Bison Oil Well Cementing
Tail & Lead

Date: 2/14/2020
Invoice # 900474
AFE # 206787
Foreman: Corey Barras

Customer: Noble Energy Inc.
Well Name: Vogler State D33-759

Consultant: Jim
County: Weld
State: Colorado
Rig Name & Number: H&P 321
Distance To Location: 21
Units On Location: 4028/3103-4020/3203
Sec: 21
Twp: 3N
Range: 64W
Time Requested: 700
Time Arrived On Location: 630
Time Left Location:

WELL DATA

Casing Size (in) :	9.625
Casing Weight (lb) :	36
Casing Depth (ft.) :	1,918
Total Depth (ft) :	1958
Open Hole Diameter (in) :	13.50
Conductor Length (ft) :	80
Conductor ID :	15.25
Shoe Joint Length (ft) :	42
Landing Joint (ft) :	0
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	10%

Tail

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
30BBL WATER DYE IN 2ND 10

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results

HOC of Lead	1615.44 ft
Casing Depth - HOC Tail	
Volume of Lead Cement	789.52 cuft
HOC of Lead X Open Hole Ann	
Volume of Conductor	61.05 cuft
(Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	
Total Volume of Lead Cement	850.57 cuft
(cuft of Lead Cement) + (Cuft of Conductor)	
bbls of Lead Cement	166.63 bbls
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	
Sacks of Lead Cement	550.37 sk
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	
bbls of Lead Mix Water	117.94 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42	
Displacement	145.01 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth) - (Shoe Length)	
Total Water Needed:	326.97 bbls

Tail Calculated Results

Tail Cement Volume In Ann	127.00 cuft
(HOC Tail) X (OH Ann)	
Total Volume of Tail Cement	108.77 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	222.56 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	Vogler State D33-759

Date	2/14/2020
INVOICE #	900474
LOCATION	Weld
FOREMAN	Corey Barras

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Lead mixed bbls	117.9
Lead % Excess	10%
Lead Sacks	550
Tail mixed bbls	14
Tail % Excess	0%
Tail Sacks	100
Total Sacks	650
Water Temp	78
bbl Returns	19

Notes:

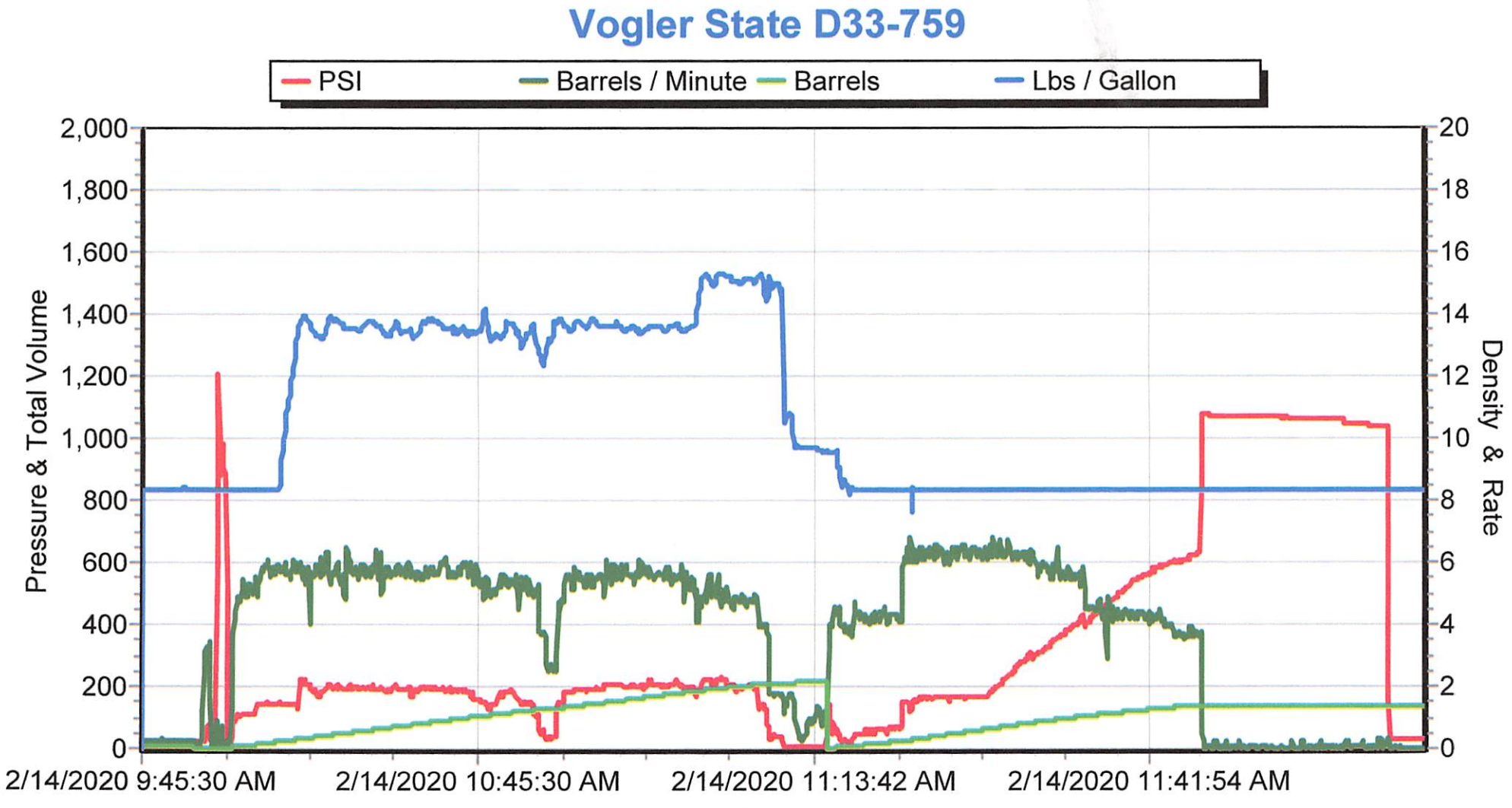
DESCRIPTION OF JOB EVENTS

Time/Date	Event	Description	Rate	BBLs	Pressure
630	ARRIVE ON LOCATION	ASSESS LOCATION AND HAZARDS			
830	MIRU	SPOT EQUIPMENT, PRE RIG UP MEETING			
930	PRE JOB SAFETY MEETING	RIG CREW AND BISON			
1020	PRESSURE TEST LINES				1200
1022	bbls ahead	WATER SUPPLIED RIG W/DYE IN 2ND 10	6	30	120
1030	LEAD CEMENT	CEMENT MIXED AT 13.5 PPG	6	166.3	170
1104	TAIL CEMENT	CEMENT MIXED AT 15.2 PPG	4	22.6	120
1111	SHUT DOWN				
1112	DROP PLUG				
1113	DISPLACEMENT	Displace w/ H2O (Lift 630 PSI)	7	70	380
1144	BUMP PLUG	15 Min Casing Test @ 1070 PSI	2	145	1070
1200	CHECK FLOATS	FLOATS HELD/ WATCH FOR FALL BACK			
1215	RIG DOWN				
1220	LEAVE LOCATION				
		monitered well no top off			

X _____ Work Preformed

X _____ Title

X 2-14-20 Date


Vogler State D33-759
PSI
Barrels / Minute
Barrels
Lbs / Gallon
Pressure & Total Volume
Density & Rate
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
20
18
16
14
12
10
8
6
4
2
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