



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 9/3/2016
Invoice #: 80525
API#: 05-123-43294
Foreman: Matthew Rosales

Customer: Noble Energy Inc.
Well Name: Harper LD21-662

County: Weld
State: Colorado

Sec: SWSW
Twp: 136N
Range: 64W

Consultant: Sanchez
Rig Name & Number: H&P 517
Distance To Location: 60
Units On Location: 3106
Time Requested: 11:30am
Time Arrived On Location: 10:00am
Time Left Location:

WELL DATA

Casing Size OD (in) : 9.625
Casing Weight (lb) : 36.00
Casing Depth (ft.) : 1,938
Total Depth (ft) : 1948
Open Hole Diameter (in.) : 13.50
Conductor Length (ft) : 80
Conductor ID : 15.25
Shoe Joint Length (ft) : 41
Landing Joint (ft) : 3

Max Rate: 8
Max Pressure: 1700

Cement Data

Cement Name: BFN III
Cement Density (lb/gal) : 14.2
Cement Yield (cuft) : 1.49
Gallons Per Sack: 7.48
% Excess: 15%
Displacement Fluid lb/gal: 8.3

Fluid Ahead (bbls): 50.0
H2O Wash Up (bbls): 20.0

Spacer Ahead Makeup
40H2O, 10Dye

Casing ID

8.921

Casing Grade

J-55 only used

Calculated Results

cuft of Shoe 20.00 cuft
(Casing ID Squared) X (.005454) X (Shoe Joint ft)
cuft of Conductor 61.05 cuft
(Conductor Width Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)
cuft of Casing 892.00 cuft
(Open Hole Squared) - (Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)
Total Slurry Volume 1104.00 cuft
(cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)
bbls of Slurry 197.00 bbls
(Total Slurry Volume) X (.1781)
Sacks Needed 742 sk
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)
Mix Water 132.00 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42

Displacement: 146.60 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)

Pressure of cement in annulus

Hydrostatic Pressure: 1429.66 PSI

Pressure of the fluids inside casing

Displacement: 817.95 psi
Shoe Joint: 30.25 psi
Total 848.20 psi

Differential Pressure: 581.47 psi

Collapse PSI: 2020.00 psi

Burst PSI: 3520.00 psi

Total Water Needed: 300.00 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.



Customer
Well Name

Noble Energy Inc.
Harper LD21-662

INVOICE #
LOCATION
FOREMAN
Date

| |
|-----------------|
| 80525 |
| Weld |
| Matthew Rosales |
| 9/3/2016 |

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DESCRIPTION OF JOB EVENTS

X Cmt Surface CS,

X WSS

Title

X 9-3-18
Date