



# Bison Oil Well Cementing Tail & Lead

Customer: Noble Energy Inc.  
Well Name: Bison Ridge Y22-764

Date: 12/8/2017  
Invoice # 900221  
API# 05-123-45376  
Foreman: Corey Barras

County: Weld Consultant: Matt  
State: Colorado Rig Name & Number: H&P 517  
Distance To Location: 38  
Units On Location: 4027/3103-4032/3203  
Sec: 8 Time Requested: 1000  
Twp: 5N Time Arrived On Location: 900  
Range: 62W Time Left Location:

| WELL DATA  | Cement Data  |
|--|--|
| Casing Size (in) : <u>9.625</u><br>Casing Weight (lb) : <u>36</u><br>Casing Depth (ft) : <u>2,039</u><br>Total Depth (ft) : <u>2049</u><br>Open Hole Diameter (in) : <u>13.50</u><br>Conductor Length (ft) : <u>80</u><br>Conductor ID : <u>15.25</u><br>Shoe Joint Length (ft) : <u>42</u><br>Landing Joint (ft) : <u>4</u><br><br>Sacks of Tail Requested <u>100</u><br>HOC Tail (ft): <u>0</u><br><div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> One or the other, cannot have quantity in both </div><br>Max Rate: <u>8</u><br>Max Pressure: <u>2500</u> | <div>Lead</div> 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><br><br><div>Tail Type III</div> Cement Name:<br>Cement Density (lb/gal) : <u>15.2</u><br>Cement Yield (cuft) : <u>1.27</u><br>Gallons Per Sack: <u>5.80</u><br>% Excess: <u>0%</u><br><br>Fluid Ahead (bbls) <u>50.0</u><br>H2O Wash Up (bbls) <u>20.0</u><br><br>Spacer Ahead Makeup<br><u>50 BBL ahead with Die in 2nd 10</u> |

|   |             |   |                |
|---|-------------|---|----------------|
| Casing ID   | 8.921       | Casing Grade  | J-55 only used |
| <b>Lead Calculated Results</b>  |             | <b>Tail Calculated Results</b>  |                |
| HOC of Lead   | 1732.44 ft  | Tail Cement Volume In Ann   | 127.00 cuft    |
| Casing Depth - HOC Tail   |             | (HOC Tail) X (OH Ann)   |                |
| Volume of Lead Cement   | 846.70 cuft | Total Volume of Tail Cement   | 108.77 Cuft    |
| HOC of Lead X Open Hole Ann   |             | (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)                                |                |
| Volume of Conductor   | 61.05 cuft  | bbls of Tail Cement   | 22.62 bbls     |
| (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) |                |
| Total Volume of Lead Cement   | 907.75 cuft | HOC Tail  | 222.56 ft      |
| (cuft of Lead Cement) + (Cuft of Conductor)   |             | (Tail Cement Volume) ÷ (OH Ann)   |                |
| bbls of Lead Cement   | 185.92 bbls | Sacks of Tail Cement  | 100.00 sk      |
| (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)                              |             | (Total Volume of Tail Cement) ÷ (Cement Yield)                                      |                |
| Sacks of Lead Cement  | 621.37 sk   | bbls of Tail Mix Water  | 13.81 bbls     |
| (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)                            |             | (Sacks of Tail Cement X Gallons Per Sack) ÷ 42                                      |                |
| bbls of Lead Mix Water  | 131.67 bbls | Pressure of cement in annulus   |                |
| (Sacks Needed) X (Gallons Per Sack) ÷ 42  |             | Hydrostatic Pressure  |                |
| Displacement  | 154.68 bbls | 585.23 PSI  |                |
| (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)   |             | Collapse PSI: 2020.00 psi   |                |
| Total Water Needed:   | 370.16 bbls | Burst PSI: 3520.00 psi  |                |

X

Authorization To Proceed

X  
Date