BISON

Bison Oil Well Cementing Inc.
1547 Gaylord Street
Denver, CO 80206
303-296-3010

Invoice

Date	Invoice #
12/8/2013	12595

Bill To
Noble Energy Inc. Attn: Accounting 1625 Broadway Ste 2000 Denver, CO 80202'

Location	Well Name & No.	Terms	Job Type		
Weld CO	Castor Federal LD15-72HN	Net 30	Surface Pipe		
Item	**Description**	**Qty**	**U/M**	**Rate**	**Amount**
Pump surface	PUMP Charge-surface pipe	1			
Discount 15%	Discount 15%				
MILEAGE	Mileage charge	480			
Discount 15%	Discount 15%				
Data Acquisition ...	Data Acquisition Charge	1			
Discount 15%	Discount 15%				
	Subtotal of Services				
BFN III Winter ...	BFN III Blend	505	Sack		
Discount 15%	Discount 15%				
KCL Mud Flush	(BHS 117)	4	qt		
Discount 15%	Discount 15%				
Dye - 4880	Dye (Hot Pink 4880)	16	oz		
Discount 15%	Discount 15%				
	Subtotal of Materials				

Please Remit Payment To:

Bison Oil Well Cementing, Inc.
P.O. Box 29671
Thornton, CO 80229

Subtotal	
Sales Tax (2.9%)	
Total	
Balance Due	

Bison Oil Well Cementing
Tail & Lead

Date: 12/8/2013
Invoice # 12595
API# 05-123-37433
Foreman: Calvin Reimers

Customer: Noble
Well Name: Castor Federal LD 15-72HN

Consultant: Dave N / Mike P
Rig Name & Number: H&P 273
Distance To Location: 80 Miles
Units On Location: 3106/3212
Time Requested: 1000pm
Time Arrived On Location: 1000pm
Time Left Location:

County: Weld
State: Colorado
Sec: 15
Twp: 9N
Range: 58W

WELL DATA

Casing Size (in)	9.625
Casing Weight (lb)	36
Casing Depth (ft.)	1,209
Total Depth (ft)	1242
Open Hole Diameter (in)	13.75
Conductor Length (ft)	100
Conductor ID	16
Shoe Joint Length (ft)	42
Landing Joint (ft)	30
Sacks of Tail Requested	100
HOC Tail (ft)	0

One or the other, cannot have quantity in both

Max Rate:	7
Max Pressure:	2500

Cement Data

Lead

Cement Name:	
Cement Density (lb/gal) :	13.1
Cement Yield (cuft) :	1.69
Gallons Per Sack	8.64
% Excess	25%

Tail

Cement Name:	
Cement Density (lb/gal) :	15.2
Cement Yield (cuft) :	1.27
Gallons Per Sack:	5.89
% Excess:	0%

Fluid Ahead (bbls)	92.5
H20 Wash Up (bbls)	20.0

Spacer Ahead Makeup

40bbls H2O with KCL+Dye in 2nd 10bbls

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results

HOC of Lead Casing Depth - HOC Tail	871.79 ft
Volume of Lead Cement HOC of Lead X Open Hole Ann	458.46 cuft
Volume of Conductor (Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)	89.10 cuft
Total Volume of Lead Cement (cuft of Lead Cement) + (Cuft of Conductor)	547.56 cuft
bbls of Lead Cement (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	121.90 bbls
Sacks of Lead Cement (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	405.00 sk
bbls of Lead Mix Water (Sacks Needed) X (Gallons Per Sack) ÷ 42	83.31 bbls
Displacement (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	92.49 bbls
Total Water Needed:	199.80 bbls

Tail Calculated Results

Tail Cement Volume In Ann (HOC Tail) X (OH Ann)	127.00 cuft
Total Volume of Tail Cement (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)	108.74 Cuft
bbls of Tail Cement (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)	22.62 bbls
HOC Tail (Tail Cement Volume) ÷ (OH Ann)	206.77 ft
Sacks of Tail Cement (Total Volume of Tail Cement) ÷ (Cement Yield)	100.00 sk
bbls of Tail Mix Water (Sacks of Tail Cement X Gallons Per Sack) ÷ 42	14.02 bbls

Pressure of cement in annulus

Hydrostatic Pressure	822.43 PSI
Collapse PSI:	2020.00 psi
Burst PSI:	3520.00 psi

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.

Bison Oil Well Cementing
Two Cement Surface Pipe

Customer	Noble
Well Name	Castor Federal LD 15-72HN

Date	12/8/2013
INVOICE #	12595
LOCATION	Weld
FOREMAN	Calvin Reimers

Treatment Report Page 2

DESCRIPTION OF JOB EVENTS

Safety Meeting	1117am
MIRU	1224am
CIRCULATE	1148am
Drop Plug	
1247am	
M & P	

Time	Sacks
1148am	505
1245pm	

Lead mixed bbls	83.31
Lead % Excess	25%
Lead Sacks	405
Tail mixed bbls	14.02
Tail % Excess	0%
Tail Sacks	100
Total Sacks	505
bbl Returns	8

Displace 1			Displace 2			Displace 3			Displace 4			Displace 5		
BBLS	Time	PSI	BBLS	Time	PSI	BBLS	Time	PSI	BBLS	Time	PSI	BBLS	Time	PSI
0	1248pm	100	0			0			0			0		
10	1252pm	130	10			10			10			10		
20	1254pm	240	20			20			20			20		
30	1256pm	240	30			30			30			30		
40	1258pm	250	40			40			40			40		
50	100pm	300	50			50			50			50		
60	102pm	310	60			60			60			60		
70	104pm	370	70			70			70			70		
80	106pm	370	80			80			80			80		
90	112pm	340	90			90			90			90		
100	116pm	320	100			100			100			100		
110	Bump	510	110			110			110			110		
120			120			120			120			120		
130			130			130			130			130		
140			140			140			140			140		
150			150			150			150			150		

Notes:
Float Held

X _____
Work Preformed

X CO MAN
Title

X 12-9-2013
Date