



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 10/22/2015
 Invoice # 80457
 API# 05-123-40731
 Foreman: Calvin Reimers

Customer: Noble Energy Inc.
 Well Name: Moser H34-769

County: Weld Consultant: JW
 State: Colorado Rig Name & Number: H&P 273
 Distance To Location: 24 Miles
 Sec: 22 Units On Location: 4023-3104/4033-3212
 Twp: 3N Time Requested: 800am
 Range: 65W Time Arrived On Location: 545am
 Time Left Location: 815pm

WELL DATA	Cement Data
Casing Size OD (in) : <u>9.625</u>	Cement Name: <u>BFN III</u>
Casing Weight (lb) : <u>36.00</u>	Cement Density (lb/gal) : <u>14.2</u>
Casing Depth (ft.) : <u>781</u>	Cement Yield (cuft) : <u>1.49</u>
Total Depth (ft) : <u>815</u>	Gallons Per Sack: <u>7.48</u>
Open Hole Diameter (in.) : <u>13.50</u>	% Excess: <u>30%</u>
Conductor Length (ft) : <u>100</u>	Displacement Fluid lb/gal: <u>8.3</u>
Conductor ID : <u>16</u>	BBL to Pit: <u>15.0</u>
Shoe Joint Length (ft) : <u>45</u>	Fluid Ahead (bbls): <u>60.0</u>
Landing Joint (ft) : <u>29</u>	H2O Wash Up (bbls): <u>10.0</u>
Max Rate: <u>7</u>	Spacer Ahead Makeup
Max Pressure: <u>1750</u>	<u>60 bbls H2O+Dye in 2nd 10 bbls</u>

Calculated Results	Pressure of cement in annulus
Casing ID <u>8.921</u> Casing Grade <u>J-55 only used</u>	Displacement: <u>59.16 bbls</u>
cuft of Shoe <u>19.54 cuft</u> (Casing ID Squared) X (.005454) X (Shoe Joint ft)	(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)
cuft of Conductor <u>89.10 cuft</u> (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Pressure of cement in annulus
cuft of Casing <u>432.67 cuft</u> (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Hydrostatic Pressure: <u>576.14 PSI</u>
Total Slurry Volume <u>541.31 cuft</u> (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Pressure of the fluids inside casing
bbls of Slurry <u>96.41 bbls</u> (Total Slurry Volume) X (.1781)	Displacement: <u>317.34 psi</u>
Sacks Needed <u>363 sk</u> (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Shoe Joint: <u>33.20 psi</u>
Mix Water <u>64.70 bbls</u> (Sacks Needed) X (Gallons Per Sack) ÷ 42	Total <u>350.55 psi</u>
	Differential Pressure: <u>225.59 psi</u>
	Collapse PSI: <u>2020.00 psi</u>
	Burst PSI: <u>3520.00 psi</u>
	Total Water Needed: <u>193.86 bbls</u>

X [Signature]
 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.

