PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING
LEASE NO.:	NMNM125658
WELL NAME & NO.:	FEZ FEDERAL COM 602H
SURFACE HOLE FOOTAGE:	280'/S & 1690/W
BOTTOM HOLE FOOTAGE	200'/N & 1450'/W
LOCATION:	SECTION 09, T25S, R35E, NMPM
COUNTY:	LEA

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 **1065** 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 **5275'**, 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 is approved to use 5M Annular which shall be tested to 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 09152018

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

OPERATOR'S NAME:	COG OPERATING
LEASE NO.:	NMNM125658
WELL NAME & NO.:	FEZ FEDERAL COM 602H
SURFACE HOLE FOOTAGE:	280'/S & 1690/W
BOTTOM HOLE FOOTAGE	200'/N & 1450'/W
LOCATION:	SECTION 09, T25S, R35E, NMPM
COUNTY:	LEA

TABLE OF CONTENTS

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.

Approval Date: 09/28/2018

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)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken: Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Below Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

Timing Limitation Exceptions:
The Carlsbad Field Office will publish an annual map of where the LPC timing and noise stipulations and conditions of approval (Limitations) will apply for the identified year (between March 1 and June 15) based on the latest survey information. The LPC Timing Area map will identify areas which are Habitat Areas (HA), Isolated Population Area (IPA), and Primary Population Area (PPA). The LPC Timing Area map will also have an area in red crosshatch. The red crosshatch area is the only area where an operator is required to submit a request for exception to the LPC Limitations. If an operator is operating outside the red crosshatch area, the LPC Limitations do not apply for that year and an exception to LPC Limitations is not required.

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, situating 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.

Range

The proponent would not damage the allotment fence during construction of the pads or roads. If fence is damaged the blm must be contacted immediately and all work must cease till the fence has been repaired back to its original condition or better.

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.

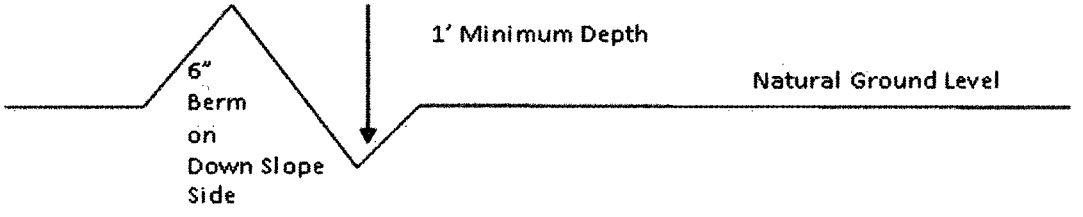
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping 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:

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

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

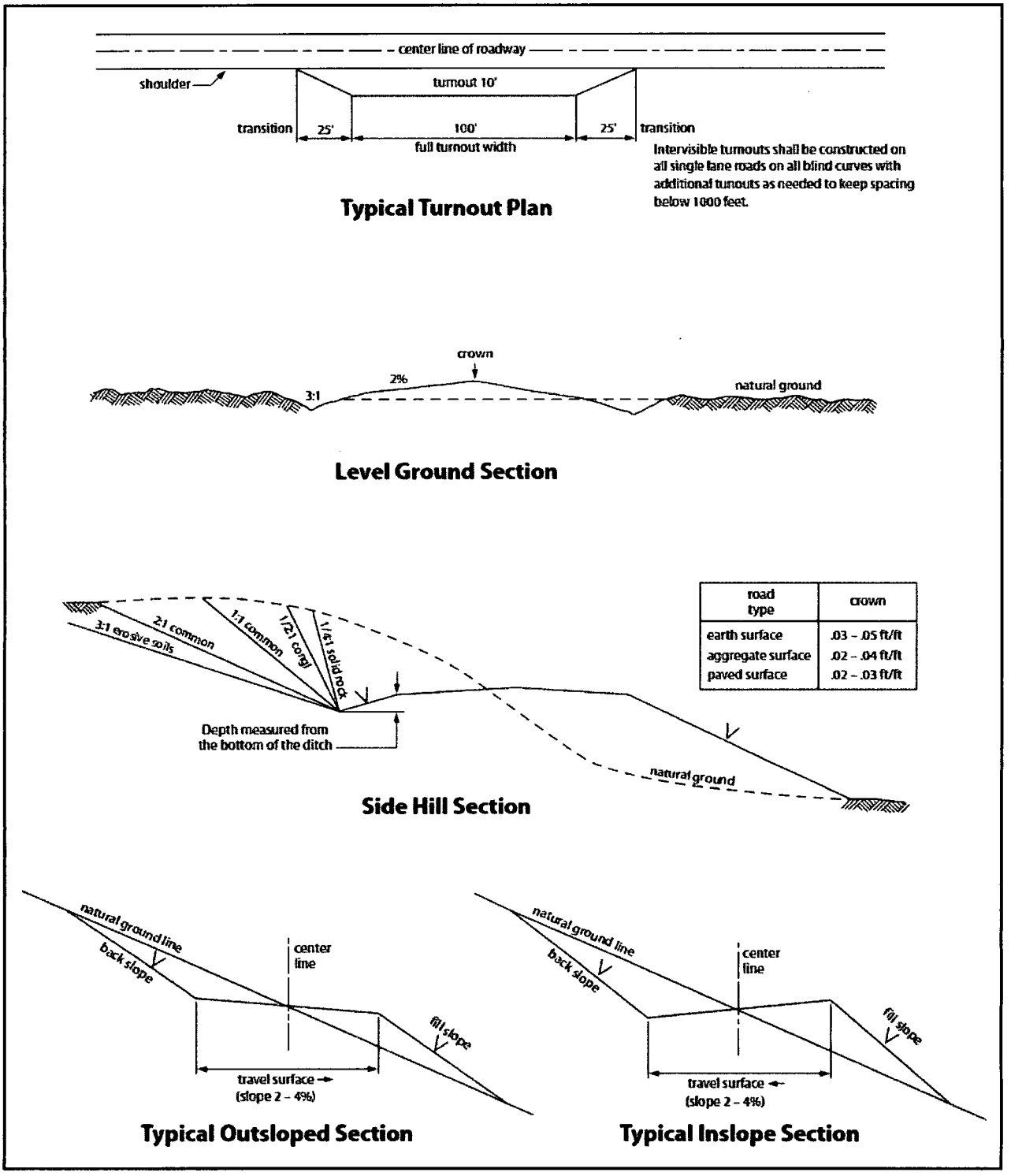


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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).

Below Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture for LPC Sand/Shinnery Sites

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 shall be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed shall be either certified or registered seed. The seed container shall 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). 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. Seeding shall be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth may 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:

Species	lb/acre
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

*Pounds of pure live seed:

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

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

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

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

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

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

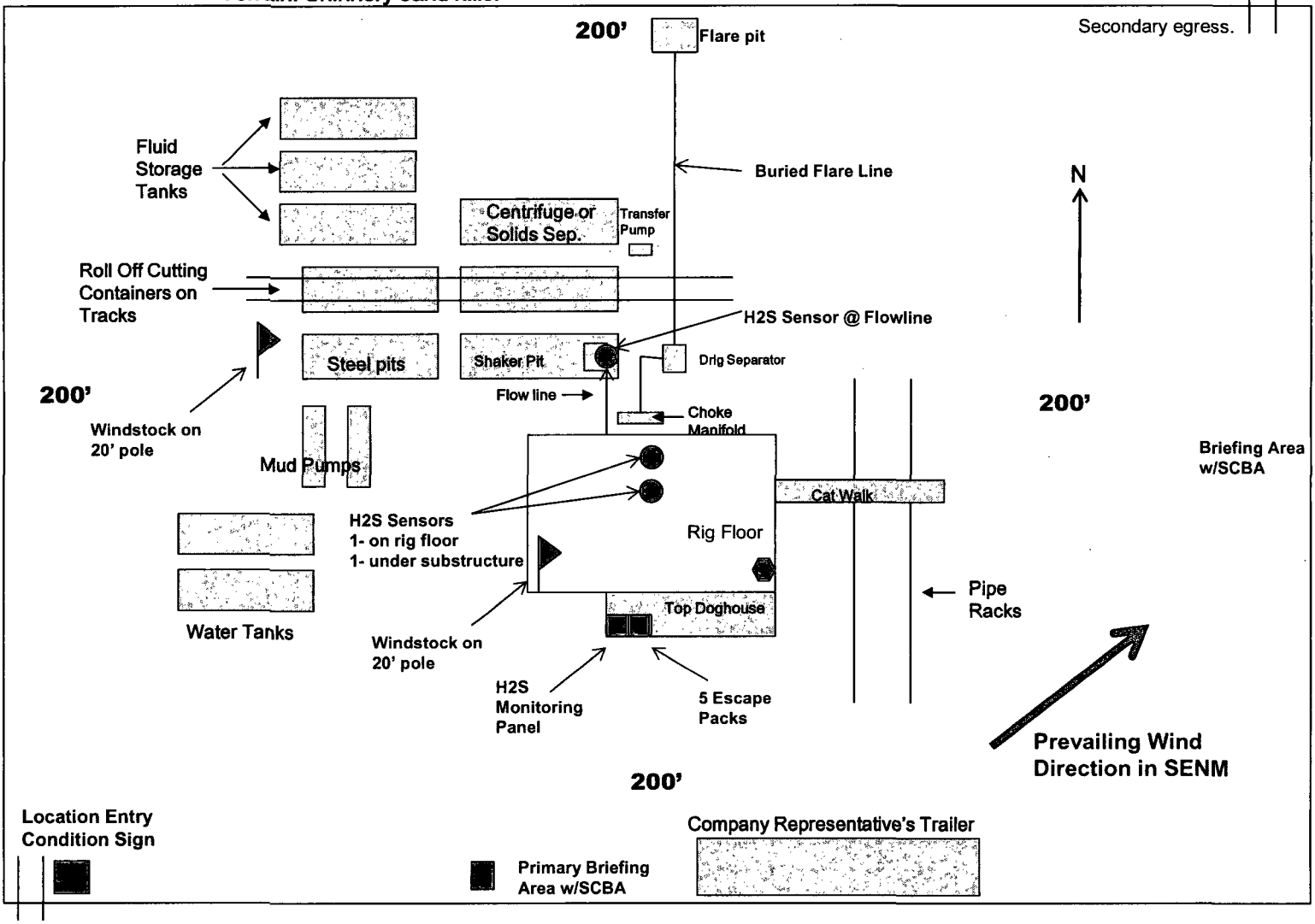
2. H_2S SAFETY EQUIPMENT AND SYSTEMS

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

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

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

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



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

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

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

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

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

g. Communication:
Company vehicles equipped with cellular telephone.

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

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

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

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

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

EMERGENCY RESPONSE NUMBERS

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

COG OPERATING, LLC

Lea County, NM (NAD27) NMEZ
FEZ FED COM
#602H

OH
Plan #1 - PP

Anticollision Report

05 March, 2018

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Reference	Plan #1 - PP		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.000 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 03/05/18

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	22,147.82	Plan #1 - PP (OH)	MWD	MWD v3:standard declination

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
FEZ FED COM						
#601H - OH - Plan #1 - PP	1,200.00	1,200.40	60.00	54.90	11.758	CC, ES
#601H - OH - Plan #1 - PP	22,147.98	22,146.11	499.92	123.52	1.328	Level 3, SF
#701H - OH - Plan #1 - PP	1,200.00	1,200.10	30.00	24.90	5.880	CC, ES
#701H - OH - Plan #1 - PP	22,147.98	22,396.50	323.93	60.58	1.230	Level 2, SF

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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	0.40	0.40	0.00	0.00	89.33	0.70	60.00	60.00				
100.00	100.00	100.40	100.40	0.08	0.08	89.33	0.70	60.00	60.00	59.85	.158	379.207	
200.00	200.00	200.40	200.40	0.30	0.30	89.33	0.70	60.00	60.00	59.40	.608	98.729	
300.00	300.00	300.40	300.40	0.53	0.53	89.33	0.70	60.00	60.00	58.95	1.057	56.752	
400.00	400.00	400.40	400.40	0.75	0.75	89.33	0.70	60.00	60.00	58.50	1.507	39.821	
500.00	500.00	500.40	500.40	0.98	0.98	89.33	0.70	60.00	60.00	58.05	1.956	30.671	
600.00	600.00	600.40	600.40	1.20	1.20	89.33	0.70	60.00	60.00	57.60	2.406	24.940	
700.00	700.00	700.40	700.40	1.43	1.43	89.33	0.70	60.00	60.00	57.15	2.855	21.014	
800.00	800.00	800.40	800.40	1.65	1.65	89.33	0.70	60.00	60.00	56.70	3.305	18.156	
900.00	900.00	900.40	900.40	1.88	1.88	89.33	0.70	60.00	60.00	56.25	3.754	15.982	
1,000.00	1,000.00	1,000.40	1,000.40	2.10	2.10	89.33	0.70	60.00	60.00	55.80	4.204	14.273	
1,100.00	1,100.00	1,100.40	1,100.40	2.33	2.33	89.33	0.70	60.00	60.00	55.35	4.654	12.894	
1,200.00	1,200.00	1,200.40	1,200.40	2.55	2.55	89.33	0.70	60.00	60.00	54.90	5.103	11.758	CC, ES
1,300.00	1,299.99	1,298.78	1,298.77	2.76	2.76	179.36	0.70	61.28	62.61	57.09	5.521	11.340	
1,400.00	1,399.91	1,403.29	1,396.62	2.96	2.97	179.43	0.70	65.06	70.40	64.47	5.932	11.868	
1,500.00	1,499.69	1,503.98	1,495.79	3.18	3.18	179.51	0.70	70.26	82.15	75.81	6.343	12.951	
1,533.33	1,532.91	1,529.04	1,528.78	3.25	3.24	179.53	0.70	71.99	86.65	80.18	6.466	13.400	
1,600.00	1,599.32	1,604.94	1,594.70	3.40	3.40	179.58	0.70	75.44	95.92	89.16	6.760	14.189	
1,700.00	1,698.94	1,705.91	1,693.59	3.63	3.62	179.63	0.70	80.63	109.84	102.66	7.179	15.300	
1,800.00	1,798.56	1,806.88	1,792.49	3.86	3.84	179.67	0.70	85.81	123.76	116.15	7.603	16.278	
1,900.00	1,898.18	1,907.86	1,891.38	4.10	4.07	179.71	0.70	90.99	137.67	129.64	8.030	17.144	

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 #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — Offset Site Error: 0.00 usft

Survey Program: 0-MWD — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
2,000.00	1,997.80	2,008.83	1,990.27	4.34	4.29	179.73	0.70	96.17	151.59	143.13	8.462	17.915	
2,100.00	2,097.42	2,109.80	2,089.16	4.59	4.52	179.76	0.70	101.36	165.51	156.61	8.896	18.605	
2,200.00	2,197.04	2,189.22	2,188.05	4.84	4.70	179.77	0.70	106.54	179.43	170.14	9.286	19.322	
2,300.00	2,296.66	2,288.25	2,286.94	5.10	4.93	179.79	0.70	111.72	193.34	183.62	9.721	19.889	
2,400.00	2,396.28	2,387.28	2,385.83	5.35	5.16	179.80	0.70	116.90	207.26	197.10	10.158	20.404	
2,500.00	2,495.90	2,486.30	2,484.72	5.61	5.39	179.82	0.70	122.09	221.18	210.58	10.596	20.873	
2,600.00	2,595.52	2,585.33	2,583.61	5.87	5.62	179.83	0.70	127.27	235.09	224.06	11.036	21.302	
2,700.00	2,695.14	2,684.36	2,682.51	6.13	5.85	179.84	0.70	132.45	249.01	237.53	11.478	21.695	
2,800.00	2,794.76	2,783.38	2,781.40	6.39	6.09	179.85	0.70	137.64	262.93	251.01	11.920	22.057	
2,900.00	2,894.38	2,882.41	2,880.29	6.65	6.32	179.85	0.70	142.82	276.85	264.48	12.364	22.391	
3,000.00	2,994.00	2,981.44	2,979.18	6.92	6.55	179.86	0.70	148.00	290.76	277.96	12.809	22.701	
3,100.00	3,093.62	3,080.46	3,078.07	7.18	6.79	179.87	0.70	153.18	304.68	291.43	13.254	22.988	
3,200.00	3,193.23	3,179.49	3,176.96	7.45	7.02	179.87	0.70	158.37	318.60	304.90	13.700	23.255	
3,300.00	3,292.85	3,278.52	3,275.85	7.71	7.26	179.88	0.70	163.55	332.52	318.37	14.147	23.503	
3,400.00	3,392.47	3,377.54	3,374.74	7.98	7.49	179.88	0.70	168.73	346.43	331.84	14.595	23.736	
3,500.00	3,492.09	3,476.57	3,473.63	8.25	7.73	179.89	0.70	173.91	360.35	345.31	15.043	23.954	
3,600.00	3,591.71	3,575.60	3,572.53	8.51	7.97	179.89	0.70	179.10	374.27	358.78	15.492	24.158	
3,700.00	3,691.33	3,674.63	3,671.42	8.78	8.20	179.90	0.70	184.28	388.18	372.24	15.942	24.350	
3,800.00	3,790.95	3,773.65	3,770.31	9.05	8.44	179.90	0.70	189.46	402.10	385.71	16.392	24.531	
3,900.00	3,890.57	3,872.68	3,869.20	9.32	8.68	179.90	0.70	194.64	416.02	399.18	16.842	24.702	
3,959.66	3,950.00	3,931.75	3,928.19	9.48	8.82	179.90	0.70	197.74	424.32	407.21	17.111	24.799	
4,000.00	3,990.21	3,971.73	3,968.12	9.59	8.92	179.91	0.70	199.83	429.73	412.43	17.292	24.851	
4,100.00	4,090.00	4,071.06	4,067.31	9.84	9.15	179.91	0.70	205.03	441.30	423.56	17.740	24.876	
4,200.00	4,189.93	4,170.65	4,166.77	10.07	9.39	179.91	0.70	210.24	450.26	432.08	18.185	24.760	
4,292.99	4,282.91	4,263.45	4,259.43	10.26	9.62	89.91	0.70	215.10	456.26	437.67	18.592	24.541	
4,300.00	4,289.92	4,270.45	4,266.42	10.27	9.63	89.91	0.70	215.46	456.63	438.01	18.621	24.522	
4,400.00	4,389.92	4,370.31	4,366.15	10.46	9.87	89.91	0.70	220.69	461.86	442.81	19.052	24.242	
4,500.00	4,489.92	4,470.17	4,465.88	10.66	10.11	89.91	0.70	225.92	467.09	447.61	19.485	23.973	
4,600.00	4,589.92	4,570.04	4,565.60	10.85	10.35	89.91	0.70	231.14	472.33	452.41	19.917	23.714	
4,700.00	4,689.92	4,669.90	4,665.33	11.05	10.59	89.92	0.70	236.37	477.56	457.21	20.351	23.466	
4,800.00	4,789.92	4,769.76	4,765.05	11.24	10.84	89.92	0.70	241.59	482.80	462.01	20.786	23.227	
4,900.00	4,889.92	4,869.63	4,864.78	11.44	11.08	89.92	0.70	246.82	488.03	466.81	21.221	22.997	
5,000.00	4,989.92	4,969.49	4,964.51	11.64	11.32	89.92	0.70	252.05	493.26	471.61	21.657	22.776	
5,100.00	5,089.92	5,076.00	5,070.88	11.84	11.57	89.92	0.70	257.28	498.20	476.08	22.117	22.526	
5,200.00	5,189.92	5,191.01	5,185.86	12.04	11.83	89.92	0.70	260.04	500.60	478.00	22.597	22.153	
5,300.00	5,289.92	5,304.53	5,290.32	12.24	12.06	89.92	0.70	260.19	500.73	477.68	23.047	21.726	
5,400.00	5,389.92	5,404.53	5,390.32	12.44	12.26	89.92	0.70	260.19	500.73	477.26	23.465	21.339	
5,500.00	5,489.92	5,504.53	5,490.32	12.64	12.46	89.92	0.70	260.19	500.73	476.84	23.885	20.964	
5,600.00	5,589.92	5,604.53	5,590.32	12.85	12.66	89.92	0.70	260.19	500.73	476.42	24.306	20.601	
5,700.00	5,689.92	5,704.53	5,690.32	13.05	12.86	89.92	0.70	260.19	500.73	476.00	24.727	20.250	
5,800.00	5,789.92	5,804.53	5,790.32	13.26	13.07	89.92	0.70	260.19	500.73	475.58	25.150	19.910	
5,900.00	5,889.92	5,904.53	5,890.32	13.46	13.27	89.92	0.70	260.19	500.73	475.16	25.574	19.580	
6,000.00	5,989.92	6,004.53	5,990.32	13.67	13.48	89.92	0.70	260.19	500.73	474.73	25.998	19.260	
6,100.00	6,089.92	6,104.53	6,090.32	13.88	13.68	89.92	0.70	260.19	500.73	474.31	26.423	18.950	
6,200.00	6,189.92	6,204.53	6,190.32	14.08	13.89	89.92	0.70	260.19	500.73	473.88	26.849	18.650	
6,300.00	6,289.92	6,304.53	6,290.32	14.29	14.09	89.92	0.70	260.19	500.73	473.45	27.276	18.358	
6,400.00	6,389.92	6,404.53	6,390.32	14.50	14.30	89.92	0.70	260.19	500.73	473.03	27.704	18.075	
6,500.00	6,489.92	6,504.53	6,490.32	14.71	14.51	89.92	0.70	260.19	500.73	472.60	28.132	17.799	
6,600.00	6,589.92	6,604.53	6,590.32	14.92	14.71	89.92	0.70	260.19	500.73	472.17	28.561	17.532	
6,700.00	6,689.92	6,704.53	6,690.32	15.13	14.92	89.92	0.70	260.19	500.73	471.74	28.990	17.272	
6,800.00	6,789.92	6,804.53	6,790.32	15.34	15.13	89.92	0.70	260.19	500.73	471.31	29.420	17.020	

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
6,900.00	6,889.92	6,904.53	6,890.32	15.55	15.34	89.92	0.70	260.19	500.73	470.88	29.851	16.774	
7,000.00	6,989.92	7,004.53	6,990.32	15.76	15.55	89.92	0.70	260.19	500.73	470.45	30.282	16.535	
7,100.00	7,089.92	7,104.53	7,090.32	15.97	15.76	89.92	0.70	260.19	500.73	470.02	30.714	16.303	
7,200.00	7,189.92	7,204.53	7,190.32	16.18	15.97	89.92	0.70	260.19	500.73	469.58	31.146	16.077	
7,300.00	7,289.92	7,304.53	7,290.32	16.39	16.18	89.92	0.70	260.19	500.73	469.15	31.579	15.857	
7,400.00	7,389.92	7,404.53	7,390.32	16.61	16.39	89.92	0.70	260.19	500.73	468.72	32.012	15.642	
7,500.00	7,489.92	7,504.53	7,490.32	16.82	16.60	89.92	0.70	260.19	500.73	468.28	32.446	15.433	
7,600.00	7,589.92	7,604.53	7,590.32	17.03	16.82	89.92	0.70	260.19	500.73	467.85	32.880	15.229	
7,700.00	7,689.92	7,704.53	7,690.32	17.24	17.03	89.92	0.70	260.19	500.73	467.42	33.314	15.031	
7,800.00	7,789.92	7,804.53	7,790.32	17.46	17.24	89.92	0.70	260.19	500.73	466.98	33.749	14.837	
7,900.00	7,889.92	7,904.53	7,890.32	17.67	17.45	89.92	0.70	260.19	500.73	466.55	34.184	14.648	
8,000.00	7,989.92	8,004.53	7,990.32	17.89	17.67	89.92	0.70	260.19	500.73	466.11	34.620	14.464	
8,100.00	8,089.92	8,104.53	8,090.32	18.10	17.88	89.92	0.70	260.19	500.73	465.67	35.056	14.284	
8,200.00	8,189.92	8,204.53	8,190.32	18.32	18.09	89.92	0.70	260.19	500.73	465.24	35.492	14.108	
8,300.00	8,289.92	8,304.53	8,290.32	18.53	18.31	89.92	0.70	260.19	500.73	464.80	35.929	13.937	
8,400.00	8,389.92	8,404.53	8,390.32	18.75	18.52	89.92	0.70	260.19	500.73	464.36	36.366	13.769	
8,500.00	8,489.92	8,504.53	8,490.32	18.96	18.74	89.92	0.70	260.19	500.73	463.93	36.803	13.606	
8,600.00	8,589.92	8,604.53	8,590.32	19.18	18.95	89.92	0.70	260.19	500.73	463.49	37.240	13.446	
8,700.00	8,689.92	8,704.53	8,690.32	19.39	19.17	89.92	0.70	260.19	500.73	463.05	37.678	13.290	
8,800.00	8,789.92	8,804.53	8,790.32	19.61	19.38	89.92	0.70	260.19	500.73	462.61	38.116	13.137	
8,900.00	8,889.92	8,904.53	8,890.32	19.82	19.60	89.92	0.70	260.19	500.73	462.17	38.555	12.988	
9,000.00	8,989.92	9,004.53	8,990.32	20.04	19.81	89.92	0.70	260.19	500.73	461.74	38.993	12.841	
9,100.00	9,089.92	9,104.53	9,090.32	20.26	20.03	89.92	0.70	260.19	500.73	461.30	39.432	12.699	
9,200.00	9,189.92	9,204.53	9,190.32	20.47	20.24	89.92	0.70	260.19	500.73	460.86	39.871	12.559	
9,300.00	9,289.92	9,304.53	9,290.32	20.69	20.46	89.92	0.70	260.19	500.73	460.42	40.310	12.422	
9,400.00	9,389.92	9,404.53	9,390.32	20.91	20.68	89.92	0.70	260.19	500.73	459.98	40.750	12.288	
9,500.00	9,489.92	9,504.53	9,490.32	21.12	20.89	89.92	0.70	260.19	500.73	459.54	41.190	12.157	
9,600.00	9,589.92	9,604.53	9,590.32	21.34	21.11	89.92	0.70	260.19	500.73	459.10	41.630	12.028	
9,700.00	9,689.92	9,704.53	9,690.32	21.56	21.33	89.92	0.70	260.19	500.73	458.66	42.070	11.902	
9,800.00	9,789.92	9,804.53	9,790.32	21.78	21.54	89.92	0.70	260.19	500.73	458.22	42.510	11.779	
9,900.00	9,889.92	9,904.53	9,890.32	21.99	21.76	89.92	0.70	260.19	500.73	457.78	42.951	11.658	
10,000.00	9,989.92	10,004.53	9,990.32	22.21	21.98	89.92	0.70	260.19	500.73	457.34	43.391	11.540	
10,100.00	10,089.92	10,104.53	10,090.32	22.43	22.20	89.92	0.70	260.19	500.73	456.90	43.832	11.424	
10,200.00	10,189.92	10,204.53	10,190.32	22.65	22.41	89.92	0.70	260.19	500.73	456.46	44.273	11.310	
10,300.00	10,289.92	10,304.53	10,290.32	22.87	22.63	89.92	0.70	260.19	500.73	456.01	44.715	11.198	
10,400.00	10,389.92	10,404.53	10,390.32	23.09	22.85	89.92	0.70	260.19	500.73	455.57	45.156	11.089	
10,500.00	10,489.92	10,504.53	10,490.32	23.30	23.07	89.92	0.70	260.19	500.73	455.13	45.598	10.981	
10,600.00	10,589.92	10,604.53	10,590.32	23.52	23.28	89.92	0.70	260.19	500.73	454.69	46.039	10.876	
10,700.00	10,689.92	10,704.53	10,690.32	23.74	23.50	89.92	0.70	260.19	500.73	454.25	46.481	10.773	
10,800.00	10,789.92	10,804.53	10,790.32	23.96	23.72	89.92	0.70	260.19	500.73	453.81	46.923	10.671	
10,900.00	10,889.92	10,904.53	10,890.32	24.18	23.94	89.92	0.70	260.19	500.73	453.36	47.365	10.572	
11,000.00	10,989.92	11,004.53	10,990.32	24.40	24.16	89.92	0.70	260.19	500.73	452.92	47.808	10.474	
11,100.00	11,089.92	11,104.53	11,090.32	24.62	24.38	89.92	0.70	260.19	500.73	452.48	48.250	10.378	
11,200.00	11,189.92	11,204.53	11,190.32	24.84	24.60	89.92	0.70	260.19	500.73	452.04	48.693	10.283	
11,300.00	11,289.92	11,304.53	11,290.32	25.06	24.82	89.92	0.70	260.19	500.73	451.59	49.135	10.191	
11,400.00	11,389.92	11,404.53	11,390.32	25.28	25.03	89.92	0.70	260.19	500.73	451.15	49.578	10.100	
11,500.00	11,489.92	11,504.53	11,490.32	25.50	25.25	89.92	0.70	260.19	500.73	450.71	50.021	10.010	
11,600.00	11,589.92	11,604.53	11,590.32	25.72	25.47	89.92	0.70	260.19	500.73	450.27	50.464	9.922	
11,700.00	11,689.92	11,695.47	11,690.32	25.94	25.67	89.92	0.70	260.19	500.73	449.84	50.887	9.840	
11,719.12	11,709.04	11,714.59	11,709.44	25.98	25.71	89.92	0.70	260.19	500.73	449.76	50.972	9.824	

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
11,750.00	11,739.91	11,745.64	11,740.47	26.05	25.78	90.34	1.56	260.18	500.73	449.62	51.109	9.797	
11,800.00	11,789.65	11,795.90	11,790.48	26.16	25.89	90.34	6.52	260.15	500.73	449.40	51.326	9.756	
11,850.00	11,838.79	11,846.16	11,839.85	26.27	26.00	90.33	15.83	260.08	500.73	449.19	51.540	9.715	
11,900.00	11,886.93	11,896.41	11,888.20	26.37	26.11	90.31	29.43	259.97	500.73	448.97	51.752	9.676	
11,950.00	11,933.72	11,946.65	11,935.17	26.48	26.21	90.30	47.21	259.84	500.72	448.76	51.963	9.636	
12,000.00	11,978.81	11,996.87	11,980.39	26.58	26.31	90.28	69.03	259.68	500.72	448.54	52.179	9.596	
12,050.00	12,021.83	12,047.09	12,023.52	26.69	26.41	90.26	94.72	259.48	500.72	448.32	52.402	9.555	
12,100.00	12,062.48	12,097.28	12,064.22	26.79	26.51	90.24	124.07	259.26	500.71	448.08	52.640	9.512	
12,150.00	12,100.44	12,147.46	12,102.18	26.90	26.62	90.22	156.86	259.02	500.71	447.81	52.897	9.466	
12,200.00	12,135.42	12,197.62	12,137.12	27.01	26.73	90.20	192.83	258.75	500.71	447.53	53.179	9.416	
12,250.00	12,167.15	12,247.77	12,168.77	27.14	26.87	90.17	231.70	258.46	500.70	447.21	53.492	9.360	
12,300.00	12,195.40	12,297.89	12,196.88	27.29	27.02	90.14	273.17	258.14	500.70	446.86	53.841	9.300	
12,350.00	12,219.95	12,347.99	12,221.26	27.46	27.21	90.11	316.92	257.82	500.70	446.47	54.230	9.233	
12,400.00	12,240.61	12,398.06	12,241.72	27.65	27.42	90.09	362.61	257.47	500.69	446.03	54.662	9.160	
12,450.00	12,257.22	12,448.12	12,258.10	27.88	27.65	90.06	409.89	257.12	500.69	445.55	55.140	9.080	
12,500.00	12,269.66	12,498.15	12,270.29	28.13	27.91	90.03	458.40	256.75	500.68	445.02	55.663	8.995	
12,550.00	12,277.83	12,548.16	12,278.20	28.40	28.20	90.00	507.76	256.38	500.68	444.45	56.230	8.904	
12,600.00	12,281.68	12,598.14	12,281.77	28.70	28.50	89.96	557.60	256.01	500.68	443.84	56.839	8.809	
12,620.82	12,282.00	12,618.95	12,281.99	28.83	28.64	89.95	578.40	255.85	500.67	443.57	57.105	8.768	
12,700.00	12,281.76	12,701.87	12,281.75	29.37	29.21	89.95	657.58	255.26	500.67	442.45	58.219	8.600	
12,800.00	12,281.46	12,801.87	12,281.45	30.13	29.99	89.95	757.58	254.51	500.66	440.89	59.773	8.376	
12,900.00	12,281.17	12,901.87	12,281.16	30.99	30.86	89.95	857.57	253.76	500.65	439.14	61.510	8.139	
13,000.00	12,280.87	13,001.87	12,280.86	31.93	31.82	89.95	957.57	253.00	500.64	437.23	63.417	7.895	
13,100.00	12,280.57	13,101.87	12,280.56	32.95	32.85	89.95	1,057.57	252.25	500.64	435.16	65.477	7.646	
13,200.00	12,280.28	13,201.87	12,280.27	34.04	33.95	89.95	1,157.56	251.50	500.63	432.95	67.677	7.397	
13,300.00	12,279.98	13,301.87	12,279.97	35.19	35.11	89.95	1,257.56	250.75	500.62	430.62	70.004	7.151	
13,400.00	12,279.68	13,401.87	12,279.67	36.40	36.33	89.95	1,357.56	250.00	500.61	428.17	72.445	6.910	
13,500.00	12,279.39	13,501.87	12,279.38	37.67	37.61	89.95	1,457.55	249.25	500.60	425.62	74.989	6.676	
13,600.00	12,279.09	13,601.87	12,279.08	38.98	38.93	89.95	1,557.55	248.50	500.60	422.97	77.627	6.449	
13,700.00	12,278.79	13,701.87	12,278.78	40.33	40.29	89.95	1,657.55	247.75	500.59	420.24	80.349	6.230	
13,800.00	12,278.50	13,801.87	12,278.49	41.72	41.69	89.95	1,757.54	247.00	500.58	417.43	83.146	6.020	
13,900.00	12,278.20	13,901.87	12,278.19	43.14	43.12	89.95	1,857.54	246.25	500.57	414.56	86.012	5.820	
14,000.00	12,277.90	14,001.87	12,277.89	44.60	44.58	89.95	1,957.54	245.49	500.57	411.63	88.940	5.628	
14,100.00	12,277.61	14,101.87	12,277.60	46.09	46.07	89.95	2,057.53	244.74	500.56	408.63	91.923	5.445	
14,200.00	12,277.31	14,201.87	12,277.30	47.60	47.59	89.95	2,157.53	243.99	500.55	405.59	94.957	5.271	
14,300.00	12,277.01	14,301.87	12,277.00	49.13	49.13	89.95	2,257.53	243.24	500.54	402.50	98.037	5.106	
14,400.00	12,276.72	14,401.87	12,276.71	50.68	50.69	89.95	2,357.52	242.49	500.53	399.38	101.158	4.948	
14,500.00	12,276.42	14,501.87	12,276.41	52.26	52.27	89.95	2,457.52	241.74	500.53	396.21	104.318	4.798	
14,600.00	12,276.12	14,601.87	12,276.11	53.85	53.86	89.95	2,557.52	240.99	500.52	393.01	107.512	4.655	
14,700.00	12,275.83	14,701.87	12,275.82	55.46	55.48	89.95	2,657.51	240.24	500.51	389.77	110.738	4.520	
14,800.00	12,275.53	14,801.87	12,275.52	57.08	57.10	89.95	2,757.51	239.49	500.50	386.51	113.992	4.391	
14,900.00	12,275.23	14,901.87	12,275.22	58.72	58.74	89.95	2,857.51	238.74	500.49	383.22	117.273	4.268	
15,000.00	12,274.94	15,001.87	12,274.93	60.36	60.39	89.95	2,957.50	237.99	500.49	379.91	120.579	4.151	
15,100.00	12,274.64	15,101.87	12,274.63	62.02	62.06	89.95	3,057.50	237.23	500.48	376.57	123.907	4.039	
15,200.00	12,274.34	15,201.87	12,274.33	63.69	63.73	89.95	3,157.50	236.48	500.47	373.22	127.255	3.933	
15,300.00	12,274.05	15,301.87	12,274.04	65.37	65.41	89.95	3,257.49	235.73	500.46	369.84	130.623	3.831	
15,400.00	12,273.75	15,401.87	12,273.74	67.06	67.11	89.95	3,357.49	234.98	500.45	366.45	134.008	3.735	
15,500.00	12,273.45	15,501.87	12,273.44	68.76	68.81	89.95	3,457.49	234.23	500.45	363.04	137.410	3.642	
15,600.00	12,273.16	15,601.87	12,273.15	70.47	70.51	89.95	3,557.48	233.48	500.44	359.61	140.826	3.554	
15,700.00	12,272.86	15,701.87	12,272.85	72.18	72.23	89.95	3,657.48	232.73	500.43	356.17	144.257	3.469	
15,800.00	12,272.56	15,801.87	12,272.55	73.90	73.95	89.95	3,757.48	231.98	500.42	352.72	147.701	3.388	

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 #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — Offset Site Error: 0.00 usft

Survey Program: 0-MWD — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
15,900.00	12,272.27	15,901.87	12,272.26	75.62	75.68	89.95	3,857.48	231.23	500.41	349.26	151.157	3.311	
16,000.00	12,271.97	16,001.87	12,271.96	77.35	77.41	89.95	3,957.47	230.48	500.41	345.78	154.624	3.236	
16,100.00	12,271.67	16,101.87	12,271.66	79.09	79.15	89.95	4,057.47	229.72	500.40	342.30	158.102	3.165	
16,200.00	12,271.38	16,201.87	12,271.37	80.83	80.89	89.95	4,157.47	228.97	500.39	338.80	161.590	3.097	
16,300.00	12,271.08	16,301.87	12,271.07	82.58	82.64	89.95	4,257.46	228.22	500.38	335.30	165.087	3.031	
16,400.00	12,270.78	16,401.87	12,270.77	84.33	84.39	89.95	4,357.46	227.47	500.38	331.78	168.593	2.968	
16,500.00	12,270.49	16,501.87	12,270.48	86.08	86.15	89.95	4,457.46	226.72	500.37	328.26	172.108	2.907	
16,600.00	12,270.19	16,601.87	12,270.18	87.84	87.91	89.95	4,557.45	225.97	500.36	324.73	175.629	2.849	
16,700.00	12,269.89	16,698.13	12,269.88	89.61	89.61	89.95	4,657.45	225.22	500.35	321.26	179.093	2.794	
16,800.00	12,269.60	16,801.87	12,269.59	91.37	91.44	89.95	4,757.45	224.47	500.34	317.65	182.695	2.739	
16,900.00	12,269.30	16,901.87	12,269.29	93.14	93.21	89.95	4,857.44	223.72	500.34	314.10	186.237	2.687	
17,000.00	12,269.00	17,001.87	12,268.99	94.91	94.99	89.95	4,957.44	222.97	500.33	310.54	189.785	2.636	
17,100.00	12,268.71	17,101.87	12,268.70	96.69	96.76	89.95	5,057.44	222.21	500.32	306.98	193.340	2.588	
17,200.00	12,268.41	17,201.87	12,268.40	98.47	98.54	89.95	5,157.43	221.46	500.31	303.41	196.899	2.541	
17,300.00	12,268.11	17,301.87	12,268.10	100.25	100.33	89.95	5,257.43	220.71	500.30	299.84	200.464	2.496	
17,400.00	12,267.82	17,401.87	12,267.81	102.03	102.11	89.95	5,357.43	219.96	500.30	296.26	204.034	2.452	
17,500.00	12,267.52	17,501.87	12,267.51	103.82	103.90	89.95	5,457.42	219.21	500.29	292.68	207.608	2.410	
17,600.00	12,267.22	17,601.87	12,267.21	105.60	105.69	89.95	5,557.42	218.46	500.28	289.09	211.187	2.369	
17,700.00	12,266.93	17,701.87	12,266.92	107.39	107.48	89.95	5,657.42	217.71	500.27	285.50	214.769	2.329	
17,800.00	12,266.63	17,801.87	12,266.62	109.19	109.27	89.95	5,757.41	216.96	500.26	281.91	218.356	2.291	
17,900.00	12,266.33	17,901.87	12,266.32	110.98	111.06	89.95	5,857.41	216.21	500.26	278.31	221.947	2.254	
18,000.00	12,266.04	18,001.87	12,266.03	112.78	112.86	89.95	5,957.41	215.46	500.25	274.71	225.541	2.218	
18,100.00	12,265.74	18,101.87	12,265.73	114.57	114.66	89.95	6,057.40	214.70	500.24	271.10	229.138	2.183	
18,200.00	12,265.44	18,201.87	12,265.43	116.37	116.46	89.95	6,157.40	213.95	500.23	267.49	232.739	2.149	
18,300.00	12,265.15	18,301.87	12,265.14	118.17	118.26	89.95	6,257.40	213.20	500.22	263.88	236.343	2.117	
18,400.00	12,264.85	18,401.87	12,264.84	119.98	120.07	89.95	6,357.39	212.45	500.22	260.27	239.950	2.085	
18,500.00	12,264.55	18,501.87	12,264.54	121.78	121.87	89.95	6,457.39	211.70	500.21	256.65	243.560	2.054	
18,600.00	12,264.26	18,601.87	12,264.25	123.58	123.68	89.95	6,557.39	210.95	500.20	253.03	247.172	2.024	
18,700.00	12,263.96	18,701.87	12,263.95	125.39	125.48	89.95	6,657.38	210.20	500.19	249.41	250.787	1.994	
18,800.00	12,263.66	18,801.87	12,263.65	127.20	127.29	89.95	6,757.38	209.45	500.19	245.78	254.405	1.966	
18,900.00	12,263.37	18,901.87	12,263.36	129.01	129.10	89.95	6,857.38	208.70	500.18	242.15	258.025	1.938	
19,000.00	12,263.07	19,001.87	12,263.06	130.82	130.91	89.95	6,957.37	207.95	500.17	238.52	261.647	1.912	
19,100.00	12,262.77	19,101.87	12,262.76	132.63	132.72	89.95	7,057.37	207.20	500.16	234.89	265.272	1.885	
19,200.00	12,262.48	19,201.87	12,262.47	134.44	134.54	89.95	7,157.37	206.44	500.15	231.26	268.898	1.860	
19,300.00	12,262.18	19,301.87	12,262.17	136.26	136.35	89.95	7,257.36	205.69	500.15	227.62	272.527	1.835	
19,400.00	12,261.88	19,401.87	12,261.87	138.07	138.17	89.95	7,357.36	204.94	500.14	223.98	276.157	1.811	
19,500.00	12,261.59	19,501.87	12,261.58	139.89	139.98	89.95	7,457.36	204.19	500.13	220.34	279.790	1.788	
19,600.00	12,261.29	19,601.87	12,261.28	141.70	141.80	89.95	7,557.35	203.44	500.12	216.70	283.424	1.765	
19,700.00	12,260.99	19,701.87	12,260.98	143.52	143.62	89.95	7,657.35	202.69	500.11	213.05	287.060	1.742	
19,800.00	12,260.70	19,801.87	12,260.69	145.34	145.44	89.95	7,757.35	201.94	500.11	209.41	290.697	1.720	
19,900.00	12,260.40	19,901.87	12,260.39	147.16	147.26	89.95	7,857.34	201.19	500.10	205.76	294.336	1.699	
20,000.00	12,260.10	20,001.87	12,260.09	148.98	149.08	89.95	7,957.34	200.44	500.09	202.11	297.977	1.678	
20,100.00	12,259.81	20,101.87	12,259.80	150.80	150.90	89.95	8,057.34	199.69	500.08	198.46	301.619	1.658	
20,200.00	12,259.51	20,201.87	12,259.50	152.62	152.72	89.95	8,157.34	198.93	500.07	194.81	305.263	1.638	
20,300.00	12,259.21	20,301.87	12,259.20	154.44	154.54	89.95	8,257.33	198.18	500.07	191.16	308.908	1.619	
20,400.00	12,258.92	20,401.87	12,258.91	156.26	156.36	89.95	8,357.33	197.43	500.06	187.50	312.554	1.600	
20,500.00	12,258.62	20,501.87	12,258.61	158.08	158.19	89.95	8,457.33	196.68	500.05	183.85	316.202	1.581	
20,600.00	12,258.32	20,601.87	12,258.31	159.91	160.01	89.95	8,557.32	195.93	500.04	180.19	319.850	1.563	
20,700.00	12,258.03	20,701.87	12,258.02	161.73	161.84	89.95	8,657.32	195.18	500.03	176.53	323.500	1.546	
20,800.00	12,257.73	20,801.87	12,257.72	163.56	163.66	89.95	8,757.32	194.43	500.03	172.88	327.152	1.528	

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #601H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
20,900.00	12,257.43	20,901.87	12,257.42	165.38	165.49	89.95	8,857.31	193.68	500.02	169.21	330.804	1.512	
21,000.00	12,257.14	21,001.87	12,257.13	167.21	167.31	89.95	8,957.31	192.93	500.01	165.55	334.457	1.495	Level 3
21,100.00	12,256.84	21,101.87	12,256.83	169.04	169.14	89.95	9,057.31	192.18	500.00	161.89	338.112	1.479	Level 3
21,200.00	12,256.54	21,201.87	12,256.53	170.86	170.97	89.95	9,157.30	191.42	499.99	158.23	341.767	1.463	Level 3
21,300.00	12,256.25	21,301.87	12,256.24	172.69	172.80	89.95	9,257.30	190.67	499.99	154.56	345.424	1.447	Level 3
21,400.00	12,255.95	21,401.87	12,255.94	174.52	174.63	89.95	9,357.30	189.92	499.98	150.90	349.081	1.432	Level 3
21,500.00	12,255.65	21,501.87	12,255.64	176.35	176.45	89.95	9,457.29	189.17	499.97	147.23	352.739	1.417	Level 3
21,600.00	12,255.36	21,601.87	12,255.35	178.18	178.28	89.95	9,557.29	188.42	499.96	143.56	356.398	1.403	Level 3
21,700.00	12,255.06	21,701.87	12,255.05	180.01	180.11	89.95	9,657.29	187.67	499.96	139.90	360.059	1.389	Level 3
21,800.00	12,254.76	21,801.87	12,254.75	181.84	181.94	89.95	9,757.28	186.92	499.95	136.23	363.719	1.375	Level 3
21,900.00	12,254.47	21,901.87	12,254.46	183.67	183.77	89.95	9,857.28	186.17	499.94	132.56	367.381	1.361	Level 3
22,000.00	12,254.17	22,001.87	12,254.16	185.50	185.61	89.95	9,957.28	185.42	499.93	128.89	371.044	1.347	Level 3
22,100.00	12,253.87	22,101.87	12,253.86	187.33	187.44	89.95	10,057.27	184.67	499.92	125.22	374.707	1.334	Level 3
22,147.98	12,253.73	22,146.11	12,253.72	188.21	188.25	89.95	10,105.25	184.31	499.92	123.52	376.396	1.328	Level 3, SF

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #701H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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	0.10	0.10	0.00	0.00	89.24	0.40	30.00	30.00				
100.00	100.00	100.10	100.10	0.08	0.08	89.24	0.40	30.00	30.00	29.85	.158	190.419	
200.00	200.00	200.10	200.10	0.30	0.30	89.24	0.40	30.00	30.00	29.40	.607	49.420	
300.00	300.00	300.10	300.10	0.53	0.53	89.24	0.40	30.00	30.00	28.95	1.057	28.395	
400.00	400.00	400.10	400.10	0.75	0.75	89.24	0.40	30.00	30.00	28.50	1.506	19.920	
500.00	500.00	500.10	500.10	0.98	0.98	89.24	0.40	30.00	30.00	28.05	1.956	15.341	
600.00	600.00	600.10	600.10	1.20	1.20	89.24	0.40	30.00	30.00	27.60	2.405	12.474	
700.00	700.00	700.10	700.10	1.43	1.43	89.24	0.40	30.00	30.00	27.15	2.855	10.510	
800.00	800.00	800.10	800.10	1.65	1.65	89.24	0.40	30.00	30.00	26.70	3.304	9.080	
900.00	900.00	900.10	900.10	1.88	1.88	89.24	0.40	30.00	30.00	26.25	3.754	7.993	
1,000.00	1,000.00	1,000.10	1,000.10	2.10	2.10	89.24	0.40	30.00	30.00	25.80	4.203	7.138	
1,100.00	1,100.00	1,100.10	1,100.10	2.33	2.33	89.24	0.40	30.00	30.00	25.35	4.653	6.448	
1,200.00	1,200.00	1,200.10	1,200.10	2.55	2.55	89.24	0.40	30.00	30.00	24.90	5.102	5.880	CC, ES
1,300.00	1,299.99	1,300.09	1,300.09	2.76	2.78	179.27	0.40	30.00	31.31	25.77	5.538	5.654	
1,400.00	1,399.91	1,400.01	1,400.01	2.96	3.00	179.35	0.40	30.00	35.24	29.27	5.964	5.909	
1,500.00	1,499.69	1,500.21	1,499.79	3.18	3.23	179.45	0.40	30.00	41.78	35.38	6.394	6.533	
1,533.33	1,532.91	1,533.01	1,533.01	3.25	3.30	179.48	0.40	30.00	44.54	38.00	6.539	6.811	
1,600.00	1,599.32	1,600.58	1,599.42	3.40	3.45	179.54	0.40	30.00	50.35	43.52	6.829	7.373	
1,700.00	1,698.94	1,700.96	1,699.04	3.63	3.68	179.61	0.40	30.00	59.06	51.80	7.263	8.132	
1,800.00	1,798.56	1,801.34	1,798.66	3.86	3.90	179.66	0.40	30.00	67.78	60.08	7.701	8.802	
1,900.00	1,898.18	1,901.72	1,898.28	4.10	4.13	179.70	0.40	30.00	76.49	68.35	8.140	9.397	
2,000.00	1,997.80	2,002.10	1,997.90	4.34	4.35	179.73	0.40	30.00	85.21	76.63	8.582	9.929	
2,100.00	2,097.42	2,102.48	2,097.52	4.59	4.58	179.76	0.40	30.00	93.92	84.90	9.025	10.407	
2,200.00	2,197.04	2,202.86	2,197.14	4.84	4.81	179.78	0.40	30.00	102.64	93.17	9.470	10.839	
2,300.00	2,296.66	2,303.24	2,296.76	5.10	5.03	179.79	0.40	30.00	111.36	101.44	9.916	11.230	
2,400.00	2,396.28	2,403.62	2,396.38	5.35	5.26	179.81	0.40	30.00	120.07	109.71	10.363	11.587	
2,500.00	2,495.90	2,504.00	2,496.00	5.61	5.48	179.82	0.40	30.00	128.79	117.98	10.811	11.913	
2,600.00	2,595.52	2,604.38	2,595.62	5.87	5.71	179.83	0.40	30.00	137.50	126.24	11.260	12.212	
2,700.00	2,695.14	2,704.76	2,695.24	6.13	5.93	179.84	0.40	30.00	146.22	134.51	11.709	12.487	
2,800.00	2,794.76	2,805.14	2,794.86	6.39	6.16	179.85	0.40	30.00	154.93	142.77	12.160	12.742	
2,900.00	2,894.38	2,905.52	2,894.48	6.65	6.38	179.86	0.40	30.00	163.65	151.04	12.610	12.977	
3,000.00	2,994.00	3,005.90	2,994.10	6.92	6.61	179.87	0.40	30.00	172.36	159.30	13.062	13.196	
3,100.00	3,093.62	3,106.28	3,093.72	7.18	6.84	179.87	0.40	30.00	181.08	167.57	13.514	13.400	
3,200.00	3,193.23	3,206.67	3,193.33	7.45	7.06	179.88	0.40	30.00	189.80	175.83	13.966	13.590	
3,300.00	3,292.85	3,307.05	3,292.95	7.71	7.29	179.88	0.40	30.00	198.51	184.09	14.418	13.768	
3,400.00	3,392.47	3,407.43	3,392.57	7.98	7.51	179.89	0.40	30.00	207.23	192.35	14.871	13.935	
3,500.00	3,492.09	3,507.81	3,492.19	8.25	7.74	179.89	0.40	30.00	215.94	200.62	15.325	14.091	
3,600.00	3,591.71	3,608.19	3,591.81	8.51	7.96	179.90	0.40	30.00	224.66	208.88	15.778	14.238	
3,700.00	3,691.33	3,708.57	3,691.43	8.78	8.19	179.90	0.40	30.00	233.37	217.14	16.232	14.377	
3,800.00	3,790.95	3,808.95	3,791.05	9.05	8.42	179.90	0.40	30.00	242.09	225.40	16.686	14.508	
3,900.00	3,890.57	3,909.33	3,890.67	9.32	8.64	179.91	0.40	30.00	250.80	233.66	17.141	14.632	
3,959.66	3,950.00	3,950.10	3,950.10	9.48	8.73	179.91	0.40	30.00	256.00	238.63	17.369	14.739	
4,000.00	3,990.21	4,009.69	3,990.31	9.59	8.87	179.91	0.40	30.00	259.31	241.71	17.595	14.738	
4,100.00	4,090.00	4,109.90	4,090.10	9.84	9.09	179.91	0.40	30.00	265.66	247.62	18.046	14.722	
4,200.00	4,189.93	4,209.97	4,190.03	10.07	9.32	179.91	0.40	30.00	269.41	250.91	18.493	14.568	
4,292.99	4,282.91	4,283.01	4,283.01	10.26	9.48	89.92	0.40	30.00	270.54	251.68	18.856	14.348	
4,300.00	4,289.92	4,309.98	4,290.02	10.27	9.54	89.92	0.40	30.00	270.54	251.61	18.931	14.291	
4,400.00	4,389.92	4,409.98	4,390.02	10.46	9.77	89.92	0.40	30.00	270.54	251.18	19.362	13.973	
4,500.00	4,489.92	4,509.98	4,490.02	10.66	9.99	89.92	0.40	30.00	270.54	250.75	19.793	13.668	
4,600.00	4,589.92	4,609.98	4,590.02	10.85	10.22	89.92	0.40	30.00	270.54	250.31	20.226	13.376	
4,700.00	4,689.92	4,709.98	4,690.02	11.05	10.44	89.92	0.40	30.00	270.54	249.88	20.659	13.096	

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #701H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
4,800.00	4,789.92	4,809.98	4,790.02	11.24	10.67	89.92	0.40	30.00	270.54	249.45	21.093	12.826	
4,900.00	4,889.92	4,909.98	4,890.02	11.44	10.89	89.92	0.40	30.00	270.54	249.01	21.527	12.567	
5,000.00	4,989.92	5,009.98	4,990.02	11.64	11.11	89.92	0.40	30.00	270.54	248.58	21.962	12.318	
5,100.00	5,089.92	5,109.98	5,090.02	11.84	11.34	89.92	0.40	30.00	270.54	248.14	22.398	12.079	
5,200.00	5,189.92	5,209.98	5,190.02	12.04	11.56	89.92	0.40	30.00	270.54	247.70	22.834	11.848	
5,300.00	5,289.92	5,309.98	5,290.02	12.24	11.79	89.92	0.40	30.00	270.54	247.27	23.271	11.626	
5,400.00	5,389.92	5,409.98	5,390.02	12.44	12.01	89.92	0.40	30.00	270.54	246.83	23.708	11.411	
5,500.00	5,489.92	5,509.98	5,490.02	12.64	12.24	89.92	0.40	30.00	270.54	246.39	24.146	11.204	
5,600.00	5,589.92	5,609.98	5,590.02	12.85	12.46	89.92	0.40	30.00	270.54	245.95	24.584	11.005	
5,700.00	5,689.92	5,709.98	5,690.02	13.05	12.69	89.92	0.40	30.00	270.54	245.52	25.022	10.812	
5,800.00	5,789.92	5,809.98	5,790.02	13.26	12.91	89.92	0.40	30.00	270.54	245.08	25.461	10.626	
5,900.00	5,889.92	5,909.98	5,890.02	13.46	13.14	89.92	0.40	30.00	270.54	244.64	25.900	10.445	
6,000.00	5,989.92	5,990.02	5,990.02	13.67	13.32	89.92	0.40	30.00	270.54	244.24	26.295	10.289	
6,100.00	6,089.92	6,096.86	6,096.85	13.88	13.54	89.91	0.40	28.77	269.40	242.66	26.739	10.075	
6,200.00	6,189.92	6,204.31	6,204.21	14.08	13.76	89.91	0.40	24.54	265.46	238.30	27.158	9.774	
6,300.00	6,289.92	6,303.87	6,303.64	14.29	13.96	89.91	0.40	19.33	260.22	232.65	27.570	9.439	
6,400.00	6,389.92	6,403.74	6,403.37	14.50	14.16	89.91	0.40	14.10	254.99	227.01	27.984	9.112	
6,500.00	6,489.92	6,503.60	6,503.09	14.71	14.36	89.91	0.40	8.88	249.76	221.36	28.398	8.795	
6,600.00	6,589.92	6,603.46	6,602.82	14.92	14.56	89.91	0.40	3.65	244.52	215.71	28.814	8.486	
6,700.00	6,689.92	6,703.33	6,702.54	15.13	14.77	89.90	0.40	-1.58	239.29	210.06	29.231	8.186	
6,800.00	6,789.92	6,803.19	6,802.27	15.34	14.98	89.90	0.40	-6.80	234.06	204.41	29.648	7.894	
6,900.00	6,889.92	6,903.05	6,902.00	15.55	15.18	89.90	0.40	-12.03	228.82	198.76	30.067	7.610	
7,000.00	6,989.92	7,002.91	7,001.72	15.76	15.39	89.90	0.40	-17.26	223.59	193.10	30.487	7.334	
7,100.00	7,089.92	7,102.78	7,101.45	15.97	15.60	89.89	0.40	-22.48	218.36	187.45	30.907	7.065	
7,200.00	7,189.92	7,202.64	7,201.18	16.18	15.81	89.89	0.40	-27.71	213.12	181.79	31.329	6.803	
7,300.00	7,289.92	7,302.50	7,300.90	16.39	16.02	89.89	0.40	-32.94	207.89	176.14	31.751	6.547	
7,400.00	7,389.92	7,399.81	7,398.09	16.61	16.23	89.89	0.40	-37.72	202.97	170.80	32.173	6.309	
7,500.00	7,489.92	7,494.76	7,493.00	16.82	16.43	89.89	0.40	-40.32	200.24	167.65	32.589	6.144	
7,583.10	7,573.02	7,574.88	7,573.12	17.00	16.60	89.89	0.40	-40.74	199.80	166.85	32.941	6.065	
7,600.00	7,589.92	7,608.22	7,590.02	17.03	16.68	89.89	0.40	-40.74	199.80	166.74	33.053	6.045	
7,700.00	7,689.92	7,708.22	7,690.02	17.24	16.90	89.89	0.40	-40.74	199.80	166.30	33.495	5.965	
7,800.00	7,789.92	7,808.22	7,790.02	17.46	17.12	89.89	0.40	-40.74	199.80	165.86	33.938	5.887	
7,900.00	7,889.92	7,908.22	7,890.02	17.67	17.35	89.89	0.40	-40.74	199.80	165.42	34.380	5.811	
8,000.00	7,989.92	8,008.22	7,990.02	17.89	17.57	89.89	0.40	-40.74	199.80	164.97	34.823	5.737	
8,100.00	8,089.92	8,108.22	8,090.02	18.10	17.79	89.89	0.40	-40.74	199.80	164.53	35.266	5.665	
8,200.00	8,189.92	8,208.22	8,190.02	18.32	18.02	89.89	0.40	-40.74	199.80	164.09	35.710	5.595	
8,300.00	8,289.92	8,308.22	8,290.02	18.53	18.24	89.89	0.40	-40.74	199.80	163.64	36.153	5.526	
8,400.00	8,389.92	8,408.22	8,390.02	18.75	18.46	89.89	0.40	-40.74	199.80	163.20	36.596	5.459	
8,500.00	8,489.92	8,508.22	8,490.02	18.96	18.69	89.89	0.40	-40.74	199.80	162.76	37.040	5.394	
8,600.00	8,589.92	8,608.22	8,590.02	19.18	18.91	89.89	0.40	-40.74	199.80	162.31	37.484	5.330	
8,700.00	8,689.92	8,708.22	8,690.02	19.39	19.13	89.89	0.40	-40.74	199.80	161.87	37.928	5.268	
8,800.00	8,789.92	8,808.22	8,790.02	19.61	19.36	89.89	0.40	-40.74	199.80	161.42	38.372	5.207	
8,900.00	8,889.92	8,908.22	8,890.02	19.82	19.58	89.89	0.40	-40.74	199.80	160.98	38.816	5.147	
9,000.00	8,989.92	9,008.22	8,990.02	20.04	19.80	89.89	0.40	-40.74	199.80	160.53	39.261	5.089	
9,100.00	9,089.92	9,108.22	9,090.02	20.26	20.03	89.89	0.40	-40.74	199.80	160.09	39.705	5.032	
9,200.00	9,189.92	9,208.22	9,190.02	20.47	20.25	89.89	0.40	-40.74	199.80	159.65	40.150	4.976	
9,300.00	9,289.92	9,308.22	9,290.02	20.69	20.47	89.89	0.40	-40.74	199.80	159.20	40.594	4.922	
9,400.00	9,389.92	9,408.22	9,390.02	20.91	20.70	89.89	0.40	-40.74	199.80	158.76	41.039	4.868	
9,500.00	9,489.92	9,508.22	9,490.02	21.12	20.92	89.89	0.40	-40.74	199.80	158.31	41.484	4.816	
9,600.00	9,589.92	9,608.22	9,590.02	21.34	21.14	89.89	0.40	-40.74	199.80	157.87	41.929	4.765	

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #701H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
9,700.00	9,689.92	9,708.22	9,690.02	21.56	21.37	89.89	0.40	-40.74	199.80	157.42	42.374	4.715	
9,800.00	9,789.92	9,808.22	9,790.02	21.78	21.59	89.89	0.40	-40.74	199.80	156.98	42.819	4.666	
9,900.00	9,889.92	9,908.22	9,890.02	21.99	21.82	89.89	0.40	-40.74	199.80	156.53	43.264	4.618	
10,000.00	9,989.92	10,008.22	9,990.02	22.21	22.04	89.89	0.40	-40.74	199.80	156.09	43.710	4.571	
10,100.00	10,089.92	10,108.22	10,090.02	22.43	22.26	89.89	0.40	-40.74	199.80	155.64	44.155	4.525	
10,200.00	10,189.92	10,208.22	10,190.02	22.65	22.49	89.89	0.40	-40.74	199.80	155.19	44.601	4.480	
10,300.00	10,289.92	10,308.22	10,290.02	22.87	22.71	89.89	0.40	-40.74	199.80	154.75	45.046	4.435	
10,400.00	10,389.92	10,408.22	10,390.02	23.09	22.93	89.89	0.40	-40.74	199.80	154.30	45.492	4.392	
10,500.00	10,489.92	10,508.22	10,490.02	23.30	23.16	89.89	0.40	-40.74	199.80	153.86	45.938	4.349	
10,600.00	10,589.92	10,608.22	10,590.02	23.52	23.38	89.89	0.40	-40.74	199.80	153.41	46.384	4.307	
10,700.00	10,689.92	10,708.22	10,690.02	23.74	23.61	89.89	0.40	-40.74	199.80	152.97	46.830	4.266	
10,800.00	10,789.92	10,808.22	10,790.02	23.96	23.83	89.89	0.40	-40.74	199.80	152.52	47.275	4.226	
10,900.00	10,889.92	10,908.22	10,890.02	24.18	24.05	89.89	0.40	-40.74	199.80	152.07	47.722	4.187	
11,000.00	10,989.92	11,008.22	10,990.02	24.40	24.28	89.89	0.40	-40.74	199.80	151.63	48.168	4.148	
11,100.00	11,089.92	11,108.22	11,090.02	24.62	24.50	89.89	0.40	-40.74	199.80	151.18	48.614	4.110	
11,200.00	11,189.92	11,208.22	11,190.02	24.84	24.73	89.89	0.40	-40.74	199.80	150.74	49.060	4.072	
11,300.00	11,289.92	11,308.22	11,290.02	25.06	24.95	89.89	0.40	-40.74	199.80	150.29	49.506	4.036	
11,400.00	11,389.92	11,408.22	11,390.02	25.28	25.17	89.89	0.40	-40.74	199.80	149.84	49.953	4.000	
11,500.00	11,489.92	11,508.22	11,490.02	25.50	25.40	89.89	0.40	-40.74	199.80	149.40	50.399	3.964	
11,600.00	11,589.92	11,608.22	11,590.02	25.72	25.62	89.89	0.40	-40.74	199.80	148.95	50.845	3.929	
11,700.00	11,689.92	11,708.22	11,690.02	25.94	25.85	89.89	0.40	-40.74	199.80	148.50	51.292	3.895	
11,719.12	11,709.04	11,710.90	11,709.14	25.98	25.85	89.89	0.40	-40.74	199.80	148.45	51.341	3.892	
11,750.00	11,739.91	11,741.77	11,740.01	26.05	25.92	90.55	0.40	-40.74	199.80	148.32	51.478	3.881	
11,800.00	11,789.65	11,808.49	11,789.75	26.16	26.07	91.93	0.40	-40.74	199.91	148.17	51.737	3.864	
11,850.00	11,838.79	11,840.65	11,838.89	26.27	26.14	94.45	0.40	-40.74	200.43	148.51	51.917	3.861	
11,900.00	11,886.93	11,888.79	11,887.03	26.37	26.25	97.96	0.40	-40.74	201.94	149.81	52.133	3.874	
11,950.00	11,933.72	11,935.58	11,933.82	26.48	26.36	102.20	0.40	-40.74	205.24	152.89	52.347	3.921	
12,000.00	11,978.81	11,982.68	11,980.92	26.58	26.46	107.04	0.65	-40.75	211.16	158.59	52.565	4.017	
12,050.00	12,021.83	12,034.72	12,032.80	26.69	26.58	112.12	4.54	-40.77	219.34	166.55	52.792	4.155	
12,100.00	12,062.48	12,089.35	12,086.64	26.79	26.70	116.88	13.67	-40.84	229.25	176.24	53.008	4.325	
12,150.00	12,100.44	12,146.91	12,142.15	26.90	26.83	121.27	28.79	-40.95	240.49	187.28	53.209	4.520	
12,200.00	12,135.42	12,207.75	12,198.86	27.01	26.96	125.27	50.73	-41.12	252.60	199.21	53.392	4.731	
12,250.00	12,167.15	12,272.23	12,256.07	27.14	27.09	128.87	80.41	-41.34	265.11	211.55	53.560	4.950	
12,300.00	12,195.40	12,340.67	12,312.73	27.29	27.23	132.07	118.72	-41.62	277.53	223.80	53.725	5.166	
12,350.00	12,219.95	12,413.30	12,367.41	27.46	27.39	134.84	166.45	-41.98	289.37	235.46	53.904	5.368	
12,400.00	12,240.61	12,490.23	12,418.25	27.65	27.61	137.19	224.10	-42.40	300.13	246.01	54.121	5.545	
12,450.00	12,257.22	12,571.30	12,462.96	27.88	27.88	139.08	291.65	-42.90	309.34	254.93	54.403	5.686	
12,500.00	12,269.66	12,656.09	12,499.04	28.13	28.22	140.51	368.28	-43.47	316.57	261.79	54.779	5.779	
12,550.00	12,277.83	12,743.80	12,524.06	28.40	28.64	141.45	452.26	-44.10	321.45	266.18	55.268	5.816	
12,600.00	12,281.68	12,833.32	12,536.08	28.70	29.14	141.88	540.88	-44.75	323.72	267.85	55.876	5.794	
12,620.82	12,282.00	12,870.81	12,536.98	28.83	29.37	141.91	578.35	-45.03	323.87	267.70	56.162	5.767	
12,620.99	12,282.00	12,871.13	12,536.97	28.83	29.37	141.91	578.67	-45.03	323.86	267.70	56.164	5.766	
12,700.00	12,281.76	12,948.52	12,536.76	29.37	29.89	141.91	656.06	-45.61	323.87	267.18	56.690	5.713	
12,800.00	12,281.46	13,048.52	12,536.46	30.13	30.64	141.91	756.06	-46.35	323.87	266.41	57.463	5.636	
12,900.00	12,281.17	13,148.52	12,536.16	30.99	31.48	141.91	856.05	-47.09	323.87	265.53	58.337	5.552	
13,000.00	12,280.87	13,248.52	12,535.86	31.93	32.40	141.91	956.05	-47.83	323.87	264.56	59.309	5.461	
13,100.00	12,280.57	13,348.52	12,535.57	32.95	33.40	141.91	1,056.05	-48.58	323.87	263.50	60.373	5.364	
13,200.00	12,280.28	13,448.52	12,535.27	34.04	34.47	141.91	1,156.04	-49.32	323.87	262.35	61.526	5.264	
13,300.00	12,279.98	13,548.52	12,534.97	35.19	35.60	141.91	1,256.04	-50.06	323.87	261.11	62.762	5.160	
13,400.00	12,279.68	13,648.52	12,534.68	36.40	36.79	141.91	1,356.04	-50.80	323.87	259.80	64.076	5.055	
13,500.00	12,279.39	13,748.52	12,534.38	37.67	38.04	141.91	1,456.03	-51.54	323.88	258.41	65.463	4.947	

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 #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #701H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
13,600.00	12,279.09	13,848.52	12,534.08	38.98	39.33	141.91	1,556.03	-52.29	323.88	256.96	66.920	4.840	
13,700.00	12,278.79	13,948.52	12,533.79	40.33	40.67	141.91	1,656.03	-53.03	323.88	255.44	68.441	4.732	
13,800.00	12,278.50	14,048.52	12,533.49	41.72	42.04	141.91	1,756.02	-53.77	323.88	253.85	70.023	4.625	
13,900.00	12,278.20	14,148.52	12,533.19	43.14	43.45	141.91	1,856.02	-54.51	323.88	252.22	71.661	4.520	
14,000.00	12,277.90	14,248.52	12,532.90	44.60	44.89	141.91	1,956.02	-55.25	323.88	250.53	73.352	4.415	
14,100.00	12,277.61	14,348.52	12,532.60	46.09	46.37	141.91	2,056.01	-55.99	323.88	248.79	75.091	4.313	
14,200.00	12,277.31	14,448.52	12,532.30	47.60	47.86	141.91	2,156.01	-56.74	323.88	247.00	76.877	4.213	
14,300.00	12,277.01	14,548.52	12,532.01	49.13	49.38	141.91	2,256.01	-57.48	323.88	245.18	78.705	4.115	
14,400.00	12,276.72	14,648.52	12,531.71	50.68	50.93	141.91	2,356.01	-58.22	323.88	243.31	80.573	4.020	
14,500.00	12,276.42	14,748.52	12,531.41	52.26	52.49	141.91	2,456.00	-58.96	323.88	241.40	82.478	3.927	
14,600.00	12,276.12	14,848.52	12,531.12	53.85	54.07	141.91	2,556.00	-59.70	323.88	239.46	84.418	3.837	
14,700.00	12,275.83	14,948.52	12,530.82	55.46	55.67	141.91	2,656.00	-60.45	323.88	237.49	86.390	3.749	
14,800.00	12,275.53	15,048.52	12,530.52	57.08	57.28	141.91	2,755.99	-61.19	323.88	235.49	88.392	3.664	
14,900.00	12,275.23	15,148.52	12,530.23	58.72	58.91	141.91	2,855.99	-61.93	323.88	233.46	90.422	3.582	
15,000.00	12,274.94	15,248.52	12,529.93	60.36	60.55	141.91	2,955.99	-62.67	323.89	231.41	92.478	3.502	
15,100.00	12,274.64	15,348.52	12,529.63	62.02	62.20	141.90	3,055.98	-63.41	323.89	229.33	94.558	3.425	
15,200.00	12,274.34	15,448.52	12,529.34	63.69	63.87	141.90	3,155.98	-64.16	323.89	227.22	96.662	3.351	
15,300.00	12,274.05	15,548.52	12,529.04	65.37	65.54	141.90	3,255.98	-64.90	323.89	225.10	98.787	3.279	
15,400.00	12,273.75	15,648.52	12,528.74	67.06	67.22	141.90	3,355.97	-65.64	323.89	222.96	100.932	3.209	
15,500.00	12,273.45	15,748.52	12,528.45	68.76	68.91	141.90	3,455.97	-66.38	323.89	220.79	103.096	3.142	
15,600.00	12,273.16	15,848.52	12,528.15	70.47	70.61	141.90	3,555.97	-67.12	323.89	218.61	105.278	3.077	
15,700.00	12,272.86	15,948.52	12,527.85	72.18	72.32	141.90	3,655.96	-67.87	323.89	216.41	107.476	3.014	
15,800.00	12,272.56	16,048.52	12,527.56	73.90	74.03	141.90	3,755.96	-68.61	323.89	214.20	109.690	2.953	
15,900.00	12,272.27	16,148.52	12,527.26	75.62	75.75	141.90	3,855.96	-69.35	323.89	211.97	111.919	2.894	
16,000.00	12,271.97	16,248.52	12,526.96	77.35	77.48	141.90	3,955.95	-70.09	323.89	209.73	114.161	2.837	
16,100.00	12,271.67	16,348.52	12,526.67	79.09	79.21	141.90	4,055.95	-70.83	323.89	207.48	116.417	2.782	
16,200.00	12,271.38	16,448.52	12,526.37	80.83	80.95	141.90	4,155.95	-71.57	323.89	205.21	118.684	2.729	
16,300.00	12,271.08	16,548.52	12,526.07	82.58	82.69	141.90	4,255.94	-72.32	323.89	202.93	120.964	2.678	
16,400.00	12,270.78	16,648.52	12,525.78	84.33	84.43	141.90	4,355.94	-73.06	323.89	200.64	123.254	2.628	
16,500.00	12,270.49	16,748.52	12,525.48	86.08	86.18	141.90	4,455.94	-73.80	323.89	198.34	125.555	2.580	
16,600.00	12,270.19	16,848.52	12,525.18	87.84	87.94	141.90	4,555.93	-74.54	323.90	196.03	127.865	2.533	
16,700.00	12,269.89	16,948.52	12,524.89	89.61	89.70	141.90	4,655.93	-75.28	323.90	193.71	130.185	2.488	
16,800.00	12,269.60	17,048.52	12,524.59	91.37	91.46	141.90	4,755.93	-76.03	323.90	191.38	132.514	2.444	
16,900.00	12,269.30	17,148.52	12,524.29	93.14	93.23	141.90	4,855.93	-76.77	323.90	189.05	134.850	2.402	
17,000.00	12,269.00	17,248.52	12,524.00	94.91	94.99	141.90	4,955.92	-77.51	323.90	186.70	137.195	2.361	
17,100.00	12,268.71	17,348.52	12,523.70	96.69	96.77	141.90	5,055.92	-78.25	323.90	184.35	139.548	2.321	
17,200.00	12,268.41	17,448.52	12,523.40	98.47	98.54	141.90	5,155.92	-78.99	323.90	181.99	141.907	2.282	
17,300.00	12,268.11	17,548.52	12,523.10	100.25	100.32	141.90	5,255.91	-79.74	323.90	179.63	144.273	2.245	
17,400.00	12,267.82	17,648.52	12,522.81	102.03	102.10	141.90	5,355.91	-80.48	323.90	177.25	146.646	2.209	
17,500.00	12,267.52	17,748.52	12,522.51	103.82	103.88	141.90	5,455.91	-81.22	323.90	174.88	149.025	2.173	
17,600.00	12,267.22	17,848.52	12,522.21	105.60	105.67	141.90	5,555.90	-81.96	323.90	172.49	151.410	2.139	
17,700.00	12,266.93	17,948.52	12,521.92	107.39	107.45	141.90	5,655.90	-82.70	323.90	170.10	153.800	2.106	
17,800.00	12,266.63	18,048.52	12,521.62	109.19	109.24	141.90	5,755.90	-83.45	323.90	167.71	156.196	2.074	
17,900.00	12,266.33	18,148.52	12,521.32	110.98	111.04	141.90	5,855.89	-84.19	323.90	165.31	158.597	2.042	
18,000.00	12,266.04	18,248.52	12,521.03	112.78	112.83	141.90	5,955.89	-84.93	323.90	162.90	161.002	2.012	
18,100.00	12,265.74	18,348.52	12,520.73	114.57	114.62	141.90	6,055.89	-85.67	323.91	160.49	163.413	1.982	
18,200.00	12,265.44	18,448.52	12,520.43	116.37	116.42	141.90	6,155.88	-86.41	323.91	158.08	165.827	1.953	
18,300.00	12,265.15	18,548.52	12,520.14	118.17	118.22	141.90	6,255.88	-87.15	323.91	155.66	168.246	1.925	
18,400.00	12,264.85	18,648.52	12,519.84	119.98	120.02	141.90	6,355.88	-87.90	323.91	153.24	170.669	1.898	
18,500.00	12,264.55	18,748.52	12,519.54	121.78	121.82	141.90	6,455.87	-88.64	323.91	150.81	173.096	1.871	

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 #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Offset Design FEZ FED COM - #701H - OH - Plan #1 - PP — **Offset Site Error:** 0.00 usft

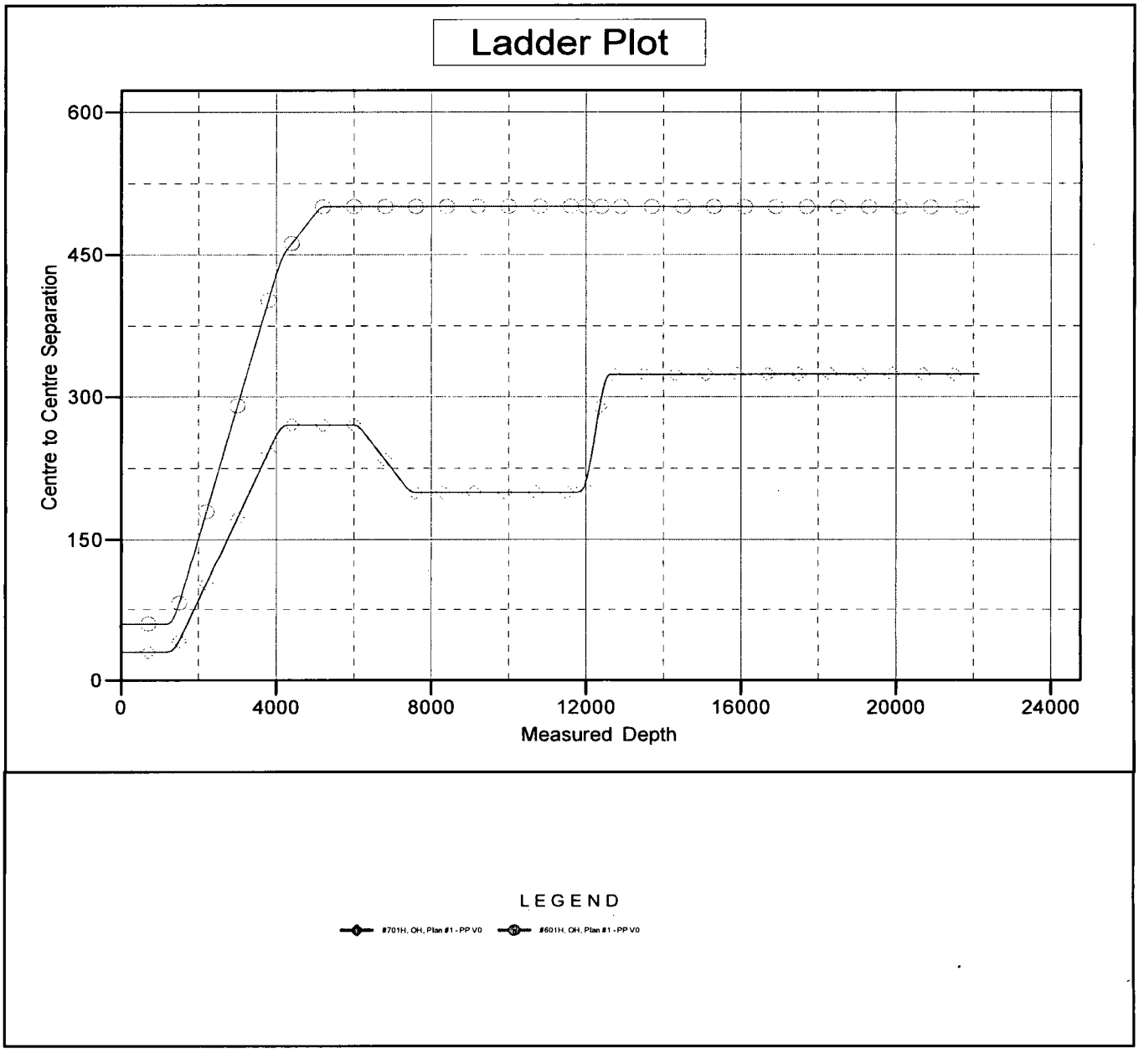
Survey Program: 0-MWD — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical 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
18,600.00	12,264.26	18,848.52	12,519.25	123.58	123.62	141.90	6,555.87	-89.38	323.91	148.38	175.527	1.845	
18,700.00	12,263.96	18,948.52	12,518.95	125.39	125.43	141.90	6,655.87	-90.12	323.91	145.95	177.962	1.820	
18,800.00	12,263.66	19,048.52	12,518.65	127.20	127.24	141.90	6,755.86	-90.86	323.91	143.51	180.399	1.796	
18,900.00	12,263.37	19,148.52	12,518.36	129.01	129.04	141.90	6,855.86	-91.61	323.91	141.07	182.840	1.772	
19,000.00	12,263.07	19,248.52	12,518.06	130.82	130.85	141.90	6,955.86	-92.35	323.91	138.63	185.285	1.748	
19,100.00	12,262.77	19,348.52	12,517.76	132.63	132.66	141.90	7,055.86	-93.09	323.91	136.18	187.732	1.725	
19,200.00	12,262.48	19,448.52	12,517.47	134.44	134.47	141.90	7,155.85	-93.83	323.91	133.73	190.182	1.703	
19,300.00	12,262.18	19,548.52	12,517.17	136.26	136.28	141.90	7,255.85	-94.57	323.91	131.28	192.636	1.681	
19,400.00	12,261.88	19,648.52	12,516.87	138.07	138.10	141.90	7,355.85	-95.32	323.91	128.82	195.091	1.660	
19,500.00	12,261.59	19,748.52	12,516.58	139.89	139.91	141.90	7,455.84	-96.06	323.91	126.36	197.550	1.640	
19,600.00	12,261.29	19,848.52	12,516.28	141.70	141.72	141.90	7,555.84	-96.80	323.92	123.90	200.011	1.619	
19,700.00	12,260.99	19,948.52	12,515.98	143.52	143.54	141.90	7,655.84	-97.54	323.92	121.44	202.474	1.600	
19,800.00	12,260.70	20,048.52	12,515.69	145.34	145.36	141.90	7,755.83	-98.28	323.92	118.98	204.940	1.581	
19,900.00	12,260.40	20,148.52	12,515.39	147.16	147.17	141.90	7,855.83	-99.03	323.92	116.51	207.408	1.562	
20,000.00	12,260.10	20,248.52	12,515.09	148.98	148.99	141.90	7,955.83	-99.77	323.92	114.04	209.878	1.543	
20,100.00	12,259.81	20,348.52	12,514.80	150.80	150.81	141.90	8,055.82	-100.51	323.92	111.57	212.351	1.525	
20,200.00	12,259.51	20,448.52	12,514.50	152.62	152.63	141.90	8,155.82	-101.25	323.92	109.09	214.825	1.508	
20,300.00	12,259.21	20,548.52	12,514.20	154.44	154.45	141.90	8,255.82	-101.99	323.92	106.62	217.301	1.491	Level 3
20,400.00	12,258.92	20,648.52	12,513.91	156.26	156.27	141.90	8,355.81	-102.73	323.92	104.14	219.780	1.474	Level 3
20,500.00	12,258.62	20,748.52	12,513.61	158.08	158.09	141.90	8,455.81	-103.48	323.92	101.66	222.260	1.457	Level 3
20,600.00	12,258.32	20,848.52	12,513.31	159.91	159.92	141.90	8,555.81	-104.22	323.92	99.18	224.742	1.441	Level 3
20,700.00	12,258.03	20,948.52	12,513.02	161.73	161.74	141.90	8,655.80	-104.96	323.92	96.70	227.225	1.426	Level 3
20,800.00	12,257.73	21,048.52	12,512.72	163.56	163.56	141.90	8,755.80	-105.70	323.92	94.21	229.710	1.410	Level 3
20,900.00	12,257.43	21,148.52	12,512.42	165.38	165.39	141.90	8,855.80	-106.44	323.92	91.73	232.197	1.395	Level 3
21,000.00	12,257.14	21,248.52	12,512.13	167.21	167.21	141.90	8,955.79	-107.19	323.92	89.24	234.686	1.380	Level 3
21,100.00	12,256.84	21,348.52	12,511.83	169.04	169.04	141.89	9,055.79	-107.93	323.93	86.75	237.176	1.366	Level 3
21,200.00	12,256.54	21,448.52	12,511.53	170.86	170.86	141.89	9,155.79	-108.67	323.93	84.26	239.667	1.352	Level 3
21,300.00	12,256.25	21,548.52	12,511.24	172.69	172.69	141.89	9,255.79	-109.41	323.93	81.77	242.160	1.338	Level 3
21,400.00	12,255.95	21,648.52	12,510.94	174.52	174.52	141.89	9,355.78	-110.15	323.93	79.27	244.654	1.324	Level 3
21,500.00	12,255.65	21,748.52	12,510.64	176.35	176.35	141.89	9,455.78	-110.90	323.93	76.78	247.149	1.311	Level 3
21,600.00	12,255.36	21,848.52	12,510.35	178.18	178.17	141.89	9,555.78	-111.64	323.93	74.28	249.646	1.298	Level 3
21,700.00	12,255.06	21,948.52	12,510.05	180.01	180.00	141.89	9,655.77	-112.38	323.93	71.78	252.144	1.285	Level 3
21,800.00	12,254.76	22,048.52	12,509.75	181.84	181.83	141.89	9,755.77	-113.12	323.93	69.29	254.644	1.272	Level 3
21,900.00	12,254.47	22,148.52	12,509.45	183.67	183.66	141.89	9,855.77	-113.86	323.93	66.79	257.144	1.260	Level 3
22,000.00	12,254.17	22,248.52	12,509.16	185.50	185.49	141.89	9,955.76	-114.61	323.93	64.29	259.646	1.248	Level 2
22,100.00	12,253.87	22,348.52	12,508.86	187.33	187.32	141.89	10,055.76	-115.35	323.93	61.78	262.148	1.236	Level 2
22,147.98	12,253.73	22,396.50	12,508.72	188.21	188.20	141.89	10,103.74	-115.70	323.93	60.58	263.350	1.230	Level 2, SF

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB @ 3273.50usft (Scandrill Quest
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

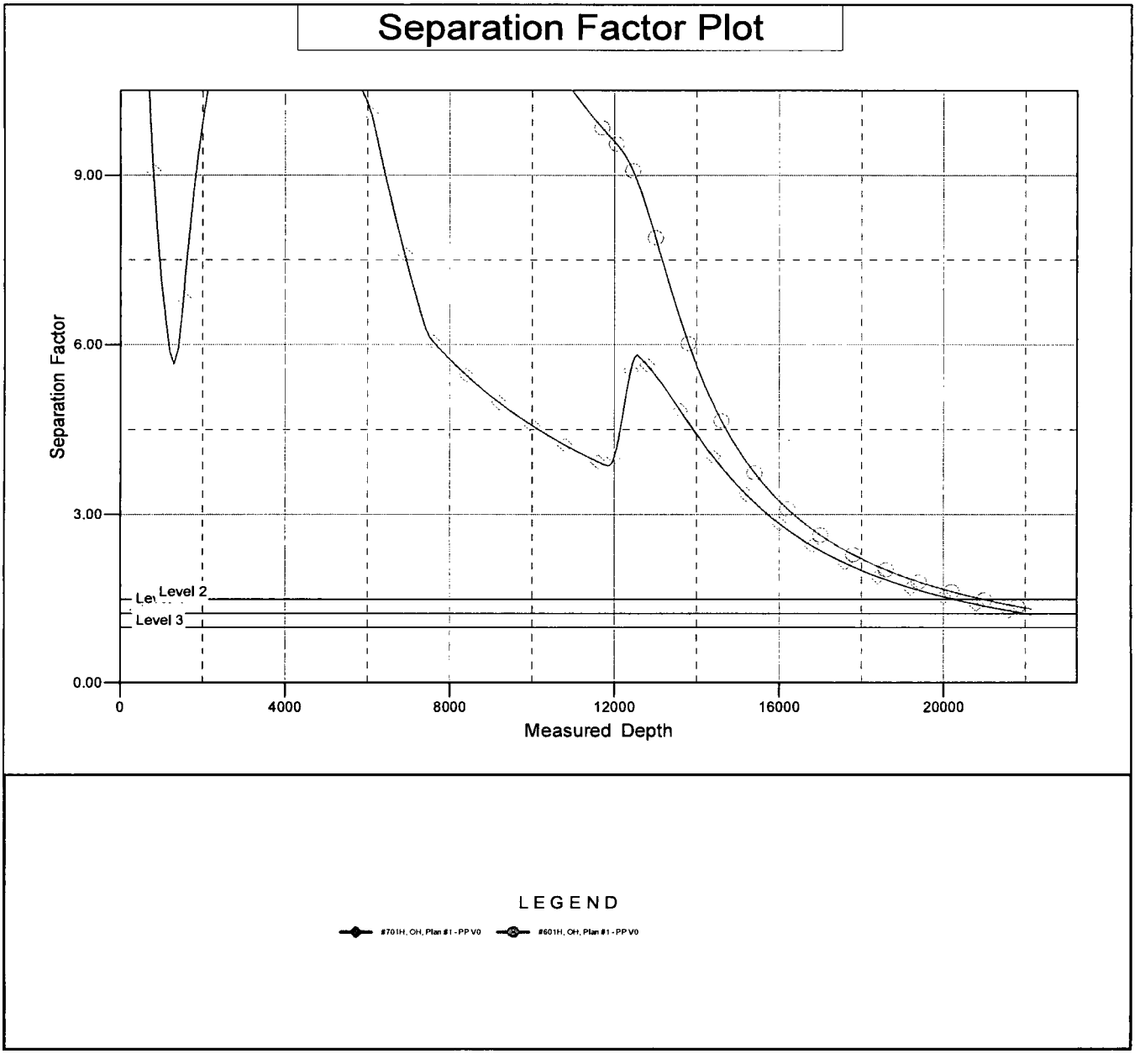
Coordinates are relative to: #602H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.51°



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 #602H
Project:	Lea County, NM (NAD27) NMEZ	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Reference Site:	FEZ FED COM	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.000 sigma
Reference Wellbore	OH	**Database:**	EDM 5000.14 Single User Db
Reference Design:	Plan #1 - PP	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB @ 3273.50usft (Scandrill Quest	Coordinates are relative to: #602H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.51°



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

COG OPERATING, LLC

Lea County, NM (NAD27) NMEZ
FEZ FED COM #602H
SHL: 280' FSL, 1,690' FWL, Sec 9, T-25S, R-35E, Unit N
PP: 330' FSL, 1,450' FWL, Sec 9, T-25S, R-35E, Unit N
PBHL: 200' FNL, 1,450' FWL, Sec 4, T-25S, R-35E, Unit 3

Plan: Plan #1 - PP

Standard Planning Report

05 March, 2018

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

Project	Lea County, NM (NAD27) NMEZ		
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	FEZ FED COM				
Site Position:		**Northing:**	415,342.20 usft	**Latitude:**	32° 8' 17.810 N
From:	Map	**Easting:**	795,972.50 usft	**Longitude:**	103° 22' 37.735 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.51 °

Well	#602H					
Well Position	**+N/-S**	5.40 usft	**Northing:**	415,347.60 usft	**Latitude:**	32° 8' 17.808 N
	+E/-W	635.00 usft	**Easting:**	796,607.50 usft	**Longitude:**	103° 22' 30.350 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,243.50 usft

Wellbore	OH				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	03/05/18	6.78	60.01	47,835.49842451

Design	Plan #1 - PP				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	359.57	

Plan Survey Tool Program **Date** 03/05/18

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	22,147.82	Plan #1 - PP (OH)	MWD	
				MWD v3:standard declination	

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

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	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,533.33	5.00	270.00	1,532.91	0.00	-14.54	1.50	1.50	0.00	270.00	
3,959.66	5.00	270.00	3,950.00	0.00	-226.00	0.00	0.00	0.00	0.00	
4,292.99	0.00	0.00	4,282.91	0.00	-240.54	1.50	-1.50	0.00	180.00	
11,719.12	0.00	0.00	11,709.04	0.00	-240.54	0.00	0.00	0.00	0.00	
12,620.82	90.17	359.57	12,282.00	574.64	-244.81	10.00	10.00	-0.05	359.57	
22,147.98	90.17	359.57	12,253.73	10,101.50	-315.60	0.00	0.00	0.00	0.00	

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

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
SHL(FFC#602H)									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
Start of Nudge: 5° INC, 270°AZ/@1.5°DLS									
1,300.00	1.50	270.00	1,299.99	0.00	-1.31	0.01	1.50	1.50	0.00
1,400.00	3.00	270.00	1,399.91	0.00	-5.23	0.04	1.50	1.50	0.00
1,500.00	4.50	270.00	1,499.69	0.00	-11.77	0.09	1.50	1.50	0.00
1,533.33	5.00	270.00	1,532.91	0.00	-14.54	0.11	1.50	1.50	0.00
1,600.00	5.00	270.00	1,599.32	0.00	-20.35	0.15	0.00	0.00	0.00
1,700.00	5.00	270.00	1,698.94	0.00	-29.06	0.22	0.00	0.00	0.00
1,800.00	5.00	270.00	1,798.56	0.00	-37.78	0.28	0.00	0.00	0.00
1,900.00	5.00	270.00	1,898.18	0.00	-46.49	0.35	0.00	0.00	0.00
2,000.00	5.00	270.00	1,997.80	0.00	-55.21	0.41	0.00	0.00	0.00
2,100.00	5.00	270.00	2,097.42	0.00	-63.92	0.48	0.00	0.00	0.00
2,200.00	5.00	270.00	2,197.04	0.00	-72.64	0.55	0.00	0.00	0.00
2,300.00	5.00	270.00	2,296.66	0.00	-81.35	0.61	0.00	0.00	0.00
2,400.00	5.00	270.00	2,396.28	0.00	-90.07	0.68	0.00	0.00	0.00
2,500.00	5.00	270.00	2,495.90	0.00	-98.79	0.74	0.00	0.00	0.00
2,600.00	5.00	270.00	2,595.52	0.00	-107.50	0.81	0.00	0.00	0.00
2,700.00	5.00	270.00	2,695.14	0.00	-116.22	0.87	0.00	0.00	0.00
2,800.00	5.00	270.00	2,794.76	0.00	-124.93	0.94	0.00	0.00	0.00
2,900.00	5.00	270.00	2,894.38	0.00	-133.65	1.00	0.00	0.00	0.00
3,000.00	5.00	270.00	2,994.00	0.00	-142.36	1.07	0.00	0.00	0.00
3,100.00	5.00	270.00	3,093.62	0.00	-151.08	1.13	0.00	0.00	0.00
3,200.00	5.00	270.00	3,193.23	0.00	-159.79	1.20	0.00	0.00	0.00
3,300.00	5.00	270.00	3,292.85	0.00	-168.51	1.26	0.00	0.00	0.00
3,400.00	5.00	270.00	3,392.47	0.00	-177.23	1.33	0.00	0.00	0.00
3,500.00	5.00	270.00	3,492.09	0.00	-185.94	1.40	0.00	0.00	0.00
3,600.00	5.00	270.00	3,591.71	0.00	-194.66	1.46	0.00	0.00	0.00
3,700.00	5.00	270.00	3,691.33	0.00	-203.37	1.53	0.00	0.00	0.00
3,800.00	5.00	270.00	3,790.95	0.00	-212.09	1.59	0.00	0.00	0.00
3,900.00	5.00	270.00	3,890.57	0.00	-220.80	1.66	0.00	0.00	0.00
3,959.66	5.00	270.00	3,950.00	0.00	-226.00	1.70	0.00	0.00	0.00
Drop to Vertical /@1.5°DLS									
4,000.00	4.39	270.00	3,990.21	0.00	-229.31	1.72	1.50	-1.50	0.00
4,100.00	2.89	270.00	4,090.00	0.00	-235.66	1.77	1.50	-1.50	0.00
4,200.00	1.39	270.00	4,189.93	0.00	-239.41	1.80	1.50	-1.50	0.00
4,292.99	0.00	0.00	4,282.91	0.00	-240.54	1.81	1.50	-1.50	0.00
4,300.00	0.00	0.00	4,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
4,400.00	0.00	0.00	4,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
4,500.00	0.00	0.00	4,489.92	0.00	-240.54	1.81	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

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)
4,600.00	0.00	0.00	4,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
4,700.00	0.00	0.00	4,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
4,800.00	0.00	0.00	4,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
4,900.00	0.00	0.00	4,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,000.00	0.00	0.00	4,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,100.00	0.00	0.00	5,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,200.00	0.00	0.00	5,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,300.00	0.00	0.00	5,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,400.00	0.00	0.00	5,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,500.00	0.00	0.00	5,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,600.00	0.00	0.00	5,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,700.00	0.00	0.00	5,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,800.00	0.00	0.00	5,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
5,900.00	0.00	0.00	5,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,000.00	0.00	0.00	5,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,100.00	0.00	0.00	6,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,200.00	0.00	0.00	6,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,300.00	0.00	0.00	6,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,400.00	0.00	0.00	6,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,500.00	0.00	0.00	6,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,600.00	0.00	0.00	6,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,700.00	0.00	0.00	6,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,800.00	0.00	0.00	6,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
6,900.00	0.00	0.00	6,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,000.00	0.00	0.00	6,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,100.00	0.00	0.00	7,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,200.00	0.00	0.00	7,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,300.00	0.00	0.00	7,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,400.00	0.00	0.00	7,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,500.00	0.00	0.00	7,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,600.00	0.00	0.00	7,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,700.00	0.00	0.00	7,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,800.00	0.00	0.00	7,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
7,900.00	0.00	0.00	7,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,000.00	0.00	0.00	7,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,100.00	0.00	0.00	8,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,200.00	0.00	0.00	8,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,300.00	0.00	0.00	8,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,400.00	0.00	0.00	8,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,500.00	0.00	0.00	8,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,600.00	0.00	0.00	8,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,700.00	0.00	0.00	8,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,800.00	0.00	0.00	8,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
8,900.00	0.00	0.00	8,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,000.00	0.00	0.00	8,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,100.00	0.00	0.00	9,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,200.00	0.00	0.00	9,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,300.00	0.00	0.00	9,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,400.00	0.00	0.00	9,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,500.00	0.00	0.00	9,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,600.00	0.00	0.00	9,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,700.00	0.00	0.00	9,689.92	0.00	-240.54	1.81	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,800.00	0.00	0.00	9,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
9,900.00	0.00	0.00	9,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,000.00	0.00	0.00	9,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,100.00	0.00	0.00	10,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,200.00	0.00	0.00	10,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,300.00	0.00	0.00	10,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,400.00	0.00	0.00	10,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,500.00	0.00	0.00	10,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,600.00	0.00	0.00	10,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,700.00	0.00	0.00	10,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,800.00	0.00	0.00	10,789.92	0.00	-240.54	1.81	0.00	0.00	0.00
10,900.00	0.00	0.00	10,889.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,000.00	0.00	0.00	10,989.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,100.00	0.00	0.00	11,089.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,200.00	0.00	0.00	11,189.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,300.00	0.00	0.00	11,289.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,400.00	0.00	0.00	11,389.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,500.00	0.00	0.00	11,489.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,600.00	0.00	0.00	11,589.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,700.00	0.00	0.00	11,689.92	0.00	-240.54	1.81	0.00	0.00	0.00
11,719.12	0.00	0.00	11,709.04	0.00	-240.54	1.81	0.00	0.00	0.00
KOP: 11719.12' MD, 11709.04' TVD - Build at 10°/100ft to 90.17° INC @ 359.57° AZ									
11,750.00	3.09	359.57	11,739.91	0.83	-240.54	2.64	10.00	10.00	0.00
11,800.00	8.09	359.57	11,789.65	5.70	-240.58	7.50	10.00	10.00	0.00
11,850.00	13.09	359.57	11,838.79	14.88	-240.65	16.69	10.00	10.00	0.00
11,900.00	18.09	359.57	11,886.93	28.31	-240.75	30.12	10.00	10.00	0.00
11,950.00	23.09	359.57	11,933.72	45.89	-240.88	47.70	10.00	10.00	0.00
12,000.00	28.09	359.57	11,978.81	67.48	-241.04	69.29	10.00	10.00	0.00
12,050.00	33.09	359.57	12,021.83	92.91	-241.23	94.72	10.00	10.00	0.00
12,100.00	38.09	359.57	12,062.48	122.00	-241.44	123.81	10.00	10.00	0.00
12,150.00	43.09	359.57	12,100.44	154.52	-241.69	156.33	10.00	10.00	0.00
12,200.00	48.09	359.57	12,135.42	190.22	-241.95	192.03	10.00	10.00	0.00
FTP(FFC#602H)									
12,250.00	53.09	359.57	12,167.15	228.84	-242.24	230.65	10.00	10.00	0.00
12,300.00	58.09	359.57	12,195.40	270.08	-242.55	271.89	10.00	10.00	0.00
12,350.00	63.09	359.57	12,219.95	313.62	-242.87	315.43	10.00	10.00	0.00
12,400.00	68.09	359.57	12,240.61	359.13	-243.21	360.95	10.00	10.00	0.00
12,450.00	73.09	359.57	12,257.22	406.27	-243.56	408.09	10.00	10.00	0.00
12,500.00	78.09	359.57	12,269.66	454.68	-243.92	456.50	10.00	10.00	0.00
12,550.00	83.09	359.57	12,277.83	503.99	-244.28	505.81	10.00	10.00	0.00
12,600.00	88.09	359.57	12,281.68	553.83	-244.65	555.65	10.00	10.00	0.00
12,620.82	90.17	359.57	12,282.00	574.64	-244.81	576.46	10.00	10.00	0.00
EOC: 12620.82' MD, 12282.00' TVD, 90.17° INC, 359.57° AZ, 576.46' VS									
12,700.00	90.17	359.57	12,281.76	653.82	-245.40	655.64	0.00	0.00	0.00
12,800.00	90.17	359.57	12,281.46	753.82	-246.14	755.64	0.00	0.00	0.00
12,900.00	90.17	359.57	12,281.17	853.81	-246.88	855.64	0.00	0.00	0.00
13,000.00	90.17	359.57	12,280.87	953.81	-247.63	955.64	0.00	0.00	0.00
13,100.00	90.17	359.57	12,280.57	1,053.81	-248.37	1,055.64	0.00	0.00	0.00
13,200.00	90.17	359.57	12,280.28	1,153.80	-249.11	1,155.64	0.00	0.00	0.00
13,300.00	90.17	359.57	12,279.98	1,253.80	-249.85	1,255.64	0.00	0.00	0.00
13,400.00	90.17	359.57	12,279.68	1,353.80	-250.60	1,355.64	0.00	0.00	0.00
13,500.00	90.17	359.57	12,279.39	1,453.80	-251.34	1,455.64	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,600.00	90.17	359.57	12,279.09	1,553.79	-252.08	1,555.64	0.00	0.00	0.00
13,700.00	90.17	359.57	12,278.79	1,653.79	-252.83	1,655.64	0.00	0.00	0.00
13,800.00	90.17	359.57	12,278.50	1,753.79	-253.57	1,755.64	0.00	0.00	0.00
13,900.00	90.17	359.57	12,278.20	1,853.78	-254.31	1,855.64	0.00	0.00	0.00
14,000.00	90.17	359.57	12,277.90	1,953.78	-255.06	1,955.64	0.00	0.00	0.00
14,100.00	90.17	359.57	12,277.61	2,053.78	-255.80	2,055.64	0.00	0.00	0.00
14,200.00	90.17	359.57	12,277.31	2,153.77	-256.54	2,155.64	0.00	0.00	0.00
14,300.00	90.17	359.57	12,277.01	2,253.77	-257.29	2,255.64	0.00	0.00	0.00
14,400.00	90.17	359.57	12,276.72	2,353.77	-258.03	2,355.64	0.00	0.00	0.00
14,500.00	90.17	359.57	12,276.42	2,453.76	-258.77	2,455.64	0.00	0.00	0.00
14,600.00	90.17	359.57	12,276.12	2,553.76	-259.51	2,555.64	0.00	0.00	0.00
14,700.00	90.17	359.57	12,275.83	2,653.76	-260.26	2,655.64	0.00	0.00	0.00
14,800.00	90.17	359.57	12,275.53	2,753.75	-261.00	2,755.63	0.00	0.00	0.00
14,900.00	90.17	359.57	12,275.23	2,853.75	-261.74	2,855.63	0.00	0.00	0.00
15,000.00	90.17	359.57	12,274.94	2,953.75	-262.49	2,955.63	0.00	0.00	0.00
15,100.00	90.17	359.57	12,274.64	3,053.74	-263.23	3,055.63	0.00	0.00	0.00
15,200.00	90.17	359.57	12,274.34	3,153.74	-263.97	3,155.63	0.00	0.00	0.00
15,300.00	90.17	359.57	12,274.05	3,253.74	-264.72	3,255.63	0.00	0.00	0.00
15,400.00	90.17	359.57	12,273.75	3,353.73	-265.46	3,355.63	0.00	0.00	0.00
15,500.00	90.17	359.57	12,273.45	3,453.73	-266.20	3,455.63	0.00	0.00	0.00
15,600.00	90.17	359.57	12,273.16	3,553.73	-266.95	3,555.63	0.00	0.00	0.00
15,700.00	90.17	359.57	12,272.86	3,653.72	-267.69	3,655.63	0.00	0.00	0.00
15,800.00	90.17	359.57	12,272.56	3,753.72	-268.43	3,755.63	0.00	0.00	0.00
15,900.00	90.17	359.57	12,272.27	3,853.72	-269.17	3,855.63	0.00	0.00	0.00
16,000.00	90.17	359.57	12,271.97	3,953.72	-269.92	3,955.63	0.00	0.00	0.00
16,100.00	90.17	359.57	12,271.67	4,053.71	-270.66	4,055.63	0.00	0.00	0.00
16,200.00	90.17	359.57	12,271.38	4,153.71	-271.40	4,155.63	0.00	0.00	0.00
16,300.00	90.17	359.57	12,271.08	4,253.71	-272.15	4,255.63	0.00	0.00	0.00
16,400.00	90.17	359.57	12,270.78	4,353.70	-272.89	4,355.63	0.00	0.00	0.00
16,500.00	90.17	359.57	12,270.49	4,453.70	-273.63	4,455.63	0.00	0.00	0.00
16,600.00	90.17	359.57	12,270.19	4,553.70	-274.38	4,555.63	0.00	0.00	0.00
16,700.00	90.17	359.57	12,269.89	4,653.69	-275.12	4,655.63	0.00	0.00	0.00
16,800.00	90.17	359.57	12,269.60	4,753.69	-275.86	4,755.63	0.00	0.00	0.00
16,900.00	90.17	359.57	12,269.30	4,853.69	-276.60	4,855.63	0.00	0.00	0.00
17,000.00	90.17	359.57	12,269.00	4,953.68	-277.35	4,955.63	0.00	0.00	0.00
17,100.00	90.17	359.57	12,268.71	5,053.68	-278.09	5,055.62	0.00	0.00	0.00
17,200.00	90.17	359.57	12,268.41	5,153.68	-278.83	5,155.62	0.00	0.00	0.00
17,300.00	90.17	359.57	12,268.11	5,253.67	-279.58	5,255.62	0.00	0.00	0.00
17,400.00	90.17	359.57	12,267.82	5,353.67	-280.32	5,355.62	0.00	0.00	0.00
17,500.00	90.17	359.57	12,267.52	5,453.67	-281.06	5,455.62	0.00	0.00	0.00
17,600.00	90.17	359.57	12,267.22	5,553.66	-281.81	5,555.62	0.00	0.00	0.00
17,700.00	90.17	359.57	12,266.93	5,653.66	-282.55	5,655.62	0.00	0.00	0.00
17,800.00	90.17	359.57	12,266.63	5,753.66	-283.29	5,755.62	0.00	0.00	0.00
17,900.00	90.17	359.57	12,266.33	5,853.65	-284.04	5,855.62	0.00	0.00	0.00
18,000.00	90.17	359.57	12,266.04	5,953.65	-284.78	5,955.62	0.00	0.00	0.00
18,100.00	90.17	359.57	12,265.74	6,053.65	-285.52	6,055.62	0.00	0.00	0.00
18,200.00	90.17	359.57	12,265.44	6,153.64	-286.26	6,155.62	0.00	0.00	0.00
18,300.00	90.17	359.57	12,265.15	6,253.64	-287.01	6,255.62	0.00	0.00	0.00
18,400.00	90.17	359.57	12,264.85	6,353.64	-287.75	6,355.62	0.00	0.00	0.00
18,500.00	90.17	359.57	12,264.55	6,453.64	-288.49	6,455.62	0.00	0.00	0.00
18,600.00	90.17	359.57	12,264.26	6,553.63	-289.24	6,555.62	0.00	0.00	0.00
18,700.00	90.17	359.57	12,263.96	6,653.63	-289.98	6,655.62	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
18,800.00	90.17	359.57	12,263.66	6,753.63	-290.72	6,755.62	0.00	0.00	0.00
18,900.00	90.17	359.57	12,263.37	6,853.62	-291.47	6,855.62	0.00	0.00	0.00
19,000.00	90.17	359.57	12,263.07	6,953.62	-292.21	6,955.62	0.00	0.00	0.00
19,100.00	90.17	359.57	12,262.77	7,053.62	-292.95	7,055.62	0.00	0.00	0.00
19,200.00	90.17	359.57	12,262.48	7,153.61	-293.69	7,155.62	0.00	0.00	0.00
19,300.00	90.17	359.57	12,262.18	7,253.61	-294.44	7,255.62	0.00	0.00	0.00
19,400.00	90.17	359.57	12,261.88	7,353.61	-295.18	7,355.61	0.00	0.00	0.00
19,500.00	90.17	359.57	12,261.59	7,453.60	-295.92	7,455.61	0.00	0.00	0.00
19,600.00	90.17	359.57	12,261.29	7,553.60	-296.67	7,555.61	0.00	0.00	0.00
19,700.00	90.17	359.57	12,260.99	7,653.60	-297.41	7,655.61	0.00	0.00	0.00
19,800.00	90.17	359.57	12,260.70	7,753.59	-298.15	7,755.61	0.00	0.00	0.00
19,900.00	90.17	359.57	12,260.40	7,853.59	-298.90	7,855.61	0.00	0.00	0.00
20,000.00	90.17	359.57	12,260.10	7,953.59	-299.64	7,955.61	0.00	0.00	0.00
20,100.00	90.17	359.57	12,259.81	8,053.58	-300.38	8,055.61	0.00	0.00	0.00
20,200.00	90.17	359.57	12,259.51	8,153.58	-301.13	8,155.61	0.00	0.00	0.00
20,300.00	90.17	359.57	12,259.21	8,253.58	-301.87	8,255.61	0.00	0.00	0.00
20,400.00	90.17	359.57	12,258.92	8,353.57	-302.61	8,355.61	0.00	0.00	0.00
20,500.00	90.17	359.57	12,258.62	8,453.57	-303.35	8,455.61	0.00	0.00	0.00
20,600.00	90.17	359.57	12,258.32	8,553.57	-304.10	8,555.61	0.00	0.00	0.00
20,700.00	90.17	359.57	12,258.03	8,653.56	-304.84	8,655.61	0.00	0.00	0.00
20,800.00	90.17	359.57	12,257.73	8,753.56	-305.58	8,755.61	0.00	0.00	0.00
20,900.00	90.17	359.57	12,257.43	8,853.56	-306.33	8,855.61	0.00	0.00	0.00
21,000.00	90.17	359.57	12,257.14	8,953.56	-307.07	8,955.61	0.00	0.00	0.00
21,100.00	90.17	359.57	12,256.84	9,053.55	-307.81	9,055.61	0.00	0.00	0.00
21,200.00	90.17	359.57	12,256.54	9,153.55	-308.56	9,155.61	0.00	0.00	0.00
21,300.00	90.17	359.57	12,256.25	9,253.55	-309.30	9,255.61	0.00	0.00	0.00
21,400.00	90.17	359.57	12,255.95	9,353.54	-310.04	9,355.61	0.00	0.00	0.00
21,500.00	90.17	359.57	12,255.65	9,453.54	-310.79	9,455.61	0.00	0.00	0.00
21,600.00	90.17	359.57	12,255.36	9,553.54	-311.53	9,555.60	0.00	0.00	0.00
21,700.00	90.17	359.57	12,255.06	9,653.53	-312.27	9,655.60	0.00	0.00	0.00
21,800.00	90.17	359.57	12,254.76	9,753.53	-313.01	9,755.60	0.00	0.00	0.00
21,900.00	90.17	359.57	12,254.47	9,853.53	-313.76	9,855.60	0.00	0.00	0.00
22,000.00	90.17	359.57	12,254.17	9,953.52	-314.50	9,955.60	0.00	0.00	0.00
22,100.00	90.17	359.57	12,253.87	10,053.52	-315.24	10,055.60	0.00	0.00	0.00
LTP(FFC#602H)									
22,147.98	90.17	359.57	12,253.73	10,101.50	-315.60	10,103.58	0.00	0.00	0.00
TD: 22147.98' MD, 12253.73' TVD - PBHL(FFC#602H)									

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #602H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Project:	Lea County, NM (NAD27) NMEZ	**MD Reference:**	RKB @ 3273.50usft (Scandrill Quest - KB=30')
Site:	FEZ FED COM	**North Reference:**	Grid
Well:	#602H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - PP		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL(FFC#602H) - plan hits target center - Point	0.00	0.01	0.00	0.00	0.00	415,347.60	796,607.50	32° 8' 17.808 N	103° 22' 30.350 W
LTP(FFC#602H) - plan misses target center by 10.51usft at 22100.00usft MD (12253.87 TVD, 10053.52 N, -315.24 E) - Point	0.00	0.00	12,253.73	10,064.02	-315.44	425,411.62	796,292.06	32° 9' 57.420 N	103° 22' 32.977 W
PBHL(FFC#602H) - plan hits target center - Point	0.00	0.00	12,253.73	10,101.50	-315.60	425,449.10	796,291.90	32° 9' 57.791 N	103° 22' 32.975 W
FTP(FFC#602H) - plan misses target center by 204.17usft at 12200.00usft MD (12135.42 TVD, 190.22 N, -241.95 E) - Point	0.00	0.00	12,282.00	48.11	-240.29	415,395.71	796,367.21	32° 8' 18.305 N	103° 22' 33.139 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,200.00	1,200.00	0.00	0.00	Start of Nudge: 5° INC, 270°AZ/@1.5°DLS
3,959.66	3,950.00	0.00	-226.00	Drop to Vertical /@1.5°DLS
11,719.12	11,709.04	0.00	-240.54	KOP: 11719.12' MD, 11709.04' TVD
11,719.12	11,709.04	0.00	-240.54	Build at 10°/100ft to 90.17° INC @ 359.57° AZ
12,620.82	12,282.00	574.64	-244.81	EOC: 12620.82' MD, 12282.00' TVD, 90.17° INC, 359.57° AZ, 576.46' VS
22,147.98	12,253.73	10,101.50	-315.60	TD: 22147.98' MD, 12253.73' TVD

CONCHO

WELL DETAILS: #602H

Ground Elevation:: 3243.50
RKB Elevation: RKB @ 3273.50usft (Scandrill Quest - KB=30')
Rig Name: Scandrill Quest - KB=30'

COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: FEZ FED COM
Well: #602H
Wellbore: OH
Plan: Plan #1 - PP (#602H/OH)

Surface Hole Location			
Northing	Easting	Latitude	Longitude
415347.60	796607.50	32° 8' 17.808 N	103° 22' 30.350 W

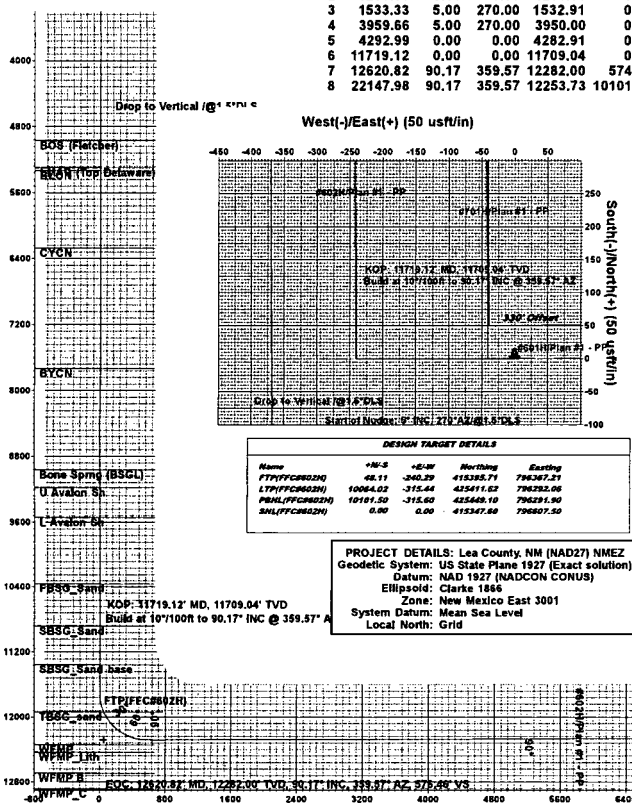
G
T M

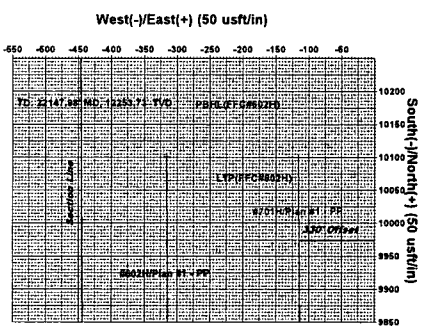
Azimuths to Grid North
True North: -0.51°
Magnetic North: 6.27°

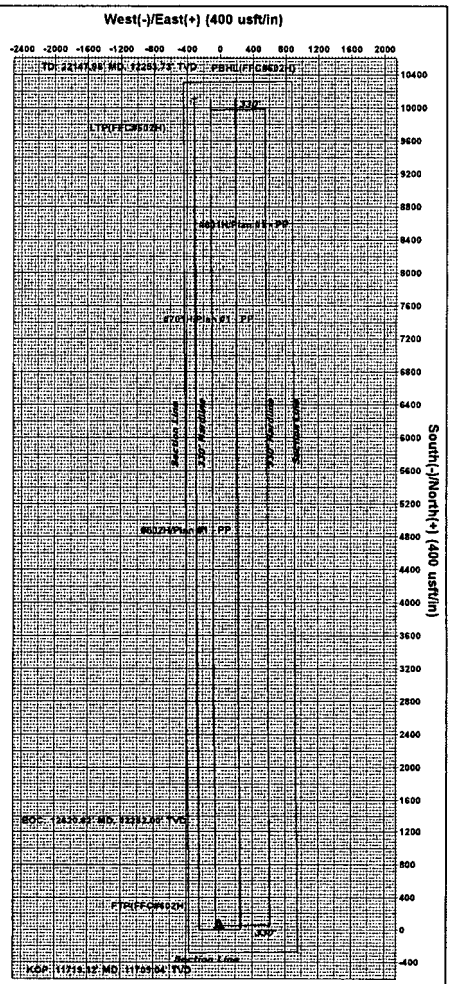
Magnetic Field
Strength: 47835.5snT
Dip Angle: 60.01°
Date: 03/05/2018
Model: IGRF2015

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00
3	1533.33	5.00	270.00	1532.91	0.00	-14.54	1.50	270.00	0.11
4	3959.66	5.00	270.00	3950.00	0.00	-226.00	0.00	0.00	1.70
5	4292.99	0.00	0.00	4282.91	0.00	-240.54	1.50	180.00	1.81
6	11719.12	0.00	0.00	11709.04	0.00	-240.54	0.00	0.00	1.81
7	12620.82	90.17	359.57	12282.00	574.64	-244.81	10.00	359.57	576.46
8	22147.98	90.17	359.57	12253.73	10101.50	-315.60	0.00	0.0010103.58	







DESIGN TARGET DETAILS				
Name	+N/-S	+E/-W	Northing	Easting
FTP(FFC8602H)	48.11	-240.29	415395.71	796367.21
LTP(FFC8602H)	10064.02	-315.44	425411.62	796292.06
PBHL(FFC8602H)	10101.50	-315.60	425449.10	796291.90
SHL(FFC8602H)	0.00	0.00	415347.60	796607.50

PROJECT DETAILS: Lea County, NM (NAD27) NMEZ	
Geodetic System:	US State Plane 1927 (Exact solution)
Datum:	NAD 1927 (NADCON CONUS)
Ellipsoid:	Clarke 1866
Zone:	New Mexico East 3001
System Datum:	Mean Sea Level
Local North:	Grid

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
835.00	835.00	Rustler
1176.00	1176.00	TOS
4971.00	4981.08	BOS (Fletcher)
5302.00	5312.08	LMAR (Top Delaware)
5334.00	5344.08	BLCN
6273.00	6283.08	CYCN
7733.00	7743.08	BYCN
8964.00	8974.08	Bone Spring (BSGL)
9181.00	9191.08	U Avalon Sh
9545.00	9555.08	L Avalon Sh
10362.00	10372.08	FBSG_Sand
10682.00	10692.08	SBSG Sand
11356.00	11366.08	SBSG_Sand base
11938.00	11955.78	TBSG_sand

VON ENERGY SERVICES, LLC

VON Directional
2407 E. Murphy St. Bldg. E3 Odessa, TX 79761
Phone: 432-232-8838

Plan: Plan #1 - PP (#602H/OH)
Created By: Gabriel Cruz Date: 18:06, March 05 2018