



Bison Oil Well Cementing

Tail & Lead

Date: 1/24/2018

Invoice #: 900246

API#: 05-123-44601

Foreman: Corey Barras

Customer: Noble Energy Inc.

Well Name: Centennial State G34-684

County: Weld

State: Colorado

Sec: 8

Twp: 5N

Range: 62W

Consultant: Matt

Rig Name & Number: H&P 517

Distance To Location: 20

Units On Location: 4027/3103-4032/3203

Time Requested: 800

Time Arrived On Location: 700

Time Left Location:

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625</p> <p>Casing Weight (lb) : 36</p> <p>Casing Depth (ft.) : 1,942</p> <p>Total Depth (ft) : 1952</p> <p>Open Hole Diameter (in) : 13.50</p> <p>Conductor Length (ft) : 80</p> <p>Conductor ID : 15.25</p> <p>Shoe Joint Length (ft) : 48</p> <p>Landing Joint (ft) : 4</p> <p>Sacks of Tail Requested : 100</p> <p>HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: 8</p> <p>Max Pressure: 2500</p>	<p>Lead</p> <p>Cement Name: BFN III</p> <p>Cement Density (lb/gal) : 13.5</p> <p>Cement Yield (cuft) : 1.68</p> <p>Gallons Per Sack : 8.90</p> <p>% Excess : 15%</p> <p>Tail Type III</p> <p>Cement Name:</p> <p>Cement Density (lb/gal) : 15.2</p> <p>Cement Yield (cuft) : 1.27</p> <p>Gallons Per Sack: 5.80</p> <p>% Excess: 0%</p> <p>Fluid Ahead (bbls) : 50.0</p> <p>H2O Wash Up (bbls) : 20.0</p> <p>Spacer Ahead Makeup</p> <p>50 BBL ahead with Die in 2nd 10</p>

Casing ID

8.921

Casing Grade

J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1640.77 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 801.89 cuft	Total Volume of Tail Cement 106.17 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 61.05 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 862.94 cuft	HOC Tail 217.23 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 176.74 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 590.71 sk	bbls of Tail Mix Water 13.81 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 125.17 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 146.72 bbls	Collapse PSI: 2020.00 psi
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: 3520.00 psi
Total Water Needed: 355.70 bbls	

X

Authorization To Proceed

DAVE NIELSEN

Centennial State G34-684

