



Bison Oil Well Cementing Tail & Lead

Date: 10/24/2018
 Invoice # 200358
 API# _____
 Foreman: Kirk Kallhoff

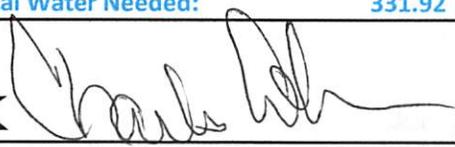
Customer: Noble Energy Inc.
 Well Name: dorothy state lg 16-785

County: Weld Consultant: jim
 State: Colorado Rig Name & Number: H&P 321
 Distance To Location: 53
 Units On Location: 4028/4033
 Sec: 8 Time Requested: 200 am
 Twp: 5N Time Arrived On Location: 1230 am
 Range: 62W Time Left Location: 9:30am

WELL DATA	Cement Data
Casing Size (in) : <u>9.625</u> Casing Weight (lb) : <u>36</u> Casing Depth (ft.) : <u>1,908</u> Total Depth (ft) : <u>1953</u> Open Hole Diameter (in) : <u>13.50</u> Conductor Length (ft) : <u>110</u> Conductor ID : <u>15.15</u> Shoe Joint Length (ft) : <u>39</u> Landing Joint (ft) : <u>35</u> Sacks of Tail Requested <u>100</u> HOC Tail (ft): <u>0</u> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> One or the other, cannot have quantity in both </div> Max Rate: <u>8</u> Max Pressure: <u>2500</u>	Lead Cement Name: <u>BFN III</u> Cement Density (lb/gal) : <u>13.5</u> Cement Yield (cuft) : <u>1.68</u> Gallons Per Sack <u>8.90</u> % Excess <u>15%</u> Tail Type III Cement Name: Cement Density (lb/gal) : <u>15.2</u> Cement Yield (cuft) : <u>1.27</u> Gallons Per Sack: <u>5.80</u> % Excess: <u>0%</u> Fluid Ahead (bbls) 30.0 H2O Wash Up (bbls) 20.0 Spacer Ahead Makeup 30 BBL ahead with Die in 2nd 10

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1537.78 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 751.56 cuft	Total Volume of Tail Cement 110.07 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 82.12 cuft	bbls of Tail Cement 22.62 bbls
(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 833.68 cuft	HOC Tail 225.22 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 170.75 bbls	Sacks of Tail Cement 100.00 sk
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	(Total Volume of Tail Cement) ÷ (Cement Yield)
Sacks of Lead Cement 570.67 sk	bbls of Tail Mix Water 13.81 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 120.93 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 147.18 bbls	Collapse PSI: 2020.00 psi
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Burst PSI: 3520.00 psi
Total Water Needed: 331.92 bbls	

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.

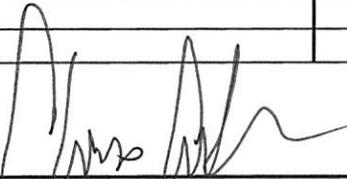


**Bison Oil Well Cementing
Two Cement Surface Pipe**

Date 10/24/2018
 INVOICE # 200358
 LOCATION Weld
 FOREMAN Kirk Kallhoff

Customer Noble Energy Inc.
 Well Name dorothy state lg 16-785

Amount Pumped	Time	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	120.9	1230 am	ARRIVE ON LOCATION			
Lead % Excess	15%	530 am	JSA			
Lead Sacks	571	630 am	JSA			
		648 am	PRESSURE TEST			1000
		650 am	SPACER AHEAD	6	30	200
Tail mixed bbls	13.81	654 am	LEAD CEMENT	6	170.7	210
Tail % Excess	0%	726 am	TAIL CEMENT	6	22.6	180
Tail Sacks	100	731 am	SHUT DOWN			
		734 am	DROP PLUG			
Total Sacks	671	734 am	DISPLACEMENT	8	147.1	350
Water Temp	60	810 am	Bump Plug	1	147.1	510
bbl Returns	31	810 am	Casing TEST			1050
		825 am	Check Floats			
Notes:		900 am	RIG DOWN			
Montered well for		930 am	Leave Location			
30 Min. No top out						
Needed						

X 
 Work Performed

X 
 Title

X 10-24-18
 Date