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Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM130854

6. If Indian, Allotee or Tribe Name

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

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
COTTONBERRY 20 FEDERAL 6H
322224

2. Name of Operator
CIMAREX ENERGY COMPANY

9. API Well No.
30 015 46693

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
600 N. Marienfeld St., Suite 600 Midland TX 79701	(432)620-1936	BONE SPRING / WILDCAT BONE SPRIN

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWNW / 1047 FNL / 630 FWL / LAT 32.119868 / LONG -104.218805
At proposed prod. zone SWSW / 100 FSL / 1980 FWL / LAT 32.108443 / LONG -104.214177

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 20 / T25S / R27E / NMP

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

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
630 feet	360	200

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
60 feet	7799 feet / 11920 feet	FED: NMB001188

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3150 feet	07/09/2019	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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Hope Knauls / Ph: (918)295-1799	04/16/2019
Title: Regulatory Technician		
Approved by *(Signature)* (Electronic Submission)	Name *(Printed/Typed)* Cody Layton / Ph: (575)234-5959	Date 01/29/2020
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.

APPROVED WITH CONDITIONS
Approval Date: 01/29/2020

KS 2-10-20

(Continued on page 2)

*(Instructions on page 2)

completing the cement job.

b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

Single Stage:

- 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.**

❖ In High Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

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

Single Stage:

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

Excess is at 18% for the production casing cement. Additional cement may be needed.

C. PRESSURE CONTROL

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

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi

3. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **3000 (3M)** psi.

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.

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

GENERAL REQUIREMENTS

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

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

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

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig
      - Notify the BLM when moving in and removing the Spudder Rig.
      - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

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

B. PRESSURE CONTROL

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

2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

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

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

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

lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

e. The results of the test shall be reported to the appropriate BLM office.

f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

YJ 01/24/2020

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Cimarex Energy Company
LEASE NO.:	NMNM130854, NMNM113954, NMNM130855
LOCATION:	S1 T26S R32E S17 T25S R27E S20 T25S R27E
COUNTY:	Eddy

Wells:

Cottonberry 20 Federal 6H
Surface Hole Location: 406' FNL & 1916' FEL, Section 1, T. 26 S., R. 32 E.
Bottom Hole Location: 50' FSL & 990' FEL, Section 12, T. 26 S., R. 32 E.

Cottonberry 20 Federal Com 7H
Surface Hole Location: 127' FSL & 2285' FEL, Section 17, T. 25 S., R. 27 E.
Bottom Hole Location: 100' FSL & 1980' FWL, Section 20, T. 25 S., R. 27 E.

Cottonberry 20 Federal Com 8H
Surface Hole Location: 390' FNL & 701' FEL, Section 20, T. 25 S., R. 27 E.
Bottom Hole Location: 330' FSL & 660' FWL, Section 20, T. 25 S., R. 27 E.

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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.

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 resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The 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 the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

OR

If the entire project is covered under the Permian Basin Programmatic Agreement (cultural resources only):

The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. See information below discussing NAGPRA.

If the proposed project is split between a Class III inventory and a Permian Basin Programmatic Agreement contribution, the portion of the project covered under Class III inventory should default to the first paragraph stipulations.

The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The 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 the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

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)

Watershed:
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.

Karst Resources:

CONSTRUCTION MITIGATION

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

- In the event that any underground voids are encountered during construction activities, construction activities will be halted and the BLM will be notified immediately.
- No blasting – the pad and roads will be constructed and leveled by adding the necessary fill and caliche.
- All pads will be bermed to minimize the impact of any spilled contaminates

DRILLING MITIGATION

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required.

- Closed mud system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

PRODUCTION MITIGATION

In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

RESIDUAL AND CUMULATIVE MITIGATION

The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be taken to correct the problem to the BLM's approval.

PLUGGING AND ABANDONMENT MITIGATION

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

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.

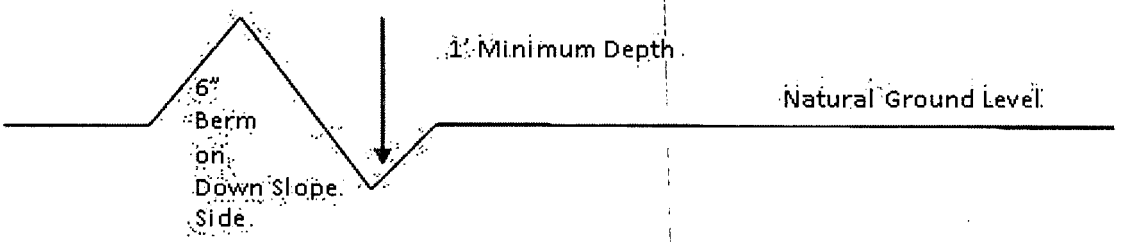
Crowning
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

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

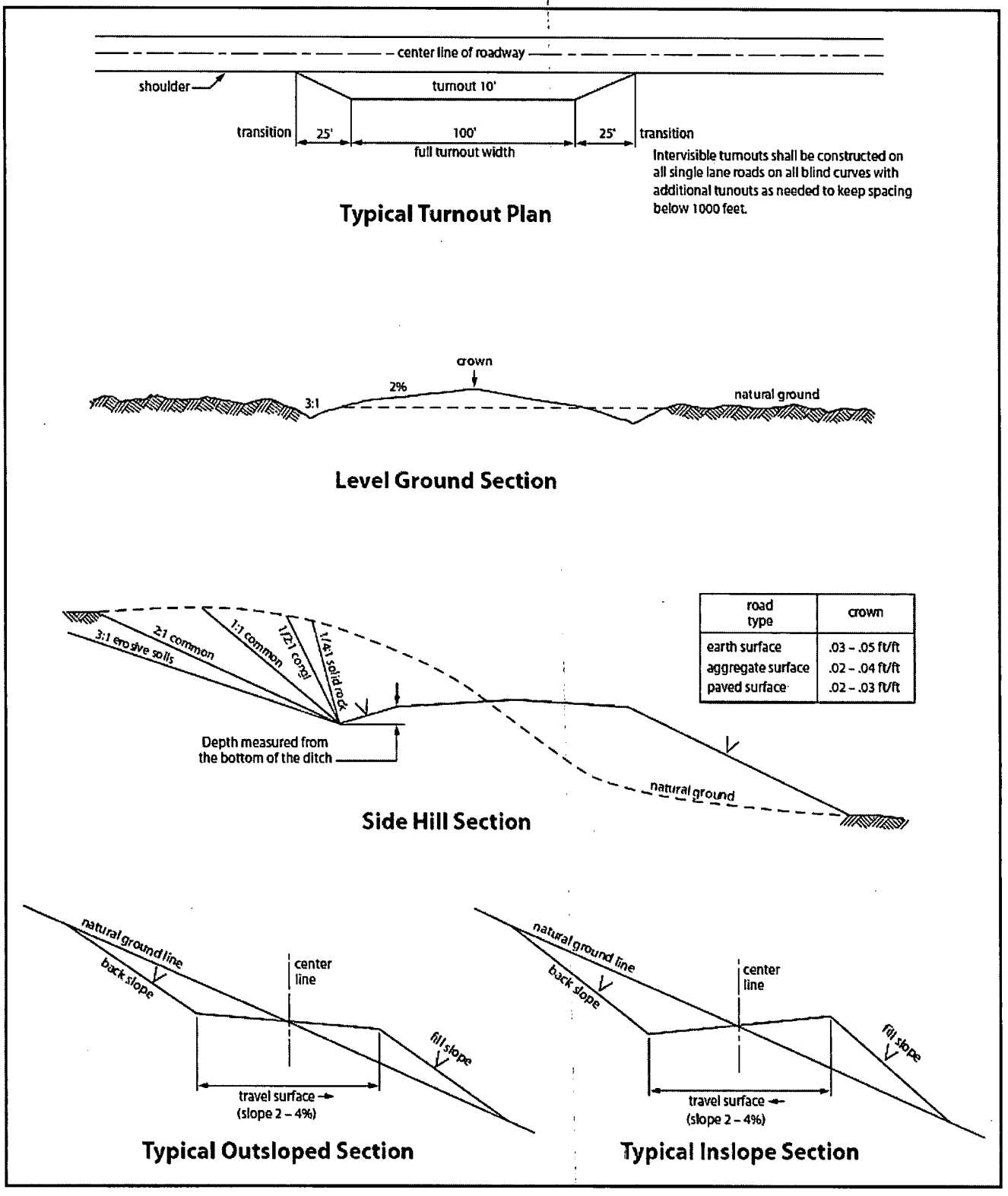


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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).

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.

(Insert Seed Mixture Here)

Approval Date: 01/29/2020

AFMSS

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

Operator Certification Data Report

02/03/2020

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: Amithy Crawford **Signed on:** 04/15/2019

Title: Regulatory Analyst

Street Address: 600 N MARIENFELD STE 600

City: MIDLAND **State:** TX **Zip:** 79701

Phone: (432)620-1909

Email address: acrawford@cimarex.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

Email address:

AFMSS

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

Application Data Report

02/03/2020

APD ID: 10400040714 **Submission Date:** 04/16/2019

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400040714 **Tie to previous NOS?** Y **Submission Date:** 04/16/2019

BLM Office: CARLSBAD **User:** Amithy Crawford **Title:** Regulatory Analyst

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM130854 **Lease Acres:** 360

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: COTTONBERRY 20 FEDERAL **Well Number:** 6H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** BONE SPRING **Pool Name:** WILDCAT BONE SPRING

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

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

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

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** COTTONBERRY 20 FEDERAL **Number:** 1H,5H & 6H

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 11 Miles **Distance to nearest well:** 60 FT **Distance to lease line:** 630 FT

Reservoir well spacing assigned acres Measurement: 200 Acres

Well plat: Cottonberry_20_Fed_6H_C102_20190409162835.pdf

Well work start Date: 07/09/2019 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 23782 **Reference Datum:**

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
SHL Leg #1	1047	FNL	630	FWL	25S	27E	20	Aliquot NWNW	32.119868	-104.218805	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 130854	3150	0	0	
KOP Leg #1	1047	FNL	720	FWL	25S	27E	20	Aliquot NWNW	32.119863 9	-104.214441 7	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 130854	-4171	7492	7321	
PPP Leg	1057	FNL	720	FWL	25S	27E	20	Aliquot NWN	32.120513 9	-104.2183	EDDY	NEW MEXI	NEW MEXI	F	NMNM 130854	-426	7588	7417	

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
EXIT Leg #1	100	FSL	1980	FWL	25S	27E	20	Aliquot SWSW	32.108443	-104.214177	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 130854	-4649	11920	7799	
BHL Leg #1	100	FSL	1980	FWL	25S	27E	20	Aliquot SWSW	32.108443	-104.214177	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 130854	-4649	11920	7799	

AFMSS

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

Drilling Plan Data Report

02/03/2020

APD ID: 10400040714 **Submission Date:** 04/16/2019

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
435653	RUSTLER	1198	0	0		USEABLE WATER	N
435654	SALADO	0	1198	1198		NONE	N
435655	CASTILE	-563	1761	1761		NONE	N
435650	BELL CANYON	-757	1955	1955		NATURAL GAS, OIL	N
435647	CHERRY CANYON	-1744	2942	2942		NATURAL GAS, OIL	N
435649	BRUSHY CANYON	-2765	3963	3963		NATURAL GAS, OIL	N
435651	BONE SPRING	-4321	5519	5519		NATURAL GAS, OIL	N
435657	BONE SPRING 1ST	-5359	6557	6557		NATURAL GAS, OIL	N
435652	BONE SPRING 2ND	-5791	6989	6989		NATURAL GAS, OIL	N
436494	BONE SPRING 3RD	-6601	7799	7799		NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 2M **Rating Depth:** 1935

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

Requesting Variance? YES

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

Testing Procedure: A multi-bowl wellhead system will be utilized. After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 3000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 2000 psi test. Annular will be tested to 50% of working pressure. The pressure

a third-party welder while being monitored by the wellhead vendor representative. All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type. A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 2000 psi. A solid steel body pack-off will be utilized after running and cementing the production casing. After installation the pack-off and lower flange will be pressure tested to 2000 psi. The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater. The casing string utilizing steel body pack-off will be tested to 70% of casing burst. If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Choke Diagram Attachment:

Cottonberry_20_Fed_6H_Choke_2M3M_20190410095036.pdf

BOP Diagram Attachment:

Cottonberry_20_Fed_6H_BOP_2M_20190410095051.pdf

Pressure Rating (PSI): 3M **Rating Depth:** 11920

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

Requesting Variance? YES

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

Testing Procedure: A multi-bowl wellhead system will be utilized. After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 3000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2. The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office. The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative. All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type. A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 3000 psi. A solid steel body pack-off will be utilized after running and cementing the production casing. After installation the pack-off and lower flange will be pressure tested to 3000 psi. The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater. The casing string utilizing steel body pack-off will be tested to 70% of casing burst. If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Choke Diagram Attachment:

Cottonberry_20_Fed_6H_Choke_2M3M_20190410095117.pdf

BOP Diagram Attachment:

Cottonberry_20_Fed_6H_BOP_3M_20190410095135.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

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	17.5	13.375	NEW	NON API	N	0	450	0	450	0	450	450	OTHER	48	ST&C	3.59	8.4	BUOY	14.91	BUOY	14.91
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	1935	0	1935	0	1935	1935	J-55	36	ST&C	1.97	3.43	BUOY	5.66	BUOY	5.66
3	PRODUCTION	8.75	5.5	NEW	API	N	0	7492	0	7492	0	7492	7492	L-80	17	LT&C	1.79	2.21	BUOY	2.55	BUOY	2.55
4	PRODUCTION	8.75	5.5	NEW	API	N	7492	11920	7799	11920		11920	4428	L-80	17	BUTT	1.72	2.12	BUOY	49.58	BUOY	49.58

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Cottonberry_20_Fed_6H_Spec_Sheet_20190410095216.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cottonberry_20_Fed_6H_Casing_Assumptions_20190415102925.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

Casing Attachments

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cottonberry_20_Fed_6H_Casing_Assumptions_20190415103216.pdf

Casing ID: 3 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cottonberry_20_Fed_6H_Casing_Assumptions_20190415103152.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Cottonberry_20_Fed_6H_Casing_Assumptions_20190415104736.pdf

Section 4 - Cement

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	450	91	1.72	13.5	156	50	Class C	Bentonite
SURFACE	Tail		0	450	195	1.34	14.8	260	25	Class C	LCM
INTERMEDIATE	Lead		0	1935	365	1.88	12.9	686	50	35:65 (POZ C)	Salt, Bentonite
INTERMEDIATE	Tail		0	1935	113	1.34	14.8	151	25	Class C	LCM
PRODUCTION	Lead		0	7492	497	3.64	10.3	1809	25	Tuned light	LCM
PRODUCTION	Tail		0	7492	947	1.3	14.2	1231	25	50:50 (POZ H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
PRODUCTION	Lead		7492	11920	497	3.64	10.3	1809	25	35:65 (Poz:C)	Salt, Bentonite, fluid loss, dispersant, sms
PRODUCTION	Tail		7492	11920	947	1.3	14.2	1231	25	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

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	450	SPUD MUD	8.3	8.8							

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

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
450	1935	SALT SATURATED	9.7	10.2							
1935	11920	OTHER : FW/Cute Brine	8.5	9							

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: 3649 **Anticipated Surface Pressure:** 1933.22

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

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

Contingency Plans geoharzards 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:

Cottonberry_20_Fed_6H_H2S_Plan_20190410132826.pdf

Operator Name: CIMAREX ENERGY COMPANY

Well Name: COTTONBERRY 20 FEDERAL **Well Number:** 6H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Cottonberry_20_Fed_6H_Directional_Plan_20190410105533.pdf

Cottonberry_20_Fed_6H_AC_Report_20190410105558.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Cottonberry_20_Fed_6H_Flex_Hose_20190410105639.pdf

Cottonberry_20_Fed_6H_Gas_Capture_Plan_20190410110041.pdf

Cottonberry_20_Fed_6H_Drilling_Plan_20190415114033.pdf

Other Variance attachment:

Cottonberry_20_Fed_6H_Multibowl_Procedure_20190415121900.pdf

Cottonberry_20_Fed_6H_Multibowl_wellhead_20190415121924.pdf

Hydrogen Sulfide Drilling Operations Plan
Cottonberry 20 Federal 6H
Cimarex Energy Co.
UL: D, Sec. 20, 25S, 27E
Eddy 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 H_2S
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.

H_2S 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 play 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 (H_2S 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 r cores are planned at this time.

8 Drilling contractor supervisor will be required to be familiar with the effects H_2S 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.

H_2S Contingency Plan
Cottonberry 20 Federal 6H
Cimarex Energy Co.
UL: D, Sec. 20, 25S, 27E
Eddy Co., NM

Emergency Procedures

In the event of a release of gas containing H_2S, 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 H_2S 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 H_2S, 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 (SO_2). 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 H_2S and SO_2

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).

H_2S Contingency Plan Emergency Contacts
Cottonberry 20 Federal 6H
Cimarex Energy Co.
UL: D, Sec. 20, 25S, 27E
Eddy Co., NM

Company Office			
Cimarex Energy Co. of Colorado		800-969-4789	
Co. Office and After-Hours Menu			
Key Personnel			
Name	**Title**	**Office**	**Mobile**
Larry Seigrist	Director of Drilling & Completions	432-620-1934	580-243-8485
Charlie Pritchard	Drilling Manager	432-620-1975	432-238-7084
Spencer Bryant	Drilling Superintendent	432-620-7885	580-603-2611
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	

Schlumberger

Cimarex Cottonberry 20 Federal 6H Rev0 RM 09Apr19 Proposal Geodetic Report

(Non-Def Plan)

CIMAREX

Report Date:	April 09, 2019 - 01:37 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex Energy	**Vertical Section Azimuth:**	178.805 ° (Grid North)
Field:	NM Eddy County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Cottonberry 20 Federal 6H / New Slot	**TVD Reference Datum:**	RKB
Well:	Cottonberry 20 Federal 6H	**TVD Reference Elevation:**	3176.100 ft above MSL
Borehole:	Cottonberry 20 Federal 6H	**Seabed / Ground Elevation:**	3150.100 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.269 °
Survey Name:	Cimarex Cottonberry 20 Federal 6H Rev0 RM 09Apr19	**Total Gravity Field Strength:**	998.4465mgn (9.80665 Based)
Survey Date:	April 08, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	120.309 ° / 5506.532 ft / 6.005 / 0.706	**Total Magnetic Field Strength:**	47822.179 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.769 °
Location Lat / Long:	N 32° 7' 11.52454", W 104° 13' 7.69743"	**Declination Date:**	April 08, 2019
Location Grid N/E Y/X:	N 407362.910 ftUS, E 576793.710 ftUS	**Magnetic Declination Model:**	HDGM 2019
CRS Grid Convergence Angle:	0.0609 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991053	**Grid Convergence Used:**	0.0609 °
Version / Patch:	2.10.753.0	**Total Corr Mag North->Grid North:**	7.2086 °
		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 [1047' FNL, 630' FWL]	0.00	0.00	160.92	0.00	0.00	0.00	0.00	N/A	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	100.00	0.00	90.00	100.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	200.00	0.00	90.00	200.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	300.00	0.00	90.00	300.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	400.00	0.00	90.00	400.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	500.00	0.00	90.00	500.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	600.00	0.00	90.00	600.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	700.00	0.00	90.00	700.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	800.00	0.00	90.00	800.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	900.00	0.00	90.00	900.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	1000.00	0.00	90.00	1000.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	1100.00	0.00	90.00	1100.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
Top Salt	*1198.00*	*0.00*	*90.00*	*1198.00*	*0.00*	*0.00*	*0.00*	*0.00*	*407362.91*	*576793.71*	*N 32 7 11.52*	*W 104 13 7.70*
	1200.00	0.00	90.00	1200.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	1300.00	0.00	90.00	1300.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	1400.00	0.00	90.00	1400.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
Nudge 2°/100' DLS	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00	407362.91	576793.71	N 32 7 11.52	W 104 13 7.70
	1600.00	2.00	90.00	1599.98	0.04	0.00	1.75	2.00	407362.91	576795.45	N 32 7 11.52	W 104 13 7.68
	1700.00	4.00	90.00	1699.84	0.15	0.00	6.98	2.00	407362.91	576800.69	N 32 7 11.52	W 104 13 7.62
Base Salt	*1761.36*	*5.23*	*90.00*	*1761.00*	*0.25*	*0.00*	*11.91*	*2.00*	*407362.91*	*576805.62*	*N 32 7 11.52*	*W 104 13 7.56*
	1800.00	6.00	90.00	1799.45	0.33	0.00	15.69	2.00	407362.91	576809.40	N 32 7 11.52	W 104 13 7.51
	1900.00	8.00	90.00	1898.70	0.58	0.00	27.88	2.00	407362.91	576821.59	N 32 7 11.52	W 104 13 7.37
Bell Canyon (Top Delaware)	*1956.93*	*9.14*	*90.00*	*1955.00*	*0.76*	*0.00*	*36.36*	*2.00*	*407362.91*	*576830.07*	*N 32 7 11.52*	*W 104 13 7.27*
	2000.00	10.00	90.00	1997.47	0.91	0.00	43.52	2.00	407362.91	576837.23	N 32 7 11.52	W 104 13 7.19
	2100.00	12.00	90.00	2095.62	1.31	0.00	62.60	2.00	407362.91	576856.31	N 32 7 11.52	W 104 13 6.97
	2200.00	14.00	90.00	2193.06	1.77	0.00	85.10	2.00	407362.91	576878.80	N 32 7 11.52	W 104 13 6.71

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Hold Nudge	2257.73	15.15	90.00	2248.92	2.08	0.00	99.62	2.00	407362.91	576893.33	N 32 7 11.52	W 104 13 6.54
	2300.00	15.15	90.00	2289.73	2.31	0.00	110.68	0.00	407362.91	576904.38	N 32 7 11.52	W 104 13 6.41
	2400.00	15.15	90.00	2386.25	2.85	0.00	136.82	0.00	407362.91	576930.52	N 32 7 11.52	W 104 13 6.11
	2500.00	15.15	90.00	2482.77	3.40	0.00	162.96	0.00	407362.91	576956.66	N 32 7 11.52	W 104 13 5.80
	2600.00	15.15	90.00	2579.29	3.94	0.00	189.10	0.00	407362.91	576982.80	N 32 7 11.52	W 104 13 5.50
	2700.00	15.15	90.00	2675.82	4.49	0.00	215.25	0.00	407362.91	577008.94	N 32 7 11.52	W 104 13 5.19
	2800.00	15.15	90.00	2772.34	5.03	0.00	241.39	0.00	407362.91	577035.08	N 32 7 11.52	W 104 13 4.89
	2900.00	15.15	90.00	2868.86	5.58	0.00	267.53	0.00	407362.91	577061.22	N 32 7 11.52	W 104 13 4.59
Cherry Canyon	*2975.77*	*15.15*	*90.00*	*2942.00*	*5.99*	*0.00*	*287.34*	*0.00*	*407362.91*	*577081.02*	*N 32 7 11.52*	*W 104 13 4.36*
	3000.00	15.15	90.00	2965.38	6.12	0.00	293.67	0.00	407362.91	577087.36	N 32 7 11.52	W 104 13 4.28
	3100.00	15.15	90.00	3061.91	6.67	0.00	319.81	0.00	407362.91	577113.50	N 32 7 11.52	W 104 13 3.98
	3200.00	15.15	90.00	3158.43	7.21	0.00	345.96	0.00	407362.91	577139.64	N 32 7 11.52	W 104 13 3.67
	3300.00	15.15	90.00	3254.95	7.76	0.00	372.10	0.00	407362.91	577165.78	N 32 7 11.52	W 104 13 3.37
	3400.00	15.15	90.00	3351.47	8.31	0.00	398.24	0.00	407362.91	577191.92	N 32 7 11.52	W 104 13 3.07
	3500.00	15.15	90.00	3448.00	8.85	0.00	424.38	0.00	407362.91	577218.05	N 32 7 11.52	W 104 13 2.76
	3600.00	15.15	90.00	3544.52	9.40	0.00	450.53	0.00	407362.91	577244.19	N 32 7 11.52	W 104 13 2.46
	3700.00	15.15	90.00	3641.04	9.94	0.00	476.67	0.00	407362.91	577270.33	N 32 7 11.52	W 104 13 2.16
	3800.00	15.15	90.00	3737.56	10.49	0.00	502.81	0.00	407362.91	577296.47	N 32 7 11.52	W 104 13 1.85
	3900.00	15.15	90.00	3834.08	11.03	0.00	528.95	0.00	407362.91	577322.61	N 32 7 11.52	W 104 13 1.55
	4000.00	15.15	90.00	3930.61	11.58	0.00	555.10	0.00	407362.91	577348.75	N 32 7 11.52	W 104 13 1.24
Brushy Canyon	*4033.56*	*15.15*	*90.00*	*3963.00*	*11.76*	*0.00*	*563.87*	*0.00*	*407362.91*	*577357.53*	*N 32 7 11.52*	*W 104 13 1.14*
	4100.00	15.15	90.00	4027.13	12.12	0.00	581.24	0.00	407362.91	577374.89	N 32 7 11.52	W 104 13 0.94
	4200.00	15.15	90.00	4123.65	12.67	0.00	607.38	0.00	407362.91	577401.03	N 32 7 11.52	W 104 13 0.64
	4300.00	15.15	90.00	4220.17	13.21	0.00	633.52	0.00	407362.91	577427.17	N 32 7 11.52	W 104 13 0.33
	4400.00	15.15	90.00	4316.70	13.76	0.00	659.66	0.00	407362.91	577453.31	N 32 7 11.52	W 104 13 0.03
	4500.00	15.15	90.00	4413.22	14.30	0.00	685.81	0.00	407362.91	577479.45	N 32 7 11.52	W 104 12 59.72
	4600.00	15.15	90.00	4509.74	14.85	0.00	711.95	0.00	407362.91	577505.59	N 32 7 11.52	W 104 12 59.42
	4700.00	15.15	90.00	4606.26	15.39	0.00	738.09	0.00	407362.91	577531.73	N 32 7 11.52	W 104 12 59.12
	4800.00	15.15	90.00	4702.79	15.94	0.00	764.23	0.00	407362.91	577557.87	N 32 7 11.52	W 104 12 58.81
	4900.00	15.15	90.00	4799.31	16.48	0.00	790.38	0.00	407362.91	577584.01	N 32 7 11.52	W 104 12 58.51
	5000.00	15.15	90.00	4895.83	17.03	0.00	816.52	0.00	407362.91	577610.15	N 32 7 11.52	W 104 12 58.20
	5100.00	15.15	90.00	4992.35	17.57	0.00	842.66	0.00	407362.91	577636.29	N 32 7 11.52	W 104 12 57.90
	5200.00	15.15	90.00	5088.88	18.12	0.00	868.80	0.00	407362.91	577662.43	N 32 7 11.52	W 104 12 57.60
	5300.00	15.15	90.00	5185.40	18.66	0.00	894.94	0.00	407362.91	577688.57	N 32 7 11.52	W 104 12 57.29
	5400.00	15.15	90.00	5281.92	19.21	0.00	921.09	0.00	407362.91	577714.71	N 32 7 11.51	W 104 12 56.99
	5500.00	15.15	90.00	5378.44	19.75	0.00	947.23	0.00	407362.91	577740.85	N 32 7 11.51	W 104 12 56.68
	5600.00	15.15	90.00	5474.97	20.30	0.00	973.37	0.00	407362.91	577766.99	N 32 7 11.51	W 104 12 56.38
Bone Spring	*5645.62*	*15.15*	*90.00*	*5519.00*	*20.55*	*0.00*	*985.30*	*0.00*	*407362.91*	*577778.92*	*N 32 7 11.51*	*W 104 12 56.24*
	5700.00	15.15	90.00	5571.49	20.85	0.00	999.51	0.00	407362.91	577793.13	N 32 7 11.51	W 104 12 56.08
	5800.00	15.15	90.00	5668.01	21.39	0.00	1025.66	0.00	407362.91	577819.27	N 32 7 11.51	W 104 12 55.77
	5900.00	15.15	90.00	5764.53	21.94	0.00	1051.80	0.00	407362.91	577845.41	N 32 7 11.51	W 104 12 55.47
	6000.00	15.15	90.00	5861.06	22.48	0.00	1077.94	0.00	407362.91	577871.55	N 32 7 11.51	W 104 12 55.16
	6100.00	15.15	90.00	5957.58	23.03	0.00	1104.08	0.00	407362.91	577897.69	N 32 7 11.51	W 104 12 54.86
	6200.00	15.15	90.00	6054.10	23.57	0.00	1130.23	0.00	407362.91	577923.83	N 32 7 11.51	W 104 12 54.56
	6300.00	15.15	90.00	6150.62	24.12	0.00	1156.37	0.00	407362.91	577949.97	N 32 7 11.51	W 104 12 54.25
	6400.00	15.15	90.00	6247.15	24.66	0.00	1182.51	0.00	407362.91	577976.11	N 32 7 11.51	W 104 12 53.95
	6500.00	15.15	90.00	6343.67	25.21	0.00	1208.65	0.00	407362.91	578002.25	N 32 7 11.51	W 104 12 53.64
	6600.00	15.15	90.00	6440.19	25.75	0.00	1234.79	0.00	407362.91	578028.39	N 32 7 11.51	W 104 12 53.34
Drop to Vertical 2°/100' DLS	6661.96	15.15	90.00	6500.00	26.09	0.00	1250.99	0.00	407362.91	578044.59	N 32 7 11.51	W 104 12 53.15
	6700.00	14.39	90.00	6536.78	26.29	0.00	1260.69	2.00	407362.91	578054.29	N 32 7 11.51	W 104 12 53.04
1st Bone Spring Sand	*6720.86*	*13.98*	*90.00*	*6557.00*	*26.40*	*0.00*	*1265.80*	*2.00*	*407362.91*	*578059.40*	*N 32 7 11.51*	*W 104 12 52.98*
	6800.00	12.39	90.00	6634.05	26.78	0.00	1283.86	2.00	407362.91	578077.45	N 32 7 11.51	W 104 12 52.77
	6900.00	10.39	90.00	6732.08	27.19	0.00	1303.61	2.00	407362.91	578097.20	N 32 7 11.51	W 104 12 52.54
	7000.00	8.39	90.00	6830.73	27.53	0.00	1319.93	2.00	407362.91	578113.52	N 32 7 11.51	W 104 12 52.35
	7100.00	6.39	90.00	6929.90	27.80	0.00	1332.80	2.00	407362.91	578126.39	N 32 7 11.51	W 104 12 52.20
2nd Bone Spring Sand	*7159.41*	*5.21*	*90.00*	*6989.00*	*27.92*	*0.00*	*1338.80*	*2.00*	*407362.91*	*578132.39*	*N 32 7 11.51*	*W 104 12 52.13*

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 ° ' ")
	7200.00	4.39	90.00	7029.45	27.99	0.00	1342.20	2.00	407362.91	578135.79	N 32 7 11.51	W 104 12 52.09
	7300.00	2.39	90.00	7129.27	28.12	0.00	1348.12	2.00	407362.91	578141.70	N 32 7 11.51	W 104 12 52.02
	7400.00	0.39	90.00	7229.23	28.17	0.00	1350.55	2.00	407362.91	578144.14	N 32 7 11.51	W 104 12 51.99
Hold Vertical	7419.69	0.00	90.00	7248.92	28.17	0.00	1350.62	2.00	407362.91	578144.20	N 32 7 11.51	W 104 12 51.99
KOP - Build 12°/100' DLS	7492.30	0.00	90.00	7321.54	28.17	0.00	1350.62	0.00	407362.91	578144.20	N 32 7 11.51	W 104 12 51.99
	7500.00	0.92	178.80	7329.23	28.23	-0.06	1350.62	12.00	407362.85	578144.21	N 32 7 11.51	W 104 12 51.99
3rd Bone Sping Carb	*7588.42*	*11.53*	*178.80*	*7417.00*	*37.81*	*-9.64*	*1350.82*	*12.00*	*407353.27*	*578144.41*	*N 32 7 11.41*	*W 104 12 51.99*
	7600.00	12.92	178.80	7428.32	40.26	-12.09	1350.87	12.00	407350.82	578144.46	N 32 7 11.39	W 104 12 51.99
	7700.00	24.92	178.80	7522.74	72.63	-44.46	1351.55	12.00	407318.46	578145.13	N 32 7 11.07	W 104 12 51.98
	7800.00	36.92	178.80	7608.37	123.93	-95.74	1352.61	12.00	407267.18	578146.20	N 32 7 10.56	W 104 12 51.97
	7900.00	48.92	178.80	7681.46	191.91	-163.70	1354.03	12.00	407199.22	578147.62	N 32 7 9.89	W 104 12 51.96
Harkey Sand	*7958.31*	*55.92*	*178.80*	*7717.00*	*238.09*	*-209.87*	*1355.00*	*12.00*	*407153.05*	*578148.58*	*N 32 7 9.43*	*W 104 12 51.95*
	8000.00	60.92	178.80	7738.83	273.60	-245.38	1355.74	12.00	407117.56	578149.32	N 32 7 9.08	W 104 12 51.94
	8100.00	72.92	178.80	7777.95	365.43	-337.19	1357.65	12.00	407025.76	578151.24	N 32 7 8.17	W 104 12 51.92
	8200.00	84.92	178.80	7797.13	463.38	-435.12	1359.69	12.00	406927.83	578153.28	N 32 7 7.20	W 104 12 51.89
Landing Point	8242.30	90.00	178.80	7799.00	505.63	-477.36	1360.58	12.00	406885.59	578154.16	N 32 7 6.79	W 104 12 51.88
	8300.00	90.00	178.80	7799.00	563.33	-535.05	1361.78	0.00	406827.91	578155.36	N 32 7 6.22	W 104 12 51.87
	8400.00	90.00	178.80	7799.00	663.33	-635.02	1363.86	0.00	406727.94	578157.45	N 32 7 5.23	W 104 12 51.85
	8500.00	90.00	178.80	7799.00	763.33	-735.00	1365.95	0.00	406627.98	578159.54	N 32 7 4.24	W 104 12 51.82
	8600.00	90.00	178.80	7799.00	863.33	-834.98	1368.04	0.00	406528.01	578161.62	N 32 7 3.25	W 104 12 51.80
	8700.00	90.00	178.80	7799.00	963.33	-934.96	1370.12	0.00	406428.04	578163.71	N 32 7 2.26	W 104 12 51.78
	8800.00	90.00	178.80	7799.00	1063.33	-1034.94	1372.21	0.00	406328.07	578165.79	N 32 7 1.27	W 104 12 51.76
	8900.00	90.00	178.80	7799.00	1163.33	-1134.91	1374.29	0.00	406228.10	578167.88	N 32 7 0.28	W 104 12 51.73
	9000.00	90.00	178.80	7799.00	1263.33	-1234.89	1376.38	0.00	406128.13	578169.96	N 32 6 59.29	W 104 12 51.71
	9100.00	90.00	178.80	7799.00	1363.33	-1334.87	1378.46	0.00	406028.16	578172.05	N 32 6 58.30	W 104 12 51.69
	9200.00	90.00	178.80	7799.00	1463.33	-1434.85	1380.55	0.00	405928.19	578174.13	N 32 6 57.31	W 104 12 51.66
	9300.00	90.00	178.80	7799.00	1563.33	-1534.83	1382.63	0.00	405828.22	578176.22	N 32 6 56.32	W 104 12 51.64
	9400.00	90.00	178.80	7799.00	1663.33	-1634.81	1384.72	0.00	405728.25	578178.30	N 32 6 55.33	W 104 12 51.62
	9500.00	90.00	178.80	7799.00	1763.33	-1734.78	1386.81	0.00	405628.28	578180.39	N 32 6 54.34	W 104 12 51.59
	9600.00	90.00	178.80	7799.00	1863.33	-1834.76	1388.89	0.00	405528.32	578182.47	N 32 6 53.35	W 104 12 51.57
	9700.00	90.00	178.80	7799.00	1963.33	-1934.74	1390.98	0.00	405428.35	578184.56	N 32 6 52.36	W 104 12 51.55
	9800.00	90.00	178.80	7799.00	2063.33	-2034.72	1393.06	0.00	405328.38	578186.64	N 32 6 51.38	W 104 12 51.53
	9900.00	90.00	178.80	7799.00	2163.33	-2134.70	1395.15	0.00	405228.41	578188.73	N 32 6 50.39	W 104 12 51.50
	10000.00	90.00	178.80	7799.00	2263.33	-2234.68	1397.23	0.00	405128.44	578190.82	N 32 6 49.40	W 104 12 51.48
	10100.00	90.00	178.80	7799.00	2363.33	-2334.65	1399.32	0.00	405028.47	578192.90	N 32 6 48.41	W 104 12 51.46
	10200.00	90.00	178.80	7799.00	2463.33	-2434.63	1401.40	0.00	404928.50	578194.99	N 32 6 47.42	W 104 12 51.43
	10300.00	90.00	178.80	7799.00	2563.33	-2534.61	1403.49	0.00	404828.53	578197.07	N 32 6 46.43	W 104 12 51.41
	10400.00	90.00	178.80	7799.00	2663.33	-2634.59	1405.58	0.00	404728.56	578199.16	N 32 6 45.44	W 104 12 51.39
	10500.00	90.00	178.80	7799.00	2763.33	-2734.57	1407.66	0.00	404628.59	578201.24	N 32 6 44.45	W 104 12 51.37
	10600.00	90.00	178.80	7799.00	2863.33	-2834.55	1409.75	0.00	404528.62	578203.33	N 32 6 43.46	W 104 12 51.34
	10700.00	90.00	178.80	7799.00	2963.33	-2934.52	1411.83	0.00	404428.66	578205.41	N 32 6 42.47	W 104 12 51.32
	10800.00	90.00	178.80	7799.00	3063.33	-3034.50	1413.92	0.00	404328.69	578207.50	N 32 6 41.48	W 104 12 51.30
	10900.00	90.00	178.80	7799.00	3163.33	-3134.48	1416.00	0.00	404228.72	578209.58	N 32 6 40.49	W 104 12 51.27
	11000.00	90.00	178.80	7799.00	3263.33	-3234.46	1418.09	0.00	404128.75	578211.67	N 32 6 39.50	W 104 12 51.25
	11100.00	90.00	178.80	7799.00	3363.33	-3334.44	1420.17	0.00	404028.78	578213.75	N 32 6 38.51	W 104 12 51.23
	11200.00	90.00	178.80	7799.00	3463.33	-3434.41	1422.26	0.00	403928.81	578215.84	N 32 6 37.52	W 104 12 51.20
	11300.00	90.00	178.80	7799.00	3563.33	-3534.39	1424.35	0.00	403828.84	578217.93	N 32 6 36.54	W 104 12 51.18
	11400.00	90.00	178.80	7799.00	3663.33	-3634.37	1426.43	0.00	403728.87	578220.01	N 32 6 35.55	W 104 12 51.16
	11500.00	90.00	178.80	7799.00	3763.33	-3734.35	1428.52	0.00	403628.90	578222.10	N 32 6 34.56	W 104 12 51.14
	11600.00	90.00	178.80	7799.00	3863.33	-3834.33	1430.60	0.00	403528.93	578224.18	N 32 6 33.57	W 104 12 51.11
	11700.00	90.00	178.80	7799.00	3963.33	-3934.31	1432.69	0.00	403428.96	578226.27	N 32 6 32.58	W 104 12 51.09
	11800.00	90.00	178.80	7799.00	4063.33	-4034.28	1434.77	0.00	403329.00	578228.35	N 32 6 31.59	W 104 12 51.07
	11900.00	90.00	178.80	7799.00	4163.33	-4134.26	1436.86	0.00	403229.03	578230.44	N 32 6 30.60	W 104 12 51.04

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 Cottonberry 20 Federal 6H - PBHL [100' FSL, 1980' FWL]	11920.75	90.00	178.80	7799.00	4184.08	-4155.01	1437.29	0.00	403208.28	578230.87	N 32 6 30.39	W 104 12 51.04

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	Cottonberry 20 Federal 6H / Cimarex Cottonberry 20 Federal 6H Rev0 RM 09Apr19
	1	26.000	11920.752	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Cottonberry 20 Federal 6H / Cimarex Cottonberry 20 Federal

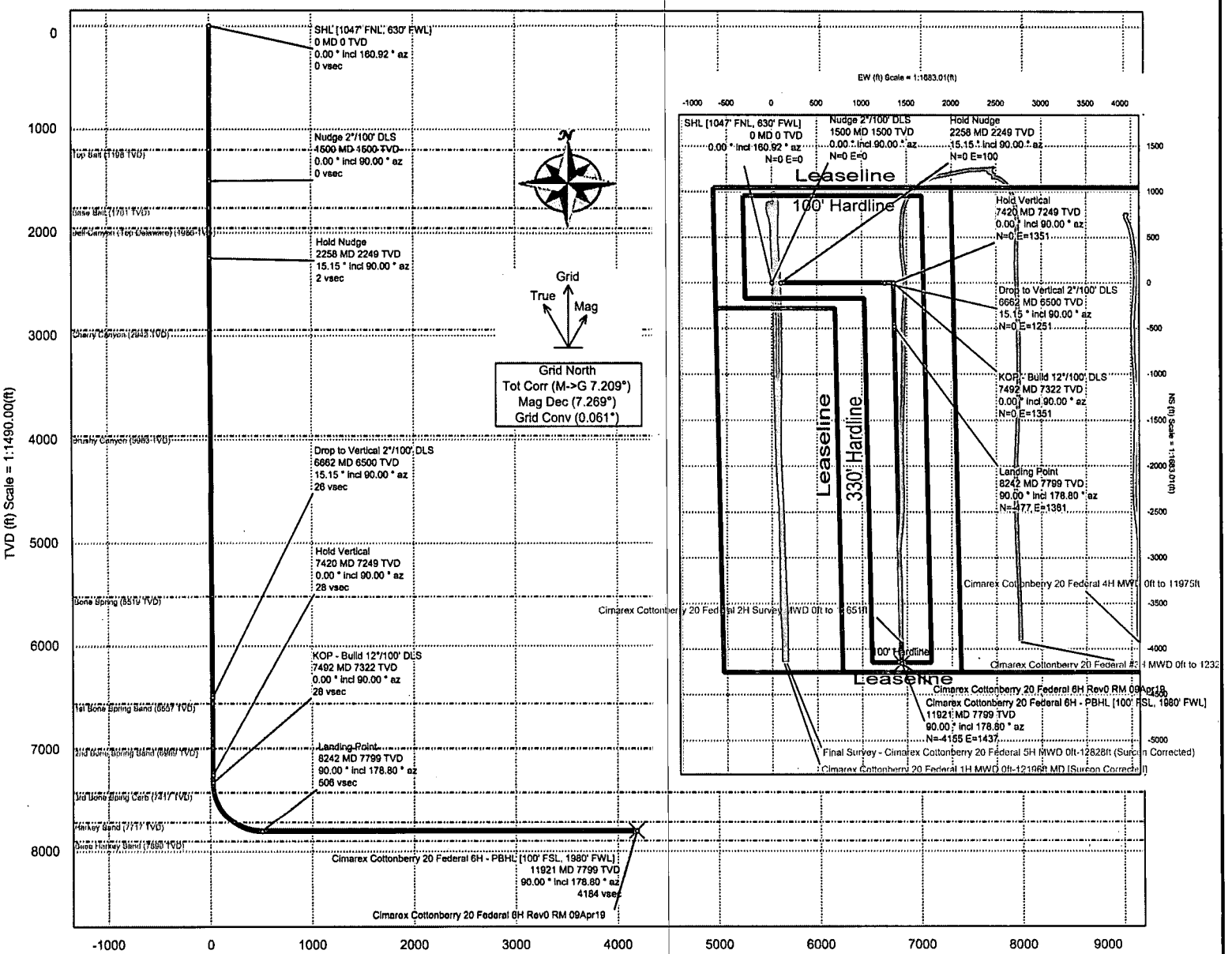
Schlumberger

Cimarex Energy Rev 0

CIMAREX

Borehole:	Well:	Field:	Structure:
Cottonberry 20 Federal 6H	Cottonberry 20 Federal 6H	NM Eddy County (NAD 83)	Cimarex Cottonberry 20 Federal 6H

Gravity & Magnetic Parameters					Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	HDGM 2019	Dip: 59.769°	Date:	08-Apr-2019	Lat:	N 32 7 11.62	Northing:	407362.91ftUS	Grid Conv:	0.0609°	Slot:	New Slot	TVD Ref:	RKB(3176.1ft above MSL)
MagDec:	7.269°	FS: 47822.179nT	Gravity FS:	998.446mgn (9.80665 Based)	Lon:	W 104 13 7.70	Easting:	576793.71ftUS	Scale Fact:	0.99991053	Plan:	Cimarex Cottonberry 20 Federal 6H Rev0 RM 09Apr19		



Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [1047' FNL, 630' FWL]	0.00	0.00	160.92	0.00	0.00	0.00	0.00	
Top Salt	1198.00	0.00	90.00	1198.00	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
Base Salt	1761.36	5.23	90.00	1761.00	0.25	0.00	11.91	2.00
Bell Canyon (Top Delaware)	1956.93	9.14	90.00	1955.00	0.76	0.00	36.36	2.00
Hold Nudge	2257.73	15.15	90.00	2248.92	2.08	0.00	99.62	2.00
Cherry Canyon	2975.77	15.15	90.00	2942.00	5.99	0.00	287.34	0.00
Brushy Canyon	4033.56	15.15	90.00	3963.00	11.76	0.00	563.87	0.00
Bone Spring	5645.62	15.15	90.00	5519.00	20.55	0.00	985.30	0.00
Drop to Vertical 2°/100' DLS	6661.96	15.15	90.00	6500.00	26.09	0.00	1250.99	0.00
1st Bone Spring Sand	6720.86	13.98	90.00	6557.00	26.40	0.00	1265.80	2.00
2nd Bone Spring Sand	7159.41	5.21	90.00	6989.00	27.92	0.00	1338.80	2.00
Hold Vertical	7419.69	0.00	90.00	7248.92	28.17	0.00	1350.62	2.00
KOP - Build 12°/100' DLS	7492.30	0.00	90.00	7321.54	28.17	0.00	1350.82	0.00
3rd Bone Sping Carb	7588.42	11.53	178.80	7417.00	37.61	-9.64	1350.82	12.00
Harkey Sand	7958.31	55.92	178.80	7717.00	238.09	-209.87	1355.00	12.00
Landing Point	8242.30	90.00	178.80	7799.00	505.63	-477.36	1360.58	12.00
Cimarex Cottonberry 20 Federal 6H - PBHL [100' FSL, 1980' FWL]	11920.75	90.00	178.80	7799.00	4184.08	-4155.01	1437.29	0.00
Base Harkey Sand	NaN			7899.00				

1. Geological Formations

TVD of target 7,799
MD at TD 11,920

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Top Salt	1198	N/A	
Base Salt	1761	N/A	
Bell Canyon (Top Delaware)	1955	N/A	
Cherry Canyon	2942	N/A	
Brushy Canyon	3963	N/A	
Bone Spring	5519	N/A	
1st Bone Spring Sand	6557	N/A	
2nd Bone Spring Sand	6989	N/A	
3rd Bone Spring Carb	7417	N/A	
Harkey Sand	7717	N/A	
Harkey Sand Target	7799	N/A	
Base Harkey Sand	7899	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
17 1/2	0	450	450	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	3.59	8.40	14.91
12 1/4	0	1935	1935	9-5/8"	36.00	J-55	ST&C	1.97	3.43	5.66
8 3/4	0	7492	7492	5-1/2"	17.00	L-80	LT&C	1.79	2.21	2.55
8 3/4	7492	11920	7799	5-1/2"	17.00	L-80	BT&C	1.72	2.12	76.07
						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

	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?	N
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	# Sks	Wt. lb/gal	Yld ft3/sack	H2O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	91	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	195	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	365	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	113	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	497	10.30	3.64	22.18		Lead: Tuned Light + LCM
	947	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	%Excess
Surface	0	33
Intermediate	0	50
Production	1735	18

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
12 1/4	13 5/8	2M	Annular	X	50% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	3M	Annular	X	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	X	
			Other		

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

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

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

5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 450'	FW Spud Mud	8.30 - 8.80	30-32	N/C
450' to 1935'	Brine Water	9.70 - 10.20	30-32	N/C
1935' to 11920'	FW/Cut Brine	8.50 - 9.00	30-32	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.

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 fromTD 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	3649 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

9. Wellhead

A multi-bowl wellhead system will be utilized.

After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 3000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 3000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

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

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

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

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 3000 psi.

The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

The casing string utilizing steel body pack-off will be tested to 70% of casing burst.

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