

# Bison Oil Well Cementing Tail & Lead

Date: 4/12/2019

Invoice # 200433

API# \_\_\_\_\_

Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.

Well Name: vogler state d21-790

County: Weld

State: Colorado

Sec: 8

Twp: 5N

Range: 62W

Consultant: tommy

Rig Name & Number: H&P 517

Distance To Location: 34

Units On Location: 4047/4032

Time Requested: 1000 pm

Time Arrived On Location: 800 pm

Time Left Location: 3:30pm

| WELL DATA  | Cement Data  |
|--|--|
| <p>Casing Size (in) : <u>9.625</u><br/>           Casing Weight (lb) : <u>36</u><br/>           Casing Depth (ft.) : <u>1,915</u><br/>           Total Depth (ft) : <u>1960</u><br/>           Open Hole Diameter (in) : <u>13.50</u><br/>           Conductor Length (ft) : <u>110</u><br/>           Conductor ID : <u>15.6</u><br/>           Shoe Joint Length (ft) : <u>40</u><br/>           Landing Joint (ft) : <u>5</u></p> <p>Sacks of Tail Requested <u>100</u><br/>           HOC Tail (ft): <u>0</u></p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: <u>8</u><br/>           Max Pressure: <u>2500</u></p> | <p><b>Lead</b></p> <p>Cement Name: <u>BFN III</u><br/>           Cement Density (lb/gal) : <u>13.5</u><br/>           Cement Yield (cuft) : <u>1.68</u><br/>           Gallons Per Sack <u>8.90</u><br/>           % Excess <u>15%</u></p> <p><b>Tail Type III</b></p> <p>Cement Name:<br/>           Cement Density (lb/gal) : <u>15.2</u><br/>           Cement Yield (cuft) : <u>1.27</u><br/>           Gallons Per Sack: <u>5.89</u><br/>           % Excess: <u>0%</u></p> <p>Fluid Ahead (bbls) <u>30.0</u><br/>           H2O Wash Up (bbls) <u>20.0</u></p> <p><b>Spacer Ahead Makeup</b><br/> <u>30 BBL ahead with Die in 2nd 10</u></p> |

| Lead Calculated Results   | Tail Calculated Results   |
|---|---|
| <b>HOC of Lead</b> <u>1575.67 ft</u>  | <b>Tail Cement Volume In Ann</b> <u>127.00 cuft</u>                                 |
| Casing Depth - HOC Tail   | (HOC Tail) X (OH Ann)   |
| <b>Volume of Lead Cement</b> <u>770.08 cuft</u>                                       | <b>Total Volume of Tail Cement</b> <u>109.64 Cuft</u>                               |
| HOC of Lead X Open Hole Ann   | (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)                                |
| <b>Volume of Conductor</b> <u>90.42 cuft</u>  | <b>bbls of Tail Cement</b> <u>22.62 bbls</u>  |
| (Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft) | (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess) |
| <b>Total Volume of Lead Cement</b> <u>860.50 cuft</u>                                 | <b>HOC Tail</b> <u>224.33 ft</u>  |
| (cuft of Lead Cement) + (Cuft of Conductor)   | (Tail Cement Volume) ÷ (OH Ann)   |
| <b>bbls of Lead Cement</b> <u>176.24 bbls</u>   | <b>Sacks of Tail Cement</b> <u>100.00 sk</u>  |
| (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)                              | (Total Volume of Tail Cement) ÷ (Cement Yield)                                      |
| <b>Sacks of Lead Cement</b> <u>589.03 sk</u>  | <b>bbls of Tail Mix Water</b> <u>14.02 bbls</u>                                     |
| (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)                            | (Sacks of Tail Cement X Gallons Per Sack) ÷ 42                                      |
| <b>bbls of Lead Mix Water</b> <u>124.82 bbls</u>                                      | <b>Pressure of cement in annulus</b>  |
| (Sacks Needed) X (Gallons Per Sack) ÷ 42  | <b>Hydrostatic Pressure</b> <u>585.23 PSI</u>                                       |
| <b>Displacement</b> <u>145.32 bbls</u>  | <b>Collapse PSI:</b> <u>2020.00 psi</u>   |
| (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)   | <b>Burst PSI:</b> <u>3520.00 psi</u>  |
| <b>Total Water Needed:</b> <u>334.17 bbls</u>   |   |

X \_\_\_\_\_  
 Authorization To Proceed



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

Customer  
Well Name

Noble Energy Inc.  
vogler state d21-790

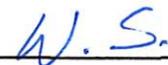
Date  
INVOICE #  
LOCATION  
FOREMAN

4/12/2019  
200433  
Weld  
Kirk Kallhoff

Treatment Report Page 2

| Amount Pumped      | Time  | Event   | Description        | Rate | BBLs  | Pressure |
|--------------------|-------|---------|--------------------|------|-------|----------|
| Lead mixed bbls    | 124.8 | 800 pm  | ARRIVE ON LOCATION |      |       |          |
| Lead % Excess      | 15%   | 1130 pm | JSA                |      |       |          |
| Lead Sacks         | 589   | 1230 am | JSA                |      |       |          |
|                    |       | 1249 am | PRESSURE TEST      |      |       | 800      |
|                    |       | 1250 am | SPACER AHEAD       | 6    | 30    | 180      |
| Tail mixed bbls    | 14    | 1254 am | LEAD CEMENT        | 6    | 176.2 | 190      |
| Tail % Excess      | 0%    | 130 am  | TAIL CEMENT        | 6    | 22.6  | 310      |
| Tail Sacks         | 100   | 135 am  | SHUT DOWN          |      |       |          |
|                    |       | 140 am  | DROP PLUG          |      |       |          |
| Total Sacks        | 689   | 140 am  | DISPLACEMENT       | 7    | 145.3 | 300      |
| Water Temp         | 50    | 209 am  | Bump Plug          |      | 145.3 | 760      |
| bbl Returns        | 32    | 210 am  | Casing TEST        |      |       | 1030     |
|                    |       | 225 am  | Check Floats       |      |       |          |
| Notes:             |       | 315 am  | RIG DOWN           |      |       |          |
| Montered well for  |       | 330 am  | Leave Location     |      |       |          |
| 20 Min. No top out |       |         |                    |      |       |          |
| Needed             |       |         |                    |      |       |          |

X   
Work Preformed

X   
Title

X 4-13-19  
Date

# SERIES 2000

