UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM138848

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
TAR HEEL 19-18-7 FEDERAL 20H

2. Name of Operator
CIMAREX ENERGY COMPANY
Contact: AMITHY E CRAWFORD
E-Mail: acrawford@cimarex.com

9. API Well No.
30-015-46567-00-X1

3a. Address
600 N MARIENFELD STREET STE 600
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 432-620-1909

10. Field and Pool or Exploratory Area
WILDCAT - BONE SPRING

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 19 T26S R30E SESW 760FSL 1436FWL
32.022644 N Lat, 103.924583 W Lon

11. County or Parish, State
EDDY COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Cimarex Respectfully requests the following changes:

Change the well name to: Tar Heel 19-18-7 Federal Com 20H

Change the BHL to: 2561' FSL & 2310' FWL Section 7 26S 30E

Changes to casing and cement program as attached in Drilling plan.

Please see attached: C102, Directional plan, Drilling Plan, Casing Specs, BOPS & choke Diagrams & Multibowl wellhead.

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #538529 verified by the BLM Well Information System
For CIMAREX ENERGY COMPANY, sent to the Carlsbad
Committed to AFMSS for processing by PRISCILLA PEREZ on 11/29/2020 (21PP0729SE)

Name *(Printed/Typed)* AMITHY E CRAWFORD — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 11/24/2020

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS — Title PETROLEUM ENGINEER — Date 12/22/2020

Conditions of approval, if any, are attached. Approval of this notice 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.

Office Carlsbad

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.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Revisions to Operator-Submitted EC Data for Sundry Notice #538529

	Operator Submitted	BLM Revised (AFMSS)
Sundry Type:	APDCH NOI	APDCH NOI
Lease:	NMNM138848	NMNM138848
Agreement:		
Operator:	CIMAREX ENERGY CO. 600 N. MARIENFELD SUITE 600 MIDLAND, TX 79701 Ph: 432-620-1909	CIMAREX ENERGY COMPANY 600 N MARIENFELD STREET STE 600 MIDLAND, TX 79701 Ph: 432.620.1936 Fx: 918.749.8059
Admin Contact:	AMITHY E CRAWFORD REGULATORY ANALSYT E-Mail: acrawford@cimarex.com Ph: 432-620-1909	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909
Tech Contact:	AMITHY E CRAWFORD REGULATORY ANALSYT E-Mail: acrawford@cimarex.com Ph: 432-620-1909	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909
Location: State: County:	 NM EDDY	 NM EDDY
Field/Pool:	WC 015 G03 S262925D; BS	WILDCAT - BONE SPRING
Well/Facility:	TAR HEEL 19-18-7 FEDERAL COM 20H Sec 19 T26S R30E 760FSL 1436FWL	TAR HEEL 19-18-7 FEDERAL 20H Sec 19 T26S R30E SESW 760FSL 1436FWL 32.022644 N Lat, 103.924583 W Lon

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Cimarex Energy**
LEASE NO.:	**NMNM138848**
LOCATION:	Section 19,T.26 S.,R.30 E., NMPM
COUNTY:	Eddy County, New Mexico

WELL NAME & NO.:	Tar Heel 19-18-7 Fed Com 20H
SURFACE HOLE FOOTAGE:	760'/S & 1436'/W
BOTTOM HOLE FOOTAGE	2561'/S & 2310'/W

COA

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	○ Medium	◉ High
Cave/Karst Potential	○ Critical		
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	○ Conventional	◉ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ 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 **13-3/8** inch surface casing shall be set at approximately **500_** feet (a minimum of 70 feet (Eddy County) into the Rustler Anhydrite and above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
    b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8**

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

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

2. The minimum required fill of cement behind the **9-5/8** 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.

Operator is approved for offline cementing for the 7 inch casing.

3. The minimum required fill of cement behind the **7** inch production casing is:
   - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

4. The minimum required fill of cement behind the **4-1/2** inch production liner is:
   - Cement should tie-back **100 feet** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

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

2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

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

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

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.

ZS 122220

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

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

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

☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-46567	98211	WC-015 G-03 S262925D; Bone Spring

[4] Property Code	[5] Property Name	[6] Well Number
326774	Tar Heel 19-18-7 Federal Com	20H

[7] OGRID No.	[8] Operator Name	[9] Elevation
215099	CIMAREX ENERGY CO.	3022.7'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	19	26S	30E		760	SOUTH	1436	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
K	7	26S	30E		2561	SOUTH	2310	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
400			

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

[16]

NAD 83 (SURFACE HOLE LOCATION)
LATITUDE = 32°01'21.52" (32.022645°)
LONGITUDE = 103°55'28.49" (103.924581°)
NAD 27 (SURFACE HOLE LOCATION)
LATITUDE = 32°01'21.07" (32.022520°)
LONGITUDE = 103°55'26.77" (103.924102°)
STATE PLANE NAD 83 (N.M. EAST)
N: 372216.72' E: 668015.04'
STATE PLANE NAD 27 (N.M. EAST)
N: 372159.34' E: 626829.00'

NAD 83 (LP/FTP)
LATITUDE = 32°01'21.56" (32.022656°)
LONGITUDE = 103°55'18.34" (103.921762°)
NAD 27 (LP/FTP)
LATITUDE = 32°01'21.11" (32.022531°)
LONGITUDE = 103°55'16.62" (103.921283°)
STATE PLANE NAD 83 (N.M. EAST)
N: 372224.09' E: 668888.80'
STATE PLANE NAD 27 (N.M. EAST)
N: 372166.70' E: 627702.75'

NAD 83 (BHL/LTP)
LATITUDE = 32°03'24.56" (32.056823°)
LONGITUDE = 103°55'18.39" (103.921776°)
NAD 27 (BHL/LTP)
LATITUDE = 32°03'24.11" (32.056699°)
LONGITUDE = 103°55'16.66" (103.921295°)
STATE PLANE NAD 83 (N.M. EAST)
N: 384653.19' E: 668837.20'
STATE PLANE NAD 27 (N.M. EAST)
N: 384595.55' E: 627651.50'

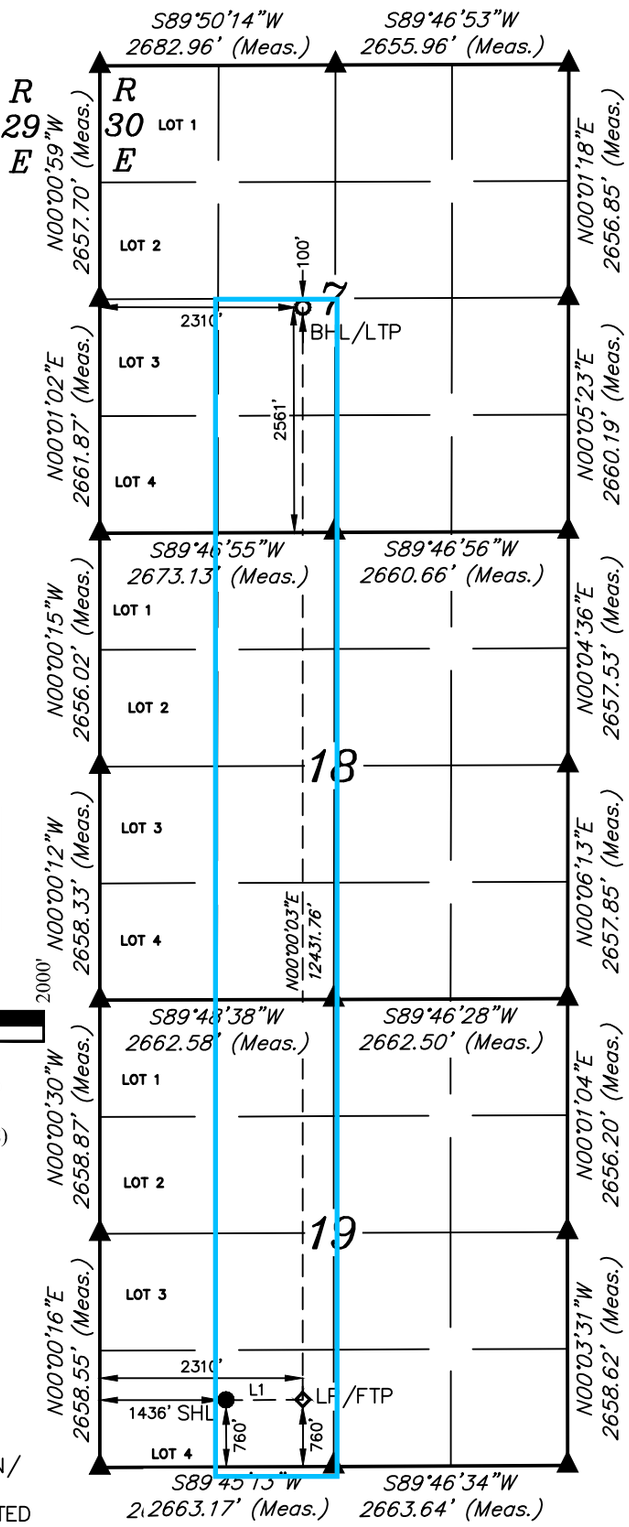
NOTE:
- Distances referenced on plat to section lines are perpendicular.
- Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00" (NAD 83)

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N89°45'22"E	874.00'

2000' 1000' 0' 2000'

SCALE
DRAWN BY: C.M.T. 01-16-19
REV: 2 C.D.L. 10-30-20
(LP/FTP & BHL/LTP CHANGE)

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



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Amithy Crawford 11/18/20
Signature Date

Amithy Crawford
Printed Name

acrawford@cimarex.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

December 03, 2018
Date of Survey

Signature and Seal of Professional Surveyor:

PAUL BUCHELE NEW MEXICO 23782 PROFESSIONAL SURVEYOR 11-03-20

Certificate Number:

Schlumberger

Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20 Proposal
Geodetic Report
(Def Plan)

CIMAREX

Report Date:	November 17, 2020 - 02:49 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex Energy	**Vertical Section Azimuth:**	359.762 ° (Grid North)
Field:	NM Eddy County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Tar Heel 19-18 Federal Com #20H / New Slot	**TVD Reference Datum:**	RKB
Well:	Tar Heel 19-18 Federal Com #20H	**TVD Reference Elevation:**	3048.700 ft above MSL
Borehole:	Tar Heel 19-18 Federal Com #20H	**Seabed / Ground Elevation:**	3022.700 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.583 °
Survey Name:	Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20	**Total Gravity Field Strength:**	998.4402mgn (9.80665 Based)
Survey Date:	January 24, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	108.000 ° / 13303.990 ft / 6.516 / 1.387	**Total Magnetic Field Strength:**	47622.778 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.598 °
Location Lat / Long:	N 32° 1' 21.52241", W 103° 55' 28.49308"	**Declination Date:**	November 17, 2020
Location Grid N/E Y/X:	N 372216.720 ftUS, E 668015.040 ftUS	**Magnetic Declination Model:**	HDGM 2020
CRS Grid Convergence Angle:	0.2167 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99992747	**Grid Convergence Used:**	0.2167 °
Version / Patch:	2.10.821.3	**Total Corr Mag North->Grid North:**	6.3667 °
		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 [760' FSL, 1436' FWL]	0.00	0.00	2.94	0.00	0.00	0.00	0.00	N/A	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	100.00	0.00	89.52	100.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	200.00	0.00	89.52	200.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	300.00	0.00	89.52	300.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	400.00	0.00	89.52	400.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	500.00	0.00	89.52	500.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	600.00	0.00	89.52	600.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	700.00	0.00	89.52	700.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	800.00	0.00	89.52	800.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	900.00	0.00	89.52	900.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	1000.00	0.00	89.52	1000.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
Rustler	*1050.00*	*0.00*	*89.52*	*1050.00*	*0.00*	*0.00*	*0.00*	*0.00*	*372216.72*	*668015.04*	*N 32 1 21.52*	*W 103 55 28.49*
	1100.00	0.00	89.52	1100.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	1200.00	0.00	89.52	1200.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	1300.00	0.00	89.52	1300.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	1400.00	0.00	89.52	1400.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
Nudge 2°/100' DLS	1500.00	0.00	89.52	1500.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
	1600.00	2.00	89.52	1599.98	0.01	0.01	1.75	2.00	372216.73	668016.78	N 32 1 21.52	W 103 55 28.47
	1700.00	4.00	89.52	1699.84	0.03	0.06	6.98	2.00	372216.78	668022.02	N 32 1 21.52	W 103 55 28.41
	1800.00	6.00	89.52	1799.45	0.07	0.13	15.69	2.00	372216.85	668030.73	N 32 1 21.52	W 103 55 28.31
	1900.00	8.00	89.52	1898.70	0.12	0.24	27.88	2.00	372216.96	668042.92	N 32 1 21.52	W 103 55 28.17
Salado (Top Salt)	*1919.50*	*8.39*	*89.52*	*1918.00*	*0.13*	*0.26*	*30.66*	*2.00*	*372216.98*	*668045.70*	*N 32 1 21.52*	*W 103 55 28.14*
Hold Nudge	1950.00	9.00	89.52	1948.15	0.15	0.30	35.27	2.00	372217.02	668050.31	N 32 1 21.52	W 103 55 28.08
	2000.00	9.00	89.52	1997.54	0.18	0.36	43.09	0.00	372217.08	668058.13	N 32 1 21.52	W 103 55 27.99
	2100.00	9.00	89.52	2096.30	0.25	0.50	58.73	0.00	372217.22	668073.77	N 32 1 21.53	W 103 55 27.81
	2200.00	9.00	89.52	2195.07	0.32	0.63	74.38	0.00	372217.35	668089.41	N 32 1 21.53	W 103 55 27.63
	2300.00	9.00	89.52	2293.84	0.39	0.76	90.02	0.00	372217.48	668105.05	N 32 1 21.53	W 103 55 27.45
	2400.00	9.00	89.52	2392.61	0.45	0.89	105.66	0.00	372217.61	668120.69	N 32 1 21.53	W 103 55 27.27
Castille (Base Salt)	*2461.14*	*9.00*	*89.52*	*2453.00*	*0.49*	*0.97*	*115.23*	*0.00*	*372217.69*	*668130.26*	*N 32 1 21.53*	*W 103 55 27.15*
	2500.00	9.00	89.52	2491.38	0.52	1.02	121.31	0.00	372217.74	668136.34	N 32 1 21.53	W 103 55 27.08
	2600.00	9.00	89.52	2590.15	0.59	1.16	136.95	0.00	372217.88	668151.98	N 32 1 21.53	W 103 55 26.90
	2700.00	9.00	89.52	2688.92	0.65	1.29	152.59	0.00	372218.01	668167.62	N 32 1 21.53	W 103 55 26.72
	2800.00	9.00	89.52	2787.69	0.72	1.42	168.23	0.00	372218.14	668183.26	N 32 1 21.53	W 103 55 26.54
	2900.00	9.00	89.52	2886.46	0.79	1.55	183.88	0.00	372218.27	668198.90	N 32 1 21.53	W 103 55 26.36
	3000.00	9.00	89.52	2985.22	0.85	1.68	199.52	0.00	372218.40	668214.54	N 32 1 21.53	W 103 55 26.18
	3100.00	9.00	89.52	3083.99	0.92	1.81	215.16	0.00	372218.53	668230.19	N 32 1 21.53	W 103 55 25.99
	3200.00	9.00	89.52	3182.76	0.99	1.95	230.81	0.00	372218.67	668245.83	N 32 1 21.53	W 103 55 25.81
Bell Canyon (Top Delaware)	*3286.30*	*9.00*	*89.52*	*3268.00*	*1.05*	*2.06*	*244.31*	*0.00*	*372218.78*	*668259.33*	*N 32 1 21.53*	*W 103 55 25.66*
	3300.00	9.00	89.52	3281.53	1.06	2.08	246.45	0.00	372218.80	668261.47	N 32 1 21.53	W 103 55 25.63
	3400.00	9.00	89.52	3380.30	1.12	2.21	262.09	0.00	372218.93	668277.11	N 32 1 21.53	W 103 55 25.45
	3500.00	9.00	89.52	3479.07	1.19	2.34	277.73	0.00	372219.06	668292.75	N 32 1 21.54	W 103 55 25.27
	3600.00	9.00	89.52	3577.84	1.26	2.47	293.38	0.00	372219.19	668308.40	N 32 1 21.54	W 103 55 25.09
	3700.00	9.00	89.52	3676.61	1.32	2.61	309.02	0.00	372219.33	668324.04	N 32 1 21.54	W 103 55 24.90
	3800.00	9.00	89.52	3775.38	1.39	2.74	324.66	0.00	372219.46	668339.68	N 32 1 21.54	W 103 55 24.72
	3900.00	9.00	89.52	3874.14	1.46	2.87	340.31	0.00	372219.59	668355.32	N 32 1 21.54	W 103 55 24.54
	4000.00	9.00	89.52	3972.91	1.52	3.00	355.95	0.00	372219.72	668370.96	N 32 1 21.54	W 103 55 24.36
	4100.00	9.00	89.52	4071.68	1.59	3.13	371.59	0.00	372219.85	668386.60	N 32 1 21.54	W 103 55 24.18
	4200.00	9.00	89.52	4170.45	1.66	3.27	387.23	0.00	372219.99	668402.25	N 32 1 21.54	W 103 55 24.00
Cherry Canyon	*4214.73*	*9.00*	*89.52*	*4185.00*	*1.67*	*3.29*	*389.54*	*0.00*	*372220.01*	*668404.55*	*N 32 1 21.54*	*W 103 55 23.97*
	4300.00	9.00	89.52	4269.22	1.72	3.40	402.88	0.00	372220.12	668417.89	N 32 1 21.54	W 103 55 23.81
	4400.00	9.00	89.52	4367.99	1.79	3.53	418.52	0.00	372220.25	668433.53	N 32 1 21.54	W 103 55 23.63
	4500.00	9.00	89.52	4466.76	1.86	3.66	434.16	0.00	372220.38	668449.17	N 32 1 21.54	W 103 55 23.45
	4600.00	9.00	89.52	4565.53	1.93	3.79	449.81	0.00	372220.51	668464.81	N 32 1 21.54	W 103 55 23.27
	4700.00	9.00	89.52	4664.29	1.99	3.93	465.45	0.00	372220.65	668480.45	N 32 1 21.54	W 103 55 23.09
	4800.00	9.00	89.52	4763.06	2.06	4.06	481.09	0.00	372220.78	668496.10	N 32 1 21.54	W 103 55 22.91
	4900.00	9.00	89.52	4861.83	2.13	4.19	496.73	0.00	372220.91	668511.74	N 32 1 21.55	W 103 55 22.72
	5000.00	9.00	89.52	4960.60	2.19	4.32	512.38	0.00	372221.04	668527.38	N 32 1 21.55	W 103 55 22.54
	5100.00	9.00	89.52	5059.37	2.26	4.45	528.02	0.00	372221.17	668543.02	N 32 1 21.55	W 103 55 22.36
	5200.00	9.00	89.52	5158.14	2.33	4.59	543.66	0.00	372221.31	668558.66	N 32 1 21.55	W 103 55 22.18
	5300.00	9.00	89.52	5256.91	2.39	4.72	559.31	0.00	372221.44	668574.30	N 32 1 21.55	W 103 55 22.00
	5400.00	9.00	89.52	5355.68	2.46	4.85	574.95	0.00	372221.57	668589.95	N 32 1 21.55	W 103 55 21.81
	5500.00	9.00	89.52	5454.45	2.53	4.98	590.59	0.00	372221.70	668605.59	N 32 1 21.55	W 103 55 21.63
Brushy Canyon	*5519.80*	*9.00*	*89.52*	*5474.00*	*2.54*	*5.01*	*593.69*	*0.00*	*372221.73*	*668608.68*	*N 32 1 21.55*	*W 103 55 21.60*
	5600.00	9.00	89.52	5553.21	2.60	5.11	606.23	0.00	372221.83	668621.23	N 32 1 21.55	W 103 55 21.45
	5700.00	9.00	89.52	5651.98	2.66	5.25	621.88	0.00	372221.97	668636.87	N 32 1 21.55	W 103 55 21.27
	5800.00	9.00	89.52	5750.75	2.73	5.38	637.52	0.00	372222.10	668652.51	N 32 1 21.55	W 103 55 21.09
	5900.00	9.00	89.52	5849.52	2.80	5.51	653.16	0.00	372222.23	668668.15	N 32 1 21.55	W 103 55 20.91
	6000.00	9.00	89.52	5948.29	2.86	5.64	668.81	0.00	372222.36	668683.80	N 32 1 21.55	W 103 55 20.72
	6100.00	9.00	89.52	6047.06	2.93	5.77	684.45	0.00	372222.49	668699.44	N 32 1 21.55	W 103 55 20.54
	6200.00	9.00	89.52	6145.83	3.00	5.91	700.09	0.00	372222.62	668715.08	N 32 1 21.55	W 103 55 20.36
	6300.00	9.00	89.52	6244.60	3.06	6.04	715.74	0.00	372222.76	668730.72	N 32 1 21.56	W 103 55 20.18
	6400.00	9.00	89.52	6343.36	3.13	6.17	731.38	0.00	372222.89	668746.36	N 32 1 21.56	W 103 55 20.00
	6500.00	9.00	89.52	6442.13	3.20	6.30	747.02	0.00	372223.02	668762.01	N 32 1 21.56	W 103 55 19.82

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 ° ' ")
	6600.00	9.00	89.52	6540.90	3.26	6.43	762.66	0.00	372223.15	668777.65	N 32 1 21.56	W 103 55 19.63
	6700.00	9.00	89.52	6639.67	3.33	6.56	778.31	0.00	372223.28	668793.29	N 32 1 21.56	W 103 55 19.45
	6800.00	9.00	89.52	6738.44	3.40	6.70	793.95	0.00	372223.42	668808.93	N 32 1 21.56	W 103 55 19.27
	6900.00	9.00	89.52	6837.21	3.47	6.83	809.59	0.00	372223.55	668824.57	N 32 1 21.56	W 103 55 19.09
	7000.00	9.00	89.52	6935.98	3.53	6.96	825.24	0.00	372223.68	668840.21	N 32 1 21.56	W 103 55 18.91
Drop to Vertical 2°/100' DLS	7085.15	9.00	89.52	7020.08	3.59	7.07	838.56	0.00	372223.79	668853.53	N 32 1 21.56	W 103 55 18.75
Top Bone Spring	*7091.14*	*8.88*	*89.52*	*7026.00*	*3.59*	*7.08*	*839.49*	*2.00*	*372223.80*	*668854.46*	*N 32 1 21.56*	*W 103 55 18.74*
	7100.00	8.70	89.52	7034.75	3.60	7.09	840.84	2.00	372223.81	668855.82	N 32 1 21.56	W 103 55 18.73
	7200.00	6.70	89.52	7133.85	3.66	7.21	854.24	2.00	372223.92	668869.22	N 32 1 21.56	W 103 55 18.57
	7300.00	4.70	89.52	7233.35	3.70	7.29	864.18	2.00	372224.01	668879.16	N 32 1 21.56	W 103 55 18.46
	7400.00	2.70	89.52	7333.13	3.73	7.34	870.64	2.00	372224.06	668885.61	N 32 1 21.56	W 103 55 18.38
	7500.00	0.70	89.52	7433.08	3.74	7.37	873.61	2.00	372224.09	668888.58	N 32 1 21.56	W 103 55 18.35
Hold Vertical	7535.15	0.00	89.52	7468.24	3.74	7.37	873.83	2.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	7600.00	0.00	89.52	7533.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	7700.00	0.00	89.52	7633.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	7800.00	0.00	89.52	7733.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	7900.00	0.00	89.52	7833.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
Top 1st BSPG SS	*7998.92*	*0.00*	*89.52*	*7932.00*	*3.74*	*7.37*	*873.83*	*0.00*	*372224.09*	*668888.80*	*N 32 1 21.56*	*W 103 55 18.34*
	8000.00	0.00	89.52	7933.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8100.00	0.00	89.52	8033.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8200.00	0.00	89.52	8133.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8300.00	0.00	89.52	8233.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8400.00	0.00	89.52	8333.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
Top 2nd BSPG Carb	*8442.92*	*0.00*	*89.52*	*8376.00*	*3.74*	*7.37*	*873.83*	*0.00*	*372224.09*	*668888.80*	*N 32 1 21.56*	*W 103 55 18.34*
	8500.00	0.00	89.52	8433.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8600.00	0.00	89.52	8533.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
Top 2nd BSPG SS	*8671.92*	*0.00*	*89.52*	*8605.00*	*3.74*	*7.37*	*873.83*	*0.00*	*372224.09*	*668888.80*	*N 32 1 21.56*	*W 103 55 18.34*
	8700.00	0.00	89.52	8633.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8800.00	0.00	89.52	8733.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	8900.00	0.00	89.52	8833.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
	9000.00	0.00	89.52	8933.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
2nd BSPG SS Target	*9099.92*	*0.00*	*89.52*	*9033.00*	*3.74*	*7.37*	*873.83*	*0.00*	*372224.09*	*668888.80*	*N 32 1 21.56*	*W 103 55 18.34*
	9100.00	0.00	89.52	9033.08	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
KOP - Build 12°/100' DLS	9182.45	0.00	89.52	9115.54	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
Top 3rd BSPG Carb	*9182.92*	*0.06*	*359.76*	*9116.00*	*3.74*	*7.37*	*873.83*	*12.00*	*372224.09*	*668888.80*	*N 32 1 21.56*	*W 103 55 18.34*
	9200.00	2.11	359.76	9133.08	4.06	7.69	873.82	12.00	372224.41	668888.80	N 32 1 21.57	W 103 55 18.34
	9300.00	14.11	359.76	9231.90	18.14	21.77	873.77	12.00	372238.49	668888.74	N 32 1 21.70	W 103 55 18.34
	9400.00	26.11	359.76	9325.63	52.45	56.08	873.62	12.00	372272.79	668888.60	N 32 1 22.04	W 103 55 18.34
	9500.00	38.11	359.76	9410.18	105.50	109.13	873.40	12.00	372325.84	668888.38	N 32 1 22.57	W 103 55 18.34
	9600.00	50.11	359.76	9481.86	174.97	178.60	873.11	12.00	372395.31	668888.09	N 32 1 23.26	W 103 55 18.34
	9700.00	62.11	359.76	9537.52	257.83	261.45	872.77	12.00	372478.15	668887.75	N 32 1 24.08	W 103 55 18.34
	9800.00	74.11	359.76	9574.75	350.44	354.07	872.39	12.00	372570.76	668887.36	N 32 1 24.99	W 103 55 18.34
	9900.00	86.11	359.76	9591.90	448.78	452.40	871.98	12.00	372669.09	668886.95	N 32 1 25.97	W 103 55 18.35
Landing Point	9932.45	90.00	359.76	9593.00	481.21	484.83	871.84	12.00	372701.52	668886.82	N 32 1 26.29	W 103 55 18.35
	10000.00	90.00	359.76	9593.00	548.75	552.38	871.56	0.00	372769.06	668886.54	N 32 1 26.96	W 103 55 18.35
	10100.00	90.00	359.76	9593.00	648.75	652.38	871.15	0.00	372869.05	668886.12	N 32 1 27.95	W 103 55 18.35
	10200.00	90.00	359.76	9593.00	748.75	752.37	870.73	0.00	372969.04	668885.71	N 32 1 28.93	W 103 55 18.35
	10300.00	90.00	359.76	9593.00	848.75	852.37	870.32	0.00	373069.03	668885.29	N 32 1 29.92	W 103 55 18.35
	10400.00	90.00	359.76	9593.00	948.75	952.37	869.90	0.00	373169.02	668884.88	N 32 1 30.91	W 103 55 18.35
	10500.00	90.00	359.76	9593.00	1048.75	1052.37	869.49	0.00	373269.01	668884.46	N 32 1 31.90	W 103 55 18.35
	10600.00	90.00	359.76	9593.00	1148.75	1152.37	869.07	0.00	373369.01	668884.05	N 32 1 32.89	W 103 55 18.35
	10700.00	90.00	359.76	9593.00	1248.75	1252.37	868.66	0.00	373469.00	668883.63	N 32 1 33.88	W 103 55 18.35
	10800.00	90.00	359.76	9593.00	1348.75	1352.37	868.24	0.00	373568.99	668883.22	N 32 1 34.87	W 103 55 18.35
	10900.00	90.00	359.76	9593.00	1448.75	1452.37	867.83	0.00	373668.98	668882.80	N 32 1 35.86	W 103 55 18.35
	11000.00	90.00	359.76	9593.00	1548.75	1552.37	867.41	0.00	373768.97	668882.39	N 32 1 36.85	W 103 55 18.35
	11100.00	90.00	359.76	9593.00	1648.75	1652.37	867.00	0.00	373868.96	668881.97	N 32 1 37.84	W 103 55 18.35
	11200.00	90.00	359.76	9593.00	1748.75	1752.37	866.58	0.00	373968.96	668881.56	N 32 1 38.83	W 103 55 18.35
	11300.00	90.00	359.76	9593.00	1848.75	1852.37	866.17	0.00	374068.95	668881.14	N 32 1 39.82	W 103 55 18.35
	11400.00	90.00	359.76	9593.00	1948.75	1952.36	865.75	0.00	374168.94	668880.73	N 32 1 40.81	W 103 55 18.35
	11500.00	90.00	359.76	9593.00	2048.75	2052.36	865.34	0.00	374268.93	668880.31	N 32 1 41.80	W 103 55 18.35
	11600.00	90.00	359.76	9593.00	2148.75	2152.36	864.92	0.00	374368.92	668879.90	N 32 1 42.79	W 103 55 18.35
	11700.00	90.00	359.76	9593.00	2248.75	2252.36	864.50	0.00	374468.91	668879.48	N 32 1 43.78	W 103 55 18.35
	11800.00	90.00	359.76	9593.00	2348.75	2352.36	864.09	0.00	374568.91	668879.07	N 32 1 44.77	W 103 55 18.35
	11900.00	90.00	359.76	9593.00	2448.75	2452.36	863.67	0.00	374668.90	668878.65	N 32 1 45.76	W 103 55 18.35
	12000.00	90.00	359.76	9593.00	2548.75	2552.36	863.26	0.00	374768.89	668878.24	N 32 1 46.75	W 103 55 18.35
	12100.00	90.00	359.76	9593.00	2648.75	2652.36	862.84	0.00	374868.88	668877.82	N 32 1 47.74	W 103 55 18.35
	12200.00	90.00	359.76	9593.00	2748.75	2752.36	862.43	0.00	374968.87	668877.40	N 32 1 48.73	W 103 55 18.35
	12300.00	90.00	359.76	9593.00	2848.75	2852.36	862.01	0.00	375068.86	668876.99	N 32 1 49.72	W 103 55 18.35
	12400.00	90.00	359.76	9593.00	2948.75	2952.36	861.60	0.00	375168.86	668876.57	N 32 1 50.70	W 103 55 18.35
	12500.00	90.00	359.76	9593.00	3048.75	3052.36	861.18	0.00	375268.85	668876.16	N 32 1 51.69	W 103 55 18.36
	12600.00	90.00	359.76	9593.00	3148.75	3152.35	860.77	0.00	375368.84	668875.74	N 32 1 52.68	W 103 55 18.36
	12700.00	90.00	359.76	9593.00	3248.75	3252.35	860.35	0.00	375468.83	668875.33	N 32 1 53.67	W 103 55 18.36
	12800.00	90.00	359.76	9593.00	3348.75	3352.35	859.94	0.00	375568.82	668874.91	N 32 1 54.66	W 103 55 18.36
	12900.00	90.00	359.76	9593.00	3448.75	3452.35	859.52	0.00	375668.81	668874.50	N 32 1 55.65	W 103 55 18.36
	13000.00	90.00	359.76	9593.00	3548.75	3552.35	859.11	0.00	375768.81	668874.08	N 32 1 56.64	W 103 55 18.36
	13100.00	90.00	359.76	9593.00	3648.75	3652.35	858.69	0.00	375868.80	668873.67	N 32 1 57.63	W 103 55 18.36
	13200.00	90.00	359.76	9593.00	3748.75	3752.35	858.28	0.00	375968.79	668873.25	N 32 1 58.62	W 103 55 18.36
	13300.00	90.00	359.76	9593.00	3848.75	3852.35	857.86	0.00	376068.78	668872.84	N 32 1 59.61	W 103 55 18.36
	13400.00	90.00	359.76	9593.00	3948.75	3952.35	857.45	0.00	376168.77	668872.42	N 32 2 0.60	W 103 55 18.36
	13500.00	90.00	359.76	9593.00	4048.75	4052.35	857.03	0.00	376268.76	668872.01	N 32 2 1.59	W 103 55 18.36
	13600.00	90.00	359.76	9593.00	4148.75	4152.35	856.62	0.00	376368.76	668871.59	N 32 2 2.58	W 103 55 18.36
	13700.00	90.00	359.76	9593.00	4248.75	4252.34	856.20	0.00	376468.75	668871.18	N 32 2 3.57	W 103 55 18.36
	13800.00	90.00	359.76	9593.00	4348.75	4352.34	855.79	0.00	376568.74	668870.76	N 32 2 4.56	W 103 55 18.36
	13900.00	90.00	359.76	9593.00	4448.75	4452.34	855.37	0.00	376668.73	668870.35	N 32 2 5.55	W 103 55 18.36
	14000.00	90.00	359.76	9593.00	4548.75	4552.34	854.96	0.00	376768.72	668869.93	N 32 2 6.54	W 103 55 18.36
	14100.00	90.00	359.76	9593.00	4648.75	4652.34	854.54	0.00	376868.71	668869.52	N 32 2 7.53	W 103 55 18.36
	14200.00	90.00	359.76	9593.00	4748.75	4752.34	854.13	0.00	376968.71	668869.10	N 32 2 8.52	W 103 55 18.36
	14300.00	90.00	359.76	9593.00	4848.75	4852.34	853.71	0.00	377068.70	668868.69	N 32 2 9.51	W 103 55 18.36
	14400.00	90.00	359.76	9593.00	4948.75	4952.34	853.30	0.00	377168.69	668868.27	N 32 2 10.50	W 103 55 18.36
	14500.00	90.00	359.76	9593.00	5048.75	5052.34	852.88	0.00	377268.68	668867.86	N 32 2 11.49	W 103 55 18.36
	14600.00	90.00	359.76	9593.00	5148.75	5152.34	852.47	0.00	377368.67	668867.44	N 32 2 12.47	W 103 55 18.36
	14700.00	90.00	359.76	9593.00	5248.75	5252.34	852.05	0.00	377468.66	668867.03	N 32 2 13.46	W 103 55 18.36
	14800.00	90.00	359.76	9593.00	5348.75	5352.34	851.64	0.00	377568.66	668866.61	N 32 2 14.45	W 103 55 18.36
	14900.00	90.00	359.76	9593.00	5448.75	5452.33	851.22	0.00	377668.65	668866.20	N 32 2 15.44	W 103 55 18.36
	15000.00	90.00	359.76	9593.00	5548.75	5552.33	850.80	0.00	377768.64	668865.78	N 32 2 16.43	W 103 55 18.37
	15100.00	90.00	359.76	9593.00	5648.75	5652.33	850.39	0.00	377868.63	668865.37	N 32 2 17.42	W 103 55 18.37
	15200.00	90.00	359.76	9593.00	5748.75	5752.33	849.97	0.00	377968.62	668864.95	N 32 2 18.41	W 103 55 18.37
	15300.00	90.00	359.76	9593.00	5848.75	5852.33	849.56	0.00	378068.61	668864.54	N 32 2 19.40	W 103 55 18.37
	15400.00	90.00	359.76	9593.00	5948.75	5952.33	849.14	0.00	378168.61	668864.12	N 32 2 20.39	W 103 55 18.37
	15500.00	90.00	359.76	9593.00	6048.75	6052.33	848.73	0.00	378268.60	668863.71	N 32 2 21.38	W 103 55 18.37
	15600.00	90.00	359.76	9593.00	6148.75	6152.33	848.31	0.00	378368.59	668863.29	N 32 2 22.37	W 103 55 18.37

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 ° ' ")
	15700.00	90.00	359.76	9593.00	6248.75	6252.33	847.90	0.00	378468.58	668862.88	N 32 2 23.36	W 103 55 18.37
	15800.00	90.00	359.76	9593.00	6348.75	6352.33	847.48	0.00	378568.57	668862.46	N 32 2 24.35	W 103 55 18.37
	15900.00	90.00	359.76	9593.00	6448.75	6452.33	847.07	0.00	378668.56	668862.05	N 32 2 25.34	W 103 55 18.37
	16000.00	90.00	359.76	9593.00	6548.75	6552.32	846.65	0.00	378768.56	668861.63	N 32 2 26.33	W 103 55 18.37
	16100.00	90.00	359.76	9593.00	6648.75	6652.32	846.24	0.00	378868.55	668861.22	N 32 2 27.32	W 103 55 18.37
	16200.00	90.00	359.76	9593.00	6748.75	6752.32	845.82	0.00	378968.54	668860.80	N 32 2 28.31	W 103 55 18.37
	16300.00	90.00	359.76	9593.00	6848.75	6852.32	845.41	0.00	379068.53	668860.38	N 32 2 29.30	W 103 55 18.37
	16400.00	90.00	359.76	9593.00	6948.75	6952.32	844.99	0.00	379168.52	668859.97	N 32 2 30.29	W 103 55 18.37
	16500.00	90.00	359.76	9593.00	7048.75	7052.32	844.58	0.00	379268.51	668859.55	N 32 2 31.28	W 103 55 18.37
	16600.00	90.00	359.76	9593.00	7148.75	7152.32	844.16	0.00	379368.51	668859.14	N 32 2 32.27	W 103 55 18.37
	16700.00	90.00	359.76	9593.00	7248.75	7252.32	843.75	0.00	379468.50	668858.72	N 32 2 33.26	W 103 55 18.37
	16800.00	90.00	359.76	9593.00	7348.75	7352.32	843.33	0.00	379568.49	668858.31	N 32 2 34.24	W 103 55 18.37
	16900.00	90.00	359.76	9593.00	7448.75	7452.32	842.92	0.00	379668.48	668857.89	N 32 2 35.23	W 103 55 18.37
	17000.00	90.00	359.76	9593.00	7548.75	7552.32	842.50	0.00	379768.47	668857.48	N 32 2 36.22	W 103 55 18.37
	17100.00	90.00	359.76	9593.00	7648.75	7652.32	842.09	0.00	379868.47	668857.06	N 32 2 37.21	W 103 55 18.37
	17200.00	90.00	359.76	9593.00	7748.75	7752.31	841.67	0.00	379968.46	668856.65	N 32 2 38.20	W 103 55 18.37
	17300.00	90.00	359.76	9593.00	7848.75	7852.31	841.26	0.00	380068.45	668856.23	N 32 2 39.19	W 103 55 18.37
	17400.00	90.00	359.76	9593.00	7948.75	7952.31	840.84	0.00	380168.44	668855.82	N 32 2 40.18	W 103 55 18.37
	17500.00	90.00	359.76	9593.00	8048.75	8052.31	840.43	0.00	380268.43	668855.40	N 32 2 41.17	W 103 55 18.38
	17600.00	90.00	359.76	9593.00	8148.75	8152.31	840.01	0.00	380368.42	668854.99	N 32 2 42.16	W 103 55 18.38
	17700.00	90.00	359.76	9593.00	8248.75	8252.31	839.60	0.00	380468.42	668854.57	N 32 2 43.15	W 103 55 18.38
	17800.00	90.00	359.76	9593.00	8348.75	8352.31	839.18	0.00	380568.41	668854.16	N 32 2 44.14	W 103 55 18.38
	17900.00	90.00	359.76	9593.00	8448.75	8452.31	838.77	0.00	380668.40	668853.74	N 32 2 45.13	W 103 55 18.38
	18000.00	90.00	359.76	9593.00	8548.75	8552.31	838.35	0.00	380768.39	668853.33	N 32 2 46.12	W 103 55 18.38
	18100.00	90.00	359.76	9593.00	8648.75	8652.31	837.94	0.00	380868.38	668852.91	N 32 2 47.11	W 103 55 18.38
	18200.00	90.00	359.76	9593.00	8748.75	8752.31	837.52	0.00	380968.37	668852.50	N 32 2 48.10	W 103 55 18.38
	18300.00	90.00	359.76	9593.00	8848.75	8852.31	837.10	0.00	381068.37	668852.08	N 32 2 49.09	W 103 55 18.38
	18400.00	90.00	359.76	9593.00	8948.75	8952.30	836.69	0.00	381168.36	668851.67	N 32 2 50.08	W 103 55 18.38
	18500.00	90.00	359.76	9593.00	9048.75	9052.30	836.27	0.00	381268.35	668851.25	N 32 2 51.07	W 103 55 18.38
	18600.00	90.00	359.76	9593.00	9148.75	9152.30	835.86	0.00	381368.34	668850.84	N 32 2 52.06	W 103 55 18.38
	18700.00	90.00	359.76	9593.00	9248.75	9252.30	835.44	0.00	381468.33	668850.42	N 32 2 53.05	W 103 55 18.38
	18800.00	90.00	359.76	9593.00	9348.75	9352.30	835.03	0.00	381568.32	668850.01	N 32 2 54.04	W 103 55 18.38
	18900.00	90.00	359.76	9593.00	9448.75	9452.30	834.61	0.00	381668.32	668849.59	N 32 2 55.03	W 103 55 18.38
	19000.00	90.00	359.76	9593.00	9548.75	9552.30	834.20	0.00	381768.31	668849.18	N 32 2 56.01	W 103 55 18.38
	19100.00	90.00	359.76	9593.00	9648.75	9652.30	833.78	0.00	381868.30	668848.76	N 32 2 57.00	W 103 55 18.38
	19200.00	90.00	359.76	9593.00	9748.75	9752.30	833.37	0.00	381968.29	668848.35	N 32 2 57.99	W 103 55 18.38
	19300.00	90.00	359.76	9593.00	9848.75	9852.30	832.95	0.00	382068.28	668847.93	N 32 2 58.98	W 103 55 18.38
	19400.00	90.00	359.76	9593.00	9948.75	9952.30	832.54	0.00	382168.27	668847.52	N 32 2 59.97	W 103 55 18.38
	19500.00	90.00	359.76	9593.00	10048.75	10052.29	832.12	0.00	382268.27	668847.10	N 32 3 0.96	W 103 55 18.38
	19600.00	90.00	359.76	9593.00	10148.75	10152.29	831.71	0.00	382368.26	668846.69	N 32 3 1.95	W 103 55 18.38
	19700.00	90.00	359.76	9593.00	10248.75	10252.29	831.29	0.00	382468.25	668846.27	N 32 3 2.94	W 103 55 18.38
	19800.00	90.00	359.76	9593.00	10348.75	10352.29	830.88	0.00	382568.24	668845.86	N 32 3 3.93	W 103 55 18.38
	19900.00	90.00	359.76	9593.00	10448.75	10452.29	830.46	0.00	382668.23	668845.44	N 32 3 4.92	W 103 55 18.38
	20000.00	90.00	359.76	9593.00	10548.75	10552.29	830.05	0.00	382768.22	668845.03	N 32 3 5.91	W 103 55 18.39
	20100.00	90.00	359.76	9593.00	10648.75	10652.29	829.63	0.00	382868.22	668844.61	N 32 3 6.90	W 103 55 18.39
	20200.00	90.00	359.76	9593.00	10748.75	10752.29	829.22	0.00	382968.21	668844.20	N 32 3 7.89	W 103 55 18.39
	20300.00	90.00	359.76	9593.00	10848.75	10852.29	828.80	0.00	383068.20	668843.78	N 32 3 8.88	W 103 55 18.39
	20400.00	90.00	359.76	9593.00	10948.75	10952.29	828.39	0.00	383168.19	668843.37	N 32 3 9.87	W 103 55 18.39
	20500.00	90.00	359.76	9593.00	11048.75	11052.29	827.97	0.00	383268.18	668842.95	N 32 3 10.86	W 103 55 18.39
	20600.00	90.00	359.76	9593.00	11148.75	11152.29	827.56	0.00	383368.17	668842.53	N 32 3 11.85	W 103 55 18.39
	20700.00	90.00	359.76	9593.00	11248.75	11252.28	827.14	0.00	383468.17	668842.12	N 32 3 12.84	W 103 55 18.39
	20800.00	90.00	359.76	9593.00	11348.75	11352.28	826.73	0.00	383568.16	668841.70	N 32 3 13.83	W 103 55 18.39
	20900.00	90.00	359.76	9593.00	11448.75	11452.28	826.31	0.00	383668.15	668841.29	N 32 3 14.82	W 103 55 18.39
	21000.00	90.00	359.76	9593.00	11548.75	11552.28	825.90	0.00	383768.14	668840.87	N 32 3 15.81	W 103 55 18.39
	21100.00	90.00	359.76	9593.00	11648.75	11652.28	825.48	0.00	383868.13	668840.46	N 32 3 16.79	W 103 55 18.39
	21200.00	90.00	359.76	9593.00	11748.75	11752.28	825.07	0.00	383968.12	668840.04	N 32 3 17.78	W 103 55 18.39
	21300.00	90.00	359.76	9593.00	11848.75	11852.28	824.65	0.00	384068.12	668839.63	N 32 3 18.77	W 103 55 18.39
	21400.00	90.00	359.76	9593.00	11948.75	11952.28	824.24	0.00	384168.11	668839.21	N 32 3 19.76	W 103 55 18.39
	21500.00	90.00	359.76	9593.00	12048.75	12052.28	823.82	0.00	384268.10	668838.80	N 32 3 20.75	W 103 55 18.39
	21600.00	90.00	359.76	9593.00	12148.75	12152.28	823.40	0.00	384368.09	668838.38	N 32 3 21.74	W 103 55 18.39
	21700.00	90.00	359.76	9593.00	12248.75	12252.28	822.99	0.00	384468.08	668837.97	N 32 3 22.73	W 103 55 18.39
	21800.00	90.00	359.76	9593.00	12348.75	12352.27	822.57	0.00	384568.07	668837.55	N 32 3 23.72	W 103 55 18.39
Cimarex Tar Heel 19-18 Federal Com #20H - PBHL [2561' FSL, 2310' FWL]	21885.12	90.00	359.76	9593.00	12433.87	12437.40	822.22	0.00	384653.19	668837.20	N 32 3 24.56	W 103 55 18.39

Survey Type: 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	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only	Tar Heel 19-18 Federal Com #20H / Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20
	1	26.000	21885.123	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS	Tar Heel 19-18 Federal Com #20H / Cimarex Tar Heel 19-18 Federal

Schlumberger

Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20 Proposal Geodetic Report

(Def Plan)

CIMAREX

Report Date:	November 17, 2020 - 02:49 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex Energy	**Vertical Section Azimuth:**	359.762 ° (Grid North)
Field:	NM Eddy County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Tar Heel 19-18 Federal Com #20H / New Slot	**TVD Reference Datum:**	RKB
Well:	Tar Heel 19-18 Federal Com #20H	**TVD Reference Elevation:**	3048.700 ft above MSL
Borehole:	Tar Heel 19-18 Federal Com #20H	**Seabed / Ground Elevation:**	3022.700 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.583 °
Survey Name:	Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20	**Total Gravity Field Strength:**	998.4402mgn (9.80665 Based)
Survey Date:	January 24, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	108.000 ° / 13303.990 ft / 6.516 / 1.387	**Total Magnetic Field Strength:**	47622.778 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.598 °
Location Lat / Long:	N 32° 1' 21.52241", W 103° 55' 28.49308"	**Declination Date:**	November 17, 2020
Location Grid N/E Y/X:	N 372216.720 ftUS, E 668015.040 ftUS	**Magnetic Declination Model:**	HDGM 2020
CRS Grid Convergence Angle:	0.2167 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99992747	**Grid Convergence Used:**	0.2167 °
Version / Patch:	2.10.821.3	**Total Corr Mag North->Grid North:**	6.3667 °
		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 [760' FSL, 1436' FWL]	0.00	0.00	2.94	0.00	0.00	0.00	0.00	N/A	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
Nudge 2°/100' DLS	1500.00	0.00	89.52	1500.00	0.00	0.00	0.00	0.00	372216.72	668015.04	N 32 1 21.52	W 103 55 28.49
Hold Nudge	1950.00	9.00	89.52	1948.15	0.15	0.30	35.27	2.00	372217.02	668050.31	N 32 1 21.52	W 103 55 28.08
Drop to Vertical 2°/100' DLS	7085.15	9.00	89.52	7020.08	3.59	7.07	838.56	0.00	372223.79	668853.53	N 32 1 21.56	W 103 55 18.75
Hold Vertical	7535.15	0.00	89.52	7468.24	3.74	7.37	873.83	2.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
KOP - Build 12°/100' DLS	9182.45	0.00	89.52	9115.54	3.74	7.37	873.83	0.00	372224.09	668888.80	N 32 1 21.56	W 103 55 18.34
Landing Point	9932.45	90.00	359.76	9593.00	481.21	484.83	871.84	12.00	372701.52	668886.82	N 32 1 26.29	W 103 55 18.35
Cimarex Tar Heel 19-18 Federal Com #20H - PBHL [2561' FSL, 2310' FWL]	21885.12	90.00	359.76	9593.00	12433.87	12437.40	822.22	0.00	384653.19	668837.20	N 32 3 24.56	W 103 55 18.39

Survey Type: 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	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only	Tar Heel 19-18 Federal Com #20H / Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20
	1	26.000	21885.123	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS	Tar Heel 19-18 Federal Com #20H / Cimarex Tar Heel 19-18 Federal

Schlumberger

CIMAREX

Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20 Anti-Collision Summary Report

Analysis Date-24hr Time: November 17, 2020 - 14:50
Client: Cimarex Energy
Field: NM Eddy County (NAD 83)
Structure: Cimarex Tar Heel 19-18 Federal Com #20H
Slot: New Slot
Well: Tar Heel 19-18 Federal Com #20H
Borehole: Tar Heel 19-18 Federal Com #20H
Scan MD Range: 0.00ft ~ 21885.12ft

Analysis Method: 3D Least Distance
Reference Trajectory: Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20 (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: 2.10.821.3
Database \ Project: US1153APP452.dir.slb.com\drilling-NM Eddy County 2.10

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

Offset Trajectories Summary

Offset Selection Criteria
Wellhead distance scan: 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	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
Results highlighted: Sep-Factor separation <= 1.50 ft													
Cimarex Tar Heel 19-18 Federal Com #19H Rev2 RM 17Nov20 (Def Plan)													Warning Alert
	20.03	16.25	18.75	3.78	N/A	MAS = 4.95 (m)	0.00	0.00	CtCt<=15m<15.00			Enter Alert	
	19.99	16.25	18.71	3.74	N/A	MAS = 4.95 (m)	26.00	26.00				WRP	
	19.99	16.25	9.68	3.74	2.07	MAS = 4.95 (m)	1500.00	1500.00				MinPts	
	20.01	16.25	9.65	3.76	2.06	MAS = 4.95 (m)	1510.00	1510.00				MINPT-O-EOU	
	20.15	16.25	9.69	3.90	2.06	MAS = 4.95 (m)	1530.00	1530.00				MinPt-O-SF	
	55.26	17.57	43.12	37.69	4.97	OSF1.50	1950.00	1948.15	OSF>5.00			Exit Alert	
	85.28	26.55	67.15	58.73	4.99	OSF1.50	3670.00	3646.98	OSF<5.00			Enter Alert	
	82.72	33.41	60.02	49.31	3.80	OSF1.50	4430.00	4397.62				MinPt-CtCt	
	85.26	40.75	57.66	44.51	3.19	OSF1.50	5180.00	5138.39				MINPT-O-EOU	
	88.94	45.15	58.41	43.79	3.00	OSF1.50	5620.00	5572.97				MinPt-O-ADP	
	110.19	59.87	69.85	50.32	2.79	OSF1.50	7085.15	7020.08				MinPt-O-SF	
	115.06	62.58	72.91	52.48	2.78	OSF1.50	9182.45	9115.54				MinPts	
	115.12	62.62	72.95	52.50	2.78	OSF1.50	9190.00	9123.08				MinPt-O-SF	
	204.81	64.04	161.69	140.77	4.86	OSF1.50	9480.00	9394.19	OSF>5.00			Exit Alert	
	1131.30	340.45	903.91	790.85	5.00	OSF1.50	20300.00	9593.00	OSF<5.00			Enter Alert	
	1131.30	389.10	871.47	742.20	4.37	OSF1.50	21885.12	9593.00				MinPts	
Cimarex Tar Heel 19-18 Federal Com #18H Rev2 RM 17Nov20 (Def Plan)													Warning Alert
	40.03	32.25	38.74	7.78	N/A	MAS = 9.83 (m)	0.00	0.00	CtCt<=15m<15.00			Enter Alert	
	39.99	32.25	38.71	7.74	N/A	MAS = 9.83 (m)	26.00	26.00				WRP	
	39.99	32.25	29.68	7.74	4.29	MAS = 9.83 (m)	1500.00	1500.00				MinPts	
	40.01	32.25	29.65	7.76	4.27	MAS = 9.83 (m)	1510.00	1510.00				MINPT-O-EOU	
	40.62	32.25	30.03	8.37	4.22	MAS = 9.83 (m)	1560.00	1560.00				MinPt-O-SF	
	50.90	32.25	39.57	18.64	4.94	MAS = 9.83 (m)	1750.00	1749.68	OSF>5.00			Exit Alert	
	344.10	39.37	317.42	304.73	13.50	OSF1.50	5210.00	5168.02				MinPt-O-SF	
	660.03	63.58	617.22	596.45	15.86	OSF1.50	9280.00	9212.40				MINPT-O-EOU	
	660.13	63.71	617.23	596.42	15.83	OSF1.50	9300.00	9231.90				MinPt-O-ADP	
	664.89	64.79	621.27	600.11	15.68	OSF1.50	9460.00	9377.71				MinPt-O-SF	
	1093.32	328.94	873.60	764.38	5.00	OSF1.50	19290.00	9593.00	OSF<5.00			Enter Alert	
	1093.32	409.83	819.67	683.49	4.01	OSF1.50	21885.12	9593.00				MinPts	
XTO New Era Federal #1 (Offset) API 30-015-24831 Blind Plugged D&A 0ft-7500ft (Def Survey)													Warning Alert
	4986.62	32.81	4977.76	4953.81	658.17	MAS = 10.00 (m)	0.00	0.00				Surface	
	4986.62	32.81	4975.04	4953.81	484.09	MAS = 10.00 (m)	26.00	26.00				WRP	
	4711.68	1414.96	3767.88	3296.72	5.00	OSF1.50	4550.00	4516.14	OSF<5.00			Enter Alert	
	4469.17	2326.42	2917.60	2142.74	2.88	OSF1.50	7500.00	7433.08				MinPts	
	4469.16	2326.40	2917.62	2142.76	2.88	OSF1.50	7510.00	7443.08				MinPt-CtCt	
	3202.26	1708.28	2062.98	1493.98	2.81	OSF1.50	13260.00	9593.00				MinPts	
	3202.28	1708.31	2062.98	1493.98	2.81	OSF1.50	13270.00	9593.00				MinPt-O-ADP	
	3202.86	1708.64	2063.34	1494.22	2.81	OSF1.50	13320.00	9593.00				MinPt-O-SF	
	7418.75	2226.56	5933.95	5192.19	5.00	OSF1.50	19950.00	9593.00	OSF>5.00			Exit Alert	
	9202.30	2262.66	7693.44	6939.65	6.10	OSF1.50	21885.12	9593.00				TD	
Gothic Production Bedena Federal #2 (Offset) API 30-015-25579 Plugged Blind 0ft-6500ft (Def Survey)													Warning Alert
	9593.48	32.81	9592.19	9560.67	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	9593.47	32.81	9590.79	9560.67	6884.12	MAS = 10.00 (m)	26.00	26.00				WRP	
	9593.47	439.17	9300.27	9154.31	32.86	OSF1.50	1500.00	1500.00				MinPt-CtCt	
	9707.45	2012.39	8365.43	7695.06	7.24	OSF1.50	6570.00	6511.27				MinPts	
	5601.55	1682.87	4478.74	3918.68	5.00	OSF1.50	14750.00	9593.00	OSF<5.00			Enter Alert	
	4338.29	1420.58	3390.81	2917.71	4.58	OSF1.50	16670.00	9593.00				MinPt-O-SF	
	3672.18	1107.87	2933.16	2564.30	4.98	OSF1.50	18980.00	9593.00				MinPt-CtCt	
	3672.19	1107.91	2933.15	2564.28	4.98	OSF1.50	18990.00	9593.00				MINPT-O-EOU	
	3672.39	1108.14	2933.20	2564.25	4.98	OSF1.50	19020.00	9593.00				MinPt-O-ADP	
	4338.34	1428.21	3385.78	2910.14	4.56	OSF1.50	21290.00	9593.00				MinPt-O-SF	
	4682.40	1525.56	3664.93	3156.84	4.61	OSF1.50	21885.12	9593.00				TD	
Cimarex Tar Heel 19-18 Federal Com #3H Rev1 RM 17Nov20 (Def Plan)													Pass
	1051.13	32.81	1049.84	1018.32	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1051.11	32.81	1049.83	1018.30	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1051.11	32.81	1040.81	1018.30	116.49	MAS = 10.00 (m)	1500.00	1500.00				MinPts	
	1051.13	32.81	1040.78	1018.32	115.88	MAS = 10.00 (m)	1510.00	1510.00				MINPT-O-EOU	
	1104.18	32.81	1091.55	1071.37	97.30	MAS = 10.00 (m)	2080.00	2076.55				MinPt-O-SF	
	1271.58	55.13	1234.40	1216.46	35.39	OSF1.50	6750.00	6689.06				MinPt-O-SF	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	1339.00	61.45	1297.60	1277.55	33.35	OSF1.50	9190.00	9123.08				MINPT-O-EOU	
	1339.04	61.51	1297.61	1277.54	33.32	OSF1.50	9200.00	9133.08				MinPt-O-ADP	
	1354.41	62.93	1312.03	1291.49	32.93	OSF1.50	9460.00	9377.71				MinPt-O-SF	
	1741.33	423.00	1458.90	1318.32	6.19	OSF1.50	21880.00	9593.00				MinPt-CtCt	
	1741.33	423.07	1458.86	1318.26	6.19	OSF1.50	21885.12	9593.00				MinPts	
Cimarex Tar Heel 19-18 Federal Com #2H Rev1 RM 17Nov20 (Def Plan)													Pass
	1070.68	32.81	1069.39	1037.87	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1070.67	32.81	1069.38	1037.86	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1070.67	32.81	1060.37	1037.86	118.63	MAS = 10.00 (m)	1500.00	1500.00				MinPts	
	1070.68	32.81	1060.34	1037.88	118.01	MAS = 10.00 (m)	1510.00	1510.00				MINPT-O-EOU	
	1114.41	32.81	1102.03	1081.60	100.31	MAS = 10.00 (m)	2010.00	2007.41				MinPt-O-SF	
	1977.66	52.93	1941.94	1924.73	57.40	OSF1.50	7100.00	7034.75				MinPt-O-SF	
	2010.22	63.34	1967.56	1946.88	48.56	OSF1.50	9200.00	9133.08				MinPts	
	2044.89	65.94	2000.50	1978.95	47.41	OSF1.50	9590.00	9475.37				MinPt-O-SF	
	2164.59	424.64	1881.07	1739.95	7.66	OSF1.50	21885.12	9593.00				MinPts	
Cimarex Tar Heel 19-18 Federal Com #1H Rev1 RM 17Nov20 (Def Plan)													Pass
	1090.27	32.81	1088.98	1057.46	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1090.25	32.81	1088.96	1057.44	N/A	MAS = 10.00 (m)	26.00	26.00				WRP	
	1090.25	32.81	1079.95	1057.44	120.85	MAS = 10.00 (m)	1500.00	1500.00				MinPts	
	1090.27	32.81	1079.92	1057.46	120.21	MAS = 10.00 (m)	1510.00	1510.00				MINPT-O-EOU	
	1921.34	63.83	1878.36	1857.51	46.05	OSF1.50	7100.00	7034.75				MinPt-O-SF	
	1954.15	75.83	1903.17	1878.32	39.30	OSF1.50	9200.00	9133.08				MinPts	
	1979.73	83.24	1923.81	1896.49	36.21	OSF1.50	9932.45	9593.00				MinPt-CtCt	
	1979.78	425.89	1695.42	1553.89	6.99	OSF1.50	21885.12	9593.00				MinPts	
XTO Ross Draw 31 Federal Wal Com #6H (Offset) API 30-015-45121 Gas 0ft-22980ft (Def Survey)													Pass
	8745.20	32.81	8743.91	8712.39	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	8745.18	32.81	8743.89	8712.37	N/A	MAS = 10.00 (m)	10.00	10.00				MinPt-O-SF	
	8745.17	32.81	8743.88	8712.36	N/A	MAS = 10.00 (m)	20.00	20.00				MINPT-O-EOU	
	8745.17	32.81	8743.88	8712.36	N/A	MAS = 10.00 (m)	26.00	26.00				MinPts	
	8706.23	32.81	8698.14	8673.42	1252.40	MAS = 10.00 (m)	1780.00	1779.55				MinPt-O-SF	
	2463.22	405.77	2192.15	2057.45	9.14	OSF1.50	9920.00	9592.84				MinPt-CtCt	
	2463.31	405.97	2192.10	2057.35	9.13	OSF1.50	9930.00	9592.99				MINPT-O-EOU	
	2463.49	406.16	2192.14	2057.33	9.13	OSF1.50	9940.00	9593.00				MinPt-O-ADP	
	2466.86	410.32	2192.69	2056.53	9.05	OSF1.50	10070.00	9593.00				MinPt-O-ADP	
	2478.68	423.60	2195.69	2055.08	8.81	OSF1.50	10350.00	9593.00				MINPT-O-EOU	
	2493.93	453.27	2191.19	2040.66	8.28	OSF1.50	10950.00	9593.00				MINPT-O-EOU	
	2483.83	515.19	2139.88	1968.64	7.25	OSF1.50	12190.00	9593.00				MinPt-CtCt	
	2484.48	517.05	2139.23	1967.42	7.23	OSF1.50	12270.00	9593.00				MINPT-O-EOU	
	2485.06	517.74	2139.33	1967.32	7.22	OSF1.50	12300.00	9593.00				MinPt-O-ADP	
	2482.84	548.60	2116.61	1934.24	6.80	OSF1.50	12860.00	9593.00				MinPt-CtCt	
	2483.76	563.20	2107.81	1920.56	6.63	OSF1.50	13180.00	9593.00				MinPt-CtCt	
	2485.18	569.02	2105.28	1916.16	6.57	OSF1.50	13350.00	9593.00				MINPT-O-EOU	
	2485.38	569.23	2105.33	1916.15	6.56	OSF1.50	13360.00	9593.00				MinPt-O-ADP	
	2497.09	577.64	2111.31	1919.45	6.50	OSF1.50	13620.00	9593.00				MinPt-O-ADP	
	2519.47	590.95	2124.72	1928.51	6.41	OSF1.50	13950.00	9593.00				MinPt-O-SF	
	8509.58	196.21	8377.94	8313.37	65.88	OSF1.50	21885.12	9593.00				TD	
ORYX Energy Bedena Federal #1 (Offset) API 30-015-25273 Plugged SWD Inc Only 0ft-6300ft (Def Survey)													Pass
	6652.10	32.81	6650.81	6619.29	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	6652.09	32.81	6650.39	6619.28	15926.27	MAS = 10.00 (m)	26.00	26.00				WRP	
	6641.60	47.86	6609.33	6593.74	212.97	OSF1.50	920.00	920.00				MinPt-CtCt	
	6648.58	85.65	6591.12	6562.93	117.92	OSF1.50	1440.00	1440.00				MINPT-O-EOU	
	6652.24	89.91	6591.94	6562.33	112.32	OSF1.50	1570.00	1569.99				MinPt-O-ADP	
	6650.66	119.97	6570.32	6530.69	83.90	OSF1.50	2250.00	2244.46				MinPt-CtCt	
	6655.61	135.17	6565.13	6520.44	74.45	OSF1.50	2640.00	2629.66				MINPT-O-EOU	
	6660.81	141.25	6566.28	6519.56	71.27	OSF1.50	2810.00	2797.56				MinPt-O-ADP	
	6703.50	163.01	6594.50	6540.49	62.05	OSF1.50	3540.00	3518.58				MinPts	
	6705.58	166.68	6594.13	6538.90	60.69	OSF1.50	3590.00	3567.96				MINPT-O-EOU	
	6707.40	169.67	6593.96	6537.73	59.63	OSF1.50	3760.00	3735.87				MINPT-O-EOU	
	6707.77	170.11	6594.04	6537.66	59.48	OSF1.50	3820.00	3795.13				MinPt-O-ADP	
	6768.56	220.85	6620.99	6547.71	46.17	OSF1.50	5910.00	5859.40				MINPT-O-EOU	
	6771.28	223.88	6621.70	6547.40	45.56	OSF1.50	6030.00	5977.92				MinPt-O-ADP	
	6782.43	232.65	6627.00	6549.78	43.91	OSF1.50	6380.00	6323.61				MinPt-O-SF	
	3701.03	176.28	3583.18	3524.75	31.66	OSF1.50	16060.00	9593.00				MinPt-CtCt	
	3701.14	176.67	3583.04	3524.48	31.59	OSF1.50	16090.00	9593.00				MINPT-O-EOU	
	3701.35	176.93	3583.07	3524.42	31.55	OSF1.50	16110.00	9593.00				MinPt-O-ADP	
	3967.19	200.62	3833.12	3766.57	29.80	OSF1.50	17490.00	9593.00				MinPt-O-SF	
	6900.26	241.57	6738.89	6658.70	43.02	OSF1.50	21885.12	9593.00				TD	
JC Williams New Era Federal #2 (Offset) API 30-015-25326 Plugged Inc Only 0ft-5717ft (Def Survey)													Pass
	4193.40	32.81	4191.99	4160.59	35690.50	MAS = 10.00 (m)	0.00	0.00				MinPts	
	4193.41	32.81	4191.59	4160.60	7780.50	MAS = 10.00 (m)	26.00	26.00				WRP	
	4187.44	51.29	4152.88	4136.15	125.10	OSF1.50	1340.00	1340.00				MinPt-CtCt	
	3713.83	192.32	3585.14	3521.51	29.17	OSF1.50	6010.00	5958.17				MinPt-O-SF	
	3711.08	191.93	3582.66	3519.15	29.21	OSF1.50	6140.00	6086.57				MinPts	
	3711.06	191.89	3582.66	3519.17	29.21	OSF1.50	6150.00	6096.44				MinPt-CtCt	
	4554.31	126.04	4469.95	4428.26	54.61	OSF1.50	12130.00	9593.00				MinPt-CtCt	
	4554.47	126.57	4469.76	4427.90	54.39	OSF1.50	12170.00	9593.00				MINPT-O-EOU	
	4554.68	126.83	4469.80	4427.85	54.28	OSF1.50	12190.00	9593.00				MinPt-O-ADP	
	5278.53	175.31	5161.33	5103.22	45.41	OSF1.50	14800.00	9593.00				MinPt-O-SF	
	10764.57	220.76	10617.06	10543.80	73.46	OSF1.50	21885.12	9593.00				TD	
K P Kauffman McKenna Federal #2 (Offset) API 30-015-20222 Inc Only SWD 0ft-3370ft (Def Survey)													Pass
	5004.74	32.81	5002.68	4971.93	63899.61	MAS = 10.00 (m)	0.00	0.00				Surface	
	5004.73	32.81	5002.20	4971.92	9068.24	MAS = 10.00 (m)	26.00	26.00				WRP	
	4994.00	55.29	4956.48	4938.71	140.46	OSF1.50	980.00	980.00				MinPt-CtCt	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	4998.44	66.60	4953.38	4931.84	115.98	OSF1.50	1340.00	1340.00				MINPT-O-EOU	
	5003.19	72.41	4954.26	4930.78	106.51	OSF1.50	1520.00	1520.00				MinPt-O-ADP	
	5003.82	91.76	4941.99	4912.06	83.56	OSF1.50	1680.00	1679.88				MinPt-CtCt	
	5012.55	128.88	4925.97	4883.67	59.23	OSF1.50	2320.00	2313.60				MINPT-O-EOU	
	5017.74	135.19	4926.95	4882.55	56.48	OSF1.50	2500.00	2491.38				MinPt-O-ADP	
	5064.03	173.73	4947.55	4890.30	44.21	OSF1.50	3300.00	3281.53				MinPts	
	5067.33	175.62	4949.59	4891.71	43.76	OSF1.50	3390.00	3370.42				MinPt-O-SF	
	6534.90	116.92	6456.30	6417.98	85.25	OSF1.50	14330.00	9593.00				MinPt-CtCt	
	6535.36	118.27	6455.85	6417.09	84.27	OSF1.50	14410.00	9593.00				MINPT-O-EOU	
	6535.96	118.96	6455.99	6417.00	83.78	OSF1.50	14450.00	9593.00				MinPt-O-ADP	
	7691.98	186.75	7566.82	7505.23	62.43	OSF1.50	18390.00	9593.00				MinPt-O-SF	
	9987.19	215.50	9842.86	9771.69	70.15	OSF1.50	21885.12	9593.00				TD	
Hankamer Curtis Federal AT #1 (Offet) API 30-015-04775 Plugged Blind 0ft-3450ft (Def Survey)													Pass
	5269.68	32.81	5268.26	5236.87	38682.74	MAS = 10.00 (m)	0.00	0.00				Surface	
	5269.68	32.81	5265.54	5236.87	1842.04	MAS = 10.00 (m)	26.00	26.00				WRP	
	5269.68	443.72	4973.44	4825.96	17.86	OSF1.50	1500.00	1500.00				MinPt-CtCt	
	5315.70	1053.36	4613.03	4262.34	7.58	OSF1.50	3460.00	3439.56				MinPts	
	6372.63	296.39	6174.61	6076.25	32.39	OSF1.50	14660.00	9593.00				MinPt-CtCt	
	6372.81	296.84	6174.49	6075.97	32.34	OSF1.50	14710.00	9593.00				MINPT-O-EOU	
	6373.38	297.50	6174.61	6075.88	32.27	OSF1.50	14760.00	9593.00				MinPt-O-ADP	
	8608.57	755.65	8104.38	7852.92	17.11	OSF1.50	20450.00	9593.00				MinPt-O-SF	
	9632.19	827.98	9079.78	8804.21	17.47	OSF1.50	21885.12	9593.00				TD	
Amoco Production Federal AX #1 (Offset) API 30-015-23311 Plugged Blind 0ft-3550ft (Def Survey)													Pass
	5285.40	32.81	5283.56	5252.59	9516.52	MAS = 10.00 (m)	0.00	0.00				Surface	
	5285.40	32.81	5280.83	5252.59	1611.42	MAS = 10.00 (m)	26.00	26.00				WRP	
	5285.40	459.03	4978.95	4826.37	17.32	OSF1.50	1500.00	1500.00				MinPt-CtCt	
	5340.01	1101.72	4605.10	4238.29	7.28	OSF1.50	3570.00	3548.21				MinPts	
	6298.27	327.39	6079.59	5970.89	28.97	OSF1.50	14660.00	9593.00				MinPt-CtCt	
	6298.39	327.70	6079.49	5970.69	28.94	OSF1.50	14700.00	9593.00				MINPT-O-EOU	
	6298.88	328.29	6079.60	5970.59	28.89	OSF1.50	14750.00	9593.00				MinPt-O-ADP	
	8472.91	789.33	7946.26	7683.58	16.13	OSF1.50	20330.00	9593.00				MinPt-O-SF	
	9583.13	870.91	9002.10	8712.22	16.53	OSF1.50	21885.12	9593.00				TD	
Aldridge & Stroud American Trading #1 (Offset) API 30-015-04774 Plugged Blind 0ft-1269ft (Def Survey)													Pass
	9179.28	32.81	9177.99	9146.47	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	9179.26	32.81	9177.21	9146.45	12000.68	MAS = 10.00 (m)	26.00	26.00				WRP	
	9179.26	382.33	8923.94	8796.93	36.13	OSF1.50	1280.00	1280.00				MinPt-CtCt	
	9179.26	384.75	8922.33	8794.51	35.90	OSF1.50	1290.00	1290.00				MinPts	
	9179.27	384.75	8922.34	8794.52	35.90	OSF1.50	1300.00	1300.00				MinPt-O-SF	
	11331.62	266.48	11153.53	11065.13	64.09	OSF1.50	11050.00	9593.00				MinPt-O-SF	
	8443.05	210.48	8302.30	8232.57	60.53	OSF1.50	18610.00	9593.00				MinPt-CtCt	
	8443.79	212.60	8301.63	8231.20	59.93	OSF1.50	18720.00	9593.00				MINPT-O-EOU	
	8444.80	213.79	8301.85	8231.02	59.60	OSF1.50	18780.00	9593.00				MinPt-O-ADP	
	9056.81	290.74	8862.55	8766.07	46.93	OSF1.50	21885.12	9593.00				MinPt-O-SF	

Schlumberger

Cimarex Energy

Rev 2

CIMAREX

Borehole:	Well:	Field:	Structure:
Tar Heel 19-18 Federal Com #20H	Tar Heel 19-18 Federal Com #20H	NM Eddy County (NAD 83)	Cimarex Tar Heel 19-18 Federal Com #20H

Gravity & Magnetic Parameters						Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	HDGM 2020	Dip:	59.598°	Date:	17-Nov-2020	Lat:	N 32 1 21.52	Northing:	372216.72ftUS	Grid Conv:	0.2167°	Slot:	New Slot	TVD Ref:	RKB(3048.7ft above MSL)
MagDec:	6.583°	FS:	47622.778nT	Gravity FS:	998.44mgn (9.80665 Based)	Lon:	W 103 55 28.49	Easting:	668015.04ftUS	Scale Fact:	0.9992747	Plan:	Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20		

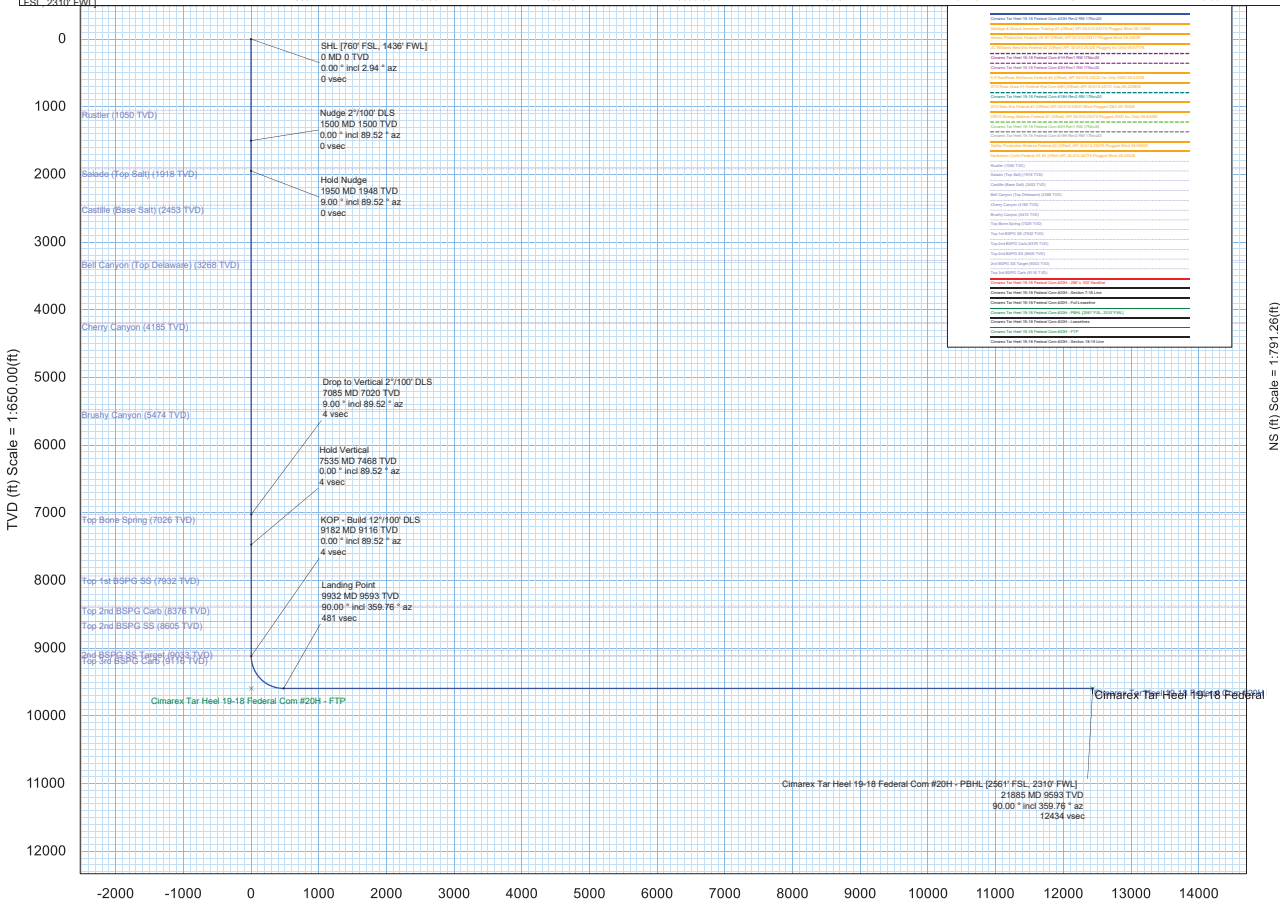
Critical Points

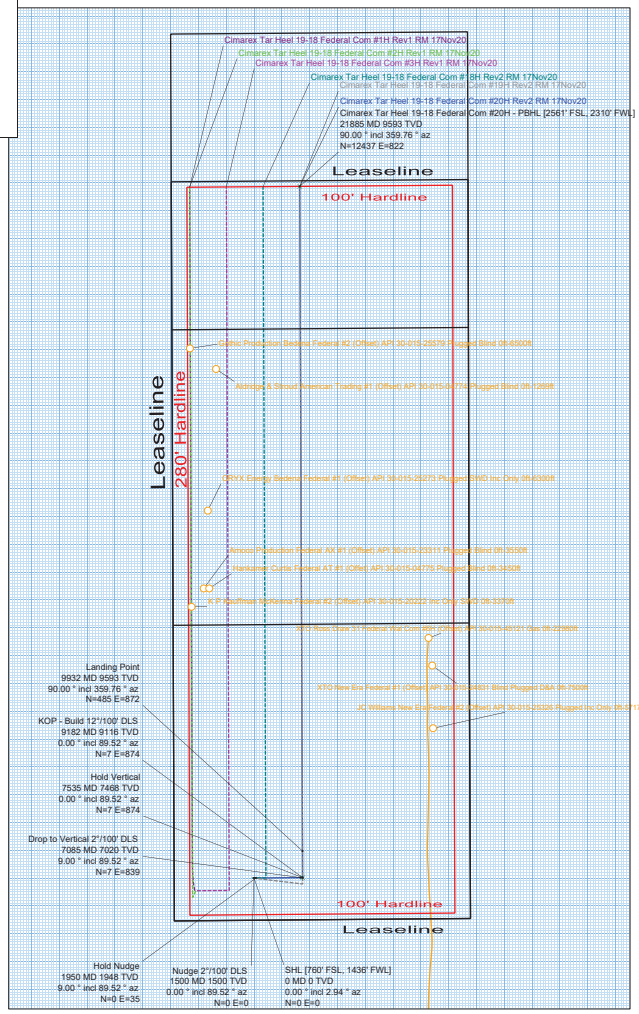
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [760' FSL, 1436' FWL]	0.00	0.00	2.94	0.00	0.00	0.00	0.00	
Rustler	1050.00	0.00	89.52	1050.00	0.00	0.00	0.00	0.00
Nudge 2°/100' DLS	1500.00	0.00	89.52	1500.00	0.00	0.00	0.00	0.00
Salado (Top Salt)	1919.50	8.39	89.52	1918.00	0.13	0.26	30.66	2.00
Hold Nudge	1950.00	9.00	89.52	1948.15	0.15	0.30	35.27	2.00
Castille (Base Salt)	2461.14	9.00	89.52	2453.00	0.49	0.97	115.23	0.00
Bell Canyon (Top Delaware)	3286.30	9.00	89.52	3268.00	1.05	2.06	244.31	0.00
Cherry Canyon	4214.73	9.00	89.52	4185.00	1.67	3.29	389.54	0.00
Brushy Canyon	5519.80	9.00	89.52	5474.00	2.54	5.01	593.69	0.00
Drop to Vertical 2°/100' DLS	7085.15	9.00	89.52	7020.08	3.59	7.07	838.56	0.00
Top Bone Spring	7091.14	8.88	89.52	7026.00	3.59	7.08	839.49	2.00
Hold Vertical	7535.15	0.00	89.52	7468.24	3.74	7.37	873.83	2.00
Top 1st BSPG SS	7998.92	0.00	89.52	7932.00	3.74	7.37	873.83	0.00
Top 2nd BSPG Carb	8442.92	0.00	89.52	8376.00	3.74	7.37	873.83	0.00
Top 2nd BSPG SS	8671.92	0.00	89.52	8605.00	3.74	7.37	873.83	0.00
2nd BSPG SS Target	9099.92	0.00	89.52	9033.00	3.74	7.37	873.83	0.00
KOP - Build 12°/100' DLS	9182.45	0.00	89.52	9115.54	3.74	7.37	873.83	0.00
Top 3rd BSPG Carb	9182.92	0.06	359.76	9116.00	3.74	7.37	873.83	12.00
Landing Point	9932.45	90.00	359.76	9593.00	481.21	484.83	871.84	12.00
Cimarex Tar Heel 19-18 Federal Com #20H - PBHL [2561' FSL, 2310' FWL]	21885.12	90.00	359.76	9593.00	12433.87	12437.40	822.22	0.00

CONTROLLED

D		
E		
C		
Plan ref	Cimarex Tar Heel 19-18 Federal Com #20H Rev2 RM 17Nov20	
Drawing ref		
Copy number	of 3	
Date	17-Nov-2020	
1	Client	
2	Client	
3	Office	
4	Office	

Copy number for





1. Geological Formations

TVD of target 9,593
MD at TD 21,885

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	1050	N/A	
Salado	1918	N/A	
Castille	2453	N/A	
Bell Canyon	3268	Hydrocarbons	
Cherry Canyon	4185	Hydrocarbons	
Brushy Canyon	5474	Hydrocarbons	
Bone Spring	7026	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	1100	1100	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.47	3.44	6.10
12 1/4	0	3200	3200	9-5/8"	36.00	J-55	LT&C	1.19	2.07	3.93
8 3/4	0	8282	8282	7"	26.00	L-80	BT&C	1.40	1.87	2.18
8 3/4	8282	9800	9574	7"	29.00	P-110	LT&C	1.90	2.50	21.27
6	8182	21885	9593	4-1/2"	11.60	P-110 CY	BT&C	1.38	1.95	22.42
						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?	Y
If yes, are there two strings cemented to surface?	Y
(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	534	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	143	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	586	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	187	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	401	10.50	3.45	22.18	N/A	Lead: NeoCem
	108	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Completion System	894	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	45
Intermediate	0	54
Production	3000	25
Completion System	9600	10

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

4. Pressure Control Equipment

	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.

BOP installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
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	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		
6	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			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 1100'	FW Spud Mud	8.30 - 8.80	30-32	N/C
1100' to 3200'	Brine Water	9.70 - 10.20	30-32	N/C
3200' to 9800'	Cut Brine or OBM	8.50 - 9.00	27-70	N/C
9800' to 21885'	OBM	10.50 - 11.00	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.

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	5487 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 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

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

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

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

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

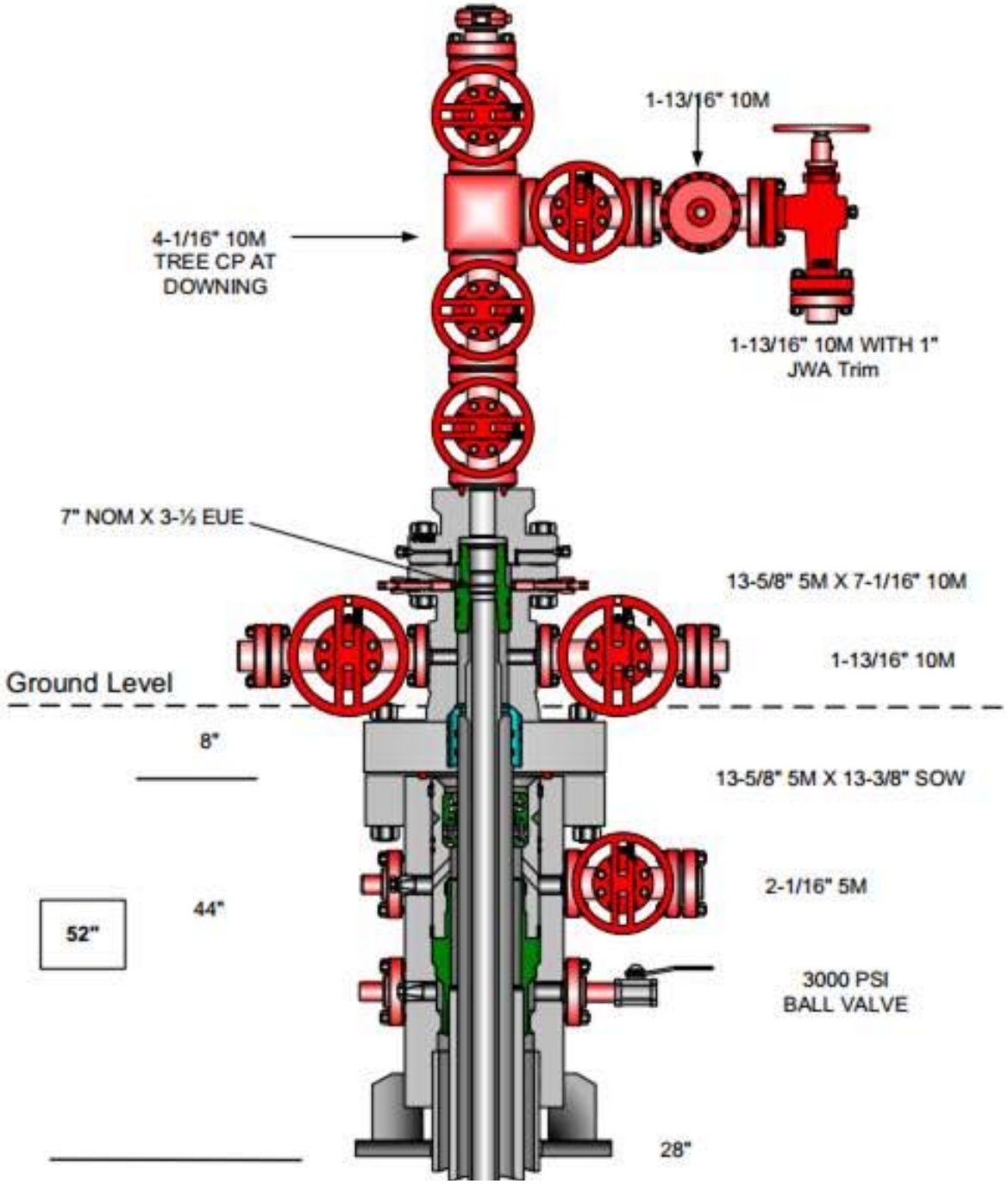
A solid steel body pack-off will be utilized after running and cementing the production casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

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

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

Multi-bowl Wellhead Diagram

Tar Heel 19-18-7 Federal Com 20H



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	1100	1100	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.47	3.44	6.10
12 1/4	0	3200	3200	9-5/8"	36.00	J-55	LT&C	1.19	2.07	3.93
8 3/4	0	8282	8282	7"	26.00	L-80	BT&C	1.40	1.87	2.18
8 3/4	8282	9800	9574	7"	29.00	P-110	LT&C	1.90	2.50	21.27
6	8182	21885	9593	4-1/2"	11.60	P-110 CY	BT&C	1.38	1.95	22.42
							BLM Minimum Safety Factor	1.125	1	1.6 Dry 1.8 Wet

Print

EVRAZ

Tar Heel 19-18-7 Fed Com 20H

Surface Casing Spec Sheet

OCTG Performance Data

Casing Performance

Availability: ERW

Pipe Body Geometry

Outside Diameter:	13.375 in	Inside Diameter:	12.715 in
Wall Thickness:	0.330 in	Cross Section Area:	13.524 sq in
Nominal Weight:	48.00 lb/ft	Drift Diameter:	12.559 in
Plain End Weight:	46.02 lb/ft	Alternate Drift Diameter:	-

Pipe Body Performance

Grade:	H40	Collapse Strength (ERW):	740 psi
Pipe Body Yield Strength:	541000 lbf	Collapse Strength (SMLS):	-

SC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	3220 lb·ft	2420 lb·ft	4030 lb·ft
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	1730 psi
Joint Strength:	322000 lbf		

LC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	-
Joint Strength:	-		

BC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	-
Joint Strength:	-		

PE Connection

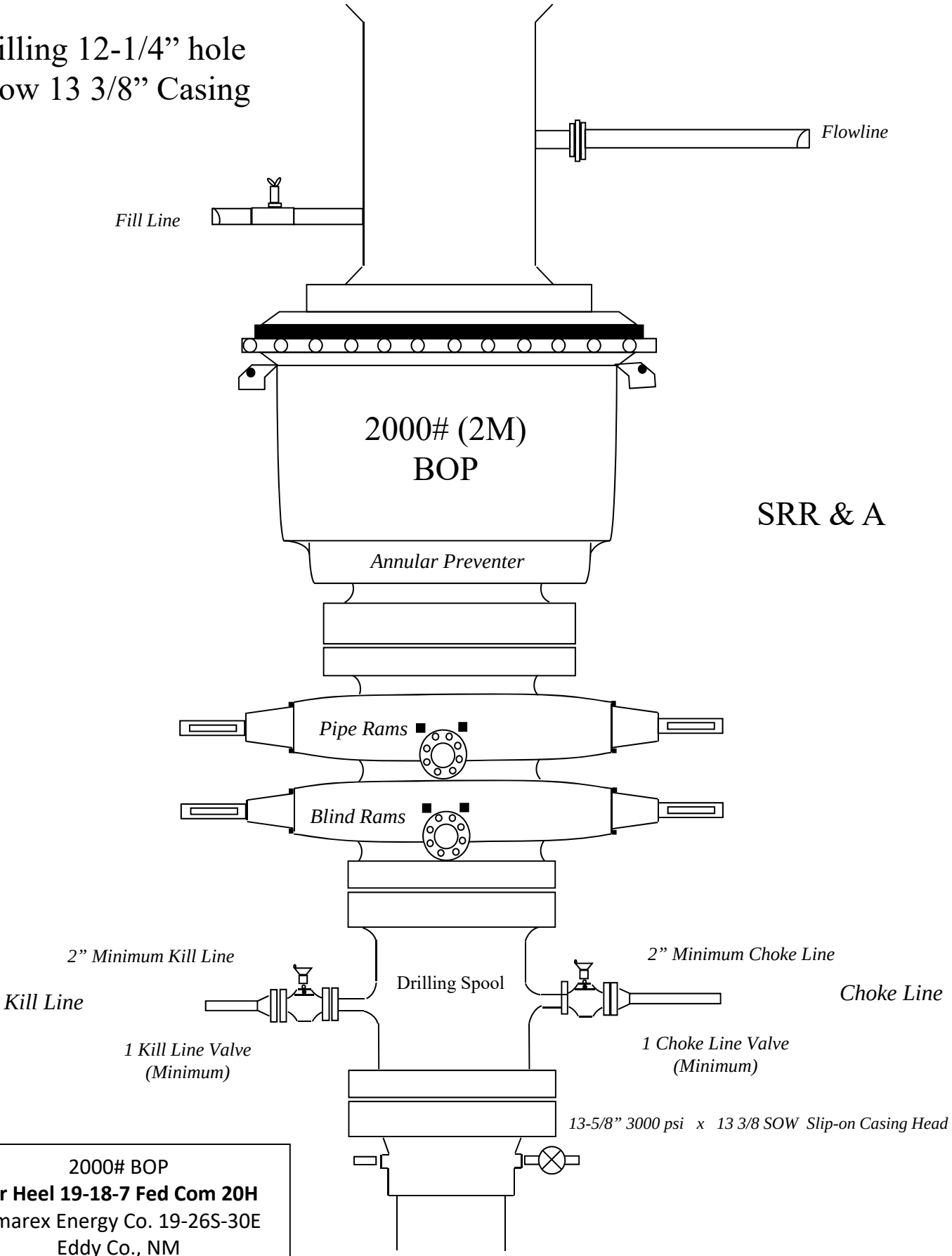
Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

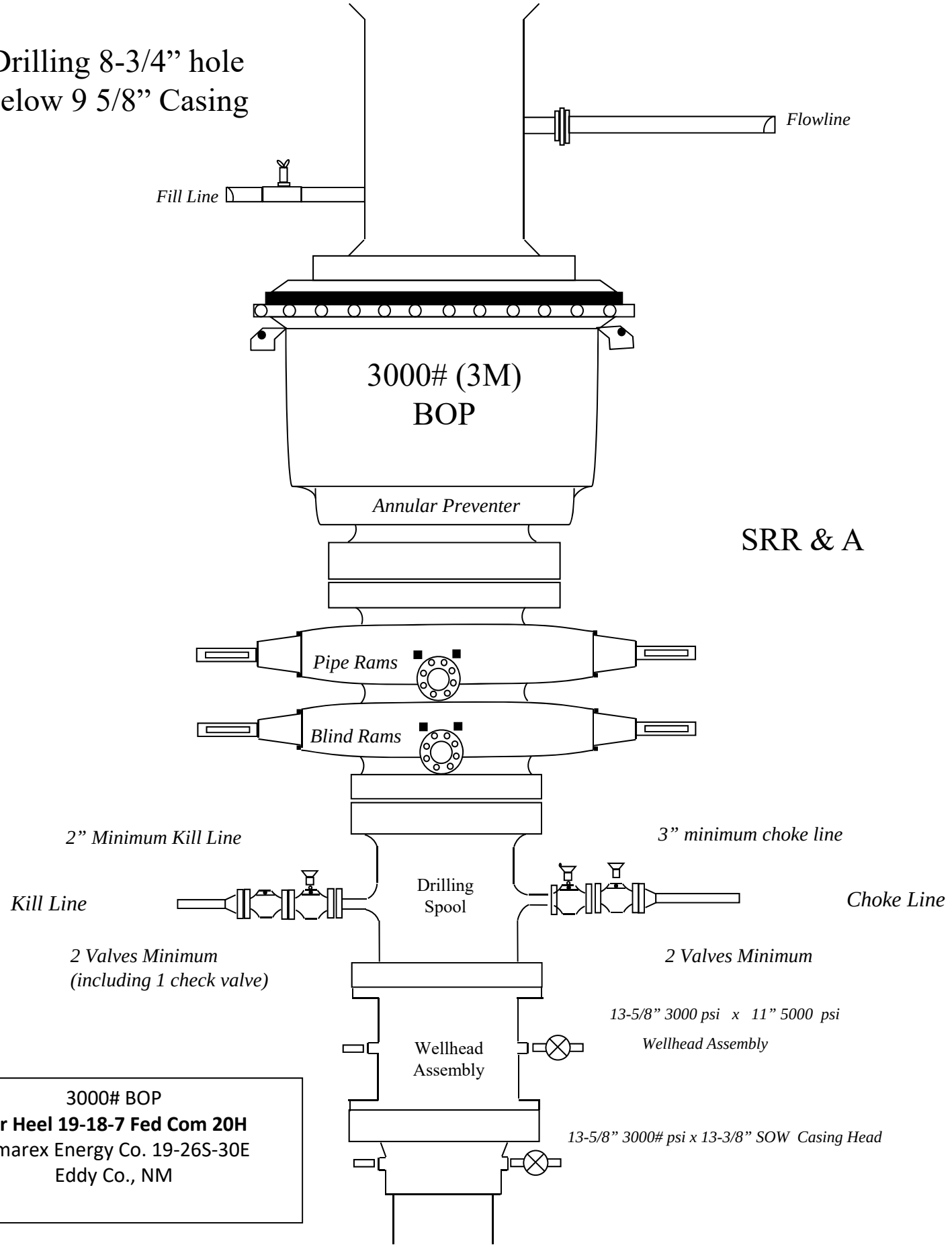
Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	1730 psi
Joint Strength:	-		

Drilling 12-1/4" hole
below 13 3/8" Casing

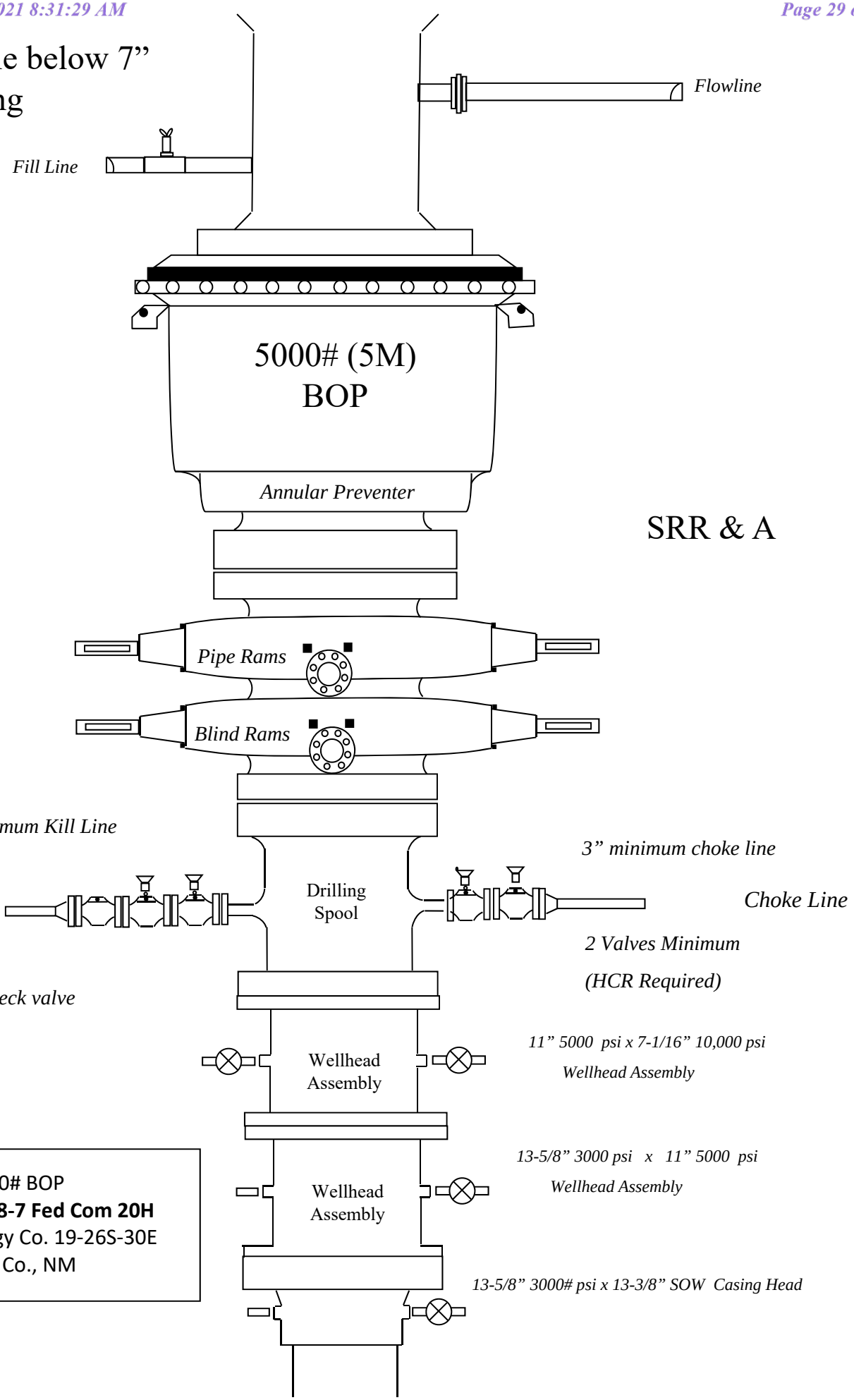


2000# BOP
Tar Heel 19-18-7 Fed Com 20H
Cimarex Energy Co. 19-26S-30E
Eddy Co., NM

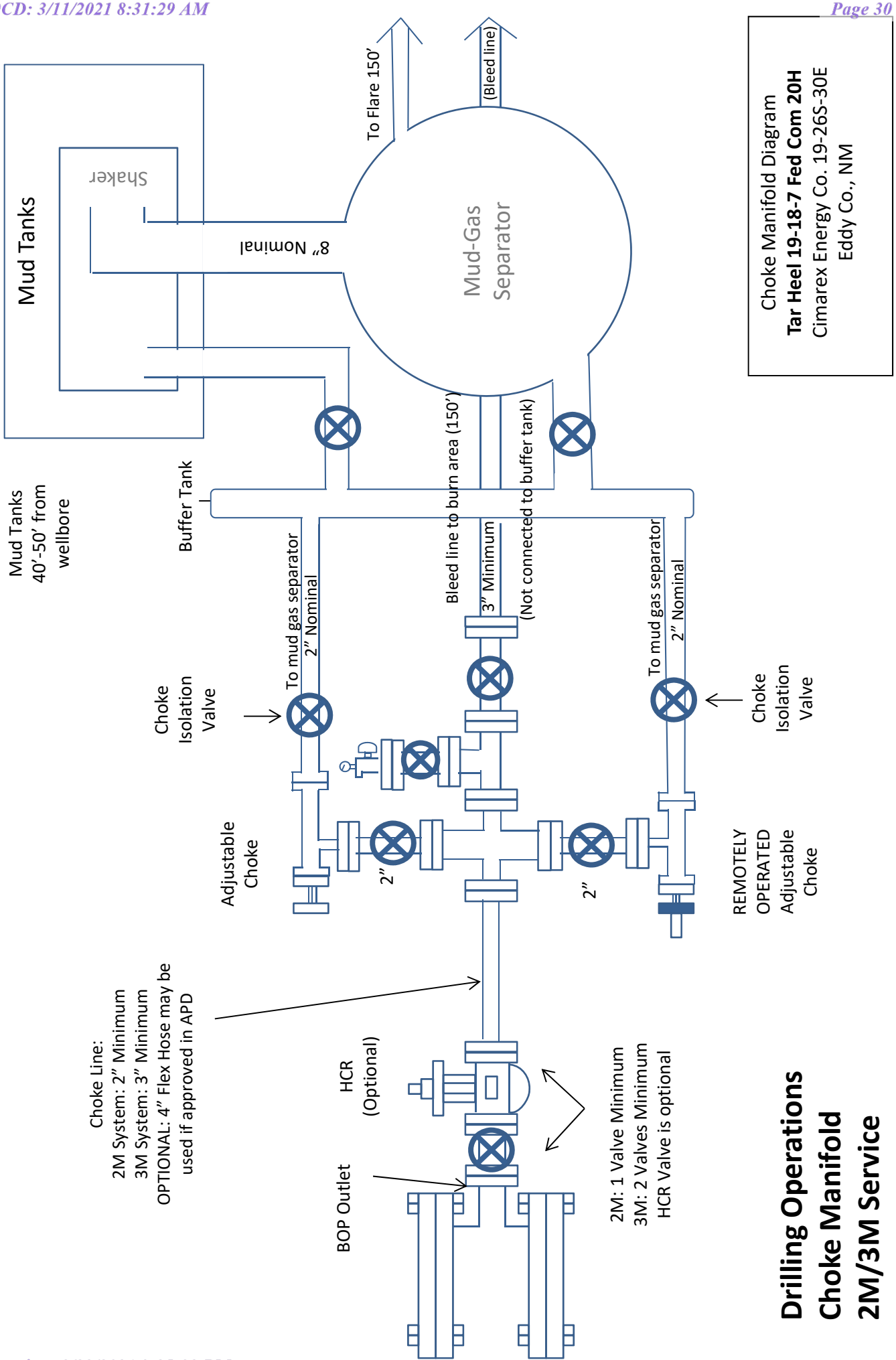


3000# BOP
Tar Heel 19-18-7 Fed Com 20H
Cimarex Energy Co. 19-26S-30E
Eddy Co., NM

Drilling 6” hole below 7” Casing

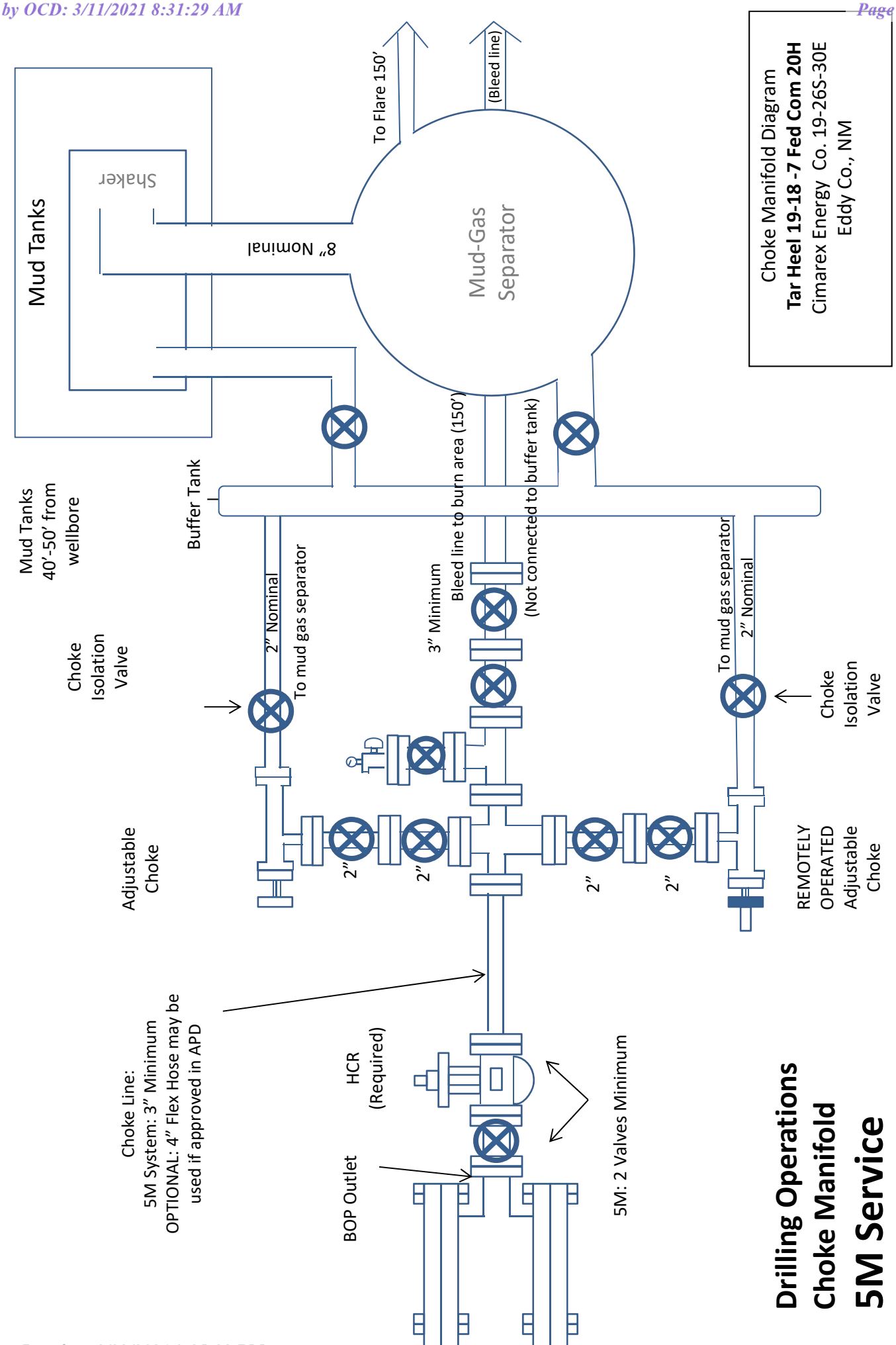


5000# BOP
Tar Heel 19-18-7 Fed Com 20H
Cimarex Energy Co. 19-26S-30E
Eddy Co., NM



Choke Manifold Diagram
Tar Heel 19-18-7 Fed Com 20H
Cimarex Energy Co. 19-26S-30E
Eddy Co., NM

Drilling Operations
Choke Manifold
2M/3M Service


Mud Tanks
Shaker
8" Nominal
Mud-Gas Separator
To Flare 150'
(Bleed line)
Choke Manifold Diagram
Tar Heel 19-18 -7 Fed Com 20H
Cimarex Energy Co. 19-26S-30E
Eddy Co., NM
Mud Tanks 40'-50' from wellbore
Buffer Tank
Choke Isolation Valve
2" Nominal
To mud gas separator
3" Minimum
Bleed line to burn area (150')
(Not connected to buffer tank)
To mud gas separator
2" Nominal
Choke Isolation Valve
Adjustable Choke
2"
2"
2"
2"
REMOTELY OPERATED Adjustable Choke
Choke Line:
5M System: 3" Minimum
OPTIONAL: 4" Flex Hose may be used if approved in APD
HCR (Required)
5M: 2 Valves Minimum
BOP Outlet
Drilling Operations
Choke Manifold
5M Service

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 20499

CONDITIONS OF APPROVAL

Operator:	OGRID:	Action Number:	Action Type:
CIMAREX ENERGY CO. 600 N. Marienfeld Street Suite 600 Midland, TX79701	215099	20499	C-103A

OCD Reviewer	Condition
pkautz	None