

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING LLC
LEASE NO.:	NMNM114987
WELL NAME & NO.:	DOMINATOR 25 FED 701H
SURFACE HOLE FOOTAGE:	3280'/S & 600'/E
BOTTOM HOLE FOOTAGE:	200'/N & 330'/E
LOCATION:	SECTION 25, T25S, R33E, NMPM
COUNTY:	LEA

HOBBS OCD
MAY 07 2018
RECEIVED

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 **10 3/4** inch surface casing shall be set at approximately **1200** 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.

Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

2. The minimum required fill of cement behind the 7 5/8 inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above.
3. The minimum required fill of cement behind the 5 1/2 X 5 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 7 5/8 inch intermediate casing shoe shall be **10,000 (10M) psi. Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi.)**

D. SPECIAL REQUIREMENT(S)

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 04102018

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 - 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,

GENERAL REQUIREMENTS

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

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

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

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

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

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

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

A. CASING

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

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

B. PRESSURE CONTROL

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

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

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

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

- ☐ **General Provisions**
- ☐ **Permit Expiration**
- ☐ **Archaeology, Paleontology, and Historical Sites**
- ☐ **Noxious Weeds**
- ☒ **Special Requirements**
 - Lesser Prairie-Chicken Timing Stipulations
 - Below Ground-level Abandoned Well Marker
 - Range
 - Watershed
- ☐ **Construction**
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 - Topsoil
 - Closed Loop System
 - Federal Mineral Material Pits
 - Well Pads
 - Roads
- ☐ **Road Section Diagram**
- ☒ **Production (Post Drilling)**
 - Well Structures & Facilities
 - Pipelines
- ☐ **Interim Reclamation**
- ☐ **Final Abandonment & Reclamation**

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.

Range

The operator must contact the allotment holder prior to construction to identify the location of the pipeline. The operator must take measures to protect the pipeline from compression or other damages. If the pipeline is damaged or compromised in any way near the proposed project as a result of oil and gas activity, the operator is responsible for repairing the pipeline immediately. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

Watershed

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.

VI. CONSTRUCTION

A. NOTIFICATION

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

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

B. TOPSOIL

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

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

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

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

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

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

G. ON LEASE ACCESS ROADS**Road Width**

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

Surfacing

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

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

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

Crowning

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

Ditching

Ditching shall be required on both sides of the road.

Turnouts

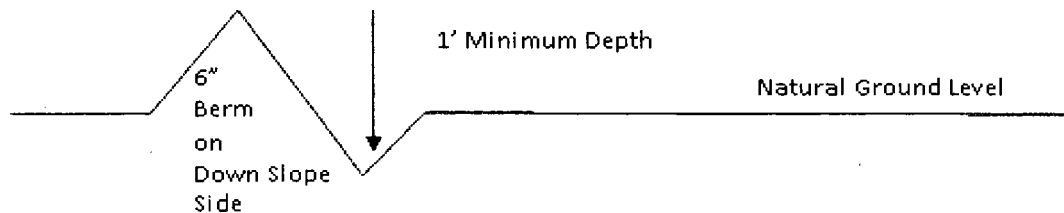
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

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

Cattle guards

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

Fence Requirement

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

Public Access

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

Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

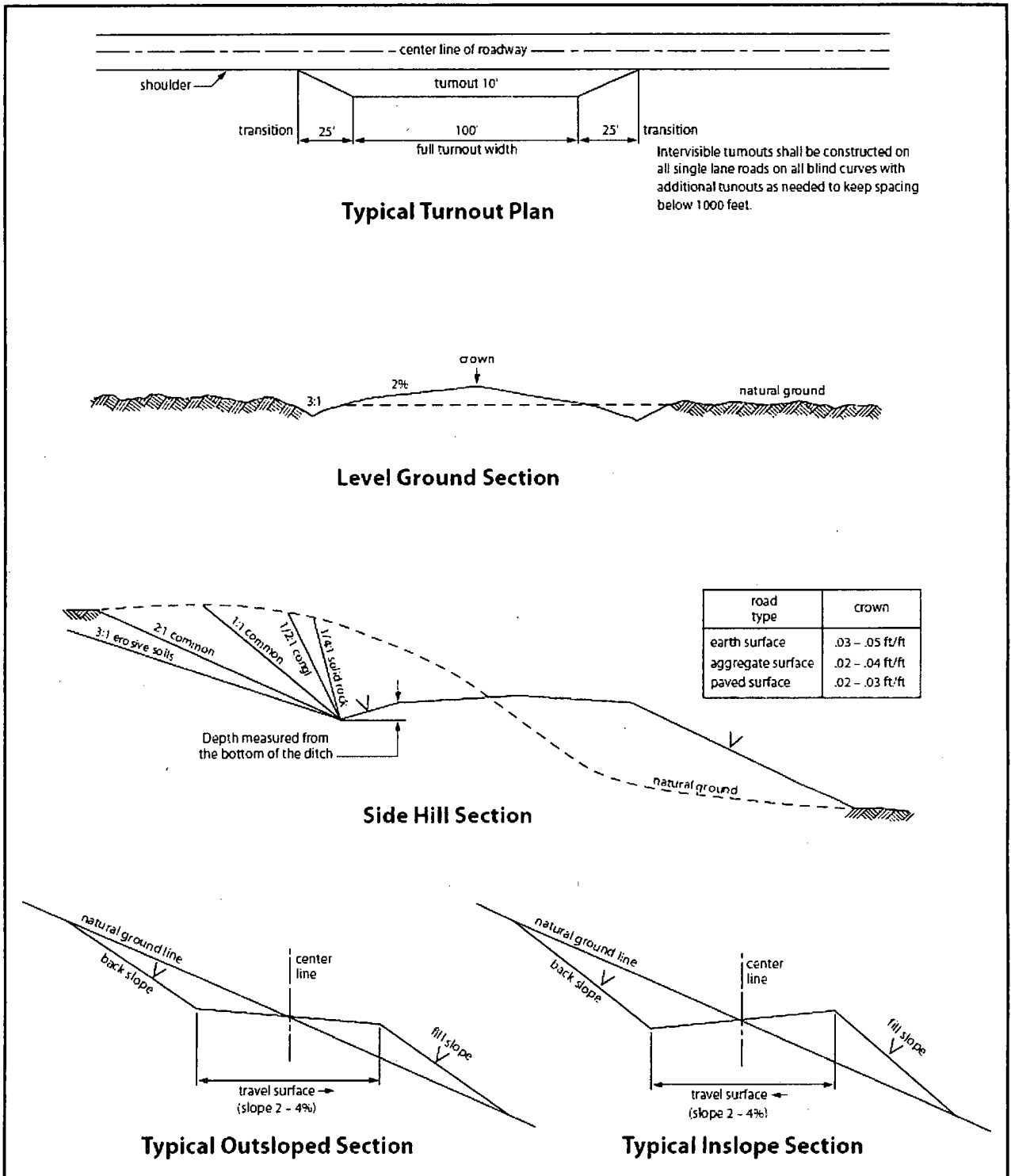


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

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

Exclosure Netting (Open-top Tanks)

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

Chemical and Fuel Secondary Containment and Exclosure Screening

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

Open-Vent Exhaust Stack Exclosures

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

Containment Structures

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

Painting Requirement

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

B. PIPELINES

STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES

A copy of the Grant and attachments, including stipulations, survey plat(s) and/or map(s), shall be on location during construction. BLM personnel may request to review a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, Holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC § 2601 *et seq.* (1982) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant (*see* 40 CFR, Part 702-799 and in particular, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. Holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601, *et seq.* or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, *et seq.*) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way Holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way Holder on the Right-of-Way. This provision applies without

regard to whether a release is caused by Holder, its agent, or unrelated third parties.

4. Holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. Holder shall be held to a standard of strict liability for damage or injury to the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

- a. Activities of Holder including, but not limited to: construction, operation, maintenance, and termination of the facility;
- b. Activities of other parties including, but not limited to:
 - (1) Land clearing
 - (2) Earth-disturbing and earth-moving work
 - (3) Blasting
 - (4) Vandalism and sabotage;

c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars (\$1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil, salt water, or other pollutant, wherever found, shall be the responsibility of Holder, regardless of fault. Upon failure of Holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he/she deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of Holder. Such action by the Authorized Officer shall not relieve Holder of any responsibility as provided herein.

6. All construction and maintenance activity shall be confined to the authorized right-of-way width of 20 feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline shall be installed no farther than 10 feet from the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline shall be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity shall be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation shall be allowed unless approved in

writing by the Authorized Officer.

8. Holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky or dune areas, the pipeline shall be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of 24 inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

10. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

13. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. Signs will be maintained in a legible condition for the life of the pipeline.

14. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

15. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder 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 will be made by the authorized officer to determine appropriate cultural or scientific values. The holder will be responsible

for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting with the holder.

16. 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, powerline 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.

17. Surface pipelines shall be less than or equal to 4 inches and a working pressure below 125 psi.

18. Special Stipulations:

- a. **Lesser Prairie-Chicken:** Oil and gas activities 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 and 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. Normal vehicle use on existing roads will not be restricted.

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:

<u>Species</u>	<u>lb/acre</u>
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



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

Operator Certification Data Report

04/26/2018

Operator Certification

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

NAME: Mayte Reyes

Signed on: 12/04/2017

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

Field Representative

Representative Name: Rand French

Street Address: 2208 West Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6940

Email address: rfrench@concho.com

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

- a. The hazards and characteristics of hydrogen sulfide (H₂S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
- d. The proper techniques for first aid and rescue procedures.

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

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

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

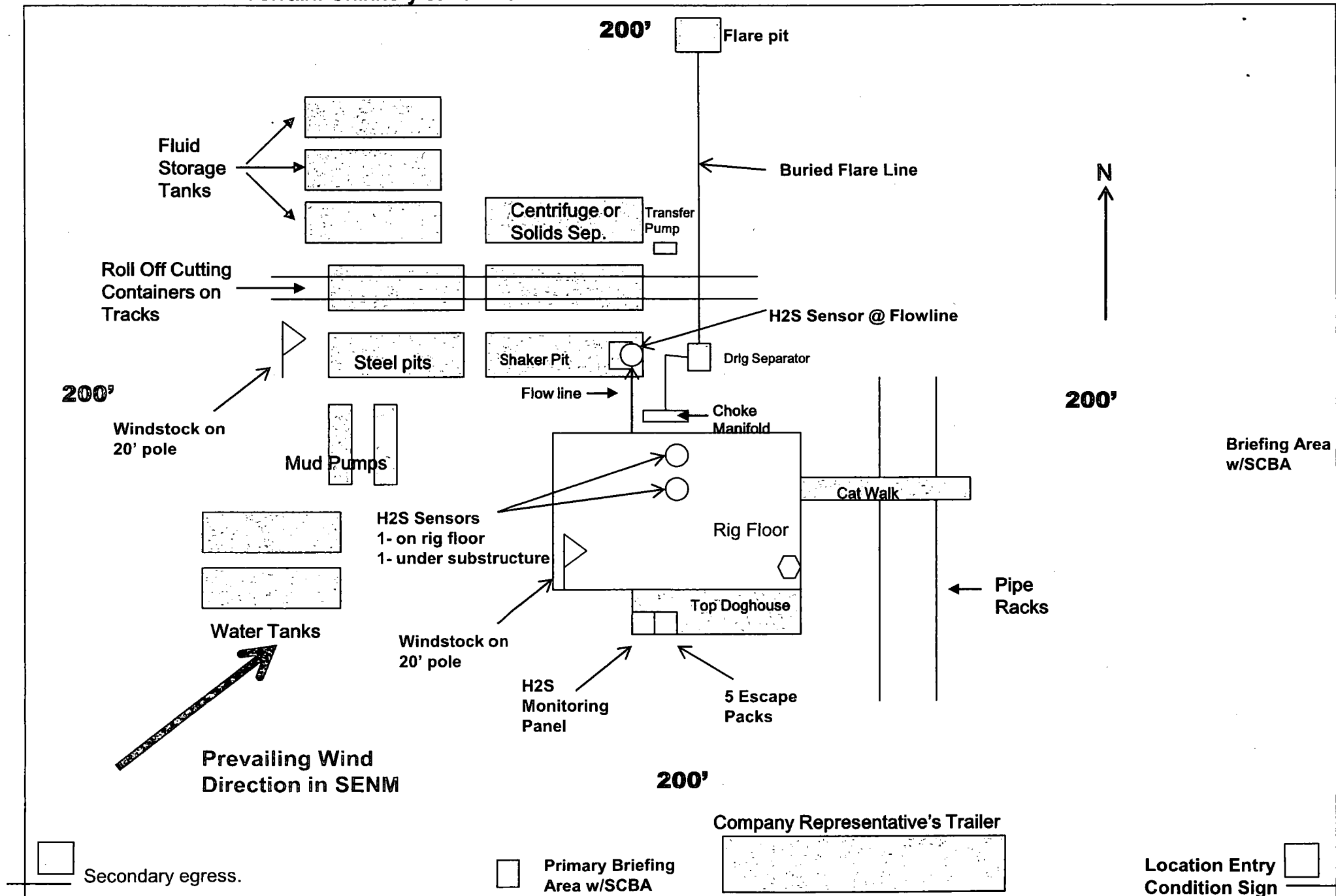
2. H₂S SAFETY EQUIPMENT AND SYSTEMS

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

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

COG Operating LLC
H₂S 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 H₂S AREA
AUTHORIZED PERSONNEL ONLY**

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

COG OPERATING LLC

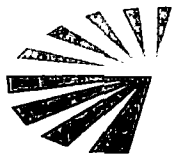
1-575-748-6940

EMERGENCY CALL LIST

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

EMERGENCY RESPONSE NUMBERS

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



C O N C H O

COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

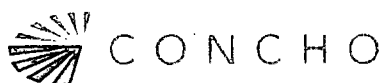
DOMINATOR 25 FED #701H

OWB

PWP0

Anticollision Report

14 November, 2017



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference	PWP0		
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 10,000.0 usft	Error Surface:	Major Axis
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date 11/14/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	12,000.0	PWP0 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
12,000.0	17,580.8	PWP0 (OWB)	MWD	OWSG MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
BULLDOG						
DOMINATOR 25 FED #102H - OWB - PWP0	5,000.0	5,000.9	94.9	80.6	6.620	CC, ES, SF
DOMINATOR 25 FED #301H - OWB - PWP0	5,000.0	5,000.3	30.0	15.7	2.093	CC, ES, SF
DOMINATOR 25 FED #401H - OWB - PWP0	9,377.6	9,381.9	35.2	17.3	1.963	Advise and Monitor, CC
DOMINATOR 25 FED #401H - OWB - PWP0	9,400.0	9,404.3	35.2	17.2	1.960	Advise and Monitor, ES
DOMINATOR 25 FED #401H - OWB - PWP0	9,500.0	9,504.3	35.3	17.2	1.953	Advise and Monitor, SF
DOMINATOR 25 FED #501H - OWB - PWP0	5,000.0	5,000.4	67.0	52.7	4.677	CC, ES, SF
DOMINATOR 25 FED #601H - OWB - PWP0	5,000.5	5,001.0	30.0	15.7	2.093	CC, ES, SF
DOMINATOR 25 FED #602H - OWB - PWP0	5,000.0	5,000.8	60.0	45.7	4.186	CC, ES
DOMINATOR 25 FED #602H - OWB - PWP0	17,580.8	17,374.3	555.0	387.7	3.317	SF
DOMINATOR 25 FED #702H - OWB - PWP0	5,000.0	5,001.4	90.0	75.7	6.278	CC, ES
DOMINATOR 25 FED #702H - OWB - PWP0	17,580.8	17,561.1	690.3	522.8	4.121	SF
DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WEL	9,605.1	13,875.0	172.1	81.2	1.894	Advise and Monitor, CC,

Offset Design BULLDOG - DOMINATOR 25 FED #102H - OWB - PWP0														Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 9100-MWD														Offset Well Error: 3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.0	0.0	0.9	0.9	3.0	3.0	-72.08	29.2	-90.3	94.9					
100.0	100.0	100.9	100.9	3.0	3.0	-72.08	29.2	-90.3	94.9	88.9	6.00	15.815		
200.0	200.0	200.9	200.9	3.0	3.0	-72.08	29.2	-90.3	94.9	88.9	6.01	15.789		
300.0	300.0	300.9	300.9	3.0	3.0	-72.08	29.2	-90.3	94.9	88.9	6.03	15.732		
400.0	400.0	400.9	400.9	3.0	3.0	-72.08	29.2	-90.3	94.9	88.8	6.07	15.646		
500.0	500.0	500.9	500.9	3.1	3.1	-72.08	29.2	-90.3	94.9	88.8	6.11	15.533		
600.0	600.0	600.9	600.9	3.1	3.1	-72.08	29.2	-90.3	94.9	88.7	6.17	15.394		
700.0	700.0	700.9	700.9	3.1	3.1	-72.08	29.2	-90.3	94.9	88.7	6.23	15.231		
800.0	800.0	800.9	800.9	3.2	3.2	-72.08	29.2	-90.3	94.9	88.6	6.31	15.047		
900.0	900.0	900.9	900.9	3.2	3.2	-72.08	29.2	-90.3	94.9	88.5	6.39	14.844		
1,000.0	1,000.0	1,000.9	1,000.9	3.2	3.2	-72.08	29.2	-90.3	94.9	88.4	6.49	14.625		
1,100.0	1,100.0	1,100.9	1,100.9	3.3	3.3	-72.08	29.2	-90.3	94.9	88.3	6.59	14.392		
1,200.0	1,200.0	1,200.9	1,200.9	3.4	3.4	-72.08	29.2	-90.3	94.9	88.2	6.71	14.148		
1,300.0	1,300.0	1,300.9	1,300.9	3.4	3.4	-72.08	29.2	-90.3	94.9	88.1	6.83	13.895		
1,400.0	1,400.0	1,400.9	1,400.9	3.5	3.5	-72.08	29.2	-90.3	94.9	87.9	6.96	13.636		

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

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #102H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 9100-MWD													Offset Well Error: 3.0 usft
Reference	Offset	Semi Major Axis					Distance						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
1,500.0	1,500.0	1,500.9	1,500.9	3.5	3.5	-72.08	29.2	-90.3	94.9	87.8	7.10	13.373	
1,600.0	1,600.0	1,600.9	1,600.9	3.6	3.6	-72.08	29.2	-90.3	94.9	87.7	7.24	13.106	
1,700.0	1,700.0	1,700.9	1,700.9	3.7	3.7	-72.08	29.2	-90.3	94.9	87.5	7.39	12.839	
1,800.0	1,800.0	1,800.9	1,800.9	3.8	3.8	-72.08	29.2	-90.3	94.9	87.4	7.55	12.572	
1,900.0	1,900.0	1,900.9	1,900.9	3.9	3.9	-72.08	29.2	-90.3	94.9	87.2	7.71	12.306	
2,000.0	2,000.0	2,000.9	2,000.9	3.9	3.9	-72.08	29.2	-90.3	94.9	87.0	7.88	12.043	
2,100.0	2,100.0	2,100.9	2,100.9	4.0	4.0	-72.08	29.2	-90.3	94.9	86.9	8.05	11.784	
2,200.0	2,200.0	2,200.9	2,200.9	4.1	4.1	-72.08	29.2	-90.3	94.9	86.7	8.23	11.529	
2,300.0	2,300.0	2,300.9	2,300.9	4.2	4.2	-72.08	29.2	-90.3	94.9	86.5	8.41	11.278	
2,400.0	2,400.0	2,400.9	2,400.9	4.3	4.3	-72.08	29.2	-90.3	94.9	86.3	8.60	11.033	
2,500.0	2,500.0	2,500.9	2,500.9	4.4	4.4	-72.08	29.2	-90.3	94.9	86.1	8.79	10.794	
2,600.0	2,600.0	2,600.9	2,600.9	4.5	4.5	-72.08	29.2	-90.3	94.9	85.9	8.99	10.560	
2,700.0	2,700.0	2,700.9	2,700.9	4.6	4.6	-72.08	29.2	-90.3	94.9	85.7	9.19	10.332	
2,800.0	2,800.0	2,800.9	2,800.9	4.7	4.7	-72.08	29.2	-90.3	94.9	85.5	9.39	10.111	
2,900.0	2,900.0	2,900.9	2,900.9	4.8	4.8	-72.08	29.2	-90.3	94.9	85.3	9.59	9.896	
3,000.0	3,000.0	3,000.9	3,000.9	4.9	4.9	-72.08	29.2	-90.3	94.9	85.1	9.80	9.686	
3,100.0	3,100.0	3,100.9	3,100.9	5.0	5.0	-72.08	29.2	-90.3	94.9	84.9	10.01	9.483	
3,200.0	3,200.0	3,200.9	3,200.9	5.1	5.1	-72.08	29.2	-90.3	94.9	84.7	10.22	9.286	
3,300.0	3,300.0	3,300.9	3,300.9	5.2	5.2	-72.08	29.2	-90.3	94.9	84.5	10.43	9.095	
3,400.0	3,400.0	3,400.9	3,400.9	5.3	5.3	-72.08	29.2	-90.3	94.9	84.3	10.65	8.910	
3,500.0	3,500.0	3,500.9	3,500.9	5.4	5.4	-72.08	29.2	-90.3	94.9	84.0	10.87	8.731	
3,600.0	3,600.0	3,600.9	3,600.9	5.5	5.5	-72.08	29.2	-90.3	94.9	83.8	11.09	8.557	
3,700.0	3,700.0	3,700.9	3,700.9	5.7	5.7	-72.08	29.2	-90.3	94.9	83.6	11.31	8.389	
3,800.0	3,800.0	3,800.9	3,800.9	5.8	5.8	-72.08	29.2	-90.3	94.9	83.4	11.54	8.225	
3,900.0	3,900.0	3,900.9	3,900.9	5.9	5.9	-72.08	29.2	-90.3	94.9	83.1	11.76	8.067	
4,000.0	4,000.0	4,000.9	4,000.9	6.0	6.0	-72.08	29.2	-90.3	94.9	82.9	11.99	7.914	
4,100.0	4,100.0	4,100.9	4,100.9	6.1	6.1	-72.08	29.2	-90.3	94.9	82.7	12.22	7.766	
4,200.0	4,200.0	4,200.9	4,200.9	6.2	6.2	-72.08	29.2	-90.3	94.9	82.5	12.45	7.622	
4,300.0	4,300.0	4,300.9	4,300.9	6.3	6.3	-72.08	29.2	-90.3	94.9	82.2	12.68	7.483	
4,400.0	4,400.0	4,400.9	4,400.9	6.5	6.5	-72.08	29.2	-90.3	94.9	82.0	12.92	7.348	
4,500.0	4,500.0	4,500.9	4,500.9	6.6	6.6	-72.08	29.2	-90.3	94.9	81.8	13.15	7.217	
4,600.0	4,600.0	4,600.9	4,600.9	6.7	6.7	-72.08	29.2	-90.3	94.9	81.5	13.38	7.091	
4,700.0	4,700.0	4,700.9	4,700.9	6.8	6.8	-72.08	29.2	-90.3	94.9	81.3	13.62	6.968	
4,800.0	4,800.0	4,800.9	4,800.9	6.9	6.9	-72.08	29.2	-90.3	94.9	81.0	13.86	6.848	
4,900.0	4,900.0	4,900.9	4,900.9	7.0	7.0	-72.08	29.2	-90.3	94.9	80.8	14.10	6.733	
5,000.0	5,000.0	5,000.9	5,000.9	7.2	7.2	-72.08	29.2	-90.3	94.9	80.6	14.34	6.620 CC, ES, SF	
5,100.0	5,100.0	5,100.9	5,100.9	7.2	7.3	161.74	29.2	-90.3	96.6	82.1	14.51	6.656	
5,140.0	5,139.9	5,140.8	5,140.8	7.2	7.3	162.04	29.2	-90.3	98.2	83.6	14.55	6.746	
5,200.0	5,199.9	5,200.8	5,200.8	7.2	7.4	162.55	29.2	-90.3	100.9	86.3	14.61	6.908	
5,300.0	5,299.8	5,300.7	5,300.7	7.2	7.5	163.34	29.2	-90.3	105.6	90.9	14.72	7.174	
5,400.0	5,399.6	5,400.5	5,400.5	7.2	7.6	164.07	29.2	-90.3	110.3	95.5	14.83	7.436	
5,500.0	5,499.5	5,500.4	5,500.4	7.2	7.8	164.74	29.2	-90.3	115.0	100.1	14.95	7.694	
5,600.0	5,599.4	5,597.8	5,597.8	7.2	7.8	164.70	28.3	-91.7	120.7	105.7	15.00	8.051	
5,700.0	5,699.3	5,694.9	5,694.8	7.2	7.8	163.48	25.7	-95.9	128.5	113.6	14.99	8.576	
5,800.0	5,799.2	5,807.2	5,792.3	7.2	7.8	161.42	21.4	-102.7	138.3	123.4	14.98	9.234	
5,900.0	5,899.0	5,892.1	5,891.3	7.2	7.8	159.45	16.9	-110.0	148.7	133.7	14.98	9.923	
6,000.0	5,998.9	5,991.5	5,990.2	7.2	7.8	157.73	12.3	-117.4	159.1	144.2	14.99	10.619	
6,100.0	6,098.8	6,090.8	6,089.2	7.2	7.8	156.23	7.7	-124.7	169.7	154.7	14.99	11.320	
6,200.0	6,198.7	6,209.9	6,188.2	7.2	7.8	154.91	3.1	-132.1	180.4	165.4	15.01	12.022	
6,300.0	6,298.6	6,289.5	6,287.1	7.2	7.8	153.73	-1.5	-139.4	191.2	176.2	15.02	12.727	
6,400.0	6,398.4	6,388.8	6,386.1	7.2	7.8	152.68	-6.1	-146.8	202.1	187.0	15.05	13.430	
6,500.0	6,498.3	6,488.2	6,485.1	7.2	7.8	151.74	-10.7	-154.1	213.0	197.9	15.07	14.130	

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



CONCHO

COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
 Project: LEA COUNTY, NM
 Reference Site: BULLDOG
 Site Error: 0.0 usft
 Reference Well: DOMINATOR 25 FED #701H
 Well Error: 3.0 usft
 Reference Wellbore: OWB
 Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
 TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: EDM_Users
 Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #102H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 9100-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
6,600.0	6,598.2	6,587.5	6,584.0	7.3	7.8	150.89	-15.3	-161.4	224.0	208.8	15.10	14.827	
6,700.0	6,698.1	6,686.9	6,683.0	7.3	7.9	150.12	-19.8	-168.8	235.0	219.8	15.14	15.519	
6,800.0	6,798.0	6,786.2	6,782.0	7.3	7.9	149.41	-24.4	-176.1	246.0	230.8	15.18	16.205	
6,900.0	6,897.8	6,885.6	6,880.9	7.3	7.9	148.77	-29.0	-183.5	257.1	241.9	15.23	16.885	
7,000.0	6,997.7	6,984.9	6,979.9	7.4	7.9	148.18	-33.6	-190.8	268.2	252.9	15.28	17.558	
7,100.0	7,097.6	7,084.2	7,078.9	7.4	7.9	147.64	-38.2	-198.2	279.3	264.0	15.33	18.222	
7,200.0	7,197.5	7,183.6	7,177.8	7.4	8.0	147.14	-42.8	-205.5	290.5	275.1	15.39	18.878	
7,300.0	7,297.4	7,282.9	7,276.8	7.5	8.0	146.68	-47.4	-212.8	301.7	286.2	15.45	19.524	
7,400.0	7,397.2	7,382.3	7,375.8	7.5	8.0	146.25	-52.0	-220.2	312.9	297.4	15.52	20.161	
7,500.0	7,497.1	7,481.6	7,474.7	7.5	8.1	145.85	-56.6	-227.5	324.1	308.5	15.59	20.787	
7,600.0	7,597.0	7,581.0	7,573.7	7.6	8.1	145.47	-61.1	-234.9	335.3	319.7	15.67	21.402	
7,700.0	7,696.9	7,680.3	7,672.6	7.6	8.1	145.12	-65.7	-242.2	346.6	330.8	15.75	22.005	
7,800.0	7,796.8	7,779.7	7,771.6	7.7	8.2	144.80	-70.3	-249.6	357.8	342.0	15.84	22.597	
7,900.0	7,896.6	7,879.0	7,870.6	7.7	8.2	144.49	-74.9	-256.9	369.1	353.2	15.93	23.176	
8,000.0	7,996.5	7,978.3	7,969.5	7.7	8.3	144.20	-79.5	-264.2	380.4	364.3	16.02	23.744	
8,100.0	8,096.4	8,077.7	8,068.5	7.8	8.3	143.93	-84.1	-271.6	391.7	375.5	16.12	24.298	
8,200.0	8,196.3	8,177.0	8,167.5	7.9	8.4	143.67	-88.7	-278.9	402.9	386.7	16.22	24.840	
8,300.0	8,296.2	8,276.4	8,266.4	7.9	8.4	143.43	-93.3	-286.3	414.2	397.9	16.33	25.369	
8,400.0	8,396.1	8,375.7	8,365.4	8.0	8.5	143.20	-97.8	-293.6	425.6	409.1	16.44	25.886	
8,500.0	8,495.9	8,475.1	8,464.4	8.0	8.5	142.98	-102.4	-301.0	436.9	420.3	16.55	26.389	
8,600.0	8,595.8	8,574.4	8,563.3	8.1	8.6	142.77	-107.0	-308.3	448.2	431.5	16.67	26.880	
8,700.0	8,695.7	8,673.8	8,662.3	8.1	8.6	142.57	-111.6	-315.6	459.5	442.7	16.80	27.358	
8,800.0	8,795.6	8,773.1	8,761.3	8.2	8.7	142.38	-116.2	-323.0	470.8	453.9	16.92	27.823	
8,900.0	8,895.5	8,872.4	8,860.2	8.3	8.8	142.21	-120.8	-330.3	482.2	465.1	17.05	28.275	
9,000.0	8,995.3	8,971.8	8,959.2	8.3	8.8	142.04	-125.4	-337.7	493.5	476.3	17.19	28.715	
9,100.0	9,095.2	9,071.1	9,058.2	8.4	8.9	141.87	-130.0	-345.0	504.9	487.6	17.30	29.174	
9,200.0	9,195.1	9,170.8	9,157.5	8.5	8.9	141.74	-134.3	-352.4	516.2	498.8	17.40	29.667	
9,300.0	9,295.0	9,270.6	9,256.4	8.5	8.9	141.07	-125.4	-359.8	527.4	509.9	17.51	30.115	
9,400.0	9,394.9	9,361.8	9,343.4	8.6	9.0	146.13	-99.4	-366.5	539.7	522.1	17.65	30.577	
9,500.0	9,494.7	9,440.0	9,412.9	8.7	9.1	149.99	-64.3	-371.9	555.9	538.1	17.81	31.217	
9,600.0	9,594.6	9,504.4	9,465.3	8.7	9.2	153.88	-27.0	-376.1	578.6	560.7	17.97	32.198	
9,700.0	9,694.5	9,556.7	9,503.7	8.8	9.2	157.39	8.2	-379.2	609.8	591.7	18.14	33.618	
9,800.0	9,794.4	9,600.0	9,532.6	8.9	9.3	160.47	40.4	-381.6	650.0	631.7	18.31	35.501	
9,900.0	9,894.3	9,633.3	9,552.7	9.0	9.4	162.91	66.9	-383.3	699.0	680.5	18.48	37.832	
10,000.0	9,994.1	9,661.6	9,568.3	9.1	9.5	164.99	90.5	-384.7	755.7	737.1	18.64	40.542	
10,100.0	10,094.0	9,685.1	9,580.2	9.1	9.6	166.74	110.7	-385.7	819.2	800.4	18.80	43.567	
10,200.0	10,193.9	9,700.0	9,587.2	9.2	9.6	167.84	123.8	-386.3	888.3	869.4	18.94	46.897	
10,300.0	10,293.8	9,725.0	9,598.0	9.3	9.7	169.68	146.4	-387.3	962.1	942.9	19.13	50.278	
10,400.0	10,393.7	9,735.9	9,602.4	9.4	9.8	170.48	156.4	-387.7	1,039.6	1,020.3	19.27	53.942	
10,500.0	10,493.5	9,750.0	9,607.7	9.5	9.9	171.50	169.4	-388.2	1,120.3	1,100.9	19.43	57.657	
10,600.0	10,593.4	9,759.3	9,610.9	9.6	9.9	172.17	178.1	-388.5	1,203.6	1,184.0	19.57	61.503	
10,700.0	10,693.3	9,775.0	9,616.1	9.6	10.0	173.30	192.9	-389.0	1,289.0	1,269.3	19.75	65.266	
10,800.0	10,793.2	9,775.0	9,616.1	9.7	10.0	173.30	192.9	-389.0	1,376.2	1,356.3	19.84	69.371	
10,900.0	10,893.1	9,784.8	9,619.1	9.8	10.1	173.99	202.3	-389.3	1,464.8	1,444.8	19.99	73.273	
11,000.0	10,992.9	9,800.0	9,623.3	9.9	10.2	175.05	216.9	-389.7	1,554.8	1,534.6	20.18	77.032	
11,100.0	11,092.8	9,800.0	9,623.3	10.0	10.2	175.05	216.9	-389.7	1,645.7	1,625.5	20.27	81.173	
11,200.0	11,192.7	9,800.0	9,623.3	10.1	10.2	175.05	216.9	-389.7	1,737.6	1,717.3	20.37	85.322	
11,300.0	11,292.6	9,800.0	9,623.3	10.2	10.2	175.05	216.9	-389.7	1,830.4	1,809.9	20.46	89.473	
11,400.0	11,392.5	9,812.9	9,626.5	10.3	10.3	175.94	229.3	-390.0	1,923.7	1,903.0	20.65	93.172	
11,500.0	11,492.4	9,825.0	9,629.2	10.4	10.4	176.77	241.1	-390.3	2,017.7	1,996.9	20.83	96.849	
11,600.0	11,592.2	9,825.0	9,629.2	10.5	10.4	176.77	241.1	-390.3	2,112.1	2,091.2	20.93	100.923	
11,700.0	11,692.1	9,825.0	9,629.2	10.6	10.4	176.77	241.1	-390.3	2,207.0	2,186.0	21.02	104.981	

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



COG Operating LLC

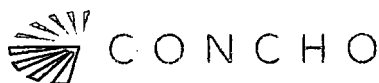
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #102H - OWB - PWP0													Offset Site Error:
Survey Program: 0-Standard Keeper 104, 9100-MWD													Offset Well Error:
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,800.0	11,792.0	9,825.0	9,629.2	10.7	10.4	176.77	241.1	-390.3	2,302.3	2,281.2	21.12	109.018	
11,900.0	11,891.9	9,825.0	9,629.2	10.7	10.4	176.77	241.1	-390.3	2,398.1	2,376.8	21.22	113.032	
12,000.0	11,991.8	9,825.0	9,629.2	10.8	10.4	176.77	241.1	-390.3	2,494.1	2,472.8	21.28	117.186	
12,100.0	12,091.6	9,836.5	9,631.5	10.8	10.5	177.54	252.4	-390.6	2,590.3	2,568.9	21.39	121.092	
12,200.0	12,191.5	9,839.0	9,631.9	10.9	10.5	177.71	254.8	-390.6	2,686.8	2,665.4	21.44	125.333	
12,288.0	12,279.4	9,850.0	9,633.8	10.9	10.6	178.44	265.7	-390.8	2,772.1	2,750.5	21.56	128.552	
12,300.0	12,291.4	9,850.0	9,633.8	10.9	10.6	-146.49	265.7	-390.8	2,783.7	2,762.1	21.55	129.183	
12,325.0	12,316.4	9,850.0	9,633.8	10.9	10.6	-81.95	265.7	-390.8	2,807.7	2,786.2	21.52	130.455	
12,350.0	12,341.3	9,850.0	9,633.8	10.9	10.6	-58.34	265.7	-390.8	2,831.4	2,809.9	21.50	131.678	
12,375.0	12,366.1	9,850.0	9,633.8	10.9	10.6	-46.88	265.7	-390.8	2,854.8	2,833.3	21.53	132.579	
12,400.0	12,390.6	9,850.0	9,633.8	10.9	10.6	-39.72	265.7	-390.8	2,877.9	2,856.1	21.73	132.425	
12,425.0	12,414.9	9,850.0	9,633.8	11.0	10.6	-34.66	265.7	-390.8	2,900.5	2,878.1	22.32	129.968	
12,450.0	12,438.9	9,850.0	9,633.8	11.0	10.6	-30.85	265.7	-390.8	2,922.6	2,899.5	23.12	126.386	
12,475.0	12,462.5	9,850.0	9,633.8	11.0	10.6	-27.87	265.7	-390.8	2,944.2	2,920.1	24.02	122.581	
12,500.0	12,485.6	9,850.0	9,633.8	11.0	10.6	-25.47	265.7	-390.8	2,965.2	2,939.8	25.36	116.912	
12,525.0	12,508.2	9,850.0	9,633.8	11.0	10.6	-23.50	265.7	-390.8	2,985.5	2,958.8	26.77	111.527	
12,550.0	12,530.2	9,850.0	9,633.8	11.1	10.6	-21.85	265.7	-390.8	3,005.3	2,977.1	28.20	106.557	
12,575.0	12,551.5	9,850.0	9,633.8	11.1	10.6	-20.46	265.7	-390.8	3,024.3	2,994.6	29.65	102.012	
12,600.0	12,572.2	9,860.8	9,635.4	11.1	10.7	-19.23	276.4	-391.0	3,042.4	3,011.3	31.09	97.853	
12,625.0	12,592.0	9,863.3	9,635.8	11.2	10.7	-18.21	278.9	-391.1	3,059.8	3,027.3	32.51	94.112	
12,650.0	12,611.1	9,875.0	9,637.2	11.2	10.8	-17.30	290.5	-391.3	3,076.5	3,042.6	33.91	90.721	
12,675.0	12,629.3	9,875.0	9,637.2	11.3	10.8	-16.54	290.5	-391.3	3,092.1	3,056.9	35.26	87.691	
12,700.0	12,646.5	9,875.0	9,637.2	11.4	10.8	-15.89	290.5	-391.3	3,106.9	3,070.3	36.56	84.972	
12,725.0	12,662.8	9,875.0	9,637.2	11.4	10.8	-15.32	290.5	-391.3	3,120.8	3,082.9	37.81	82.537	
12,750.0	12,678.1	9,875.0	9,637.2	11.5	10.8	-14.82	290.5	-391.3	3,133.7	3,094.7	38.99	80.363	
12,775.0	12,692.3	9,875.0	9,637.2	11.6	10.8	-14.38	290.5	-391.3	3,145.6	3,105.5	40.11	78.428	
12,800.0	12,705.4	9,875.0	9,637.2	11.7	10.8	-14.01	290.5	-391.3	3,156.6	3,115.5	41.15	76.712	
12,825.0	12,717.4	9,886.3	9,638.3	11.9	10.9	-13.66	301.7	-391.4	3,166.4	3,124.3	42.12	75.174	
12,850.0	12,728.2	9,889.5	9,638.5	12.0	10.9	-13.38	304.9	-391.5	3,175.3	3,132.3	43.00	73.841	
12,875.0	12,737.8	9,900.0	9,639.2	12.1	11.1	-13.13	315.4	-391.6	3,183.2	3,139.4	43.80	72.670	
12,900.0	12,746.2	9,900.0	9,639.2	12.3	11.1	-12.93	315.4	-391.6	3,189.8	3,145.3	44.50	71.680	
12,925.0	12,753.4	9,900.0	9,639.2	12.5	11.1	-12.77	315.4	-391.6	3,195.5	3,150.4	45.10	70.846	
12,950.0	12,759.3	9,900.0	9,639.2	12.7	11.1	-12.64	315.4	-391.6	3,200.0	3,154.4	45.61	70.158	
12,975.0	12,763.9	9,900.0	9,639.2	12.9	11.1	-12.54	315.4	-391.6	3,203.5	3,157.4	46.02	69.612	
13,000.0	12,767.3	9,900.0	9,639.2	13.1	11.1	-12.48	315.4	-391.6	3,205.8	3,159.5	46.33	69.203	
13,025.0	12,769.3	9,912.6	9,639.8	13.3	11.2	-12.44	327.9	-391.7	3,206.9	3,160.4	46.55	68.898	
13,051.2	12,770.0	9,926.9	9,640.0	13.5	11.3	-12.44	342.2	-391.8	3,207.1	3,160.4	46.67	68.720	
13,057.6	12,770.0	9,926.9	9,640.0	13.6	11.3	-12.44	342.2	-391.8	3,207.0	3,160.3	46.68	68.706	
13,100.0	12,769.8	9,926.9	9,640.0	14.0	11.3	-12.44	342.2	-391.8	3,206.1	3,159.4	46.71	68.633	
13,200.0	12,769.4	9,994.9	9,640.0	15.1	12.1	-12.44	410.2	-392.3	3,205.5	3,158.6	46.92	68.325	
13,300.0	12,768.9	10,093.9	9,640.0	16.2	13.3	-12.44	509.3	-393.1	3,205.1	3,157.9	47.21	67.885	
13,400.0	12,768.5	10,193.0	9,639.9	17.4	14.7	-12.44	608.3	-393.8	3,204.7	3,157.1	47.57	67.370	
13,500.0	12,768.0	10,292.0	9,639.8	18.8	16.1	-12.44	707.4	-394.5	3,204.4	3,156.4	47.99	66.775	
13,600.0	12,767.6	10,391.1	9,639.7	20.1	17.5	-12.44	806.4	-395.3	3,204.1	3,155.6	48.49	66.074	
13,700.0	12,767.1	10,490.2	9,639.5	21.5	19.0	-12.44	905.5	-396.0	3,203.8	3,154.6	49.21	65.103	
13,800.0	12,766.7	10,589.2	9,639.3	23.0	20.5	-12.44	1,004.6	-396.7	3,203.5	3,153.0	50.52	63.416	
13,900.0	12,766.3	10,688.3	9,639.1	24.4	22.0	-12.44	1,103.6	-397.4	3,203.3	3,151.1	52.18	61.384	
14,000.0	12,765.8	10,787.3	9,638.9	25.9	23.5	-12.44	1,202.7	-398.2	3,203.1	3,149.1	53.96	59.366	
14,100.0	12,765.4	10,886.4	9,638.6	27.4	25.1	-12.44	1,301.7	-398.9	3,202.9	3,147.2	55.78	57.419	
14,200.0	12,764.9	10,985.5	9,638.3	28.9	26.6	-12.45	1,400.8	-399.6	3,202.8	3,145.1	57.66	55.548	
14,300.0	12,764.5	11,084.5	9,638.0	30.5	28.2	-12.45	1,499.8	-400.4	3,202.7	3,143.1	59.63	53.712	
14,400.0	12,764.1	11,183.6	9,637.6	32.0	29.8	-12.45	1,598.9	-401.1	3,202.6	3,140.6	62.06	51.609	

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



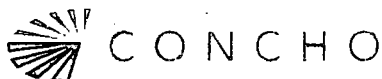
COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #102H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 9100-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
14,500.0	12,763.6	11,282.6	9,637.2	33.6	31.4	-12.45	1,897.9	-401.9	3,202.6	3,137.5	85.07	49.215	
14,600.0	12,763.2	11,381.7	9,636.8	35.2	33.0	-12.45	1,797.0	-402.6	3,202.5	3,134.3	68.21	46.954	
14,614.7	12,763.1	11,396.2	9,636.7	35.4	33.2	-12.45	1,811.5	-402.7	3,202.5	3,133.9	68.67	46.638	
14,700.0	12,762.7	11,480.8	9,636.4	36.8	34.6	-12.45	1,896.1	-403.3	3,202.6	3,131.2	71.37	44.871	
14,800.0	12,762.3	11,579.8	9,635.9	38.4	36.2	-12.44	1,995.1	-404.1	3,202.6	3,128.0	74.56	42.955	
14,900.0	12,761.8	11,678.9	9,635.4	39.9	37.8	-12.44	2,094.2	-404.8	3,202.7	3,124.9	77.75	41.190	
15,000.0	12,761.4	11,777.9	9,634.8	41.5	39.4	-12.44	2,193.2	-405.6	3,202.8	3,121.8	80.96	39.559	
15,100.0	12,761.0	11,877.6	9,634.3	43.2	41.0	-12.44	2,292.8	-406.3	3,202.9	3,118.7	84.19	38.045	
15,200.0	12,760.5	11,977.6	9,633.7	44.8	42.7	-12.44	2,392.8	-407.0	3,203.0	3,115.6	87.43	36.636	
15,300.0	12,760.1	12,077.6	9,633.1	46.4	44.3	-12.44	2,492.8	-407.8	3,203.1	3,112.5	90.67	35.326	
15,400.0	12,759.6	12,177.6	9,632.5	48.0	45.9	-12.44	2,592.8	-408.5	3,203.3	3,109.3	93.93	34.104	
15,500.0	12,759.2	12,277.6	9,632.0	49.6	47.6	-12.44	2,692.8	-409.3	3,203.4	3,106.2	97.18	32.962	
15,600.0	12,758.8	12,377.6	9,631.4	51.2	49.2	-12.44	2,792.8	-410.0	3,203.5	3,103.1	100.45	31.893	
15,700.0	12,758.3	12,477.6	9,630.8	52.9	50.9	-12.44	2,892.8	-410.8	3,203.6	3,099.9	103.71	30.890	
15,800.0	12,757.9	12,577.6	9,630.3	54.5	52.5	-12.44	2,992.8	-411.5	3,203.8	3,096.8	106.98	29.946	
15,900.0	12,757.4	12,677.6	9,629.7	56.1	54.1	-12.44	3,092.8	-412.3	3,203.9	3,093.6	110.26	29.058	
16,000.0	12,757.0	12,777.6	9,629.1	57.7	55.8	-12.44	3,192.8	-413.0	3,204.0	3,090.5	113.53	28.221	
16,100.0	12,756.5	12,877.6	9,628.6	59.4	57.4	-12.44	3,292.8	-413.8	3,204.1	3,087.3	116.81	27.429	
16,200.0	12,756.1	12,977.6	9,628.0	61.0	59.1	-12.44	3,392.8	-414.5	3,204.3	3,084.2	120.10	26.681	
16,300.0	12,755.7	13,077.6	9,627.4	62.7	60.7	-12.44	3,492.8	-415.3	3,204.4	3,081.0	123.38	25.971	
16,400.0	12,755.2	13,177.6	9,626.8	64.3	62.4	-12.44	3,592.8	-416.0	3,204.5	3,077.8	126.67	25.298	
16,500.0	12,754.8	13,277.6	9,626.3	65.9	64.0	-12.44	3,692.8	-416.8	3,204.6	3,074.7	129.96	24.659	
16,600.0	12,754.3	13,377.6	9,625.7	67.6	65.7	-12.43	3,792.8	-417.5	3,204.8	3,071.5	133.25	24.050	
16,700.0	12,753.9	13,477.6	9,625.1	69.2	67.3	-12.43	3,892.8	-418.3	3,204.9	3,068.3	136.55	23.471	
16,800.0	12,753.4	13,577.6	9,624.6	70.9	69.0	-12.43	3,992.8	-419.0	3,205.0	3,065.2	139.84	22.919	
16,900.0	12,753.0	13,677.6	9,624.0	72.5	70.6	-12.43	4,092.8	-419.8	3,205.1	3,062.0	143.14	22.392	
17,000.0	12,752.6	13,777.6	9,623.4	74.1	72.3	-12.43	4,192.8	-420.5	3,205.3	3,058.8	146.44	21.889	
17,100.0	12,752.1	13,877.6	9,622.8	75.8	73.9	-12.43	4,292.8	-421.3	3,205.4	3,055.6	149.73	21.407	
17,200.0	12,751.7	13,977.6	9,622.3	77.4	75.6	-12.43	4,392.8	-422.0	3,205.5	3,052.5	153.04	20.946	
17,300.0	12,751.2	14,077.6	9,621.7	79.1	77.3	-12.43	4,492.8	-422.8	3,205.6	3,049.3	156.34	20.505	
17,400.0	12,750.8	14,177.6	9,621.1	80.7	78.9	-12.43	4,592.7	-423.5	3,205.8	3,046.1	159.64	20.081	
17,500.0	12,750.4	14,277.6	9,620.6	82.4	80.6	-12.43	4,692.7	-424.3	3,205.9	3,042.9	162.94	19.675	
17,580.8	12,750.0	14,358.4	9,620.1	83.7	81.9	-12.43	4,773.6	-424.9	3,206.0	3,040.4	165.62	19.358	



COG Operating LLC

Anticollision Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well DOMINATOR 25 FED #701H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3322.5+26 @ 3348.5usft (RIG 4)
Reference Site:	BULLDOG	MD Reference:	RKB=3322.5+26 @ 3348.5usft (RIG 4)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	DOMINATOR 25 FED #701H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OWB	Database:	EDM_Users
Reference Design:	PWP0	Offset TVD Reference:	Offset Datum

Offset Design: BULLDOG - DOMINATOR 25 FED #301H - OWB - PWP0													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 9700-MWD													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.3	-0.3	3.0	3.0	-0.57	30.0	-0.3	30.0					
100.0	100.0	100.3	99.7	3.0	3.0	-0.57	30.0	-0.3	30.0	24.0	6.00	5.000		
200.0	200.0	200.3	199.7	3.0	3.0	-0.57	30.0	-0.3	30.0	24.0	6.01	4.991		
300.0	300.0	300.3	299.7	3.0	3.0	-0.57	30.0	-0.3	30.0	24.0	6.03	4.973		
400.0	400.0	400.3	399.7	3.0	3.0	-0.57	30.0	-0.3	30.0	23.9	6.07	4.946		
500.0	500.0	500.3	499.7	3.1	3.1	-0.57	30.0	-0.3	30.0	23.9	6.11	4.910		
600.0	600.0	600.3	599.7	3.1	3.1	-0.57	30.0	-0.3	30.0	23.8	6.16	4.866		
700.0	700.0	700.3	699.7	3.1	3.1	-0.57	30.0	-0.3	30.0	23.8	6.23	4.815		
800.0	800.0	800.3	799.7	3.2	3.2	-0.57	30.0	-0.3	30.0	23.7	6.31	4.757		
900.0	900.0	900.3	899.7	3.2	3.2	-0.57	30.0	-0.3	30.0	23.6	6.39	4.693		
1,000.0	1,000.0	1,000.3	999.7	3.2	3.2	-0.57	30.0	-0.3	30.0	23.5	6.49	4.623		
1,100.0	1,100.0	1,100.3	1,099.7	3.3	3.3	-0.57	30.0	-0.3	30.0	23.4	6.59	4.550		
1,200.0	1,200.0	1,200.3	1,199.7	3.4	3.4	-0.57	30.0	-0.3	30.0	23.3	6.71	4.473		
1,300.0	1,300.0	1,300.3	1,299.7	3.4	3.4	-0.57	30.0	-0.3	30.0	23.2	6.83	4.393		
1,400.0	1,400.0	1,400.3	1,399.7	3.5	3.5	-0.57	30.0	-0.3	30.0	23.0	6.96	4.311		
1,500.0	1,500.0	1,500.3	1,499.7	3.5	3.5	-0.57	30.0	-0.3	30.0	22.9	7.10	4.228		
1,600.0	1,600.0	1,600.3	1,599.7	3.6	3.6	-0.57	30.0	-0.3	30.0	22.8	7.24	4.143		
1,700.0	1,700.0	1,700.3	1,699.7	3.7	3.7	-0.57	30.0	-0.3	30.0	22.6	7.39	4.059		
1,800.0	1,800.0	1,800.3	1,799.7	3.8	3.8	-0.57	30.0	-0.3	30.0	22.5	7.55	3.974		
1,900.0	1,900.0	1,900.3	1,899.7	3.9	3.9	-0.57	30.0	-0.3	30.0	22.3	7.71	3.891		
2,000.0	2,000.0	2,000.3	1,999.7	3.9	3.9	-0.57	30.0	-0.3	30.0	22.1	7.88	3.807		
2,100.0	2,100.0	2,100.3	2,099.7	4.0	4.0	-0.57	30.0	-0.3	30.0	21.9	8.05	3.725		
2,200.0	2,200.0	2,200.3	2,199.7	4.1	4.1	-0.57	30.0	-0.3	30.0	21.8	8.23	3.645		
2,300.0	2,300.0	2,300.3	2,299.7	4.2	4.2	-0.57	30.0	-0.3	30.0	21.6	8.41	3.566		
2,400.0	2,400.0	2,400.3	2,399.7	4.3	4.3	-0.57	30.0	-0.3	30.0	21.4	8.60	3.488		
2,500.0	2,500.0	2,500.3	2,499.7	4.4	4.4	-0.57	30.0	-0.3	30.0	21.2	8.79	3.412		
2,600.0	2,600.0	2,600.3	2,599.7	4.5	4.5	-0.57	30.0	-0.3	30.0	21.0	8.99	3.339		
2,700.0	2,700.0	2,700.3	2,699.7	4.6	4.6	-0.57	30.0	-0.3	30.0	20.8	9.18	3.267		
2,800.0	2,800.0	2,800.3	2,799.7	4.7	4.7	-0.57	30.0	-0.3	30.0	20.6	9.39	3.197		
2,900.0	2,900.0	2,900.3	2,899.7	4.8	4.8	-0.57	30.0	-0.3	30.0	20.4	9.59	3.128		
3,000.0	3,000.0	3,000.3	2,999.7	4.9	4.9	-0.57	30.0	-0.3	30.0	20.2	9.80	3.062		
3,100.0	3,100.0	3,100.3	3,099.7	5.0	5.0	-0.57	30.0	-0.3	30.0	20.0	10.01	2.998		
3,200.0	3,200.0	3,200.3	3,199.7	5.1	5.1	-0.57	30.0	-0.3	30.0	19.8	10.22	2.936		
3,300.0	3,300.0	3,300.3	3,299.7	5.2	5.2	-0.57	30.0	-0.3	30.0	19.6	10.43	2.875		
3,400.0	3,400.0	3,400.3	3,399.7	5.3	5.3	-0.57	30.0	-0.3	30.0	19.4	10.65	2.817		
3,500.0	3,500.0	3,500.3	3,499.7	5.4	5.4	-0.57	30.0	-0.3	30.0	19.1	10.87	2.760		
3,600.0	3,600.0	3,600.3	3,599.7	5.5	5.5	-0.57	30.0	-0.3	30.0	18.9	11.09	2.705		
3,700.0	3,700.0	3,700.3	3,699.7	5.7	5.7	-0.57	30.0	-0.3	30.0	18.7	11.31	2.652		
3,800.0	3,800.0	3,800.3	3,799.7	5.8	5.8	-0.57	30.0	-0.3	30.0	18.5	11.54	2.600		
3,900.0	3,900.0	3,900.3	3,899.7	5.9	5.9	-0.57	30.0	-0.3	30.0	18.2	11.76	2.550		
4,000.0	4,000.0	4,000.3	3,999.7	6.0	6.0	-0.57	30.0	-0.3	30.0	18.0	11.99	2.502		
4,100.0	4,100.0	4,100.3	4,099.7	6.1	6.1	-0.57	30.0	-0.3	30.0	17.8	12.22	2.455		
4,200.0	4,200.0	4,200.3	4,199.7	6.2	6.2	-0.57	30.0	-0.3	30.0	17.6	12.45	2.410		
4,300.0	4,300.0	4,300.3	4,299.7	6.3	6.3	-0.57	30.0	-0.3	30.0	17.3	12.68	2.366		
4,400.0	4,400.0	4,400.3	4,399.7	6.5	6.5	-0.57	30.0	-0.3	30.0	17.1	12.91	2.323		
4,500.0	4,500.0	4,500.3	4,499.7	6.6	6.6	-0.57	30.0	-0.3	30.0	16.9	13.15	2.282		
4,600.0	4,600.0	4,600.3	4,599.7	6.7	6.7	-0.57	30.0	-0.3	30.0	16.6	13.38	2.242		
4,700.0	4,700.0	4,700.3	4,699.7	6.8	6.8	-0.57	30.0	-0.3	30.0	16.4	13.62	2.203		
4,800.0	4,800.0	4,800.3	4,799.7	6.9	6.9	-0.57	30.0	-0.3	30.0	16.1	13.86	2.165		
4,900.0	4,900.0	4,900.3	4,899.7	7.0	7.0	-0.57	30.0	-0.3	30.0	15.9	14.10	2.128		
5,000.0	5,000.0	5,000.3	4,999.7	7.2	7.2	-0.57	30.0	-0.3	30.0	15.7	14.33	2.093 CC, ES, SF		
5,100.0	5,100.0	5,100.3	5,099.7	7.2	7.3	-129.62	30.0	-0.3	31.1	16.6	14.51	2.143		

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #301H - OWB - PWP0														Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 9700-MWD														Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
5,140.0	5,139.9	5,139.6	5,139.6	7.2	7.3	-131.90	30.0	-0.3	32.2	17.6	14.55	2.212			
5,200.0	5,199.9	5,200.4	5,199.6	7.2	7.4	-135.56	30.0	-0.3	34.2	19.6	14.61	2.341			
5,300.0	5,299.8	5,300.5	5,299.5	7.2	7.5	-140.74	30.0	-0.3	37.9	23.1	14.72	2.571			
5,400.0	5,399.6	5,400.7	5,399.3	7.2	7.6	-144.98	30.0	-0.3	41.8	26.9	14.83	2.814			
5,500.0	5,499.5	5,499.2	5,499.2	7.2	7.8	-148.49	30.0	-0.3	45.8	30.9	14.95	3.067			
5,600.0	5,599.4	5,600.5	5,600.5	7.2	7.8	-150.33	29.1	1.2	48.6	33.6	15.00	3.241			
5,700.0	5,699.3	5,702.0	5,701.8	7.2	7.8	-149.72	26.2	5.7	48.5	33.5	14.99	3.234			
5,800.0	5,799.2	5,801.9	5,801.5	7.2	7.8	-147.93	22.4	11.6	46.9	32.0	14.98	3.133			
5,900.0	5,899.0	5,901.9	5,901.2	7.2	7.8	-146.02	18.7	17.5	45.5	30.5	14.98	3.035			
6,000.0	5,998.9	6,001.9	6,001.0	7.2	7.8	-143.99	14.9	23.3	44.0	29.1	14.98	2.940			
6,100.0	6,098.8	6,101.8	6,100.7	7.2	7.8	-141.82	11.2	29.2	42.7	27.7	14.99	2.847			
6,200.0	6,198.7	6,201.8	6,200.4	7.2	7.8	-139.51	7.4	35.1	41.4	26.4	15.00	2.758			
6,300.0	6,298.6	6,301.8	6,300.2	7.2	7.8	-137.06	3.7	41.0	40.2	25.1	15.02	2.674			
6,400.0	6,398.4	6,401.8	6,399.9	7.2	7.8	-134.46	-0.1	46.9	39.0	24.0	15.04	2.594			
6,500.0	6,498.3	6,501.8	6,499.6	7.2	7.8	-131.70	-3.8	52.8	37.9	22.9	15.06	2.519			
6,600.0	6,598.2	6,601.7	6,599.4	7.3	7.8	-128.79	-7.5	58.6	37.0	21.9	15.09	2.449			
6,700.0	6,698.1	6,701.7	6,699.1	7.3	7.9	-125.74	-11.3	64.5	36.1	21.0	15.13	2.386			
6,800.0	6,798.0	6,801.7	6,798.8	7.3	7.9	-122.54	-15.0	70.4	35.3	20.2	15.17	2.329			
6,900.0	6,897.8	6,901.7	6,898.6	7.3	7.9	-119.22	-18.8	76.3	34.7	19.5	15.21	2.280			
7,000.0	6,997.7	7,001.6	6,998.3	7.4	7.9	-115.78	-22.5	82.2	34.2	18.9	15.26	2.238			
7,100.0	7,097.6	7,101.6	7,098.0	7.4	7.9	-112.24	-26.3	88.0	33.8	18.4	15.31	2.204			
7,200.0	7,197.5	7,201.6	7,197.8	7.4	8.0	-108.64	-30.0	93.9	33.5	18.1	15.37	2.179			
7,300.0	7,297.4	7,301.6	7,297.5	7.5	8.0	-104.98	-33.8	99.8	33.4	17.9	15.43	2.161			
7,349.1	7,346.5	7,350.7	7,346.5	7.5	8.0	-103.18	-35.6	102.7	33.3	17.9	15.46	2.156			
7,400.0	7,397.2	7,401.6	7,397.2	7.5	8.0	-101.32	-37.5	105.7	33.4	17.9	15.50	2.152			
7,500.0	7,497.1	7,501.5	7,497.0	7.5	8.0	-97.67	-41.3	111.6	33.5	17.9	15.57	2.151			
7,600.0	7,597.0	7,601.5	7,596.7	7.6	8.1	-94.06	-45.0	117.5	33.8	18.1	15.64	2.158			
7,700.0	7,696.9	7,701.5	7,696.4	7.6	8.1	-90.53	-48.8	123.3	34.2	18.4	15.72	2.173			
7,800.0	7,796.8	7,801.5	7,796.2	7.7	8.2	-87.09	-52.5	129.2	34.7	18.9	15.81	2.195			
7,900.0	7,896.6	7,901.4	7,895.9	7.7	8.2	-83.77	-56.3	135.1	35.3	19.5	15.89	2.224			
8,000.0	7,996.5	8,001.4	7,995.6	7.7	8.2	-80.57	-60.0	141.0	36.1	20.1	15.98	2.259			
8,100.0	8,096.4	8,101.4	8,095.4	7.8	8.3	-77.52	-63.8	146.9	37.0	20.9	16.08	2.300			
8,200.0	8,196.3	8,201.4	8,195.1	7.9	8.3	-74.62	-67.5	152.7	38.0	21.8	16.18	2.346			
8,300.0	8,296.2	8,301.3	8,294.8	7.9	8.4	-71.87	-71.2	158.6	39.0	22.7	16.28	2.397			
8,400.0	8,396.1	8,401.3	8,394.6	8.0	8.4	-69.27	-75.0	164.5	40.2	23.8	16.39	2.451			
8,500.0	8,495.9	8,501.3	8,494.3	8.0	8.5	-66.82	-78.7	170.4	41.4	24.9	16.50	2.509			
8,600.0	8,595.8	8,601.3	8,594.0	8.1	8.5	-64.51	-82.5	176.3	42.7	26.1	16.61	2.570			
8,700.0	8,695.7	8,701.3	8,693.8	8.1	8.6	-62.34	-86.2	182.2	44.1	27.3	16.73	2.634			
8,800.0	8,795.6	8,801.2	8,793.5	8.2	8.7	-60.31	-90.0	188.0	45.5	28.6	16.85	2.699			
8,900.0	8,895.5	8,901.2	8,893.2	8.3	8.7	-58.40	-93.7	193.9	47.0	30.0	16.98	2.767			
9,000.0	8,995.3	9,001.2	8,993.0	8.3	8.8	-56.61	-97.5	199.8	48.5	31.4	17.11	2.835			
9,100.0	9,095.2	9,101.2	9,092.7	8.4	8.8	-54.94	-101.2	205.7	50.1	32.8	17.24	2.905			
9,200.0	9,195.1	9,201.1	9,192.4	8.5	8.9	-53.36	-105.0	211.6	51.7	34.3	17.37	2.975			
9,300.0	9,295.0	9,301.1	9,292.2	8.5	9.0	-51.88	-108.7	217.4	53.3	35.8	17.51	3.046			
9,400.0	9,394.9	9,401.1	9,391.9	8.6	9.0	-50.49	-112.5	223.3	55.0	37.4	17.65	3.117			
9,500.0	9,494.7	9,501.1	9,491.7	8.7	9.1	-49.19	-116.2	229.2	56.7	38.9	17.79	3.188			
9,600.0	9,594.6	9,601.0	9,591.4	8.7	9.2	-47.96	-120.0	235.1	58.5	40.5	17.94	3.259			
9,700.0	9,694.5	9,701.0	9,691.1	8.8	9.2	-46.80	-123.7	241.0	60.2	42.2	18.06	3.335			
9,800.0	9,794.4	9,799.3	9,789.1	8.9	9.2	-45.63	-127.1	246.7	62.8	44.7	18.15	3.463			
9,900.0	9,894.3	9,892.1	9,879.9	9.0	9.3	-44.48	-130.2	251.9	65.9	47.9	18.27	3.598			
10,000.0	9,994.1	9,974.4	9,956.2	9.1	9.3	-43.30	-133.9	256.2	69.0	51.6	18.40	3.736			
10,100.0	10,094.0	10,043.9	10,015.8	9.1	9.4	-42.13	-137.4	259.4	72.4	55.4	18.56	3.883			

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



COG Operating LLC

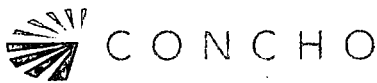
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #301H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 9700-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,200.0	10,193.9	10,100.0	10,059.7	9.2	9.5	-101.47	-4.7	261.7	205.9	187.2	18.73	10.995	
10,300.0	10,293.8	10,150.0	10,095.3	9.3	9.6	-106.00	30.4	263.6	275.6	256.7	18.91	14.574	
10,400.0	10,393.7	10,186.0	10,118.5	9.4	9.7	-108.56	57.9	264.7	352.0	332.9	19.08	18.448	
10,500.0	10,493.5	10,217.4	10,137.0	9.5	9.8	-110.42	83.2	265.6	433.3	414.1	19.26	22.501	
10,600.0	10,593.4	10,243.4	10,151.0	9.6	9.9	-111.74	105.1	266.3	518.2	498.8	19.43	26.667	
10,700.0	10,693.3	10,265.2	10,161.9	9.6	10.0	-112.73	124.1	266.8	605.7	586.1	19.60	30.900	
10,800.0	10,793.2	10,283.7	10,170.4	9.7	10.0	-113.48	140.5	267.2	695.3	675.6	19.77	35.171	
10,900.0	10,893.1	10,300.0	10,177.4	9.8	10.1	-114.10	155.2	267.5	786.5	766.6	19.93	39.456	
11,000.0	10,992.9	10,313.2	10,182.7	9.9	10.2	-114.56	167.3	267.7	879.0	858.9	20.09	43.748	
11,100.0	11,092.8	10,325.0	10,187.1	10.0	10.2	-114.95	178.2	267.9	972.5	952.2	20.25	48.035	
11,200.0	11,192.7	10,335.6	10,190.8	10.1	10.3	-115.28	188.1	268.0	1,066.8	1,046.4	20.40	52.297	
11,300.0	11,292.6	10,350.0	10,195.6	10.2	10.4	-115.71	201.7	268.2	1,161.8	1,141.2	20.58	56.462	
11,400.0	11,392.5	10,350.0	10,195.6	10.3	10.4	-115.71	201.7	268.2	1,257.3	1,236.7	20.67	60.830	
11,500.0	11,492.4	10,360.4	10,198.8	10.4	10.5	-116.01	211.6	268.3	1,353.4	1,332.5	20.83	64.966	
11,600.0	11,592.2	10,375.0	10,202.8	10.5	10.6	-116.39	225.6	268.5	1,449.9	1,428.9	21.02	68.963	
11,700.0	11,692.1	10,375.0	10,202.8	10.6	10.6	-116.39	225.6	268.5	1,546.6	1,525.5	21.12	73.231	
11,800.0	11,792.0	10,375.0	10,202.8	10.7	10.6	-116.39	225.6	268.5	1,643.7	1,622.5	21.22	77.477	
11,900.0	11,891.9	10,375.0	10,202.8	10.7	10.6	-116.39	225.6	268.5	1,741.2	1,719.9	21.31	81.697	
12,000.0	11,991.8	10,388.0	10,206.1	10.8	10.7	-116.72	238.2	268.6	1,838.7	1,817.2	21.48	85.617	
12,100.0	12,091.6	10,400.0	10,208.8	10.8	10.7	-117.01	249.9	268.6	1,936.5	1,914.9	21.58	89.744	
12,200.0	12,191.5	10,400.0	10,208.8	10.9	10.7	-117.01	249.9	268.6	2,034.4	2,012.8	21.60	94.170	
12,288.0	12,279.4	10,400.0	10,208.8	10.9	10.7	-117.01	249.9	268.6	2,120.7	2,099.1	21.64	98.018	
12,300.0	12,291.4	10,400.0	10,208.8	10.9	10.7	-87.36	249.9	268.6	2,132.5	2,110.8	21.64	98.537	
12,325.0	12,316.4	10,400.0	10,208.8	10.9	10.7	-31.98	249.9	268.6	2,156.8	2,135.1	21.65	99.609	
12,350.0	12,341.3	10,400.0	10,208.8	10.9	10.7	-15.34	249.9	268.6	2,180.7	2,159.0	21.66	100.664	
12,375.0	12,366.1	10,400.0	10,208.8	10.9	10.7	-9.28	249.9	268.6	2,204.3	2,182.6	21.71	101.543	
12,400.0	12,390.6	10,400.0	10,208.8	10.9	10.7	-6.36	249.9	268.6	2,227.5	2,205.5	21.91	101.679	
12,425.0	12,414.9	10,400.0	10,208.8	11.0	10.7	-4.71	249.9	268.6	2,250.1	2,227.6	22.53	99.891	
12,450.0	12,438.9	10,400.0	10,208.8	11.0	10.7	-3.67	249.9	268.6	2,272.3	2,248.8	23.46	96.870	
12,475.0	12,462.5	10,411.2	10,211.1	11.0	10.8	-3.00	260.9	268.7	2,293.7	2,269.1	24.62	93.160	
12,500.0	12,485.6	10,413.6	10,211.6	11.0	10.9	-2.51	263.2	268.7	2,314.6	2,288.7	25.92	89.292	
12,525.0	12,508.2	10,425.0	10,213.6	11.0	11.0	-2.16	274.4	268.7	2,335.0	2,307.6	27.35	85.377	
12,550.0	12,530.2	10,425.0	10,213.6	11.1	11.0	-1.87	274.4	268.7	2,354.4	2,325.6	28.83	81.665	
12,575.0	12,551.5	10,425.0	10,213.6	11.1	11.0	-1.65	274.4	268.7	2,373.2	2,342.8	30.34	78.217	
12,600.0	12,572.2	10,425.0	10,213.6	11.1	11.0	-1.48	274.4	268.7	2,391.2	2,359.3	31.85	75.064	
12,625.0	12,592.0	10,425.0	10,213.6	11.2	11.0	-1.34	274.4	268.7	2,408.3	2,375.0	33.35	72.205	
12,650.0	12,611.1	10,425.0	10,213.6	11.2	11.0	-1.22	274.4	268.7	2,424.7	2,389.8	34.83	69.623	
12,675.0	12,629.3	10,425.0	10,213.6	11.3	11.0	-1.13	274.4	268.7	2,440.2	2,403.9	36.26	67.302	
12,700.0	12,646.5	10,437.1	10,215.4	11.4	11.1	-1.06	286.4	268.7	2,454.6	2,416.9	37.65	65.202	
12,725.0	12,662.8	10,450.0	10,217.0	11.4	11.2	-0.99	299.2	268.7	2,468.3	2,429.3	38.98	63.326	
12,750.0	12,678.1	10,450.0	10,217.0	11.5	11.2	-0.94	299.2	268.7	2,480.8	2,440.6	40.24	61.657	
12,775.0	12,692.3	10,450.0	10,217.0	11.6	11.2	-0.89	299.2	268.7	2,492.4	2,451.0	41.42	60.172	
12,800.0	12,705.4	10,450.0	10,217.0	11.7	11.2	-0.85	299.2	268.7	2,503.1	2,460.5	42.53	58.855	
12,825.0	12,717.4	10,450.0	10,217.0	11.9	11.2	-0.81	299.2	268.7	2,512.7	2,469.2	43.55	57.694	
12,850.0	12,728.2	10,450.0	10,217.0	12.0	11.2	-0.78	299.2	268.7	2,521.4	2,476.9	44.49	56.677	
12,875.0	12,737.8	10,462.5	10,218.2	12.1	11.3	-0.76	311.6	268.7	2,528.8	2,483.4	45.34	55.776	
12,900.0	12,746.2	10,475.0	10,219.1	12.3	11.4	-0.74	324.1	268.7	2,535.3	2,489.2	46.10	55.002	
12,925.0	12,753.4	10,475.0	10,219.1	12.5	11.4	-0.72	324.1	268.7	2,540.7	2,493.9	46.74	54.356	
12,950.0	12,759.3	10,475.0	10,219.1	12.7	11.4	-0.70	324.1	268.7	2,544.9	2,497.6	47.28	53.823	
12,975.0	12,763.9	10,475.0	10,219.1	12.9	11.4	-0.69	324.1	268.7	2,548.1	2,500.4	47.72	53.397	
13,000.0	12,767.3	10,475.0	10,219.1	13.1	11.4	-0.68	324.1	268.7	2,550.3	2,502.2	48.05	53.074	
13,025.0	12,769.3	10,485.9	10,219.7	13.3	11.5	-0.68	334.9	268.6	2,551.2	2,502.9	48.29	52.836	

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



COG Operating LLC

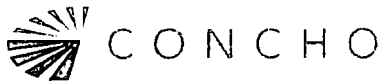
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #301H - OWB - PWP0													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 9700-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,051.2	12,770.0	10,500.0	10,220.0	13.5	11.7	-0.67	349.1	268.6	2,551.2	2,502.8	48.42	52.690		
13,057.6	12,770.0	10,500.0	10,220.0	13.6	11.7	-0.67	349.1	268.6	2,551.0	2,502.6	48.43	52.678		
13,100.0	12,769.8	10,500.0	10,220.0	14.0	11.7	-0.67	349.1	268.6	2,549.9	2,501.4	48.46	52.615		
13,149.9	12,769.6	10,514.9	10,220.0	14.5	11.8	-0.67	354.1	268.5	2,549.5	2,500.9	48.53	52.531		
13,200.0	12,769.4	10,555.2	10,219.8	15.1	12.2	-0.67	404.2	268.1	2,549.5	2,500.8	48.64	52.417		
13,300.0	12,768.9	10,655.2	10,219.3	16.2	13.4	-0.67	504.2	267.4	2,549.5	2,500.6	48.91	52.122		
13,400.0	12,768.5	10,755.2	10,218.9	17.4	14.7	-0.67	604.2	266.6	2,549.5	2,500.3	49.24	51.777		
13,500.0	12,768.0	10,855.2	10,218.4	18.8	16.1	-0.67	704.2	265.9	2,549.5	2,499.9	49.62	51.381		
13,600.0	12,767.6	10,955.2	10,218.0	20.1	17.5	-0.67	804.2	265.1	2,549.5	2,499.5	50.05	50.936		
13,700.0	12,767.1	11,055.2	10,217.5	21.5	18.9	-0.67	904.2	264.4	2,549.5	2,499.0	50.55	50.434		
13,800.0	12,766.7	11,155.2	10,217.1	23.0	20.4	-0.67	1,004.2	263.6	2,549.5	2,498.4	51.17	49.823		
13,900.0	12,766.3	11,255.2	10,216.6	24.4	21.9	-0.67	1,104.2	262.9	2,549.5	2,497.3	52.28	48.770		
14,000.0	12,765.8	11,355.2	10,216.2	25.9	23.5	-0.67	1,204.2	262.1	2,549.5	2,495.6	53.94	47.263		
14,100.0	12,765.4	11,455.2	10,215.7	27.4	25.0	-0.67	1,304.2	261.3	2,549.6	2,493.8	55.75	45.732		
14,200.0	12,764.9	11,555.2	10,215.3	28.9	26.6	-0.67	1,404.2	260.6	2,549.6	2,491.9	57.62	44.246		
14,300.0	12,764.5	11,655.2	10,214.8	30.5	28.2	-0.67	1,504.2	259.8	2,549.6	2,490.0	59.59	42.782		
14,400.0	12,764.1	11,755.2	10,214.4	32.0	29.8	-0.67	1,604.2	259.1	2,549.6	2,487.6	62.03	41.105		
14,500.0	12,763.6	11,855.2	10,213.9	33.6	31.4	-0.67	1,704.2	258.3	2,549.6	2,484.5	65.05	39.195		
14,600.0	12,763.2	11,955.2	10,213.5	35.2	33.0	-0.67	1,804.2	257.6	2,549.6	2,481.4	68.19	37.390		
14,700.0	12,762.7	12,055.2	10,213.0	36.8	34.6	-0.67	1,904.2	256.8	2,549.6	2,478.2	71.36	35.727		
14,800.0	12,762.3	12,155.2	10,212.6	38.4	36.2	-0.67	2,004.2	256.1	2,549.6	2,475.1	74.56	34.197		
14,900.0	12,761.8	12,255.2	10,212.1	39.9	37.8	-0.67	2,104.2	255.3	2,549.6	2,471.9	77.76	32.787		
15,000.0	12,761.4	12,355.2	10,211.7	41.5	39.4	-0.67	2,204.2	254.6	2,549.6	2,468.6	80.98	31.484		
15,100.0	12,761.0	12,455.2	10,211.2	43.2	41.0	-0.67	2,304.2	253.8	2,549.6	2,465.4	84.21	30.278		
15,200.0	12,760.5	12,555.2	10,210.8	44.8	42.7	-0.67	2,404.1	253.1	2,549.6	2,462.2	87.44	29.158		
15,300.0	12,760.1	12,655.2	10,210.3	46.4	44.3	-0.67	2,504.1	252.3	2,549.7	2,459.0	90.69	28.115		
15,400.0	12,759.6	12,755.2	10,209.9	48.0	45.9	-0.67	2,604.1	251.5	2,549.7	2,455.7	93.93	27.143		
15,500.0	12,759.2	12,855.2	10,209.4	49.6	47.6	-0.67	2,704.1	250.8	2,549.7	2,452.5	97.19	26.234		
15,600.0	12,758.8	12,955.2	10,209.0	51.2	49.2	-0.67	2,804.1	250.0	2,549.7	2,449.2	100.45	25.383		
15,700.0	12,758.3	13,055.2	10,208.5	52.9	50.8	-0.67	2,904.1	249.3	2,549.7	2,446.0	103.71	24.585		
15,800.0	12,757.9	13,155.2	10,208.1	54.5	52.5	-0.67	3,004.1	248.5	2,549.7	2,442.7	106.98	23.834		
15,900.0	12,757.4	13,255.2	10,207.6	56.1	54.1	-0.67	3,104.1	247.8	2,549.7	2,439.5	110.25	23.127		
16,000.0	12,757.0	13,355.2	10,207.2	57.7	55.8	-0.67	3,204.1	247.0	2,549.7	2,436.2	113.52	22.460		
16,100.0	12,756.5	13,455.2	10,206.7	59.4	57.4	-0.67	3,304.1	246.3	2,549.7	2,432.9	116.80	21.829		
16,200.0	12,756.1	13,555.2	10,206.3	61.0	59.1	-0.67	3,404.1	245.5	2,549.7	2,429.6	120.08	21.233		
16,300.0	12,755.7	13,655.2	10,205.8	62.7	60.7	-0.67	3,504.1	244.8	2,549.7	2,426.4	123.37	20.668		
16,400.0	12,755.2	13,755.2	10,205.4	64.3	62.4	-0.67	3,604.1	244.0	2,549.7	2,423.1	126.65	20.132		
16,500.0	12,754.8	13,855.2	10,204.9	65.9	64.0	-0.67	3,704.1	243.2	2,549.8	2,419.8	129.94	19.623		
16,600.0	12,754.3	13,955.2	10,204.5	67.6	65.7	-0.67	3,804.1	242.5	2,549.8	2,416.5	133.23	19.138		
16,700.0	12,753.9	14,055.2	10,204.0	69.2	67.3	-0.67	3,904.1	241.7	2,549.8	2,413.3	136.52	18.677		
16,800.0	12,753.4	14,155.2	10,203.6	70.9	69.0	-0.67	4,004.1	241.0	2,549.8	2,410.0	139.81	18.237		
16,900.0	12,753.0	14,255.2	10,203.1	72.5	70.6	-0.67	4,104.1	240.2	2,549.8	2,406.7	143.11	17.817		
17,000.0	12,752.6	14,355.2	10,202.7	74.1	72.3	-0.67	4,204.1	239.5	2,549.8	2,403.4	146.41	17.416		
17,100.0	12,752.1	14,455.2	10,202.2	75.8	73.9	-0.67	4,304.1	238.7	2,549.8	2,400.1	149.70	17.032		
17,200.0	12,751.7	14,555.2	10,201.8	77.4	75.6	-0.67	4,404.1	238.0	2,549.8	2,396.8	153.00	16.665		
17,300.0	12,751.2	14,655.2	10,201.3	79.1	77.2	-0.67	4,504.1	237.2	2,549.8	2,393.5	156.30	16.313		
17,400.0	12,750.8	14,755.2	10,200.9	80.7	78.9	-0.67	4,604.1	236.5	2,549.8	2,390.2	159.61	15.976		
17,500.0	12,750.4	14,855.2	10,200.4	82.4	80.5	-0.67	4,704.1	235.7	2,549.8	2,386.9	162.91	15.652		
17,580.8	12,750.0	14,936.0	10,200.1	83.7	81.9	-0.67	4,784.9	235.1	2,549.8	2,384.3	165.58	15.400		

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design: BULLDOG - DOMINATOR 25 FED #401H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.0	0.0	0.0	0.0	3.0	3.0	-45.57	29.7	-30.3	42.4				
100.0	100.0	100.0	100.0	3.0	3.0	-45.57	29.7	-30.3	42.4	36.4	6.00	7.070	
200.0	200.0	200.0	200.0	3.0	3.0	-45.57	29.7	-30.3	42.4	36.4	6.01	7.059	
300.0	300.0	300.0	300.0	3.0	3.0	-45.57	29.7	-30.3	42.4	36.4	6.03	7.033	
400.0	400.0	400.0	400.0	3.0	3.0	-45.57	29.7	-30.3	42.4	36.4	6.07	6.995	
500.0	500.0	500.0	500.0	3.1	3.1	-45.57	29.7	-30.3	42.4	36.3	6.11	6.945	
600.0	600.0	600.0	600.0	3.1	3.1	-45.57	29.7	-30.3	42.4	36.3	6.16	6.882	
700.0	700.0	700.0	700.0	3.1	3.1	-45.57	29.7	-30.3	42.4	36.2	6.23	6.810	
800.0	800.0	800.0	800.0	3.2	3.2	-45.57	29.7	-30.3	42.4	36.1	6.31	6.727	
900.0	900.0	900.0	900.0	3.2	3.2	-45.57	29.7	-30.3	42.4	36.0	6.39	6.637	
1,000.0	1,000.0	1,000.0	1,000.0	3.2	3.2	-45.57	29.7	-30.3	42.4	35.9	6.49	6.539	
1,100.0	1,100.0	1,100.0	1,100.0	3.3	3.3	-45.57	29.7	-30.3	42.4	35.8	6.59	6.435	
1,200.0	1,200.0	1,200.0	1,200.0	3.4	3.4	-45.57	29.7	-30.3	42.4	35.7	6.71	6.326	
1,300.0	1,300.0	1,300.0	1,300.0	3.4	3.4	-45.57	29.7	-30.3	42.4	35.6	6.83	6.213	
1,400.0	1,400.0	1,400.0	1,400.0	3.5	3.5	-45.57	29.7	-30.3	42.4	35.5	6.96	6.097	
1,500.0	1,500.0	1,500.0	1,500.0	3.5	3.5	-45.57	29.7	-30.3	42.4	35.3	7.10	5.979	
1,600.0	1,600.0	1,600.0	1,600.0	3.6	3.6	-45.57	29.7	-30.3	42.4	35.2	7.24	5.860	
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	-45.57	29.7	-30.3	42.4	35.0	7.39	5.740	
1,800.0	1,800.0	1,800.0	1,800.0	3.8	3.8	-45.57	29.7	-30.3	42.4	34.9	7.55	5.621	
1,900.0	1,900.0	1,900.0	1,900.0	3.9	3.9	-45.57	29.7	-30.3	42.4	34.7	7.71	5.502	
2,000.0	2,000.0	2,000.0	2,000.0	3.9	3.9	-45.57	29.7	-30.3	42.4	34.5	7.88	5.385	
2,100.0	2,100.0	2,100.0	2,100.0	4.0	4.0	-45.57	29.7	-30.3	42.4	34.4	8.05	5.269	
2,200.0	2,200.0	2,200.0	2,200.0	4.1	4.1	-45.57	29.7	-30.3	42.4	34.2	8.23	5.155	
2,300.0	2,300.0	2,300.0	2,300.0	4.2	4.2	-45.57	29.7	-30.3	42.4	34.0	8.41	5.043	
2,400.0	2,400.0	2,400.0	2,400.0	4.3	4.3	-45.57	29.7	-30.3	42.4	33.8	8.60	4.933	
2,500.0	2,500.0	2,500.0	2,500.0	4.4	4.4	-45.57	29.7	-30.3	42.4	33.6	8.79	4.826	
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	-45.57	29.7	-30.3	42.4	33.4	8.99	4.722	
2,700.0	2,700.0	2,700.0	2,700.0	4.6	4.6	-45.57	29.7	-30.3	42.4	33.2	9.18	4.620	
2,800.0	2,800.0	2,800.0	2,800.0	4.7	4.7	-45.57	29.7	-30.3	42.4	33.0	9.39	4.521	
2,900.0	2,900.0	2,900.0	2,900.0	4.8	4.8	-45.57	29.7	-30.3	42.4	32.8	9.59	4.424	
3,000.0	3,000.0	3,000.0	3,000.0	4.9	4.9	-45.57	29.7	-30.3	42.4	32.6	9.80	4.331	
3,100.0	3,100.0	3,100.0	3,100.0	5.0	5.0	-45.57	29.7	-30.3	42.4	32.4	10.01	4.240	
3,200.0	3,200.0	3,200.0	3,200.0	5.1	5.1	-45.57	29.7	-30.3	42.4	32.2	10.22	4.152	
3,300.0	3,300.0	3,300.0	3,300.0	5.2	5.2	-45.57	29.7	-30.3	42.4	32.0	10.43	4.067	
3,400.0	3,400.0	3,400.0	3,400.0	5.3	5.3	-45.57	29.7	-30.3	42.4	31.8	10.65	3.984	
3,500.0	3,500.0	3,500.0	3,500.0	5.4	5.4	-45.57	29.7	-30.3	42.4	31.6	10.87	3.904	
3,600.0	3,600.0	3,600.0	3,600.0	5.5	5.5	-45.57	29.7	-30.3	42.4	31.3	11.09	3.826	
3,700.0	3,700.0	3,700.0	3,700.0	5.7	5.7	-45.57	29.7	-30.3	42.4	31.1	11.31	3.751	
3,800.0	3,800.0	3,800.0	3,800.0	5.8	5.8	-45.57	29.7	-30.3	42.4	30.9	11.54	3.678	
3,900.0	3,900.0	3,900.0	3,900.0	5.9	5.9	-45.57	29.7	-30.3	42.4	30.7	11.76	3.607	
4,000.0	4,000.0	4,000.0	4,000.0	6.0	6.0	-45.57	29.7	-30.3	42.4	30.4	11.99	3.539	
4,100.0	4,100.0	4,100.0	4,100.0	6.1	6.1	-45.57	29.7	-30.3	42.4	30.2	12.22	3.472	
4,200.0	4,200.0	4,200.0	4,200.0	6.2	6.2	-45.57	29.7	-30.3	42.4	30.0	12.45	3.408	
4,300.0	4,300.0	4,300.0	4,300.0	6.3	6.3	-45.57	29.7	-30.3	42.4	29.7	12.68	3.346	
4,400.0	4,400.0	4,400.0	4,400.0	6.5	6.5	-45.57	29.7	-30.3	42.4	29.5	12.91	3.285	
4,500.0	4,500.0	4,500.0	4,500.0	6.6	6.6	-45.57	29.7	-30.3	42.4	29.3	13.15	3.227	
4,600.0	4,600.0	4,600.0	4,600.0	6.7	6.7	-45.57	29.7	-30.3	42.4	29.0	13.38	3.170	
4,700.0	4,700.0	4,700.0	4,700.0	6.8	6.8	-45.57	29.7	-30.3	42.4	28.8	13.62	3.115	
4,800.0	4,800.0	4,800.0	4,800.0	6.9	6.9	-45.57	29.7	-30.3	42.4	28.6	13.86	3.062	
4,900.0	4,900.0	4,900.0	4,900.0	7.0	7.0	-45.57	29.7	-30.3	42.4	28.3	14.10	3.010	
5,000.0	5,000.0	5,000.0	5,000.0	7.2	7.2	-45.57	29.7	-30.3	42.4	28.1	14.33	2.960	
5,100.0	5,100.0	5,100.0	5,100.0	7.2	7.3	-172.38	29.7	-30.3	44.2	29.7	14.51	3.044	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design: BULLDOG - DOMINATOR 25 FED #401H - OWB - PWP0														Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10000-MWD														Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centro +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,140.0	5,139.9	5,139.9	5,139.9	7.2	7.3	-172.65	29.7	-30.3	45.8	31.3	14.55	3.149		
5,200.0	5,199.9	5,200.1	5,199.9	7.2	7.4	-173.09	29.7	-30.3	48.7	34.1	14.61	3.335		
5,300.0	5,299.8	5,300.2	5,299.8	7.2	7.5	-173.72	29.7	-30.3	53.6	38.9	14.72	3.639		
5,400.0	5,399.6	5,400.4	5,399.6	7.2	7.6	-174.25	29.7	-30.3	58.4	43.6	14.83	3.939		
5,500.0	5,499.5	5,500.5	5,499.5	7.2	7.8	-174.69	29.7	-30.3	63.3	48.4	14.95	4.234		
5,600.0	5,599.4	5,600.6	5,599.4	7.2	7.9	-175.07	29.7	-30.3	68.2	53.1	15.07	4.524		
5,700.0	5,699.3	5,700.7	5,699.3	7.2	8.0	-175.40	29.7	-30.3	73.0	57.8	15.19	4.809		
5,800.0	5,799.2	5,800.8	5,799.2	7.2	8.1	-175.69	29.7	-30.3	77.9	62.6	15.31	5.089		
5,900.0	5,899.0	5,901.0	5,899.0	7.2	8.3	-175.94	29.7	-30.3	82.8	67.3	15.43	5.363		
6,000.0	5,998.9	5,998.9	5,998.9	7.2	8.4	-176.17	29.7	-30.3	87.6	72.1	15.56	5.633		
6,100.0	6,098.8	6,102.0	6,102.0	7.2	8.4	-176.17	28.8	-28.7	90.8	75.2	15.63	5.810		
6,200.0	6,198.7	6,205.2	6,205.0	7.2	8.4	-175.76	26.0	-23.9	90.4	74.8	15.63	5.784		
6,300.0	6,298.6	6,305.4	6,305.0	7.2	8.4	-175.09	22.3	-17.5	88.0	72.4	15.64	5.627		
6,400.0	6,398.4	6,405.4	6,404.6	7.2	8.4	-174.39	18.6	-11.1	85.6	70.0	15.65	5.470		
6,500.0	6,498.3	6,505.3	6,504.3	7.2	8.4	-173.65	14.9	-4.7	83.2	67.6	15.67	5.312		
6,600.0	6,598.2	6,605.3	6,604.0	7.3	8.4	-172.87	11.2	1.7	80.9	65.2	15.69	5.154		
6,700.0	6,698.1	6,705.3	6,703.7	7.3	8.4	-172.03	7.5	8.1	78.5	62.8	15.71	4.996		
6,800.0	6,798.0	6,805.2	6,803.4	7.3	8.4	-171.15	3.8	14.6	76.2	60.4	15.74	4.838		
6,900.0	6,897.8	6,905.2	6,903.1	7.3	8.5	-170.21	0.1	21.0	73.9	58.1	15.78	4.681		
7,000.0	6,997.7	7,005.2	7,002.8	7.4	8.5	-169.21	-3.6	27.4	71.6	55.7	15.82	4.524		
7,100.0	7,097.6	7,105.1	7,102.5	7.4	8.5	-168.14	-7.3	33.8	69.3	53.4	15.86	4.369		
7,200.0	7,197.5	7,205.1	7,202.2	7.4	8.5	-167.01	-11.0	40.2	67.0	51.1	15.91	4.215		
7,300.0	7,297.4	7,305.1	7,301.9	7.5	8.5	-165.79	-14.7	46.6	64.8	48.9	15.96	4.062		
7,400.0	7,397.2	7,405.0	7,401.6	7.5	8.5	-164.49	-18.4	53.1	62.6	46.6	16.01	3.912		
7,500.0	7,497.1	7,505.0	7,501.2	7.5	8.5	-163.09	-22.1	59.5	60.5	44.4	16.07	3.763		
7,600.0	7,597.0	7,605.0	7,600.9	7.6	8.6	-161.60	-25.8	65.9	58.4	42.2	16.14	3.617		
7,700.0	7,696.9	7,704.9	7,700.6	7.6	8.6	-159.99	-29.5	72.3	56.3	40.1	16.21	3.474		
7,800.0	7,796.8	7,804.9	7,800.3	7.7	8.6	-158.26	-33.2	78.7	54.3	38.0	16.28	3.335		
7,900.0	7,896.6	7,904.9	7,900.0	7.7	8.7	-156.40	-36.9	85.1	52.3	36.0	16.36	3.199		
8,000.0	7,996.5	8,004.8	7,999.7	7.7	8.7	-154.40	-40.7	91.6	50.4	34.0	16.44	3.067		
8,100.0	8,096.4	8,104.8	8,099.4	7.8	8.7	-152.24	-44.4	98.0	48.6	32.0	16.52	2.940		
8,200.0	8,196.3	8,204.7	8,199.1	7.9	8.8	-149.92	-48.1	104.4	46.8	30.2	16.61	2.818		
8,300.0	8,296.2	8,304.7	8,298.8	7.9	8.8	-147.41	-51.8	110.8	45.1	28.4	16.70	2.701		
8,400.0	8,396.1	8,404.7	8,398.5	8.0	8.8	-144.72	-55.5	117.2	43.5	26.7	16.80	2.591		
8,500.0	8,495.9	8,504.6	8,498.1	8.0	8.9	-141.83	-59.2	123.6	42.0	25.1	16.90	2.488		
8,600.0	8,595.8	8,604.6	8,597.8	8.1	8.9	-138.74	-62.9	130.0	40.7	23.7	17.00	2.392		
8,700.0	8,695.7	8,704.6	8,697.5	8.1	9.0	-135.44	-66.6	136.5	39.4	22.3	17.11	2.304		
8,800.0	8,795.6	8,804.5	8,797.2	8.2	9.0	-131.94	-70.3	142.9	38.3	21.1	17.22	2.224		
8,900.0	8,895.5	8,904.5	8,896.9	8.3	9.1	-128.25	-74.0	149.3	37.3	20.0	17.33	2.154		
9,000.0	8,995.3	9,004.5	8,996.6	8.3	9.1	-124.37	-77.7	155.7	36.5	19.1	17.45	2.094		
9,100.0	9,095.2	9,104.4	9,096.3	8.4	9.2	-120.35	-81.4	162.1	35.9	18.4	17.57	2.045		
9,200.0	9,195.1	9,204.4	9,196.0	8.5	9.2	-116.20	-85.1	168.5	35.5	17.8	17.70	2.005		
9,300.0	9,295.0	9,304.4	9,295.7	8.5	9.3	-111.98	-88.8	175.0	35.2	17.4	17.83	1.977 Advise and Monitor		
9,377.6	9,372.5	9,381.9	9,373.0	8.6	9.3	-108.67	-91.7	179.9	35.2	17.3	17.93	1.963 Advise and Monitor, CC		
9,400.0	9,394.9	9,404.3	9,395.4	8.6	9.4	-107.71	-92.5	181.4	35.2	17.2	17.96	1.960 Advise and Monitor, ES		
9,500.0	9,494.7	9,504.3	9,495.1	8.7	9.4	-103.46	-96.2	187.8	35.3	17.2	18.09	1.953 Advise and Monitor, SF		
9,600.0	9,594.6	9,604.3	9,594.7	8.7	9.5	-99.27	-99.9	194.2	35.7	17.4	18.23	1.957 Advise and Monitor		
9,700.0	9,694.5	9,704.2	9,694.4	8.8	9.5	-95.17	-103.6	200.6	36.2	17.8	18.37	1.970 Advise and Monitor		
9,800.0	9,794.4	9,804.2	9,794.1	8.9	9.6	-91.21	-107.3	207.0	36.9	18.4	18.51	1.993 Advise and Monitor		
9,900.0	9,894.3	9,904.2	9,893.8	9.0	9.7	-87.41	-111.0	213.5	37.8	19.1	18.66	2.024		
10,000.0	9,994.1	10,004.1	9,993.5	9.1	9.7	-83.80	-114.7	219.9	38.8	20.0	18.77	2.066		
10,100.0	10,094.0	10,104.1	10,093.2	9.1	9.7	-80.39	-118.4	226.3	40.0	21.1	18.87	2.118		

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



COG Operating LLC

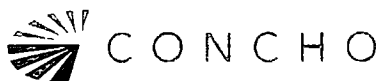
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #401H - OWB - PWP0														Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 10000-MWD														Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N-S (usft)	+E-W (usft)							
10,200.0	10,193.9	10,204.1	10,192.9	9.2	9.8	-77.19	-122.1	232.7	41.3	22.3	18.98	2.174			
10,300.0	10,293.8	10,304.0	10,292.6	9.3	9.8	-74.19	-125.8	239.1	42.7	23.6	19.10	2.235			
10,400.0	10,393.7	10,397.6	10,385.6	9.4	9.9	-80.57	-119.8	245.0	50.7	31.5	19.24	2.637			
10,500.0	10,493.5	10,484.7	10,469.7	9.5	9.9	-93.83	-97.9	250.3	74.4	55.0	19.39	3.835			
10,600.0	10,593.4	10,561.0	10,538.9	9.6	10.0	-103.42	-66.4	254.5	115.1	95.5	19.55	5.886			
10,700.0	10,693.3	10,625.0	10,592.6	9.6	10.1	-109.02	-31.8	257.7	169.9	150.1	19.72	8.614			
10,800.0	10,793.2	10,678.3	10,633.4	9.7	10.2	-112.36	2.3	260.0	235.0	215.2	19.89	11.820			
10,900.0	10,893.1	10,725.0	10,665.9	9.8	10.2	-114.57	35.8	261.9	307.9	287.8	20.06	15.351			
11,000.0	10,992.9	10,757.5	10,686.5	9.9	10.3	-115.82	60.9	263.0	386.3	366.0	20.21	19.109			
11,100.0	11,092.8	10,787.2	10,703.8	10.0	10.4	-116.80	85.0	263.9	468.8	448.4	20.37	23.011			
11,200.0	11,192.7	10,811.9	10,717.1	10.1	10.4	-117.51	105.9	264.6	554.5	534.0	20.53	27.008			
11,300.0	11,292.6	10,832.8	10,727.4	10.2	10.5	-118.05	124.1	265.1	642.6	621.9	20.69	31.065			
11,400.0	11,392.5	10,850.0	10,735.3	10.3	10.6	-118.46	139.3	265.5	732.6	711.7	20.83	35.161			
11,500.0	11,492.4	10,866.0	10,742.1	10.4	10.6	-118.81	153.7	265.9	824.0	803.0	20.99	39.262			
11,600.0	11,592.2	10,875.0	10,745.8	10.5	10.7	-119.00	162.0	266.1	916.6	895.5	21.12	43.411			
11,700.0	11,692.1	10,890.9	10,751.9	10.6	10.7	-119.31	176.7	266.3	1,010.2	988.9	21.28	47.476			
11,800.0	11,792.0	10,900.0	10,755.1	10.7	10.8	-119.48	185.2	266.5	1,104.6	1,083.2	21.41	51.582			
11,900.0	11,891.9	10,910.2	10,758.6	10.7	10.8	-119.67	194.8	266.6	1,199.6	1,178.0	21.56	55.640			
12,000.0	11,991.8	10,925.0	10,763.2	10.8	10.9	-119.92	208.8	266.8	1,295.2	1,273.5	21.70	59.683			
12,100.0	12,091.6	10,925.0	10,763.2	10.8	10.9	-119.92	208.8	266.8	1,391.2	1,369.5	21.72	64.066			
12,200.0	12,191.5	10,925.0	10,763.2	10.9	10.9	-119.92	208.8	266.8	1,487.7	1,466.0	21.74	68.430			
12,288.0	12,279.4	10,937.4	10,766.7	10.9	11.0	-120.12	220.7	267.0	1,572.8	1,551.0	21.84	72.007			
12,300.0	12,291.4	10,938.1	10,766.9	10.9	11.0	-89.97	221.4	267.0	1,584.4	1,562.6	21.85	72.507			
12,325.0	12,316.4	10,939.8	10,767.4	10.9	11.0	-33.88	223.0	267.0	1,608.3	1,586.4	21.87	73.532			
12,350.0	12,341.3	10,950.0	10,770.0	10.9	11.0	-16.86	232.9	267.1	1,631.9	1,610.0	21.94	74.373			
12,375.0	12,366.1	10,950.0	10,770.0	10.9	11.0	-10.50	232.9	267.1	1,655.0	1,633.0	21.99	75.269			
12,400.0	12,390.6	10,950.0	10,770.0	10.9	11.0	-7.37	232.9	267.1	1,677.5	1,655.3	22.25	75.395			
12,425.0	12,414.9	10,950.0	10,770.0	11.0	11.0	-5.56	232.9	267.1	1,699.6	1,676.6	23.01	73.865			
12,450.0	12,438.9	10,950.0	10,770.0	11.0	11.0	-4.41	232.9	267.1	1,721.1	1,697.0	24.11	71.374			
12,475.0	12,462.5	10,950.0	10,770.0	11.0	11.0	-3.62	232.9	267.1	1,742.0	1,716.6	25.42	68.529			
12,500.0	12,485.6	10,950.0	10,770.0	11.0	11.0	-3.06	232.9	267.1	1,762.3	1,735.4	26.85	65.623			
12,525.0	12,508.2	10,961.1	10,772.6	11.0	11.1	-2.65	243.6	267.2	1,781.7	1,753.4	28.37	62.803			
12,550.0	12,530.2	10,964.5	10,773.4	11.1	11.1	-2.33	247.0	267.2	1,800.6	1,770.6	29.93	60.164			
12,575.0	12,551.5	10,975.0	10,775.6	11.1	11.2	-2.09	257.2	267.3	1,818.7	1,787.2	31.50	57.727			
12,600.0	12,572.2	10,975.0	10,775.6	11.1	11.2	-1.88	257.2	267.3	1,835.9	1,802.8	33.08	55.500			
12,625.0	12,592.0	10,975.0	10,775.6	11.2	11.2	-1.71	257.2	267.3	1,852.3	1,817.7	34.64	53.479			
12,650.0	12,611.1	10,975.0	10,775.6	11.2	11.2	-1.58	257.2	267.3	1,868.0	1,831.8	36.16	51.653			
12,675.0	12,629.3	10,975.0	10,775.6	11.3	11.2	-1.46	257.2	267.3	1,882.8	1,845.1	37.65	50.009			
12,700.0	12,646.5	10,988.1	10,778.0	11.4	11.3	-1.37	270.1	267.3	1,896.5	1,857.4	39.09	48.521			
12,725.0	12,662.8	11,000.0	10,779.9	11.4	11.4	-1.30	281.9	267.4	1,909.5	1,869.0	40.46	47.190			
12,750.0	12,678.1	11,000.0	10,779.9	11.5	11.4	-1.23	281.9	267.4	1,921.4	1,879.7	41.77	46.002			
12,775.0	12,692.3	11,000.0	10,779.9	11.6	11.4	-1.17	281.9	267.4	1,932.4	1,889.4	43.00	44.944			
12,800.0	12,705.4	11,000.0	10,779.9	11.7	11.4	-1.12	281.9	267.4	1,942.5	1,898.4	44.14	44.005			
12,825.0	12,717.4	11,010.3	10,781.3	11.9	11.5	-1.07	292.1	267.4	1,951.5	1,906.3	45.21	43.167			
12,850.0	12,728.2	11,015.0	10,781.8	12.0	11.5	-1.04	296.7	267.4	1,959.6	1,913.4	46.18	42.434			
12,875.0	12,737.8	11,025.0	10,782.9	12.1	11.6	-1.01	306.7	267.4	1,966.7	1,919.6	47.06	41.792			
12,900.0	12,746.2	11,025.0	10,782.9	12.3	11.6	-0.98	306.7	267.4	1,972.6	1,924.8	47.83	41.244			
12,925.0	12,753.4	11,025.0	10,782.9	12.5	11.6	-0.96	306.7	267.4	1,977.6	1,929.1	48.49	40.780			
12,950.0	12,759.3	11,025.0	10,782.9	12.7	11.6	-0.94	306.7	267.4	1,981.6	1,932.6	49.05	40.396			
12,975.0	12,763.9	11,038.8	10,784.0	12.9	11.7	-0.93	320.5	267.3	1,984.4	1,934.9	49.52	40.074			
13,000.0	12,767.3	11,050.0	10,784.6	13.1	11.8	-0.92	331.6	267.3	1,986.3	1,936.4	49.87	39.829			
13,025.0	12,769.3	11,050.0	10,784.6	13.3	11.8	-0.91	331.6	267.3	1,987.0	1,936.9	50.10	39.662			

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #401H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
13,051.2	12,770.0	11,050.0	10,784.6	13.5	11.8	-0.90	331.6	267.3	1,986.7	1,936.5	50.22	39.562	
13,057.6	12,770.0	11,050.0	10,784.6	13.6	11.8	-0.90	331.6	267.3	1,986.5	1,936.3	50.22	39.552	
13,100.0	12,769.8	11,070.0	10,785.0	14.0	12.0	-0.90	351.6	267.2	1,985.4	1,935.1	50.28	39.483	
13,200.0	12,769.4	11,134.1	10,785.0	15.1	12.6	-0.90	415.7	266.7	1,984.6	1,934.1	50.47	39.326	
13,300.0	12,768.9	11,234.1	10,785.0	16.2	13.8	-0.90	515.7	266.0	1,984.2	1,933.4	50.73	39.111	
13,400.0	12,768.5	11,334.1	10,785.0	17.4	15.0	-0.90	615.7	265.2	1,983.7	1,932.7	51.05	38.860	
13,500.0	12,768.0	11,434.1	10,785.0	18.8	16.4	-0.90	715.7	264.5	1,983.3	1,931.9	51.41	38.576	
13,600.0	12,767.6	11,534.1	10,785.0	20.1	17.8	-0.90	815.7	263.8	1,982.8	1,931.0	51.83	38.259	
13,700.0	12,767.1	11,634.1	10,785.0	21.5	19.2	-0.90	915.7	263.0	1,982.4	1,930.1	52.29	37.909	
13,800.0	12,766.7	11,734.1	10,785.0	23.0	20.7	-0.90	1,015.7	262.3	1,982.0	1,929.1	52.82	37.521	
13,900.0	12,766.3	11,834.1	10,785.0	24.4	22.2	-0.90	1,115.7	261.6	1,981.5	1,928.1	53.46	37.068	
14,000.0	12,765.8	11,934.1	10,785.0	25.9	23.7	-0.90	1,215.7	260.8	1,981.1	1,926.6	54.45	36.383	
14,100.0	12,765.4	12,034.1	10,785.0	27.4	25.3	-0.90	1,315.7	260.1	1,980.6	1,924.6	56.05	35.335	
14,200.0	12,764.9	12,134.1	10,785.0	28.9	26.8	-0.90	1,415.7	259.4	1,980.2	1,922.3	57.87	34.216	
14,300.0	12,764.5	12,234.1	10,785.0	30.5	28.4	-0.90	1,515.7	258.6	1,979.7	1,919.9	59.82	33.095	
14,400.0	12,764.1	12,334.1	10,785.0	32.0	30.0	-0.90	1,615.7	257.9	1,979.3	1,917.1	62.24	31.802	
14,500.0	12,763.6	12,434.1	10,785.0	33.6	31.6	-0.90	1,715.7	257.2	1,978.9	1,913.6	65.25	30.326	
14,600.0	12,763.2	12,534.1	10,785.0	35.2	33.1	-0.90	1,815.7	256.4	1,978.4	1,910.0	68.38	28.931	
14,700.0	12,762.7	12,634.1	10,785.0	36.8	34.8	-0.90	1,915.6	255.7	1,978.0	1,906.4	71.55	27.644	
14,800.0	12,762.3	12,734.1	10,785.0	38.4	36.4	-0.90	2,015.6	255.0	1,977.5	1,902.8	74.74	26.459	
14,900.0	12,761.8	12,834.1	10,785.0	39.9	38.0	-0.90	2,115.6	254.2	1,977.1	1,899.1	77.94	25.367	
15,000.0	12,761.4	12,934.1	10,785.0	41.5	39.6	-0.90	2,215.6	253.5	1,976.6	1,895.5	81.15	24.357	
15,100.0	12,761.0	13,034.1	10,785.0	43.2	41.2	-0.90	2,315.6	252.8	1,976.2	1,891.8	84.38	23.421	
15,200.0	12,760.5	13,134.1	10,785.0	44.8	42.8	-0.90	2,415.6	252.0	1,975.8	1,888.2	87.61	22.552	
15,300.0	12,760.1	13,234.1	10,785.0	46.4	44.5	-0.90	2,515.6	251.3	1,975.3	1,884.5	90.85	21.744	
15,400.0	12,759.6	13,334.1	10,785.0	48.0	46.1	-0.90	2,615.6	250.6	1,974.9	1,880.8	94.09	20.989	
15,500.0	12,759.2	13,434.1	10,785.0	49.6	47.7	-0.89	2,715.6	249.8	1,974.4	1,877.1	97.34	20.283	
15,600.0	12,758.8	13,534.1	10,785.0	51.2	49.4	-0.89	2,815.6	249.1	1,974.0	1,873.4	100.60	19.623	
15,700.0	12,758.3	13,634.1	10,785.0	52.9	51.0	-0.89	2,915.6	248.4	1,973.6	1,869.7	103.86	19.002	
15,800.0	12,757.9	13,734.1	10,785.0	54.5	52.6	-0.89	3,015.6	247.6	1,973.1	1,866.0	107.12	18.419	
15,900.0	12,757.4	13,834.1	10,785.0	56.1	54.3	-0.89	3,115.6	246.9	1,972.7	1,862.3	110.39	17.869	
16,000.0	12,757.0	13,934.1	10,785.0	57.7	55.9	-0.89	3,215.6	246.2	1,972.2	1,858.6	113.67	17.351	
16,100.0	12,756.5	14,034.1	10,785.0	59.4	57.6	-0.89	3,315.6	245.4	1,971.8	1,854.8	116.94	16.861	
16,200.0	12,756.1	14,134.1	10,785.0	61.0	59.2	-0.89	3,415.6	244.7	1,971.3	1,851.1	120.22	16.398	
16,300.0	12,755.7	14,234.1	10,785.0	62.7	60.8	-0.89	3,515.6	244.0	1,970.9	1,847.4	123.50	15.959	
16,400.0	12,755.2	14,334.1	10,785.0	64.3	62.5	-0.89	3,615.6	243.2	1,970.5	1,843.7	126.78	15.542	
16,500.0	12,754.8	14,434.1	10,785.0	65.9	64.1	-0.89	3,715.6	242.5	1,970.0	1,839.9	130.07	15.146	
16,600.0	12,754.3	14,534.1	10,785.0	67.6	65.8	-0.89	3,815.6	241.8	1,969.6	1,836.2	133.36	14.769	
16,700.0	12,753.9	14,634.1	10,785.0	69.2	67.4	-0.89	3,915.6	241.0	1,969.1	1,832.5	136.65	14.410	
16,800.0	12,753.4	14,734.1	10,785.0	70.9	69.1	-0.89	4,015.6	240.3	1,968.7	1,828.7	139.94	14.068	
16,900.0	12,753.0	14,834.1	10,785.0	72.5	70.7	-0.89	4,115.6	239.6	1,968.2	1,825.0	143.23	13.741	
17,000.0	12,752.6	14,934.1	10,785.0	74.1	72.4	-0.89	4,215.6	238.8	1,967.8	1,821.3	146.53	13.429	
17,100.0	12,752.1	15,034.1	10,785.0	75.8	74.0	-0.89	4,315.6	238.1	1,967.4	1,817.5	149.83	13.131	
17,200.0	12,751.7	15,134.1	10,785.0	77.4	75.7	-0.89	4,415.6	237.4	1,966.9	1,813.8	153.12	12.845	
17,300.0	12,751.2	15,234.1	10,785.0	79.1	77.3	-0.89	4,515.6	236.6	1,966.5	1,810.1	156.42	12.571	
17,400.0	12,750.8	15,334.1	10,785.0	80.7	79.0	-0.89	4,615.5	235.9	1,966.0	1,806.3	159.72	12.309	
17,500.0	12,750.4	15,434.1	10,785.0	82.4	80.6	-0.89	4,715.5	235.2	1,965.6	1,802.6	163.03	12.057	
17,580.8	12,750.0	15,515.7	10,785.0	83.7	82.0	-0.87	4,797.2	235.0	1,965.2	1,799.5	165.71	11.860	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design: BULLDOG - DOMINATOR 25 FED #501H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10800-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.0	0.0	0.4	0.4	3.0	3.0	-63.89	29.5	-60.2	67.0				
100.0	100.0	100.4	100.4	3.0	3.0	-63.89	29.5	-60.2	67.0	61.0	6.00	11.172	
200.0	200.0	200.4	200.4	3.0	3.0	-63.89	29.5	-60.2	67.0	61.0	6.01	11.153	
300.0	300.0	300.4	300.4	3.0	3.0	-63.89	29.5	-60.2	67.0	61.0	6.03	11.113	
400.0	400.0	400.4	400.4	3.0	3.0	-63.89	29.5	-60.2	67.0	61.0	6.07	11.053	
500.0	500.0	500.4	500.4	3.1	3.1	-63.89	29.5	-60.2	67.0	60.9	6.11	10.973	
600.0	600.0	600.4	600.4	3.1	3.1	-63.89	29.5	-60.2	67.0	60.9	6.16	10.874	
700.0	700.0	700.4	700.4	3.1	3.1	-63.89	29.5	-60.2	67.0	60.8	6.23	10.759	
800.0	800.0	800.4	800.4	3.2	3.2	-63.89	29.5	-60.2	67.0	60.7	6.31	10.629	
900.0	900.0	900.4	900.4	3.2	3.2	-63.89	29.5	-60.2	67.0	60.6	6.39	10.486	
1,000.0	1,000.0	1,000.4	1,000.4	3.2	3.2	-63.89	29.5	-60.2	67.0	60.6	6.49	10.331	
1,100.0	1,100.0	1,100.4	1,100.4	3.3	3.3	-63.89	29.5	-60.2	67.0	60.4	6.59	10.167	
1,200.0	1,200.0	1,200.4	1,200.4	3.4	3.4	-63.89	29.5	-60.2	67.0	60.3	6.71	9.995	
1,300.0	1,300.0	1,300.4	1,300.4	3.4	3.4	-63.89	29.5	-60.2	67.0	60.2	6.83	9.816	
1,400.0	1,400.0	1,400.4	1,400.4	3.5	3.5	-63.89	29.5	-60.2	67.0	60.1	6.96	9.633	
1,500.0	1,500.0	1,500.4	1,500.4	3.5	3.5	-63.89	29.5	-60.2	67.0	59.9	7.10	9.447	
1,600.0	1,600.0	1,600.4	1,600.4	3.6	3.6	-63.89	29.5	-60.2	67.0	59.8	7.24	9.259	
1,700.0	1,700.0	1,700.4	1,700.4	3.7	3.7	-63.89	29.5	-60.2	67.0	59.6	7.39	9.070	
1,800.0	1,800.0	1,800.4	1,800.4	3.8	3.8	-63.89	29.5	-60.2	67.0	59.5	7.55	8.881	
1,900.0	1,900.0	1,900.4	1,900.4	3.9	3.9	-63.89	29.5	-60.2	67.0	59.3	7.71	8.693	
2,000.0	2,000.0	2,000.4	2,000.4	3.9	3.9	-63.89	29.5	-60.2	67.0	59.2	7.88	8.508	
2,100.0	2,100.0	2,100.4	2,100.4	4.0	4.0	-63.89	29.5	-60.2	67.0	59.0	8.05	8.324	
2,200.0	2,200.0	2,200.4	2,200.4	4.1	4.1	-63.89	29.5	-60.2	67.0	58.8	8.23	8.144	
2,300.0	2,300.0	2,300.4	2,300.4	4.2	4.2	-63.89	29.5	-60.2	67.0	58.6	8.41	7.967	
2,400.0	2,400.0	2,400.4	2,400.4	4.3	4.3	-63.89	29.5	-60.2	67.0	58.4	8.60	7.794	
2,500.0	2,500.0	2,500.4	2,500.4	4.4	4.4	-63.89	29.5	-60.2	67.0	58.2	8.79	7.625	
2,600.0	2,600.0	2,600.4	2,600.4	4.5	4.5	-63.89	29.5	-60.2	67.0	58.1	8.99	7.460	
2,700.0	2,700.0	2,700.4	2,700.4	4.6	4.6	-63.89	29.5	-60.2	67.0	57.9	9.18	7.299	
2,800.0	2,800.0	2,800.4	2,800.4	4.7	4.7	-63.89	29.5	-60.2	67.0	57.7	9.39	7.143	
2,900.0	2,900.0	2,900.4	2,900.4	4.8	4.8	-63.89	29.5	-60.2	67.0	57.4	9.59	6.991	
3,000.0	3,000.0	3,000.4	3,000.4	4.9	4.9	-63.89	29.5	-60.2	67.0	57.2	9.80	6.843	
3,100.0	3,100.0	3,100.4	3,100.4	5.0	5.0	-63.89	29.5	-60.2	67.0	57.0	10.01	6.699	
3,200.0	3,200.0	3,200.4	3,200.4	5.1	5.1	-63.89	29.5	-60.2	67.0	56.8	10.22	6.560	
3,300.0	3,300.0	3,300.4	3,300.4	5.2	5.2	-63.89	29.5	-60.2	67.0	56.6	10.43	6.425	
3,400.0	3,400.0	3,400.4	3,400.4	5.3	5.3	-63.89	29.5	-60.2	67.0	56.4	10.65	6.295	
3,500.0	3,500.0	3,500.4	3,500.4	5.4	5.4	-63.89	29.5	-60.2	67.0	56.2	10.87	6.168	
3,600.0	3,600.0	3,600.4	3,600.4	5.5	5.5	-63.89	29.5	-60.2	67.0	55.9	11.09	6.045	
3,700.0	3,700.0	3,700.4	3,700.4	5.7	5.7	-63.89	29.5	-60.2	67.0	55.7	11.31	5.926	
3,800.0	3,800.0	3,800.4	3,800.4	5.8	5.8	-63.89	29.5	-60.2	67.0	55.5	11.54	5.811	
3,900.0	3,900.0	3,900.4	3,900.4	5.9	5.9	-63.89	29.5	-60.2	67.0	55.3	11.76	5.699	
4,000.0	4,000.0	4,000.4	4,000.4	6.0	6.0	-63.89	29.5	-60.2	67.0	55.0	11.99	5.591	
4,100.0	4,100.0	4,100.4	4,100.4	6.1	6.1	-63.89	29.5	-60.2	67.0	54.8	12.22	5.486	
4,200.0	4,200.0	4,200.4	4,200.4	6.2	6.2	-63.89	29.5	-60.2	67.0	54.6	12.45	5.385	
4,300.0	4,300.0	4,300.4	4,300.4	6.3	6.3	-63.89	29.5	-60.2	67.0	54.4	12.68	5.286	
4,400.0	4,400.0	4,400.4	4,400.4	6.5	6.5	-63.89	29.5	-60.2	67.0	54.1	12.91	5.191	
4,500.0	4,500.0	4,500.4	4,500.4	6.6	6.6	-63.89	29.5	-60.2	67.0	53.9	13.15	5.099	
4,600.0	4,600.0	4,600.4	4,600.4	6.7	6.7	-63.89	29.5	-60.2	67.0	53.7	13.38	5.009	
4,700.0	4,700.0	4,700.4	4,700.4	6.8	6.8	-63.89	29.5	-60.2	67.0	53.4	13.62	4.922	
4,800.0	4,800.0	4,800.4	4,800.4	6.9	6.9	-63.89	29.5	-60.2	67.0	53.2	13.86	4.838	
4,900.0	4,900.0	4,900.4	4,900.4	7.0	7.0	-63.89	29.5	-60.2	67.0	52.9	14.10	4.756	
5,000.0	5,000.0	5,000.4	5,000.4	7.2	7.2	-63.89	29.5	-60.2	67.0	52.7	14.33	4.677 CC, ES, SF	
5,100.0	5,100.0	5,100.4	5,100.4	7.2	7.3	169.86	29.5	-60.2	68.8	54.3	14.51	4.740	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #501H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10800-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,140.0	5,139.9	5,140.3	5,140.3	7.2	7.3	170.10	29.5	-60.2	70.4	55.9	14.55	4.839	
5,200.0	5,199.9	5,200.3	5,200.3	7.2	7.4	170.49	29.5	-60.2	73.3	58.7	14.61	5.016	
5,300.0	5,299.8	5,300.2	5,300.2	7.2	7.5	171.08	29.5	-60.2	78.1	63.4	14.72	5.306	
5,400.0	5,399.6	5,400.0	5,400.0	7.2	7.6	171.61	29.5	-60.2	82.9	68.1	14.83	5.592	
5,500.0	5,499.5	5,499.9	5,499.9	7.2	7.8	172.07	29.5	-60.2	87.8	72.8	14.95	5.872	
5,600.0	5,599.4	5,601.4	5,601.3	7.2	7.8	171.52	27.7	-60.2	91.8	76.8	14.98	6.126	
5,700.0	5,699.3	5,701.3	5,701.2	7.2	7.8	170.10	24.2	-60.2	95.0	80.0	14.93	6.362	
5,800.0	5,799.2	5,801.2	5,801.0	7.2	7.7	168.78	20.7	-60.1	98.2	83.3	14.88	6.601	
5,900.0	5,899.0	5,901.1	5,900.9	7.2	7.7	167.54	17.2	-60.1	101.5	86.7	14.84	6.842	
6,000.0	5,998.9	6,001.0	6,000.8	7.2	7.6	166.39	13.8	-60.1	104.9	90.1	14.80	7.086	
6,100.0	6,098.8	6,101.0	6,100.6	7.2	7.6	165.30	10.3	-60.0	108.2	93.5	14.76	7.332	
6,200.0	6,198.7	6,200.9	6,200.5	7.2	7.5	164.28	6.8	-60.0	111.7	96.9	14.73	7.579	
6,300.0	6,298.6	6,300.8	6,300.4	7.2	7.5	163.32	3.3	-60.0	115.1	100.4	14.71	7.827	
6,400.0	6,398.4	6,400.7	6,400.2	7.2	7.5	162.41	-0.2	-59.9	118.6	103.9	14.68	8.076	
6,500.0	6,498.3	6,500.6	6,500.1	7.2	7.4	161.56	-3.7	-59.9	122.1	107.4	14.67	8.324	
6,600.0	6,598.2	6,600.6	6,599.9	7.3	7.4	160.76	-7.2	-59.9	125.6	111.0	14.65	8.573	
6,700.0	6,698.1	6,700.5	6,699.8	7.3	7.4	160.00	-10.7	-59.8	129.2	114.5	14.65	8.821	
6,800.0	6,798.0	6,800.4	6,799.7	7.3	7.3	159.28	-14.1	-59.8	132.8	118.1	14.64	9.068	
6,900.0	6,897.8	6,900.3	6,899.5	7.3	7.3	158.60	-17.6	-59.8	136.4	121.7	14.64	9.313	
7,000.0	6,997.7	7,000.3	6,999.4	7.4	7.3	157.95	-21.1	-59.8	140.0	125.3	14.65	9.557	
7,100.0	7,097.6	7,100.2	7,099.2	7.4	7.3	157.34	-24.6	-59.7	143.6	129.0	14.66	9.799	
7,200.0	7,197.5	7,200.1	7,199.1	7.4	7.3	156.75	-28.1	-59.7	147.3	132.6	14.67	10.038	
7,300.0	7,297.4	7,300.0	7,299.0	7.5	7.2	156.20	-31.6	-59.7	150.9	136.3	14.69	10.275	
7,400.0	7,397.2	7,400.1	7,398.8	7.5	7.2	155.67	-35.1	-59.6	154.6	139.9	14.71	10.510	
7,500.0	7,497.1	7,500.1	7,498.7	7.5	7.2	155.17	-38.5	-59.6	158.3	143.6	14.74	10.741	
7,600.0	7,597.0	7,600.2	7,598.6	7.6	7.2	154.69	-42.0	-59.6	162.0	147.2	14.77	10.968	
7,700.0	7,696.9	7,700.3	7,698.4	7.6	7.2	154.23	-45.5	-59.5	165.7	150.9	14.81	11.193	
7,800.0	7,796.8	7,800.4	7,798.3	7.7	7.2	153.79	-49.0	-59.5	169.5	154.6	14.85	11.413	
7,900.0	7,896.6	7,900.4	7,898.1	7.7	7.2	153.37	-52.5	-59.5	173.2	158.3	14.89	11.630	
8,000.0	7,996.5	8,000.5	7,998.0	7.7	7.2	152.96	-56.0	-59.5	176.9	162.0	14.94	11.843	
8,100.0	8,096.4	8,100.6	8,097.9	7.8	7.2	152.58	-59.5	-59.4	180.7	165.7	14.99	12.051	
8,200.0	8,196.3	8,200.7	8,197.7	7.9	7.2	152.21	-63.0	-59.4	184.4	169.4	15.05	12.255	
8,300.0	8,296.2	8,300.7	8,297.6	7.9	7.2	151.85	-66.4	-59.4	188.2	173.1	15.11	12.454	
8,400.0	8,396.1	8,400.8	8,397.4	8.0	7.2	151.51	-69.9	-59.3	192.0	176.8	15.18	12.649	
8,500.0	8,495.9	8,500.9	8,497.3	8.0	7.2	151.18	-73.4	-59.3	195.8	180.5	15.25	12.839	
8,600.0	8,595.8	8,601.0	8,597.2	8.1	7.2	150.87	-76.9	-59.3	199.5	184.2	15.32	13.025	
8,700.0	8,695.7	8,701.1	8,697.0	8.1	7.3	150.56	-80.4	-59.2	203.3	187.9	15.40	13.206	
8,800.0	8,795.6	8,801.1	8,796.9	8.2	7.3	150.27	-83.9	-59.2	207.1	191.7	15.48	13.381	
8,900.0	8,895.5	8,901.2	8,896.8	8.3	7.3	149.99	-87.4	-59.2	210.9	195.4	15.56	13.552	
9,000.0	8,995.3	9,001.3	8,996.6	8.3	7.3	149.72	-90.9	-59.1	214.7	199.1	15.65	13.719	
9,100.0	9,095.2	9,101.4	9,096.5	8.4	7.4	149.45	-94.3	-59.1	218.6	202.8	15.75	13.880	
9,200.0	9,195.1	9,201.4	9,196.3	8.5	7.4	149.20	-97.8	-59.1	222.4	206.5	15.84	14.036	
9,300.0	9,295.0	9,301.5	9,296.2	8.5	7.4	148.95	-101.3	-59.1	226.2	210.3	15.94	14.188	
9,400.0	9,394.9	9,401.6	9,396.1	8.6	7.4	148.72	-104.8	-59.0	230.0	214.0	16.05	14.335	
9,500.0	9,494.7	9,501.7	9,495.9	8.7	7.5	148.49	-108.3	-59.0	233.9	217.7	16.15	14.477	
9,600.0	9,594.6	9,601.8	9,595.8	8.7	7.5	148.27	-111.8	-59.0	237.7	221.4	16.26	14.614	
9,700.0	9,694.5	9,701.8	9,695.6	8.8	7.6	148.05	-115.3	-58.9	241.5	225.1	16.38	14.747	
9,800.0	9,794.4	9,801.9	9,795.5	8.9	7.6	147.84	-118.8	-58.9	245.4	228.9	16.50	14.875	
9,900.0	9,894.3	9,902.0	9,895.4	9.0	7.6	147.64	-122.2	-58.9	249.2	232.6	16.62	14.998	
10,000.0	9,994.1	10,002.1	9,995.2	9.1	7.7	147.44	-125.7	-58.8	253.0	236.3	16.74	15.117	
10,100.0	10,094.0	10,102.1	10,095.1	9.1	7.7	147.25	-129.2	-58.8	256.9	240.0	16.87	15.231	
10,200.0	10,193.9	10,202.2	10,195.0	9.2	7.8	147.07	-132.7	-58.8	260.7	243.7	17.00	15.342	

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



COG Operating LLC

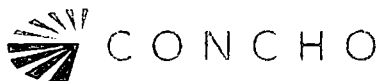
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #501H - OWB - PWP0												Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper, 104, 10800-MWD												Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance				Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
10,300.0	10,293.8	10,302.3	10,294.8	9.3	7.8	146.89	-136.2	-58.8	264.6	247.5	17.13	15.448	
10,400.0	10,393.7	10,402.4	10,394.7	9.4	7.9	146.72	-139.7	-58.7	268.5	251.2	17.26	15.549	
10,500.0	10,493.5	10,502.5	10,494.5	9.5	7.9	146.55	-143.2	-58.7	272.3	254.9	17.40	15.647	
10,600.0	10,593.4	10,602.5	10,594.4	9.6	8.0	146.39	-146.6	-58.7	276.2	258.6	17.55	15.736	
10,700.0	10,693.3	10,702.6	10,694.3	9.6	8.0	146.23	-150.1	-58.6	280.0	262.3	17.70	15.820	
10,800.0	10,793.2	10,802.7	10,794.1	9.7	8.1	146.07	-153.6	-58.6	283.9	266.1	17.83	15.921	
10,900.0	10,893.1	10,895.9	10,892.6	9.8	8.1	146.29	-155.2	-58.6	287.9	269.9	17.94	16.051	
11,000.0	10,992.9	10,989.4	10,984.9	9.9	8.2	149.52	-141.2	-58.7	293.3	275.3	18.07	16.237	
11,100.0	11,092.8	11,073.6	11,064.3	10.0	8.2	155.16	-113.4	-58.9	303.4	285.2	18.22	16.655	
11,200.0	11,192.7	11,145.5	11,127.4	10.1	8.3	161.59	-79.0	-59.1	322.6	304.2	18.39	17.544	
11,300.0	11,292.6	11,205.1	11,175.2	10.2	8.4	167.61	-43.5	-59.4	353.9	335.3	18.61	19.019	
11,400.0	11,392.5	11,253.9	11,210.8	10.3	8.5	172.72	-10.2	-59.6	397.9	379.0	18.85	21.108	
11,500.0	11,492.4	11,293.7	11,237.3	10.4	8.7	176.85	19.6	-59.8	453.2	434.1	19.10	23.726	
11,600.0	11,592.2	11,325.0	11,256.3	10.5	8.8	180.00	44.4	-60.0	517.8	498.4	19.35	26.766	
11,700.0	11,692.1	11,350.0	11,270.3	10.6	9.0	-177.57	65.1	-60.2	589.5	569.9	19.58	30.112	
11,800.0	11,792.0	11,375.0	11,283.1	10.7	9.1	-175.23	86.6	-60.3	666.6	646.7	19.82	33.625	
11,900.0	11,891.9	11,400.0	11,294.9	10.7	9.3	-172.98	108.6	-60.5	747.8	727.8	20.09	37.231	
12,000.0	11,991.8	11,412.1	11,300.1	10.8	9.4	-171.94	119.5	-60.6	832.2	812.0	20.24	41.114	
12,100.0	12,091.6	11,425.0	11,305.4	10.8	9.5	-170.85	131.3	-60.7	919.1	898.8	20.35	45.168	
12,200.0	12,191.5	11,438.6	11,310.7	10.9	9.6	-169.74	143.9	-60.8	1,007.9	987.5	20.48	49.214	
12,288.0	12,279.4	11,450.0	11,314.8	10.9	9.7	-168.83	154.5	-60.8	1,087.4	1,066.8	20.60	52.781	
12,300.0	12,291.4	11,450.0	11,314.8	10.9	9.7	-136.04	154.5	-60.8	1,098.3	1,077.7	20.61	53.297	
12,325.0	12,316.4	11,450.0	11,314.8	10.9	9.7	-75.25	154.5	-60.8	1,120.7	1,100.0	20.62	54.351	
12,350.0	12,341.3	11,450.0	11,314.8	10.9	9.7	-54.29	154.5	-60.8	1,142.7	1,122.1	20.64	55.368	
12,375.0	12,366.1	11,458.9	11,317.8	10.9	9.8	-44.33	162.9	-60.9	1,164.2	1,143.4	20.78	56.026	
12,400.0	12,390.6	11,462.6	11,319.0	10.9	9.8	-38.40	166.3	-60.9	1,185.3	1,164.2	21.10	56.175	
12,425.0	12,414.9	11,466.5	11,320.3	11.0	9.8	-34.21	170.0	-60.9	1,205.8	1,183.7	22.06	54.661	
12,450.0	12,438.9	11,475.0	11,322.9	11.0	9.9	-30.92	178.1	-61.0	1,225.8	1,202.4	23.44	52.293	
12,475.0	12,462.5	11,475.0	11,322.9	11.0	9.9	-28.48	178.1	-61.0	1,245.2	1,220.2	24.99	49.834	
12,500.0	12,485.6	11,475.0	11,322.9	11.0	9.9	-26.47	178.1	-61.0	1,264.0	1,237.3	26.63	47.465	
12,525.0	12,508.2	11,484.1	11,325.6	11.0	10.0	-24.65	186.8	-61.1	1,282.0	1,253.7	28.33	45.251	
12,550.0	12,530.2	11,489.0	11,326.9	11.1	10.0	-23.16	191.5	-61.1	1,299.4	1,269.4	30.06	43.225	
12,575.0	12,551.5	11,500.0	11,329.8	11.1	10.1	-21.82	202.1	-61.2	1,316.2	1,284.4	31.80	41.387	
12,600.0	12,572.2	11,500.0	11,329.8	11.1	10.1	-20.78	202.1	-61.2	1,332.1	1,298.5	33.53	39.727	
12,625.0	12,592.0	11,500.0	11,329.8	11.2	10.1	-19.87	202.1	-61.2	1,347.3	1,312.0	35.23	38.238	
12,650.0	12,611.1	11,509.9	11,332.2	11.2	10.2	-19.00	211.7	-61.3	1,361.6	1,324.7	36.90	36.901	
12,675.0	12,629.3	11,515.4	11,333.4	11.3	10.3	-18.26	217.1	-61.3	1,375.2	1,336.7	38.52	35.705	
12,700.0	12,646.5	11,525.0	11,335.4	11.4	10.4	-17.60	226.5	-61.4	1,388.0	1,347.9	40.07	34.636	
12,725.0	12,662.8	11,525.0	11,335.4	11.4	10.4	-17.06	226.5	-61.4	1,399.8	1,358.3	41.56	33.682	
12,750.0	12,678.1	11,525.0	11,335.4	11.5	10.4	-16.59	226.5	-61.4	1,410.9	1,368.0	42.97	32.835	
12,775.0	12,692.3	11,538.4	11,337.9	11.6	10.5	-16.12	239.6	-61.5	1,421.0	1,376.7	44.30	32.075	
12,800.0	12,705.4	11,550.0	11,339.8	11.7	10.6	-15.72	251.1	-61.5	1,430.3	1,384.7	45.54	31.404	
12,825.0	12,717.4	11,550.0	11,339.8	11.9	10.6	-15.41	251.1	-61.5	1,438.6	1,391.9	46.69	30.812	
12,850.0	12,728.2	11,550.0	11,339.8	12.0	10.6	-15.14	251.1	-61.5	1,446.0	1,398.3	47.73	30.296	
12,875.0	12,737.8	11,562.5	11,341.5	12.1	10.7	-14.88	263.5	-61.6	1,452.4	1,403.8	48.68	29.839	
12,900.0	12,746.2	11,575.0	11,342.8	12.3	10.9	-14.67	275.9	-61.7	1,458.0	1,408.5	49.51	29.447	
12,925.0	12,753.4	11,575.0	11,342.8	12.5	10.9	-14.51	275.9	-61.7	1,462.6	1,412.4	50.23	29.116	
12,950.0	12,759.3	11,575.0	11,342.8	12.7	10.9	-14.39	275.9	-61.7	1,466.3	1,415.4	50.84	28.844	
12,975.0	12,763.9	11,587.4	11,343.8	12.9	11.0	-14.29	288.2	-61.8	1,468.9	1,417.6	51.33	28.616	
13,000.0	12,767.3	11,600.0	11,344.5	13.1	11.1	-14.23	300.8	-61.9	1,470.7	1,419.0	51.71	28.441	
13,025.0	12,769.3	11,600.0	11,344.5	13.3	11.1	-14.20	300.8	-61.9	1,471.4	1,419.5	51.96	28.319	
13,051.2	12,770.0	11,600.0	11,344.5	13.5	11.1	-14.20	300.8	-61.9	1,471.2	1,419.1	52.09	28.246	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #501H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 10800-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,057.6	12,770.0	11,608.1	11,344.8	13.6	11.2	-14.20	308.9	-62.0	1,471.0	1,418.9	52.10	28.232	
13,100.0	12,769.8	11,620.8	11,345.0	14.0	11.4	-14.21	321.7	-62.1	1,470.2	1,418.0	52.15	28.190	
13,114.8	12,769.7	11,633.6	11,345.0	14.2	11.5	-14.21	321.7	-62.1	1,470.1	1,417.9	52.18	28.173	
13,200.0	12,769.4	11,706.1	11,344.6	15.1	12.4	-14.21	406.9	-62.7	1,470.1	1,417.7	52.35	28.083	
13,300.0	12,768.9	11,806.1	11,344.2	16.2	13.6	-14.20	506.9	-63.4	1,470.1	1,417.5	52.60	27.946	
13,400.0	12,768.5	11,906.1	11,343.7	17.4	15.0	-14.20	606.9	-64.2	1,470.1	1,417.2	52.91	27.786	
13,500.0	12,768.0	12,006.1	11,343.3	18.8	16.4	-14.20	706.9	-64.9	1,470.1	1,416.8	53.25	27.605	
13,600.0	12,767.6	12,106.1	11,342.8	20.1	17.9	-14.20	806.9	-65.6	1,470.1	1,416.4	53.65	27.403	
13,700.0	12,767.1	12,206.1	11,342.4	21.5	19.3	-14.20	906.9	-66.4	1,470.1	1,416.0	54.08	27.183	
13,800.0	12,766.7	12,306.1	11,341.9	23.0	20.9	-14.20	1,006.9	-67.1	1,470.1	1,415.5	54.56	26.944	
13,900.0	12,766.3	12,406.1	11,341.5	24.4	22.4	-14.20	1,106.9	-67.8	1,470.1	1,415.0	55.08	26.689	
14,000.0	12,765.8	12,506.1	11,341.1	25.9	23.9	-14.20	1,206.9	-68.6	1,470.1	1,414.5	55.64	26.420	
14,100.0	12,765.4	12,606.1	11,340.6	27.4	25.5	-14.20	1,306.9	-69.3	1,470.1	1,413.8	56.25	26.134	
14,200.0	12,764.9	12,706.1	11,340.2	28.9	27.1	-14.20	1,406.9	-70.1	1,470.1	1,412.0	56.88	25.310	
14,300.0	12,764.5	12,806.1	11,339.7	30.5	28.7	-14.20	1,506.9	-70.8	1,470.1	1,410.0	60.07	24.472	
14,400.0	12,764.1	12,906.1	11,339.3	32.0	30.3	-14.20	1,606.9	-71.5	1,470.1	1,407.6	62.52	23.515	
14,500.0	12,763.6	13,006.1	11,338.8	33.6	31.9	-14.20	1,706.9	-72.3	1,470.1	1,404.6	65.55	22.426	
14,600.0	12,763.2	13,106.1	11,338.4	35.2	33.5	-14.20	1,806.8	-73.0	1,470.1	1,401.4	68.70	21.398	
14,700.0	12,762.7	13,206.1	11,337.9	36.8	35.1	-14.19	1,906.8	-73.7	1,470.1	1,398.2	71.88	20.451	
14,800.0	12,762.3	13,306.1	11,337.5	38.4	36.7	-14.19	2,006.8	-74.5	1,470.1	1,395.0	75.08	19.580	
14,900.0	12,761.8	13,406.1	11,337.0	39.9	38.3	-14.19	2,106.8	-75.2	1,470.1	1,391.8	78.29	18.777	
15,000.0	12,761.4	13,506.1	11,336.6	41.5	40.0	-14.19	2,206.8	-75.9	1,470.1	1,388.6	81.52	18.034	
15,100.0	12,761.0	13,606.1	11,336.1	43.2	41.6	-14.19	2,306.8	-76.7	1,470.1	1,385.4	84.75	17.347	
15,200.0	12,760.5	13,706.1	11,335.7	44.8	43.2	-14.19	2,406.8	-77.4	1,470.1	1,382.1	87.99	16.708	
15,300.0	12,760.1	13,806.1	11,335.2	46.4	44.9	-14.19	2,506.8	-78.2	1,470.1	1,378.9	91.23	16.114	
15,400.0	12,759.6	13,906.1	11,334.8	48.0	46.5	-14.19	2,606.8	-78.9	1,470.1	1,375.6	94.49	15.559	
15,500.0	12,759.2	14,006.1	11,334.3	49.6	48.1	-14.19	2,706.8	-79.6	1,470.1	1,372.4	97.74	15.041	
15,600.0	12,758.8	14,106.1	11,333.9	51.2	49.8	-14.19	2,806.8	-80.4	1,470.1	1,369.1	101.01	14.555	
15,700.0	12,758.3	14,206.1	11,333.4	52.9	51.4	-14.19	2,906.8	-81.1	1,470.1	1,365.8	104.27	14.099	
15,800.0	12,757.9	14,306.1	11,333.0	54.5	53.1	-14.19	3,006.8	-81.8	1,470.1	1,362.6	107.54	13.670	
15,900.0	12,757.4	14,406.1	11,332.6	56.1	54.7	-14.19	3,106.8	-82.6	1,470.1	1,359.3	110.81	13.267	
16,000.0	12,757.0	14,506.1	11,332.1	57.7	56.3	-14.19	3,206.8	-83.3	1,470.1	1,356.0	114.09	12.886	
16,100.0	12,756.5	14,606.1	11,331.7	59.4	58.0	-14.18	3,306.8	-84.0	1,470.1	1,352.8	117.37	12.525	
16,200.0	12,756.1	14,706.1	11,331.2	61.0	59.6	-14.18	3,406.8	-84.8	1,470.1	1,349.5	120.65	12.185	
16,300.0	12,755.7	14,806.1	11,330.8	62.7	61.3	-14.18	3,506.8	-85.5	1,470.1	1,346.2	123.94	11.862	
16,400.0	12,755.2	14,906.1	11,330.3	64.3	62.9	-14.18	3,606.8	-86.3	1,470.1	1,342.9	127.23	11.555	
16,500.0	12,754.8	15,006.1	11,329.9	65.9	64.6	-14.18	3,706.8	-87.0	1,470.1	1,339.6	130.51	11.264	
16,600.0	12,754.3	15,106.1	11,329.4	67.6	66.2	-14.18	3,806.8	-87.7	1,470.1	1,336.3	133.81	10.987	
16,700.0	12,753.9	15,206.1	11,329.0	69.2	67.9	-14.18	3,906.8	-88.5	1,470.1	1,333.0	137.10	10.723	
16,800.0	12,753.4	15,306.1	11,328.5	70.9	69.5	-14.18	4,006.8	-89.2	1,470.1	1,329.7	140.39	10.472	
16,900.0	12,753.0	15,406.1	11,328.1	72.5	71.2	-14.18	4,106.8	-89.9	1,470.1	1,326.4	143.69	10.231	
17,000.0	12,752.6	15,506.1	11,327.6	74.1	72.8	-14.18	4,206.8	-90.7	1,470.1	1,323.2	146.99	10.002	
17,100.0	12,752.1	15,606.1	11,327.2	75.8	74.5	-14.18	4,306.8	-91.4	1,470.1	1,319.9	150.29	9.782	
17,200.0	12,751.7	15,706.1	11,326.7	77.4	76.1	-14.18	4,406.8	-92.1	1,470.1	1,316.6	153.59	9.572	
17,300.0	12,751.2	15,806.1	11,326.3	79.1	77.8	-14.18	4,506.7	-92.9	1,470.1	1,313.3	156.89	9.371	
17,400.0	12,750.8	15,906.1	11,325.8	80.7	79.5	-14.18	4,606.7	-93.6	1,470.1	1,310.0	160.19	9.178	
17,500.0	12,750.4	16,006.1	11,325.4	82.4	81.1	-14.18	4,706.7	-94.4	1,470.1	1,306.7	163.49	8.992	
17,580.8	12,750.0	16,086.9	11,325.0	83.7	82.5	-14.17	4,787.6	-95.0	1,470.1	1,304.0	166.16	8.848	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #601H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N-S (usft)	+E-W (usft)					
0.0	0.0	0.5	0.5	3.0	3.0	-90.57	-0.3	-30.0	30.0	24.0	6.00	5.000	
100.0	100.0	100.5	100.5	3.0	3.0	-90.57	-0.3	-30.0	30.0	24.0	6.01	4.991	
200.0	200.0	200.5	200.5	3.0	3.0	-90.57	-0.3	-30.0	30.0	24.0	6.03	4.973	
300.0	300.0	300.5	300.5	3.0	3.0	-90.57	-0.3	-30.0	30.0	23.9	6.07	4.946	
400.0	400.0	400.5	400.5	3.1	3.1	-90.57	-0.3	-30.0	30.0	23.9	6.11	4.910	
500.0	500.0	500.5	500.5	3.1	3.1	-90.57	-0.3	-30.0	30.0	23.8	6.16	4.866	
600.0	600.0	600.5	600.5	3.1	3.1	-90.57	-0.3	-30.0	30.0	23.8	6.23	4.815	
700.0	700.0	700.5	700.5	3.2	3.2	-90.57	-0.3	-30.0	30.0	23.7	6.31	4.757	
800.0	800.0	800.5	800.5	3.2	3.2	-90.57	-0.3	-30.0	30.0	23.6	6.39	4.693	
900.0	900.0	900.5	900.5	3.2	3.2	-90.57	-0.3	-30.0	30.0	23.5	6.49	4.623	
1,000.0	1,000.0	1,000.5	1,000.5	3.3	3.3	-90.57	-0.3	-30.0	30.0	23.4	6.59	4.550	
1,100.0	1,100.0	1,100.5	1,100.5	3.4	3.4	-90.57	-0.3	-30.0	30.0	23.3	6.71	4.473	
1,200.0	1,200.0	1,200.5	1,200.5	3.4	3.4	-90.57	-0.3	-30.0	30.0	23.2	6.83	4.393	
1,300.0	1,300.0	1,300.5	1,300.5	3.5	3.5	-90.57	-0.3	-30.0	30.0	23.0	6.96	4.311	
1,400.0	1,400.0	1,400.5	1,400.5	3.5	3.5	-90.57	-0.3	-30.0	30.0	22.9	7.10	4.228	
1,500.0	1,500.0	1,500.5	1,500.5	3.6	3.6	-90.57	-0.3	-30.0	30.0	22.8	7.24	4.143	
1,600.0	1,600.0	1,600.5	1,600.5	3.7	3.7	-90.57	-0.3	-30.0	30.0	22.6	7.39	4.059	
1,700.0	1,700.0	1,700.5	1,700.5	3.8	3.8	-90.57	-0.3	-30.0	30.0	22.5	7.55	3.974	
1,800.0	1,800.0	1,800.5	1,800.5	3.9	3.9	-90.57	-0.3	-30.0	30.0	22.3	7.71	3.890	
1,900.0	1,900.0	1,900.5	1,900.5	3.9	3.9	-90.57	-0.3	-30.0	30.0	22.1	7.88	3.807	
2,000.0	2,000.0	2,000.5	2,000.5	4.0	4.0	-90.57	-0.3	-30.0	30.0	21.9	8.05	3.725	
2,100.0	2,100.0	2,100.5	2,100.5	4.1	4.1	-90.57	-0.3	-30.0	30.0	21.8	8.23	3.645	
2,200.0	2,200.0	2,200.5	2,200.5	4.2	4.2	-90.57	-0.3	-30.0	30.0	21.6	8.41	3.566	
2,300.0	2,300.0	2,300.5	2,300.5	4.3	4.3	-90.57	-0.3	-30.0	30.0	21.4	8.60	3.488	
2,400.0	2,400.0	2,400.5	2,400.5	4.4	4.4	-90.57	-0.3	-30.0	30.0	21.2	8.79	3.412	
2,500.0	2,500.0	2,500.5	2,500.5	4.5	4.5	-90.57	-0.3	-30.0	30.0	21.0	8.99	3.338	
2,600.0	2,600.0	2,600.5	2,600.5	4.6	4.6	-90.57	-0.3	-30.0	30.0	20.8	9.18	3.266	
2,700.0	2,700.0	2,700.5	2,700.5	4.7	4.7	-90.57	-0.3	-30.0	30.0	20.6	9.39	3.196	
2,800.0	2,800.0	2,800.5	2,800.5	4.8	4.8	-90.57	-0.3	-30.0	30.0	20.4	9.59	3.128	
2,900.0	2,900.0	2,900.5	2,900.5	4.9	4.9	-90.57	-0.3	-30.0	30.0	20.2	9.80	3.062	
3,000.0	3,000.0	3,000.5	3,000.5	5.0	5.0	-90.57	-0.3	-30.0	30.0	20.0	10.01	2.998	
3,100.0	3,100.0	3,100.5	3,100.5	5.1	5.1	-90.57	-0.3	-30.0	30.0	19.8	10.22	2.936	
3,200.0	3,200.0	3,200.5	3,200.5	5.2	5.2	-90.57	-0.3	-30.0	30.0	19.6	10.43	2.875	
3,300.0	3,300.0	3,300.5	3,300.5	5.3	5.3	-90.57	-0.3	-30.0	30.0	19.4	10.65	2.817	
3,400.0	3,400.0	3,400.5	3,400.5	5.4	5.4	-90.57	-0.3	-30.0	30.0	19.1	10.87	2.760	
3,500.0	3,500.0	3,500.5	3,500.5	5.5	5.5	-90.57	-0.3	-30.0	30.0	18.9	11.09	2.705	
3,600.0	3,600.0	3,600.5	3,600.5	5.7	5.7	-90.57	-0.3	-30.0	30.0	18.7	11.31	2.652	
3,700.0	3,700.0	3,700.5	3,700.5	5.8	5.8	-90.57	-0.3	-30.0	30.0	18.5	11.54	2.600	
3,800.0	3,800.0	3,800.5	3,800.5	5.9	5.9	-90.57	-0.3	-30.0	30.0	18.2	11.76	2.550	
3,900.0	3,900.0	3,900.5	3,900.5	6.0	6.0	-90.57	-0.3	-30.0	30.0	18.0	11.99	2.502	
4,000.0	4,000.0	4,000.5	4,000.5	6.1	6.1	-90.57	-0.3	-30.0	30.0	17.8	12.22	2.455	
4,100.0	4,100.0	4,100.5	4,100.5	6.2	6.2	-90.57	-0.3	-30.0	30.0	17.6	12.45	2.410	
4,200.0	4,200.0	4,200.5	4,200.5	6.3	6.3	-90.57	-0.3	-30.0	30.0	17.3	12.68	2.366	
4,300.0	4,300.0	4,300.5	4,300.5	6.5	6.5	-90.57	-0.3	-30.0	30.0	17.1	12.91	2.323	
4,400.0	4,400.0	4,400.5	4,400.5	6.6	6.6	-90.57	-0.3	-30.0	30.0	16.9	13.15	2.282	
4,500.0	4,500.0	4,500.5	4,500.5	6.7	6.7	-90.57	-0.3	-30.0	30.0	16.6	13.38	2.242	
4,600.0	4,600.0	4,600.5	4,600.5	6.8	6.8	-90.57	-0.3	-30.0	30.0	16.4	13.62	2.203	
4,700.0	4,700.0	4,700.5	4,700.5	6.9	6.9	-90.57	-0.3	-30.0	30.0	16.1	13.86	2.165	
4,800.0	4,800.0	4,800.5	4,800.5	7.0	7.0	-90.57	-0.3	-30.0	30.0	15.9	14.10	2.128	
4,900.0	4,900.0	4,900.5	4,900.5	7.2	7.2	-90.57	-0.3	-30.0	30.0	15.7	14.33	2.093	
5,000.0	5,000.0	5,000.5	5,000.5	7.2	7.2	-90.57	-0.3	-30.0	30.0	15.7	14.33	2.093 CC, ES, SF	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #601H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,100.0	5,100.0	5,100.9	5,100.9	7.2	7.2	141.83	-1.9	-29.3	30.7	16.3	14.42	2.130	
5,140.0	5,139.9	5,140.9	5,140.8	7.2	7.2	141.33	-3.2	-28.8	31.5	17.1	14.40	2.190	
5,200.0	5,199.9	5,200.9	5,200.8	7.2	7.2	141.12	-5.1	-27.9	33.1	18.7	14.37	2.302	
5,300.0	5,299.8	5,300.8	5,300.7	7.2	7.1	140.80	-8.4	-26.6	35.7	21.3	14.32	2.490	
5,400.0	5,399.6	5,400.8	5,400.6	7.2	7.1	140.52	-11.6	-25.2	38.2	24.0	14.27	2.679	
5,500.0	5,499.5	5,500.8	5,500.5	7.2	7.0	140.28	-14.8	-23.9	40.8	26.6	14.23	2.868	
5,600.0	5,599.4	5,600.7	5,600.4	7.2	7.0	140.06	-18.0	-22.5	43.4	29.2	14.19	3.057	
5,700.0	5,699.3	5,700.7	5,700.3	7.2	7.0	139.87	-21.2	-21.1	46.0	31.8	14.16	3.247	
5,800.0	5,799.2	5,800.7	5,800.2	7.2	7.0	139.70	-24.4	-19.8	48.5	34.4	14.13	3.436	
5,900.0	5,899.0	5,900.6	5,900.1	7.2	6.9	139.55	-27.6	-18.4	51.1	37.0	14.10	3.624	
6,000.0	5,998.9	6,000.6	6,000.0	7.2	6.9	139.41	-30.8	-17.0	53.7	39.6	14.09	3.812	
6,100.0	6,098.8	6,100.6	6,099.9	7.2	6.9	139.29	-34.0	-15.7	56.3	42.2	14.07	3.999	
6,200.0	6,198.7	6,200.5	6,199.8	7.2	6.9	139.17	-37.3	-14.3	58.9	44.8	14.06	4.186	
6,300.0	6,298.6	6,300.5	6,299.7	7.2	6.8	139.07	-40.5	-12.9	61.4	47.4	14.06	4.370	
6,400.0	6,398.4	6,400.5	6,399.6	7.2	6.8	138.97	-43.7	-11.6	64.0	50.0	14.06	4.554	
6,500.0	6,498.3	6,500.4	6,499.6	7.2	6.8	138.88	-46.9	-10.2	66.6	52.5	14.06	4.736	
6,600.0	6,598.2	6,600.4	6,599.5	7.3	6.8	138.80	-50.1	-8.9	69.2	55.1	14.07	4.916	
6,700.0	6,698.1	6,700.4	6,699.4	7.3	6.8	138.73	-53.3	-7.5	71.8	57.7	14.09	5.094	
6,800.0	6,798.0	6,800.3	6,799.3	7.3	6.8	138.65	-56.5	-6.1	74.3	60.2	14.10	5.270	
6,900.0	6,897.8	6,900.3	6,899.2	7.3	6.8	138.59	-59.7	-4.8	76.9	62.8	14.13	5.444	
7,000.0	6,997.7	7,000.3	6,999.1	7.4	6.8	138.53	-63.0	-3.4	79.5	65.3	14.16	5.616	
7,100.0	7,097.6	7,100.2	7,099.0	7.4	6.8	138.47	-66.2	-2.0	82.1	67.9	14.19	5.785	
7,200.0	7,197.5	7,200.2	7,198.9	7.4	6.8	138.41	-69.4	-0.7	84.7	70.4	14.23	5.951	
7,300.0	7,297.4	7,300.2	7,298.8	7.5	6.8	138.36	-72.6	0.7	87.2	73.0	14.27	6.114	
7,400.0	7,397.2	7,400.1	7,398.7	7.5	6.8	138.31	-75.8	2.0	89.8	75.5	14.32	6.274	
7,500.0	7,497.1	7,500.1	7,498.6	7.5	6.8	138.27	-79.0	3.4	92.4	78.0	14.37	6.431	
7,600.0	7,597.0	7,600.1	7,598.5	7.6	6.9	138.23	-82.2	4.8	95.0	80.6	14.42	6.585	
7,700.0	7,696.9	7,700.0	7,698.4	7.6	6.9	138.19	-85.4	6.1	97.6	83.1	14.48	6.736	
7,800.0	7,796.8	7,800.0	7,798.3	7.7	6.9	138.15	-88.6	7.5	100.1	85.6	14.55	6.884	
7,900.0	7,896.6	7,900.0	7,898.2	7.7	6.9	138.11	-91.9	8.9	102.7	88.1	14.62	7.028	
8,000.0	7,996.5	8,000.1	7,998.1	7.7	6.9	138.07	-95.1	10.2	105.3	90.6	14.69	7.168	
8,100.0	8,096.4	8,100.1	8,098.0	7.8	7.0	138.04	-98.3	11.6	107.9	93.1	14.77	7.306	
8,200.0	8,196.3	8,200.1	8,198.0	7.9	7.0	138.01	-101.5	13.0	110.5	95.6	14.85	7.439	
8,300.0	8,296.2	8,300.2	8,297.9	7.9	7.0	137.98	-104.7	14.3	113.0	98.1	14.93	7.569	
8,400.0	8,396.1	8,400.2	8,397.8	8.0	7.1	137.95	-107.9	15.7	115.6	100.6	15.02	7.696	
8,500.0	8,495.9	8,500.2	8,497.7	8.0	7.1	137.92	-111.1	17.0	118.2	103.1	15.12	7.819	
8,600.0	8,595.8	8,600.3	8,597.6	8.1	7.1	137.90	-114.3	18.4	120.8	105.6	15.22	7.939	
8,700.0	8,695.7	8,700.3	8,697.5	8.1	7.2	137.87	-117.5	19.8	123.4	108.1	15.32	8.054	
8,800.0	8,795.6	8,800.3	8,797.4	8.2	7.2	137.85	-120.8	21.1	126.0	110.5	15.42	8.166	
8,900.0	8,895.5	8,900.4	8,897.3	8.3	7.3	137.82	-124.0	22.5	128.5	113.0	15.53	8.275	
9,000.0	8,995.3	9,000.4	8,997.2	8.3	7.3	137.80	-127.2	23.9	131.1	115.5	15.65	8.380	
9,100.0	9,095.2	9,100.4	9,097.1	8.4	7.4	137.78	-130.4	25.2	133.7	117.9	15.76	8.482	
9,200.0	9,195.1	9,199.5	9,197.0	8.5	7.4	137.76	-133.6	26.6	136.3	120.4	15.88	8.581	
9,300.0	9,295.0	9,300.5	9,296.9	8.5	7.5	137.74	-136.8	27.9	138.9	122.9	16.01	8.676	
9,400.0	9,394.9	9,400.5	9,396.8	8.6	7.5	137.72	-140.0	29.3	141.4	125.3	16.13	8.767	
9,500.0	9,494.7	9,500.6	9,496.7	8.7	7.6	137.70	-143.2	30.7	144.0	127.8	16.26	8.856	
9,600.0	9,594.6	9,600.6	9,596.6	8.7	7.6	137.68	-146.5	32.0	146.6	130.2	16.40	8.942	
9,700.0	9,694.5	9,700.6	9,696.5	8.8	7.7	137.67	-149.7	33.4	149.2	132.7	16.53	9.024	
9,800.0	9,794.4	9,800.7	9,796.4	8.9	7.8	137.65	-152.9	34.8	151.8	135.1	16.67	9.104	
9,900.0	9,894.3	9,900.7	9,896.4	9.0	7.8	137.63	-156.1	36.1	154.4	137.5	16.81	9.180	
10,000.0	9,994.1	10,000.7	9,996.3	9.1	7.9	137.62	-159.3	37.5	156.9	140.0	16.96	9.254	
10,100.0	10,094.0	10,100.8	10,096.2	9.1	8.0	137.60	-162.5	38.9	159.5	142.4	17.11	9.325	

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



COG Operating LLC

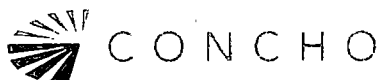
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #601H - OWB - PWP0													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,200.0	10,193.9	10,200.8	10,196.1	9.2	8.0	137.59	-165.7	40.2	162.1	144.8	17.26	9.394		
10,300.0	10,293.8	10,300.8	10,296.0	9.3	8.1	137.57	-168.9	41.6	164.7	147.3	17.41	9.459		
10,400.0	10,393.7	10,400.9	10,395.9	9.4	8.2	137.56	-172.1	42.9	167.3	149.7	17.56	9.523		
10,500.0	10,493.5	10,500.9	10,495.8	9.5	8.2	137.55	-175.4	44.3	169.8	152.1	17.72	9.584		
10,600.0	10,593.4	10,600.9	10,595.7	9.6	8.3	137.53	-178.6	45.7	172.4	154.5	17.88	9.642		
10,700.0	10,693.3	10,701.0	10,695.6	9.6	8.4	137.52	-181.8	47.0	175.0	157.0	18.04	9.699		
10,800.0	10,793.2	10,801.0	10,795.5	9.7	8.5	137.51	-185.0	48.4	177.6	159.4	18.21	9.753		
10,900.0	10,893.1	10,901.0	10,895.4	9.8	8.5	137.50	-188.2	49.8	180.2	161.8	18.38	9.805		
11,000.0	10,992.9	11,001.1	10,995.3	9.9	8.6	137.49	-191.4	51.1	182.8	164.2	18.54	9.855		
11,100.0	11,092.8	11,101.1	11,095.2	10.0	8.7	137.47	-194.6	52.5	185.3	166.6	18.72	9.903		
11,200.0	11,192.7	11,201.1	11,195.1	10.1	8.8	137.46	-197.8	53.8	187.9	169.0	18.89	9.948		
11,300.0	11,292.6	11,301.2	11,295.0	10.2	8.9	137.45	-201.0	55.2	190.5	171.4	19.06	9.993		
11,400.0	11,392.5	11,401.2	11,394.9	10.3	9.0	137.44	-204.3	56.6	193.1	173.8	19.24	10.035		
11,500.0	11,492.4	11,501.2	11,494.8	10.4	9.0	137.43	-207.5	57.9	195.7	176.2	19.42	10.076		
11,600.0	11,592.2	11,601.3	11,594.7	10.5	9.1	137.42	-210.7	59.3	198.2	178.6	19.60	10.114		
11,700.0	11,692.1	11,701.3	11,694.7	10.6	9.2	137.41	-213.9	60.7	200.8	181.0	19.78	10.152		
11,800.0	11,792.0	11,801.3	11,794.6	10.7	9.3	137.40	-217.1	62.0	203.4	183.4	19.97	10.187		
11,900.0	11,891.9	11,901.4	11,894.5	10.7	9.4	137.39	-220.3	63.4	206.0	185.8	20.15	10.222		
12,000.0	11,991.8	12,001.4	11,994.4	10.8	9.4	137.39	-223.5	64.8	208.6	188.3	20.26	10.292		
12,100.0	12,091.6	12,100.9	12,096.5	10.8	9.5	138.36	-223.2	66.1	210.8	190.5	20.29	10.390		
12,200.0	12,191.5	12,199.8	12,193.4	10.9	9.5	144.32	-204.0	67.3	212.7	192.4	20.35	10.455		
12,288.0	12,279.4	12,277.0	12,265.0	10.9	9.5	152.42	-175.5	68.0	218.6	198.2	20.44	10.697		
12,300.0	12,291.4	12,286.7	12,273.7	10.9	9.6	-175.47	-171.1	68.1	220.0	199.6	20.45	10.761		
12,325.0	12,316.4	12,306.7	12,291.2	10.9	9.6	-115.68	-161.4	68.3	223.3	202.8	20.48	10.906		
12,350.0	12,341.3	12,326.4	12,308.1	10.9	9.6	-95.27	-151.3	68.4	227.1	206.5	20.60	11.023		
12,375.0	12,366.1	12,345.8	12,324.3	10.9	9.6	-85.86	-140.5	68.6	231.3	210.2	21.08	10.970		
12,400.0	12,390.6	12,365.0	12,339.8	10.9	9.7	-79.90	-129.3	68.7	235.8	213.9	21.90	10.767		
12,425.0	12,414.9	12,383.9	12,354.7	11.0	9.7	-75.46	-117.7	68.8	240.5	217.3	23.20	10.366		
12,450.0	12,438.9	12,402.5	12,368.9	11.0	9.7	-71.85	-105.6	68.9	245.5	220.7	24.82	9.893		
12,475.0	12,462.5	12,421.0	12,382.5	11.0	9.8	-68.77	-93.1	69.0	250.7	224.1	26.57	9.433		
12,500.0	12,485.6	12,439.3	12,395.5	11.0	9.8	-66.06	-80.2	69.1	255.9	227.5	28.42	9.006		
12,525.0	12,508.2	12,457.4	12,407.8	11.0	9.9	-63.65	-67.0	69.1	261.2	230.9	30.31	8.619		
12,550.0	12,530.2	12,475.0	12,419.4	11.1	9.9	-61.49	-53.7	69.2	266.6	234.3	32.23	8.271		
12,575.0	12,551.5	12,493.1	12,430.7	11.1	10.0	-59.49	-39.5	69.3	271.9	237.7	34.15	7.961		
12,600.0	12,572.2	12,510.8	12,441.2	11.1	10.1	-57.69	-25.4	69.3	277.1	241.1	36.05	7.686		
12,625.0	12,592.0	12,528.3	12,451.1	11.2	10.2	-56.04	-10.9	69.3	282.2	244.3	37.92	7.443		
12,650.0	12,611.1	12,545.7	12,460.4	11.2	10.2	-54.54	3.8	69.3	287.2	247.5	39.76	7.225		
12,675.0	12,629.3	12,563.0	12,469.2	11.3	10.3	-53.17	18.7	69.3	292.1	250.5	41.53	7.033		
12,700.0	12,646.5	12,580.2	12,477.3	11.4	10.4	-51.92	33.9	69.3	296.7	253.5	43.23	6.864		
12,725.0	12,662.8	12,597.3	12,484.9	11.4	10.5	-50.78	49.2	69.3	301.2	256.3	44.86	6.714		
12,750.0	12,678.1	12,614.4	12,491.8	11.5	10.6	-49.74	64.8	69.3	305.4	259.0	46.41	6.581		
12,775.0	12,692.3	12,631.3	12,498.2	11.6	10.8	-48.81	80.5	69.3	309.4	261.5	47.86	6.464		
12,800.0	12,705.4	12,650.0	12,504.5	11.7	10.9	-47.92	96.1	69.2	313.1	263.9	49.22	6.361		
12,825.0	12,717.4	12,665.0	12,509.2	11.9	11.0	-47.21	112.4	69.2	316.5	266.1	50.48	6.271		
12,850.0	12,728.2	12,681.8	12,513.8	12.0	11.1	-46.53	128.5	69.1	319.7	268.1	51.62	6.193		
12,875.0	12,737.8	12,700.0	12,518.2	12.1	11.3	-45.92	146.2	69.1	322.5	269.9	52.66	6.126		
12,900.0	12,746.2	12,715.2	12,521.3	12.3	11.4	-45.43	161.1	69.0	325.1	271.5	53.57	6.068		
12,925.0	12,753.4	12,731.9	12,524.2	12.5	11.6	-44.98	177.5	68.9	327.3	272.9	54.37	6.020		
12,950.0	12,759.3	12,750.0	12,526.7	12.7	11.7	-44.60	195.4	68.8	329.2	274.2	55.04	5.981		
12,975.0	12,763.9	12,765.1	12,528.2	12.9	11.9	-44.31	210.4	68.7	330.8	275.2	55.58	5.951		
13,000.0	12,767.3	12,781.7	12,529.4	13.1	12.0	-44.08	226.9	68.6	332.0	276.0	55.99	5.929		
13,025.0	12,769.3	12,800.0	12,530.0	13.3	12.2	-43.90	243.3	68.5	332.9	276.6	56.28	5.915		

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



COG Operating LLC

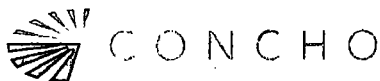
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #601H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,051.2	12,770.0	12,818.2	12,530.0	13.5	12.4	-43.81	263.5	68.4	333.4	276.9	56.44	5.907	
13,057.6	12,770.0	12,834.5	12,529.9	13.6	12.6	-43.81	268.1	68.3	333.4	276.9	56.46	5.905	
13,100.0	12,769.8	12,865.3	12,529.3	14.0	12.9	-43.75	310.5	68.0	333.7	277.2	56.52	5.904	
13,200.0	12,769.4	12,965.2	12,527.7	15.1	14.1	-43.62	410.5	67.3	334.5	277.8	56.73	5.896	
13,300.0	12,768.9	13,065.2	12,526.2	16.2	15.4	-43.49	510.5	66.5	335.3	278.3	56.98	5.884	
13,400.0	12,768.5	13,165.2	12,524.6	17.4	16.7	-43.36	610.5	65.8	336.1	278.8	57.27	5.868	
13,500.0	12,768.0	13,265.2	12,523.1	18.8	18.1	-43.23	710.4	65.1	336.9	279.3	57.61	5.848	
13,600.0	12,767.6	13,365.2	12,521.5	20.1	19.5	-43.10	810.4	64.3	337.7	279.7	57.98	5.824	
13,700.0	12,767.1	13,465.2	12,520.0	21.5	21.0	-42.97	910.4	63.6	338.5	280.1	58.39	5.796	
13,800.0	12,766.7	13,565.2	12,518.5	23.0	22.5	-42.84	1,010.4	62.9	339.3	280.4	58.85	5.765	
13,900.0	12,766.3	13,665.2	12,516.9	24.4	24.0	-42.71	1,110.3	62.1	340.1	280.7	59.34	5.730	
14,000.0	12,765.8	13,765.2	12,515.4	25.9	25.5	-42.58	1,210.3	61.4	340.9	281.0	59.88	5.692	
14,100.0	12,765.4	13,865.2	12,513.8	27.4	27.1	-42.45	1,310.3	60.7	341.7	281.2	60.45	5.651	
14,200.0	12,764.9	13,965.2	12,512.3	28.9	28.6	-42.33	1,410.3	59.9	342.5	281.4	61.08	5.606	
14,300.0	12,764.5	14,065.2	12,510.7	30.5	30.2	-42.20	1,510.3	59.2	343.3	281.4	61.86	5.549	
14,400.0	12,764.1	14,165.2	12,509.2	32.0	31.8	-42.08	1,610.2	58.4	344.1	280.0	64.04	5.372	
14,500.0	12,763.6	14,265.2	12,507.6	33.6	33.4	-41.95	1,710.2	57.7	344.9	277.8	67.06	5.143	
14,600.0	12,763.2	14,365.2	12,506.1	35.2	35.0	-41.83	1,810.2	57.0	345.7	275.5	70.19	4.925	
14,700.0	12,762.7	14,465.2	12,504.6	36.8	36.6	-41.70	1,910.2	56.2	346.5	273.1	73.36	4.723	
14,800.0	12,762.3	14,565.1	12,503.0	38.4	38.2	-41.58	2,010.2	55.5	347.3	270.8	76.55	4.537	
14,900.0	12,761.8	14,665.1	12,501.5	39.9	39.8	-41.46	2,110.1	54.8	348.1	268.4	79.75	4.365	
15,000.0	12,761.4	14,765.1	12,499.9	41.5	41.4	-41.33	2,210.1	54.0	348.9	266.0	82.97	4.206	
15,100.0	12,761.0	14,865.1	12,498.4	43.2	43.0	-41.21	2,310.1	53.3	349.8	263.6	86.19	4.058	
15,200.0	12,760.5	14,965.1	12,496.8	44.8	44.7	-41.09	2,410.1	52.6	350.6	261.1	89.42	3.920	
15,300.0	12,760.1	15,065.1	12,495.3	46.4	46.3	-40.97	2,510.1	51.8	351.4	258.7	92.66	3.792	
15,400.0	12,759.6	15,165.1	12,493.7	48.0	47.9	-40.85	2,610.0	51.1	352.2	256.3	95.91	3.672	
15,500.0	12,759.2	15,265.1	12,492.2	49.6	49.5	-40.73	2,710.0	50.4	353.0	253.9	99.16	3.560	
15,600.0	12,758.8	15,365.1	12,490.7	51.2	51.2	-40.61	2,810.0	49.6	353.9	251.4	102.41	3.455	
15,700.0	12,758.3	15,465.1	12,489.1	52.9	52.8	-40.50	2,910.0	48.9	354.7	249.0	105.67	3.356	
15,800.0	12,757.9	15,565.1	12,487.6	54.5	54.5	-40.38	3,010.0	48.1	355.5	246.6	108.94	3.263	
15,900.0	12,757.4	15,665.1	12,486.0	56.1	56.1	-40.26	3,109.9	47.4	356.3	244.1	112.21	3.176	
16,000.0	12,757.0	15,765.1	12,484.5	57.7	57.7	-40.15	3,209.9	46.7	357.2	241.7	115.48	3.093	
16,100.0	12,756.5	15,865.1	12,482.9	59.4	59.4	-40.03	3,309.9	45.9	358.0	239.3	118.75	3.015	
16,200.0	12,756.1	15,965.1	12,481.4	61.0	61.0	-39.91	3,409.9	45.2	358.8	236.8	122.03	2.941	
16,300.0	12,755.7	16,065.1	12,479.9	62.7	62.7	-39.80	3,509.9	44.5	359.7	234.4	125.31	2.870	
16,400.0	12,755.2	16,165.1	12,478.3	64.3	64.3	-39.69	3,609.8	43.7	360.5	231.9	128.60	2.803	
16,500.0	12,754.8	16,265.0	12,476.8	65.9	66.0	-39.57	3,709.8	43.0	361.4	229.5	131.88	2.740	
16,600.0	12,754.3	16,365.0	12,475.2	67.6	67.6	-39.46	3,809.8	42.3	362.2	227.0	135.17	2.680	
16,700.0	12,753.9	16,465.0	12,473.7	69.2	69.2	-39.35	3,909.8	41.5	363.0	224.6	138.46	2.622	
16,800.0	12,753.4	16,565.0	12,472.1	70.9	70.9	-39.23	4,009.7	40.8	363.9	222.1	141.75	2.567	
16,900.0	12,753.0	16,665.0	12,470.6	72.5	72.5	-39.12	4,109.7	40.0	364.7	219.7	145.04	2.515	
17,000.0	12,752.6	16,765.0	12,469.0	74.1	74.2	-39.01	4,209.7	39.3	365.6	217.2	148.34	2.464	
17,100.0	12,752.1	16,865.0	12,467.5	75.8	75.8	-38.90	4,309.7	38.6	366.4	214.8	151.63	2.416	
17,200.0	12,751.7	16,965.0	12,466.0	77.4	77.5	-38.79	4,409.7	37.8	367.3	212.3	154.93	2.370	
17,300.0	12,751.2	17,065.0	12,464.4	79.1	79.1	-38.68	4,509.6	37.1	368.1	209.9	158.23	2.326	
17,400.0	12,750.8	17,165.0	12,462.9	80.7	80.8	-38.57	4,609.6	36.4	369.0	207.4	161.53	2.284	
17,500.0	12,750.4	17,265.0	12,461.3	82.4	82.5	-38.46	4,709.6	35.6	369.8	205.0	164.83	2.244	
17,580.8	12,750.0	17,345.8	12,460.1	83.7	83.8	-38.38	4,790.4	35.0	370.5	203.0	167.50	2.212	

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



COG Operating LLC

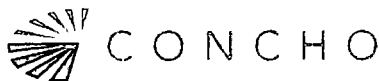
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

BULLDOG - DOMINATOR 25 FED #602H - OWB - PWP0													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.0	0.0	0.8	0.8	3.0	3.0	-90.48	-0.5	-60.0	60.0					
100.0	100.0	100.8	100.8	3.0	3.0	-90.48	-0.5	-60.0	60.0	54.0	6.00	9.999		
200.0	200.0	200.8	200.8	3.0	3.0	-90.48	-0.5	-60.0	60.0	54.0	6.01	9.982		
300.0	300.0	300.8	300.8	3.0	3.0	-90.48	-0.5	-60.0	60.0	54.0	6.03	9.946		
400.0	400.0	400.8	400.8	3.0	3.0	-90.48	-0.5	-60.0	60.0	53.9	6.07	9.892		
500.0	500.0	500.8	500.8	3.1	3.1	-90.48	-0.5	-60.0	60.0	53.9	6.11	9.821		
600.0	600.0	600.8	600.8	3.1	3.1	-90.48	-0.5	-60.0	60.0	53.8	6.17	9.733		
700.0	700.0	700.8	700.8	3.1	3.1	-90.48	-0.5	-60.0	60.0	53.8	6.23	9.630		
800.0	800.0	800.8	800.8	3.2	3.2	-90.48	-0.5	-60.0	60.0	53.7	6.31	9.513		
900.0	900.0	900.8	900.8	3.2	3.2	-90.48	-0.5	-60.0	60.0	53.6	6.39	9.385		
1,000.0	1,000.0	1,000.8	1,000.8	3.2	3.2	-90.48	-0.5	-60.0	60.0	53.5	6.49	9.246		
1,100.0	1,100.0	1,100.8	1,100.8	3.3	3.3	-90.48	-0.5	-60.0	60.0	53.4	6.59	9.099		
1,200.0	1,200.0	1,200.8	1,200.8	3.4	3.4	-90.48	-0.5	-60.0	60.0	53.3	6.71	8.945		
1,300.0	1,300.0	1,300.8	1,300.8	3.4	3.4	-90.48	-0.5	-60.0	60.0	53.2	6.83	8.785		
1,400.0	1,400.0	1,400.8	1,400.8	3.5	3.5	-90.48	-0.5	-60.0	60.0	53.0	6.96	8.621		
1,500.0	1,500.0	1,500.8	1,500.8	3.5	3.5	-90.48	-0.5	-60.0	60.0	52.9	7.10	8.455		
1,600.0	1,600.0	1,600.8	1,600.8	3.6	3.6	-90.48	-0.5	-60.0	60.0	52.8	7.24	8.286		
1,700.0	1,700.0	1,700.8	1,700.8	3.7	3.7	-90.48	-0.5	-60.0	60.0	52.6	7.39	8.117		
1,800.0	1,800.0	1,800.8	1,800.8	3.8	3.8	-90.48	-0.5	-60.0	60.0	52.5	7.55	7.948		
1,900.0	1,900.0	1,900.8	1,900.8	3.9	3.9	-90.48	-0.5	-60.0	60.0	52.3	7.71	7.780		
2,000.0	2,000.0	2,000.8	2,000.8	3.9	3.9	-90.48	-0.5	-60.0	60.0	52.1	7.88	7.614		
2,100.0	2,100.0	2,100.8	2,100.8	4.0	4.0	-90.48	-0.5	-60.0	60.0	51.9	8.05	7.450		
2,200.0	2,200.0	2,200.8	2,200.8	4.1	4.1	-90.48	-0.5	-60.0	60.0	51.8	8.23	7.289		
2,300.0	2,300.0	2,300.8	2,300.8	4.2	4.2	-90.48	-0.5	-60.0	60.0	51.6	8.41	7.131		
2,400.0	2,400.0	2,400.8	2,400.8	4.3	4.3	-90.48	-0.5	-60.0	60.0	51.4	8.60	6.976		
2,500.0	2,500.0	2,500.8	2,500.8	4.4	4.4	-90.48	-0.5	-60.0	60.0	51.2	8.79	6.824		
2,600.0	2,600.0	2,600.8	2,600.8	4.5	4.5	-90.48	-0.5	-60.0	60.0	51.0	8.99	6.677		
2,700.0	2,700.0	2,700.8	2,700.8	4.6	4.6	-90.48	-0.5	-60.0	60.0	50.8	9.18	6.533		
2,800.0	2,800.0	2,800.8	2,800.8	4.7	4.7	-90.48	-0.5	-60.0	60.0	50.6	9.39	6.393		
2,900.0	2,900.0	2,900.8	2,900.8	4.8	4.8	-90.48	-0.5	-60.0	60.0	50.4	9.59	6.256		
3,000.0	3,000.0	3,000.8	3,000.8	4.9	4.9	-90.48	-0.5	-60.0	60.0	50.2	9.80	6.124		
3,100.0	3,100.0	3,100.8	3,100.8	5.0	5.0	-90.48	-0.5	-60.0	60.0	50.0	10.01	5.996		
3,200.0	3,200.0	3,200.8	3,200.8	5.1	5.1	-90.48	-0.5	-60.0	60.0	49.8	10.22	5.871		
3,300.0	3,300.0	3,300.8	3,300.8	5.2	5.2	-90.48	-0.5	-60.0	60.0	49.6	10.43	5.751		
3,400.0	3,400.0	3,400.8	3,400.8	5.3	5.3	-90.48	-0.5	-60.0	60.0	49.4	10.65	5.634		
3,500.0	3,500.0	3,500.8	3,500.8	5.4	5.4	-90.48	-0.5	-60.0	60.0	49.1	10.87	5.520		
3,600.0	3,600.0	3,600.8	3,600.8	5.5	5.5	-90.48	-0.5	-60.0	60.0	48.9	11.09	5.410		
3,700.0	3,700.0	3,700.8	3,700.8	5.7	5.7	-90.48	-0.5	-60.0	60.0	48.7	11.31	5.304		
3,800.0	3,800.0	3,800.8	3,800.8	5.8	5.8	-90.48	-0.5	-60.0	60.0	48.5	11.54	5.201		
3,900.0	3,900.0	3,900.8	3,900.8	5.9	5.9	-90.48	-0.5	-60.0	60.0	48.2	11.76	5.101		
4,000.0	4,000.0	4,000.8	4,000.8	6.0	6.0	-90.48	-0.5	-60.0	60.0	48.0	11.99	5.004		
4,100.0	4,100.0	4,100.8	4,100.8	6.1	6.1	-90.48	-0.5	-60.0	60.0	47.8	12.22	4.910		
4,200.0	4,200.0	4,200.8	4,200.8	6.2	6.2	-90.48	-0.5	-60.0	60.0	47.6	12.45	4.819		
4,300.0	4,300.0	4,300.8	4,300.8	6.3	6.3	-90.48	-0.5	-60.0	60.0	47.3	12.68	4.731		
4,400.0	4,400.0	4,400.8	4,400.8	6.5	6.5	-90.48	-0.5	-60.0	60.0	47.1	12.92	4.646		
4,500.0	4,500.0	4,500.8	4,500.8	6.6	6.6	-90.48	-0.5	-60.0	60.0	46.9	13.15	4.563		
4,600.0	4,600.0	4,600.8	4,600.8	6.7	6.7	-90.48	-0.5	-60.0	60.0	46.6	13.38	4.483		
4,700.0	4,700.0	4,700.8	4,700.8	6.8	6.8	-90.48	-0.5	-60.0	60.0	46.4	13.62	4.405		
4,800.0	4,800.0	4,800.8	4,800.8	6.9	6.9	-90.48	-0.5	-60.0	60.0	46.1	13.86	4.330		
4,900.0	4,900.0	4,900.8	4,900.8	7.0	7.0	-90.48	-0.5	-60.0	60.0	45.9	14.10	4.257		
5,000.0	5,000.0	5,000.8	5,000.8	7.2	7.2	-90.48	-0.5	-60.0	60.0	45.7	14.34	4.186 CC, ES		
5,100.0	5,100.0	5,100.4	5,099.6	7.2	7.2	142.60	-2.0	-60.9	62.3	47.9	14.43	4.320		

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #602H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: O-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,140.0	5,139.9	5,139.6	5,139.5	7.2	7.2	142.43	-3.2	-61.6	64.4	50.0	14.41	4.471	
5,200.0	5,199.9	5,200.5	5,199.4	7.2	7.2	142.45	-4.9	-62.7	67.9	53.5	14.38	4.721	
5,300.0	5,299.8	5,300.7	5,299.2	7.2	7.1	142.49	-7.9	-64.6	73.6	59.3	14.33	5.137	
5,400.0	5,399.6	5,400.9	5,398.9	7.2	7.1	142.51	-10.9	-66.4	79.4	65.1	14.29	5.555	
5,500.0	5,499.5	5,501.0	5,498.7	7.2	7.1	142.54	-13.8	-68.2	85.1	70.9	14.25	5.973	
5,600.0	5,599.4	5,601.2	5,598.5	7.2	7.0	142.56	-16.8	-70.1	90.9	76.7	14.22	6.391	
5,700.0	5,699.3	5,701.4	5,698.3	7.2	7.0	142.57	-19.8	-71.9	96.7	82.5	14.20	6.809	
5,800.0	5,799.2	5,801.5	5,798.0	7.2	7.0	142.59	-22.7	-73.7	102.4	88.2	14.17	7.226	
5,900.0	5,899.0	5,901.7	5,897.8	7.2	7.0	142.60	-25.7	-75.6	108.2	94.0	14.16	7.642	
6,000.0	5,998.9	6,001.9	5,997.6	7.2	7.0	142.62	-28.7	-77.4	113.9	99.8	14.14	8.056	
6,100.0	6,098.8	6,102.0	6,097.4	7.2	6.9	142.63	-31.6	-79.2	119.7	105.6	14.14	8.466	
6,200.0	6,198.7	6,202.2	6,197.1	7.2	6.9	142.64	-34.6	-81.0	125.5	111.3	14.13	8.877	
6,300.0	6,298.6	6,302.4	6,296.9	7.2	6.9	142.65	-37.5	-82.9	131.2	117.1	14.13	9.284	
6,400.0	6,398.4	6,402.5	6,396.7	7.2	6.9	142.66	-40.5	-84.7	137.0	122.8	14.14	9.687	
6,500.0	6,498.3	6,502.7	6,496.4	7.2	6.9	142.66	-43.5	-86.5	142.7	128.6	14.15	10.086	
6,600.0	6,598.2	6,602.8	6,596.2	7.3	6.9	142.67	-46.4	-88.4	148.5	134.3	14.17	10.481	
6,700.0	6,698.1	6,703.0	6,696.0	7.3	6.9	142.68	-49.4	-90.2	154.3	140.1	14.19	10.872	
6,800.0	6,798.0	6,803.2	6,795.8	7.3	6.9	142.68	-52.4	-92.0	160.0	145.8	14.21	11.258	
6,900.0	6,897.8	6,903.3	6,895.5	7.3	6.9	142.69	-55.3	-93.9	165.8	151.5	14.24	11.638	
7,000.0	6,997.7	7,003.5	6,995.3	7.4	6.9	142.69	-58.3	-95.7	171.5	157.3	14.28	12.013	
7,100.0	7,097.6	7,103.7	7,095.1	7.4	6.9	142.70	-61.3	-97.5	177.3	163.0	14.32	12.382	
7,200.0	7,197.5	7,203.8	7,194.9	7.4	6.9	142.70	-64.2	-99.4	183.0	168.7	14.36	12.745	
7,300.0	7,297.4	7,304.0	7,294.6	7.5	7.0	142.71	-67.2	-101.2	188.8	174.4	14.41	13.101	
7,400.0	7,397.2	7,404.2	7,394.4	7.5	7.0	142.71	-70.2	-103.0	194.6	180.1	14.46	13.451	
7,500.0	7,497.1	7,504.3	7,494.2	7.5	7.0	142.72	-73.1	-104.9	200.3	185.8	14.52	13.794	
7,600.0	7,597.0	7,604.5	7,594.0	7.6	7.0	142.72	-76.1	-106.7	206.1	191.5	14.58	14.130	
7,700.0	7,696.9	7,704.7	7,693.7	7.6	7.0	142.72	-79.0	-108.5	211.8	197.2	14.65	14.459	
7,800.0	7,796.8	7,804.8	7,793.5	7.7	7.1	142.73	-82.0	-110.3	217.6	202.9	14.72	14.780	
7,900.0	7,896.6	7,905.0	7,893.3	7.7	7.1	142.73	-85.0	-112.2	223.4	208.6	14.80	15.093	
8,000.0	7,996.5	8,005.2	7,993.0	7.7	7.1	142.73	-87.9	-114.0	229.1	214.2	14.88	15.400	
8,100.0	8,096.4	8,105.3	8,092.8	7.8	7.2	142.74	-90.9	-115.8	234.9	219.9	14.96	15.698	
8,200.0	8,196.3	8,205.5	8,192.6	7.9	7.2	142.74	-93.9	-117.7	240.6	225.6	15.05	15.989	
8,300.0	8,296.2	8,305.7	8,292.4	7.9	7.2	142.74	-96.8	-119.5	246.4	231.3	15.14	16.271	
8,400.0	8,396.1	8,405.8	8,392.1	8.0	7.3	142.74	-99.8	-121.3	252.2	236.9	15.24	16.546	
8,500.0	8,495.9	8,506.0	8,491.9	8.0	7.3	142.75	-102.8	-123.2	257.9	242.6	15.34	16.814	
8,600.0	8,595.8	8,606.2	8,591.7	8.1	7.3	142.75	-105.7	-125.0	263.7	248.2	15.44	17.073	
8,700.0	8,695.7	8,706.3	8,691.5	8.1	7.4	142.75	-108.7	-126.8	269.4	253.9	15.55	17.325	
8,800.0	8,795.6	8,806.5	8,791.2	8.2	7.4	142.75	-111.7	-128.7	275.2	259.5	15.66	17.570	
8,900.0	8,895.5	8,906.7	8,891.0	8.3	7.5	142.76	-114.6	-130.5	280.9	265.2	15.78	17.806	
9,000.0	8,995.3	9,006.8	8,990.8	8.3	7.5	142.76	-117.6	-132.3	286.7	270.8	15.90	18.036	
9,100.0	9,095.2	9,107.0	9,090.5	8.4	7.6	142.76	-120.5	-134.1	292.5	276.4	16.02	18.258	
9,200.0	9,195.1	9,207.2	9,190.3	8.5	7.7	142.76	-123.5	-136.0	298.2	282.1	16.14	18.473	
9,300.0	9,295.0	9,307.3	9,290.1	8.5	7.7	142.76	-126.5	-137.8	304.0	287.7	16.27	18.681	
9,400.0	9,394.9	9,407.5	9,389.9	8.6	7.8	142.76	-129.4	-139.6	309.7	293.3	16.40	18.882	
9,500.0	9,494.7	9,507.7	9,489.6	8.7	7.8	142.77	-132.4	-141.5	315.5	299.0	16.54	19.076	
9,600.0	9,594.6	9,607.8	9,589.4	8.7	7.9	142.77	-135.4	-143.3	321.3	304.6	16.68	19.264	
9,700.0	9,694.5	9,708.0	9,689.2	8.8	8.0	142.77	-138.3	-145.1	327.0	310.2	16.82	19.445	
9,800.0	9,794.4	9,808.2	9,789.0	8.9	8.0	142.77	-141.3	-147.0	332.8	315.8	16.96	19.620	
9,900.0	9,894.3	9,908.3	9,888.7	9.0	8.1	142.77	-144.3	-148.8	338.5	321.4	17.11	19.789	
10,000.0	9,994.1	10,008.5	9,988.5	9.1	8.2	142.77	-147.2	-150.6	344.3	327.0	17.26	19.952	
10,100.0	10,094.0	10,108.7	10,088.3	9.1	8.2	142.77	-150.2	-152.5	350.1	332.6	17.41	20.108	
10,200.0	10,193.9	10,191.2	10,188.1	9.2	8.3	142.78	-153.2	-154.3	355.8	338.3	17.55	20.275	

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



COG Operating LLC

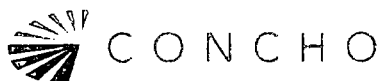
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #602H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
10,300.0	10,293.8	10,309.0	10,287.8	9.3	8.4	142.78	-156.1	-156.1	361.6	343.9	17.72	20.405	
10,400.0	10,393.7	10,409.2	10,387.6	9.4	8.4	142.78	-159.1	-157.9	367.3	349.5	17.88	20.546	
10,500.0	10,493.5	10,509.3	10,487.4	9.5	8.5	142.78	-162.0	-159.8	373.1	355.1	18.04	20.681	
10,600.0	10,593.4	10,609.5	10,587.1	9.6	8.6	142.78	-165.0	-161.6	378.9	360.6	18.20	20.812	
10,700.0	10,693.3	10,709.7	10,686.9	9.6	8.7	142.78	-168.0	-163.4	384.6	366.2	18.37	20.937	
10,800.0	10,793.2	10,809.8	10,786.7	9.7	8.8	142.78	-170.9	-165.3	390.4	371.8	18.54	21.058	
10,900.0	10,893.1	10,910.0	10,886.5	9.8	8.8	142.78	-173.9	-167.1	396.1	377.4	18.71	21.174	
11,000.0	10,992.9	10,989.8	10,986.2	9.9	8.9	142.78	-176.9	-168.9	401.9	383.0	18.86	21.305	
11,100.0	11,092.8	11,089.7	11,086.0	10.0	9.0	142.79	-179.8	-170.8	407.6	388.6	19.04	21.413	
11,200.0	11,192.7	11,189.5	11,185.8	10.1	9.1	142.79	-182.8	-172.6	413.4	394.2	19.21	21.517	
11,300.0	11,292.6	11,289.4	11,285.6	10.2	9.2	142.79	-185.8	-174.4	419.2	399.8	19.39	21.617	
11,400.0	11,392.5	11,389.2	11,385.3	10.3	9.2	142.79	-188.7	-176.3	424.9	405.4	19.57	21.713	
11,500.0	11,492.4	11,489.0	11,485.1	10.4	9.3	142.79	-191.7	-178.1	430.7	410.9	19.75	21.805	
11,600.0	11,592.2	11,588.9	11,584.9	10.5	9.4	142.79	-194.7	-179.9	436.4	416.5	19.93	21.894	
11,700.0	11,692.1	11,688.7	11,684.7	10.6	9.5	142.79	-197.6	-181.7	442.2	422.1	20.12	21.979	
11,800.0	11,792.0	11,788.5	11,784.4	10.7	9.6	142.79	-200.6	-183.6	448.0	427.7	20.31	22.061	
11,900.0	11,891.9	11,888.4	11,884.2	10.7	9.7	142.79	-203.6	-185.4	453.7	433.2	20.49	22.139	
12,000.0	11,991.8	11,988.2	11,984.0	10.8	9.7	142.79	-206.5	-187.2	459.5	438.8	20.64	22.267	
12,100.0	12,091.6	12,088.0	12,083.7	10.8	9.8	142.79	-209.5	-189.1	465.2	444.6	20.67	22.507	
12,200.0	12,191.5	12,186.8	12,182.1	10.9	9.8	144.04	-202.2	-190.9	471.1	450.3	20.72	22.734	
12,288.0	12,279.4	12,267.5	12,259.9	10.9	9.8	146.82	-181.4	-192.5	477.3	456.5	20.79	22.958	
12,300.0	12,291.4	12,277.8	12,269.6	10.9	9.8	178.16	-177.7	-192.8	478.3	457.5	20.82	22.975	
12,325.0	12,316.4	12,299.2	12,289.3	10.9	9.8	-123.59	-169.6	-193.2	480.5	459.6	20.91	22.986	
12,350.0	12,341.3	12,320.3	12,308.4	10.9	9.9	-104.66	-160.7	-193.6	482.9	461.8	21.07	22.923	
12,375.0	12,366.1	12,341.1	12,326.9	10.9	9.9	-96.65	-151.1	-194.0	485.4	464.0	21.41	22.670	
12,400.0	12,390.6	12,361.6	12,344.7	10.9	9.9	-92.01	-140.9	-194.4	488.0	465.9	22.11	22.069	
12,425.0	12,414.9	12,381.9	12,361.8	11.0	9.9	-88.80	-130.0	-194.8	490.6	467.3	23.36	21.003	
12,450.0	12,438.9	12,402.0	12,378.3	11.0	10.0	-86.34	-118.6	-195.2	493.4	468.4	24.94	19.782	
12,475.0	12,462.5	12,421.9	12,394.2	11.0	10.0	-84.33	-106.5	-195.6	496.1	469.5	26.68	18.596	
12,500.0	12,485.6	12,441.6	12,409.3	11.0	10.0	-82.61	-94.0	-196.0	499.0	470.4	28.51	17.499	
12,525.0	12,508.2	12,461.1	12,423.9	11.0	10.1	-81.09	-81.0	-196.3	501.8	471.4	30.40	16.505	
12,550.0	12,530.2	12,480.5	12,437.7	11.1	10.1	-79.73	-67.5	-196.7	504.6	472.2	32.32	15.613	
12,575.0	12,551.5	12,500.0	12,451.1	11.1	10.2	-78.50	-53.3	-197.0	507.3	473.1	34.24	14.818	
12,600.0	12,572.2	12,518.7	12,463.4	11.1	10.3	-77.38	-39.2	-197.4	510.1	473.9	36.14	14.113	
12,625.0	12,592.0	12,537.7	12,475.3	11.2	10.3	-76.35	-24.4	-197.7	512.7	474.7	38.01	13.487	
12,650.0	12,611.1	12,556.5	12,486.5	11.2	10.4	-75.40	-9.3	-198.0	515.3	475.5	39.84	12.933	
12,675.0	12,629.3	12,575.0	12,497.0	11.3	10.5	-74.54	6.0	-198.3	517.8	476.2	41.62	12.441	
12,700.0	12,646.5	12,593.8	12,507.0	11.4	10.6	-73.73	21.9	-198.6	520.2	476.9	43.33	12.005	
12,725.0	12,662.8	12,612.3	12,516.2	11.4	10.7	-72.99	37.9	-198.9	522.5	477.5	44.97	11.620	
12,750.0	12,678.1	12,630.7	12,524.7	11.5	10.8	-72.32	54.3	-199.2	524.7	478.2	46.52	11.279	
12,775.0	12,692.3	12,650.0	12,533.0	11.6	10.9	-71.69	71.7	-199.5	526.7	478.7	47.98	10.978	
12,800.0	12,705.4	12,667.4	12,539.8	11.7	11.0	-71.15	87.7	-199.7	528.6	479.2	49.34	10.713	
12,825.0	12,717.4	12,685.6	12,546.4	11.9	11.2	-70.66	104.7	-200.0	530.3	479.7	50.60	10.480	
12,850.0	12,728.2	12,703.8	12,552.2	12.0	11.3	-70.22	121.9	-200.2	531.9	480.1	51.75	10.277	
12,875.0	12,737.8	12,721.9	12,557.4	12.1	11.4	-69.84	139.2	-200.4	533.2	480.5	52.79	10.101	
12,900.0	12,746.2	12,740.0	12,562.0	12.3	11.6	-69.51	156.7	-200.6	534.5	480.7	53.71	9.951	
12,925.0	12,753.4	12,758.1	12,565.8	12.5	11.7	-69.23	174.4	-200.8	535.5	481.0	54.51	9.824	
12,950.0	12,759.3	12,775.0	12,568.8	12.7	11.9	-69.01	191.0	-201.0	536.3	481.1	55.18	9.719	
12,975.0	12,763.9	12,794.1	12,571.5	12.9	12.1	-68.84	209.9	-201.2	537.0	481.2	55.73	9.635	
13,000.0	12,767.3	12,812.1	12,573.3	13.1	12.2	-68.72	227.8	-201.4	537.4	481.3	56.15	9.571	
13,025.0	12,769.3	12,830.1	12,574.5	13.3	12.4	-68.66	245.8	-201.5	537.7	481.2	56.44	9.527	
13,051.2	12,770.0	12,848.9	12,575.0	13.5	12.6	-68.64	264.6	-201.7	537.7	481.1	56.60	9.501	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #602H - OWB - PWP0														Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD														Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,057.6	12,770.0	12,853.8	12,575.0	13.6	12.6	-68.65	269.5	-201.7	537.7	481.1	56.61	9.498		
13,063.2	12,770.0	12,858.8	12,575.0	13.6	12.7	-68.65	274.5	-201.7	537.7	481.1	56.62	9.497		
13,100.0	12,769.8	12,906.3	12,574.5	14.0	13.2	-68.62	309.4	-202.0	537.8	481.1	56.69	9.486		
13,200.0	12,769.4	13,006.3	12,573.1	15.1	14.3	-68.52	409.4	-202.7	538.2	481.3	56.90	9.458		
13,300.0	12,768.9	13,106.3	12,571.7	16.2	15.6	-68.42	509.4	-203.5	538.5	481.4	57.15	9.423		
13,400.0	12,768.5	13,206.3	12,570.2	17.4	16.9	-68.32	609.4	-204.2	538.9	481.4	57.44	9.382		
13,500.0	12,768.0	13,306.3	12,568.8	18.8	18.3	-68.22	709.4	-204.9	539.2	481.4	57.77	9.334		
13,600.0	12,767.6	13,406.3	12,567.3	20.1	19.7	-68.12	809.3	-205.7	539.6	481.4	58.14	9.280		
13,700.0	12,767.1	13,506.3	12,565.9	21.5	21.1	-68.02	909.3	-206.4	539.9	481.4	58.55	9.221		
13,800.0	12,766.7	13,606.3	12,564.5	23.0	22.6	-67.92	1,009.3	-207.1	540.3	481.3	59.01	9.156		
13,900.0	12,766.3	13,706.3	12,563.0	24.4	24.1	-67.83	1,109.3	-207.9	540.6	481.1	59.50	9.086		
14,000.0	12,765.8	13,806.3	12,561.6	25.9	25.6	-67.73	1,209.3	-208.6	541.0	481.0	60.03	9.011		
14,100.0	12,765.4	13,906.3	12,560.2	27.4	27.2	-67.63	1,309.2	-209.4	541.4	480.7	60.61	8.932		
14,200.0	12,764.9	14,006.3	12,558.7	28.9	28.7	-67.53	1,409.2	-210.1	541.7	480.5	61.25	8.845		
14,300.0	12,764.5	14,106.3	12,557.3	30.5	30.3	-67.43	1,509.2	-210.8	542.1	480.0	62.04	8.737		
14,400.0	12,764.1	14,206.3	12,555.8	32.0	31.9	-67.33	1,609.2	-211.6	542.5	478.3	64.15	8.456		
14,500.0	12,763.6	14,306.3	12,554.4	33.6	33.5	-67.24	1,709.2	-212.3	542.8	475.7	67.15	8.084		
14,600.0	12,763.2	14,396.3	12,553.0	35.2	34.8	-67.14	1,809.2	-213.0	543.2	473.1	70.07	7.752		
14,700.0	12,762.7	14,506.4	12,551.5	36.8	36.6	-67.04	1,909.1	-213.8	543.6	470.1	73.44	7.402		
14,800.0	12,762.3	14,606.4	12,550.1	38.4	38.2	-66.94	2,009.1	-214.5	543.9	467.3	76.62	7.099		
14,900.0	12,761.8	14,706.4	12,548.6	39.9	39.9	-66.85	2,109.1	-215.2	544.3	464.5	79.82	6.820		
15,000.0	12,761.4	14,806.4	12,547.2	41.5	41.5	-66.75	2,209.1	-216.0	544.7	461.7	83.03	6.560		
15,100.0	12,761.0	14,906.4	12,545.8	43.2	43.1	-66.65	2,309.1	-216.7	545.1	458.8	86.25	6.320		
15,200.0	12,760.5	15,006.4	12,544.3	44.8	44.7	-66.56	2,409.0	-217.5	545.5	456.0	89.48	6.096		
15,300.0	12,760.1	15,096.4	12,542.9	46.4	46.1	-66.46	2,509.0	-218.2	545.8	453.3	92.50	5.901		
15,400.0	12,759.6	15,206.4	12,541.4	48.0	48.0	-66.36	2,609.0	-218.9	546.2	450.3	95.95	5.693		
15,500.0	12,759.2	15,306.4	12,540.0	49.6	49.6	-66.27	2,709.0	-219.7	546.6	447.4	99.20	5.510		
15,600.0	12,758.8	15,406.4	12,538.6	51.2	51.2	-66.17	2,809.0	-220.4	547.0	444.5	102.46	5.339		
15,700.0	12,758.3	15,506.4	12,537.1	52.9	52.9	-66.07	2,909.0	-221.1	547.4	441.7	105.71	5.178		
15,800.0	12,757.9	15,606.4	12,535.7	54.5	54.5	-65.98	3,008.9	-221.9	547.8	438.8	108.98	5.027		
15,900.0	12,757.4	15,706.4	12,534.2	56.1	56.1	-65.88	3,108.9	-222.6	548.2	435.9	112.24	4.884		
16,000.0	12,757.0	15,806.4	12,532.8	57.7	57.8	-65.79	3,208.9	-223.3	548.6	433.0	115.51	4.749		
16,100.0	12,756.5	15,906.4	12,531.4	59.4	59.4	-65.69	3,308.9	-224.1	548.9	430.2	118.79	4.621		
16,200.0	12,756.1	16,006.4	12,529.9	61.0	61.0	-65.59	3,408.9	-224.8	549.3	427.3	122.06	4.501		
16,300.0	12,755.7	16,106.4	12,528.5	62.7	62.7	-65.50	3,508.9	-225.5	549.7	424.4	125.34	4.386		
16,400.0	12,755.2	16,206.4	12,527.0	64.3	64.3	-65.40	3,608.8	-226.3	550.1	421.5	128.62	4.277		
16,500.0	12,754.8	16,306.4	12,525.6	65.9	66.0	-65.31	3,708.8	-227.0	550.5	418.6	131.91	4.174		
16,600.0	12,754.3	16,406.4	12,524.2	67.6	67.6	-65.21	3,808.8	-227.8	550.9	415.7	135.19	4.075		
16,700.0	12,753.9	16,506.5	12,522.7	69.2	69.3	-65.12	3,908.8	-228.5	551.3	412.9	138.48	3.981		
16,800.0	12,753.4	16,606.5	12,521.3	70.9	70.9	-65.02	4,008.8	-229.2	551.7	410.0	141.77	3.892		
16,900.0	12,753.0	16,706.5	12,519.9	72.5	72.6	-64.93	4,108.7	-230.0	552.2	407.1	145.06	3.806		
17,000.0	12,752.6	16,806.5	12,518.4	74.1	74.2	-64.83	4,208.7	-230.7	552.6	404.2	148.36	3.725		
17,100.0	12,752.1	16,906.5	12,517.0	75.8	75.9	-64.74	4,308.7	-231.4	553.0	401.3	151.65	3.646		
17,200.0	12,751.7	17,006.5	12,515.5	77.4	77.5	-64.65	4,408.7	-232.2	553.4	398.4	154.95	3.571		
17,300.0	12,751.2	17,106.5	12,514.1	79.1	79.2	-64.55	4,508.7	-232.9	553.8	395.5	158.25	3.500		
17,400.0	12,750.8	17,206.5	12,512.7	80.7	80.8	-64.46	4,608.7	-233.6	554.2	392.7	161.55	3.431		
17,500.0	12,750.4	17,306.5	12,511.2	82.4	82.5	-64.36	4,708.6	-234.4	554.6	389.8	164.85	3.364		
17,580.8	12,750.0	17,374.3	12,510.1	83.7	83.6	-64.29	4,789.5	-235.0	555.0	387.7	167.30	3.317 SF		

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



COG Operating LLC

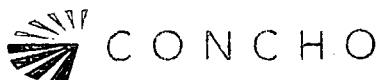
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #702H - OWB - PWP0												Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD												Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.0	0.0	1.4	1.4	3.0	3.0	-90.51	-0.8	-90.0	90.0				
100.0	100.0	101.4	101.4	3.0	3.0	-90.51	-0.8	-90.0	90.0	84.0	6.00	14.999	
200.0	200.0	201.4	201.4	3.0	3.0	-90.51	-0.8	-90.0	90.0	84.0	6.01	14.973	
300.0	300.0	301.4	301.4	3.0	3.0	-90.51	-0.8	-90.0	90.0	84.0	6.03	14.919	
400.0	400.0	401.4	401.4	3.0	3.0	-90.51	-0.8	-90.0	90.0	83.9	6.07	14.838	
500.0	500.0	501.4	501.4	3.1	3.1	-90.51	-0.8	-90.0	90.0	83.9	6.11	14.731	
600.0	600.0	601.4	601.4	3.1	3.1	-90.51	-0.8	-90.0	90.0	83.8	6.17	14.599	
700.0	700.0	701.4	701.4	3.1	3.1	-90.51	-0.8	-90.0	90.0	83.8	6.23	14.444	
800.0	800.0	801.4	801.4	3.2	3.2	-90.51	-0.8	-90.0	90.0	83.7	6.31	14.269	
900.0	900.0	901.4	901.4	3.2	3.2	-90.51	-0.8	-90.0	90.0	83.6	6.39	14.077	
1,000.0	1,000.0	1,001.4	1,001.4	3.2	3.2	-90.51	-0.8	-90.0	90.0	83.5	6.49	13.869	
1,100.0	1,100.0	1,101.4	1,101.4	3.3	3.3	-90.51	-0.8	-90.0	90.0	83.4	6.59	13.648	
1,200.0	1,200.0	1,201.4	1,201.4	3.4	3.4	-90.51	-0.8	-90.0	90.0	83.3	6.71	13.417	
1,300.0	1,300.0	1,301.4	1,301.4	3.4	3.4	-90.51	-0.8	-90.0	90.0	83.2	6.83	13.177	
1,400.0	1,400.0	1,401.4	1,401.4	3.5	3.5	-90.51	-0.8	-90.0	90.0	83.0	6.96	12.932	
1,500.0	1,500.0	1,501.4	1,501.4	3.5	3.5	-90.51	-0.8	-90.0	90.0	82.9	7.10	12.681	
1,600.0	1,600.0	1,601.4	1,601.4	3.6	3.6	-90.51	-0.8	-90.0	90.0	82.8	7.24	12.429	
1,700.0	1,700.0	1,701.4	1,701.4	3.7	3.7	-90.51	-0.8	-90.0	90.0	82.6	7.39	12.175	
1,800.0	1,800.0	1,801.4	1,801.4	3.8	3.8	-90.51	-0.8	-90.0	90.0	82.5	7.55	11.922	
1,900.0	1,900.0	1,901.4	1,901.4	3.9	3.9	-90.51	-0.8	-90.0	90.0	82.3	7.71	11.670	
2,000.0	2,000.0	2,001.4	2,001.4	3.9	3.9	-90.51	-0.8	-90.0	90.0	82.1	7.88	11.421	
2,100.0	2,100.0	2,101.4	2,101.4	4.0	4.0	-90.51	-0.8	-90.0	90.0	81.9	8.05	11.175	
2,200.0	2,200.0	2,201.4	2,201.4	4.1	4.1	-90.51	-0.8	-90.0	90.0	81.8	8.23	10.933	
2,300.0	2,300.0	2,301.4	2,301.4	4.2	4.2	-90.51	-0.8	-90.0	90.0	81.6	8.42	10.695	
2,400.0	2,400.0	2,401.4	2,401.4	4.3	4.3	-90.51	-0.8	-90.0	90.0	81.4	8.60	10.463	
2,500.0	2,500.0	2,501.4	2,501.4	4.4	4.4	-90.51	-0.8	-90.0	90.0	81.2	8.79	10.236	
2,600.0	2,600.0	2,601.4	2,601.4	4.5	4.5	-90.51	-0.8	-90.0	90.0	81.0	8.99	10.014	
2,700.0	2,700.0	2,701.4	2,701.4	4.6	4.6	-90.51	-0.8	-90.0	90.0	80.8	9.19	9.798	
2,800.0	2,800.0	2,801.4	2,801.4	4.7	4.7	-90.51	-0.8	-90.0	90.0	80.6	9.39	9.588	
2,900.0	2,900.0	2,901.4	2,901.4	4.8	4.8	-90.51	-0.8	-90.0	90.0	80.4	9.59	9.384	
3,000.0	3,000.0	3,001.4	3,001.4	4.9	4.9	-90.51	-0.8	-90.0	90.0	80.2	9.80	9.186	
3,100.0	3,100.0	3,101.4	3,101.4	5.0	5.0	-90.51	-0.8	-90.0	90.0	80.0	10.01	8.993	
3,200.0	3,200.0	3,201.4	3,201.4	5.1	5.1	-90.51	-0.8	-90.0	90.0	79.8	10.22	8.806	
3,300.0	3,300.0	3,301.4	3,301.4	5.2	5.2	-90.51	-0.8	-90.0	90.0	79.6	10.43	8.625	
3,400.0	3,400.0	3,401.4	3,401.4	5.3	5.3	-90.51	-0.8	-90.0	90.0	79.4	10.65	8.450	
3,500.0	3,500.0	3,501.4	3,501.4	5.4	5.4	-90.51	-0.8	-90.0	90.0	79.1	10.87	8.280	
3,600.0	3,600.0	3,601.4	3,601.4	5.5	5.5	-90.51	-0.8	-90.0	90.0	78.9	11.09	8.115	
3,700.0	3,700.0	3,701.4	3,701.4	5.7	5.7	-90.51	-0.8	-90.0	90.0	78.7	11.31	7.955	
3,800.0	3,800.0	3,801.4	3,801.4	5.8	5.8	-90.51	-0.8	-90.0	90.0	78.5	11.54	7.800	
3,900.0	3,900.0	3,901.4	3,901.4	5.9	5.9	-90.51	-0.8	-90.0	90.0	78.2	11.76	7.651	
4,000.0	4,000.0	4,001.4	4,001.4	6.0	6.0	-90.51	-0.8	-90.0	90.0	78.0	11.99	7.505	
4,100.0	4,100.0	4,101.4	4,101.4	6.1	6.1	-90.51	-0.8	-90.0	90.0	77.8	12.22	7.365	
4,200.0	4,200.0	4,201.4	4,201.4	6.2	6.2	-90.51	-0.8	-90.0	90.0	77.6	12.45	7.228	
4,300.0	4,300.0	4,301.4	4,301.4	6.3	6.3	-90.51	-0.8	-90.0	90.0	77.3	12.68	7.096	
4,400.0	4,400.0	4,401.4	4,401.4	6.5	6.5	-90.51	-0.8	-90.0	90.0	77.1	12.92	6.968	
4,500.0	4,500.0	4,501.4	4,501.4	6.6	6.6	-90.51	-0.8	-90.0	90.0	76.9	13.15	6.844	
4,600.0	4,600.0	4,601.4	4,601.4	6.7	6.7	-90.51	-0.8	-90.0	90.0	76.6	13.39	6.724	
4,700.0	4,700.0	4,701.4	4,701.4	6.8	6.8	-90.51	-0.8	-90.0	90.0	76.4	13.62	6.608	
4,800.0	4,800.0	4,801.4	4,801.4	6.9	6.9	-90.51	-0.8	-90.0	90.0	76.1	13.86	6.494	
4,900.0	4,900.0	4,901.4	4,901.4	7.0	7.0	-90.51	-0.8	-90.0	90.0	75.9	14.10	6.385	
5,000.0	5,000.0	5,001.4	5,001.4	7.2	7.2	-90.51	-0.8	-90.0	90.0	75.7	14.34	6.278 CC, ES	
5,100.0	5,100.0	5,098.8	5,098.8	7.2	7.2	142.96	-1.8	-91.4	92.8	78.4	14.44	6.428	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #702H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,140.0	5,139.9	5,142.3	5,137.6	7.2	7.2	142.93	-2.8	-92.6	95.4	81.0	14.42	6.517	
5,200.0	5,199.9	5,202.5	5,197.4	7.2	7.2	142.94	-4.6	-94.9	100.1	85.7	14.41	6.949	
5,300.0	5,299.8	5,302.8	5,296.9	7.2	7.2	142.94	-7.6	-98.8	107.9	93.5	14.38	7.503	
5,400.0	5,399.6	5,403.1	5,396.5	7.2	7.2	142.94	-10.5	-102.7	115.7	101.4	14.36	8.056	
5,500.0	5,499.5	5,503.4	5,496.1	7.2	7.2	142.94	-13.5	-106.5	123.5	109.2	14.35	8.608	
5,600.0	5,599.4	5,603.7	5,595.7	7.2	7.2	142.94	-16.5	-110.4	131.3	117.0	14.34	9.157	
5,700.0	5,699.3	5,704.0	5,695.2	7.2	7.2	142.94	-19.4	-114.3	139.1	124.8	14.33	9.705	
5,800.0	5,799.2	5,804.3	5,794.8	7.2	7.2	142.95	-22.4	-118.1	146.9	132.6	14.33	10.249	
5,900.0	5,899.0	5,904.6	5,894.4	7.2	7.2	142.95	-25.3	-122.0	154.7	140.4	14.34	10.790	
6,000.0	5,998.9	6,004.9	5,994.0	7.2	7.2	142.95	-28.3	-125.9	162.5	148.2	14.35	11.327	
6,100.0	6,098.8	6,094.8	6,093.6	7.2	7.2	142.95	-31.3	-129.7	170.3	155.9	14.36	11.859	
6,200.0	6,198.7	6,205.6	6,193.1	7.2	7.2	142.95	-34.2	-133.6	178.1	163.7	14.38	12.386	
6,300.0	6,298.6	6,305.9	6,292.7	7.2	7.2	142.95	-37.2	-137.4	185.9	171.5	14.40	12.908	
6,400.0	6,398.4	6,406.2	6,392.3	7.2	7.2	142.95	-40.2	-141.3	193.7	179.3	14.43	13.423	
6,500.0	6,498.3	6,506.5	6,491.9	7.2	7.2	142.95	-43.1	-145.2	201.5	187.0	14.46	13.932	
6,600.0	6,598.2	6,606.8	6,591.4	7.3	7.2	142.95	-46.1	-149.0	209.3	194.8	14.50	14.434	
6,700.0	6,698.1	6,707.1	6,691.0	7.3	7.3	142.95	-49.1	-152.9	217.1	202.5	14.54	14.929	
6,800.0	6,798.0	6,807.4	6,790.6	7.3	7.3	142.95	-52.0	-156.8	224.9	210.3	14.59	15.416	
6,900.0	6,897.8	6,907.7	6,890.2	7.3	7.3	142.95	-55.0	-160.6	232.7	218.0	14.64	15.895	
7,000.0	6,997.7	7,008.0	6,989.7	7.4	7.3	142.95	-58.0	-164.5	240.5	225.8	14.69	16.366	
7,100.0	7,097.6	7,108.3	7,089.3	7.4	7.4	142.95	-60.9	-168.4	248.3	233.5	14.75	16.828	
7,200.0	7,197.5	7,208.6	7,188.9	7.4	7.4	142.95	-63.9	-172.2	256.1	241.2	14.82	17.281	
7,300.0	7,297.4	7,308.9	7,288.5	7.5	7.4	142.95	-66.9	-176.1	263.9	249.0	14.89	17.725	
7,400.0	7,397.2	7,390.8	7,388.1	7.5	7.5	142.96	-69.8	-179.9	271.7	256.7	14.95	18.169	
7,500.0	7,497.1	7,509.5	7,487.6	7.5	7.5	142.96	-72.8	-183.8	279.5	264.4	15.04	18.586	
7,600.0	7,597.0	7,609.8	7,587.2	7.6	7.5	142.96	-75.7	-187.7	287.2	272.1	15.12	19.002	
7,700.0	7,696.9	7,689.9	7,686.8	7.6	7.6	142.96	-78.7	-191.5	295.0	279.9	15.19	19.419	
7,800.0	7,796.8	7,789.6	7,786.4	7.7	7.6	142.96	-81.7	-195.4	302.8	287.6	15.28	19.816	
7,900.0	7,896.6	7,889.3	7,885.9	7.7	7.7	142.96	-84.6	-199.3	310.6	295.3	15.38	20.204	
8,000.0	7,996.5	7,989.0	7,985.5	7.7	7.7	142.96	-87.6	-203.1	318.4	303.0	15.47	20.582	
8,100.0	8,096.4	8,088.7	8,085.1	7.8	7.8	142.96	-90.6	-207.0	326.2	310.7	15.57	20.950	
8,200.0	8,196.3	8,188.4	8,184.7	7.9	7.8	142.96	-93.5	-210.9	334.0	318.4	15.68	21.308	
8,300.0	8,296.2	8,288.1	8,284.2	7.9	7.9	142.96	-96.5	-214.7	341.8	326.0	15.78	21.656	
8,400.0	8,396.1	8,387.7	8,383.8	8.0	7.9	142.96	-99.5	-218.6	349.6	333.7	15.90	21.995	
8,500.0	8,495.9	8,487.4	8,483.4	8.0	8.0	142.96	-102.4	-222.4	357.4	341.4	16.01	22.323	
8,600.0	8,595.8	8,587.1	8,583.0	8.1	8.0	142.96	-105.4	-226.3	365.2	349.1	16.13	22.643	
8,700.0	8,695.7	8,686.8	8,682.5	8.1	8.1	142.96	-108.4	-230.2	373.0	356.8	16.25	22.953	
8,800.0	8,795.6	8,786.5	8,782.1	8.2	8.2	142.96	-111.3	-234.0	380.8	364.4	16.38	23.254	
8,900.0	8,895.5	8,886.2	8,881.7	8.3	8.2	142.96	-114.3	-237.9	388.6	372.1	16.50	23.545	
9,000.0	8,995.3	8,985.9	8,981.3	8.3	8.3	142.96	-117.3	-241.8	396.4	379.8	16.64	23.828	
9,100.0	9,095.2	9,085.6	9,080.9	8.4	8.3	142.96	-120.2	-245.6	404.2	387.4	16.77	24.102	
9,200.0	9,195.1	9,185.3	9,180.4	8.5	8.4	142.96	-123.2	-249.5	412.0	395.1	16.91	24.367	
9,300.0	9,295.0	9,285.0	9,280.0	8.5	8.5	142.96	-126.1	-253.4	419.8	402.7	17.05	24.624	
9,400.0	9,394.9	9,384.7	9,379.6	8.6	8.6	142.96	-129.1	-257.2	427.6	410.4	17.19	24.872	
9,500.0	9,494.7	9,484.4	9,479.2	8.7	8.6	142.96	-132.1	-261.1	435.4	418.0	17.34	25.112	
9,600.0	9,594.6	9,584.1	9,578.7	8.7	8.7	142.96	-135.0	-264.9	443.2	425.7	17.49	25.345	
9,700.0	9,694.5	9,683.8	9,678.3	8.8	8.8	142.96	-138.0	-268.8	451.0	433.3	17.64	25.569	
9,800.0	9,794.4	9,783.5	9,777.9	8.9	8.8	142.96	-141.0	-272.7	458.8	441.0	17.79	25.787	
9,900.0	9,894.3	9,883.2	9,877.5	9.0	8.9	142.96	-143.9	-276.5	466.6	448.6	17.95	25.996	
10,000.0	9,994.1	9,982.9	9,977.0	9.1	9.0	142.96	-146.9	-280.4	474.4	456.3	18.11	26.199	
10,100.0	10,094.0	10,082.6	10,076.6	9.1	9.1	142.96	-149.9	-284.3	482.2	463.9	18.27	26.394	
10,200.0	10,193.9	10,182.3	10,176.2	9.2	9.2	142.96	-152.8	-288.1	490.0	471.5	18.43	26.583	

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



COG Operating LLC

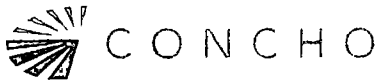
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #702H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,300.0	10,293.8	10,282.0	10,275.8	9.3	9.2	142.96	-155.8	-292.0	497.8	479.2	18.60	26.765	
10,400.0	10,393.7	10,381.7	10,375.3	9.4	9.3	142.96	-158.8	-295.9	505.6	486.8	18.77	26.940	
10,500.0	10,493.5	10,481.4	10,474.9	9.5	9.4	142.96	-161.7	-299.7	513.4	494.4	18.94	27.110	
10,600.0	10,593.4	10,581.1	10,574.5	9.6	9.5	142.96	-164.7	-303.6	521.1	502.0	19.11	27.274	
10,700.0	10,693.3	10,680.7	10,674.1	9.6	9.6	142.96	-167.7	-307.4	528.9	509.7	19.28	27.431	
10,800.0	10,793.2	10,780.4	10,773.7	9.7	9.7	142.96	-170.6	-311.3	536.7	517.3	19.46	27.583	
10,900.0	10,893.1	10,880.1	10,873.2	9.8	9.7	142.96	-173.6	-315.2	544.5	524.9	19.64	27.730	
11,000.0	10,992.9	10,979.8	10,972.8	9.9	9.8	142.96	-176.5	-319.0	552.3	532.5	19.82	27.871	
11,100.0	11,092.8	11,079.5	11,072.4	10.0	9.9	142.96	-179.5	-322.9	560.1	540.1	20.00	28.007	
11,200.0	11,192.7	11,179.2	11,172.0	10.1	10.0	142.96	-182.5	-326.8	567.9	547.7	20.18	28.139	
11,300.0	11,292.6	11,278.9	11,271.5	10.2	10.1	142.96	-185.4	-330.6	575.7	555.4	20.37	28.265	
11,400.0	11,392.5	11,378.6	11,371.1	10.3	10.2	142.96	-188.4	-334.5	583.5	563.0	20.56	28.387	
11,500.0	11,492.4	11,478.3	11,470.7	10.4	10.3	142.96	-191.4	-338.4	591.3	570.6	20.74	28.504	
11,600.0	11,592.2	11,578.0	11,570.3	10.5	10.4	142.96	-194.3	-342.2	599.1	578.2	20.94	28.618	
11,700.0	11,692.1	11,677.7	11,669.8	10.6	10.5	142.96	-197.3	-346.1	606.9	585.8	21.13	28.726	
11,800.0	11,792.0	11,777.4	11,769.4	10.7	10.6	142.96	-200.3	-349.9	614.7	593.4	21.32	28.831	
11,900.0	11,891.9	11,877.1	11,869.0	10.7	10.7	142.96	-203.2	-353.8	622.5	601.0	21.52	28.932	
12,000.0	11,991.8	11,976.8	11,968.6	10.8	10.7	142.96	-206.2	-357.7	630.3	608.6	21.68	29.077	
12,100.0	12,091.6	12,076.5	12,068.1	10.8	10.8	142.96	-209.2	-361.5	638.1	616.4	21.73	29.370	
12,200.0	12,191.5	12,176.2	12,167.7	10.9	10.8	142.96	-212.1	-365.4	645.9	624.1	21.78	29.658	
12,288.0	12,279.4	12,263.9	12,255.4	10.9	10.8	142.96	-214.7	-368.8	652.8	630.9	21.84	29.884	
12,300.0	12,291.4	12,275.9	12,267.3	10.9	10.8	173.84	-215.0	-369.3	653.7	631.9	21.84	29.934	
12,325.0	12,316.4	12,300.8	12,292.2	10.9	10.8	-128.88	-214.7	-370.2	655.6	633.8	21.84	30.025	
12,350.0	12,341.3	12,325.8	12,317.1	10.9	10.8	-110.88	-213.1	-371.2	657.6	635.7	21.85	30.097	
12,375.0	12,366.1	12,350.8	12,341.9	10.9	10.9	-103.79	-210.1	-372.2	659.5	637.6	21.92	30.086	
12,400.0	12,390.6	12,375.7	12,366.5	10.9	10.9	-100.04	-205.9	-373.2	661.4	639.1	22.30	29.664	
12,425.0	12,414.9	12,400.7	12,390.8	11.0	10.9	-97.70	-200.4	-374.2	663.3	639.8	23.51	28.217	
12,450.0	12,438.9	12,425.7	12,414.9	11.0	10.9	-96.08	-193.6	-375.2	665.2	640.1	25.14	26.462	
12,475.0	12,462.5	12,450.8	12,438.6	11.0	10.9	-94.87	-185.6	-376.2	667.1	640.1	26.93	24.772	
12,500.0	12,485.6	12,475.8	12,461.8	11.0	10.9	-93.92	-176.3	-377.1	668.9	640.1	28.80	23.220	
12,525.0	12,508.2	12,500.9	12,484.5	11.0	11.0	-93.15	-165.8	-378.1	670.6	639.9	30.73	21.821	
12,550.0	12,530.2	12,525.9	12,506.7	11.1	11.0	-92.50	-154.1	-379.1	672.3	639.7	32.68	20.571	
12,575.0	12,551.5	12,551.0	12,528.2	11.1	11.0	-91.95	-141.3	-380.0	674.0	639.4	34.63	19.460	
12,600.0	12,572.2	12,576.1	12,549.1	11.1	11.1	-91.47	-127.3	-380.9	675.6	639.0	36.57	18.475	
12,625.0	12,592.0	12,601.3	12,569.2	11.2	11.1	-91.05	-112.2	-381.8	677.2	638.7	38.47	17.603	
12,650.0	12,611.1	12,626.4	12,588.4	11.2	11.2	-90.68	-96.1	-382.7	678.7	638.3	40.32	16.830	
12,675.0	12,629.3	12,651.6	12,606.9	11.3	11.2	-90.35	-79.0	-383.5	680.1	638.0	42.12	16.145	
12,700.0	12,646.5	12,676.7	12,624.4	11.4	11.3	-90.05	-60.9	-384.3	681.4	637.6	43.85	15.539	
12,725.0	12,662.8	12,701.9	12,640.9	11.4	11.4	-89.78	-42.0	-385.1	682.7	637.2	45.51	15.003	
12,750.0	12,678.1	12,727.1	12,656.4	11.5	11.5	-89.54	-22.1	-385.9	683.9	636.8	47.07	14.528	
12,775.0	12,692.3	12,752.3	12,670.9	11.6	11.6	-89.32	-1.5	-386.6	685.0	636.5	48.55	14.110	
12,800.0	12,705.4	12,777.6	12,684.2	11.7	11.7	-89.12	19.9	-387.3	686.0	636.1	49.93	13.740	
12,825.0	12,717.4	12,802.8	12,696.4	11.9	11.8	-88.95	42.0	-387.9	687.0	635.8	51.20	13.416	
12,850.0	12,728.2	12,828.1	12,707.4	12.0	11.9	-88.80	64.7	-388.5	687.8	635.4	52.37	13.134	
12,875.0	12,737.8	12,853.3	12,717.3	12.1	12.1	-88.66	88.0	-389.0	688.6	635.1	53.42	12.890	
12,900.0	12,746.2	12,878.6	12,725.8	12.3	12.3	-88.55	111.7	-389.6	689.2	634.9	54.35	12.681	
12,925.0	12,753.4	12,903.9	12,733.1	12.5	12.4	-88.45	135.9	-390.0	689.8	634.6	55.16	12.505	
12,950.0	12,759.3	12,929.2	12,739.1	12.7	12.6	-88.37	160.5	-390.4	690.2	634.4	55.84	12.360	
12,975.0	12,763.9	12,954.5	12,743.9	12.9	12.8	-88.31	185.3	-390.8	690.6	634.2	56.40	12.244	
13,000.0	12,767.3	12,979.7	12,747.2	13.1	13.0	-88.26	210.4	-391.1	690.9	634.0	56.83	12.157	
13,025.0	12,769.3	13,005.0	12,749.3	13.3	13.3	-88.24	235.6	-391.4	691.0	633.9	57.12	12.097	
13,051.2	12,770.0	13,031.6	12,750.0	13.5	13.5	-88.23	262.1	-391.6	691.1	633.8	57.29	12.063	

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



COG Operating LLC

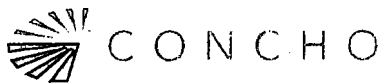
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FED #702H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-Standard Keeper 104, 12000-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
13,057.6	12,770.0	13,037.8	12,750.0	13.6	13.6	-88.23	268.3	-391.6	691.1	633.8	57.30	12.060	
13,100.0	12,769.8	13,080.2	12,749.8	14.0	14.0	-88.23	310.7	-392.0	691.1	633.7	57.38	12.045	
13,200.0	12,769.4	13,180.2	12,749.4	15.1	15.1	-88.23	410.7	-392.7	691.1	633.5	57.58	12.001	
13,300.0	12,768.9	13,280.2	12,748.9	16.2	16.2	-88.23	510.7	-393.4	691.0	633.2	57.83	11.950	
13,400.0	12,768.5	13,380.2	12,748.5	17.4	17.5	-88.23	610.7	-394.2	691.0	632.9	58.12	11.890	
13,500.0	12,768.0	13,480.2	12,748.0	18.8	18.8	-88.23	710.7	-394.9	691.0	632.6	58.45	11.823	
13,600.0	12,767.6	13,580.2	12,747.6	20.1	20.2	-88.23	810.7	-395.6	691.0	632.2	58.82	11.748	
13,700.0	12,767.1	13,680.2	12,747.1	21.5	21.6	-88.23	910.7	-396.4	691.0	631.7	59.23	11.666	
13,800.0	12,766.7	13,780.2	12,746.7	23.0	23.0	-88.23	1,010.7	-397.1	691.0	631.3	59.68	11.578	
13,900.0	12,766.3	13,880.2	12,746.3	24.4	24.5	-88.23	1,110.7	-397.9	690.9	630.8	60.17	11.483	
14,000.0	12,765.8	13,980.2	12,745.8	25.9	26.0	-88.23	1,210.7	-398.6	690.9	630.2	60.71	11.381	
14,100.0	12,765.4	14,080.2	12,745.4	27.4	27.5	-88.23	1,310.7	-399.3	690.9	629.6	61.29	11.273	
14,200.0	12,764.9	14,180.2	12,744.9	28.9	29.0	-88.22	1,410.7	-400.1	690.9	629.0	61.94	11.155	
14,300.0	12,764.5	14,280.2	12,744.5	30.5	30.6	-88.22	1,510.7	-400.8	690.9	628.1	62.76	11.008	
14,400.0	12,764.1	14,380.2	12,744.1	32.0	32.1	-88.22	1,610.7	-401.5	690.9	626.3	64.54	10.704	
14,500.0	12,763.6	14,480.2	12,743.6	33.6	33.7	-88.22	1,710.7	-402.3	690.8	623.4	67.43	10.246	
14,600.0	12,763.2	14,580.2	12,743.2	35.2	35.2	-88.22	1,810.7	-403.0	690.8	620.3	70.51	9.798	
14,700.0	12,762.7	14,680.2	12,742.7	36.8	36.8	-88.22	1,910.7	-403.8	690.8	617.2	73.65	9.380	
14,800.0	12,762.3	14,780.2	12,742.3	38.4	38.4	-88.22	2,010.7	-404.5	690.8	614.0	76.81	8.994	
14,900.0	12,761.8	14,880.2	12,741.8	39.9	40.0	-88.22	2,110.7	-405.2	690.8	610.8	79.99	8.636	
15,000.0	12,761.4	14,980.2	12,741.4	41.5	41.6	-88.22	2,210.7	-406.0	690.8	607.6	83.19	8.304	
15,100.0	12,761.0	15,080.2	12,741.0	43.2	43.2	-88.22	2,310.7	-406.7	690.7	604.4	86.39	7.995	
15,200.0	12,760.5	15,180.2	12,740.5	44.8	44.8	-88.22	2,410.7	-407.4	690.7	601.1	89.61	7.708	
15,300.0	12,760.1	15,280.2	12,740.1	46.4	46.4	-88.22	2,510.7	-408.2	690.7	597.9	92.83	7.440	
15,400.0	12,759.6	15,380.2	12,739.6	48.0	48.1	-88.22	2,610.7	-408.9	690.7	594.6	96.07	7.190	
15,500.0	12,759.2	15,480.2	12,739.2	49.6	49.7	-88.22	2,710.7	-409.7	690.7	591.4	99.30	6.955	
15,600.0	12,758.8	15,580.2	12,738.8	51.2	51.3	-88.22	2,810.7	-410.4	690.7	588.1	102.55	6.735	
15,700.0	12,758.3	15,680.2	12,738.3	52.9	52.9	-88.22	2,910.7	-411.1	690.6	584.9	105.80	6.528	
15,800.0	12,757.9	15,780.2	12,737.9	54.5	54.6	-88.22	3,010.6	-411.9	690.6	581.6	109.05	6.333	
15,900.0	12,757.4	15,880.2	12,737.4	56.1	56.2	-88.22	3,110.6	-412.6	690.6	578.3	112.31	6.149	
16,000.0	12,757.0	15,980.2	12,737.0	57.7	57.8	-88.22	3,210.6	-413.3	690.6	575.0	115.58	5.975	
16,100.0	12,756.5	16,080.2	12,736.5	59.4	59.5	-88.22	3,310.6	-414.1	690.6	571.7	118.84	5.811	
16,200.0	12,756.1	16,180.2	12,736.1	61.0	61.1	-88.22	3,410.6	-414.8	690.6	568.5	122.11	5.655	
16,300.0	12,755.7	16,280.2	12,735.7	62.7	62.7	-88.22	3,510.6	-415.6	690.6	565.2	125.39	5.507	
16,400.0	12,755.2	16,380.2	12,735.2	64.3	64.4	-88.22	3,610.6	-416.3	690.5	561.9	128.66	5.367	
16,500.0	12,754.8	16,480.2	12,734.8	65.9	66.0	-88.22	3,710.6	-417.0	690.5	558.6	131.94	5.233	
16,600.0	12,754.3	16,580.2	12,734.3	67.6	67.7	-88.22	3,810.6	-417.8	690.5	555.3	135.22	5.106	
16,700.0	12,753.9	16,680.2	12,733.9	69.2	69.3	-88.22	3,910.6	-418.5	690.5	552.0	138.51	4.985	
16,800.0	12,753.4	16,780.2	12,733.5	70.9	70.9	-88.22	4,010.6	-419.2	690.5	548.7	141.79	4.870	
16,900.0	12,753.0	16,880.2	12,733.0	72.5	72.6	-88.22	4,110.6	-420.0	690.5	545.4	145.08	4.759	
17,000.0	12,752.6	16,980.2	12,732.6	74.1	74.2	-88.22	4,210.6	-420.7	690.4	542.1	148.37	4.653	
17,100.0	12,752.1	17,080.2	12,732.1	75.8	75.9	-88.22	4,310.6	-421.5	690.4	538.8	151.66	4.552	
17,200.0	12,751.7	17,180.2	12,731.7	77.4	77.5	-88.22	4,410.6	-422.2	690.4	535.5	154.96	4.456	
17,300.0	12,751.2	17,280.2	12,731.2	79.1	79.2	-88.22	4,510.6	-422.9	690.4	532.1	158.25	4.363	
17,400.0	12,750.8	17,380.2	12,730.8	80.7	80.8	-88.22	4,610.6	-423.7	690.4	528.8	161.55	4.274	
17,500.0	12,750.4	17,480.2	12,730.4	82.4	82.5	-88.22	4,710.6	-424.4	690.4	525.5	164.84	4.188	
17,580.8	12,750.0	17,561.1	12,730.0	83.7	83.8	-88.22	4,791.4	-425.0	690.3	522.8	167.51	4.121 SF	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WELLPATH												Offset Site Error:	0.0 usft
Survey Program: 100-GYRO-NS, 8962-MWD												Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.0	0.0	0.0	0.0	3.0	3.0	2.61	4,605.1	209.9	4,609.9				
100.0	100.0	84.9	84.9	3.0	3.0	2.60	4,605.2	209.3	4,609.9	4,603.9	6.00	767.880	
200.0	200.0	193.6	193.6	3.0	3.0	2.58	4,605.4	207.4	4,610.1	4,604.0	6.04	762.711	
300.0	300.0	324.5	324.5	3.0	3.1	2.55	4,605.0	205.3	4,609.6	4,603.5	6.16	748.197	
400.0	400.0	417.7	417.7	3.0	3.3	2.53	4,604.5	203.7	4,609.1	4,602.8	6.29	732.736	
500.0	500.0	528.5	528.4	3.1	3.4	2.51	4,603.9	202.2	4,608.4	4,601.9	6.48	711.035	
600.0	600.0	640.9	640.8	3.1	3.6	2.50	4,602.9	200.6	4,607.5	4,600.8	6.71	686.215	
700.0	700.0	744.3	744.2	3.1	3.8	2.48	4,601.8	199.4	4,606.4	4,599.5	6.96	661.636	
800.0	800.0	841.5	841.4	3.2	4.1	2.47	4,600.9	198.3	4,605.4	4,598.2	7.22	637.772	
900.0	900.0	950.1	950.0	3.2	4.3	2.45	4,599.7	197.0	4,604.3	4,596.7	7.53	611.524	
1,000.0	1,000.0	1,067.2	1,067.1	3.2	4.6	2.43	4,598.1	195.3	4,602.9	4,595.0	7.88	583.948	
1,100.0	1,100.0	1,160.7	1,160.5	3.3	4.9	2.42	4,596.7	194.1	4,601.3	4,593.1	8.19	561.862	
1,200.0	1,200.0	1,242.9	1,242.7	3.4	5.1	2.40	4,595.7	193.0	4,600.0	4,591.5	8.48	542.653	
1,300.0	1,300.0	1,323.9	1,323.8	3.4	5.4	2.39	4,595.0	192.1	4,599.1	4,590.4	8.77	524.378	
1,400.0	1,400.0	1,409.5	1,409.3	3.5	5.6	2.39	4,594.6	191.5	4,598.7	4,589.6	9.09	506.109	
1,500.0	1,500.0	1,525.3	1,525.1	3.5	6.0	2.38	4,594.0	190.8	4,598.1	4,588.6	9.50	483.930	
1,600.0	1,600.0	1,623.0	1,622.8	3.6	6.3	2.37	4,593.4	190.3	4,597.4	4,587.6	9.87	465.710	
1,700.0	1,700.0	1,716.6	1,716.4	3.7	6.5	2.37	4,592.9	190.0	4,596.9	4,586.6	10.24	449.059	
1,800.0	1,800.0	1,807.9	1,807.8	3.8	6.8	2.37	4,592.5	189.7	4,596.5	4,585.9	10.60	433.581	
1,900.0	1,900.0	1,897.9	1,897.7	3.9	7.1	2.36	4,592.3	189.5	4,596.3	4,585.3	10.97	419.108	
2,000.0	2,000.0	2,016.9	2,016.7	3.9	7.5	2.36	4,592.0	189.6	4,596.0	4,584.5	11.43	402.086	
2,100.0	2,100.0	2,107.7	2,107.5	4.0	7.8	2.37	4,591.7	189.7	4,595.6	4,583.8	11.81	389.208	
2,200.0	2,200.0	2,208.1	2,207.9	4.1	8.1	2.37	4,591.3	190.0	4,595.3	4,583.1	12.22	376.041	
2,284.1	2,284.1	2,277.8	2,277.6	4.2	8.3	2.37	4,591.2	190.4	4,595.2	4,582.7	12.52	366.974	
2,300.0	2,300.0	2,291.2	2,291.0	4.2	8.4	2.38	4,591.2	190.5	4,595.2	4,582.6	12.58	365.276	
2,400.0	2,400.0	2,390.2	2,390.0	4.3	8.7	2.38	4,591.3	191.0	4,595.3	4,582.3	12.99	353.627	
2,500.0	2,500.0	2,483.1	2,482.9	4.4	9.0	2.39	4,591.4	191.6	4,595.4	4,582.0	13.39	343.120	
2,600.0	2,600.0	2,586.8	2,586.6	4.5	9.3	2.40	4,591.6	192.3	4,595.6	4,581.8	13.83	332.293	
2,700.0	2,700.0	2,678.2	2,678.0	4.6	9.6	2.40	4,591.8	192.6	4,595.8	4,581.6	14.23	322.967	
2,800.0	2,800.0	2,766.0	2,765.8	4.7	9.9	2.41	4,592.2	193.2	4,596.3	4,581.7	14.62	314.372	
2,900.0	2,900.0	2,859.4	2,859.2	4.8	10.2	2.42	4,592.8	193.9	4,597.0	4,582.0	15.03	305.803	
3,000.0	3,000.0	2,959.4	2,959.1	4.9	10.6	2.43	4,593.5	194.6	4,597.8	4,582.3	15.47	297.227	
3,100.0	3,100.0	3,057.4	3,057.2	5.0	10.9	2.44	4,594.2	195.4	4,598.5	4,582.6	15.90	289.189	
3,200.0	3,200.0	3,149.7	3,149.5	5.1	11.2	2.45	4,595.0	196.3	4,599.4	4,583.1	16.32	281.874	
3,300.0	3,300.0	3,240.4	3,240.1	5.2	11.5	2.46	4,595.9	197.6	4,600.4	4,583.7	16.73	274.990	
3,400.0	3,400.0	3,331.2	3,330.9	5.3	11.8	2.49	4,596.9	199.5	4,601.7	4,584.6	17.14	268.405	
3,500.0	3,500.0	3,421.5	3,421.2	5.4	12.1	2.51	4,598.2	201.7	4,603.2	4,585.6	17.56	262.139	
3,600.0	3,600.0	3,519.5	3,519.1	5.5	12.5	2.54	4,599.7	204.0	4,604.8	4,586.8	18.00	255.780	
3,700.0	3,700.0	3,630.1	3,629.7	5.7	12.8	2.57	4,601.2	206.7	4,606.3	4,587.8	18.49	249.121	
3,800.0	3,800.0	3,738.3	3,737.9	5.8	13.2	2.60	4,602.5	209.2	4,607.5	4,588.6	18.97	242.877	
3,900.0	3,900.0	3,831.2	3,830.7	5.9	13.5	2.62	4,603.6	211.0	4,608.8	4,589.4	19.40	237.566	
4,000.0	4,000.0	3,922.9	3,922.5	6.0	13.8	2.65	4,604.8	213.0	4,610.3	4,590.5	19.83	232.528	
4,100.0	4,100.0	4,022.0	4,021.4	6.1	14.2	2.68	4,606.2	215.3	4,611.8	4,591.5	20.28	227.411	
4,200.0	4,200.0	4,110.2	4,109.7	6.2	14.5	2.70	4,607.6	217.2	4,613.5	4,592.8	20.70	222.912	
4,300.0	4,300.0	4,223.9	4,223.3	6.3	14.9	2.72	4,609.4	218.7	4,615.2	4,594.0	21.20	217.687	
4,400.0	4,400.0	4,332.2	4,331.6	6.5	15.2	2.73	4,611.0	219.7	4,616.7	4,595.0	21.69	212.871	
4,500.0	4,500.0	4,445.6	4,445.0	6.6	15.6	2.74	4,612.2	220.7	4,617.7	4,595.5	22.19	208.073	
4,600.0	4,600.0	4,556.0	4,555.4	6.7	16.0	2.76	4,613.3	222.4	4,618.8	4,596.1	22.69	203.572	
4,700.0	4,700.0	4,663.5	4,662.8	6.8	16.4	2.79	4,613.8	224.9	4,619.4	4,596.3	23.18	199.322	
4,800.0	4,800.0	4,797.2	4,796.5	6.9	16.8	2.84	4,614.2	228.7	4,619.9	4,596.1	23.75	194.489	
4,900.0	4,900.0	4,927.1	4,926.3	7.0	17.3	2.90	4,613.5	233.3	4,619.5	4,595.2	24.32	189.945	
5,000.0	5,000.0	13,875.0	9,595.4	7.2	82.1	83.18	28.7	240.1	4,608.3	4,519.0	89.27	51.621	

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



COG Operating LLC

Anticollision Report

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Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 100-GYRO-NS, 8962-MWD														Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Distance									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
5,100.0	5,100.0	13,875.0	9,595.4	7.2	82.1	-84.16	28.7	240.1	4,508.4	4,419.1	89.32	50.472			
5,140.0	5,139.9	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,468.4	4,379.1	89.32	50.028			
5,200.0	5,199.9	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,408.4	4,319.1	89.31	49.361			
5,300.0	5,299.8	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,308.5	4,219.2	89.30	48.249			
5,400.0	5,399.6	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,208.6	4,119.3	89.29	47.134			
5,500.0	5,499.5	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,108.7	4,019.4	89.28	46.019			
5,600.0	5,599.4	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	4,008.8	3,919.5	89.28	44.902			
5,700.0	5,699.3	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,908.9	3,819.6	89.28	43.784			
5,800.0	5,799.2	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,809.0	3,719.7	89.31	42.665			
5,900.0	5,899.0	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,709.1	3,619.8	89.28	41.545			
6,000.0	5,998.9	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,609.2	3,519.9	89.28	40.424			
6,100.0	6,098.8	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,509.3	3,420.0	89.29	39.302			
6,200.0	6,198.7	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,409.4	3,320.1	89.30	38.179			
6,300.0	6,298.6	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,309.6	3,220.3	89.31	37.056			
6,400.0	6,398.4	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,209.7	3,120.4	89.33	35.932			
6,500.0	6,498.3	13,875.0	9,595.4	7.2	82.1	-105.38	28.7	240.1	3,109.9	3,020.5	89.34	34.808			
6,600.0	6,598.2	13,875.0	9,595.4	7.3	82.1	-105.38	28.7	240.1	3,010.0	2,920.6	89.36	33.683			
6,700.0	6,698.1	13,875.0	9,595.4	7.3	82.1	-105.38	28.7	240.1	2,910.2	2,820.8	89.38	32.558			
6,800.0	6,798.0	13,875.0	9,595.4	7.3	82.1	-105.38	28.7	240.1	2,810.4	2,721.0	89.41	31.433			
6,900.0	6,897.8	13,875.0	9,595.4	7.3	82.1	-105.38	28.7	240.1	2,710.6	2,621.1	89.43	30.308			
7,000.0	6,997.7	13,875.0	9,595.4	7.4	82.1	-105.38	28.7	240.1	2,610.8	2,521.3	89.46	29.183			
7,100.0	7,097.6	13,875.0	9,595.4	7.4	82.1	-105.38	28.7	240.1	2,511.0	2,421.5	89.49	28.059			
7,200.0	7,197.5	13,875.0	9,595.4	7.4	82.1	-105.38	28.7	240.1	2,411.2	2,321.7	89.52	26.934			
7,300.0	7,297.4	13,875.0	9,595.4	7.5	82.1	-105.38	28.7	240.1	2,311.5	2,221.9	89.56	25.810			
7,400.0	7,397.2	13,875.0	9,595.4	7.5	82.1	-105.38	28.7	240.1	2,211.8	2,122.2	89.59	24.687			
7,500.0	7,497.1	13,875.0	9,595.4	7.5	82.1	-105.38	28.7	240.1	2,112.1	2,022.5	89.63	23.564			
7,600.0	7,597.0	13,875.0	9,595.4	7.6	82.1	-105.38	28.7	240.1	2,012.5	1,922.8	89.67	22.442			
7,700.0	7,696.9	13,875.0	9,595.4	7.6	82.1	-105.38	28.7	240.1	1,912.8	1,823.1	89.72	21.321			
7,800.0	7,796.8	13,875.0	9,595.4	7.7	82.1	-105.38	28.7	240.1	1,813.3	1,723.5	89.76	20.201			
7,900.0	7,896.6	13,875.0	9,595.4	7.7	82.1	-105.38	28.7	240.1	1,713.7	1,623.9	89.81	19.083			
8,000.0	7,996.5	13,875.0	9,595.4	7.7	82.1	-105.38	28.7	240.1	1,614.3	1,524.4	89.85	17.966			
8,100.0	8,096.4	13,875.0	9,595.4	7.8	82.1	-105.38	28.7	240.1	1,514.9	1,425.0	89.90	16.850			
8,200.0	8,196.3	13,875.0	9,595.4	7.9	82.1	-105.38	28.7	240.1	1,415.6	1,325.6	89.96	15.736			
8,300.0	8,296.2	13,875.0	9,595.4	7.9	82.1	-105.38	28.7	240.1	1,316.4	1,226.4	90.01	14.625			
8,400.0	8,396.1	13,875.0	9,595.4	8.0	82.1	-105.38	28.7	240.1	1,217.3	1,127.2	90.07	13.516			
8,500.0	8,495.9	13,875.0	9,595.4	8.0	82.1	-105.38	28.7	240.1	1,118.4	1,028.3	90.12	12.410			
8,600.0	8,595.8	13,875.0	9,595.4	8.1	82.1	-105.38	28.7	240.1	1,019.7	929.5	90.18	11.307			
8,700.0	8,695.7	13,875.0	9,595.4	8.1	82.1	-105.38	28.7	240.1	921.3	831.1	90.24	10.209			
8,800.0	8,795.6	13,875.0	9,595.4	8.2	82.1	-105.38	28.7	240.1	823.3	733.0	90.30	9.117			
8,900.0	8,895.5	13,875.0	9,595.4	8.3	82.1	-105.38	28.7	240.1	725.8	635.4	90.37	8.031			
9,000.0	8,995.3	13,875.0	9,595.4	8.3	82.1	-105.38	28.7	240.1	629.1	538.6	90.43	6.956			
9,100.0	9,095.2	13,875.0	9,595.4	8.4	82.1	-105.38	28.7	240.1	533.6	443.1	90.50	5.896			
9,200.0	9,195.1	13,875.0	9,595.4	8.5	82.1	-105.38	28.7	240.1	440.1	349.5	90.57	4.859			
9,300.0	9,295.0	13,875.0	9,595.4	8.5	82.1	-105.38	28.7	240.1	350.3	259.6	90.64	3.864			
9,400.0	9,394.9	13,875.0	9,595.4	8.6	82.1	-105.38	28.7	240.1	267.7	177.0	90.71	2.951			
9,500.0	9,494.7	13,875.0	9,595.4	8.7	82.1	-105.38	28.7	240.1	201.6	110.8	90.78	2.221			
9,600.0	9,594.6	13,875.0	9,595.4	8.7	82.1	-105.38	28.7	240.1	172.1	81.3	90.86	1.895 Advise and Monitor			
9,605.1	9,599.7	13,875.0	9,595.4	8.8	82.1	-105.38	28.7	240.1	172.1	81.2	90.86	1.894 Advise and Monitor, CC, ES, SF			
9,700.0	9,694.5	13,875.0	9,595.4	8.8	82.1	-105.38	28.7	240.1	196.5	105.6	90.93	2.161			
9,800.0	9,794.4	13,875.0	9,595.4	8.9	82.1	-105.38	28.7	240.1	260.0	169.0	91.01	2.857			
9,900.0	9,894.3	13,875.0	9,595.4	9.0	82.1	-105.38	28.7	240.1	341.4	250.3	91.08	3.749			
10,000.0	9,994.1	13,875.0	9,595.4	9.1	82.1	-105.38	28.7	240.1	430.8	339.6	91.16	4.725			

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



COG Operating LLC

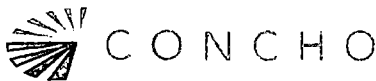
Anticollision Report

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Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft
Survey Program: 100-GYRO-NS; 8962-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,100.0	10,094.0	13,875.0	9,595.4	9.1	82.1	-105.38	28.7	240.1	524.0	432.7	91.24	5.743	
10,200.0	10,193.9	13,875.0	9,595.4	9.2	82.1	-105.38	28.7	240.1	619.3	528.0	91.32	6.781	
10,300.0	10,293.8	13,875.0	9,595.4	9.3	82.1	-105.38	28.7	240.1	715.9	624.5	91.41	7.832	
10,400.0	10,393.7	13,875.0	9,595.4	9.4	82.1	-105.38	28.7	240.1	813.3	721.8	91.49	8.890	
10,500.0	10,493.5	13,875.0	9,595.4	9.5	82.1	-105.38	28.7	240.1	911.3	819.7	91.57	9.952	
10,600.0	10,593.4	13,875.0	9,595.4	9.6	82.1	-105.38	28.7	240.1	1,009.7	918.0	91.66	11.016	
10,700.0	10,693.3	13,875.0	9,595.4	9.6	82.1	-105.38	28.7	240.1	1,108.3	1,016.6	91.75	12.081	
10,800.0	10,793.2	13,875.0	9,595.4	9.7	82.1	-105.38	28.7	240.1	1,207.2	1,115.4	91.83	13.146	
10,900.0	10,893.1	13,875.0	9,595.4	9.8	82.1	-105.38	28.7	240.1	1,306.3	1,214.4	91.92	14.211	
11,000.0	10,992.9	13,875.0	9,595.4	9.9	82.1	-105.38	28.7	240.1	1,405.5	1,313.5	92.01	15.275	
11,100.0	11,092.8	13,875.0	9,595.4	10.0	82.1	-105.38	28.7	240.1	1,504.8	1,412.7	92.10	16.338	
11,200.0	11,192.7	13,875.0	9,595.4	10.1	82.1	-105.38	28.7	240.1	1,604.2	1,512.0	92.19	17.400	
11,300.0	11,292.6	13,875.0	9,595.4	10.2	82.1	-105.38	28.7	240.1	1,703.6	1,611.3	92.28	18.461	
11,400.0	11,392.5	13,875.0	9,595.4	10.3	82.1	-105.38	28.7	240.1	1,803.1	1,710.8	92.38	19.519	
11,500.0	11,492.4	13,875.0	9,595.4	10.4	82.1	-105.38	28.7	240.1	1,902.7	1,810.2	92.47	20.576	
11,600.0	11,592.2	13,875.0	9,595.4	10.5	82.1	-105.38	28.7	240.1	2,002.3	1,909.8	92.56	21.632	
11,700.0	11,692.1	13,875.0	9,595.4	10.6	82.1	-105.38	28.7	240.1	2,102.0	2,009.3	92.66	22.685	
11,800.0	11,792.0	13,875.0	9,595.4	10.7	82.1	-105.38	28.7	240.1	2,201.6	2,108.9	92.76	23.736	
11,900.0	11,891.9	13,875.0	9,595.4	10.7	82.1	-105.38	28.7	240.1	2,301.4	2,208.5	92.85	24.785	
12,000.0	11,991.8	13,875.0	9,595.4	10.8	82.1	-105.38	28.7	240.1	2,401.1	2,308.2	92.92	25.840	
12,100.0	12,091.6	13,875.0	9,595.4	10.8	82.1	-105.38	28.7	240.1	2,500.8	2,407.9	92.93	26.910	
12,200.0	12,191.5	13,875.0	9,595.4	10.9	82.1	-105.38	28.7	240.1	2,600.6	2,507.7	92.96	27.976	
12,288.0	12,279.4	13,875.0	9,595.4	10.9	82.1	-105.38	28.7	240.1	2,688.4	2,595.4	92.99	28.910	
12,300.0	12,291.4	13,875.0	9,595.4	10.9	82.1	-80.63	28.7	240.1	2,700.4	2,607.4	93.00	29.037	
12,325.0	12,316.4	13,875.0	9,595.4	10.9	82.1	-29.35	28.7	240.1	2,725.2	2,632.2	93.01	29.301	
12,350.0	12,341.3	13,875.0	9,595.4	10.9	82.1	-14.22	28.7	240.1	2,749.9	2,656.9	93.02	29.563	
12,375.0	12,366.1	13,875.0	9,595.4	10.9	82.1	-8.86	28.7	240.1	2,774.3	2,681.3	93.06	29.811	
12,400.0	12,390.6	13,875.0	9,595.4	10.9	82.1	-6.30	28.7	240.1	2,798.5	2,705.2	93.26	30.006	
12,425.0	12,414.9	13,875.0	9,595.4	11.0	82.1	-4.85	28.7	240.1	2,822.2	2,728.4	93.85	30.073	
12,450.0	12,438.9	13,875.0	9,595.4	11.0	82.1	-3.93	28.7	240.1	2,845.6	2,751.0	94.65	30.063	
12,475.0	12,462.5	13,875.0	9,595.4	11.0	82.1	-3.30	28.7	240.1	2,868.5	2,773.0	95.55	30.022	
12,500.0	12,485.6	13,875.0	9,595.4	11.0	82.1	-2.85	28.7	240.1	2,890.9	2,794.4	96.49	29.961	
12,525.0	12,508.2	13,875.0	9,595.4	11.0	82.1	-2.51	28.7	240.1	2,912.8	2,815.3	97.46	29.888	
12,550.0	12,530.2	13,875.0	9,595.4	11.1	82.1	-2.25	28.7	240.1	2,934.0	2,835.6	98.43	29.806	
12,575.0	12,551.5	13,875.0	9,595.4	11.1	82.1	-2.05	28.7	240.1	2,954.6	2,855.1	99.41	29.720	
12,600.0	12,572.2	13,875.0	9,595.4	11.1	82.1	-1.88	28.7	240.1	2,974.4	2,874.1	100.38	29.630	
12,625.0	12,592.0	13,875.0	9,595.4	11.2	82.1	-1.74	28.7	240.1	2,993.6	2,892.2	101.34	29.540	
12,650.0	12,611.1	13,875.0	9,595.4	11.2	82.1	-1.63	28.7	240.1	3,011.9	2,909.7	102.27	29.451	
12,675.0	12,629.3	13,875.0	9,595.4	11.3	82.1	-1.54	28.7	240.1	3,029.5	2,926.3	103.17	29.363	
12,700.0	12,646.5	13,875.0	9,595.4	11.4	82.1	-1.46	28.7	240.1	3,046.2	2,942.2	104.04	29.279	
12,725.0	12,662.8	13,875.0	9,595.4	11.4	82.1	-1.39	28.7	240.1	3,062.1	2,957.2	104.87	29.198	
12,750.0	12,678.1	13,875.0	9,595.4	11.5	82.1	-1.33	28.7	240.1	3,077.0	2,971.3	105.66	29.121	
12,775.0	12,692.3	13,866.8	9,595.5	11.6	82.0	-1.29	36.9	239.9	3,091.0	2,984.7	106.28	29.084	
12,800.0	12,705.4	13,845.4	9,595.7	11.7	81.6	-1.26	58.2	239.3	3,103.9	2,997.2	106.64	29.107	
12,825.0	12,717.4	13,823.2	9,596.0	11.9	81.3	-1.24	80.4	238.7	3,115.7	3,008.7	106.94	29.136	
12,850.0	12,728.2	13,798.3	9,596.2	12.0	80.9	-1.23	105.4	238.0	3,126.2	3,019.1	107.14	29.180	
12,875.0	12,737.8	13,772.7	9,596.5	12.1	80.5	-1.21	131.0	237.3	3,135.6	3,028.3	107.27	29.231	
12,900.0	12,746.2	13,751.0	9,596.8	12.3	80.2	-1.20	152.6	236.7	3,143.8	3,036.3	107.41	29.270	
12,925.0	12,753.4	13,730.6	9,597.0	12.5	79.9	-1.19	173.1	236.2	3,150.7	3,043.2	107.50	29.309	
12,950.0	12,759.3	13,709.9	9,597.2	12.7	79.6	-1.18	193.8	235.6	3,156.3	3,048.8	107.52	29.355	
12,975.0	12,763.9	13,688.9	9,597.4	12.9	79.2	-1.18	214.7	235.0	3,160.8	3,053.3	107.48	29.408	
13,000.0	12,767.3	13,667.8	9,597.6	13.1	78.9	-1.18	235.8	234.5	3,163.9	3,056.6	107.37	29.467	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft
Survey Program: 100-GYRO-NS, 8962-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
13,025.0	12,769.3	13,646.6	9,597.7	13.3	78.6	-1.18	257.0	233.9	3,165.8	3,058.6	107.19	29.533	
13,051.2	12,770.0	13,624.2	9,597.8	13.5	78.3	-1.19	279.4	233.3	3,166.4	3,059.5	106.93	29.611	
13,057.6	12,770.0	13,618.8	9,597.8	13.6	78.2	-1.19	284.8	233.2	3,166.4	3,059.5	106.86	29.631	
13,100.0	12,769.8	13,583.1	9,597.9	14.0	77.6	-1.20	320.4	232.4	3,166.1	3,059.7	106.35	29.770	
13,200.0	12,769.4	13,488.7	9,598.0	15.1	76.2	-1.22	414.9	230.4	3,165.6	3,060.5	105.02	30.144	
13,263.9	12,769.1	13,438.2	9,597.9	15.8	75.4	-1.24	465.3	229.3	3,165.4	3,061.1	104.33	30.341	
13,300.0	12,768.9	13,410.3	9,597.8	16.2	75.0	-1.24	493.3	228.7	3,165.5	3,061.5	103.95	30.452	
13,400.0	12,768.5	13,311.9	9,597.0	17.4	73.5	-1.27	591.6	226.7	3,165.8	3,063.2	102.61	30.854	
13,500.0	12,768.0	13,201.0	9,596.6	18.8	71.8	-1.28	702.5	225.1	3,165.8	3,064.7	101.10	31.312	
13,526.5	12,767.9	13,175.4	9,596.5	19.1	71.5	-1.28	728.1	224.8	3,165.7	3,065.0	100.77	31.415	
13,600.0	12,767.6	13,127.4	9,596.1	20.1	70.7	-1.29	776.1	224.2	3,166.0	3,065.8	100.19	31.600	
13,700.0	12,767.1	13,041.9	9,594.8	21.5	69.5	-1.29	861.6	223.2	3,167.2	3,068.0	99.12	31.952	
13,800.0	12,766.7	12,935.0	9,593.0	23.0	67.9	-1.30	968.4	221.8	3,168.4	3,070.6	97.76	32.408	
13,900.0	12,766.3	12,859.9	9,591.7	24.4	66.8	-1.32	1,043.5	220.5	3,169.7	3,072.8	96.90	32.710	
14,000.0	12,765.8	12,767.0	9,589.3	25.9	65.4	-1.32	1,136.4	219.3	3,171.9	3,076.0	95.81	33.106	
14,100.0	12,765.4	12,670.9	9,587.0	27.4	64.0	-1.33	1,232.4	218.1	3,173.8	3,079.1	94.70	33.515	
14,200.0	12,764.9	12,553.1	9,584.0	28.9	62.3	-1.35	1,350.2	216.0	3,176.0	3,082.6	93.32	34.034	
14,300.0	12,764.5	12,462.5	9,582.1	30.5	61.0	-1.35	1,440.7	215.2	3,177.6	3,085.2	92.42	34.383	
14,400.0	12,764.1	12,317.6	9,579.8	32.0	59.0	-1.31	1,585.7	216.4	3,178.7	3,087.5	91.22	34.846	
14,500.0	12,763.6	12,155.2	9,579.2	33.6	56.7	-1.22	1,748.0	220.5	3,178.8	3,088.4	90.40	35.164	
14,600.0	12,763.2	12,084.9	9,579.5	35.2	55.8	-1.17	1,818.3	222.3	3,177.8	3,086.9	90.98	34.930	
14,648.9	12,763.0	12,052.9	9,579.4	36.0	55.3	-1.16	1,850.2	222.9	3,177.7	3,086.4	91.31	34.803	
14,700.0	12,762.7	12,021.7	9,579.2	36.8	54.9	-1.14	1,881.5	223.7	3,177.9	3,086.2	91.69	34.660	
14,800.0	12,762.3	11,960.1	9,578.1	38.4	54.1	-1.10	1,943.0	225.4	3,179.1	3,086.7	92.43	34.393	
14,900.0	12,761.8	11,897.1	9,576.3	39.9	53.2	-1.05	2,006.0	227.5	3,181.5	3,088.3	93.18	34.143	
15,000.0	12,761.4	11,806.8	9,572.8	41.5	52.0	-0.97	2,096.1	231.5	3,184.8	3,091.2	93.59	34.030	
15,100.0	12,761.0	11,719.1	9,569.3	43.2	50.9	-0.88	2,183.6	235.7	3,188.2	3,094.2	94.05	33.900	
15,200.0	12,760.5	11,591.3	9,564.3	44.8	49.2	-0.77	2,311.2	240.6	3,191.7	3,097.7	94.02	33.949	
15,300.0	12,760.1	11,486.6	9,560.8	46.4	47.9	-0.69	2,415.8	244.4	3,194.6	3,100.3	94.31	33.873	
15,400.0	12,759.6	11,273.8	9,558.1	48.0	45.3	-0.56	2,628.5	250.4	3,195.2	3,101.9	93.33	34.237	
15,500.0	12,759.2	11,163.3	9,559.1	49.6	44.0	-0.51	2,739.0	251.9	3,193.8	3,100.2	93.64	34.107	
15,600.0	12,758.8	11,086.7	9,559.2	51.2	43.1	-0.51	2,815.6	251.4	3,193.2	3,098.8	94.38	33.834	
15,700.0	12,758.3	10,967.2	9,559.9	52.9	41.8	-0.57	2,935.0	247.5	3,192.2	3,097.5	94.65	33.724	
15,800.0	12,757.9	10,894.4	9,560.1	54.5	41.0	-0.62	3,007.7	243.9	3,191.4	3,095.9	95.48	33.424	
15,813.3	12,757.8	10,887.3	9,560.1	54.7	40.9	-0.63	3,014.8	243.6	3,191.4	3,095.8	95.62	33.375	
15,900.0	12,757.4	10,841.4	9,559.7	56.1	40.4	-0.66	3,060.6	241.3	3,192.0	3,095.4	96.54	33.062	
16,000.0	12,757.0	10,786.4	9,558.3	57.7	39.9	-0.70	3,115.6	238.6	3,194.0	3,096.4	97.60	32.725	
16,100.0	12,756.5	10,700.0	9,554.7	59.4	39.3	-0.76	3,225.1	234.2	3,196.9	3,045.3	151.65	21.082	
16,200.0	12,756.1	10,535.0	9,552.5	61.0	37.4	-0.82	3,366.7	229.9	3,197.8	3,099.4	98.41	32.495	
16,300.0	12,755.7	10,480.5	9,551.5	62.7	36.9	-0.84	3,421.2	228.3	3,199.4	3,099.8	99.56	32.134	
16,400.0	12,755.2	10,399.1	9,548.4	64.3	36.2	-0.86	3,502.6	226.9	3,202.7	3,102.2	100.50	31.867	
16,500.0	12,754.8	10,263.2	9,544.9	65.9	35.1	-0.83	3,638.4	227.2	3,204.7	3,103.6	101.06	31.712	
16,600.0	12,754.3	10,165.5	9,542.5	67.6	34.4	-0.81	3,736.1	227.4	3,206.6	3,104.7	101.99	31.442	
16,700.0	12,753.9	10,046.2	9,539.9	69.2	33.6	-0.80	3,855.3	227.4	3,208.3	3,105.5	102.86	31.192	
16,800.0	12,753.4	9,956.8	9,538.3	70.9	33.1	-0.78	3,944.7	227.7	3,209.8	3,105.8	103.98	30.869	
16,900.0	12,753.0	9,924.6	9,537.3	72.5	33.0	-0.77	3,976.8	228.1	3,212.5	3,107.0	105.45	30.464	
17,000.0	12,752.6	9,894.5	9,535.6	74.1	32.8	-0.75	4,006.9	229.0	3,217.5	3,110.6	106.94	30.087	
17,100.0	12,752.1	9,844.0	9,532.1	75.8	32.6	-0.69	4,057.2	231.7	3,224.1	3,115.7	108.35	29.757	
17,200.0	12,751.7	9,812.0	9,529.2	77.4	32.4	-0.65	4,089.0	233.6	3,232.7	3,122.8	109.85	29.428	
17,300.0	12,751.2	9,812.0	9,529.2	79.1	32.4	-0.65	4,089.0	233.6	3,243.9	3,132.4	111.50	29.094	
17,400.0	12,750.8	9,781.0	9,524.9	80.7	32.3	-0.62	4,119.6	235.5	3,257.6	3,144.6	113.01	28.824	
17,500.0	12,750.4	9,768.7	9,522.8	82.4	32.2	-0.60	4,131.7	236.2	3,273.8	3,159.1	114.61	28.563	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - DOMINATOR 25 FEDERAL #1H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft
Survey Program: 100-GYRO-NS, 8962-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
17,580.8	12,750.0	9,749.0	9,519.0	83.7	32.2	-0.58	4,151.1	237.4	3,288.6	3,172.7	115.87	28.382	

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



COG Operating LLC

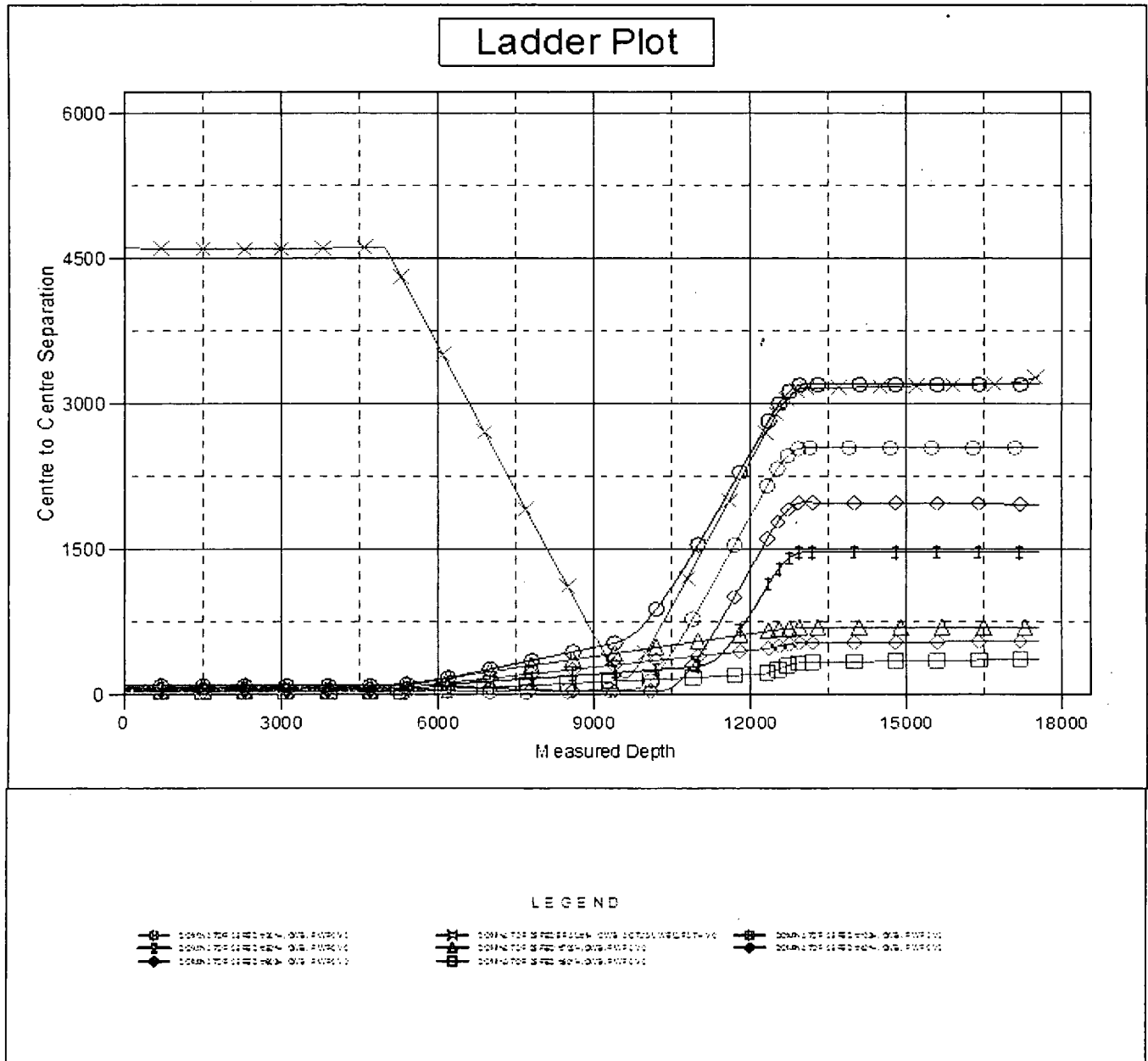
Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB=3322.5+26 @ 3348.5usft (RIG 4)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: DOMINATOR 25 FED #701H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.43°



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

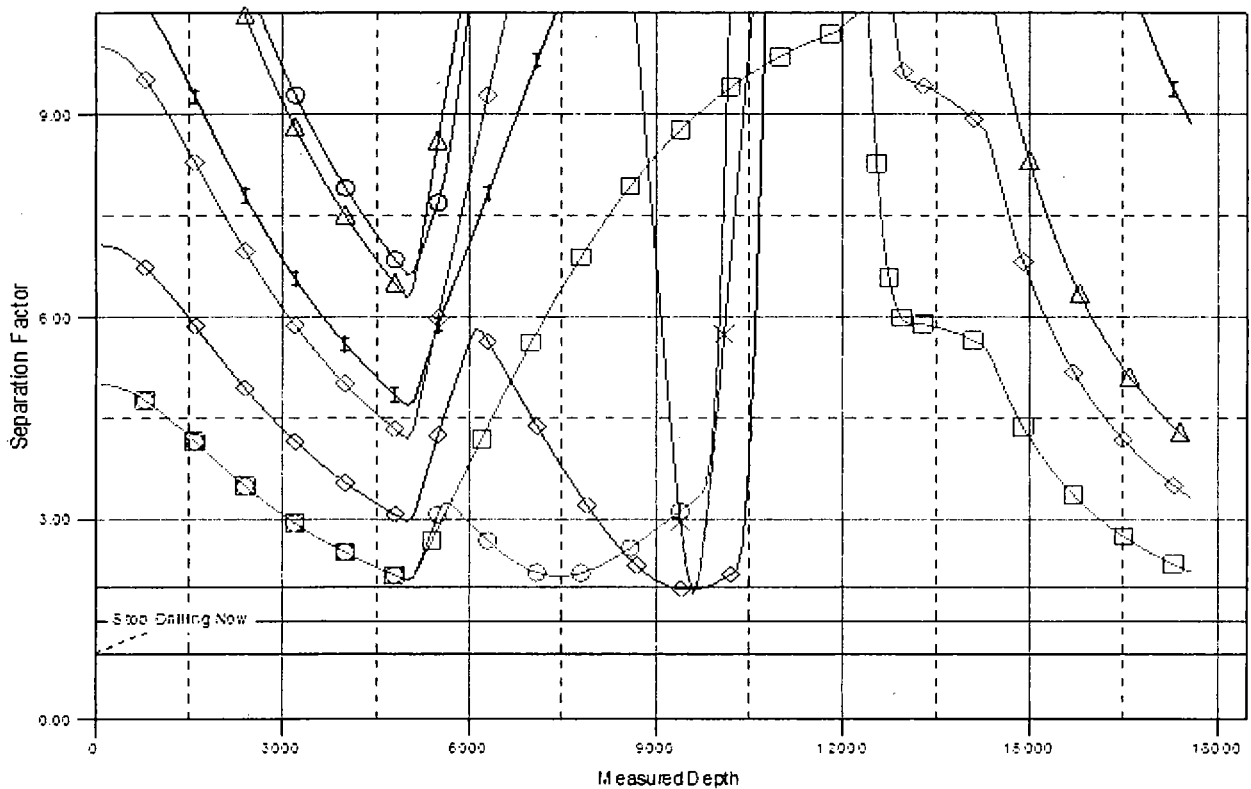
Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: DOMINATOR 25 FED #701H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB=3322.5+26 @ 3348.5usft (RIG 4)
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: DOMINATOR 25 FED #701H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.43°

Separation Factor Plot



LEGEND

○ DOMINATOR 25 FED #701H, PWP0 ● DOMINATOR 25 FED #701H, PWP0 ◊ DOMINATOR 25 FED #701H, PWP0	✱ DOMINATOR 25 FED #701H, PWP0 ✱ DOMINATOR 25 FED #701H, PWP0 ✱ DOMINATOR 25 FED #701H, PWP0	○ DOMINATOR 25 FED #701H, PWP0 ● DOMINATOR 25 FED #701H, PWP0
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C O N C H O

COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

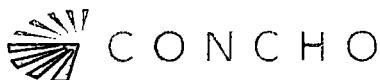
DOMINATOR 25 FED #701H

OWB

Plan: PWP0

Survey Report - Geographic

14 November, 2017



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: DOMINATOR 25 FED #701H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Project: LEA COUNTY, NM

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

System Datum: Mean Sea Level

Site: BULLDOG

Site Position: Northing: 398,637.10 usft Latitude: 32° 5' 36.820 N
From: Map Easting: 741,887.40 usft Longitude: 103° 33' 8.116 W
Position Uncertainty: 0.0 usft Slot Radius: 13-3/16 " Grid Convergence: 0.42 °

Well: DOMINATOR 25 FED #701H

Well Position: +N/-S 0.0 usft Northing: 399,203.10 usf Latitude: 32° 5' 41.667 N
+E/-W 0.0 usft Easting: 752,183.70 usf Longitude: 103° 31' 8.384 W
Position Uncertainty: 3.0 usft Wellhead Elevation: usf Ground Level: 3,322.5 usf

Wellbore: OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM2015	11/13/2017	6.90	59.93	47,813.07745822

Design: PWP0

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.0

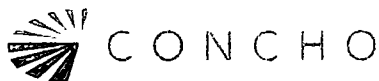
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	3.16

Survey Tool Program Date: 11/14/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	12,000.0	PWP0 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
12,000.0	17,580.8	PWP0 (OWB)	MWD	OWSG MWD - Standard

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
100.0	0.00	0.00	100.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
200.0	0.00	0.00	200.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
300.0	0.00	0.00	300.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
400.0	0.00	0.00	400.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
500.0	0.00	0.00	500.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
600.0	0.00	0.00	600.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
700.0	0.00	0.00	700.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
800.0	0.00	0.00	800.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
900.0	0.00	0.00	900.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
 Project: LEA COUNTY, NM
 Site: BULLDOG
 Well: DOMINATOR 25 FED #701H
 Wellbore: OWB
 Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
 TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	0.00	0.00	1,100.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	399,203.10	752,183.70	32° 5' 41.667 N	103° 31' 8.384 W
5,100.0	2.00	126.50	5,100.0	-1.0	1.4	399,202.06	752,185.10	32° 5' 41.657 N	103° 31' 8.368 W
5,140.0	2.80	126.50	5,139.9	-2.0	2.7	399,201.06	752,186.45	32° 5' 41.647 N	103° 31' 8.353 W
5,200.0	2.80	126.50	5,199.9	-3.8	5.1	399,199.32	752,188.80	32° 5' 41.630 N	103° 31' 8.325 W
5,300.0	2.80	126.50	5,299.8	-6.7	9.0	399,196.42	752,192.73	32° 5' 41.601 N	103° 31' 8.280 W
5,400.0	2.80	126.50	5,399.6	-9.6	13.0	399,193.51	752,196.66	32° 5' 41.571 N	103° 31' 8.235 W
5,500.0	2.80	126.50	5,499.5	-12.5	16.9	399,190.60	752,200.58	32° 5' 41.542 N	103° 31' 8.189 W
5,600.0	2.80	126.50	5,599.4	-15.4	20.8	399,187.70	752,204.51	32° 5' 41.513 N	103° 31' 8.144 W
5,700.0	2.80	126.50	5,699.3	-18.3	24.7	399,184.79	752,208.44	32° 5' 41.484 N	103° 31' 8.098 W
5,800.0	2.80	126.50	5,799.2	-21.2	28.7	399,181.89	752,212.36	32° 5' 41.455 N	103° 31' 8.053 W
5,900.0	2.80	126.50	5,899.0	-24.1	32.6	399,178.98	752,216.29	32° 5' 41.426 N	103° 31' 8.008 W
6,000.0	2.80	126.50	5,998.9	-27.0	36.5	399,176.08	752,220.22	32° 5' 41.397 N	103° 31' 7.962 W
6,100.0	2.80	126.50	6,098.8	-29.9	40.4	399,173.17	752,224.14	32° 5' 41.368 N	103° 31' 7.917 W
6,200.0	2.80	126.50	6,198.7	-32.8	44.4	399,170.26	752,228.07	32° 5' 41.339 N	103° 31' 7.872 W
6,300.0	2.80	126.50	6,298.6	-35.7	48.3	399,167.36	752,232.00	32° 5' 41.310 N	103° 31' 7.826 W
6,400.0	2.80	126.50	6,398.4	-38.6	52.2	399,164.45	752,235.92	32° 5' 41.281 N	103° 31' 7.781 W



COG Operating LLC

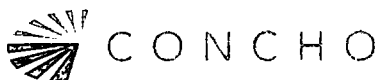
Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: DOMINATOR 25 FED #701H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.0	2.80	126.50	6,498.3	-41.6	56.2	399,161.55	752,239.85	32° 5' 41.252 N	103° 31' 7.735 W
6,600.0	2.80	126.50	6,598.2	-44.5	60.1	399,158.64	752,243.78	32° 5' 41.223 N	103° 31' 7.690 W
6,700.0	2.80	126.50	6,698.1	-47.4	64.0	399,155.74	752,247.70	32° 5' 41.194 N	103° 31' 7.645 W
6,800.0	2.80	126.50	6,798.0	-50.3	67.9	399,152.83	752,251.63	32° 5' 41.165 N	103° 31' 7.599 W
6,900.0	2.80	126.50	6,897.8	-53.2	71.9	399,149.92	752,255.56	32° 5' 41.136 N	103° 31' 7.554 W
7,000.0	2.80	126.50	6,997.7	-56.1	75.8	399,147.02	752,259.49	32° 5' 41.107 N	103° 31' 7.508 W
7,100.0	2.80	126.50	7,097.6	-59.0	79.7	399,144.11	752,263.41	32° 5' 41.078 N	103° 31' 7.463 W
7,200.0	2.80	126.50	7,197.5	-61.9	83.6	399,141.21	752,267.34	32° 5' 41.049 N	103° 31' 7.418 W
7,300.0	2.80	126.50	7,297.4	-64.8	87.6	399,138.30	752,271.27	32° 5' 41.020 N	103° 31' 7.372 W
7,400.0	2.80	126.50	7,397.2	-67.7	91.5	399,135.40	752,275.19	32° 5' 40.991 N	103° 31' 7.327 W
7,500.0	2.80	126.50	7,497.1	-70.6	95.4	399,132.49	752,279.12	32° 5' 40.961 N	103° 31' 7.281 W
7,600.0	2.80	126.50	7,597.0	-73.5	99.3	399,129.58	752,283.05	32° 5' 40.932 N	103° 31' 7.236 W
7,700.0	2.80	126.50	7,696.9	-76.4	103.3	399,126.68	752,286.97	32° 5' 40.903 N	103° 31' 7.191 W
7,800.0	2.80	126.50	7,796.8	-79.3	107.2	399,123.77	752,290.90	32° 5' 40.874 N	103° 31' 7.145 W
7,900.0	2.80	126.50	7,896.6	-82.2	111.1	399,120.87	752,294.83	32° 5' 40.845 N	103° 31' 7.100 W
8,000.0	2.80	126.50	7,996.5	-85.1	115.1	399,117.96	752,298.75	32° 5' 40.816 N	103° 31' 7.055 W
8,100.0	2.80	126.50	8,096.4	-88.0	119.0	399,115.06	752,302.68	32° 5' 40.787 N	103° 31' 7.009 W
8,200.0	2.80	126.50	8,196.3	-90.9	122.9	399,112.15	752,306.61	32° 5' 40.758 N	103° 31' 6.964 W
8,300.0	2.80	126.50	8,296.2	-93.9	126.8	399,109.24	752,310.53	32° 5' 40.729 N	103° 31' 6.918 W
8,400.0	2.80	126.50	8,396.1	-96.8	130.8	399,106.34	752,314.46	32° 5' 40.700 N	103° 31' 6.873 W
8,500.0	2.80	126.50	8,495.9	-99.7	134.7	399,103.43	752,318.39	32° 5' 40.671 N	103° 31' 6.828 W
8,600.0	2.80	126.50	8,595.8	-102.6	138.6	399,100.53	752,322.31	32° 5' 40.642 N	103° 31' 6.782 W
8,700.0	2.80	126.50	8,695.7	-105.5	142.5	399,097.62	752,326.24	32° 5' 40.613 N	103° 31' 6.737 W
8,800.0	2.80	126.50	8,795.6	-108.4	146.5	399,094.72	752,330.17	32° 5' 40.584 N	103° 31' 6.691 W
8,900.0	2.80	126.50	8,895.5	-111.3	150.4	399,091.81	752,334.09	32° 5' 40.555 N	103° 31' 6.646 W
9,000.0	2.80	126.50	8,995.3	-114.2	154.3	399,088.90	752,338.02	32° 5' 40.526 N	103° 31' 6.601 W
9,100.0	2.80	126.50	9,095.2	-117.1	158.3	399,086.00	752,341.95	32° 5' 40.497 N	103° 31' 6.555 W
9,200.0	2.80	126.50	9,195.1	-120.0	162.2	399,083.09	752,345.88	32° 5' 40.468 N	103° 31' 6.510 W
9,300.0	2.80	126.50	9,295.0	-122.9	166.1	399,080.19	752,349.80	32° 5' 40.439 N	103° 31' 6.464 W
9,400.0	2.80	126.50	9,394.9	-125.8	170.0	399,077.28	752,353.73	32° 5' 40.410 N	103° 31' 6.419 W
9,500.0	2.80	126.50	9,494.7	-128.7	174.0	399,074.38	752,357.66	32° 5' 40.381 N	103° 31' 6.374 W
9,600.0	2.80	126.50	9,594.6	-131.6	177.9	399,071.47	752,361.58	32° 5' 40.351 N	103° 31' 6.328 W
9,700.0	2.80	126.50	9,694.5	-134.5	181.8	399,068.56	752,365.51	32° 5' 40.322 N	103° 31' 6.283 W
9,800.0	2.80	126.50	9,794.4	-137.4	185.7	399,065.66	752,369.44	32° 5' 40.293 N	103° 31' 6.238 W
9,900.0	2.80	126.50	9,894.3	-140.3	189.7	399,062.75	752,373.36	32° 5' 40.264 N	103° 31' 6.192 W
10,000.0	2.80	126.50	9,994.1	-143.3	193.6	399,059.85	752,377.29	32° 5' 40.235 N	103° 31' 6.147 W
10,100.0	2.80	126.50	10,094.0	-146.2	197.5	399,056.94	752,381.22	32° 5' 40.206 N	103° 31' 6.101 W
10,200.0	2.80	126.50	10,193.9	-149.1	201.4	399,054.04	752,385.14	32° 5' 40.177 N	103° 31' 6.056 W
10,300.0	2.80	126.50	10,293.8	-152.0	205.4	399,051.13	752,389.07	32° 5' 40.148 N	103° 31' 6.011 W
10,400.0	2.80	126.50	10,393.7	-154.9	209.3	399,048.22	752,393.00	32° 5' 40.119 N	103° 31' 5.965 W
10,500.0	2.80	126.50	10,493.5	-157.8	213.2	399,045.32	752,396.92	32° 5' 40.090 N	103° 31' 5.920 W
10,600.0	2.80	126.50	10,593.4	-160.7	217.2	399,042.41	752,400.85	32° 5' 40.061 N	103° 31' 5.874 W
10,700.0	2.80	126.50	10,693.3	-163.6	221.1	399,039.51	752,404.78	32° 5' 40.032 N	103° 31' 5.829 W
10,800.0	2.80	126.50	10,793.2	-166.5	225.0	399,036.60	752,408.70	32° 5' 40.003 N	103° 31' 5.784 W
10,900.0	2.80	126.50	10,893.1	-169.4	228.9	399,033.70	752,412.63	32° 5' 39.974 N	103° 31' 5.738 W
11,000.0	2.80	126.50	10,992.9	-172.3	232.9	399,030.79	752,416.56	32° 5' 39.945 N	103° 31' 5.693 W
11,100.0	2.80	126.50	11,092.8	-175.2	236.8	399,027.89	752,420.48	32° 5' 39.916 N	103° 31' 5.647 W
11,200.0	2.80	126.50	11,192.7	-178.1	240.7	399,024.98	752,424.41	32° 5' 39.887 N	103° 31' 5.602 W
11,300.0	2.80	126.50	11,292.6	-181.0	244.6	399,022.07	752,428.34	32° 5' 39.858 N	103° 31' 5.557 W
11,400.0	2.80	126.50	11,392.5	-183.9	248.6	399,019.17	752,432.27	32° 5' 39.829 N	103° 31' 5.511 W
11,500.0	2.80	126.50	11,492.4	-186.8	252.5	399,016.26	752,436.19	32° 5' 39.800 N	103° 31' 5.466 W
11,600.0	2.80	126.50	11,592.2	-189.7	256.4	399,013.36	752,440.12	32° 5' 39.771 N	103° 31' 5.421 W
11,700.0	2.80	126.50	11,692.1	-192.6	260.3	399,010.45	752,444.05	32° 5' 39.741 N	103° 31' 5.375 W
11,800.0	2.80	126.50	11,792.0	-195.5	264.3	399,007.55	752,447.97	32° 5' 39.712 N	103° 31' 5.330 W
11,900.0	2.80	126.50	11,891.9	-198.5	268.2	399,004.64	752,451.90	32° 5' 39.683 N	103° 31' 5.284 W



COG Operating LLC

Survey Report - Geographic

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Well: DOMINATOR 25 FED #701H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
12,000.0	2.80	126.50	11,991.8	-201.4	272.1	399,001.73	752,455.83	32° 5' 39.654 N	103° 31' 5.239 W
12,100.0	2.80	126.50	12,091.6	-204.3	276.1	398,998.83	752,459.75	32° 5' 39.625 N	103° 31' 5.194 W
12,200.0	2.80	126.50	12,191.5	-207.2	280.0	398,995.92	752,463.68	32° 5' 39.596 N	103° 31' 5.148 W
12,288.0	2.80	126.50	12,279.4	-209.7	283.4	398,993.37	752,467.14	32° 5' 39.571 N	103° 31' 5.108 W
12,300.0	2.25	95.70	12,291.4	-209.9	283.9	398,993.17	752,467.61	32° 5' 39.569 N	103° 31' 5.103 W
12,400.0	11.98	10.20	12,390.6	-199.9	287.7	399,003.22	752,471.41	32° 5' 39.668 N	103° 31' 5.058 W
12,500.0	23.88	4.65	12,485.6	-169.4	291.2	399,033.73	752,474.90	32° 5' 39.970 N	103° 31' 5.014 W
12,600.0	35.86	2.68	12,572.2	-119.8	294.2	399,083.35	752,477.92	32° 5' 40.460 N	103° 31' 4.975 W
12,700.0	47.85	1.61	12,646.5	-53.2	296.6	399,149.90	752,480.34	32° 5' 41.119 N	103° 31' 4.941 W
12,800.0	59.85	0.88	12,705.4	27.4	298.4	399,230.48	752,482.05	32° 5' 41.916 N	103° 31' 4.914 W
12,900.0	71.85	0.31	12,746.2	118.5	299.3	399,321.56	752,482.98	32° 5' 42.817 N	103° 31' 4.895 W
13,000.0	83.85	359.82	12,767.3	216.0	299.4	399,419.14	752,483.09	32° 5' 43.783 N	103° 31' 4.885 W
13,051.2	90.00	359.58	12,770.0	267.2	299.1	399,470.26	752,482.82	32° 5' 44.289 N	103° 31' 4.884 W
13,057.6	90.25	359.57	12,770.0	273.5	299.1	399,476.59	752,482.78	32° 5' 44.351 N	103° 31' 4.884 W
13,100.0	90.25	359.57	12,769.8	315.9	298.8	399,519.04	752,482.46	32° 5' 44.771 N	103° 31' 4.884 W
13,200.0	90.25	359.57	12,769.4	415.9	298.0	399,619.03	752,481.70	32° 5' 45.761 N	103° 31' 4.884 W
13,300.0	90.25	359.57	12,768.9	515.9	297.3	399,719.03	752,480.95	32° 5' 46.751 N	103° 31' 4.884 W
13,400.0	90.25	359.57	12,768.5	615.9	296.5	399,819.02	752,480.20	32° 5' 47.740 N	103° 31' 4.884 W
13,500.0	90.25	359.57	12,768.0	715.9	295.7	399,919.02	752,479.44	32° 5' 48.730 N	103° 31' 4.884 W
13,600.0	90.25	359.57	12,767.6	815.9	295.0	400,019.02	752,478.69	32° 5' 49.719 N	103° 31' 4.884 W
13,700.0	90.25	359.57	12,767.1	915.9	294.2	400,119.01	752,477.94	32° 5' 50.709 N	103° 31' 4.884 W
13,800.0	90.25	359.57	12,766.7	1,015.9	293.5	400,219.01	752,477.18	32° 5' 51.698 N	103° 31' 4.884 W
13,900.0	90.25	359.57	12,766.3	1,115.9	292.7	400,319.01	752,476.43	32° 5' 52.688 N	103° 31' 4.884 W
14,000.0	90.25	359.57	12,765.8	1,215.9	292.0	400,419.00	752,475.67	32° 5' 53.678 N	103° 31' 4.884 W
14,100.0	90.25	359.57	12,765.4	1,315.9	291.2	400,519.00	752,474.92	32° 5' 54.667 N	103° 31' 4.884 W
14,200.0	90.25	359.57	12,764.9	1,415.9	290.5	400,618.99	752,474.17	32° 5' 55.657 N	103° 31' 4.884 W
14,300.0	90.25	359.57	12,764.5	1,515.9	289.7	400,718.99	752,473.41	32° 5' 56.646 N	103° 31' 4.884 W
14,400.0	90.25	359.57	12,764.1	1,615.9	289.0	400,818.99	752,472.66	32° 5' 57.636 N	103° 31' 4.884 W
14,500.0	90.25	359.57	12,763.6	1,715.9	288.2	400,918.98	752,471.91	32° 5' 58.625 N	103° 31' 4.883 W
14,600.0	90.25	359.57	12,763.2	1,815.9	287.5	401,018.98	752,471.15	32° 5' 59.615 N	103° 31' 4.883 W
14,700.0	90.25	359.57	12,762.7	1,915.9	286.7	401,118.98	752,470.40	32° 6' 0.605 N	103° 31' 4.883 W
14,800.0	90.25	359.57	12,762.3	2,015.9	286.0	401,218.97	752,469.65	32° 6' 1.594 N	103° 31' 4.883 W
14,900.0	90.25	359.57	12,761.8	2,115.9	285.2	401,318.97	752,468.89	32° 6' 2.584 N	103° 31' 4.883 W
15,000.0	90.25	359.57	12,761.4	2,215.9	284.4	401,418.96	752,468.14	32° 6' 3.573 N	103° 31' 4.883 W
15,100.0	90.25	359.57	12,761.0	2,315.9	283.7	401,518.96	752,467.39	32° 6' 4.563 N	103° 31' 4.883 W
15,200.0	90.25	359.57	12,760.5	2,415.9	282.9	401,618.96	752,466.63	32° 6' 5.552 N	103° 31' 4.883 W
15,300.0	90.25	359.57	12,760.1	2,515.9	282.2	401,718.95	752,465.88	32° 6' 6.542 N	103° 31' 4.883 W
15,400.0	90.25	359.57	12,759.6	2,615.8	281.4	401,818.95	752,465.13	32° 6' 7.532 N	103° 31' 4.883 W
15,500.0	90.25	359.57	12,759.2	2,715.8	280.7	401,918.94	752,464.37	32° 6' 8.521 N	103° 31' 4.883 W
15,600.0	90.25	359.57	12,758.8	2,815.8	279.9	402,018.94	752,463.62	32° 6' 9.511 N	103° 31' 4.883 W
15,700.0	90.25	359.57	12,758.3	2,915.8	279.2	402,118.94	752,462.87	32° 6' 10.500 N	103° 31' 4.883 W
15,800.0	90.25	359.57	12,757.9	3,015.8	278.4	402,218.93	752,462.11	32° 6' 11.490 N	103° 31' 4.883 W
15,900.0	90.25	359.57	12,757.4	3,115.8	277.7	402,318.93	752,461.36	32° 6' 12.479 N	103° 31' 4.883 W
16,000.0	90.25	359.57	12,757.0	3,215.8	276.9	402,418.93	752,460.61	32° 6' 13.469 N	103° 31' 4.883 W
16,100.0	90.25	359.57	12,756.5	3,315.8	276.2	402,518.92	752,459.85	32° 6' 14.459 N	103° 31' 4.883 W
16,200.0	90.25	359.57	12,756.1	3,415.8	275.4	402,618.92	752,459.10	32° 6' 15.448 N	103° 31' 4.883 W
16,300.0	90.25	359.57	12,755.7	3,515.8	274.6	402,718.91	752,458.35	32° 6' 16.438 N	103° 31' 4.883 W
16,400.0	90.25	359.57	12,755.2	3,615.8	273.9	402,818.91	752,457.59	32° 6' 17.427 N	103° 31' 4.883 W
16,500.0	90.25	359.57	12,754.8	3,715.8	273.1	402,918.91	752,456.84	32° 6' 18.417 N	103° 31' 4.883 W
16,600.0	90.25	359.57	12,754.3	3,815.8	272.4	403,018.90	752,456.09	32° 6' 19.407 N	103° 31' 4.883 W
16,700.0	90.25	359.57	12,753.9	3,915.8	271.6	403,118.90	752,455.33	32° 6' 20.396 N	103° 31' 4.883 W
16,800.0	90.25	359.57	12,753.4	4,015.8	270.9	403,218.90	752,454.58	32° 6' 21.386 N	103° 31' 4.883 W
16,900.0	90.25	359.57	12,753.0	4,115.8	270.1	403,318.89	752,453.83	32° 6' 22.375 N	103° 31' 4.883 W
17,000.0	90.25	359.57	12,752.6	4,215.8	269.4	403,418.89	752,453.07	32° 6' 23.365 N	103° 31' 4.883 W
17,100.0	90.25	359.57	12,752.1	4,315.8	268.6	403,518.88	752,452.32	32° 6' 24.354 N	103° 31' 4.883 W



CONCHO

COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
 Project: LEA COUNTY, NM
 Site: BULLDOG
 Well: DOMINATOR 25 FED #701H
 Wellbore: OWB
 Design: PWP0

Local Co-ordinate Reference: Well DOMINATOR 25 FED #701H
 TVD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 MD Reference: RKB=3322.5+26 @ 3348.5usft (RIG 4)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
17,200.0	90.25	359.57	12,751.7	4,415.8	267.9	403,618.88	752,451.57	32° 6' 25.344 N	103° 31' 4.883 W
17,300.0	90.25	359.57	12,751.2	4,515.8	267.1	403,718.88	752,450.81	32° 6' 26.334 N	103° 31' 4.883 W
17,400.0	90.25	359.57	12,750.8	4,615.8	266.4	403,818.87	752,450.06	32° 6' 27.323 N	103° 31' 4.883 W
17,500.0	90.25	359.57	12,750.4	4,715.8	265.6	403,918.87	752,449.31	32° 6' 28.313 N	103° 31' 4.882 W
17,580.8	90.25	359.57	12,750.0	4,796.6	265.0	403,999.70	752,448.70	32° 6' 29.113 N	103° 31' 4.882 W

Design Targets

Target Name	hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-Dominator 25	- plan hits target center	0.00	0.00	12,750.0	4,796.6	265.0	403,999.70	752,448.70	32° 6' 29.113 N	103° 31' 4.882 W
	- Point									

Checked By: _____ Approved By: _____ Date: _____



WELL DETAILS: DOMINATOR 25 FED #701H

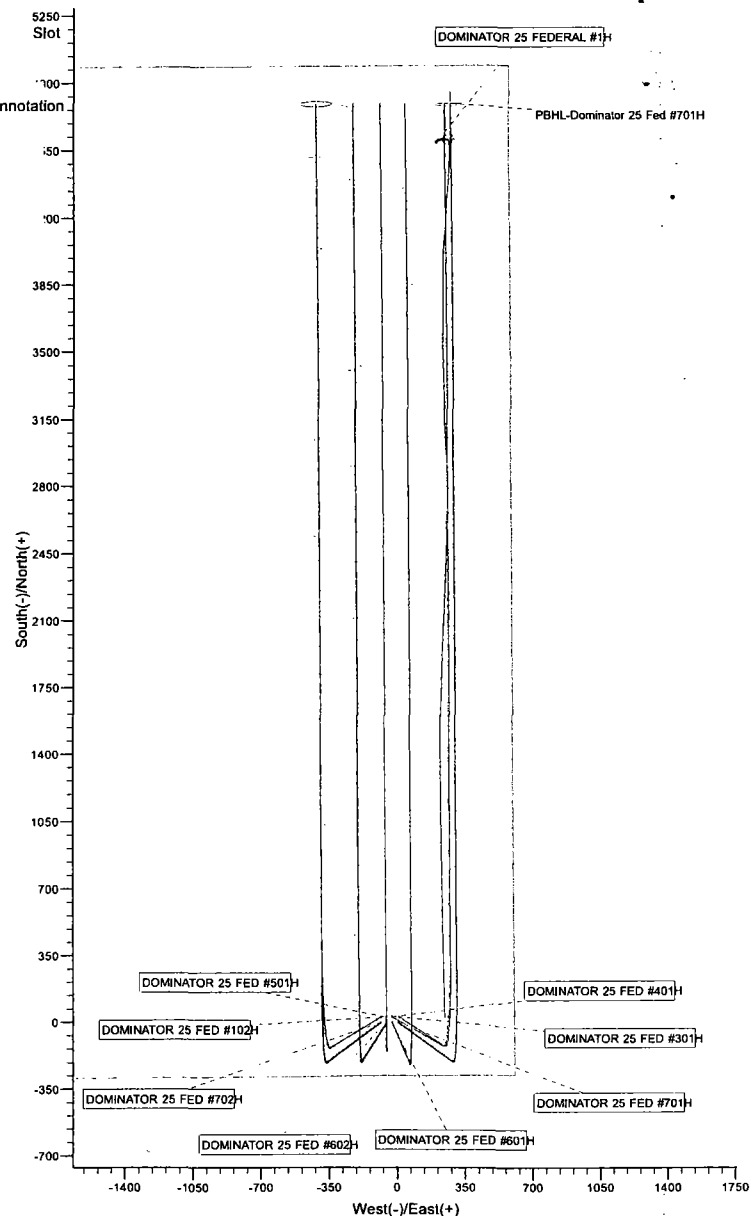
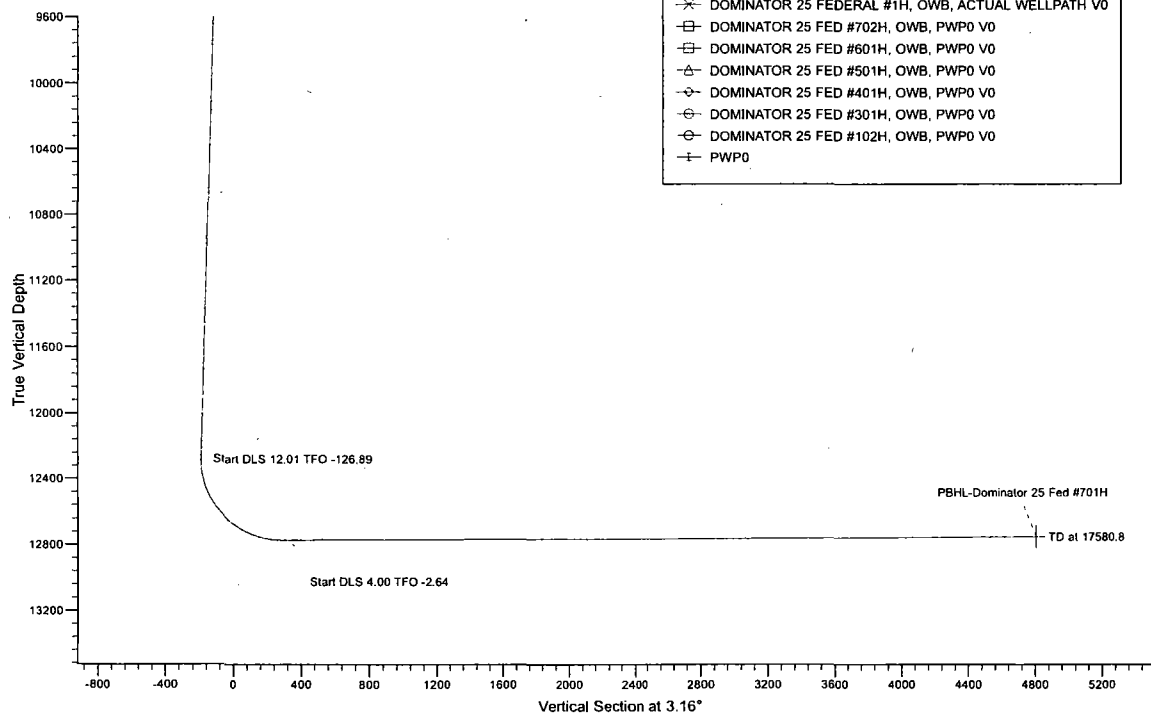
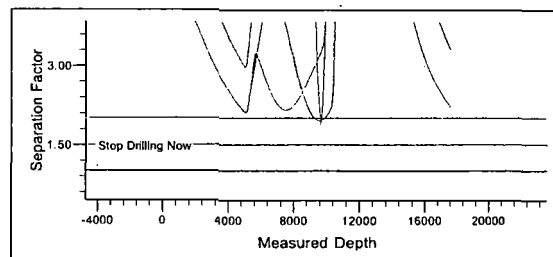
3322.5
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.0 0.0 399203.10 752183.70 32° 5' 41.667 N 103° 31' 8.384 W

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	5000.0	0.00	0.00	5000.0	0.0	0.0	0.00	0.00	0.0
3	5140.0	2.80	126.50	5139.9	-2.0	2.7	2.00	126.50	-1.9
4	12288.0	2.80	126.50	12279.4	-209.7	283.4	0.00	0.00	-193.8
5	13051.2	90.00	359.58	12770.0	267.2	299.1	12.01	-126.89	283.3
6	13057.6	90.25	359.57	12770.0	273.5	299.1	4.00	-2.64	289.6
7	17580.8	90.25	359.57	12750.0	4796.6	265.0	0.00	0.00	4803.9

Project: LEA COUNTY, NM
 Site: BULLDOG
 Well: DOMINATOR 25 FED #701H
 Wellbore: OWB
 Design: PWP0

LEGEND:

- DOMINATOR 25 FED #602H, OWB, PWP0 V0
- DOMINATOR 25 FEDERAL #1H, OWB, ACTUAL WELLPATH V0
- DOMINATOR 25 FED #702H, OWB, PWP0 V0
- DOMINATOR 25 FED #601H, OWB, PWP0 V0
- DOMINATOR 25 FED #501H, OWB, PWP0 V0
- DOMINATOR 25 FED #401H, OWB, PWP0 V0
- DOMINATOR 25 FED #301H, OWB, PWP0 V0
- DOMINATOR 25 FED #102H, OWB, PWP0 V0
- PWP0



COG Operating, LLC - Dominator 25 Federal #701H

1. Geologic Formations

TVD of target	12,770' EOL	Pilot hole depth	NA
MD at TD:	17,581'	Deepest expected fresh water:	142'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1173	Water	
Top of Salt	1574	Salt	
Base of Salt	5134	Salt	
Lamar	5252	Salt Water	
Bell Canyon	5294	Salt Water	
Cherry Canyon	6293	Oil/Gas	
Brushy Canyon	7873	Oil/Gas	
Bone Spring Lime	9339	Oil/Gas	
U. Avalon Shale	9413	Oil/Gas	
L. Avalon Shale	10024	Oil/Gas	
1st Bone Spring Sand	10371	Oil/Gas	
2nd Bone Spring Sand	10889	Oil/Gas	
3rd Bone Spring Sand	12013	Oil/Gas	
Wolfcamp	12384	Target Oil/Gas	
Strawn	14211	Not Penetrated	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body
	From	To							
13.5"	0	1200	10.75"	45.5	N80	BTC	4.50	1.18	19.05
9.875"	0	12040	7.875"	29.7	P110	BTC	1.26	1.03	3.04
6.75"	0	11540	5.5"	23	P110	BTC	1.82	1.89	3.17
6.75"	11540	17,581	5"	18	P110	BTC	1.82	1.89	3.17
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

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

The 5" casing will be run back 500' into the intermediate casing to ensure the coupling OD clearance is greater than .422" for the cement bond tie in.