



**Bison Oil Well Cementing
Tail & Lead**

Date: 3/1/2019

Invoice # 300270

API# 05-123-48572

Foreman: JASON KELEHER

Customer: Noble Energy Inc.
Well Name: VOGLER STATE D21-780

County: Weld
State: Colorado

Sec: 21
Twp: 3N
Range: 64W

Consultant: JOHN
Rig Name & Number: H&P 517
Distance To Location: 22
Units On Location: 4045-3103,4032-3203
Time Requested: 1400
Time Arrived On Location: 1300
Time Left Location: 1930

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 1,936 Total Depth (ft) : 1946 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.5 Shoe Joint Length (ft) : 49 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: 1500</p>	<p>Lead Cement Name: Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.7 Gallons Per Sack 9.00 % Excess 15%</p> <p>Tail Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.89 % Excess: 0%</p> <p>Fluid Ahead (bbls) 30.0 H2O Wash Up (bbls) 20.0</p> <p>Spacer Ahead Makeup 30 BBL WATER DYE IN 2ND 10</p>

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1719.71 ft	Tail Cement Volume In Ann 105.56 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 921.52 cuft	Total Volume of Tail Cement 127.00 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 64.40 cuft	bbls of Tail Cement 22.62 bbls
(Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	(HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
Total Volume of Lead Cement 985.40 cuft	HOC Tail 216.09 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 175.60 bbls	Sacks of Tail Cement 100.00 sk
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	(Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement 580.00 sk	bbls of Tail Mix Water 14.02 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 124.20 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 520.00 PSI
Displacement 146.10 bbls	
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	
Total Water Needed: 190.00 bbls	Collapse PSI: 2020.00 psi
	Burst PSI: 3520.00 psi

X Authorization To Proceed

VOLGER STATE D21-780 SURFACE

