Form 3160-3
(June 2015)

HOBBS OCD
DEC 05 2019
RECEIVED

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.
NMNM101609

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.
TIN FOIL FEDERAL COM
604H (326507)

2. Name of Operator
COG OPERATING LLC (229137)

9. API Well No.
30-025-46562

3a. Address
600 West Illinois Ave Midland TX 79701

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

10. Field and Pool, or Exploratory (98187)
RATTLESNAKE FLAT / ~~BONE SPRING~~

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface SWSE / 400 FSL / 2320 FEL / LAT 32.109697 / LONG -103.337274
At proposed prod. zone NWNE / 50 FNL / 2320 FEL / LAT 32.137485 / LONG -103.337253

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 23 / T25S / R35E / NMP

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

12. County or Parish
LEA

13. State
NM

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

16. No of acres in lease
1920

17. Spacing Unit dedicated to this well
640

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

19. Proposed Depth
12266 feet / 22502 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3154 feet

22. Approximate date work will start*
11/01/2019

23. Estimated duration
30 days

24. Attachments

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

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6940	08/09/2019

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Christopher Walls / Ph: (575)234-2234	12/04/2019
Title	Office	
Petroleum Engineer	CARLSBAD	

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

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

APPROVED WITH CONDITIONS

KZ
12/05/19

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 12/04/2019

AFMSS

Application for Permit to Drill

U.S. Department of the Interior
Bureau of Land Management

APD Package Report

Date Printed: 12/05/2019 08:04 AM

APD ID: 10400045425	Well Status: AAPD
APD Received Date: 08/09/2019 08:28 AM	Well Name: TIN FOIL FEDERAL COM
Operator: COG OPERATING LLC	Well Number: 604H

APD Package Report Contents

- Form 3160-3

- Operator Certification Report

- Application Report
- Application Attachments
  -- Well Plat: 1 file(s)

- Drilling Plan Report
- Drilling Plan Attachments
  -- Blowout Prevention Choke Diagram Attachment: 2 file(s)
  -- Blowout Prevention BOP Diagram Attachment: 4 file(s)
  -- Casing Design Assumptions and Worksheet(s): 4 file(s)
  -- Hydrogen sulfide drilling operations plan: 2 file(s)
  -- Proposed horizontal/directional/multi-lateral plan submission: 2 file(s)
  -- Other Facets: 3 file(s)
  -- Other Variances: 1 file(s)

- SUPO Report
- SUPO Attachments
  -- Existing Road Map: 1 file(s)
  -- New Road Map: 1 file(s)
  -- Attach Well map: 1 file(s)
  -- Production Facilities map: 2 file(s)
  -- Water source and transportation map: 2 file(s)
  -- Well Site Layout Diagram: 1 file(s)
  -- Recontouring attachment: 1 file(s)
  -- Pit closure attachment: 1 file(s)
  -- Other SUPO Attachment: 11 file(s)

- PWD Report
- PWD Attachments
  -- None

- Bond Report
- Bond Attachments
  -- None

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC**
LEASE NO.:	**NMNM101609**
WELL NAME & NO.:	**Tin Foil Federal Com 604H**
SURFACE HOLE FOOTAGE:	**400' FSL & 2320' FEL**
BOTTOM HOLE FOOTAGE	**50' FNL & 2320' FEL**
LOCATION:	**Section 23, T 25S, R 35E, NMPM**
COUNTY:	**Lea 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
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 at approximately **1175'**, a minimum of 25' above the salt (BLM geologists estimate Top of Salt @ 1200') 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 at approximately **11645'** and cemented to surface.
   a. **If cement does not circulate to surface,** see B.1.a, c & d.
   b. Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.
      i. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with the second stage.
      ii. Second stage via DV tool: Cement to surface. If cement does not circulate, contact the appropriate BLM office.
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.

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 **5000 (5M)** psi.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi. **Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi).**

D. SPECIAL REQUIREMENTS

1. Submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
   a. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 12/04/2019

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. 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.

AFMSS

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

Operator Certification Data Report

12/05/2019

Operator Certification

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

NAME: Mayte Reyes **Signed on:** 08/06/2019

Title: Regulatory Analyst

Street Address: 2208 West Main Street

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

Phone: (575)748-6940

Email address: gherrera@concho.com

Field Representative

Representative Name:

Street Address: 2208 West Main Street

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

Phone: (575)748-6940

Email address: gherrera@concho.com

AFMSS

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

Application Data Report

12/05/2019

APD ID: 10400045425 **Submission Date:** 08/09/2019

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400045425 **Tie to previous NOS?** **Submission Date:** 08/09/2019

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: NMNM101609 **Lease Acres:** 1920

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:**

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

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H **Well API Number:**

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

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

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** N **New surface disturbance?**

Type of Well Pad: SINGLE WELL **Multiple Well Pad Name:** **Number:**

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: 8 Miles **Distance to nearest well:** 620 FT **Distance to lease line:** 50 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: COG_Tin_Foil_604H_C102_20190805150208.pdf

Well work start Date: 11/01/2019 **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
SHL Leg #1	400	FSL	282 0	FEL	25S	35E	23	Aliquot SWSE	32.10989 7	-103.3972 74	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 101609	3154	0	0	Y
KOP Leg #1	400	FSL	282 0	FEL	25S	35E	23	Aliquot SWSE	32.10989 7	-103.3972 74	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 101609	3154	0	0	Y
PPP Leg #1-1	100	FNL	282 0	FEL	25S	35E	23	Aliquot SWSE	32.10887 3	-103.3972 74	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 101609	-2400	3455 0	3399	Y

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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
PPP Leg #1-2	1	FSL	282	FEL	25S	35E	14	Aliquot SWSE	32.12811	-103.3372	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 101608	-907	175	122	Y
EXIT Leg #1	100	FNL	282	FEL	25S	35E	14	Aliquot NWNE	32.13734	-103.3372	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-904	224	121	Y
BHL Leg #1	50	FNL	282	FEL	25S	35E	14	Aliquot NWNE	32.13748	-103.3372	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-911	226	122	Y

APD ID: 10400045425 **Submission Date:** 08/09/2019

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	UNKNOWN	3154	0	0	SALT	NONE	N
2	RUSTLER	2196	958	958	SALT	NONE	N
3	TOP SALT	1824	1330	1330	SALT	NONE	N
4	BOTTOM SALT	-1692	4846	4846	ANHYDRITE	NONE	N
5	LAMAR	-2077	5231	5231	LIMESTONE	NATURAL GAS,OIL	N
6	BELL CANYON	-2123	5277	5277	LIMESTONE	NONE	N
7	CHERRY CANYON	-3070	6224	6244	LIMESTONE	NATURAL GAS,OIL	N
8	BRUSHY CANYON	-4445	7599	7599	LIMESTONE	NATURAL GAS,OIL	N
9	BONE SPRING LIME	-5606	8760	8760	SANDSTONE	NATURAL GAS,OIL	N
10	UPPER AVALON SHALE	-5629	8783	8783	SANDSTONE	NATURAL GAS,OIL	N
11	—	-6060	9214	9214	SANDSTONE	NATURAL GAS,OIL	N
12	BONE SPRING 1ST	-7010	10164	10164	HALITE	NATURAL GAS,OIL	N
13	BONE SPRING 2ND	-7554	10708	10708	SANDSTONE	NATURAL GAS,OIL	N
14	BONE SPRING 3RD	-8637	11791	11791	SANDSTONE	NATURAL GAS,OIL	N
15	WOLFCAMP	-8942	12096	12096	SHALE	NATURAL GAS,OIL	Y

Section 2 - Blowout Prevention

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

Pressure Rating (PSI): 10M **Rating Depth:** 12266

Equipment: Accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.

Requesting Variance? YES

Variance request: Request a 5M annular variance on a 10M system. (5M variance attached in section 8). A variance is requested for the use of a flexible choke line from the BOP to the choke manifold. See attached for specs and hydrostatic test chart.

Testing Procedure: 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.

Choke Diagram Attachment:

COG_Tin_Foil_604H_10M_Choke_20190807142821.pdf

BOP Diagram Attachment:

COG_Tin_Foil_604H_10M_BOP_20190807143023.pdf

COG_Tin_Foil_604H_Flex_Hose_20190807143146.pdf

Pressure Rating (PSI): 5M **Rating Depth:** 11645

Equipment: Annular, Blind Ram, Pipe Ram. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold

Requesting Variance? YES

Variance request: A variance is requested for the use of a flexible choke line from the BOP to the choke manifold. See attached for specs and hydrostatic test chart.

Testing Procedure: 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.

Choke Diagram Attachment:

COG_Tin_Foil_604H_5M_Choke_20190807143218.pdf

BOP Diagram Attachment:

COG_Tin_Foil_604H_5M_BOP_20190807143231.pdf

COG_Tin_Foil_604H_Flex_Hose_20190807143239.pdf

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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	1215	0	1215	3154	1939	1215	J-55	45.5	ST&C	3.85	7.58	DRY	8.92	DRY	8.92
2	INTERMEDIATE	9.875	7.625	NEW	API	N	0	11645	0	11645		-8491	11645	HCL-80	29.7	OTHER - BTC	1.52	1.07	DRY	2.08	DRY	2.08
3	PRODUCTION	6.75	5.5	NEW	API	N	0	22502	0	12266	-9411	-9112	22502	P-110	23	OTHER - SF Torq	1.82	2.15	DRY	2.33	DRY	2.33

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Tin_Foil_604H_Casing_604H_20190807143819.pdf

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Tin_Foil_604H_Casing_604H_20190807143715.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Tin_Foil_604H_Casing_604H_20190807143948.pdf

Technical_Data_Sheet_TMK_UP_SF_TORQ_5.5_x_23_P110_HC_20191113101906.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	1215	540	1.75	13.5	945	50	Class C	4% Ge
SURFACE	Tail		0	1215	260	1.34	14.8	335	50	Class C	2% CaCl2
INTERMEDIATE	Lead	5200	0	11845	700	2.8	11	1960	50	Stage 1: Lead NeoCem, Stage 2: Cementing attached in Section 8.	As needed

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
INTERMEDIATE	Tail		0	11345	300	1.1	15.4	330	50	Class H	As needed
INTERMEDIATE	Lead	6200	0	11345	800	2.8	11	2240	50	Lead: NeoCem	As needed
INTERMEDIATE	Tail		0	11345	200	1.35	14.8	270	50	Tail: Class C	2% CaCl
PRODUCTION	Lead		11345	22502	750	2	12.7	1500	35	Lead: 35:65:6 H BLEND	As needed
PRODUCTION	Tail		11345	22502	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
0	1215	OTHER : FW Gel	8.4	8.6							FW Gel
1215	11645	OTHER : Diesel Brine Emulsion	8.6	9.4							Diesel Brine Emulsion
11645	22502	OIL-BASED MUD	10.5	12.5							OBM

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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:

COMPENSATED NEUTRON LOG,GAMMA RAY LOG,

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 7975 **Anticipated Surface Pressure:** 5265

Anticipated Bottom Hole Temperature(F): 180

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_Tin_Foil_604H_H2S_Schematic_20190807144901.pdf

COG_Tin_Foil_604H_H2S_SUP_20190807144907.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Tin_Foil_604H_AC_Report_20190807144936.pdf

COG_Tin_Foil_604H_Directional_Plan_20190807144942.pdf

Other proposed operations facets description:

Drilling Program attached.
Cementing Plan attached.
Gas Capture Plan attached.

Other proposed operations facets attachment:

COG_Tin_Foil_604H_Cementing_Prog_604H_20190807144955.pdf

COG_Tin_Foil_Com_604H_GCP_20190807145006.pdf

COG_Tin_Foil_705H_Drilling_Prog_20191113081317.pdf

Other Variance attachment:

COG_5M_Variance_Well_Plan_20190211080830.pdf

AFMSS

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

PWD Data Report

12/05/2019

APD ID: 10400045425 **Submission Date:** 08/09/2019

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? 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:

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

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?

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM Well Number: 604H

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):

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM **Well Number:** 604H

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

12/05/2019

APD ID: 10400045425

Submission Date: 08/09/2019

Operator Name: COG OPERATING LLC

Well Name: TIN FOIL FEDERAL COM

Well Number: 604H

Well Type: OIL WELL

Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

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:

COG Operating, LLC - Tin Foil Federal Com 604H

1. Geologic Formations

TVD of target	12,266' EOL	Pilot hole depth	NA
MD at TD:	22,502'	Deepest expected fresh water:	207'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	958	Water	
Top of Salt	1330	Salt	
Base of Salt	4846	Salt	
Lamar	5231	Salt Water	
Bell Canyon	5277	Salt Water	
Cherry Canyon	6224	Oil/Gas	
Brushy Canyon	7599	Oil/Gas	
Bone Spring Lime	8760	Oil/Gas	
U. Avalon Shale	8783	Oil/Gas	
L. Avalon Shale	9214	Oil/Gas	
1st Bone Spring Sand	10164	Oil/Gas	
2nd Bone Spring Sand	10708	Oil/Gas	
3rd Bone Spring Sand	11791	Oil/Gas	
Wolfcamp	12096	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14.75	0	1215	10.75	45.5	J55	STC	3.85	7.58	8.92
9.875	0	11645	7.625	29.7	HCL80	BTC	1.52	1.07	2.08
6.75	0	22,502	5.5"	23	P110	SF Torq	1.82	2.15	2.33
			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 - Tin Foil Federal Com 604H

	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.	540	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. Stage1	700	11	2.8	19	48	Lead: NeoCem
	300	16.4	1.1	5	8	Tail: Class H
DV Tool @ 5200'						
Inter. Stage2	800	11	2.8	19	48	Lead: NeoCem
	200	14.8	1.35	6.34	8	Tail: Class C + 2% Cacl
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	11,145'	35%

COG Operating, LLC - Tin Foil Federal Com 604H

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"	5M	Annular	x	2500 psi
			Blind Ram	x	5M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8 1/2"	13-5/8"	10M	5M Annular	x	5000 psi
			Blind Ram	x	10M
			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 - 12.5	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	7975 psi at 12266' TVD
Abnormal Temperature	NO 180 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

CONCHO

COG Operating LLC

Lea County, NM (NAD27 NME)
Tin Foil Federal Com
604H

OH

Plan: Plan 1 08-02-19

Standard Planning Report

02 August, 2019

PHOENIX
TECHNOLOGY SERVICES

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

Project	Lea County, NM (NAD27 NME)		
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		

Site	Tin Foil Federal Com				
Site Position:		**Northing:**	405,011.10 usft	**Latitude:**	32° 6' 34.454410 N
From:	Map	**Easting:**	808,555.50 usft	**Longitude:**	103° 20' 12.519903 W
Position Uncertainty:	1.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.53 °

Well	604H					
Well Position	**+N/-S**	0.00 usft	**Northing:**	405,011.10 usft	**Latitude:**	32° 6' 34.454410 N
	+E/-W	0.00 usft	**Easting:**	808,555.50 usft	**Longitude:**	103° 20' 12.519903 W
Position Uncertainty		1.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,153.80 usft

Wellbore	OH				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	MVHD	9/25/2019	6.55	59.72	47,714.15608497

Design	Plan 1 08-02-19				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	359.51	

Plan Survey Tool Program **Date** 8/2/2019

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	22,502.76	Plan 1 08-02-19 (OH)	MWD+HRGM	
				OWSG MWD + HRGM	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,900.00	8.00	179.50	2,898.70	-27.88	0.24	2.00	2.00	0.00	179.50	
5,014.00	8.00	179.50	4,992.13	-322.08	2.81	0.00	0.00	0.00	0.00	
5,414.00	0.00	0.00	5,390.83	-349.96	3.05	2.00	-2.00	0.00	180.00	
11,716.23	0.00	0.00	11,693.06	-349.96	3.05	0.00	0.00	0.00	0.00	
12,620.29	90.41	359.51	12,266.00	227.04	-1.89	10.00	10.00	-0.05	359.51	
22,502.76	90.41	359.51	12,196.00	10,108.90	-86.50	0.00	0.00	0.00	0.00	BHL - Tin Foil Fed Co

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
2,600.00	2.00	179.50	2,599.98	-1.75	0.02	-1.75	2.00	2.00	0.00
2,700.00	4.00	179.50	2,699.84	-6.98	0.06	-6.98	2.00	2.00	0.00
2,800.00	6.00	179.50	2,799.45	-15.69	0.14	-15.69	2.00	2.00	0.00
2,900.00	8.00	179.50	2,898.70	-27.88	0.24	-27.88	2.00	2.00	0.00
Hold 8.00° Inc at 179.50° Azm									
3,000.00	8.00	179.50	2,997.73	-41.80	0.36	-41.80	0.00	0.00	0.00
3,100.00	8.00	179.50	3,096.76	-55.71	0.49	-55.71	0.00	0.00	0.00
3,200.00	8.00	179.50	3,195.78	-69.63	0.61	-69.63	0.00	0.00	0.00
3,300.00	8.00	179.50	3,294.81	-83.55	0.73	-83.55	0.00	0.00	0.00
3,400.00	8.00	179.50	3,393.84	-97.46	0.85	-97.47	0.00	0.00	0.00
3,500.00	8.00	179.50	3,492.86	-111.38	0.97	-111.38	0.00	0.00	0.00
3,600.00	8.00	179.50	3,591.89	-125.30	1.09	-125.30	0.00	0.00	0.00
3,700.00	8.00	179.50	3,690.92	-139.21	1.21	-139.22	0.00	0.00	0.00
3,800.00	8.00	179.50	3,789.94	-153.13	1.33	-153.14	0.00	0.00	0.00
3,900.00	8.00	179.50	3,888.97	-167.05	1.46	-167.05	0.00	0.00	0.00
4,000.00	8.00	179.50	3,988.00	-180.96	1.58	-180.97	0.00	0.00	0.00
4,100.00	8.00	179.50	4,087.02	-194.88	1.70	-194.89	0.00	0.00	0.00
4,200.00	8.00	179.50	4,186.05	-208.80	1.82	-208.81	0.00	0.00	0.00
4,300.00	8.00	179.50	4,285.08	-222.71	1.94	-222.72	0.00	0.00	0.00
4,400.00	8.00	179.50	4,384.10	-236.63	2.06	-236.64	0.00	0.00	0.00
4,500.00	8.00	179.50	4,483.13	-250.55	2.18	-250.56	0.00	0.00	0.00
4,600.00	8.00	179.50	4,582.16	-264.47	2.30	-264.48	0.00	0.00	0.00
4,700.00	8.00	179.50	4,681.18	-278.38	2.43	-278.39	0.00	0.00	0.00
4,800.00	8.00	179.50	4,780.21	-292.30	2.55	-292.31	0.00	0.00	0.00
4,900.00	8.00	179.50	4,879.24	-306.22	2.67	-306.23	0.00	0.00	0.00
5,000.00	8.00	179.50	4,978.26	-320.13	2.79	-320.14	0.00	0.00	0.00
5,014.00	8.00	179.50	4,992.13	-322.08	2.81	-322.09	0.00	0.00	0.00
Begin 2.00°/100' Drop									
5,100.00	6.28	179.50	5,077.46	-332.77	2.90	-332.78	2.00	-2.00	0.00
5,200.00	4.28	179.50	5,177.03	-341.97	2.98	-341.98	2.00	-2.00	0.00
5,300.00	2.28	179.50	5,276.86	-347.69	3.03	-347.71	2.00	-2.00	0.00
5,400.00	0.28	179.50	5,376.83	-349.93	3.05	-349.94	2.00	-2.00	0.00
5,414.00	0.00	0.00	5,390.83	-349.96	3.05	-349.97	2.00	-2.00	0.00
Begin Vertical Hold									
5,500.00	0.00	0.00	5,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
5,600.00	0.00	0.00	5,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
5,700.00	0.00	0.00	5,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
5,800.00	0.00	0.00	5,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
5,900.00	0.00	0.00	5,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,000.00	0.00	0.00	5,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,100.00	0.00	0.00	6,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,200.00	0.00	0.00	6,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,300.00	0.00	0.00	6,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,400.00	0.00	0.00	6,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,500.00	0.00	0.00	6,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,600.00	0.00	0.00	6,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,700.00	0.00	0.00	6,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,800.00	0.00	0.00	6,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
6,900.00	0.00	0.00	6,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,000.00	0.00	0.00	6,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

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)
7,100.00	0.00	0.00	7,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,200.00	0.00	0.00	7,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,300.00	0.00	0.00	7,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,400.00	0.00	0.00	7,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,500.00	0.00	0.00	7,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,600.00	0.00	0.00	7,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,700.00	0.00	0.00	7,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,800.00	0.00	0.00	7,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
7,900.00	0.00	0.00	7,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,000.00	0.00	0.00	7,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,100.00	0.00	0.00	8,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,200.00	0.00	0.00	8,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,300.00	0.00	0.00	8,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,400.00	0.00	0.00	8,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,500.00	0.00	0.00	8,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,600.00	0.00	0.00	8,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,700.00	0.00	0.00	8,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,800.00	0.00	0.00	8,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
8,900.00	0.00	0.00	8,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,000.00	0.00	0.00	8,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,100.00	0.00	0.00	9,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,200.00	0.00	0.00	9,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,300.00	0.00	0.00	9,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,400.00	0.00	0.00	9,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,500.00	0.00	0.00	9,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,600.00	0.00	0.00	9,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,700.00	0.00	0.00	9,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,800.00	0.00	0.00	9,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
9,900.00	0.00	0.00	9,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,000.00	0.00	0.00	9,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,100.00	0.00	0.00	10,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,200.00	0.00	0.00	10,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,300.00	0.00	0.00	10,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,400.00	0.00	0.00	10,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,500.00	0.00	0.00	10,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,600.00	0.00	0.00	10,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,700.00	0.00	0.00	10,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,800.00	0.00	0.00	10,776.83	-349.96	3.05	-349.97	0.00	0.00	0.00
10,900.00	0.00	0.00	10,876.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,000.00	0.00	0.00	10,976.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,100.00	0.00	0.00	11,076.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,200.00	0.00	0.00	11,176.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,300.00	0.00	0.00	11,276.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,400.00	0.00	0.00	11,376.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,500.00	0.00	0.00	11,476.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,600.00	0.00	0.00	11,576.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,700.00	0.00	0.00	11,676.83	-349.96	3.05	-349.97	0.00	0.00	0.00
11,716.23	0.00	0.00	11,693.06	-349.96	3.05	-349.97	0.00	0.00	0.00
KOP2, Begin 10.00°/100' Build									
11,800.00	8.38	359.51	11,776.53	-343.85	3.00	-343.86	10.00	10.00	0.00
11,900.00	18.38	359.51	11,873.70	-320.74	2.80	-320.75	10.00	10.00	0.00
12,000.00	28.38	359.51	11,965.37	-281.12	2.46	-281.13	10.00	10.00	0.00
12,100.00	38.38	359.51	12,048.77	-226.17	1.99	-226.18	10.00	10.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

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)
12,200.00	48.38	359.51	12,121.36	-157.58	1.40	-157.59	10.00	10.00	0.00
12,300.00	58.38	359.51	12,180.94	-77.43	0.72	-77.43	10.00	10.00	0.00
12,400.00	68.38	359.51	12,225.70	11.85	-0.05	11.85	10.00	10.00	0.00
12,500.00	78.38	359.51	12,254.27	107.55	-0.87	107.55	10.00	10.00	0.00
12,600.00	88.38	359.51	12,265.79	206.75	-1.72	206.76	10.00	10.00	0.00
12,620.29	90.41	359.51	12,266.00	227.04	-1.89	227.04	10.00	10.00	0.00
LP, Hold 90.41° Inc at 359.51° Azm									
12,700.00	90.41	359.51	12,265.44	306.74	-2.57	306.75	0.00	0.00	0.00
12,800.00	90.41	359.51	12,264.73	406.74	-3.43	406.75	0.00	0.00	0.00
12,900.00	90.41	359.51	12,264.02	506.73	-4.29	506.75	0.00	0.00	0.00
13,000.00	90.41	359.51	12,263.31	606.72	-5.14	606.74	0.00	0.00	0.00
13,100.00	90.41	359.51	12,262.61	706.72	-6.00	706.74	0.00	0.00	0.00
13,200.00	90.41	359.51	12,261.90	806.71	-6.85	806.74	0.00	0.00	0.00
13,300.00	90.41	359.51	12,261.19	906.70	-7.71	906.74	0.00	0.00	0.00
13,400.00	90.41	359.51	12,260.48	1,006.70	-8.57	1,006.73	0.00	0.00	0.00
13,500.00	90.41	359.51	12,259.77	1,106.69	-9.42	1,106.73	0.00	0.00	0.00
13,600.00	90.41	359.51	12,259.06	1,206.69	-10.28	1,206.73	0.00	0.00	0.00
13,700.00	90.41	359.51	12,258.36	1,306.68	-11.13	1,306.73	0.00	0.00	0.00
13,800.00	90.41	359.51	12,257.65	1,406.67	-11.99	1,406.72	0.00	0.00	0.00
13,900.00	90.41	359.51	12,256.94	1,506.67	-12.85	1,506.72	0.00	0.00	0.00
14,000.00	90.41	359.51	12,256.23	1,606.66	-13.70	1,606.72	0.00	0.00	0.00
14,100.00	90.41	359.51	12,255.52	1,706.65	-14.56	1,706.72	0.00	0.00	0.00
14,200.00	90.41	359.51	12,254.81	1,806.65	-15.42	1,806.71	0.00	0.00	0.00
14,300.00	90.41	359.51	12,254.11	1,906.64	-16.27	1,906.71	0.00	0.00	0.00
14,400.00	90.41	359.51	12,253.40	2,006.64	-17.13	2,006.71	0.00	0.00	0.00
14,500.00	90.41	359.51	12,252.69	2,106.63	-17.98	2,106.71	0.00	0.00	0.00
14,600.00	90.41	359.51	12,251.98	2,206.62	-18.84	2,206.70	0.00	0.00	0.00
14,700.00	90.41	359.51	12,251.27	2,306.62	-19.70	2,306.70	0.00	0.00	0.00
14,800.00	90.41	359.51	12,250.56	2,406.61	-20.55	2,406.70	0.00	0.00	0.00
14,900.00	90.41	359.51	12,249.86	2,506.61	-21.41	2,506.70	0.00	0.00	0.00
15,000.00	90.41	359.51	12,249.15	2,606.60	-22.26	2,606.69	0.00	0.00	0.00
15,100.00	90.41	359.51	12,248.44	2,706.59	-23.12	2,706.69	0.00	0.00	0.00
15,200.00	90.41	359.51	12,247.73	2,806.59	-23.98	2,806.69	0.00	0.00	0.00
15,300.00	90.41	359.51	12,247.02	2,906.58	-24.83	2,906.69	0.00	0.00	0.00
15,400.00	90.41	359.51	12,246.31	3,006.57	-25.69	3,006.68	0.00	0.00	0.00
15,500.00	90.41	359.51	12,245.60	3,106.57	-26.55	3,106.68	0.00	0.00	0.00
15,600.00	90.41	359.51	12,244.90	3,206.56	-27.40	3,206.68	0.00	0.00	0.00
15,700.00	90.41	359.51	12,244.19	3,306.56	-28.26	3,306.68	0.00	0.00	0.00
15,800.00	90.41	359.51	12,243.48	3,406.55	-29.11	3,406.67	0.00	0.00	0.00
15,900.00	90.41	359.51	12,242.77	3,506.54	-29.97	3,506.67	0.00	0.00	0.00
16,000.00	90.41	359.51	12,242.06	3,606.54	-30.83	3,606.67	0.00	0.00	0.00
16,100.00	90.41	359.51	12,241.35	3,706.53	-31.68	3,706.67	0.00	0.00	0.00
16,200.00	90.41	359.51	12,240.65	3,806.53	-32.54	3,806.66	0.00	0.00	0.00
16,300.00	90.41	359.51	12,239.94	3,906.52	-33.39	3,906.66	0.00	0.00	0.00
16,400.00	90.41	359.51	12,239.23	4,006.51	-34.25	4,006.66	0.00	0.00	0.00
16,500.00	90.41	359.51	12,238.52	4,106.51	-35.11	4,106.66	0.00	0.00	0.00
16,600.00	90.41	359.51	12,237.81	4,206.50	-35.96	4,206.65	0.00	0.00	0.00
16,700.00	90.41	359.51	12,237.10	4,306.49	-36.82	4,306.65	0.00	0.00	0.00
16,800.00	90.41	359.51	12,236.40	4,406.49	-37.68	4,406.65	0.00	0.00	0.00
16,900.00	90.41	359.51	12,235.69	4,506.48	-38.53	4,506.65	0.00	0.00	0.00
17,000.00	90.41	359.51	12,234.98	4,606.48	-39.39	4,606.64	0.00	0.00	0.00
17,100.00	90.41	359.51	12,234.27	4,706.47	-40.24	4,706.64	0.00	0.00	0.00
17,200.00	90.41	359.51	12,233.56	4,806.46	-41.10	4,806.64	0.00	0.00	0.00
17,300.00	90.41	359.51	12,232.85	4,906.46	-41.96	4,906.64	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

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)
17,400.00	90.41	359.51	12,232.15	5,006.45	-42.81	5,006.63	0.00	0.00	0.00
17,500.00	90.41	359.51	12,231.44	5,106.45	-43.67	5,106.63	0.00	0.00	0.00
17,600.00	90.41	359.51	12,230.73	5,206.44	-44.52	5,206.63	0.00	0.00	0.00
17,700.00	90.41	359.51	12,230.02	5,306.43	-45.38	5,306.63	0.00	0.00	0.00
17,800.00	90.41	359.51	12,229.31	5,406.43	-46.24	5,406.62	0.00	0.00	0.00
17,900.00	90.41	359.51	12,228.60	5,506.42	-47.09	5,506.62	0.00	0.00	0.00
18,000.00	90.41	359.51	12,227.90	5,606.41	-47.95	5,606.62	0.00	0.00	0.00
18,100.00	90.41	359.51	12,227.19	5,706.41	-48.81	5,706.62	0.00	0.00	0.00
18,200.00	90.41	359.51	12,226.48	5,806.40	-49.66	5,806.61	0.00	0.00	0.00
18,300.00	90.41	359.51	12,225.77	5,906.40	-50.52	5,906.61	0.00	0.00	0.00
18,400.00	90.41	359.51	12,225.06	6,006.39	-51.37	6,006.61	0.00	0.00	0.00
18,500.00	90.41	359.51	12,224.35	6,106.38	-52.23	6,106.61	0.00	0.00	0.00
18,600.00	90.41	359.51	12,223.65	6,206.38	-53.09	6,206.60	0.00	0.00	0.00
18,700.00	90.41	359.51	12,222.94	6,306.37	-53.94	6,306.60	0.00	0.00	0.00
18,800.00	90.41	359.51	12,222.23	6,406.36	-54.80	6,406.60	0.00	0.00	0.00
18,900.00	90.41	359.51	12,221.52	6,506.36	-55.65	6,506.60	0.00	0.00	0.00
19,000.00	90.41	359.51	12,220.81	6,606.35	-56.51	6,606.59	0.00	0.00	0.00
19,100.00	90.41	359.51	12,220.10	6,706.35	-57.37	6,706.59	0.00	0.00	0.00
19,200.00	90.41	359.51	12,219.40	6,806.34	-58.22	6,806.59	0.00	0.00	0.00
19,300.00	90.41	359.51	12,218.69	6,906.33	-59.08	6,906.59	0.00	0.00	0.00
19,400.00	90.41	359.51	12,217.98	7,006.33	-59.94	7,006.58	0.00	0.00	0.00
19,500.00	90.41	359.51	12,217.27	7,106.32	-60.79	7,106.58	0.00	0.00	0.00
19,600.00	90.41	359.51	12,216.56	7,206.32	-61.65	7,206.58	0.00	0.00	0.00
19,700.00	90.41	359.51	12,215.85	7,306.31	-62.50	7,306.58	0.00	0.00	0.00
19,800.00	90.41	359.51	12,215.15	7,406.30	-63.36	7,406.57	0.00	0.00	0.00
19,900.00	90.41	359.51	12,214.44	7,506.30	-64.22	7,506.57	0.00	0.00	0.00
20,000.00	90.41	359.51	12,213.73	7,606.29	-65.07	7,606.57	0.00	0.00	0.00
20,100.00	90.41	359.51	12,213.02	7,706.28	-65.93	7,706.57	0.00	0.00	0.00
20,200.00	90.41	359.51	12,212.31	7,806.28	-66.78	7,806.56	0.00	0.00	0.00
20,300.00	90.41	359.51	12,211.60	7,906.27	-67.64	7,906.56	0.00	0.00	0.00
20,400.00	90.41	359.51	12,210.90	8,006.27	-68.50	8,006.56	0.00	0.00	0.00
20,500.00	90.41	359.51	12,210.19	8,106.26	-69.35	8,106.56	0.00	0.00	0.00
20,600.00	90.41	359.51	12,209.48	8,206.25	-70.21	8,206.55	0.00	0.00	0.00
20,700.00	90.41	359.51	12,208.77	8,306.25	-71.07	8,306.55	0.00	0.00	0.00
20,800.00	90.41	359.51	12,208.06	8,406.24	-71.92	8,406.55	0.00	0.00	0.00
20,900.00	90.41	359.51	12,207.35	8,506.24	-72.78	8,506.55	0.00	0.00	0.00
21,000.00	90.41	359.51	12,206.65	8,606.23	-73.63	8,606.54	0.00	0.00	0.00
21,100.00	90.41	359.51	12,205.94	8,706.22	-74.49	8,706.54	0.00	0.00	0.00
21,200.00	90.41	359.51	12,205.23	8,806.22	-75.35	8,806.54	0.00	0.00	0.00
21,300.00	90.41	359.51	12,204.52	8,906.21	-76.20	8,906.54	0.00	0.00	0.00
21,400.00	90.41	359.51	12,203.81	9,006.20	-77.06	9,006.53	0.00	0.00	0.00
21,500.00	90.41	359.51	12,203.10	9,106.20	-77.91	9,106.53	0.00	0.00	0.00
21,600.00	90.41	359.51	12,202.40	9,206.19	-78.77	9,206.53	0.00	0.00	0.00
21,700.00	90.41	359.51	12,201.69	9,306.19	-79.63	9,306.53	0.00	0.00	0.00
21,800.00	90.41	359.51	12,200.98	9,406.18	-80.48	9,406.52	0.00	0.00	0.00
21,900.00	90.41	359.51	12,200.27	9,506.17	-81.34	9,506.52	0.00	0.00	0.00
22,000.00	90.41	359.51	12,199.56	9,606.17	-82.20	9,606.52	0.00	0.00	0.00
22,100.00	90.41	359.51	12,198.85	9,706.16	-83.05	9,706.52	0.00	0.00	0.00
22,200.00	90.41	359.51	12,198.14	9,806.15	-83.91	9,806.51	0.00	0.00	0.00
22,300.00	90.41	359.51	12,197.44	9,906.15	-84.76	9,906.51	0.00	0.00	0.00
22,400.00	90.41	359.51	12,196.73	10,006.14	-85.62	10,006.51	0.00	0.00	0.00
22,500.00	90.41	359.51	12,196.02	10,106.14	-86.48	10,106.51	0.00	0.00	0.00
22,502.76	90.41	359.51	12,196.00	10,108.90	-86.50	10,109.27	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 604H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3179.80usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3179.80usft (McVay 8)
Site:	Tin Foil Federal Com	**North Reference:**	Grid
Well:	604H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 08-02-19		

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)
TD at 22502.76									

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
BHL - Tin Foil Fed Com - plan hits target center - Point	0.00	0.00	12,196.00	10,108.90	-86.50	415,120.00	808,469.00	32° 8' 14.490302 N	103° 20' 12.438491 W
LTP - Tin Foil Fed Com - plan misses target center by 0.03usft at 22452.76usft MD (12196.35 TVD, 10058.90 N, -86.07 E) - Point	0.00	0.00	12,196.35	10,058.90	-86.10	415,070.00	808,469.40	32° 8' 13.995515 N	103° 20' 12.439219 W
FTP - Tin Foil Fed Com - plan misses target center by 202.99usft at 12200.00usft MD (12121.36 TVD, -157.58 N, 1.40 E) - Point	0.00	0.00	12,266.00	-300.00	2.60	404,711.10	808,558.10	32° 6' 31.485654 N	103° 20' 12.521923 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,500.00	2,500.00	0.00	0.00	KOP, Begin 2.00°/100' Build
2,900.00	2,898.70	-27.88	0.24	Hold 8.00° Inc at 179.50° Azm
5,014.00	4,992.13	-322.08	2.81	Begin 2.00°/100' Drop
5,414.00	5,390.83	-349.96	3.05	Begin Vertical Hold
11,716.23	11,693.06	-349.96	3.05	KOP2, Begin 10.00°/100' Build
12,620.29	12,266.00	227.04	-1.89	LP, Hold 90.41° Inc at 359.51° Azm
22,502.76	12,196.00	10,108.90	-86.50	TD at 22502.76

CONCHO

Project: Lea County, NM (NAD27 NME)
Site: Tin Foil Federal Com
Well: 604H
Wellbore: OH
Design: Plan 1 08-02-19
Rig: McVay 8

PHOENIX TECHNOLOGY SERVICES

Azimuths to Grid North
True North: -0.53°
Magnetic North: 6.02°

Magnetic Field
Strength: 47714.2nT
Dip Angle: 59.72°
Date: 9/25/2019
Model: MVHD

KB @ 3179.80usft (McVay 8)
Ground Level 3153.80

WELL DETAILS

3153.80

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	405011.10	808555.50	32° 6' 34.454410 N	103° 20' 12.519903 W

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
BHL - Tin Foil Fed Com 604H	12196.00	10108.90	-86.50	415120.00	808469.00	32° 8' 14.490302 N	103° 20' 12.438491 W
LTP - Tin Foil Fed Com 604H	12196.35	10058.90	-86.10	415070.00	808469.40	32° 8' 13.995515 N	103° 20' 12.439219 W
FTP - Tin Foil Fed Com 604H	12266.00	-300.00	2.60	404711.10	808558.10	32° 6' 31.485653 N	103° 20' 12.521923 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	2500.00	0.00	0.00	2500.00	0.00	0.00	0.00	0.00	0.00		KOP, Begin 2.00°/100' Build
3	2900.00	8.00	179.50	2898.70	-27.88	0.24	2.00	179.50	-27.88		Hold 8.00° Inc at 179.50° Azm
4	5014.00	8.00	179.50	4992.13	-322.08	2.81	0.00	0.00	-322.09		Begin 2.00°/100' Drop
5	5414.00	0.00	0.00	5390.83	-349.96	3.05	2.00	180.00	-349.97		Begin Vertical Hold
6	11718.23	0.00	0.00	11693.06	-349.96	3.05	0.00	0.00	-349.97		KOP2, Begin 10.00°/100' Build
7	12620.29	90.41	359.51	12266.00	227.04	-1.89	10.00	359.51	227.04		LP, Hold 90.41° Inc at 359.51° Azm
8	22502.76	90.41	359.51	12196.00	10108.90	-88.50	0.00	0.00	10109.27	BHL - Tin Foil Fed Com 604H	TD at 22502.76

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

Local Origin: Well 604H, Grid North

Latitude: 32° 6' 34.454410 N
Longitude: 103° 20' 12.519903 W

Grid East: 808555.50
Grid North: 405011.10
Scale Factor: 1.000

Geomagnetic Model: MVHD
Sample Date: 25-Sep-19
Magnetic Declination: 6.55°
Dip Angle from Horizontal: 59.72°
Magnetic Field Strength: 47714.15608497nT

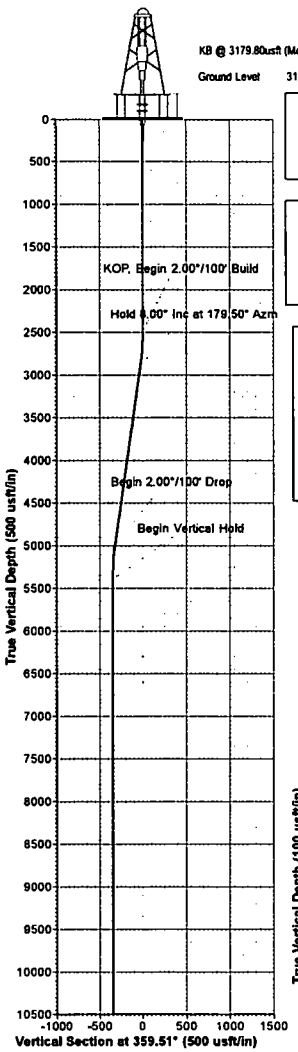
To convert a Magnetic Direction to a Grid Direction, Add 6.02°
To convert a Magnetic Direction to a True Direction, Add 6.55° East
To convert a True Direction to a Grid Direction, Subtract 0.53°

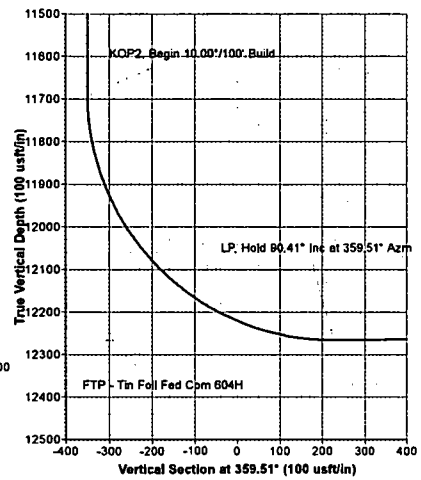
FORMATION TOP DETAILS

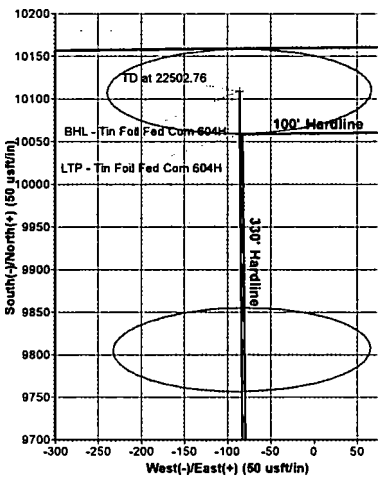
No formation data is available

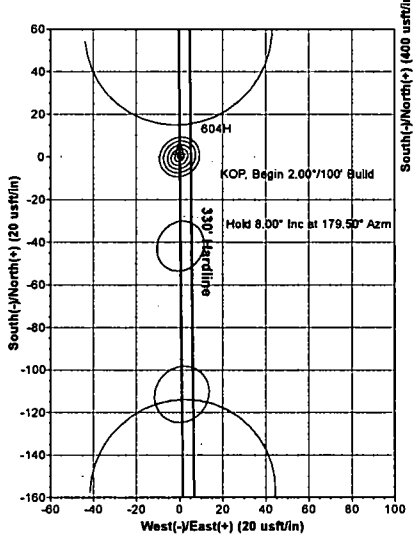
LEGEND

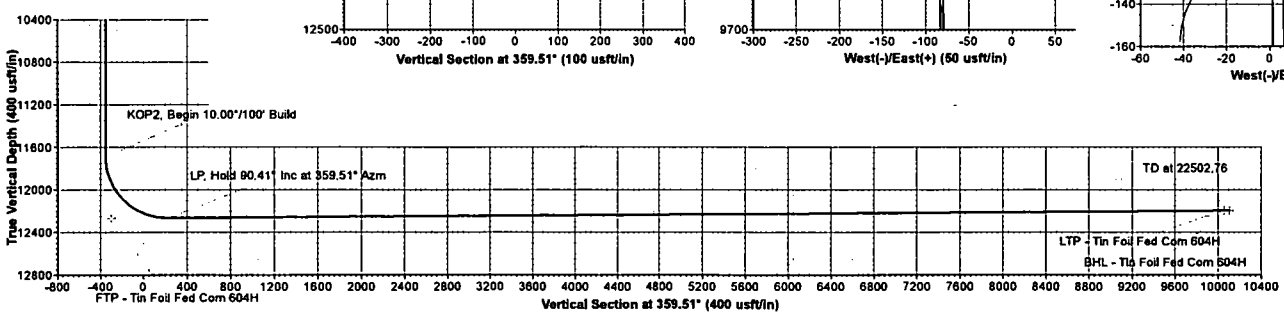
1H, OH, Surveys V0
Plan 1 08-02-19

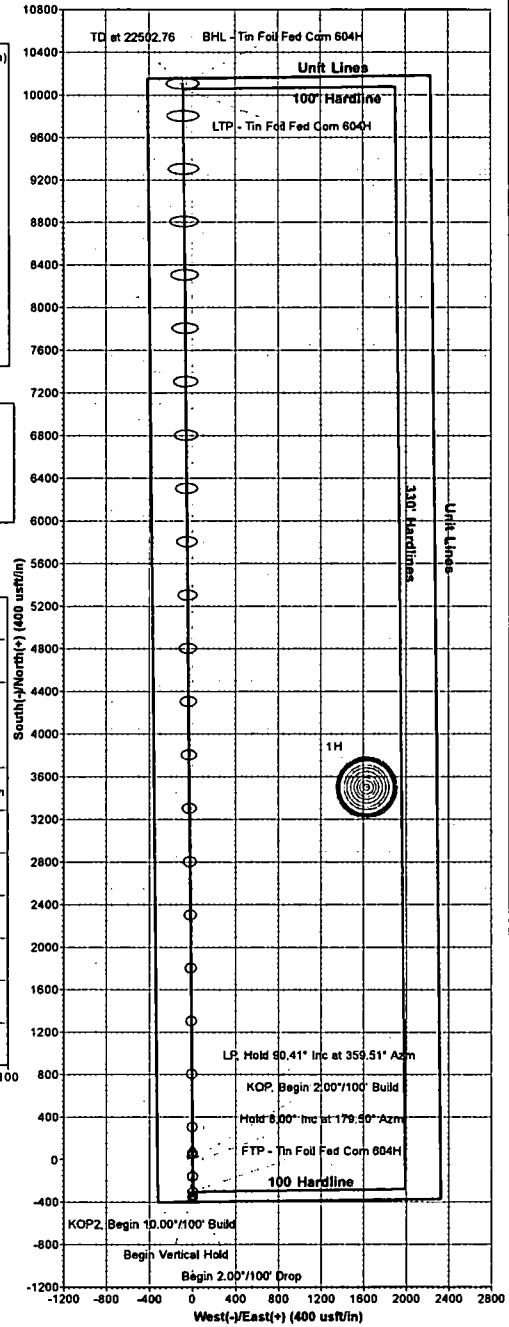












Created By: Sherman Sholars Date: 9:40, August 02 2019

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

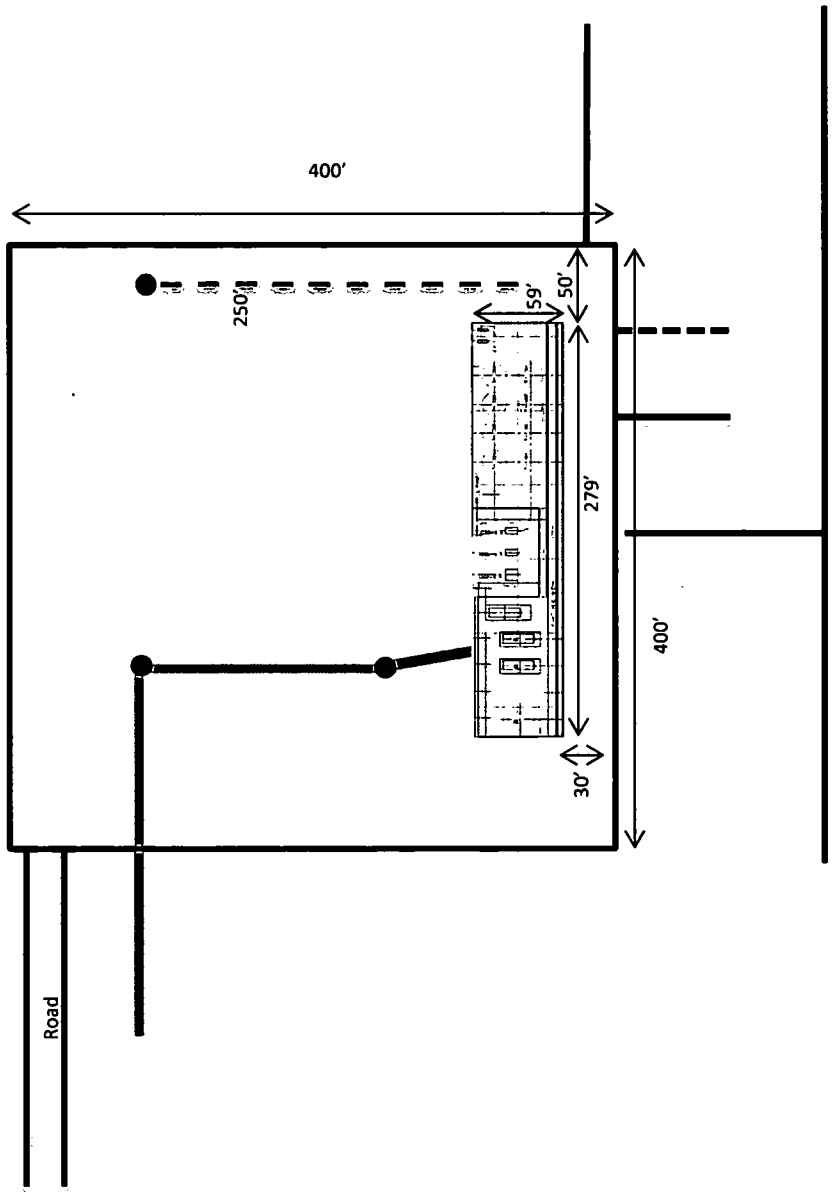
EMERGENCY CALL LIST

	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

Tin Foil Federal 23 M CTB - Facility Layout



Key

- Area To Reclaim
- Flowline ROW
- Wellhead
- Flowline Pivot Point
- Flare
- Flare Line
- Offsite GL Facility
- Oil Pipeline
- Water Pipeline
- Gas Pipeline
- Overhead Power