

**Bison Oil Well Cementing  
Tail & Lead**

Date: 7/15/2019

Invoice # 900372

AFE # 205573

Foreman: Corey Barras

Customer: Noble Energy Inc.

Well Name: SLW Ranch State BB07-668

County: Weld  
State: Colorado

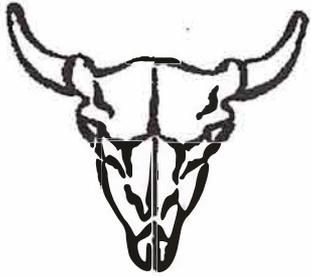
Sec: #7  
Twp: #5N  
Range: #4W 63W

Consultant: Tommy  
Rig Name & Number: H&P 517  
Distance To Location: 21  
Units On Location: 4033/3201-4024/3201- 4035/3205  
Time Requested: 2300  
Time Arrived On Location: 2230  
Time Left Location: \_\_\_\_\_

WELL DATA	Cement Data
<p>Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,902</u> Total Depth (ft) : <u>1942</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>80</u> Conductor ID : <u>15.25</u> Shoe Joint Length (ft) : <u>44</u> Landing Joint (ft) : <u>0</u></p> <p>Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u></p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: <u>8</u> Max Pressure: <u>1500</u></p>	<p><b>Lead</b> 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>10%</u></p> <p><b>Tail</b> 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></p> <p>Fluid Ahead (bbls) <u>30.0</u> H2O Wash Up (bbls) <u>20.0</u></p> <p><b>Spacer Ahead Makeup</b> 30BBL WATER DYE IN 2ND 10</p>

Lead Calculated Results	Tail Calculated Results
HOC of Lead <u>1601.22 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>782.56 cuft</u>	Total Volume of Tail Cement <u>107.90 Cuft</u>
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor <u>61.05 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>843.61 cuft</u>	HOC Tail <u>220.78 ft</u>
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement <u>165.27 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>545.87 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>116.97 bbls</u>	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure <u>585.23 PSI</u>
Displacement <u>143.62 bbls</u>	
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	
Total Water Needed: <u>324.62 bbls</u>	
	Collapse PSI: <u>2020.00 psi</u>
	Burst PSI: <u>3520.00 psi</u>

X Authorization To Proceed



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

Customer: Noble Energy Inc.  
Well Name: SLW Ranch State BB07-668

Date: 7/15/2019  
INVOICE #: 900372  
LOCATION: Weld  
FOREMAN: Corey Barras

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**DESCRIPTION OF JOB EVENTS**

		Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	117	2230	ARRIVE ON LOCATION	ASSESS LOCATION AND HAZARDS			
Lead % Excess	10%	2345	MIRU	SPOT EQUIPMENT, PRE RIG UP MEETING			
Lead Sacks	546	1220	PRE JOB SAFETY MEETING	RIG CREW AND BISON			
		102	PRESSURE TEST LINES				1500
		104	bbls ahead	WATER SUPPLIED RIG W/DYE IN 2ND 10	8	30	180
Tail mixed bbls	14	108	LEAD CEMENT	CEMENT MIXED AT 13.5 PPG	6	165.2	110
Tail % Excess	0%	144	TAIL CEMENT	CEMENT MIXED AT 15.2 PPG	5	22.6	120
Tail Sacks	100	152	SHUT DOWN				
		153	DROP PLUG				
Total Sacks	646	154	DISPLACEMENT	DISPLACE W/ H2O	8	70	360
Water Temp	62	219	BUMP PLUG	Casing Test for 15 Min @ 1030 Psi ( Lift 610)	3	143.6	1030
bbl Returns	33	235	CHECK FLOATS	FLOATS HELD/ WATCH FOR FALL BACK			
		245	RIG DOWN				
Notes:		315	LEAVE LOCATION				
				monitered well no top off			

x

Title

7/15/19 x  
Date

Work Performed

# SWL Ranch State BB07-668

