 | Pre-Rig Up Safety Meeting | Pre-Rig Up Safety Meeting | 12/25/2018 | 14:30:00 | USER | | | | | Held a pre rig up safety meeting with my crew. |
| Event | 7 | Rig-Up Equipment | Rig-Up Equipment | 12/25/2018 | 14:45:00 | USER | | | | | The crew rigged up all lines, hoses and equipment for the job. |

| | | | | | | | | | | | |
|-------|----|-------------------|-------------------|------------|----------|------|--------|------|-------|--------|--|
| Event | 8 | Safety Meeting | Safety Meeting | 12/25/2018 | 19:30:00 | USER | -1.00 | 0.00 | 8.46 | 6.10 | Halliburton cement crew held a pre cement job safety meeting and JSA with third party personnel and rig crew. |
| Event | 9 | Start Job | Start Job | 12/25/2018 | 19:52:49 | COM5 | -4.00 | 0.00 | 8.46 | 6.10 | Pumped 3 bbls. of fresh water at 3 bpm. to fill lines and establish circulation. |
| Event | 10 | Test Lines | Test Lines | 12/25/2018 | 19:57:20 | COM5 | 78.00 | 0.00 | 8.63 | 8.60 | Pressure tested lines to 6,500 psi. with a 500 psi. electronic kick out test. |
| Event | 11 | Drop Bottom Plug | Drop Bottom Plug | 12/25/2018 | 20:10:00 | COM5 | 602.00 | 3.10 | 12.56 | 9.70 | Halliburton dropped the bottom plug which, was witnessed by the customer. |
| Event | 12 | Pump Spacer 1 | Pump Spacer 1 | 12/25/2018 | 20:10:12 | COM5 | 441.00 | 3.10 | 12.81 | 10.30 | Pumped 150 bbls. of Tuned Spacer III mixed at 12.5 ppg., Yield: 2.72 ft3/sks, 16.8 gal/sks. Density was verified by pressurized scales. |
| Event | 13 | Pump Lead Cement | Pump Lead Cement | 12/25/2018 | 20:34:14 | COM5 | 175.00 | 4.10 | 12.67 | 126.60 | Pumped 271 bbls. (980 sks.) of Gasstop B1 mixed at 13.2 ppg., Yield: 1.55 ft3/sks, 7.73 gal/sks. Density was verified by pressurized scales. |
| Event | 14 | Pump Tail Cement | Pump Tail Cement | 12/25/2018 | 21:10:40 | COM5 | 244.00 | 4.40 | 13.27 | 0.00 | Pumped 265 bbls. (875 sks.) of Elasticem mixed at 14.4 ppg., Yield: 1.7 ft3/sks, 7.3 gal/sks. Density was verified by pressurized scales. |
| Event | 15 | Shutdown | Shutdown | 12/25/2018 | 21:58:53 | COM5 | 27.00 | 0.00 | 0.31 | 282.80 | Washed and blew down pumps and iron until clean. |
| Event | 16 | Drop Top Plug | Drop Top Plug | 12/25/2018 | 22:08:17 | COM5 | 8.00 | 0.00 | 8.19 | 292.00 | Halliburton loaded and dropped the top plug, which was witnessed by the customer. |
| Event | 17 | Pump Displacement | Pump Displacement | 12/25/2018 | 22:08:21 | COM5 | 7.00 | 0.00 | 8.19 | 292.00 | Pumped 284.2 bbls. of |

| | | | | | | | | | | | |
|-------|----|--|--|------------|----------|------|---------|------|------|--------|--|
| | | | | 8 | | | | | | | fresh water with MMCR in the first 20 bbls. Packer fluid was added throughout the rest of displacement. |
| Event | 18 | Bump Plug | Bump Plug | 12/25/2018 | 22:47:49 | COM5 | 2907.00 | 0.00 | 8.27 | 277.70 | Bumped the plug 500 psi. over 2,500 psi. at 3 bpm. Final pressure was 3,100 psi. Held for a minute. Pressure held. |
| Event | 19 | Pressure Up | Pressure Up | 12/25/2018 | 22:51:57 | USER | 3872.00 | 1.90 | 8.29 | 278.40 | Pressured up the well to 4,027 psi. to shift the sleeve. Pumped 5 bbls. of fresh water at 4 bpm. for a wet shoe. Circulated 150 bbls. of spacer and 10 bbls of cement to surface. Estimated TOT at 5,947'. |
| Event | 20 | Check Floats | Check Floats | 12/25/2018 | 22:54:44 | USER | 2061.00 | 0.00 | 8.24 | 283.50 | Bled off pressure to check floats. Floats held. Got 2 bbls. of fluid back to the truck. |
| Event | 21 | Shutdown | Shutdown | 12/25/2018 | 22:57:19 | COM5 | 10.00 | 0.00 | 8.19 | 283.50 | Shutdown. |
| Event | 22 | End Job | End Job | 12/25/2018 | 23:03:11 | COM5 | | | | | Washed and blew down all pumps and lines until clean and dry. |
| Event | 23 | Pre-Rig Down Safety Meeting | Pre-Rig Down Safety Meeting | 12/25/2018 | 23:10:00 | USER | 6.00 | 0.00 | 8.15 | 283.50 | Halliburton cement crew held a pre rig down safety meeting and JSA. |
| Event | 24 | Rig-Down Equipment | Rig-Down Equipment | 12/25/2018 | 23:20:00 | USER | 1.00 | 0.00 | 8.15 | 283.50 | Rigged down all lines, hoses and equipment. |
| Event | 25 | Safety Meeting - Departing Location | Safety Meeting - Departing Location | 12/26/2018 | 00:50:00 | USER | | | | | Held a pre journey safety meeting with crew. |
| Event | 26 | Depart Location for Service Center or Other Site | Depart Location for Service Center or Other Site | 12/26/2018 | 01:00:00 | USER | | | | | Started journey management with dispatch and left location. |