



**Bison Oil Well Cementing
Tail & Lead**

Date: 6/27/2017

Invoice # 666155

API# 05-123-42972

Supervisor: Nick Vigil

Customer: Noble Energy Inc.

Well Name: Rattlesnake Federal LC10-785

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 Authorization To Proceed

