Bison Oil Well Cementing
Tail & Lead

Date: 11/6/2019
Invoice # 200537
API#
Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
Well Name: wells ranch state aa 32-789

County: Weld
State: Colorado

Sec: 5
Twp: 5N
Range: 63W

Consultant: chris
Rig Name & Number: H&P 517
Distance To Location: 23
Units On Location: 4047/4020
Time Requested: 600 pm
Time Arrived On Location: 400 pm
Time Left Location: 11:30pm

WELL DATA

Casing Size (in) :	9.625
Casing Weight (lb) :	36
Casing Depth (ft.) :	1,900
Total Depth (ft) :	1945
Open Hole Diameter (in) :	13.50
Conductor Length (ft) :	110
Conductor ID :	15.5
Shoe Joint Length (ft) :	37
Landing Joint (ft) :	35
Sacks of Tail Requested	100
HOC Tail (ft):	0

One or the other, cannot have quantity in both

Max Rate: 8
Max Pressure: 2500

Cement Data

Lead

Cement Name:	BFN III
Cement Density (lb/gal) :	13.5
Cement Yield (cuft) :	1.68
Gallons Per Sack	8.90
% Excess	10%

Tail Type III

Cement Name:	
Cement Density (lb/gal) :	15.2
Cement Yield (cuft) :	1.27
Gallons Per Sack:	5.89
% Excess:	0%
Fluid Ahead (bbls)	30.0
H20 Wash Up (bbls)	20.0

Spacer Ahead Makeup

30 BBL ahed with Die in 2nd 10

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results

HOC of Lead	1528.00 ft
Casing Depth - HOC Tail	
Volume of Lead Cement	746.78 cuft
HOC of Lead X Open Hole Ann	
Volume of Conductor	88.56 cuft
(Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	
Total Volume of Lead Cement	835.34 cuft
(cuft of Lead Cement) + (Cuft of Conductor)	
bbls of Lead Cement	163.65 bbls
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	
Sacks of Lead Cement	546.95 sk
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	
bbls of Lead Mix Water	115.90 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42	
Displacement	146.72 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	
Total Water Needed:	326.64 bbls

Tail Calculated Results

Tail Cement Volume In Ann	127.00 cuft
(HOC Tail) X (OH Ann)	
Total Volume of Tail Cement	110.94 Cuft
(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)	
bbls of Tail Cement	22.62 bbls
(HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)	
HOC Tail	227.00 ft
(Tail Cement Volume) ÷ (OH Ann)	
Sacks of Tail Cement	100.00 sk
(Total Volume of Tail Cement) ÷ (Cement Yield)	
bbls of Tail Mix Water	14.02 bbls
(Sacks of Tail Cement X Gallons Per Sack) ÷ 42	
Pressure of cement in annulus	
Hydrostatic Pressure	585.23 PSI
Collapse PSI:	2020.00 psi
Burst PSI:	3520.00 psi

X _____
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	wells ranch state aa 32-789

Date	11/6/2019
INVOICE #	200537
LOCATION	Weld
FOREMAN	Kirk Kallhoff

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Amount Pumped		Time	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	115.9	400 pm	ARRIVE ON LOCATION	ASSESS LOCATION			
Lead % Excess	10%	745 pm	JSA	Bison/SPOT EQUIPMENT IN			
Lead Sacks	547	840 pm	JSA	Bison and Rig Crew			
		859 pm	PRESSURE TEST	PRESSURE TEST TO 800 PSI			800
		900 pm	SPACER AHEAD	WATER S. .	6	30	180
Tail mixed bbls	14	905 pm	LEAD CEMENT	CEMENT MIXED AT 13.5 PPG 547 SKS	5	163.6	190
Tail % Excess	0%	935 pm	TAIL CEMENT	CEMENT MIXED AT 15.2 PPG PG. 100sks	6	22.6	310
Tail Sacks	100	940 pm	SHUT DOWN				
		944 pm	DROP PLUG	PLUG PRELOADED			
Total Sacks	647	944 pm	DISPLACEMENT	rig to DISPLACE	6	146.7	300
Water Temp	60	1008 pm	Bump Plug	420 lift psi		146.7	1090
bbl Returns	28	1009 pm	Casing TEST	Held for 15 Min.			1090
		1024 pm	Check Floats	FLOATS I held .5 BBL Back			0
Notes:		1100 pm	RIG DOWN				
Montered well for		1130 pm	Leave Location				
20 Min. No top out							
Needed							

X _____ Work Preformed

X VSS Title

X 11-6-19 Date

Wells Ranch State AA32-789