



**Bison Oil Well Cementing
Tail & Lead**

Date: 10/31/2016
 Invoice # 80594
 API#
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
 Well Name: riley Id 19-745

County: Weld
 State: Colorado
 Sec: 20
 Twp: 9n
 Range: 58w

Consultant: dave
 Rig Name & Number: H&P 524
 Distance To Location: 65
 Units On Location: 3103-3204-3213
 Time Requested: 800 am
 Time Arrived On Location: 715 am
 Time Left Location: 9:00pm

WELL DATA	Cement Data
Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 1,883 Total Depth (ft) : 1928 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.6 Shoe Joint Length (ft) : 44 Landing Joint (ft) : 35 Sacks of Tail Requested : 100 HOC Tail (ft): 0 One or the other, cannot have quantity in both Max Rate: Max Pressure:	Lead Cement Name: fn3 gel calcium Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.7 Gallons Per Sack : 9.00 % Excess : 15% Tail Cement Name: bfn 3 Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.89 % Excess: 0% Fluid Ahead (bbls) : 144.9 H2O Wash Up (bbls) : 20.0 Spacer Ahead Makeup

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1547.22 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 756.17 cuft	Total Volume of Tail Cement 107.90 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 65.76 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 821.93 cuft	HOC Tail 220.78 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 168.34 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 556.01 sk	bbls of Tail Mix Water 14.02 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 119.15 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 144.86 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: 442.89 bbls	

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: Noble Energy Inc.
Well Name: riley Id 19-745

Date: 10/31/2016
INVOICE #: 80594
LOCATION: Weld
FOREMAN: Kirk Kallhoff

DESCRIPTION OF JOB EVENTS

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure	
Lead mixed bbls	119.2	715 am	arived on location				
Lead % Excess	15%	535 pm	rig up				
Lead Sacks	556	603 pm	jsa				
		622 pm	test lines		1	2	1300
		624 pm	bbls ahead		5	50	120
Tail mixed bbls	14	633 pm	m&p lead cement		5	168.3	200
Tail % Excess	0%	709 pm	m&p tail cement		5	22.6	200
Tail Sacks	100	715 pm	shutdown				
		718 pm	drop plug				
Total Sacks	656	718 pm	displace			144.8	
Water Temp	55	742 pm	bump plug		1.5	144.8	650
bbl Returns	41	745 pm	casing test				1000
		800 pm	release psi				0
Notes:		845 pm	rig down				
		900 pm	leave location				
			wait time approved by don cox				
			monitored well no top off				

X *Don Cox*
Work Performed

X _____
Title

X 10-31-16
Date