

HOBBS OGD
AUG 22 2019
RECEIVED

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
1b. Type of Well: Oil Well Gas Well Other
1c. Type of Completion: Hydraulic Fracturing Single Zone Multiple Zone

5. Lease Serial No.
NMNM043562
6. If Indian, Allottee or Tribe Name
7. If Unit or CA Agreement, Name and No.
8. Lease Name and Well No.
CASCADE 29 FEDERAL
45H
(39981)

2. Name of Operator
CIMAREX ENERGY COMPANY (24099)

9. API-Well No.
30-025-46311
10. Field and Pool, or Exploratory (98180)
1ST BONESPRING SAND / WILDCAT; W

3a. Address
600 N. Marienfeld St., Suite 600 Midland TX 79701
3b. Phone No. (include area code)
(432)620-1936

4. Location of Well (Report location clearly and in accordance with any State requirements. *)
At surface SESW / 390 FSL / 2245 FWL / LAT 32.095388 / LONG -103.595477
At proposed prod. zone NENW / 100 FNL / 2430 FWL / LAT 32.108559 / LONG -103.595002

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 29 / T25S / R33E / 1PM

14. Distance in miles and direction from nearest town or post office*
23.9 miles
12. County or Parish
LEA
13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. 390 feet
(Also to nearest drig. unit line, if any)
16. No of acres in lease 640
17. Spacing Unit dedicated to this well 320

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 20 feet
19. Proposed Depth 12430 feet / 16993 feet
20. BLM/BIA Bond No. in file
FED: NMB001188

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3408 feet
22. Approximate date work will start*
02/07/2019
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.
- 2. A Drilling Plan.
- 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office)
- 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
- 5. Operator certification.
- 6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature (Electronic Submission) Name (Printed/Typed) Date
Hope Knauls / Ph: (918)295-1799 11/16/2018

Title
Regulatory Technician

Approved by (Signature) Name (Printed/Typed) Date
Cody Layton / Ph: (575)234-5959 08/15/2019

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.

GCP Rec 08/22/19

K 08/26/19

APPROVED WITH CONDITIONS
Approval Date: 08/15/2019

REQUIRING NR

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

Additional Operator Remarks

Location of Well

- 1. SHL: SESW / 390 FSL / 2245 FWL / TWSP: 25S / RANGE: 33E / SECTION: 29 / LAT: 32.095388 / LONG: -103.595477 (TVD: 0 feet, MD: 0 feet)
- PPP: SESW / 473 FSL / 2140 FWL / TWSP: 25S / RANGE: 33E / SECTION: 29 / LAT: 32.095752 / LONG: -103.598193 (TVD: 12189 feet, MD: 12210 feet)
- BHL: NENW / 100 FNL / 2430 FWL / TWSP: 25S / RANGE: 33E / SECTION: 29 / LAT: 32.108559 / LONG: -103.595002 (TVD: 12430 feet, MD: 16993 feet)

BLM Point of Contact

Name: Priscilla Perez
Title: Legal Instruments Examiner
Phone: 5752345934
Email: pperez@blm.gov

CONFIDENTIAL

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

CONFIDENTIAL



Application for Permit to Drill

APD Package Report

Date Printed: 08/16/2019 07:42 AM

APD ID: 10400034752	Well Status: AAPD
APD Received Date: 11/16/2018 08:00 AM	Well Name: CASCADE 29 FEDERAL
Operator: CIMAREX ENERGY COMPANY	Well Number: 45H

APD Package Report Contents

- Form 3160-3
- Operator Certification Report
- Application Report
- Application Attachments
 - Well Plat: 1 file(s)
- Drilling Plan Report
- Drilling Plan Attachments
 - Blowout Prevention Choke Diagram Attachment: 2 file(s)
 - Blowout Prevention BOP Diagram Attachment: 2 file(s)
 - Casing Design Assumptions and Worksheet(s): 4 file(s)
 - Hydrogen sulfide drilling operations plan: 1 file(s)
 - Proposed horizontal/directional/multi-lateral plan submission: 2 file(s)
 - Other Facets: 3 file(s)
 - Other Variances: 1 file(s)
- SUPO Report
- SUPO Attachments
 - New Road Map: 3 file(s)
 - Attach Well map: 1 file(s)
 - Production Facilities map: 4 file(s)
 - Water source and transportation map: 1 file(s)
 - Well Site Layout Diagram: 1 file(s)
 - Other SUPO Attachment: 10 file(s)
- PWD Report
- PWD Attachments
 - None
- Bond Report
- Bond Attachments

-- None

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Cimarex Energy Company
LEASE NO.:	NMNM043562
WELL NAME & NO.:	Cascade 29 Federal 45H
SURFACE HOLE FOOTAGE:	390'/S & 2245'/W
BOTTOM HOLE FOOTAGE:	100'/N & 2430'/W
LOCATION:	Section 29, T.25 S., R.33 E., NMPM
COUNTY:	Lea County, New Mexico

COA

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

A. HYDROGEN SULFIDE

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

B. CASING

1. The **10-3/4** inch surface casing shall be set at approximately **985** feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to

- include the lead cement)
- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Operator shall filled 1/3rd of casing with fluid while running intermediate casing to maintain collapse safety factor.

2. The minimum required fill of cement behind the 7-5/8 inch intermediate casing is:

- Cement to surface. If cement does not circulate see B.1.a, c-d above.

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

Variance is approved for annular spacing between 7 5/8" x 5 1/2" casing.

3. The minimum required fill of cement behind the 5-1/2 inch production casing is:

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification. **Additional cement maybe required. Excess calculates to 18%.**

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).

Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the intermediate casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **10,000 (10M) psi. Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi.)**

- a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
- b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
- c. Manufacturer representative shall install the test plug for the initial BOP test.
- d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
- e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

GENERAL REQUIREMENTS

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

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

Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)

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

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

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

which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

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

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
 - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

- a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time.
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

ZS 051719

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

**Cascade 29 Federal Com 15H
Cascade 29 Federal Com 16H
Cascade 29 Federal Com 17H
Cascade 29 Federal Com 29H
Cascade 29 Federal Com 30H
Cascade 29 Federal Com 31H
Cascade 29 Federal Com 43H
Cascade 29 Federal Com 44H
Cascade 29 Federal Com 45H**

**Lease Number NMNM 0001917
Cimarex Energy CO**

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
 - Lesser Prairie-Chicken Timing Stipulations
 - Ground-level Abandoned Well Marker
 - Hydrology

- Construction**
 - Notification
 - Topsoil
 - Closed Loop System

Federal Mineral Material Pits
Well Pads
Roads

- Road Section Diagram**
- Production (Post Drilling)**
 - Well Structures & Facilities
 - Pipelines
 - Electric Lines
- Interim Reclamation**
- Final Abandonment & Reclamation**

I. GENERAL PROVISIONS

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

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult

with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken:

Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period.

Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted.

Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

Hydrology

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

When crossing ephemeral drainages the pipeline(s) will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

Prior to pipeline installation/construction a leak detection plan will be developed. The method(s) could incorporate gauges to detect pressure drops, situating valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

Any water erosion that may occur due to the construction of overhead electric line and during the life of the power line will be quickly corrected and proper measures will be taken to prevent future erosion. A power pole should not be placed in drainages, playas, wetlands, riparian areas, or floodplains and must span across the features at a distance away that would not promote further erosion.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the .

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which

creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching

Ditching shall be required on both sides of the road.

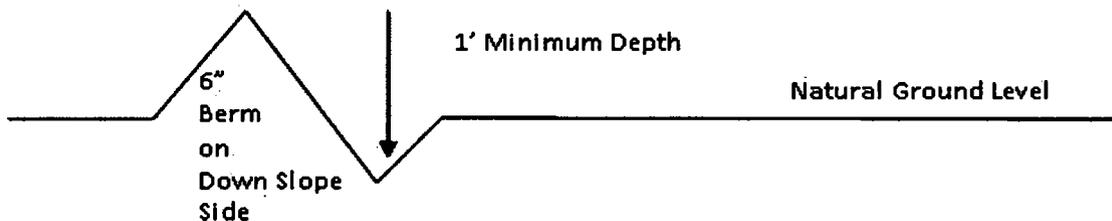
Turnouts

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, leadoff ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Cattle guards

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

Fence Requirement

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

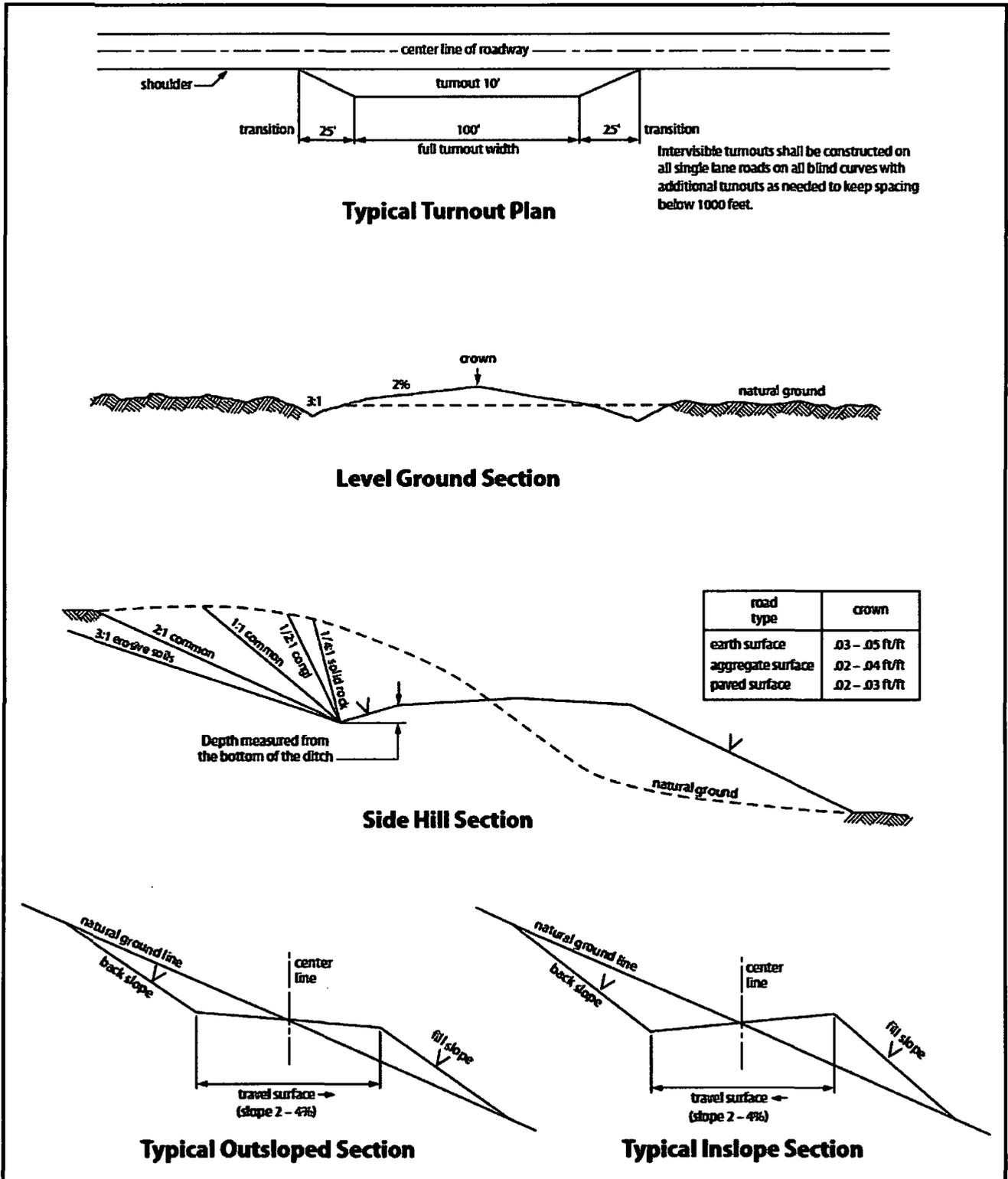


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

B. PIPELINES

BURIED PIPELINE STIPULATIONS

A copy of the application (Grant, APD, or Sundry Notice) and attachments, including conditions of approval, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 *et seq.* (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, *et seq.* or the Resource Conservation and Recovery Act, 42 U.S.C.6901, *et seq.*) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way.

This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil or other pollutant, wherever found, shall be the responsibility of holder, regardless of fault. Upon failure of holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve holder of any responsibility as provided herein.

5. All construction and maintenance activity will be confined to the authorized right-of-way.
6. The pipeline will be buried with a minimum cover of 36 inches between the top of the pipe and ground level.
7. The maximum allowable disturbance for construction in this right-of-way will be 30 feet:
 - Blading of vegetation within the right-of-way will be allowed: maximum width of blading operations will not exceed 30 feet. The trench is included in this area. (*Blading is defined as the complete removal of brush and ground vegetation.*)
 - Clearing of brush species within the right-of-way will be allowed: maximum width of clearing operations will not exceed 30 feet. The trench and bladed area are included in this area. (*Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface.*)
 - The remaining area of the right-of-way (if any) shall only be disturbed by compressing the vegetation. (*Compressing can be caused by vehicle tires, placement of equipment, etc.*)
8. The holder shall stockpile an adequate amount of topsoil where blading is allowed. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles from trench construction. The topsoil will be evenly distributed over the bladed area for the preparation of seeding.
9. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.
10. Vegetation, soil, and rocks left as a result of construction or maintenance activity will be randomly scattered on this right-of-way and will not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. The entire right-of-way shall be recontoured to match the surrounding landscape. The backfilled soil shall be compacted and a 6 inch berm will be left over the ditch line to allow for settling back to grade.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. The holder will reseed all disturbed areas. Seeding will be done according to the attached seeding requirements, using the following seed mix.

- | | |
|--|--|
| <input type="checkbox"/> seed mixture 1 | <input type="checkbox"/> seed mixture 3 |
| <input type="checkbox"/> seed mixture 2 | <input type="checkbox"/> seed mixture 4 |
| <input checked="" type="checkbox"/> seed mixture 2/LPC | <input type="checkbox"/> Aplomado Falcon Mixture |

13. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2.

14. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. All signs and information thereon will be posted in a permanent, conspicuous manner, and will be maintained in a legible condition for the life of the pipeline.

15. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder before maintenance begins. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway. As determined necessary during the life of the pipeline, the Authorized Officer may ask the holder to construct temporary deterrence structures.

16. Any cultural and/or paleontological resources (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

17. The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes associated roads, pipeline corridor and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

18. **Escape Ramps** - The operator will construct and maintain pipeline/utility trenches [that are not otherwise fenced, screened, or netted] to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in the trenches according to the following criteria:

- a. Any trench left open for eight (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, the contractor/operator shall inspect the trench for wildlife, remove all trapped wildlife, and release them at least 100 yards from the trench.
- b. For trenches left open for eight (8) hours or more, earthen escape ramps (built at no more than a 30 degree slope and spaced no more than 500 feet apart) shall be placed in the trench.

Temporary Water Line:

Subject to the terms and conditions which are shown below, is hereby approved:

- Surface pipelines 6.5 inch to 16 inch OD may be in place for no more than 180 days not including installation. In accordance with your request, this 180 day period is requested to begin 5/1//2018.
- Surface pipeline will be in operation for no more than 180 days; a maximum of seven (7) days authorized for installation of the lay flat poly line prior to operation.
- Surface pipelines larger than 6.5 inch to-16-inch OD may be in place for no more than 180 days from date of authorization; 5/1/2018, unless a SF-299 is submitted within 30 days of this decision expiring requesting a long term buried fresh water pipeline, and processing of the SF-299 is not yet complete at the end of 30 days, in which case the line(s) may be left in place until a decision is made on the SF-299.
- All lines will be removed when no longer in use.
- Width of authorized use is 15-feet.
- No blading and/or earthwork will be allowed in order to place the pipeline except burying the line under crossings.
- The pipeline will be buried under all intersecting routes, including BLM-designated trails and access roads into caliche pits, rancher watering stations, etc. All such buried crossings will be removed when the pipeline is removed, unless otherwise approved by the Authorized Officer. Pipelines larger than 6.5-inch OD may utilize other crossing methodologies (but any fill placed over pipeline must be brought in from off-site).
- Pipeline crossings of fences should be avoided where possible. If a crossing is necessary, contact fence owner [usually the grazing permittee] prior to installation, and install by threading pipeline under the lowest wire of the fence; pipeline should never cross on top of any fence wires.

- The pipeline shall stay within 10 feet maximum of existing disturbance (e.g. lease road, pipeline right-of-way etc.); placement should be within 5 feet whenever possible.
- Placement of pumps or other high-maintenance equipment shall be installed along maintained lease roads.
- Gas or diesel pumps, generators, or compressors shall be placed on visquen matting [or 20 mil plastic] and in a containment structure capable of containing all potentially released fuels. Containments must be protected against wildlife deaths in accordance with oilfield best management practices.
- Due to potential damage to natural resources, no work is allowed during inclement weather.
- Pipeline will be marked with your company's name and contact number, at beginning and ending points, at all public-road crossings, and at intervals not exceeding every 0.6 mile, unless otherwise approved by the Authorized Officer.
- Should unforeseen damage occur to resources, BLM will require reclamation of the impacted land.
- No water may be released into the environment without BLM consent.
- Placement of surface pipelines along or under public roadways may require permits from the road authority.
- This authorization is limited to lands under BLM jurisdiction. If your proposed pipeline crosses lands under private ownership or under other agency jurisdiction, you are responsible for obtaining all necessary permits and approvals from those parties.

C. ELECTRIC LINES

STANDARD STIPULATIONS FOR OVERHEAD ELECTRIC DISTRIBUTION LINES

A copy of the grant and attachments, including stipulations, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on

facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. There will be no clearing or blading of the right-of-way unless otherwise agreed to in writing by the Authorized Officer.

5. Power lines shall be constructed and designed in accordance to standards outlined in "Suggested Practices for Avian Protection on Power lines: The State of the Art in 2006" Edison Electric Institute, APLIC, and the California Energy Commission 2006 . The holder shall assume the burden and expense of proving that pole designs not shown in the above publication deter raptor perching, roosting, and nesting. Such proof shall be provided by a raptor expert approved by the Authorized Officer. The BLM reserves the right to require modification or additions to all powerline structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States.

Raptor deterrence will consist of but not limited to the following: triangle perch discouragers shall be placed on each side of the cross arms and a nonconductive perching deterrence shall be placed on all vertical poles that extend past the cross arms.

6. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

7. The BLM serial number assigned to this authorization shall be posted in a permanent, conspicuous manner where the power line crosses roads and at all serviced facilities. Numbers will be at least two inches high and will be affixed to the pole nearest the road crossing and at the facilities served.

8. Upon cancellation, relinquishment, or expiration of this grant, the holder shall comply with those abandonment procedures as prescribed by the Authorized Officer.

9. All surface structures (poles, lines, transformers, etc.) shall be removed within 180 days of abandonment, relinquishment, or termination of use of the serviced facility or facilities or within 180 days of abandonment, relinquishment, cancellation, or expiration of this grant, whichever comes first. This will not apply where the power line extends service to an active, adjoining facility or facilities.

10. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

11. Special Stipulations:

- For reclamation remove poles, lines, transformer, etc. and dispose of properly.
- Fill in any holes from the poles removed.

Timing Limitation Stipulation/Condition of Approval for Lesser Prairie-Chicken:

Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, geophysical exploration other than 3-D operations, and pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise.

This authorization is subject to your Certificate of Participation and/or Certificate of Inclusion under the New Mexico Candidate Conservation Agreement. Because it involves surface disturbing activities covered under your Certificate, your Habitat Conservation Fund Account with the Center of Excellence for Hazardous Materials Management (CEHMM) will be debited according to Exhibit B Part 2 of the Certificate of Participation.

VIII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

IX. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture for LPC Sand/Shinnery Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

<u>Species</u>	<u>lb/acre</u>
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed



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

Operator Certification Data Report

08/16/2019

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Hope Knauls

Signed on: 11/16/2018

Title: Regulatory Technician

Street Address: 202 S. Cheyenne Ave, Ste 1000

City: Tulsa

State: OK

Zip: 74103

Phone: (918)295-1799

Email address: hknauls@cimarex.com

Field Representative

Representative Name:

Street Address:

City:

State:

Zip:

Phone:

Email address:



APD ID: 10400034752

Submission Date: 11/16/2018

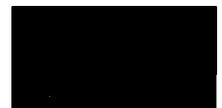
Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill



[Show Final Text](#)

Section 1 - General

APD ID: 10400034752

Tie to previous NOS? Y

Submission Date: 11/16/2018

BLM Office: CARLSBAD

User: Hope Knauls

Title: Regulatory Technician

Federal/Indian APD: FED

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

Lease number: NMNM043562

Lease Acres: 640

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? NO

APD Operator: CIMAREX ENERGY COMPANY

Operator letter of designation:

Operator Info

Operator Organization Name: CIMAREX ENERGY COMPANY

Operator Address: 600 N. Marienfeld St., Suite 600

Zip: 79701

Operator PO Box:

Operator City: Midland

State: TX

Operator Phone: (432)620-1936

Operator Internet Address: tstathem@cimarex.com

Section 2 - Well Information

Well in Master Development Plan? NO

Master Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: 1ST BONESPRING

Pool Name: WILDCAT;WOLFCAMP

SAND

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

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Describe other minerals:

Is the proposed well in a Helium production area? N Use Existing Well Pad? NO New surface disturbance?

Type of Well Pad: MULTIPLE WELL

Multiple Well Pad Name:

Number: E2W2 PAD

Well Class: HORIZONTAL

CASCADE 29 FEDERAL

Number of Legs: 1

Well Work Type: Drill

Well Type: CONVENTIONAL GAS WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 23.9 Miles

Distance to nearest well: 20 FT

Distance to lease line: 390 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: Cascade_29_Fed_45H_C102_20181115130038.pdf

Well work start Date: 02/07/2019

Duration: 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83

Vertical Datum: NAVD88

Survey number: 23782

Reference Datum:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	390	FSL	224 5	FWL	25S	33E	29	Aliquot SESW	32.09538 8	- 103.5954 77	LEA	NEW MEXI CO	FIRS T PRIN	F	NMNM 043562	340 8	0	0
KOP Leg #1	390	FSL	214 0	FWL	25S	33E	29	Aliquot SESW	32.09552 48	- 103.5981 934	LEA	NEW MEXI CO	FIRS T PRIN	F	NMNM 043562	- 851 2	119 25	119 20
PPP Leg #1	473	FSL	214 0	FWL	25S	33E	29	Aliquot SESW	32.09575 2	- 103.5981 93	LEA	NEW MEXI CO	FIRS T PRIN	F	NMNM 043562	- 878 1	122 10	121 89

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
EXIT Leg #1	100	FNL	243 0	FWL	25S	33E	29	Aliquot NENW 8	32.10855 8	- 103.5950 02	LEA	NEW MEXI CO	FIRS T PRIN	F	NMNM 043562	- 902 2	169 93	124 30
BHL Leg #1	100	FNL	243 0	FWL	25S	33E	29	Aliquot NENW 9	32.10855 9	- 103.5950 02	LEA	NEW MEXI CO	FIRS T PRIN	F	NMNM 043562	- 902 2	169 93	124 30



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

Drilling Plan Data Report

08/16/2019

APD ID: 10400034752

Submission Date: 11/16/2018

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

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
1	RUSTLER	3408	935	935		NATURAL GAS,OIL	N
2	TOP SALT	-1298	1298	1298		NATURAL GAS,OIL	N
3	BASE OF SALT	-4714	4714	4714		NATURAL GAS,OIL	N
4	LAMAR	-4909	4909	4909		NATURAL GAS,OIL	N
5	BELL CANYON	-4937	4937	4937		NATURAL GAS,OIL	N
6	BELL CANYON	-4937	4937	4937		NATURAL GAS,OIL	N
7	CHERRY CANYON	-5990	5990	5990		NATURAL GAS,OIL	N
8	BRUSHY CANYON	-7536	7536	7536		NATURAL GAS,OIL	N
9	BONE SPRING 1ST	-10011	10011	10011		NATURAL GAS,OIL	N
10	BONE SPRING 2ND	-10583	10583	10583		NATURAL GAS,OIL	N
11	BONE SPRING 3RD	-11722	11722	11722		NATURAL GAS,OIL	N
12	WOLFCAMP	-12189	12189	12189		NATURAL GAS,OIL	N
13	WOLFCAMP	-12430	12430	12430		NATURAL GAS,OIL	Y

Section 2 - Blowout Prevention

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Pressure Rating (PSI): 10M

Rating Depth: 12430

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. Cimarex requests a 5M annular variance for the 10M BOP system. See attached procedure.

Testing Procedure: BOP's will be tested by an independent service company. The ram preventers, choke manifold, and safety valves will be tested as follows: Prior to drilling out the surface casing, BOPE pressure tests will be 250 psi low and 5000 psi high. Prior to drilling out the intermediate casing, BOPE pressure tests will be 250 psi low and 10,000 psi high. The Annular Preventer will be tested to 250 psi low and 2500 psi high prior to drilling out the surface casing, 250 psi low and 5000 psi high prior to drilling out the production casing. The System may be upgraded to a higher pressure but still tested to the working pressures listed. If the system is upgraded all the components installed will be functional and tested

Choke Diagram Attachment:

Cascade_29_Fed_45H_10M_Choke_20181115152137.pdf

BOP Diagram Attachment:

Cascade_29_Fed_45H_10M_BOP_20181115152151.pdf

Pressure Rating (PSI): 5M

Rating Depth: 12381

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. Cimarex requests a 5M annular variance for the 10M BOP system. See attached procedure.

Testing Procedure: BOP's will be tested by an independent service company. The ram preventers, choke manifold, and safety valves will be tested as follows: Prior to drilling out the surface casing, BOPE pressure tests will be 250 psi low and 5000 psi high. Prior to drilling out the intermediate casing, BOPE pressure tests will be 250 psi low and 10,000 psi high. The Annular Preventer will be tested to 250 psi low and 2500 psi high prior to drilling out the surface casing, 250 psi low and 5000 psi high prior to drilling out the production casing. The System may be upgraded to a higher pressure but still tested to the working pressures listed. If the system is upgraded all the components installed will be functional and tested

Choke Diagram Attachment:

Cascade_29_Fed_45H_5M_Choke_20181115152324.pdf

BOP Diagram Attachment:

Cascade_29_Fed_45H_5M_BOP_20181115152340.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

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	PRODUCTI ON	6.75	5.5	NEW	API	N	0	11925	0	11925	0		11925	P-110	20	LT&C	1.43	1.63	BUOY	2.45	BUOY	2.45
3	INTERMED IATE	9.875	7.625	NEW	API	N	0	12550	0	12381	0		12550	L-80	29.7	BUTT	2.47	1.19	BUOY	1.81	BUOY	1.81
4	PRODUCTI ON	6.75	5.0	NEW	API	N	11925	16993	11925	12430			5068	HCP-110	18	BUTT	1.66	1.69	BUOY	63.81	BUOY	63.81

Casing Attachments

Casing ID: 1 String Type: SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cascade_29_Fed_45H_Casing_Assumptions_20181115152935.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Casing Attachments

Casing ID: 2 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cascade_29_Fed_45H_Casing_Assumptions_20181115153435.pdf

Casing ID: 3 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cascade_29_Fed_45H_Casing_Assumptions_20181115153212.pdf

Casing ID: 4 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cascade_29_Fed_45H_Casing_Assumptions_20181115153642.pdf

Section 4 - Cement

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
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
PRODUCTION	Lead		0	1192 5	359	1.3	14.2	466	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS

INTERMEDIATE	Lead	4850	0	1225 0	594	3.64	10.3	2159	50	Tuned Light	ICM
INTERMEDIATE	Tail		0	1225 0	207	1.3	14.2	268	25	50:50 (Poz:H)	Salt, Bentonite, Fluid loss, Dispersant, SMS
INTERMEDIATE	Lead	4850	0	1255 0	786	1.88	12.9	1476	50	35:65 (Poz:C)	Salt, Bentonite

PRODUCTION	Lead		1192 5	1699 3	359	1.3	14.2	466	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
------------	------	--	-----------	-----------	-----	-----	------	-----	----	---------------	--

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: CASCADE 29 FEDERAL

Well Number: 45H

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
985	1255 0	OTHER : Brine Diesel Emulsion	8.5	9							
0	985	SPUD MUD	8.3	8.8							
1225 0	1699 3	OIL-BASED MUD	12	12.5							

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: 8079

Anticipated Surface Pressure: 5344.4

Anticipated Bottom Hole Temperature(F): 192

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.

(Also if we are in the Capitan Reef area we should mention that it can have lost circulation)

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:

Cascade_29_Fed_45H_H2S_Plan_20181115155237.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Cascade_29_Fed_45H_Directional_Plan_20181115155602.pdf

Cascade_29_Fed_45H_AC_Report_20181115155613.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

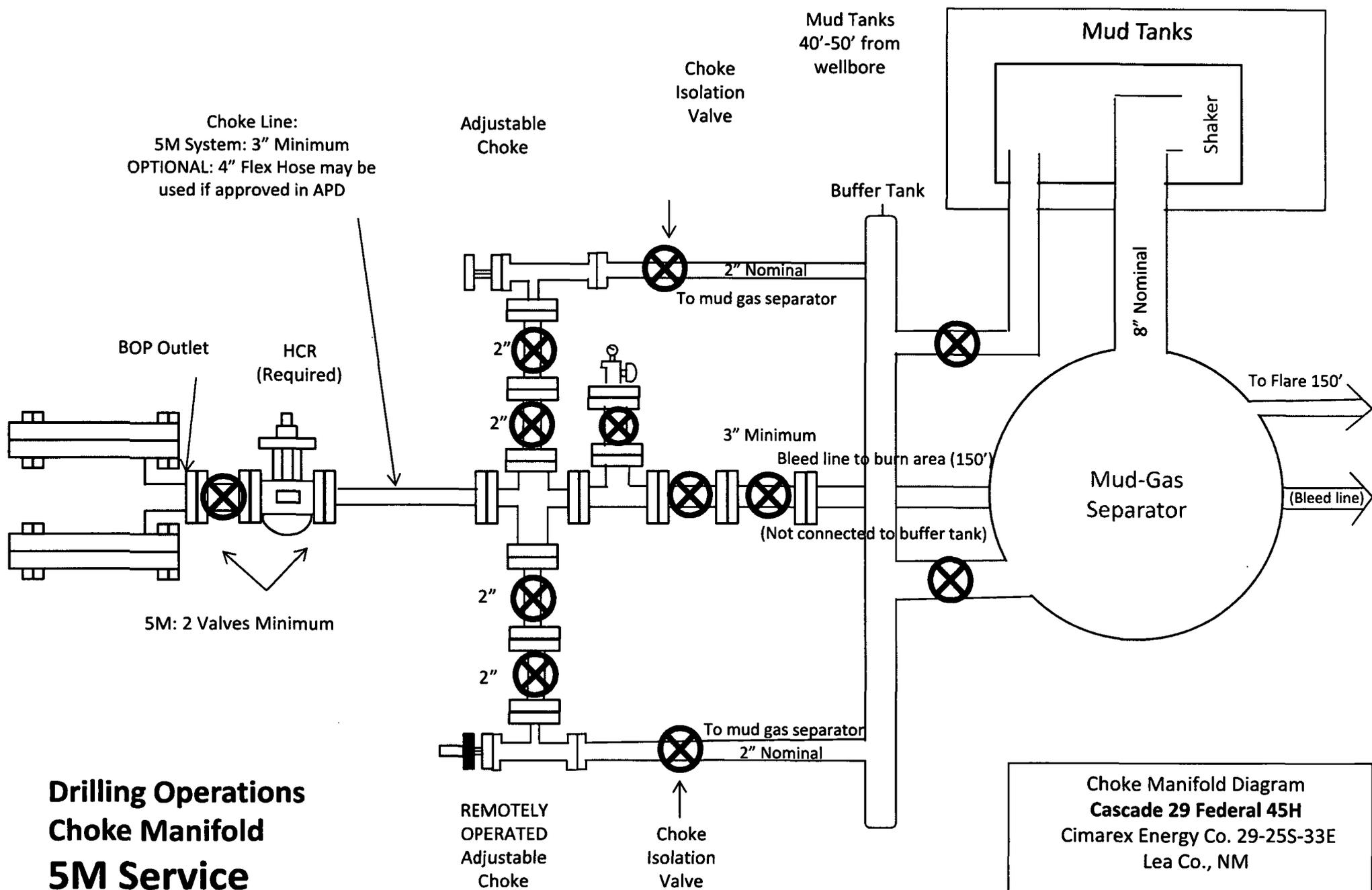
Cascade_29_Fed_45H_Drilling_Plan_20181115155706.pdf

Cascade_29_Fed_45H_Flex_Hose_20181115155729.pdf

Cascade_29_Fed_45H_Gas_Capture_Plan_20181115155730.pdf

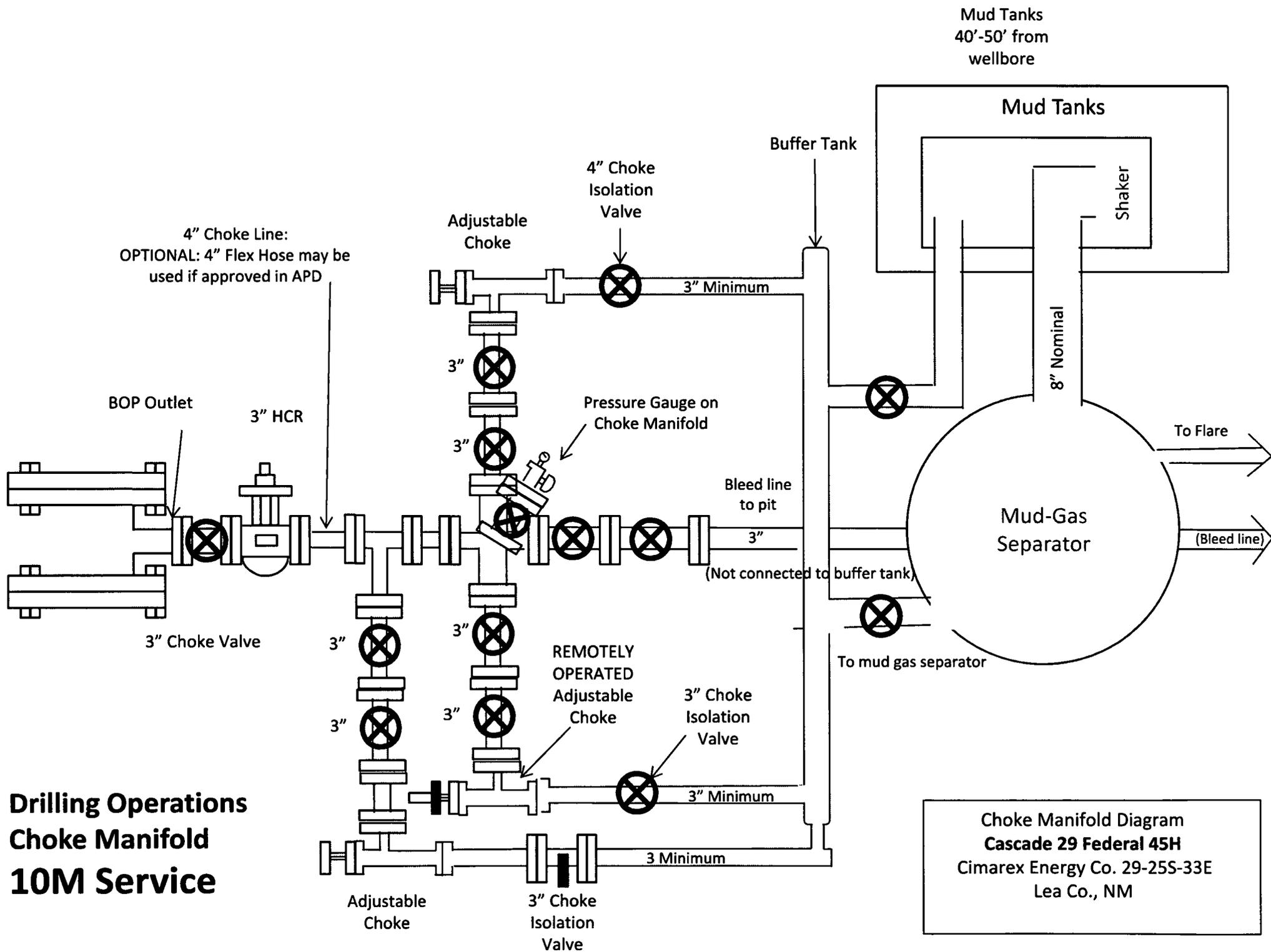
Other Variance attachment:

Cascade_29_Fed_45H_Well_Control_10M_w_5M_annular_Plan_20181115160130.pdf



**Drilling Operations
Choke Manifold
5M Service**

Choke Manifold Diagram
Cascade 29 Federal 45H
 Cimarex Energy Co. 29-25S-33E
 Lea Co., NM



4" Choke Line:
 OPTIONAL: 4" Flex Hose may be
 used if approved in APD

Mud Tanks
 40'-50' from
 wellbore

Mud Tanks

Shaker

Buffer Tank

4" Choke
 Isolation
 Valve

Adjustable
 Choke

3" Minimum

BOP Outlet

3" HCR

Pressure Gauge on
 Choke Manifold

3"

3"

Bleed line
 to pit

3"

(Not connected to buffer tank)

To Flare

Mud-Gas
 Separator

(Bleed line)

3" Choke Valve

3"

3"

To mud gas separator

REMOTELY
 OPERATED
 Adjustable
 Choke

3" Choke
 Isolation
 Valve

3" Minimum

Adjustable
 Choke

3" Choke
 Isolation
 Valve

3 Minimum

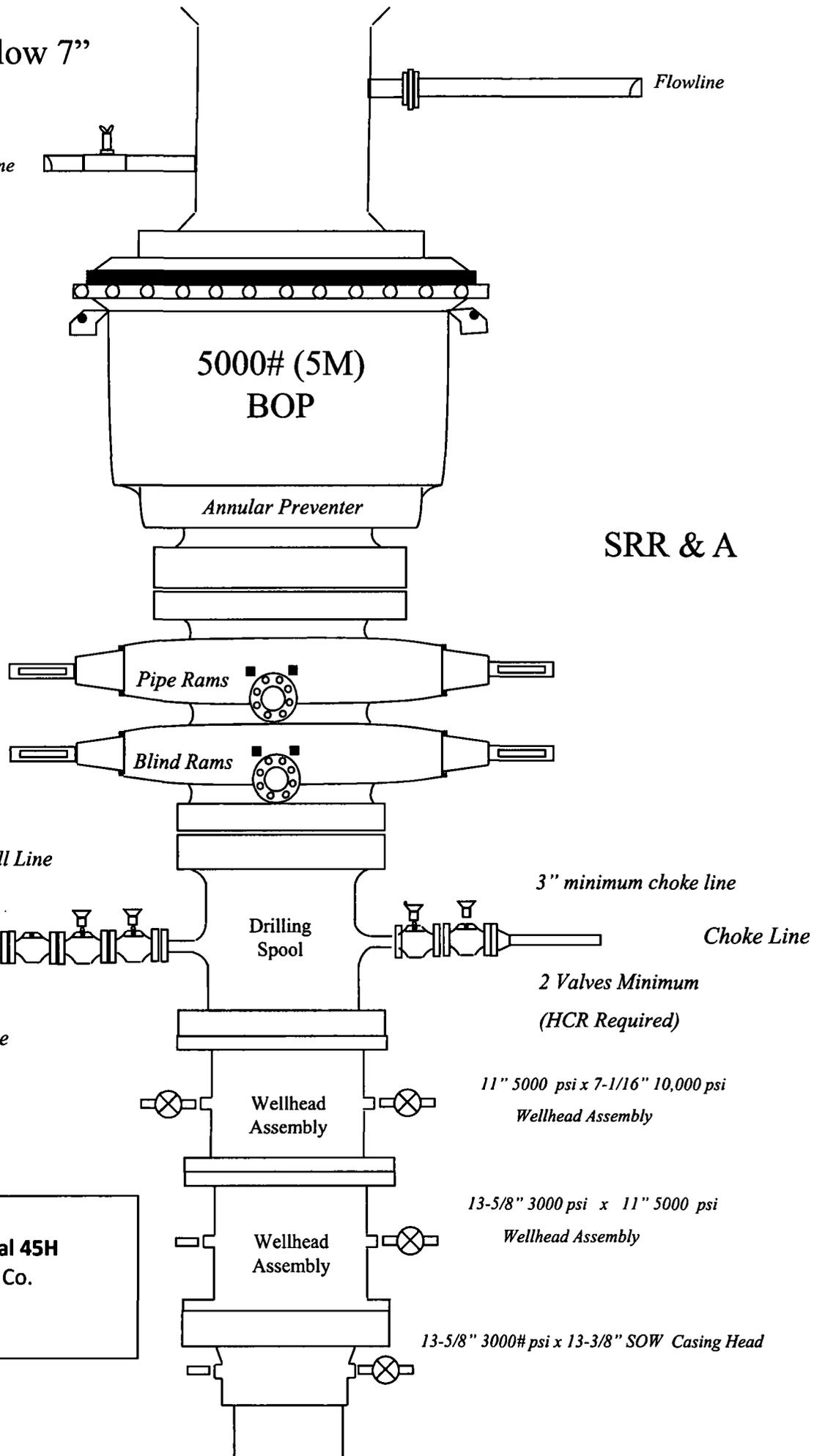
**Drilling Operations
 Choke Manifold
 10M Service**

**Choke Manifold Diagram
 Cascade 29 Federal 45H
 Cimarex Energy Co. 29-25S-33E
 Lea Co., NM**

Drilling 6" hole below 7" Casing

Fill Line

Flowline



5000# (5M)
BOP

Annular Preventer

SRR & A

Pipe Rams

Blind Rams

2" Minimum Kill Line

3" minimum choke line

Kill Line

Drilling Spool

Choke Line

2 Valves and a check valve

2 Valves Minimum
(HCR Required)

Wellhead Assembly

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

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# BOP
Cascade 29 Federal 45H
Cimarex Energy Co.
29-25S-33E
Lea Co., NM

Drilling 6-3/4" Hole
below 7-5/8" Casing

5M Annular Preventer

10M Double
Ram BOP

Pipe Rams

Blind Rams

2" Kill Line Valves (2)
with Check Valve

3" Manual Choke Valve
and 3" HCR Valve

2" Kill Line

3" Choke Line

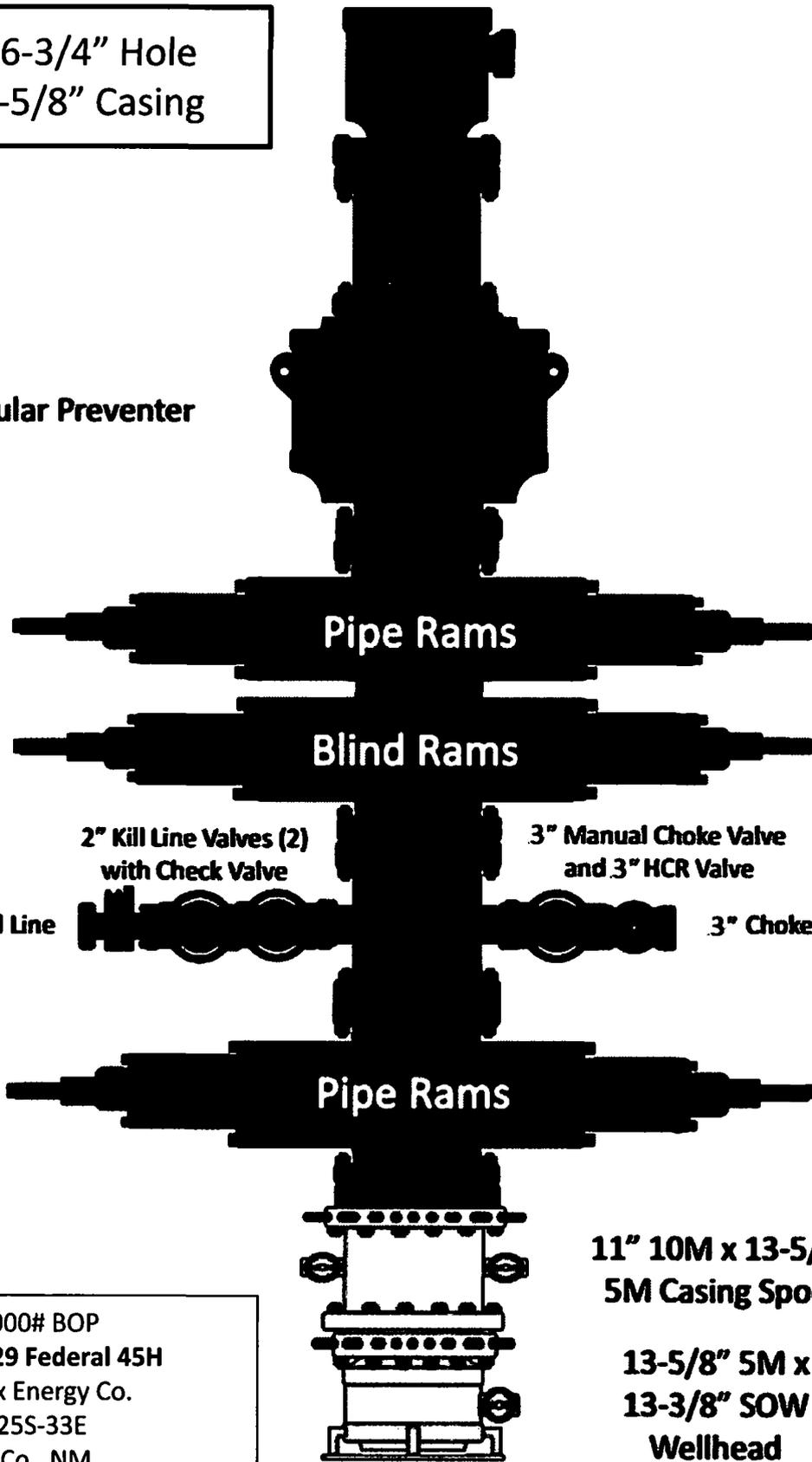
10M Single
Ram BOP

Pipe Rams

11" 10M x 13-5/8"
5M Casing Spool

13-5/8" 5M x
13-3/8" SOW
Wellhead

10,000# BOP
Cascade 29 Federal 45H
Cimarex Energy Co.
29-25S-33E
Lea Co., NM



Cascade 29 Federal 45H Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12550	12381	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
6 3/4	0	11925	11925	5-1/2"	20.00	P-110	LT&C	1.43	1.63	2.45
6 3/4	11925	16993	12430	5"	18.00	HCP-110	BT&C	1.66	1.69	63.81
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

Cascade 29 Federal 45H Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12550	12381	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
6 3/4	0	11925	11925	5-1/2"	20.00	P-110	LT&C	1.43	1.63	2.45
6 3/4	11925	16993	12430	5"	18.00	HCP-110	BT&C	1.66	1.69	63.81
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

Cascade 29 Federal 45H Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	1250	12381	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
6 3/4	0	11925	11925	5-1/2"	20.00	P-110	LT&C	1.43	1.63	2.45
6 3/4	11925	16993	12430	5"	18.00	HCP-110	BT&C	1.66	1.69	63.81
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

Cascade 29 Federal 45H Casing Assumptions

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	985	985	10-3/4"	40.50	J-55	BT&C	3.51	6.94	15.77
9 7/8	0	12550	12381	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
6 3/4	0	11925	11925	5-1/2"	20.00	P-110	LT&C	1.43	1.63	2.45
6 3/4	11925	16993	12430	5"	18.00	HCP-110	BT&C	1.66	1.69	63.81
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

Hydrogen Sulfide Drilling Operations Plan
Cascade 29 Federal 45H
Cimarex Energy Co.
UL: N, Sec. 29, 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
Cascade 29 Federal 45H
Cimarex Energy Co.
UL: N, Sec. 29, 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
Cascade 29 Federal 45H
 Cimarex Energy Co.
 UL: N, Sec. 29, 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 Selgrist	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	
Medical			
Flight for Life - 4000 24th St.; Lubbock, TX		806-743-9911	
Aerocare - R3, Box 49F; Lubbock, TX		806-747-8923	
Med Flight Air Amb - 2301 Yale Blvd S.E., #D3; Albuquerque, NM		505-842-4433	
SB Air Med Service - 2505 Clark Carr Loop S.E.; Albuquerque, NM		505-842-4949	
Other			
Boots & Coots IWC	800-256-9688	or	281-931-8884
Cudd Pressure Control	432-699-0139	or	432-563-3356
Halliburton	575-746-2757		
B.J. Services	575-746-3569		



Cimarex Cascade 29 Federal #45H Rev0 RM 09Oct18 Proposal Geodetic Report

(Non-Def Plan)



Report Date: October 10, 2018 - 03:11 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Cascade 29 Federal #45H / New Slot
Well: Cascade 29 Federal #45H
Borehole: Cascade 29 Federal #45H
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Cascade 29 Federal #45H Rev0 RM 09Oct18
Survey Date: October 10, 2018
Tort / AHD / DDI / ERD Ratio: 98.293 ° / 4937.523 ft / 5.822 / 0.397
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 5' 43.39873", W 103° 35' 43.71863"
Location Grid N/E Y/X: N 399220.850 ftUS, E 769829.690 ftUS
CRS Grid Convergence Angle: 0.3921 °
Grid Scale Factor: 0.99996889
Version / Patch: 2.10.740.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.635 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3434.200 ft above MSL
Seabed / Ground Elevation: 3408.200 ft above MSL
Magnetic Declination: 6.723 °
Total Gravity Field Strength: 998.4290mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47822.393 nT
Magnetic Dip Angle: 59.738 °
Declination Date: October 10, 2018
Magnetic Declination Model: HDGM 2018
North Reference: Grid North
Grid Convergence Used: 0.3921 °
Total Corr Mag North->Grid North: 6.3305 °
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 [390' FSL, 2285' FWL]	0.00	0.00	90.00	0.00	0.00	0.00	0.00	N/A	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	100.00	0.00	90.00	100.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	200.00	0.00	90.00	200.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	300.00	0.00	90.00	300.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	400.00	0.00	90.00	400.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	500.00	0.00	90.00	500.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	600.00	0.00	90.00	600.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	700.00	0.00	90.00	700.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	800.00	0.00	90.00	800.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	900.00	0.00	90.00	900.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
Rustler	935.00	0.00	90.00	935.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1000.00	0.00	90.00	1000.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1100.00	0.00	90.00	1100.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1200.00	0.00	90.00	1200.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
Top of Salt	1298.00	0.00	90.00	1298.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1300.00	0.00	90.00	1300.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1400.00	0.00	90.00	1400.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
Nudge 2"/100' DLS	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00	399220.85	769829.69	N 32 5 43.40 W 103 35 43.72	
	1600.00	2.00	90.00	1599.98	-0.01	0.00	1.75	2.00	399220.85	769831.44	N 32 5 43.40 W 103 35 43.70	
	1700.00	4.00	90.00	1699.84	-0.04	0.00	6.98	2.00	399220.85	769836.67	N 32 5 43.40 W 103 35 43.64	
Hold Nudge	1707.32	4.15	90.00	1707.13	-0.05	0.00	7.50	2.00	399220.85	769837.19	N 32 5 43.40 W 103 35 43.63	
	1800.00	4.15	90.00	1799.58	-0.09	0.00	14.20	0.00	399220.85	769843.89	N 32 5 43.40 W 103 35 43.55	
	1900.00	4.15	90.00	1899.31	-0.14	0.00	21.43	0.00	399220.85	769851.12	N 32 5 43.40 W 103 35 43.47	
	2000.00	4.15	90.00	1999.05	-0.18	0.00	28.66	0.00	399220.85	769858.35	N 32 5 43.40 W 103 35 43.39	
	2100.00	4.15	90.00	2098.79	-0.23	0.00	35.89	0.00	399220.85	769865.58	N 32 5 43.40 W 103 35 43.30	
	2200.00	4.15	90.00	2198.53	-0.27	0.00	43.12	0.00	399220.85	769872.81	N 32 5 43.40 W 103 35 43.22	
	2300.00	4.15	90.00	2298.27	-0.32	0.00	50.35	0.00	399220.85	769880.04	N 32 5 43.40 W 103 35 43.13	

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 ° ' ")
	2400.00	4.15	90.00	2398.01	-0.37	0.00	57.58	0.00	399220.85	769887.27	N 32	5 43.39 W 103 35 43.05
	2500.00	4.15	90.00	2497.74	-0.41	0.00	64.81	0.00	399220.85	769894.50	N 32	5 43.39 W 103 35 42.97
	2600.00	4.15	90.00	2597.48	-0.46	0.00	72.04	0.00	399220.85	769901.73	N 32	5 43.39 W 103 35 42.88
	2700.00	4.15	90.00	2697.22	-0.50	0.00	79.27	0.00	399220.85	769908.96	N 32	5 43.39 W 103 35 42.80
	2800.00	4.15	90.00	2796.96	-0.55	0.00	86.50	0.00	399220.85	769916.19	N 32	5 43.39 W 103 35 42.71
	2900.00	4.15	90.00	2896.70	-0.60	0.00	93.73	0.00	399220.85	769923.42	N 32	5 43.39 W 103 35 42.63
	3000.00	4.15	90.00	2996.44	-0.64	0.00	100.96	0.00	399220.85	769930.65	N 32	5 43.39 W 103 35 42.55
	3100.00	4.15	90.00	3096.17	-0.69	0.00	108.19	0.00	399220.85	769937.88	N 32	5 43.39 W 103 35 42.46
	3200.00	4.15	90.00	3195.91	-0.74	0.00	115.42	0.00	399220.85	769945.11	N 32	5 43.39 W 103 35 42.38
	3300.00	4.15	90.00	3295.65	-0.78	0.00	122.65	0.00	399220.85	769952.34	N 32	5 43.39 W 103 35 42.29
	3400.00	4.15	90.00	3395.39	-0.83	0.00	129.89	0.00	399220.85	769959.57	N 32	5 43.39 W 103 35 42.21
	3500.00	4.15	90.00	3495.13	-0.87	0.00	137.12	0.00	399220.85	769966.80	N 32	5 43.39 W 103 35 42.12
Drop to Vertical 2°/100' DLS	3504.89	4.15	90.00	3500.00	-0.88	0.00	137.47	0.00	399220.85	769967.15	N 32	5 43.39 W 103 35 42.12
	3600.00	2.24	90.00	3594.96	-0.91	0.00	142.77	2.00	399220.85	769972.46	N 32	5 43.39 W 103 35 42.06
	3700.00	0.24	90.00	3694.93	-0.92	0.00	144.94	2.00	399220.85	769974.63	N 32	5 43.39 W 103 35 42.03
Hold Vertical	3712.20	0.00	90.00	3707.13	-0.92	0.00	144.97	2.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	3800.00	0.00	90.00	3794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	3900.00	0.00	90.00	3894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4000.00	0.00	90.00	3994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4100.00	0.00	90.00	4094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4200.00	0.00	90.00	4194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4300.00	0.00	90.00	4294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4400.00	0.00	90.00	4394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4500.00	0.00	90.00	4494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4600.00	0.00	90.00	4594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4700.00	0.00	90.00	4694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
Base of Salt	4719.07	0.00	90.00	4714.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4800.00	0.00	90.00	4794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	4900.00	0.00	90.00	4894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
Lamar	4914.07	0.00	90.00	4909.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
Bell Canyon	4942.07	0.00	90.00	4937.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5000.00	0.00	90.00	4994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5100.00	0.00	90.00	5094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5200.00	0.00	90.00	5194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5300.00	0.00	90.00	5294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5400.00	0.00	90.00	5394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5500.00	0.00	90.00	5494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5600.00	0.00	90.00	5594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5700.00	0.00	90.00	5694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5800.00	0.00	90.00	5794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	5900.00	0.00	90.00	5894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
Cherry Canyon	5995.07	0.00	90.00	5990.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6000.00	0.00	90.00	5994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6100.00	0.00	90.00	6094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6200.00	0.00	90.00	6194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6300.00	0.00	90.00	6294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6400.00	0.00	90.00	6394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6500.00	0.00	90.00	6494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6600.00	0.00	90.00	6594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6700.00	0.00	90.00	6694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6800.00	0.00	90.00	6794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	6900.00	0.00	90.00	6894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7000.00	0.00	90.00	6994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7100.00	0.00	90.00	7094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7200.00	0.00	90.00	7194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7300.00	0.00	90.00	7294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7400.00	0.00	90.00	7394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03
	7500.00	0.00	90.00	7494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32	5 43.39 W 103 35 42.03

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Eastng (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	
Brushy Canyon	7541.07	0.00	90.00	7536.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	7600.00	0.00	90.00	7594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	7700.00	0.00	90.00	7694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	7800.00	0.00	90.00	7794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	7900.00	0.00	90.00	7894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8000.00	0.00	90.00	7994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8100.00	0.00	90.00	8094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8200.00	0.00	90.00	8194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8300.00	0.00	90.00	8294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8400.00	0.00	90.00	8394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8500.00	0.00	90.00	8494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8600.00	0.00	90.00	8594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8700.00	0.00	90.00	8694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8800.00	0.00	90.00	8794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	8900.00	0.00	90.00	8894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9000.00	0.00	90.00	8994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	Bone Spring Leonard Shale	9037.07	0.00	90.00	9032.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
9092.07		0.00	90.00	9087.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
9100.00		0.00	90.00	9094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
Avalon Shale	9200.00	0.00	90.00	9194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9300.00	0.00	90.00	9294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9317.07	0.00	90.00	9312.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9400.00	0.00	90.00	9394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9500.00	0.00	90.00	9494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9600.00	0.00	90.00	9594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9700.00	0.00	90.00	9694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	9800.00	0.00	90.00	9794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
1st Bone Spring Sand	9900.00	0.00	90.00	9894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	10000.00	0.00	90.00	9994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	10016.07	0.00	90.00	10011.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	10100.00	0.00	90.00	10094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	10200.00	0.00	90.00	10194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	2nd Bone Spring Carb	10228.07	0.00	90.00	10223.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
		10300.00	0.00	90.00	10294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
		10400.00	0.00	90.00	10394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
	2nd Bone Spring Sand	10500.00	0.00	90.00	10494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
		10588.07	0.00	90.00	10583.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
10600.00		0.00	90.00	10594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
10700.00		0.00	90.00	10694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
10800.00		0.00	90.00	10794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
10900.00		0.00	90.00	10894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
11000.00		0.00	90.00	10994.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
3rd Bone Spring Carb	11076.07	0.00	90.00	11071.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11100.00	0.00	90.00	11094.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11200.00	0.00	90.00	11194.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11300.00	0.00	90.00	11294.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11400.00	0.00	90.00	11394.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11500.00	0.00	90.00	11494.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11600.00	0.00	90.00	11594.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11700.00	0.00	90.00	11694.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
3rd Bone Spring Sand	11727.07	0.00	90.00	11722.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11800.00	0.00	90.00	11794.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	
	11900.00	0.00	90.00	11894.93	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03	

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
KOP - Build	11925.06	0.00	90.00	11920.00	-0.92	0.00	144.97	0.00	399220.85	769974.65	N 32 5 43.39 W	103 35 42.03
12°/100' DLS	12000.00	8.99	359.64	11994.63	4.94	5.87	144.93	12.00	399226.72	769974.61	N 32 5 43.45 W	103 35 42.03
	12100.00	20.99	359.64	12091.05	30.77	31.69	144.76	12.00	399252.54	769974.45	N 32 5 43.70 W	103 35 42.03
	12200.00	32.99	359.64	12179.99	76.07	76.99	144.48	12.00	399297.84	769974.16	N 32 5 44.15 W	103 35 42.03
Wolfcamp	12210.82	34.29	359.64	12189.00	82.07	82.99	144.44	12.00	399303.84	769974.12	N 32 5 44.21 W	103 35 42.03
	12300.00	44.99	359.64	12257.57	138.88	139.80	144.08	12.00	399360.64	769973.76	N 32 5 44.77 W	103 35 42.03
Wolfcamp Y Sand	12367.87	53.14	359.64	12302.00	190.10	191.02	143.75	12.00	399411.87	769973.43	N 32 5 45.28 W	103 35 42.03
	12400.00	56.99	359.64	12320.40	216.44	217.36	143.58	12.00	399438.20	769973.27	N 32 5 45.54 W	103 35 42.03
	12500.00	68.99	359.64	12365.73	305.37	306.29	143.02	12.00	399527.13	769972.70	N 32 5 46.42 W	103 35 42.03
Build 4°/100' DLS	12550.06	75.00	359.64	12381.19	352.96	353.88	142.71	12.00	399574.72	769972.40	N 32 5 46.89 W	103 35 42.03
	12600.00	77.00	359.63	12393.27	401.41	402.33	142.40	4.00	399623.17	769972.09	N 32 5 47.37 W	103 35 42.03
	12700.00	81.00	359.63	12412.35	499.56	500.47	141.78	4.00	399721.30	769971.46	N 32 5 48.34 W	103 35 42.03
	12800.00	85.00	359.63	12424.54	598.79	599.70	141.15	4.00	399820.53	769970.83	N 32 5 49.32 W	103 35 42.03
	12900.00	89.00	359.63	12429.78	698.63	699.54	140.51	4.00	399920.37	769970.20	N 32 5 50.31 W	103 35 42.03
Landing Point	12925.06	90.00	359.63	12430.00	723.70	724.60	140.35	4.00	399945.43	769970.04	N 32 5 50.56 W	103 35 42.03
	13000.00	90.00	359.63	12430.00	798.63	799.54	139.87	0.00	400020.36	769969.56	N 32 5 51.30 W	103 35 42.03
	13100.00	90.00	359.63	12430.00	898.63	899.54	139.24	0.00	400120.36	769968.92	N 32 5 52.29 W	103 35 42.03
	13200.00	90.00	359.63	12430.00	998.63	999.54	138.60	0.00	400220.35	769968.28	N 32 5 53.28 W	103 35 42.03
	13300.00	90.00	359.63	12430.00	1098.63	1099.53	137.96	0.00	400320.35	769967.65	N 32 5 54.27 W	103 35 42.03
	13400.00	90.00	359.63	12430.00	1198.63	1199.53	137.32	0.00	400420.34	769967.01	N 32 5 55.26 W	103 35 42.03
	13500.00	90.00	359.63	12430.00	1298.63	1299.53	136.69	0.00	400520.34	769966.37	N 32 5 56.25 W	103 35 42.03
	13600.00	90.00	359.63	12430.00	1398.63	1399.53	136.05	0.00	400620.33	769965.74	N 32 5 57.24 W	103 35 42.03
	13700.00	90.00	359.63	12430.00	1498.63	1499.53	135.41	0.00	400720.33	769965.10	N 32 5 58.23 W	103 35 42.03
	13800.00	90.00	359.63	12430.00	1598.63	1599.52	134.78	0.00	400820.32	769964.46	N 32 5 59.22 W	103 35 42.02
	13900.00	90.00	359.63	12430.00	1698.63	1699.52	134.14	0.00	400920.31	769963.82	N 32 6 0.21 W	103 35 42.02
	14000.00	90.00	359.63	12430.00	1798.63	1799.52	133.50	0.00	401020.31	769963.19	N 32 6 1.20 W	103 35 42.02
	14100.00	90.00	359.63	12430.00	1898.63	1899.52	132.86	0.00	401120.30	769962.55	N 32 6 2.19 W	103 35 42.02
	14200.00	90.00	359.63	12430.00	1998.63	1999.51	132.23	0.00	401220.30	769961.91	N 32 6 3.18 W	103 35 42.02
	14300.00	90.00	359.63	12430.00	2098.63	2099.51	131.59	0.00	401320.29	769961.28	N 32 6 4.16 W	103 35 42.02
	14400.00	90.00	359.63	12430.00	2198.63	2199.51	130.95	0.00	401420.29	769960.64	N 32 6 5.15 W	103 35 42.02
	14500.00	90.00	359.63	12430.00	2298.63	2299.51	130.32	0.00	401520.28	769960.00	N 32 6 6.14 W	103 35 42.02
	14600.00	90.00	359.63	12430.00	2398.63	2399.51	129.68	0.00	401620.28	769959.37	N 32 6 7.13 W	103 35 42.02
	14700.00	90.00	359.63	12430.00	2498.63	2499.50	129.04	0.00	401720.27	769958.73	N 32 6 8.12 W	103 35 42.02
	14800.00	90.00	359.63	12430.00	2598.63	2599.50	128.41	0.00	401820.27	769958.09	N 32 6 9.11 W	103 35 42.02
	14900.00	90.00	359.63	12430.00	2698.63	2699.50	127.77	0.00	401920.26	769957.45	N 32 6 10.10 W	103 35 42.02
	15000.00	90.00	359.63	12430.00	2798.63	2799.50	127.13	0.00	402020.26	769956.82	N 32 6 11.09 W	103 35 42.02
	15100.00	90.00	359.63	12430.00	2898.63	2899.50	126.49	0.00	402120.25	769956.18	N 32 6 12.08 W	103 35 42.02
	15200.00	90.00	359.63	12430.00	2998.63	2999.49	125.86	0.00	402220.25	769955.54	N 32 6 13.07 W	103 35 42.02
	15300.00	90.00	359.63	12430.00	3098.63	3099.49	125.22	0.00	402320.24	769954.91	N 32 6 14.06 W	103 35 42.02
	15400.00	90.00	359.63	12430.00	3198.63	3199.49	124.58	0.00	402420.23	769954.27	N 32 6 15.05 W	103 35 42.02
	15500.00	90.00	359.63	12430.00	3298.63	3299.49	123.95	0.00	402520.23	769953.63	N 32 6 16.04 W	103 35 42.02
	15600.00	90.00	359.63	12430.00	3398.63	3399.49	123.31	0.00	402620.22	769952.99	N 32 6 17.03 W	103 35 42.01
	15700.00	90.00	359.63	12430.00	3498.63	3499.48	122.67	0.00	402720.22	769952.36	N 32 6 18.02 W	103 35 42.01
	15800.00	90.00	359.63	12430.00	3598.63	3599.48	122.03	0.00	402820.21	769951.72	N 32 6 19.01 W	103 35 42.01
	15900.00	90.00	359.63	12430.00	3698.63	3699.48	121.40	0.00	402920.21	769951.08	N 32 6 20.00 W	103 35 42.01
	16000.00	90.00	359.63	12430.00	3798.63	3799.48	120.76	0.00	403020.20	769950.45	N 32 6 20.99 W	103 35 42.01
	16100.00	90.00	359.63	12430.00	3898.63	3899.48	120.12	0.00	403120.20	769949.81	N 32 6 21.98 W	103 35 42.01
	16200.00	90.00	359.63	12430.00	3998.63	3999.47	119.49	0.00	403220.19	769949.17	N 32 6 22.97 W	103 35 42.01
	16300.00	90.00	359.63	12430.00	4098.63	4099.47	118.85	0.00	403320.19	769948.53	N 32 6 23.96 W	103 35 42.01
	16400.00	90.00	359.63	12430.00	4198.63	4199.47	118.21	0.00	403420.18	769947.90	N 32 6 24.94 W	103 35 42.01
	16500.00	90.00	359.63	12430.00	4298.63	4299.47	117.57	0.00	403520.18	769947.26	N 32 6 25.93 W	103 35 42.01
	16600.00	90.00	359.63	12430.00	4398.63	4399.47	116.94	0.00	403620.17	769946.62	N 32 6 26.92 W	103 35 42.01
	16700.00	90.00	359.63	12430.00	4498.63	4499.46	116.30	0.00	403720.17	769945.99	N 32 6 27.91 W	103 35 42.01
	16800.00	90.00	359.63	12430.00	4598.63	4599.46	115.66	0.00	403820.16	769945.35	N 32 6 28.90 W	103 35 42.01
	16900.00	90.00	359.63	12430.00	4698.63	4699.46	115.03	0.00	403920.15	769944.71	N 32 6 29.89 W	103 35 42.01

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 ° ' ")
Cimarex Cascade 29 Federal #45H - PBHL [100' FNL, 2430' FWL]	16993.00	90.00	359.63	12430.00	4791.63	4792.46	114.43	0.00	404013.15	769944.12	N 32 6 30.81 W	103 35 42.01

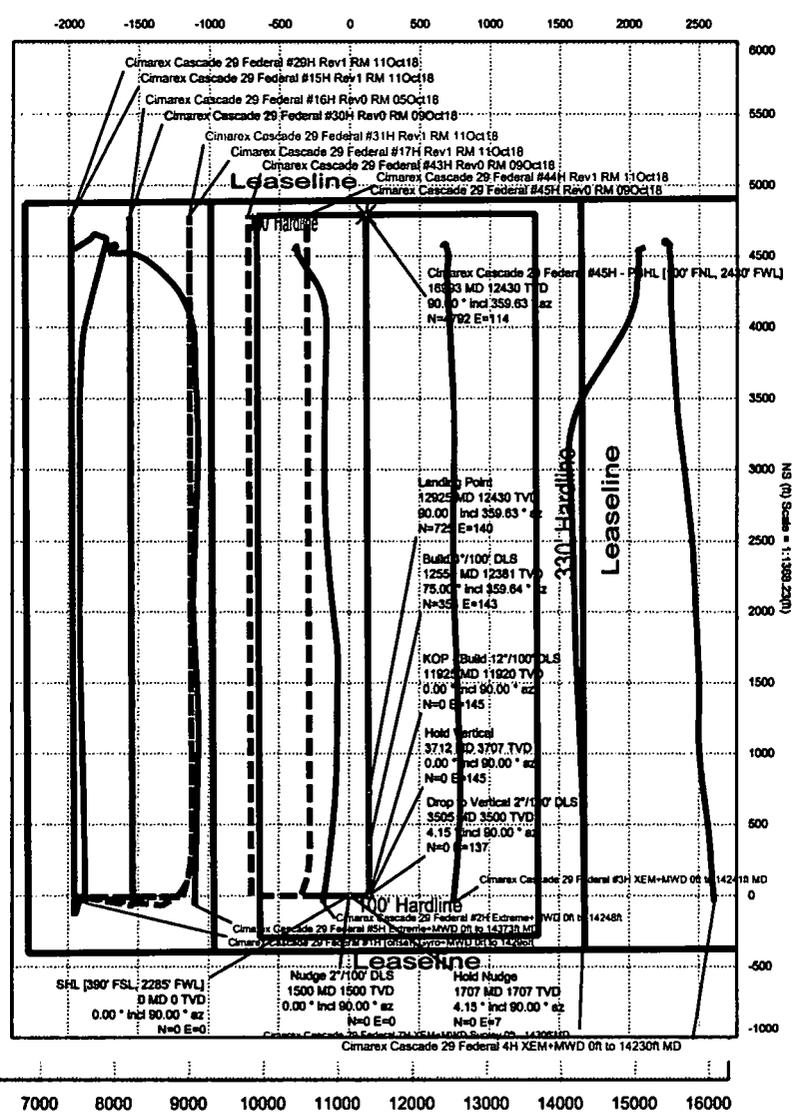
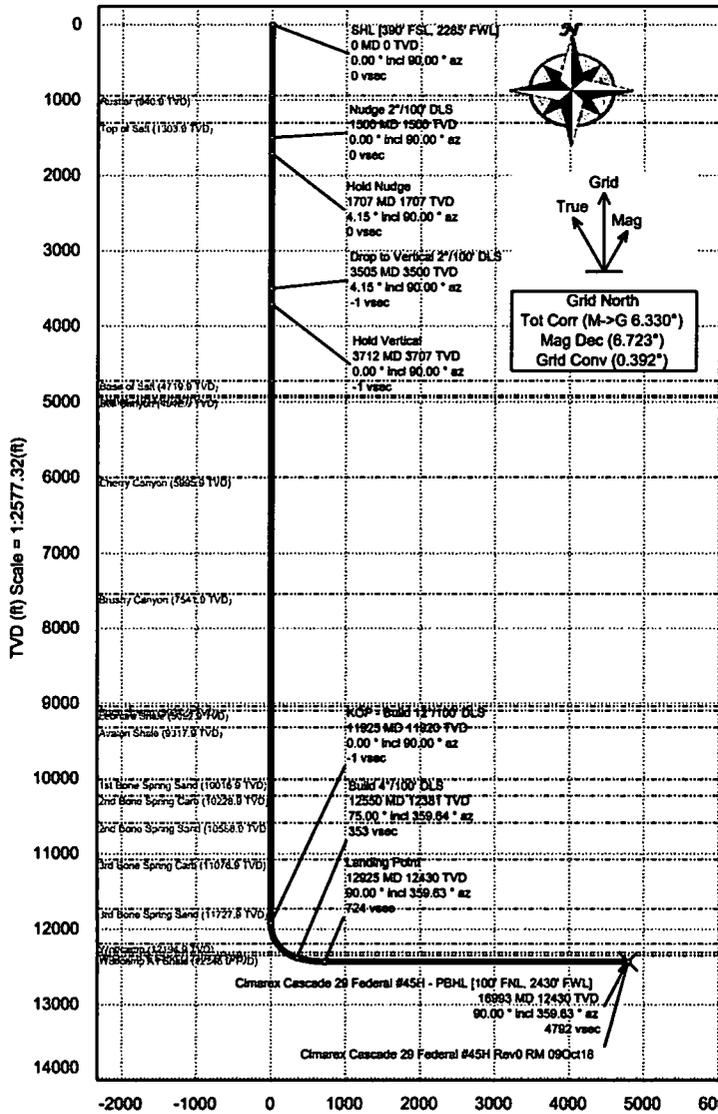
Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (In)	Casing Diameter (In)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	26.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS-Depth Only	Cascade 29 Federal #45H / Cimarex Cascade 29 Federal #45H Rev0 RM 09Oct18
	1	26.000	16993.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Cascade 29 Federal #45H / Cimarex Cascade 29 Federal

Borehole: Cascade 29 Federal #45H	Well: Cascade 29 Federal #45H	Field: NM Lea County (NAD 83)	Structure: Cinarex Cascade 29 Federal #45H
---	---	---	--

Gravity & Magnetic Parameters		Surface Location NAD83 New Mexico State Plane, Eastern Zone, US Feet		Miscellaneous	
Model: HDGM 2018	Dip: 88.733°	Date: 10-Oct-2018	Lat: N 32 8 43.40	Northing: 298220.68103	Grid Conv: 0.3921"
MagDec: 8.723°	FB: 47822.353nT	Gravity FS: 998.423mgal (8.00683 Based)	Lon: W 103 35 43.72	Easting: 765629.690103	Scale Fact: 0.69996829
				Shot: New Shot	TVD Ref: RIG(3434.28 above MSL)
				Plan: Cinarex Cascade 29 Federal #45H Rev0 RM 09Oct18	



Vertical Section (ft) Azim = 359.64° Scale = 1:2577.32(ft) Origin = 0N-S, 0E-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [390' FSL, 2285' FWL]	0.00	0.00	90.00	0.00	0.00	0.00	0.00	
Nudge 2'/100' DLS	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00
Hold Nudge	1707.32	4.15	90.00	1707.13	-0.05	0.00	7.50	2.00
Drop to Vertical 2'/100' DLS	3504.89	4.15	90.00	3500.00	-0.88	0.00	137.47	0.00
Hold Vertical	3712.20	0.00	90.00	3707.13	-0.92	0.00	144.97	2.00
KOP - Build 12'/100' DLS	11925.06	0.00	90.00	11920.00	-0.92	0.00	144.97	0.00
Build 4'/100' DLS	12550.06	75.00	359.94	12381.19	352.96	353.68	142.71	12.00
Landing Point	12925.06	90.00	359.63	12430.00	723.70	724.60	140.35	4.00
Cinarex Cascade 29 Federal #45H - PBHL [100' FNL, 2430' FWL]	16983.00	90.00	359.63	12430.00	4791.63	4782.48	114.43	0.00

Cimarex Cascade 29 Federal #45H Rev0 RM 09Oct18 Anti-Collision Summary Report

Analysis Date-24hr Time: October 11, 2018 - 15:44
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure: Cimarex Cascade 29 Federal #45H
Slot: New Slot
Well: Cascade 29 Federal #45H
Borehole: Cascade 29 Federal #45H
Scan MD Range: 0.00ft ~ 16993.00ft

Analysis Method: 3D Least Distance
Reference Trajectory: Cimarex Cascade 29 Federal #45H Rev0 RM 09Oct18 (Non-Def Plan)
Depth Interval: Every 10.00 Measured Depth (ft)
Rule Set: NAL Procedure: D&M AntiCollision Standard S002
Min Pts: All local minima indicated.
Version / Patch: 2.10.740.0
Database \ Project: US1153APP452.dir.slb.com\drilling-NM Lea County 2.10

ISCWSA0 3-D 95.000% Confidence 2.7955 sigma, for subject well. For offset wells, error model version is specified with each well respectively.

Trajectory Error Model:

Offset Trajectories Summary

Offset Selection Criteria

Wellhead distance scan: Not performed
Selection filters: Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans
 - All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

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

Results highlighted: Sep-Factor separation <= 1.50 ft

Cimarex Cascade 29 Federal #44H Rev1 RM 11Oct18 (Non-Def Plan) Warning Alert

19.99	16.49	17.49	3.50	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00	Enter Alert
19.99	16.49	17.49	3.50	78723.71	MAS = 5.03 (m)	26.00	26.00		WRP
19.99	16.49	8.46	3.50	1.94	MAS = 5.03 (m)	1500.00	1500.00		MinPts
20.01	16.49	8.43	3.52	1.93	MAS = 5.03 (m)	1510.00	1510.00		MINPT-O-EOU
20.15	16.49	8.47	3.66	1.92	MAS = 5.03 (m)	1530.00	1530.00		MinPt-O-SF
61.67	20.27	47.32	41.39	4.99	OSF1.50	2180.00	2178.58	OSF>5.00	Exit Alert
482.27	61.91	440.17	420.36	12.11	OSF1.50	8520.00	8514.93		MinPt-O-SF
486.60	62.41	444.16	424.19	12.12	OSF1.50	8610.00	8604.93		MinPt-O-SF
419.94	127.86	333.87	292.08	4.99	OSF1.50	14540.00	12430.00	OSF<5.00	Enter Alert
419.93	193.24	290.28	226.70	3.28	OSF1.50	16990.00	12430.00		MinPt-CtCt
419.93	193.32	290.22	226.61	3.28	OSF1.50	16993.00	12430.00		MinPts

Cimarex Cascade 29 Federal #43H Rev0 RM 09Oct18 (Non-Def Plan) Warning Alert

40.12	32.60	37.62	7.52	N/A	MAS = 9.94 (m)	0.00	0.00	CtCt<=15m<15.00	Enter Alert
40.12	32.60	37.62	7.52	N/A	MAS = 9.94 (m)	26.00	26.00		WRP
40.12	32.60	28.59	7.52	4.17	MAS = 9.94 (m)	1500.00	1500.00		MinPts
40.26	32.60	28.67	7.66	4.15	MAS = 9.94 (m)	1520.00	1520.00		MinPt-O-SF
48.97	32.60	37.10	16.37	4.96	MAS = 9.94 (m)	1660.00	1659.92	OSF>5.00	Exit Alert
828.40	59.54	787.87	768.85	21.72	OSF1.50	7600.00	7594.93		MinPt-O-SF
839.88	96.23	774.89	743.65	13.40	OSF1.50	12890.00	12429.57		MinPt-CtCt
839.88	192.29	710.85	647.59	6.62	OSF1.50	16990.00	12430.00		MinPt-CtCt
839.88	192.37	710.80	647.50	6.62	OSF1.50	16993.00	12430.00		MinPts

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

Cimarex Cascade 29 Federal
#2H Extreme+MWD Off to
14248ft (Def Survey)

Warning Alert

4577.34	32.81	4574.84	4544.53	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
4577.31	32.81	4574.76	4544.50	97656.05	MAS = 10.00 (m)	26.00	26.00					WRP
4567.13	32.81	4557.96	4534.32	684.23	MAS = 10.00 (m)	1520.00	1520.00					MinPts
4567.23	32.81	4557.80	4534.42	659.35	MAS = 10.00 (m)	1600.00	1599.98					MINPT-O-EOU
4567.50	32.81	4558.01	4534.69	652.86	MAS = 10.00 (m)	1670.00	1669.90					MinPt-O-SF
4568.94	32.81	4559.38	4536.13	646.95	MAS = 10.00 (m)	1870.00	1869.39					MinPt-O-SF
4593.08	32.81	4579.51	4560.27	414.96	MAS = 10.00 (m)	3450.00	3445.26					MinPts
4593.16	32.81	4579.41	4560.36	408.06	MAS = 10.00 (m)	3504.89	3500.00					MinPts
4593.42	32.81	4579.66	4560.61	407.45	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF
4597.29	32.81	4580.40	4564.48	319.30	MAS = 10.00 (m)	4880.00	4874.93					MinPts
527.57	161.84	418.84	365.73	4.94	OSF1.50	9460.00	9454.93	OSF<5.00				Enter Alert
317.44	234.75	159.67	82.69	2.04	OSF1.50	9880.00	9874.93					MinPts
525.32	159.83	417.94	365.50	4.98	OSF1.50	10300.00	10294.93	OSF>5.00				Exit Alert
2577.79	74.42	2527.34	2503.37	53.71	OSF1.50	13910.00	12430.00					MinPt-O-ADP
2577.77	74.39	2527.34	2503.37	53.73	OSF1.50	13920.00	12430.00					MINPT-O-EOU
2577.75	74.35	2527.35	2503.40	53.76	OSF1.50	13940.00	12430.00					MinPt-CtCt
2577.48	73.72	2527.50	2503.78	54.24	OSF1.50	14060.00	12430.00					MinPt-O-ADP
2577.46	73.69	2527.49	2503.76	54.25	OSF1.50	14070.00	12430.00					MINPT-O-EOU
2577.43	73.63	2527.51	2503.80	54.30	OSF1.50	14100.00	12430.00					MinPt-CtCt
2578.44	73.59	2528.55	2504.85	54.35	OSF1.50	14260.00	12430.00					MinPt-O-SF
2581.86	73.57	2531.98	2508.29	54.44	OSF1.50	14470.00	12430.00					MinPt-O-SF
2582.77	73.87	2532.68	2508.89	54.23	OSF1.50	14760.00	12430.00					MinPt-CtCt
2580.08	77.16	2527.81	2502.92	51.78	OSF1.50	15230.00	12430.00					MinPt-CtCt
2573.10	90.86	2511.70	2482.24	43.64	OSF1.50	16180.00	12430.00					MinPt-CtCt
2573.29	91.43	2511.50	2481.86	43.36	OSF1.50	16220.00	12430.00					MINPT-O-EOU
2573.41	91.57	2511.53	2481.84	43.29	OSF1.50	16230.00	12430.00					MinPt-O-ADP
2659.09	99.22	2592.10	2559.86	41.20	OSF1.50	16920.00	12430.00					MinPt-O-SF
2677.27	99.83	2609.89	2577.44	41.22	OSF1.50	16993.00	12430.00					TD

Cimarex Cascade 29 Federal
#3H XEM+MWD Off to 14241ft
MD (Def Survey)

Warning Alert

4614.55	32.81	4612.05	4581.74	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
4614.55	32.81	4612.05	4581.74	N/A	MAS = 10.00 (m)	20.00	20.00					MinPts
4614.55	32.81	4612.02	4581.74	150908.04	MAS = 10.00 (m)	26.00	26.00					WRP
4614.39	32.81	4609.56	4581.58	1978.23	MAS = 10.00 (m)	410.00	410.00					MinPts
4614.72	32.81	4608.96	4581.91	1413.59	MAS = 10.00 (m)	660.00	660.00					MINPT-O-EOU
4615.02	32.81	4607.45	4582.21	910.62	MAS = 10.00 (m)	1090.00	1090.00					MinPts
4615.01	32.81	4606.93	4582.20	826.73	MAS = 10.00 (m)	1220.00	1220.00					MinPts
4615.50	32.81	4606.23	4582.70	680.99	MAS = 10.00 (m)	1500.00	1500.00					MINPT-O-EOU
4606.21	32.81	4594.34	4573.40	491.65	MAS = 10.00 (m)	2930.00	2926.62					MinPts
4606.25	32.81	4594.29	4573.44	486.72	MAS = 10.00 (m)	2960.00	2956.54					MINPT-O-EOU
4606.61	32.81	4594.27	4573.80	468.24	MAS = 10.00 (m)	3080.00	3076.23					MINPT-O-EOU
4608.41	32.81	4594.84	4575.60	416.01	MAS = 10.00 (m)	3430.00	3425.31					MinPts
4608.51	32.81	4594.76	4575.70	409.32	MAS = 10.00 (m)	3480.00	3475.18					MINPT-O-EOU
4609.69	32.81	4595.82	4576.88	405.26	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF
4612.55	32.81	4599.01	4579.74	417.71	MAS = 10.00 (m)	3760.00	3754.93					MinPt-O-SF
4619.19	32.81	4601.93	4586.38	312.75	MAS = 10.00 (m)	4970.00	4964.93					MinPts
778.94	235.74	620.95	543.20	4.99	OSF1.50	9380.00	9374.93	OSF<5.00				Enter Alert
598.60	296.16	400.33	302.45	3.04	OSF1.50	9880.00	9874.93					MinPts
780.96	236.50	622.46	544.46	4.99	OSF1.50	10380.00	10374.93	OSF>5.00				Exit Alert
2627.88	91.00	2566.38	2536.88	44.50	OSF1.50	13220.00	12430.00					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		
2607.60	84.20	2550.63	2523.40	47.83	OSF1.50	13790.00	12430.00					MinPts	
2621.36	79.47	2567.54	2541.89	51.04	OSF1.50	14600.00	12430.00					MinPts	
2620.07	79.80	2566.03	2540.27	50.79	OSF1.50	14810.00	12430.00					MinPt-CtCt	
2620.14	80.01	2565.97	2540.13	50.66	OSF1.50	14850.00	12430.00					MINPT-O-EOU	
2620.24	80.13	2565.98	2540.11	50.58	OSF1.50	14870.00	12430.00					MinPt-O-ADP	
2623.20	82.50	2567.37	2540.70	49.14	OSF1.50	15250.00	12430.00					MinPt-CtCt	
2614.50	94.02	2550.99	2520.48	42.81	OSF1.50	16140.00	12430.00					MinPt-CtCt	
2614.74	95.11	2550.50	2519.62	42.31	OSF1.50	16210.00	12430.00					MINPT-O-EOU	
2614.98	95.40	2550.54	2519.58	42.18	OSF1.50	16230.00	12430.00					MinPt-O-ADP	
2711.09	104.37	2640.68	2606.72	39.88	OSF1.50	16990.00	12430.00					MinPt-O-SF	
2711.81	104.40	2641.38	2607.42	39.88	OSF1.50	16993.00	12430.00					TD	

Cimarex Cascade 29 Federal
#31H Rev1 RM 11Oct18 (Non-Def Plan)

Pass

1184.99	32.81	1182.49	1152.18	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
1184.97	32.81	1182.47	1152.16	N/A	MAS = 10.00 (m)	26.00	26.00					WRP	
1184.97	32.81	1173.46	1152.16	131.23	MAS = 10.00 (m)	1500.00	1500.00					MinPts	
1184.99	32.81	1173.43	1152.18	130.55	MAS = 10.00 (m)	1510.00	1510.00					MINPT-O-EOU	
1294.43	79.95	1240.30	1214.48	25.02	OSF1.50	9210.00	9204.93					MinPts	
1294.48	80.00	1240.31	1214.47	25.01	OSF1.50	9220.00	9214.93					MinPt-O-ADP	
1296.54	80.30	1242.17	1216.24	24.95	OSF1.50	9290.00	9284.93					MinPt-O-SF	
3377.37	154.38	3273.62	3222.99	33.33	OSF1.50	16990.00	12430.00					MinPt-CtCt	
3377.37	154.44	3273.57	3222.93	33.32	OSF1.50	16993.00	12430.00					MinPts	

Cimarex Cascade 29 Federal
#30H Rev0 RM 09Oct18 (Non-Def Plan)

Pass

1204.99	32.81	1202.49	1172.18	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
1204.97	32.81	1202.47	1172.16	N/A	MAS = 10.00 (m)	26.00	26.00					WRP	
1204.97	32.81	1193.46	1172.16	133.45	MAS = 10.00 (m)	1500.00	1500.00					MinPts	
1204.99	32.81	1193.44	1172.18	132.86	MAS = 10.00 (m)	1510.00	1510.00					MINPT-O-EOU	
1211.43	32.81	1199.57	1178.62	129.12	MAS = 10.00 (m)	1650.00	1649.93					MinPt-O-SF	
1217.41	32.81	1205.52	1184.61	129.36	MAS = 10.00 (m)	1707.32	1707.13					MinPt-O-SF	
1525.14	32.81	1507.09	1492.34	97.88	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF	
1677.05	37.19	1651.43	1639.86	72.41	OSF1.50	5200.00	5194.93					MinPt-O-SF	
1679.99	69.94	1632.53	1610.05	37.31	OSF1.50	9630.00	9624.93					MINPT-O-EOU	
1680.19	70.18	1632.57	1610.01	37.18	OSF1.50	9660.00	9654.93					MinPt-O-ADP	
1697.19	72.45	1648.06	1624.74	36.34	OSF1.50	10010.00	10004.93					MinPt-O-SF	
2998.39	165.08	2887.50	2833.31	27.64	OSF1.50	16990.00	12430.00					MinPt-CtCt	
2998.39	165.14	2887.46	2833.25	27.63	OSF1.50	16993.00	12430.00					MinPts	

Cimarex Cascade 29 Federal
#29H Rev1 RM 11Oct18 (Non-Def Plan)

Pass

1224.98	32.81	1222.48	1192.17	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
1224.96	32.81	1222.46	1192.16	N/A	MAS = 10.00 (m)	26.00	26.00					WRP	
1224.96	32.81	1213.45	1192.16	135.68	MAS = 10.00 (m)	1500.00	1500.00					MinPts	
1224.98	32.81	1213.43	1192.17	135.07	MAS = 10.00 (m)	1510.00	1510.00					MINPT-O-EOU	
1231.40	32.81	1219.54	1198.59	131.26	MAS = 10.00 (m)	1650.00	1649.93					MinPt-O-SF	
1237.37	32.81	1225.48	1204.56	131.49	MAS = 10.00 (m)	1707.32	1707.13					MinPt-O-SF	
1625.08	32.81	1607.10	1592.27	104.84	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF	
2093.78	52.24	2058.12	2041.55	63.07	OSF1.50	6830.00	6824.93					MinPt-O-SF	
2099.93	64.54	2056.07	2035.39	50.72	OSF1.50	8980.00	8974.93					MINPT-O-EOU	
2100.10	64.75	2056.10	2035.35	50.55	OSF1.50	9010.00	9004.93					MinPt-O-ADP	
2132.03	67.90	2085.93	2064.13	48.85	OSF1.50	9520.00	9514.93					MinPt-O-SF	

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		
3771.95	168.15	3659.02	3603.80	34.13	OSF1.50	16990.00	12430.00					MinPt-CtCt	
3771.95	168.20	3658.98	3603.74	34.12	OSF1.50	16993.00	12430.00					MinPts	

Cimarex Cascade 29 Federal
#5H Extreme-MWD Off to
14373R MD (Def Survey)

Pass

4868.28	32.81	4865.78	4835.47	N/A	MAS = 10.00 (m)	0.00	0.00					MinPts	
4868.29	32.81	4865.77	4835.49	223096.08	MAS = 10.00 (m)	26.00	26.00					WRP	
4868.45	32.81	4864.56	4835.64	3500.21	MAS = 10.00 (m)	300.00	300.00					MinPts	
4868.96	32.81	4863.58	4836.16	1686.35	MAS = 10.00 (m)	580.00	580.00					MINPT-O-EOU	
4868.47	32.81	4861.62	4835.66	1117.16	MAS = 10.00 (m)	980.00	980.00					MinPts	
4868.56	32.81	4861.53	4835.75	1073.48	MAS = 10.00 (m)	1020.00	1020.00					MINPT-O-EOU	
4870.01	32.81	4861.78	4837.20	850.35	MAS = 10.00 (m)	1270.00	1270.00					MinPts	
4870.40	32.81	4860.91	4837.60	696.32	MAS = 10.00 (m)	1510.00	1510.00					MINPT-O-EOU	
4906.93	32.81	4894.60	4874.12	499.16	MAS = 10.00 (m)	2640.00	2637.38					MinPt-O-SF	
4909.27	32.81	4896.94	4876.46	499.12	MAS = 10.00 (m)	2710.00	2707.19					MinPt-O-SF	
4927.78	32.81	4912.66	4894.97	390.51	MAS = 10.00 (m)	3504.89	3500.00					MinPt-O-SF	
4929.56	32.81	4914.45	4896.75	390.82	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF	
4930.19	32.81	4915.20	4897.38	394.46	MAS = 10.00 (m)	3780.00	3774.93					MinPts	
1240.18	240.86	1078.36	999.32	7.82	OSF1.50	9870.00	9864.93					MinPts	
2835.91	106.81	2763.87	2729.10	40.74	OSF1.50	13470.00	12430.00					MinPt-CtCt	
2833.95	88.14	2774.35	2745.81	49.59	OSF1.50	15060.00	12430.00					MinPt-O-SF	
2828.05	90.17	2767.10	2737.88	48.34	OSF1.50	15520.00	12430.00					MinPt-CtCt	
2828.46	91.42	2766.68	2737.04	47.67	OSF1.50	15670.00	12430.00					MINPT-O-EOU	
2828.93	92.01	2766.76	2736.92	47.36	OSF1.50	15730.00	12430.00					MinPt-O-ADP	
2834.49	95.07	2770.28	2739.42	45.89	OSF1.50	16010.00	12430.00					MinPt-O-ADP	
2959.22	107.33	2886.83	2851.89	42.31	OSF1.50	16993.00	12430.00					MinPt-O-SF	

Cimarex Cascade 29 Federal
#17H Rev1 RM 11Oct18 (Non-
Def Plan)

Pass

1874.72	32.81	1872.22	1841.91	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
1874.71	32.81	1872.21	1841.90	N/A	MAS = 10.00 (m)	26.00	26.00					WRP	
1874.71	32.81	1863.20	1841.90	207.75	MAS = 10.00 (m)	1500.00	1500.00					MinPts	
1476.61	83.71	1419.81	1392.90	27.39	OSF1.50	11570.00	11564.93					MinPts	
1259.84	192.97	1129.99	1066.87	9.95	OSF1.50	16990.00	12430.00					MinPt-CtCt	
1259.84	193.03	1129.95	1066.81	9.95	OSF1.50	16993.00	12430.00					MinPts	

Cimarex Cascade 29 Federal
7H XEM-MWD Survey On -
14305MD (Def Survey)

Pass

5027.60	32.81	5025.10	4994.79	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
5027.57	32.81	5025.07	4994.76	N/A	MAS = 10.00 (m)	10.00	10.00					MinPt-O-SF	
5027.56	32.81	5025.06	4994.75	N/A	MAS = 10.00 (m)	26.00	26.00					WRP	
4935.42	32.81	4921.53	4902.61	435.20	MAS = 10.00 (m)	3590.00	3584.97					MinPt-O-SF	
4934.15	32.81	4920.64	4901.34	450.56	MAS = 10.00 (m)	3710.00	3704.93					MINPT-O-EOU	
1535.12	238.03	1375.35	1297.10	9.79	OSF1.50	9870.00	9864.93					MinPts	
2968.60	127.42	2882.82	2841.17	35.61	OSF1.50	12930.00	12430.00					MinPt-O-ADP	
2966.18	124.83	2882.13	2841.35	36.34	OSF1.50	13010.00	12430.00					MINPT-O-EOU	
2941.76	110.46	2867.29	2831.30	40.84	OSF1.50	13690.00	12430.00					MinPt-O-ADP	
2939.96	108.28	2866.94	2831.68	41.65	OSF1.50	13830.00	12430.00					MINPT-O-EOU	
2935.07	104.38	2864.65	2830.69	43.18	OSF1.50	14100.00	12430.00					MinPt-O-ADP	
2935.04	104.34	2864.65	2830.70	43.19	OSF1.50	14110.00	12430.00					MINPT-O-EOU	
2935.04	104.31	2864.66	2830.72	43.21	OSF1.50	14120.00	12430.00					MinPt-CtCt	

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		
2926.70	98.75	2860.03	2827.94	45.57	OSF1.50	14470.00	12430.00				MinPt-O-SF		
2926.50	98.64	2859.91	2827.86	45.62	OSF1.50	14480.00	12430.00				MinPt-O-ADP		
2918.07	97.08	2852.51	2820.99	46.24	OSF1.50	14780.00	12430.00				MinPt-O-SF		
2914.85	96.63	2849.60	2818.22	46.41	OSF1.50	15090.00	12430.00				MinPt-CtCt		
2914.86	96.68	2849.57	2818.18	46.39	OSF1.50	15100.00	12430.00				MinPts		
2914.01	96.60	2848.77	2817.41	46.41	OSF1.50	15280.00	12430.00				MinPt-CtCt		
2914.12	97.00	2848.62	2817.12	46.21	OSF1.50	15320.00	12430.00				MINPT-O-EOU		
2914.29	97.23	2848.64	2817.06	46.11	OSF1.50	15340.00	12430.00				MinPt-O-ADP		
3136.12	114.05	3059.25	3022.07	42.14	OSF1.50	16720.00	12430.00				MinPt-O-SF		
3219.31	117.02	3140.46	3102.29	42.13	OSF1.50	16980.00	12430.00				MinPt-O-SF		
3223.62	117.17	3144.67	3106.44	42.13	OSF1.50	16993.00	12430.00				TD		

Cimarex Cascade 29 Federal #16H Rev0 RM 09Oct18 (Non-Def Plan)

Pass

1894.72	32.81	1892.22	1861.91	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
1894.71	32.81	1892.21	1861.90	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
1894.71	32.81	1883.20	1861.90	209.94	MAS = 10.00 (m)	1500.00	1500.00				MinPts	
1892.03	32.81	1880.27	1859.23	203.93	MAS = 10.00 (m)	1600.00	1599.98				MinPt-O-SF	
1680.78	88.03	1621.18	1592.75	29.51	OSF1.50	11925.06	11920.00				MinPt-CtCt	
1679.77	194.47	1549.21	1485.29	13.12	OSF1.50	16990.00	12430.00				MinPt-CtCt	
1679.77	194.53	1549.17	1485.23	13.11	OSF1.50	16993.00	12430.00				MinPts	

Cimarex Cascade 29 Federal #15H Rev1 RM 11Oct18 (Non-Def Plan)

Pass

1914.71	32.81	1912.21	1881.90	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
1914.70	32.81	1912.20	1881.89	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
1914.70	32.81	1903.19	1881.89	212.18	MAS = 10.00 (m)	1500.00	1500.00				MinPts	
1914.72	32.81	1903.17	1881.91	211.37	MAS = 10.00 (m)	1510.00	1510.00				MINPT-O-EOU	
1917.73	32.81	1906.02	1884.92	208.13	MAS = 10.00 (m)	1620.00	1619.96				MinPt-O-SF	
2099.25	32.81	2085.09	2066.44	179.86	MAS = 10.00 (m)	3570.00	3564.99				MinPt-O-SF	
2101.22	32.81	2087.05	2068.41	179.86	MAS = 10.00 (m)	3600.00	3594.96				MinPt-O-SF	
2099.71	194.36	1969.31	1905.36	16.40	OSF1.50	16990.00	12430.00				MinPt-CtCt	
2099.71	194.42	1969.27	1905.30	16.39	OSF1.50	16993.00	12430.00				MinPts	

Cimarex Cascade 29 Federal #14H (Def) Gyro-MWD On to 14295ft (Def Survey)

Pass

4953.67	32.81	4951.17	4920.86	N/A	MAS = 10.00 (m)	0.00	0.00				MinPts	
4953.67	32.81	4951.14	4920.86	176620.88	MAS = 10.00 (m)	26.00	26.00				WRP	
4954.12	32.81	4950.71	4921.31	5419.21	MAS = 10.00 (m)	250.00	250.00				MINPT-O-EOU	
4955.69	32.81	4950.74	4922.88	2025.36	MAS = 10.00 (m)	520.00	520.00				MINPT-O-EOU	
4959.57	32.81	4951.83	4926.76	945.24	MAS = 10.00 (m)	1170.00	1170.00				MINPT-O-EOU	
4959.73	32.81	4951.83	4926.92	917.81	MAS = 10.00 (m)	1210.00	1210.00				MINPT-O-EOU	
5036.21	32.81	5021.71	5003.40	419.56	MAS = 10.00 (m)	3504.89	3500.00				MinPt-O-SF	
5039.38	32.81	5024.88	5006.58	419.67	MAS = 10.00 (m)	3600.00	3594.96				MinPt-O-SF	
2020.54	247.09	1854.98	1773.45	12.38	OSF1.50	9850.00	9844.93				MinPts	
2020.57	247.10	1855.01	1773.47	12.38	OSF1.50	9860.00	9854.93				MinPt-O-SF	
3285.97	148.11	3186.40	3137.86	33.82	OSF1.50	13010.00	12430.00				MinPt-CtCt	
3303.57	124.65	3219.64	3178.92	40.54	OSF1.50	13880.00	12430.00				MINPT-O-EOU	
3303.44	124.26	3219.76	3179.18	40.66	OSF1.50	13920.00	12430.00				MinPt-CtCt	
3309.32	115.32	3231.60	3193.99	43.96	OSF1.50	14330.00	12430.00				MINPT-O-EOU	
3309.24	115.12	3231.66	3194.11	44.04	OSF1.50	14360.00	12430.00				MinPt-CtCt	
3302.41	109.45	3228.62	3192.97	46.28	OSF1.50	14640.00	12430.00				MinPts	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
3296.39	107.08	3224.16	3189.30	47.24	OSF1.50	14990.00	12430.00					MinPts	
3297.33	107.20	3225.02	3190.12	47.20	OSF1.50	15090.00	12430.00					MinPt-O-SF	
3298.65	105.64	3227.39	3193.00	47.94	OSF1.50	15180.00	12430.00					MinPt-CtCt	
3299.13	104.80	3228.42	3194.32	48.34	OSF1.50	15650.00	12430.00					MinPts	
3293.46	104.87	3222.72	3188.59	48.22	OSF1.50	15820.00	12430.00					MinPt-O-SF	
3288.05	105.99	3216.56	3182.06	47.62	OSF1.50	15970.00	12430.00					MinPts	
3274.22	109.35	3200.49	3164.87	45.93	OSF1.50	16320.00	12430.00					MinPt-CtCt	
3274.41	109.85	3200.34	3164.55	45.72	OSF1.50	16360.00	12430.00					MINPT-O-EOU	
3274.51	109.98	3200.36	3164.53	45.66	OSF1.50	16370.00	12430.00					MinPt-O-ADP	
3328.27	117.14	3249.35	3211.14	43.52	OSF1.50	16993.00	12430.00					MinPt-O-SF	

Cimarex Cascade 29 Federal
4H XEM-MWD Off to 14230ft
MD (Def Survey)

Pass

5093.61	32.81	5091.11	5060.80	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
5093.58	32.81	5091.08	5060.77	N/A	MAS = 10.00 (m)	10.00	10.00					MinPt-O-SF
5093.57	32.81	5091.07	5060.76	N/A	MAS = 10.00 (m)	26.00	26.00					WRP
5093.41	32.81	5090.45	5060.60	11087.67	MAS = 10.00 (m)	150.00	150.00					MinPts
5093.49	32.81	5090.37	5060.68	8204.31	MAS = 10.00 (m)	190.00	190.00					MINPT-O-EOU
5065.83	32.81	5051.85	5033.02	442.37	MAS = 10.00 (m)	3600.00	3594.96					MinPt-O-SF
5065.79	32.81	5051.85	5032.98	443.53	MAS = 10.00 (m)	3610.00	3604.96					MINPT-O-EOU
5065.75	32.81	5051.88	5032.95	445.98	MAS = 10.00 (m)	3630.00	3624.94					MinPts
2455.11	235.04	2297.57	2220.07	15.82	OSF1.50	9900.00	9894.93					MinPts
2455.22	235.07	2297.66	2220.15	15.82	OSF1.50	9920.00	9914.93					MinPt-O-SF
3469.74	145.94	3371.61	3323.80	36.26	OSF1.50	13250.00	12430.00					MinPt-O-ADP
3469.41	145.56	3371.53	3323.85	36.35	OSF1.50	13280.00	12430.00					MINPT-O-EOU
3469.16	144.81	3371.78	3324.34	36.54	OSF1.50	13340.00	12430.00					MinPt-CtCt
3469.10	131.51	3380.59	3337.59	40.31	OSF1.50	13740.00	12430.00					MinPt-O-ADP
3453.86	119.25	3373.52	3334.61	44.34	OSF1.50	14310.00	12430.00					MinPt-O-ADP
3453.41	118.76	3373.41	3334.65	44.52	OSF1.50	14350.00	12430.00					MINPT-O-EOU
3450.55	114.65	3373.29	3335.90	46.12	OSF1.50	14450.00	12430.00					MinPts
3361.08	106.54	3289.22	3254.54	48.42	OSF1.50	15750.00	12430.00					MinPt-O-SF
3345.65	111.37	3270.57	3234.28	46.06	OSF1.50	16160.00	12430.00					MinPt-CtCt
3345.86	111.96	3270.39	3233.90	45.82	OSF1.50	16200.00	12430.00					MINPT-O-EOU
3346.10	112.26	3270.43	3233.85	45.70	OSF1.50	16220.00	12430.00					MinPt-O-ADP
3430.85	122.72	3348.20	3308.12	42.77	OSF1.50	16993.00	12430.00					MinPt-O-SF

1. Geological Formations

TVD of target 12,430
MD at TD 16,993

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	935	N/A	
Top of Salt	1298	N/A	
Base of Salt	4714	N/A	
Lamar	4909	N/A	
Bell Canyon	4937	N/A	
Cherry Canyon	5990	N/A	
Brushy Canyon	7536	N/A	
Bone Spring	9032	N/A	
Leonard Shale	9087	N/A	
Avalon Shale	9312	N/A	
1st Bone Spring Sand	10011	N/A	
2nd Bone Spring Sand	10583	N/A	
3rd Bone Spring Sand	11722	N/A	
Wolfcamp	12189	N/A	
Wolfcamp Target	12430	N/A	

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	12550	12381	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
6 3/4	0	11925	11925	5-1/2"	20.00	P-110	LT&C	1.43	1.63	2.45
6 3/4	11925	16993	12430	5"	18.00	HCP-110	BT&C	1.66	1.69	63.81
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., Cascade 29 Federal 45H

	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.	N
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	594	10.30	3.64	22.18		Lead: Tuned Light + LCM
	207	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Intermediate Stage 2	786	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
Production	359	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 +/- 4,850'.

Casing String	TOC	% Excess
Surface	0	42
Intermediate Stage 1	4850	47
Intermediate Stage 2	0	40
Production	12350	8

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	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		
6 3/4	13 5/8	10M	Annular	X	50% of working pressure
			Blind Ram		10M
			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.

X	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 12550'	Brine Diesel Emulsion	8.50 - 9.00	30-35	N/C
12550' to 16993'	Oil Based Mud	12.00 - 12.50	50-70	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times. The Brine Emulsion is completely saturated brine fluid that ties diesel into itself to lower the weight of the fluid. The drilling fluid is completely salt saturated.

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

6. Logging and Testing Procedures

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

Additional Logs Planned	Interval

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	8079 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	H2S is present
X	H2S plan is attached

8. Other Facets of Operation

Co-Flex Hose
Cascade 29 Federal 45H
Cimarex Energy Co. 29-25S-
33E
Lea Co., NM



Co-Flex Hose Hydrostatic Test
Cascade 29 Federal 45H
 Cimarex Energy Co.
 29-25S-33E
 Lea Co., NM



Midwest Hose & Specialty, Inc.

INTERNAL HYDROSTATIC TEST REPORT

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



Midwest Hose & Specialty, Inc.

Internal Hydrostatic Test Graph

March 9, 2011

Customer: Houston

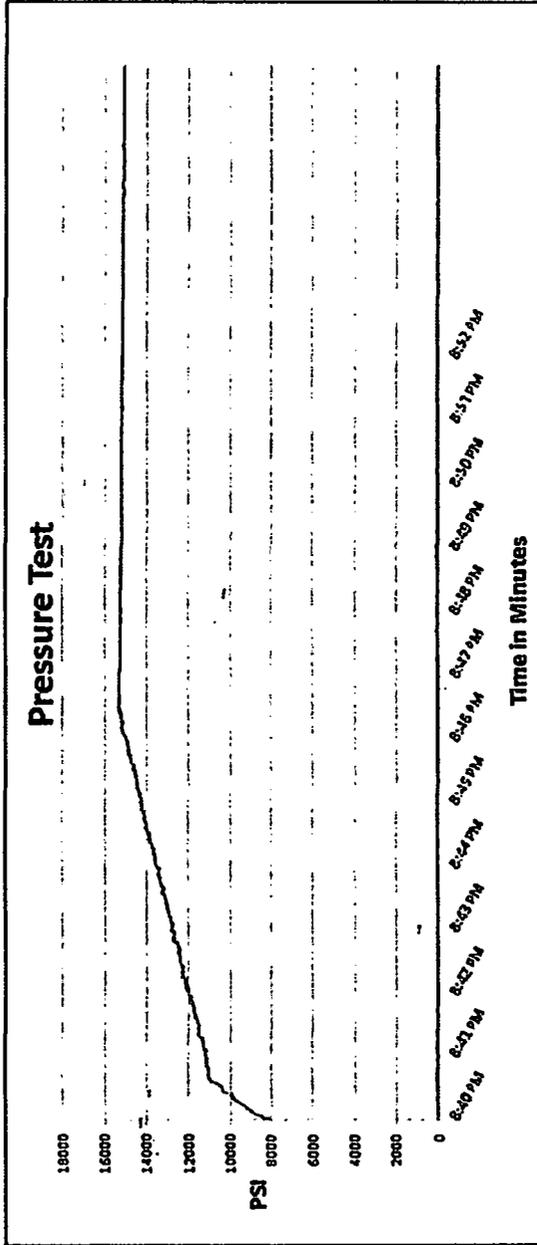
Pick Ticket #: 94260

Hose Specifications

Hose Type: C & K
 Length: 43'
 I.D.: 4"
 O.D.: 6.09"
 Working Pressure: 10000 PSI
 Burst Pressure: 34,000 PSI (4x Working Pressure)

Verification

Type of Fittings: 4 1/16 10K
 Die Size: 6.38"
 Hose Serial #: 5544
 Coupling Method: Swage
 Final O.D.: 6.25"
 Hose Assembly Serial #: 79793



Co-Flex Hose
Cascade 29 Federal 45H
Cimarex Energy Co. 29-25S-33E
Lea Co., NM



Midwest Hose & Specialty, Inc.

Certificate of Conformity

Customer: DEM	PO ODYD-271
-------------------------	-----------------------

SPECIFICATIONS

Sales Order 79793	Dated: 3/8/2011
-----------------------------	---------------------------

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

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

Comments:

Approved: <i>Janet Garcia</i>	Date: 3/8/2011
---	--------------------------



Co-Flex Hose
Cascade 29 Federal 45H
Cimarex Energy Co.
29-25S-33E
Lea Co., NM

Specification Sheet Choke & Kill Hose

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

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



Cimarex 10M Well Control Plan

Version 1.0

BOPE Preventer Utilization

The table below displays all BHA components, drill pipe, casing, or open hole that could be present during a required shut in and the associated preventer component that would provide a barrier to flow. It is specific to the hole section that requires a 10M system. The mud system being utilized in the hole will always assumed to be the first barrier to flow. The below table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill String Element	OD	Preventer	RWP
4" Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4.5" Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4" HWDP Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4.5" HWDP Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Drill Collars (including non-magnetic)	4.75-	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
	5.25"	Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	5.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
ALL	0-13 5/8"	Annular	5M
Open Hole		Blind Rams	10M

*VBR – Variable Bore Ram

Well Control Procedures

Proper well control response is highly specific to current well conditions and must be adapted based on environment as needed. The procedures below are given in "common" operating conditions to cover the basic and most necessary operations required during the wellbore construction. These include drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole. In some of the procedures below, there will be a switch of control from the lesser RWP annular to the appropriate 10M RWP ram. The pressure at which this is done is variable based on overall well conditions that must be evaluated situationally. The pressure that control is switched may be equal to or less than the RWP but at no time will the pressure on the annular preventer exceed the RWP of the annular. The annular will be tested to 5,000 psi. This will be the RWP of the annular preventer.

Shutting In While Drilling

1. Sound alarm to alert crew
2. Space out drill string
3. Shut down pumps

9. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting In While Tripping

1. Sound alarm and alert crew
2. Install open, full open safety valve and close valve
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting In While Running Casing

1. Sound alarm and alert crew
2. Install circulating swedge. Close high pressure, low torque valves.
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold Pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting in while out of hole

1. Sound alarm
2. Shut-in well: close blind rams
3. Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and ram preventer and combo immediately available

1. Sound alarm and alert crew
2. Stab Crossover and install open, full open safety valve and close valve
3. Space out drill string with upset just beneath the compatible pipe ram.
4. Shut in upper compatible pipe ram and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and no ram preventer or combo immediately available

1. Sound alarm and alert crew
2. If possible pick up high enough, to pull string clear and follow "Open Hole" scenario
3. If not possible to pick up high enough:
 1. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve and close valve
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR.
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure



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

SUPO Data Report

08/16/2019

APD ID: 10400034752

Submission Date: 11/16/2018

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

[Show Final Text](#)

Section 1 - Existing Roads

Will existing roads be used? NO

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Cascade_29_Fed_E2W2_Road_ROW_20181115160524.pdf

Cascade_29_Fed_CTB_Road_ROW_20181115160530.pdf

Cascade_29_Fed_and_Red_Hills_Road_ROW_20181115160920.pdf

New road type: COLLECTOR

Length: 13485

Feet

Width (ft.): 30

Max slope (%): 2

Max grade (%): 6

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 18

New road access erosion control: The side slopes of any drainage channels or swales that are crossed will be re-contoured to original grade and compacted and mulched as necessary to avoid erosion. Where steeper slopes cannot be avoided, water bars or silt fence will be constructed, mulch/rip-rap applied, or other measures employed as necessary to control erosion. Hay bales, straw waddles or silt fence may also be installed to control erosion as needed. All disturbed areas will be seeded with a mix appropriate for the area unless specified otherwise by the landowner.

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Turnout? N

Access surfacing type: GRAVEL

Access topsoil source: ONSITE

Access surfacing type description:

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Push off and stockpile alongside the location.

Access other construction information: The operator will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations or other events.

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing: CROSSING,CULVERT,LOW WATER,OTHER

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

Road Drainage Control Structures (DCS) description: N/A

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

Cascade_29_Fed_E2W2_One_Mile_Radius_20181115161121.pdf

Existing Wells description:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description:

Production Facilities map:

Cascade_29_Fed_West_Zone_2_CTB_Layout_20181115161213.pdf

Cascade_29_Fed_West_Zone_1_CTB_Layout_20181115161222.pdf

Cascade_29_Fed_East_Zone_2_CTB_Layout_20181115161232.pdf

Cascade_29_Fed_East_Zone_1_CTB_Layout_20181115161240.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING,
SURFACE CASING

Water source type: MUNICIPAL

Describe type:

Source latitude:

Source longitude:

Source datum:

Water source permit type: WATER RIGHT

Permit Number:

Source land ownership: FEDERAL

Water source transport method: PIPELINE,TRUCKING

Source transportation land ownership: FEDERAL

Water source volume (barrels): 5000

Source volume (acre-feet): 0.6444655

Source volume (gal): 210000

Water source and transportation map:

Cascade_29_Fed_W2W2_Pad_2_Drilling_Water_Routes_20181115163211.pdf

Water source comments:

New water well? NO

New Water Well Info

Well latitude:

Well Longitude:

Well datum:

Well target aquifer:

Est. depth to top of aquifer(ft):

Est thickness of aquifer:

Aquifer comments:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well depth (ft):

Well casing type:

Well casing outside diameter (in.):

Well casing inside diameter (in.):

New water well casing?

Used casing source:

Drilling method:

Drill material:

Grout material:

Grout depth:

Casing length (ft.):

Casing top depth (ft.):

Well Production type:

Completion Method:

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: The drilling and testing operations will be conducted on a watered and compacted native soil grade. Soft spots will be covered with caliche, free of large rocks (3" diameter). Upon completion as a commercial producer the location will be covered with caliche, free of large rocks (3" dia.) from an existing privately owned gravel pit.

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations

Amount of waste: 32500 pounds

Waste disposal frequency : Weekly

Safe containment description: N/A

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Windmill Spraying Service hauls trash to Lea County Landfill

Waste type: DRILLING

Waste content description: Drilling Fluids, drill cuttings, water and other waste produced from the well during drilling operations.

Amount of waste: 15000 barrels

Waste disposal frequency : Weekly

Safe containment description: N/A

Safe containmant attachment:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL FACILITY

Disposal type description:

Disposal location description: Haul to R360 commercial Disposal

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.)

Reserve pit width (ft.)

Reserve pit depth (ft.)

Reserve pit volume (cu. yd.)

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? NO

Description of cuttings location

Cuttings area length (ft.)

Cuttings area width (ft.)

Cuttings area depth (ft.)

Cuttings area volume (cu. yd.)

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Section 9 - Well Site Layout

Well Site Layout Diagram:

Cascade_29_Fed_45H_Wellsite_Layout_20181115163540.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: CASCADE 29 FEDERAL

Multiple Well Pad Number: E2W2 PAD

Recontouring attachment:

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

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

Wellpad long term disturbance (acres): 3.36

Wellpad short term disturbance (acres): 3.55

Access road long term disturbance (acres): 9.287

Access road short term disturbance (acres): 0

Pipeline long term disturbance (acres): 20.78

Pipeline short term disturbance (acres): 0

Other long term disturbance (acres): 20.99

Other short term disturbance (acres): 0

Total long term disturbance: 63.39

Total short term disturbance: 3.55

Disturbance Comments: Road: 13,484'; Power: 13,032'; SWD: 5043'; Oil: 5016'; Sales/Buyback: 4760'; Flow/ Gas lift: 6,484'; Temp Water: 27,237'; West Zone CTB 1: 5.235 acres; CTB 2: 5.209 acres, East Zone CTB 1: 5.267 acres, CTB 2: 5.277 acres.

Reconstruction method: After well plugging, all disturbed areas would be returned to the original contour or a contour that blends with the surrounding landform including roads unless the surface owner requests that they be left intact. In consultation with the surface owners it will be determined if any gravel or similar materials used to reinforce an area are to be removed, buried, or left in place during final reclamation. Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated. As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, or fertilizing.

Reclamation, Re-vegetation, and Drainage: All disturbed and re-contoured areas would be reseeded using techniques outlined under Phase I and II of this plan or as specified by the land owner. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Topsoil redistribution: Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated.

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

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

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Seed Type

Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name:

Last Name:

Phone:

Email:

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Section 12 - Other Information

Right of Way needed? YES

Use APD as ROW? YES

ROW Type(s): 281001 ROW - ROADS,285003 ROW – POWER TRANS,288100 ROW – O&G Pipeline,288101 ROW – O&G Facility Sites,288103 ROW – Salt Water Disposal Pipeline/Facility,288104 ROW – Salt Water Disposal ApIn/Fac-FLPMA,289001 ROW- O&G Well Pad

ROW Applications

SUPO Additional Information: Surface disturbance will be the same for Flow/gas lift, Sales/buyback, oil, SWD & power for all Cascade 29 Fed Wells. 4 battery pads & battery road disturbances will be the same for all Cascade 29 Fed wells. Roads to well will be the same for Cascade 29 Fed 43H, 44H & 45H.

Use a previously conducted onsite? YES

Previous Onsite information: Onsite with BLM(Jeff Robertson) and Cimarex Barry Hunt on June 19, 2018

Other SUPO Attachment

Cascade_29_Fed_E2W2_Public_Access_Road_20181116073656.pdf

Cascade_29_Fed_Temp_Water_Route_20181116073658.pdf

Cascade_29_Fed_E2W2_Road_Description_20181116073658.pdf

Cascade_29_Fed_CTB_Oil_Pipeline_ROW_20181116073701.pdf

Cascade_29_Fed_CTB_Gas_Sales_Buyback_ROW_20181116073702.pdf

Cascade_29_Fed_Power_ROW_20181116073708.pdf

Cascade_29_Fed_Flow_Line_Gas_Lift_ROW_20181116073712.pdf

Cascade_29_Fed_45H_SUPO_Pack_2_for_Jeff_20181116075709.pdf

Cascade_29_Fed_45H_SUPO_Pack_1_for_Jeff_20190404154209.pdf

Cascade_29_Fed_45H_SUPO_20190404154233.pdf



APD ID: 10400034752

Submission Date: 11/16/2018

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD disturbance (acres):

PWD surface owner:

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number:

Injection well name:

Assigned injection well API number?

Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:



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

Bond Info Data Report

08/16/2019

APD ID: 10400034752

Submission Date: 11/16/2018

Operator Name: CIMAREX ENERGY COMPANY

Well Name: CASCADE 29 FEDERAL

Well Number: 45H

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

[Show Final Text](#)

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001188

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: