



# Bison Oil Well Cementing Tail & Lead

Date: 10/23/2016  
 Invoice # 666024  
 API# 05-123-43481  
 Foreman: Nick Vigil

Customer: Noble Energy Inc.  
 Well Name: Riley LD19-738

County: Weld  
 State: Colorado  
 Sec: 19  
 Twp: 9N  
 Range: 58W

Consultant: Justin  
 Rig Name & Number: H&P 524  
 Distance To Location: 66 miles  
 Units On Location: 3104/3215/3214  
 Time Requested: 14:00  
 Time Arrived On Location: 14:00  
 Time Left Location: 18:30

WELL DATA	Cement Data
Casing Size (in) : 9.625 Casing Weight (lb) : 40 Casing Depth (ft.) : 1,945 Total Depth (ft) : 1955 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.25 Shoe Joint Length (ft) : 45 Landing Joint (ft) : 35  Sacks of Tail Requested : 100 HOC Tail (ft): 0 <small>One or the other, cannot have quantity in both</small>  Max Rate: 8 Max Pressure: 2000	<b>Lead</b> Cement Name: Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.7 Gallons Per Sack : 9.00 % Excess : 15%  <b>Tail</b> Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack : 5.89 % Excess: 0%  Fluid Ahead (bbls) : 50.0 H2O Wash Up (bbls) : 20.0  <b>Spacer Ahead Makeup</b> Dye in second 10 bbl

Casing ID 8.835 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1609.34 ft	Tail Cement Volume In Ann (HOC Tail) X (OH Ann) 127.00 cuft
Casing Depth - HOC Tail	Total Volume of Tail Cement 107.84 Cuft
Volume of Lead Cement 786.53 cuft	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
HOC of Lead X Open Hole Ann	bbls of Tail Cement 22.62 bbls
Volume of Conductor 61.05 cuft	(HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
(Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	HOC Tail 220.66 ft
Total Volume of Lead Cement 847.58 cuft	(Tail Cement Volume) ÷ (OH Ann)
(cuft of Lead Cement) + (Cuft of Conductor)	Sacks of Tail Cement 100.00 sk
bbls of Lead Cement 173.60 bbls	(Total Volume of Tail Cement) ÷ (Cement Yield)
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	bbls of Tail Mix Water 14.02 bbls
Sacks of Lead Cement 573.37 sk	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Pressure of cement in annulus
bbls of Lead Mix Water 122.86 bbls	Hydrostatic Pressure 585.23 PSI
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Collapse PSI: 2570.00 psi
Displacement 146.67 bbls	Burst PSI: 3950.00 psi
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	
Total Water Needed: 353.56 bbls	

X 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.

