



# Bison Oil Well Cementing Tail & Lead

Date: 12/10/2016  
Invoice #: 20002  
API#  
Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.  
Well Name: browning federal lc 24-~~75~~ 780

County: Weld  
State: Colorado  
Sec: 20  
Twp: 9n  
Range: 58w  
Consultant: lance  
Rig Name & Number: H&P 524  
Distance To Location: 65  
Units On Location: 4028/4020/4032  
Time Requested: 200 pm  
Time Arrived On Location: 115 pm  
Time Left Location:

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 1,880 Total Depth (ft) : 1925 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.6 Shoe Joint Length (ft) : 46 Landing Joint (ft) : 35</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: Max Pressure:</p>	<p><b>Lead</b> Cement Name: fn3 gel calcium Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.7 Gallons Per Sack 9.00 % Excess 15%</p> <p><b>Tail</b> Cement Name: bfn 3 Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.89 % Excess: 0%</p> <p>Fluid Ahead (bbls) 144.5 H2O Wash Up (bbls) 20.0</p> <p>Spacer Ahead Makeup</p>

Casing ID	8.921	Casing Grade	J-55 only used
<b>Lead Calculated Results</b>		<b>Tail Calculated Results</b>	
HOC of Lead	1546.00 ft	Tail Cement Volume In Ann (HOC Tail) X (OH Ann)	127.00 cuft
Casing Depth - HOC Tail		Total Volume of Tail Cement (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)	107.03 Cuft
Volume of Lead Cement	755.57 cuft	bbls of Tail Cement (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)	22.62 bbls
HOC of Lead X Open Hole Ann		HOC Tail (Tail Cement Volume) ÷ (OH Ann)	219.00 ft
Volume of Conductor	65.76 cuft (Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Sacks of Tail Cement (Total Volume of Tail Cement) ÷ (Cement Yield)	100.00 sk
Total Volume of Lead Cement (cuft of Lead Cement) + (Cuft of Conductor)	821.34 cuft	bbls of Tail Mix Water (Sacks of Tail Cement X Gallons Per Sack) ÷ 42	14.02 bbls
bbls of Lead Cement (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	168.22 bbls	Pressure of cement in annulus	
Sacks of Lead Cement (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	555.61 sk	Hydrostatic Pressure	585.23 PSI
bbls of Lead Mix Water (Sacks Needed) X (Gallons Per Sack) ÷ 42	119.06 bbls	Collapse PSI:	2020.00 psi
Displacement (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	144.47 bbls	Burst PSI:	3520.00 psi
Total Water Needed:	442.03 bbls		

X

Authorization To Proceed

X 12-10-16  
Date