



**Bison Oil Well Cementing
Tail & Lead**

Date: 7/28/2017

Invoice # 300109

API# 05-123-42789

Foreman: JASON KELEHER

Customer: Noble Energy Inc.

Well Name: MINUTEMAN FEDERAL LC21-620

County: Weld	Consultant: CHARLES
State: Colorado	Rig Name & Number: H&P 524
Sec: 22	Distance To Location: 67
Twp: 9N	Units On Location: 2
Range: 59W	Time Requested: 1400
	Time Arrived On Location: 1330
	Time Left Location: 1700

WELL DATA	
Casing Size (in) :	9.625
Casing Weight (lb) :	36
Casing Depth (ft.) :	1,930
Total Depth (ft) :	1940
Open Hole Diameter (in) :	13.50
Conductor Length (ft) :	80
Conductor ID :	15.25
Shoe Joint Length (ft) :	44
Landing Joint (ft) :	4
Sacks of Tail Requested	100
HOC Tail (ft):	0
One or the other, cannot have quantity in both	
Max Rate:	8
Max Pressure:	1500

Cement Data	
Lead	
Cement Name:	
Cement Density (lb/gal) :	13.5
Cement Yield (cuft) :	1.7
Gallons Per Sack	9.00
% Excess	15%
Tail	
Cement Name:	
Cement Density (lb/gal) :	15.2
Cement Yield (cuft) :	1.27
Gallons Per Sack:	5.89
% Excess:	0%
Fluid Ahead (bbls)	50.0
H2O Wash Up (bbls)	20.0
Spacer Ahead Makeup	
50BBL WATER DYE IN 2ND 10	

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1625.65 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 794.50 cuft	Total Volume of Tail Cement 107.69 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 855.55 cuft	HOC Tail 220.35 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 175.23 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 578.76 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 124.02 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 146.06 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: 354.10 bbls	

X

Authorization To Proceed

