

**Read and Stevens, Inc.  
Drilling Prognosis  
North Lea 10 Fed Com #2H**

Revision date: October 27, 2016

**HOBBS OCD**  
MAR 09 2017  
**RECEIVED**

Surface Location:	470' FNL, 1470' FEL  Section 10, T-20-S, R-34-E Lea County, New Mexico
Bottom Hole:	330' FSL, 1670' FEL  Section 10, T-20-S, R-34-E Lea County, New Mexico
Planned Total Depth:	10,857.50' TVD / 14,933' MD
RKB: 3662.7	GL: 3640.7
Preparer:	Rory McMinn

  
27 October 2016

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**Article I. General Provisions:**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

**Article II. Permit Expiration**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3106-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

**Article III. Estimated Formation Tops (geoprognoisis with TVD's adjusted to actual KB):**

Formation	TVD	Subsea	Thickness	Type
Rustler	1522'	-2124'		
Top of Salt	1693'	-1970'		
Base of Salt	3194'	-469'		
Tansil	3194'	-469'		
Yates	3405'	-258'		
Seven Rivers	3682'	19'		
Queen	4453'	790'		
Delaware	5543'	1880'	2698'	Hydrocarbon
Bone Spring Lime	8241'	4578'		
Avalon	8592'	4929'	860'	Hydrocarbon
1 <sup>st</sup> Bone Spring	9452'	5789'	500'	Hydrocarbon
2 <sup>nd</sup> Bone Spring	9952'	6289'	708'	Hydrocarbon
3 <sup>rd</sup> Bone Spring	10660'	6997'	626'	Hydrocarbon

POD, Water Column Reports attached.

**Article IV. Pressure Control:**

A 13-5/8" 5M BOP and 5M choke manifold will be used. See schematics below.

BOP test shall be conducted:

- A. when initially installed
- B. whenever any seal subject to test pressure is broken
- C. following related repairs
- D. at 30 day intervals

BOP, choke, kill lines, Kelly cock, inside BOP, etc. will be hydro tested to 250psi(low) and 5,000psi(high). The annular will be tested to 250psi (low) and 2500psi (high).

BOP will be function tested on each trip.

All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17



Minimum Working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 9-5/8 inch intermediate casing show shall be 5000 (5M) psi. 5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500PSI compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (18 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater prior to initiating the test (see casing segment as lead cement may be critical item).

- a. The results of the test shall be reported to the appropriate BLM office.
- b. All Tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- c. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

See  
COA

A Co-Flex hose may be used from the BOP to the Choke Manifold. If this is used the manufacture specifications and certifications will be furnished prior to use as well a copy of the documents will be on location in the company man's trailer. A variance is requested for the use of the Co-Flex hose. Below is an example of a typical test sheet.



Fluid Technology

Quality Document

QUALITY CONTROL INSPECTION AND TEST CERTIFICATE				CERT. N°: 205	
PURCHASER: ContiTech Beattie Co.				P.O. N°: 004790	
CONTITECH ORDER N°: 493177		HOSE TYPE: 3" ID Choke and Kill Hose			
HOSE SERIAL N°: 60295		NOMINAL / ACTUAL LENGTH: 10,67 m / 10,67 m			
W.P. 68,9 MPa 10000 psi		T.P. 103,4 MPa 15000 psi		Duration: 60 min.	
Pressure test with water at ambient temperature  <p style="text-align: center;">See attachment. ( 1 page )</p>					
↑ 10 mm = 10 Min. → 10 mm = 20 MPa					
COUPLINGS Type	Serial N°	Quality	Heat N°		
3" coupling with 4 1/16" Swivel Flange end Hub	226 229	AISI 4130	H0434		
		AISI 4130	31742		
		AISI 4130	G9496		
ASSET NO.: 66-0628			API Spec 16 C Temperature rate: "B"		
All metal parts are flawless					
WE CERTIFY THAT THE ABOVE HOSE HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE TERMS OF THE ORDER INSPECTED AND PRESSURE TESTED AS ABOVE WITH SATISFACTORY RESULT.					
STATEMENT OF CONFORMITY: We hereby certify that the above items/equipment supplied by us are in conformity with the terms, conditions and specifications of the above Purchaser Order and that these items/equipment were fabricated inspected and tested in accordance with the referenced standards, codes and specifications and meet the relevant acceptance criteria and design requirements.					
COUNTRY OF ORIGIN HUNGARY/EU					
Date:	Inspector	Quality Control			
21. February 2011.		ContiTech Rubber Industrial Kft. Quality Control Dept. (1)			

ContiTech Rubber Industrial Kft.

Phone: +36 62 568 737


The Court of Csongrád County as

Bank data

## ATTACHMENT OF QUALITY CONTROL INSPECTION AND TEST CERTIFICATE

NO. 203, 203, 200

Page: 1/1

  
 Contitech Rubber  
 Industrial Kft.  
 Quality Control Dept.  
 (1)

	1019.46 °C	1014.50	60	70	80
GN	+19.46 °C	14:30			
RD	+1052. bar	14:30			
BL	+1052. bar	14:30			
GN	+19.73 °C	14:30			
RD	+1054. bar	14:30			
BL	+1054. bar	14:30			
GN	+19.13 °C	14:10			
RD	+1056. bar	14:10			
BL	+1056. bar	14:10			
GN	+18.73 °C	14:00			
RD	+1057. bar	14:00			
BL	+1057. bar	14:00			
GN	+18.89 °C	13:50			
RD	+1059. bar	13:50			
BL	+1059. bar	13:50			
GN	+18.87 °C	13:40			
RD	+1062. bar	13:40			
BL	+1062. bar	13:40			
GN	+19.25 °C	13:30			
RD	+1064. bar	13:30			
BL	+1064. bar	13:30			
9					
8					
60293, 60295, 60296	3:00				
60293, 60295, 60296	2:50				
7					



A variance is requested to use 1502(15,000psi working pressure) hammer unions downstream of the Choke Manifold used to connect the mud/gas separator and panic line.

*Article V.*

Casing Program (minimum):

**\*All casing is new API casing.\***

Hole Size	Casing	Weight lb/ft	Grade	Conn	MD/RKB	
	20"				120'	
16"	13.375"	54.5	J-55	STC	1547' <del>1650'</del>	Set 25' into Rustler
12.25"	9.625"	40	L-80	LTC	5523' <del>5338'</del>	Set 20' above Delaware
8.5"	5.5"	17	P-110	BTC	15439'	

Size	Collapse psi	SF	Burst psi	SF	Tension Klbs	SF	Max Setting Depth TVD
13.375	1130	3.08	2730	3.54	514	5.66	2568
9.625	2570	1.24	3950	1.82	520	3.12	4985
9.625	3090	1.28	5750	2.03	727	3.33	7022
5.5	7480	1.55	10640	1.29	568	3.06	17000

13.375" casing will be set 25' into the Rustler  
9.625" casing will be set 20' above the Delaware

*Article VI.*

Cement Program:

Section 6.01

13.375" Surface Casing

Lead: 0 – 1247'

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
13.5ppg	1.93cuft/sk	580	9.71	100%	Class C + 4% bwoc Bentonite II + 2% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.005% bwoc Static Free + 0.005 gps FP- 6L

Tail: 1247' – 1547'

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
14.8ppg	1.34cuft/sk	166	6.35	100%	Class C + 1.5% bwoc Calcium Chloride + 0.005 lbs/sack Static Free + 0.005 gps FP-6L

Circulate cement to surface. If cement does not circulate a 1" grout string will be used to perform a top job.

Cement volumes will be adjusted respectively once actual casing depth is determined and washout from a fluid caliper.

Section 6.02

9.625" Intermediate Casing

A DV tool and ECP will be used to cement this 9.625" casing if losses are encountered in the Capitan Reef. DV tool and ECP placement will be determined if and when the loss circulation is encountered. DV tool

and ECP placement will be a minimum of 100' above the lost circulation zone and a minimum of 100' from the previous casing shoe.

- (i) Cement detail if DV tool is used: Assuming losses at 3200'. DV tool and ECP will be placed at 3100'. Actual DV tool placement will be determined when and if losses are encountered. DV tool will be placed 150' above loss zone and a minimum of 100' below the last casing shoe.

#### Cement Stage 1

Lead: 3100' – 5023'

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
12.6ppg	2.13cuft/sk	730	8.81	80%	Class C (35:65) + Poz (Fly Ash) + 4% bwoc Bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sack Cello Flake + 0.005 lbs/sack Static Free + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride

Tail :5023' – 5523'

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
14.8ppg	1.33cuft/sk	220	6.35	80%	Class C

#### Cement Stage 2

Lead: 0-3100'

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
12.6ppg	2.13cuft/sk	690	8.81	80%	Class C (35:65) + Poz (Fly Ash) + 4% bwoc Bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sack Cello Flake + 0.005 lbs/sack Static Free + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride

Once DV tool placement is determined cement volumes will be adjusted accordingly.



(ii) Cement detail if no DV tool is used:

**Lead: 0 – 5023'**

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
12.5ppg	2.13cuft/sk	1500	8.81	80%	Class C (35:65) + Poz (Fly Ash) + 4% bwoc Bentonite II + 5% bwoc MPA-5 + 0.25% bwoc FL-52 + 5 lbs/sack LCM-1 + 0.125 lbs/sack Cello Flake + 0.005 lbs/sack Static Free + 0.005 gps FP-6L + 1.2% bwoc Sodium Metasilicate + 5% bwow Sodium Chloride

**Tail: 5023' – 5523'**

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
14.8ppg	1.33cuft/sk	222	6.35	80%	Class C

Circulate cement to surface. If cement does not circulate to surface a top squeeze job or casing perforation will be used. As well, a temperature survey or CBL will be performed.

Cement volumes will be adjusted accordingly once actual casing depth is determined and washout from a fluid caliper.

### Section 6.03                      5.5" Production Casing

**Lead: 0 – 11000'**

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
11.9ppg	2.38cuft/sk	2600	13.22	80%	Class H (50:50) + Poz (Fly Ash) + 10% bwoc Bentonite II + 5% bwow Sodium Chloride + 5 lbs/sack LCM-1 + 0.005 lbs/sack Static Free + 0.005 gps FP-6L

**Tail: 11000 - TD**

Slurry WT	Yield	Sx	Gallons/ Sack	Excess	Additives
13.2ppg	1.62cuft/sk	900	9.45	20%	Class H (15:61:11) Poz (Fly Ash):Class H Cement:CSE-2 + 4% bwow Sodium Chloride + 3 lbs/sack LCM-1 + 0.6% bwoc FL-25 + 0.005 gps FP-6L + 0.005% bwoc Static Free

Circulate cement to surface. If cement does not circulate to surface a top squeeze job or casing perforation will be used. As well, a temperature survey or CBL will be performed.

Cement volumes will be adjusted accordingly once actual depth is determined and washout from a fluid caliper.

*Article VII.                      Product Descriptions:*

**Bentonite II**  
P105

**CSE-2**

An additive which contributes to low density, high compressive strength development of cement slurries at all temperature ranges. This material also controls free water without the need for standard extenders.

**Calcium Chloride**

A powdered, flaked or pelletized material used to decrease thickening time and increase the rate of strength development.

**Cello Flake**

Graded (3/8 to 3/4 inch) cellophane flakes used as a lost circulation material.

**Class C Cement**

Intended for use from surface to 6000 ft., and for conditions requiring high early strength and/or sulfate resistance.

**Class H Cement**

Class H cement is an API type, all-purpose oil well cement which is used without modification in wells up to 8,000 ft. It possesses a moderate sulfate resistance. With the use of accelerators or retarders, it can be used in a wide range of well depths and temperatures.

**FL-25**

An all-purpose salt-tolerant fluid loss additive that provides exceptional fluid loss control across a wide range of temperatures and salinity conditions and remedial cementing applications.

**FL-52**

A water soluble, high molecular weight fluid loss additive used in medium to low density slurries. It is functional from low to high temperature ranges.

**FP-6L**

A clear liquid that decreases foaming in slurries during mixing.

**LCM-1**

A graded (8 to 60 mesh) naturally occurring hydrocarbon, asphaltite. It is used as a lost circulation material at low to moderate temperatures and will act as a slurry extender. Cement compressive strength is reduced.

**MPA-5**

Used to enhanced compressive, tensile, flexural strength development and reduced permeability

**Poz (Fly Ash)**

A synthetic pozzolan, (primarily Silicon Dioxide). When blended with cement, Pozzolan can be used to create lightweight cement slurries used as either a filler slurry or a sulfate resistant completion cement.

**Sodium Chloride**

At low concentrations, it is used to protect against clay swelling.

**Sodium Metasilicate**

An extender used to produce economical, low density cement slurry.



**Static Free**

An anti-static additive used to prevent air entrainment due to agglomerated particles. Can be used in Cementing and Fracturing operations to aid in the flow of dry materials.

*Article VIII. Mud Program:*

*See COA*

Depth	Hole	Type	MW	PV	YP	WL	pH	Sol %
0-1547 <sup>1650'</sup>	16"	Fresh Water	8.4-8.9	10-12	12-15	NC	9.5	<3.0
1547-5523 <sup>5338'</sup>	12.25"	Brine	9.8-10	1-2	1-2	NC	9.5	<1.0
5445- KOP	8.5"	Cut Brine	8.4-8.6	1-2	1-2	NC	9.5	<1.0
KOP-TD	8.5"	Cut Brine	8.9-9.1	4-6	4-6	18-20	9.5	<3.0

Sufficient mud will be on location to control any abnormal conditions encountered. Such as but not limited to a kick, lost circulation and hole sloughing.

*Article IX. Mud Monitoring System:*

A Pason PVT system will be rigged up prior to spudding the well. A volume monitoring system that measures, calculates, and displays readings from the mud system on the rig to alert the rig crew of impending gas kicks and lost circulation issues.

**Components****a) PVT Pit Bull monitor:**

Acts as the heart of the system, containing all the controls, switches, and alarms. Typically, it is mounted near the driller's console.

**b) Junction box:**

Provides a safe, convenient place for making the wiring connections.

**c) Mud probes:**

Measure the volume of drilling fluid in each individual tank.

**d) Flow sensor:**

Measures the relative amount of mud flowing in the return line.

*Article X. Logging, Drill stem testing and Coring:*

2 man mud logging will start after surface casing has been set.

8.75" hole will have LWD (Gamma Ray) to section TD.

*Article XI. Bottom Hole:*

Temperature is expected to be 162°F, using a 0.76°/100' gradient. The bottom hole pressure is expected to be 4796psi maximum using a pressure gradient of 0.44psi/ft. With a partially evacuated hole and a gradient of 0.22psi the maximum surface pressure would be 2398psi.

*Article XII. Abnormal Conditions:*

Temperature is expected to be normal. All zones are expected to be normal pressure.

Lost circulation is possible in both the 16" and 12.25" hole sections. 20ppb of LCM will be maintained in the active system at all times while drilling these sections. As well, a 50bbl pill of 50ppb LCM will be premixed in the slug pit in case lost circulation is encountered. If complete loss circulation is encountered in the Capitan Reef the Brine will be switched over to fresh water. The BLM will be notified of this and an inspector requested to witness the drilling fluid swap. Daily reports will be submitted to the BLM if losses are encountered.



See  
cont

*Article XIII.                    H2S:*

No H2S is expected. But there is the possibility of the presence of H2S. Attached is the H2S response plan. H2S response plan will be put into effect after surface casing has been set and BOPE has been nipped up.

*Article XIV.                    Directional:*  
Directional survey plan and plot attached.

*Article XV.                    Drilling Recorder:*  
Rig up EDR & PVT prior to spud to record drilling times and other drilling parameters from surface to TD.

## Design Plan, Operating Plan and Maintenance Plan, and Closure Plan for the OCD form C-144

### Design Plan:

Fluid and cuttings coming from drilling operations will pass over the shale shaker with the cuttings going to the haul off bin and the cleaned fluid returning to the working steel pits.

### Equipment Includes:

- 1-670bbl steel working pit
- 2-100bbl steel working suction pits
- 2-500bbl steel tanks
- 2-20yd<sup>3</sup> steel haul off bins
- 2-pumps (HHF-1600)
- 2-Shale shakers
- 1-Centrifuge
- 1-Desilter/Desander

### Operating and Maintenance Plan:

Inspection to occur every tour for proper operation of system and individual components. If any problems are found they will be repaired and/or corrected immediately.

All drilling fluid circulated over shakers with cuttings discharged into roll off bins

Fluid and fines below shakers are circulated with transfer pump through centrifuge

Roll off bins are lined and de watered with fluids recirculated into system

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

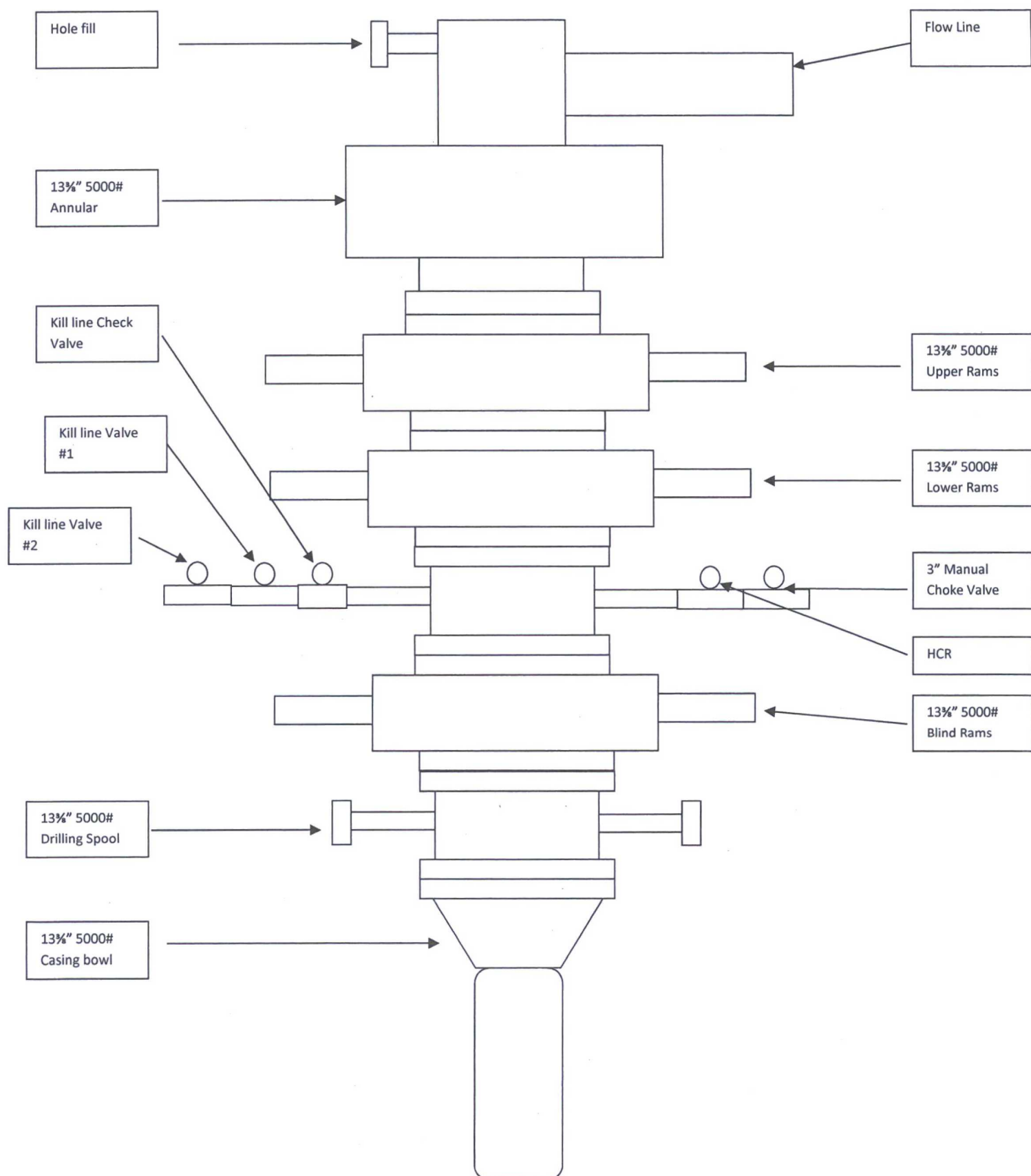
### Closure Plan:

All haul off bins containing cuttings will be removed from location and hauled to:

R360 Permit number R9166/NM-01-0006

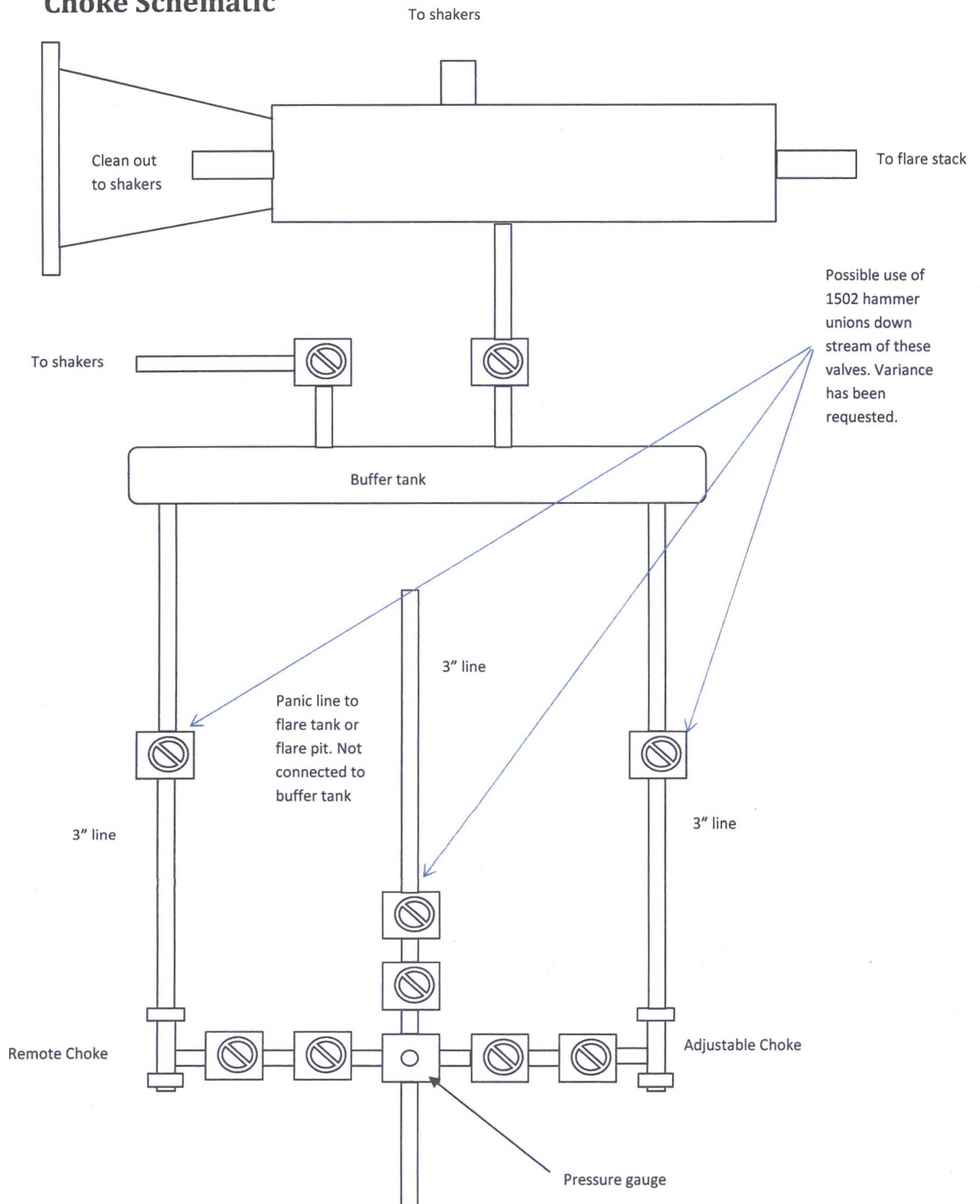
GMI Permit number 711-019-001/NM-01-0019

# BOP Schematic





# Choke Schematic





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## New Mexico Office of the State Engineer Water Column/Average Depth to Water

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No records found.

**Basin/County Search:**

**Basin:** Lea County

**County:** Lea

**PLSS Search:**

**Section(s):** 10

**Township:** 20S

**Range:** 34E

## Read and Stevens, Inc.

400 N Pennsylvania Ave #1000, Roswell, NM 88201

**Operator Certification:** Application for Permit to Drill  
North Lea 10 Fed Com #2H  
Read and Stevens, Inc.  
Lea County, New Mexico

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in the Application for Permit to Drill (APD) package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Read and Stevens, Inc. and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. I also certify responsibility for the operations conducted on that portion of the leased lands associated with this application with bond coverage provided by BLM Bond Number NM-2310. This statement is subject to the provisions of the 18U.S.C.1001 for filing a false statement.

Signed: BM  
Rory McMinn  
President of Read Operating Company LLC,  
Agent for Read & Stevens, Inc.

Dated: 27 October 2016