



# Bison Oil Well Cementing Single Cement Surface Pipe

Date: 7/22/2014  
 Invoice #: 55004  
 API#: \_\_\_\_\_  
 Foreman: monte

Customer: Noble Energy Inc.  
 Well Name: rainbow lc28-74hna

County: Weld  
 State: Colorado  
 Sec: 29  
 Twp: 9n  
 Range: 59w  
 Consultant: michal  
 Rig Name & Number: h&p 273  
 Distance To Location: 65.6  
 Units On Location: 4031-3104 4020-3212  
 Time Requested: 5:30am  
 Time Arrived On Location: 4:15  
 Time Left Location: 8/15

| WELL DATA                        | Cement Data                    |
|----------------------------------|--------------------------------|
| Casing Size OD (in) : 9.625      | Cement Name: BFN III           |
| Casing Weight (lb) : 36.00       | Cement Density (lb/gal) : 15.2 |
| Casing Depth (ft) : 568          | Cement Yield (cuft) : 1.27     |
| Total Depth (ft) : 622           | Gallons Per Sack: 5.89         |
| Open Hole Diameter (in.) : 13.75 | % Excess: 55%                  |
| Conductor Length (ft) : 124      | Displacement Fluid lb/gal: 8.3 |
| Conductor ID : 15.6              | BBL to Pit:                    |
| Shoe Joint Length (ft) : 44      | Fluid Ahead (bbls): 40.0       |
| Landing Joint (ft) : 30          | H2O Wash Up (bbls): 20.0       |
| Max Rate: 5                      | Spacer Ahead Makeup            |
| Max Pressure: 2000               | 10 fresh 10 dye 20 fresh       |

| Calculated Results   | Pressure of cement in annulus  |
|--|--|
| <b>cuft of Shoe</b> 19.10 cuft<br>(Casing ID Squared) X (.005454) X (Shoe Joint ft)  | <b>Displacement:</b> 42.83 bbls<br>(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)                          |
| <b>cuft of Conductor</b> 101.93 cuft<br>(Conductor Width Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft) | <b>Hydrostatic Pressure:</b> 448.49 PSI  |
| <b>cuft of Casing</b> 361.91 cuft<br>(Open Hole Squared) - (Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length) | <b>Pressure of the fluids inside casing</b><br><b>Displacement:</b> 225.94 psi<br><b>Shoe Joint:</b> 34.74 psi<br><b>Total:</b> 260.68 psi |
| <b>Total Slurry Volume</b> 482.94 cuft<br>(cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)                                | <b>Differential Pressure:</b> 187.81 psi   |
| <b>bbls of Slurry</b> 86.01 bbls<br>(Total Slurry Volume) X (.1781)  | <b>Collapse PSI:</b> 2020.00 psi<br><b>Burst PSI:</b> 3520.00 psi  |
| <b>Sacks Needed</b> 380 sk<br>(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)   | <b>Total Water Needed:</b> 156.16 bbls   |
| <b>Mix Water</b> 53.33 bbls<br>(Sacks Needed) X (Gallons Per Sack) ÷ 42  |  |

x   
 Authorization To Proceed

Customers hereby acknowledges and specifically agrees to the terms and condition on this work order, including, without limitation, the provisions on this work order.



**Bison Oil Well Cementing  
Single Cement Surface Pipe**

Customer: Noble Energy Inc.  
Well Name: rainbow lc28-74hna

INVOICE # 55004  
LOCATION Weld  
FOREMAN monte  
Date 7/22/2014

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**DESCRIPTION OF JOB EVENTS**

|                | Time  | Displace 1 |      |     | Displace 2 |      |     | Displace 3 |      |     | Displace 4 |      |     | Displace 5 |      |     |
|----------------|-------|------------|------|-----|------------|------|-----|------------|------|-----|------------|------|-----|------------|------|-----|
|                |       | BBLS       | Time | PSI | BBLS       | Time | PSI | BBLS       | Time | PSI | BBLS       | Time | PSI | BBLS       | Time | PSI |
| Safety Meeting | 6:20  |            |      |     |            |      |     |            |      |     |            |      |     |            |      |     |
| MIRU           | 5:40  |            |      |     |            |      |     |            |      |     |            |      |     |            |      |     |
| CIRCULATE      | 6:53  | 0          | 7:21 | 0   | 0          |      |     | 0          |      |     | 0          |      |     | 0          |      |     |
| Drop Plug      |       | 10         | 7:24 | 170 | 10         |      |     | 10         |      |     | 10         |      |     | 10         |      |     |
|                | 7:21  |            |      |     |            |      |     |            |      |     |            |      |     |            |      |     |
|                |       | 20         | 7:26 | 220 | 20         |      |     | 20         |      |     | 20         |      |     | 20         |      |     |
|                |       | 30         | 7:28 | 270 | 30         |      |     | 30         |      |     | 30         |      |     | 30         |      |     |
|                |       | 40         | 7:30 | 230 | 40         |      |     | 40         |      |     | 40         |      |     | 40         |      |     |
| M & P          |       | 50         | 7:33 | 470 | 50         |      |     | 50         |      |     | 50         |      |     | 50         |      |     |
| Time           | Sacks | 60         |      |     | 60         |      |     | 60         |      |     | 60         |      |     | 60         |      |     |
| 7:00-7:17      | 380   | 70         |      |     | 70         |      |     | 70         |      |     | 70         |      |     | 70         |      |     |
|                |       | 80         |      |     | 80         |      |     | 80         |      |     | 80         |      |     | 80         |      |     |
|                |       | 90         |      |     | 90         |      |     | 90         |      |     | 90         |      |     | 90         |      |     |
|                |       | 100        |      |     | 100        |      |     | 100        |      |     | 100        |      |     | 100        |      |     |
|                |       | 110        |      |     | 110        |      |     | 110        |      |     | 110        |      |     | 110        |      |     |
| % Excess       | 55%   | 120        |      |     | 120        |      |     | 120        |      |     | 120        |      |     | 120        |      |     |
| Mixed bbls     | 53.33 | 130        |      |     | 130        |      |     | 130        |      |     | 130        |      |     | 130        |      |     |
| Total Sacks    | 380   | 140        |      |     | 140        |      |     | 140        |      |     | 140        |      |     | 140        |      |     |
| bbl Returns    | 17    | 150        |      |     | 150        |      |     | 150        |      |     | 150        |      |     | 150        |      |     |
| Water Temp     | 76.5  |            |      |     |            |      |     |            |      |     |            |      |     |            |      |     |

Notes:

Safety Meeting, miru, pressure test per company manm circulate 40 bbls ahead with dye in 2nd 10, mix and pump 380 sks cement at 55% excess, drop plug and displ  
bumped at 7:33 am, at 470 psi, 17 bbls to pit

X [Signature]  
Work Performed

X COMAN  
Title

X 7-22-14  
Date