



Bison Oil Well Cementing

Tail & Lead

Date: 10/2/2018
 Invoice # 200344
 API# _____
 Foreman: Kirk Kallhoff

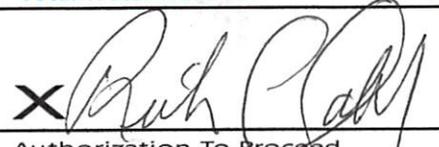
Customer: Noble Energy Inc.
 Well Name: Wells Ranch bb 09-626

County: Weld Consultant: dave
 State: Colorado Rig Name & Number: H&P 321
 Distance To Location: 27
 Units On Location: 4028/4032
 Sec: 8 Time Requested: 400 am
 Twp: 5N Time Arrived On Location: 130 am
 Range: 62W Time Left Location: _____

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,896</u> Total Depth (ft) : <u>1945</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>110</u> Conductor ID : <u>15.15</u> Shoe Joint Length (ft) : <u>41</u> Landing Joint (ft) : <u>35</u> Sacks of Tail Requested : <u>100</u> HOC Tail (ft): <u>0</u> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> One or the other, cannot have quantity in both </div> Max Rate: <u>8</u> Max Pressure: <u>2500</u>	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 1527.56 ft	Tail Cement Volume In Ann 127.00 cuft (HOC Tail) X (OH Ann)
Casing Depth - HOC Tail	Total Volume of Tail Cement 109.20 Cuft (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Lead Cement 746.56 cuft	bbls of Tail Cement 22.62 bbls (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
HOC of Lead X Open Hole Ann	HOC Tail 223.44 ft (Tail Cement Volume) ÷ (OH Ann)
Volume of Conductor 82.12 cuft (Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Sacks of Tail Cement 100.00 sk (Total Volume of Tail Cement) ÷ (Cement Yield)
Total Volume of Lead Cement 828.68 cuft (cuft of Lead Cement) + (Cuft of Conductor)	bbls of Tail Mix Water 13.81 bbls (Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Cement 169.73 bbls (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	Pressure of cement in annulus
Sacks of Lead Cement 567.25 sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Hydrostatic Pressure 585.23 PSI
bbls of Lead Mix Water 120.20 bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Collapse PSI: 2020.00 psi
Displacement 146.10 bbls (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: 3520.00 psi
Total Water Needed: 330.11 bbls	


 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.

SERIES 2000

