

HALLIBURTON

iCem[®] Service

ENSIGN UNITED STATES DRILLING

For:

Date: Tuesday, October 14, 2014

SRC Kiehn 22-4CHZ

Intermediate

Sincerely,
Devin Birchell

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1.1 Executive Summary

Halliburton appreciates the opportunity to perform the cementing services on the **SRC Kiehn 22-4CHZ** cement **Intermediate** 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]

1.2 Cementing Job Summary

| | | | | | | | | | | |
|---|-------------------|---------------------------------|------------------------|--|------------------------------------|-----------------------------------|------------------------|------------------------|----------------------|-------------------------|
| Sold To #: 301256 | | Ship To #: 3542582 | | Quote #: | | Sales Order #: 0901740946 | | | | |
| Customer: ENSIGN UNITED STATES DRILLING | | | | | Customer Rep: Brandon Young | | | | | |
| Well Name: SRC KIEHN | | | Well #: 22-4CHZ | | | API/UWI #: 05-123-39711-00 | | | | |
| Field: WATTENBERG | | City (SAP): JOHNSTOWN | | County/Parish: WELD | | | State: COLORADO | | | |
| Legal Description: SW SE-4-4N-68W-201FSL-1873FEL | | | | | | | | | | |
| Contractor: | | | | Rig/Platform Name/Num: Ensign 131 | | | | | | |
| Job BOM: 7522 | | | | | | | | | | |
| Well Type: HORIZONTAL OIL | | | | | | | | | | |
| Sales Person: HALAMERICA\HB21661 | | | | Srvc Supervisor: Devin Birchell | | | | | | |
| Job | | | | | | | | | | |
| Formation Name | | | | | | | | | | |
| Formation Depth (MD) | | Top | | | Bottom | | | | | |
| Form Type | | | | | BHST | | | | | |
| Job depth MD | | 7641ft | | | Job Depth TVD | | | | | |
| Water Depth | | | | | Wk Ht Above Floor | | | | | |
| Perforation Depth (MD) | | | | | To | | | | | |
| Well Data | | | | | | | | | | |
| | 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 | 1289 | 0 | 1289 |
| Casing | | 7 | 6.276 | 26 | BTC | | 0 | 7621 | 0 | 7102 |
| Open Hole Section | | | 8.75 | | | | 1289 | 7641 | 1289 | 7950 |
| Tools and Accessories | | | | | | | | | | |
| Type | Size in | Qty | Make | Depth ft | | Type | Size in | Qty | Make | |
| Guide Shoe | 7 | 1 | | | | Top Plug | 7 | 1 | HES | |
| Float Shoe | 7 | 1 | | 7621 | | Bottom Plug | 7 | | HES | |
| Float Collar | 7 | 1 | | 7577 | | SSR plug set | 7 | | HES | |
| Insert Float | 7 | 1 | | | | Plug Container | 7 | 1 | HES | |
| | 7 | 1 | | | | Centralizers | 7 | 1 | HES | |
| Miscellaneous Materials | | | | | | | | | | |
| Gelling Agt | | Conc | | Surfactant | | Conc | | Acid Type | Qty | |
| Treatment Fld | | Conc | | | | Conc | | Sand Type | | |
| Fluid Data | | | | | | | | | | |
| Stage/Plug #: 1 | | | | | | | | | | |

| Fluid # | Stage Type | Fluid Name | Qty | Qty UoM | Mixing Density lbm/gal | Yield ft ³ /sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
|----------------|-----------------|-------------------------|-------|---------|---------------------------|--------------------------------|------------------|-----------------|---------------------------|
| 1 | CLEANSPACER III | CLEANSPACER III | 40 | bbl | 11.5 | 2.63 | 32.2 | 4 | |
| 35.10 gal/bbl | | | | | | | | | |
| Fluid # | Stage Type | Fluid Name | Qty | Qty UoM | Mixing Density lbm/gal | Yield ft ³ /sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 2 | EconoCem B2 | ECONOCEM (TM) SYSTEM | 505 | sack | 12.5 | 1.89 | | 6 | 10.23 |
| 10.23 Gal | | | | | | | | | |
| Fluid # | Stage Type | Fluid Name | Qty | Qty UoM | Mixing Density lbm/gal | Yield ft ³ /sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 3 | FracCem | FRACCEN (TM) SYSTEM | 220 | sack | 13.5 | 1.74 | | 6 | 8.27 |
| 8.27 Gal | | | | | | | | | |
| 3 lbm | | D, 50 LB SK (100012223) | | | | | | | |
| Fluid # | Stage Type | Fluid Name | Qty | Qty UoM | Mixing Density lbm/gal | Yield ft ³ /sack | Mix Fluid Gal | Rate bbl/min | Total Mix Fluid Gal |
| 4 | Displacement | Displacement | 281 | bbl | 9 | | | | |
| | | Amount | 46 ft | | | | | | |
| Comment | | | | | | | | | |

1.4 Planned Pumping Schedule

1.3 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) |
|-----------------------------|-----------|------------------|-------------------|----------------------------------|--------------------------|-----------------|------------------------|-------------------|
| Synergy WBM ppg10.5 | 1 | 10.50 | 5.00 | | | 0.00 | | 0.00 |
| CSIII | 2 | 11.50 | 5.00 | | | 40.00 | | 8.00 |
| Synergy 12.5ppg EconoCem | 3 | 12.50 | 5.00 | 1.8900 | 10.250 | 169.99 | 505.00 | 34.00 |
| Synerg yIntermediate Tail | 4 | 13.50 | 5.00 | 1.7500 | 8.290 | 68.57 | 220.00 | 13.71 |
| Top Plug/Start Displacement | | | | | | | | |
| Synergy WBM ppg10.5 | 5 | 10.50 | 5.00 | | | 290.68 | | 58.14 |
| Total: | | | | | | 569.25 | | 113.85 |

**Pump schedule may include additional rows for displacement if "Automatic Rate Adjustment" was enabled and ECDs approached the fracture gradient.*

1.5 Water Field Test

| 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 | 0 | ppm | 1500 ppm | Will greatly decrease the strength of cement |
| Total Hardness | 0 | ppm | 500 mg/L | High concentrations will accelerate the set of the cement |
| Calcium | 0 | ppm | 500 ppm | High concentrations will accelerate the set of the cement |
| Total Alkalinity | 0 | ppm | 1000 ppm | Cement is greatly retarded to the point where it may not set up at all (typically occurs @ pH ≥ 8.3). |
| Bicarbonates | 0 | ppm | 1000 ppm | Cement is greatly retarded to the point where it may not set up at all |
| Potassium | 0 | 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 | 0 | ppm | 300 ppm | High concentrations will accelerate the set of the cement |
| Temperature | 71 | °F | 50-80 °F | High temps will accelerate; Low temps may risk freezing in cold weather |

Submitted Respectfully by: _____

1.6 Job Event Log

| Type | Seq. No. | Activity | Graph Label | Date | Time | Source | Truck 1 Pr (psi) | Truck 1 Dens (ppg) | Truck 1 Slry Rt (bbl/min) | Comment |
|-------|----------|--|--|------------|----------|--------|---------------------|-----------------------|---------------------------------|---|
| Event | 1 | Call Out | Call Out | 10/14/2014 | 09:00:12 | USER | | | | called cement crew out for ensign src kieh 22-4chz intermediate |
| Event | 2 | Pre-Convoy Safety Meeting | Pre-Convoy Safety Meeting | 10/14/2014 | 12:20:12 | USER | | | | discussed route weather other traffic following distance |
| Event | 3 | Depart from Service Center or Other Site | Depart from Service Center or Other Site | 10/14/2014 | 12:30:25 | USER | | | | called journey and departed for location |
| Event | 4 | Arrive At Loc | Arrive At Loc | 10/14/2014 | 13:30:25 | USER | | | | ended journey and talk with company rep on job procedures |
| Event | 5 | Wait on Customer or Customer Sub-Contractor Equip - Start Time | Wait on Customer or Customer Sub-Contractor Equip - Start Time | 10/14/2014 | 14:30:25 | USER | | | | wait on rig to finish running casing and on lab results for lead cement |
| Event | 6 | Pre-Rig Up Safety Meeting | Pre-Rig Up Safety Meeting | 10/14/2014 | 16:00:12 | USER | | | | discussed spotting equipment swing path hand placement |
| Event | 7 | Rig-Up Equipment | Rig-Up Equipment | 10/14/2014 | 16:10:24 | USER | | | | spot pump and rig up water hoses and iron to red zone |
| Event | 8 | Pre-Job Safety Meeting | Pre-Job Safety Meeting | 10/14/2014 | 18:05:12 | USER | 23.00 | 1.49 | 0.00 | descussed job procedures with rig and cement crews |
| Event | 9 | Rig-Up Completed | Rig-Up Completed | 10/14/2014 | 18:50:12 | USER | 34.00 | 10.25 | 0.00 | rigged cement head to casing and tied in stand pipe |
| Event | 10 | Prime Pumps | Prime Pumps | 10/14/2014 | 18:56:12 | USER | 36.00 | 10.27 | 0.00 | primed pump and lines ready for pressure test |
| Event | 11 | Test Lines | Test Lines | 10/14/2014 | 19:00:26 | COM1 | 105.00 | 10.35 | 0.00 | test pump and lines to 4640 spi |
| Event | 12 | Pump Spacer 1 | Pump Spacer 1 | 10/14/2014 | 19:07:50 | COM1 | 51.00 | 10.33 | 0.00 | pump 40 bbls clean spacer @ 11.5 ppg |
| Event | 13 | Pump Lead Cement | Pump Lead Cement | 10/14/2014 | 19:29:30 | COM1 | 77.00 | 11.24 | 0.00 | pump 170 bbls (505 sks) 12.5 ppg lead y: 1.89 ft3/sk |

| | | | | | | | | | | |
|-------|----|-----------------------------|-----------------------------|------------|----------|------|---------|-------|------|---|
| | | | | | | | | | | w:10.23 gal/sk |
| Event | 14 | Pump Tail Cement | Pump Tail Cement | 10/14/2014 | 20:04:32 | COM1 | 167.00 | 12.86 | 5.60 | pump 68 bbls (220 sks) 13.5 ppg tail y: 1.74 ft3/sk w:8.27 gal/sk |
| Event | 15 | Drop Top Plug | Drop Top Plug | 10/14/2014 | 20:28:18 | USER | 48.00 | 12.66 | 0.00 | dripped top plug with company rep witnessing |
| Event | 16 | Clean Lines | Clean Lines | 10/14/2014 | 20:29:45 | USER | 49.00 | 12.59 | 0.00 | cleaned pump and lines on plug |
| Event | 17 | Pump Displacement | Pump Displacement | 10/14/2014 | 20:31:13 | COM1 | 59.00 | 13.14 | 0.50 | pump 20 bbls wash up 241 bbls mud 20 fresh water |
| Event | 18 | Displ Reached Cmnt | Displ Reached Cmnt | 10/14/2014 | 20:43:07 | USER | 159.00 | 10.57 | 6.60 | displacement reached cement with 106 bbls away |
| Event | 19 | Spacer Returns to Surface | Spacer Returns to Surface | 10/14/2014 | 21:16:12 | USER | 1378.00 | 10.73 | 5.50 | with 224 bbls displacement away spacer returns to surface |
| Event | 20 | Cement Returns to Surface | Cement Returns to Surface | 10/14/2014 | 21:23:12 | USER | 1352.00 | 8.65 | 4.00 | with 266 bbls displacement away cement returns to surface (14 bbls) |
| Event | 21 | Bump Plug | Bump Plug | 10/14/2014 | 21:25:45 | USER | 1312.00 | 8.61 | 3.30 | bumped plug with 1495 psi and took pressure to 2105 psi |
| Event | 22 | Check Floats | Check Floats | 10/14/2014 | 21:35:56 | USER | 1996.00 | 8.79 | 0.00 | checked floats, floats held with 3 bbls back to truck |
| Event | 23 | Pressure Up | Pressure Up | 10/14/2014 | 21:41:40 | USER | 1036.00 | 8.69 | 0.00 | pressured up casing to 1000 psi and hold for 15 minutes |
| Event | 24 | Pre-Rig Down Safety Meeting | Pre-Rig Down Safety Meeting | 10/14/2014 | 21:49:25 | USER | 1097.00 | 8.72 | 0.00 | discussed hand placement swing path pinch points team lifting |
| Event | 25 | Release Casing Pressure | Release Casing Pressure | 10/14/2014 | 21:58:56 | USER | 327.00 | 8.67 | 0.00 | released all pressure ready for rig down |
| Event | 26 | Rig-Down Equipment | Rig-Down Equipment | 10/14/2014 | 22:00:16 | USER | 67.00 | 8.65 | 0.00 | rig down water, bulk, and mud hoses rigged down all iron |
| Event | 27 | Rig-Down Completed | Rig-Down Completed | 10/14/2014 | 22:30:12 | USER | | | | walk around to ensure everything is properly wut away |
| Event | 28 | Pre-Convoy Safety | Pre-Convoy Safety | 10/14/2014 | 22:35:01 | USER | | | | discussed route weather |

| | | | | | | | |
|-------|---------|--|--|------------|----------|------|---|
| | Meeting | Meeting | | | | | other traffic fallowing distance |
| Event | 29 | Depart Location for Service Center or Other Site | Depart Location for Service Center or Other Site | 10/14/2014 | 22:40:12 | USER | thank you for using halliburton energy services |

2.0 Custom Graphs

2.1 Custom Graph



