

**Bison Oil Well Cementing  
Tail & Lead**

Date: 9/17/2017  
 Invoice # 200168  
 API# \_\_\_\_\_  
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.  
 Well Name: wells ranch state bb11-635

County: Weld Consultant: jim  
 State: Colorado Rig Name & Number: H&P 524  
 Distance To Location: 23  
 Units On Location: 4028/4031  
 Time Requested: 400 am  
 Time Arrived On Location: 230 am  
 Range: 58w Time Left Location: 9:30 am

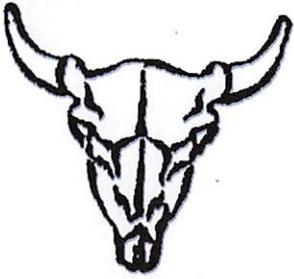
WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,908</u> Total Depth (ft) : <u>1953</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>80</u> Conductor ID : <u>15.6</u> Shoe Joint Length (ft) : <u>47</u> Landing Joint (ft) : <u>35</u>  Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u> One or the other, cannot have quantity in both  Max Rate: Max Pressure:	<b>Lead</b> Cement Name: <u>fn3 gel calcium</u> Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.7</u> Gallons Per Sack <u>9.00</u> % Excess <u>15%</u>  <b>Tail</b> Cement Name: <u>bfm 3</u> 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>  Fluid Ahead (bbls) <u>146.6</u> H2O Wash Up (bbls) <u>20.0</u>  <b>Spacer Ahead Makeup</b>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1574.88 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>769.69 cuft</u>	Total Volume of Tail Cement <u>106.60 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor <u>65.76 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>835.45 cuft</u>	HOC Tail <u>218.12 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement <u>171.11 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>565.16 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>121.11 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>146.56 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>448.25 bbls</u>	

X [Signature]  
 Authorization To Proceed

Customers hereby acknowledges and specifically agrees to the terms and condition on this work order, including, without limitation, the provisions on this work order.



**Bison Oil Well Cementing  
Two Cement Surface Pipe**

Customer  
Well Name

Noble Energy Inc.  
wells ranch state bb11-635

Date  
INVOICE #  
LOCATION  
FOREMAN

9/17/2017  
200168  
Weld  
Kirk Kallhoff

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**DESCRIPTION OF JOB EVENTS**

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	121.1	230 am	arived on location			
Lead % Excess	15%	600 am	rig up			
Lead Sacks	565	640 am	jsa			
		708 am	test lines			
		710 am	bbls ahead			
Tail mixed bbls	14	715 am	m&p lead cement			
Tail % Excess	0%	746 am	m&p tail cement			
Tail Sacks	100	755 am	shutdown			
		800 am	drop plug			
Total Sacks	665	800 am	displace			
Water Temp	60	830 am	bump plug			
bbl Returns	34	830 am	casing test			
		845 am	release psi			
Notes:		915 am	rig down			
		930 am	leave location			
			monitered well no top off			

X [Signature]  
Work Preformed

X CO MAN  
Title

X 9-17-17  
Date