



# Bison Oil Well Cementing Tail & Lead

Customer: Noble Energy Inc.  
Well Name: Wells Ranch B11-667

Date: 8/18/2017  
Invoice #: 900156  
API#: 05-123-44968  
Foreman: Corey B.

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: 1800  
Time Arrived On Location: 1700  
Time Left Location:

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 1,935 Total Depth (ft) : 1945 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.25 Shoe Joint Length (ft) : 44 Landing Joint (ft) : 4</p> <p>Sacks of Tail Requested : 100 HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: 8 Max Pressure: 2500</p>	<p><b>Lead</b></p> <p>Cement Name: BFN III Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.68 Gallons Per Sack : 8.90 % Excess : 15%</p> <p><b>Tail Type III</b></p> <p>Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.80 % Excess: 0%</p> <p>Fluid Ahead (bbls) : 30.0 H2O Wash Up (bbls) : 20.0</p> <p><b>Spacer Ahead Makeup</b> 30 BBL ahead with Die in 2nd 10</p>

Lead Calculated Results	Tail Calculated Results
<p>HOC of Lead : 1630.22 ft Casing Depth - HOC Tail</p> <p>Volume of Lead Cement : 796.74 cuft HOC of Lead X Open Hole Ann</p> <p>Volume of Conductor : 61.05 cuft (Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)</p> <p>Total Volume of Lead Cement : 857.79 cuft (cuft of Lead Cement) + (Cuft of Conductor)</p> <p>bbls of Lead Cement : 175.69 bbls (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)</p> <p>Sacks of Lead Cement : 587.18 sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)</p> <p>bbls of Lead Mix Water : 124.43 bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42</p> <p>Displacement : 146.48 bbls (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)</p> <p>Total Water Needed: 334.72 bbls</p>	<p>Tail Cement Volume In Ann : 127.00 cuft (HOC Tail) X (OH Ann)</p> <p>Total Volume of Tail Cement : 107.90 Cuft (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)</p> <p>bbls of Tail Cement : 22.62 bbls (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)</p> <p>HOC Tail : 220.78 ft (Tail Cement Volume) ÷ (OH Ann)</p> <p>Sacks of Tail Cement : 100.00 sk (Total Volume of Tail Cement) ÷ (Cement Yield)</p> <p>bbls of Tail Mix Water : 13.81 bbls (Sacks of Tail Cement X Gallons Per Sack) ÷ 42</p> <p>Pressure of cement in annulus</p> <p>Hydrostatic Pressure : 585.23 PSI</p> <p>Collapse PSI: 2020.00 psi Burst PSI: 3520.00 psi</p>

Authorization To Proceed

