



**Bison Oil Well Cementing
Single Cement Surface Pipe**

Date: 2/10/2015
 Invoice # 45125
 API# 05-123-38143
 Foreman: JASON KELEHER

Customer: Noble Energy Inc.
Well Name: RELIANCE E23-69-HH

County: Weld
 State: Colorado
 Sec: 23
 Twp: 6N
 Range: 65W

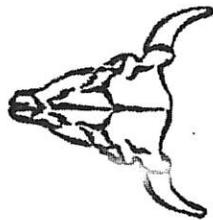
Consultant: GARY
 Rig Name & Number: H&P 326
 Distance To Location: 19
 Units On Location: 4027-3106/ 4022-3213
 Time Requested: 900
 Time Arrived On Location: 830
 Time Left Location: 1500

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>753</u>	Cement Yield (cuft) : <u>1.49</u>
Total Depth (ft) : <u>792</u>	Gallons Per Sack: <u>7.48</u>
Open Hole Diameter (in.) : <u>13.50</u>	% Excess: <u>0%</u>
Conductor Length (ft) : <u>100</u>	Displacement Fluid lb/gal: <u>8.3</u>
Conductor ID : <u>15.25</u>	BBL to Pit: <u>17.0</u>
Shoe Joint Length (ft) : <u>44</u>	Fluid Ahead (bbls): <u>30.0</u>
Landing Joint (ft) : <u>30</u>	H2O Wash Up (bbls): <u>20.0</u>
Max Rate: <u>6</u>	Spacer Ahead Makeup
Max Pressure: <u>1000</u>	<u>30 BBL WATER W/ DYE IN 2ND 10</u>

Calculated Results	Pressure of cement in annulus
Displacement: <u>57.09</u> bbls (Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)	Hydrostatic Pressure: <u>555.36</u> PSI
cuft of Shoe <u>19.25</u> cuft (Casing ID Squared) X (.005454) X (Shoe Joint ft)	Pressure of the fluids inside casing
cuft of Conductor <u>76.31</u> cuft (Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	Displacement: <u>305.48</u> psi
cuft of Casing <u>319.06</u> cuft (Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)	Shoe Joint: <u>32.72</u> psi
Total Slurry Volume <u>414.62</u> cuft (cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)	Total <u>338.20</u> psi
bbls of Slurry <u>73.84</u> bbls (Total Slurry Volume) X (.1781)	Differential Pressure: <u>217.16</u> psi
Sacks Needed <u>278</u> sk (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	Collapse PSI: <u>2020.00</u> psi
Mix Water <u>49.56</u> bbls (Sacks Needed) X (Gallons Per Sack) ÷ 42	Burst PSI: <u>3520.00</u> psi
	Total Water Needed: <u>156.65</u> bbls

[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.



Bison Oil Well Cementing
Single Cement Surface Pipe

Customer
Well Name

Noble Energy Inc.
RELIANCE E23-69-NM

INVOICE #
LOCATION
FOREMAN
Date

45125
Weld
JASON KELEHER
2/10/2015

Treatment Report Page 2

DESCRIPTION OF JOB EVENTS

Safety Meeting	Displace 1			Displace 2			Displace 3			Displace 4			Displace 5		
	BLS	Time	PSI	BLS	Time	PSI	BLS	Time	PSI	BLS	Time	PSI	BLS	Time	PSI
MIRU	120														
CIRCULATE	1241	0	1315	0	10		0	10		0	10		0	10	
Drop Plug		10	1317	40	20		20	20		20	20		20	20	
		20	1320	70	30		30	30		30	30		30	30	
		30	1324	100	40		40	40		40	40		40	40	
		40	1329	170	50		50	50		50	50		50	50	
		50	1333	210	60		60	60		60	60		60	60	
M & P		60	1336	220	70		70	70		70	70		70	70	
		70	BUIMP	480	80		80	80		80	80		80	80	
1253-1313		80			90		90	90		90	90		90	90	
		90			100		100	100		100	100		100	100	
		100			110		110	110		110	110		110	110	
		110			120		120	120		120	120		120	120	
% Excess		120			130		130	130		130	130		130	130	
Mixed bbls		130			140		140	140		140	140		140	140	
Total Sacks		140			150		150	150		150	150		150	150	
bbl Returns		150													
Water Temp		51													

Notes:

PRESSURED TESTED TO 1500 PSI AT 1238, PUMPED 40 BBL WATER W/ DYE IN 2ND 10 AT 1241, MIXED AND PUMPED 342 SKS AT 14.2, 90.7 BBL AT 1253, SHUT DOWN AT 1313, STARTED DISPLACEMENT AT 1315, PLUG LANDED AT 220 PSI AT 1336 AND PRESSURED UP TO 480 PSI, HELD FOR 2 MINUTE AND PRESSURED UP TO 1020 PSI TO PERFORM CASING TEST, HELD FOR 15 MINUTES AND THEN RELEASED AND CHECKED FLOATS, FLOATS HELD, GOT .5 BBL FACK

Work Performed/
Ray Stoltz

X *WSS*
Title

X *2/10/2015*
Date