



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 12/29/2013
 Invoice # 12576
 API# 512336206
 Foreman: Kirk

Customer: encana
 Well Name: libertl 2b-21h

County: weld
 State: Colorado
 Sec: 21
 Twp: 3n
 Range: 68w

Consultant: cody
 Rig Name & Number: ensign 135
 Distance To Location: _____
 Units On Location: 3103-3203
 Time Requested: 730 pm
 Time Arrived On Location: 745 pm
 Time Left Location: 11:15 pm

| WELL DATA | | Cement Data | |
|----------------------------|--------|----------------------------|---------|
| Casing Size OD (in) : | 9.6250 | Cement Name: | BFN III |
| Casing Weight (lb) : | 40 | Cement Density (lb/gal) : | 15.2 |
| Casing Depth (ft.) : | 900 | Cement Yield (cuft) : | 1.27 |
| Total Depth (ft) : | 916 | Gallons Per Sack: | 5.89 |
| Open Hole Diameter (in.) : | 12.25 | % Excess: | 50% |
| Conductor Length (ft) : | 100 | Displacement Fluid lb/gal: | 8.3 |
| Conductor ID : | 15.5 | BBL to Pit: | |
| Shoe Joint Length (ft) : | 44 | Fluid Ahead (bbls): | |
| Landing Joint (ft) : | 16 | H2O Wash Up (bbls): | 20.0 |
| Max Rate: | | Spacer Ahead Makeup | |
| Max Pressure: | | | |

| Calculated Results | | Displacement: 66.12 bbls | |
|---|---|--|--|
| cuft of Shoe 18.73 cuft | (Casing ID Squared) X (.005454) X (Shoe Joint ft) | (Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint) | |
| cuft of Conductor 80.51 cuft | (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft) | Pressure of cement in annulus | |
| cuft of Casing 250.54 cuft | (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length) | Hydrostatic Pressure: 710.64 PSI | |
| Total Slurry Volume 349.78 cuft | (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing) | Pressure of the fluids inside casing | |
| bbls of Slurry 93.44 bbls | (Total Slurry Volume) X (.1781) X (% Excess Cement) | Displacement: 369.09 psi | |
| Sacks Needed 413 sk | (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement) | Shoe Joint: 34.74 psi | |
| Mix Water 57.94 bbls | (Sacks Needed) X (Gallons Per Sack) ÷ 42 | Total 403.83 psi | |
| | | Differential Pressure: 306.81 psi | |
| | | Collapse PSI: 2570.00 psi | |
| | | Burst PSI: 3950.00 psi | |
| | | Total Water Needed: 77.94 bbls | |

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.

