

Form 3160-3
(June 2015)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM026394P
1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☒ Multiple Zone		7. If Unit or CA Agreement, Name and No.
2. Name of Operator CIMAREX ENERGY COMPANY [215099]		8. Lease Name and Well No. VACA DRAW 20-17 FEDERAL [319775] 48H
3a. Address 600 N MARIENFELD STREET ST SUITE 600, MIDLAND	3b. Phone No. (include area code) (432) 571-7800	9. API Well No. 30-025-50535
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SESE / 330 FSL / 2020 FEL / LAT 32.109738 / LONG -103.592292 At proposed prod. zone NENE / 100 FNL / 1161 FEL / LAT 32.137578 / LONG -103.589502		10. Field and Pool, or Exploratory [98180] NOTHING WILL NOT SAVE/UPPER WO
14. Distance in miles and direction from nearest town or post office* 26 miles		11. Sec., T. R. M. or Blk. and Survey or Area SEC 20/T25S/R33E/NMP
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 330 feet	16. No of acres in lease	12. County or Parish LEA
17. Spacing Unit dedicated to this well 640.0	13. State NM	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 20 feet	19. Proposed Depth 12320 feet / 22438 feet	20. BLM/BIA Bond No. in file FED: NMB001188
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3404 feet	22. Approximate date work will start* 05/04/2020	23. Estimated duration 30 days
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. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan. | 5. Operator certification. |
| 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). | 6. Such other site specific information and/or plans as may be requested by the BLM. |

25. Signature (Electronic Submission)	Name (Printed/Typed) ARICKA EASTERLING / Ph: (432) 620-1936	Date 01/24/2019
Title Regulatory Analyst		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) null / Ph: (575) 234-5959	Date 04/25/2022
Title Assistant Field Manager Lands & Minerals		
Office CARLSBAD		

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 09/02/2022

SL

(Continued on page 2)



Approval Date: 04/25/2022

KZ
09/02/2022

*(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 30-025-50535	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	
⁷ OGRID No. 215099	⁸ Operator Name CIMAREX ENERGY CO.	⁶ Well Number 48H ⁹ Elevation 3404.8'

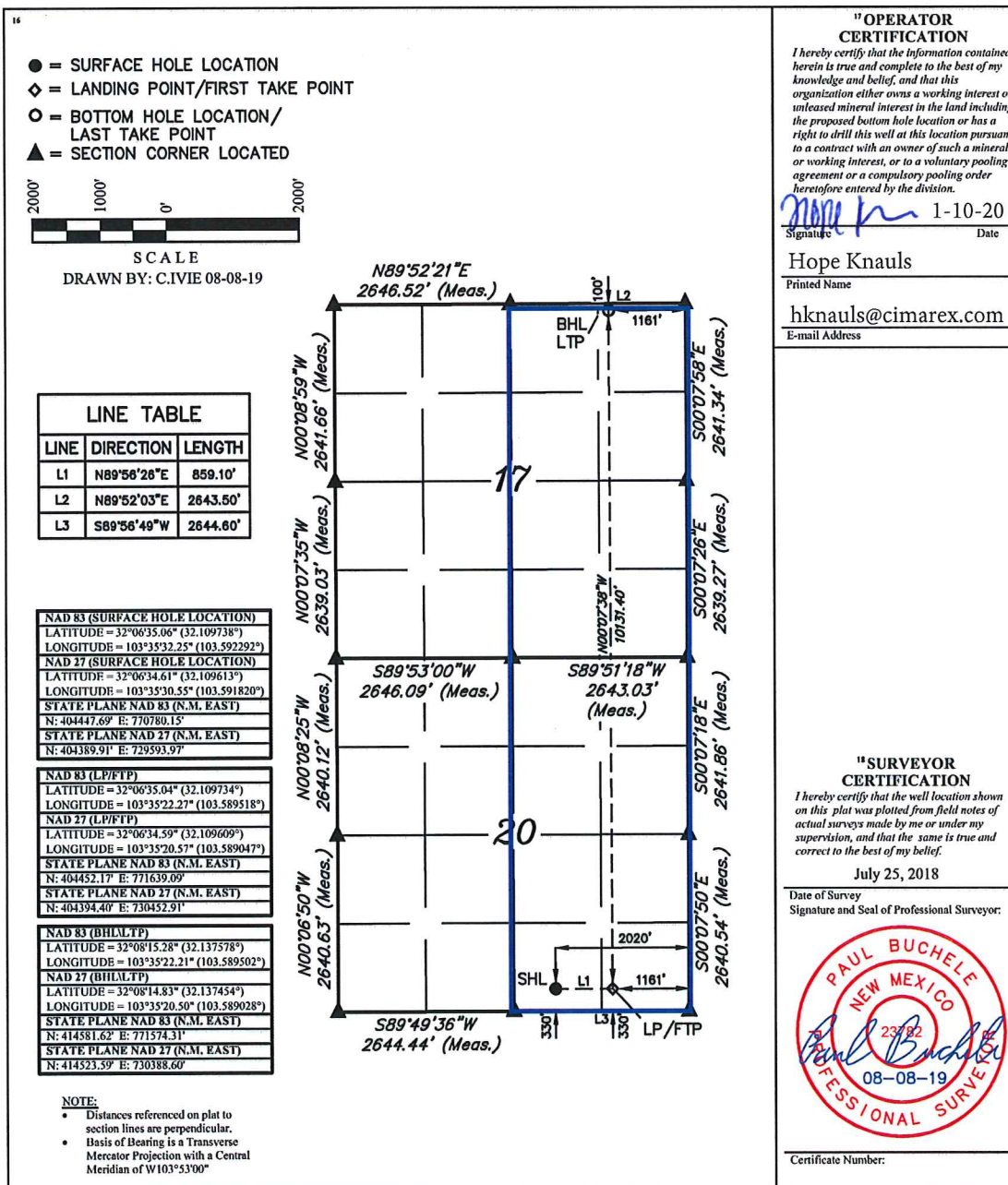
"Surface Location

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	2020	EAST	LEA

"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
A	17	25S	33E		100	NORTH	1161	EAST	LEA
¹¹ Dedicated Acres 640	¹² Joint or Infill	¹³ Consolidation Code	¹⁴ 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.



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:** 6 / 6 / 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 Federal 48H		O, Sec 20 T25S, R33E	100 FSL/2020	FEL 1500	2250	3000
	30-025-50535					

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 Federal 48H		6/1/2025	6/20/2025	10/1/2025	1/1/2026	1/1/2026
	30-025-50535					

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: 6/6/2022
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.



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

Drilling Plan Data Report

10/12/2021

APD ID: 10400038297

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: 48H

[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
379877	RUSTLER	3404	935	935		USEABLE WATER	N
379878	TOP SALT	2106	1298	1298		NONE	N
379879	BASE OF SALT	-1310	4714	4714		NONE	N
379888	LAMAR	-1505	4909	4909		NONE	N
379889	BELL CANYON	-1533	4937	4937		NONE	N
379890	CHERRY CANYON	-2586	5990	5990		OIL	N
379884	BRUSHY CANYON	-4132	7536	7536		NATURAL GAS, OIL	N
379882	BONE SPRING	-5628	9032	9032		NATURAL GAS, OIL	Y
379883	UPPER AVALON SHALE	-5908	9312	9312		NATURAL GAS, OIL	N
379885	BONE SPRING 1ST	-6607	10011	10011		NATURAL GAS, OIL	N
379886	BONE SPRING 2ND	-6819	10223	10223		NATURAL GAS, OIL	N
660128	BONE SPRING 3RD	-7667	11071	11071		NATURAL GAS, OIL	N
660174	WOLFCAMP	-8785	12189	12189		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 48H**Pressure Rating (PSI):** 5M**Rating Depth:** 22438

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 10-3/4" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 10000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 10000 psi test. Annular will be tested to 100% 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 10000 psi. 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_48H_Choke_5M_20210412132429.pdf

BOP Diagram Attachment:

Vaca_Draw_20_17_Fed_48H_BOP_5M_20210412132613.pdf

Pressure Rating (PSI): 5M**Rating Depth:** 12501

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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Choke Diagram Attachment:

Vaca_Draw_20_17_Fed_48H_Choke_5M_20210412132444.pdf

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 48H

Vaca_Draw_20_17_Fed_48H_Choke_5M_20210412132444.pdf

BOP Diagram Attachment:

Vaca_Draw_20_17_Fed_48H_BOP_5M_Surf_20210412132637.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	PRODUCT ION	6.75	5.5	NEW	API	N	0	11800	0	11800	0		11800	L-80	20	LT&C	1.37	1.43	BUOY	1.88	BUOY	1.88
3	INTERMEDIATE	9.875	7.625	NEW	NON API	N	0	12501	0	12276			12501	OTHER	29.7	OTHER - TMK FJ	2.9	1.14	BUOY	1.87	BUOY	1.14
4	PRODUCT ION	6.75	5.0	NEW	API	N	11800	22438	11800	12320			10638	P-110	18	BUTT	2	2.02	BUOY	61.97	BUOY	61.97

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_48H_Casing_Assumptions_20210412131237.pdf

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 48H**Casing Attachments**

Casing ID: 2 **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**Vaca_Draw_20_17_Fed_48H_Casing_Assumptions_20210412131250.pdf

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

Vaca_Draw_20_17_Fed_48H__Spec_Sheet_for_L80_7.625_Inter_Csg_20200212131303.pdf

Tapered String Spec:**Casing Design Assumptions and Worksheet(s):**Vaca_Draw_20_17_Fed_48H_Casing_Assumptions_20210412131303.pdf

Casing ID: 4 **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**Vaca_Draw_20_17_Fed_48H_Casing_Assumptions_20210412131318.pdf

Section 4 - Cement

Operator Name: CIMAREX ENERGY COMPANY**Well Name:** VACA DRAW 20-17 FEDERAL**Well Number:** 48H

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	0	0	0	0	0	0	0	0
PRODUCTION	Lead		0	0	0	0	0	0	0	0	0
PRODUCTION	Tail		0	2243 8	849	1.3	14.2	1103	25	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
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		0	4900	585	3.64	10.3	2127	50	TUNED LIGHT	LCM
INTERMEDIATE	Tail		0	4900	198	1.36	14.8	268	25	Class C	Retarder
INTERMEDIATE	Lead	4900	4900	1250 1	794	1.88	12.9	1492	50	35:65 (POZ C)	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:** 48H

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	1250 1	OTHER : BRINE DIESEL EMULSION	9	9.5							
1250 1	2243 8	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: 6726

Anticipated Surface Pressure: 4015.6

Anticipated Bottom Hole Temperature(F): 171

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_48H_H2S_Plan_20210412130932.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: VACA DRAW 20-17 FEDERAL

Well Number: 48H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Vaca_Draw_20_17_Fed_48H_AC_Report_20200212133942.pdf

Vaca_Draw_20_17_Fed_48H_Directional_Plan_20200212134000.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Vaca_Draw_20_17_Fed_48H_Gas_Capture_20200212134024.pdf

Vaca_Draw_20_17_Fed_48H_Drilling_Plan_20210412131418.pdf

Other Variance attachment:

Vaca_Draw_20_17_Fed_48H_Multibowl_Wellhead_20210412131359.pdf

Vaca_Draw_20_17_Fed_48H_Flex_Hose_20210412131533.pdf

Schlumberger



Cimarex Vaca Draw 20-17 Federal #48H Rev0 RM 12Sept19 Anti-Collision Summary Report

Analysis Date-24hr Time:	October 07, 2019 - 09:36	Analysis Method:	3D Least Distance
Client:	Cimarex Energy	Reference Trajectory:	Cimarex Vaca Draw 20-17 Federal #48H Rev0 RM 12Sept19 (Non-Def Plan)
Field:	NM Lea County (NAD 83)	Depth Interval:	Every 10.00 Measured Depth (ft)
Structure:	Cimarex Vaca Draw 20-17 Federal #48H	Rule Set:	NAL Procedure: D&M AntiCollision Standard S002
Slot:	New Slot	Min Pts:	All local minima indicated.
Well:	Vaca Draw 20-17 Federal #48H	Version / Patch:	2.10.782.0
Borehole:	Vaca Draw 20-17 Federal #48H	Database / Project:	US1153APPA452.dfr.slb.com/drilling-NM Lea County 2. 10
Scan MD Range:	0.00ft ~ 22438.25ft		

Trajectory Error Model: ISOWSA0 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:
- All Non-Def Surveys
- 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

Not performed!
Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans

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

Results highlighted: Sep-Factor separation <= 1.50 ft

Cimarex Vaca Draw 20-17 Federal #47H Rev0 RM 12Sept19 (Non-Def Plan)	20.00	16.50	17.50	3.50	N/A	MAS = 5.03 (m)	0.00	0.00	CCIC<=15m<15.00				Fail Minor
	20.00	16.50	17.50	3.50	5626.26	MAS = 5.03 (m)	26.00	26.00					
	20.00	20.01	5.83	-0.01	1.50	OSF 1.50	1920.00	1920.00		OSF<1.50			
	20.00	23.59	3.44	-3.59	1.24	OSF 1.50	2300.00	2300.00					
	20.02	23.66	3.41	-3.64	1.24	OSF 1.50	2310.00	2310.00					
	20.07	23.73	3.42	-3.65	1.24	OSF 1.50	2320.00	2320.00					
	20.07	24.52	7.23	-0.11	1.40	OSF 1.50	2460.00	2459.92		OSF>1.50			
	145.68	48.03	114.16	99.65	4.93	OSF 1.50	6520.00	6478.86					
	148.77	48.45	116.97	102.32	4.99	OSF 1.50	6900.00	6558.03		OSF<5.00			
	413.92	77.44	362.47	337.49	8.26	OSF 1.50	12410.00	12244.09					
	415.40	126.46	330.25	286.82	5.00	OSF 1.50	15000.00	12323.89					
	415.94	333.02	192.10	61.92	1.67	OSF 1.50	21900.00	12320.28		OSF<5.00			
	414.94	349.96	180.81	64.99	1.70	OSF 1.50	22438.25	12320.00					
	3323.33	32.81	3320.83	3290.52	N/A	MAS = 10.00 (m)	0.00	0.00					
	3323.31	32.81	3320.68	3290.50	N/A	MAS = 10.00 (m)	20.00	20.00					

EOC Vaca Draw 20 Federal #1 (Offset) Plugged Inc Only 0ft-14200ft (Def Survey)	3323.33	32.81	3320.83	3290.52	N/A	MAS = 10.00 (m)	0.00	0.00					Fail Minor
	3323.31	32.81	3320.68	3290.50	N/A	MAS = 10.00 (m)	20.00	20.00					
	3323.34	32.81	3320.71	3290.53	N/A	MAS = 10.00 (m)	26.00	26.00					
	3320.94	35.29	3296.56	3285.65	151.61	OSF 1.50	700.00	700.00					
	3325.84	129.32	3238.79	3196.52	39.31	OSF 1.50	2500.00	2499.94					
	3350.92	211.85	3208.85	3139.07	23.99	OSF 1.50	4050.00	4044.52					
	3367.62	249.86	3200.21	3117.76	20.41	OSF 1.50	4890.00	4885.96					
	3429.55	362.06	3187.33	3067.46	14.30	OSF 1.50	7030.00	6983.54					
	3457.92	398.15	3192.98	3061.77	13.17	OSF 1.50	7730.00	7676.24					
	3462.58	402.92	3193.14	3059.66	12.96	OSF 1.50	7830.00	7775.20					
	3478.60	428.14	3192.35	3050.47	12.25	OSF 1.50	8290.00	8230.40					
	3478.91	428.59	3192.36	3050.33	12.24	OSF 1.50	8290.00	8230.40					
	3482.22	561.34	3114.75	2932.27	9.53	OSF 1.50	10670.00	10608.22					
	3485.62	561.34	3110.56	2924.28	9.35	OSF 1.50	10970.00	10908.22					
	2120.24	640.91	169.141	1479.33	4.99	OSF 1.50	13530.00	12324.66		OSF<5.00			

Cimarex Vaca Draw 20-17 Federal #46H Rev0 RM 12Sept19 (Non-Def Plan)	40.00	32.50	37.50	7.50	N/A	MAS = 9.91 (m)	0.00	0.00	CCIC<=15m<15.00				Warning Alert
	40.00	32.50	37.50	7.50	12983.64	MAS = 9.91 (m)	0.00	0.00					
	40.02	32.50	23.44	7.50	2.07	MAS = 9.91 (m)	26.00	26.00					
	40.16	32.50	23.41	7.52	2.06	MAS = 9.91 (m)	2300.00	2300.00					
	40.16	32.50	23.46	7.65	2.05	MAS = 9.91 (m)	2310.00	2310.00					
	40.49	32.50	62.25	47.99	4.95	MAS = 9.91 (m)	2330.00	2330.00					
	830.88	104.68	760.26	736.20	12.16	OSF 1.50	27900.00	2787.77	OSF<5.00				
	830.88	251.16	662.61	579.72	5.00	OSF 1.50	13050.00	12324.91					
	830.89	358.78	590.90	472.15	3.49	OSF 1.50	18940.00	12321.83	OSF<5.00				
	416.04	351.51	180.25	64.53	1.78	OSF 1.50	22438.25	12320.00					
	1729.80	32.81	1727.30	1696.99	N/A	MAS = 10.00 (m)	0.00	0.00					
	1729.78	32.81	1727.28	1696.97	N/A	MAS = 10.00 (m)	26.00	26.00					
	1716.38	32.81	1700.98	1685.57	115.20	MAS = 10.00 (m)	2550.00	2549.68					
	415.95	79.65	361.40	336.30	8.20	OSF 1.50	12550.00	12287.89					
	416.04	127.94	329.31	288.10	5.00	OSF 1.50	15050.00	12323.86					

Cimarex Vaca Draw 20-17 Federal #75H Rev0 RM 12Sept19 (Non-Def Plan)	1749.80	32.81	1747.30	1717.00	N/A	MAS = 10.00 (m)	0.00	0.00					Warning Alert
	1749.78	32.81	1747.28	1716.97	N/A	MAS = 10.00 (m)	26.00	26.00					
	830.89	80.66	775.82	750.22	16.15	OSF 1.50	12490.00	12273.01					
	830.94	252.20	661.52	578.74	5.00	OSF 1.50	19230.00	12321.68	OSF<5.00				
	830.94	352.89	594.42	478.09	3.55	OSF 1.50	22438.25	12320.00					
	1749.80	32.81	1727.30	1696.99	N/A	MAS = 10.00 (m)	0.00	0.00					
	1729.78	32.81	1727.28	1696.97	N/A	MAS = 10.00 (m)	26.00	26.00					
	1716.38	32.81	1700.98	1685.57	115.20	MAS = 10.00 (m)	2550.00	2549.68					
	415.95	79.65	361.40	336.30	8.20	OSF 1.50	12550.00	12287.89					
	416.04	127.94	329.31	288.10	5.00	OSF 1.50	15050.00	12323.86					
	416.04	351.51	180.25	64.53	1.78	OSF 1.50	22438.25	12320.00					
	1749.80	32.81	1727.30	1696.99	N/A	MAS = 10.00 (m)	0.00	0.00					
	1729.78	32.81	1727.28	1696.97	N/A	MAS = 10.00 (m)	26.00	26.00					
	1716.38	32.81	1700.98	1685.57	115.20	MAS = 10.00 (m)	2550.00	2549.68					
	415.95	79.65	361.40	336.30	8.20	OSF 1.50	12550.00	12287.89					

Hankamer Curtis Bass-Federal #1 (Offset) Plugged Blind Off-5074ft (Def Survey)	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					Warning Alert
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					
	4262.68	32.81	4260.16	4259.87	204751.95	MAS = 10.00 (m)	0.00	0.00					

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		
4292.68	32.81	4287.44	4259.87	1562.99		MAS = 10.00 (m)	26.00	26.00				WRP	
4292.68	710.13	3818.43	3582.55	9.09		OSF1.50	2300.00	2300.00				MinPt-CtCt	
4340.91	1305.06	3470.04	3035.85	5.00		OSF1.50	4210.00	4192.96	OSF<5.00			Enter Alert	
4371.38	1581.91	3315.94	2789.48	4.15		OSF1.50	5100.00	5073.67				MinPts	
4837.67	1455.28	3866.65	3382.39	4.99		OSF1.50	7020.00	6973.64	OSF>5.00			Exit Alert	
7390.24	317.83	7177.52	7072.41	35.14		OSF1.50	15420.00	12323.67				MinPt-O-ADP	
7294.54	203.71	7157.90	7090.83	54.36		OSF1.50	16610.00	12323.05				MinPt-CtCt	
7317.12	243.56	7153.92	7073.56	45.51		OSF1.50	17180.00	12322.75				MINPT-O-EQU	
7396.60	339.14	7169.68	7057.46	32.95		OSF1.50	17830.00	12322.41				MinPt-O-ADP	
9339.78	1013.30	8663.41	8326.47	13.86		OSF1.50	22438.25	12320.00				MinPt-O-SF	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #45H Off-
19226ft (Surcon Corrected)
(Def Survey)

Pass

99.99	32.81	98.19	67.18	N/A		MAS = 10.00 (m)	0.00	0.00				MinPts	
100.00	32.81	98.18	67.19	16783.82		MAS = 10.00 (m)	26.00	26.00				WRP	
91.87	32.81	85.62	59.06	20.26		MAS = 10.00 (m)	1060.00	1060.00				MINPT-O-EQU	
65.44	32.81	53.15	32.63	6.00		MAS = 10.00 (m)	2440.00	2439.94				MinPts	
65.46	32.81	53.17	32.66	6.00		MAS = 10.00 (m)	2450.00	2449.93				MinPt-O-SF	
67.41	32.81	55.17	34.61	6.21		MAS = 10.00 (m)	2740.00	2738.29				MINPT-O-EQU	
68.26	32.81	55.81	35.45	6.17		MAS = 10.00 (m)	2890.00	2886.72				MinPt-O-SF	
68.51	32.81	56.02	35.70	6.17		MAS = 10.00 (m)	2910.00	2906.52				MinPt-O-SF	
72.94	32.81	60.07	40.13	6.35		MAS = 10.00 (m)	3220.00	3213.28				MINPT-O-EQU	
74.70	32.81	61.24	41.89	6.19		MAS = 10.00 (m)	3480.00	3470.57				MinPt-O-SF	
77.27	32.81	63.38	44.47	6.18		MAS = 10.00 (m)	3670.00	3658.59				MinPt-O-SF	
94.55	32.81	78.44	61.74	6.42		MAS = 10.00 (m)	4340.00	4321.60				MinPt-O-SF	
96.33	32.81	79.94	63.52	6.42		MAS = 10.00 (m)	4420.00	4400.77				MinPt-O-SF	
95.71	32.81	77.62	62.90	5.72		MAS = 10.00 (m)	4930.00	4905.45				MINPT-O-EQU	
95.34	32.81	77.09	62.53	5.61		MAS = 10.00 (m)	5000.00	4974.72				MinPts	
95.39	32.81	77.05	62.58	5.59		MAS = 10.00 (m)	5020.00	4994.51				MINPT-O-EQU	
96.33	32.81	77.70	63.52	5.55		MAS = 10.00 (m)	5090.00	5063.78				MinPt-O-SF	
156.62	37.98	130.79	118.64	6.38		OSF1.50	6680.00	6637.19				MinPt-O-SF	
159.40	38.64	133.13	120.76	6.38		OSF1.50	6770.00	6726.25				MinPt-O-SF	
184.36	46.72	152.68	137.63	6.07		OSF1.50	7910.00	7854.36				MinPt-O-ADP	
186.92	47.92	154.46	139.00	6.00		OSF1.50	8080.00	8022.59				MinPt-O-SF	
212.98	47.68	180.68	165.31	6.87		OSF1.50	8790.00	8728.22				MinPt-O-SF	
212.98	47.67	180.68	165.30	6.87		OSF1.50	8800.00	8738.22				MinPts	
212.99	47.69	180.68	165.30	6.87		OSF1.50	8810.00	8748.22				MinPt-O-ADP	
213.06	47.71	180.74	165.35	6.87		OSF1.50	8830.00	8768.22				MinPt-O-SF	
3005.26	32.81	2985.30	2972.46	163.01		MAS = 10.00 (m)	12500.00	12275.73				MinPt-O-SF	
2924.16	140.54	2829.95	2783.62	31.54		OSF1.50	16800.00	12322.95				MinPt-CtCt	
2924.99	142.96	2829.19	2782.04	31.01		OSF1.50	16910.00	12322.89				MINPT-O-EQU	
2925.92	144.07	2829.36	2781.85	30.78		OSF1.50	16960.00	12322.86				MinPt-O-ADP	
2926.88	145.03	2829.68	2781.85	30.58		OSF1.50	17000.00	12322.84				MinPt-O-ADP	
2938.35	158.21	2832.36	2780.13	28.12		OSF1.50	17430.00	12322.62				MINPT-O-EQU	
2940.22	160.44	2832.74	2779.77	27.74		OSF1.50	17520.00	12322.57				MinPt-O-ADP	
2957.52	197.41	2825.40	2760.12	22.64		OSF1.50	18710.00	12321.95				MinPt-CtCt	
2958.03	199.02	2824.84	2759.01	22.46		OSF1.50	18790.00	12321.91				MINPT-O-EQU	
2958.71	199.82	2824.96	2758.90	22.37		OSF1.50	18830.00	12321.89				MinPt-O-ADP	
2961.02	210.29	2820.31	2750.73	21.27		OSF1.50	19140.00	12321.72				MinPt-CtCt	
2969.20	216.28	2814.50	2742.92	20.66		OSF1.50	19340.00	12321.62				MinPt-CtCt	
2962.37	222.35	2813.62	2740.02	20.11		OSF1.50	19580.00	12321.49				MINPT-O-EQU	
2966.88	230.98	2812.38	2735.90	19.39		OSF1.50	19860.00	12321.35				MINPT-O-EQU	
2967.78	232.13	2812.51	2735.65	19.30		OSF1.50	19910.00	12321.32				MinPt-O-ADP	
2932.79	267.52	2753.93	2665.27	16.53		OSF1.50	21050.00	12320.73				MinPt-CtCt	
2933.83	270.57	2752.94	2663.27	16.35		OSF1.50	21180.00	12320.66				MINPT-O-EQU	
2945.82	294.19	2749.17	2651.62	15.09		OSF1.50	21940.00	12320.26				MinPt-CtCt	
2946.49	306.31	2741.77	2640.19	14.49		OSF1.50	22340.00	12320.05				MinPt-CtCt	
2946.70	309.12	2740.11	2637.58	14.36		OSF1.50	22438.25	12320.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #44H Rev6 Kfc
28Sep19 (Def Plan)

Pass

116.61	32.81	114.80	83.80	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
116.61	32.81	114.80	83.80	25270.72		MAS = 10.00 (m)	26.00	26.00				WRP	
115.33	32.81	110.11	82.53	33.23		MAS = 10.00 (m)	820.00	820.00				MinPts	
115.32	32.81	109.06	82.51	25.50		MAS = 10.00 (m)	1060.00	1060.00				MINPT-O-EQU	
115.32	32.81	109.17	82.51	25.28		MAS = 10.00 (m)	1070.00	1070.00				MinPts	
117.06	32.81	107.41	84.25	14.43		MAS = 10.00 (m)	1790.00	1790.00				MINPT-O-EQU	
118.99	32.81	107.31	86.19	11.69		MAS = 10.00 (m)	2300.00	2300.00				MinPts	
119.01	32.81	107.31	86.20	11.68		MAS = 10.00 (m)	2310.00	2310.00				MINPT-O-EQU	
119.78	32.81	107.97	86.97	11.63		MAS = 10.00 (m)	2370.00	2369.99				MinPt-O-SF	
144.20	32.81	131.84	111.39	13.31		MAS = 10.00 (m)	3360.00	3351.82				MinPts	
144.22	32.81	131.82	111.41	13.27		MAS = 10.00 (m)	3380.00	3371.61				MINPT-O-EQU	
155.52	32.81	141.83	122.71	12.78		MAS = 10.00 (m)	3950.00	3935.67				MinPt-O-SF	
164.11	32.81	147.75	131.30	11.05		MAS = 10.00 (m)	4760.00	4737.22				MinPts	
164.15	32.81	147.71	131.34	10.99		MAS = 10.00 (m)	4780.00	4757.01				MINPT-O-EQU	
200.04	32.81	178.78	167.23	10.07		MAS = 10.00 (m)	5920.00	5885.12				MinPt-O-SF	
443.29	47.06	411.08	396.23	14.84		OSF1.50	9540.00	9478.22				MinPt-O-SF	
443.28	47.05	411.08	396.23	14.84		OSF1.50	9550.00	9488.22				MinPts	
2330.97	159.93	2223.52	2171.05	22.19		OSF1.50	17410.00	12322.63				MinPt-CtCt	
2348.37	313.75	2138.36	2034.61	11.31		OSF1.50	22438.25	12320.00				MinPts	

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

Pass

116.61	32.81	114.80	83.80	N/A	MAS = 10.00 (m)	0.00	0.00		Surface
116.61	32.81	114.80	83.80	25270.72	MAS = 10.00 (m)	26.00	26.00		WRP
115.33	32.81	110.11	82.53	33.23	MAS = 10.00 (m)	820.00	820.00		MinPts
115.32	32.81	109.06	82.51	25.50	MAS = 10.00 (m)	1060.00	1060.00		MINPT-O-EQU
115.32	32.81	109.17	82.51	25.28	MAS = 10.00 (m)	1070.00	1070.00		MinPts
117.06	32.81	107.41	84.25	14.43	MAS = 10.00 (m)	1790.00	1790.00		MINPT-O-EQU
118.99	32.81	107.31	86.19	11.69	MAS = 10.00 (m)	2300.00	2300.00		MinPts
119.01	32.81	107.31	86.20	11.68	MAS = 10.00 (m)	2310.00	2310.00		MINPT-O-EQU
119.78	32.81	107.97	86.97	11.63	MAS = 10.00 (m)	2370.00	2369.99		MinPt-O-SF
144.20	32.81	131.84	111.39	13.31	MAS = 10.00 (m)	3360.00	3351.82		MinPts
144.22	32.81	131.82	111.41	13.27	MAS = 10.00 (m)	3380.00	3371.61		MINPT-O-EQU
155.52	32.81	141.83	122.71	12.78	MAS = 10.00 (m)	3950.00	3935.67		MinPt-O-SF
164.11	32.81	147.75	131.30	11.05	MAS = 10.00 (m)	4760.00	4737.22		MinPts
164.15	32.81	147.71	131.34	10.99	MAS = 10.00 (m)	4780.00	4757.01		MINPT-O-EQU
200.04	32.81	178.78	167.23	10.07	MAS = 10.00 (m)	5920.00	5885.12		MinPt-O-SF
444.09	46.02	412.89	398.07	14.92	OSF1.50	9480.00	9418.22		MinPt-O-SF
444.04	46.01	412.85	398.02	14.93	OSF1.50	9490.00	9428.22		MinPts
2399.58	32.81	2378.35	2366.77	121.82	MAS = 10.00 (m)	12940.00	12324.97		MinPts
2399.61	32.81	2378.35	2366.80	121.65	MAS = 10.00 (m)	12950.00	12324.96		MINPT-O-EQU

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		
	2994.50	50.62	2960.24	2943.88	91.48	OSF1.50	14730.00	12324.03				MinPt-O-SF	
	9798.00	68.81	9751.62	9729.20	218.46	OSF1.50	22438.25	12320.00				TD	
Cimarex Vaca Draw 20-17 Federal #43H MWD Off-Update (Non-Def Survey)													
	134.15	32.81	132.34	101.34	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	134.14	32.81	132.32	101.33	15511.15	MAS = 10.00 (m)	26.00	26.00				WRP	
	130.85	32.81	124.57	98.04	28.89	MAS = 10.00 (m)	1060.00	1060.00				MinPts	
	142.38	32.81	135.50	109.57	27.74	MAS = 10.00 (m)	1120.00	1120.00				MinPt-O-SF	
	11255.57	32.81	11240.00	11222.76	817.79	MAS = 10.00 (m)	12500.00	12275.73				MinPt-O-SF	
	15141.13	164.95	15030.56	14976.18	139.20	OSF1.50	22438.25	12320.00				MinPt-O-SF	
Cimarex Vaca Draw 20-17 Federal #43H Rev3 IP 13Aug19 (Def Plan)													
	134.15	32.81	131.65	101.34	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	134.15	32.81	131.64	101.34	19113.49	MAS = 10.00 (m)	26.00	26.00				WRP	
	134.15	32.81	117.58	101.34	9.36	MAS = 10.00 (m)	2300.00	2300.00				MinPts	
	134.16	32.81	117.55	101.36	9.33	MAS = 10.00 (m)	2310.00	2310.00				MINPT-O-EOU	
	135.82	32.81	118.81	103.02	9.19	MAS = 10.00 (m)	2400.00	2399.98				MinPt-O-SF	
	1002.62	74.54	952.09	928.08	20.82	OSF1.50	8890.00	8828.22				MINPT-O-EOU	
	1002.64	74.56	952.09	928.07	20.82	OSF1.50	8900.00	8838.22				MinPt-O-ADP	
	1003.37	74.68	952.75	928.69	20.80	OSF1.50	8950.00	8888.22				MinPt-O-SF	
	3122.95	135.04	3032.09	2987.91	35.32	OSF1.50	16580.00	12323.06				MinPt-CICt	
	3130.13	313.81	2920.09	2816.32	15.07	OSF1.50	22438.25	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #71H Rev4 RM 19Jul19 (Def Plan)													
	1650.91	32.81	1649.10	1618.10	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1650.88	32.81	1649.08	1618.08	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	283.65	65.30	239.04	218.35	6.78	OSF1.50	9500.00	9438.22				MinPt-O-SF	
	283.64	65.81	238.69	217.82	6.72	OSF1.50	9620.00	9558.22				MinPt-CICt	
	283.66	65.88	238.67	217.78	6.71	OSF1.50	9630.00	9568.22				MinPts	
	284.02	66.02	238.94	218.00	6.71	OSF1.50	9650.00	9588.22				MinPt-O-SF	
	2251.95	109.93	2178.07	2142.03	31.22	OSF1.50	15600.00	12323.58				MinPt-CICt	
	2275.79	318.14	2063.09	1957.65	10.78	OSF1.50	22438.25	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #60H Rev0 RM 12Sept19 (Non-Def Plan)													
	1179.87	32.81	1177.37	1147.06	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1179.84	32.81	1177.34	1147.04	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	729.43	58.78	689.22	670.64	19.59	OSF1.50	8440.00	8378.98				MinPt-O-SF	
	721.58	66.03	676.51	655.52	17.12	OSF1.50	10670.00	10608.22				MinPt-CICt	
	721.63	66.39	676.39	655.31	17.04	OSF1.50	10720.00	10658.22				MINPT-O-EOU	
	721.73	66.45	676.41	655.28	17.01	OSF1.50	10740.00	10678.22				MinPt-O-ADP	
	728.41	67.80	682.19	660.60	16.89	OSF1.50	10960.00	10898.22				MinPt-O-SF	
	1423.71	340.36	1196.01	1083.40	6.31	OSF1.50	22438.25	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #61H Rev0 RM 12Sept19 (Non-Def Plan)													
	1199.85	32.81	1197.35	1167.04	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1199.84	32.81	1197.34	1167.03	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1199.84	32.81	1185.16	1167.03	98.52	MAS = 10.00 (m)	2000.00	2000.00				MinPts	
	1199.86	32.81	1185.11	1167.05	97.73	MAS = 10.00 (m)	2020.00	2020.00				MINPT-O-EOU	
	1217.18	32.81	1201.25	1184.37	90.46	MAS = 10.00 (m)	2400.00	2399.98				MinPt-O-SF	
	1123.35	41.22	1095.01	1082.13	43.53	OSF1.50	5710.00	5677.31				MinPt-O-SF	
	737.45	70.18	689.57	667.27	16.47	OSF1.50	10390.00	10328.22				MinPt-CICt	
	737.47	70.26	689.54	667.22	16.45	OSF1.50	10400.00	10338.22				MINPT-O-EOU	
	737.52	70.31	689.54	667.21	16.43	OSF1.50	10410.00	10348.22				MinPt-O-ADP	
	742.49	71.22	693.92	671.27	16.32	OSF1.50	10560.00	10498.22				MinPt-O-SF	
	1676.87	335.38	1452.47	1341.52	7.55	OSF1.50	22438.25	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #72H Rev6 kFc 28Sep19 (Def Plan)													
	1670.90	32.81	1669.09	1638.09	N/A	MAS = 10.00 (m)	0.00	0.00				MinPt-O-SF	Pass
	1670.87	32.81	1669.06	1638.06	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1616.85	32.81	1603.78	1584.04	143.75	MAS = 10.00 (m)	2730.00	2728.39				MinPt-O-SF	
	798.59	47.26	766.10	751.33	26.92	OSF1.50	8520.00	8458.56				MinPt-O-SF	
	786.31	46.89	753.83	739.42	27.15	OSF1.50	8770.00	8708.22				MinPt-O-SF	
	785.01	47.07	752.41	737.94	27.00	OSF1.50	8870.00	8808.22				MinPt-CICt	
	785.02	47.12	752.39	737.90	26.96	OSF1.50	8880.00	8818.22				MinPts	
	788.32	47.50	755.44	740.82	26.83	OSF1.50	8970.00	8908.22				MinPt-O-SF	
	3106.97	36.39	3081.88	3070.58	137.41	OSF1.50	12500.00	12275.73				MinPt-O-SF	
	2998.48	228.08	2845.57	2770.38	19.92	OSF1.50	19360.00	12321.61				MinPt-CICt	
	3019.96	322.17	2804.35	2697.79	14.16	OSF1.50	22438.25	12320.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #72H Surveys Off to update (Non-Def Survey)													
	1670.90	32.81	1669.09	1638.09	N/A	MAS = 10.00 (m)	0.00	0.00				MinPt-O-SF	Pass
	1670.87	32.81	1669.06	1638.06	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1616.85	32.81	1603.78	1584.04	143.75	MAS = 10.00 (m)	2730.00	2728.39				MinPt-O-SF	
	798.59	47.26	766.10	751.33	26.92	OSF1.50	8520.00	8458.56				MinPt-O-SF	
	786.09	46.28	754.24	739.80	27.11	OSF1.50	8810.00	8748.22				MinPts	
	789.96	46.73	757.82	743.23	26.96	OSF1.50	8950.00	8888.22				MinPt-O-SF	
	3119.44	35.89	3094.91	3083.55	137.22	OSF1.50	12500.00	12275.73				MinPt-O-SF	
	3131.07	41.59	3102.74	3089.48	117.99	OSF1.50	13020.00	12324.93				MinPt-CICt	
	3131.15	41.84	3102.66	3089.31	117.26	OSF1.50	13040.00	12324.92				MINPT-O-EOU	
	3131.36	42.09	3102.70	3089.27	116.53	OSF1.50	13060.00	12324.90				MinPt-O-ADP	
	3777.22	70.90	3729.35	3706.32	81.97	OSF1.50	15130.00	12323.82				MinPt-O-SF	
	9927.69	90.10	9867.03	9837.60	168.64	OSF1.50	22438.25	12320.00				TD	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H Off- 19583R (Surcon Corrected) (Def Survey)													
	1690.89	32.81	1689.08	1658.08	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)	26.00	26.00				WRP	
	1690.56	32.81	1687.63	1657.75	1511.30	MAS = 10.00 (m)	300.00	300.00				MinPts	
	1689.83	32.81	1684.62	1657.02	496.05	MAS = 10.00 (m)	810.00	810.00				MinPts	
	1690.00	32.81	1684.43	1657.19	449.58	MAS = 10.00 (m)	900.00	900.00				MINPT-O-EOU	
	938.16	47.20	905.82	890.97	31.50	OSF1.50	8440.00	8378.98				MinPt-O-SF	
	921.05	45.70	889.68	875.36	32.03	OSF1.50	8770.00	8708.22				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		
914.57	46.20	882.86	868.36	31.45		OSF1.50	9230.00	9168.22				MinPt-O-SF	
913.94	46.15	882.26	867.76	31.47		OSF1.50	9250.00	9188.22				MinPts	
888.05	47.04	855.78	841.02	29.98		OSF1.50	9520.00	9458.22				MinPt-CtCt	
888.07	47.16	855.76	840.97	29.94		OSF1.50	9530.00	9468.22				MinPts	
893.46	47.68	860.77	845.77	29.69		OSF1.50	9650.00	9588.22				MinPt-O-SF	
2702.59	36.90	2677.48	2665.69	114.57		OSF1.50	12500.00	12275.73				MinPt-O-SF	
2609.73	118.60	2530.15	2491.13	33.42		OSF1.50	15780.00	12323.48				MinPt-CtCt	
2610.20	120.05	2529.66	2490.16	33.02		OSF1.50	15850.00	12323.45				MINPT-O-EQU	
2608.25	127.58	2522.68	2480.67	31.02		OSF1.50	16090.00	12323.32				MinPt-CtCt	
2599.69	159.61	2492.76	2440.07	24.65		OSF1.50	17180.00	12322.75				MinPt-CtCt	
2600.57	162.54	2491.70	2438.03	24.21		OSF1.50	17300.00	12322.69				MINPT-O-EQU	
2601.74	163.95	2491.92	2437.78	24.01		OSF1.50	17360.00	12322.66				MinPt-O-ADP	
2602.24	174.44	2485.43	2427.79	22.56		OSF1.50	17680.00	12322.49				MinPt-CtCt	
2589.50	197.69	2457.20	2391.82	19.79		OSF1.50	18460.00	12322.08				MinPt-CtCt	
2588.32	203.25	2452.31	2385.07	19.24		OSF1.50	18650.00	12321.98				MinPt-CtCt	
2588.88	205.04	2451.67	2383.84	19.07		OSF1.50	18730.00	12321.94				MINPT-O-EQU	
2589.59	205.90	2451.81	2383.69	19.00		OSF1.50	18770.00	12321.92				MinPt-O-ADP	
2587.20	242.46	2425.04	2344.73	16.10		OSF1.50	19660.00	12321.30				MinPt-CtCt	
2587.39	253.58	2417.82	2333.80	15.39		OSF1.50	20330.00	12321.10				MinPt-CtCt	
2588.50	256.86	2416.75	2331.70	15.20		OSF1.50	20460.00	12321.03				MINPT-O-EQU	
2588.40	264.41	2411.61	2323.99	14.76		OSF1.50	20690.00	12320.91				MinPt-CtCt	
2548.18	292.36	2352.76	2255.82	13.14		OSF1.50	21630.00	12320.42				MinPt-CtCt	
2548.78	294.42	2351.99	2254.36	13.05		OSF1.50	21720.00	12320.38				MINPT-O-EQU	
2549.49	295.27	2352.13	2254.22	13.01		OSF1.50	21760.00	12320.35				MinPt-O-ADP	
2568.67	305.55	2364.45	2263.12	12.67		OSF1.50	22150.00	12320.15				MinPt-O-ADP	
2587.82	312.10	2379.23	2275.71	12.40		OSF1.50	22438.25	12320.00				MinPt-O-SF	

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

Pass

1320.05	32.81	1318.35	1287.24	N/A	MAS = 10.00 (m)	0.00	0.00					MinPts	
1320.07	32.81	1318.35	1287.26	48003.14	MAS = 10.00 (m)	26.00	26.00					WRP	
1320.15	32.81	1318.32	1287.34	10605.68	MAS = 10.00 (m)	60.00	60.00					MINPT-O-EQU	
1180.37	32.81	1167.75	1147.57	107.25	MAS = 10.00 (m)	2400.00	2399.98					MinPt-O-SF	
1170.89	32.81	1158.44	1138.08	108.15	MAS = 10.00 (m)	2600.00	2599.45					MinPts	
1210.45	32.81	1194.06	1177.64	81.68	MAS = 10.00 (m)	4480.00	4460.14					MinPts	
1210.54	32.81	1193.90	1177.73	80.38	MAS = 10.00 (m)	4550.00	4529.41					MINPT-O-EQU	
1231.37	32.81	1210.07	1198.56	62.33	MAS = 10.00 (m)	5660.00	5627.83					MINPT-O-EQU	
1296.27	49.82	1262.53	1246.45	40.25	OSF1.50	8400.00	8339.29					MinPt-O-SF	
1266.58	48.57	1233.68	1218.02	40.37	OSF1.50	9240.00	9178.22					MinPts	
1267.74	48.64	1234.79	1219.10	40.35	OSF1.50	9360.00	9298.22					MinPt-O-SF	
1274.36	49.79	1240.65	1224.58	39.59	OSF1.50	9920.00	9858.22					MinPt-CtCt	
1274.38	49.84	1240.63	1224.54	39.55	OSF1.50	9950.00	9888.22					MINPT-O-EQU	
1274.41	49.88	1240.63	1224.53	39.52	OSF1.50	9970.00	9908.22					MinPt-O-ADP	
1274.92	50.24	1240.91	1224.68	39.24	OSF1.50	10130.00	10068.22					MinPt-O-ADP	
1278.38	52.35	1242.95	1226.03	37.72	OSF1.50	10910.00	10848.22					MinPts	
1278.40	52.37	1242.96	1226.03	37.70	OSF1.50	10920.00	10858.22					MinPt-O-ADP	
1288.40	53.14	1252.45	1235.27	37.43	OSF1.50	11280.00	11218.22					MinPt-O-SF	
1223.65	63.66	1180.74	1160.02	29.49	OSF1.50	13100.00	13234.88					MinPt-CtCt	
1224.48	65.18	1180.53	1159.30	28.80	OSF1.50	13210.00	13234.83					MINPT-O-EQU	
1224.82	65.59	1180.60	1159.23	28.63	OSF1.50	13240.00	13234.81					MinPt-O-ADP	
1234.38	70.18	1187.11	1164.21	26.92	OSF1.50	13520.00	13234.66					MinPt-O-ADP	
1236.44	72.22	1187.80	1164.22	26.18	OSF1.50	13630.00	13234.61					MinPt-O-ADP	
1251.09	99.71	1184.13	1151.37	19.08	OSF1.50	14830.00	13233.98					MinPt-CtCt	
1251.33	100.37	1183.93	1150.95	18.95	OSF1.50	14870.00	13233.96					MINPT-O-EQU	
1251.63	100.70	1184.01	1150.92	18.89	OSF1.50	14890.00	13233.95					MinPt-O-ADP	
1250.18	114.50	1173.36	1135.67	16.57	OSF1.50	15400.00	13233.68					MinPt-CtCt	
1250.49	115.40	1173.07	1135.09	16.44	OSF1.50	15450.00	13233.65					MINPT-O-EQU	
1250.80	115.75	1173.15	1135.05	16.39	OSF1.50	15470.00	13233.64					MinPt-O-ADP	
1250.99	123.61	1168.11	1127.38	15.34	OSF1.50	15740.00	13233.50					MinPt-CtCt	
1247.09	143.72	1150.79	1103.37	13.13	OSF1.50	16470.00	13233.12					MinPt-CtCt	
1236.49	177.12	1117.92	1059.37	10.55	OSF1.50	17650.00	13232.50					MinPt-CtCt	
1237.46	179.69	1117.21	1057.83	10.41	OSF1.50	17760.00	13232.45					MINPT-O-EQU	
1238.43	185.68	1114.16	1052.76	10.07	OSF1.50	17950.00	13232.35					MinPt-CtCt	
1239.17	188.00	1113.35	1051.17	9.95	OSF1.50	18050.00	13232.29					MINPT-O-EQU	
1239.51	191.93	1111.07	1047.58	9.75	OSF1.50	18170.00	13232.23					MinPt-CtCt	
1239.84	192.90	1110.76	1046.95	9.70	OSF1.50	18220.00	13232.21					MINPT-O-EQU	
1240.33	193.47	1110.87	1046.86	9.68	OSF1.50	18250.00	13232.19					MinPt-O-ADP	
1246.87	202.11	1111.64	1044.75	9.31	OSF1.50	18550.00	13232.03					MINPT-O-EQU	
1250.31	211.44	1108.86	1038.86	8.92	OSF1.50	18850.00	13231.88					MinPt-CtCt	
1250.77	213.26	1108.12	1037.52	8.85	OSF1.50	18930.00	13231.83					MINPT-O-EQU	
1251.27	213.83	1108.23	1037.44	8.83	OSF1.50	18960.00	13231.82					MinPt-O-ADP	
1229.19	247.88	1063.45	981.32	7.47	OSF1.50	20080.00	13231.23					MinPt-CtCt	
1229.48	248.86	1063.08	980.63	7.45	OSF1.50	20130.00	13231.21					MINPT-O-EQU	
1230.64	250.16	1063.38	980.48	7.41	OSF1.50	20190.00	13231.18					MinPt-O-ADP	
1253.10	280.43	1065.66	972.66	6.73	OSF1.50	21170.00	13230.66					MinPt-CtCt	
1247.89	291.19	1053.28	956.70	6.45	OSF1.50	21530.00	13230.47					MinPt-CtCt	
1249.31	295.57	1051.78	953.74	6.36	OSF1.50	21700.00	13230.39					MINPT-O-EQU	
1250.31	296.75	1052.00	953.56	6.34	OSF1.50	21750.00	13230.36					MinPt-O-ADP	
1248.90	318.59	1036.02	930.31	5.90	OSF1.50	22438.25	13230.00					MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #4H MWD
Off-12228ft (Surcon Corrected)
(Def Survey)

Pass

1320.05	32.81	1317.55	1287.24	N/A	MAS = 10.00 (m)	0.00	0.00
1320.07	32.81	1317.54	1287.26	47973.94	MAS = 10.00 (m)	26.00	26.00
1320.15	32.81	1317.52	1287.34	10599.23	MAS = 10.00 (m)	60.00	60.00
1176.96	32.81	1163.48	1144.15	107.62	MAS = 10.00 (m)	2440.00	2439.94
1170.89	32.81	1157.54	1138.08	108.37	MAS = 10.00 (m)	2600.00	2599.45
1210.45	32.81	1193.13	1177.64	81.65	MAS = 10.00 (m)	4480.00	4460.14
1210.54	32.81	1192.98	1177.73	80.35	MAS = 10.00 (m)	4550.00	4529.41
1231.41	32.81	1209.15	1198.60	62.18	MAS = 10.00 (m)	5670.00	5637.73
1296.27	50.73	1261.61	1245.53	40.24	OSF1.50	8400.00	8339.29
1266.58	49.51	1232.75	1217.08	40.34	OSF1.50	9240.00	9178.22
1267.56	49.57	1233.69	1218.00	40.32	OSF1.50	9350.00	9288.22
1274.36	50.72	1239.72	1223.64	39.56	OSF1.50	9920.00	9858.22
1274.38	50.78	1239.69	1223.60	39.52	OSF1.50	9950.00	9888.22
1274.41	50.81	1239.70	1223.59	39.49	OSF1.50	9970.00	9908.22
1274.92	51.17	1239.98	1223.75	39.22	OSF1.50	10130.00	10068.22
1278.38	52.26	1242.04	1225.12	37.71	OSF1.50	10910.00	10848.22
1278.40	53.28	1242.04	1225.12	37.69	OSF1.50	10920.00	10858.22
1288.40	54.04	1251.54	1234.36	37.42	OSF1.50	11280.00	11218.22

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		
1326.71	55.54	1288.85	1271.16	37.45		OSF1.50	11840.00	11778.22				MinPt-O-SF	
1378.63	56.32	1340.25	1322.31	38.35		OSF1.50	12290.00	12178.54				MinPts	
1382.48	56.94	1343.69	1325.54	38.02		OSF1.50	12350.00	12214.46				MinPts	
10174.39	57.88	10134.97	10116.51	275.54		OSF1.50	22438.25	12320.00				TD	
Cimarex Vaca Draw 20-17 Federal #71H MWD Off-Update (Non-Def Survey)													
1650.91	32.81	1649.10	1618.10	N/A		MAS = 10.00 (m)	0.00	0.00				Pass	
1650.89	32.81	1649.08	1618.08	N/A		MAS = 10.00 (m)	10.00	10.00				Surface	
1650.89	32.81	1649.08	1618.08	607853.25		MAS = 10.00 (m)	26.00	26.00				MinPts	
1651.23	32.81	1648.97	1618.42	3626.42		MAS = 10.00 (m)	150.00	150.00				WRP	
1648.10	32.81	1641.20	1615.30	322.79		MAS = 10.00 (m)	1070.00	1070.00				MINPT-O-EOU	
1648.10	32.81	1641.16	1615.30	320.33		MAS = 10.00 (m)	1080.00	1080.00				MinPts	
1648.10	32.81	1641.16	1615.30	320.33		MAS = 10.00 (m)	1080.00	1080.00				MINPT-O-EOU	
1951.49	32.81	1940.89	1918.68	221.81		MAS = 10.00 (m)	2120.00	2120.00				MinPt-O-SF	
11229.23	32.81	11211.81	11196.42	719.29		MAS = 10.00 (m)	12500.00	12275.73				MinPts	
15113.14	170.39	14998.94	14942.75	134.45		OSF1.50	22438.25	12320.00				MinPt-O-SF	



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



Report Date: October 04, 2019 - 03:14 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #48H / New Slot
Well: Vaca Draw 20-17 Federal #48H
Borehole: Vaca Draw 20-17 Federal #48H
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #48H Rev0 RM 12Sept19
Survey Date: September 12, 2019
Tort / AHD / DDI / ERD Ratio: 106.596 ° / 11159.242 ft / 6.336 / 0.905
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.05604", W 103° 35' 32.25244"
Location Grid N/E Y/X: N 404447.690 ftUS, E 770780.150 ftUS
CRS Grid Convergence Angle: 0.3939 °
Grid Scale Factor: 0.99996939
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: 3430.800 ft above MSL
Seabed / Ground Elevation: 3404.800 ft above MSL
Magnetic Declination: 6.617 °
Total Gravity Field Strength: 998.4318mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47745.580 nT
Magnetic Dip Angle: 59.709 °
Declination Date: September 12, 2019
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3939 °
Total Corr Mag North->Grid North: 6.2233 °
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, 2020' FEL]	0.00	0.00	4.48	0.00	0.00	0.00	0.00	N/A	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	100.00	0.00	100.00	100.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	200.00	0.00	100.00	200.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	300.00	0.00	100.00	300.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	400.00	0.00	100.00	400.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	500.00	0.00	100.00	500.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	600.00	0.00	100.00	600.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	700.00	0.00	100.00	700.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	800.00	0.00	100.00	800.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	900.00	0.00	100.00	900.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
Rustler	935.00	0.00	100.00	935.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1000.00	0.00	100.00	1000.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1100.00	0.00	100.00	1100.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1200.00	0.00	100.00	1200.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
Top of Salt	1298.00	0.00	100.00	1298.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1300.00	0.00	100.00	1300.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1400.00	0.00	100.00	1400.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1500.00	0.00	100.00	1500.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1600.00	0.00	100.00	1600.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1700.00	0.00	100.00	1700.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1800.00	0.00	100.00	1800.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	1900.00	0.00	100.00	1900.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	2000.00	0.00	100.00	2000.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	2100.00	0.00	100.00	2100.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	2200.00	0.00	100.00	2200.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
Nudge 2"/100' DLS	2300.00	0.00	100.00	2300.00	0.00	0.00	0.00	0.00	404447.69	770780.15	N 32° 6' 35.06"	W 103° 35' 32.25"
	2400.00	2.00	100.00	2399.98	-0.31	-0.30	1.72	2.00	404447.39	770781.87	N 32° 6' 35.05"	W 103° 35' 32.23"
	2500.00	4.00	100.00	2499.84	-1.26	-1.21	6.87	2.00	404446.48	770787.02	N 32° 6' 35.04"	W 103° 35' 32.17"
	2600.00	6.00	100.00	2599.45	-2.82	-2.73	15.46	2.00	404444.96	770795.60	N 32° 6' 35.03"	W 103° 35' 32.07"
	2700.00	8.00	100.00	2698.70	-5.02	-4.84	27.46	2.00	404442.85	770807.61	N 32° 6' 35.01"	W 103° 35' 31.93"
	2714.14	8.28	100.00	2712.70	-5.38	-5.19	29.43	2.00	404442.50	770809.58	N 32° 6' 35.00"	W 103° 35' 31.91"
	2800.00	8.28	100.00	2797.66	-7.60	-7.34	41.61	0.00	404440.35	770821.76	N 32° 6' 34.98"	W 103° 35' 31.77"
	2900.00	8.28	100.00	2896.62	-10.19	-9.84	55.80	0.00	404437.85	770835.94	N 32° 6' 34.95"	W 103° 35' 31.60"
	3000.00	8.28	100.00	2995.58	-12.79	-12.34	69.98	0.00	404435.35	770850.13	N 32° 6' 34.93"	W 103° 35' 31.44"
	3100.00	8.28	100.00	3094.53	-15.38	-14.84	84.17	0.00	404432.85	770864.32	N 32° 6' 34.90"	W 103° 35' 31.28"
	3200.00	8.28	100.00	3193.49	-17.97	-17.34	98.36	0.00	404430.35	770878.50	N 32° 6' 34.88"	W 103° 35' 31.11"
	3300.00	8.28	100.00	3292.45	-20.56	-19.84	112.54	0.00	404427.85	770892.69	N 32° 6' 34.85"	W 103° 35' 30.95"
	3400.00	8.28	100.00	3391.40	-23.16	-22.35	126.73	0.00	404425.34	770906.88	N 32° 6' 34.83"	W 103° 35' 30.78"
	3500.00	8.28	100.00	3490.36	-25.75	-24.85	140.92	0.00	404422.84	770921.06	N 32° 6' 34.80"	W 103° 35' 30.62"
	3600.00	8.28	100.00	3589.32	-28.34	-27.35	155.11	0.00	404420.34	770935.25	N 32° 6' 34.77"	W 103° 35' 30.45"
	3700.00	8.28	100.00	3688.28	-30.93	-29.85	169.29	0.00	404417.84	770949.44	N 32° 6' 34.75"	W 103° 35' 30.29"
	3800.00	8.28	100.00	3787.23	-33.52	-32.35	183.48	0.00	404415.34	770963.62	N 32° 6' 34.72"	W 103° 35' 30.12"
	3900.00	8.28	100.00	3886.19	-36.12	-34.85	197.67	0.00	404412.84	770977.81	N 32° 6' 34.70"	W 103° 35' 29.96"
	4000.00	8.28	100.00	3985.15	-38.71	-37.36	211.85	0.00	404410.34	770992.00	N 32° 6' 34.67"	W 103° 35' 29.79"
	4100.00	8.28	100.00	4084.10	-41.30	-39.86	226.04	0.00	404407.83	771006.18	N 32° 6' 34.65"	W 103° 35' 29.63"
	4200.00	8.28	100.00	4183.06	-43.89	-42.36	240.23	0.00	404405.33	771020.37	N 32° 6' 34.62"	W 103° 35' 29.46"
	4300.00	8.28	100.00	4282.02	-46.48	-44.86	254.42	0.00	404402.83	771034.56	N 32° 6' 34.59"	W 103° 35' 29.30"
	4400.00	8.28	100.00	4380.97	-49.08	-47.36	268.60	0.00	404400.33	771048.74	N 32° 6' 34.57"	W 103° 35' 29.13"
	4500.00	8.28	100.00	4479.93	-51.67	-49.86	282.79	0.00	404397.83	771062.93	N 32° 6' 34.54"	W 103° 35' 28.97"
	4600.00	8.28	100.00	4578.89	-54.26	-52.36	296.98	0.00	404395.33	771077.12	N 32° 6' 34.52"	W 103° 35' 28.80"
	4700.00	8.28	100.00	4677.84	-56.85	-54.87	311.16	0.00	404392.83	771091.30	N 32° 6' 34.49"	W 103° 35' 28.64"
Base of Salt	4736.54	8.28	100.00	4714.00	-57.80	-55.78	316.35	0.00	404391.91	771096.49	N 32° 6' 34.48"	W 103° 35' 28.58"
	4800.00	8.28	100.00	4776.80	-59.45	-57.37	325.35	0.00	404390.32	771105.49	N 32° 6' 34.47"	W 103° 35' 28.47"
	4900.00	8.28	100.00	4875.76	-62.04	-59.87	339.54	0.00	404387.82	771119.68	N 32° 6' 34.44"	W 103° 35' 28.31"
	4933.59	8.28	100.00	4909.00	-62.91	-60.71	344.30	0.00	404386.98	771124.44	N 32° 6' 34.43"	W 103° 35' 28.25"
Lamar	4961.89	8.28	100.00	4937.00	-63.64	-61.42	348.32	0.00	404386.27	771128.46	N 32° 6' 34.42"	W 103° 35' 28.21"
Bell Canyon	5000.00	8.28	100.00	4974.72	-64.63	-62.37	353.72	0.00	404385.32	771133.86	N 32° 6' 34.41"	W 103° 35' 28.15"
	5100.00	8.28	100.00	5073.67	-67.22	-64.87	367.91	0.00	404382.82	771148.05	N 32° 6' 34.39"	W 103° 35' 27.98"
	5200.00	8.28	100.00	5172.63	-69.81	-67.37	382.10	0.00	404380.32	771162.24	N 32° 6' 34.36"	W 103° 35' 27.82"
	5300.00	8.28	100.00	5271.59	-72.41	-69.88	396.29	0.00	404377.82	771176.42	N 32° 6' 34.34"	W 103° 35' 27.65"
	5400.00	8.28	100.00	5370.54	-75.00	-72.38	410.47	0.00	404375.31	771190.61	N 32° 6' 34.31"	W 103° 35' 27.49"
	5500.00	8.28	100.00	5469.50	-77.59	-74.88	424.66	0.00	404372.81	771204.80	N 32° 6' 34.29"	W 103° 35' 27.32"
	5600.00	8.28	100.00	5568.46	-80.18	-77.38	438.85	0.00	404370.31	771218.98	N 32° 6' 34.26"	W 103° 35' 27.16"
	5700.00	8.28	100.00	5667.41	-82.77	-79.88	453.03	0.00	404367.81	771233.17	N 32° 6' 34.23"	W 103° 35' 26.99"
	5800.00	8.28	100.00	5766.37	-85.37	-82.38	467.22	0.00	404365.31	771247.36	N 32° 6' 34.21"	W 103° 35' 26.83"
	5900.00	8.28	100.00	5865.33	-87.96	-84.89	481.41	0.00	404362.81	771261.54	N 32° 6' 34.18"	W 103° 35' 26.66"
	6000.00	8.28	100.00	5964.28	-90.55	-87.39	495.60	0.00	404360.31	771275.73	N 32° 6' 34.16"	W 103° 35' 26.50"
Cherry Canyon	6025.99	8.28	100.00	5990.00	-91.22	-88.04	499.28	0.00	404359.66	771279.42	N 32° 6' 34.15"	W 103° 35' 26.45"
	6100.00	8.28	100.00	6063.24	-93.14	-89.89	509.78	0.00	404357.80	771289.92	N 32° 6' 34.13"	W 103° 35' 26.33"
	6200.00	8.28	100.00	6162.20	-95.74	-92.39	523.97	0.00	404355.30	771304.10	N 32° 6' 34.11"	W 103° 35' 26.17"
	6300.00	8.28	100.00	6261.16	-98.33	-94.89	538.16	0.00	404352.80	771318.29	N 32° 6' 34.08"	W 103° 35' 26.00"
	6400.00	8.28	100.00	6360.11	-100.92	-97.39	552.34	0.00	404350.30	771332.48	N 32° 6'	

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 ° ' ")
	7000.00	8.28	100.00	6953.85	-116.47	-112.40	637.47	0.00	404335.29	771417.59	N 32 6 33.90 W 103 35 24.85	
	7100.00	8.28	100.00	7052.81	-119.06	-114.90	651.65	0.00	404332.79	771431.78	N 32 6 33.87 W 103 35 24.69	
	7200.00	8.28	100.00	7151.77	-121.66	-117.41	665.84	0.00	404330.29	771445.97	N 32 6 33.85 W 103 35 24.52	
	7300.00	8.28	100.00	7250.72	-124.25	-119.91	680.03	0.00	404327.79	771460.15	N 32 6 33.82 W 103 35 24.36	
	7400.00	8.28	100.00	7349.68	-126.84	-122.41	694.21	0.00	404325.29	771474.34	N 32 6 33.80 W 103 35 24.19	
	7500.00	8.28	100.00	7448.64	-129.43	-124.91	708.40	0.00	404322.78	771488.53	N 32 6 33.77 W 103 35 24.03	
Brushy Canyon	7588.28	8.28	100.00	7536.00	-131.72	-127.12	720.93	0.00	404320.58	771501.05	N 32 6 33.75 W 103 35 23.88	
	7600.00	8.28	100.00	7547.60	-132.02	-127.41	722.59	0.00	404320.28	771502.71	N 32 6 33.75 W 103 35 23.86	
	7700.00	8.28	100.00	7646.55	-134.62	-129.91	736.78	0.00	404317.78	771516.90	N 32 6 33.72 W 103 35 23.70	
	7800.00	8.28	100.00	7745.51	-137.21	-132.41	750.96	0.00	404315.28	771531.09	N 32 6 33.69 W 103 35 23.53	
	7900.00	8.28	100.00	7844.47	-139.80	-134.92	765.15	0.00	404312.78	771545.27	N 32 6 33.67 W 103 35 23.37	
	8000.00	8.28	100.00	7943.42	-142.39	-137.42	779.34	0.00	404310.28	771559.46	N 32 6 33.64 W 103 35 23.20	
	8100.00	8.28	100.00	8042.38	-144.99	-139.92	793.52	0.00	404307.77	771573.65	N 32 6 33.62 W 103 35 23.04	
	8200.00	8.28	100.00	8141.34	-147.58	-142.42	807.71	0.00	404305.27	771587.83	N 32 6 33.59 W 103 35 22.87	
	8300.00	8.28	100.00	8240.29	-150.17	-144.92	821.90	0.00	404302.77	771602.02	N 32 6 33.57 W 103 35 22.71	
Drop to Vertical 2°/100' DLS	8360.34	8.28	100.00	8300.00	-151.73	-146.43	830.46	0.00	404301.26	771610.58	N 32 6 33.55 W 103 35 22.61	
	8400.00	7.49	100.00	8339.29	-152.71	-147.38	835.82	2.00	404300.32	771615.94	N 32 6 33.54 W 103 35 22.55	
	8500.00	5.49	100.00	8438.64	-154.75	-149.34	846.95	2.00	404298.36	771627.07	N 32 6 33.52 W 103 35 22.42	
	8600.00	3.49	100.00	8538.33	-156.16	-150.70	854.66	2.00	404297.00	771634.78	N 32 6 33.51 W 103 35 22.33	
	8700.00	1.49	100.00	8638.23	-156.94	-151.45	858.93	2.00	404296.24	771639.05	N 32 6 33.50 W 103 35 22.28	
Hold Vertical	8774.48	0.00	100.00	8712.70	-157.11	-151.62	859.89	2.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	8800.00	0.00	100.00	8738.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	8900.00	0.00	100.00	8838.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9000.00	0.00	100.00	8938.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
Bone Spring Lime	9093.78	0.00	100.00	9032.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9100.00	0.00	100.00	9038.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
Leonard Shale	9148.78	0.00	100.00	9087.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9200.00	0.00	100.00	9138.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9300.00	0.00	100.00	9238.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
Avalon Shale	9373.78	0.00	100.00	9312.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9400.00	0.00	100.00	9338.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9500.00	0.00	100.00	9438.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9600.00	0.00	100.00	9538.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9700.00	0.00	100.00	9638.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9800.00	0.00	100.00	9738.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	9900.00	0.00	100.00	9838.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10000.00	0.00	100.00	9938.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
1st Bone Spring Sand	10072.78	0.00	100.00	10011.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10100.00	0.00	100.00	10038.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10200.00	0.00	100.00	10138.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
2nd Bone Spring Carb	10284.78	0.00	100.00	10223.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10300.00	0.00	100.00	10238.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10400.00	0.00	100.00	10338.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10500.00	0.00	100.00	10438.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10600.00	0.00	100.00	10538.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
2nd Bone Spring Sand	10644.78	0.00	100.00	10583.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10700.00	0.00	100.00	10638.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10800.00	0.00	100.00	10738.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	10900.00	0.00	100.00	10838.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11000.00	0.00	100.00	10938.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11100.00	0.00	100.00	11038.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
3rd Bone Spring Carb	11132.78	0.00	100.00	11071.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11200.00	0.00	100.00	11138.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11300.00	0.00	100.00	11238.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11400.00	0.00	100.00	11338.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11500.00	0.00	100.00	11438.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11600.00	0.00	100.00	11538.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11700.00	0.00	100.00	11638.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
3rd Bone Spring Sand	11783.78	0.00	100.00	11722.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11800.00	0.00	100.00	11738.22	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
KOP - Build 12°/100' DLS	11876.77	0.00	100.00	11815.00	-157.11	-151.62	859.89	0.00	404296.07	771640.01	N 32 6 33.50 W 103 35 22.27	
	11900.00	2.79	359.63	11838.21	-156.55	-151.06	859.88	12.00	404296.64	771640.00	N 32 6 33.50 W 103 35 22.27	
	12000.00	14.79	359.63	11936.86	-141.30	-135.81	859.78	12.00	404311.89	771639.91	N 32 6 33.65 W 103 35 22.27	
	12100.00	26.79	359.63	12030.18	-105.87	-100.38	859.56	12.00	404347.31	771639.68	N 32 6 34.00 W 103 35 22.27	
	12200.00	38.79	359.63	12114.09	-51.82	-46.33	859.21	12.00	404401.36	771639.34	N 32 6 34.54 W 103 35 22.27	
	12300.00	50.79	359.63	12184.94	18.50	23.99	858.76	12.00	404471.67	771638.89	N 32 6 35.23 W 103 35 22.27	
Wolfcamp	12306.48	51.56	359.63	12189.00	23.55	29.03	858.73	12.00	404476.72	771638.85	N 32 6 35.28 W 103 35 22.27	
	12400.00	62.79	359.63	12239.61	102.01	107.49	858.23	12.00	404555.18	771638.35	N 32 6 36.06 W 103 35 22.27	
	12500.00	74.79	359.63	12275.73	195.06	200.55	857.64	12.00	404648.23	771637.76	N 32 6 36.98 W 103 35 22.27	
Build 4°/100' DLS	12501.77	75.00	359.63	12276.19	196.78	202.26	857.63	12.00	404649.94	771637.75	N 32 6 37.00 W 103 35 22.27	
	12600.00	78.93	359.63	12298.34	292.45	297.93	857.01	4.00	404745.61	771637.14	N 32 6 37.95 W 103 35 22.27	
Wolfcamp Y SS	12619.74	79.72	359.63	12302.00	311.85	317.33	856.89	4.00	404765.01	771637.01	N 32 6 38.14 W 103 35 22.26	
	12700.00	82.93	359.63	12314.11	391.18	396.66	856.38	4.00	404844.34	771636.51	N 32 6 38.92 W 103 35 22.26	
	12800.00	86.93	359.63	12322.94	490.77	496.25	855.75	4.00	404943.92	771635.87	N 32 6 39.91 W 103 35 22.26	
Wolfcamp Y Target	12876.08	89.97	359.63	12325.00	566.81	572.29	855.26	4.00	405019.96	771635.38	N 32 6 40.66 W 103 35 22.26	
Wolfcamp Y Target	12877.47	90.03	359.63	12325.00	568.20	573.68	855.25	4.00	405021.35	771635.		

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 ° ' ")
	14900.00	90.03	359.63	12323.94	2590.73	2596.17	842.33	0.00	407043.77	771622.46	N 32 7 0.69 W	103 35 22.25
	15000.00	90.03	359.63	12323.89	2690.73	2696.17	841.70	0.00	407143.77	771621.82	N 32 7 1.68 W	103 35 22.25
	15100.00	90.03	359.63	12323.84	2790.73	2796.16	841.06	0.00	407243.76	771621.18	N 32 7 2.67 W	103 35 22.25
	15200.00	90.03	359.63	12323.79	2890.73	2896.16	840.42	0.00	407343.76	771620.54	N 32 7 3.66 W	103 35 22.25
	15300.00	90.03	359.63	12323.73	2990.73	2996.16	839.78	0.00	407443.75	771619.90	N 32 7 4.65 W	103 35 22.25
	15400.00	90.03	359.63	12323.68	3090.73	3096.16	839.14	0.00	407543.75	771619.26	N 32 7 5.64 W	103 35 22.25
	15500.00	90.03	359.63	12323.63	3190.73	3196.16	838.50	0.00	407643.74	771618.62	N 32 7 6.63 W	103 35 22.25
	15600.00	90.03	359.63	12323.58	3290.73	3296.15	837.86	0.00	407743.74	771617.99	N 32 7 7.61 W	103 35 22.25
	15700.00	90.03	359.63	12323.52	3390.73	3396.15	837.22	0.00	407843.73	771617.35	N 32 7 8.60 W	103 35 22.25
	15800.00	90.03	359.63	12323.47	3490.73	3496.15	836.59	0.00	407943.73	771616.71	N 32 7 9.59 W	103 35 22.25
	15900.00	90.03	359.63	12323.42	3590.73	3596.15	835.95	0.00	408043.72	771616.07	N 32 7 10.58 W	103 35 22.25
	16000.00	90.03	359.63	12323.37	3690.73	3696.14	835.31	0.00	408143.71	771615.43	N 32 7 11.57 W	103 35 22.24
	16100.00	90.03	359.63	12323.31	3790.73	3796.14	834.67	0.00	408243.71	771614.79	N 32 7 12.56 W	103 35 22.24
	16200.00	90.03	359.63	12323.26	3890.73	3896.14	834.03	0.00	408343.70	771614.15	N 32 7 13.55 W	103 35 22.24
	16300.00	90.03	359.63	12323.21	3990.73	3996.14	833.39	0.00	408443.70	771613.52	N 32 7 14.54 W	103 35 22.24
	16400.00	90.03	359.63	12323.16	4090.73	4096.14	832.75	0.00	408543.69	771612.88	N 32 7 15.53 W	103 35 22.24
	16500.00	90.03	359.63	12323.11	4190.73	4196.13	832.11	0.00	408643.69	771612.24	N 32 7 16.52 W	103 35 22.24
	16600.00	90.03	359.63	12323.05	4290.73	4296.13	831.48	0.00	408743.68	771611.60	N 32 7 17.51 W	103 35 22.24
	16700.00	90.03	359.63	12323.00	4390.73	4396.13	830.84	0.00	408843.68	771610.96	N 32 7 18.50 W	103 35 22.24
	16800.00	90.03	359.63	12322.95	4490.73	4496.13	830.20	0.00	408943.67	771610.32	N 32 7 19.49 W	103 35 22.24
	16900.00	90.03	359.63	12322.90	4590.73	4596.13	829.56	0.00	409043.67	771609.68	N 32 7 20.48 W	103 35 22.24
	17000.00	90.03	359.63	12322.84	4690.73	4696.12	828.92	0.00	409143.66	771609.04	N 32 7 21.47 W	103 35 22.24
	17100.00	90.03	359.63	12322.79	4790.73	4796.12	828.28	0.00	409243.66	771608.41	N 32 7 22.46 W	103 35 22.24
	17200.00	90.03	359.63	12322.74	4890.73	4896.12	827.64	0.00	409343.65	771607.77	N 32 7 23.45 W	103 35 22.24
	17300.00	90.03	359.63	12322.69	4990.73	4996.12	827.01	0.00	409443.65	771607.13	N 32 7 24.44 W	103 35 22.24
	17400.00	90.03	359.63	12322.63	5090.73	5096.12	826.37	0.00	409543.64	771606.49	N 32 7 25.43 W	103 35 22.24
	17500.00	90.03	359.63	12322.58	5190.73	5196.11	825.73	0.00	409643.63	771605.85	N 32 7 26.42 W	103 35 22.24
	17600.00	90.03	359.63	12322.53	5290.73	5296.11	825.09	0.00	409743.63	771605.21	N 32 7 27.41 W	103 35 22.24
	17700.00	90.03	359.63	12322.48	5390.73	5396.11	824.45	0.00	409843.62	771604.57	N 32 7 28.39 W	103 35 22.23
	17800.00	90.03	359.63	12322.43	5490.73	5496.11	823.81	0.00	409943.62	771603.93	N 32 7 29.38 W	103 35 22.23
	17900.00	90.03	359.63	12322.37	5590.73	5596.11	823.17	0.00	410043.61	771603.30	N 32 7 30.37 W	103 35 22.23
	18000.00	90.03	359.63	12322.32	5690.73	5696.10	822.53	0.00	410143.61	771602.66	N 32 7 31.36 W	103 35 22.23
	18100.00	90.03	359.63	12322.27	5790.73	5796.10	821.90	0.00	410243.60	771602.02	N 32 7 32.35 W	103 35 22.23
	18200.00	90.03	359.63	12322.22	5890.73	5896.10	821.26	0.00	410343.60	771601.38	N 32 7 33.34 W	103 35 22.23
	18300.00	90.03	359.63	12322.16	5990.73	5996.10	820.62	0.00	410443.59	771600.74	N 32 7 34.33 W	103 35 22.23
	18400.00	90.03	359.63	12322.11	6090.73	6096.10	819.98	0.00	410543.59	771600.10	N 32 7 35.32 W	103 35 22.23
	18500.00	90.03	359.63	12322.06	6190.73	6196.09	819.34	0.00	410643.58	771599.46	N 32 7 36.31 W	103 35 22.23
	18600.00	90.03	359.63	12322.01	6290.73	6296.09	818.70	0.00	410743.58	771598.82	N 32 7 37.30 W	103 35 22.23
	18700.00	90.03	359.63	12321.95	6390.73	6396.09	818.06	0.00	410843.57	771598.19	N 32 7 38.29 W	103 35 22.23
	18800.00	90.03	359.63	12321.90	6490.73	6496.09	817.42	0.00	410943.57	771597.55	N 32 7 39.28 W	103 35 22.23
	18900.00	90.03	359.63	12321.85	6590.73	6596.09	816.79	0.00	411043.56	771596.91	N 32 7 40.27 W	103 35 22.23
	19000.00	90.03	359.63	12321.80	6690.73	6696.08	816.15	0.00	411143.55	771596.27	N 32 7 41.26 W	103 35 22.23
	19100.00	90.03	359.63	12321.75	6790.73	6796.08	815.51	0.00	411243.55	771595.63	N 32 7 42.25 W	103 35 22.23
	19200.00	90.03	359.63	12321.69	6890.73	6896.08	814.87	0.00	411343.54	771594.99	N 32 7 43.24 W	103 35 22.23
	19300.00	90.03	359.63	12321.64	6990.73	6996.08	814.23	0.00	411443.54	771594.35	N 32 7 44.23 W	103 35 22.22
	19400.00	90.03	359.63	12321.59	7090.73	7096.08	813.59	0.00	411543.53	771593.72	N 32 7 45.22 W	103 35 22.22
	19500.00	90.03	359.63	12321.54	7190.73	7196.07	812.95	0.00	411643.53	771593.08	N 32 7 46.21 W	103 35 22.22
	19600.00	90.03	359.63	12321.48	7290.73	7296.07	812.31	0.00	411743.52	771592.44	N 32 7 47.20 W	103 35 22.22
	19700.00	90.03	359.63	12321.43	7390.73	7396.07	811.68	0.00	411843.52	771591.80	N 32 7 48.19 W	103 35 22.22
	19800.00	90.03	359.63	12321.38	7490.73	7496.07	811.04	0.00	411943.51	771591.16	N 32 7 49.17 W	103 35 22.22
	19900.00	90.03	359.63	12321.33	7590.73	7596.06	810.40	0.00	412043.51	771590.52	N 32 7 50.16 W	103 35 22.22
	20000.00	90.03	359.63	12321.28	7690.73	7696.06	809.76	0.00	412143.50	771589.88	N 32 7 51.15 W	103 35 22.22
	20100.00	90.03	359.63	12321.22	7790.73	7796.06	809.12	0.00	412243.50	771589.24	N 32 7 52.14 W	103 35 22.22
	20200.00	90.03	359.63	12321.17	7890.73	7896.06	808.48	0.00	412343.49	771588.61	N 32 7 53.13 W	103 35 22.22
	20300.00	90.03	359.63	12321.12	7990.73	7996.06	807.84	0.00	412443.49	771587.97	N 32 7 54.12 W	103 35 22.22
	20400.00	90.03	359.63	12321.07	8090.73	8096.05	807.20	0.00	412543.48	771587.33	N 32 7 55.11 W	103 35 22.22
	20500.00	90.03	359.63	12321.01	8190.73	8196.05	806.57	0.00	412643.48	771586.69	N 32 7 56.10 W	103 35 22.22
	20600.00	90.03	359.63	12320.96	8290.73	8296.05	805.93	0.00	412743.47	771586.05	N 32 7 57.09 W	103 35 22.22
	20700.00	90.03	359.63	12320.91	8390.73	8396.05	805.29	0.00	412843.46	771585.41	N 32 7 58.08 W	103 35 22.22
	20800.00	90.03	359.63	12320.86	8490.73	8496.05	804.65	0.00	412943.46	771584.77	N 32 7 59.07 W	103 35 22.22
	20900.00	90.03	359.63	12320.80	8590.73	8596.04	804.01	0.00	413043.45	771584.13	N 32 8 0.06 W	103 35 22.22
	21000.00	90.03	359.63	12320.75	8690.73	8696.04	803.37	0.00	413143.45	771583.50	N 32 8 1.05 W	103 35 22.21
	21100.00	90.03	359.63	12320.70	8790.73	8796.04	802.73	0.00	413243.44	771582.86	N 32 8 2.04 W	103 35 22.21
	21200.00	90.03	359.63	12320.65	8890.73	8896.04	802.09	0.00	413343.44	771582.22	N 32 8 3.03 W	103 35 22.21
	21300.00	90.03	359.63	12320.60	8990.73	8996.04	801.46	0.00	413443.43	771581.58	N 32 8 4.02 W	103 35 22.21
	21400.00	90.03	359.63	12320.54	9090.73	9096.03	800.82	0.00	413543.43	771580.94	N 32 8 5.01 W	103 35 22.21
	21500.00	90.03	359.63	12320.49	9190.73	9196.03	800.18	0.00	413643.42	771580.30	N 32 8 6.00 W	103 35 22.21
	21600.00	90.03	359.63	12320.44	9290.73	9296.03	799.54	0.00	413743.42	771579.66	N 32 8 6.99 W	103 35 22.21
	21700.00	90.03	359.63	12320.39	9390.73	9396.03	798.90	0.00	413843.41	771579.03	N 32 8 7.98 W	103 35 22.21
	21800.00	90.03	359.63	12320.33	9490.73	9496.03	798.26	0.00	413943.41	771578.39	N 32 8 8.97 W	103 35 22.21
	21900.00	90.03	359.63	12320.28	9590.73	9596.02	797.62	0.00	414043.40	771577.75	N 32 8 9.95 W	103 35 22.21
	22000.00	90.03	359.63	12320.23	9690.73	9696.02	796.99	0.00	414143.40	771577.11	N 32 8 10.94 W	103 35 22.21
	22100.00	90.03	359.63	12320.18	9790.73	9796.02	796.35	0.00	414243.39	771576.47	N 32 8 11.93 W	103 35 22.21
	22200.00	90.03	359.63	12320.12	9890.73	9896.02	795.71	0.00	414343.38	771575.83	N 32 8 12.92 W	103 35 22.21
	22300.00	90.03	359.63	12320.07	9990.73	9996.02	795.07	0.00	414443.38	771575.19	N 32 8 13.91 W	103 35

1. Geological Formations

TVD of target 10,128

Pilot Hole TD N/A

MD at TD 22,438

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	12501	12276	7-5/8"	29.70	L80 HC	TMK FJ	2.90	1.14	1.87
6 3/4	0	11800	11800	5-1/2"	20.00	L-80	LT&C	1.37	1.43	1.88
6 3/4	11800	22438	12320	5"	18.00	P-110	BT&C	2.00	2.02	61.97
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 48H

	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	585	10.30	3.64	22.18		Lead: Tuned Light + LCM
	198	14.80	1.36	6.57	9.5	Tail: Class C + Retarder
Intermediate Stage 2	794	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
Production	849	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	12100	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 12501'	Brine Diesel Emulsion	9.00 - 9.50	30-35	N/C
12501' to 22438'	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
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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	6726 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 100% 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 atleast 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.

Hydrogen Sulfide Drilling Operations Plan

Vaca Draw 20-17 Federal 48H

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 Federal 48H
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 Federal 48H**

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		

Drilling 9 7/8" hole
below 10 3/4"
Casing

Fill Line

Flowline

2" Minimum Kill Line

Kill Line

3" minimum choke line

Choke Line

2 Valves Minimum
(HCR Required)

2 Valves and a check valve

11" 5000 psi x 7-1/16" 10,000 psi
Wellhead Assembly

13-5/8" 3000 psi x 11" 5000 psi
Wellhead Assembly

13-5/8" 3000#psi x 13-3/8" SOW Casing Head

5000# (5M)
BOP

Annular Preventer

Pipe Rams

Blind Rams

Drilling
Spool

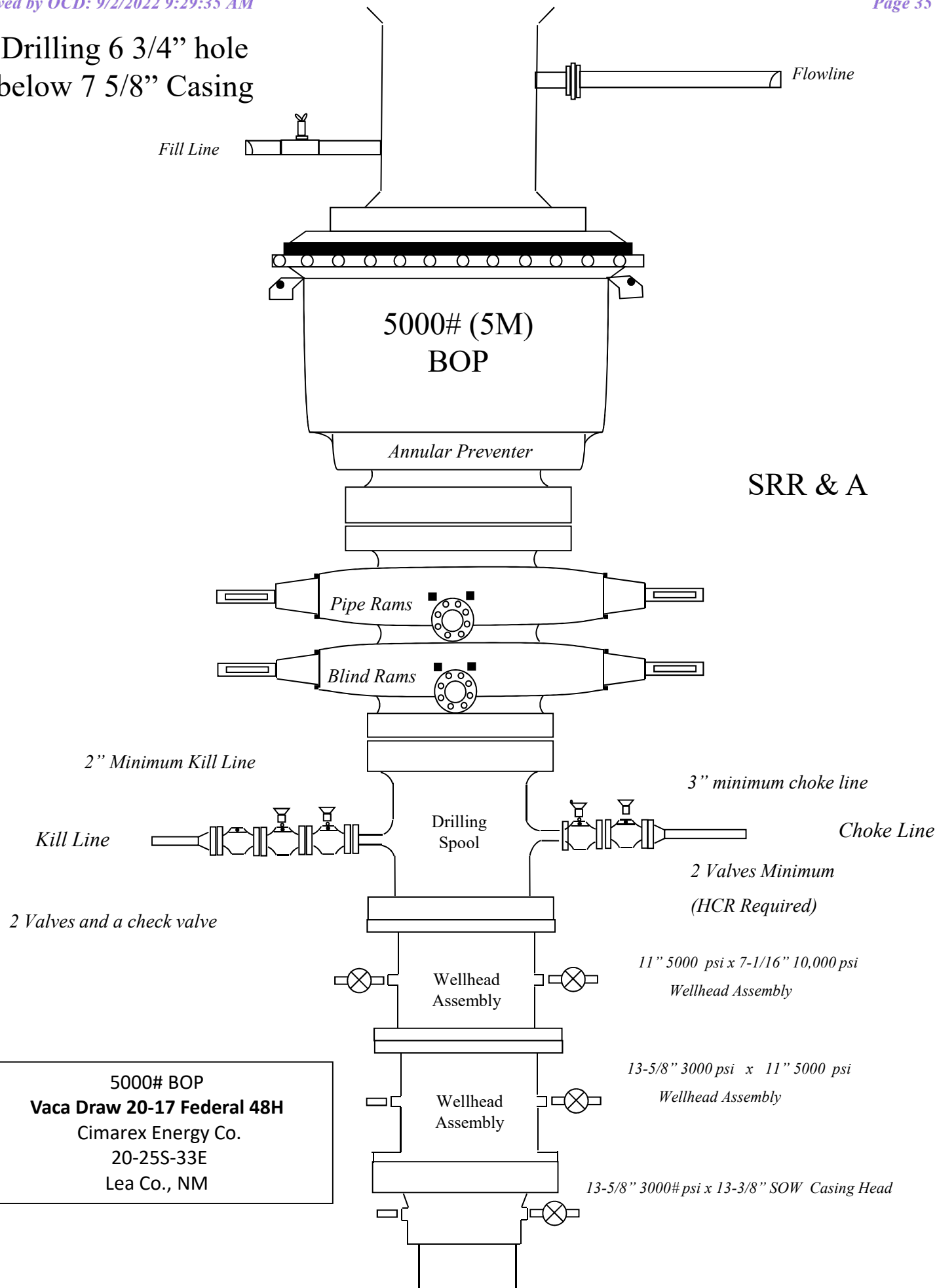
Wellhead
Assembly

Wellhead
Assembly

SRR & A

5000# BOP
Vaca Draw 20-17 Federal 48H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

Drilling 6 3/4" hole
below 7 5/8" Casing



Intent ☐ As Drilled ☐

API #		
Operator Name:	Property Name:	Well Number

Kick Off Point (KOP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
Latitude					Longitude			NAD	

First Take Point (FTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
Latitude					Longitude			NAD	

Last Take Point (LTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
Latitude					Longitude			NAD	

Is this well the defining well for the Horizontal Spacing Unit? ☐Is this well an infill well? ☐

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #		
Operator Name:	Property Name:	Well Number

Estimated Formation Tops

Formation:	Top:	Formation:	Top:

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 Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170

District IV

1220 S. St Francis Dr., Santa Fe, NM 87505
 Phone:(505) 476-3470 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 140413

CONDITIONS

Operator: CIMAREX ENERGY CO. 600 N. Marienfeld Street Midland, TX 79701	OGRID: 215099
	Action Number: 140413
	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	9/2/2022
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	9/2/2022
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	9/2/2022
pkautz	Cement is required to circulate on both surface and intermediate1 strings of casing	9/2/2022