



Bison Oil Well Cementing Tail & Lead

Date: 8/24/2017
 Invoice #: 900161
 API#: 05-123-44969
 Foreman: Corey B.

Customer: Noble Energy Inc.
 Well Name: Wells Ranch B11-682

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

Consultant: Matt
 Rig Name & Number: H&P 524
 Distance To Location: 24
 Units On Location: 4027/3103-4032/3203
 Time Requested: 1400
 Time Arrived On Location: 1300
 Time Left Location:

WELL DATA	Cement Data
Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft) : 1,953 Total Depth (ft) : 1943 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.25 Shoe Joint Length (ft) : 44 Landing Joint (ft) : 4 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: 2500	Lead Cement Name: BFN III Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.68 Gallons Per Sack : 8.90 % Excess : 15% Tail Type III Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.80 % Excess: 0% Fluid Ahead (bbls) : 30.0 H2O Wash Up (bbls) : 20.0 Spacer Ahead Makeup 30 BBL ahead with Die in 2nd 10

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1648.22 ft	Tail Cement Volume In Ann 127.00 cuft (HOC Tail) X (OH Ann)
Volume of Lead Cement 805.53 cuft HOC of Lead X Open Hole Ann	Total Volume of Tail Cement 107.90 Cuft (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 61.05 cuft (Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	bbls of Tail Cement 22.62 bbls (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
Total Volume of Lead Cement 866.58 cuft (cuft of Lead Cement) + (Cuft of Conductor)	HOC Tail 220.78 ft (Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 177.49 bbls (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	Sacks of Tail Cement 100.00 sk (Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement 593.20 sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	bbls of Tail Mix Water 13.81 bbls (Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 125.70 bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Pressure of cement in annulus
Displacement 147.87 bbls (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Hydrostatic Pressure 585.23 PSI
Total Water Needed: 337.39 bbls	Collapse PSI: 2020.00 psi 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.

