



# Bison Oil Well Cementing Tail & Lead

Date: 8/12/2017

Invoice # 666181

API# 05-123-44247

Supervisor: Nick Vigil

Customer: Noble Energy Inc.  
Well Name: Wells Ranch AF07-638

County: Weld  
State: Colorado  
Sec: 8  
Twp: 5N  
Range: 62W

Consultant: John  
Rig Name & Number: H&P 517  
Distance To Location: 25 miles  
Units On Location: 4023/4030/4040  
Time Requested: 5:30  
Time Arrived On Location: 4:50  
Time Left Location:

## WELL DATA

Casing Size (in) : 9.625  
Casing Weight (lb) : 36  
Casing Depth (ft.) : 1,942  
Total Depth (ft) : 1952  
Open Hole Diameter (in) : 13.50  
Conductor Length (ft) : 80  
Conductor ID : 15.25  
Shoe Joint Length (ft) : 45  
Landing Joint (ft) :

Sacks of Tail Requested : 100  
HOC Tail (ft) : 0

One or the other, cannot have quantity in both

Max Rate: 8  
Max Pressure: 2000

## Cement Data

### Lead

Cement Name:  
Cement Density (lb/gal) : 13.5  
Cement Yield (cuft) : 1.7  
Gallons Per Sack : 9.00  
% Excess : 15%

### Tail

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

Spacer Ahead Makeup  
Dye in second 10 bbl

Casing ID	8.921	Casing Grade	J-55 only used
<b>Lead Calculated Results</b>		<b>Tail Calculated Results</b>	
HOC of Lead	1638.11 ft	Tail Cement Volume In Ann	127.00 cuft
Casing Depth - HOC Tail		(HOC Tail) X (OH Ann)	
Volume of Lead Cement	800.59 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	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	861.64 cuft	HOC Tail	219.89 ft
(cuft of Lead Cement) + (Cuft of Conductor)		(Tail Cement Volume) ÷ (OH Ann)	
bbls of Lead Cement	176.48 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	582.88 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	124.90 bbls	Pressure of cement in annulus	
(Sacks Needed) X (Gallons Per Sack) ÷ 42		Hydrostatic Pressure	585.23 PSI
Displacement	146.95 bbls		
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)		Collapse PSI:	2020.00 psi
Total Water Needed:	355.87 bbls	Burst PSI:	3520.00 psi

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.

