



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 8/9/2017
 Invoice #: 666179
 API#: 05-123-43575
 Foreman: Nick Vigil

Customer: Anadarko Petroleum Corporation
 Well Name: Norden 1N-14HZ

County: Weld
 State: Colorado
 Sec: 14
 Twp: 1N
 Range: 67W

Consultant: Levi
 Rig Name & Number: Cartel 88
 Distance To Location: 32 Miles
 Units On Location: 4023/4044/4045
 Time Requested: 23:30
 Time Arrived On Location: 23:00
 Time Left Location:

WELL DATA	Cement Data
Casing Size OD (in) : 9.625	Cement Name: BFN III
Casing Weight (lb) : 36.00	Cement Density (lb/gal) : 14.2
Casing Depth (ft.) : 1,859	Cement Yield (cuft) : 1.49
Total Depth (ft) : 1869	Gallons Per Sack: 7.48
Open Hole Diameter (in.) : 13.50	% Excess: 5%
Conductor Length (ft) : 80	Displacement Fluid lb/gal: 8.3
Conductor ID : 15.25	BBL to Pit: 0.0
Shoe Joint Length (ft) : 46	Fluid Ahead (bbls): 30.0
Landing Joint (ft) : 10	H2O Wash Up (bbls): 20.0
Max Rate: 8	Spacer Ahead Makeup
Max Pressure: 2000	Dye in second 10 bbl

Calculated Results	Displacement: 140.93 bbls
cuft of Shoe 19.97 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 61.05 cuft (Conductor Width Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Pressure of cement in annulus
cuft of Casing 912.92 cuft (Open Hole Squared) - (Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Hydrostatic Pressure: 1371.38 PSI
Total Slurry Volume 993.94 cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Pressure of the fluids inside casing
bbls of Slurry 177.02 bbls (Total Slurry Volume) X (.1781)	Displacement: 781.73 psi
Sacks Needed 667 sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Shoe Joint: 33.93 psi
Mix Water 118.80 bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Total 815.67 psi
	Differential Pressure: 555.72 psi
	Collapse PSI: 2020.00 psi
	Burst PSI: 3520.00 psi
	Total Water Needed: 309.74 bbls

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 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.

Norden 1N-14HZ

— PSI — Barrels / Minute — Lbs / Gallon

