



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 12/30/2013
Invoice # 12577
API#
Foreman: Kirk

Customer: encana
Well Name: liberty 2c-21h

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

Consultant: cody
Rig Name & Number: ensign 135
Distance To Location:
Units On Location: 3106- 3210
Time Requested: 530 pm
Time Arrived On Location: 500 pm
Time Left Location: 9:00 pm

WELL DATA

Casing Size OD (in) : 9.6250
Casing Weight (lb) : 40
Casing Depth (ft.) : 894
Total Depth (ft) : 910
Open Hole Diameter (in.) : 12.26
Conductor Length (ft) : 100
Conductor ID : 15.5
Shoe Joint Length (ft) : 44
Landing Joint (ft) : 16

Max Rate:
Max Pressure:

Cement Data

Cement Name: BFN III
Cement Density (lb/gal) : 15.2
Cement Yield (cuft) : 1.27
Gallons Per Sack: 5.89
% Excess: 45%
Displacement Fluid lb/gal: 8.3
BBL to Pit:
Fluid Ahead (bbls):
H2O Wash Up (bbls): 20.0

Spacer Ahead Makeup

Casing ID

8.835

Casing Grade

J-55 only used

Calculated Results

cuft of Shoe 18.73 cuft
(Casing ID Squared) X (.005454) X (Shoe Joint ft)

cuft of Conductor 80.51 cuft
(Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)

cuft of Casing 249.51 cuft
(Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)

Total Slurry Volume 348.75 cuft
(cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)

bbls of Slurry 90.06 bbls
(Total Slurry Volume) X (.1781) X (% Excess Cement)

Sacks Needed 398 sk
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)

Mix Water 55.84 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42

Displacement: 65.66 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)

Pressure of cement in annulus

Hydrostatic Pressure: 705.90 PSI

Pressure of the fluids inside casing

Displacement: 366.50 psi

Shoe Joint: 34.74 psi

Total 401.25 psi

Differential Pressure: 304.66 psi

Collapse PSI: 2570.00 psi

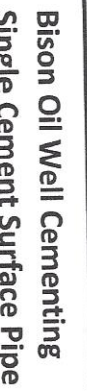
Burst PSI: 3950.00 psi

Total Water Needed: 75.84 bbls

X

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.



encana
liberty 2c-21h

12577
weld
Kirk
12/30/2013

DESCRIPTION OF JOB EVENTS

[illegible]

bumped plug at 800 pm 810 psi 90 bbls slurry

X 12-30-13
Date