



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 5/29/2015
 Invoice # 90002
 API# 05-123-41211
 Foreman: Nick

Customer: Noble Energy Inc.
 Well Name: Wells Ranch AA11-690

County: Weld
 State: Colorado
 Sec: 11
 Twp: 6N
 Range: 63W

Consultant: Stetson
 Rig Name & Number: H&P 321
 Distance To Location: 60
 Units On Location: 4029/3103
 Time Requested: 11:00
 Time Arrived On Location: 9:50
 Time Left Location: 3:00

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>573</u>	Cement Yield (cuft) : <u>1.49</u>
Total Depth (ft) : <u>624</u>	Gallons Per Sack: <u>7.48</u>
Open Hole Diameter (in.) : <u>13.50</u>	% Excess: <u>20%</u>
Conductor Length (ft) : <u>100</u>	Displacement Fluid lb/gal: <u>8.3</u>
Conductor ID : <u>15.5</u>	BBL to Pit: <u>15.0</u>
Shoe Joint Length (ft) : <u>43</u>	Fluid Ahead (bbls): <u>40.0</u>
Landing Joint (ft) : <u>42</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
Displacement: <u>44.20</u> bbls (Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)	Hydrostatic Pressure: <u>422.70</u> PSI
cuft of Shoe <u>18.78</u> cuft (Casing ID Squared) X (.005454) X (Shoe Joint ft)	Pressure of the fluids inside casing
cuft of Conductor <u>80.51</u> cuft (Conductor Width Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Displacement: <u>228.41</u> psi
cuft of Casing <u>277.40</u> cuft (Open Hole Squared) - (Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Shoe Joint: <u>31.92</u> psi
Total Slurry Volume <u>376.69</u> cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Total <u>260.33</u> psi
bbls of Slurry <u>74.76</u> bbls (Total Slurry Volume) X (.1781)	Differential Pressure: <u>162.37</u> psi
Sacks Needed <u>282</u> sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Collapse PSI: <u>2020.00</u> psi
Mix Water <u>50.22</u> bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Burst PSI: <u>3520.00</u> psi
	Total Water Needed: <u>154.42</u> 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.

