

Form 3160-3
(June 2015)FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: <input type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		5. Lease Serial No. 6. If Indian, Allottee or Tribe Name 7. If Unit or CA Agreement, Name and No. 8. Lease Name and Well No. <div style="text-align: center; font-weight: bold; font-size: 1.2em;">[319775]</div>
2. Name of Operator <div style="text-align: center; font-weight: bold; font-size: 1.2em;">[215099]</div>		9. API Well No. <div style="text-align: center; font-weight: bold; font-size: 1.2em;">30-025-50178</div>
3a. Address	3b. Phone No. (include area code)	10. Field and Pool, or Exploratory <div style="text-align: center; font-weight: bold; font-size: 1.2em;">[98180]</div>
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface At proposed prod. zone		11. Sec., T. R. M. or Blk. and Survey or Area
14. Distance in miles and direction from nearest town or post office*		12. County or Parish 13. State
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
24. Attachments		

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

- | | |
|---|---|
| 1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM. |
|---|---|

25. Signature	Name (Printed/Typed)	Date
Title		
Approved by (Signature)	Name (Printed/Typed)	Date
Title		
Office		

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
 Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

NGMP Rec 05/03/2022

SL

(Continued on page 2)



Approval Date: 05/11/2021

KZ
05/27/2022

*(Instructions on page 2)

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-025 50178	² Pool Code 98180	³ Pool Name WC-025 G-09 S253309P; UPR WOLFCAMP
⁴ Property Code 319775	⁵ Property Name VACA DRAW 20-17 FEDERAL	⁶ Well Number 47H
⁷ OGRID No. 215099	⁸ Operator Name CIMAREX ENERGY CO.	⁹ Elevation 3406.2'

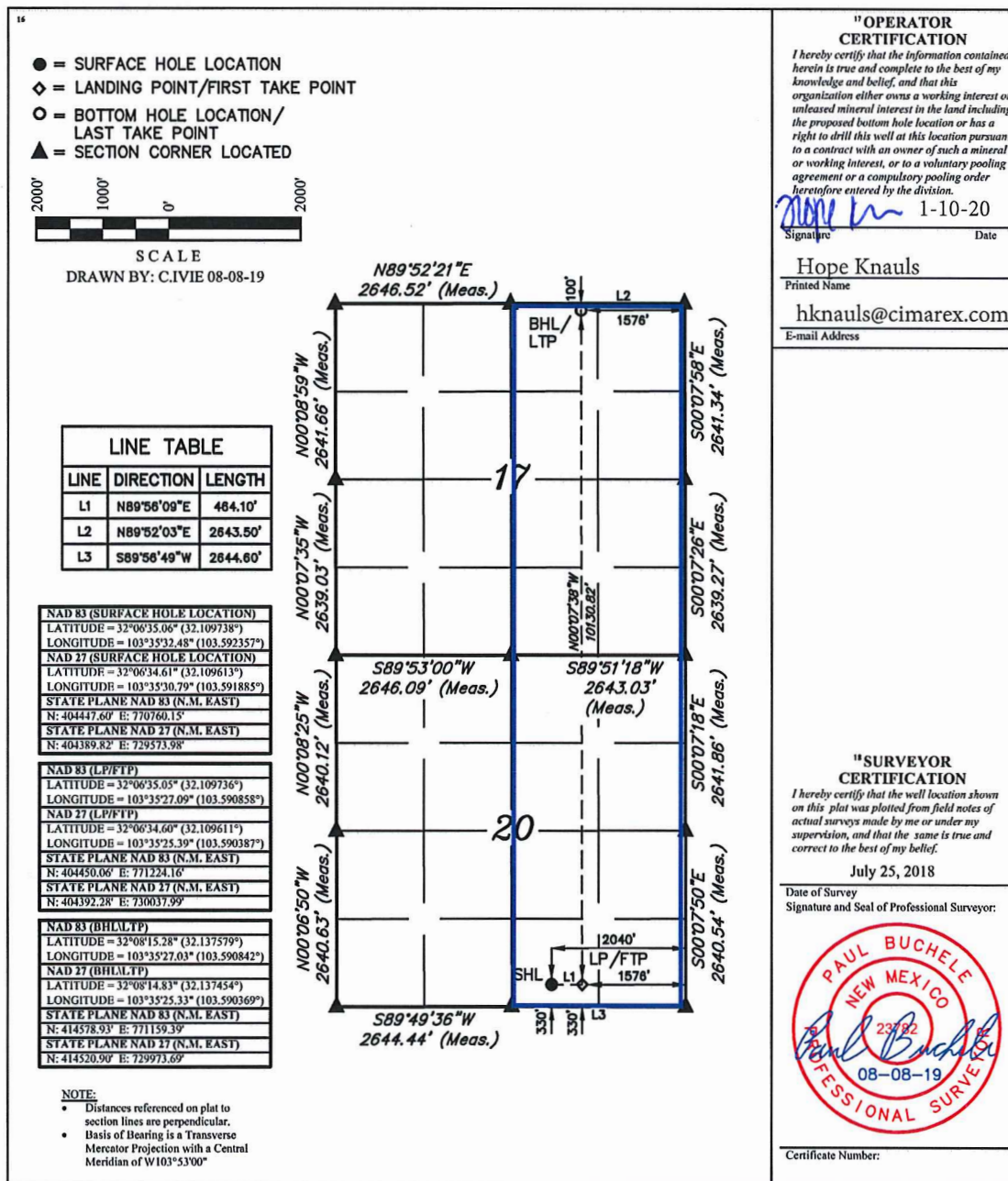
¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	20	25S	33E		330	SOUTH	2040	EAST	LEA

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	17	25S	33E		100	NORTH	1576	EAST	LEA
¹² Dedicated Acres 640	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.						

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



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¹⁶

● = SURFACE HOLE LOCATION
◆ = LANDING POINT/FIRST TAKE POINT
○ = BOTTOM HOLE LOCATION/
LAST TAKE POINT
▲ = SECTION CORNER LOCATED

SCALE
DRAWN BY: C.IVIE 08-08-19

LINE	DIRECTION	LENGTH
L1	N89°56'09"E	484.10'
L2	N89°52'03"E	2643.50'
L3	S89°56'49"W	2644.60'

NAD 83 (SURFACE HOLE LOCATION)
LATITUDE = 32°06'35.06" (32.109738°)
LONGITUDE = 103°35'32.48" (103.592357°)
NAD 27 (SURFACE HOLE LOCATION)
LATITUDE = 32°06'34.61" (32.109613°)
LONGITUDE = 103°35'30.79" (103.591885°)
STATE PLANE NAD 83 (N.M. EAST)
N: 404447.60' E: 770760.15'
STATE PLANE NAD 27 (N.M. EAST)
N: 404389.82' E: 729573.98'

NAD 83 (LP/FTP)
LATITUDE = 32°06'35.05" (32.109736°)
LONGITUDE = 103°35'27.09" (103.590858°)
NAD 27 (LP/FTP)
LATITUDE = 32°06'34.60" (32.109611°)
LONGITUDE = 103°35'25.39" (103.590387°)
STATE PLANE NAD 83 (N.M. EAST)
N: 404450.06' E: 771224.16'
STATE PLANE NAD 27 (N.M. EAST)
N: 404392.28' E: 730037.99'

NAD 83 (BHL/FTP)
LATITUDE = 32°08'15.28" (32.137579°)
LONGITUDE = 103°35'27.03" (103.590842°)
NAD 27 (BHL/FTP)
LATITUDE = 32°08'14.83" (32.137454°)
LONGITUDE = 103°35'25.33" (103.590369°)
STATE PLANE NAD 83 (N.M. EAST)
N: 414578.93' E: 771159.39'
STATE PLANE NAD 27 (N.M. EAST)
N: 414520.90' E: 729973.69'

NOTE:
• Distances referenced on plat to section lines are perpendicular.
• Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

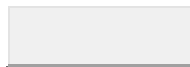
¹⁷ OPERATOR
CERTIFICATION
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.
Signature: Hope Knauls
Date: 1-10-2020
Printed Name: Hope Knauls
E-mail Address: hknauls@cimarex.com

¹⁸ SURVEYOR
CERTIFICATION
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.
Date of Survey: July 25, 2018
Signature and Seal of Professional Surveyor:
Paul Buchele
Professional Surveyor
08-08-19
Certificate Number:

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Cimarex Energy
LEASE NO.:	NMNM0026394
LOCATION:	Section 20, T.25 S., R.33 E., NMPM
COUNTY:	Lea County, New Mexico

WELL NAME & NO.:	Vaca Draw 20-17 Fed 47H
SURFACE HOLE FOOTAGE:	330'/S & 2040'/E
BOTTOM HOLE FOOTAGE:	100'/N & 1576'/E



H2S	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input type="checkbox"/> COM	<input type="checkbox"/> Unit

A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **10-3/4** inch surface casing shall be set at approximately **1050** feet (a minimum of **25 feet (Lea County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8**

hours or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is: Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.
- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.
 - b. Second stage above DV tool:
 - Cement to surface. If cement does not circulate, contact the appropriate BLM office.

Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

A variance for annular clearance is approve between 7 5/8" x 5 1/2".

3. The minimum required fill of cement behind the **5-1/2 x 5** inch production casing is:
 - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. **Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).**
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.

- d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
- e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Eddy County

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)
393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a

larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. 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.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher 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.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
 - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. 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 500 psi 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).

- b. In potash areas, 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. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. 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 (8 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).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. 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.
- g. 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. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test

does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

ZS033021



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Application Data Report

05/11/2021

APD ID: 10400038315

Submission Date: 01/24/2019

Highlighted data
reflects the most
recent changes

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - General

APD ID: 10400038315

Tie to previous NOS? Y

Submission Date: 01/24/2019

BLM Office: CARLSBAD

User: Amithy Crawford

Title: Regulatory Analyst

Federal/Indian APD: FED

Is the first lease penetrated for production Federal or Indian? FED

Lease number: NMNM0026394

Lease Acres:

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? NO

APD Operator: CIMAREX ENERGY COMPANY

Operator letter of designation:

Operator Info

Operator Organization Name: CIMAREX ENERGY COMPANY

Operator Address: 600 N MARIENFELD STREET ST SUITE 600

Zip: 79701

Operator PO Box:

Operator City: MIDLAND

State: TX

Operator Phone: (432)571-7800

Operator Internet Address: tstathem@cimarex.com

Section 2 - Well Information

Well in Master Development Plan? NO

Master Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: PURPLE SAGE
WOLFCAMP GASPool Name: UPPER
WOLFCAMP

Is the proposed well in an area containing other mineral resources? USEABLE WATER

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Is the proposed well in an area containing other mineral resources?** USEABLE WATER**Is the proposed well in a Helium production area?** N **Use Existing Well Pad?** NO **New surface disturbance?****Type of Well Pad:** MULTIPLE WELL**Multiple Well Pad Name:** VACA **Number:** W2E2 PAD 4
DRAW 20-17**Well Class:** HORIZONTAL**Number of Legs:** 1**Well Work Type:** Drill**Well Type:** CONVENTIONAL GAS WELL**Describe Well Type:****Well sub-Type:** INFILL**Describe sub-type:****Distance to town:** 26 Miles**Distance to nearest well:** 20 FT**Distance to lease line:** 330 FT**Reservoir well spacing assigned acres Measurement:** 640 Acres**Well plat:** Vaca_Draw_20_17_Fed_47H_C102_BLM_Lease_20200130071815.pdf

Vaca_Draw_20_17_Fed_47H_C102_20200130071816.pdf

Well work start Date: 12/01/2019**Duration:** 30 DAYS**Section 3 - Well Location Table****Survey Type:** RECTANGULAR**Describe Survey Type:****Datum:** NAD83**Vertical Datum:** NAVD88**Survey number:****Reference Datum:**

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
SHL Leg #1	330	FSL	2040	FEL	25S	33E	20	Aliquot SWSE	32.109738	-103.592357	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 26394	3406	0	0	
KOP Leg #1	222	FSL	1576	FEL	25S	33E	20	Aliquot SWSE	32.1220611	-103.6336917	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 26394	-8436	11869	11842	

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
PPP Leg #1-1	100	FSL	1576	FEL	25S	33E	17	Aliquot NWS W	32.137579	-103.590842	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 26394	-5894	11400	9300	
EXIT Leg #1	100	FNL	1576	FEL	25S	33E	17	Aliquot NWNE	32.137579	-103.590842	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 26394	-8914	22384	12320	
BHL Leg #1	100	FNL	1576	FEL	26S	33E	17	Aliquot NWNE	32.137579	-103.590842	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 26394	-8914	22384	12320	



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Drilling Plan Data Report

05/11/2021

APD ID: 10400038315

Submission Date: 01/24/2019

Highlighted data
reflects the most
recent changes

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
380202	RUSTLER	3447	935	935		USEABLE WATER	N
380203	TOP SALT	2149	1298	1298		NONE	N
380204	BASE OF SALT	-1267	4714	4714		NONE	N
380213	LAMAR	-1462	4909	4909		NONE	N
380214	BELL CANYON	-1490	4937	4937		NONE	N
380215	CHERRY CANYON	-2543	5990	5990		OIL	N
380209	BRUSHY CANYON	-4089	7536	7536		NATURAL GAS, OIL	N
380207	BONE SPRING	-5585	9032	9032		NATURAL GAS, OIL	Y
380208	UPPER AVALON SHALE	-5865	9312	9312		NATURAL GAS, OIL	N
380210	BONE SPRING 1ST	-6564	10011	10011		NATURAL GAS, OIL	N
380211	BONE SPRING 2ND	-6776	10223	10223		NATURAL GAS, OIL	N
650973	BONE SPRING 3RD	-7624	11071	11071		NATURAL GAS, OIL	N
650989	WOLFCAMP	-8904	12351	12351		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Pressure Rating (PSI):** 5M**Rating Depth:** 22384

Equipment: A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

Testing Procedure: A multi-bowl wellhead system will be utilized. After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 5000psi. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2. The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office. The wellhead will be installed by a third-party welder, monitored by the wellhead vendor representative. All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type. A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi. Slips will be utilized after running and cementing the production casing. After installation of the slips and wellhead on the production casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2. The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater. The casing string utilizing steel body pack-off will be tested to 70% of casing burst. If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Choke Diagram Attachment:

Vaca_Draw_20_17_Fed_47H_Choke_5M_20210113115200.pdf

BOP Diagram Attachment:

Vaca_Draw_20_17_Fed_47H_BOP_5M_20210113115213.pdf

Pressure Rating (PSI): 5M**Rating Depth:** 12494

Equipment: A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

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Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H

test will be repeated at least every 30 days, as per Onshore Order No. 2. The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater. The casing string utilizing steel body pack-off will be tested to 70% of casing burst. If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Choke Diagram Attachment:

Vaca_Draw_20_17_Fed_47H_Choke_5M_20210113115343.pdf

BOP Diagram Attachment:

Vaca_Draw_20_17_Fed_47H_BOP_5M_20210113115409.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	14.75	10.75	NEW	API	N	0	985	0	985			985	J-55	40.5	BUTT	3.51	6.94	BUOY	15.77	BUOY	15.77
2	PRODUCTION	6.75	5.5	NEW	API	Y	0	11800	0	11800	0		11800	L-80	20	LT&C	1.37	1.43	BUOY	1.87	BUOY	1.87
3	INTERMEDIATE	9.875	7.625	NEW	NON API	N	0	12494	0	12302			12494	OTHER	29.7	OTHER - LHC	2.36	1.13	BUOY	1.82	BUOY	1.82
4	PRODUCTION	6.75	5.0	NEW	API	Y	11800	22384	11800	12351			10584	P-110	18	BUTT	1.99	2.02	BUOY	58.48	BUOY	58.48

Casing Attachments**Casing ID:** 1 **String Type:** SURFACE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

Vaca_Draw_20_17_Fed_47H_Casing_Assumptions_20210113123202.pdf

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Casing Attachments**

Casing ID: 2 **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:**

Vaca_Draw_20_17_Tapered_Casing_Specs_20210113120500.pdf

Casing Design Assumptions and Worksheet(s):Vaca_Draw_20_17_Fed_47H_Casing_Assumptions_20210113123220.pdf

Casing ID: 3 **String Type:** INTERMEDIATE**Inspection Document:****Spec Document:**

Vaca_Draw_20_17_Fed_47H_Spec_Sheet_for_L80_7.625_Inter_Csg_20210113123317.pdf

Tapered String Spec:**Casing Design Assumptions and Worksheet(s):**Vaca_Draw_20_17_Fed_47H_Casing_Assumptions_20210113123455.pdf

Casing ID: 4 **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:**

Vaca_Draw_20_17_Tapered_Casing_Specs_20210113120744.pdf

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_47H_Casing_Assumptions_20210113123634.pdf

Vaca_Draw_20_17_Fed_47H_Casing_Assumptions_20210113123515.pdf

Section 4 - Cement

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		0	0	0	0	0	0	0	0	0
PRODUCTION	Tail		0	2338 4	1135	1.3	14.2	1475	25	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
PRODUCTION	Lead		0	0	0	0	0	0	0	0	0

SURFACE	Lead		0	985	332	1.72	13.5	571	50	Class C	Bentonite
SURFACE	Tail		0	985	156	1.34	14.8	208	25	Class C	LCM
INTERMEDIATE	Lead	4900	0	1249 4	584	3.64	10.3	2125	50	Tuned Light	LCM
INTERMEDIATE	Tail		0	1249 4	200	1.34	14.8	268	25	Class C	LCM
INTERMEDIATE	Lead	4900	0	1249 4	794	1.88	12.9	1492	25	35:65 PozC	Salt, Bentonite

Section 5 - Circulating Medium

Mud System Type: Closed**Will an air or gas system be Used?** NO**Description of the equipment for the circulating system in accordance with Onshore Order #2:****Diagram of the equipment for the circulating system in accordance with Onshore Order #2:**

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials will be kept on location at all times in order to combat lost circulation or unexpected kicks. In order to run DSTs, open hole logs, and casing, the viscosity and water loss may have to be adjusted in order to meet these needs.

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	985	SPUD MUD	8.3	8.8							
985	1249 4	OTHER : Brine diesel emulsion	9	9.5							
1249 4	2238 4	OIL-BASED MUD	10	10.5							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

No DST Planned

List of open and cased hole logs run in the well:

CNL,DS,GR

Coring operation description for the well:

N/A

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6743

Anticipated Surface Pressure: 4032.6

Anticipated Bottom Hole Temperature(F): 190

Anticipated abnormal pressures, temperatures, or potential geologic hazards? YES

Describe:

Lost circulation may be encountered in the Delaware mountain group. Abnormal pressure as well as hole stability issues may be encountered in the Wolfcamp.

Contingency Plans geohazards description:

Lost circulation material will be available, as well as additional drilling fluid along with the fluid volume in the drilling rig pit system. Drilling fluid can be mixed on location or mixed in vendor mud plant and trucked to location if needed. Sufficient barite will be available to maintain appropriate mud weight for the Wolfcamp interval.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Vaca_Draw_20_17_Fed_47H_H2S_Plan_20210113114434.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Vaca_Draw_20_17_Fed_47H_AC_Report_20200204160708.pdf

Vaca_Draw_20_17_Fed_47H_Directional_Plan_20200204160800.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

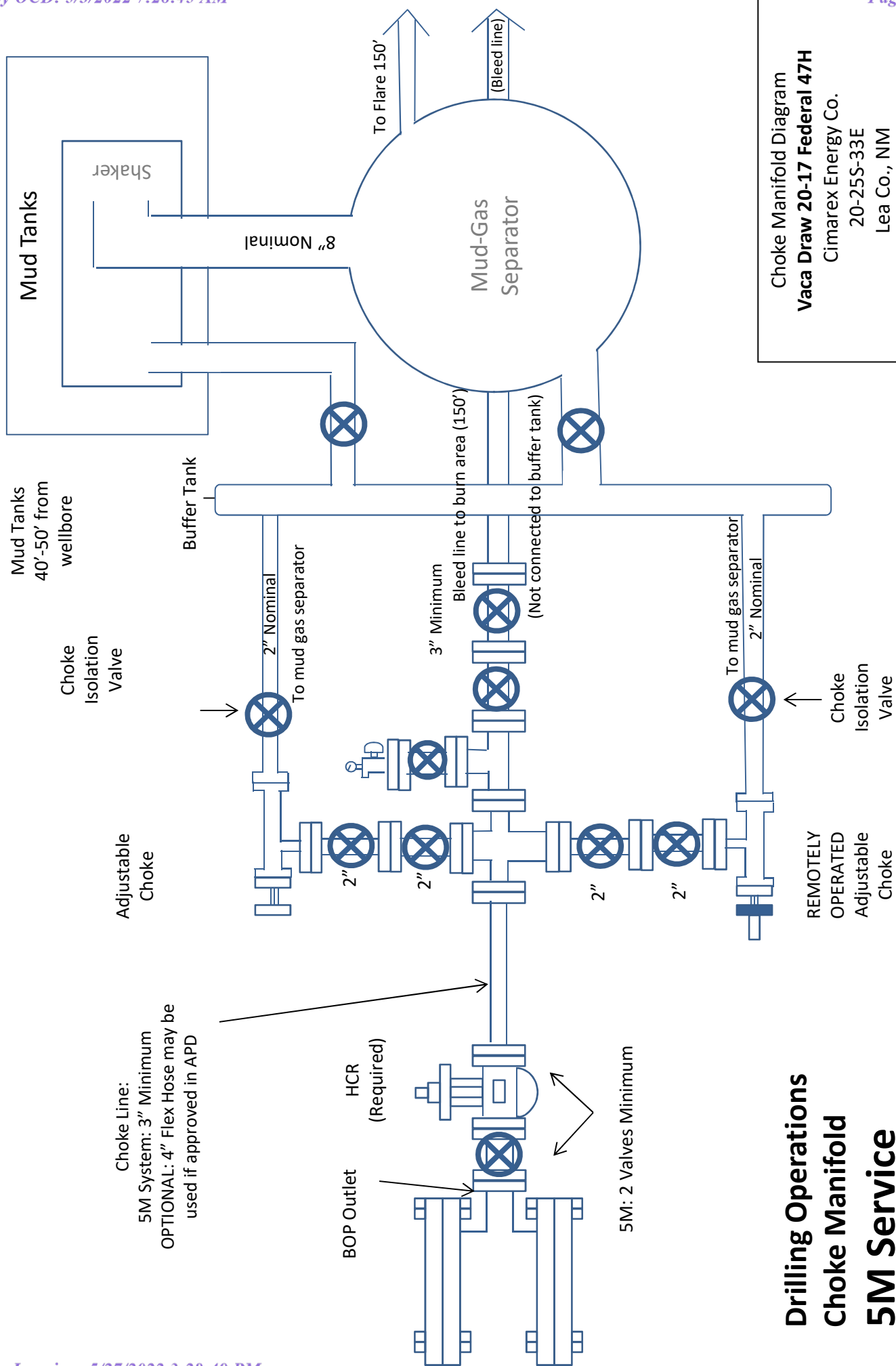
Vaca_Draw_20_17_Fed_47H_Gas_Capture_20200204160837.pdf

Vaca_Draw_20_17_Fed_47H_Drilling_Plan_20210113122947.pdf

Vaca_Draw_20_17_Fed_47H_Flex_Hose_20210113123103.pdf

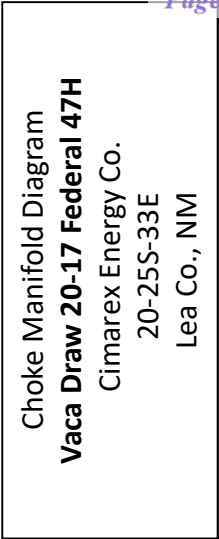
Other Variance attachment:

Vaca_Draw_20_17_Fed_47H_Multibowl_Wellhead_20210113123023.pdf

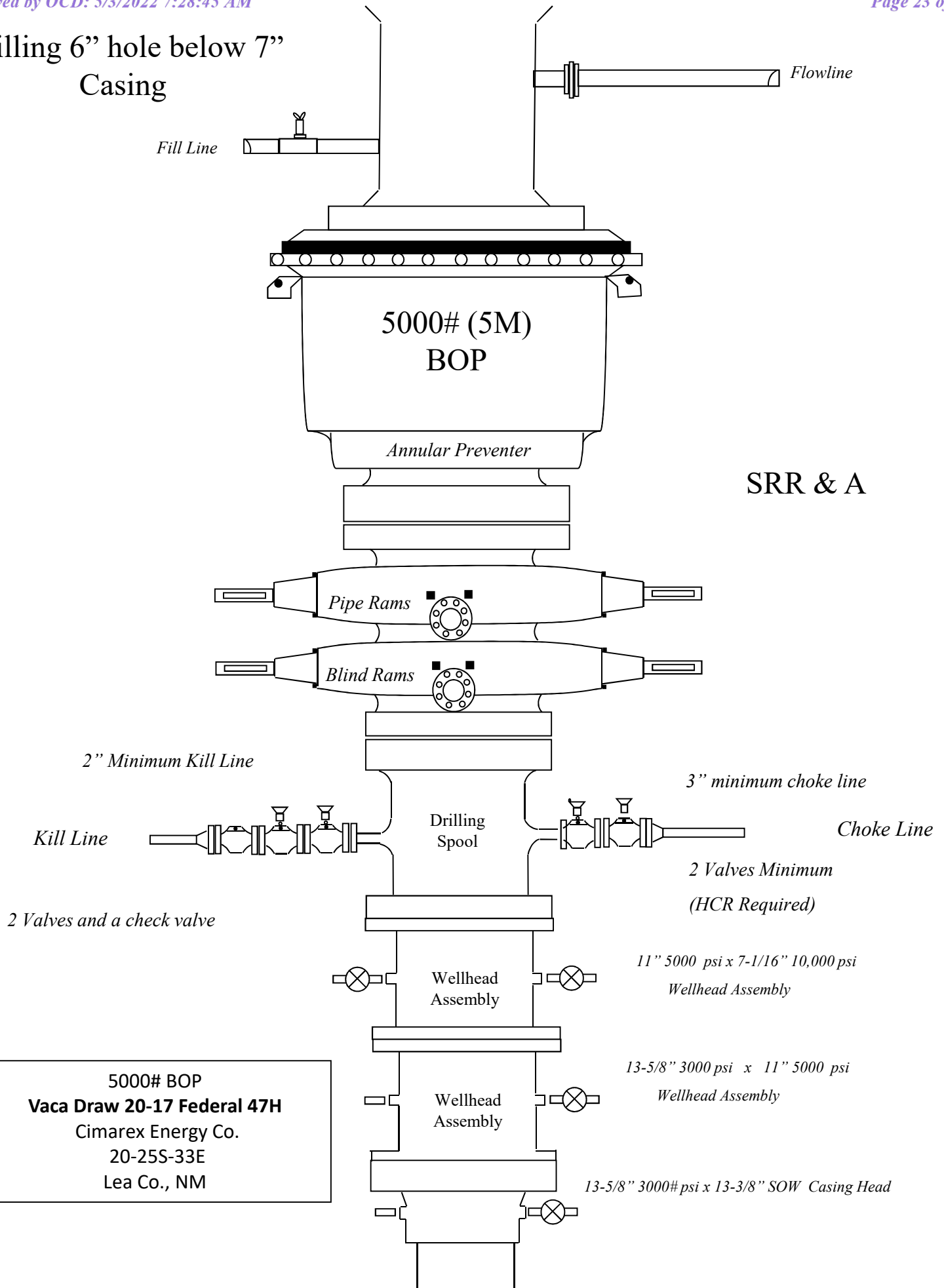


**Drilling Operations
Choke Manifold
5M Service**

Choke Manifold Diagram
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

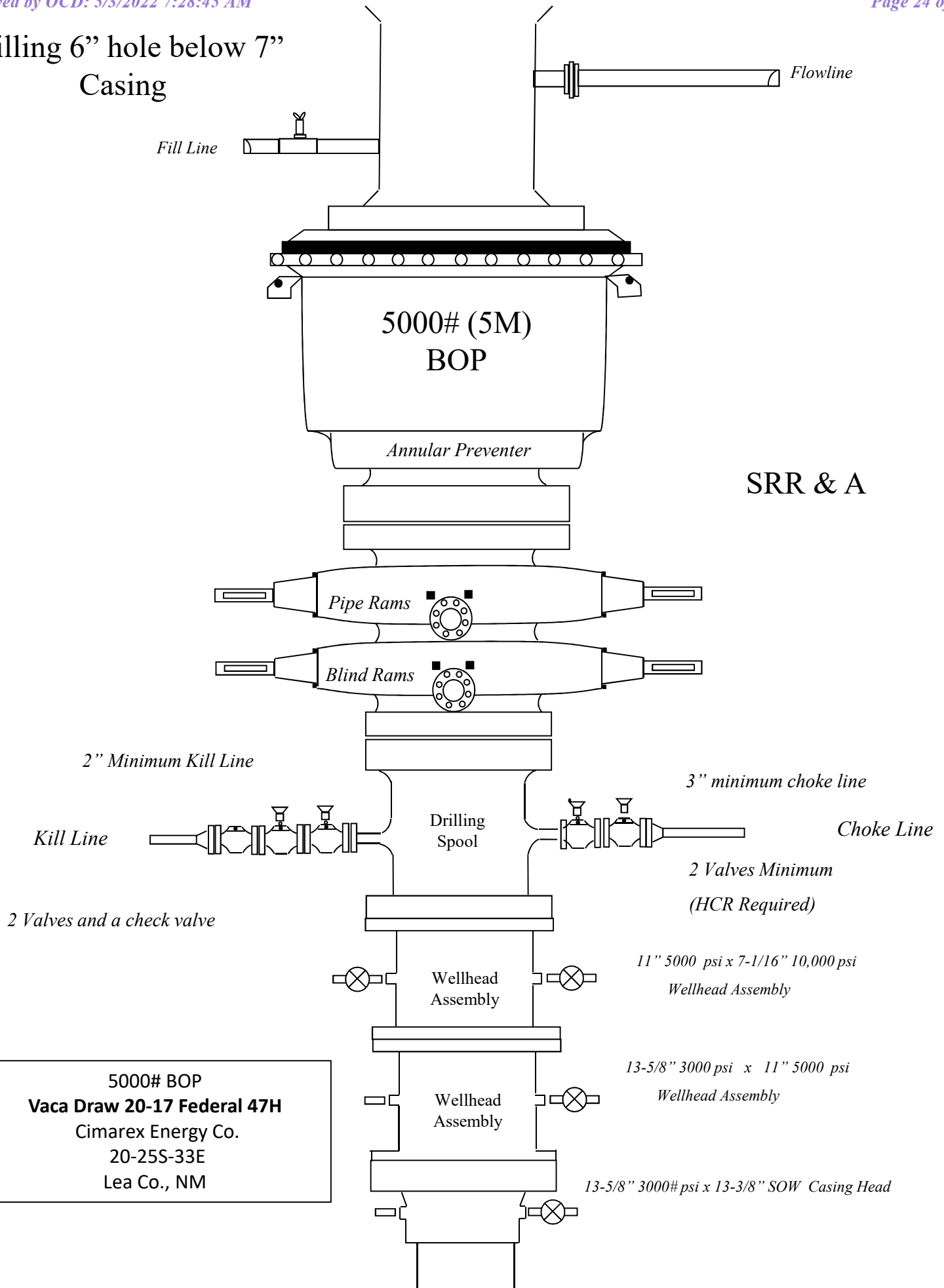


Drilling 6" hole below 7"
Casing



5000# BOP
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

Drilling 6" hole below 7"
Casing



5000# BOP
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

PERFORMANCE DATA

TMK UP ULTRA™ FJ Technical Data Sheet

7.625 in

29.70 lbs/ft

L80 HC

Tubular Parameters

Size	7.625	in	Minimum Yield	80,000	psi
Nominal Weight	29.70	lbs/ft	Minimum Tensile	95,000	psi
Grade	L80 HC		Yield Load	683,000	lbs
PE Weight	29.04	lbs/ft	Tensile Load	811,000	lbs
Wall Thickness	0.375	in	Min. Internal Yield Pressure	6,890	psi
Nominal ID	6.875	in	Collapse Pressure	5,510	psi
Drift Diameter	6.750	in			
Nom. Pipe Body Area	8.541	in ²			

Connection Parameters

Connection OD	7.625	in
Connection ID	6.881	in
Make-Up Loss	4.022	in
Critical Section Area	5.316	in ²
Tension Efficiency	62.2	%
Compression Efficiency	62.2	%
Yield Load In Tension	425,000	lbs
Min. Internal Yield Pressure	6,890	psi
Collapse Pressure	5,510	psi
Uniaxial Bending	30	°/ 100 ft

Make-Up Torques

Min. Make-Up Torque	13,200	ft-lbs
Opt. Make-Up Torque	14,700	ft-lbs
Max. Make-Up Torque	16,200	ft-lbs
Operating Torque	13,200	ft-lbs
Yield Torque	23,500	ft-lbs



Printed on: August-27-2018

NOTE:

The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine considering the specific installation and operation parameters. Information that is printed or downloaded is no longer controlled by TMK IPSCO and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest TMK IPSCO technical information, please contact TMK IPSCO Technical Sales toll-free at 1-888-258-2000.



5.5" 20# L80 LT&C

Burst-14530 psi

Collapse-14540

Tension-729000 lbs/ft

5" 18# P110 BT&C

Burst-13940

Collapse-13470

Tension-580000/ body 388000/ joint

5.5" 20# L80 LT&C

Burst-14530 psi

Collapse-14540

Tension-729000 lbs/ft

5" 18# P110 BT&C

Burst-13940

Collapse-13470

Tension-580000/ body 388000/ joint

Vaca Draw 20-17 Fed 47H

Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12494	12302	7-5/8"	29.70	L HC	TMK FJ	2.36	1.13	1.82
6 3/4	0	11800	11800	5-1/2"	20.00	L-80	LT&C	1.37	1.43	1.87
6 3/4	11800	22384	12351	5"	18.00	P-110	BT&C	1.99	2.02	58.48
BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet

Vaca Draw 20-17 Fed 47H

Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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Vaca Draw 20-17 Fed 47H

Casing Assumptions

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Vaca Draw 20-17 Fed 47H

Casing Assumptions

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Vaca Draw 20-17 Fed 47H
Casing Assumptions

2. Casing Program

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BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet

Vaca Draw 20-17 Fed 47H

Cimarex Energy Co.

Sec. 20-25S-33E

Lea Co., NM

- 1 All Company and Contract personnel admitted on location must be trained by a qualified H₂S safety instructor to the following:
 - A. Characteristics of H₂S
 - B. Physical effects and hazards
 - C. Principal and operation of H₂S detectors, warning system and briefing areas.
 - D. Evacuation procedure, routes and first aid.
 - E. Proper use of safety equipment & life support systems
 - F. Essential personnel meeting Medical Evaluation criteria will receive additional training on the proper use of 30 minute pressure demand air packs.

H₂S Detection and Alarm Systems:

 - A. H₂S sensors/detectors to be located on the drilling rig floor, in the base of the sub structure/cellar area, on the mud pits in the shale shaker area. Additional H₂S detectors may be placed as deemed necessary.
 - B. An audio alarm system will be installed on the derrick floor and in the top doghouse.
- 3 Windsock and/or wind streamers:
 - A. Windsock at mudpit area should be high enough to be visible.
 - B. Windsock on the rig floor and / or top doghouse should be high enough to be visible.
- 4 Condition Flags and Signs
 - A. Warning sign on access road to location.
 - B. Flags to be displayed on sign at entrance to location. Green flag indicates normal safe condition. Yellow flag indicates potential pressure and danger. Red flag indicates danger (H₂S present in dangerous concentration). Only H₂S trained and certified personnel admitted to location.
- 5 Well control equipment:
 - A. See exhibit "E-1"
- 6 Communication:
 - A. While working under masks chalkboards will be used for communication.
 - B. Hand signals will be used where chalk board is inappropriate.
 - C. Two way radio will be used to communicate off location in case of emergency help is required. In most cases cellular telephones will be available at most drilling foreman's trailer or living quarters.
- 7 Drillstem Testing:

No DSTs or cores are planned at this time.
- 8 Drilling contractor supervisor will be required to be familiar with the effects H₂S has on tubular goods and other mechanical equipment.
- 9 If H₂S is encountered, mud system will be altered if necessary to maintain control of formation. A mud gas separator will be brought into service along with H₂S scavengers if necessary.

H₂S Contingency Plan
Vaca Draw 20-17 Fed 47H
Cimarex Energy Co.
Sec. 20-25S-33E
Lea Co., NM

Emergency Procedures

In the event of a release of gas containing H₂S, the first responder(s) must:

- « Isolate the area and prevent entry by other persons into the 100 ppm ROE.
- « Evacuate any public places encompassed by the 100 ppm ROE.
- « Be equipped with H₂S monitors and air packs in order to control the release.
- « Use the "buddy system" to ensure no injuries occur during the 432-620-1975
- « Take precautions to avoid personal injury during this operation.
- « Contact operator and/or local officials to aid in operation. See list of phone numbers attached.
- « Have received training in the:
 - Detection of H₂S, and
 - Measures for protection against the gas,
 - Equipment used for protection and emergency response.

Ignition of Gas Source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO₂). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally, the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of the gas.

Characteristics of H₂S and SO₂

Please see attached International Chemical Safety Cards.

Contacting Authorities

Cimarex Energy Co. of Colorado's personnel must liaise with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including directions to site. The following call list of essential and potential responders has been prepared for use during a release. Cimarex Energy Co. of Colorado's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER).

H₂S Contingency Plan Emergency Contacts
Vaca Draw 20-17 Fed 47H
Cimarex Energy Co.
Sec. 20-25S-33E
Lea Co., NM

Company Office

Cimarex Energy Co. of Colorado	800-969-4789
Co. Office and After-Hours Menu	

Key Personnel

Name	Title	Office	Mobile
Larry Seigrist	Drilling Manager	432-620-1934	580-243-8485
Charlie Pritchard	Drilling Superintendent	432-620-1975	432-238-7084
Roy Shirley	Construction Superintendent		432-634-2136

Artesia

Ambulance	911
State Police	575-746-2703
City Police	575-746-2703
Sheriff's Office	575-746-9888
Fire Department	575-746-2701
Local Emergency Planning Committee	575-746-2122
New Mexico Oil Conservation Division	575-748-1283

Carlsbad

Ambulance	911
State Police	575-885-3137
City Police	575-885-2111
Sheriff's Office	575-887-7551
Fire Department	575-887-3798
Local Emergency Planning Committee	575-887-6544
US Bureau of Land Management	575-887-6544

Santa Fe

New Mexico Emergency Response Commission (Santa Fe)	505-476-9600
New Mexico Emergency Response Commission (Santa Fe) 24 Hrs	505-827-9126
New Mexico State Emergency Operations Center	505-476-9635

National

National Emergency Response Center (Washington, D.C.)	800-424-8802
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Medical

Flight for Life - 4000 24th St.; Lubbock, TX	806-743-9911
Aerocare - R3, Box 49F; Lubbock, TX	806-747-8923
Med Flight Air Amb - 2301 Yale Blvd S.E., #D3; Albuquerque, NM	505-842-4433
SB Air Med Service - 2505 Clark Carr Loop S.E.; Albuquerque, NM	505-842-4949

Other

Boots & Coots IWC	800-256-9688	or	281-931-8884
Cudd Pressure Control	432-699-0139	or	432-563-3356
Halliburton	575-746-2757		
B.J. Services	575-746-3569		



Cimarex Vaca Draw 20-17 Federal #47H Rev0 RM 12Sept19 Anti-Collision Summary Report

Analysis Date-24hr Time: October 07, 2019 - 09:40

Client: Cimarex Energy

Field: NM Lea County (NAD 83)

Structure: Cimarex Vaca Draw 20-17 Federal #47H

Slot: New Slot

Well: Vaca Draw 20-17 Federal #47H

Borehole: Vaca Draw 20-17 Federal #47H

Scan MD Range: 0.00ft ~ 22384.12ft

Analysis Method: 3D Least Distance

Reference Trajectory: Cimarex Vaca Draw 20-17 Federal #47H Rev0 RM 12Sept19 (Non-Def Plan)

Depth Interval: Every 10.00 Measured Depth (ft)

Rule Set: NAL Procedure: D&M AntiCollision Standard S002

Min Pts: All local minima indicated.

Version / Patch: 2.10.782.0

Database \ Project: US1153APP452.dir.slb.com\drilling-NM Lea County 2.10

Trajectory Error Model: ISCSA0 3-D 95.000% Confidence 2.7955 sigma, for subject well. For offset wells, error model version is specified with each well respectively.

Offset Trajectories Summary

Offset Selection Criteria

Wellhead distance scan:

Selection filters:

Not performed!

Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans

- All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)		Minor	Major		

Results highlighted: Sep-Factor separation <= 1.50 ft

EOG Vaca Draw 20 Federal #1
(Offset) Plugged Inc Only Off-
14200ft (Def Survey)

Fail Major

3325.64	32.81	3323.14	3292.83	N/A	MAS = 10.00 (m)	0.00	0.00						Surface
3325.61	32.81	3322.98	3292.80	25960.79	MAS = 10.00 (m)	20.00	20.00						MinPts
3325.61	32.81	3322.87	3292.80	13791.66	MAS = 10.00 (m)	26.00	26.00						WRP
3323.23	35.25	3298.89	3287.98	152.11	OSF1.50	700.00	700.00						MinPt-CtCt
3327.50	132.70	3238.19	3194.79	38.31	OSF1.50	2570.00	2569.99						MinPt-CtCt
3337.24	157.83	3231.19	3179.42	32.20	OSF1.50	3110.00	3107.30						MINPT-O-EQU
3353.39	212.02	3211.21	3141.37	23.99	OSF1.50	4060.00	4050.62						MinPt-CtCt
3371.82	254.13	3201.57	3117.69	20.08	OSF1.50	4970.00	4954.22						MINPT-O-EQU
3412.34	375.17	3161.40	3037.18	13.72	OSF1.50	7290.00	7262.46						MinPt-CtCt
3410.79	431.65	3122.19	2979.14	11.91	OSF1.50	8380.00	8352.46						MinPt-CtCt
3401.46	552.17	3032.51	2849.29	9.28	OSF1.50	10680.00	10652.46						MinPt-CtCt
3404.36	561.53	3029.17	2842.83	9.13	OSF1.50	10940.00	10912.46						MINPT-O-EQU
2129.80	642.53	1699.80	1487.26	5.00	OSF1.50	13410.00	12350.20		OSF<5.00				Enter Alert
643.14	645.51	210.36	-2.37	1.49	OSF1.50	14900.00	12345.18			OSF<1.50			Enter Minor
425.60	646.02	-7.60	-220.42	0.98	OSF1.50	15120.00	12344.44				OSF<1.00		Enter Major
77.94	646.06	-353.56	-568.06	0.18	OSF1.50	15540.00	12343.03						MinPts
418.89	640.88	-9.20	-221.99	0.98	OSF1.50	15950.00	12341.65				OSF>1.00		Exit Major
636.36	640.91	208.25	-4.55	1.49	OSF1.50	16170.00	12340.91						Exit Minor
2122.97	641.52	1694.45	1481.44	4.98	OSF1.50	17660.00	12335.90		OSF>5.00				Exit Alert
6845.94	644.25	6415.60	6201.69	16.00	OSF1.50	22384.12	12320.00						TD

Cimarex Vaca Draw 20-17
Federal #46H Rev0 RM
12Sept19 (Non-Def Plan)

Fail Minor

20.00	16.50	17.50	3.50	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00					Enter Alert
20.00	16.50	17.50	3.50	N/A	MAS = 5.03 (m)	26.00	26.00						WRP
20.00	20.00	5.83	0.00	1.50	OSF1.50	1920.00	1920.00			OSF<1.50			Enter Minor
20.00	25.47	2.19	-5.47	1.14	OSF1.50	2500.00	2500.00						MinPt-CtCt
20.02	25.54	2.16	-5.52	1.14	OSF1.50	2510.00	2510.00						MinPts
20.07	25.60	2.17	-5.53	1.14	OSF1.50	2520.00	2520.00						MinPt-O-ADP
26.17	26.49	7.68	-0.32	1.48	OSF1.50	2690.00	2689.86			OSF>1.50			Exit Minor
91.84	29.41	71.40	62.43	4.98	OSF1.50	3280.00	3276.11		OSF>5.00				Exit Alert
416.58	126.78	331.23	289.80	5.00	OSF1.50	14240.00	12347.40		OSF<5.00				Enter Alert
415.94	360.45	174.81	55.50	1.73	OSF1.50	22380.00	12320.01						MinPt-CtCt
415.94	360.57	174.73	55.37	1.73	OSF1.50	22384.12	12320.00						MinPts

Cimarex Vaca Draw 20-17
Federal #48H Rev0 RM
12Sept19 (Non-Def Plan)

Fail Minor

20.05	16.50	17.55	3.55	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00					Enter Alert
20.00	16.50	17.50	3.50	N/A	MAS = 5.03 (m)	26.00	26.00						WRP
20.00	20.09	5.77	-0.09	1.49	OSF1.50	1930.00	1930.00			OSF<1.50			Enter Minor
20.00	23.58	3.45	-3.58	1.25	OSF1.50	2300.00	2300.00						MinPt-CtCt
20.01	23.65	3.41	-3.64	1.24	OSF1.50	2310.00	2310.00						MINPT-O-EQU
20.06	23.72	3.41	-3.66	1.24	OSF1.50	2320.00	2320.00						MinPts
24.30	24.49	7.14	-0.18	1.49	OSF1.50	2460.00	2460.00			OSF>1.50			Exit Minor
145.71	46.03	114.19	99.68	4.93	OSF1.50	6526.74	6500.00						MinPt-O-SF
148.57	46.42	116.80	102.16	4.99	OSF1.50	6600.00	6572.85		OSF>5.00				Exit Alert
414.93	77.45	362.47	337.49	8.25	OSF1.50	12350.00	12245.39						MinPt-CtCt
415.40	126.58	330.18	288.82	4.99	OSF1.50	14950.00	12345.02		OSF<5.00				Enter Alert
414.94	332.83	192.22	82.11	1.87	OSF1.50	21840.00	12321.83						MinPt-CtCt
414.94	349.98	180.81	64.99	1.78	OSF1.50	22384.12	12320.00						MinPts

Cimarex Vaca Draw 20-17
Federal #44H Rev0 kFc
28Sep19 (Def Plan)

Warning Alert

99.99	32.81	98.18	67.18	N/A	MAS = 10.00 (m)	0.00	0.00						Surface
99.98	32.81	98.18	67.18	62908.58	MAS = 10.00 (m)	26.00	26.00						WRP
98.65	32.81	93.39	65.84	28.01	MAS = 10.00 (m)	830.00	830.00						MinPts
98.60	32.81	92.35	65.80	21.75	MAS = 10.00 (m)	1060.00	1060.00						MINPT-O-EQU
98.60	32.81	92.22	65.79	20.51	MAS = 10.00 (m)	1120.00	1120.00						MinPts
99.87	32.81	90.10	67.07	12.09	MAS = 10.00 (m)	1820.00	1820.00						MINPT-O-EQU
102.25	32.81	90.03	69.44	9.52	MAS = 10.00 (m)	2420.00	2420.00						MINPT-O-EQU
102.29	32.81	89.60	69.49	9.11	MAS = 10.00 (m)	2560.00	2560.00						MinPts
102.31	32.81	89.57	69.51	9.08	MAS = 10.00 (m)	2590.00	2589.99						MINPT-O-EQU
102.33	32.81	89.57	69.52	9.08	MAS = 10.00 (m)	2600.00	2599.98						MinPt-O-SF
102.91	32.81	90.00	70.10	9.00	MAS = 10.00 (m)	3510.00	3504.49						MinPts
102.93	32.81	89.99	70.12	8.97	MAS = 10.00 (m)	3540.00	3534.28						MINPT-O-EQU
105.45	32.81	92.05	72.64	8.83	MAS = 10.00 (m)	3840.00	3832.17						MinPt-O-SF
109.48	32.81	93.05	76.67	7.30	MAS = 10.00 (m)	4930.00	4914.50						MINPT-O-EQU
109.44	32.81	93.02	76.63	7.25	MAS = 10.00 (m)	4960.00	4944.29						MinPts
109.47	32.81	92.98	76.66	7.22	MAS = 10.00 (m)	4980.00	4964.15						MINPT-O-EQU
115.37	32.81	97.74	82.56	7.08	MAS = 10.00 (m)	5290.00	5271.96						MinPt-O-SF
136.21	42.90	106.77	93.31	4.96	OSF1.50	9390.00	9362.46		OSF<5.00				Enter Alert

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
132.41	43.68	102.51	88.81	4.74		OSF1.50	9520.00	9492.46				MinPts	
132.48	43.68	102.53	88.80	4.73		OSF1.50	9530.00	9502.46				MinPts	
140.22	44.04	110.03	96.16	4.97		OSF1.50	9620.00	9692.46	OSF<5.00			Exit Alert	
2297.63	161.00	2189.46	2136.63	21.72		OSF1.50	17370.00	12336.87				MinPt-CtCt	
2301.02	314.27	2090.68	1986.75	11.06		OSF1.50	22384.12	12320.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #44H MWD Off-Update
(Non-Def Survey)

Warning Alert												
99.99	32.81	98.18	67.18	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
99.98	32.81	98.18	67.18	62908.57	MAS = 10.00 (m)	26.00	26.00					WRP
98.65	32.81	93.35	65.84	28.01	MAS = 10.00 (m)	830.00	830.00					MinPts
98.60	32.81	92.35	65.80	21.75	MAS = 10.00 (m)	1060.00	1060.00					MINPT-O-EQU
98.60	32.81	92.22	65.79	20.51	MAS = 10.00 (m)	1120.00	1120.00					MinPts
99.87	32.81	90.10	67.07	12.09	MAS = 10.00 (m)	1820.00	1820.00					MINPT-O-EQU
102.25	32.81	90.03	69.44	9.52	MAS = 10.00 (m)	2420.00	2420.00					MINPT-O-EQU
102.29	32.81	89.60	69.48	9.11	MAS = 10.00 (m)	2560.00	2560.00					MinPts
102.31	32.81	89.57	69.51	9.08	MAS = 10.00 (m)	2590.00	2589.99					MINPT-O-EQU
102.33	32.81	89.57	69.52	9.06	MAS = 10.00 (m)	2600.00	2599.98					MinPt-O-SF
102.91	32.81	90.00	70.10	9.00	MAS = 10.00 (m)	3510.00	3504.49					MinPts
102.93	32.81	89.99	70.12	8.97	MAS = 10.00 (m)	3540.00	3534.28					MINPT-O-EQU
105.45	32.81	92.05	72.64	8.83	MAS = 10.00 (m)	3840.00	3832.17					MinPt-O-SF
109.48	32.81	93.05	76.67	7.30	MAS = 10.00 (m)	4930.00	4914.50					MINPT-O-EQU
109.44	32.81	93.02	76.63	7.25	MAS = 10.00 (m)	4960.00	4944.29					MinPts
109.47	32.81	92.98	76.66	7.22	MAS = 10.00 (m)	4980.00	4964.15					MINPT-O-EQU
115.37	32.81	97.74	82.56	7.08	MAS = 10.00 (m)	5290.00	5271.96					MinPt-O-SF
135.89	41.99	107.38	93.90	4.98	OSF1.50	9400.00	9372.46	OSF<5.00				Enter Alert
133.72	42.50	104.87	91.22	4.84	OSF1.50	9480.00	9452.46					MinPts
133.83	42.57	104.93	91.26	4.84	OSF1.50	9490.00	9462.46					MinPt-O-SF
139.16	42.85	110.08	96.31	5.00	OSF1.50	9560.00	9532.46	OSF>5.00				Exit Alert
2380.08	32.81	2358.47	2347.27	118.48	MAS = 10.00 (m)	12890.00	12351.95					MinPts
2380.10	32.81	2358.45	2347.29	118.28	MAS = 10.00 (m)	12900.00	12351.91					MINPT-O-EQU
2941.66	51.25	2906.98	2890.41	88.73	OSF1.50	14620.00	12346.13					MinPt-O-SF
9786.69	69.01	9740.17	9717.68	217.55	OSF1.50	22384.12	12320.00					TD

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #4H ST01
MWD Off-22279H (Surcon
Corrected) (Def Survey)

Warning Alert												
1300.06	32.81	1298.37	1267.26	N/A	MAS = 10.00 (m)	0.00	0.00					MinPts
1300.09	32.81	1298.37	1267.28	52738.98	MAS = 10.00 (m)	26.00	26.00					WRP
1300.16	32.81	1298.34	1267.35	10635.54	MAS = 10.00 (m)	60.00	60.00					MINPT-O-EQU
1137.34	32.81	1123.98	1104.53	96.94	MAS = 10.00 (m)	2600.00	2599.98					MinPt-O-SF
1121.73	32.81	1107.81	1088.92	91.37	MAS = 10.00 (m)	3460.00	3454.84					MinPts
1116.35	32.81	1099.82	1083.54	75.01	MAS = 10.00 (m)	4670.00	4656.33					MinPts
1116.37	32.81	1099.81	1083.56	74.87	MAS = 10.00 (m)	4680.00	4666.26					MINPT-O-EQU
1103.89	32.81	1081.66	1071.08	53.65	MAS = 10.00 (m)	6160.00	6135.84					MinPts
1101.60	34.97	1077.72	1066.63	49.57	OSF1.50	6600.00	6572.85					MinPt-O-SF
849.37	44.08	819.25	805.30	30.36	OSF1.50	9210.00	9182.46					MinPt-CtCt
849.38	44.11	819.23	805.27	30.34	OSF1.50	9220.00	9192.46					MINPT-O-EQU
849.42	44.15	819.24	805.27	30.31	OSF1.50	9230.00	9202.46					MinPt-O-ADP
857.20	46.95	825.17	810.25	28.67	OSF1.50	9890.00	9862.46					MinPt-CtCt
857.29	47.25	825.06	810.04	28.48	OSF1.50	9960.00	9932.46					MINPT-O-EQU
857.78	47.94	825.08	809.84	28.06	OSF1.50	10110.00	10082.46					MINPT-O-EQU
857.82	47.99	825.09	809.83	28.03	OSF1.50	10120.00	10092.46					MinPt-O-ADP
859.88	49.33	826.25	810.54	27.29	OSF1.50	10400.00	10372.46					MinPt-O-ADP
861.23	51.64	826.07	809.58	26.06	OSF1.50	10870.00	10842.46					MinPt-CtCt
861.25	51.73	826.03	809.51	26.01	OSF1.50	10890.00	10862.46					MINPT-O-EQU
861.28	51.78	826.03	809.50	25.99	OSF1.50	10900.00	10872.46					MinPt-O-ADP
876.12	53.59	839.68	822.53	25.48	OSF1.50	11320.00	11292.46					MinPt-O-SF
809.03	65.93	764.35	743.10	18.98	OSF1.50	13050.00	12351.41					MinPt-CtCt
809.70	67.54	763.95	742.16	18.53	OSF1.50	13160.00	12351.04					MINPT-O-EQU
809.91	67.81	763.98	742.10	18.46	OSF1.50	13180.00	12350.97					MinPt-O-ADP
821.92	75.35	770.97	746.58	16.80	OSF1.50	13610.00	12349.52					MinPt-O-ADP
835.70	102.23	766.84	733.47	12.49	OSF1.50	14780.00	12345.59					MinPt-CtCt
835.89	102.78	766.67	733.12	12.43	OSF1.50	14810.00	12345.49					MINPT-O-EQU
836.19	103.15	766.72	733.05	12.39	OSF1.50	14830.00	12345.42					MinPt-O-ADP
834.83	117.02	756.10	717.80	10.87	OSF1.50	15350.00	12343.67					MinPt-CtCt
835.10	117.81	755.85	717.29	10.80	OSF1.50	15390.00	12343.53					MINPT-O-EQU
835.42	118.20	755.90	717.21	10.77	OSF1.50	15410.00	12343.47					MinPt-O-ADP
835.68	126.14	750.87	709.54	10.08	OSF1.50	15690.00	12342.53					MinPt-CtCt
831.89	146.26	733.68	685.64	8.64	OSF1.50	16420.00	12340.07					MinPt-CtCt
821.39	179.71	700.87	641.68	6.92	OSF1.50	17600.00	12336.10					MinPt-CtCt
822.49	182.40	700.17	640.08	6.83	OSF1.50	17710.00	12335.73					MINPT-O-EQU
823.35	188.31	697.09	635.03	6.62	OSF1.50	17900.00	12335.09					MinPt-CtCt
824.43	194.37	694.13	630.06	6.42	OSF1.50	18110.00	12334.38					MinPt-CtCt
824.87	195.65	693.72	629.22	6.38	OSF1.50	18170.00	12334.18					MINPT-O-EQU
825.23	196.07	693.80	629.16	6.37	OSF1.50	18190.00	12334.11					MinPt-O-ADP
831.61	204.46	694.58	627.14	6.15	OSF1.50	18480.00	12333.14					MINPT-O-EQU
835.34	213.92	692.02	621.42	5.90	OSF1.50	18790.00	12332.09					MinPt-CtCt
835.78	215.86	691.16	619.91	5.85	OSF1.50	18870.00	12331.82					MINPT-O-EQU
836.28	216.50	691.24	619.78	5.84	OSF1.50	18900.00	12331.72					MinPt-O-ADP
816.37	246.50	651.32	569.87	5.00	OSF1.50	19880.00	12328.43	OSF<5.00				Enter Alert
814.28	250.57	646.49	563.69	4.90	OSF1.50	20030.00	12327.92					MinPt-CtCt
814.66	251.65	646.16	563.00	4.89	OSF1.50	20080.00	12327.75					MINPT-O-EQU
815.71	252.85	646.42	562.86	4.87	OSF1.50	20130.00	12327.59					MinPt-O-ADP
838.40	283.11	648.95	555.29	4.46	OSF1.50	21120.00	12324.25					MinPt-CtCt
833.22	293.89	636.58	539.33	4.27	OSF1.50	21480.00	12323.04					MinPt-CtCt
834.63	298.19	635.12	536.44	4.22	OSF1.50	21640.00	12322.50					MINPT-O-EQU
835.66	299.44	635.32	536.22	4.21	OSF1.50	21690.00	12322.34					MinPt-O-ADP
834.41	321.12	619.62	513.29	3.91	OSF1.50	22384.12	12320.00					MinPts

Cimarex Vaca Draw 20-17
Federal #74H Rev0 RM
12Sept19 (Non-Def Plan)

Warning Alert												
1749.81	32.81	1747.31	1717.00	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
1749.78	32.81	1747.28	1716.97	N/A	MAS = 10.00 (m)	10.00	10.00					MinPts
1749.78	32.81	1747.28	1716.97	N/A	MAS = 10.00 (m)	26.00	26.00					WRP
1748.15	32.81	1730.16	1715.34	112.76	MAS = 10.00 (m)	2560.00	2560.00					MinPt-O-SF
1744.77	32.81	1726.82	1711.96	112.81	MAS = 10.00 (m)	2600.00	2599.98					MinPt-O-SF
840.63	44.36	809.85	796.27	30.83	OSF1.50	6690.00	6662.58					MinPt-O-SF
830.98	43.49	800.77	787.49	31.15	OSF1.50	6860.00	6832.46					MinPt-O-ADP
830.96	43.46	800.77	787.49	31.17	OSF1.50	6866.78	6839.24					MINPT-O-EQU
830.88	77.24	778.17	753.64	16.86	OSF1.50	12130.00	12089.74					MinPt-CiCt
830.88	239.57	669.95	591.31	5.26	OSF1.50	18770.00	12332.16					MinPt-CiCt

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
	830.88	251.93	661.71	578.95	5.00	OSF1.50	19170.00	12330.82	OSF<5.00			Enter Alert	
	830.95	352.85	594.49	478.09	3.55	OSF1.50	22384.12	12320.00				MinPts	
Hankamer Curtis Bass-Federal #1 (Offset) Plugged Blind Off- 5074ft (Def Survey)													
	4292.91	32.81	4290.41	4260.10	N/A	MAS = 10.00 (m)	0.00	0.00				Warning Alert	Surface
	4292.91	32.81	4287.81	4260.10	1651.31	MAS = 10.00 (m)	26.00	26.00					WRP
	4292.91	772.57	3777.03	3520.35	8.36	OSF1.50	2500.00	2500.00	OSF<5.00			MinPt-CtCt	
	4335.64	1303.57	3465.76	3032.07	5.00	OSF1.50	4200.00	4189.63		Enter Alert			
	4364.10	1581.92	3308.65	2782.18	4.14	OSF1.50	5100.00	5083.30	OSF<5.00			MinPts	
	4822.32	1450.43	3854.53	3371.89	4.99	OSF1.50	7030.00	7002.46		Exit Alert			
	7407.19	314.23	7196.87	7092.97	35.63	OSF1.50	15180.00	12344.24				MinPt-O-ADP	
	7320.39	209.57	7179.85	7110.82	53.01	OSF1.50	15760.00	12342.29				MINPT-O-EOU	
	7275.22	132.54	7186.02	7142.67	83.89	OSF1.50	16570.00	12339.56				MinPt-CtCt	
	7328.00	243.38	7164.94	7084.65	45.62	OSF1.50	17450.00	12336.60				MINPT-O-EOU	
	7410.21	342.12	7181.30	7068.09	32.72	OSF1.50	17980.00	12334.82				MinPt-O-ADP	
	9311.79	1008.68	8638.50	8303.11	13.88	OSF1.50	22384.12	12320.00				MinPt-O-SF	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #45H Off- 19226ft (Surcon Corrected) (Def Survey)													
	84.84	32.81	83.04	52.03	N/A	MAS = 10.00 (m)	0.00	0.00				Pass	MinPts
	84.85	32.81	83.04	52.04	34560.52	MAS = 10.00 (m)	26.00	26.00					WRP
	76.22	32.81	69.96	43.41	16.74	MAS = 10.00 (m)	1060.00	1060.00				MINPT-O-EOU	
	59.93	32.81	47.60	27.12	5.46	MAS = 10.00 (m)	2370.00	2370.00				MinPts	
	59.95	32.81	47.57	27.14	5.43	MAS = 10.00 (m)	2380.00	2380.00				MINPT-O-EOU	
	60.80	32.81	48.14	28.00	5.37	MAS = 10.00 (m)	2430.00	2430.00				MinPt-O-SF	
	148.54	32.81	130.76	115.73	9.05	MAS = 10.00 (m)	5080.00	5063.44				MinPt-O-SF	
	212.67	33.13	190.06	179.53	10.02	OSF1.50	6320.00	6294.72				MinPt-O-SF	
	378.83	40.01	351.64	338.82	14.71	OSF1.50	8660.00	8632.46				MINPT-O-EOU	
	379.21	40.63	351.61	338.59	14.49	OSF1.50	8830.00	8802.46				MINPT-O-EOU	
	379.27	40.69	351.63	338.58	14.47	OSF1.50	8840.00	8812.46				MinPt-O-ADP	
	381.22	41.08	353.31	340.13	14.40	OSF1.50	8910.00	8882.46				MinPt-O-SF	
	3042.73	32.81	3022.26	3009.92	160.70	MAS = 10.00 (m)	12494.54	12303.20				MinPt-O-SF	
	2955.84	141.70	2860.86	2814.14	31.62	OSF1.50	16770.00	12338.89				MinPt-CtCt	
	2956.66	144.15	2860.04	2812.50	31.08	OSF1.50	16880.00	12338.52				MINPT-O-EOU	
	2959.42	147.38	2860.65	2812.03	30.42	OSF1.50	17010.00	12338.08				MinPt-O-ADP	
	2967.73	161.76	2859.38	2805.97	27.77	OSF1.50	17480.00	12336.50				MINPT-O-EOU	
	2970.76	165.37	2860.00	2805.39	27.19	OSF1.50	17620.00	12336.03				MinPt-O-ADP	
	2982.72	198.27	2850.03	2784.45	22.73	OSF1.50	18670.00	12332.50				MinPt-CtCt	
	2983.17	199.65	2849.56	2783.52	22.58	OSF1.50	18740.00	12332.26				MINPT-O-EOU	
	2983.82	200.43	2849.69	2783.39	22.49	OSF1.50	18780.00	12332.13				MinPt-O-ADP	
	2985.58	211.42	2844.12	2774.15	21.33	OSF1.50	19110.00	12331.02				MinPt-CtCt	
	2983.07	217.20	2837.75	2765.87	20.74	OSF1.50	19300.00	12330.38				MinPt-CtCt	
	2987.03	225.39	2836.25	2761.64	20.01	OSF1.50	19610.00	12329.33				MINPT-O-EOU	
	2988.47	229.42	2835.01	2759.05	19.66	OSF1.50	19710.00	12329.00				MinPt-CtCt	
	2989.47	232.47	2833.97	2757.00	19.41	OSF1.50	19840.00	12328.56				MINPT-O-EOU	
	2990.18	233.33	2834.11	2756.85	19.34	OSF1.50	19880.00	12328.43				MinPt-O-ADP	
	2991.95	268.79	2772.25	2683.17	16.56	OSF1.50	21020.00	12324.59				MinPt-CtCt	
	2992.00	294.86	2764.91	2667.14	15.14	OSF1.50	21890.00	12321.66				MinPt-CtCt	
	2993.77	309.42	2756.98	2654.35	14.43	OSF1.50	22384.12	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #43H MWD Off-Update (Non-Def Survey)													
	116.60	32.81	114.79	83.79	N/A	MAS = 10.00 (m)	0.00	0.00				Pass	Surface
	116.59	32.81	114.78	83.78	19250.79	MAS = 10.00 (m)	26.00	26.00					WRP
	112.59	32.81	106.32	79.78	24.80	MAS = 10.00 (m)	1060.00	1060.00				MinPts	
	121.14	32.81	114.34	88.33	23.90	MAS = 10.00 (m)	1110.00	1110.00				MinPt-O-SF	
	11253.83	32.81	11238.44	11221.02	828.60	MAS = 10.00 (m)	12494.54	12303.20				MinPt-O-SF	
	15118.88	161.78	15010.43	14957.10	141.75	OSF1.50	22384.12	12320.00				MinPt-O-SF	
Cimarex Vaca Draw 20-17 Federal #43H Rev3 IP 13Aug19 (Def Plan)													
	116.60	32.81	114.10	83.79	N/A	MAS = 10.00 (m)	0.00	0.00				Pass	Surface
	116.60	32.81	114.10	83.79	30208.28	MAS = 10.00 (m)	26.00	26.00					WRP
	116.60	32.81	98.78	83.79	7.45	MAS = 10.00 (m)	2500.00	2500.00				MinPts	
	116.62	32.81	98.75	83.81	7.43	MAS = 10.00 (m)	2510.00	2510.00				MINPT-O-EOU	
	118.26	32.81	100.00	85.46	7.35	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	589.04	70.83	540.98	518.21	12.88	OSF1.50	8860.00	8832.46				MINPT-O-EOU	
	589.08	70.89	540.98	518.20	12.87	OSF1.50	8870.00	8842.46				MinPt-O-ADP	
	590.17	71.13	541.92	519.04	12.84	OSF1.50	8920.00	8892.46				MinPt-O-SF	
	3020.66	313.23	2811.00	2707.42	14.57	OSF1.50	22384.12	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #71H Rev4 RM 19Jul19 (Def Plan)													
	1670.90	32.81	1669.10	1638.10	N/A	MAS = 10.00 (m)	0.00	0.00				Pass	Surface
	1670.87	32.81	1669.06	1638.06	N/A	MAS = 10.00 (m)	10.00	10.00				MinPts	
	1670.87	32.81	1669.06	1638.06	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	622.33	61.80	579.97	560.53	15.91	OSF1.50	9590.00	9562.46				MinPt-CtCt	
	622.35	61.86	579.95	560.48	15.90	OSF1.50	9600.00	9572.46				MINPT-O-EOU	
	622.41	61.92	579.97	560.48	15.88	OSF1.50	9610.00	9582.46				MinPt-O-ADP	
	625.93	62.53	583.10	563.40	15.80	OSF1.50	9720.00	9692.46				MinPt-O-SF	
	2340.32	109.12	2266.98	2231.21	32.69	OSF1.50	15560.00	12342.96				MinPt-CtCt	
	2344.55	317.12	2132.53	2027.43	11.14	OSF1.50	22384.12	12320.00				MinPts	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #4H MWD Off-12228ft (Surcon Corrected) (Def Survey)													
	1300.06	32.81	1297.56	1267.26	N/A	MAS = 10.00 (m)	0.00	0.00				Pass	MinPts
	1300.09	32.81	1297.56	1267.28	52706.40	MAS = 10.00 (m)	26.00	26.00				WRP	
	1300.16	32.81	1297.54	1267.35	10628.97	MAS = 10.00 (m)	60.00	60.00				MINPT-O-EOU	
	1137.34	32.81	1123.07	1104.53	97.09	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1121.73	32.81	1106.86	1088.92	91.18	MAS = 10.00 (m)	3460.00	3454.84				MinPts	
	1116.35	32.81	1098.89	1083.54	74.95	MAS = 10.00 (m)	4670.00	4656.33				MinPts	
	1116.37	32.81	1098.88	1083.56	74.81	MAS = 10.00 (m)	4680.00	4666.26				MINPT-O-EOU	
	1103.89	33.41	1080.74	1070.48	53.65	OSF1.50	6160.00	6135.84				MinPt-CtCt	
	1101.60	35.93	1076.77	1065.67	49.49	OSF1.50	6600.00	6572.85				MinPt-O-SF	
	849.37	45.02	818.31	804.36	30.32	OSF1.50	9210.00	9182.46				MinPt-CtCt	
	849.38	45.05	818.30	804.33	30.30	OSF1.50	9220.00	9192.46				MINPT-O-EOU	
	849.42	45.09	818.31	804.33	30.27	OSF1.50	9230.00	9202.46				MinPt-O-ADP	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
	857.20	47.88	824.23	809.32	28.63	OSF1.50	9890.00	9862.46				MinPt-CtCt	
	857.32	48.25	824.12	809.09	28.42	OSF1.50	9970.00	9942.46				MinPt-O-EOU	
	857.78	48.87	824.15	808.91	28.03	OSF1.50	10110.00	10082.46				MinPt-O-EOU	
	857.82	48.91	824.16	808.90	28.01	OSF1.50	10120.00	10092.46				MinPt-O-ADP	
	859.88	50.24	825.34	809.64	27.28	OSF1.50	10400.00	10372.46				MinPt-O-ADP	
	861.23	52.55	825.15	808.67	26.04	OSF1.50	10870.00	10842.46				MinPt-CtCt	
	861.25	52.64	825.11	808.60	25.99	OSF1.50	10890.00	10862.46				MinPt-O-EOU	
	861.28	52.69	825.11	808.59	25.97	OSF1.50	10900.00	10872.46				MinPt-O-ADP	
	876.12	54.50	838.76	821.62	25.47	OSF1.50	11320.00	11292.46				MinPt-O-SF	
	908.30	56.56	869.60	851.74	25.35	OSF1.50	11780.00	11752.46				MinPt-O-SF	
	959.94	57.81	920.47	902.13	26.11	OSF1.50	12150.00	12106.61				MinPts	
	967.11	58.44	927.22	908.66	25.99	OSF1.50	12270.00	12197.14				MinPt-O-SF	
	10126.36	60.80	10084.99	10065.55	260.46	OSF1.50	22384.12	12320.00				TD	
Cimarex Vaca Draw 20-17 Federal #60H Rev0 RM 12Sept19 (Non-Def Plan)													
	1199.88	32.81	1197.38	1167.07	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1199.85	32.81	1197.35	1167.04	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	955.51	43.74	925.44	911.77	34.86	OSF1.50	6570.00	6542.99				MinPt-CtCt	
	955.51	43.75	925.43	911.76	34.85	OSF1.50	6580.00	6552.94				MinPts	
	955.61	43.79	925.51	911.83	34.82	OSF1.50	6600.00	6572.85				MinPt-O-SF	
	1126.76	50.39	1092.34	1076.38	35.21	OSF1.50	8450.00	8422.46				MinPt-O-SF	
	1130.31	50.54	1095.78	1079.77	35.21	OSF1.50	8490.00	8462.46				MinPt-O-SF	
	1135.84	64.90	1091.74	1070.94	27.25	OSF1.50	10770.00	10742.46				MinPt-CtCt	
	1135.95	65.27	1091.61	1070.69	27.09	OSF1.50	10820.00	10792.46				MinPt-O-EOU	
	1136.01	65.34	1091.62	1070.67	27.06	OSF1.50	10830.00	10802.46				MinPt-O-ADP	
	1145.76	66.91	1100.32	1078.85	26.62	OSF1.50	11070.00	11042.46				MinPt-O-SF	
	1671.51	343.46	1441.71	1328.05	7.34	OSF1.50	22384.12	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #61H Rev0 RM 12Sept19 (Non-Def Plan)													
	1219.86	32.81	1217.36	1187.05	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1219.84	32.81	1217.34	1187.03	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1219.84	32.81	1205.19	1187.03	100.20	MAS = 10.00 (m)	2000.00	2000.00				MinPts	
	1219.86	32.81	1205.11	1187.05	99.38	MAS = 10.00 (m)	2020.00	2020.00				MinPt-O-EOU	
	1258.25	32.81	1241.58	1225.44	88.62	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1247.17	39.92	1219.73	1207.25	49.90	OSF1.50	5710.00	5689.01				MinPt-O-SF	
	1141.00	67.47	1095.13	1073.53	26.35	OSF1.50	10350.00	10322.46				MinPt-CtCt	
	1141.09	67.77	1095.02	1073.32	26.23	OSF1.50	10390.00	10362.46				MinPt-O-EOU	
	1141.15	67.84	1095.04	1073.31	26.20	OSF1.50	10400.00	10372.46				MinPt-O-ADP	
	1153.52	69.76	1106.15	1083.77	25.71	OSF1.50	10700.00	10672.46				MinPt-O-SF	
	1891.58	338.86	1664.84	1552.72	8.42	OSF1.50	22384.12	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #72H Surveys Off to update (Non-Def Survey)													
	1690.89	32.81	1689.09	1658.09	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1690.86	32.81	1689.05	1658.05	N/A	MAS = 10.00 (m)	10.00	10.00				MinPts	
	1690.86	32.81	1689.05	1658.05	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1666.44	32.81	1652.51	1633.63	137.41	MAS = 10.00 (m)	2620.00	2619.96				MinPt-O-SF	
	1174.30	33.08	1151.44	1141.22	57.35	OSF1.50	6600.00	6572.85				MinPt-O-SF	
	1165.51	32.81	1143.38	1132.70	59.08	MAS = 10.00 (m)	6810.00	6782.47				MinPt-O-EOU	
	1165.51	32.81	1143.41	1132.70	59.18	MAS = 10.00 (m)	6820.00	6792.47				MinPts	
	1172.33	34.01	1148.84	1138.31	55.56	OSF1.50	7660.00	7632.46				MinPt-CtCt	
	1172.42	34.29	1148.75	1138.13	55.08	OSF1.50	7770.00	7742.46				MinPt-O-EOU	
	1172.55	34.45	1148.78	1138.10	54.82	OSF1.50	7830.00	7802.46				MinPt-O-ADP	
	1168.31	38.26	1141.99	1130.04	48.81	OSF1.50	8770.00	8742.46				MinPt-CtCt	
	1168.35	38.37	1141.96	1129.98	48.68	OSF1.50	8790.00	8762.46				MinPts	
	1184.58	39.65	1157.35	1144.93	47.57	OSF1.50	9080.00	9052.46				MinPt-O-SF	
	3289.67	41.12	3261.66	3248.55	125.46	OSF1.50	12970.00	12351.68				MinPt-CtCt	
	3289.72	41.33	3261.57	3248.39	124.79	OSF1.50	12990.00	12351.61				MinPt-O-EOU	
	3289.89	41.54	3261.58	3248.35	124.12	OSF1.50	13010.00	12351.54				MinPt-O-ADP	
	3978.90	69.63	3931.88	3909.28	87.96	OSF1.50	15210.00	12344.14				MinPt-O-SF	
	9970.68	88.86	9910.84	9881.83	171.78	OSF1.50	22384.12	12320.00				TD	
Cimarex Vaca Draw 20-17 Federal #72H Rev6 kFc 28Sept19 (Def Plan)													
	1690.89	32.81	1689.09	1658.09	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1690.86	32.81	1689.05	1658.05	N/A	MAS = 10.00 (m)	10.00	10.00				MinPts	
	1690.86	32.81	1689.05	1658.05	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1666.44	32.81	1652.51	1633.63	137.41	MAS = 10.00 (m)	2620.00	2619.96				MinPt-O-SF	
	1174.30	33.08	1151.44	1141.22	57.35	OSF1.50	6600.00	6572.85				MinPt-O-SF	
	1165.51	32.81	1143.38	1132.70	59.08	MAS = 10.00 (m)	6810.00	6782.47				MinPt-O-EOU	
	1165.51	32.81	1143.41	1132.70	59.18	MAS = 10.00 (m)	6820.00	6792.47				MinPts	
	1172.33	34.01	1148.84	1138.31	55.56	OSF1.50	7660.00	7632.46				MinPt-CtCt	
	1172.42	34.29	1148.75	1138.13	55.08	OSF1.50	7770.00	7742.46				MinPt-O-EOU	
	1172.55	34.45	1148.78	1138.10	54.82	OSF1.50	7830.00	7802.46				MinPt-O-ADP	
	1167.48	39.30	1140.21	1128.16	48.29	OSF1.50	8840.00	8812.46				MinPt-CtCt	
	1167.49	39.36	1140.20	1128.13	48.21	OSF1.50	8850.00	8822.46				MinPts	
	1183.76	40.44	1155.79	1143.33	47.39	OSF1.50	9090.00	9062.46				MinPt-O-SF	
	3145.62	227.63	2993.03	2917.99	20.94	OSF1.50	19330.00	12330.28				MinPt-CtCt	
	3158.12	321.57	2942.91	2836.56	14.84	OSF1.50	22384.12	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #75H Rev0 RM 12Sept19 (Non-Def Plan)													
	1769.81	32.81	1767.31	1737.00	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1769.78	32.81	1767.28	1736.97	N/A	MAS = 10.00 (m)	10.00	10.00				MinPts	
	1769.78	32.81	1767.28	1736.97	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1513.40	40.61	1485.40	1472.78	59.86	OSF1.50	4900.00	4884.71				MinPt-O-SF	
	1267.46	39.87	1239.83	1227.59	51.63	OSF1.50	6600.00	6572.85				MinPt-O-SF	
	1245.82	79.53	1191.74	1166.29	24.41	OSF1.50	12260.00	12190.38				MinPt-CtCt	
	1245.82	232.12	1090.02	1013.70	8.14	OSF1.50	19480.00	12333.14				MinPt-CtCt	
	1245.87	354.12	1008.74	891.76	5.31	OSF1.50	22384.12	12320.00				MinPts	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H Off- 19583R (Surcon Corrected) (Def Survey)													
	1710.88	32.81	1709.07	1678.07	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1710.85	32.81	1709.04	1678.04	N/A	MAS = 10.00 (m)	10.00	10.00				MinPt-O-SF	
	1710.85	32.81	1709.04	1678.04	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1710.55	32.81	1707.62	1677.74	1529.20	MAS = 10.00 (m)	300.00	300.00				MinPts	
	1709.82	32.81	1704.61	1677.01	501.87	MAS = 10.00 (m)	810.00	810.00				MinPts	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
1709.98	32.81	1704.42	1677.17	454.81		MAS = 10.00 (m)	900.00	900.00				MINPT-O-EOU	
1699.81	32.81	1686.04	1667.00	140.22		MAS = 10.00 (m)	2970.00	2968.29				MinPt-O-SF	
1662.67	32.81	1648.47	1629.87	132.76		MAS = 10.00 (m)	3480.00	3474.70				MinPt-O-SF	
1644.91	32.81	1630.62	1612.11	130.55		MAS = 10.00 (m)	3740.00	3732.87				MinPt-O-SF	
1331.90	32.81	1309.60	1299.09	65.65		MAS = 10.00 (m)	6600.00	6572.85				MinPt-O-SF	
1314.91	32.81	1292.63	1282.11	64.94		MAS = 10.00 (m)	7320.00	7292.46				MinPts	
1314.96	32.81	1292.59	1282.15	64.68		MAS = 10.00 (m)	7360.00	7332.46				MINPT-O-EOU	
1320.56	39.49	1293.55	1281.08	52.85		OSF1.50	9160.00	9132.46				MinPts	
1283.43	41.55	1255.02	1241.88	48.76		OSF1.50	9550.00	9522.46				MinPt-CtCt	
1283.46	41.61	1255.01	1241.85	48.68		OSF1.50	9560.00	9532.46				MinPts	
1299.98	42.73	1270.82	1257.24	47.82		OSF1.50	9790.00	9762.46				MinPt-O-SF	
2788.34	117.36	2709.59	2670.98	36.09		OSF1.50	15750.00	12342.32				MinPt-CtCt	
2788.77	118.53	2709.24	2670.24	35.74		OSF1.50	15810.00	12342.12				MINPT-O-EOU	
2785.45	126.63	2700.51	2658.81	33.38		OSF1.50	16070.00	12341.25				MinPt-CtCt	
2774.73	158.29	2668.69	2616.44	26.54		OSF1.50	17150.00	12337.61				MinPt-CtCt	
2775.60	161.12	2667.68	2614.48	26.08		OSF1.50	17270.00	12337.21				MINPT-O-EOU	
2776.76	162.50	2667.92	2614.27	25.86		OSF1.50	17330.00	12337.01				MinPt-O-ADP	
2776.10	172.81	2660.38	2603.29	24.30		OSF1.50	17640.00	12335.96				MinPt-CtCt	
2758.27	202.47	2622.77	2555.80	20.58		OSF1.50	18640.00	12332.60				MinPt-CtCt	
2758.78	203.92	2622.32	2554.86	20.44		OSF1.50	18710.00	12332.36				MINPT-O-EOU	
2759.28	204.53	2622.42	2554.75	20.38		OSF1.50	18740.00	12332.26				MinPt-O-ADP	
2761.05	206.15	2623.11	2554.90	20.23		OSF1.50	18810.00	12332.03				MinPt-O-ADP	
2755.25	241.40	2593.80	2513.85	17.22		OSF1.50	19940.00	12328.22				MinPt-CtCt	
2754.78	251.90	2586.33	2502.88	16.50		OSF1.50	20290.00	12327.05				MinPt-CtCt	
2755.39	262.45	2579.91	2492.94	15.83		OSF1.50	20640.00	12325.87				MinPt-CtCt	
2708.16	292.31	2512.78	2415.86	13.96		OSF1.50	21640.00	12322.50				MinPt-CtCt	
2708.67	293.99	2512.16	2414.68	13.88		OSF1.50	21720.00	12322.23				MINPT-O-EOU	
2709.56	295.04	2512.36	2414.53	13.84		OSF1.50	21770.00	12322.07				MinPt-O-ADP	
2723.08	303.63	2520.14	2419.44	13.51		OSF1.50	22090.00	12320.99				MinPt-O-ADP	
2740.39	310.29	2533.01	2430.10	13.31		OSF1.50	22384.12	12320.00				MinPt-O-SF	

Cimarex Vaca Draw 20-17
Federal #71H MWD Oft-Update
(Non-Def Survey)

Pass

1670.90	32.81	1669.10	1638.10	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
1670.87	32.81	1669.06	1638.06	N/A		MAS = 10.00 (m)	10.00	10.00				MinPts	
1670.88	32.81	1669.07	1638.07	674207.24		MAS = 10.00 (m)	26.00	26.00				WRP	
1671.21	32.81	1668.95	1638.40	3683.61		MAS = 10.00 (m)	150.00	150.00				MINPT-O-EOU	
1668.09	32.81	1661.14	1635.28	324.22		MAS = 10.00 (m)	1080.00	1080.00				MinPts	
1972.97	32.81	1962.34	1940.17	223.30		MAS = 10.00 (m)	2130.00	2130.00				MinPt-O-SF	
11292.55	32.81	11275.92	11259.74	761.85		MAS = 10.00 (m)	12494.54	12303.20				MinPt-O-SF	
15139.38	165.64	15028.35	14973.74	138.63		OSF1.50	22384.12	12320.00				MinPt-O-SF	



Cimarex Vaca Draw 20-17 Federal #47H Rev0 RM 12Sept19 Proposal **Geodetic Report** **(Non-Def Plan)**



Report Date: October 04, 2019 - 03:57 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #47H / New Slot
Well: Vaca Draw 20-17 Federal #47H
Borehole: Vaca Draw 20-17 Federal #47H
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #47H Rev0 RM 12Sept19
Survey Date: September 12, 2019
Tort / AHD / DDI / ERD Ratio: 103.794 ° / 10716.030 ft / 6.304 / 0.868
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.05651", W 103° 35' 32.48497"
Location Grid N/E Y/X: N 404447.600 ftUS, E 770760.150 ftUS
CRS Grid Convergence Angle: 0.3939 °
Grid Scale Factor: 0.99996938
Version / Patch: 2.10.782.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.634 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3432.200 ft above MSL
Seabed / Ground Elevation: 3406.200 ft above MSL
Magnetic Declination: 6.611 °
Total Gravity Field Strength: 998.4316mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47739.044 nT
Magnetic Dip Angle: 59.707 °
Declination Date: October 04, 2019
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3939 °
Total Corr Mag North->Grid North: 6.2172 °
Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS ("/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [330' FSL, 2040' FEL]	0.00	0.00	2.26	0.00	0.00	0.00	0.00	N/A	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	100.00	0.00	103.00	100.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	200.00	0.00	103.00	200.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	300.00	0.00	103.00	300.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	400.00	0.00	103.00	400.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	500.00	0.00	103.00	500.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	600.00	0.00	103.00	600.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	700.00	0.00	103.00	700.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	800.00	0.00	103.00	800.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	900.00	0.00	103.00	900.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
Rustler	935.00	0.00	103.00	935.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1000.00	0.00	103.00	1000.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1100.00	0.00	103.00	1100.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1200.00	0.00	103.00	1200.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
Top of Salt	1298.00	0.00	103.00	1298.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1300.00	0.00	103.00	1300.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1400.00	0.00	103.00	1400.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1500.00	0.00	103.00	1500.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1600.00	0.00	103.00	1600.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1700.00	0.00	103.00	1700.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1800.00	0.00	103.00	1800.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	1900.00	0.00	103.00	1900.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2000.00	0.00	103.00	2000.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2100.00	0.00	103.00	2100.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2200.00	0.00	103.00	2200.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2300.00	0.00	103.00	2300.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2400.00	0.00	103.00	2400.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
Nudge 2"/100' DLS	2500.00	0.00	103.00	2500.00	0.00	0.00	0.00	0.00	404447.60	770760.15	N 32 6 35.06 W 103 35 32.48	
	2600.00	2.00	103.00	2599.98	-0.40	-0.39	1.70	2.00	404447.21	770761.85	N 32 6 35.05 W 103 35 32.47	
	2700.00	4.00	103.00	2699.94	-1.61	-1.57	6.80	2.00	404446.03	770766.95	N 32 6 35.04 W 103 35 32.41	
	2800.00	6.00	103.00	2799.45	-3.63	-3.53	15.29	2.00	404444.07	770775.44	N 32 6 35.02 W 103 35 32.31	
Hold Nudge	2840.04	6.80	103.00	2839.24	-4.66	-4.53	19.64	2.00	404443.07	770779.79	N 32 6 35.01 W 103 35 32.26	
	2900.00	6.80	103.00	2898.78	-6.30	-6.13	26.56	0.00	404441.47	770786.71	N 32 6 34.99 W 103 35 32.18	
	3000.00	6.80	103.00	2998.08	-9.04	-8.80	38.10	0.00	404438.80	770798.25	N 32 6 34.97 W 103 35 32.04	
	3100.00	6.80	103.00	3097.37	-11.78	-11.46	49.64	0.00	404436.14	770809.78	N 32 6 34.94 W 103 35 31.91	
	3200.00	6.80	103.00	3196.67	-14.51	-14.12	61.17	0.00	404433.48	770821.32	N 32 6 34.91 W 103 35 31.77	
	3300.00	6.80	103.00	3295.97	-17.25	-16.79	72.71	0.00	404430.81	770832.86	N 32 6 34.89 W 103 35 31.64	
	3400.00	6.80	103.00	3395.26	-19.99	-19.45	84.25	0.00	404428.15	770844.40	N 32 6 34.86 W 103 35 31.51	
	3500.00	6.80	103.00	3494.56	-22.73	-22.11	95.79	0.00	404425.49	770855.94	N 32 6 34.83 W 103 35 31.37	
	3600.00	6.80	103.00	3593.85	-25.46	-24.78	107.33	0.00	404422.82	770867.47	N 32 6 34.80 W 103 35 31.24	
	3700.00	6.80	103.00	3693.15	-28.20	-27.44	118.87	0.00	404420.16	770879.01	N 32 6 34.78 W 103 35 31.11	
	3800.00	6.80	103.00	3792.45	-30.94	-30.11	130.40	0.00	404417.50	770890.55	N 32 6 34.75 W 103 35 30.97	
	3900.00	6.80	103.00	3891.74	-33.68	-32.77	141.94	0.00	404414.83	770902.09	N 32 6 34.72 W 103 35 30.84	
	4000.00	6.80	103.00	3991.04	-36.41	-35.43	153.48	0.00	404412.17	770913.62	N 32 6 34.70 W 103 35 30.70	
	4100.00	6.80	103.00	4090.34	-39.15	-38.10	165.02	0.00	404409.50	770925.16	N 32 6 34.67 W 103 35 30.57	
	4200.00	6.80	103.00	4189.63	-41.89	-40.76	176.56	0.00	404406.84	770936.70	N 32 6 34.64 W 103 35 30.44	
	4300.00	6.80	103.00	4288.93	-44.63	-43.43	188.09	0.00	404404.18	770948.24	N 32 6 34.61 W 103 35 30.30	
	4400.00	6.80	103.00	4388.23	-47.36	-46.09	199.63	0.00	404401.51	770959.78	N 32 6 34.59 W 103 35 30.17	
	4500.00	6.80	103.00	4487.52	-50.10	-48.75	211.17	0.00	404398.85	770971.31	N 32 6 34.56 W 103 35 30.03	
	4600.00	6.80	103.00	4586.82	-52.84	-51.42	222.71	0.00	404396.19	770982.85	N 32 6 34.53 W 103 35 29.90	
	4700.00	6.80	103.00	4686.12	-55.58	-54.08	234.25	0.00	404393.52	770994.39	N 32 6 34.51 W 103 35 29.77	
Base of Salt	4728.08	6.80	103.00	4714.00	-56.34	-54.83	237.49	0.00	404392.77	770997.63	N 32 6 34.50 W 103 35 29.73	
	4800.00	6.80	103.00	4785.41	-58.31	-56.74	245.79	0.00	404390.86	771005.93	N 32 6 34.48 W 103 35 29.63	
	4900.00	6.80	103.00	4884.71	-61.05	-59.41	257.32	0.00	404388.19	771017.47	N 32 6 34.45 W 103 35 29.50	
Lamar Bell Canyon	4924.46	6.80	103.00	4909.00	-61.72	-60.06	260.15	0.00	404387.54	771020.29	N 32 6 34.44 W 103 35 29.47	
	4952.66	6.80	103.00	4937.00	-62.49	-60.81	263.40	0.00	404386.79	771023.54	N 32 6 34.44 W 103 35 29.43	
	5000.00	6.80	103.00	4984.00	-63.79	-62.07	268.86	0.00	404385.53	771029.00	N 32 6 34.42 W 103 35 29.36	
	5100.00	6.80	103.00	5083.30	-66.53	-64.74	280.40	0.00	404382.87	771040.54	N 32 6 34.40 W 103 35 29.23	
	5200.00	6.80	103.00	5182.60	-69.26	-67.40	291.94	0.00	404380.20	771052.08	N 32 6 34.37 W 103 35 29.10	
	5300.00	6.80	103.00	5281.89	-72.00	-70.06	303.48	0.00	404377.54	771063.62	N 32 6 34.34 W 103 35 28.96	
	5400.00	6.80	103.00	5381.19	-74.74	-72.73	315.02	0.00	404374.88	771075.16	N 32 6 34.32 W 103 35 28.83	
	5500.00	6.80	103.00	5480.49	-77.48	-75.39	326.55	0.00	404372.21	771086.69	N 32 6 34.29 W 103 35 28.69	
	5600.00	6.80	103.00	5579.78	-80.21	-78.05	338.09	0.00	404369.55	771098.23	N 32 6 34.26 W 103 35 28.56	
	5700.00	6.80	103.00	5679.08	-82.95	-80.72	349.63	0.00	404366.88	771109.77	N 32 6 34.23 W 103 35 28.43	
	5800.00	6.80	103.00	5778.38	-85.69	-83.38	361.17	0.00	404364.22	771121.31	N 32 6 34.21 W 103 35 28.29	
	5900.00	6.80	103.00	5877.67	-88.43	-86.05	372.71	0.00	404361.56	771132.85	N 32 6 34.18 W 103 35 28.16	
Cherry Canyon	6000.00	6.80	103.00	5976.97	-91.16	-88.71	384.25	0.00	404358.89	771144.38	N 32 6 34.15 W 103 35 28.02	
	6013.12	6.80	103.00	5990.00	-91.52	-89.06	385.76	0.00	404358.54	771145.90	N 32 6 34.15 W 103 35 28.01	
	6100.00	6.80	103.00	6076.26	-93.90	-91.37	395.78	0.00	404356.23	771155.92	N 32 6 34.13 W 103 35 27.89	
	6200.00	6.80	103.00	6175.56	-96.64	-94.04	407.32	0.00	404353.57	771167.46	N 32 6 34.10 W 103 35 27.76	
	6300.00	6.80	103.00	6274.86	-99.38	-96.70	418.86	0.00	404350.90	771179.00	N 32 6 34.07 W 103 35 27.62	
	6400.00	6.80	103.00	6374.15	-102.11	-99.37	430.40	0.00	404348.24	771190.53	N 32 6 34.04 W 103 35 27.49	
	6500.00	6.80	103.00	6473.45	-104.85	-102.03	441.94	0.00	404345.57	771202.07	N 32 6 34.02 W 103 35 27.36	
Drop to Vertical 2"/100' DLS	6526.74	6.80	103.00	6500.00	-105.58	-102.74	445.02	0.00	404344.86	771205.16	N 32 6 34.01 W 103 35 27.32	
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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	
Hold Vertical	6800.00	1.34	103.00	6772.47	-110.06	-107.10	463.90	2.00	404340.50	771224.04	N 32° 6' 33.97" W	103° 35' 27.10"	
	6866.78	0.00	103.00	6839.24	-110.24	-107.28	464.66	2.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	6900.00	0.00	103.00	6872.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7000.00	0.00	103.00	6972.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7100.00	0.00	103.00	7072.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7200.00	0.00	103.00	7172.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7300.00	0.00	103.00	7272.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7400.00	0.00	103.00	7372.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7500.00	0.00	103.00	7472.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7563.54	0.00	103.00	7536.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
Brushy Canyon	7600.00	0.00	103.00	7572.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7700.00	0.00	103.00	7672.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7800.00	0.00	103.00	7772.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	7900.00	0.00	103.00	7872.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8000.00	0.00	103.00	7972.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8100.00	0.00	103.00	8072.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8200.00	0.00	103.00	8172.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8300.00	0.00	103.00	8272.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8400.00	0.00	103.00	8372.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8500.00	0.00	103.00	8472.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8600.00	0.00	103.00	8572.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8700.00	0.00	103.00	8672.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8800.00	0.00	103.00	8772.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	8900.00	0.00	103.00	8872.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9000.00	0.00	103.00	8972.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	Bone Spring Lime	9059.54	0.00	103.00	9032.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	Leonard Shale	9100.00	0.00	103.00	9072.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
		9114.54	0.00	103.00	9087.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
		9200.00	0.00	103.00	9172.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
		9300.00	0.00	103.00	9272.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
Avalon Shale	9339.54	0.00	103.00	9312.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9400.00	0.00	103.00	9372.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9500.00	0.00	103.00	9472.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9600.00	0.00	103.00	9572.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9700.00	0.00	103.00	9672.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9800.00	0.00	103.00	9772.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	9900.00	0.00	103.00	9872.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10000.00	0.00	103.00	9972.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	1st Bone Spring Sand	10038.54	0.00	103.00	10011.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
		10100.00	0.00	103.00	10072.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
		10200.00	0.00	103.00	10172.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	2nd Bone Spring Carb	10250.54	0.00	103.00	10223.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	10300.00	0.00	103.00	10272.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10400.00	0.00	103.00	10372.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10500.00	0.00	103.00	10472.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10600.00	0.00	103.00	10572.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	2nd Bone Spring Sand	10610.54	0.00	103.00	10583.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	10700.00	0.00	103.00	10672.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10800.00	0.00	103.00	10772.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	10900.00	0.00	103.00	10872.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11000.00	0.00	103.00	10972.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	3rd Bone Spring Carb	11098.54	0.00	103.00	11071.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	11100.00	0.00	103.00	11072.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11200.00	0.00	103.00	11172.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11300.00	0.00	103.00	11272.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11400.00	0.00	103.00	11372.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11500.00	0.00	103.00	11472.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11600.00	0.00	103.00	11572.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11700.00	0.00	103.00	11672.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	3rd Bone Spring Sand	11749.54	0.00	103.00	11722.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"
	11800.00	0.00	103.00	11772.46	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
	11869.54	0.00	103.00	11842.00	-110.24	-107.28	464.66	0.00	404340.33	771224.80	N 32° 6' 33.96" W	103° 35' 27.09"	
KOP - Build 12"/100' DLS	11900.00	3.66	359.63	11872.44	-109.27	-106.30	464.66	12.00	404341.30	771224.79	N 32° 6' 33.97" W	103° 35' 27.09	

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Wolfcamp A1	15000.00	90.19	359.63	12344.85	2744.82	2747.73	446.42	0.00	407195.24	771206.56	N 32 7 2.22 W	103 35 27.07
	15100.00	90.19	359.63	12344.51	2844.82	2847.73	445.79	0.00	407295.24	771205.92	N 32 7 3.20 W	103 35 27.07
	15200.00	90.19	359.63	12344.17	2944.82	2947.73	445.15	0.00	407395.23	771205.28	N 32 7 4.19 W	103 35 27.07
	15300.00	90.19	359.63	12343.84	3044.82	3047.72	444.51	0.00	407495.22	771204.64	N 32 7 5.18 W	103 35 27.07
	15400.00	90.19	359.63	12343.50	3144.82	3147.72	443.87	0.00	407595.22	771204.00	N 32 7 6.17 W	103 35 27.07
	15500.00	90.19	359.63	12343.16	3244.82	3247.72	443.23	0.00	407695.21	771203.37	N 32 7 7.16 W	103 35 27.07
	15600.00	90.19	359.63	12342.83	3344.82	3347.72	442.59	0.00	407795.21	771202.73	N 32 7 8.15 W	103 35 27.07
	15700.00	90.19	359.63	12342.49	3444.82	3447.71	441.95	0.00	407895.20	771202.09	N 32 7 9.14 W	103 35 27.07
	15800.00	90.19	359.63	12342.16	3544.82	3547.71	441.31	0.00	407995.20	771201.45	N 32 7 10.13 W	103 35 27.07
	15900.00	90.19	359.63	12341.82	3644.82	3647.71	440.67	0.00	408095.19	771200.81	N 32 7 11.12 W	103 35 27.07
	16000.00	90.19	359.63	12341.48	3744.82	3747.71	440.04	0.00	408195.18	771200.17	N 32 7 12.11 W	103 35 27.07
	16100.00	90.19	359.63	12341.15	3844.82	3847.70	439.40	0.00	408295.18	771199.53	N 32 7 13.10 W	103 35 27.07
	16143.33	90.19	359.63	12341.00	3888.15	3891.03	439.12	0.00	408338.51	771199.26	N 32 7 13.53 W	103 35 27.07
	16200.00	90.19	359.63	12340.81	3944.82	3947.70	438.76	0.00	408395.17	771198.89	N 32 7 14.09 W	103 35 27.07
	16300.00	90.19	359.63	12340.47	4044.82	4047.70	438.12	0.00	408495.17	771198.26	N 32 7 15.08 W	103 35 27.07
	16400.00	90.19	359.63	12340.14	4144.82	4147.70	437.48	0.00	408595.16	771197.62	N 32 7 16.07 W	103 35 27.07
	16500.00	90.19	359.63	12339.80	4244.82	4247.69	436.84	0.00	408695.15	771196.98	N 32 7 17.06 W	103 35 27.07
	16600.00	90.19	359.63	12339.46	4344.82	4347.69	436.20	0.00	408795.15	771196.34	N 32 7 18.05 W	103 35 27.07
	16700.00	90.19	359.63	12339.13	4444.81	4447.69	435.56	0.00	408895.14	771195.70	N 32 7 19.04 W	103 35 27.06
	16800.00	90.19	359.63	12338.79	4544.81	4547.69	434.93	0.00	408995.14	771195.06	N 32 7 20.03 W	103 35 27.06
	16900.00	90.19	359.63	12338.45	4644.81	4647.68	434.29	0.00	409095.13	771194.42	N 32 7 21.02 W	103 35 27.06
	17000.00	90.19	359.63	12338.12	4744.81	4747.68	433.65	0.00	409195.12	771193.78	N 32 7 22.01 W	103 35 27.06
	17100.00	90.19	359.63	12337.78	4844.81	4847.68	433.01	0.00	409295.12	771193.14	N 32 7 23.00 W	103 35 27.06
	17200.00	90.19	359.63	12337.44	4944.81	4947.67	432.37	0.00	409395.11	771192.51	N 32 7 23.98 W	103 35 27.06
	17300.00	90.19	359.63	12337.11	5044.81	5047.67	431.73	0.00	409495.11	771191.87	N 32 7 24.97 W	103 35 27.06
	17400.00	90.19	359.63	12336.77	5144.81	5147.67	431.09	0.00	409595.10	771191.23	N 32 7 25.96 W	103 35 27.06
	17500.00	90.19	359.63	12336.43	5244.81	5247.67	430.45	0.00	409695.10	771190.59	N 32 7 26.95 W	103 35 27.06
	17600.00	90.19	359.63	12336.10	5344.81	5347.66	429.81	0.00	409795.09	771189.95	N 32 7 27.94 W	103 35 27.06
	17700.00	90.19	359.63	12335.76	5444.81	5447.66	429.18	0.00	409895.08	771189.31	N 32 7 28.93 W	103 35 27.06
	17800.00	90.19	359.63	12335.43	5544.81	5547.66	428.54	0.00	409995.08	771188.67	N 32 7 29.92 W	103 35 27.06
	17900.00	90.19	359.63	12335.09	5644.81	5647.66	427.90	0.00	410095.07	771188.03	N 32 7 30.91 W	103 35 27.06
	18000.00	90.19	359.63	12334.75	5744.81	5747.65	427.26	0.00	410195.07	771187.40	N 32 7 31.90 W	103 35 27.06
	18100.00	90.19	359.63	12334.42	5844.81	5847.65	426.62	0.00	410295.06	771186.76	N 32 7 32.89 W	103 35 27.06
	18200.00	90.19	359.63	12334.08	5944.81	5947.65	425.98	0.00	410395.05	771186.12	N 32 7 33.88 W	103 35 27.06
	18300.00	90.19	359.63	12333.74	6044.81	6047.65	425.34	0.00	410495.05	771185.48	N 32 7 34.87 W	103 35 27.06
	18400.00	90.19	359.63	12333.41	6144.81	6147.64	424.70	0.00	410595.04	771184.84	N 32 7 35.86 W	103 35 27.05
	18500.00	90.19	359.63	12333.07	6244.80	6247.64	424.07	0.00	410695.04	771184.20	N 32 7 36.85 W	103 35 27.05
	18600.00	90.19	359.63	12332.73	6344.80	6347.64	423.43	0.00	410795.03	771183.56	N 32 7 37.84 W	103 35 27.05
	18700.00	90.19	359.63	12332.40	6444.80	6447.64	422.79	0.00	410895.03	771182.92	N 32 7 38.83 W	103 35 27.05
	18800.00	90.19	359.63	12332.06	6544.80	6547.63	422.15	0.00	410995.02	771182.29	N 32 7 39.82 W	103 35 27.05
	18900.00	90.19	359.63	12331.72	6644.80	6647.63	421.51	0.00	411095.01	771181.65	N 32 7 40.81 W	103 35 27.05
	19000.00	90.19	359.63	12331.39	6744.80	6747.63	420.87	0.00	411195.01	771181.01	N 32 7 41.80 W	103 35 27.05
	19100.00	90.19	359.63	12331.05	6844.80	6847.63	420.23	0.00	411295.00	771180.37	N 32 7 42.79 W	103 35 27.05
	19200.00	90.19	359.63	12330.71	6944.80	6947.62	419.59	0.00	411395.00	771179.73	N 32 7 43.78 W	103 35 27.05
	19300.00	90.19	359.63	12330.38	7044.80	7047.62	418.95	0.00	411494.99	771179.09	N 32 7 44.76 W	103 35 27.05
	19400.00	90.19	359.63	12330.04	7144.80	7147.62	418.32	0.00	411594.98	771178.45	N 32 7 45.75 W	103 35 27.05
	19500.00	90.19	359.63	12329.70	7244.80	7247.61	417.68	0.00	411694.98	771177.81	N 32 7 46.74 W	103 35 27.05
	19600.00	90.19	359.63	12329.37	7344.80	7347.61	417.04	0.00	411794.97	771177.17	N 32 7 47.73 W	103 35 27.05
	19700.00	90.19	359.63	12329.03	7444.80	7447.61	416.40	0.00	411894.97	771176.54	N 32 7 48.72 W	103 35 27.05
	19800.00	90.19	359.63	12328.70	7544.80	7547.61	415.76	0.00	411994.96	771175.90	N 32 7 49.71 W	103 35 27.05
	19900.00	90.19	359.63	12328.36	7644.80	7647.60	415.12	0.00	412094.95	771175.26	N 32 7 50.70 W	103 35 27.05
	20000.00	90.19	359.63	12328.02	7744.80	7747.60	414.48	0.00	412194.95	771174.62	N 32 7 51.69 W	103 35 27.05
	20100.00	90.19	359.63	12327.69	7844.80	7847.60	413.84	0.00	412294.94	771173.98	N 32 7 52.68 W	103 35 27.05
	20200.00	90.19	359.63	12327.35	7944.79	7947.60	413.21	0.00	412394.94	771173.34	N 32 7 53.67 W	103 35 27.04
	20300.00	90.19	359.63	12327.01	8044.79	8047.59	412.57	0.00	412494.93	771172.70	N 32 7 54.66 W	103 35 27.04
	20400.00	90.19	359.63	12326.68	8144.79	8147.59	411.93	0.00	412594.93	771172.06	N 32 7 55.65 W	103 35 27.04
	20500.00	90.19	359.63	12326.34	8244.79	8247.59	411.29	0.00	412694.92	771171.43	N 32 7 56.64 W	103 35 27.04
	20600.00	90.19	359.63	12326.00	8344.79	8347.59	410.65	0.00	412794.91	771170.79	N 32 7 57.63 W	103 35 27.04
	20700.00	90.19	359.63	12325.67	8444.79	8447.58	410.01	0.00	412894.91	771170.15	N 32 7 58.62 W	103 35 27.04
	20800.00	90.19	359.63	12325.33	8544.79	8547.58	409.37	0.00	412994.90	771169.51	N 32 7 59.61 W	103 35 27.04
Wolfcamp Y Target	20898.22	90.19	359.63	12325.00	8643.01	8645.80	408.75	0.00	413093.12	771168.88	N 32 8 0.58 W	103 35 27.04
Cimarex Vaca Draw 20-17 Federal #47H - PBHL [100' FNL, 1576' FEL]	20900.00	90.19	359.63	12324.66	8644.79	8647.58	408.73	0.00	413094.90	771168.87	N 32 8 0.60 W	103 35 27.04
	21000.00	90.19	359.63	12324.32	8744.79	8747.58	408.09	0.00	413194.89	771168.23	N 32 8 1.59 W	103 35 27.04
	21100.00	90.19	359.63	12324.02	8844.79	8847.57	407.46	0.00	413294.88	771167.59	N 32 8 2.58 W	103 35 27.04
	21200.00	90.19	359.63	12323.98	8944.79	8947.57	406.82	0.00	413394.88	771166.95	N 32 8 3.57 W	103 35 27.04
	21300.00	90.19	359.63	12323.65	9044.79	9047.57	406.18	0.00	413494.87	771166.32	N 32 8 4.56 W	103 35 27.04
	21400.00	90.19	359.63	12323.31	9144.79	9147.57	405.54	0.00	413594.87	771165.68	N 32 8 5.54 W	103 35 27.04
	21500.00	90.19	359.63	12322.98	9244.79	9247.56	404.90	0.00	413694.86	771165.04	N 32 8 6.53 W	103 35 27.04
	21600.00	90.19	359.63	12322.64	9344.79	9347.56	404.26	0.00	413794.86	771164.40	N 32 8 7.52 W	

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: 12/31/19

☒ Original Operator & OGRID No.: Cimarex Energy Co- 215099
☐ Amended - Reason for Amendment: _____

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomple to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Vaca Draw 20-17 Fed 47H	Pending	20-25S-33E	330' FSL & 2040' FEL	5000		

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to Gas Transporter and will be connected to Gas Transporter low/high pressure gathering system located in Eddy County, New Mexico. It will require 3,500 ' of pipeline to connect the facility to low/high pressure gathering system. Operator provides (periodically) to Gas Transporter a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Operator and Gas Transporter have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at Gas Transporter Processing Plant located in Sec 1-25S-30E, Eddy County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on Gas Transporter system at that time. Based on current information, it is Operator's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
 - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
 - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
 - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

1. Geological Formations

TVD of target 12,320

Pilot Hole TD N/A

MD at TD 22,384

Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	935	Usable Water	
Top of Salt	1298	N/A	
Base of Salt	4714	N/A	
Lamar	4909	N/A	
Bell Canyon	4937	N/A	
Cherry Canyon	5990	Hydrocarbons	
Brushy Canyon	7536	Hydrocarbons	
Bone Spring	9032	Hydrocarbons	
Upper Avalon Shale	9312	Hydrocarbons	
1st Bone Spring	10011	Hydrocarbons	
2nd Bone Spring	10223	Hydrocarbons	
3rd Bone Spring	11071	Hydrocarbons	
Wolfcamp	12189	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12494	12302	7-5/8"	29.70	L HC	TMK FJ	2.36	1.13	1.82
6 3/4	0	11800	11800	5-1/2"	20.00	L-80	LT&C	1.37	1.43	1.87
6 3/4	11800	22384	12351	5"	18.00	P-110	BT&C	1.99	2.02	58.48
BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet

TVD was used on all calculations.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Request Variance for 5-1/2" x 7-5/8" annular clearance. The portion that does not meet clearance will not be cemented

Cimarex Energy Co., Vaca Draw 20-17 Federal 47H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	Y
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	N
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	N
Is 2nd string set 100' to 600' below the base of salt?	N
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	N
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	N
Is AC Report included?	N

3. Cementing Program

Casing	# Sk	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	332	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	156	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate Stage 1	584	10.30	3.64	22.18		Lead: Tuned Light + LCM
	200	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate Stage 2	794	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
Production	1135	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

DV tool with possible annular casing packer as needed is proposed at a depth of +/- 4,900'.

Casing String	TOC	% Excess
Surface	0	42
Intermediate Stage 1	4900	47
Intermediate Stage 2	0	40
Production	12000	25

Cimarex request the ability to perform casing integrity tests after plug bump of cement job.

4. Pressure Control Equipment

A variance is requested for the use of a diverter on the surface casing. See attached for schematic.					
BOP installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
9 7/8	13 5/8	5M	Annular	X	5M
			Blind Ram		
			Pipe Ram	X	
			Double Ram	X	
			Other		
6 3/4	13 5/8	5M	Annular	X	5M
			Blind Ram		
			Pipe Ram	X	
			Double Ram	X	
			Other		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.	
X	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?

5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 985'	FW Spud Mud	8.30 - 8.80	30-32	N/C
985' to 12494'	Brine Diesel Emulsion	9.00 - 9.50	30-35	N/C
12494' to 22384'	OBM	10.00 - 10.50	50-70	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

The Brine Emulsion is completely saturated brine fluid that ties diesel into itself to lower the weight of the fluid. The drilling fluid is completely salt saturated.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing	
	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No logs are planned based on well control or offset log information.
	Drill stem test?
	Coring?

Additional Logs Planned	Interval
-------------------------	----------

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	6743 psi
Abnormal Temperature	No

Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

X	H ₂ S is present
X	H ₂ S plan is attached

8. Other Facets of Operation**9. Wellhead**

A multi-bowl wellhead system will be utilized.

After running the 10-3/4" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office.

The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative.

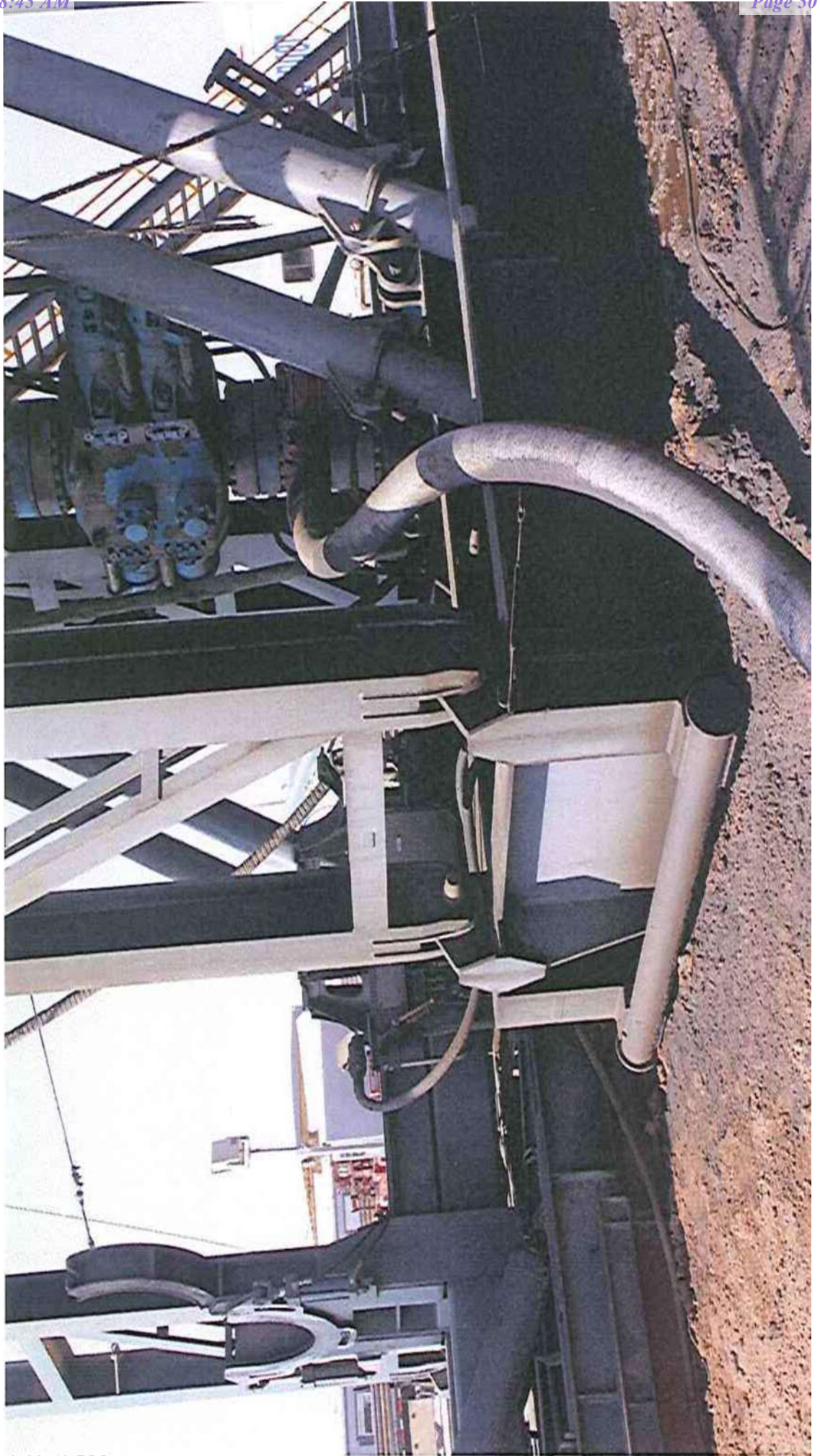
All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

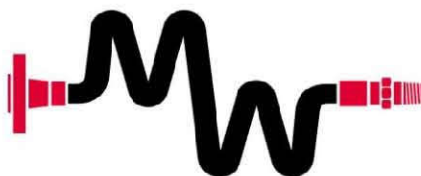
All casing strings will be tested as per Onshore Order No.2 to at least 0.22 psi/ft or 1,500 whichever is greater and not to exceed 70% of casing burst.

If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Co-Flex Hose
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM



Co-Flex Hose Hydrostatic Test
 Vaca Draw 20-17 Federal 47H
 Cimarex Energy Co.
 20-25S-33E
 Lea Co., NM



Midwest Hose & Specialty, Inc.

INTERNAL HYDROSTATIC TEST REPORT			
Customer:		P.O. Number:	
Oderco Inc		odyd-271	
HOSE SPECIFICATIONS			
Type: Stainless Steel Armor Choke & Kill Hose		Hose Length: 45'ft.	
I.D. 4 INCHES		O.D. 9 INCHES	
WORKING PRESSURE	TEST PRESSURE	BURST PRESSURE	
10,000 PSI	15,000 PSI	0 PSI	
COUPLINGS			
Stem Part No.		Ferrule No.	
OKC OKC		OKC OKC	
Type of Coupling: Swage-It			
PROCEDURE			
<u>Hose assembly pressure tested with water at ambient temperature.</u>			
TIME HELD AT TEST PRESSURE		ACTUAL BURST PRESSURE:	
15 MIN.		0 PSI	
Hose Assembly Serial Number: 79793		Hose Serial Number: OKC	
Comments:			
Date:	Tested:	Approved:	
3/8/2011	<i>A. Jaime Sandoval</i>	<i>Kevin Red</i>	

Co-Flex Hose Hydrostatic Test
Vaca Draw 20-17 Federal 47H
 Cimarex Energy Co.
 20-25S-33E
 Lea Co., NM

March 3, 2011

Internal Hydrostatic Test Graph

Customer: Houston

Pick Ticket #: 94260



Midwest Hose
& Specialty, Inc.

Hose Specifications

Hose Type

C & K

Length

45'

I.D.

4"

O.D.

6.09"

Working Pressure

10000 PSI

Burst Pressure

Standard Safety Multiplier Applies

Verification

Type of Fitting

4 1/16 10K

Coupling Method

Swage

Die Size

6.38"

Final O.D.

6.25"

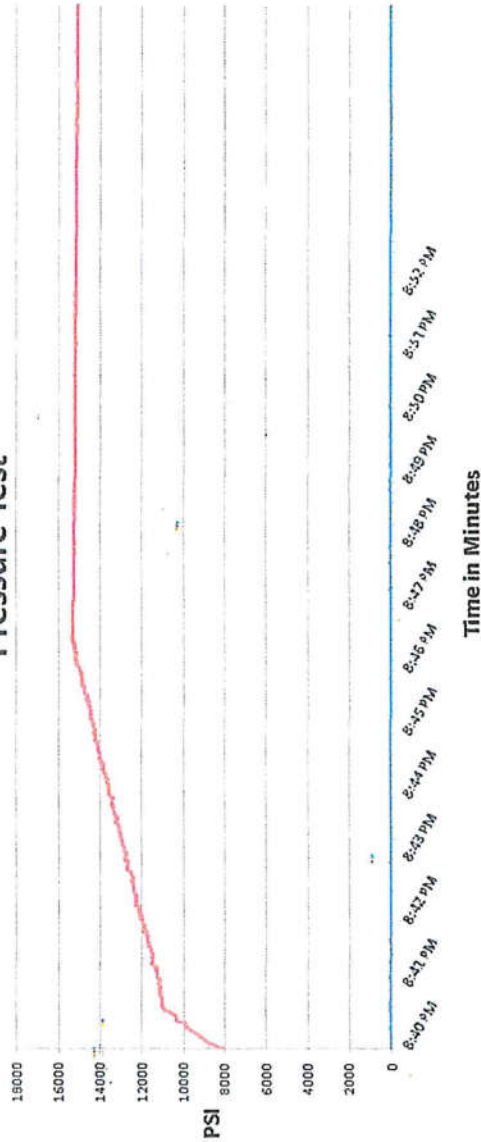
Hose Serial #

5544

Hose Assembly Serial #

79793

Pressure Test

Test Pressure
15000 PSITime Held at Test Pressure
11 Minutes

Actual Burst Pressure

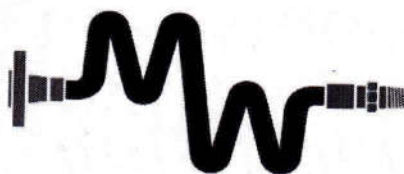
Peak Pressure
15483 PSI

Comments: Hose assembly pressure tested with water at ambient temperature.

Tested By: Zac McConnell

Approved By: Kim Thomas

Co-Flex Hose
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer:

DEM

PO

ODYD-271

SPECIFICATIONS

Sales Order

79793

Dated:

3/8/2011

We hereby certify that the material supplied
for the referenced purchase order to be true
according to the requirements of the purchase
order and current industry standards

Supplier:
Midwest Hose & Specialty, Inc.
10640 Tanner Road
Houston, Texas 77041

Comments:

Approved:

James Garcia

Date:

3/8/2011



Co-Flex Hose
Vaca Draw 20-17 Federal 47H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

Specification Sheet Choke & Kill Hose

The Midwest Hose & Specialty Choke & Kill hose is manufactured with only premium components. The reinforcement cables, inner liner and cover are made of the highest quality material to handle the tough drilling applications of today's industry. The end connections are available with API flanges, API male threads, hubs, hammer unions or other special fittings upon request. Hose assembly is manufactured to API 7K. This assembly is wrapped with fire resistant vermiculite coated fiberglass insulation, rated at 2000 degrees with stainless steel armor cover.

Working Pressure:	5,000 or 10,000 psi working pressure
Test Pressure:	10,000 or 15,000 psi test pressure
Reinforcement:	Multiple steel cables
Cover:	Stainless Steel Armor
Inner Tube:	Petroleum resistant, Abrasion resistant
End Fitting:	API flanges, API male threads, threaded or butt weld hammer unions, unbolt and other special connections
Maximum Length:	110 Feet
ID:	2-1/2", 3", 3-1/2", 4"
Operating Temperature:	-22 deg F to +180 deg F (-30 deg C to +82 deg C)

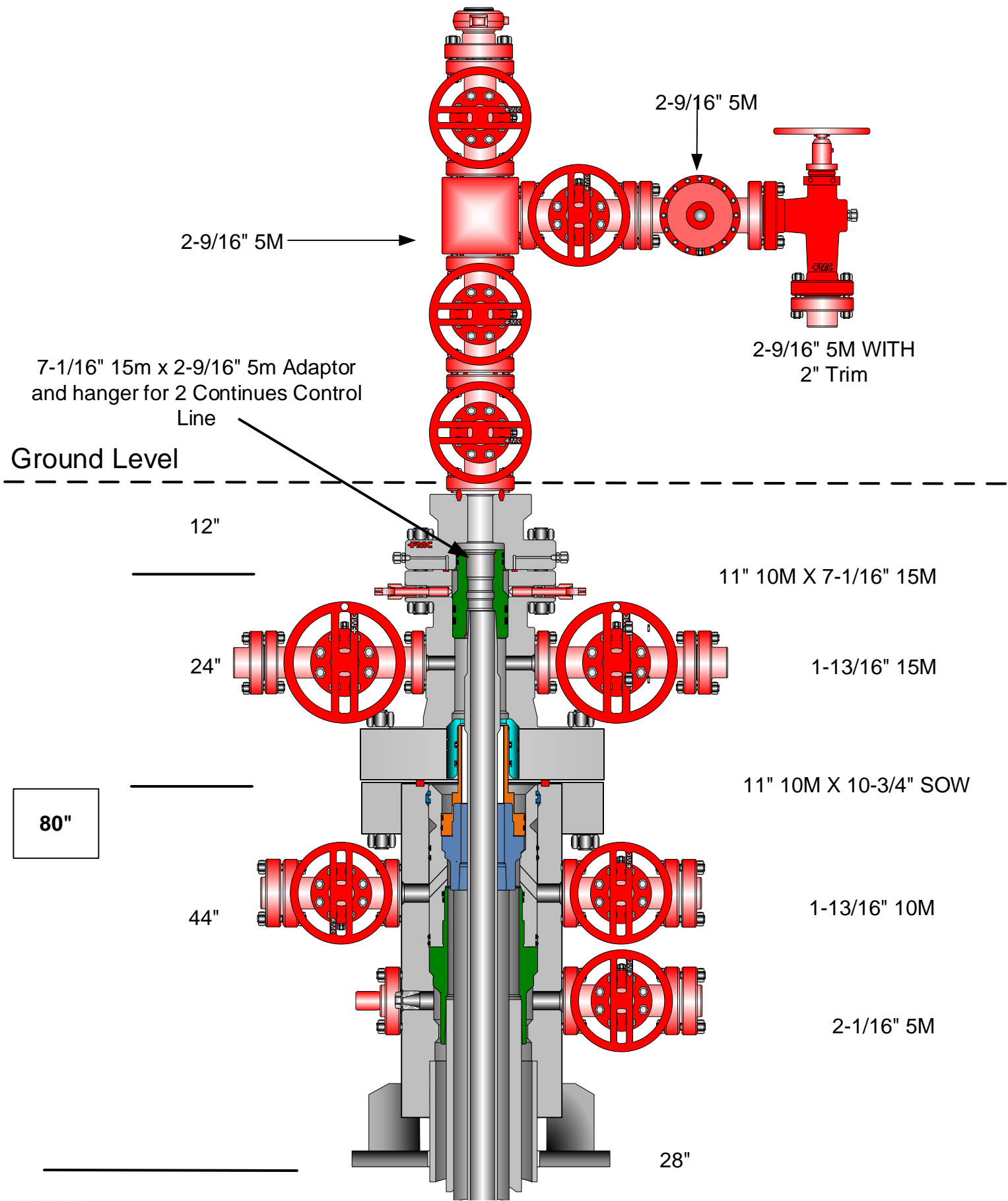
P.O. Box 96558 – 1421 S.E. 29th St. Oklahoma City, OK 73143 * (405) 670-6718 * Fax: (405) 670-6816



Vaca Draw 20-17 Federal 47H
LEA CO., NM

CACTUS FOR SERVICE
WEARBUSHING
IN CASING HEAD &
CASING SPOOL

Multi-bowl Wellhead Diagram



2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12494	12302	7-5/8"	29.70	L HC	TMK FJ	2.36	1.13	1.82
6 3/4	0	11800	11800	5-1/2"	20.00	L-80	LT&C	1.37	1.43	1.87
6 3/4	11800	22384	12351	5"	18.00	P-110	BT&C	1.99	2.02	58.48
Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

SUPO Data Report

05/11/2021

APD ID: 10400038315**Submission Date:** 01/24/2019

Highlighted data
reflects the most
recent changes

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H[Show Final Text](#)**Well Type:** CONVENTIONAL GAS WELL**Well Work Type:** Drill

Section 1 - Existing Roads

Will existing roads be used? YES**Existing Road Map:**

Vaca_Draw_20_17_Fed_W2E2_Pad_Existing_Road_20200204161118.pdf

Existing Road Purpose: ACCESS**Row(s) Exist?** NO**ROW ID(s)****ID:****Do the existing roads need to be improved?** NO**Existing Road Improvement Description:****Existing Road Improvement Attachment:**

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? YES**Attach Well map:**

Vaca_Draw_20_17_Fed_W2E2_Pad_Mile_Radius_Existing_Wells_20200204161239.pdf

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: 2 Existing & previously Approved batteries will be utilized. Road: Please see Exhibit A for 18,566' existing road - Bulkline: 4945 ' of 1- 12" buried steel oil bulk line, 1-12" Steel gas bulk line, 1-12" buried steel swd line, 1-8" buried steel gas lift lines will be constructed along the proposed road buried in the same 75' trench. Please see Attachment M for route.

Production Facilities map:

Vaca_Draw_20_17_Bulk_Line_ROW_20200423152507.pdf

Vaca_Draw_20_17_Fed_CTB_and_West_CTB_Exisitng_CTB_Layouts_20200423152521.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: MUNICIPAL

Water source use type:	SURFACE CASING
	INTERMEDIATE/PRODUCTION CASING

Source latitude:	Source longitude:
-------------------------	--------------------------

Source datum:

Water source permit type:	WATER RIGHT
----------------------------------	-------------

Permit Number:

Water source transport method:	TRUCKING
---------------------------------------	----------

Source land ownership: STATE**Source transportation land ownership:** STATE**Water source volume (barrels):** 5000**Source volume (acre-feet):** 0.6444655**Source volume (gal):** 210000**Water source and transportation map:**

Vaca_Draw_20_17_Fed_W2E2_Pad_Drilling_Water_Route_20200423152704.pdf

Water source comments:**New water well?** NO

New Water Well Info

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Well latitude:****Well Longitude:****Well datum:****Well target aquifer:****Est. depth to top of aquifer(ft):****Est thickness of aquifer:****Aquifer comments:****Aquifer documentation:****Well depth (ft):****Well casing type:****Well casing outside diameter (in.):****Well casing inside diameter (in.):****New water well casing?****Used casing source:****Drilling method:****Drill material:****Grout material:****Grout depth:****Casing length (ft.):****Casing top depth (ft.):****Well Production type:****Completion Method:****Water well additional information:****State appropriation permit:****Additional information attachment:**

Section 6 - Construction Materials

Using any construction materials: NO**Construction Materials description:** Caliche will be obtained from the actual well site if available. If not available onsite caliche will be obtained for a pit located in Sec. 16-25S-32E Lea, NM.**Construction Materials source location attachment:**

Section 7 - Methods for Handling Waste

Waste type: SEWAGE**Waste content description:** Human waste**Amount of waste:** 300**Waste disposal frequency :** Weekly**Safe containment description:** Waste will be properly contained and disposed of properly at a state approved disposal facility.**Safe containmant attachment:****Waste disposal type:** HAUL TO COMMERCIAL FACILITY**Disposal location ownership:** PRIVATE**Disposal type description:****Disposal location description:** A licensed 3rd party contractor will be used to haul and dispose human waste to City of Toyah TX waste water facility.

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Waste type:** DRILLING**Waste content description:** Drilling Fluids, drill cuttings, water and other waste produced from the well during drilling operations.**Amount of waste:** 15000 barrels**Waste disposal frequency :** Weekly**Safe containment description:** N/A**Safe containmant attachment:****Waste disposal type:** HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL**Disposal type description:****Disposal location description:** Haul to R360 commercial disposal**Waste type:** GARBAGE**Waste content description:** garbage & trash produced during drilling & completion operations**Amount of waste:** 32500 pounds**Waste disposal frequency :** Weekly**Safe containment description:** N/A**Safe containmant attachment:****Waste disposal type:** HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL**Disposal type description:****Disposal location description:** Windmill Spraying Service hauls trash to Lea County Landfill

Reserve Pit

Reserve Pit being used? NO**Temporary disposal of produced water into reserve pit?****Reserve pit length (ft.)** **Reserve pit width (ft.)****Reserve pit depth (ft.)** **Reserve pit volume (cu. yd.)****Is at least 50% of the reserve pit in cut?****Reserve pit liner****Reserve pit liner specifications and installation description**

Cuttings Area

Cuttings Area being used? NO**Are you storing cuttings on location?** NO

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Description of cuttings location****Cuttings area length (ft.)****Cuttings area width (ft.)****Cuttings area depth (ft.)****Cuttings area volume (cu. yd.)****Is at least 50% of the cuttings area in cut?****WCuttings area liner****Cuttings area liner specifications and installation description****Section 8 - Ancillary Facilities****Are you requesting any Ancillary Facilities?:** NO**Ancillary Facilities attachment:****Comments:****Section 9 - Well Site Layout****Well Site Layout Diagram:**

Vaca_Draw_20_17_Fed_47H_Wellsite_Layout_20200206081333.pdf

Comments:**Section 10 - Plans for Surface Reclamation****Type of disturbance:** New Surface Disturbance**Multiple Well Pad Name:** VACA DRAW 20-17**Multiple Well Pad Number:** W2E2 PAD 4**Recontouring attachment:**

Vaca_Draw_20_17_Fed_W2E2_Pad_Interim_Reclamation_20200206081409.pdf

Drainage/Erosion control construction: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.

Drainage/Erosion control reclamation: All disturbed and re-contoured areas would be reseeded according to specifications. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Well pad proposed disturbance (acres): 7.235	Well pad interim reclamation (acres): 3.685	Well pad long term disturbance (acres): 3.55
Road proposed disturbance (acres): 6.907	Road interim reclamation (acres): 0	Road long term disturbance (acres): 6.907
Powerline proposed disturbance (acres): 0	Powerline interim reclamation (acres): 0	Powerline long term disturbance (acres): 0
Pipeline proposed disturbance (acres): 0	Pipeline interim reclamation (acres): 0	Pipeline long term disturbance (acres): 0
Other proposed disturbance (acres): 0	Other interim reclamation (acres): 0	Other long term disturbance (acres): 0
Total proposed disturbance: 14.142	Total interim reclamation: 3.685	Total long term disturbance: 10.457

Disturbance Comments: Bulk line: 2039.86' Existing Access Road: 18,566'. We have been working on engineering solutions to reduce our footprint in the section to lower cost, disturbance, and our economic hurdle for other marginal benches within the section to increase our total mineral recovery. It turns out that simply changing our flowline / well approach and moving our separation to our drilling pads significantly reduces our foot print and cost. By placing our separation on our drill pads we can use 6-12 Group lines to gather the separated oil gas and water from the entire section instead of using up to 90 flowlines to move production to the tank batteries for separation. The Group line ability to gather the entire section helps us eliminate 2 batteries per section by simply utilizing the group line approach.

Reconstruction method: After well plugging, all disturbed areas would be returned to the original contour or a contour that blends with the surrounding landform including roads unless the surface owner requests that they be left intact. In consultation with the surface owners it will be determined if any gravel or similar materials used to reinforce an area are to be removed, buried, or left in place during final reclamation. Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated. As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, or fertilizing. Reclamation, Re-vegetation, and Drainage: All disturbed and re-contoured areas would be reseeded using techniques outlined under Phase I and II of this plan or as specified by the land owner. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage. **Topsoil redistribution:** Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated.

Soil treatment: As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching or fertilizing.

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Will seedlings be transplanted for this project?** NO**Seedling transplant description attachment:****Will seed be harvested for use in site reclamation?** NO**Seed harvest description:****Seed harvest description attachment:****Seed Management****Seed Table****Seed Summary****Total pounds/Acre:****Seed Type****Pounds/Acre****Seed reclamation attachment:****Operator Contact/Responsible Official Contact Info****First Name:** Amithy**Last Name:** Crawford**Phone:** (432)620-1909**Email:** acrawford@cimarex.com**Seedbed prep:****Seed BMP:****Seed method:****Existing invasive species?** NO**Existing invasive species treatment description:****Existing invasive species treatment attachment:****Weed treatment plan description:** na**Weed treatment plan attachment:****Monitoring plan description:** na**Monitoring plan attachment:****Success standards:** na**Pit closure description:** na**Pit closure attachment:**

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Section 11 - Surface Ownership****Disturbance type:** WELL PAD**Describe:****Surface Owner:** PRIVATE OWNERSHIP**Other surface owner description:****BIA Local Office:****BOR Local Office:****COE Local Office:****DOD Local Office:****NPS Local Office:****State Local Office:****Military Local Office:****USFWS Local Office:****Other Local Office:****USFS Region:****USFS Forest/Grassland:****USFS Ranger District:****Fee Owner:** Hughes Properties, LLC Trey Hughes**Fee Owner Address:****Phone:** (575)361-3217**Email:** trey.hcp@gmail.com**Surface use plan certification:** YES**Surface use plan certification document:**

Vaca_Draw_20_17_Fed_47H_Surface_Use_agreement_20200207093345.pdf

Surface access agreement or bond: Agreement**Surface Access Agreement Need description:** Private surface owner info attached, see attachment**Surface Access Bond BLM or Forest Service:****BLM Surface Access Bond number:****USFS Surface access bond number:**

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Disturbance type:** EXISTING ACCESS ROAD**Describe:****Surface Owner:** BUREAU OF LAND MANAGEMENT,PRIVATE OWNERSHIP**Other surface owner description:****BIA Local Office:****BOR Local Office:****COE Local Office:****DOD Local Office:****NPS Local Office:****State Local Office:****Military Local Office:****USFWS Local Office:****Other Local Office:****USFS Region:****USFS Forest/Grassland:****USFS Ranger District:****Fee Owner:** Hughes Properties, LLC (Trey Hughs)**Fee Owner Address:****Phone:** (575)361-3217**Email:** trey.hcp@gmail.com**Surface use plan certification:** YES**Surface use plan certification document:**

Vaca_Draw_20_17_Fed_47H_Surface_Use_agreement_20200207095750.pdf

Surface access agreement or bond: Agreement**Surface Access Agreement Need description:** Private surface owner info attached, see attachment**Surface Access Bond BLM or Forest Service:****BLM Surface Access Bond number:****USFS Surface access bond number:**

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Disturbance type:** PIPELINE**Describe:****Surface Owner:** BUREAU OF LAND MANAGEMENT,PRIVATE OWNERSHIP**Other surface owner description:****BIA Local Office:****BOR Local Office:****COE Local Office:****DOD Local Office:****NPS Local Office:****State Local Office:****Military Local Office:****USFWS Local Office:****Other Local Office:****USFS Region:****USFS Forest/Grassland:****USFS Ranger District:****Fee Owner:** Hughes Properties, LLC (Trey Hughes) **Fee Owner Address:****Phone:** (575)361-3217**Email:** trey.hcp@gmail.com**Surface use plan certification:** YES**Surface use plan certification document:**

Vaca_Draw_20_17_Fed_47H_Surface_Use_agreement_20200207095949.pdf

Surface access agreement or bond: Agreement**Surface Access Agreement Need description:** Private surface owner info attached, see attachment**Surface Access Bond BLM or Forest Service:****BLM Surface Access Bond number:****USFS Surface access bond number:**

Section 12 - Other Information

Right of Way needed? YES**Use APD as ROW?** YES**ROW Type(s):** 281001 ROW - ROADS,288100 ROW – O&G Pipeline,288101 ROW – O&G Facility Sites,289001 ROW-O&G Well Pad,Other

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite with BLM(Jeff Robertson) and Cimarex Barry Hunt on 7-24-2018

Other SUPO Attachment

Vaca_Draw_20_17_Fed_W2E2_Pad_Road_Description_20200206081943.pdf

Vaca_Draw_20_17_Fed_W2E2_Pad_Public_Access_20200206081942.pdf

Vaca_Draw_20_17_Fed_W2E2__Well_list_20200211102640.docx

Vaca_Draw_20_17_Fed_47H_SUPO_20200423153017.pdf



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

PWD Data Report

05/11/2021

APD ID: 10400038315

Submission Date: 01/24/2019

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD disturbance (acres):

PWD surface owner:

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 47H**Is the reclamation bond a rider under the BLM bond?****Unlined pit bond number:****Unlined pit bond amount:****Additional bond information attachment:**

Section 4 - Injection

Would you like to utilize Injection PWD options? NO**Produced Water Disposal (PWD) Location:****PWD surface owner:****PWD disturbance (acres):****Injection PWD discharge volume (bbl/day):****Injection well mineral owner:****Injection well type:****Injection well number:****Injection well name:****Assigned injection well API number?****Injection well API number:****Injection well new surface disturbance (acres):****Minerals protection information:****Mineral protection attachment:****Underground Injection Control (UIC) Permit?****UIC Permit attachment:**

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO**Produced Water Disposal (PWD) Location:****PWD surface owner:****PWD disturbance (acres):****Surface discharge PWD discharge volume (bbl/day):****Surface Discharge NPDES Permit?****Surface Discharge NPDES Permit attachment:****Surface Discharge site facilities information:****Surface discharge site facilities map:**

Section 6 - Other

Would you like to utilize Other PWD options? NO**Produced Water Disposal (PWD) Location:****PWD surface owner:****PWD disturbance (acres):****Other PWD discharge volume (bbl/day):**

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:



U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

Bond Info Data Report

05/11/2021

APD ID: 10400038315

Submission Date: 01/24/2019

Highlighted data
reflects the most
recent changes

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 47H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001188

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

Section 1 – Plan Description

Effective May 25, 2021

I. Operator: Cimarex Energy Company **OGRID:** 215099 **Date:** 5 / 3 / 2022

II. Type: ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: _____

III. Well(s): Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Vaca Draw 20-17 Fed 47H	30-025-50178	O. Sec 20. T25S, R33E	320 FSL/2040 FBL	1900	2850	3500

IV. Central Delivery Point Name: Vaca Draw 20-17 5H CTB CDP Sales [See 19.15.27.9(D)(1) NMAC]

V. Anticipated Schedule: Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Vaca Draw 20-17 Fed 47H	30-025-50178	10/1/2022	12/1/2022	3/1/2023	5/1/2023	5/1/2023

VI. Separation Equipment: ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

VII. Operational Practices: ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

VIII. Best Management Practices: ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

Section 2 – Enhanced Plan

EFFECTIVE APRIL 1, 2022

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☒ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

IX. Anticipated Natural Gas Production:

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

X. Natural Gas Gathering System (NGGS):

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

XI. Map. ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

XII. Line Capacity. The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

XIII. Line Pressure. Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

XIV. Confidentiality: ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

Section 3 - Certifications

Effective May 25, 2021

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

If Operator checks this box, Operator will select one of the following:

Well Shut-In. ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

Venting and Flaring Plan. ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

Section 4 - Notices

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature: 
Printed Name: Sarah Jordan
Title: Regulatory Analyst
E-mail Address: sarah.jordan@coterra.com
Date: 5/3/2022
Phone: 432/620-1909
OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)
Approved By:
Title:
Approval Date:
Conditions of Approval:

From State of New Mexico, Natural Gas Management Plan

VI. Separation Equipment: Attach a complete description of how Operator will size separation equipment to optimize gas capture.

XEC Standard Response

Standard facility gas process flow begins at the inlet separator. These vessels are designed based off of forecasted rates and residence times in accordance with, and often greater than, API 12J. The separated gas is then routed to an additional separation vessel (ie sales scrubber) in order to extract liquids that may have carried over or developed due to the decrease in pressure. The sales scrubber is sized based on API 521. From the sales scrubber, the gas leaves the facility and enters the gas midstream gathering network.

Cimarex

VII. Operational Practices

Cimarex values the sustainable development of New Mexico's natural resources. Venting and flaring of natural gas is a source of waste in the industry, and Cimarex will ensure that its values are aligned with those of NMOCD. As such, Cimarex plans to take pointed steps to ensure compliance with Subsection A through F of 19.15.27.8 NMAC.

Specifically, below are the steps Cimarex will plan to follow under routine well commissioning and operations.

1. Capture or combust natural gas during drilling operations where technically feasible, using the best industry practices and control technologies.
 - a. All flares during these operations will be a minimum of 100ft away from the nearest surface-hole location.
2. All gas present during post-completion drill-out and flow back will be routed through separation equipment, and, if technically feasible, flare unsellable vapors rather than vent. Lastly, formal sales separator commissioning to process well-stream fluids and send gas to a gas flow line/collection system or use the gas for on-site fuel or beneficial usage, gas as soon as is safe and technically feasible.
3. Cimarex will ensure the flare or combustion equipment is properly sized to handle expected flow rates, ensure this equipment is equipped with an automatic or continuous ignition source, and ensure this equipment is designed for proper combustion efficiency.
4. If Cimarex must flare because gas is not meeting pipeline specifications, Cimarex will limit flaring to <60 days, analyze gas composition at least twice per week, and route gas into a gathering pipeline as soon as pipeline specifications are met.
5. Under routine production operations, Cimarex will not flare/vent unless:
 - a. Venting or flaring occurs due to an emergency or equipment malfunction.
 - b. Venting or flaring occurs as a result of unloading practices, and an operator is onsite (or within 30 minutes of drive time and posts contact information at the wellsite) until the end of unloading practice.
 - c. The venting or flaring occurs during automated plungerlift operations, in which case the Cimarex operator will work to optimize the plungerlift system to minimize venting/flaring.
 - d. The venting or flaring occurs during downhole well maintenance, in which case Cimarex will work to minimize venting or flaring operations to the extent that it does not pose a risk to safe operations.
 - e. The well is an exploratory well, the division has approved the well as an exploratory well, venting or flaring is limited to 12 months, as approved by the division, and venting/flaring does not cause Cimarex to breach its State-wide 98% gas capture requirement.
 - f. Venting or flaring occurs because the stock tanks or other low-pressure vessels are being gauged, sampled, or liquids are being loaded out.
 - g. The venting or flaring occurs because pressurized vessels are being maintained and are being blown-down or depressurized.
 - h. Venting or flaring occurs as a result of normal dehydration unit operations.

- i. Venting or flaring occurs as a result of bradenhead testing.
 - j. Venting or flaring occurs as a result of normal compressor operations, including general compressor operations, compressor engines and turbines.
 - k. Venting or flaring occurs as a result of a packer leakage test.
 - l. Venting or flaring occurs as a result of a production test lasting less than 24 hours unless otherwise approved by the division.
 - m. Venting or flaring occurs as a result of new equipment commissioning and is necessary to purge impurities from the pipeline or production equipment.
6. Cimarex will maintain its equipment in accordance with its Operations and Maintenance Program, to ensure venting or flaring events are minimized and that equipment is properly functioning.
7. Cimarex will install automatic tank gauging equipment on all production facilities constructed after May 25, 2021, to ensure minimal emissions from tank gauging practices.
8. By November 25, 2022, all Cimarex facilities equipped with flares or combustors will be equipped with continuous pilots or automatic igniters, and technology to ensure proper function, i.e. thermocouple, fire-eye, etc...
9. Cimarex will perform AVO (audio, visual, olfactory) facility inspections in accordance with NMOCD requirements. Specifically, Cimarex will:
 - a. Perform weekly inspections during the first year of production, and so long as production is greater than 60 MCFD.
 - b. If production is less than 60 MCFD, Cimarex will perform weekly AVO inspections when an operator is present on location, and inspections at least once per calendar month with at least 20 calendar days between inspections.
10. Cimarex will measure or estimate the volume of vented, flared or beneficially used natural gas, regardless of the reason or authorization for such venting or flaring.
11. On all facilities constructed after May 25, 2021, Cimarex will install metering where feasible and in accordance with available technology and best engineering practices, in an effort to measure how much gas could have been vented or flared.
 - a. In areas where metering is not technically feasible, such as low-pressure/low volume venting or flaring applications, engineering estimates will be used such that the methodology could be independently verified.
12. Cimarex will fulfill the division's requirements for reporting and filing of venting or flaring that exceeds 50 MCF in volume or last eight hours or more cumulatively within any 24-hour period.

VIII. Best Management Practices to minimize venting during active and planned maintenance

Cimarex strives to ensure minimal venting occurs during active and planned maintenance activities. Below is a description of common maintenance practices, and the steps Cimarex takes to limit venting exposure.

- **Workovers:**
 - Always strive to kill well when performing downhole maintenance.
 - If vapors or trapped pressure is present and must be relieved then:
 - Initial blowdown to production facility:
 - Route vapors to LP flare if possible/applicable
 - Blowdown to portable gas buster tank:
 - Vent to existing or portable flare if applicable.
- **Stock tank servicing:**
 - Minimize time spent with thief hatches open.
 - When cleaning or servicing via manway, suck tank bottoms to ensure minimal volatiles exposed to atmosphere.
 - Connect vacuum truck to low pressure flare while cleaning bottoms to limit venting.
 - Isolate the vent lines and overflows on the tank being serviced from other tanks.
- **Pressure vessel/compressor servicing and associated blowdowns:**
 - Route to flare where possible.
 - Blow vessel down to minimum available pressure via pipeline, prior to venting vessel.
 - Preemptively changing anodes to reduce failures and extended corrosion related servicing.
 - When cleaning or servicing via manway, suck vessel bottoms to ensure minimal volatiles exposed to atmosphere.
- **Flare/combustor maintenance:**
 - Minimize downtime by coordinating with vendor and Cimarex staff travel logistics.
 - Utilizing preventative and predictive maintenance programs to replace high wear components before failure.
 - Because the flare/combustor is the primary equipment used to limit venting practices, ensure flare/combustor is properly maintained and fully operational at all times via routine maintenance, temperature telemetry, onsite visual inspections.

The Cimarex expectation is to limit all venting exposure. Equipment that may not be listed on this document is still expected to be maintained and associated venting during such maintenance minimized.

District I

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District II

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District III

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District IV

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 Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 103463

CONDITIONS

Operator: CIMAREX ENERGY CO. 600 N. Marienfeld Street Midland, TX 79701	OGRID: 215099
	Action Number: 103463
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
pkautz	Will require a File As Drilled C-102 and a Directional Survey with the C-104	5/27/2022
pkautz	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	5/27/2022
pkautz	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	5/27/2022
pkautz	Cement is required to circulate on both surface and intermediate1 strings of casing	5/27/2022