Bison Oil Well Cementing
Single Cement Surface Pipe

Date: 8/19/2016
Invoice # 666004
API# 05-123-43292
Supervisor Nick

Customer: Noble Energy Inc.
Well Name Harper LD21-675

County: Weld
State: Colorado

Sec: 22
Twp: 9N
Range: 58W

Consultant: Woody/Charles
Rig Name & Number: H&P 517
Distance To Location: 66
Units On Location: 3106/4028/4034/3202
Time Requested: 23:00
Time Arrived On Location: 22:30
Time Left Location: 7:00

WELL DATA

Casing Size OD (in) :	_9.625
Casing Weight (lb) :	36.00
Casing Depth (ft.) :	1,924
Total Depth (ft) :	1934
Open Hole Diameter (in.) :	13.50
Conductor Length (ft) :	80
Conductor ID :	15.5
Shoe Joint Length (ft) :	44
Landing Joint (ft) :	5
Max Rate:	8
Max Pressure:	1500

Cement Data

Cement Name: BFN III

Cement Density (lb/gal) :	14.2
Cement Yield (cuft) :	1.49
Gallons Per Sack:	7.48
% Excess:	15%
Displacement Fluid lb/gal:	8.3
BBL to Pit:	39.0
Fluid Ahead (bbls):	50.0
H20 Wash Up (bbls):	20.0

Spacer Ahead Makeup
DYE IN LAST 10 BBL

Casing ID 8.921 Casing Grade J-55 only used

Calculated Results

cuft of Shoe 19.10 cuft
(Casing ID Squared) X (.005454) X (Shoe Joint ft)

cuft of Conductor 64.40 cuft
(Conductor Width Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)

cuft of Casing 1039.52 cuft
(Open Hole Squared)-(Casing Size Squared) X (.005454) X (Casing Depth - Conductor Length)

Total Slurry Volume 1123.46 cuft
(cuft of Shoe) + (cuft of Conductor) + (cuft of Casing)

bbls of Slurry 198.00 bbls
(Total Slurry Volume) X (.1781)

Sacks Needed 746 sk

Mix Water 132.86 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42

Displacement: 145.50 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth + Landing Joint - Shoe Joint)

Pressure of cement in annulus

Hydrostatic Pressure: 1419.63 PSI

Pressure of the fluids inside casing

Displacement: 810.79 psi
Shoe Joint: 32.46 psi
Total 843.25 psi

Differential Pressure: 576.38 psi

Collapse PSI: 2020.00 psi
Burst PSI: 3520.00 psi

Total Water Needed: 348.36 bbls

x W J Bern
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.

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Well Name	Harper LD21-675

INVOICE #	666004
LOCATION	Weld
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DESCRIPTION OF JOB EVENTS

Amount Pumped		Time/Date	Event	Description	Rate	BBLs	Pressure
% Excess	15%	10:30 PM	Arrive on location	Well site assesment, Hazard hunt			
Mixed bbls	198	2:30 AM	Rig up equipment	Rig up safety meeting.			
Total Sacks	746	3:15 AM	Pre job JSA	Held safety meeting with all personnel involved.			
bbl Returns	39	3:32 AM	Pressure Test	Pressure tested lines to 1500 psi.			
Water Temp	65	3:35 AM	Spacer Ahead	Dye in second 10 bbl	6	50	180
		3:44 AM	Lead Cement	14.2 ppg Cement	6.5	198	260
Notes:		4:20 AM	Shutdown				
		4:21 AM	Drop Plug	Plug was pre loaded.			
		4:21 AM	Pump Displacement	Displaced with OBM	5.5	70	300
		4:47 AM	Bump Plug	Bumped 100 psi over final lift pressure	2.2	145.5	630
		4:49 AM	Casing Test	Tested casing to 1000 psi for 15 min.			1000
		5:04 AM	Check Floats	Floats held (.5 bbl back to truck)			
		6:00 AM	Top Off Well	Topped off well.			
		6:30 AM	Rig down equipment	Rig down safety meeting.			
		7:00 AM	Crew left location				

X _____ Work Performed

X _____ Title

X _____ Date