



# Bison Oil Well Cementing Single Cement Surface Pipe

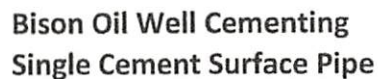
Date: 8/19/2016  
Invoice #: 666004  
API#: 05-123-43292  
Supervisor: Nick

Customer: Noble Energy Inc.  
Well Name: Harper LD21-675

County: Weld  
State: Colorado  
Sec: 22  
Twp: 9N  
Range: 58W  
Consultant: Woody/Charles  
Rig Name & Number: H&P 517  
Distance To Location: 66  
Units On Location: 3106/4028/4034/3202  
Time Requested: 23:00  
Time Arrived On Location: 22:30  
Time Left Location: 7:00

WELL DATA	Cement Data
Casing Size OD (in) : 9.625	Cement Name: BFN III
Casing Weight (lb) : 36.00	Cement Density (lb/gal) : 14.2
Casing Depth (ft) : 1,924	Cement Yield (cuft) : 1.49
Total Depth (ft) : 1934	Gallons Per Sack: 7.48
Open Hole Diameter (in.) : 13.50	% Excess: 15%
Conductor Length (ft) : 80	Displacement Fluid lb/gal: 8.3
Conductor ID : 15.5	BBL to Pit: 39.0
Shoe Joint Length (ft) : 44	Fluid Ahead (bbls): 50.0
Landing Joint (ft) : 5	H2O Wash Up (bbls): 20.0
Max Rate: 8	Spacer Ahead Makeup
Max Pressure: 1500	DYE IN LAST 10 BBL

Casing ID	8.921	Casing Grade	J-55 only used
<b>Calculated Results</b>		<b>Displacement:</b> 145.50 bbls (Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)	
<b>cuft of Shoe</b> 19.10 cuft (Casing ID Squared) X (.005454) X (Shoe Joint ft)	<b>Pressure of cement in annulus</b>		
<b>cuft of Conductor</b> 64.40 cuft (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	<b>Hydrostatic Pressure:</b> 1419.63 PSI		
<b>cuft of Casing</b> 1039.52 cuft (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length )	<b>Pressure of the fluids inside casing</b>		
<b>Total Slurry Volume</b> 1123.46 cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	<b>Displacement:</b> 810.79 psi		
<b>bbls of Slurry</b> 198.00 bbls (Total Slurry Volume) X (.1781)	<b>Shoe Joint:</b> 32.46 psi		
<b>Sacks Needed</b> 746 sk	<b>Total</b> 843.25 psi		
<b>Mix Water</b> 132.86 bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	<b>Differential Pressure:</b> 576.38 psi		
<div><div>x</div><div>W L Berry</div><div>Authorization To Proceed</div></div>		<b>Collapse PSI:</b> 2020.00 psi	
		<b>Burst PSI:</b> 3520.00 psi	
		<b>Total Water Needed:</b> 348.36 bbls	
Customers hereby acknowledges and specifically agrees to the terms and condition on this work order, including, without limitation, the provisions on this work order.			



Noble Energy Inc.  
Harper LD21-675

666004  
Weld  
Nick  
8/19/2016

Treatment Report Page 2

### DESCRIPTION OF JOB EVENTS

X
Work Performed

X  
Date