



**Bison Oil Well Cementing
Tail & Lead**

Date: 2/4/2017
 Invoice # 200029
 API# _____
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
 Well Name: dukes federal lc 10-745

County: Weld Consultant: dave
 State: Colorado Rig Name & Number: H&P 524
 Sec: 20 Distance To Location: 65
 Twp: 9n Units On Location: 4028/4034
 Range: 58w Time Requested: 530 am
 Time Arrived On Location: 300 am
 Time Left Location: _____

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft) : <u>1,892</u> Total Depth (ft) : <u>1937</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>46</u> Landing Joint (ft) : <u>35</u> Sacks of Tail Requested : <u>100</u> HOC Tail (ft) : <u>0</u> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> One or the other, cannot have quantity in both </div> Max Rate: _____ Max Pressure: _____	<div style="text-align: center;">Lead</div> 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> <div style="text-align: center;">Tail</div> 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>145.4</u> H2O Wash Up (bbls) : <u>20.0</u> <div style="text-align: center;">Spacer Ahead Makeup</div>

Lead Calculated Results	Tail Calculated Results
HOC of Lead : <u>1558.00 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>761.44 cuft</u>	Total Volume of Tail Cement : <u>107.03 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>827.20 cuft</u>	HOC Tail : <u>219.00 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement : <u>169.42 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>559.58 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>119.91 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>	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>444.74 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**

Date	2/4/2017
INVOICE #	200029
LOCATION	Weld
FOREMAN	Kirk Kallhoff

Customer	Noble Energy Inc.
Well Name	dukes federal lc 10-745

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DESCRIPTION OF JOB EVENTS

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	119.9	300 am	arived on location			
Lead % Excess	15%	710 am	rig up			
Lead Sacks	560	810 am	jsa			
		840 am	test lines		1	2
		842 am	test lines to 1300 psi		5	50
			50 bbls h2o dye in 2nd 10		5	169.7
Tail mixed bbls	14	851 am	bbls ahead		5	200
Tail % Excess	0%	921 am	m&p lead cement		5	22.6
Tail Sacks	100	927 am	m&p tail cement			200
		934 am	shutdown			
		934 am	drop plug			
Total Sacks	659	934 am	displace			145.4
Water Temp	55	1005 am	rig to displace 145.4 bbls OBM		1.5	145.4
bbl Returns	45	1005 am	bump plug			750
		1035 am	lift psi 500			1500
			casing test			0
			rig to test			
			release psi			
Notes:		1140 am	rig down			
		1200 pm	leave location			
			monitered well no top off			

X *[Signature]*
Work Preformed

X COMAN
Title

X 2-4-17
Date