



**Bison Oil Well Cementing
Tail & Lead**

Date: 10/21/2016

Invoice # 80592

API#

Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.

Well Name: Anni Id 29-755

County: Weld

State: Colorado

Sec: 20

Twp: 9n

Range: 58w

Consultant: Gary s

Rig Name & Number: H&P 517

Distance To Location: 65

Units On Location: 3103-3204-3213

Time Requested: 1015 pm

Time Arrived On Location: 930 pm

Time Left Location: 3:30 am

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625</p> <p>Casing Weight (lb) : 36</p> <p>Casing Depth (ft.) : 1,880</p> <p>Total Depth (ft) : 1925</p> <p>Open Hole Diameter (in) : 13.50</p> <p>Conductor Length (ft) : 80</p> <p>Conductor ID : 15.6</p> <p>Shoe Joint Length (ft) : 45</p> <p>Landing Joint (ft) : 35</p> <p>Sacks of Tail Requested 100</p> <p>HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate:</p> <p>Max Pressure:</p>	<p>Lead</p> <p>Cement Name: fn3 gel calcium</p> <p>Cement Density (lb/gal) : 13.5</p> <p>Cement Yield (cuft) : 1.7</p> <p>Gallons Per Sack 9.00</p> <p>% Excess 15%</p> <p>Tail</p> <p>Cement Name: bfn 3</p> <p>Cement Density (lb/gal) : 15.2</p> <p>Cement Yield (cuft) : 1.27</p> <p>Gallons Per Sack: 5.89</p> <p>% Excess: 0%</p> <p>Fluid Ahead (bbls) 144.6</p> <p>H2O Wash Up (bbls) 20.0</p> <p>Spacer Ahead Makeup</p>

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1545.11 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 755.14 cuft	Total Volume of Tail Cement 107.47 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 65.76 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 820.90 cuft	HOC Tail 219.89 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 168.13 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 555.32 sk	bbls of Tail Mix Water 14.02 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 119.00 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 144.55 bbls	Collapse PSI: 2020.00 psi
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: 3520.00 psi
Total Water Needed: 442.12 bbls	

Nancy Stapleton
 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.

