



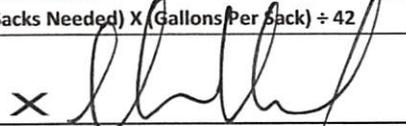
Bison Oil Well Cementing Single Cement Surface Pipe

Date: 7/2/2015
 Invoice # 90011
 API# 05-123-41514
 Foreman: Nick

Customer: Noble Energy Inc.
 Well Name: Wells Ranch State A36-649

County: Weld Consultant: Shane Herd
 State: Colorado Rig Name & Number: H&P 273
 Distance To Location: 60
 Sec: 31 Units On Location: 4027/3107/4022/3213
 Twp: 6N Time Requested: 0:30
 Range: 63W Time Arrived On Location: 23:33
 Time Left Location: 3:30

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>846</u>	Cement Yield (cuft) : <u>1.49</u>
Total Depth (ft) : <u>854</u>	Gallons Per Sack: <u>7.48</u>
Open Hole Diameter (in.) : <u>13.50</u>	% Excess: <u>10%</u>
Conductor Length (ft) : <u>100</u>	Displacement Fluid lb/gal: <u>8.3</u>
Conductor ID : <u>15.25</u>	BBL to Pit: <u>20.0</u>
Shoe Joint Length (ft) : <u>44</u>	Fluid Ahead (bbls): <u>50.0</u>
Landing Joint (ft) : <u>29</u>	H2O Wash Up (bbls): <u>20.0</u>
Max Rate: <u>6</u>	Spacer Ahead Makeup
Max Pressure: <u>1500</u>	DYE IN SECOND 10 BBL

Calculated Results	Pressure of cement in annulus
cuft of Shoe <u>19.10</u> cuft (Casing ID Squared) X (.005454) X (Shoe Joint ft)	Displacement: <u>62.00</u> bbls (Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)
cuft of Conductor <u>76.31</u> cuft (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Hydrostatic Pressure: <u>624.09</u> PSI
cuft of Casing <u>286.35</u> cuft (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Pressure of the fluids inside casing
Total Slurry Volume <u>494.00</u> cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Displacement: <u>345.81</u> psi
bbls of Slurry <u>88.00</u> bbls (Total Slurry Volume) X (.1781)	Shoe Joint: <u>32.46</u> psi
Sacks Needed <u>332</u> sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Total <u>378.27</u> psi
Mix Water <u>59.13</u> bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Differential Pressure: <u>245.83</u> psi
 Authorization To Proceed	Collapse PSI: <u>2020.00</u> psi
	Burst PSI: <u>3520.00</u> psi
	Total Water Needed: <u>191.13</u> 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.

