

# Bison Oil Well Cementing Tail & Lead

Date: 1/8/2020  
 Invoice # 200558  
 API# 05-123-48046  
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.  
 Well Name: Guttersen Y05-756

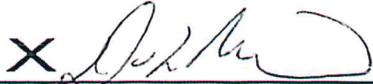
County: Weld  
 State: Colorado  
 Sec: 29  
 Twp: 3N  
 Range: 64W

Consultant: dave  
 Rig Name & Number: H&P 321  
 Distance To Location: 21  
 Units On Location: 4047/4020  
 Time Requested: 230 pm  
 Time Arrived On Location: 1230 pm  
 Time Left Location: 6:30 pm

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,895</u> Total Depth (ft) : <u>1940</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>110</u> Conductor ID : <u>15.15</u> Shoe Joint Length (ft) : <u>41</u> Landing Joint (ft) : <u>35</u>  Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u> <small>One or the other, cannot have quantity in both</small>  Max Rate: <u>8</u> Max Pressure: <u>2500</u>	<b>Lead</b> Cement Name: <u>BFN III</u> Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.68</u> Gallons Per Sack <u>8.90</u> % Excess <u>10%</u>  <b>Tail Type III</b> Cement Name: Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.80</u> % Excess: <u>0%</u>  <b>Fluid Ahead (bbls)</b> <u>30.0</u> <b>H2O Wash Up (bbls)</b> <u>20.0</u>  <b>Spacer Ahead Makeup</b> <u>30 BBL ahead with Die in 2nd 10</u>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1526.56 ft</u>	Tail Cement Volume In Ann <u>127.00 cuft</u>
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement <u>746.07 cuft</u>	Total Volume of Tail Cement <u>109.20 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor <u>82.12 cuft</u>	bbls of Tail Cement <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)
Total Volume of Lead Cement <u>828.19 cuft</u>	HOC Tail <u>223.44 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement <u>162.25 bbls</u>	Sacks of Tail Cement <u>100.00 sk</u>
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	(Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement <u>542.27 sk</u>	bbls of Tail Mix Water <u>13.81 bbls</u>
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water <u>114.91 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>146.02 bbls</u>	
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Collapse PSI: <u>2020.00 psi</u>
Total Water Needed: <u>324.74 bbls</u>	Burst PSI: <u>3520.00 psi</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.

# SERIES 2000

— PSI      — Barrels / Minute      — Lbs / Gallon

