



Bison Oil Well Cementing Single Cement Surface Pipe

Date: 8/20/2015
 Invoice # 80435
 API# 05-123-41907
 Foreman: Calvin Reimers

Customer: Anadarko Petroleum Corporation

Well Name: Powers 36N-22HZ

County: Weld
 State: Colorado
 Sec: 22
 Twp: 2N
 Range: 65W

Consultant: Bryan / Hayden
 Rig Name & Number: Noble 2
 Distance To Location: 40 Miles
 Units On Location: 4023-3104/4024-3203
 Time Requested: 900am
 Time Arrived On Location: 800am
 Time Left Location: 12:15pm

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>1,856</u>	Cement Yield (cuft) :	<u>1.49</u>
Total Depth (ft) :	<u>1873</u>	Gallons Per Sack:	<u>7.48</u>
Open Hole Diameter (in.) :	<u>13.50</u>	% Excess:	<u>15%</u>
Conductor Length (ft) :	<u>60</u>	Displacement Fluid lb/gal:	<u>8.3</u>
Conductor ID :	<u>15.5</u>	BBL to Pit:	<u>24</u>
Shoe Joint Length (ft) :	<u>42</u>	Fluid Ahead (bbls):	<u>30.0</u>
Landing Joint (ft) :	<u>10</u>	H2O Wash Up (bbls):	<u>15.0</u>
Max Rate:	<u>6</u>	Spacer Ahead Makeup	
Max Pressure:	<u>1750</u>	30 bbls With Dye in 2nd 10 bbls	

Calculated Results	Displacement:	141.02 bbls
cuft of Shoe <u>18.18</u> 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 <u>48.30</u> cuft (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Pressure of cement in annulus	
cuft of Casing <u>1009.44</u> cuft (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Hydrostatic Pressure: <u>1369.20 PSI</u>	
Total Slurry Volume <u>1075.93</u> cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Pressure of the fluids inside casing	
bbls of Slurry <u>191.62</u> bbls (Total Slurry Volume) X (.1781)	Displacement: <u>782.23 psi</u>	
Sacks Needed <u>722</u> sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Shoe Joint: <u>30.89 psi</u>	
Mix Water <u>128.60</u> bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Total <u>813.13 psi</u>	
	Differential Pressure: <u>556.07 psi</u>	
	Collapse PSI: <u>2020.00 psi</u>	
	Burst PSI: <u>3520.00 psi</u>	
	Total Water Needed: <u>314.62 bbls</u>	

X Bryan Brown
 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.

SERIES 2000

— PSI — Barrels / Minute — Barrels — Lbs / Gallon — Stage Volume

