



Bison Oil Well Cementing Tail & Lead

Date: 5/24/2018
 Invoice # 200290
 API# _____
 Foreman: Kirk Kallhoff

Customer: Noble Energy Inc.
 Well Name: Ilarson a23-662

County: Weld Consultant: jim
 State: Colorado Rig Name & Number: H&P 321
 Distance To Location: 15
 Units On Location: 1
 Time Requested: 400 am
 Time Arrived On Location: 200 am
 Range: 65w Time Left Location: 12:30pm

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,928</u> Total Depth (ft) : <u>1973</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>110</u> Conductor ID : <u>16</u> Shoe Joint Length (ft) : <u>35</u> Landing Joint (ft) : <u>35</u> Sacks of Tail Requested : <u>100</u> HOC Tail (ft) : <u>0</u> <small>One or the other, cannot have quantity in both</small> Max Rate: <u>8</u> Max Pressure: <u>1500</u>	Lead Cement Name: _____ Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.7</u> Gallons Per Sack : <u>9.00</u> % Excess : <u>15%</u> Tail Cement Name: _____ Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.89</u> % Excess: <u>0%</u> Fluid Ahead (bbls) : <u>30.0</u> H2O Wash Up (bbls) : <u>20.0</u> Spacer Ahead Makeup <u>50 BBL WATER DYE IN 2ND 10</u>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1554.23 ft</u>	Tail Cement Volume In Ann <u>127.00 cuft</u>
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement <u>759.60 cuft</u>	Total Volume of Tail Cement <u>111.81 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor <u>98.01 cuft</u>	bbls of Tail Cement <u>22.62 bbls</u>
(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 <u>857.60 cuft</u>	HOC Tail <u>228.77 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement <u>175.65 bbls</u>	Sacks of Tail Cement <u>100.00 sk</u>
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	(Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement <u>580.14 sk</u>	bbls of Tail Mix Water <u>14.02 bbls</u>
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water <u>124.32 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>149.03 bbls</u>	Collapse PSI: <u>2020.00 psi</u>
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: <u>3520.00 psi</u>
Total Water Needed: <u>337.37 bbls</u>	

X [Signature] 5-24-18
 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**

Date	5/24/2018
INVOICE #	200290
LOCATION	Weld
FOREMAN	Kirk Kallhoff

Customer: Noble Energy Inc.
Well Name: Larson a23-662

DESCRIPTION OF JOB EVENTS

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls 124.3	200 am	ARRIVE ON LOCATION	ASSESS LOCATION AND HAZARDS			
Lead % Excess 15%	850 am	MIRU	SPOT EQUIPMENT, PRE RIG UP MEETING			
Lead Sacks 580	935 am	PRE JOB SAFETY MEETING	RIG CREW AND BISON			
	1001 am	PRESSURE TEST LINES				1200
	1003 am	bbls ahead	WATER SUPPLIED RIG W/DYE IN 2ND 10	6	30	120
Tail mixed bbls 14	1008 am	LEAD CEMENT	CEMENT MIXED AT 13.5 PPG 580 SKS	4	175.6	200
Tail % Excess 0%	1045 am	TAIL CEMENT	CEMENT MIXED AT 15.2 PPG 100 SKS	4	22.6	250
Tail Sacks 100	1052 am	SHUT DOWN				
	1055 am	DROP PLUG				
Total Sacks 680	1055 am	DISPLACEMENT	RIG DISPLACES	6	149	300
Water Temp 62	1135 am	BUMP PLUG	rig to do casing test 370 lift psi			1070
bbl Returns 30	1150 am	CHECK FLOATS	FLOATS HELD/ WATCH FOR FALL BACK			0
	1210 pm	RIG DOWN				
Notes:	1230 pm	LEAVE LOCATION				
			monitered well no top off			

X [Signature]
Work Preformed

X Coman
Title

X 5-24-18
Date

SERIES 2000

