



**Bison Oil Well Cementing
Tail & Lead**

Date: 9/4/2018

Invoice # 666350

API# 05-123-46762

Supervisor: Nick Vigil

Customer: Noble Energy Inc.

Well Name: Emmy State H25-718

Consultant: Tommy

County: Weld

Rig Name & Number: H&P 517

State: Colorado

Distance To Location: 22 miles

Sec: 19

Units On Location: 4023/4032

Twp: 6N

Time Requested: 20:30

Range: 63W

Time Arrived On Location: 19:00

Time Left Location:

WELL DATA

Casing Size (in) : 9.625
 Casing Weight (lb) : 36
 Casing Depth (ft.) : 1,933
 Total Depth (ft) : 1943
 Open Hole Diameter (in) : 13.50
 Conductor Length (ft) : 80
 Conductor ID : 15.25
 Shoe Joint Length (ft) : 48
 Landing Joint (ft) :

Sacks of Tail Requested 100
 HOC Tail (ft): 0

One or the other, cannot have quantity in both

Max Rate: 8
 Max Pressure: 2000

Cement Data

Lead

Cement Name:
 Cement Density (lb/gal) : 13.5
 Cement Yield (cuft) : 1.7
 Gallons Per Sack 9.00
 % Excess 15%

Tail

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

Fluid Ahead (bbls) 30.0
 H2O Wash Up (bbls) 20.0

Spacer Ahead Makeup

Dye in second 10 bbl

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results

HOC of Lead 1626.77 ft
 Casing Depth - HOC Tail
 Volume of Lead Cement 795.05 cuft
 HOC of Lead X Open Hole Ann
 Volume of Conductor 61.05 cuft
 (Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X
 (Conductor Length ft)
 Total Volume of Lead Cement 856.10 cuft
 (cuft of Lead Cement) + (Cuft of Conductor)
 bbls of Lead Cement 175.34 bbls
 (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)
 Sacks of Lead Cement 579.13 sk
 (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)
 bbls of Lead Mix Water 124.10 bbls
 (Sacks Needed) X (Gallons Per Sack) ÷ 42
 Displacement 146.41 bbls
 (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)
 Total Water Needed: 334.53 bbls

Tail Calculated Results

Tail Cement Volume In Ann 127.00 cuft
 (HOC Tail) X (OH Ann)
 Total Volume of Tail Cement 106.17 Cuft
 (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
 bbls of Tail Cement 22.62 bbls
 (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
 HOC Tail 217.23 ft
 (Tail Cement Volume) ÷ (OH Ann)
 Sacks of Tail Cement 100.00 sk
 (Total Volume of Tail Cement) ÷ (Cement Yield)
 bbls of Tail Mix Water 14.02 bbls
 (Sacks of Tail Cement X Gallons Per Sack) ÷ 42
 Pressure of cement in annulus
 Hydrostatic Pressure 585.23 PSI
 Collapse PSI: 2020.00 psi
 Burst PSI: 3520.00 psi

X Authorization To Proceed



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

Customer: Noble Energy Inc.
Well Name: Emmy State H25-718

Date: 9/4/2018
INVOICE #: 666350
LOCATION: Weld
FOREMAN: Nick Vigil

DESCRIPTION OF JOB EVENTS

Amount Pumped	Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	175.3	17:00	Arrive On Location			
Lead % Excess	15%	17:05	Well Site Assessment			
Lead Sacks	579	21:30	Rig Up Equipment			
		22:10	JSA	Held safety meeting with all personell involved in job.		
		22:24	Test Lines	Pressure tested lines to 1700 psi.		
Tail mixed bbls	22.6	22:26	Spacer Ahead		8.3	30
Tail % Excess	0%	22:30	Lead Cement		6	175.3
Tail Sacks	100	23:06	Tail Cement		6	22.6
		23:11	Shut Down			
Total Sacks	679	23:12	Drop Plug	Plug was pre loaded.		
Water Temp	60	23:14	Displace		8	70
bbl Returns	38	23:41	Bump Plug		1	146.4
Notes:		23:42	Casing Test	Pressured up casing to 1000 psi and held for 15 min.		
MicroMotion stopped		0:00	Check Floats	Floats held (flowed back 1 bbls)		
reading density half way		0:05	End Job	Monitored well for top out.		
through lead. Weight was		0:20	Rig Down Equipment	Rig down safety meeting.		
verified both by scale and		0:45	Crew Left Location			
and mix water.						

X
Signature _____

X
Title _____

X
Date _____



BISON OILWELL CEMENTING JOB SAFETY ANALYSIS WORKSHEET

JOB/TASK: SURFACE CASING CEMENTING	CEMENTER/SUPERVISOR: Nick Vigil	PAGE 1	OF 3
WELL NAME: EMM, state H25-718	RIG #: 517	LOCATION: cr. 30 & cr. 49	DATE: 9/9/16
OPERATOR: Noble	CONSULTANT: TOMMY	INVOICE #: 666750	
PPE REQUIRED: <input type="checkbox"/> Hard Hat <input type="checkbox"/> FR Coveralls <input type="checkbox"/> Safety Glasses <input type="checkbox"/> Reflective Vest <input type="checkbox"/> Steel Toe Boots <input type="checkbox"/> Impact Gloves			
ADDITIONAL PPE (based on job specific hazards) <input type="checkbox"/> Goggles <input type="checkbox"/> Faceshield <input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Chemical Resistant Clothing <input type="checkbox"/> Air Purifying Respirator <input type="checkbox"/> Supplied Air Respirator <input type="checkbox"/> Personal H2S Monitor <input type="checkbox"/> Personal Methane Monitor			

JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE	REVIEWED BY																
1. Review JSA	Misunderstanding	Clarify job and associated hazards and safety concerns	NV																
2. Conduct pre job safety meeting	Misunderstanding	-Hold safety meeting with all personnel on location, ensure everyone pays attention to ensure they understand their role and responsibility during the job -Review treatment report with consultant and attain signature for authorization to proceed -Identify and address short service employees (SSE) who are on location	NV																
3. Move trucks in and rig up equipment	Other traffic on location, overhead lines, pinch points, heavy lifting, slips/falls	-Coordinate with well site supervisor for directions on where and when to park the equipment -All Bison crew members walk the location prior to driving in to access specific hazards -Utilize spotters when trucks are in motion -Establish buffer zone around equipment utilizing cones and caution tape -Cementer follows up to ensure connections are secure -Lift with your legs and use teamwork when rigging up -Utilize reflective vests and wands to increase visibility at night -Deploy spill berms and buckets	NV																
4. Raise cement head and hoses to rig floor	Overhead work, improper hookup/load not properly secured, poor communication between ground personnel and crane/tugger operator	-Inspect slings, chains and hooks prior to lift -Ensure line of sight with crane/tugger operator is maintained throughout the lift and hand signals are understood -Ensure no personnel are under suspended equipment -Utilize a tag line to control the load	NV																
5. Connect Cement head/swage/pin, chickens and hoses.	Working in a congested area, pinch points, swinging hammers, slippery rig floor	-Only Bison personnel install the cement head and hoses -Maintain line of sight and communication with crane/tugger operator -Remove non-essential personnel from rig floor, wait until other activity is done -Rig crew does not install chains until head and hoses are installed -Ensure a clear path when swinging a hammer -Ensure all fittings and hoses have proper pressure rating for the job and fall within the parameters of the <i>Bison Oilwell Iron Inspection Program</i>	NV																
6. Pressure test lines	Equipment failing under high pressures	-Ensure rig floor is clear and personnel are away from hoses prior to test -Establish buffer area around high pressure hoses -Lines are checked from a distance and using pressure gauges -Cementer ensures pressure gauges are functioning properly	NV																
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Test to:</td> <td style="width:50%;"></td> </tr> <tr> <td>PSI- 1500</td> <td></td> </tr> <tr> <td>Maximum pressure allowed for job:</td> <td></td> </tr> <tr> <td>PSI- 2500</td> <td></td> </tr> </table>	Test to:		PSI- 1500		Maximum pressure allowed for job:		PSI- 2500			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Pressure relief valve set to:</td> <td style="width:50%;"></td> </tr> <tr> <td>PSI- 2000</td> <td></td> </tr> <tr> <td>Max. pump pressure:</td> <td></td> </tr> <tr> <td>PSI- 10000</td> <td></td> </tr> </table>	Pressure relief valve set to:		PSI- 2000		Max. pump pressure:		PSI- 10000		
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7. Pump Spacer (dye marker)/Mix and Pump Cement	Serious Injury from high pressure line failure or catastrophic equipment failure. Casing hydraulicing from hole, causing injury. Burns or skin irritation from splashing cement, uncontrolled spills	-Pressure test prior to job, utilize heavy duty hose hobbles and pressure relief valve -Keep rig floor and buffer area clear while pumping -Utilize proper PPE -Have access to water to rinse affected skin -Deploy spill berms and buckets	NV																

BISON OILWELL CEMENTING JOB SAFETY ANALYSIS WORKSHEET

8. Drop plug	Slips, trips, falls. Miscommunication between pump operator and cementer, pressure against a closed stop	<ul style="list-style-type: none"> -Utilize 3 points of contact while descending/climbing ladder and stairs -Have visual contact between cementer and pump operator before pump is engaged 	NV
9. Displacement	Unexpected pressure associated with resuming of pumping, casing hydraulicing from hole, serious injury from high pressure line failure or catastrophic equipment failure.	<ul style="list-style-type: none"> -Ensure rig floor remains clear and non-essential personnel stay clear from buffer area -Pump operator monitors pump pressure constantly -Utilize proper PPE 	NV
10. Bump plug-Test float and release pressure	Pressure jumps before expected (calculated) displacement. Pressure jumps rapidly and higher than expected.	<ul style="list-style-type: none"> -Pump operator slows rate to 2 BPM when 5 bbls from calculated displacement and down to 1 bpm within 2 bbls of calculated displacement -Pump operator monitors pressure constantly -Pressure relief valve installed on pump 	NV
11. Pressure test casing (if required)	Test to: PSI-NA FOR: MIN- NA Serious injury from high pressure line or catastrophic equipment failure	-Ensure rig floor remains clear and non-essential personnel stay clear from the buffer area	NV
12. Wash up / rig down	Splashing cement slurry, heavy lifting, pinch points, unsecured hoses	<ul style="list-style-type: none"> -Utilize stakes or portable tank manifold to secure hoses -Use proper lifting technique (2 man lift, lift with legs, plan your route) 	NV
13. Depart location	Other traffic and personnel and location, overhead lines	<ul style="list-style-type: none"> -All Bison crew member walk the planned exit route to access possible obstacles and hazards -Utilize spotters while backing 	NV
14. General Precautions/Stop Work <ul style="list-style-type: none"> - If you see a leaking connection, notify the cementer. Do not attempt to hammer up a leaking connection as there may be pressure on the lines. -Any person on location, regardless of their position or experience level has the authority and responsibility to stop the job if they witness an unsafe act or condition. 			NV
15. OTHER HAZARDS SPECIFIC TO LOCATION OR ENVIRONMENT NOT ADDRESSED ABOVE:			NV
DESIGNATED EMERGENCY MUSTER AREA:	Entrance to location.	NEAREST EMERGENCY MEDICAL FACILITY (OTHER THAN 911): Brighton	

Emmy State H25-718

