



Bison Oil Well Cementing Tail & Lead

Date: 5/29/2019

Invoice # 300278

API# 05-123-49607

Foreman: JASON KELEHER

Customer: Noble Energy Inc.

Well Name: STARS FEDERAL LD17-740

County: Weld
State: Colorado

Sec: 5
Twp: 9N
Range: 58W

Consultant: JIM
Rig Name & Number: H&P 517
Distance To Location: 65
Units On Location: 4047-3106,4032-3203
Time Requested: 1730
Time Arrived On Location: 1530
Time Left Location:

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625 Casing Weight (lb) : 36 Casing Depth (ft.) : 1.959 Total Depth (ft) : 1968 Open Hole Diameter (in) : 13.50 Conductor Length (ft) : 80 Conductor ID : 15.25 Shoe Joint Length (ft) : 46 Landing Joint (ft) : 30</p> <p>Sacks of Tail Requested 100 HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: 8 Max Pressure: 1500</p>	<p>Lead</p> <p>Cement Name: Cement Density (lb/gal) : 13.5 Cement Yield (cuft) : 1.7 Gallons Per Sack 9.00 % Excess 10%</p> <p>Tail</p> <p>Cement Name: Cement Density (lb/gal) : 15.2 Cement Yield (cuft) : 1.27 Gallons Per Sack: 5.89 % Excess: 0%</p> <p>Fluid Ahead (bbls) 30.0 H2O Wash Up (bbls) 20.0</p> <p>Spacer Ahead Makeup 30BBL WATER DYE IN 2ND 10</p>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
HOC of Lead 1739.61 ft	Tail Cement Volume In Ann 127.00 cuft
Casing Depth - HOC Tail	(HOC Tail) X (OH Ann)
Volume of Lead Cement 892.16 cuft	Total Volume of Tail Cement 106.68 Cuft
HOC of Lead X Open Hole Ann	(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
Volume of Conductor 64.40 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 956.60 cuft	HOC Tail 218.39 ft
(cuft of Lead Cement) + (Cuft of Conductor)	(Tail Cement Volume) ÷ (OH Ann)
bbls of Lead Cement 170.40 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 563.00 sk	bbls of Tail Mix Water 14.02 bbls
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	(Sacks of Tail Cement X Gallons Per Sack) ÷ 42
bbls of Lead Mix Water 120.64 bbls	Pressure of cement in annulus
(Sacks Needed) X (Gallons Per Sack) ÷ 42	Hydrostatic Pressure 500.00 PSI
Displacement 147.80 bbls	
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	Collapse PSI: 2020.00 psi
Total Water Needed: 185.00 bbls	Burst PSI: 3520.00 psi

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.

