



Bison Oil Well Cementing Tail & Lead

Date: 12/8/2017
 Invoice #: 900221
 API#: 05-123-45376
 Foreman: Corey Barras

Customer: Noble Energy Inc.
 Well Name: Bison Ridge Y22-764

County: Weld
 State: Colorado
 Sec: 8
 Twp: 5N
 Range: 62W

Consultant: Matt
 Rig Name & Number: H&P 517
 Distance To Location: 38
 Units On Location: 4027/3103-4032/3203
 Time Requested: 1000
 Time Arrived On Location: 900
 Time Left Location: _____

WELL DATA	Cement Data
Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 2,039 Total Depth (ft) : 2049 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.25 Shoe Joint Length (ft) : 42 Landing Joint (ft) : 4 Sacks of Tail Requested : 100 HOC Tail (ft): 0 <small>One or the other, cannot have quantity in both</small> Max Rate: 8 Max Pressure: 2500	Lead Cement Name: BFN III Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.68 Gallons Per Sack : 8.90 % Excess : 15% Tail Type III Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.80 % Excess: 0% Fluid Ahead (bbls) : 50.0 H2O Wash Up (bbls) : 20.0 Spacer Ahead Makeup 50 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 1732.44 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 846.70 cuft	Total Volume of Tail Cement 108.77 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 61.05 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 907.75 cuft	HOC Tail 222.56 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 185.92 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 621.37 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 131.67 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 585.23 PSI
Displacement 154.68 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: 370.16 bbls	

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.

