Bison Oil Well Cementing
Tail & Lead

Date: 5/10/2018

Invoice # 200278

API#

Customer: Crestone Peak Resources
Well Name: rugge 3L-4h

Foreman: Kirk Kallhoff

Consultant: brent

County: Weld
State: Colorado

Rig Name & Number: ENSIGN 122
Distance To Location: 36
Units On Location: 4028/4039/4041

Sec: 4
Twp: 1n
Range: 65w

Time Requested: 330 pm
Time Arrived On Location: 200 pm
Time Left Location:

WELL DATA

Casing Size (in) :	_9.625
Casing Weight (lb) :	40
Casing Depth (ft.) :	2,434
Total Depth (ft) :	2465
Open Hole Diameter (in) :	13.50
Conductor Length (ft) :	110
Conductor ID :	15.6
Shoe Joint Length (ft) :	74
Landing Joint (ft) :	17
Sacks of Tail Requested	190
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	25%

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

Fluid Ahead (bbls) 60.0
H20 Wash Up (bbls) 10.0

Spacer Ahead Makeup
60 BBL WATER DYE IN 2ND 10

Casing ID   8.835   Casing Grade   J-55 only used

Lead Calculated Results

HOC of Lead 1877.73 ft
Casing Depth - HOC Tail

Volume of Lead Cement 917.70 cuft
HOC of Lead X Open Hole Ann

Volume of Conductor 90.42 cuft
(Conductor ID Squared) -(Casing Size OD Squared) X (.005454) X (Conductor Length ft)

Total Volume of Lead Cement 1008.13 cuft
(cuft of Lead Cement) + (Cuft of Conductor)

bbls of Lead Cement 224.43 bbls
(Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)

Sacks of Lead Cement 741.27 sk
(Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)

bbls of Lead Mix Water 158.84 bbls
(Sacks Needed) X (Gallons Per Sack) ÷ 42

Displacement 180.18 bbls
(Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)

Total Water Needed: 435.67 bbls

Tail Calculated Results

Tail Cement Volume In Ann 241.30 cuft
(HOC Tail) X (OH Ann)

Total Volume of Tail Cement 209.80 Cuft
(HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)

bbls of Tail Cement 42.98 bbls
(HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)

HOC Tail 429.27 ft
(Tail Cement Volume) ÷ (OH Ann)

Sacks of Tail Cement 190.00 sk
(Total Volume of Tail Cement) ÷ (Cement Yield)

bbls of Tail Mix Water 26.65 bbls
(Sacks of Tail Cement X Gallons Per Sack) ÷ 42

Pressure of cement in annulus

Hydrostatic Pressure 585.23 PSI

Collapse PSI: 2570.00 psi

Burst PSI: 3950.00 psi

X
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Authorization To Proceed

Bison Oil Well Cementing
Two Cement Surface Pipe

Date	5/10/2018
INVOICE #	200278
LOCATION	Weld
FOREMAN	Kirk Kallhoff

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FOREMAN: Kirk Kallhoff

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DESCRIPTION OF JOB EVENTS

Amount Pumped		Time/Date	Event	Description	Rate	BBLs	Pressure
Lead mixed bbls	158.8	200 pm	ARRIVE ON LOCATION	ASSESS LOCATION			
Lead % Excess	25%	600 pm	MIRU	SPOT EQUIPMENT AND RIG UP			
Lead Sacks	741	645 pm	PRE JOB SAFETY MEETING				
		658 pm	PRESSURE TEST	PRESSURE TEST TO 1500 PSI			
		700 pm	cicrulate	60 BBL WATER DYE IN 2ND 10	6	60	110
Tail mixed bbls	26.6	710 pm	LEAD CEMENT	741 SKS MIXED 13.5 PPG 224.4 bbls slurry	6	224.4	200
Tail % Excess	0%	751 pm	TAIL CEMENT	190 SKS MIXED AT 15.2 PPG 43 bbls slurry	6	43	230
Tail Sacks	190	758 pm	SHUT DOWN				
		801 pm	DROP PLUG				
Total Sacks	931	801 pm	DISPLACEMENT	disp 180.1 bbls h2o	3	180.1	670
Water Temp	60	900 pm	BUMP PLUG	lift pressure 900 psi		180.1	1420
bbl Returns	20	906 pm	CHECK FLOATS	1 BBL BACK			
		910 pm	RIG DOWN				
Notes:		930 pm	LEAVE LOCATION				

X _____
CUSTOMER SIGNATURE

X _____
Title

X _____
Date