

**Bison Oil Well Cementing
Tail & Lead**

Date: 7/13/2019

Invoice # 200474

API# _____

Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.

Well Name: slw ranch state bb 07-685

County: Weld
State: Colorado

Sec: #7
Twp: 5N
Range: ~~52W~~ 43W

Consultant: john
Rig Name & Number: H&P 517
Distance To Location: 20
Units On Location: 4047/4024/4041
Time Requested: 700 pm
Time Arrived On Location: 500 pm
Time Left Location: 11:30pm

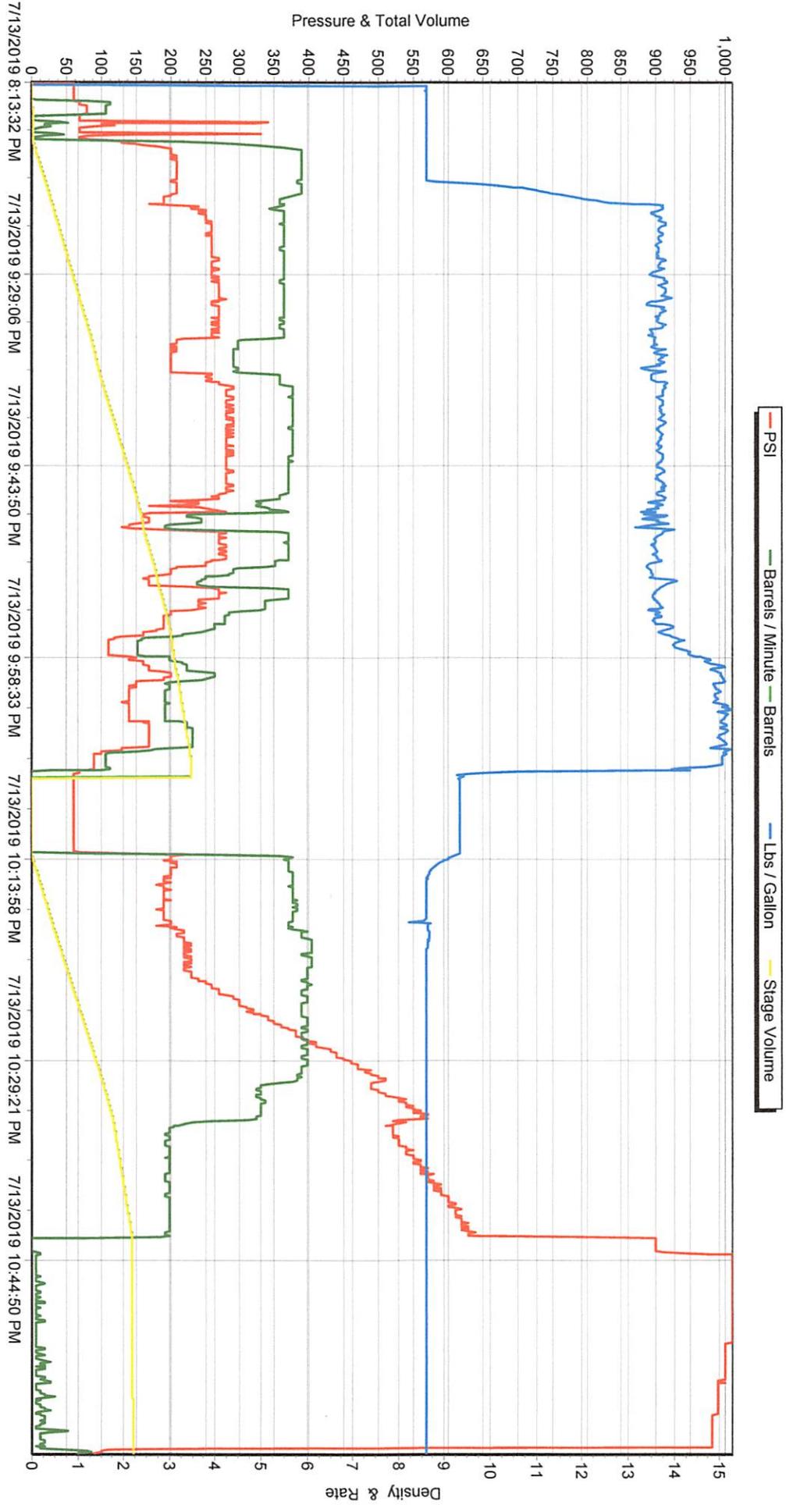
WELL DATA	Cement Data
<p>Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,919</u> Total Depth (ft) : <u>1964</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>110</u> Conductor ID : <u>15.5</u> Shoe Joint Length (ft) : <u>41</u> Landing Joint (ft) : <u>3</u></p> <p>Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u></p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: <u>8</u> Max Pressure: <u>2500</u></p>	<p>Lead</p> <p>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>10%</u></p> <p>Tail Type III</p> <p>Cement Name: _____ Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.89</u> % Excess: <u>0%</u></p> <p>Fluid Ahead (bbls) <u>30.0</u> H2O Wash Up (bbls) <u>20.0</u></p> <p>Spacer Ahead Makeup <u>30 BBL ahead with Die in 2nd 10</u></p>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1582.56 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>773.44 cuft</u>	Total Volume of Tail Cement <u>109.20 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor <u>88.56 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>862.00 cuft</u>	HOC Tail <u>223.44 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement <u>168.87 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>564.40 sk</u>	bbls of Tail Mix Water <u>14.02 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>119.60 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>145.40 bbls</u>	
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Collapse PSI: <u>2020.00 psi</u>
Total Water Needed: <u>329.02 bbls</u>	Burst PSI: <u>3520.00 psi</u>

Authorization To Proceed

SERIES 2000



9:20 PM