

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING LLC.
LEASE NO.:	NMNM014164
WELL NAME & NO.:	702H-FASCINATOR FEDERAL COM
SURFACE HOLE FOOTAGE:	210'/N & 2100'/W
BOTTOM HOLE FOOTAGE:	200'/S & 1930'/W
LOCATION:	Section. 30., T24S., R.35E., NMP
COUNTY:	LEA County, New Mexico

Potash	☒ None	☐ Secretary	☐ R-111-P
Cave/Karst Potential	☒ Low	☐ Medium	☐ High
Variance	☐ None	☒ Flex Hose	☐ Other
Wellhead	☒ Conventional	☐ Multibowl	
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP

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 13 3/8 inch surface casing shall be set at approximately **1145** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
 - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength,

whichever is greater.

- d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9 5/8** inch intermediate casing is:

Operator has proposed a DV tool at a depth of **5440'**, 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.
 - a. 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 second stage cement job.
 - b. Second stage above DV tool:
 - Cement to surface. If cement does not circulate, contact the appropriate BLM office.
3. The minimum required fill of cement behind the **5 1/2** inch production casing is:
 - Cement should tie-back at least **200** feet into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8** inch 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 REQUIREMENT(S)

Communitization Agreement

- The operator will 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.

- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

MHH 08042018

GENERAL REQUIREMENTS

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

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

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

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

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

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

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

A. CASING

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

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. Operator shall perform the intermediate casing integrity test to 70% of the casing burst. This will test the multi-bowl seals.
 - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the

plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

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

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I. GENERAL PROVISIONS

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

II. PERMIT EXPIRATION

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

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

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

IV. NOXIOUS WEEDS

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

V. SPECIAL REQUIREMENT(S)

Hydrology

The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling. A leak detection plan will be submitted to the BLM Carlsbad Field Office for approval prior to pipeline installation. The method could incorporate gauges to detect pressure drops, siting valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

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

B. TOPSOIL

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

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

G. ON LEASE ACCESS ROADS

Road Width

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

Surfacing

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

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

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

Crowning

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

Ditching

Ditching shall be required on both sides of the road.

Turnouts

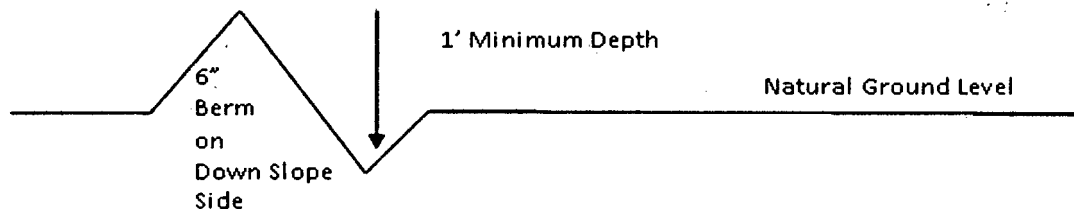
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Cattle guards

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

Fence Requirement

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

Public Access

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

Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

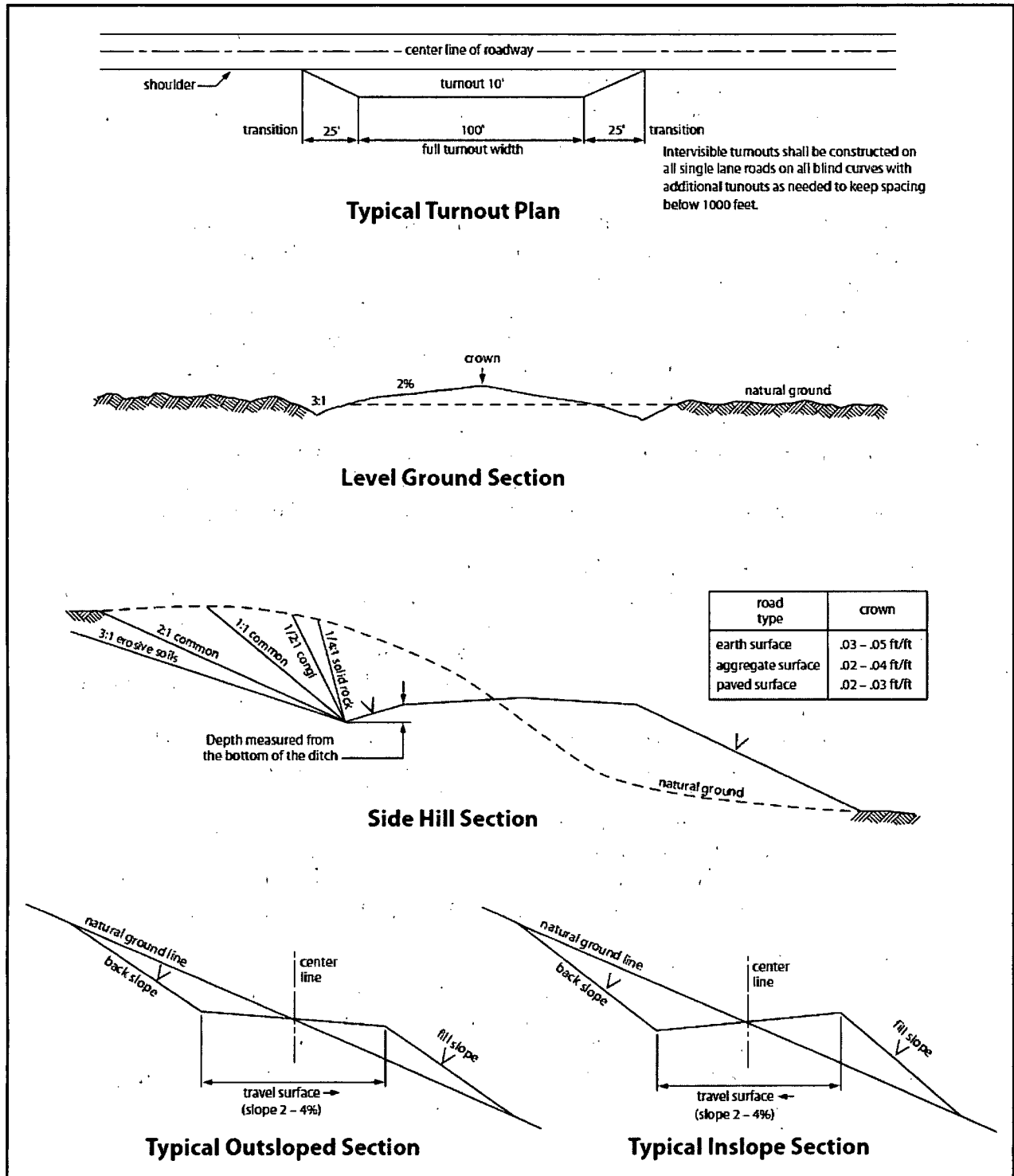


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

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

Exclosure Netting (Open-top Tanks)

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

Chemical and Fuel Secondary Containment and Exclosure Screening

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

Open-Vent Exhaust Stack Exclosures

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

Containment Structures

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

Painting Requirement

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

VIII. INTERIM RECLAMATION

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

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

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

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

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

IX. FINAL ABANDONMENT & RECLAMATION

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

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

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

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

Seed Mixture 3, for Shallow Sites

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

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

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

<u>Species</u>	<u>lb/acre</u>
Plains Bristlegrass (<i>Setaria macrostachya</i>)	1.0
Green Sprangletop (<i>Leptochloa dubia</i>)	2.0
Sideoats Grama (<i>Bouteloua curtipendula</i>)	5.0

*Pounds of pure live seed:

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



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

Operator Certification Data Report

08/07/2018

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: 03/22/2018

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

Field Representative

Representative Name: Rand French

Street Address: 2208 West Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6940

Email address: rfrench@concho.com

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 (H₂S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H₂S 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 H₂S 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. H₂S SAFETY EQUIPMENT AND SYSTEMS

Note: All H₂S 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 H₂S 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

	<u>OFFICE</u>	<u>MOBILE</u>
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

	<u>OFFICE</u>
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



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Lea County, NM (NAD27 NME)

Fascinator Fed Com

702H

OH

Plan 1 02-21-18

Anticollision Report

21 February, 2018



Company:	C&G Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Reference	Plan 1 02-21-18
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.00 u
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Major Axis
Casing Method:	Not applied

Survey Tool Program		Date	2/21/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	12,242.47	Plan 1 02-21-18 (OH)	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
12,242.47	22,827.23	Plan 1 02-21-18 (OH)	MWD+IFR1+MS	OWSG Rev. 2 MWD + IFR1 + Multi-Station Corr	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Fascinator Fed Com						
601H - OH - Plan 1 02-21-18	2,586.56	2,587.12	30.02	23.43	4.557 CC	
601H - OH - Plan 1 02-21-18	2,600.00	2,600.56	30.03	23.42	4.549 ES	
601H - OH - Plan 1 02-21-18	22,827.23	22,296.82	250.80	83.19	1.496 Level 3, SF	
701H - OH - Plan 1 02-21-18	2,500.00	2,499.00	60.00	53.55	9.300 CC, ES	
701H - OH - Plan 1 02-21-18	22,827.23	22,726.87	392.85	222.97	2.312 SF	

Offset Design											
Fascinator Fed Com - 601H - OH - Plan 1 02-21-18											
Survey Program: D-Scientific Keeper, 11992-MWD+IFR1+MS											
Offset Site Error: 0.00 usft											
Offset Well Error: 0.00 usft											
Reference Measured Depth (usft)	Offset Measured Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	89.43	0.30	30.10	30.10				
100.00	100.00	100.00	100.00	89.43	0.30	30.10	30.10	29.97	0.13	227.382	
200.00	200.00	200.00	200.00	89.43	0.30	30.10	30.10	29.71	0.39	76.973	
300.00	300.00	300.00	300.00	89.43	0.30	30.10	30.10	29.45	0.65	46.044	
400.00	400.00	400.00	400.00	89.43	0.30	30.10	30.10	29.18	0.92	32.826	
500.00	500.00	500.00	500.00	89.43	0.30	30.10	30.10	28.92	1.18	25.500	
600.00	600.00	600.00	600.00	89.43	0.30	30.10	30.10	28.66	1.44	20.846	
700.00	700.00	700.00	700.00	89.43	0.30	30.10	30.10	28.39	1.71	17.628	
800.00	800.00	800.00	800.00	89.43	0.30	30.10	30.10	28.13	1.97	15.271	
900.00	900.00	900.00	900.00	89.43	0.30	30.10	30.10	27.87	2.23	13.469	
1,000.00	1,000.00	1,000.00	1,000.00	89.43	0.30	30.10	30.10	27.60	2.50	12.048	
1,100.00	1,100.00	1,100.00	1,100.00	89.43	0.30	30.10	30.10	27.34	2.76	10.898	
1,200.00	1,200.00	1,200.00	1,200.00	89.43	0.30	30.10	30.10	27.08	3.03	9.949	
1,300.00	1,300.00	1,300.00	1,300.00	89.43	0.30	30.10	30.10	26.81	3.29	9.151	
1,400.00	1,400.00	1,400.00	1,400.00	89.43	0.30	30.10	30.10	26.55	3.55	8.472	
1,500.00	1,500.00	1,500.00	1,500.00	89.43	0.30	30.10	30.10	26.28	3.82	7.887	
1,600.00	1,600.00	1,600.00	1,600.00	89.43	0.30	30.10	30.10	26.02	4.08	7.377	
1,700.00	1,700.00	1,700.00	1,700.00	89.43	0.30	30.10	30.10	25.76	4.34	6.929	
1,800.00	1,800.00	1,800.00	1,800.00	89.43	0.30	30.10	30.10	25.49	4.61	6.533	
1,900.00	1,900.00	1,900.00	1,900.00	89.43	0.30	30.10	30.10	25.23	4.87	6.179	
2,000.00	2,000.00	2,000.00	2,000.00	89.43	0.30	30.10	30.10	24.97	5.14	5.862	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design: Fascinator Fed Com - 601H - OH - Plan 1 02-21-18													Offset Site Error:	0.00 usft
Survey Program: Scientific Keeper 11992-MWD+IFR1+MS													Offset Well Error:	0.00 usft
Reference														
Semi Major Axis														
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/S (usft)	+E/W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
2,100.00	2,100.00	2,100.00	2,100.00	2.70	2.70	89.43	0.30	30.10	30.10	24.70	5.40	5.576		
2,200.00	2,200.00	2,200.00	2,200.00	2.83	2.83	89.43	0.30	30.10	30.10	24.44	5.66	5.316		
2,300.00	2,300.00	2,300.00	2,300.00	2.96	2.96	89.43	0.30	30.10	30.10	24.18	5.93	5.080		
2,400.00	2,400.00	2,400.00	2,400.00	3.09	3.09	89.43	0.30	30.10	30.10	23.91	6.19	4.863		
2,500.00	2,500.00	2,500.00	2,500.00	3.23	3.23	89.43	0.30	30.10	30.10	23.65	6.45	4.664		
2,570.69	2,570.69	2,571.27	2,571.26	3.31	3.27	138.85	-0.20	29.37	30.03	23.45	6.57	4.567		
2,586.56	2,586.55	2,587.12	2,587.11	3.32	3.26	139.75	-0.41	29.06	30.02	23.43	6.59	4.557 CC		
2,600.00	2,599.98	2,600.56	2,600.54	3.34	3.26	140.52	-0.58	28.80	30.03	23.42	6.60	4.549 ES		
2,700.00	2,699.95	2,700.51	2,700.47	3.44	3.25	146.21	-1.90	26.86	30.21	23.52	6.69	4.513		
2,800.00	2,799.92	2,800.47	2,800.40	3.55	3.25	151.77	-3.22	24.92	30.70	23.90	6.80	4.517		
2,900.00	2,899.89	2,900.42	2,900.33	3.65	3.25	157.11	-4.54	22.98	31.46	24.55	6.90	4.557		
3,000.00	2,999.86	3,000.38	3,000.25	3.76	3.26	162.16	-5.86	21.04	32.48	25.46	7.02	4.628		
3,100.00	3,099.83	3,100.33	3,100.18	3.87	3.27	166.86	-7.18	19.10	33.73	26.59	7.14	4.725		
3,200.00	3,199.80	3,200.29	3,200.11	3.98	3.29	171.21	-8.50	17.16	35.20	27.93	7.27	4.844		
3,300.00	3,299.77	3,300.25	3,300.04	4.09	3.31	175.18	-9.82	15.22	36.85	29.45	7.40	4.980		
3,400.00	3,399.74	3,400.20	3,399.96	4.20	3.34	178.80	-11.14	13.28	38.66	31.12	7.54	5.128		
3,500.00	3,499.71	3,500.16	3,499.89	4.32	3.37	-177.92	-12.46	11.35	40.62	32.93	7.69	5.285		
3,600.00	3,599.68	3,600.11	3,599.82	4.43	3.40	-174.95	-13.78	9.41	42.69	34.86	7.84	5.448		
3,700.00	3,699.65	3,700.07	3,699.75	4.55	3.45	-172.26	-15.10	7.47	44.87	36.88	7.99	5.614		
3,800.00	3,799.62	3,800.02	3,799.68	4.66	3.49	-169.82	-16.42	5.53	47.14	38.98	8.15	5.780		
3,900.00	3,899.59	3,899.98	3,899.60	4.78	3.54	-167.61	-17.74	3.59	49.48	41.16	8.32	5.946		
4,000.00	3,999.56	3,999.93	3,999.53	4.90	3.60	-165.60	-19.06	1.65	51.90	43.40	8.49	6.110		
4,100.00	4,099.53	4,099.89	4,099.46	5.02	3.65	-163.78	-20.38	-0.29	54.37	45.70	8.67	6.271		
4,200.00	4,199.50	4,199.84	4,199.39	5.13	3.71	-162.11	-21.70	-2.23	56.89	48.04	8.85	6.428		
4,300.00	4,299.47	4,299.80	4,299.31	5.25	3.78	-160.59	-23.02	-4.17	59.45	50.42	9.03	6.581		
4,400.00	4,399.44	4,399.75	4,399.24	5.37	3.85	-159.19	-24.34	-6.11	62.06	52.83	9.22	6.729		
4,500.00	4,499.41	4,499.71	4,499.17	5.49	3.92	-157.91	-25.66	-8.05	64.69	55.28	9.41	6.872		
4,600.00	4,599.38	4,599.66	4,599.10	5.62	3.99	-156.72	-26.98	-9.99	67.36	57.75	9.61	7.010		
4,700.00	4,699.34	4,699.62	4,699.02	5.74	4.07	-155.63	-28.30	-11.93	70.05	60.25	9.81	7.143		
4,800.00	4,799.31	4,799.57	4,798.95	5.86	4.15	-154.62	-29.62	-13.87	72.77	62.76	10.01	7.271		
4,900.00	4,899.28	4,899.53	4,898.88	5.98	4.23	-153.68	-30.94	-15.81	75.51	65.30	10.21	7.393		
5,000.00	4,999.25	4,999.48	4,998.81	6.10	4.32	-152.81	-32.26	-17.75	78.27	67.85	10.42	7.511		
5,100.00	5,099.22	5,099.44	5,098.73	6.23	4.40	-152.00	-33.58	-19.69	81.04	70.41	10.63	7.624		
5,200.00	5,199.19	5,199.39	5,198.66	6.35	4.49	-151.24	-34.90	-21.63	83.83	72.99	10.84	7.732		
5,300.00	5,299.16	5,299.35	5,298.59	6.47	4.58	-150.53	-36.22	-23.57	86.63	75.58	11.06	7.835		
5,400.00	5,399.13	5,399.30	5,398.52	6.60	4.68	-149.87	-37.54	-25.51	89.45	78.17	11.27	7.935		
5,500.00	5,499.10	5,499.26	5,498.44	6.72	4.77	-149.24	-38.86	-27.45	92.27	80.78	11.49	8.030		
5,600.00	5,599.07	5,599.21	5,598.37	6.84	4.87	-148.65	-40.18	-29.38	95.11	83.40	11.71	8.121		
5,700.00	5,699.04	5,699.17	5,698.30	6.97	4.97	-148.10	-41.50	-31.32	97.96	86.02	11.93	8.208		
5,800.00	5,799.01	5,799.12	5,798.23	7.09	5.07	-147.58	-42.82	-33.26	100.81	88.65	12.16	8.292		
5,900.00	5,898.98	5,899.08	5,898.15	7.22	5.17	-147.09	-44.14	-35.20	103.67	91.29	12.38	8.372		
6,000.00	5,998.95	5,999.03	5,998.08	7.34	5.27	-146.62	-45.46	-37.14	106.55	93.93	12.61	8.449		
6,100.00	6,098.92	6,098.99	6,098.01	7.47	5.37	-146.18	-46.78	-39.08	109.42	96.58	12.84	8.523		
6,200.00	6,198.89	6,198.94	6,197.94	7.59	5.48	-145.76	-48.09	-41.02	112.30	99.24	13.07	8.594		
6,300.00	6,298.86	6,298.90	6,297.87	7.72	5.58	-145.36	-49.41	-42.96	115.19	101.89	13.30	8.662		
6,400.00	6,398.83	6,398.85	6,397.79	7.84	5.69	-144.98	-50.73	-44.90	118.09	104.56	13.53	8.727		
6,500.00	6,498.80	6,498.81	6,497.72	7.97	5.80	-144.62	-52.05	-46.84	120.99	107.22	13.76	8.790		
6,600.00	6,598.77	6,598.76	6,597.65	8.10	5.90	-144.28	-53.37	-48.78	123.89	109.89	14.00	8.850		
6,700.00	6,698.74	6,698.72	6,697.58	8.22	6.01	-143.95	-54.69	-50.72	126.80	112.56	14.23	8.908		
6,800.00	6,798.71	6,798.68	6,797.50	8.35	6.12	-143.63	-56.01	-52.66	129.71	115.24	14.47	8.964		
6,900.00	6,898.67	6,898.63	6,897.43	8.47	6.23	-143.34	-57.33	-54.60	132.62	117.92	14.71	9.017		
7,000.00	6,998.64	6,998.59	6,997.36	8.60	6.35	-143.05	-58.65	-56.54	135.54	120.80	14.95	9.069		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 601H - OH - Plan 1 02-21-18												Offset Site Error:	0.00 usft
Survey/Program: 0-Scientific Keeper: 11992-MWD+IFR1+MS												Offset Well Error:	0.00 usft
Reference Offset Semi Major Axis Distance													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
7,100.00	7,098.61	7,098.54	7,097.29	8.73	6.46	-142.77	-59.97	-58.48	138.47	123.28	15.18	9.119	
7,200.00	7,198.58	7,198.50	7,197.21	8.85	6.57	-142.51	-61.29	-60.42	141.39	125.97	15.42	9.166	
7,300.00	7,298.55	7,298.45	7,297.14	8.98	6.68	-142.26	-62.61	-62.36	144.32	128.65	15.67	9.213	
7,400.00	7,398.52	7,398.41	7,397.07	9.11	6.80	-142.02	-63.93	-64.30	147.25	131.34	15.91	9.257	
7,500.00	7,498.49	7,498.36	7,497.00	9.23	6.91	-141.78	-65.25	-66.24	150.18	134.03	16.15	9.300	
7,600.00	7,598.46	7,598.32	7,596.92	9.36	7.03	-141.56	-66.57	-68.18	153.12	136.73	16.39	9.342	
7,700.00	7,698.43	7,698.27	7,696.85	9.49	7.15	-141.34	-67.89	-70.12	156.06	139.42	16.63	9.382	
7,800.00	7,798.40	7,798.23	7,796.78	9.62	7.26	-141.13	-69.21	-72.05	159.00	142.12	16.88	9.420	
7,900.00	7,898.37	7,898.18	7,896.71	9.74	7.38	-140.93	-70.53	-73.99	161.94	144.82	17.12	9.458	
8,000.00	7,998.34	7,998.14	7,996.63	9.87	7.50	-140.74	-71.85	-75.93	164.88	147.51	17.37	9.494	
8,100.00	8,098.31	8,098.09	8,096.56	10.00	7.61	-140.56	-73.17	-77.87	167.83	150.21	17.61	9.529	
8,200.00	8,198.28	8,198.05	8,196.49	10.13	7.73	-140.38	-74.49	-79.81	170.77	152.92	17.86	9.563	
8,300.00	8,298.25	8,298.00	8,296.42	10.25	7.85	-140.20	-75.81	-81.75	173.72	155.62	18.10	9.596	
8,400.00	8,398.22	8,397.96	8,396.35	10.38	7.97	-140.03	-77.13	-83.69	176.67	158.32	18.35	9.627	
8,500.00	8,498.19	8,497.91	8,496.27	10.51	8.09	-139.87	-78.45	-85.63	179.63	161.03	18.60	9.658	
8,600.00	8,598.16	8,597.87	8,596.20	10.64	8.21	-139.71	-79.77	-87.57	182.58	163.73	18.85	9.688	
8,700.00	8,698.13	8,697.82	8,696.13	10.77	8.33	-139.56	-81.09	-89.51	185.53	166.44	19.09	9.717	
8,800.00	8,798.10	8,797.78	8,796.06	10.89	8.45	-139.41	-82.41	-91.45	188.49	169.15	19.34	9.745	
8,900.00	8,898.07	8,897.73	8,895.98	11.02	8.57	-139.27	-83.73	-93.39	191.45	171.86	19.59	9.772	
9,000.00	8,998.04	8,997.69	8,995.91	11.15	8.69	-139.13	-85.05	-95.33	194.41	174.57	19.84	9.799	
9,100.00	9,098.01	9,097.64	9,095.84	11.28	8.81	-139.00	-86.37	-97.27	197.36	177.28	20.09	9.824	
9,200.00	9,197.97	9,197.60	9,195.77	11.41	8.93	-138.87	-87.69	-99.21	200.33	179.99	20.34	9.849	
9,300.00	9,297.94	9,297.55	9,295.69	11.53	9.05	-138.74	-89.01	-101.15	203.29	182.70	20.59	9.874	
9,400.00	9,397.91	9,397.51	9,395.62	11.66	9.18	-138.62	-90.33	-103.09	206.25	185.41	20.84	9.897	
9,500.00	9,497.88	9,497.46	9,495.55	11.79	9.30	-138.50	-91.65	-105.03	209.21	188.12	21.09	9.920	
9,600.00	9,597.85	9,597.42	9,595.48	11.92	9.42	-138.38	-92.97	-106.97	212.18	190.84	21.34	9.942	
9,700.00	9,697.82	9,697.37	9,695.40	12.05	9.54	-138.27	-94.29	-108.91	215.14	193.55	21.59	9.964	
9,800.00	9,797.79	9,797.33	9,795.33	12.18	9.67	-138.16	-95.61	-110.85	218.11	196.26	21.84	9.985	
9,900.00	9,897.76	9,897.28	9,895.26	12.31	9.79	-138.05	-96.93	-112.78	221.07	198.98	22.10	10.006	
10,000.00	9,997.73	9,997.24	9,995.19	12.43	9.91	-137.95	-98.25	-114.72	224.04	201.70	22.35	10.026	
10,100.00	10,097.70	10,097.20	10,095.11	12.56	10.04	-137.85	-99.57	-116.66	227.01	204.41	22.60	10.045	
10,200.00	10,197.67	10,197.15	10,195.04	12.69	10.16	-137.75	-100.88	-118.60	229.98	207.13	22.85	10.064	
10,300.00	10,297.64	10,297.11	10,294.97	12.82	10.28	-137.65	-102.20	-120.54	232.95	209.85	23.10	10.083	
10,400.00	10,397.61	10,397.06	10,394.90	12.95	10.41	-137.56	-103.52	-122.48	235.92	212.56	23.36	10.101	
10,500.00	10,497.58	10,497.02	10,494.83	13.08	10.53	-137.47	-104.84	-124.42	238.89	215.28	23.61	10.118	
10,600.00	10,597.55	10,596.97	10,594.75	13.21	10.66	-137.38	-106.16	-126.36	241.86	218.00	23.86	10.136	
10,700.00	10,697.52	10,696.93	10,694.68	13.34	10.78	-137.29	-107.48	-128.30	244.83	220.72	24.12	10.152	
10,800.00	10,797.49	10,796.88	10,794.61	13.46	10.91	-137.21	-108.80	-130.24	247.81	223.44	24.37	10.169	
10,900.00	10,897.46	10,896.84	10,894.54	13.59	11.03	-137.12	-110.12	-132.18	250.78	226.16	24.62	10.185	
11,000.00	10,997.43	10,996.79	10,994.46	13.72	11.15	-137.04	-111.44	-134.12	253.75	228.88	24.88	10.200	
11,100.00	11,097.40	11,096.75	11,094.39	13.85	11.28	-136.96	-112.76	-136.06	256.73	231.60	25.13	10.216	
11,200.00	11,197.37	11,196.70	11,194.32	13.98	11.40	-136.89	-114.08	-138.00	259.70	234.32	25.39	10.230	
11,300.00	11,297.34	11,296.66	11,294.25	14.11	11.53	-136.81	-115.40	-139.94	262.68	237.04	25.64	10.245	
11,400.00	11,397.31	11,396.61	11,394.17	14.24	11.66	-136.74	-116.72	-141.88	265.65	239.76	25.89	10.259	
11,500.00	11,497.27	11,496.57	11,494.10	14.37	11.78	-136.67	-118.04	-143.82	268.63	242.48	26.15	10.273	
11,600.00	11,597.24	11,596.52	11,594.03	14.50	11.91	-136.59	-119.36	-145.76	271.60	245.20	26.40	10.287	
11,700.00	11,697.21	11,696.48	11,693.96	14.63	12.03	-136.53	-120.68	-147.70	274.58	247.92	26.66	10.300	
11,800.00	11,797.18	11,796.44	11,793.91	14.76	12.16	-136.46	-122.00	-149.64	277.56	250.64	26.91	10.313	
11,900.00	11,897.15	11,896.41	11,893.87	14.88	12.29	-136.39	-123.32	-151.58	280.54	253.36	27.16	10.326	
11,971.77	11,968.90	11,971.44	11,968.90	14.98	12.13	-137.22	-121.50	-148.90	280.18	253.07	27.11	10.334	
12,000.00	11,997.13	11,996.88	11,994.34	15.01	12.13	-137.30	-121.52	-148.90	280.63	253.49	27.15	10.338	
12,042.47	12,039.59	12,025.00	12,022.44	15.07	12.13	175.33	-122.63	-148.89	282.48	255.28	27.20	10.387	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 601H - OH - Plan 1 02-21-18													Offset Site Error:	0.00 usft
Survey Program: Scientific Keeper, 11992-MWD+IFR1+MS													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	Offset Wellbore Centre E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
12,100.00	12,097.12	12,059.45	12,056.69	15.13	12.13	175.38	-126.24	-148.85	288.40	261.14	27.26	10.578		
12,200.00	12,197.12	12,119.79	12,115.74	15.24	12.14	175.54	-138.47	-148.72	308.67	281.29	27.39	11.271		
12,242.47	12,239.59	12,144.32	12,139.22	15.29	12.15	175.63	-145.55	-148.65	320.92	293.48	27.44	11.695		
12,250.00	12,247.12	12,150.00	12,144.60	15.30	12.15	-3.72	-147.36	-148.63	323.26	295.81	27.45	11.775		
12,275.00	12,272.10	12,162.78	12,156.63	15.30	12.16	-3.62	-151.67	-148.58	330.64	303.16	27.48	12.031		
12,300.00	12,296.98	12,175.00	12,168.03	15.30	12.16	-3.53	-156.09	-148.54	337.50	309.91	27.59	12.233		
12,325.00	12,321.71	12,191.06	12,182.82	15.30	12.16	-3.44	-162.34	-148.47	343.79	316.01	27.78	12.376		
12,350.00	12,346.22	12,200.00	12,190.96	15.31	12.17	-3.37	-166.04	-148.43	349.60	321.54	28.07	12.457		
12,375.00	12,370.43	12,219.25	12,208.24	15.31	12.18	-3.30	-174.50	-148.34	354.73	326.24	28.49	12.451		
12,400.00	12,394.28	12,233.31	12,220.65	15.32	12.18	-3.24	-181.13	-148.27	359.36	330.24	29.11	12.343		
12,425.00	12,417.71	12,250.00	12,235.11	15.33	12.19	-3.19	-189.46	-148.18	363.44	333.43	30.01	12.110		
12,450.00	12,440.65	12,261.39	12,244.81	15.34	12.19	-3.15	-195.43	-148.12	366.93	335.76	31.17	11.770		
12,475.00	12,463.04	12,275.00	12,256.21	15.35	12.20	-3.12	-202.87	-148.04	369.86	337.34	32.52	11.373		
12,500.00	12,484.82	12,289.42	12,268.05	15.36	12.21	-3.09	-211.10	-147.96	372.23	338.24	33.99	10.952		
12,525.00	12,505.92	12,300.00	12,276.57	15.38	12.22	-3.07	-217.36	-147.89	374.04	338.52	35.52	10.530		
12,550.00	12,526.30	12,317.43	12,290.31	15.39	12.23	-3.06	-228.09	-147.78	375.23	338.14	37.10	10.115		
12,575.00	12,545.89	12,331.43	12,301.05	15.41	12.24	-3.05	-237.06	-147.68	375.87	337.19	38.68	9.717		
12,600.00	12,564.64	12,350.00	12,314.89	15.43	12.25	-3.05	-249.45	-147.55	375.99	335.73	40.26	9.338		
12,625.00	12,582.49	12,359.42	12,321.71	15.45	12.26	-3.06	-255.93	-147.48	375.43	333.61	41.82	8.977		
12,650.00	12,599.41	12,375.00	12,332.73	15.47	12.27	-3.07	-266.95	-147.37	374.35	331.01	43.34	8.638		
12,675.00	12,615.34	12,387.42	12,341.25	15.49	12.28	-3.09	-275.99	-147.27	372.69	327.88	44.81	8.317		
12,700.00	12,630.25	12,400.00	12,349.64	15.51	12.29	-3.11	-285.36	-147.17	370.46	324.25	46.22	8.016		
12,725.00	12,644.08	12,415.45	12,359.59	15.53	12.31	-3.14	-297.18	-147.05	367.65	320.10	47.56	7.731		
12,750.00	12,656.80	12,425.00	12,365.56	15.55	12.32	-3.18	-304.64	-146.97	364.33	315.52	48.81	7.464		
12,775.00	12,668.38	12,443.52	12,376.69	15.58	12.34	-3.23	-319.44	-146.81	360.34	310.35	49.99	7.208		
12,800.00	12,678.79	12,457.58	12,384.75	15.60	12.35	-3.28	-330.96	-146.69	355.84	304.77	51.07	6.968		
12,825.00	12,687.99	12,475.00	12,394.26	15.63	12.37	-3.35	-345.55	-146.54	350.81	298.75	52.06	6.739		
12,850.00	12,695.96	12,485.76	12,399.87	15.65	12.38	-3.42	-354.73	-146.44	345.16	292.22	52.93	6.520		
12,875.00	12,702.68	12,500.00	12,406.97	15.67	12.40	-3.50	-367.07	-146.31	338.98	285.28	53.71	6.312		
12,900.00	12,708.13	12,514.03	12,413.60	15.70	12.42	-3.59	-379.43	-146.18	332.26	277.89	54.37	6.111		
12,925.00	12,712.30	12,525.00	12,418.53	15.72	12.44	-3.69	-389.23	-146.08	325.03	270.11	54.91	5.919		
12,950.00	12,715.17	12,542.41	12,425.89	15.74	12.46	-3.82	-405.01	-145.91	317.20	261.85	55.35	5.731		
12,975.00	12,716.74	12,556.66	12,431.48	15.76	12.48	-3.95	-418.11	-145.77	308.86	253.20	55.66	5.549		
12,985.43	12,717.00	12,562.61	12,433.70	15.77	12.49	-4.02	-423.63	-145.72	305.23	249.48	55.75	5.475		
13,000.00	12,717.22	12,575.00	12,438.10	15.78	12.51	-4.08	-435.21	-145.59	300.25	244.47	55.78	5.383		
13,100.00	12,718.69	12,631.14	12,454.21	15.88	12.60	-4.31	-488.96	-145.03	272.52	216.58	55.94	4.872		
13,200.00	12,720.16	12,694.83	12,464.71	15.99	12.72	-4.47	-551.72	-144.37	257.49	201.37	56.12	4.588		
13,300.00	12,721.64	12,773.37	12,467.58	16.13	12.89	-4.50	-630.18	-143.54	254.87	198.54	56.32	4.525		
13,400.00	12,723.11	12,873.37	12,469.10	16.29	13.14	-4.50	-730.16	-142.49	254.83	198.24	56.59	4.503		
13,500.00	12,724.58	12,973.37	12,470.62	16.48	13.42	-4.50	-830.14	-141.43	254.78	197.90	56.89	4.479		
13,600.00	12,726.06	13,073.37	12,472.13	16.69	13.75	-4.50	-930.13	-140.38	254.74	197.51	57.23	4.451		
13,700.00	12,727.53	13,173.37	12,473.65	16.93	14.11	-4.50	-1,030.11	-139.33	254.70	197.08	57.62	4.421		
13,800.00	12,729.00	13,273.37	12,475.17	17.21	14.50	-4.50	-1,130.09	-138.27	254.65	196.61	58.04	4.388		
13,900.00	12,730.48	13,373.37	12,476.68	17.52	14.92	-4.51	-1,230.07	-137.22	254.61	196.11	58.50	4.352		
14,000.00	12,731.95	13,473.37	12,478.20	17.86	15.37	-4.51	-1,330.06	-136.16	254.57	195.56	59.00	4.314		
14,100.00	12,733.42	13,573.37	12,479.72	18.24	15.85	-4.51	-1,430.04	-135.11	254.52	194.98	59.54	4.275		
14,200.00	12,734.90	13,673.37	12,481.23	18.65	16.35	-4.51	-1,530.02	-134.06	254.48	194.36	60.12	4.233		
14,300.00	12,736.37	13,773.37	12,482.75	19.09	16.86	-4.51	-1,630.01	-133.00	254.44	193.71	60.73	4.190		
14,400.00	12,737.84	13,873.37	12,484.26	19.56	17.40	-4.51	-1,729.99	-131.95	254.40	193.02	61.37	4.145		
14,500.00	12,739.32	13,973.37	12,485.78	20.06	17.96	-4.51	-1,829.97	-130.90	254.35	192.30	62.05	4.099		
14,600.00	12,740.79	14,073.37	12,487.30	20.59	18.53	-4.51	-1,929.95	-129.84	254.31	191.55	62.76	4.052		
14,700.00	12,742.26	14,173.37	12,488.81	21.14	19.11	-4.51	-2,029.94	-128.79	254.27	190.77	63.50	4.004		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 601H - OH - Plan 1 02-21-18												Offset Site Error
Survey Program: Scientific Keeper 11992-MWD-HFR1+MS												0.00 usft
Reference Offset Semi Major Axis												Offset Well Error
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Warning
14,800.00	12,743.74	14,273.37	12,490.33	21.70	19.71	-4.51	-2,129.92	-127.74	254.22	189.96	64.27	3.956
14,900.00	12,745.21	14,373.37	12,491.85	22.29	20.32	-4.51	-2,229.90	-126.68	254.18	189.11	65.07	3.907
15,000.00	12,746.68	14,473.37	12,493.36	22.89	20.94	-4.51	-2,329.89	-125.63	254.14	188.25	65.89	3.857
15,100.00	12,748.16	14,573.37	12,494.88	23.50	21.57	-4.51	-2,429.87	-124.57	254.09	187.35	66.75	3.807
15,200.00	12,749.63	14,673.37	12,496.40	24.13	22.20	-4.52	-2,529.85	-123.52	254.05	186.43	67.62	3.757
15,300.00	12,751.10	14,773.37	12,497.91	24.77	22.85	-4.52	-2,629.84	-122.47	254.01	185.48	68.53	3.707
15,400.00	12,752.58	14,873.37	12,499.43	25.41	23.50	-4.52	-2,729.82	-121.41	253.97	184.51	69.45	3.657
15,500.00	12,754.05	14,973.37	12,500.95	26.07	24.16	-4.52	-2,829.80	-120.36	253.92	183.52	70.40	3.607
15,600.00	12,755.52	15,073.37	12,502.46	26.73	24.83	-4.52	-2,929.78	-119.31	253.88	182.50	71.38	3.557
15,700.00	12,757.00	15,173.37	12,503.98	27.40	25.50	-4.52	-3,029.77	-118.25	253.84	181.47	72.37	3.508
15,800.00	12,758.47	15,273.37	12,505.49	28.08	26.18	-4.52	-3,129.75	-117.20	253.79	180.41	73.38	3.459
15,900.00	12,759.94	15,373.37	12,507.01	28.76	26.86	-4.52	-3,229.73	-116.15	253.75	179.34	74.41	3.410
16,000.00	12,761.42	15,473.37	12,508.53	29.45	27.54	-4.52	-3,329.72	-115.09	253.71	178.24	75.47	3.362
16,100.00	12,762.89	15,573.37	12,510.04	30.14	28.24	-4.52	-3,429.70	-114.04	253.66	177.13	76.53	3.314
16,200.00	12,764.36	15,673.37	12,511.56	30.84	28.93	-4.52	-3,529.68	-112.99	253.62	176.00	77.62	3.267
16,300.00	12,765.84	15,773.37	12,513.08	31.54	29.63	-4.52	-3,629.66	-111.93	253.58	174.86	78.72	3.221
16,400.00	12,767.31	15,873.37	12,514.59	32.24	30.33	-4.52	-3,729.65	-110.88	253.54	173.70	79.84	3.176
16,500.00	12,768.78	15,973.37	12,516.11	32.95	31.03	-4.53	-3,829.63	-109.82	253.49	172.52	80.97	3.131
16,600.00	12,770.26	16,073.37	12,517.63	33.66	31.74	-4.53	-3,929.61	-108.77	253.45	171.33	82.12	3.086
16,700.00	12,771.73	16,173.37	12,519.14	34.37	32.45	-4.53	-4,029.60	-107.72	253.41	170.13	83.28	3.043
16,800.00	12,773.20	16,273.37	12,520.66	35.08	33.16	-4.53	-4,129.58	-106.66	253.36	168.91	84.46	3.000
16,900.00	12,774.68	16,373.37	12,522.18	35.80	33.87	-4.53	-4,229.56	-105.61	253.32	167.68	85.64	2.958
17,000.00	12,776.15	16,473.37	12,523.69	36.52	34.59	-4.53	-4,329.55	-104.56	253.28	166.44	86.84	2.917
17,100.00	12,777.62	16,573.37	12,525.21	37.24	35.31	-4.53	-4,429.53	-103.50	253.23	165.18	88.05	2.876
17,200.00	12,779.10	16,673.37	12,526.72	37.97	36.03	-4.53	-4,529.51	-102.45	253.19	163.92	89.27	2.836
17,300.00	12,780.57	16,773.37	12,528.24	38.69	36.75	-4.53	-4,629.49	-101.40	253.15	162.64	90.51	2.797
17,400.00	12,782.04	16,873.37	12,529.76	39.42	37.48	-4.53	-4,729.48	-100.34	253.11	161.36	91.75	2.759
17,500.00	12,783.52	16,973.37	12,531.27	40.15	38.20	-4.53	-4,829.46	-99.29	253.06	160.06	93.00	2.721
17,600.00	12,784.99	17,073.37	12,532.79	40.88	38.93	-4.53	-4,929.44	-98.23	253.02	158.75	94.26	2.684
17,700.00	12,786.46	17,173.37	12,534.31	41.61	39.66	-4.53	-5,029.43	-97.18	252.98	157.44	95.54	2.648
17,800.00	12,787.94	17,273.37	12,535.82	42.34	40.39	-4.54	-5,129.41	-96.13	252.93	156.12	96.82	2.613
17,900.00	12,789.41	17,373.37	12,537.34	43.08	41.12	-4.54	-5,229.39	-95.07	252.89	154.79	98.10	2.578
18,000.00	12,790.88	17,473.37	12,538.86	43.81	41.85	-4.54	-5,329.37	-94.02	252.85	153.45	99.40	2.544
18,100.00	12,792.36	17,573.37	12,540.37	44.55	42.59	-4.54	-5,429.36	-92.97	252.80	152.10	100.71	2.510
18,200.00	12,793.83	17,673.37	12,541.89	45.28	43.32	-4.54	-5,529.34	-91.91	252.76	150.74	102.02	2.478
18,300.00	12,795.30	17,773.37	12,543.41	46.02	44.06	-4.54	-5,629.32	-90.86	252.72	149.38	103.34	2.446
18,400.00	12,796.77	17,873.37	12,544.92	46.76	44.79	-4.54	-5,729.31	-89.81	252.67	148.01	104.66	2.414
18,500.00	12,798.25	17,973.37	12,546.44	47.50	45.53	-4.54	-5,829.29	-88.75	252.63	146.64	106.00	2.383
18,600.00	12,799.72	18,073.37	12,547.95	48.24	46.27	-4.54	-5,929.27	-87.70	252.59	145.25	107.33	2.353
18,700.00	12,801.19	18,173.37	12,549.47	48.98	47.01	-4.54	-6,029.26	-86.64	252.55	143.87	108.68	2.324
18,800.00	12,802.67	18,273.37	12,550.99	49.73	47.75	-4.54	-6,129.24	-85.59	252.50	142.47	110.03	2.295
18,900.00	12,804.14	18,373.37	12,552.50	50.47	48.49	-4.54	-6,229.22	-84.54	252.46	141.07	111.39	2.266
19,000.00	12,805.61	18,473.37	12,554.02	51.21	49.23	-4.54	-6,329.20	-83.48	252.42	139.67	112.75	2.239
19,100.00	12,807.09	18,573.37	12,555.54	51.96	49.97	-4.55	-6,429.19	-82.43	252.37	138.26	114.12	2.212
19,200.00	12,808.56	18,673.37	12,557.05	52.70	50.72	-4.55	-6,529.17	-81.38	252.33	136.84	115.49	2.185
19,300.00	12,810.03	18,773.37	12,558.57	53.45	51.46	-4.55	-6,629.15	-80.32	252.29	135.42	116.87	2.159
19,400.00	12,811.51	18,873.37	12,560.09	54.20	52.20	-4.55	-6,729.14	-79.27	252.24	133.99	118.25	2.133
19,500.00	12,812.98	18,973.37	12,561.60	54.94	52.95	-4.55	-6,829.12	-78.22	252.20	132.56	119.64	2.108
19,600.00	12,814.45	19,073.37	12,563.12	55.69	53.70	-4.55	-6,929.10	-77.16	252.16	131.13	121.03	2.083
19,700.00	12,815.93	19,173.37	12,564.64	56.44	54.44	-4.55	-7,029.08	-76.11	252.12	129.69	122.43	2.059
19,800.00	12,817.40	19,273.37	12,566.15	57.19	55.19	-4.55	-7,129.07	-75.06	252.07	128.25	123.83	2.036
19,900.00	12,818.87	19,373.37	12,567.67	57.93	55.93	-4.55	-7,229.05	-74.00	252.03	126.80	125.23	2.013

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design: Fascinator Fed Com - 601H - OH - Plan 1 02-21-18												Offset Site Error:	0.00 usft
Survey Program: O-Scientific/Keeper 11992-MWD-IFR1-MS												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Reference		Highside	Distance		Minimum		Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)	Offset/Wellbore Centre N/S (usft)	E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor	
20,000.00	12,820.35	19,473.37	12,569.18	58.68	56.68	-4.55	-7,329.03	-72.95	251.99	125.35	126.64	1.990	
20,100.00	12,821.82	19,573.37	12,570.70	59.43	57.43	-4.55	-7,429.02	-71.89	251.94	123.89	128.05	1.968	
20,200.00	12,823.29	19,673.37	12,572.22	60.18	58.18	-4.55	-7,529.00	-70.84	251.90	122.43	129.47	1.946	
20,300.00	12,824.77	19,773.37	12,573.73	60.93	58.93	-4.55	-7,628.98	-69.79	251.86	120.97	130.88	1.924	
20,400.00	12,826.24	19,873.37	12,575.25	61.69	59.68	-4.56	-7,728.97	-68.73	251.81	119.51	132.31	1.903	
20,500.00	12,827.71	19,973.37	12,576.77	62.44	60.43	-4.56	-7,828.95	-67.68	251.77	118.04	133.73	1.883	
20,600.00	12,829.19	20,073.37	12,578.28	63.19	61.18	-4.56	-7,928.93	-66.63	251.73	116.57	135.16	1.862	
20,700.00	12,830.66	20,173.37	12,579.80	63.94	61.93	-4.56	-8,028.91	-65.57	251.69	115.09	136.59	1.843	
20,800.00	12,832.13	20,273.37	12,581.32	64.69	62.68	-4.56	-8,128.90	-64.52	251.64	113.61	138.03	1.823	
20,900.00	12,833.61	20,373.37	12,582.83	65.44	63.43	-4.56	-8,228.88	-63.47	251.60	112.13	139.47	1.804	
21,000.00	12,835.08	20,473.37	12,584.35	66.20	64.18	-4.56	-8,328.86	-62.41	251.56	110.65	140.91	1.785	
21,100.00	12,836.55	20,573.37	12,585.87	66.95	64.93	-4.56	-8,428.85	-61.36	251.51	109.16	142.35	1.767	
21,200.00	12,838.03	20,673.37	12,587.38	67.70	65.68	-4.56	-8,528.83	-60.30	251.47	107.67	143.80	1.749	
21,300.00	12,839.50	20,773.37	12,588.90	68.46	66.44	-4.56	-8,628.81	-59.25	251.43	106.18	145.24	1.731	
21,400.00	12,840.97	20,873.37	12,590.41	69.21	67.19	-4.56	-8,728.79	-58.20	251.38	104.69	146.70	1.714	
21,500.00	12,842.45	20,973.37	12,591.93	69.96	67.94	-4.56	-8,828.78	-57.14	251.34	103.19	148.15	1.697	
21,600.00	12,843.92	21,073.37	12,593.45	70.72	68.70	-4.57	-8,928.76	-56.09	251.30	101.69	149.61	1.680	
21,700.00	12,845.39	21,173.37	12,594.96	71.47	69.45	-4.57	-9,028.74	-55.04	251.26	100.19	151.06	1.663	
21,800.00	12,846.87	21,273.37	12,596.48	72.23	70.20	-4.57	-9,128.73	-53.98	251.21	98.69	152.52	1.647	
21,900.00	12,848.34	21,373.37	12,598.00	72.98	70.96	-4.57	-9,228.71	-52.93	251.17	97.18	153.99	1.631	
22,000.00	12,849.81	21,473.37	12,599.51	73.74	71.71	-4.57	-9,328.69	-51.88	251.13	95.68	155.45	1.615	
22,100.00	12,851.29	21,573.37	12,601.03	74.49	72.47	-4.57	-9,428.68	-50.82	251.08	94.17	156.92	1.600	
22,200.00	12,852.76	21,673.37	12,602.55	75.25	73.22	-4.57	-9,528.66	-49.77	251.04	92.65	158.39	1.585	
22,300.00	12,854.23	21,773.37	12,604.06	76.01	73.97	-4.57	-9,628.64	-48.72	251.00	91.14	159.86	1.570	
22,400.00	12,855.71	21,873.37	12,605.58	76.76	74.73	-4.57	-9,728.62	-47.66	250.95	89.63	161.33	1.556	
22,500.00	12,857.18	21,973.37	12,607.10	77.52	75.48	-4.57	-9,828.61	-46.61	250.91	88.11	162.80	1.541	
22,600.00	12,858.65	22,073.37	12,608.61	78.27	76.24	-4.57	-9,928.59	-45.55	250.87	86.59	164.28	1.527	
22,700.00	12,860.13	22,173.37	12,610.13	79.03	77.00	-4.57	-10,028.57	-44.50	250.83	85.07	165.76	1.513	
22,800.00	12,861.60	22,273.37	12,611.64	79.79	77.75	-4.57	-10,128.56	-43.45	250.78	83.55	167.24	1.500 Level 3	
22,823.56	12,861.95	22,296.82	12,612.00	79.97	77.93	-4.57	-10,152.00	-43.20	250.77	83.19	167.58	1.496 Level 3	
22,827.23	12,862.00	22,296.82	12,612.00	79.99	77.93	-4.57	-10,152.00	-43.20	250.80	83.19	167.61	1.496 Level 3, SF	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 701H - OH - Plan 1 02-21-18												Offset Site Error:	0.00 usft
Survey Program: 10 Scientific Keeper 12141-MWD-IFR13-MS												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	89.52	0.50	60.00	60.01				
100.00	100.00	99.00	99.00	0.07	0.07	89.52	0.50	60.00	60.00	59.87	0.13	455.524	
200.00	200.00	199.00	199.00	0.20	0.19	89.52	0.50	60.00	60.00	59.61	0.39	153.942	
300.00	300.00	299.00	299.00	0.33	0.33	89.52	0.50	60.00	60.00	59.35	0.65	91.966	
400.00	400.00	399.00	399.00	0.46	0.46	89.52	0.50	60.00	60.00	59.09	0.92	65.526	
500.00	500.00	499.00	499.00	0.59	0.59	89.52	0.50	60.00	60.00	58.82	1.18	50.886	
600.00	600.00	599.00	599.00	0.72	0.72	89.52	0.50	60.00	60.00	58.56	1.44	41.591	
700.00	700.00	699.00	699.00	0.85	0.85	89.52	0.50	60.00	60.00	58.30	1.71	35.166	
800.00	800.00	799.00	799.00	0.99	0.98	89.52	0.50	60.00	60.00	58.03	1.97	30.460	
900.00	900.00	899.00	899.00	1.12	1.12	89.52	0.50	60.00	60.00	57.77	2.23	26.865	
1,000.00	1,000.00	999.00	999.00	1.25	1.25	89.52	0.50	60.00	60.00	57.50	2.50	24.029	
1,100.00	1,100.00	1,099.00	1,099.00	1.38	1.38	89.52	0.50	60.00	60.00	57.24	2.76	21.734	
1,200.00	1,200.00	1,199.00	1,199.00	1.51	1.51	89.52	0.50	60.00	60.00	56.98	3.02	19.839	
1,300.00	1,300.00	1,299.00	1,299.00	1.64	1.64	89.52	0.50	60.00	60.00	56.71	3.29	18.248	
1,400.00	1,400.00	1,399.00	1,399.00	1.78	1.78	89.52	0.50	60.00	60.00	56.45	3.55	16.894	
1,500.00	1,500.00	1,499.00	1,499.00	1.91	1.91	89.52	0.50	60.00	60.00	56.19	3.82	15.726	
1,600.00	1,600.00	1,599.00	1,599.00	2.04	2.04	89.52	0.50	60.00	60.00	55.92	4.08	14.710	
1,700.00	1,700.00	1,699.00	1,699.00	2.17	2.17	89.52	0.50	60.00	60.00	55.66	4.34	13.817	
1,800.00	1,800.00	1,799.00	1,799.00	2.30	2.30	89.52	0.50	60.00	60.00	55.40	4.61	13.026	
1,900.00	1,900.00	1,899.00	1,899.00	2.44	2.43	89.52	0.50	60.00	60.00	55.13	4.87	12.321	
2,000.00	2,000.00	1,999.00	1,999.00	2.57	2.57	89.52	0.50	60.00	60.00	54.87	5.13	11.688	
2,100.00	2,100.00	2,099.00	2,099.00	2.70	2.70	89.52	0.50	60.00	60.00	54.60	5.40	11.117	
2,200.00	2,200.00	2,199.00	2,199.00	2.83	2.83	89.52	0.50	60.00	60.00	54.34	5.66	10.599	
2,300.00	2,300.00	2,299.00	2,299.00	2.96	2.96	89.52	0.50	60.00	60.00	54.08	5.92	10.127	
2,400.00	2,400.00	2,399.00	2,399.00	3.09	3.09	89.52	0.50	60.00	60.00	53.81	6.19	9.696	
2,500.00	2,500.00	2,499.00	2,499.00	3.23	3.23	89.52	0.50	60.00	60.00	53.55	6.45	9.300 CC, ES	
2,570.69	2,570.69	2,568.72	2,568.71	3.31	3.31	136.83	1.11	60.56	61.21	54.59	6.62	9.250	
2,600.00	2,599.98	2,598.01	2,597.99	3.34	3.34	136.82	1.61	61.02	62.20	55.53	6.68	9.314	
2,700.00	2,699.95	2,697.95	2,697.91	3.44	3.45	136.81	3.33	62.60	65.60	58.71	6.89	9.523	
2,800.00	2,799.92	2,797.89	2,797.82	3.55	3.56	136.79	5.05	64.18	68.99	61.89	7.10	9.714	
2,900.00	2,899.89	2,897.83	2,897.74	3.65	3.67	136.78	6.77	65.76	72.39	65.07	7.32	9.890	
3,000.00	2,999.86	2,997.78	2,997.65	3.76	3.78	136.76	8.49	67.34	75.78	68.25	7.54	10.052	
3,100.00	3,099.83	3,097.72	3,097.57	3.87	3.89	136.75	10.21	68.92	79.18	71.42	7.76	10.202	
3,200.00	3,199.80	3,197.66	3,197.48	3.98	4.01	136.74	11.93	70.50	82.58	74.59	7.99	10.340	
3,300.00	3,299.77	3,297.60	3,297.40	4.09	4.12	136.73	13.65	72.08	85.97	77.76	8.21	10.468	
3,400.00	3,399.74	3,397.54	3,397.31	4.20	4.24	136.72	15.37	73.66	89.37	80.92	8.44	10.587	
3,500.00	3,499.71	3,497.49	3,497.23	4.32	4.35	136.72	17.09	75.24	92.76	84.09	8.67	10.697	
3,600.00	3,599.68	3,597.43	3,597.14	4.43	4.47	136.71	18.82	76.82	96.16	87.25	8.90	10.800	
3,700.00	3,699.65	3,697.37	3,697.06	4.55	4.59	136.70	20.54	78.40	99.55	90.41	9.14	10.895	
3,800.00	3,799.62	3,797.31	3,796.97	4.66	4.71	136.69	22.26	79.98	102.95	93.57	9.37	10.984	
3,900.00	3,899.59	3,897.26	3,896.89	4.78	4.83	136.69	23.98	81.56	106.34	96.73	9.61	11.067	
4,000.00	3,999.56	3,997.20	3,996.80	4.90	4.95	136.68	25.70	83.14	109.74	99.89	9.85	11.145	
4,100.00	4,099.53	4,097.14	4,096.72	5.02	5.07	136.68	27.42	84.72	113.13	103.05	10.09	11.218	
4,200.00	4,199.50	4,197.08	4,196.63	5.13	5.19	136.67	29.14	86.30	116.53	106.20	10.33	11.286	
4,300.00	4,299.47	4,297.03	4,296.55	5.25	5.31	136.67	30.86	87.88	119.92	109.36	10.57	11.350	
4,400.00	4,399.44	4,396.97	4,396.46	5.37	5.43	136.66	32.58	89.46	123.32	112.51	10.81	11.410	
4,500.00	4,499.41	4,496.91	4,496.38	5.49	5.56	136.66	34.30	91.04	126.71	115.66	11.05	11.467	
4,600.00	4,599.38	4,596.85	4,596.29	5.62	5.68	136.65	36.02	92.62	130.11	118.82	11.29	11.520	
4,700.00	4,699.34	4,696.80	4,696.21	5.74	5.80	136.65	37.74	94.20	133.50	121.97	11.54	11.571	
4,800.00	4,799.31	4,796.74	4,796.12	5.86	5.92	136.64	39.46	95.78	136.90	125.12	11.78	11.618	
4,900.00	4,899.28	4,896.68	4,896.04	5.98	6.05	136.64	41.18	97.36	140.30	128.27	12.03	11.663	
5,000.00	4,999.25	4,996.62	4,995.95	6.10	6.17	136.64	42.90	98.94	143.69	131.42	12.28	11.706	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 701H - OH - Plan 1 02-21-18													Offset Site Error:	0.00 usft
Survey Program: Scientific Keeper 12141-MWD+IFR1+MS													Offset Well Error:	0.00 usft
Reference		Offset		Semi-Major Axis		Distance		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	5,099.22	5,096.56	5,095.87	6.23	6.30	136.63	44.62	100.52	147.09	134.56	12.52	11.746		
5,200.00	5,199.19	5,196.51	5,195.78	6.35	6.42	136.63	46.34	102.11	150.48	137.71	12.77	11.785		
5,300.00	5,299.16	5,296.45	5,295.70	6.47	6.55	136.63	48.06	103.69	153.88	140.86	13.02	11.821		
5,400.00	5,399.13	5,396.39	5,395.61	6.60	6.67	136.63	49.78	105.27	157.27	144.01	13.27	11.856		
5,500.00	5,499.10	5,496.33	5,495.53	6.72	6.80	136.62	51.50	106.85	160.67	147.15	13.51	11.888		
5,600.00	5,599.07	5,596.28	5,595.44	6.84	6.92	136.62	53.22	108.43	164.06	150.30	13.76	11.920		
5,700.00	5,699.04	5,696.22	5,695.36	6.97	7.05	136.62	54.94	110.01	167.46	153.44	14.01	11.950		
5,800.00	5,799.01	5,796.16	5,795.27	7.09	7.17	136.61	56.67	111.59	170.85	156.59	14.26	11.978		
5,900.00	5,898.98	5,896.10	5,895.19	7.22	7.30	136.61	58.39	113.17	174.25	159.73	14.51	12.005		
6,000.00	5,998.95	5,996.05	5,995.10	7.34	7.42	136.61	60.11	114.75	177.64	162.88	14.77	12.031		
6,100.00	6,098.92	6,095.99	6,095.02	7.47	7.55	136.61	61.83	116.33	181.04	166.02	15.02	12.056		
6,200.00	6,198.89	6,195.93	6,194.93	7.59	7.68	136.61	63.55	117.91	184.43	169.17	15.27	12.080		
6,300.00	6,298.86	6,295.87	6,294.85	7.72	7.80	136.60	65.27	119.49	187.83	172.31	15.52	12.102		
6,400.00	6,398.83	6,395.81	6,394.76	7.84	7.93	136.60	66.99	121.07	191.22	175.45	15.77	12.124		
6,500.00	6,498.80	6,495.76	6,494.68	7.97	8.06	136.60	68.71	122.65	194.62	178.60	16.02	12.145		
6,600.00	6,598.77	6,595.70	6,594.59	8.10	8.18	136.60	70.43	124.23	198.02	181.74	16.28	12.165		
6,700.00	6,698.74	6,695.64	6,694.51	8.22	8.31	136.60	72.15	125.81	201.41	184.88	16.53	12.184		
6,800.00	6,798.71	6,795.58	6,794.42	8.35	8.44	136.60	73.87	127.39	204.81	188.02	16.78	12.203		
6,900.00	6,898.67	6,895.53	6,894.34	8.47	8.56	136.59	75.59	128.97	208.20	191.16	17.04	12.221		
7,000.00	6,998.64	6,995.47	6,994.25	8.60	8.69	136.59	77.31	130.55	211.60	194.31	17.29	12.238		
7,100.00	7,098.61	7,095.41	7,094.17	8.73	8.82	136.59	79.03	132.13	214.99	197.45	17.54	12.254		
7,200.00	7,198.58	7,195.35	7,194.08	8.85	8.94	136.59	80.75	133.71	218.39	200.59	17.80	12.270		
7,300.00	7,298.55	7,295.30	7,294.00	8.98	9.07	136.59	82.47	135.29	221.78	203.73	18.05	12.285		
7,400.00	7,398.52	7,395.24	7,393.91	9.11	9.20	136.59	84.19	136.87	225.18	206.87	18.31	12.300		
7,500.00	7,498.49	7,495.18	7,493.83	9.23	9.33	136.58	85.91	138.45	228.57	210.01	18.56	12.314		
7,600.00	7,598.46	7,595.12	7,593.74	9.36	9.46	136.58	87.63	140.03	231.97	213.15	18.82	12.328		
7,700.00	7,698.43	7,695.07	7,693.66	9.49	9.58	136.58	89.35	141.61	235.36	216.29	19.07	12.341		
7,800.00	7,798.40	7,795.01	7,793.57	9.62	9.71	136.58	91.07	143.19	238.76	219.43	19.33	12.354		
7,900.00	7,898.37	7,894.95	7,893.49	9.74	9.84	136.58	92.79	144.77	242.15	222.57	19.58	12.366		
8,000.00	7,998.34	7,994.89	7,993.40	9.87	9.97	136.58	94.52	146.35	245.55	225.71	19.84	12.378		
8,100.00	8,098.31	8,094.83	8,093.32	10.00	10.09	136.58	96.24	147.93	248.94	228.85	20.09	12.389		
8,200.00	8,198.28	8,194.78	8,193.23	10.13	10.22	136.58	97.96	149.51	252.34	231.99	20.35	12.400		
8,300.00	8,298.25	8,294.72	8,293.15	10.25	10.35	136.58	99.68	151.09	255.74	235.13	20.61	12.411		
8,400.00	8,398.22	8,394.66	8,393.06	10.38	10.48	136.57	101.40	152.67	259.13	238.27	20.86	12.422		
8,500.00	8,498.19	8,494.60	8,492.98	10.51	10.61	136.57	103.12	154.25	262.53	241.41	21.12	12.432		
8,600.00	8,598.16	8,594.55	8,592.89	10.64	10.74	136.57	104.84	155.83	265.92	244.55	21.37	12.442		
8,700.00	8,698.13	8,694.49	8,692.81	10.77	10.86	136.57	106.56	157.41	269.32	247.69	21.63	12.451		
8,800.00	8,798.10	8,794.43	8,792.72	10.89	10.99	136.57	108.28	158.99	272.71	250.83	21.89	12.460		
8,900.00	8,898.07	8,894.37	8,892.64	11.02	11.12	136.57	110.00	160.57	276.11	253.96	22.14	12.469		
9,000.00	8,998.04	8,994.32	8,992.55	11.15	11.25	136.57	111.72	162.15	279.50	257.10	22.40	12.478		
9,100.00	9,098.01	9,094.26	9,092.47	11.28	11.38	136.57	113.44	163.73	282.90	260.24	22.66	12.486		
9,200.00	9,197.97	9,194.20	9,192.38	11.41	11.51	136.57	115.16	165.31	286.29	263.38	22.91	12.495		
9,300.00	9,297.94	9,294.14	9,292.30	11.53	11.64	136.57	116.88	166.89	289.69	266.52	23.17	12.502		
9,400.00	9,397.91	9,394.09	9,392.21	11.66	11.76	136.57	118.60	168.47	293.08	269.66	23.43	12.510		
9,500.00	9,497.88	9,494.03	9,492.13	11.79	11.89	136.56	120.32	170.05	296.48	272.79	23.68	12.518		
9,600.00	9,597.85	9,593.97	9,592.04	11.92	12.02	136.56	122.04	171.63	299.87	275.93	23.94	12.525		
9,700.00	9,697.82	9,693.91	9,691.96	12.05	12.15	136.56	123.76	173.21	303.27	279.07	24.20	12.532		
9,800.00	9,797.79	9,793.85	9,791.87	12.18	12.28	136.56	125.48	174.79	306.66	282.21	24.46	12.539		
9,900.00	9,897.76	9,893.80	9,891.79	12.31	12.41	136.56	127.20	176.37	310.06	285.35	24.71	12.546		
10,000.00	9,997.73	9,993.74	9,991.70	12.43	12.54	136.56	128.92	177.95	313.46	288.48	24.97	12.552		
10,100.00	10,097.70	10,093.68	10,091.62	12.56	12.67	136.56	130.64	179.53	316.85	291.62	25.23	12.559		
10,200.00	10,197.67	10,193.62	10,191.53	12.69	12.80	136.56	132.37	181.11	320.25	294.76	25.49	12.565		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design - Fascinator Fed Com - 701H - OH - Plan 1 02-21-18											Offset Site Error:	0.00 usft
Survey Program: 0-Scientific Keeper 12141-MWD+IFR1+MS											Offset Well Error:	0.00 usft
Reference												
Semi-Major Axis												
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(")	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	(usft)	
10,300.00	10,297.64	10,293.57	10,291.45	12.82	12.93	136.56	134.09	182.69	323.64	297.90	25.75	12.571
10,400.00	10,397.61	10,393.51	10,391.36	12.95	13.05	136.56	135.81	184.27	327.04	301.03	26.00	12.577
10,500.00	10,497.58	10,493.45	10,491.28	13.08	13.18	136.56	137.53	185.86	330.43	304.17	26.26	12.583
10,600.00	10,597.55	10,593.39	10,591.19	13.21	13.31	136.56	139.25	187.44	333.83	307.31	26.52	12.588
10,700.00	10,697.52	10,693.34	10,691.11	13.34	13.44	136.56	140.97	189.02	337.22	310.45	26.78	12.594
10,800.00	10,797.49	10,793.28	10,791.02	13.46	13.57	136.56	142.69	190.60	340.62	313.58	27.04	12.599
10,900.00	10,897.46	10,893.22	10,890.94	13.59	13.70	136.55	144.41	192.18	344.01	316.72	27.29	12.604
11,000.00	10,997.43	10,993.16	10,990.85	13.72	13.83	136.55	146.13	193.76	347.41	319.86	27.55	12.609
11,100.00	11,097.40	11,093.11	11,090.77	13.85	13.96	136.55	147.85	195.34	350.80	322.99	27.81	12.614
11,200.00	11,197.37	11,193.05	11,190.68	13.98	14.09	136.55	149.57	196.92	354.20	326.13	28.07	12.619
11,300.00	11,297.34	11,292.99	11,290.60	14.11	14.22	136.55	151.29	198.50	357.59	329.27	28.33	12.624
11,400.00	11,397.31	11,392.93	11,390.51	14.24	14.35	136.55	153.01	200.08	360.99	332.40	28.59	12.628
11,500.00	11,497.27	11,492.87	11,490.43	14.37	14.48	136.55	154.73	201.66	364.39	335.54	28.84	12.633
11,600.00	11,597.24	11,592.82	11,590.34	14.50	14.61	136.55	156.45	203.24	367.78	338.68	29.10	12.637
11,700.00	11,697.21	11,692.76	11,690.26	14.63	14.73	136.55	158.17	204.82	371.18	341.81	29.36	12.642
11,800.00	11,797.18	11,792.70	11,790.17	14.76	14.86	136.55	159.89	206.40	374.57	344.95	29.62	12.646
11,900.00	11,897.15	11,894.48	11,891.93	14.88	15.00	136.56	161.59	207.96	377.92	348.04	29.88	12.648
11,971.77	11,968.90	11,970.46	11,967.90	14.98	15.09	136.71	161.87	208.22	379.45	349.38	30.07	12.621
12,000.00	11,997.13	11,998.68	11,996.13	15.01	15.12	136.77	161.87	208.22	379.85	349.72	30.13	12.605
12,042.47	12,039.59	12,041.15	12,038.59	15.07	15.17	89.47	161.87	208.22	380.08	349.85	30.24	12.571
12,100.00	12,097.12	12,098.68	12,096.12	15.13	15.24	89.47	161.87	208.22	380.08	349.71	30.37	12.516
12,100.54	12,097.66	12,099.21	12,096.66	15.13	15.24	89.47	161.87	208.22	380.08	349.71	30.37	12.516
12,200.00	12,197.12	12,198.34	12,195.65	15.24	15.26	89.99	158.45	208.25	380.10	349.60	30.50	12.462
12,242.47	12,239.59	12,239.62	12,236.37	15.29	15.27	91.00	151.75	208.32	380.24	349.68	30.56	12.444
12,250.00	12,247.12	12,246.82	12,243.40	15.30	15.27	-88.17	150.23	208.34	380.28	349.72	30.57	12.442
12,275.00	12,272.10	12,270.55	12,266.42	15.30	15.27	-87.42	144.44	208.40	380.48	349.87	30.61	12.429
12,300.00	12,296.98	12,294.07	12,288.91	15.30	15.28	-86.68	137.59	208.47	380.74	349.96	30.78	12.369
12,325.00	12,321.71	12,317.36	12,310.83	15.30	15.29	-85.96	129.72	208.55	381.07	349.99	31.08	12.263
12,350.00	12,346.22	12,340.45	12,332.16	15.31	15.30	-85.24	120.88	208.65	381.44	349.95	31.50	12.110
12,375.00	12,370.43	12,363.34	12,352.85	15.31	15.31	-84.54	111.10	208.75	381.87	349.82	32.05	11.914
12,400.00	12,394.28	12,386.05	12,372.89	15.32	15.32	-83.86	100.43	208.86	382.34	349.60	32.75	11.675
12,425.00	12,417.71	12,408.57	12,392.25	15.33	15.33	-83.20	88.92	208.98	382.86	349.28	33.58	11.401
12,450.00	12,440.65	12,430.93	12,410.91	15.34	15.34	-82.56	76.60	209.11	383.41	348.86	34.54	11.099
12,475.00	12,463.04	12,453.13	12,428.85	15.35	15.36	-81.94	63.52	209.25	383.98	348.36	35.62	10.779
12,500.00	12,484.82	12,475.00	12,445.90	15.36	15.37	-81.34	49.84	209.39	384.58	347.78	36.80	10.450
12,525.00	12,505.92	12,497.09	12,462.47	15.38	15.39	-80.76	35.23	209.55	385.20	347.13	38.06	10.120
12,550.00	12,526.30	12,518.87	12,478.13	15.39	15.40	-80.21	20.10	209.71	385.82	346.44	39.38	9.798
12,575.00	12,545.89	12,540.53	12,493.00	15.41	15.42	-79.68	4.36	209.87	386.45	345.72	40.73	9.487
12,600.00	12,564.64	12,562.06	12,507.07	15.43	15.44	-79.18	-11.94	210.04	387.08	344.98	42.11	9.193
12,625.00	12,582.49	12,583.49	12,520.32	15.45	15.45	-78.70	-28.78	210.22	387.70	344.23	43.48	8.918
12,650.00	12,599.41	12,604.82	12,532.75	15.47	15.47	-78.26	-46.11	210.40	388.31	343.48	44.83	8.662
12,675.00	12,615.34	12,625.00	12,543.78	15.49	15.49	-77.86	-63.01	210.58	388.91	342.75	46.16	8.426
12,700.00	12,630.25	12,647.21	12,555.09	15.51	15.51	-77.45	-82.12	210.78	389.47	342.03	47.44	8.210
12,725.00	12,644.08	12,668.28	12,564.98	15.53	15.53	-77.10	-100.72	210.98	390.01	341.34	48.67	8.013
12,750.00	12,656.80	12,689.29	12,574.02	15.55	15.55	-76.77	-119.68	211.18	390.51	340.68	49.84	7.836
12,775.00	12,668.38	12,710.23	12,582.19	15.58	15.57	-76.47	-138.96	211.38	390.98	340.05	50.93	7.677
12,800.00	12,678.79	12,731.11	12,589.49	15.60	15.59	-76.21	-158.52	211.59	391.41	339.46	51.95	7.535
12,825.00	12,687.99	12,750.00	12,595.34	15.63	15.60	-75.99	-176.48	211.77	391.80	338.92	52.88	7.410
12,850.00	12,695.96	12,772.74	12,601.45	15.65	15.62	-75.78	-198.38	212.01	392.13	338.41	53.72	7.300
12,875.00	12,702.68	12,793.49	12,606.10	15.67	15.64	-75.61	-218.60	212.22	392.41	337.95	54.46	7.205
12,900.00	12,708.13	12,814.22	12,609.87	15.70	15.66	-75.47	-238.98	212.43	392.64	337.54	55.10	7.125
12,925.00	12,712.30	12,834.92	12,612.75	15.72	15.68	-75.37	-259.47	212.65	392.82	337.17	55.64	7.060

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design: Fascinator Fed Com - 701H - OH - Plan 1 02-21-18													Offset Site Error:
Survey Program: 10-Scientific Keeper-12141-MWD+IFR1+MS													Offset Well Error:
Reference: Offset Semi Major Axis Distance													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/S (usft)	Offset Wellbore Centre +E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,950.00	12,715.17	12,855.60	12,614.73	15.74	15.69	-75.30	-280.06	212.86	392.94	336.86	56.07	7.007	
12,975.00	12,716.74	12,876.28	12,615.82	15.76	15.71	-75.26	-300.70	213.08	393.00	336.60	56.40	6.968	
12,985.43	12,717.00	12,885.07	12,616.02	15.77	15.72	-75.26	-309.49	213.17	393.01	336.51	56.50	6.956	
13,000.00	12,717.22	12,899.64	12,616.23	15.78	15.73	-75.26	-324.06	213.33	393.01	336.48	56.52	6.953	
13,100.00	12,718.69	12,999.64	12,617.71	15.88	15.81	-75.26	-424.04	214.38	393.01	336.29	56.71	6.930	
13,200.00	12,720.16	13,099.64	12,619.18	15.99	15.92	-75.26	-524.03	215.43	393.00	336.06	56.95	6.901	
13,300.00	12,721.64	13,199.64	12,620.65	16.13	16.04	-75.26	-624.01	216.48	393.00	335.78	57.22	6.868	
13,400.00	12,723.11	13,299.64	12,622.12	16.29	16.19	-75.26	-723.99	217.54	393.00	335.46	57.54	6.830	
13,500.00	12,724.58	13,399.64	12,623.60	16.48	16.36	-75.26	-823.98	218.59	393.00	335.10	57.90	6.788	
13,600.00	12,726.06	13,499.64	12,625.07	16.69	16.56	-75.26	-923.96	219.64	393.00	334.71	58.29	6.742	
13,700.00	12,727.53	13,599.64	12,626.54	16.93	16.79	-75.26	-1,023.94	220.69	393.00	334.27	58.73	6.692	
13,800.00	12,729.00	13,699.64	12,628.02	17.21	17.05	-75.26	-1,123.93	221.74	392.99	333.79	59.20	6.638	
13,900.00	12,730.48	13,799.64	12,629.49	17.52	17.34	-75.26	-1,223.91	222.79	392.99	333.28	59.72	6.581	
14,000.00	12,731.95	13,899.64	12,630.96	17.86	17.68	-75.26	-1,323.89	223.85	392.99	332.73	60.27	6.521	
14,100.00	12,733.42	13,999.64	12,632.44	18.24	18.04	-75.26	-1,423.88	224.90	392.99	332.14	60.85	6.458	
14,200.00	12,734.90	14,099.64	12,633.91	18.65	18.45	-75.26	-1,523.86	225.95	392.99	331.52	61.47	6.393	
14,300.00	12,736.37	14,199.64	12,635.38	19.09	18.89	-75.26	-1,623.85	227.00	392.99	330.86	62.12	6.326	
14,400.00	12,737.84	14,299.64	12,636.86	19.56	19.36	-75.26	-1,723.83	228.05	392.99	330.18	62.81	6.257	
14,500.00	12,739.32	14,399.64	12,638.33	20.06	19.86	-75.26	-1,823.81	229.11	392.98	329.46	63.52	6.186	
14,600.00	12,740.79	14,499.64	12,639.80	20.59	20.38	-75.26	-1,923.80	230.16	392.98	328.71	64.27	6.114	
14,700.00	12,742.26	14,599.64	12,641.28	21.14	20.93	-75.26	-2,023.78	231.21	392.98	327.93	65.05	6.041	
14,800.00	12,743.74	14,699.64	12,642.75	21.70	21.51	-75.26	-2,123.76	232.26	392.98	327.13	65.85	5.968	
14,900.00	12,745.21	14,799.64	12,644.22	22.29	22.09	-75.26	-2,223.75	233.31	392.98	326.29	66.68	5.893	
15,000.00	12,746.68	14,899.64	12,645.70	22.89	22.70	-75.26	-2,323.73	234.37	392.98	325.43	67.54	5.818	
15,100.00	12,748.16	14,999.64	12,647.17	23.50	23.32	-75.26	-2,423.71	235.42	392.97	324.55	68.42	5.743	
15,200.00	12,749.63	15,099.64	12,648.64	24.13	23.95	-75.26	-2,523.70	236.47	392.97	323.64	69.33	5.668	
15,300.00	12,751.10	15,199.64	12,650.12	24.77	24.59	-75.26	-2,623.68	237.52	392.97	322.71	70.26	5.593	
15,400.00	12,752.58	15,299.64	12,651.59	25.41	25.24	-75.26	-2,723.67	238.57	392.97	321.75	71.22	5.518	
15,500.00	12,754.05	15,399.64	12,653.06	26.07	25.90	-75.26	-2,823.65	239.63	392.97	320.78	72.19	5.443	
15,600.00	12,755.52	15,499.64	12,654.53	26.73	26.57	-75.26	-2,923.63	240.68	392.97	319.78	73.19	5.369	
15,700.00	12,757.00	15,599.64	12,656.01	27.40	27.24	-75.26	-3,023.62	241.73	392.96	318.76	74.20	5.296	
15,800.00	12,758.47	15,699.64	12,657.48	28.08	27.93	-75.26	-3,123.60	242.78	392.96	317.73	75.24	5.223	
15,900.00	12,759.94	15,799.64	12,658.95	28.76	28.61	-75.26	-3,223.58	243.83	392.96	316.67	76.29	5.151	
16,000.00	12,761.42	15,899.64	12,660.43	29.45	29.30	-75.26	-3,323.57	244.89	392.96	315.60	77.36	5.080	
16,100.00	12,762.89	15,999.64	12,661.90	30.14	30.00	-75.26	-3,423.55	245.94	392.96	314.51	78.44	5.009	
16,200.00	12,764.36	16,099.64	12,663.37	30.84	30.70	-75.26	-3,523.53	246.99	392.96	313.41	79.55	4.940	
16,300.00	12,765.84	16,199.64	12,664.85	31.54	31.40	-75.26	-3,623.52	248.04	392.95	312.29	80.67	4.871	
16,400.00	12,767.31	16,299.64	12,666.32	32.24	32.11	-75.26	-3,723.50	249.09	392.95	311.15	81.80	4.804	
16,500.00	12,768.78	16,399.64	12,667.79	32.95	32.82	-75.26	-3,823.48	250.15	392.95	310.00	82.95	4.737	
16,600.00	12,770.26	16,499.64	12,669.27	33.66	33.53	-75.26	-3,923.47	251.20	392.95	308.84	84.11	4.672	
16,700.00	12,771.73	16,599.64	12,670.74	34.37	34.25	-75.26	-4,023.45	252.25	392.95	307.67	85.28	4.608	
16,800.00	12,773.20	16,699.64	12,672.21	35.08	34.96	-75.26	-4,123.44	253.30	392.95	306.48	86.47	4.544	
16,900.00	12,774.68	16,799.64	12,673.69	35.80	35.68	-75.26	-4,223.42	254.35	392.95	305.28	87.67	4.482	
17,000.00	12,776.15	16,899.64	12,675.16	36.52	36.41	-75.26	-4,323.40	255.40	392.94	304.07	88.88	4.421	
17,100.00	12,777.62	16,999.64	12,676.63	37.24	37.13	-75.26	-4,423.39	256.46	392.94	302.84	90.10	4.361	
17,200.00	12,779.10	17,099.64	12,678.11	37.97	37.86	-75.26	-4,523.37	257.51	392.94	301.61	91.33	4.302	
17,300.00	12,780.57	17,199.64	12,679.58	38.69	38.58	-75.26	-4,623.35	258.56	392.94	300.37	92.57	4.245	
17,400.00	12,782.04	17,299.64	12,681.05	39.42	39.31	-75.26	-4,723.34	259.61	392.94	299.11	93.83	4.188	
17,500.00	12,783.52	17,399.64	12,682.52	40.15	40.04	-75.26	-4,823.32	260.66	392.94	297.85	95.09	4.132	
17,600.00	12,784.99	17,499.64	12,684.00	40.88	40.78	-75.26	-4,923.30	261.72	392.93	296.58	96.36	4.078	
17,700.00	12,786.46	17,599.64	12,685.47	41.61	41.51	-75.26	-5,023.29	262.77	392.93	295.30	97.64	4.024	
17,800.00	12,787.94	17,699.64	12,686.94	42.34	42.24	-75.26	-5,123.27	263.82	392.93	294.01	98.92	3.972	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Offset Design Fascinator Fed Com - 701H - OH - Plan 1 02-21-18													Offset Site Error:	0.00 usft
Survey Program: 0-Scientific Keeper: 12141-MWD+IFR1+MS													Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
17,900.00	12,789.41	17,799.64	12,688.42	43.08	42.98	-75.26	-5,223.26	264.87	392.93	292.71	100.22	3.921		
18,000.00	12,790.88	17,899.64	12,689.89	43.81	43.72	-75.26	-5,323.24	265.92	392.93	291.40	101.52	3.870		
18,100.00	12,792.36	17,999.64	12,691.36	44.55	44.45	-75.26	-5,423.22	266.98	392.93	290.09	102.83	3.821		
18,200.00	12,793.83	18,099.64	12,692.84	45.28	45.19	-75.26	-5,523.21	268.03	392.92	288.77	104.15	3.773		
18,300.00	12,795.30	18,199.64	12,694.31	46.02	45.93	-75.26	-5,623.19	269.08	392.92	287.45	105.48	3.725		
18,400.00	12,796.77	18,299.64	12,695.78	46.76	46.67	-75.26	-5,723.17	270.13	392.92	286.11	106.81	3.679		
18,500.00	12,798.25	18,399.64	12,697.26	47.50	47.42	-75.26	-5,823.16	271.18	392.92	284.77	108.15	3.633		
18,600.00	12,799.72	18,499.64	12,698.73	48.24	48.16	-75.26	-5,923.14	272.24	392.92	283.43	109.49	3.589		
18,700.00	12,801.19	18,599.64	12,700.20	48.98	48.90	-75.26	-6,023.12	273.29	392.92	282.08	110.84	3.545		
18,800.00	12,802.67	18,699.64	12,701.68	49.73	49.65	-75.26	-6,123.11	274.34	392.92	280.72	112.20	3.502		
18,900.00	12,804.14	18,799.64	12,703.15	50.47	50.39	-75.26	-6,223.09	275.39	392.91	279.36	113.56	3.460		
19,000.00	12,805.61	18,899.64	12,704.62	51.21	51.13	-75.26	-6,323.08	276.44	392.91	277.99	114.92	3.419		
19,100.00	12,807.09	18,999.64	12,706.10	51.96	51.88	-75.25	-6,423.06	277.50	392.91	276.62	116.29	3.379		
19,200.00	12,808.56	19,099.64	12,707.57	52.70	52.63	-75.25	-6,523.04	278.55	392.91	275.24	117.67	3.339		
19,300.00	12,810.03	19,199.64	12,709.04	53.45	53.37	-75.25	-6,623.03	279.60	392.91	273.85	119.05	3.300		
19,400.00	12,811.51	19,299.64	12,710.52	54.20	54.12	-75.25	-6,723.01	280.65	392.91	272.47	120.44	3.262		
19,500.00	12,812.98	19,399.64	12,711.99	54.94	54.87	-75.25	-6,822.99	281.70	392.90	271.07	121.83	3.225		
19,600.00	12,814.45	19,499.64	12,713.46	55.69	55.62	-75.25	-6,922.98	282.75	392.90	269.68	123.22	3.189		
19,700.00	12,815.93	19,599.64	12,714.93	56.44	56.37	-75.25	-7,022.96	283.81	392.90	268.28	124.62	3.153		
19,800.00	12,817.40	19,699.64	12,716.41	57.19	57.12	-75.25	-7,122.94	284.86	392.90	266.87	126.03	3.118		
19,900.00	12,818.87	19,799.64	12,717.88	57.93	57.87	-75.25	-7,222.93	285.91	392.90	265.47	127.43	3.083		
20,000.00	12,820.35	19,899.64	12,719.35	58.68	58.62	-75.25	-7,322.91	286.96	392.90	264.05	128.84	3.049		
20,100.00	12,821.82	19,999.64	12,720.83	59.43	59.37	-75.25	-7,422.90	288.01	392.89	262.64	130.26	3.016		
20,200.00	12,823.29	20,099.64	12,722.30	60.18	60.12	-75.25	-7,522.88	289.07	392.89	261.22	131.67	2.984		
20,300.00	12,824.77	20,199.64	12,723.77	60.93	60.87	-75.25	-7,622.86	290.12	392.89	259.80	133.10	2.952		
20,400.00	12,826.24	20,299.64	12,725.25	61.69	61.62	-75.25	-7,722.85	291.17	392.89	258.37	134.52	2.921		
20,500.00	12,827.71	20,399.64	12,726.72	62.44	62.37	-75.25	-7,822.83	292.22	392.89	256.94	135.95	2.890		
20,600.00	12,829.19	20,499.64	12,728.19	63.19	63.12	-75.25	-7,922.81	293.27	392.89	255.51	137.38	2.860		
20,700.00	12,830.66	20,599.64	12,729.67	63.94	63.88	-75.25	-8,022.80	294.33	392.88	254.07	138.81	2.830		
20,800.00	12,832.13	20,699.64	12,731.14	64.69	64.63	-75.25	-8,122.78	295.38	392.88	252.63	140.25	2.801		
20,900.00	12,833.61	20,799.64	12,732.61	65.44	65.38	-75.25	-8,222.76	296.43	392.88	251.19	141.69	2.773		
21,000.00	12,835.08	20,899.64	12,734.09	66.20	66.14	-75.25	-8,322.75	297.48	392.88	249.75	143.13	2.745		
21,100.00	12,836.55	20,999.64	12,735.56	66.95	66.89	-75.25	-8,422.73	298.53	392.88	248.30	144.57	2.717		
21,200.00	12,838.03	21,099.64	12,737.03	67.70	67.65	-75.25	-8,522.71	299.59	392.88	246.85	146.02	2.691		
21,300.00	12,839.50	21,199.64	12,738.51	68.46	68.40	-75.25	-8,622.70	300.64	392.88	245.40	147.47	2.664		
21,400.00	12,840.97	21,299.64	12,739.98	69.21	69.15	-75.25	-8,722.68	301.69	392.87	243.95	148.92	2.638		
21,500.00	12,842.45	21,399.64	12,741.45	69.96	69.91	-75.25	-8,822.67	302.74	392.87	242.49	150.38	2.613		
21,600.00	12,843.92	21,499.64	12,742.93	70.72	70.66	-75.25	-8,922.65	303.79	392.87	241.03	151.84	2.587		
21,700.00	12,845.39	21,599.64	12,744.40	71.47	71.42	-75.25	-9,022.63	304.85	392.87	239.57	153.29	2.563		
21,800.00	12,846.87	21,699.64	12,745.87	72.23	72.17	-75.25	-9,122.62	305.90	392.87	238.11	154.76	2.539		
21,900.00	12,848.34	21,799.64	12,747.34	72.98	72.93	-75.25	-9,222.60	306.95	392.87	236.65	156.22	2.515		
22,000.00	12,849.81	21,899.64	12,748.82	73.74	73.69	-75.25	-9,322.58	308.00	392.86	235.18	157.68	2.491		
22,100.00	12,851.29	21,999.64	12,750.29	74.49	74.44	-75.25	-9,422.57	309.05	392.86	233.71	159.15	2.468		
22,200.00	12,852.76	22,099.64	12,751.76	75.25	75.20	-75.25	-9,522.55	310.10	392.86	232.24	160.62	2.446		
22,300.00	12,854.23	22,199.64	12,753.24	76.01	75.95	-75.25	-9,622.53	311.16	392.86	230.77	162.09	2.424		
22,400.00	12,855.71	22,299.64	12,754.71	76.76	76.71	-75.25	-9,722.52	312.21	392.86	229.29	163.57	2.402		
22,500.00	12,857.18	22,399.64	12,756.18	77.52	77.47	-75.25	-9,822.50	313.26	392.86	227.82	165.04	2.380		
22,600.00	12,858.65	22,499.64	12,757.66	78.27	78.22	-75.25	-9,922.49	314.31	392.85	226.34	166.52	2.359		
22,700.00	12,860.13	22,599.64	12,759.13	79.03	78.98	-75.25	-10,022.47	315.36	392.85	224.86	168.00	2.338		
22,800.00	12,861.60	22,699.64	12,760.60	79.79	79.74	-75.25	-10,122.45	316.42	392.85	223.38	169.48	2.318		
22,827.23	12,862.00	22,726.87	12,761.00	79.99	79.95	-75.25	-10,149.68	316.70	392.85	222.97	169.88	2.312 SF		

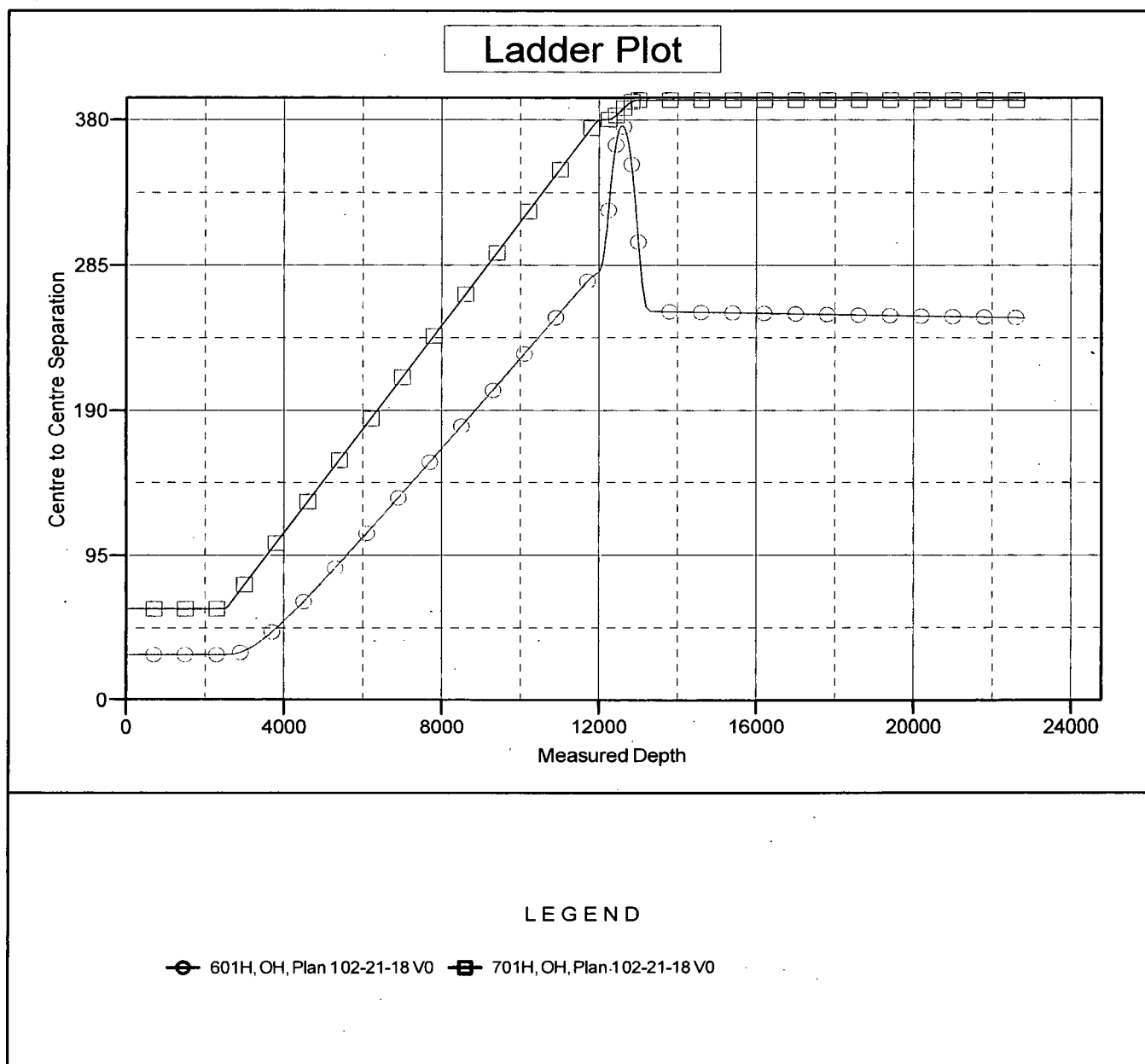
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Fascinator Fed Com
Site Error: 0.00 usft
Reference Well: 702H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan 1 02-21-18

Local Co-ordinate Reference: Well 702H
TVD Reference: RKB @ 3372.00usft (McVay 8)
MD Reference: RKB @ 3372.00usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB @ 3372.00usft (McVay 8)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 702H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.49°

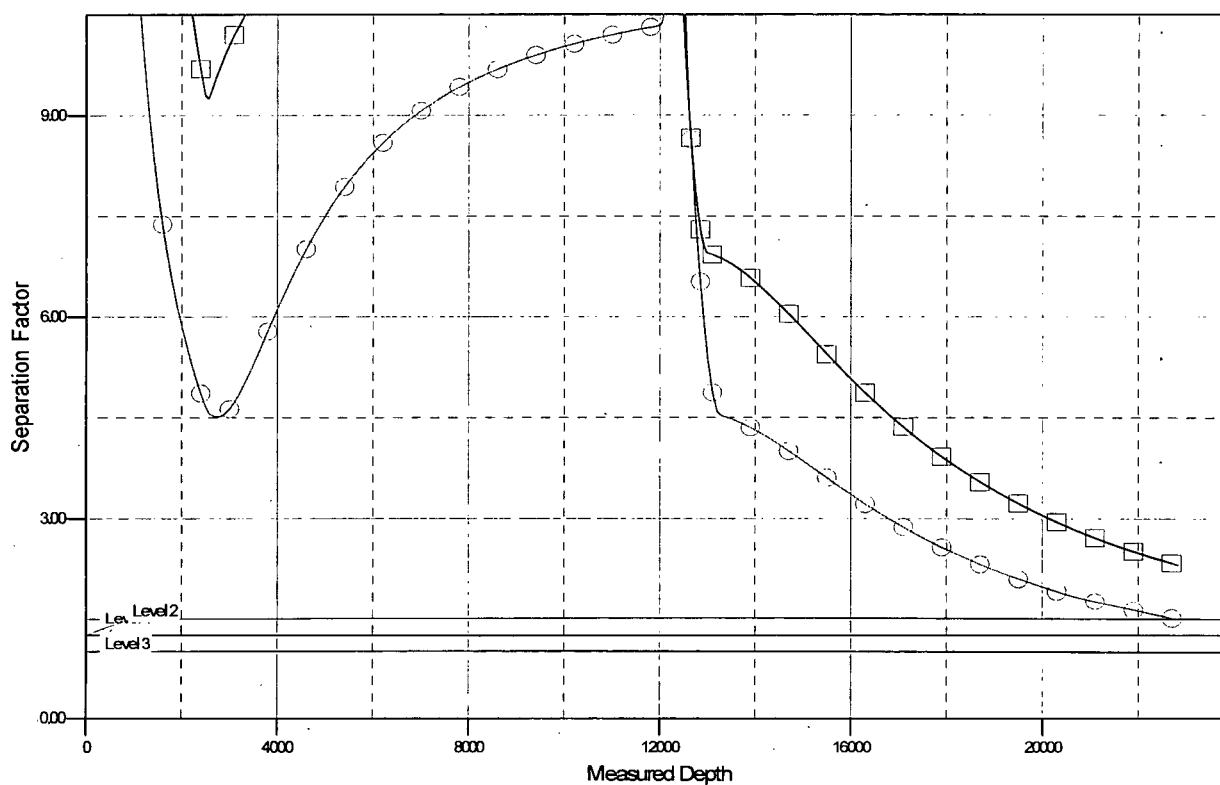


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 702H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Reference Site:	Fascinator Fed Com	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	702H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	USA Compass
Reference Design:	Plan 1 02-21-18	Offset TVD Reference:	Offset Datum

Reference Depths are relative to RKB @ 3372.00usft (McVay 8)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 702H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.49°

Separation Factor Plot



LEGEND

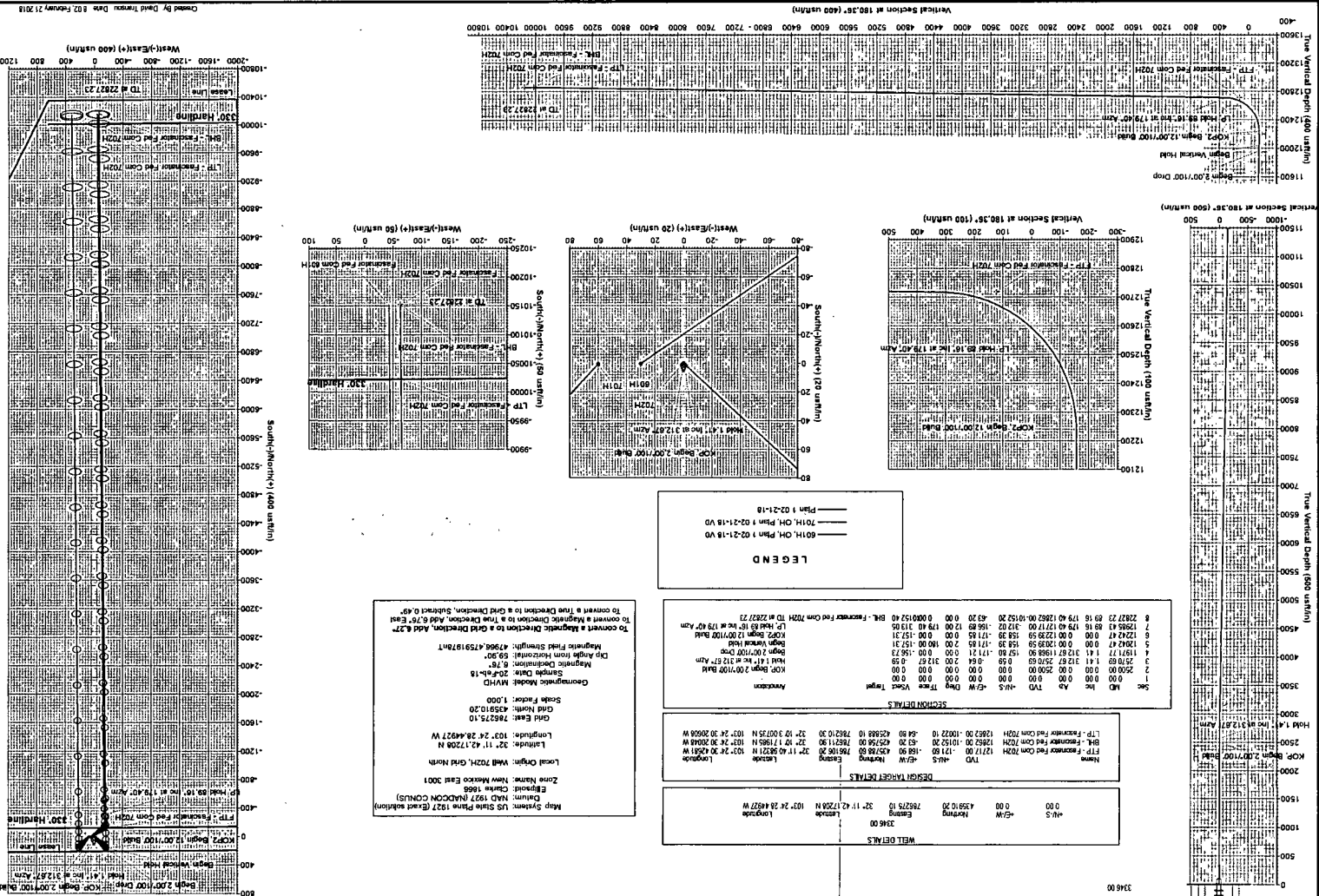
○ 601H, OH, Plan 102-21-18 V0 □ 701H, OH, Plan 102-21-18 V0



Project: Lea County, NM (NAD27 NME)
Site: Fascinator Fed Com
Wellbore: OH
Design: Plan 1 02-21-18
Rig: McWay 8



Magnetic Field
Strength: 47865.821
Dip Angle: 69.90°
Declination: 20.92318
Model: NAD83
Datum: NAD83
Units: Feet
Scale: 1" = 100'





PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

**Lea County, NM (NAD27 NME)
Fascinator Fed Com
702H**

OH

Plan: Plan 1 02-21-18

Standard Planning Report

21 February, 2018



Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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:	Fascinator Fed Com		
Site Position:		Northing:	435,910.50 usft
From:	Map	Easting:	786,305.20 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 11' 42.17248 N
		Longitude:	103° 24' 28.09899 W
		Grid Convergence:	0.49 °

Well	702H					
Well Position	+N/-S	-0.30 usft	Northing:	435,910.20 usft	Latitude:	32° 11' 42.17208 N
	+E/-W	-30.10 usft	Easting:	786,275.10 usft	Longitude:	103° 24' 28.44927 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	Ground Level: 3,346.00 usft		

Wellbore:	OH
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	2/20/2018	6.76	59.90	47,966.47591978

Design		Plan 1 02-21-18		
Audit Notes:				
Version:		Phase:	PROTOTYPE	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	180.36

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	
2,570.69	1.41	312.67	2,570.69	0.59	-0.64	2.00	2.00	0.00	312.67	
11,971.77	1.41	312.67	11,968.90	157.80	-171.21	0.00	0.00	0.00	0.00	
12,042.47	0.00	0.00	12,039.59	158.39	-171.85	2.00	-2.00	0.00	180.00	
12,242.47	0.00	0.00	12,239.59	158.39	-171.85	0.00	0.00	0.00	0.00	
12,985.43	89.16	179.40	12,717.00	-312.02	-166.89	12.00	12.00	24.15	179.40	
22,827.23	89.16	179.40	12,862.00	-10,152.20	-63.20	0.00	0.00	0.00	0.00	BHL - Fascinator Fe

Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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									
2,570.69	1.41	312.67	2,570.69	0.59	-0.64	-0.59	2.00	2.00	0.00
Hold 1.41° Inc at 312.67° Azm									
2,600.00	1.41	312.67	2,599.98	1.08	-1.17	-1.07	0.00	0.00	0.00
2,700.00	1.41	312.67	2,699.95	2.75	-2.99	-2.73	0.00	0.00	0.00
2,800.00	1.41	312.67	2,799.92	4.43	-4.80	-4.40	0.00	0.00	0.00
2,900.00	1.41	312.67	2,899.89	6.10	-6.62	-6.06	0.00	0.00	0.00
3,000.00	1.41	312.67	2,999.86	7.77	-8.43	-7.72	0.00	0.00	0.00
3,100.00	1.41	312.67	3,099.83	9.44	-10.24	-9.38	0.00	0.00	0.00
3,200.00	1.41	312.67	3,199.80	11.11	-12.06	-11.04	0.00	0.00	0.00
3,300.00	1.41	312.67	3,299.77	12.79	-13.87	-12.70	0.00	0.00	0.00
3,400.00	1.41	312.67	3,399.74	14.46	-15.69	-14.36	0.00	0.00	0.00
3,500.00	1.41	312.67	3,499.71	16.13	-17.50	-16.02	0.00	0.00	0.00
3,600.00	1.41	312.67	3,599.68	17.80	-19.32	-17.68	0.00	0.00	0.00
3,700.00	1.41	312.67	3,699.65	19.48	-21.13	-19.34	0.00	0.00	0.00
3,800.00	1.41	312.67	3,799.62	21.15	-22.95	-21.00	0.00	0.00	0.00
3,900.00	1.41	312.67	3,899.59	22.82	-24.76	-22.67	0.00	0.00	0.00
4,000.00	1.41	312.67	3,999.56	24.49	-26.57	-24.33	0.00	0.00	0.00
4,100.00	1.41	312.67	4,099.53	26.16	-28.39	-25.99	0.00	0.00	0.00
4,200.00	1.41	312.67	4,199.50	27.84	-30.20	-27.65	0.00	0.00	0.00
4,300.00	1.41	312.67	4,299.47	29.51	-32.02	-29.31	0.00	0.00	0.00
4,400.00	1.41	312.67	4,399.44	31.18	-33.83	-30.97	0.00	0.00	0.00
4,500.00	1.41	312.67	4,499.41	32.85	-35.65	-32.63	0.00	0.00	0.00
4,600.00	1.41	312.67	4,599.38	34.53	-37.46	-34.29	0.00	0.00	0.00
4,700.00	1.41	312.67	4,699.34	36.20	-39.27	-35.95	0.00	0.00	0.00
4,800.00	1.41	312.67	4,799.31	37.87	-41.09	-37.61	0.00	0.00	0.00
4,900.00	1.41	312.67	4,899.28	39.54	-42.90	-39.27	0.00	0.00	0.00
5,000.00	1.41	312.67	4,999.25	41.21	-44.72	-40.93	0.00	0.00	0.00
5,100.00	1.41	312.67	5,099.22	42.89	-46.53	-42.60	0.00	0.00	0.00
5,200.00	1.41	312.67	5,199.19	44.56	-48.35	-44.26	0.00	0.00	0.00
5,300.00	1.41	312.67	5,299.16	46.23	-50.16	-45.92	0.00	0.00	0.00
5,400.00	1.41	312.67	5,399.13	47.90	-51.97	-47.58	0.00	0.00	0.00
5,500.00	1.41	312.67	5,499.10	49.57	-53.79	-49.24	0.00	0.00	0.00
5,600.00	1.41	312.67	5,599.07	51.25	-55.60	-50.90	0.00	0.00	0.00
5,700.00	1.41	312.67	5,699.04	52.92	-57.42	-52.56	0.00	0.00	0.00
5,800.00	1.41	312.67	5,799.01	54.59	-59.23	-54.22	0.00	0.00	0.00
5,900.00	1.41	312.67	5,898.98	56.26	-61.05	-55.88	0.00	0.00	0.00
6,000.00	1.41	312.67	5,998.95	57.94	-62.86	-57.54	0.00	0.00	0.00
6,100.00	1.41	312.67	6,098.92	59.61	-64.68	-59.20	0.00	0.00	0.00
6,200.00	1.41	312.67	6,198.89	61.28	-66.49	-60.86	0.00	0.00	0.00
6,300.00	1.41	312.67	6,298.86	62.95	-68.30	-62.53	0.00	0.00	0.00
6,400.00	1.41	312.67	6,398.83	64.62	-70.12	-64.19	0.00	0.00	0.00
6,500.00	1.41	312.67	6,498.80	66.30	-71.93	-65.85	0.00	0.00	0.00
6,600.00	1.41	312.67	6,598.77	67.97	-73.75	-67.51	0.00	0.00	0.00
6,700.00	1.41	312.67	6,698.74	69.64	-75.56	-69.17	0.00	0.00	0.00
6,800.00	1.41	312.67	6,798.71	71.31	-77.38	-70.83	0.00	0.00	0.00
6,900.00	1.41	312.67	6,898.67	72.99	-79.19	-72.49	0.00	0.00	0.00
7,000.00	1.41	312.67	6,998.64	74.66	-81.00	-74.15	0.00	0.00	0.00
7,100.00	1.41	312.67	7,098.61	76.33	-82.82	-75.81	0.00	0.00	0.00
7,200.00	1.41	312.67	7,198.58	78.00	-84.63	-77.47	0.00	0.00	0.00
7,300.00	1.41	312.67	7,298.55	79.67	-86.45	-79.13	0.00	0.00	0.00
7,400.00	1.41	312.67	7,398.52	81.35	-88.26	-80.80	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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)
7,500.00	1.41	312.67	7,498.49	83.02	-90.08	-82.46	0.00	0.00	0.00
7,600.00	1.41	312.67	7,598.46	84.69	-91.89	-84.12	0.00	0.00	0.00
7,700.00	1.41	312.67	7,698.43	86.36	-93.70	-85.78	0.00	0.00	0.00
7,800.00	1.41	312.67	7,798.40	88.04	-95.52	-87.44	0.00	0.00	0.00
7,900.00	1.41	312.67	7,898.37	89.71	-97.33	-89.10	0.00	0.00	0.00
8,000.00	1.41	312.67	7,998.34	91.38	-99.15	-90.76	0.00	0.00	0.00
8,100.00	1.41	312.67	8,098.31	93.05	-100.96	-92.42	0.00	0.00	0.00
8,200.00	1.41	312.67	8,198.28	94.72	-102.78	-94.08	0.00	0.00	0.00
8,300.00	1.41	312.67	8,298.25	96.40	-104.59	-95.74	0.00	0.00	0.00
8,400.00	1.41	312.67	8,398.22	98.07	-106.40	-97.40	0.00	0.00	0.00
8,500.00	1.41	312.67	8,498.19	99.74	-108.22	-99.06	0.00	0.00	0.00
8,600.00	1.41	312.67	8,598.16	101.41	-110.03	-100.73	0.00	0.00	0.00
8,700.00	1.41	312.67	8,698.13	103.08	-111.85	-102.39	0.00	0.00	0.00
8,800.00	1.41	312.67	8,798.10	104.76	-113.66	-104.05	0.00	0.00	0.00
8,900.00	1.41	312.67	8,898.07	106.43	-115.48	-105.71	0.00	0.00	0.00
9,000.00	1.41	312.67	8,998.04	108.10	-117.29	-107.37	0.00	0.00	0.00
9,100.00	1.41	312.67	9,098.01	109.77	-119.11	-109.03	0.00	0.00	0.00
9,200.00	1.41	312.67	9,197.97	111.45	-120.92	-110.69	0.00	0.00	0.00
9,300.00	1.41	312.67	9,297.94	113.12	-122.73	-112.35	0.00	0.00	0.00
9,400.00	1.41	312.67	9,397.91	114.79	-124.55	-114.01	0.00	0.00	0.00
9,500.00	1.41	312.67	9,497.88	116.46	-126.36	-115.67	0.00	0.00	0.00
9,600.00	1.41	312.67	9,597.85	118.13	-128.18	-117.33	0.00	0.00	0.00
9,700.00	1.41	312.67	9,697.82	119.81	-129.99	-119.00	0.00	0.00	0.00
9,800.00	1.41	312.67	9,797.79	121.48	-131.81	-120.66	0.00	0.00	0.00
9,900.00	1.41	312.67	9,897.76	123.15	-133.62	-122.32	0.00	0.00	0.00
10,000.00	1.41	312.67	9,997.73	124.82	-135.43	-123.98	0.00	0.00	0.00
10,100.00	1.41	312.67	10,097.70	126.50	-137.25	-125.64	0.00	0.00	0.00
10,200.00	1.41	312.67	10,197.67	128.17	-139.06	-127.30	0.00	0.00	0.00
10,300.00	1.41	312.67	10,297.64	129.84	-140.88	-128.96	0.00	0.00	0.00
10,400.00	1.41	312.67	10,397.61	131.51	-142.69	-130.62	0.00	0.00	0.00
10,500.00	1.41	312.67	10,497.58	133.18	-144.51	-132.28	0.00	0.00	0.00
10,600.00	1.41	312.67	10,597.55	134.86	-146.32	-133.94	0.00	0.00	0.00
10,700.00	1.41	312.67	10,697.52	136.53	-148.13	-135.60	0.00	0.00	0.00
10,800.00	1.41	312.67	10,797.49	138.20	-149.95	-137.26	0.00	0.00	0.00
10,900.00	1.41	312.67	10,897.46	139.87	-151.76	-138.93	0.00	0.00	0.00
11,000.00	1.41	312.67	10,997.43	141.55	-153.58	-140.59	0.00	0.00	0.00
11,100.00	1.41	312.67	11,097.40	143.22	-155.39	-142.25	0.00	0.00	0.00
11,200.00	1.41	312.67	11,197.37	144.89	-157.21	-143.91	0.00	0.00	0.00
11,300.00	1.41	312.67	11,297.34	146.56	-159.02	-145.57	0.00	0.00	0.00
11,400.00	1.41	312.67	11,397.31	148.23	-160.84	-147.23	0.00	0.00	0.00
11,500.00	1.41	312.67	11,497.27	149.91	-162.65	-148.89	0.00	0.00	0.00
11,600.00	1.41	312.67	11,597.24	151.58	-164.46	-150.55	0.00	0.00	0.00
11,700.00	1.41	312.67	11,697.21	153.25	-166.28	-152.21	0.00	0.00	0.00
11,800.00	1.41	312.67	11,797.18	154.92	-168.09	-153.87	0.00	0.00	0.00
11,900.00	1.41	312.67	11,897.15	156.60	-169.91	-155.53	0.00	0.00	0.00
11,971.77	1.41	312.67	11,968.90	157.80	-171.21	-156.73	0.00	0.00	0.00
Begin 2.00°/100' Drop									
12,000.00	0.85	312.67	11,997.13	158.17	-171.62	-157.10	2.00	-2.00	0.00
12,042.47	0.00	0.00	12,039.59	158.39	-171.85	-157.31	2.00	-2.00	0.00
Begin Vertical Hold									
12,242.47	0.00	0.00	12,239.59	158.39	-171.85	-157.31	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build									
12,300.00	6.90	179.40	12,296.98	154.92	-171.81	-153.85	12.00	12.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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)
12,400.00	18.90	179.40	12,394.28	132.63	-171.58	-131.56	12.00	12.00	0.00
12,500.00	30.90	179.40	12,484.82	90.60	-171.14	-89.54	12.00	12.00	0.00
12,600.00	42.90	179.40	12,564.64	30.67	-170.50	-29.61	12.00	12.00	0.00
12,700.00	54.90	179.40	12,630.25	-44.55	-169.71	45.61	12.00	12.00	0.00
12,800.00	66.90	179.40	12,678.79	-131.77	-168.79	132.81	12.00	12.00	0.00
12,900.00	78.90	179.40	12,708.13	-227.17	-167.79	228.21	12.00	12.00	0.00
12,985.43	89.16	179.40	12,717.00	-312.02	-166.89	313.05	12.00	12.00	0.00
LP, Hold 89.16° Inc at 179.40° Azm									
13,000.00	89.16	179.40	12,717.22	-326.58	-166.74	327.62	0.00	0.00	0.00
13,100.00	89.16	179.40	12,718.69	-426.57	-165.69	427.59	0.00	0.00	0.00
13,200.00	89.16	179.40	12,720.16	-526.55	-164.63	527.57	0.00	0.00	0.00
13,300.00	89.16	179.40	12,721.64	-626.53	-163.58	627.54	0.00	0.00	0.00
13,400.00	89.16	179.40	12,723.11	-726.52	-162.53	727.52	0.00	0.00	0.00
13,500.00	89.16	179.40	12,724.58	-826.50	-161.47	827.49	0.00	0.00	0.00
13,600.00	89.16	179.40	12,726.06	-926.49	-160.42	927.47	0.00	0.00	0.00
13,700.00	89.16	179.40	12,727.53	-1,026.47	-159.36	1,027.44	0.00	0.00	0.00
13,800.00	89.16	179.40	12,729.00	-1,126.45	-158.31	1,127.42	0.00	0.00	0.00
13,900.00	89.16	179.40	12,730.48	-1,226.44	-157.26	1,227.39	0.00	0.00	0.00
14,000.00	89.16	179.40	12,731.95	-1,326.42	-156.20	1,327.37	0.00	0.00	0.00
14,100.00	89.16	179.40	12,733.42	-1,426.40	-155.15	1,427.34	0.00	0.00	0.00
14,200.00	89.16	179.40	12,734.90	-1,526.39	-154.10	1,527.32	0.00	0.00	0.00
14,300.00	89.16	179.40	12,736.37	-1,626.37	-153.04	1,627.29	0.00	0.00	0.00
14,400.00	89.16	179.40	12,737.84	-1,726.35	-151.99	1,727.27	0.00	0.00	0.00
14,500.00	89.16	179.40	12,739.32	-1,826.34	-150.94	1,827.24	0.00	0.00	0.00
14,600.00	89.16	179.40	12,740.79	-1,926.32	-149.88	1,927.22	0.00	0.00	0.00
14,700.00	89.16	179.40	12,742.26	-2,026.30	-148.83	2,027.19	0.00	0.00	0.00
14,800.00	89.16	179.40	12,743.74	-2,126.29	-147.78	2,127.17	0.00	0.00	0.00
14,900.00	89.16	179.40	12,745.21	-2,226.27	-146.72	2,227.14	0.00	0.00	0.00
15,000.00	89.16	179.40	12,746.68	-2,326.26	-145.67	2,327.12	0.00	0.00	0.00
15,100.00	89.16	179.40	12,748.16	-2,426.24	-144.61	2,427.09	0.00	0.00	0.00
15,200.00	89.16	179.40	12,749.63	-2,526.22	-143.56	2,527.07	0.00	0.00	0.00
15,300.00	89.16	179.40	12,751.10	-2,626.21	-142.51	2,627.04	0.00	0.00	0.00
15,400.00	89.16	179.40	12,752.58	-2,726.19	-141.45	2,727.02	0.00	0.00	0.00
15,500.00	89.16	179.40	12,754.05	-2,826.17	-140.40	2,826.99	0.00	0.00	0.00
15,600.00	89.16	179.40	12,755.52	-2,926.16	-139.35	2,926.97	0.00	0.00	0.00
15,700.00	89.16	179.40	12,757.00	-3,026.14	-138.29	3,026.94	0.00	0.00	0.00
15,800.00	89.16	179.40	12,758.47	-3,126.12	-137.24	3,126.92	0.00	0.00	0.00
15,900.00	89.16	179.40	12,759.94	-3,226.11	-136.19	3,226.89	0.00	0.00	0.00
16,000.00	89.16	179.40	12,761.42	-3,326.09	-135.13	3,326.87	0.00	0.00	0.00
16,100.00	89.16	179.40	12,762.89	-3,426.08	-134.08	3,426.84	0.00	0.00	0.00
16,200.00	89.16	179.40	12,764.36	-3,526.06	-133.02	3,526.82	0.00	0.00	0.00
16,300.00	89.16	179.40	12,765.84	-3,626.04	-131.97	3,626.79	0.00	0.00	0.00
16,400.00	89.16	179.40	12,767.31	-3,726.03	-130.92	3,726.77	0.00	0.00	0.00
16,500.00	89.16	179.40	12,768.78	-3,826.01	-129.86	3,826.74	0.00	0.00	0.00
16,600.00	89.16	179.40	12,770.26	-3,925.99	-128.81	3,926.72	0.00	0.00	0.00
16,700.00	89.16	179.40	12,771.73	-4,025.98	-127.76	4,026.69	0.00	0.00	0.00
16,800.00	89.16	179.40	12,773.20	-4,125.96	-126.70	4,126.67	0.00	0.00	0.00
16,900.00	89.16	179.40	12,774.68	-4,225.94	-125.65	4,226.64	0.00	0.00	0.00
17,000.00	89.16	179.40	12,776.15	-4,325.93	-124.60	4,326.62	0.00	0.00	0.00
17,100.00	89.16	179.40	12,777.62	-4,425.91	-123.54	4,426.59	0.00	0.00	0.00
17,200.00	89.16	179.40	12,779.10	-4,525.89	-122.49	4,526.57	0.00	0.00	0.00
17,300.00	89.16	179.40	12,780.57	-4,625.88	-121.44	4,626.54	0.00	0.00	0.00
17,400.00	89.16	179.40	12,782.04	-4,725.86	-120.38	4,726.52	0.00	0.00	0.00
17,500.00	89.16	179.40	12,783.52	-4,825.85	-119.33	4,826.49	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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)
17,600.00	89.16	179.40	12,784.99	-4,925.83	-118.27	4,926.47	0.00	0.00	0.00
17,700.00	89.16	179.40	12,786.46	-5,025.81	-117.22	5,026.45	0.00	0.00	0.00
17,800.00	89.16	179.40	12,787.94	-5,125.80	-116.17	5,126.42	0.00	0.00	0.00
17,900.00	89.16	179.40	12,789.41	-5,225.78	-115.11	5,226.40	0.00	0.00	0.00
18,000.00	89.16	179.40	12,790.88	-5,325.76	-114.06	5,326.37	0.00	0.00	0.00
18,100.00	89.16	179.40	12,792.36	-5,425.75	-113.01	5,426.35	0.00	0.00	0.00
18,200.00	89.16	179.40	12,793.83	-5,525.73	-111.95	5,526.32	0.00	0.00	0.00
18,300.00	89.16	179.40	12,795.30	-5,625.71	-110.90	5,626.30	0.00	0.00	0.00
18,400.00	89.16	179.40	12,796.77	-5,725.70	-109.85	5,726.27	0.00	0.00	0.00
18,500.00	89.16	179.40	12,798.25	-5,825.68	-108.79	5,826.25	0.00	0.00	0.00
18,600.00	89.16	179.40	12,799.72	-5,925.67	-107.74	5,926.22	0.00	0.00	0.00
18,700.00	89.16	179.40	12,801.19	-6,025.65	-106.68	6,026.20	0.00	0.00	0.00
18,800.00	89.16	179.40	12,802.67	-6,125.63	-105.63	6,126.17	0.00	0.00	0.00
18,900.00	89.16	179.40	12,804.14	-6,225.62	-104.58	6,226.15	0.00	0.00	0.00
19,000.00	89.16	179.40	12,805.61	-6,325.60	-103.52	6,326.12	0.00	0.00	0.00
19,100.00	89.16	179.40	12,807.09	-6,425.58	-102.47	6,426.10	0.00	0.00	0.00
19,200.00	89.16	179.40	12,808.56	-6,525.57	-101.42	6,526.07	0.00	0.00	0.00
19,300.00	89.16	179.40	12,810.03	-6,625.55	-100.36	6,626.05	0.00	0.00	0.00
19,400.00	89.16	179.40	12,811.51	-6,725.53	-99.31	6,726.02	0.00	0.00	0.00
19,500.00	89.16	179.40	12,812.98	-6,825.52	-98.26	6,826.00	0.00	0.00	0.00
19,600.00	89.16	179.40	12,814.45	-6,925.50	-97.20	6,925.97	0.00	0.00	0.00
19,700.00	89.16	179.40	12,815.93	-7,025.48	-96.15	7,025.95	0.00	0.00	0.00
19,800.00	89.16	179.40	12,817.40	-7,125.47	-95.09	7,125.92	0.00	0.00	0.00
19,900.00	89.16	179.40	12,818.87	-7,225.45	-94.04	7,225.90	0.00	0.00	0.00
20,000.00	89.16	179.40	12,820.35	-7,325.44	-92.99	7,325.87	0.00	0.00	0.00
20,100.00	89.16	179.40	12,821.82	-7,425.42	-91.93	7,425.85	0.00	0.00	0.00
20,200.00	89.16	179.40	12,823.29	-7,525.40	-90.88	7,525.82	0.00	0.00	0.00
20,300.00	89.16	179.40	12,824.77	-7,625.39	-89.83	7,625.80	0.00	0.00	0.00
20,400.00	89.16	179.40	12,826.24	-7,725.37	-88.77	7,725.77	0.00	0.00	0.00
20,500.00	89.16	179.40	12,827.71	-7,825.35	-87.72	7,825.75	0.00	0.00	0.00
20,600.00	89.16	179.40	12,829.19	-7,925.34	-86.67	7,925.72	0.00	0.00	0.00
20,700.00	89.16	179.40	12,830.66	-8,025.32	-85.61	8,025.70	0.00	0.00	0.00
20,800.00	89.16	179.40	12,832.13	-8,125.30	-84.56	8,125.67	0.00	0.00	0.00
20,900.00	89.16	179.40	12,833.61	-8,225.29	-83.51	8,225.65	0.00	0.00	0.00
21,000.00	89.16	179.40	12,835.08	-8,325.27	-82.45	8,325.62	0.00	0.00	0.00
21,100.00	89.16	179.40	12,836.55	-8,425.26	-81.40	8,425.60	0.00	0.00	0.00
21,200.00	89.16	179.40	12,838.03	-8,525.24	-80.34	8,525.57	0.00	0.00	0.00
21,300.00	89.16	179.40	12,839.50	-8,625.22	-79.29	8,625.55	0.00	0.00	0.00
21,400.00	89.16	179.40	12,840.97	-8,725.21	-78.24	8,725.52	0.00	0.00	0.00
21,500.00	89.16	179.40	12,842.45	-8,825.19	-77.18	8,825.50	0.00	0.00	0.00
21,600.00	89.16	179.40	12,843.92	-8,925.17	-76.13	8,925.47	0.00	0.00	0.00
21,700.00	89.16	179.40	12,845.39	-9,025.16	-75.08	9,025.45	0.00	0.00	0.00
21,800.00	89.16	179.40	12,846.87	-9,125.14	-74.02	9,125.42	0.00	0.00	0.00
21,900.00	89.16	179.40	12,848.34	-9,225.12	-72.97	9,225.40	0.00	0.00	0.00
22,000.00	89.16	179.40	12,849.81	-9,325.11	-71.92	9,325.37	0.00	0.00	0.00
22,100.00	89.16	179.40	12,851.29	-9,425.09	-70.86	9,425.35	0.00	0.00	0.00
22,200.00	89.16	179.40	12,852.76	-9,525.07	-69.81	9,525.32	0.00	0.00	0.00
22,300.00	89.16	179.40	12,854.23	-9,625.06	-68.75	9,625.30	0.00	0.00	0.00
22,400.00	89.16	179.40	12,855.71	-9,725.04	-67.70	9,725.27	0.00	0.00	0.00
22,500.00	89.16	179.40	12,857.18	-9,825.03	-66.65	9,825.25	0.00	0.00	0.00
22,600.00	89.16	179.40	12,858.65	-9,925.01	-65.59	9,925.23	0.00	0.00	0.00
22,700.00	89.16	179.40	12,860.13	-10,024.99	-64.54	10,025.20	0.00	0.00	0.00
22,800.00	89.16	179.40	12,861.60	-10,124.98	-63.49	10,125.18	0.00	0.00	0.00
22,827.23	89.16	179.40	12,862.00	-10,152.20	-63.20	10,152.40	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 702H
Company:	COG Operating LLC	TVD Reference:	RKB @ 3372.00usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	RKB @ 3372.00usft (McVay 8)
Site:	Fascinator Fed Com	North Reference:	Grid
Well:	702H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-21-18		

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 22827.23									

Design Targets									
Target Name	hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	
FTP - Fascinator Fed	- plan misses target center by 39.36usft at 12801.52usft MD (12679.38 TVD, -133.16 N, -168.78 E)	0.00	0.00	12,717.00	-121.60	-168.90	435,788.60	786,106.20	32° 11' 40.98321 N 03° 24' 30.42681 W
LTP - Fascinator Fed	- plan misses target center by 1.93usft at 22697.13usft MD (12860.08 TVD, -10022.13 N, -64.57 E)	0.00	0.00	12,862.00	-10,022.10	-64.80	425,888.10	786,210.30	32° 10' 3.00735 N 03° 24' 30.20608 W
BHL - Fascinator Fed	- plan hits target center	0.00	0.00	12,862.00	-10,152.20	-63.20	425,758.00	786,211.90	32° 10' 1.71985 N 03° 24' 30.20048 W

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
2,500.00	2,500.00	0.00	0.00	KOP, Begin 2.00°/100' Build
2,570.69	2,570.69	0.59	-0.64	Hold 1.41° Inc at 312.67° Azm
11,971.77	11,968.90	157.80	-171.21	Begin 2.00°/100' Drop
12,042.47	12,039.59	158.39	-171.85	Begin Vertical Hold
12,242.47	12,239.59	158.39	-171.85	KOP2, Begin 12.00°/100' Build
12,985.43	12,717.00	-312.02	-166.89	LP, Hold 89.16° Inc at 179.40° Azm
22,827.23	12,862.00	-10,152.20	-63.20	TD at 22827.23