



# Bison Oil Well Cementing Tail & Lead

**Customer:** Noble Energy Inc.  
**Well Name:** Rattlesnake Federal LC10-785

**Date:** 6/27/2017  
**Invoice #** 666155  
**API#** 05-123-42972  
**Supervisor:** Nick Vigil

**County:** Weld  
**State:** Colorado  
**Sec:** 22  
**Twp:** 9N  
**Range:** 59W

**Consultant:** Dave  
**Rig Name & Number:** H&P 524  
**Distance To Location:** 67 miles  
**Units On Location:** 4023/4032  
**Time Requested:** 9:00  
**Time Arrived On Location:** 8:50  
**Time Left Location:**

## WELL DATA

Casing Size (in) : 9.625  
Casing Weight (lb) : 36  
Casing Depth (ft.) : 1,933  
Total Depth (ft) : 1943  
Open Hole Diameter (in) : 13.50  
Conductor Length (ft) : 80  
Conductor ID : 15.25  
Shoe Joint Length (ft) : 46  
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)** 30.0  
**H2O Wash Up (bbls)** 20.0

**Spacer Ahead Makeup**  
Dye in second 10 bbl

Casing ID

8.921

Casing Grade

J-55 only used

## Lead Calculated Results

**HOC of Lead** 1630.00 ft  
**Casing Depth - HOC Tail**  
**Volume of Lead Cement** 796.63 cuft  
**HOC of Lead X Open Hole Ann**  
**Volume of Conductor** 61.05 cuft  
**(Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)**  
**Total Volume of Lead Cement** 857.68 cuft  
**(cuft of Lead Cement) + (Cuft of Conductor)**  
**bbls of Lead Cement** 175.67 bbls  
**(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)**  
**Sacks of Lead Cement** 580.19 sk  
**(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)**  
**bbls of Lead Mix Water** 124.33 bbls  
**(Sacks Needed) X (Gallons Per Sack) ÷ 42**  
**Displacement** 146.17 bbls  
**(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)**  
**Total Water Needed:** 334.53 bbls

## Tail Calculated Results

**Tail Cement Volume In Ann** 127.00 cuft  
**(HOC Tail) X (OH Ann)**  
**Total Volume of Tail Cement** 107.03 Cuft  
**(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)**  
**bbls of Tail Cement** 22.62 bbls  
**(HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)**  
**HOC Tail** 219.00 ft  
**(Tail Cement Volume) ÷ (OH Ann)**  
**Sacks of Tail Cement** 100.00 sk  
**(Total Volume of Tail Cement) ÷ (Cement Yield)**  
**bbls of Tail Mix Water** 14.02 bbls  
**(Sacks of Tail Cement X Gallons Per Sack) ÷ 42**  
**Pressure of cement in annulus**  
**Hydrostatic Pressure** 585.23 PSI  
**Collapse PSI:** 2020.00 psi  
**Burst PSI:** 3520.00 psi

X

*[Signature]*

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.

Date \_\_\_\_\_