



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 9/3/2017
 Invoice # 666198
 API# 05-123-43471
 Foreman: Nick Vigil

Customer: Anadarko Petroleum Corporation
Well Name: Wagner 2N-10HZ

County: Weld Consultant: Matt/Brian
 State: Colorado Rig Name & Number: Cartel 88
 Sec: 22 Distance To Location: 34 Miles
 Twp: 1N Units On Location: 4023/4024/4039
 Range: 67W Time Requested: 21:00
 Time Arrived On Location: 19:50
 Time Left Location: _____

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>1,862</u>	Cement Yield (cuft) : <u>1.49</u>
Total Depth (ft) : <u>1871</u>	Gallons Per Sack: <u>7.48</u>
Open Hole Diameter (in.) : <u>13.50</u>	% Excess: <u>5%</u>
Conductor Length (ft) : <u>80</u>	Displacement Fluid lb/gal: <u>8.3</u>
Conductor ID : <u>15.25</u>	BBL to Pit: <u>0.0</u>
Shoe Joint Length (ft) : <u>44</u>	Fluid Ahead (bbls): <u>30.0</u>
Landing Joint (ft) : <u>10</u>	H2O Wash Up (bbls): <u>20.0</u>
Max Rate: <u>8</u>	Spacer Ahead Makeup
Max Pressure: <u>2000</u>	Dye in second 10 bbl

Calculated Results	Pressure of cement in annulus
Displacement: <u>141.32 bbls</u>	(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)
cuft of Shoe <u>19.10 cuft</u> (Casing ID Squared) X (.005454) X (Shoe Joint ft)	Pressure of cement in annulus
cuft of Conductor <u>61.05 cuft</u> (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Hydrostatic Pressure: <u>1373.60 PSI</u>
cuft of Casing <u>914.46 cuft</u> (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Pressure of the fluids inside casing
Total Slurry Volume <u>994.61 cuft</u> (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Displacement: <u>783.89 psi</u>
bbls of Slurry <u>177.14 bbls</u> (Total Slurry Volume) X (.1781)	Shoe Joint: <u>32.46 psi</u>
Sacks Needed <u>668 sk</u> (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Total <u>816.35 psi</u>
Mix Water <u>118.88 bbls</u> (Sacks Needed) X (Gallons Per Sack) ÷ 42	Differential Pressure: <u>557.25 psi</u>
	Collapse PSI: <u>2020.00 psi</u>
	Burst PSI: <u>3520.00 psi</u>
	Total Water Needed: <u>310.20 bbls</u>

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.

Wagner 2N-10HZ

