Bison Oil Well Cementing
Two Cement Surface Pipe

Customer	Noble Energy Inc.
Well Name	Wells Ranch State AA32-745

Date	11/28/2019
INVOICE #	200546
LOCATION	Weld
FOREMAN	Kirk Kallhoff

Treatment Report Page 2

Amount Pumped		Time	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	116.9	500 pm	ARRIVE ON LOCATION	ASSESS LOCATION			
Lead % Excess	10%	740 pm	JSA	Bison/SPOT EQUIPMENT IN			
Lead Sacks	552	830 pm	JSA	Bison and Rig Crew			
		847 pm	PRESSURE TEST	PRESSURE TEST TO 800 PSI			800
		848 pm	SPACER AHEAD	WATER S. .	6	30	180
Tail mixed bbls	14	853 pm	LEAD CEMENT	CEMENT MIXED AT 13.5 PPG 552 SKS	5	165	190
Tail % Excess	0%	926 pm	TAIL CEMENT	CEMENT MIXED AT 15.2 PPG PG. 100sks	6	22.6	310
Tail Sacks	100	931 pm	SHUT DOWN				
		938 pm	DROP PLUG	PLUG PRELOADED			
Total Sacks	652	938 pm	DISPLACEMENT	rig to DISPLACE	8	146.5	300
Water Temp	60	1001 pm	Bump Plug	410 lift psi		146.5	720
bbl Returns	23	1002 pm	Casing TEST	Held for 15 Min.			1125
		1017 pm	Check Floats	FLOATS I held .5 BBL Back			0
Notes:		1050 pm	RIG DOWN				
Montered well for		1130 pm	Leave Location				
20 Min. No top out							
Needed							

X _____ Work Preformed

X _____ Title

X 11-28-19 Date

Bison Oil Well Cementing
Tail & Lead

Date: 11/28/2019
Invoice # 200546
API# 05-123-50172
Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
Well Name: Wells Ranch State AA32-745

County: Weld
State: Colorado
Sec: 5
Twp: 5N
Range: 63W

Consultant: tommy
Rig Name & Number: H&P 517
Distance To Location: 23
Units On Location: 4047/4020
Time Requested: 630 pm
Time Arrived On Location: 500 pm
Time Left Location: 11:30 pm

WELL DATA

Casing Size (in) :	9.625
Casing Weight (lb) :	36
Casing Depth (ft.) :	1,907
Total Depth (ft) :	1952
Open Hole Diameter (in) :	13.50
Conductor Length (ft) :	110
Conductor ID :	15.5
Shoe Joint Length (ft) :	46
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 Casing Depth - HOC Tail	1543.00 ft
Volume of Lead Cement HOC of Lead X Open Hole Ann	754.11 cuft
Volume of Conductor (Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	88.56 cuft
Total Volume of Lead Cement (cuft of Lead Cement) + (Cuft of Conductor)	842.66 cuft
bbls of Lead Cement (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	165.09 bbls
Sacks of Lead Cement (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	551.74 sk
bbls of Lead Mix Water (Sacks Needed) X (Gallons Per Sack) ÷ 42	116.92 bbls
Displacement (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	146.56 bbls
Total Water Needed:	327.50 bbls

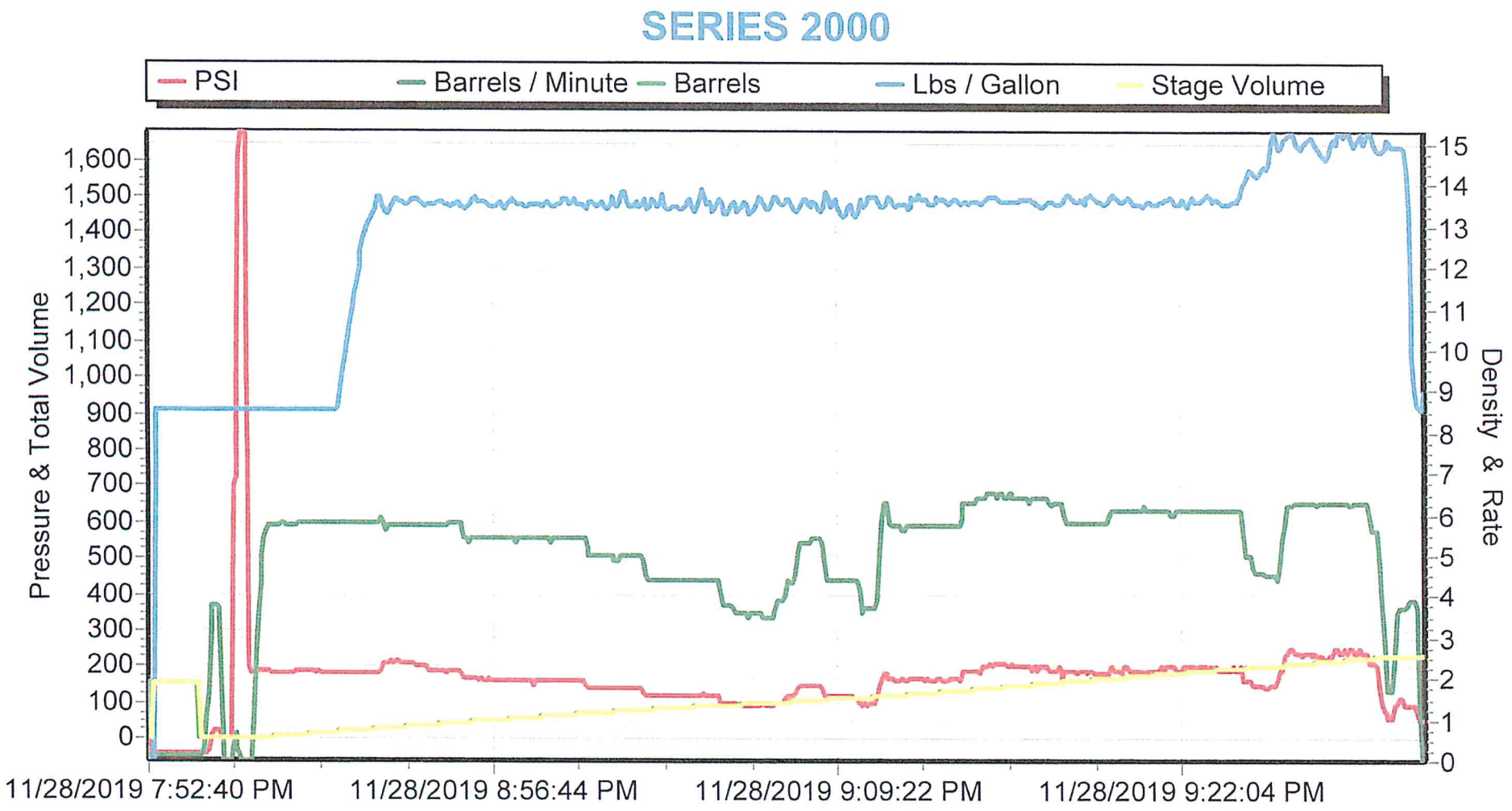
Tail Calculated Results

Tail Cement Volume In Ann (HOC Tail) X (OH Ann)	127.00 cuft
Total Volume of Tail Cement (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)	107.03 Cuft
bbls of Tail Cement (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)	22.62 bbls
HOC Tail (Tail Cement Volume) ÷ (OH Ann)	219.00 ft
Sacks of Tail Cement (Total Volume of Tail Cement) ÷ (Cement Yield)	100.00 sk
bbls of Tail Mix Water (Sacks of Tail Cement X Gallons Per Sack) ÷ 42	14.02 bbls
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.


SERIES 2000
PSI
Barrels / Minute
Barrels
Lbs / Gallon
Stage Volume
Pressure & Total Volume
Density & Rate
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
15
14
13
12
11
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8
7
6
5
4
3
2
1
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