



**Bison Oil Well Cementing
Tail & Lead**

Date: 5/6/2018
 Invoice # 900290
 API# 05-123-45508
 Foreman: Corey Barras

Customer: Noble Energy Inc.
 Well Name: Larson AA19-624

County: Weld Consultant: Matt Rosales
 State: Colorado Rig Name & Number: H&P 517
 Distance To Location: 15
 Units On Location: 4027/3103-4032/3203
 Sec: 8 Time Requested: 330
 Twp: 5N Time Arrived On Location: 245
 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>1,933</u> Total Depth (ft) : <u>1944</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>80</u> Conductor ID : <u>15.15</u> Shoe Joint Length (ft) : <u>48</u> Landing Joint (ft) : <u>6</u> Sacks of Tail Requested : <u>100</u> HOC Tail (ft) : <u>0</u> <small>One or the other, cannot have quantity in both</small> Max Rate: <u>8</u> Max Pressure: <u>2500</u>	Lead Cement Name: <u>BFN III</u> Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.68</u> Gallons Per Sack : <u>8.90</u> % Excess : <u>15%</u> Tail Type III Cement Name: _____ Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.80</u> % Excess: <u>0%</u> Fluid Ahead (bbls) : <u>30.0</u> H2O Wash Up (bbls) : <u>20.0</u> Spacer Ahead Makeup <u>50 BBL ahead with Die in 2nd 10</u>

Lead Calculated Results	Tail Calculated Results
HOC of Lead : <u>1629.77 ft</u>	Tail Cement Volume In Ann : <u>127.00 cuft</u>
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement : <u>796.52 cuft</u>	Total Volume of Tail Cement : <u>106.17 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor : <u>59.72 cuft</u>	bbls of Tail Cement : <u>22.62 bbls</u>
(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 : <u>856.24 cuft</u>	HOC Tail : <u>217.23 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement : <u>175.37 bbls</u>	Sacks of Tail Cement : <u>100.00 sk</u>
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	(Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement : <u>586.12 sk</u>	bbls of Tail Mix Water : <u>13.81 bbls</u>
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water : <u>124.20 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure : <u>585.23 PSI</u>
Displacement : <u>146.17 bbls</u>	Collapse PSI: <u>2020.00 psi</u>
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: <u>3520.00 psi</u>
Total Water Needed: <u>334.19 bbls</u>	

X
 Authorization To Proceed

Larson AA19-624

