



**Bison Oil Well Cementing
Tail & Lead**

Date: 2/28/2017
 Invoice # 200042
 API# _____
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
 Well Name: benelli federal lc 22-760


County: Weld Consultant: woody
 State: Colorado Rig Name & Number: H&P 517
 Distance To Location: 65
 Units On Location: 4028/4034/4020
 Time Requested: 1200 pm
 Time Arrived On Location: 1045 am
 Time Left Location: _____

Sec: 20
 Twp: 9n
 Range: 58w

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,877</u> Total Depth (ft) : <u>1922</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>80</u> Conductor ID : <u>15.6</u> Shoe Joint Length (ft) : <u>46</u> Landing Joint (ft) : <u>35</u> Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> One or the other, cannot have quantity in both </div> Max Rate: Max Pressure:	Lead Cement Name: <u>fn3 gel calcium</u> Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.7</u> Gallons Per Sack <u>9.00</u> % Excess <u>15%</u> Tail Cement Name: <u>bfn 3</u> Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.89</u> % Excess: <u>0%</u> Fluid Ahead (bbls) <u>144.2</u> H2O Wash Up (bbls) <u>20.0</u> Spacer Ahead Makeup

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1543.00 ft</u>	Tail Cement Volume In Ann <u>127.00 cuft</u> (HOC Tail) X (OH Ann)
Volume of Lead Cement <u>754.11 cuft</u>	Total Volume of Tail Cement <u>107.03 Cuft</u> (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
HOC of Lead X Open Hole Ann	bbls of Tail Cement <u>22.62 bbls</u> (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
Volume of Conductor <u>65.76 cuft</u> (Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	HOC Tail <u>219.00 ft</u> (Tail Cement Volume) ÷ (OH Ann)
Total Volume of Lead Cement <u>819.87 cuft</u> (cuft of Lead Cement) + (Cuft of Conductor)	Sacks of Tail Cement <u>100.00 sk</u> (Total Volume of Tail Cement) ÷ (Cement Yield)
bbls of Lead Cement <u>167.92 bbls</u> (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	bbls of Tail Mix Water <u>14.02 bbls</u> (Sacks of Tail Cement X Gallons Per Sack) ÷ 42
Sacks of Lead Cement <u>554.62 sk</u> (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Pressure of cement in annulus
bbls of Lead Mix Water <u>118.85 bbls</u> (Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>144.24 bbls</u> (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Collapse PSI: <u>2020.00 psi</u> Burst PSI: <u>3520.00 psi</u>
Total Water Needed: <u>441.35 bbls</u>	


 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.

