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.: NMNM092757

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.: TOMAHAWK FEDERAL UNIT [328919] 703H

2. Name of Operator: COG OPERATING LLC [229137]

9. API Well No.: 30-015-47307

3a. Address: 600 West Illinois Ave, Midland, TX 79701

3b. Phone No. *(include area code)*: (432) 683-7443

10. Field and Pool, or Exploratory: Malaga/PURPLE SAGE WOLFCAMP GAS 98220

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: SESW / 500 FSL / 1648 FWL / LAT 32.197324 / LONG -104.112891

At proposed prod. zone: SESW / 200 FSL / 2614 FWL / LAT 32.167071 / LONG -104.109767

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 20/T24S/R28E/NMP

14. Distance in miles and direction from nearest town or post office*: 3 miles

12. County or Parish: EDDY

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 200 feet

16. No of acres in lease: 1081.18

17. Spacing Unit dedicated to this well: 1280.0

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 30 feet

19. Proposed Depth: 9398 feet / 20328 feet

20. BLM/BIA Bond No. in file: FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3047 feet

22. Approximate date work will start*: 07/01/2020

23. Estimated duration: 30 days

24. Attachments

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

1. Well plat certified by a registered surveyor.
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)	MAYTE REYES / Ph: (432) 683-7443	03/26/2020

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575) 234-5959	07/21/2020

Title	Office
Assistant Field Manager Lands & Minerals	Carlsbad Field Office

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

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

GCP Rec 07/22/2020

Standard Location per R-21254

APPROVED WITH CONDITIONS

KZ 07/30/2020

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 07/21/2020

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC**
LEASE NO.:	**NMNM092757**
WELL NAME & NO.:	**Tomahawk Federal Unit 703H**
SURFACE HOLE FOOTAGE:	**500' FSL & 1648' FWL**
BOTTOM HOLE FOOTAGE	**200' FSL & 2614' FWL**
LOCATION:	**Section 20, T 24S, R 28E, NMPM**
COUNTY:	**Eddy County, New Mexico**

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
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

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

B. CASING

1. The **10-3/4"** surface casing shall be set a minimum of 25' above the top of the salt and cemented to surface.
   a. **If cement does not circulate to 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 **6 hours** after pumping cement, ideally between 8-10 hours after.
   b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
   c. If cement falls back, remedial cementing will be done prior to drilling out the shoe.
   d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The **7-5/8"** intermediate casing shall be set be cemented to surface.

   a. **If cement does not circulate to surface,** see B.1.a, c & d.

3. The **5-1/2"** production casing shall be cemented with at least **200' tie-back** into the previous casing. Operator shall provide method of verification.

   a. In Medium 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.

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **5000 (5M)** psi.

D. SPECIAL REQUIREMENTS

2. The well sign for a unit well shall include the unit number (when applied for) in addition to the surface and bottom hole lease numbers. This also applies to participating area numbers. If a participating area has not been established, the operator can use the general unit designation, but will replace the unit number with the participating area number once it has been established.

   a. A commercial well determination shall be submit after production has been established for at least six months. Secondary recovery unit wells are exempt from this requirement.

DR 7/17/2020

GENERAL REQUIREMENTS

1. The BLM is to be notified in advance for a representative to witness:
   a. Spudding the well (minimum of 24 hours)
   b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
   c. BOP/BOPE tests (minimum of 4 hours)

      ☒ Eddy County: Call the Carlsbad Field Office, (575) 361-2822

      ☒ Lea County: Call the Hobbs Field Station, (575) 393-3612
2. 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:
      i. Notify the BLM when moving in and removing the Spudder Rig.
      ii. 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.
      iii. BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
3. 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.
4. 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 available upon request. 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 the portion of 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. If the operator has proposed a multi-bowl wellhead assembly in the APD, it must meet or exceed the pressure rating of the BOP system. Additionally, 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. 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 Onshore Order 2 III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the BOP/BOPE 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 which 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. The results of the test shall be made available upon request.
    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 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. This test shall be performed prior

to the test at full stack pressure.

f. BOP/BOPE must be tested 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

1. 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

1. 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.
2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

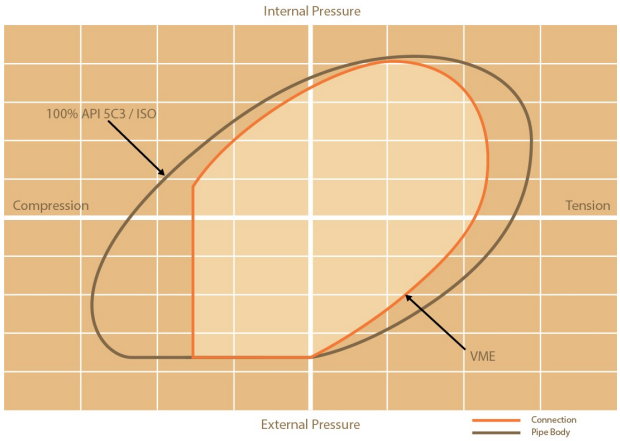
TECHNICAL DATA SHEET TMK UP SF_TORQ 5.5 X 23 P110 HC

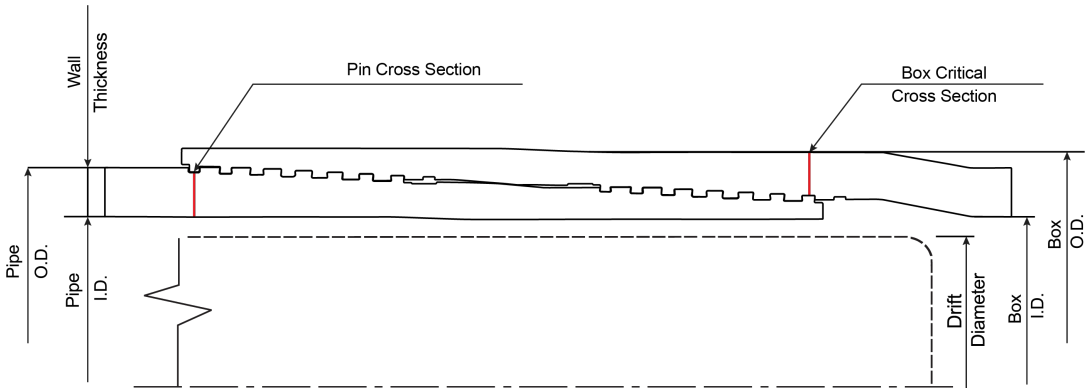
TUBULAR PARAMETERS	
Nominal OD, (inch)	5.500
Wall Thickness, (inch)	0.415
Pipe Grade	P110 HC
Coupling	Regular
Coupling Grade	P110 HC
Drift	Standard

CONNECTION PARAMETERS	
Connection OD (inch)	5.830
Connection ID, (inch)	4.626
Make-Up Loss, (inch)	5.592
Connection Critical Area, (sq inch)	7.007
Yield Strength in Tension, (klbs)	656
Yeld Strength in Compression, (klbs)	656
Tension Efficiency	90%
Compression Efficiency	90%
Min. Internal Yield Pressure, (psi)	14 530
Collapse Pressure, (psi)	15 990
Uniaxial Bending (deg/100ft)	83.0

MAKE-UP TORQUES	
Minimum Make-Up Torque, (ft-lb)	16 100
Optimum Make-Up Torque, (ft-lb)	23 000
Maximum Make-Up Torque, (ft-lb)	25 300
Operating Torque, (ft-lb)	34 500
Yield Torque, (ft-lb)	43 000

PIPE BODY PROPERTIES	
PE Weight, (lbs/ft)	22.54
Nominal Weight, (lbs/ft)	23.00
Nominal ID, (inch)	4.670
Drift Diameter, (inch)	4.545
Nominal Pipe Body Area, (sq inch)	6.630
Yield Strength in Tension, (klbs)	729
Min. Internal Yield Pressure, (psi)	14 530
Collapse Pressure, (psi)	15 990
Minimum Yield Strength, (psi)	110 000
Minimum Tensile Strength, (psi)	125 000





Print date: 02/15/2019 04:34

Approval Date: 07/21/2020

APD ID: 10400055531
Submission Date: 03/26/2020
Operator Name: COG OPERATING LLC
Federal/Indian APD: FED
Well Name: TOMAHAWK FEDERAL UNIT
Well Number: 703H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Application

Section 1 - General

APD ID: 10400055531
Tie to previous NOS? N
Submission Date: 03/26/2020
BLM Office: CARLSBAD
User: MAYTE REYES
Title: Regulatory Analyst
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMNM092757
Lease Acres: 1081.18
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: COG OPERATING LLC
Operator letter of designation:

Operator Info

Operator Organization Name: COG OPERATING LLC
Operator Address: 600 West Illinois Ave
Zip: 79701
Operator PO Box:
Operator City: Midland
State: TX
Operator Phone: (432)683-7443
Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO
Master Development Plan name:
Well in Master SUPO? NO
Master SUPO name:

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** Malaga **Pool Name:** PURPLE SAGE WOLFCAMP GAS

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?** N **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** Tomahawk Federal Unit **Number:** 703H, 704H and 705H

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: 3 Miles **Distance to nearest well:** 30 FT **Distance to lease line:** 200 FT

Reservoir well spacing assigned acres Measurement: 1280 Acres

Well plat: COG_Tomahawk_703H_C102_20200325222235.pdf

Well work start Date: 07/01/2020 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: **Reference Datum:** GROUND LEVEL

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	500	FSL	1648	FWL	24S	28E	20	Aliquot SESW	32.197324	-104.112891	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	3047	0	0	Y
KOP Leg #1	500	FSL	1648	FWL	24S	28E	20	Aliquot SESW	32.197324	-104.112891	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	3047	0	0	Y

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
PPP Leg #1-1	10	FNL	2614	FWL	24S	28E	29	Aliquot NENW	32.195904	-104.109761	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-6351	9800	9398	Y
PPP Leg #1-2	2639	FSL	2614	FWL	24S	28E	29	Aliquot NESW	32.188576	-104.109762	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 092757	-6359	12450	9406	Y
PPP Leg #1-3	1319	FSL	2614	FWL	24S	28E	29	Aliquot SESW	32.1849	-104.109763	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 110829	-6362	13800	9409	Y
PPP Leg #1-4	1321	FNL	670	FWL	24S	28E	32	Aliquot SENW	32.177546	-104.109765	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 102909	-6370	16400	9417	Y
EXIT Leg #1	330	FSL	2614	FWL	24S	28E	32	Aliquot SESW	32.216742 8	-104.109767	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	-6381	20198	9428	Y
BHL Leg #1	200	FSL	2614	FWL	24S	28E	32	Aliquot SESW	32.167071	-104.109767	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	-6351	20328	9398	Y

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
698113	QUATERNARY	3047	0	0	ALLUVIUM	NONE	N
698108	RUSTLER	2647	400	400	ANHYDRITE	USEABLE WATER	N
698109	TOP SALT	2121	926	926	SALT	NONE	N
698118	BASE OF SALT	740	2307	2307	SALT	NONE	N
698111	LAMAR	533	2514	2514	LIMESTONE	NONE	N
698112	BELL CANYON	497	2550	2550	SANDSTONE	NONE	N
698119	CHERRY CANYON	-285	3332	3332	SANDSTONE	NATURAL GAS, OIL	N

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
698120	BRUSHY CANYON	-1482	4529	4529	SANDSTONE	NATURAL GAS, OIL	N
698121	BONE SPRING LIME	-2999	6046	6046	LIMESTONE	NATURAL GAS, OIL	N
698128	UPPER AVALON SHALE	-3192	6239	6239	SANDSTONE	NATURAL GAS, OIL	N
698127	---	-3574	6621	6621	GILSONITE	NATURAL GAS, OIL	N
698122	BONE SPRING 1ST	-3957	7004	7004	SANDSTONE	NATURAL GAS, OIL	N
698123	BONE SPRING 2ND	-4701	7748	7748	SANDSTONE	NATURAL GAS, OIL	N
698115	BONE SPRING 3RD	-5877	8924	8924	SANDSTONE	NATURAL GAS, OIL	N
698110	WOLFCAMP	-6244	9291	9291	SHALE	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M **Rating Depth:** 8775

Equipment: BOP and BOPE will be installed per Onshore Order #2 requirements prior to drilling below the surface casing and will be rated to the above pressure rating or greater, see attached diagrams. Required safety valves, with appropriate wrenches and subs for the drill string being utilized, will be in the open position and accessible on the rig floor.
Requesting Variance? YES

Variance request: 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. 5M Annular variance requested. A variance is requested to use a multibowl wellhead.
Testing Procedure: The BOP and BOPE will be fully tested per Onshore Order #2 when initially installed, whenever any seal subject to test pressure is broken, and/or following related repairs.

Choke Diagram Attachment:

COG_Tomahawk_703H_3M_Choke_20200326105053.pdf

BOP Diagram Attachment:

COG_Tomahawk_703H_3M_BOP_20200326105100.pdf

COG_Tomahawk_703H_Flex_Hose_20200326105124.pdf

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Pressure Rating (PSI): 5M **Rating Depth:** 9398

Equipment: BOP and BOPE will be installed per Onshore Order #2 requirements prior to drilling below the surface casing and will be rated to the above pressure rating or greater, see attached diagrams. Required safety valves, with appropriate wrenches and subs for the drill string being utilized, will be in the open position and accessible on the rig floor.
Requesting Variance? YES

Variance request: 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. 5M Variance is requested. A variance is requested to use a multibowl wellhead.
Testing Procedure: The BOP and BOPE will be fully tested per Onshore Order #2 when initially installed, whenever any seal subject to test pressure is broken, and/or following related repairs.

Choke Diagram Attachment:

COG_Tomahawk_703H_5M_Choke_20200326104721.pdf

BOP Diagram Attachment:

COG_Tomahawk_703H_5M_BOP_20200326104733.pdf

COG_Tomahawk_703H_Flex_Hose_20200326104800.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	14.75	10.75	NEW	API	N	0	815	0	815	3042	2227	815	J-55	45.5	ST&C	5.73	11.3	DRY	13.29	DRY	13.9
2	INTERMEDIATE	9.875	7.625	NEW	API	N	0	8775	0	8775	3585	-5733	8775	HCL-80	29.7	OTHER - BTC	2.02	1.5	DRY	2.77	DRY	2.
3	PRODUCTION	6.75	5.5	NEW	API	N	0	20328	0	9398	3585	-6356	20328	P-110	23	OTHER - SF Torq	2.48	2.95	DRY	3.03	DRY	3.

Casing Attachments

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_TOMAHAWK_703H_Casing_Plan_20200326110632.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_TOMAHAWK_703H_Casing_Plan_20200326110800.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_TOMAHAWK_703H_Casing_Plan_20200326110526.pdf

Section 4 - Cement

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	815	300	1.75	13.5	525	50	Class C +4% Gel	As needed
SURFACE	Tail			815	250	1.34	14.8	335	50	Class C + 2% CaCl2	As needed
INTERMEDIATE	Lead		0	8775	1400	2.8	11	3920	50	NeoCem	N/A
INTERMEDIATE	Tail			8775	300	1.1	16.4	330	50	Class H	N/A
PRODUCTION	Lead		8275	20328	750	2	12.7	1500	35	Lead: 35:65:6 H Blend	As needed
PRODUCTION	Tail		8275	20328	1200	1.24	14.4	1488	35	Tail: 50:50:2 Class H Blend	As needed

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

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
815	8775	OTHER : Diesel Brine Emulsion	8.6	9.4							Diesel Brine Emulsion
8775	20328	OIL-BASED MUD	10.5	12							OBM

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	815	OTHER : Fresh water gel	8.4	8.6							Fresh water gel

Section 6 - Test, Logging, Coring

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

None planned

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

CEMENT BOND LOG,COMPENSATED NEUTRON LOG,GAMMA RAY LOG,

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 5865 **Anticipated Surface Pressure:** 3790

Anticipated Bottom Hole Temperature(F): 150

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Tomahawk_703H_H2S_Schem_20200326113130.pdf

COG_Tomahawk_703H_H2S_SUP_20200326113138.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_TOMAHAWK_703H_AC_RPT_20200326113231.pdf

COG_TOMAHAWK_703H_Direct_Plan_Plot_20200326113254.pdf

COG_TOMAHAWK_703H_Direct_Plan_20200326113308.pdf

Other proposed operations facets description:

Drilling Plan attached.
GCP attached.
Cement Plan attached.

Other proposed operations facets attachment:

COG_TOMAHAWK_703H_Drilling_Program_20200326113323.pdf

COG_TOMAHAWK_703H_Cement_Program_20200326113333.pdf

COG_Tomahawk_703H_GCP_20200326113432.pdf

Other Variance attachment:

SUPO

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Tomahawk_703H_Vicinity_Map_20200325223159.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT **Row(s) Exist?** NO

ROW ID(s)

ID:

Do the existing roads need to be improved? YES

Existing Road Improvement Description: Existing roads will be maintained in the same condition or better.

Existing Road Improvement Attachment:

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

COG_Tomahawk_703H_Road_Plat_Maps_20200326093352.pdf

New road type: RESOURCE

Length: 1303.04 Feet **Width (ft.):** 30

Max slope (%): 33 **Max grade (%):** 1

Army Corp of Engineers (ACOE) permit required? N

ACOE Permit Number(s):

New road travel width: 14

New road access erosion control: Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

New road access plan or profile prepared? N

New road access plan attachment:

Access road engineering design? N

Access road engineering design attachment:

Turnout? N

Access surfacing type: OTHER

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Blading

Access other construction information: No turnouts are planned.

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: None necessary

Road Drainage Control Structures (DCS) description: None needed.

Road Drainage Control Structures (DCS) attachment:

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Access Additional Attachments

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

COG_Tomahawk_703H_1_Mile_Data_20200326093813.pdf
COG_Tomahawk_703H_1_Mile_Map_20200326093820.pdf

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: The new Tomahawk Fed Unit 20 O Central Tank Battery (CTB) proposed in Sec. 20, T24S, R28E will be utilized for the production of 10 Wolfcamp wells. Each well head will be connected to a buried 4 FP 601HT that will be used to carry oil, water and gas production from each wellhead to the inlet manifold of the CTB; the route for these flowlines will follow the flowline corridor route as shown in the exhibit drawing and in the attached plats. Additionally, each well pad will have one buried 6 FP 150 line for gas lift supply from the CTB; the route for this gas lift line will start on the CTB pad where designated by gas line in the exhibit drawing and then following the flowline corridor in the attached plats.
Production Facilities map:

COG_Tomahawk_Federal_Unit_20_O_CTB_Schematic_20200325143519.pdf
COG_Tomahawk_703H_CTB_Flowline_Powerline_20200327094812.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: OTHER

Describe type: Brine Water

Water source use type: INTERMEDIATE/PRODUCTION CASING

Source latitude: **Source longitude:**

Source datum:

Water source permit type: PRIVATE CONTRACT

Water source transport method: TRUCKING

Source land ownership: COMMERCIAL

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 30000 **Source volume (acre-feet):** 3.866793

Source volume (gal): 1260000

Water source type: OTHER

Describe type: Fresh Water

Water source use type: ICE PAD CONSTRUCTION & MAINTENANCE
SURFACE CASING
STIMULATION

Source latitude: **Source longitude:**

Source datum:

Water source permit type: PRIVATE CONTRACT

Water source transport method: PIPELINE

Source land ownership: PRIVATE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 450000 **Source volume (acre-feet):** 58.001892

Source volume (gal): 18900000

Water source and transportation map:

COG_Tomahawk_703H_Brine_H2O_20200326094028.pdf
COG_Tomahawk_703H_Fresh_H2O_20200326094044.pdf

Water source comments: See attached maps

New water well? N

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: Caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche source will be from the Hayhurst Caliche Pit located in Sec 18-T24S-R28E.
Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling fluids and produced oil land water while drilling and completion operations

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

Safe containment description: All drilling waste will be stored safely and disposed of properly

Safe containmant attachment:

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

Disposal location description: Trucked to an approved disposal facility

Waste type: SEWAGE

Waste content description: Human waste and gray water

Amount of waste: 1000 gallons

Waste disposal frequency : One Time Only

Safe containment description: Waste will be properly contained and disposed of properly at a state approved disposal facility.
Safe containmant attachment:

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

Disposal location description: Trucked to an approved disposal facility

Waste type: GARBAGE

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

Amount of waste: 500 pounds

Waste disposal frequency : One Time Only

Safe containment description: Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit? NO

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? Y

Description of cuttings location Roll off cutting containers on tracks

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

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

WCuttings area liner

Cuttings area liner specifications and installation description

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: N

Ancillary Facilities attachment:

Comments: Gas Capture Plan attached

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Tomahawk_703H_Layout_20200326101547.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: Tomahawk Federal Unit

Multiple Well Pad Number: 703H, 704H and 705H

Recontouring attachment:

COG_Tomahawk_703H_RECLAMATION_20200326101733.pdf

Drainage/Erosion control construction: Proper erosion control methods will be used at the well site to control erosion, runoff, and siltation of the surrounding area. Straw waddles will be used as necessary at the well site to reduce sediment impacts to fragile/sensitive soils.

Drainage/Erosion control reclamation: The interim reclamation will be monitored periodically to ensure that vegetation has re-established and that erosion is controlled.

Well pad proposed disturbance (acres): 3.67

Road proposed disturbance (acres): 0.42

Powerline proposed disturbance (acres): 2.62

Pipeline proposed disturbance (acres): 1.44

Other proposed disturbance (acres): 5.74

Total proposed disturbance: 13.89

Well pad interim reclamation (acres): 0.06

Road interim reclamation (acres): 0.42

Powerline interim reclamation (acres): 2.62

Pipeline interim reclamation (acres): 1.44

Other interim reclamation (acres): 5.74

Total interim reclamation: 10.280000000000001

Well pad long term disturbance (acres): 3.21

Road long term disturbance (acres): 0.42

Powerline long term disturbance (acres): 2.62

Pipeline long term disturbance (acres): 1.44

Other long term disturbance (acres): 5.74

Total long term disturbance: 13.43

Disturbance Comments:

Reconstruction method: If needed, portions of the pad not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused. The stockpiled topsoil will be spread out over reclaimed area and reseeded with BLM approved seed mixture.

Topsoil redistribution: North

Soil treatment: None

Existing Vegetation at the well pad: Shinnery Oak/Mesquite grassland

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: N/A

Existing Vegetation Community at other disturbances attachment:

Non native seed used? N

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? N

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? N

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? N

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

COG_Tomahawk_703H_Closed_Loop_20200326101803.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Fee Owner: Pecos Valley Artesian Conservancy District
Phone: (575)622-7000

Fee Owner Address: P.O. Box 1346

Email:

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: AGREEMENT

Surface Access Agreement Need description: Surface Use Agreement in progress.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Section 12 - Other Information

Right of Way needed? N

Use APD as ROW?

ROW Type(s):

ROW Applications

SUPO Additional Information: Surface Use & Operating Plan. Attached On-site was done by Gerald Herrera (COG); Zane Kirsch (BLM); on February 13th, 2020.
Use a previously conducted onsite? N

Previous Onsite information:

Other SUPO Attachment

COG_Tomahawk_Federal_Unit_20_O_CTB_Schematic_20200325152424.pdf
COG_Tomahawk_703H_C102_20200326102341.pdf
COG_Tomahawk_703H_SUP_20200326102503.pdf
COG_Tomahawk_703H_Road_Plat_Maps_20200326102533.pdf
COG_Tomahawk_703H_CTB_Flowline_Powerline_20200326102611.pdf

PWD

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD disturbance (acres): **PWD surface owner:**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Other PWD discharge volume (bbl/day):

Other PWD type description:

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

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: MAYTE REYES **Signed on:** 03/25/2020

Title: Regulatory Analyst

Street Address: 2208 West Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6940

Email address: MREYES1@CONCHO.COM

Operator Name: COG OPERATING LLC

Well Name: TOMAHAWK FEDERAL UNIT **Well Number:** 703H

Field Representative

Representative Name: Gerald Herrera

Street Address: 2208 West Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6940

Email address: gherrera@concho.com

Payment Info

Payment

APD Fee Payment Method: PAY.GOV

pay.gov Tracking ID: 26OF5AK9

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-15 30-015-47307	98220	Purple Sage;Wolfcamp (Gas)

Property Code	Property Name	Well Number
328919	TOMAHAWK FEDERAL UNIT	703H

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	3047.3'

Surface Location

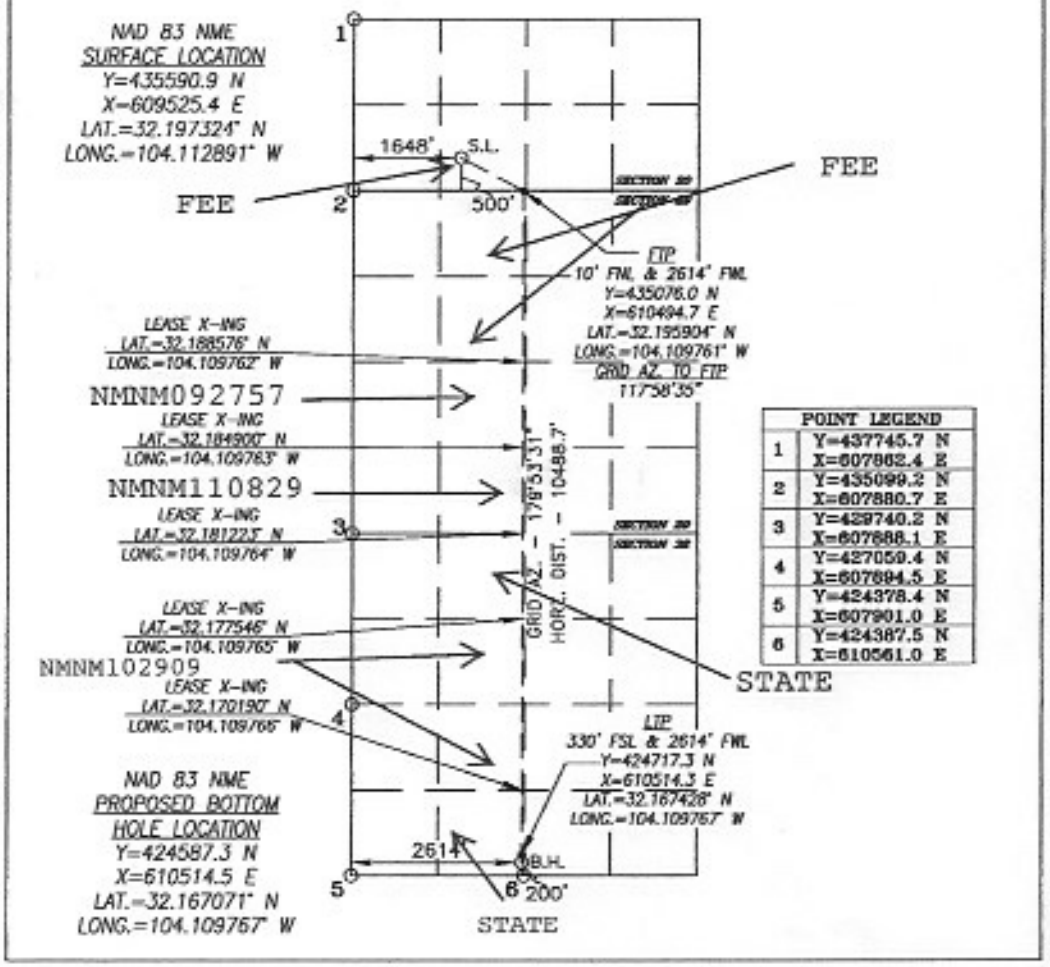
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	20	24-S	28-E		500	SOUTH	1648	WEST	EDDY

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
N	32	24-S	28-E		200	SOUTH	2614	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
1280			R-21254 Standard Location

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



POINT LEGEND	
1	Y=437745.7 N X=607862.4 E
2	Y=435099.2 N X=607880.7 E
3	Y=429740.2 N X=607688.1 E
4	Y=427059.4 N X=607694.5 E
5	Y=424378.4 N X=607901.0 E
6	Y=424387.5 N X=610561.0 E

OPERATOR CERTIFICATION

I hereby certify that the information 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 mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Genesis P. Vasq 3/2/20
Signature Date

Genesis P. Vasquez
Printed Name

ggarzaperez@concho.com
E-mail Address

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.

JANUARY 30, 2020
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 2/17/20

Certificate No. CHAD HARCROW 17777

W.O. # 20-368H DRAWN BY: AH

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

State of New Mexico
Energy, Minerals and Natural Resources Department

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

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: **3/12/2020**

☒ Original
☐ Amended - Reason for Amendment:

Operator & OGRID No.: **COG Operating LLC, OGRID 229137**

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

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

Well(s)/Production Facility – Name of facility

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

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Tomahawk Federal Unit 703H	**30-015-** 30-015-47307	**N-20-24S-28E**	**500' FSL & 1648' FWL**	**3,677 MCFD**		**Gas will connect on well pad.**

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to **Crestwood Midstream** and will be connected to **Willow Lake low**/high pressure gathering system located in **Reeves County, Texas**. It will require approximately **0**' of pipeline on lease to connect the facility to **low**/high pressure gathering system. **COG Operating LLC** provides (periodically) to **Crestwood Midstream** a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, **COG Operating LLC** and **Crestwood Midstream** have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at **Orla** Processing Plant located in **Sec 19-Blk 56-T2 Reeves County, Texas**. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

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

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

Alternatives to Reduce Flaring

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

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

COG Operating, LLC - Tomahawk Federal Unit #703H

1. Geologic Formations

TVD of target	9,398' EOL	Pilot hole depth	NA
MD at TD:	20,328'	Deepest expected fresh water:	50'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	400	Water	
Top of Salt	926	Salt	
Base of Salt	2307	Salt	
Lamar	2514	Salt Water	
Bell Canyon	2550	Salt Water	
Cherry Canyon	3332	Oil/Gas	
Brushy Canyon	4529	Oil/Gas	
Bone Spring Lime	6046	Oil/Gas	
U. Avalon Shale	6239	Oil/Gas	
L. Avalon Shale	6621	Oil/Gas	
1st Bone Spring Sand	7004	Oil/Gas	
2nd Bone Spring Sand	7748	Oil/Gas	
3rd Bone Spring Sand	8924	Oil/Gas	
Wolfcamp	9291	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
14.75	0	815	10.75	45.5	J55	STC	5.73	11.30	13.29
9.875	0	8775	7.625	29.7	HCL80	BTC	2.02	1.50	2.77
6.75	0	20,328	5.5”	23	P110	SF Torq	2.48	2.95	3.03
			BLM Minimum Safety Factor				1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Operating, LLC - Tomahawk Federal Unit #703H

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

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	300	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter.	1400	11	2.8	19	48	Lead: NeoCem
	300	16.4	1.1	5	8	Tail: Class H
5.5 Prod	750	12.7	2	10.6	16	Lead: 35:65:6 H Blend
	1200	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results
Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0’	50%
1st Intermediate	0’	50%
Production	8,275'	35%

4. Pressure Control Equipment

N	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	x	Tested to:
12-1/4"	13-5/8"	3M	Annular	x	2500 psi
			Blind Ram		3M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8 1/2"	13-5/8"	5M	5M Annular	x	2500 psi
			Blind Ram		5M
			Pipe Ram	x	
			Double Ram	x	
			Other*		

BOP and BOPE will be installed per Onshore Order #2 requirements prior to drilling below the surface casing and will be rated to the above pressure rating or greater, see attached diagrams. Required safety valves, with appropriate wrenches and subs for the drill string being utilized, will be in the open position and accessible on the rig floor. 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 valves (inside BOP and full-opening valve) with appropriate wrenches and choke lines and choke manifold. See attached schematics.

Y	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.
Y	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?
Y	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.4 - 8.6	28-29	N/C
Surf csg	Int shoe	Diesel Brine Emul	8.6 - 9.4	30-40	N/C
Int shoe	Lateral TD	OBM	10.5 - 12	30-40	20

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.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
N	Are Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	5865 psi at 9398' TVD
Abnormal Temperature	NO 150 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

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.	
N	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
Y	Is casing pre-set?

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan
x	5M Annular Variance

NORTHERN DELAWARE BASIN

EDDY COUNTY, NM
ATLAS
TOMAHAWK FEDERAL UNIT #703H

OWB

Plan: PWP1

Standard Survey Report

17 March, 2020

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well TOMAHAWK FEDERAL UNIT #703H
Project:	EDDY COUNTY, NM	**TVD Reference:**	KB=24' @ 3071.3usft (E 155)
Site:	ATLAS	**MD Reference:**	KB=24' @ 3071.3usft (E 155)
Well:	TOMAHAWK FEDERAL UNIT #703H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	edm

Project EDDY COUNTY, NM

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Well TOMAHAWK FEDERAL UNIT #703H

Well Position	**+N/-S**	0.0 usft	**Northing:**	435,532.60 usft	**Latitude:**	32° 11' 49.931 N
	+E/-W	0.0 usft	**Easting:**	568,342.00 usft	**Longitude:**	104° 6' 44.631 W
Position Uncertainty		3.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,047.3 usft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/16/2020	6.91	59.92	47,585.82025112

Design PWP1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	174.86

Survey Tool Program **Date** 3/17/2020

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	8,863.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
8,863.0	20,328.4	PWP1 (OWB)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00

Concho Resources LLC

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Design:	PWP1	**Database:**	edm

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
5,600.0	2.00	90.00	5,600.0	0.0	1.7	0.2	2.00	2.00	0.00

Concho Resources LLC

Survey Report

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Design:	PWP1	**Database:**	edm

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,700.0	4.00	90.00	5,699.8	0.0	7.0	0.6	2.00	2.00	0.00
5,750.0	5.00	90.00	5,749.7	0.0	10.9	1.0	2.00	2.00	0.00
Start 3113.4 hold at 5750.0 MD									
5,800.0	5.00	90.00	5,799.5	0.0	15.3	1.4	0.00	0.00	0.00
5,900.0	5.00	90.00	5,899.1	0.0	24.0	2.1	0.00	0.00	0.00
6,000.0	5.00	90.00	5,998.7	0.0	32.7	2.9	0.00	0.00	0.00
6,100.0	5.00	90.00	6,098.4	0.0	41.4	3.7	0.00	0.00	0.00
6,200.0	5.00	90.00	6,198.0	0.0	50.1	4.5	0.00	0.00	0.00
6,300.0	5.00	90.00	6,297.6	0.0	58.8	5.3	0.00	0.00	0.00
6,400.0	5.00	90.00	6,397.2	0.0	67.6	6.0	0.00	0.00	0.00
6,500.0	5.00	90.00	6,496.8	0.0	76.3	6.8	0.00	0.00	0.00
6,600.0	5.00	90.00	6,596.4	0.0	85.0	7.6	0.00	0.00	0.00
6,700.0	5.00	90.00	6,696.1	0.0	93.7	8.4	0.00	0.00	0.00
6,800.0	5.00	90.00	6,795.7	0.0	102.4	9.2	0.00	0.00	0.00
6,900.0	5.00	90.00	6,895.3	0.0	111.1	9.9	0.00	0.00	0.00
7,000.0	5.00	90.00	6,994.9	0.0	119.8	10.7	0.00	0.00	0.00
7,100.0	5.00	90.00	7,094.5	0.0	128.6	11.5	0.00	0.00	0.00
7,200.0	5.00	90.00	7,194.2	0.0	137.3	12.3	0.00	0.00	0.00
7,300.0	5.00	90.00	7,293.8	0.0	146.0	13.1	0.00	0.00	0.00
7,400.0	5.00	90.00	7,393.4	0.0	154.7	13.8	0.00	0.00	0.00
7,500.0	5.00	90.00	7,493.0	0.0	163.4	14.6	0.00	0.00	0.00
7,600.0	5.00	90.00	7,592.6	0.0	172.1	15.4	0.00	0.00	0.00
7,700.0	5.00	90.00	7,692.3	0.0	180.9	16.2	0.00	0.00	0.00
7,800.0	5.00	90.00	7,791.9	0.0	189.6	17.0	0.00	0.00	0.00
7,900.0	5.00	90.00	7,891.5	0.0	198.3	17.7	0.00	0.00	0.00
8,000.0	5.00	90.00	7,991.1	0.0	207.0	18.5	0.00	0.00	0.00
8,100.0	5.00	90.00	8,090.7	0.0	215.7	19.3	0.00	0.00	0.00
8,200.0	5.00	90.00	8,190.4	0.0	224.4	20.1	0.00	0.00	0.00
8,300.0	5.00	90.00	8,290.0	0.0	233.1	20.9	0.00	0.00	0.00
8,400.0	5.00	90.00	8,389.6	0.0	241.9	21.6	0.00	0.00	0.00
8,500.0	5.00	90.00	8,489.2	0.0	250.6	22.4	0.00	0.00	0.00
8,600.0	5.00	90.00	8,588.8	0.0	259.3	23.2	0.00	0.00	0.00
8,700.0	5.00	90.00	8,688.5	0.0	268.0	24.0	0.00	0.00	0.00
8,800.0	5.00	90.00	8,788.1	0.0	276.7	24.8	0.00	0.00	0.00
8,863.4	5.00	90.00	8,851.2	0.0	282.2	25.3	0.00	0.00	0.00
Start DLS 10.00 TFO 60.61									
8,900.0	7.51	115.22	8,887.6	-1.0	286.0	26.6	10.00	6.85	68.83
9,000.0	16.69	135.79	8,985.3	-14.1	302.0	41.1	10.00	9.18	20.58
9,100.0	26.46	141.71	9,078.2	-42.0	325.8	71.0	10.00	9.77	5.92
9,200.0	36.35	144.57	9,163.5	-83.7	356.9	115.3	10.00	9.89	2.86
9,300.0	46.28	146.34	9,238.5	-138.1	394.2	172.8	10.00	9.93	1.76
9,400.0	56.23	147.59	9,301.0	-203.4	436.6	241.7	10.00	9.95	1.26
9,500.0	66.20	148.59	9,349.1	-277.7	482.9	319.8	10.00	9.96	0.99
9,600.0	76.16	149.44	9,381.3	-358.8	531.5	404.9	10.00	9.97	0.85

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well TOMAHAWK FEDERAL UNIT #703H
Project:	EDDY COUNTY, NM	**TVD Reference:**	KB=24' @ 3071.3usft (E 155)
Site:	ATLAS	**MD Reference:**	KB=24' @ 3071.3usft (E 155)
Well:	TOMAHAWK FEDERAL UNIT #703H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	edm

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,700.0	86.13	150.22	9,396.7	-444.1	581.1	494.3	10.00	9.97	0.78
9,737.2	89.84	150.50	9,398.0	-476.4	599.5	528.1	10.00	9.97	0.76
Start DLS 2.00 TFO 90.05									
9,800.0	89.84	151.76	9,398.2	-531.4	629.8	585.6	2.00	0.00	2.00
9,900.0	89.84	153.76	9,398.4	-620.3	675.6	678.3	2.00	0.00	2.00
10,000.0	89.84	155.76	9,398.7	-710.7	718.2	772.2	2.00	0.00	2.00
10,100.0	89.84	157.76	9,399.0	-802.6	757.7	867.2	2.00	0.00	2.00
10,200.0	89.83	159.76	9,399.3	-895.8	793.9	963.3	2.00	0.00	2.00
10,300.0	89.83	161.76	9,399.6	-990.2	826.9	1,060.3	2.00	0.00	2.00
10,400.0	89.83	163.76	9,399.9	-1,085.7	856.5	1,158.0	2.00	0.00	2.00
10,500.0	89.83	165.76	9,400.2	-1,182.2	882.8	1,256.5	2.00	0.00	2.00
10,600.0	89.83	167.76	9,400.5	-1,279.5	905.7	1,355.5	2.00	0.00	2.00
10,700.0	89.83	169.76	9,400.8	-1,377.6	925.2	1,454.9	2.00	0.00	2.00
10,800.0	89.83	171.76	9,401.0	-1,476.3	941.3	1,554.6	2.00	0.00	2.00
10,900.0	89.83	173.76	9,401.3	-1,575.5	953.9	1,654.6	2.00	0.00	2.00
11,000.0	89.84	175.76	9,401.6	-1,675.1	963.0	1,754.6	2.00	0.00	2.00
11,100.0	89.84	177.76	9,401.9	-1,774.9	968.7	1,854.5	2.00	0.00	2.00
11,200.0	89.84	179.76	9,402.2	-1,874.9	970.9	1,954.3	2.00	0.00	2.00
11,206.5	89.84	179.89	9,402.2	-1,881.4	970.9	1,960.8	2.00	0.00	2.00
Start 9122.1 hold at 11206.5 MD									
11,300.0	89.84	179.89	9,402.5	-1,974.9	971.1	2,053.9	0.00	0.00	0.00
11,400.0	89.84	179.89	9,402.8	-2,074.9	971.3	2,153.5	0.00	0.00	0.00
11,500.0	89.84	179.89	9,403.0	-2,174.9	971.5	2,253.1	0.00	0.00	0.00
11,600.0	89.84	179.89	9,403.3	-2,274.9	971.7	2,352.7	0.00	0.00	0.00
11,700.0	89.84	179.89	9,403.6	-2,374.9	971.8	2,452.4	0.00	0.00	0.00
11,800.0	89.84	179.89	9,403.9	-2,474.9	972.0	2,552.0	0.00	0.00	0.00
11,900.0	89.84	179.89	9,404.2	-2,574.9	972.2	2,651.6	0.00	0.00	0.00
12,000.0	89.84	179.89	9,404.5	-2,674.9	972.4	2,751.2	0.00	0.00	0.00
12,100.0	89.84	179.89	9,404.7	-2,774.9	972.6	2,850.8	0.00	0.00	0.00
12,200.0	89.84	179.89	9,405.0	-2,874.9	972.8	2,950.4	0.00	0.00	0.00
12,300.0	89.84	179.89	9,405.3	-2,974.9	973.0	3,050.0	0.00	0.00	0.00
12,400.0	89.84	179.89	9,405.6	-3,074.9	973.2	3,149.7	0.00	0.00	0.00
12,500.0	89.84	179.89	9,405.9	-3,174.9	973.4	3,249.3	0.00	0.00	0.00
12,600.0	89.84	179.89	9,406.2	-3,274.9	973.6	3,348.9	0.00	0.00	0.00
12,700.0	89.84	179.89	9,406.4	-3,374.9	973.8	3,448.5	0.00	0.00	0.00
12,800.0	89.84	179.89	9,406.7	-3,474.9	974.0	3,548.1	0.00	0.00	0.00
12,900.0	89.84	179.89	9,407.0	-3,574.9	974.2	3,647.7	0.00	0.00	0.00
13,000.0	89.84	179.89	9,407.3	-3,674.9	974.4	3,747.4	0.00	0.00	0.00
13,100.0	89.84	179.89	9,407.6	-3,774.9	974.6	3,847.0	0.00	0.00	0.00
13,200.0	89.84	179.89	9,407.8	-3,874.9	974.8	3,946.6	0.00	0.00	0.00
13,300.0	89.84	179.89	9,408.1	-3,974.9	975.0	4,046.2	0.00	0.00	0.00
13,400.0	89.84	179.89	9,408.4	-4,074.9	975.2	4,145.8	0.00	0.00	0.00
13,500.0	89.84	179.89	9,408.7	-4,174.9	975.4	4,245.4	0.00	0.00	0.00

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well TOMAHAWK FEDERAL UNIT #703H
Project:	EDDY COUNTY, NM	**TVD Reference:**	KB=24' @ 3071.3usft (E 155)
Site:	ATLAS	**MD Reference:**	KB=24' @ 3071.3usft (E 155)
Well:	TOMAHAWK FEDERAL UNIT #703H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	edm

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,600.0	89.84	179.89	9,409.0	-4,274.9	975.6	4,345.0	0.00	0.00	0.00
13,700.0	89.84	179.89	9,409.3	-4,374.9	975.8	4,444.7	0.00	0.00	0.00
13,800.0	89.84	179.89	9,409.5	-4,474.9	976.0	4,544.3	0.00	0.00	0.00
13,900.0	89.84	179.89	9,409.8	-4,574.9	976.2	4,643.9	0.00	0.00	0.00
14,000.0	89.84	179.89	9,410.1	-4,674.9	976.4	4,743.5	0.00	0.00	0.00
14,100.0	89.84	179.89	9,410.4	-4,774.9	976.6	4,843.1	0.00	0.00	0.00
14,200.0	89.84	179.89	9,410.7	-4,874.9	976.8	4,942.7	0.00	0.00	0.00
14,300.0	89.84	179.89	9,411.0	-4,974.9	977.0	5,042.4	0.00	0.00	0.00
14,400.0	89.84	179.89	9,411.2	-5,074.9	977.2	5,142.0	0.00	0.00	0.00
14,500.0	89.84	179.89	9,411.5	-5,174.9	977.4	5,241.6	0.00	0.00	0.00
14,600.0	89.84	179.89	9,411.8	-5,274.9	977.6	5,341.2	0.00	0.00	0.00
14,700.0	89.84	179.89	9,412.1	-5,374.9	977.8	5,440.8	0.00	0.00	0.00
14,800.0	89.84	179.89	9,412.4	-5,474.9	978.0	5,540.4	0.00	0.00	0.00
14,900.0	89.84	179.89	9,412.7	-5,574.9	978.2	5,640.1	0.00	0.00	0.00
15,000.0	89.84	179.89	9,412.9	-5,674.9	978.4	5,739.7	0.00	0.00	0.00
15,100.0	89.84	179.89	9,413.2	-5,774.9	978.6	5,839.3	0.00	0.00	0.00
15,200.0	89.84	179.89	9,413.5	-5,874.9	978.8	5,938.9	0.00	0.00	0.00
15,300.0	89.84	179.89	9,413.8	-5,974.9	979.0	6,038.5	0.00	0.00	0.00
15,400.0	89.84	179.89	9,414.1	-6,074.9	979.2	6,138.1	0.00	0.00	0.00
15,500.0	89.84	179.89	9,414.4	-6,174.9	979.4	6,237.7	0.00	0.00	0.00
15,600.0	89.84	179.89	9,414.6	-6,274.9	979.6	6,337.4	0.00	0.00	0.00
15,700.0	89.84	179.89	9,414.9	-6,374.9	979.8	6,437.0	0.00	0.00	0.00
15,800.0	89.84	179.89	9,415.2	-6,474.9	980.0	6,536.6	0.00	0.00	0.00
15,900.0	89.84	179.89	9,415.5	-6,574.9	980.1	6,636.2	0.00	0.00	0.00
16,000.0	89.84	179.89	9,415.8	-6,674.9	980.3	6,735.8	0.00	0.00	0.00
16,100.0	89.84	179.89	9,416.0	-6,774.9	980.5	6,835.4	0.00	0.00	0.00
16,200.0	89.84	179.89	9,416.3	-6,874.9	980.7	6,935.1	0.00	0.00	0.00
16,300.0	89.84	179.89	9,416.6	-6,974.9	980.9	7,034.7	0.00	0.00	0.00
16,400.0	89.84	179.89	9,416.9	-7,074.9	981.1	7,134.3	0.00	0.00	0.00
16,500.0	89.84	179.89	9,417.2	-7,174.9	981.3	7,233.9	0.00	0.00	0.00
16,600.0	89.84	179.89	9,417.5	-7,274.9	981.5	7,333.5	0.00	0.00	0.00
16,700.0	89.84	179.89	9,417.7	-7,374.9	981.7	7,433.1	0.00	0.00	0.00
16,800.0	89.84	179.89	9,418.0	-7,474.9	981.9	7,532.8	0.00	0.00	0.00
16,900.0	89.84	179.89	9,418.3	-7,574.9	982.1	7,632.4	0.00	0.00	0.00
17,000.0	89.84	179.89	9,418.6	-7,674.9	982.3	7,732.0	0.00	0.00	0.00
17,100.0	89.84	179.89	9,418.9	-7,774.9	982.5	7,831.6	0.00	0.00	0.00
17,200.0	89.84	179.89	9,419.2	-7,874.9	982.7	7,931.2	0.00	0.00	0.00
17,300.0	89.84	179.89	9,419.4	-7,974.9	982.9	8,030.8	0.00	0.00	0.00
17,400.0	89.84	179.89	9,419.7	-8,074.9	983.1	8,130.4	0.00	0.00	0.00
17,500.0	89.84	179.89	9,420.0	-8,174.9	983.3	8,230.1	0.00	0.00	0.00
17,600.0	89.84	179.89	9,420.3	-8,274.9	983.5	8,329.7	0.00	0.00	0.00
17,700.0	89.84	179.89	9,420.6	-8,374.9	983.7	8,429.3	0.00	0.00	0.00
17,800.0	89.84	179.89	9,420.9	-8,474.9	983.9	8,528.9	0.00	0.00	0.00
17,900.0	89.84	179.89	9,421.1	-8,574.9	984.1	8,628.5	0.00	0.00	0.00

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well TOMAHAWK FEDERAL UNIT #703H
Project:	EDDY COUNTY, NM	**TVD Reference:**	KB=24' @ 3071.3usft (E 155)
Site:	ATLAS	**MD Reference:**	KB=24' @ 3071.3usft (E 155)
Well:	TOMAHAWK FEDERAL UNIT #703H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	edm

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
18,000.0	89.84	179.89	9,421.4	-8,674.9	984.3	8,728.1	0.00	0.00	0.00
18,100.0	89.84	179.89	9,421.7	-8,774.9	984.5	8,827.8	0.00	0.00	0.00
18,200.0	89.84	179.89	9,422.0	-8,874.9	984.7	8,927.4	0.00	0.00	0.00
18,300.0	89.84	179.89	9,422.3	-8,974.9	984.9	9,027.0	0.00	0.00	0.00
18,400.0	89.84	179.89	9,422.5	-9,074.9	985.1	9,126.6	0.00	0.00	0.00
18,500.0	89.84	179.89	9,422.8	-9,174.9	985.3	9,226.2	0.00	0.00	0.00
18,600.0	89.84	179.89	9,423.1	-9,274.9	985.5	9,325.8	0.00	0.00	0.00
18,700.0	89.84	179.89	9,423.4	-9,374.9	985.7	9,425.4	0.00	0.00	0.00
18,800.0	89.84	179.89	9,423.7	-9,474.9	985.9	9,525.1	0.00	0.00	0.00
18,900.0	89.84	179.89	9,424.0	-9,574.9	986.1	9,624.7	0.00	0.00	0.00
19,000.0	89.84	179.89	9,424.2	-9,674.8	986.3	9,724.3	0.00	0.00	0.00
19,100.0	89.84	179.89	9,424.5	-9,774.8	986.5	9,823.9	0.00	0.00	0.00
19,200.0	89.84	179.89	9,424.8	-9,874.8	986.7	9,923.5	0.00	0.00	0.00
19,300.0	89.84	179.89	9,425.1	-9,974.8	986.9	10,023.1	0.00	0.00	0.00
19,400.0	89.84	179.89	9,425.4	-10,074.8	987.1	10,122.8	0.00	0.00	0.00
19,500.0	89.84	179.89	9,425.7	-10,174.8	987.3	10,222.4	0.00	0.00	0.00
19,600.0	89.84	179.89	9,425.9	-10,274.8	987.5	10,322.0	0.00	0.00	0.00
19,700.0	89.84	179.89	9,426.2	-10,374.8	987.7	10,421.6	0.00	0.00	0.00
19,800.0	89.84	179.89	9,426.5	-10,474.8	987.9	10,521.2	0.00	0.00	0.00
19,900.0	89.84	179.89	9,426.8	-10,574.8	988.1	10,620.8	0.00	0.00	0.00
20,000.0	89.84	179.89	9,427.1	-10,674.8	988.3	10,720.5	0.00	0.00	0.00
20,100.0	89.84	179.89	9,427.4	-10,774.8	988.4	10,820.1	0.00	0.00	0.00
20,200.0	89.84	179.89	9,427.6	-10,874.8	988.6	10,919.7	0.00	0.00	0.00
20,300.0	89.84	179.89	9,427.9	-10,974.8	988.8	11,019.3	0.00	0.00	0.00
20,328.6	89.84	179.89	9,428.0	-11,003.4	988.9	11,047.7	0.00	0.00	0.00
TD at 20328.6									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
FTP (TOMAHAWK FE	0.00	0.00	9,398.0	-514.8	969.3	435,017.77	569,311.30	32° 11' 44.817 N	104° 6' 33.363 W
- plan misses target center by 310.3usft at 9929.9usft MD (9398.5 TVD, -647.2 N, 688.7 E)									
- Circle (radius 50.0)									
PBHL (TOMAHAWK F	-0.16	359.89	9,428.0	-11,003.4	988.9	424,529.20	569,330.90	32° 10' 1.017 N	104° 6' 33.389 W
- plan hits target center									
- Rectangle (sides W100.0 H10,489.0 D20.0)									
LTP (TOMAHAWK FE	0.00	0.00	9,428.0	-10,873.4	988.6	424,659.20	569,330.60	32° 10' 2.304 N	104° 6' 33.389 W
- plan misses target center by 0.4usft at 20198.6usft MD (9427.6 TVD, -10873.4 N, 988.6 E)									
- Point									

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well TOMAHAWK FEDERAL UNIT #703H
Project:	EDDY COUNTY, NM	**TVD Reference:**	KB=24' @ 3071.3usft (E 155)
Site:	ATLAS	**MD Reference:**	KB=24' @ 3071.3usft (E 155)
Well:	TOMAHAWK FEDERAL UNIT #703H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP1	**Database:**	edm

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5500	5500	0	0	Start Build 2.00
5750	5750	0	11	Start 3113.4 hold at 5750.0 MD
8863	8851	0	282	Start DLS 10.00 TFO 60.61
9737	9398	-476	599	Start DLS 2.00 TFO 90.05
11,207	9402	-1881	971	Start 9122.1 hold at 11206.5 MD
20,329	9428	-11,003	989	TD at 20328.6

Checked By: _____ Approved By: _____ Date: _____

CONCHO

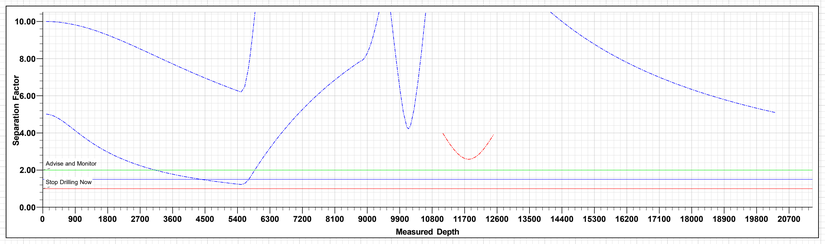
Project:	EDDY COUNTY, NM
Site:	ATLAS
Well:	TOMAHAWK FEDERAL UNIT #703H
Wellbore:	OWB
Design:	PWP1
GL:	3047.3
KB=24' @ 3071.3usft (E 155)	

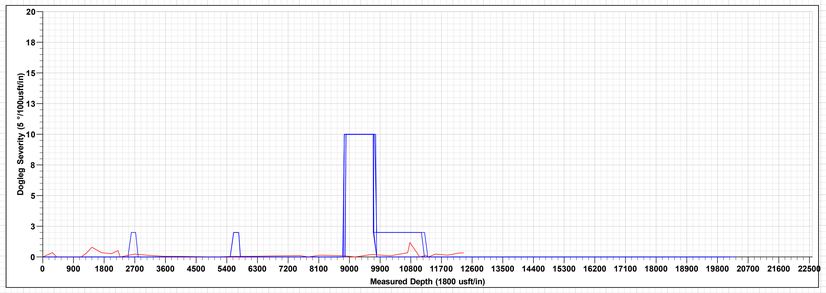
WELL DETAILS: TOMAHAWK FEDERAL UNIT #703H

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude
0.0	0.0	435532.60	568342.00	32° 11' 49.931 N	104° 6' 44.631 W

DESIGN TARGET DETAILS

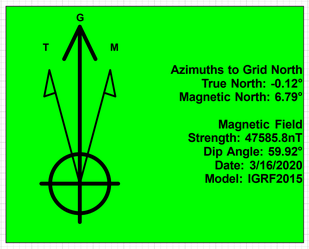
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP (TOMAHAWK FEDERAL #703H)	9398.0	-514.8	969.3	435017.77	569311.30	32° 11' 44.817 N	104° 6' 33.363 W
LTP (TOMAHAWK FEDERAL #703H)	9428.0	-10873.4	988.6	424659.20	569330.60	32° 10' 2.304 N	104° 6' 33.389 W
PBHL (TOMAHAWK FEDERAL #703H)	9428.0	-11003.4	988.9	424529.20	569330.90	32° 10' 1.017 N	104° 6' 33.389 W





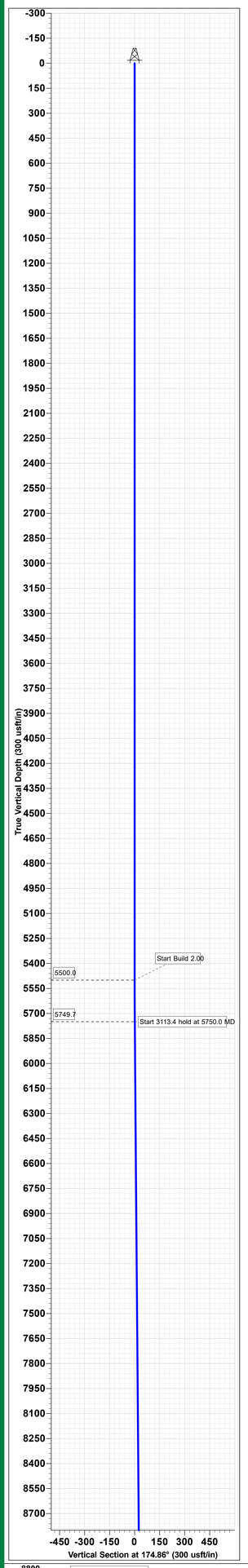
TOMAHAWK FEDERAL UNIT #703H

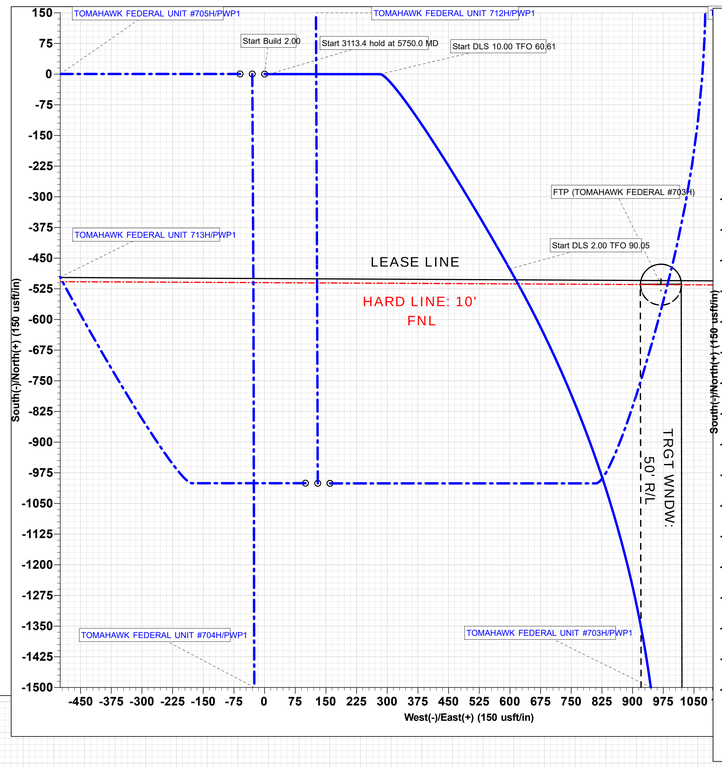
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
5500.0	0.00	0.00	5500.0	0.0	0.0	0.00	0.00	0.0	Start Build 2.00
5750.0	5.00	90.00	5749.7	0.0	10.9	2.00	90.00	1.0	Start 3113.4 hold at 5750.0 MD
8863.4	5.00	90.00	8851.2	0.0	282.2	0.00	0.00	25.3	Start DLS 10.00 TFO 60.61
9737.2	89.84	150.50	9398.0	-476.4	599.5	10.00	60.61	528.1	Start DLS 2.00 TFO 90.05
11206.5	89.84	179.89	9402.2	-1881.4	970.9	2.00	90.05	1960.8	Start 9122.1 hold at 11206.5 MD
20328.6	89.84	179.89	9428.0	-11003.4	988.9	0.00	0.00	11047.7	TD at 20328.6

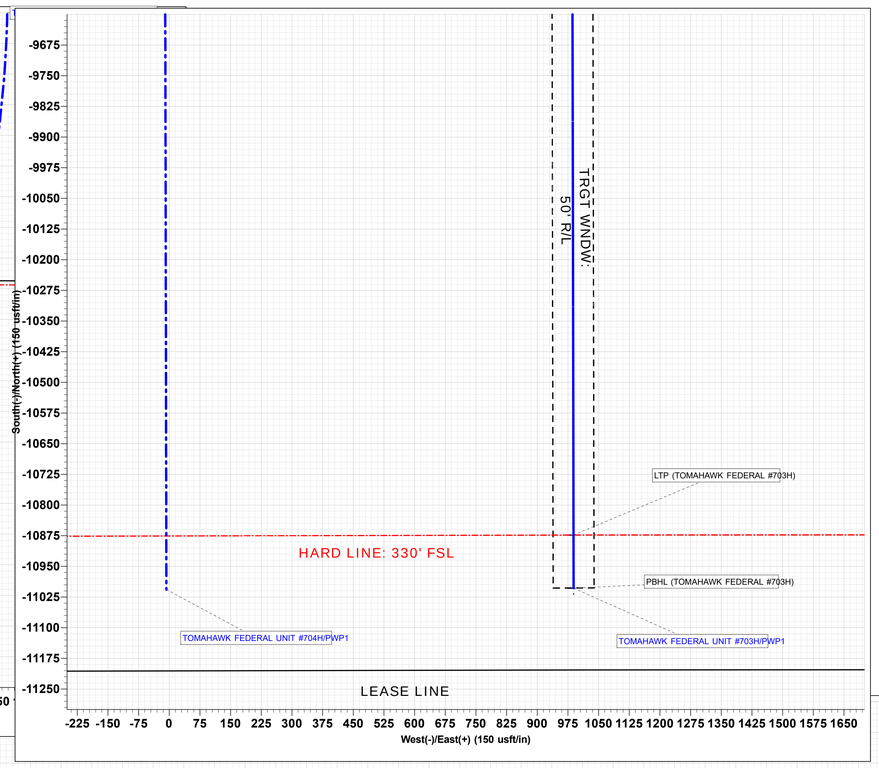


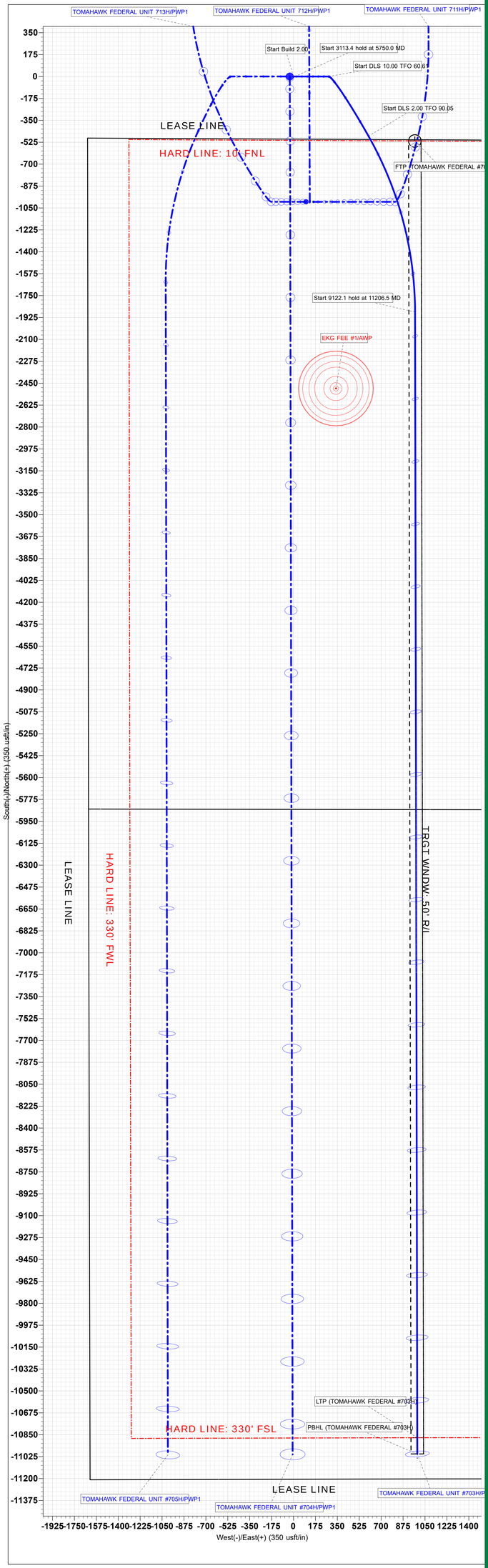
Azimuths to Grid North
True North: -0.12°
Magnetic North: 6.79°

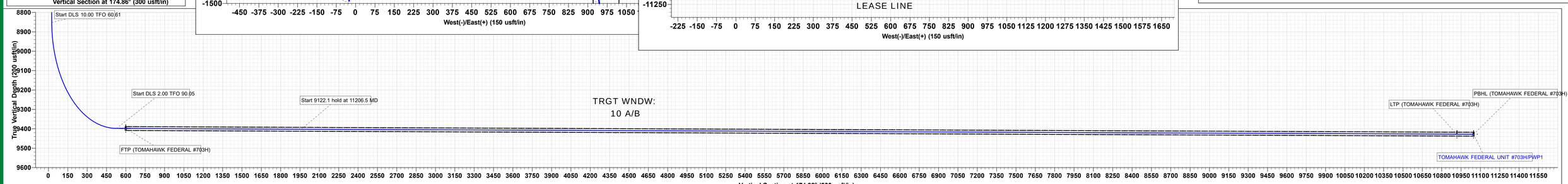
Magnetic Field
Strength: 47585.8nT
Dip Angle: 59.92°
Date: 3/16/2020
Model: IGRF2015



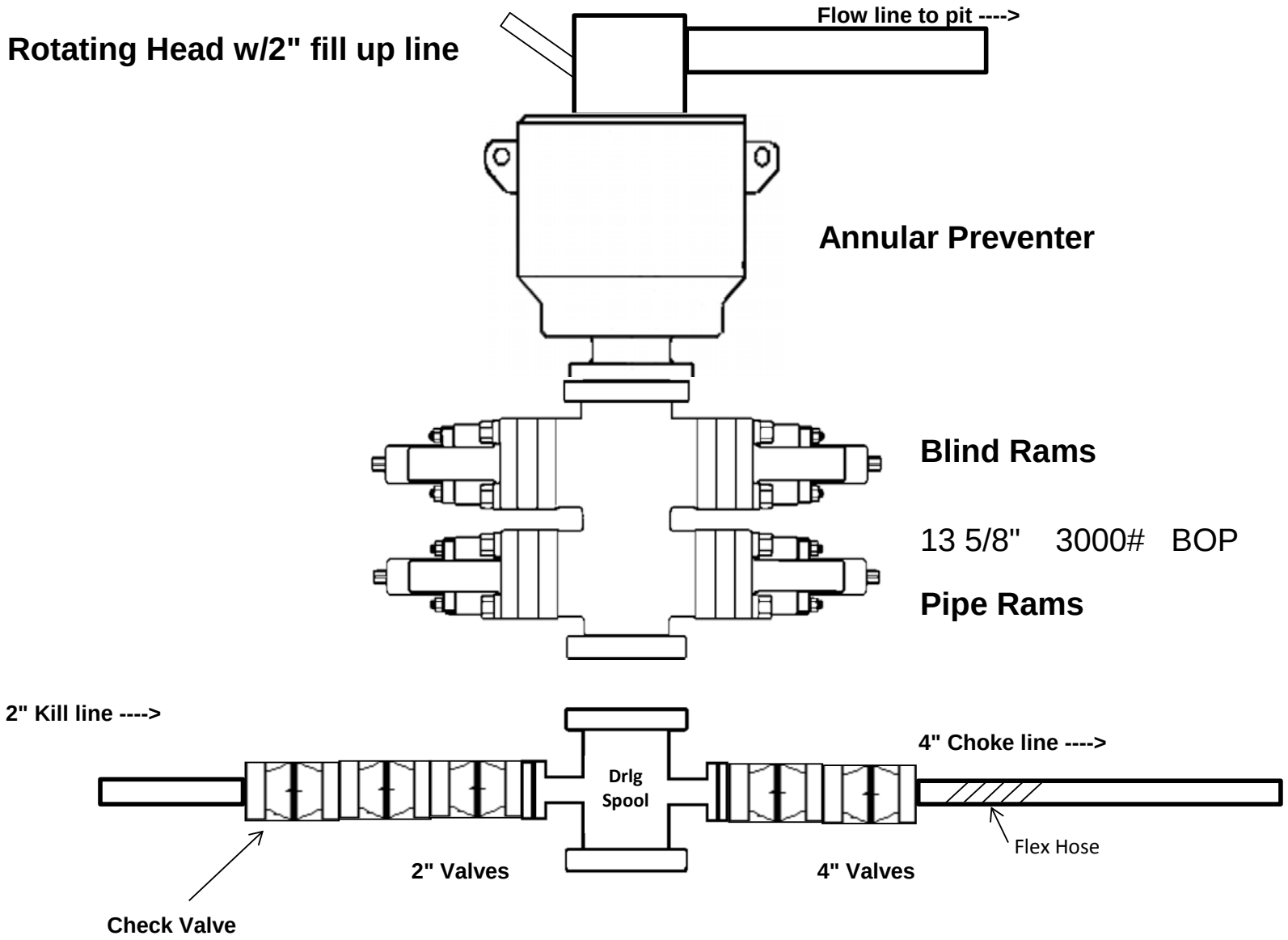




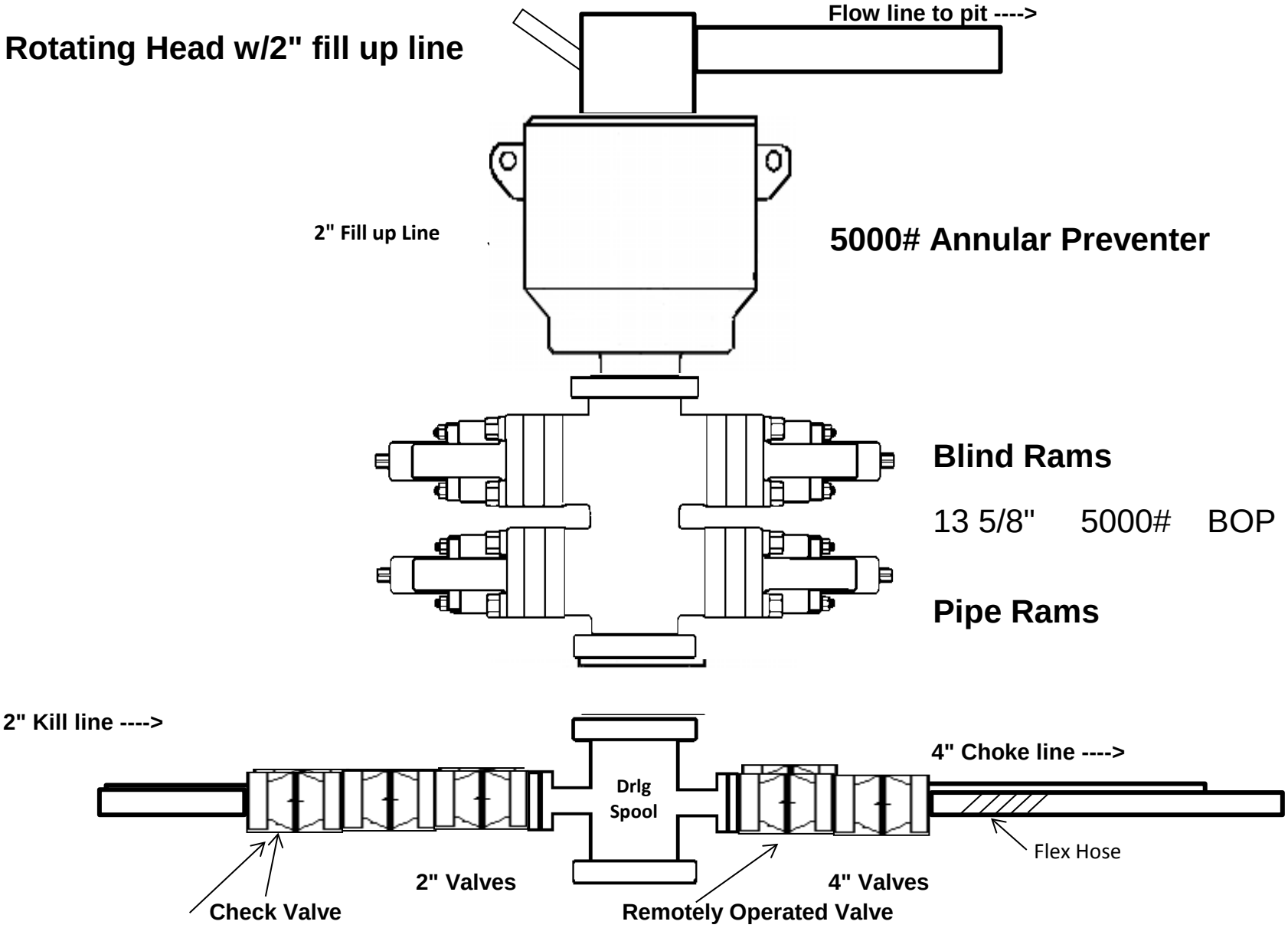




3,000 psi BOP Schematic

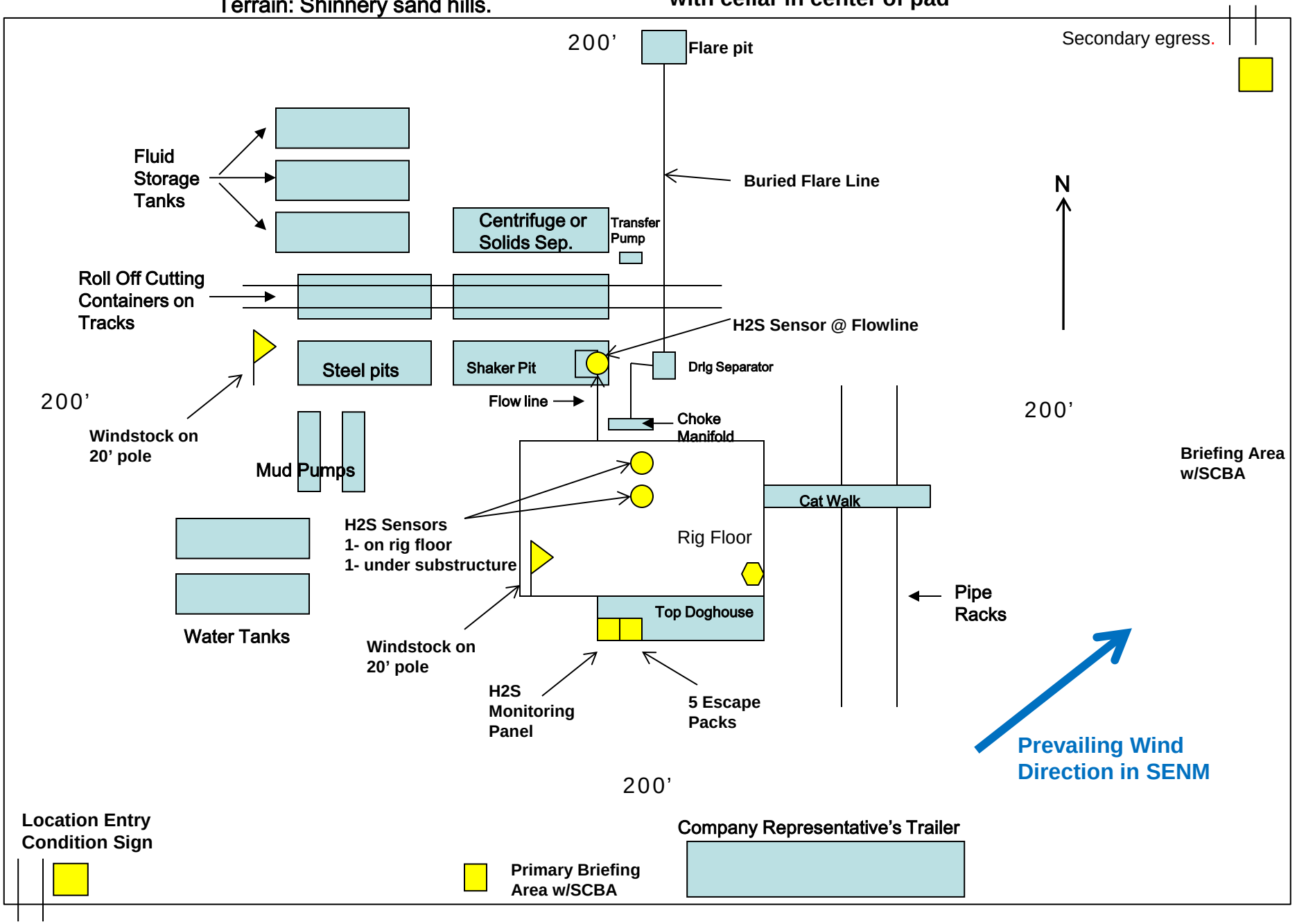


5,000 psi BOP Schematic



COG Operating LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.

Well pad will be 400' x 400' with cellar in center of pad



COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

a. The hazards and characteristics of hydrogen sulfide (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

a. The effects of H2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
c. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H2S. If H2S greater than 100 ppm is encountered in the gas stream we will shut in and install H2S equipment.

a. Well Control Equipment:
   Flare line.
   Choke manifold with remotely operated choke.
   Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
   Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.

c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.

d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.

f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

1. ***BEARDS OR CONTACT LENSES NOT ALLOWED***
2. ***HARD HATS REQUIRED***
3. ***SMOKING IN DESIGNATED AREAS ONLY***
4. ***BE WIND CONSCIOUS AT ALL TIMES***
5. ***CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

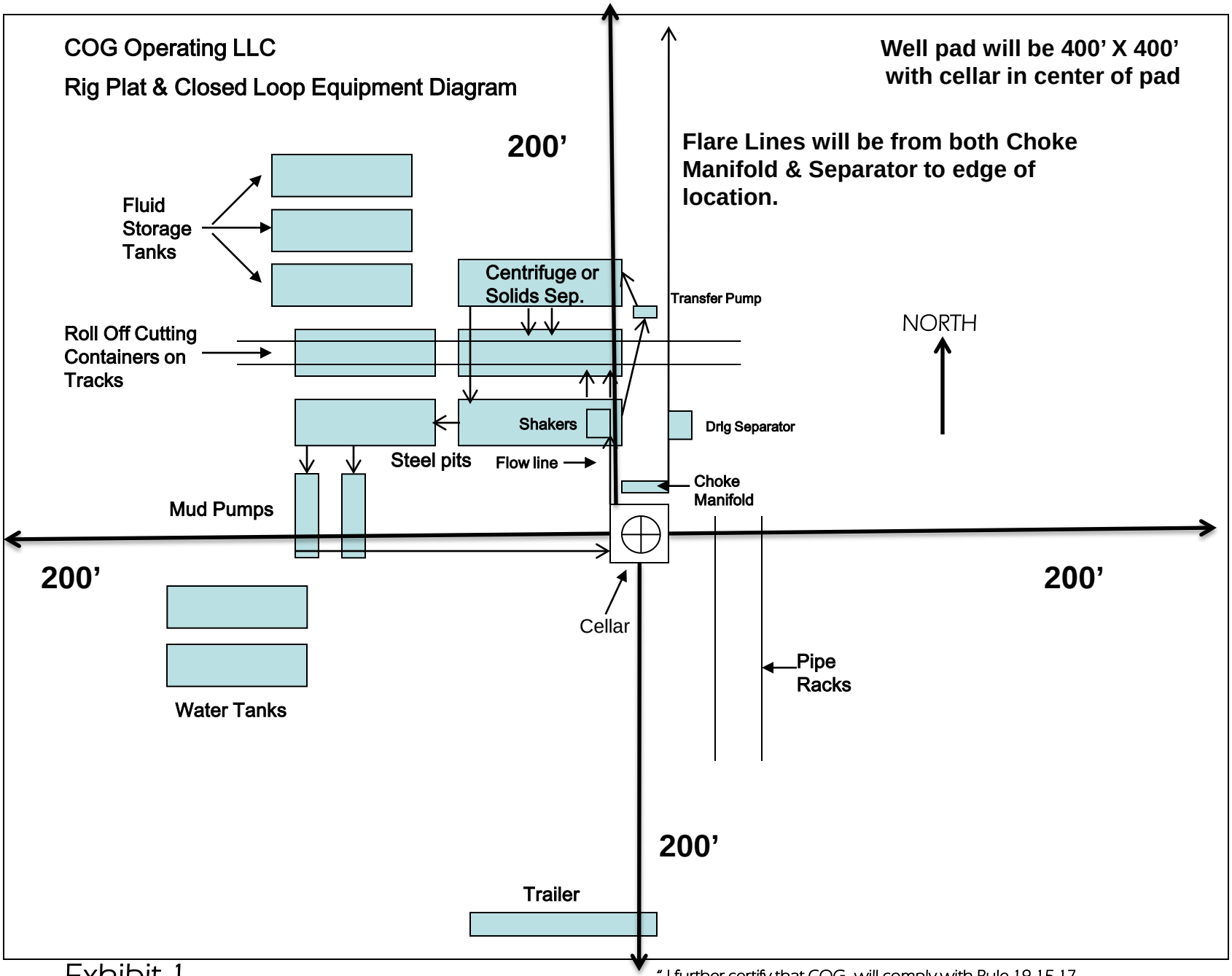


Exhibit 1

" I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

Surface Use & Operating Plan

Tomahawk Federal Unit 703H

- Surface Owner: Pecos Valley Artesian Conservancy District, whose address is P.O. Box 1346, Roswell, NM 88202-1346
- Bureau of Land Management
- New Road: 1303.4'
- Flow Line: 4471.4'
- Gas Line: 4506.2'
- Power Line: 3810.3'
- Tank Battery Facilities: Will utilize the Tomahawk Federal Unit 20 O CTB located in Section 20. T24S. R28E.
- Well Pad: Multiple. Tomahawk Federal Unit 703H, 704H and 705H share a well pad.

Well Site Information

- V Door: East
- Topsoil: North
- Interim Reclamation: North

Attachments

- C102
- Closed Loop System
- Layout
- CTB Layout and Flowlines
- Brine H20
- Fresh H2O
- Existing Roads
- 1Mile Map and Data
- Maps and Plats
- Well Site Layout
- Reclamation

Notes

Onsite: On-site was done by Gerald Herrera (COG); Zane Kirsch (BLM); on February 13th, 2020.

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.

B. All roads to the location are shown on the maps and road plats. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in well layout map. The road shown in the well layout will be used to access the well.

C. Directions to location: See 600 x 600 plat

D. Based on current road maintenance performed on other roads serving existing wells, we anticipate maintaining the lease roads leading to the proposed well pad at least once a year on dry conditions and twice a year in wetter conditions.

2. Proposed Access Road:

The Location Verification Map shows that 26' of new road will be required for this location. If any road is required, it will be constructed as follows:

The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

A. The average grade will be less than 1%.

B. No turnouts are planned.

C. No cattleguard, culvert, gates, low water crossings or fence cuts are necessary.

D. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be obtained from Hayhurst caliche pit located in Section 32, T24S, R28E.

3. Location of Existing Well:

The One-Mile Radius Map shows existing wells within a one-mile radius of the proposed wellbore.

4. Location of Existing and/or Proposed Facilities:

A. COG Operating LLC does not operate an oil production facility on this lease.

1) The new Tomahawk Fed Unit 20 O Central Tank Battery (CTB) proposed in Sec. 20, T24S, R28E will be utilized for the production of 10 Wolfcamp wells. Each well head will be connected to a buried 4" FP 601HT that will be used to carry oil, water and gas production from each wellhead to the inlet manifold of the CTB; the route for these flowlines will follow the flowline corridor route as shown in the exhibit drawing and in the attached plats. Additionally, each well pad will have one buried 6" FP 150 line for gas lift supply from the CTB; the route for this gas lift line will start on the CTB pad where designated by "gas line" in the exhibit drawing and then following the flowline corridor in the attached plats.

2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.

3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, caliche will be obtained from Hayhurst caliche pit located in Section 32 T24S, R28E. Any additional construction materials will be purchased from contractors.

4) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.

5) If the well is productive, rehabilitation plans will include the following:

- The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

5. Location and Type of Water Supply:

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. Fresh water will be obtained from the Bongo Frac Pond located in Section 13. T24S. R28E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E., or if necessary commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in road maps. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

6. Source of Construction Materials and Location "Turn-Over" Procedure:

Obtaining caliche: One primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well site. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

B. An approximate 160' X 160' area is used within the proposed well site to remove caliche.

C. Subsoil is removed and stockpiled within the surveyed well pad.

D. When caliche is found, material will be stock piled within the pad site to build the location and road.

E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.

F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced.

G. Neither caliche, nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in the Well Site Layout or survey plat.

In the event that no caliche is found onsite, the caliche will be caliche will be obtained from Hayhurst caliche pit located in Section 32, T24S, R28E.

H. Methods of Handling Water Disposal:

A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to R360's disposal site.

B. Drilling fluids will be contained in steel mud pits.

C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.

D. It is anticipated that the disposal of produced water will be trucked to the turquoise 30 Federal 1 SWD Section 30, T24S, R32E., or Gold Coast 26 Federal SWD #1 Section 26, T24S, R32E. Might also be trucked to unspecified commercial SWD wells in this area.

E. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.

F. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).

G. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

7. Ancillary Facilities:

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

8. Well Site Layout:

A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.

B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

9. Plans for Restoration of the Surface:

A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

10. Sedimentation and Erosion Control

Immediately following construction, straw waddles will be placed as necessary at the well site to reduce sediment impacts to fragile/sensitive soils.

B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recountoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be re-seeded with a BLM approved mixture and re-vegetated as per BLM orders. When required by BLM, the well pad site will be restored to match pre-construction grades.

11. Surface Ownership:

The surface is owned by the Pecos Valley Artesian Conservancy District, whose address is P.O. Box 1346, Roswell, NM 88202-1346.. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas. The surface owner was notified before staking this well.

A. The proposed road routes and surface location will be restored as directed by the BLM.

12. Other Information:

A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.

B. There is no permanent or live water in the immediate area.

C. There are no dwellings within 2 miles of this location.

D. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of NM, LLC., 2030 North Canal, Carlsbad, New Mexico, 88220, phone number 575-885-1352 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

13. Bond Coverage:

Bond Coverage is Statewide Bonds # NMB000740 and NMB000215

14. Lessee's and Operator's Representative:

The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

Seth Wild
Drilling Superintendent
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
(432) 221-0414 (office)
(432) 525-3633(cell)

Ray Peterson
Drilling Manager
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
Phone (432) 685-4304 (office)
(432) 818-2254 (business)