



**Bison Oil Well Cementing
Tail & Lead**

Date: 9/16/2018

Invoice # 300188

API# 05-123-44958

Foreman: JASON KELEHER

Customer: Noble Energy Inc.

Well Name: WELLS RANCH BB09-649

County: Weld

State: Colorado

Sec: 11

Twp: 5N

Range: 63W

Consultant: DAVE

Rig Name & Number: H&P 321

Distance To Location: 24

Units On Location: -3103,4039-3214,4030-3215

Time Requested: 400

Time Arrived On Location: 230

Time Left Location: 1030

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625</p> <p>Casing Weight (lb) : 36</p> <p>Casing Depth (ft.) : 1,938</p> <p>Total Depth (ft) : 1948</p> <p>Open Hole Diameter (in) : 13.50</p> <p>Conductor Length (ft) : 80</p> <p>Conductor ID : 15.25</p> <p>Shoe Joint Length (ft) : 49</p> <p>Landing Joint (ft) : 5</p> <p>Sacks of Tail Requested : 100</p> <p>HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: 8</p> <p>Max Pressure: 1500</p>	<p>Lead</p> <p>Cement Name:</p> <p>Cement Density (lb/gal) : 13.5</p> <p>Cement Yield (cuft) : 1.7</p> <p>Gallons Per Sack : 9.00</p> <p>% Excess : 15%</p> <p>Tail</p> <p>Cement Name:</p> <p>Cement Density (lb/gal) : 15.2</p> <p>Cement Yield (cuft) : 1.27</p> <p>Gallons Per Sack: 5.89</p> <p>% Excess: 0%</p> <p>Fluid Ahead (bbls) : 30.0</p> <p>H2O Wash Up (bbls) : 20.0</p> <p>Spacer Ahead Makeup</p> <p>30 BBL WATER DYE IN 2ND 10</p>

Lead Calculated Results	Tail Calculated Results
HOC of Lead : 1720.46 ft	Tail Cement Volume in Ann (HOC Tail) X (OH Ann) : 106.12 cuft
Casing Depth - HOC Tail	Total Volume of Tail Cement (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann) : 127.00 Cuft
Volume of Lead Cement : 921.95 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 of Lead X Open Hole Ann	HOC Tail (Tail Cement Volume) ÷ (OH Ann) : 217.24 ft
Volume of Conductor : 60.64 cuft	Sacks of Tail Cement (Total Volume of Tail Cement) ÷ (Cement Yield) : 100.00 sk
(Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	bbls of Tail Mix Water (Sacks of Tail Cement X Gallons Per Sack) ÷ 42 : 14.02 bbls
Total Volume of Lead Cement (cuft of Lead Cement) + (Cuft of Conductor) : 982.44 cuft	Pressure of cement in annulus
bbls of Lead Cement (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess) : 175.00 bbls	Hydrostatic Pressure : 460.00 PSI
Sacks of Lead Cement (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement) : 578.00 sk	Collapse PSI: 2020.00 psi
bbls of Lead Mix Water (Sacks Needed) X (Gallons Per Sack) ÷ 42 : 123.80 bbls	Burst PSI: 3520.00 psi
Displacement (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length) : 146.30 bbls	
Total Water Needed: 189.00 bbls	

Authorization To Proceed



**Bison Oil Well Cementing
Two Cement Surface Pipe**

Customer
Well Name

Noble Energy Inc.
WELLS RANCH BB09-649

Date
INVOICE #
LOCATION
FOREMAN

9/16/2018
300188
Weld
JASON KELEHER

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DESCRIPTION OF JOB EVENTS

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	123.8	230	ARRIVE ON LOCATION			
Lead % Excess	15%	600	MIRU			
Lead Sacks	578	700	PRE JOB SAFETY MEETING			
		727	PRESSURE TEST LINES			1500
		729	SPACER AHEAD	6	30	230
Tail mixed bbls	14	734	LEAD CEMENT	5	175	210
Tail % Excess	0%	809	TAIL CEMENT	3.5	22.6	210
Tail Sacks	100	815	SHUT DOWN			
		819	DROP PLUG			
Total Sacks	675	819	DISPLACEMENT	2	146.3	549
Water Temp	60	1151	BUMP PLUG			1134
bbl Returns	34	907	CHECK FLOATS			1107
		940	RIG DOWN			
Notes:	1030	LEAVE LOCATION				
			monitered well no top off			

X *[Signature]*
Signature

X COMAN
Title

X 9-16-2018
Date

WELLS RANCH BB09-649 SURFACE

