

NM OIL CONSERVATION

ARTESIA DISTRICT

OCT 30 2017

RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		7. If Unit or CA Agreement, Name and No. DODD FEDERAL / NMNM111789X
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		8. Lease Name and Well No. DODD FEDERAL UNIT 912H 308195
2. Name of Operator COG OPERATING LLC		9. API Well No. 30-015-44531
3a. Address 600 West Illinois Ave Midland TX 79701	3b. Phone No. (include area code) 229137 (432)683-7443	10. Field and Pool, or Exploratory DODD / GLORIETA-UPPER YESO
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface NWSW / 1860 FSL / 1240 FWL / LAT 32.8469697 / LONG -104.0672512 At proposed prod. zone NESE / 2170 FSL / 220 FEL / LAT 32.8477589 / LONG -104.0375608		11. Sec., T. R. M. or Blk. and Survey or Area SEC 10 / T17S / R29E / NMP
14. Distance in miles and direction from nearest town or post office* 5.5 miles		12. County or Parish EDDY
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 220 feet		13. State NM
16. No. of acres in lease 160	17. Spacing Unit dedicated to this well 280	
18. Distance from proposed location* to nearest well, drilling, completed, 1 foot applied for, on this lease, ft. 1 feet	19. Proposed Depth 4900 feet / 13650 feet	20. BLM/BIA Bond No. on file FED: NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3577 feet	22. Approximate date work will start* 06/21/2017	23. Estimated duration 15 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, must be attached to this form:

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

25. Signature (Electronic Submission)	Name (Printed/Typed) Robyn Odom / Ph: (432)685-4385	Date 02/23/2017
Title Regulatory Analyst		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575)234-5959	Date 10/23/2017
Title Supervisor Multiple Resources		
Office CARLSBAD		

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

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

(Continued on page 2)

*(Instructions on page 2)

NM OIL CONSERVATION
ARTESIA DISTRICT

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APPROVED WITH CONDITIONS

RW 11-2-2017

APD Package Report

Date Printed: 10/23/2017 12:36 PM

APD ID: 10400011771	Well Status: AAPD
APD Received Date: 02/23/2017 01:09 PM	Well Name: DODD FEDERAL UNIT
Operator: COG OPERATING LLC	Well Number: 912H

APD Package Report Contents

- Form 3160-3
- Operator Certification Report
- Application Report
- Application Attachments
 - Well Plat: 1 file(s)
- Drilling Plan Report
- Drilling Plan Attachments
 - Blowout Prevention Choke Diagram Attachment: 1 file(s)
 - Blowout Prevention BOP Diagram Attachment: 1 file(s)
 - Casing Design Assumptions and Worksheet(s): 5 file(s)
 - Hydrogen sulfide drilling operations plan: 2 file(s)
 - Proposed horizontal/directional/multi-lateral plan submission: 2 file(s)
 - Other Facets: 4 file(s)
- SUPO Report
- SUPO Attachments
 - Existing Road Map: 1 file(s)
 - New Road Map: 1 file(s)
 - New road access plan attachment: 1 file(s)
 - Attach Well map: 1 file(s)
 - Water source and transportation map: 2 file(s)
 - Construction Materials source location attachment: 3 file(s)
 - Well Site Layout Diagram: 2 file(s)
 - Other SUPO Attachment: 1 file(s)
- PWD Report
- PWD Attachments
 - None
- Bond Report

NM OIL CONSERVATION
 ARTESIA DISTRICT
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**PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	COG Operating, LLC.
LEASE NO.:	NMLC068722
WELL NAME & NO.:	912H – Dodd Federal Unit
SURFACE HOLE FOOTAGE:	1860'/S & 1240'/W
BOTTOM HOLE FOOTAGE:	2170'/S & 220'/E; 11
LOCATION:	Section 10 T.17 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave Karst Potential	<input type="radio"/> Low	<input type="radio"/> Medium	<input checked="" type="radio"/> High
Variance	<input checked="" type="radio"/> None	<input type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input checked="" type="radio"/> Conventional	<input type="radio"/> Multibowl	
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP

A. Hydrogen Sulfide

1. A Hydrogen Sulfide (H₂S) Drilling Plan shall be activated 500 feet prior to drilling into the **Yates** formation. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

B. CASING

1. The **13 3/8** inch surface casing shall be set at approximately **275** 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.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH.

ON A THREE STRING DESIGN; IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

2. The minimum required fill of cement behind the 9 5/8 inch intermediate casing is:

Option 1:

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

Option 2:

Operator has proposed DV tool at depth of 325', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.
- b. Second stage above DV tool:
 - Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

3. The minimum required fill of cement behind the 7 X 5 1/2 inch production casing is:

Option 1:

- Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

Option 2:

Operator has proposed DV tool at depth of 2597', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.
- b. Second stage above DV tool:
 - Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M) psi. In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

D. SPECIAL REQUIREMENT(S)

Unit Wells

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

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 10192017

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 bottom of Salt are to be recorded on the Completion Report.

A. CASING

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

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

B. PRESSURE CONTROL

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

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

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	COG Operating, LLC.
LEASE NO.:	NMLC068722
WELL NAME & NO.:	912H – Dodd Federal Unit
SURFACE HOLE FOOTAGE:	1860'S & 1240'/W
BOTTOM HOLE FOOTAGE	2170'S & 220'E; 11
LOCATION:	Section 10 T.17 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

TABLE OF CONTENTS

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

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
 - Cave/Karst
 - Watershed
- Construction**
 - Notification
 - 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)

Cave and Karst Conditions of Approval

** Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

Cave/Karst Surface Mitigation

The following stipulations will be applied to minimize impacts during construction, drilling and production.

Construction:

In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

No Blasting:

No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

Pad Berming:

The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

Tank Battery Liners and Berms:

Tank battery locations and all facilities will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

Leak Detection System:

A method of detecting leaks is required. The method could incorporate gauges to measure loss, siting valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

Automatic Shut-off Systems:

Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and ground water concerns:

Rotary Drilling with Fresh Water:

Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

Directional/Horizontal Drilling:

Kick off for directional/Horizontal drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

Lost Circulation:

ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

Abandonment Cementing:

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:

Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

Watershed

- The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed.
- Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion.

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

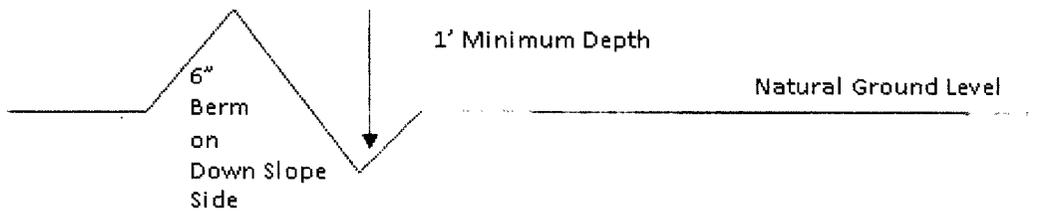
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out-sloping and in-sloping, 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

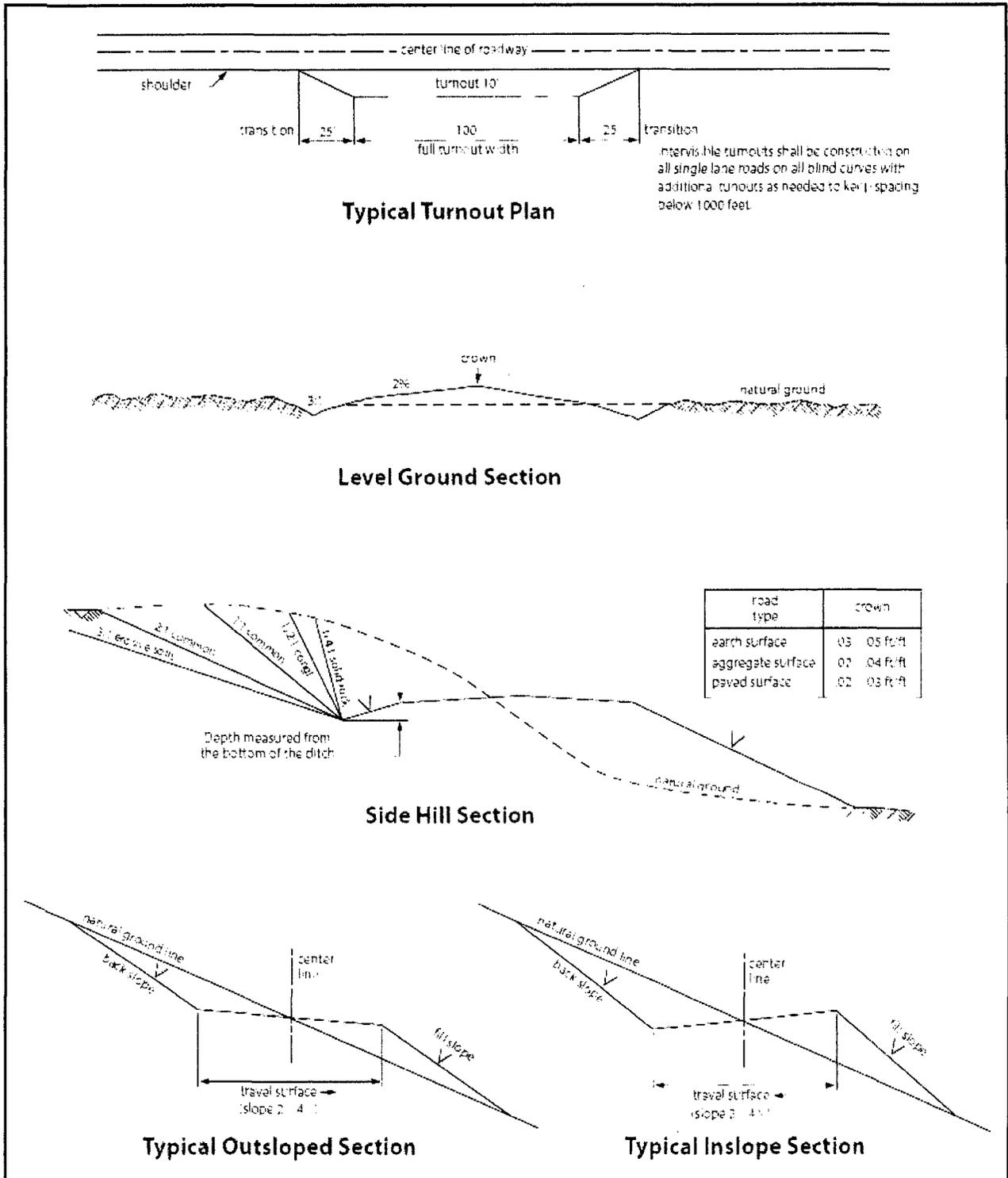


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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.

VIII. INTERIM RECLAMATION

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

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

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

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

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

IX. FINAL ABANDONMENT & RECLAMATION

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

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory

revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

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

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

Seed Mixture 1 for Loamy 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 shall be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed 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 shall be planted using a drill equipped with a depth regulator to ensure proper depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area (small/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 shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre shall be doubled. The 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 lovegrass (<i>Eragrostis intermedia</i>)	0.5
Sand dropseed (<i>Sporobolus cryptandrus</i>)	1.0
Sideoats grama (<i>Bouteloua curtipendula</i>)	5.0
Plains bristlegrass (<i>Setaria macrostachya</i>)	2.0

*Pounds of pure live seed:

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

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: Robyn Odom**Signed on:** 02/23/2017**Title:** Regulatory Analyst**Street Address:** 600 W Illinois Ave**City:** Midland**State:** TX**Zip:** 79701**Phone:** (432)685-4385**Email address:** rodom@concho.com**Field Representative****Representative Name:****Street Address:****City:****State:****Zip:****Phone:****Email address:**

APD ID: 10400011771	Submission Date: 02/23/2017	Highlighted data reflects the most recent changes Show Final Text
Operator Name: COG OPERATING LLC		
Well Name: DODD FEDERAL UNIT	Well Number: 912H	
Well Type: OIL WELL	Well Work Type: Drill	

Section 1 - General

APD ID: 10400011771	Tie to previous NOS?	Submission Date: 02/23/2017
BLM Office: CARLSBAD	User: Robyn Odom	Title: Regulatory Analyst
Federal/Indian APD: FED	Is the first lease penetrated for production Federal or Indian? FED	
Lease number: NMLC068722	Lease Acres: 160	
Surface access agreement in place?	Allotted?	Reservation:
Agreement in place? YES	Federal or Indian agreement: FEDERAL	
Agreement number: NMNM111789X		
Agreement name: DODD FEDERAL		
Keep application confidential? NO		
Permitting Agent? NO	APD Operator: COG OPERATING LLC	
Operator letter of designation:		

Operator Info

Operator Organization Name: COG OPERATING LLC

Operator Address: 600 West Illinois Ave

Operator PO Box: Zip: 79701

Operator City: Midland **State:** TX

Operator Phone: (432)683-7443

Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO	Mater Development Plan name:	
Well in Master SUPO? NO	Master SUPO name:	
Well in Master Drilling Plan? NO	Master Drilling Plan name:	
Well Name: DODD FEDERAL UNIT	Well Number: 912H	Well API Number:
Field/Pool or Exploratory? Field and Pool	Field Name: DODD	Pool Name: GLORIETA-UPPER YESO
Is the proposed well in an area containing other mineral resources? USEABLE WATER		

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: SINGLE WELL

Multiple Well Pad Name:

Number:

Well Class: HORIZONTAL

Number of Legs: 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 5.5 Miles

Distance to nearest well: 1 FT

Distance to lease line: 220 FT

Reservoir well spacing assigned acres Measurement: 280 Acres

Well plat: Dodd_Federal_Unit_912H_C102_04-18-2017.pdf

Well work start Date: 06/21/2017

Duration: 15 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83

Vertical Datum: NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	186 0	FSL	124 0	FWL	17S	29E	10	Aliquot NWS W	32.84696 97	- 104.0672 512	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 68722	357 7	0	0
KOP Leg #1	186 0	FSL	124 0	FWL	17S	29E	10	Aliquot NWS W	32.84696 97	- 104.0672 512	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 68722	-652 9	422	422 9
PPP Leg #1	186 3	FSL	132 1	FWL	17S	29E	10	Aliquot NESW	32.84696 97	- 104.0672 512	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 28731B	-953 0	455	453 0

APD ID: 10400011771

Submission Date: 02/23/2017

Highlighted data reflects the most recent changes

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	UNKNOWN	3577	0	0	ALLUVIUM	USEABLE WATER	No
2	RUSTLER	3367	210	210	ANHYDRITE	NONE	No
3	TOP SALT	3236	341	341	SALT	OTHER : Salt	No
4	TANSILL	2755	822	822	DOLOMITE	NONE	No
5	YATES	2650	927	927	SANDSTONE,DOL OMITE	NATURAL GAS,OIL	No
6	SEVEN RIVERS	2375	1202	1202	SANDSTONE,DOL OMITE	NATURAL GAS,OIL	No
7	QUEEN	1783	1794	1794	SANDSTONE	NATURAL GAS,OIL	No
8	GRAYBURG	1369	2208	2208	SANDSTONE,DOL OMITE	NATURAL GAS,OIL	No
9	SAN ANDRES	1080	2497	2497	DOLOMITE,ANHY DRITE	NATURAL GAS,OIL	No
10	GLORIETA	-338	3915	3915	SANDSTONE,SILT STONE	NATURAL GAS,OIL	No
11	PADDOCK	-402	3979	3979	DOLOMITE	NATURAL GAS,OIL	No
12	BLINEBRY	-830	4407	4407	DOLOMITE	NATURAL GAS,OIL	Yes
13	TUBB	-1796	5373	5373	SANDSTONE,DOL OMITE	NATURAL GAS,OIL	No

Section 2 - Blowout Prevention

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Pressure Rating (PSI): 2M

Rating Depth: 9000

Equipment: All required equipment per Federal and State regulations to be in place prior to drilling out the Surface casing.

Requesting Variance? NO

Variance request:

Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure of 2000 psi per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure of 2000 psi. If the system is upgraded all the components installed will be functional and tested. Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.

Choke Diagram Attachment:

2M Choke Schematic_01-31-2017.pdf

BOP Diagram Attachment:

2M ANNULAR BOP_01-31-2017.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	275	0	275	-1222	-1497	275	H-40	48	STC	6.94	3.28	DRY	28.7 ⁹	DRY	28.7 ⁹
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	950	0	950	-1222	-2172	950	J-55	40	LTC	5.17	1.67	DRY	13.6	DRY	13.6
3	PRODUCTION	8.75	7.0	NEW	API	N	0	4700	0	4638	-1222	-5860	4700	L-80	29	BUTT	3.31	1.33	DRY	2.68	DRY	2.68
4	PRODUCTION	8.75	5.5	NEW	API	N	4700	5038	4638	4750	-5860	-5972	338	L-80	17	BUTT	2.66	1.26	DRY	3.74	DRY	3.74
5	PRODUCTION	7.875	5.5	NEW	API	N	5038	13651	4750	4900	-5972	-6122	8613	L-80	17	BUTT	2.66	1.26	DRY	7.68	DRY	7.68

Casing Attachments

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_02-23-2017.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_02-23-2017.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_02-23-2017.pdf

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Casing Attachments

Casing ID: 4 String Type: PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Casing Design Attachment_02-23-2017.pdf

Casing ID: 5 String Type: PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Casing Design Attachment_02-23-2017.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	275	300	1.32	14.8	396	107	Class C	2% CaCl ₂ + 0.25 pps CF

INTERMEDIATE	Lead		0	950	200	2.45	11.8	490	225	50:50:10 C:Poz:Gel	5%Salt+5pps LCM+0.25pps CF
INTERMEDIATE	Tail		0	950	200	1.32	14.8	264	225	Class C	2% CaCl ₂
PRODUCTION	Lead		0	1365 1	500	2.01	12.5	1206	103	35:65:6 C:Poz:Gel	5%Salt+5pps LCM+0.25pps CF

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	1365 1	2400	1.37	14	1918	103	50:50:2 C:Poz:Gel	5%salt+3pps LCM+0.6%SMS+1%FL- 25+1%Ba-58+0.125pps
PRODUCTION	Lead		0	1365 1	500	2.01	12.5	1206	103	35:65:6 C:Poz:Gel	5%Salt+5pps LCM+0.25pps CF
PRODUCTION	Tail		0	1365 1	2400	1.37	14	1918	103	50:50:2 C:Poz:Gel	5%salt+3pps LCM+0.6%SMS+1%FL- 25+1%Ba-58+0.125pps
PRODUCTION	Lead		0	1365 1	500	2.01	12.5	1206	103	35:65:6 C:Poz:Gel	5%Salt+5pps LCM+0.25pps CF
PRODUCTION	Tail		0	1365 1	2400	1.37	14	1918	103	50:50:2 C:Poz:Gel	5%salt+3pps LCM+0.6%SMS+1%FL- 25+1%Ba-58+0.125pps

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
5038	1365 1	WATER-BASED MUD	8.5	9.2							
0	5038	SALT SATURATED	10	10.2							
0	275	WATER-BASED MUD	8.6	8.8							

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Section 6 - Test, Logging, Coring

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

Interval Perforating, Fracture stimulating, Flowback testing

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

CNL,MUDLOG

Coring operation description for the well:

N/A

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 2090

Anticipated Surface Pressure: 1012

Anticipated Bottom Hole Temperature(F): 105

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

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

H2S Plan_01-31-2017.pdf

Dodd Federal Unit 912H_H2S Schematic_01-31-2017.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Dodd_Federal_Unit_912H_Design_2_Rpt_04-18-2017.pdf

Dodd_Federal_Unit_912H_Design_2_AC_Rpt_04-18-2017.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Closed Loop Schematic_01-31-2017.pdf

Dodd Federal Unit 912H Production Cement Breakdown_02-23-2017.pdf

Dodd_912H_Contingent_Multi_Stage_Cmt_Plan_05-08-2017.pdf

Dodd_912H_Gas_Capture_Plan_05-10-2017.pdf

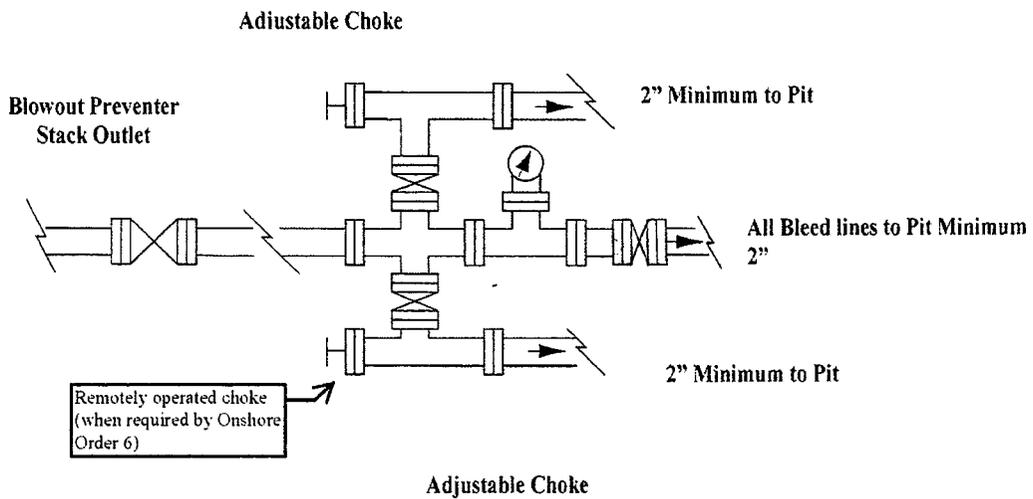
Other Variance attachment:

COG Operating LLC

Exhibit #9

Choke Schematic

Choke Manifold Requirement (2000 psi WP)



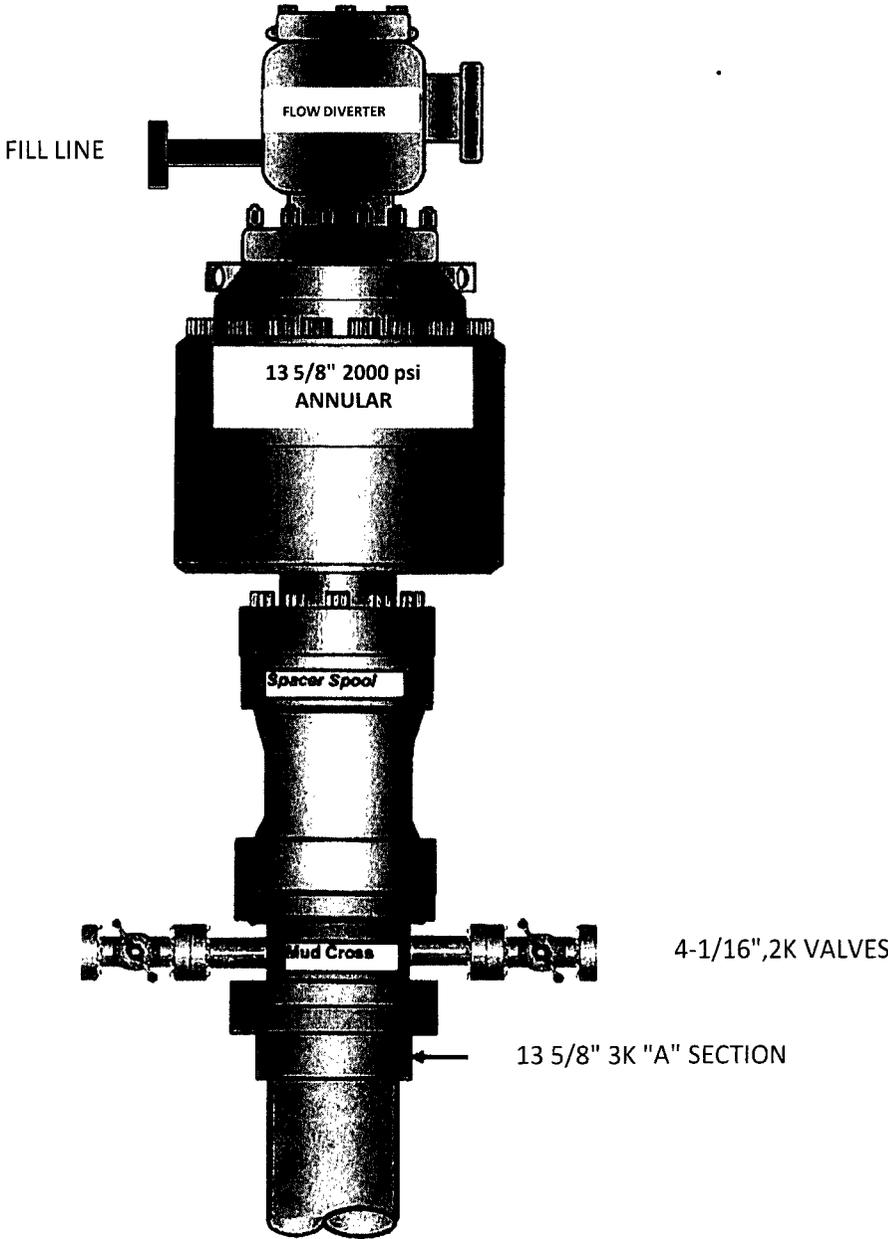
NOTES REGARDING THE BLOWOUT PREVENTERS

Master Drilling Plan Eddy County, New Mexico

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

Exhibit #10

13 5/8" 2K ANNULAR



Casing Program

	Collapse SF	Burst SF	Tension SF
BLM Minimum Safety Factor	1.125	1	1.6 Dry 1.8 Wet

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Assumed 9.0ppg MW equivalent pore pressure from 9 5/8" shoe to deepest TVD in wellbore.

BLM standard formulas were used on all SF calculations.

Casing design does meet and/or exceed BLM's minimum standards.

The pipe will be kept at a minimum 1/3 fluid fill to avoid approaching the collapse pressure rating of the casing.

This well is not located within the Capitan Reef.

This well is not located in the SOPA or in the R-111-P.

This well is not located in a high or critical Cave/Karst area.

This is not a walking operation.

We will not be pre-setting casing.

All completion intervals are planned to be fracture stimulated.

COG Operating LLC

Hydrogen Sulfide Drilling Operation Plan

I. 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:

1. The hazards and characteristics of hydrogen sulfide (H₂S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

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

1. The effects of H₂S on metal components. If high tensile tubular are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H₂S Drilling Operations Plan and 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. **The concentrations of H₂S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

II. 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 reasonable expected to contain H2S.

1. Well Control Equipment:

- A. Flare line.
- B. Choke manifold with minimum of one remotely operated choke.
- C. Closed Loop Blow Down Tank
- D. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
- E. Auxiliary equipment may include if applicable: mud-gas separator, annular preventer & rotating head.

2. Protective equipment for essential personnel:

- A. SCBA (Self contained breathing apparatus) 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

3. H2S detection and monitoring equipment:

- A. Portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

4. Visual warning systems:

- A. Wind direction indicators as shown on well site diagram.
- B. Caution/Danger signs (Exhibit #7) 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.

5. Mud program:

- A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices, and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.
-

6. Metallurgy:

- A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- B. All elastomers used for packing and seals shall be H2S trim.

7. Communication:

- A. Radio communications in company vehicles including cellular telephone and 2-way radio.
- B. Land line (telephone) communication at Office.

8. Well testing:

- A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H2S environment will use the closed chamber method of testing.
- B. There will be no drill stem testing.

EXHIBIT #7

WARNING

YOU ARE ENTERING AN H₂S

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. CHECK WITH COG OPERATING FOREMAN AT

COG OPERATING LLC

1-432-683-7443

1-575-746-2010

EDDY COUNTY EMERGENCY NUMBERS

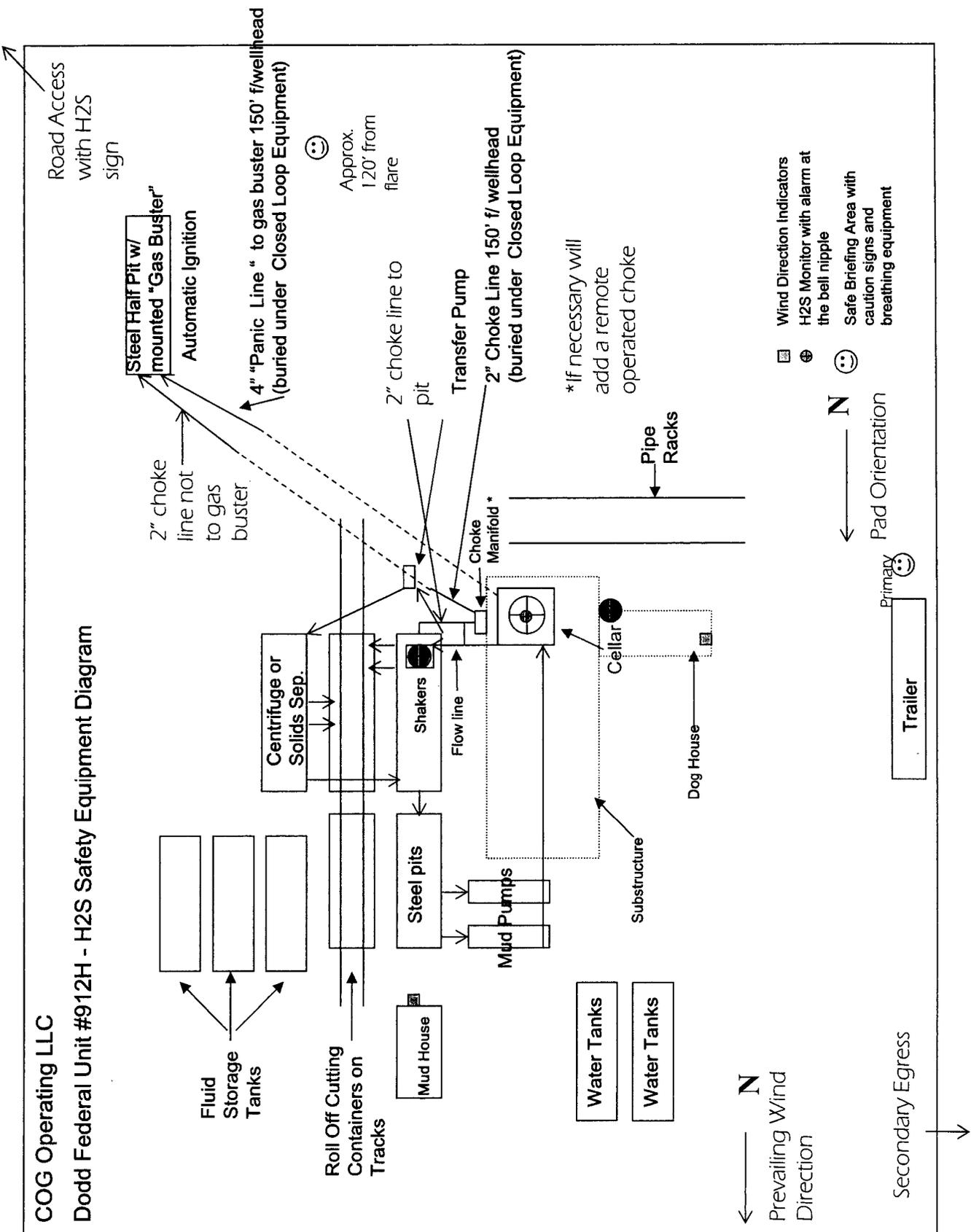
ARTESIA FIRE DEPT. 575-746-5050
ARTESIA POLICE DEPT. 575-746-5000
EDDY CO. SHERIFF DEPT. 575-746-9888

LEA COUNTY EMERGENCY NUMBERS

HOBBS FIRE DEPT. 575-397-9308
HOBBS POLICE DEPT. 575-397-9285
LEA CO. SHERIFF DEPT. 575-396-1196

COG Operating LLC

Dodd Federal Unit #912H - H2S Safety Equipment Diagram



Road Access with H2S sign

Steel Half Pit w/ mounted "Gas Buster" Automatic Ignition

2" choke line not to gas buster

4" "Panic Line" to gas buster 150' f/wellhead (buried under Closed Loop Equipment)



Approx. 120' from flare

2" choke line to pit

Transfer Pump

2" Choke Line 150' f/ wellhead (buried under Closed Loop Equipment)

*If necessary will add a remote operated choke

Pipe Racks

Centrifuge or Solids Sep.

Shakers

Flow line

Steel pits

Mud Pumps

Cellar

Dog House

Substructure

Fluid Storage Tanks

Roll Off Cutting Containers on Tracks

Mud House

Water Tanks

Water Tanks

Prevaling Wind Direction



Pad Orientation



Trailer

Secondary Egress

- Wind Direction Indicators
- H2S Monitor with alarm at the bell nipple
- Safe Briefing Area with caution signs and breathing equipment



COG Operating LLC

Eddy County, NM (NAD-27 2015)

Dodd Federal Unit #912H

SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L

PP: 1781' FSL, 1655' FWL, Sec 10, T17S, R29E, Unit K

BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I

Plan: Design #2

Standard Planning Report

29 March, 2017





TDS
Planning Report



Database: EDM 5000.1 Single User Db
Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Company: COG Operating LLC
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
Project: Eddy County, NM (NAD-27 2015)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
Site: Dodd Federal Unit #912H
North Reference: Grid
Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Survey Calculation Method: Minimum Curvature
Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Design: Design #2

Project	Eddy County, NM (NAD-27 2015)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site Dodd Federal Unit #912H

Site Position: Northing: 671,800.30 usft Latitude: 32° 50' 47.689 N
From: Map Easting: 581,804.20 usft Longitude: 104° 4' 1.086 W
Position Uncertainty: 0.00 usft Slot Radius: 13.20 in Grid Convergence: 0.14 °

Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L

Well Position +N/-S 0.00 usft Northing: 671,800.30 usft Latitude: 32° 50' 47.689 N
+E/-W 0.00 usft Easting: 581,804.20 usft Longitude: 104° 4' 1.086 W
Position Uncertainty 0.00 usft Wellhead Elevation: 0.00 usft Ground Level: 3,577.00 usft

Wellbore BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/28/2017	7.26	60.56	48,276

Design Design #2

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	87.44

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,279.13	0.00	0.00	4,279.13	0.00	0.00	0.00	0.00	0.00	0.00	
5,097.31	90.00	87.44	4,800.00	23.29	520.35	11.00	11.00	10.69	87.44	
13,772.44	90.00	87.44	4,800.00	411.20	9,186.80	0.00	0.00	0.00	0.00	PBHL-D2 (DFU#912H)



TDS
Planning Report



Database: EDM 5000.1 Single User Db
Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Dodd Federal Unit #912H
Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,279.13	0.00	0.00	4,279.13	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 11.00 TFO 87.44									
4,300.00	2.30	87.44	4,299.99	0.02	0.42	0.42	11.00	11.00	0.00
4,350.00	7.80	87.44	4,349.78	0.22	4.81	4.81	11.00	11.00	0.00
4,400.00	13.30	87.44	4,398.92	0.62	13.95	13.96	11.00	11.00	0.00
4,450.00	18.80	87.44	4,446.95	1.24	27.75	27.78	11.00	11.00	0.00
4,500.00	24.30	87.44	4,493.44	2.06	46.09	46.13	11.00	11.00	0.00
4,550.00	29.80	87.44	4,537.96	3.08	68.79	68.86	11.00	11.00	0.00



TDS
Planning Report



Database: EDM 5000.1 Single User Db
Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Dodd Federal Unit #912H
Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,600.00	35.30	87.44	4,580.09	4.28	95.65	95.75	11.00	11.00	0.00
4,650.00	40.80	87.44	4,619.45	5.66	126.42	126.55	11.00	11.00	0.00
4,700.00	46.30	87.44	4,655.68	7.20	160.82	160.98	11.00	11.00	0.00
4,750.00	51.80	87.44	4,688.44	8.89	198.53	198.73	11.00	11.00	0.00
4,800.00	57.30	87.44	4,717.43	10.71	239.20	239.44	11.00	11.00	0.00
4,850.00	62.80	87.44	4,742.38	12.64	282.46	282.75	11.00	11.00	0.00
4,900.00	68.30	87.44	4,763.07	14.68	327.92	328.24	11.00	11.00	0.00
4,950.00	73.80	87.44	4,779.31	16.79	375.14	375.51	11.00	11.00	0.00
5,000.00	79.30	87.44	4,790.94	18.96	423.70	424.12	11.00	11.00	0.00
5,050.00	84.80	87.44	4,797.85	21.18	473.15	473.62	11.00	11.00	0.00
5,097.31	90.00	87.44	4,800.00	23.29	520.35	520.87	11.00	11.00	0.00
Start 8675.13 hold at 5097.31 MD									
5,100.00	90.00	87.44	4,800.00	23.41	523.04	523.56	0.00	0.00	0.00
5,200.00	90.00	87.44	4,800.00	27.88	622.94	623.56	0.00	0.00	0.00
5,300.00	90.00	87.44	4,800.00	32.35	722.84	723.56	0.00	0.00	0.00
5,400.00	90.00	87.44	4,800.00	36.83	822.74	823.56	0.00	0.00	0.00
5,500.00	90.00	87.44	4,800.00	41.30	922.64	923.56	0.00	0.00	0.00
5,600.00	90.00	87.44	4,800.00	45.77	1,022.54	1,023.56	0.00	0.00	0.00
5,700.00	90.00	87.44	4,800.00	50.24	1,122.44	1,123.56	0.00	0.00	0.00
5,800.00	90.00	87.44	4,800.00	54.71	1,222.34	1,223.56	0.00	0.00	0.00
5,900.00	90.00	87.44	4,800.00	59.18	1,322.24	1,323.56	0.00	0.00	0.00
6,000.00	90.00	87.44	4,800.00	63.65	1,422.14	1,423.56	0.00	0.00	0.00
6,100.00	90.00	87.44	4,800.00	68.13	1,522.04	1,523.56	0.00	0.00	0.00
6,200.00	90.00	87.44	4,800.00	72.60	1,621.94	1,623.56	0.00	0.00	0.00
6,300.00	90.00	87.44	4,800.00	77.07	1,721.84	1,723.56	0.00	0.00	0.00
6,400.00	90.00	87.44	4,800.00	81.54	1,821.73	1,823.56	0.00	0.00	0.00
6,500.00	90.00	87.44	4,800.00	86.01	1,921.63	1,923.56	0.00	0.00	0.00
6,600.00	90.00	87.44	4,800.00	90.48	2,021.53	2,023.56	0.00	0.00	0.00
6,700.00	90.00	87.44	4,800.00	94.96	2,121.43	2,123.56	0.00	0.00	0.00
6,800.00	90.00	87.44	4,800.00	99.43	2,221.33	2,223.56	0.00	0.00	0.00
6,900.00	90.00	87.44	4,800.00	103.90	2,321.23	2,323.56	0.00	0.00	0.00
7,000.00	90.00	87.44	4,800.00	108.37	2,421.13	2,423.56	0.00	0.00	0.00
7,100.00	90.00	87.44	4,800.00	112.84	2,521.03	2,523.56	0.00	0.00	0.00
7,200.00	90.00	87.44	4,800.00	117.31	2,620.93	2,623.56	0.00	0.00	0.00
7,300.00	90.00	87.44	4,800.00	121.78	2,720.83	2,723.56	0.00	0.00	0.00
7,400.00	90.00	87.44	4,800.00	126.26	2,820.73	2,823.56	0.00	0.00	0.00
7,500.00	90.00	87.44	4,800.00	130.73	2,920.63	2,923.56	0.00	0.00	0.00
7,600.00	90.00	87.44	4,800.00	135.20	3,020.53	3,023.56	0.00	0.00	0.00
7,700.00	90.00	87.44	4,800.00	139.67	3,120.43	3,123.56	0.00	0.00	0.00
7,800.00	90.00	87.44	4,800.00	144.14	3,220.33	3,223.56	0.00	0.00	0.00
7,900.00	90.00	87.44	4,800.00	148.61	3,320.23	3,323.56	0.00	0.00	0.00
8,000.00	90.00	87.44	4,800.00	153.08	3,420.13	3,423.56	0.00	0.00	0.00
8,100.00	90.00	87.44	4,800.00	157.56	3,520.03	3,523.56	0.00	0.00	0.00
8,200.00	90.00	87.44	4,800.00	162.03	3,619.93	3,623.56	0.00	0.00	0.00
8,300.00	90.00	87.44	4,800.00	166.50	3,719.83	3,723.56	0.00	0.00	0.00
8,400.00	90.00	87.44	4,800.00	170.97	3,819.73	3,823.56	0.00	0.00	0.00
8,500.00	90.00	87.44	4,800.00	175.44	3,919.63	3,923.56	0.00	0.00	0.00
8,600.00	90.00	87.44	4,800.00	179.91	4,019.53	4,023.56	0.00	0.00	0.00
8,700.00	90.00	87.44	4,800.00	184.39	4,119.43	4,123.56	0.00	0.00	0.00
8,800.00	90.00	87.44	4,800.00	188.86	4,219.33	4,223.56	0.00	0.00	0.00
8,900.00	90.00	87.44	4,800.00	193.33	4,319.23	4,323.56	0.00	0.00	0.00



TDS
Planning Report



Database: EDM 5000.1 Single User Db
Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Dodd Federal Unit #912H
Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,000.00	90.00	87.44	4,800.00	197.80	4,419.13	4,423.56	0.00	0.00	0.00
9,100.00	90.00	87.44	4,800.00	202.27	4,519.03	4,523.56	0.00	0.00	0.00
9,200.00	90.00	87.44	4,800.00	206.74	4,618.93	4,623.56	0.00	0.00	0.00
9,300.00	90.00	87.44	4,800.00	211.21	4,718.83	4,723.56	0.00	0.00	0.00
9,400.00	90.00	87.44	4,800.00	215.69	4,818.73	4,823.56	0.00	0.00	0.00
9,500.00	90.00	87.44	4,800.00	220.16	4,918.63	4,923.56	0.00	0.00	0.00
9,600.00	90.00	87.44	4,800.00	224.63	5,018.53	5,023.56	0.00	0.00	0.00
9,700.00	90.00	87.44	4,800.00	229.10	5,118.43	5,123.56	0.00	0.00	0.00
9,800.00	90.00	87.44	4,800.00	233.57	5,218.33	5,223.56	0.00	0.00	0.00
9,900.00	90.00	87.44	4,800.00	238.04	5,318.23	5,323.56	0.00	0.00	0.00
10,000.00	90.00	87.44	4,800.00	242.52	5,418.13	5,423.56	0.00	0.00	0.00
10,100.00	90.00	87.44	4,800.00	246.99	5,518.03	5,523.56	0.00	0.00	0.00
10,200.00	90.00	87.44	4,800.00	251.46	5,617.93	5,623.56	0.00	0.00	0.00
10,300.00	90.00	87.44	4,800.00	255.93	5,717.83	5,723.56	0.00	0.00	0.00
10,400.00	90.00	87.44	4,800.00	260.40	5,817.73	5,823.56	0.00	0.00	0.00
10,500.00	90.00	87.44	4,800.00	264.87	5,917.63	5,923.56	0.00	0.00	0.00
10,600.00	90.00	87.44	4,800.00	269.34	6,017.53	6,023.56	0.00	0.00	0.00
10,700.00	90.00	87.44	4,800.00	273.82	6,117.43	6,123.56	0.00	0.00	0.00
10,800.00	90.00	87.44	4,800.00	278.29	6,217.33	6,223.56	0.00	0.00	0.00
10,900.00	90.00	87.44	4,800.00	282.76	6,317.23	6,323.56	0.00	0.00	0.00
11,000.00	90.00	87.44	4,800.00	287.23	6,417.13	6,423.56	0.00	0.00	0.00
11,100.00	90.00	87.44	4,800.00	291.70	6,517.03	6,523.56	0.00	0.00	0.00
11,200.00	90.00	87.44	4,800.00	296.17	6,616.93	6,623.56	0.00	0.00	0.00
11,300.00	90.00	87.44	4,800.00	300.64	6,716.83	6,723.56	0.00	0.00	0.00
11,400.00	90.00	87.44	4,800.00	305.12	6,816.73	6,823.56	0.00	0.00	0.00
11,500.00	90.00	87.44	4,800.00	309.59	6,916.63	6,923.56	0.00	0.00	0.00
11,600.00	90.00	87.44	4,800.00	314.06	7,016.53	7,023.56	0.00	0.00	0.00
11,700.00	90.00	87.44	4,800.00	318.53	7,116.43	7,123.56	0.00	0.00	0.00
11,800.00	90.00	87.44	4,800.00	323.00	7,216.33	7,223.56	0.00	0.00	0.00
11,900.00	90.00	87.44	4,800.00	327.47	7,316.23	7,323.56	0.00	0.00	0.00
12,000.00	90.00	87.44	4,800.00	331.95	7,416.13	7,423.56	0.00	0.00	0.00
12,100.00	90.00	87.44	4,800.00	336.42	7,516.03	7,523.56	0.00	0.00	0.00
12,200.00	90.00	87.44	4,800.00	340.89	7,615.93	7,623.56	0.00	0.00	0.00
12,300.00	90.00	87.44	4,800.00	345.36	7,715.83	7,723.56	0.00	0.00	0.00
12,400.00	90.00	87.44	4,800.00	349.83	7,815.73	7,823.56	0.00	0.00	0.00
12,500.00	90.00	87.44	4,800.00	354.30	7,915.63	7,923.56	0.00	0.00	0.00
12,600.00	90.00	87.44	4,800.00	358.77	8,015.53	8,023.56	0.00	0.00	0.00
12,700.00	90.00	87.44	4,800.00	363.25	8,115.43	8,123.56	0.00	0.00	0.00
12,800.00	90.00	87.44	4,800.00	367.72	8,215.33	8,223.56	0.00	0.00	0.00
12,900.00	90.00	87.44	4,800.00	372.19	8,315.23	8,323.56	0.00	0.00	0.00
13,000.00	90.00	87.44	4,800.00	376.66	8,415.13	8,423.56	0.00	0.00	0.00
13,100.00	90.00	87.44	4,800.00	381.13	8,515.03	8,523.56	0.00	0.00	0.00
13,200.00	90.00	87.44	4,800.00	385.60	8,614.93	8,623.56	0.00	0.00	0.00
13,300.00	90.00	87.44	4,800.00	390.07	8,714.83	8,723.56	0.00	0.00	0.00
13,400.00	90.00	87.44	4,800.00	394.55	8,814.73	8,823.56	0.00	0.00	0.00
13,500.00	90.00	87.44	4,800.00	399.02	8,914.63	8,923.56	0.00	0.00	0.00
13,600.00	90.00	87.44	4,800.00	403.49	9,014.53	9,023.56	0.00	0.00	0.00
13,700.00	90.00	87.44	4,800.00	407.96	9,114.43	9,123.56	0.00	0.00	0.00
13,772.44	90.00	87.44	4,800.00	411.20	9,186.80	9,196.00	0.00	0.00	0.00

TD at 13772.44



TDS
Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Company:	COG Operating LLC	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD-27 2015)	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site:	Dodd Federal Unit #912H	North Reference:	Grid
Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I		
Design:	Design #2		

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
2446' TVD @ TD - plan misses target center by 551.94usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Circle (radius 50.00)	0.00	0.00	0.00	219.86	-506.26	672,020.16	581,297.94	32° 50' 49.878 N	104° 4' 7.014 W
2702' TVD @ TD - plan misses target center by 4800.26usft at 10681.09usft MD (4800.00 TVD, 272.97 N, 6098.54 E) - Circle (radius 50.00)	0.00	0.00	0.00	223.42	6,100.76	672,023.72	587,904.96	32° 50' 49.742 N	104° 2' 49.566 W
Max Dev 56.75' @ 4426 - plan misses target center by 492.77usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Circle (radius 56.75)	0.00	0.00	0.00	-109.70	480.40	671,690.60	582,284.60	32° 50' 46.592 N	104° 3' 55.458 W
2478' TVD @ TD - plan misses target center by 531.78usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Circle (radius 50.00)	0.00	0.00	0.00	220.85	483.75	672,021.15	582,287.95	32° 50' 49.863 N	104° 3' 55.409 W
Max Dev 68.27' @ 5000 - plan misses target center by 4802.20usft at 13668.54usft MD (4800.00 TVD, 406.55 N, 9083.00 E) - Circle (radius 68.27)	0.00	0.00	0.00	551.80	9,076.50	672,352.10	590,880.70	32° 50' 52.911 N	104° 2' 14.674 W
KOP-D2 (DFU#912H/L1) - plan hits target center - Point	0.00	0.00	4,279.13	0.00	0.00	671,800.30	581,804.20	32° 50' 47.689 N	104° 4' 1.086 W
PP-D2 (DFU#912H/L1) - plan hits target center - Point	0.00	0.00	4,798.78	21.70	484.70	671,821.99	582,288.90	32° 50' 47.892 N	104° 3' 55.404 W
PBHL-D2 (DFU#912H/L) - plan hits target center - Point	0.00	0.00	4,800.00	411.20	9,186.80	672,211.50	590,991.00	32° 50' 51.516 N	104° 2' 13.386 W
EOC-D2 (DFU#912H/L1) - plan hits target center - Point	0.00	0.00	4,800.00	23.29	520.35	671,823.59	582,324.55	32° 50' 47.907 N	104° 3' 54.986 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,279.13	4,279.13	0.00	0.00	Start DLS 11.00 TFO 87.44
5,097.31	4,800.00	23.29	520.35	Start 8675.13 hold at 5097.31 MD
13,772.44	4,800.00	411.20	9,186.80	TD at 13772.44



COG Operating LLC

Eddy County, NM (NAD-27 2015)

Dodd Federal Unit #912H

SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L

PP: 1781' FSL, 1655' FWL, Sec 10, T17S, R29E, Unit K

BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Design #2

Anticollision Report

29 March, 2017





TDS
Anticollision Report



Company: COG Operating LLC	Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	
Project: Eddy County, NM (NAD-27 2015)	TVD Reference: KB @ 3595.00usft (Silver Oak 3)	
Reference Site: Dodd Federal Unit #912H	MD Reference: KB @ 3595.00usft (Silver Oak 3)	
Site Error: 0.00 usft	North Reference: Grid	
Reference Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method: Minimum Curvature	
Well Error: 0.00 usft	Output errors are at 2.00 sigma	
Reference Wellbore BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database: EDM 5000.1 Single User Db	
Reference Design: Design #2	Offset TVD Reference: Offset Datum	

Reference Design #2		
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 separation factor of 5.00	Error Surface: Elliptical Conic	
Warning Levels Evaluated at: 2.00 Sigma	Casing Method: Not applied	

Survey Tool Program Date 3/28/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	13,772.44	Design #2 (BHL: 2170' FSL, 220' FEL, Sec	MWD	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						
Dodd Federal Unit #560						
Dodd Federal Unit #560 - Dodd Federal Unit #560 - OH						Out of range
Dodd Federal Unit #913H						
SHL: 1510' FSL, 70' FWL, Sec 11, T17S, R29E, Unit L -	9,030.50	4,919.32	430.06	301.43	3.343	CC
SHL: 1510' FSL, 70' FWL, Sec 11, T17S, R29E, Unit L -	13,500.00	9,378.30	636.74	264.98	1.713	ES
SHL: 1510' FSL, 70' FWL, Sec 11, T17S, R29E, Unit L -	13,600.00	9,474.53	642.01	264.99	1.703	SF
Eddy County Offset Wells						
Bee Federal #2 - OH - OH	7,365.97	4,813.72	338.66	167.90	1.983	CC
Bee Federal #2 - OH - OH	7,500.00	4,813.72	364.21	149.99	1.700	ES
Bee Federal #2 - OH - OH	7,600.00	4,813.72	411.65	158.17	1.624	SF
Dodd Federal Unit #10 - OH - OH						Out of range
Dodd Federal Unit #123 - OH - OH	11,683.09	4,841.55	387.66	185.00	1.913	CC, ES
Dodd Federal Unit #123 - OH - OH	11,700.00	4,841.46	388.02	185.07	1.912	SF
Dodd Federal Unit #124 - OH - OH	7,699.13	4,815.99	109.99	-69.33	0.613	Level 1, CC
Dodd Federal Unit #124 - OH - OH	7,800.00	4,815.99	149.24	-221.33	0.403	Level 1, ES, SF
Dodd Federal Unit #125 - OH - OH	6,300.00	4,897.72	139.87	-65.72	0.680	Level 1, SF
Dodd Federal Unit #125 - OH - OH	6,380.69	4,897.72	114.26	-31.49	0.784	Level 1, CC
Dodd Federal Unit #125 - OH - OH	6,500.00	4,897.72	165.20	-67.55	0.710	Level 1, ES
Dodd Federal Unit #126 - OH - OH	9,703.17	4,834.10	243.66	8.60	1.037	Level 2, CC
Dodd Federal Unit #126 - OH - OH	9,800.00	4,834.10	262.20	-3.87	0.985	Level 1, ES, SF
Dodd Federal Unit #128 - OH - OH	13,668.53	4,847.33	78.70	-266.59	0.228	Level 1, CC, SF
Dodd Federal Unit #128 - OH - OH	13,700.00	4,847.33	84.76	-270.95	0.238	Level 1, ES
Dodd Federal Unit #552 - OH - OH	4,550.00	4,426.40	424.93	223.80	2.113	SF
Dodd Federal Unit #552 - OH - OH	4,650.00	4,426.40	399.46	215.31	2.169	ES
Dodd Federal Unit #552 - OH - OH	4,900.00	4,426.40	362.79	273.86	4.079	CC
Dodd Federal Unit #563 - OH - OH	10,446.02	4,541.00	329.32	208.64	2.729	CC
Dodd Federal Unit #563 - OH - OH	10,600.00	4,541.00	363.54	154.51	1.739	ES
Dodd Federal Unit #563 - OH - OH	10,700.00	4,541.00	415.88	160.23	1.627	SF
Dodd Federal Unit #648 - OH - OH	12,349.30	4,560.00	305.66	171.14	2.272	CC
Dodd Federal Unit #648 - OH - OH	12,500.00	4,560.00	340.79	121.60	1.555	ES
Dodd Federal Unit #648 - OH - OH	12,600.00	4,560.00	395.32	135.63	1.522	SF
Empire Federal SWD #3 - OH - OH	5,398.72	4,789.75	133.11	14.48	1.122	Level 2, CC
Empire Federal SWD #3 - OH - OH	5,500.00	4,789.74	167.26	8.19	1.051	Level 2, ES, SF

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

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						
Eddy County Offset Wells						
Featherstone Federal #3 - OH - OH						Out of range
M Dodd B #13 - OH - OH						Out of range

Offset Design Dodd Federal Unit #913H - SHL: 1510' FSL, 70' FWL, Sec 11, T17S, R29E, Unit L - BHL: 1525' FSL, 35												Offset Site Error: 0.00 usft	
Survey Program: 100-Good_gyro. 4315-MWD												Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
8,700.00	4,800.00	4,716.84	4,685.04	112.06	5.22	69.29	-230.58	4,312.94	485.00	381.75	103.25	4.698	
8,800.00	4,800.00	4,761.03	4,717.50	114.80	5.61	73.28	-230.57	4,342.91	455.46	342.75	112.71	4.041	
8,900.00	4,800.00	4,824.97	4,760.16	117.54	6.37	78.76	-230.82	4,390.50	438.38	317.56	120.83	3.628	
9,000.00	4,800.00	4,900.44	4,804.10	120.28	7.52	84.55	-229.54	4,451.79	430.53	303.36	127.17	3.385	
9,030.50	4,800.00	4,919.32	4,814.03	121.11	7.85	85.87	-229.39	4,467.85	430.06	301.43	128.63	3.343	CC
9,100.00	4,800.00	4,961.23	4,834.34	123.02	8.64	88.59	-230.43	4,504.47	433.07	301.84	131.23	3.300	
9,200.00	4,800.00	5,071.45	4,872.58	125.75	11.03	93.58	-234.73	4,607.45	442.48	306.24	136.25	3.248	
9,300.00	4,800.00	5,188.77	4,886.92	128.49	13.94	95.38	-233.81	4,723.68	447.02	305.22	141.80	3.152	
9,400.00	4,800.00	5,290.38	4,888.92	131.23	16.56	95.60	-232.30	4,825.26	450.18	303.08	147.10	3.060	
9,500.00	4,800.00	5,390.95	4,890.55	133.98	19.20	95.77	-230.62	4,925.80	453.13	300.70	152.43	2.973	
9,600.00	4,800.00	5,491.32	4,892.57	136.72	21.87	95.99	-228.66	5,026.13	455.85	298.09	157.75	2.890	
9,700.00	4,800.00	5,587.21	4,893.76	139.46	24.44	96.10	-227.44	5,122.00	459.15	296.18	162.97	2.817	
9,800.00	4,800.00	5,688.04	4,893.42	142.20	27.16	96.01	-226.66	5,222.83	462.80	294.36	168.44	2.748	
9,900.00	4,800.00	5,787.25	4,892.46	144.94	29.84	95.85	-225.56	5,322.03	466.05	292.17	173.87	2.680	
10,000.00	4,800.00	5,881.32	4,890.25	147.68	32.39	95.53	-225.87	5,416.07	470.57	291.41	179.15	2.627	
10,100.00	4,800.00	5,982.66	4,887.61	150.43	35.15	95.15	-226.34	5,517.38	475.24	290.49	184.75	2.572	
10,200.00	4,800.00	6,083.67	4,885.48	153.17	37.90	94.84	-226.63	5,618.37	479.80	289.48	190.32	2.521	
10,300.00	4,800.00	6,184.90	4,882.99	155.91	40.66	94.51	-226.53	5,719.56	483.95	288.05	195.91	2.470	
10,400.00	4,800.00	6,286.28	4,880.82	158.66	43.43	94.21	-226.25	5,820.91	487.98	286.49	201.49	2.422	
10,500.00	4,800.00	6,387.15	4,878.71	161.40	46.19	93.93	-225.59	5,921.76	491.63	284.58	207.05	2.374	
10,600.00	4,800.00	6,489.05	4,876.57	164.14	48.98	93.66	-224.73	6,023.63	495.12	282.47	212.65	2.328	
10,700.00	4,800.00	6,581.73	4,874.63	166.89	51.51	93.41	-224.17	6,116.29	498.86	280.98	217.88	2.290	
10,800.00	4,800.00	6,680.55	4,872.35	169.63	54.22	93.12	-224.86	6,215.08	503.90	280.53	223.36	2.256	
10,900.00	4,800.00	6,784.01	4,869.34	172.38	57.06	92.75	-225.14	6,318.50	508.49	279.43	229.06	2.220	
11,000.00	4,800.00	6,881.78	4,866.27	175.12	59.74	92.38	-225.19	6,416.22	512.86	278.36	234.50	2.187	
11,100.00	4,800.00	6,983.21	4,863.09	177.86	62.52	92.01	-225.38	6,517.60	517.40	277.30	240.10	2.155	
11,200.00	4,800.00	7,083.01	4,860.14	180.61	65.26	91.66	-225.38	6,617.36	521.77	276.15	245.62	2.124	
11,300.00	4,800.00	7,183.59	4,857.34	183.35	68.02	91.34	-225.37	6,717.90	526.16	275.00	251.16	2.095	
11,400.00	4,800.00	7,284.60	4,854.97	186.10	70.80	91.08	-224.75	6,818.87	529.96	273.25	256.71	2.064	
11,500.00	4,800.00	7,369.75	4,853.09	188.85	73.14	90.87	-225.75	6,904.00	535.55	274.05	261.50	2.048	
11,600.00	4,800.00	7,471.87	4,850.70	191.59	75.95	90.60	-227.92	7,006.07	542.11	274.98	267.13	2.029	
11,700.00	4,800.00	7,569.33	4,850.03	194.34	78.63	90.53	-229.93	7,103.51	548.64	276.15	272.49	2.013	
11,800.00	4,800.00	7,663.18	4,849.99	197.08	81.22	90.52	-232.69	7,197.31	556.05	278.41	277.64	2.003	
11,900.00	4,800.00	7,763.29	4,850.49	199.83	83.98	90.56	-236.32	7,297.36	564.14	280.99	283.15	1.992	
12,000.00	4,800.00	7,876.70	4,849.76	202.57	87.10	90.48	-238.78	7,410.73	570.77	281.40	289.37	1.972	
12,100.00	4,800.00	7,984.25	4,848.40	205.32	90.06	90.34	-238.83	7,518.28	575.26	280.05	295.20	1.949	
12,200.00	4,800.00	8,084.97	4,847.55	208.07	92.83	90.25	-238.32	7,618.98	579.23	278.50	300.73	1.926	
12,300.00	4,800.00	8,184.87	4,847.28	210.81	95.58	90.22	-237.80	7,718.88	583.17	276.95	306.22	1.904	

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 usft
Dodd Federal Unit #913H - SHL: 1510' FSL, 70' FWL, Sec 11, T17S, R29E, Unit L - BHL: 1525' FSL, 35													Offset Well Error:	0.00 usft
Survey Program: 100-Good_gyro, 4315-MWD														
Reference		Offset		Semi Major Axls			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		
12,400.00	4,800.00	8,286.40	4,848.09	213.56	98.37	90.30	-237.16	7,820.41	587.02	275.24	311.78	1.883		
12,500.00	4,800.00	8,383.38	4,849.03	216.30	101.04	90.39	-236.55	7,917.38	590.87	273.72	317.15	1.863		
12,600.00	4,800.00	8,480.00	4,848.36	219.05	103.70	90.32	-236.55	8,014.00	595.33	272.83	322.50	1.846		
12,700.00	4,800.00	8,580.31	4,846.96	221.80	106.46	90.19	-236.82	8,114.30	600.07	272.06	328.02	1.829		
12,800.00	4,800.00	8,678.33	4,845.31	224.54	109.16	90.03	-237.14	8,212.30	604.87	271.44	333.43	1.814		
12,900.00	4,800.00	8,781.28	4,842.96	227.29	111.99	89.81	-237.42	8,315.22	609.61	270.56	339.05	1.798		
13,000.00	4,800.00	8,881.98	4,840.90	230.04	114.76	89.62	-237.32	8,415.90	614.00	269.42	344.57	1.782		
13,100.00	4,800.00	8,979.33	4,837.99	232.79	117.44	89.35	-237.36	8,513.21	618.53	268.60	349.94	1.768		
13,200.00	4,800.00	9,076.88	4,835.85	235.53	120.13	89.16	-237.94	8,610.73	623.63	268.32	355.30	1.755		
13,300.00	4,800.00	9,183.62	4,833.08	238.28	123.06	88.91	-237.85	8,717.43	628.04	266.97	361.08	1.739		
13,400.00	4,800.00	9,281.99	4,830.24	241.03	125.77	88.66	-237.48	8,815.76	632.20	265.74	366.47	1.725		
13,500.00	4,800.00	9,378.30	4,827.26	243.77	128.42	88.40	-237.47	8,912.03	636.74	264.98	371.76	1.713 ES		
13,600.00	4,800.00	9,474.53	4,823.97	246.52	131.07	88.12	-238.14	9,008.20	642.01	264.99	377.01	1.703 SF		
13,700.00	4,800.00	9,520.00	4,822.38	249.27	132.32	87.99	-238.54	9,053.64	649.74	271.33	378.42	1.717		
13,772.44	4,800.00	9,520.00	4,822.38	251.26	132.32	87.99	-238.54	9,053.64	663.63	290.51	373.12	1.779		

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



TDS
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Reference Site: Dodd Federal Unit #912H
Site Error: 0.00 usft
Reference Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Well Error: 0.00 usft
Reference Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Reference Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Eddy County Offset Wells - Bee Federal #2 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 321-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,900.00	4,800.00	4,813.73	4,812.82	36.22	296.31	-90.81	463.02	2,771.60	1,504.58	1,201.76	302.82	4.969		
6,000.00	4,800.00	4,813.72	4,812.82	38.85	296.31	-90.81	463.02	2,771.60	1,407.32	1,104.75	302.58	4.651		
6,100.00	4,800.00	4,813.72	4,812.82	41.50	296.31	-90.81	463.02	2,771.60	1,310.48	1,008.20	302.29	4.335		
6,200.00	4,800.00	4,813.72	4,812.82	44.15	296.31	-90.81	463.02	2,771.60	1,214.15	912.24	301.92	4.021		
6,300.00	4,800.00	4,813.72	4,812.82	46.82	296.31	-90.81	463.02	2,771.60	1,118.47	817.05	301.42	3.711		
6,400.00	4,800.00	4,813.72	4,812.82	49.50	296.31	-90.81	463.02	2,771.60	1,023.61	722.89	300.72	3.404		
6,500.00	4,800.00	4,813.72	4,812.82	52.19	296.31	-90.81	463.02	2,771.60	929.83	630.16	299.67	3.103		
6,600.00	4,800.00	4,813.72	4,812.82	54.88	296.31	-90.81	463.02	2,771.60	837.49	539.44	298.05	2.810		
6,700.00	4,800.00	4,813.72	4,812.82	57.58	296.31	-90.81	463.02	2,771.60	747.13	451.65	295.48	2.529		
6,800.00	4,800.00	4,813.72	4,812.82	60.28	296.31	-90.81	463.02	2,771.60	659.55	368.29	291.26	2.264		
6,900.00	4,800.00	4,813.72	4,812.82	62.99	296.31	-90.81	463.02	2,771.60	576.03	291.82	284.21	2.027		
7,000.00	4,800.00	4,813.72	4,812.82	65.69	296.31	-90.81	463.02	2,771.60	498.62	226.40	272.22	1.832		
7,100.00	4,800.00	4,813.72	4,812.81	68.41	296.31	-90.81	463.02	2,771.60	430.61	178.67	251.94	1.709		
7,200.00	4,800.00	4,813.72	4,812.81	71.12	296.31	-90.81	463.02	2,771.60	377.14	157.21	219.93	1.715		
7,300.00	4,800.00	4,813.72	4,812.81	73.84	296.31	-90.81	463.02	2,771.60	345.02	163.30	181.72	1.899		
7,365.97	4,800.00	4,813.72	4,812.81	75.64	296.31	-90.81	463.02	2,771.60	338.66	167.90	170.76	1.983	CC	
7,400.00	4,800.00	4,813.72	4,812.81	76.56	296.31	-90.81	463.02	2,771.60	340.36	165.00	175.36	1.941		
7,500.00	4,800.00	4,813.72	4,812.81	79.29	296.31	-90.81	463.02	2,771.60	364.21	149.99	214.23	1.700	ES	
7,600.00	4,800.00	4,813.72	4,812.81	82.01	296.31	-90.81	463.02	2,771.60	411.65	158.17	253.49	1.624	SF	
7,700.00	4,800.00	4,813.72	4,812.81	84.74	296.31	-90.81	463.02	2,771.60	475.67	196.05	279.62	1.701		
7,800.00	4,800.00	4,813.72	4,812.81	87.46	296.31	-90.81	463.02	2,771.60	550.52	255.21	295.31	1.864		
7,900.00	4,800.00	4,813.72	4,812.81	90.19	296.31	-90.81	463.02	2,771.60	632.36	327.82	304.54	2.076		
8,000.00	4,800.00	4,813.72	4,812.81	92.92	296.31	-90.81	463.02	2,771.60	718.81	408.80	310.01	2.319		
8,100.00	4,800.00	4,813.72	4,812.81	95.66	296.31	-90.81	463.02	2,771.60	808.39	495.10	313.28	2.580		
8,200.00	4,800.00	4,813.72	4,812.81	98.39	296.31	-90.81	463.02	2,771.60	900.16	584.91	315.26	2.855		
8,300.00	4,800.00	4,813.72	4,812.81	101.12	296.31	-90.81	463.02	2,771.60	993.53	677.09	316.44	3.140		
8,400.00	4,800.00	4,813.72	4,812.81	103.86	296.31	-90.81	463.02	2,771.60	1,088.08	770.94	317.14	3.431		
8,500.00	4,800.00	4,813.72	4,812.81	106.59	296.31	-90.81	463.02	2,771.60	1,183.52	866.00	317.52	3.727		
8,600.00	4,800.00	4,813.72	4,812.81	109.33	296.31	-90.81	463.02	2,771.60	1,279.66	961.95	317.71	4.028		
8,700.00	4,800.00	4,813.72	4,812.81	112.06	296.31	-90.81	463.02	2,771.60	1,376.35	1,058.58	317.77	4.331		
8,800.00	4,800.00	4,813.72	4,812.81	114.80	296.31	-90.81	463.02	2,771.60	1,473.48	1,155.73	317.75	4.637		
8,900.00	4,800.00	4,813.72	4,812.81	117.54	296.31	-90.81	463.02	2,771.60	1,570.97	1,253.30	317.67	4.945		

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 usft
Eddy County Offset Wells - Dodd Federal Unit #123 - OH - OH													Offset Well Error:	0.00 ush
Survey Program: 100-VES-ISCWSA-GYRO-3														
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	
11,300.00	4,800.00	4,843.62	4,843.30	183.35	8.83	90.49	-69.49	7,116.87	545.01	405.88	139.13	3.917		
11,400.00	4,800.00	4,843.08	4,842.75	186.10	8.83	90.41	-69.49	7,116.87	480.02	321.05	158.97	3.020		
11,500.00	4,800.00	4,842.53	4,842.21	188.85	8.83	90.33	-69.49	7,116.87	428.72	249.28	179.44	2.389		
11,600.00	4,800.00	4,841.99	4,841.67	191.59	8.83	90.25	-69.49	7,116.88	396.46	200.40	196.06	2.022		
11,683.09	4,800.00	4,841.55	4,841.23	193.87	8.82	90.18	-69.49	7,116.88	387.66	185.00	202.66	1.913 CC, ES		
11,700.00	4,800.00	4,841.46	4,841.14	194.34	8.82	90.17	-69.49	7,116.88	388.02	185.07	202.95	1.912 SF		
11,800.00	4,800.00	4,840.93	4,840.61	197.08	8.82	90.09	-69.49	7,116.88	404.90	207.34	197.56	2.050		
11,900.00	4,800.00	4,840.41	4,840.08	199.83	8.82	90.01	-69.50	7,116.88	444.21	260.90	183.31	2.423		
12,000.00	4,800.00	4,839.88	4,839.56	202.57	8.82	89.93	-69.50	7,116.89	500.70	334.89	165.81	3.020		
12,100.00	4,800.00	4,839.37	4,839.04	205.32	8.82	89.86	-69.50	7,116.89	569.28	420.44	148.84	3.825		
12,200.00	4,800.00	4,838.85	4,838.53	208.07	8.82	89.78	-69.50	7,116.89	646.11	512.19	133.92	4.825		

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



TDS
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Reference Site: Dodd Federal Unit #912H
Site Error: 0.00 usft
Reference Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Well Error: 0.00 usft
Reference Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Reference Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #124 - OH - OH														Offset Site Error:	0.00 usft
Survey Program: 438-INC														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
5,500.00	4,800.00	4,815.99	4,813.50	25.95	440.32	90.78	29.76	3,124.48	2,201.88	1,751.25	450.63	4.886			
5,600.00	4,800.00	4,815.99	4,813.50	28.46	440.32	90.78	29.76	3,124.48	2,102.01	1,651.40	450.60	4.665			
5,700.00	4,800.00	4,815.99	4,813.50	31.02	440.32	90.78	29.76	3,124.48	2,002.15	1,551.57	450.58	4.443			
5,800.00	4,800.00	4,815.99	4,813.50	33.61	440.32	90.78	29.76	3,124.48	1,902.31	1,451.75	450.56	4.222			
5,900.00	4,800.00	4,815.99	4,813.50	36.22	440.32	90.78	29.76	3,124.48	1,802.49	1,351.96	450.53	4.001			
6,000.00	4,800.00	4,815.99	4,813.50	38.85	440.32	90.78	29.76	3,124.48	1,702.68	1,252.18	450.51	3.779			
6,100.00	4,800.00	4,815.99	4,813.50	41.50	440.32	90.78	29.76	3,124.48	1,602.91	1,152.43	450.48	3.558			
6,200.00	4,800.00	4,815.99	4,813.50	44.15	440.32	90.78	29.76	3,124.48	1,503.16	1,052.71	450.45	3.337			
6,300.00	4,800.00	4,815.99	4,813.50	46.82	440.32	90.78	29.76	3,124.48	1,403.44	953.02	450.42	3.116			
6,400.00	4,800.00	4,815.99	4,813.50	49.50	440.32	90.78	29.76	3,124.48	1,303.78	853.38	450.39	2.895			
6,500.00	4,800.00	4,815.99	4,813.50	52.19	440.32	90.78	29.76	3,124.48	1,204.16	753.80	450.36	2.674			
6,600.00	4,800.00	4,815.99	4,813.50	54.88	440.32	90.78	29.76	3,124.48	1,104.62	654.29	450.33	2.453			
6,700.00	4,800.00	4,815.99	4,813.50	57.58	440.32	90.78	29.76	3,124.48	1,005.16	554.87	450.29	2.232			
6,800.00	4,800.00	4,815.99	4,813.50	60.28	440.32	90.78	29.76	3,124.48	905.83	455.58	450.25	2.012			
6,900.00	4,800.00	4,815.99	4,813.50	62.99	440.32	90.78	29.76	3,124.48	806.66	356.49	450.17	1.792			
7,000.00	4,800.00	4,815.99	4,813.50	65.69	440.32	90.78	29.76	3,124.48	707.73	257.69	450.04	1.573			
7,100.00	4,800.00	4,815.99	4,813.50	68.41	440.32	90.78	29.76	3,124.48	609.14	159.38	449.77	1.354	Level 3		
7,200.00	4,800.00	4,815.99	4,813.50	71.12	440.32	90.78	29.76	3,124.48	511.10	61.98	449.12	1.138	Level 2		
7,300.00	4,800.00	4,815.99	4,813.50	73.84	440.32	90.78	29.76	3,124.48	414.01	-33.48	447.49	0.925	Level 1		
7,400.00	4,800.00	4,815.99	4,813.50	76.56	440.32	90.78	29.76	3,124.48	318.71	-124.17	442.88	0.720	Level 1		
7,500.00	4,800.00	4,815.99	4,813.50	79.29	440.32	90.78	29.76	3,124.48	227.49	-200.14	427.63	0.532	Level 1		
7,600.00	4,800.00	4,815.99	4,813.50	82.01	440.32	90.78	29.76	3,124.48	148.07	-216.32	364.39	0.406	Level 1		
7,699.13	4,800.00	4,815.99	4,813.50	84.71	440.32	90.78	29.76	3,124.48	109.99	-69.33	179.32	0.613	Level 1, CC		
7,700.00	4,800.00	4,815.99	4,813.50	84.74	440.32	90.78	29.76	3,124.48	109.99	-69.41	179.40	0.613	Level 1		
7,800.00	4,800.00	4,815.99	4,813.50	87.46	440.32	90.78	29.76	3,124.48	149.24	-221.33	370.58	0.403	Level 1, ES, SF		
7,900.00	4,800.00	4,815.99	4,813.50	90.19	440.32	90.78	29.76	3,124.48	229.01	-204.28	433.30	0.529	Level 1		
8,000.00	4,800.00	4,815.99	4,813.50	92.92	440.32	90.78	29.76	3,124.48	320.35	-128.08	448.42	0.714	Level 1		
8,100.00	4,800.00	4,815.99	4,813.50	95.66	440.32	90.78	29.76	3,124.48	415.69	-37.20	452.88	0.918	Level 1		
8,200.00	4,800.00	4,815.99	4,813.50	98.39	440.32	90.78	29.76	3,124.48	512.81	58.48	454.33	1.129	Level 2		
8,300.00	4,800.00	4,815.99	4,813.50	101.12	440.32	90.78	29.76	3,124.48	610.86	156.10	454.75	1.343	Level 3		
8,400.00	4,800.00	4,815.99	4,813.50	103.86	440.32	90.78	29.76	3,124.48	709.45	254.65	454.80	1.560			
8,500.00	4,800.00	4,815.99	4,813.50	106.59	440.32	90.78	29.76	3,124.48	808.39	353.68	454.71	1.778			
8,600.00	4,800.00	4,815.99	4,813.50	109.33	440.32	90.78	29.76	3,124.48	907.56	452.99	454.57	1.997			
8,700.00	4,800.00	4,815.99	4,813.50	112.06	440.32	90.78	29.76	3,124.48	1,006.90	552.48	454.42	2.216			
8,800.00	4,800.00	4,815.99	4,813.50	114.80	440.32	90.78	29.76	3,124.48	1,106.35	652.08	454.27	2.435			
8,900.00	4,800.00	4,815.99	4,813.50	117.54	440.32	90.78	29.76	3,124.48	1,205.90	751.76	454.14	2.655			
9,000.00	4,800.00	4,815.99	4,813.50	120.28	440.32	90.78	29.76	3,124.48	1,305.51	851.49	454.02	2.875			
9,100.00	4,800.00	4,815.99	4,813.50	123.02	440.32	90.78	29.76	3,124.48	1,405.18	951.27	453.91	3.096			
9,200.00	4,800.00	4,815.99	4,813.50	125.75	440.32	90.78	29.76	3,124.48	1,504.90	1,051.07	453.82	3.316			
9,300.00	4,800.00	4,815.99	4,813.50	128.49	440.32	90.78	29.76	3,124.48	1,604.65	1,150.90	453.74	3.536			
9,400.00	4,800.00	4,815.99	4,813.50	131.23	440.32	90.78	29.76	3,124.48	1,704.43	1,250.75	453.67	3.757			
9,500.00	4,800.00	4,815.99	4,813.50	133.98	440.32	90.78	29.76	3,124.48	1,804.23	1,350.61	453.61	3.977			
9,600.00	4,800.00	4,815.99	4,813.50	136.72	440.32	90.78	29.76	3,124.48	1,904.05	1,450.49	453.56	4.198			
9,700.00	4,800.00	4,815.99	4,813.50	139.46	440.32	90.78	29.76	3,124.48	2,003.89	1,550.37	453.52	4.419			
9,800.00	4,800.00	4,815.99	4,813.50	142.20	440.32	90.78	29.76	3,124.48	2,103.75	1,650.27	453.48	4.639			
9,900.00	4,800.00	4,815.99	4,813.50	144.94	440.32	90.78	29.76	3,124.48	2,203.62	1,750.17	453.45	4.860			

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #125 - OH - OH														Offset Site Error: 0.00 usft
Survey Program: 372-INC														Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,097.31	4,800.00	4,897.72	4,897.00	16.58	254.75	90.50	-33.46	1,807.55	1,288.45	1,023.75	264.70	4.868		
5,100.00	4,800.00	4,897.72	4,897.00	16.63	254.75	90.50	-33.46	1,807.55	1,285.77	1,021.07	264.70	4.857		
5,200.00	4,800.00	4,897.72	4,897.00	18.79	254.75	90.50	-33.46	1,807.55	1,186.20	921.61	264.60	4.483		
5,300.00	4,800.00	4,897.72	4,897.00	21.09	254.75	90.50	-33.46	1,807.55	1,086.71	822.24	264.47	4.109		
5,400.00	4,800.00	4,897.72	4,897.00	23.48	254.75	90.50	-33.46	1,807.55	987.32	723.00	264.32	3.735		
5,500.00	4,800.00	4,897.72	4,897.00	25.95	254.75	90.50	-33.46	1,807.55	888.07	623.94	264.12	3.362		
5,600.00	4,800.00	4,897.72	4,897.00	28.46	254.75	90.50	-33.46	1,807.55	789.00	525.13	263.88	2.990		
5,700.00	4,800.00	4,897.72	4,897.00	31.02	254.75	90.50	-33.46	1,807.55	690.21	426.67	263.54	2.619		
5,800.00	4,800.00	4,897.72	4,897.00	33.61	254.75	90.50	-33.46	1,807.55	591.82	328.76	263.06	2.250		
5,900.00	4,800.00	4,897.72	4,897.00	36.22	254.75	90.50	-33.46	1,807.55	494.08	231.81	262.27	1.884		
6,000.00	4,800.00	4,897.72	4,897.00	38.85	254.75	90.50	-33.46	1,807.55	397.46	136.68	260.78	1.524		
6,100.00	4,800.00	4,897.72	4,897.00	41.50	254.75	90.50	-33.46	1,807.55	303.05	45.75	257.30	1.178	Level 2	
6,200.00	4,800.00	4,897.72	4,897.00	44.15	254.75	90.50	-33.46	1,807.55	213.78	-32.94	246.72	0.866	Level 1	
6,300.00	4,800.00	4,897.72	4,897.00	46.82	254.75	90.50	-33.46	1,807.55	139.87	-65.72	205.60	0.680	Level 1, SF	
6,380.69	4,800.00	4,897.72	4,897.00	48.98	254.75	90.50	-33.46	1,807.55	114.26	-31.49	145.74	0.784	Level 1, CC	
6,400.00	4,800.00	4,897.72	4,897.00	49.50	254.75	90.50	-33.46	1,807.55	115.88	-37.40	153.27	0.756	Level 1	
6,500.00	4,800.00	4,897.72	4,897.00	52.19	254.75	90.50	-33.46	1,807.55	165.20	-67.55	232.75	0.710	Level 1, ES	
6,600.00	4,800.00	4,897.72	4,897.00	54.88	254.75	90.50	-33.46	1,807.55	247.29	-10.18	257.47	0.960	Level 1	
6,700.00	4,800.00	4,897.72	4,897.00	57.58	254.75	90.50	-33.46	1,807.55	339.14	75.10	264.04	1.284	Level 3	
6,800.00	4,800.00	4,897.72	4,897.00	60.28	254.75	90.50	-33.46	1,807.55	434.60	168.44	266.16	1.633		
6,900.00	4,800.00	4,897.72	4,897.00	62.99	254.75	90.50	-33.46	1,807.55	531.73	264.81	266.93	1.992		
7,000.00	4,800.00	4,897.72	4,897.00	65.69	254.75	90.50	-33.46	1,807.55	629.76	362.55	267.22	2.357		
7,100.00	4,800.00	4,897.72	4,897.00	68.41	254.75	90.50	-33.46	1,807.55	728.33	461.02	267.31	2.725		
7,200.00	4,800.00	4,897.72	4,897.00	71.12	254.75	90.50	-33.46	1,807.55	827.24	559.91	267.33	3.094		
7,300.00	4,800.00	4,897.72	4,897.00	73.84	254.75	90.50	-33.46	1,807.55	926.39	659.07	267.31	3.466		
7,400.00	4,800.00	4,897.72	4,897.00	76.56	254.75	90.50	-33.46	1,807.55	1,025.70	758.42	267.28	3.838		
7,500.00	4,800.00	4,897.72	4,897.00	79.29	254.75	90.50	-33.46	1,807.55	1,125.13	857.89	267.24	4.210		
7,600.00	4,800.00	4,897.72	4,897.00	82.01	254.75	90.50	-33.46	1,807.55	1,224.66	957.45	267.21	4.583		
7,700.00	4,800.00	4,897.72	4,897.00	84.74	254.75	90.50	-33.46	1,807.55	1,324.25	1,057.08	267.17	4.957		

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #126 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 382-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
8,300.00	4,800.00	4,834.10	4,832.91	101.12	271.30	-90.45	472.65	5,110.71	1,424.17	1,135.85	288.33	4.939		
8,400.00	4,800.00	4,834.10	4,832.91	103.86	271.30	-90.45	472.65	5,110.71	1,325.76	1,036.45	289.31	4.582		
8,500.00	4,800.00	4,834.10	4,832.91	106.59	271.30	-90.45	472.65	5,110.71	1,227.60	937.15	290.44	4.227		
8,600.00	4,800.00	4,834.10	4,832.91	109.33	271.30	-90.45	472.65	5,110.71	1,129.76	838.01	291.75	3.872		
8,700.00	4,800.00	4,834.10	4,832.91	112.06	271.30	-90.45	472.65	5,110.71	1,032.34	739.09	293.25	3.520		
8,800.00	4,800.00	4,834.10	4,832.91	114.80	271.30	-90.45	472.65	5,110.71	935.47	640.50	294.97	3.171		
8,900.00	4,800.00	4,834.10	4,832.91	117.54	271.30	-90.45	472.65	5,110.71	839.32	542.40	296.92	2.827		
9,000.00	4,800.00	4,834.10	4,832.91	120.28	271.30	-90.45	472.65	5,110.71	744.19	445.11	299.09	2.488		
9,100.00	4,800.00	4,834.10	4,832.91	123.02	271.30	-90.45	472.65	5,110.71	650.53	349.16	301.37	2.159		
9,200.00	4,800.00	4,834.10	4,832.91	125.75	271.30	-90.45	472.65	5,110.71	559.07	255.58	303.48	1.842		
9,300.00	4,800.00	4,834.10	4,832.91	128.49	271.30	-90.45	472.65	5,110.71	471.08	166.50	304.59	1.547		
9,400.00	4,800.00	4,834.10	4,832.91	131.23	271.30	-90.45	472.65	5,110.71	388.96	86.47	302.48	1.286	Level 3	
9,500.00	4,800.00	4,834.10	4,832.91	133.98	271.30	-90.45	472.65	5,110.71	317.26	25.49	291.77	1.087	Level 2	
9,600.00	4,800.00	4,834.10	4,832.91	136.72	271.30	-90.45	472.65	5,110.71	264.61	1.05	263.56	1.004	Level 2	
9,700.00	4,800.00	4,834.10	4,832.91	139.46	271.30	-90.45	472.65	5,110.71	243.68	8.66	235.02	1.037	Level 2	
9,703.17	4,800.00	4,834.10	4,832.91	139.54	271.30	-90.45	472.65	5,110.71	243.66	8.60	235.07	1.037	Level 2, CC	
9,800.00	4,800.00	4,834.10	4,832.91	142.20	271.30	-90.45	472.65	5,110.71	262.20	-3.87	266.07	0.985	Level 1, ES, SF	
9,900.00	4,800.00	4,834.10	4,832.91	144.94	271.30	-90.45	472.65	5,110.71	313.23	14.29	298.94	1.048	Level 2	
10,000.00	4,800.00	4,834.10	4,832.91	147.68	271.30	-90.45	472.65	5,110.71	384.03	71.64	312.39	1.229	Level 2	
10,100.00	4,800.00	4,834.10	4,832.91	150.43	271.30	-90.45	472.65	5,110.71	465.66	149.82	315.84	1.474	Level 3	
10,200.00	4,800.00	4,834.10	4,832.91	153.17	271.30	-90.45	472.65	5,110.71	553.36	237.95	315.41	1.754		
10,300.00	4,800.00	4,834.10	4,832.91	155.91	271.30	-90.45	472.65	5,110.71	644.65	331.01	313.64	2.055		
10,400.00	4,800.00	4,834.10	4,832.91	158.66	271.30	-90.45	472.65	5,110.71	738.20	426.68	311.52	2.370		
10,500.00	4,800.00	4,834.10	4,832.91	161.40	271.30	-90.45	472.65	5,110.71	833.25	523.82	309.43	2.693		
10,600.00	4,800.00	4,834.10	4,832.91	164.14	271.30	-90.45	472.65	5,110.71	929.34	621.85	307.49	3.022		
10,700.00	4,800.00	4,834.10	4,832.91	166.89	271.30	-90.45	472.65	5,110.71	1,026.17	720.43	305.74	3.356		
10,800.00	4,800.00	4,834.10	4,832.91	169.63	271.30	-90.45	472.65	5,110.71	1,123.57	819.38	304.19	3.694		
10,900.00	4,800.00	4,834.10	4,832.91	172.38	271.30	-90.45	472.65	5,110.71	1,221.38	918.57	302.81	4.034		
11,000.00	4,800.00	4,834.10	4,832.91	175.12	271.30	-90.45	472.65	5,110.71	1,319.52	1,017.94	301.58	4.375		
11,100.00	4,800.00	4,834.10	4,832.91	177.86	271.30	-90.45	472.65	5,110.71	1,417.92	1,117.43	300.49	4.719		

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



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 usft
Eddy County Offset Wells - Dodd Federal Unit #128 - OH - OH													Offset Well Error:	0.00 usft
Survey Program: 200-INC														
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		
12,500.00	4,800.00	4,847.33	4,846.83	216.30	230.70	-90.60	485.17	9,079.48	1,171.18	921.74	249.44	4.695		
12,600.00	4,800.00	4,847.33	4,846.83	219.05	230.70	-90.60	485.17	9,079.48	1,071.43	820.84	250.59	4.276		
12,700.00	4,800.00	4,847.33	4,846.83	221.80	230.70	-90.60	485.17	9,079.48	971.73	719.72	252.01	3.856		
12,800.00	4,800.00	4,847.33	4,846.83	224.54	230.70	-90.60	485.17	9,079.48	872.09	618.30	253.80	3.436		
12,900.00	4,800.00	4,847.33	4,846.83	227.29	230.70	-90.60	485.17	9,079.48	772.55	516.45	256.10	3.017		
13,000.00	4,800.00	4,847.33	4,846.83	230.04	230.70	-90.60	485.17	9,079.48	673.15	414.02	259.13	2.598		
13,100.00	4,800.00	4,847.33	4,846.83	232.79	230.70	-90.60	485.17	9,079.48	573.95	310.69	263.26	2.180		
13,200.00	4,800.00	4,847.33	4,846.83	235.53	230.70	-90.60	485.17	9,079.48	475.10	205.99	269.11	1.765		
13,300.00	4,800.00	4,847.33	4,846.83	238.28	230.70	-90.60	485.17	9,079.48	376.84	98.98	277.87	1.356	Level 3	
13,400.00	4,800.00	4,847.33	4,846.83	241.03	230.70	-90.60	485.17	9,079.48	279.83	-12.16	291.99	0.958	Level 1	
13,500.00	4,800.00	4,847.33	4,846.83	243.77	230.70	-90.60	485.17	9,079.48	186.00	-130.84	316.84	0.587	Level 1	
13,600.00	4,800.00	4,847.33	4,846.83	246.52	230.70	-90.60	485.17	9,079.48	104.36	-249.96	354.32	0.295	Level 1	
13,668.53	4,800.00	4,847.33	4,846.83	248.40	230.70	-90.60	485.17	9,079.48	78.70	-266.59	345.29	0.228	Level 1, CC, SF	
13,700.00	4,800.00	4,847.33	4,846.83	249.27	230.70	-90.60	485.17	9,079.48	84.76	-270.95	355.71	0.238	Level 1, ES	
13,772.44	4,800.00	4,847.33	4,846.83	251.26	230.70	-90.60	485.17	9,079.48	130.35	-214.67	345.01	0.378	Level 1	

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



TDS
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Reference Site: Dodd Federal Unit #912H
Site Error: 0.00 usft
Reference Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Well Error: 0.00 usft
Reference Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Reference Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #552 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 263-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
2,300.00	2,300.00	2,267.94	2,287.75	5.04	99.59	99.66	-81.59	479.44	486.33	383.32	103.01	4.721		
2,400.00	2,400.00	2,387.99	2,387.78	5.26	105.79	99.45	-79.76	479.38	485.97	376.59	109.38	4.443		
2,500.00	2,500.00	2,488.04	2,487.81	5.49	111.99	99.23	-77.87	479.31	485.60	369.83	115.77	4.195		
2,600.00	2,600.00	2,588.08	2,587.84	5.71	118.19	99.00	-75.92	479.24	485.22	363.06	122.16	3.972		
2,700.00	2,700.00	2,688.01	2,687.75	5.94	124.02	98.77	-73.93	479.18	484.85	356.65	128.20	3.782		
2,800.00	2,800.00	2,787.84	2,787.55	6.16	129.46	98.56	-72.08	479.11	484.51	350.67	133.84	3.620		
2,900.00	2,900.00	2,887.66	2,887.37	6.39	134.89	98.36	-70.42	479.06	484.21	344.72	139.49	3.471		
3,000.00	3,000.00	2,987.50	2,987.19	6.61	140.32	98.19	-68.94	479.01	483.94	338.81	145.13	3.335		
3,100.00	3,100.00	3,087.34	3,087.03	6.84	145.71	98.04	-67.63	478.96	483.71	332.99	150.72	3.209		
3,200.00	3,200.00	3,187.30	3,186.98	7.06	149.83	97.90	-66.43	478.92	483.51	328.43	155.07	3.118		
3,300.00	3,300.00	3,287.27	3,286.94	7.28	153.95	97.76	-65.27	478.88	483.31	323.88	159.43	3.032		
3,400.00	3,400.00	3,387.23	3,386.90	7.51	158.08	97.63	-64.14	478.84	483.12	319.34	163.78	2.950		
3,500.00	3,500.00	3,487.20	3,486.86	7.73	162.20	97.50	-63.04	478.80	482.94	314.80	168.13	2.872		
3,600.00	3,600.00	3,587.17	3,586.83	7.96	166.13	97.38	-61.98	478.77	482.76	310.47	172.30	2.802		
3,700.00	3,700.00	3,687.16	3,686.80	8.18	169.93	97.25	-60.93	478.73	482.59	306.26	176.34	2.737		
3,800.00	3,800.00	3,787.14	3,786.78	8.41	173.74	97.13	-59.90	478.70	482.43	302.05	180.38	2.675		
3,900.00	3,900.00	3,887.13	3,886.76	8.63	177.54	97.01	-58.88	478.66	482.27	297.85	184.42	2.615		
4,000.00	4,000.00	3,987.11	3,986.74	8.86	181.35	96.89	-57.87	478.63	482.11	293.65	188.46	2.558		
4,100.00	4,100.00	4,087.14	4,086.77	9.08	185.29	96.78	-56.86	478.59	481.96	289.32	192.64	2.502		
4,200.00	4,200.00	4,187.18	4,186.80	9.31	189.26	96.65	-55.78	478.55	481.80	284.95	196.85	2.448		
4,279.13	4,279.13	4,266.34	4,265.95	9.49	192.40	96.54	-54.89	478.52	481.66	281.48	200.18	2.406		
4,300.00	4,299.99	4,287.21	4,286.82	9.53	193.22	9.09	-54.65	478.52	481.21	280.16	201.05	2.393		
4,350.00	4,349.78	4,337.01	4,336.62	9.63	195.20	9.19	-54.06	478.50	476.79	273.68	203.11	2.347		
4,400.00	4,398.92	4,386.15	4,385.76	9.74	197.24	9.46	-53.47	478.48	467.67	262.48	205.19	2.279		
4,450.00	4,446.95	4,426.40	4,426.00	9.85	198.96	9.89	-52.99	478.46	454.01	247.13	206.88	2.195		
4,500.00	4,493.44	4,426.40	4,426.00	9.97	198.96	10.19	-52.99	478.46	439.13	233.83	205.30	2.139		
4,550.00	4,537.96	4,426.40	4,426.00	10.12	198.96	10.48	-52.99	478.46	424.93	223.80	201.13	2.113 SF		
4,600.00	4,580.09	4,426.40	4,426.00	10.31	198.96	10.76	-52.99	478.46	411.64	217.49	194.15	2.120		
4,650.00	4,619.45	4,426.40	4,426.00	10.54	198.96	11.03	-52.99	478.46	399.46	215.31	184.15	2.169 ES		
4,700.00	4,655.68	4,426.40	4,426.00	10.84	198.96	11.26	-52.99	478.46	388.63	217.62	171.01	2.273		
4,750.00	4,688.44	4,426.40	4,426.00	11.23	198.96	11.47	-52.99	478.46	379.35	224.66	154.69	2.452		
4,800.00	4,717.43	4,426.40	4,426.00	11.71	198.96	11.63	-52.99	478.46	371.84	236.52	135.32	2.748		
4,850.00	4,742.38	4,426.40	4,426.00	12.30	198.96	11.76	-52.99	478.46	366.27	253.05	113.22	3.235		
4,900.00	4,763.07	4,426.40	4,426.00	12.99	198.96	11.84	-52.99	478.46	362.79	273.86	88.93	4.079 CC		
5,200.00	4,800.00	4,426.40	4,426.00	18.79	198.96	11.67	-52.99	478.46	396.25	314.68	81.57	4.858		
5,300.00	4,800.00	4,426.40	4,426.00	21.09	198.96	11.67	-52.99	478.46	443.40	324.32	119.07	3.724		
5,400.00	4,800.00	4,426.40	4,426.00	23.48	198.96	11.67	-52.99	478.46	506.15	360.85	145.30	3.484		
5,500.00	4,800.00	4,426.40	4,426.00	25.95	198.96	11.67	-52.99	478.46	579.47	416.57	162.89	3.557		
5,600.00	4,800.00	4,426.40	4,426.00	28.46	198.96	11.67	-52.99	478.46	659.83	485.10	174.72	3.776		
5,700.00	4,800.00	4,426.40	4,426.00	31.02	198.96	11.67	-52.99	478.46	744.96	562.11	182.84	4.074		
5,800.00	4,800.00	4,426.40	4,426.00	33.61	198.96	11.67	-52.99	478.46	833.40	644.83	188.57	4.420		
5,900.00	4,800.00	4,426.40	4,426.00	36.22	198.96	11.67	-52.99	478.46	924.20	731.48	192.71	4.796		

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



TDS
Anticollision Report.



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #563 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 140-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
8,900.00	4,800.00	4,541.00	4,540.00	117.54	305.70	26.39	116.24	5,870.25	1,580.70	1,264.42	316.28	4.998		
9,000.00	4,800.00	4,541.00	4,540.00	120.28	305.70	26.39	116.24	5,870.25	1,483.04	1,166.81	316.23	4.690		
9,100.00	4,800.00	4,541.00	4,540.00	123.02	305.70	26.39	116.24	5,870.25	1,385.72	1,069.58	316.13	4.383		
9,200.00	4,800.00	4,541.00	4,540.00	125.75	305.70	26.39	116.24	5,870.25	1,288.80	972.85	315.95	4.079		
9,300.00	4,800.00	4,541.00	4,540.00	128.49	305.70	26.39	116.24	5,870.25	1,192.39	876.74	315.65	3.778		
9,400.00	4,800.00	4,541.00	4,540.00	131.23	305.70	26.39	116.24	5,870.25	1,096.63	781.47	315.16	3.480		
9,500.00	4,800.00	4,541.00	4,540.00	133.98	305.70	26.39	116.24	5,870.25	1,001.70	687.32	314.37	3.186		
9,600.00	4,800.00	4,541.00	4,540.00	136.72	305.70	26.39	116.24	5,870.25	907.85	594.74	313.11	2.899		
9,700.00	4,800.00	4,541.00	4,540.00	139.46	305.70	26.39	116.24	5,870.25	815.47	504.40	311.07	2.622		
9,800.00	4,800.00	4,541.00	4,540.00	142.20	305.70	26.39	116.24	5,870.25	725.11	417.38	307.74	2.356		
9,900.00	4,800.00	4,541.00	4,540.00	144.94	305.70	26.39	116.24	5,870.25	637.64	335.44	302.20	2.110		
10,000.00	4,800.00	4,541.00	4,540.00	147.68	305.70	26.39	116.24	5,870.25	554.42	261.60	292.82	1.893		
10,100.00	4,800.00	4,541.00	4,540.00	150.43	305.70	26.39	116.24	5,870.25	477.68	201.11	276.57	1.727		
10,200.00	4,800.00	4,541.00	4,540.00	153.17	305.70	26.39	116.24	5,870.25	411.07	162.72	248.34	1.655		
10,300.00	4,800.00	4,541.00	4,540.00	155.91	305.70	26.39	116.24	5,870.25	360.24	158.85	201.39	1.789		
10,400.00	4,800.00	4,541.00	4,540.00	158.66	305.70	26.39	116.24	5,870.25	332.52	195.25	137.27	2.422		
10,446.02	4,800.00	4,541.00	4,540.00	159.92	305.70	26.39	116.24	5,870.25	329.32	208.64	120.68	2.729	CC	
10,500.00	4,800.00	4,541.00	4,540.00	161.40	305.70	26.39	116.24	5,870.25	333.71	190.34	143.38	2.328		
10,600.00	4,800.00	4,541.00	4,540.00	164.14	305.70	26.39	116.24	5,870.25	363.54	154.51	209.03	1.739	ES	
10,700.00	4,800.00	4,541.00	4,540.00	166.89	305.70	26.39	116.24	5,870.25	415.88	160.23	255.65	1.627	SF	
10,800.00	4,800.00	4,541.00	4,540.00	169.63	305.70	26.39	116.24	5,870.25	483.48	199.92	283.56	1.705		
10,900.00	4,800.00	4,541.00	4,540.00	172.38	305.70	26.39	116.24	5,870.25	560.85	261.21	299.64	1.872		
11,000.00	4,800.00	4,541.00	4,540.00	175.12	305.70	26.39	116.24	5,870.25	644.48	335.51	308.96	2.086		
11,100.00	4,800.00	4,541.00	4,540.00	177.86	305.70	26.39	116.24	5,870.25	732.22	417.75	314.47	2.328		
11,200.00	4,800.00	4,541.00	4,540.00	180.61	305.70	26.39	116.24	5,870.25	822.77	504.97	317.79	2.589		
11,300.00	4,800.00	4,541.00	4,540.00	183.35	305.70	26.39	116.24	5,870.25	915.28	595.46	319.82	2.862		
11,400.00	4,800.00	4,541.00	4,540.00	186.10	305.70	26.39	116.24	5,870.25	1,009.23	688.16	321.07	3.143		
11,500.00	4,800.00	4,541.00	4,540.00	188.85	305.70	26.39	116.24	5,870.25	1,104.23	782.40	321.83	3.431		
11,600.00	4,800.00	4,541.00	4,540.00	191.59	305.70	26.39	116.24	5,870.25	1,200.05	877.76	322.29	3.724		
11,700.00	4,800.00	4,541.00	4,540.00	194.34	305.70	26.39	116.24	5,870.25	1,296.51	973.96	322.55	4.020		
11,800.00	4,800.00	4,541.00	4,540.00	197.08	305.70	26.39	116.24	5,870.25	1,393.46	1,070.78	322.68	4.318		
11,900.00	4,800.00	4,541.00	4,540.00	199.83	305.70	26.39	116.24	5,870.25	1,490.81	1,168.08	322.73	4.619		
12,000.00	4,800.00	4,541.00	4,540.00	202.57	305.70	26.39	116.24	5,870.25	1,588.50	1,265.77	322.73	4.922		

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



TDS
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Reference Site: Dodd Federal Unit #912H
Site Error: 0.00 usft
Reference Well: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Well Error: 0.00 usft
Reference Wellbore: BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I
Reference Design: Design #2

Local Co-ordinate Reference: Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
TVD Reference: KB @ 3595.00usft (Silver Oak 3)
MD Reference: KB @ 3595.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Eddy County Offset Wells - Dodd Federal Unit #648 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 272-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
11,000.00	4,800.00	4,560.00	4,559.10	175.12	281.17	-23.22	467.96	7,759.70	1,383.49	1,087.16	296.33	4.669		
11,100.00	4,800.00	4,560.00	4,559.10	177.86	281.17	-23.22	467.96	7,759.70	1,286.15	989.50	296.65	4.336		
11,200.00	4,800.00	4,560.00	4,559.10	180.61	281.17	-23.22	467.96	7,759.70	1,189.25	892.30	296.95	4.005		
11,300.00	4,800.00	4,560.00	4,559.10	183.35	281.17	-23.22	467.96	7,759.70	1,092.91	795.73	297.19	3.678		
11,400.00	4,800.00	4,560.00	4,559.10	186.10	281.17	-23.22	467.96	7,759.70	997.30	700.00	297.30	3.355		
11,500.00	4,800.00	4,560.00	4,559.10	188.85	281.17	-23.22	467.96	7,759.70	902.63	605.45	297.18	3.037		
11,600.00	4,800.00	4,560.00	4,559.10	191.59	281.17	-23.22	467.96	7,759.70	809.25	512.62	296.63	2.728		
11,700.00	4,800.00	4,560.00	4,559.10	194.34	281.17	-23.22	467.96	7,759.70	717.65	422.37	295.28	2.430		
11,800.00	4,800.00	4,560.00	4,559.10	197.08	281.17	-23.22	467.96	7,759.70	628.62	336.17	292.44	2.150		
11,900.00	4,800.00	4,560.00	4,559.10	199.83	281.17	-23.22	467.96	7,759.70	543.42	256.64	286.78	1.895		
12,000.00	4,800.00	4,560.00	4,559.10	202.57	281.17	-23.22	467.96	7,759.70	464.16	188.51	275.64	1.684		
12,100.00	4,800.00	4,560.00	4,559.10	205.32	281.17	-23.22	467.96	7,759.70	394.44	140.39	254.04	1.553		
12,200.00	4,800.00	4,560.00	4,559.10	208.07	281.17	-23.22	467.96	7,759.70	340.18	126.06	214.12	1.589		
12,300.00	4,800.00	4,560.00	4,559.10	210.81	281.17	-23.22	467.96	7,759.70	309.61	156.42	153.19	2.021		
12,349.30	4,800.00	4,560.00	4,559.10	212.17	281.17	-23.22	467.96	7,759.70	305.66	171.14	134.52	2.272 CC		
12,400.00	4,800.00	4,560.00	4,559.10	213.56	281.17	-23.22	467.96	7,759.70	309.84	153.21	156.63	1.978		
12,500.00	4,800.00	4,560.00	4,559.10	216.30	281.17	-23.22	467.96	7,759.70	340.79	121.60	219.20	1.555 ES		
12,600.00	4,800.00	4,560.00	4,559.10	219.05	281.17	-23.22	467.96	7,759.70	395.32	135.63	259.69	1.522 SF		
12,700.00	4,800.00	4,560.00	4,559.10	221.80	281.17	-23.22	467.96	7,759.70	465.21	183.66	281.55	1.652		
12,800.00	4,800.00	4,560.00	4,559.10	224.54	281.17	-23.22	467.96	7,759.70	544.57	251.78	292.79	1.860		
12,900.00	4,800.00	4,560.00	4,559.10	227.29	281.17	-23.22	467.96	7,759.70	629.84	331.34	298.50	2.110		
13,000.00	4,800.00	4,560.00	4,559.10	230.04	281.17	-23.22	467.96	7,759.70	718.92	417.56	301.35	2.386		
13,100.00	4,800.00	4,560.00	4,559.10	232.79	281.17	-23.22	467.96	7,759.70	810.54	507.85	302.69	2.678		
13,200.00	4,800.00	4,560.00	4,559.10	235.53	281.17	-23.22	467.96	7,759.70	903.95	600.73	303.22	2.981		
13,300.00	4,800.00	4,560.00	4,559.10	238.28	281.17	-23.22	467.96	7,759.70	998.63	695.32	303.31	3.292		
13,400.00	4,800.00	4,560.00	4,559.10	241.03	281.17	-23.22	467.96	7,759.70	1,094.26	791.10	303.16	3.610		
13,500.00	4,800.00	4,560.00	4,559.10	243.77	281.17	-23.22	467.96	7,759.70	1,190.60	887.72	302.89	3.931		
13,600.00	4,800.00	4,560.00	4,559.10	246.52	281.17	-23.22	467.96	7,759.70	1,287.51	984.95	302.56	4.255		
13,700.00	4,800.00	4,560.00	4,559.10	249.27	281.17	-23.22	467.96	7,759.70	1,384.85	1,082.65	302.21	4.582		
13,772.44	4,800.00	4,560.00	4,559.10	251.26	281.17	-23.22	467.96	7,759.70	1,455.59	1,153.64	301.95	4.821		



TDS
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design Eddy County Offset Wells - Empire Federal SWD #3 - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 203-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,200.00	4,200.00	4,190.34	4,190.06	9.31	161.49	77.73	177.24	815.24	834.29	665.40	168.89	4.940		
4,279.13	4,279.13	4,269.64	4,269.35	9.49	165.30	77.82	176.05	815.28	834.08	661.22	172.86	4.825		
4,300.00	4,299.99	4,290.44	4,290.15	9.53	166.25	-9.61	175.73	815.30	833.61	659.76	173.85	4.795		
4,350.00	4,349.78	4,340.05	4,339.75	9.63	168.51	-9.70	175.00	815.32	829.15	652.97	176.18	4.706		
4,400.00	4,398.92	4,389.01	4,388.71	9.74	170.74	-9.93	174.34	815.34	820.01	641.55	178.46	4.595		
4,450.00	4,446.95	4,436.87	4,436.57	9.85	172.92	-10.34	173.75	815.36	806.29	625.62	180.86	4.463		
4,500.00	4,493.44	4,483.20	4,482.89	9.97	175.03	-10.94	173.23	815.38	788.11	605.34	182.77	4.312		
4,550.00	4,537.96	4,527.71	4,527.40	10.12	176.88	-11.77	172.76	815.40	765.65	581.04	184.60	4.148		
4,600.00	4,580.09	4,569.88	4,569.56	10.31	178.60	-12.91	172.30	815.41	739.11	552.85	186.26	3.968		
4,650.00	4,619.45	4,609.27	4,608.96	10.54	180.21	-14.43	171.86	815.43	708.77	521.01	187.76	3.775		
4,700.00	4,655.68	4,645.53	4,645.21	10.84	181.69	-16.48	171.45	815.44	674.91	485.85	189.07	3.570		
4,750.00	4,688.44	4,678.31	4,677.99	11.23	183.03	-19.28	171.07	815.46	637.89	447.73	190.16	3.355		
4,800.00	4,717.43	4,707.33	4,707.00	11.71	184.21	-23.16	170.72	815.47	598.07	407.07	191.00	3.131		
4,850.00	4,742.38	4,732.30	4,731.97	12.30	185.23	-28.62	170.42	815.48	555.88	364.33	191.55	2.902		
4,900.00	4,763.07	4,752.98	4,752.65	12.99	186.06	-36.40	170.17	815.49	511.77	320.03	191.74	2.669		
4,950.00	4,779.31	4,769.17	4,768.84	13.78	186.69	-47.29	169.98	815.49	466.24	274.75	191.49	2.435		
5,000.00	4,790.94	4,780.76	4,780.43	14.66	187.13	-61.48	169.84	815.50	419.85	229.12	190.73	2.201		
5,050.00	4,797.85	4,787.65	4,787.32	15.62	187.40	-77.28	169.76	815.50	373.21	183.91	189.30	1.972		
5,097.31	4,800.00	4,789.79	4,789.46	16.58	187.48	-90.67	169.74	815.50	329.49	142.41	187.08	1.761		
5,100.00	4,800.00	4,789.79	4,789.46	16.63	187.48	-90.67	169.74	815.50	327.03	140.11	186.93	1.750		
5,200.00	4,800.00	4,789.78	4,789.45	18.79	187.48	-90.67	169.74	815.50	239.18	61.66	177.52	1.347 Level 3		
5,300.00	4,800.00	4,789.76	4,789.43	21.09	187.48	-90.66	169.74	815.50	165.72	13.23	152.49	1.087 Level 2		
5,398.72	4,800.00	4,789.75	4,789.42	23.45	187.48	-90.66	169.74	815.50	133.11	14.48	118.63	1.122 Level 2, CC		
5,400.00	4,800.00	4,789.75	4,789.42	23.48	187.48	-90.66	169.74	815.50	133.12	14.41	118.70	1.121 Level 2		
5,500.00	4,800.00	4,789.74	4,789.41	25.95	187.48	-90.65	169.74	815.50	167.26	8.19	159.07	1.051 Level 2, ES, SF		
5,600.00	4,800.00	4,789.73	4,789.40	28.46	187.48	-90.64	169.74	815.50	241.32	57.54	183.78	1.313 Level 3		
5,700.00	4,800.00	4,789.72	4,789.39	31.02	187.48	-90.64	169.74	815.50	329.38	137.14	192.24	1.713		
5,800.00	4,800.00	4,789.70	4,789.37	33.61	187.48	-90.63	169.74	815.50	422.79	227.19	195.60	2.162		
5,900.00	4,800.00	4,789.69	4,789.36	36.22	187.47	-90.63	169.74	815.50	518.66	321.50	197.15	2.631		
6,000.00	4,800.00	4,789.68	4,789.35	38.85	187.47	-90.62	169.74	815.50	615.84	417.88	197.97	3.111		
6,100.00	4,800.00	4,789.67	4,789.34	41.50	187.47	-90.62	169.74	815.50	713.81	515.38	198.43	3.597		
6,200.00	4,800.00	4,789.66	4,789.33	44.15	187.47	-90.61	169.74	815.50	812.27	613.56	198.71	4.088		
6,300.00	4,800.00	4,789.64	4,789.31	46.82	187.47	-90.61	169.74	815.50	911.06	712.18	198.89	4.581		

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



TDS
Anticollision Report

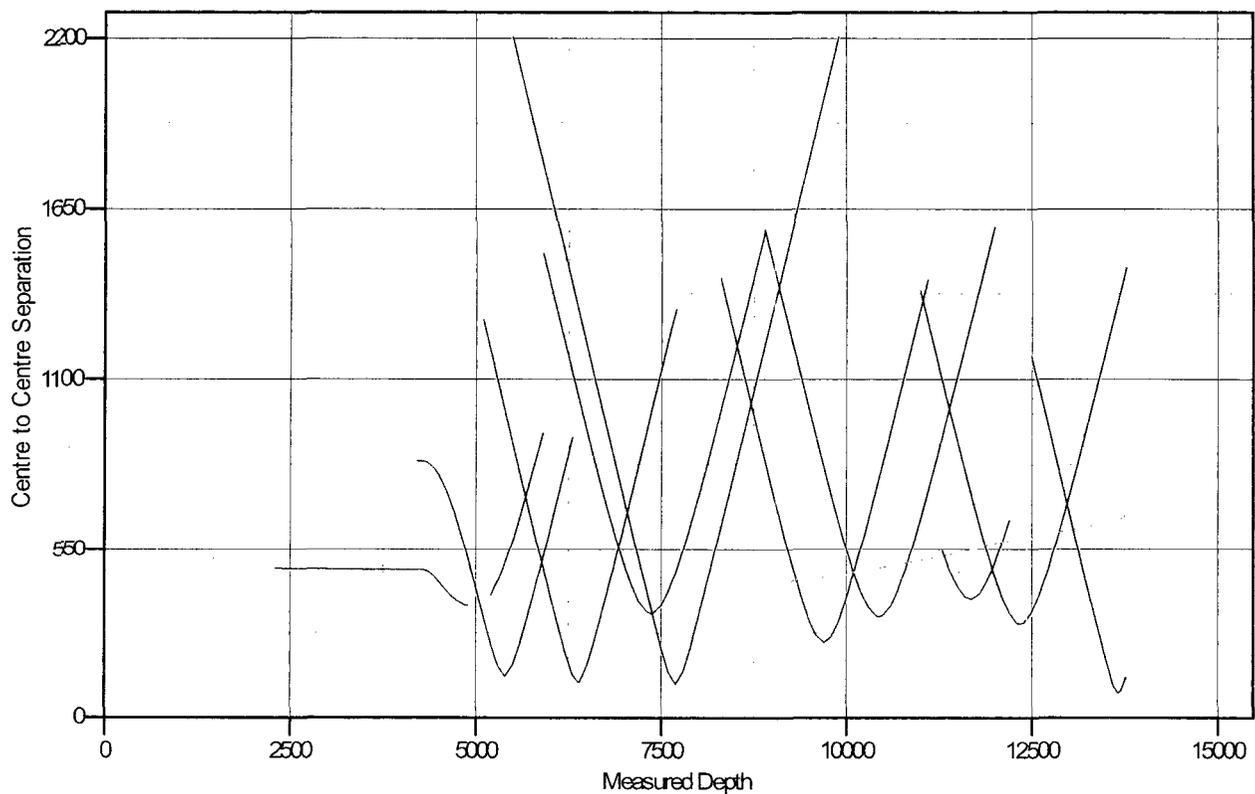


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3595.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Un
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.14°

Ladder Plot



LEGEND

- Empire Federal SWD#3, OH, OH V0
- Dodd Federal Unit#125, OH, OH V0
- Dodd Federal Unit#124, OH, OH V0
- Dodd Federal Unit#128, OH, OH V0

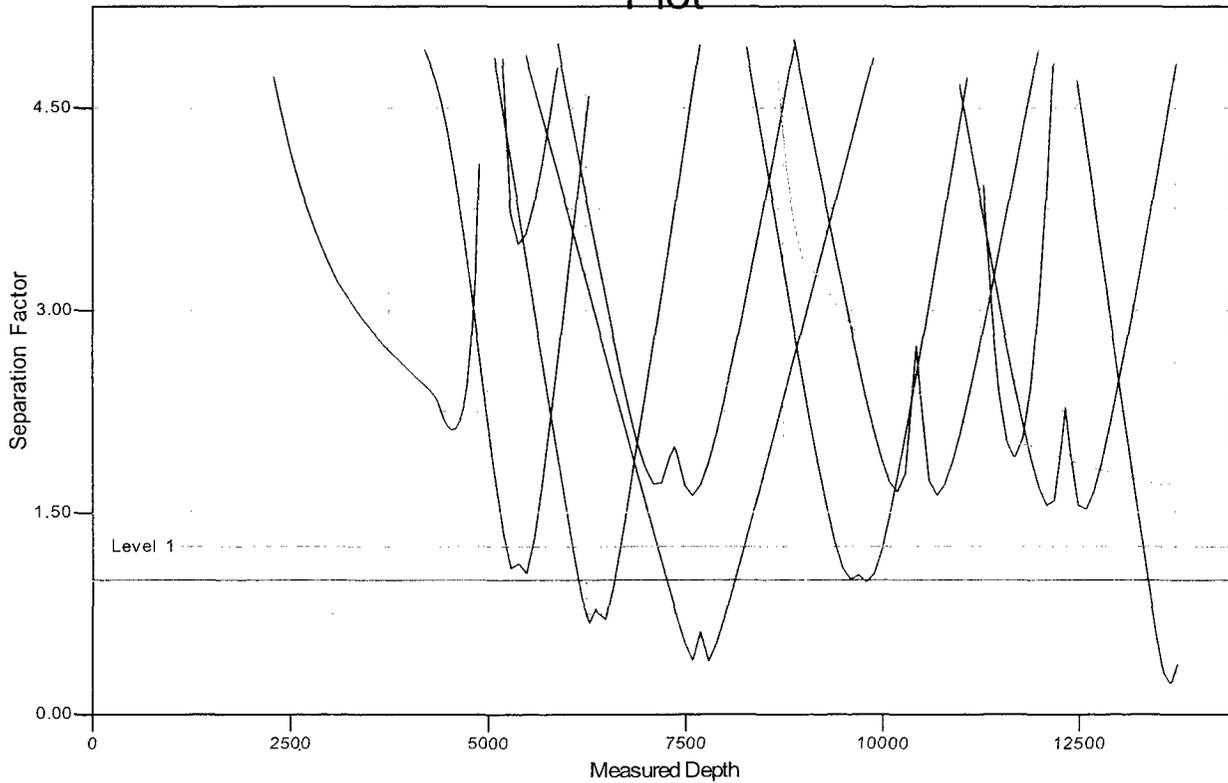


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3595.00usft (Silver Oak 3)
Reference Site:	Dodd Federal Unit #912H	MD Reference:	KB @ 3595.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 2170' FSL, 220' FEL, Sec 11, T17S, R29E, Unit I	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3595.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: SHL: 1760' FSL, 1170' FWL, Sec 10, T17S, R29E, Un
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.14°

Separation Factor Plot



LEGEND

- Empire Federal SWD#3, OH, OH V0
- Dodd Federal Unit#125, OH, OH V0
- Dodd Federal Unit#124, OH, OH V0
- Dodd Federal Unit#128, OH, OH V0

Closed Loop Operation & Maintenance Procedure

All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

Cuttings will be hauled to either:

CRI (permit number R9166)

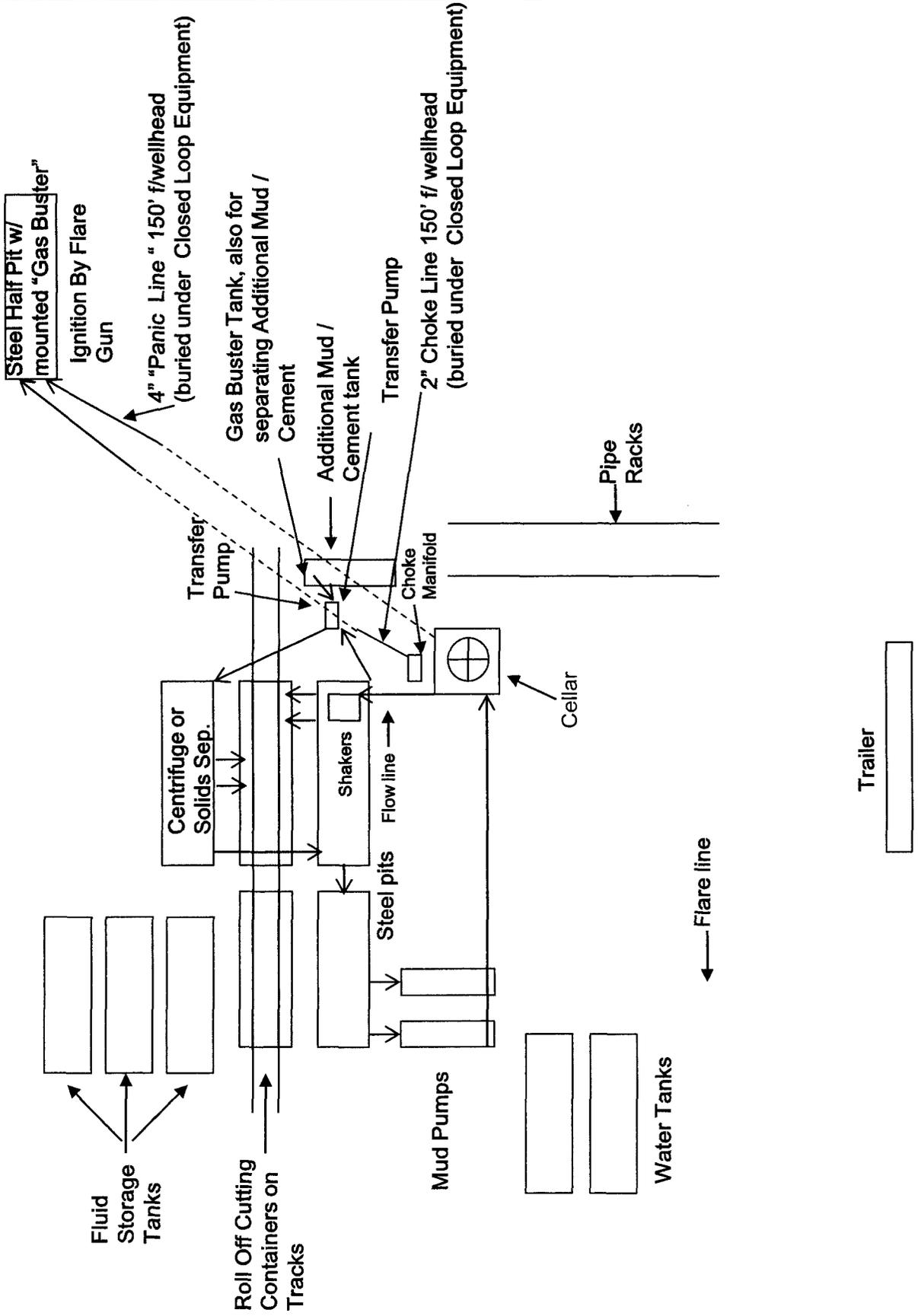
or

GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.

COG Operating LLC

Closed Loop Equipment Diagram



Well: Dodd 912H

Hole Volumes						
Hole	Hole Section (Length)	Casing	Capacity (ft ³ /Lin.ft)	Cu.Ft	Total Cu.Ft	% Excess
Prod	0-950 (950)	7"	0.1585	146.11	146.11	0
Prod	950-4700 (3750)	7"	0.1503	563.6	2141.6	103
Prod	4700-5038 (338)	5.5"	0.2526	85.4		103
Prod	5038-13651 (8613)	5.5"	0.1733	1492.6		103

Cement Volumes					
Blend	Cement Sacks	Yield	Weight	Volume	Total Volume
35:65:6	500	2.01	12.5	1206	4494
50:50:02	2400	1.37	14	3288	

% Excess Calculation			
Total Volume	4494		4347.89
Cu.Ft	-146.11		/2141.6
	4347.89		103%excess

APD ID: 10400011771

Submission Date: 02/23/2017

Highlighted data reflects the most recent changes

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

Dodd_Federal_Unit_912H_Vinicity_Plat_04-18-2017.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Dodd_Federal_Unit_912H_New_Road_Plat_04-18-2017.pdf

New road type: RESOURCE

Length: 232.16 Feet **Width (ft.):** 30

Max slope (%): 3 **Max grade (%):** 1

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 20

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

New road access plan or profile prepared? YES

New road access plan attachment:

New Access Road Plan_02-23-2017.pdf

Access road engineering design? NO

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Access road engineering design attachment:

Access surfacing type: OTHER

Access topsoil source: BOTH

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description: Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. Secondary candidate source will be NMSLO Caliche Pit located in S2/SW4 of Sec 32, T16S, R30E. A third candidate source will be Caswell Ranch owned Caliche Pit located in NESE of Sec 9, T17S, R32E.

Onsite topsoil removal process: See attached New Access Road Plan.

Access other construction information:

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage and to be consistent with local drainage patterns.

Road Drainage Control Structures (DCS) description: Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage and to be consistent with local drainage patterns.

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

Dodd Federal Unit 912H_1mile Radius Map_02-23-2017.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: If the well is productive, contemplated facilities will be as follows: Two (2) proposed flowlines, will follow an archaeologically approved route to the Dodd Federal Unit 10A Battery located in Section 10 in T17S R29E. The flowlines will be SDR 7 3" poly line laid on the surface and will be approximately 6173 feet in length. Normal working pressure of the flowlines will be below 70 psi and carry a mixture of produced oil, water, and gas. Flowlines will follow existing well-traveled or proposed roads. The tank battery and facilities including all flow lines and piping will be installed according to API specifications.

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING,
SURFACE CASING

Water source type: GW WELL

Describe type:

Source latitude:

Source longitude:

Source datum:

Water source permit type: WATER WELL

Source land ownership: PRIVATE

Water source transport method: PIPELINE,TRUCKING

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 1904.762

Source volume (acre-feet): 0.24551065

Source volume (gal): 80000

Water source and transportation map:

Loco Hills Water Disposal Co Water Supply_02-23-2017.pdf

Caswell Ranch_Water Supply_02-23-2017.pdf

Water source comments: The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. Water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Vicinity Map. A fresh water source is nearby and fast line may be laid along existing road ROW's and fresh water pumped to the well. Water will originate from private wells location described on the attached "Loco Hills Water Disposal Co" map attached to this APD. James R. Maloney; 575-677-2118. A secondary water source will be from 1 and/or all of the 3 private wells location depicted on the attached "Caswell Ranch Water Supply" Map. No water well will be drilled on the location.

New water well? NO

New Water Well Info

Well latitude:

Well Longitude:

Well datum:

Well target aquifer:

Est. depth to top of aquifer(ft):

Est thickness of aquifer:

Aquifer comments:

Aquifer documentation:

Well depth (ft):

Well casing type:

Well casing outside diameter (in.):

Well casing inside diameter (in.):

New water well casing?

Used casing source:

Drilling method:

Drill material:

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Grout material:

Grout depth:

Casing length (ft.):

Casing top depth (ft.):

Well Production type:

Completion Method:

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. Secondary candidate source will be NMSLO Caliche Pit located in S2/SW4 of Sec 32, T16S, R30E. A third candidate source will be Caswell Ranch owned Caliche Pit located in NESE of Sec 9, T17S, R32E.

Construction Materials source location attachment:

Construction Turn-Over Procedure_02-23-2017.pdf

NMSLO Caliche Pit_02-23-2017.pdf

Caswell Ranch Caliche Pit_02-23-2017.pdf

Section 7 - Methods for Handling Waste

Waste type: PRODUCED WATER

Waste content description: Produced Water

Amount of waste: 100 barrels

Waste disposal frequency : Daily

Safe containment description: Steel Tanks

Safe containmant attachment:

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

Disposal type description:

Disposal location description: NMOCD approved commercial disposal facility. R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.

Waste type: GARBAGE

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

Amount of waste: 100 pounds

Waste disposal frequency : Weekly

Safe containment description: Trash Bin

Safe containmant attachment:

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

Disposal type description:

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Disposal location description: Garbage and trash to be collected in trash bin and hauled to Lea Landfill LLC. Located at mile marker 64, Highway 62-180 East, PO Box 3247, Carlsbad, NM 88221. No toxic waste or hazardous chemicals will be produced by this operation.

Waste type: SEWAGE

Waste content description: Human waste and grey water

Amount of waste: 100 gallons

Waste disposal frequency : Weekly

Safe containment description: Portable septic system and/or portable waste gathering system.

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Hauled to NMOCD approved waste disposal facility.

Waste type: DRILLING

Waste content description: Drill cuttings and drilling fluids

Amount of waste: 100 barrels

Waste disposal frequency : Daily

Safe containment description: Closed Loop System

Safe containmant attachment:

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

Disposal type description:

Disposal location description: R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

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

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Closed Loop Mud System: Roll-off Style Mud Box

Cuttings area length (ft.)

Cuttings area width (ft.)

Cuttings area depth (ft.)

Cuttings area volume (cu. yd.)

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Dodd_Federal_Unit_912H_Well_Site_Plat_04-18-2017.pdf

Dodd_Federal_Unit_912H_Interim_Reclamation_Plat_04-18-2017.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: NEW

Recontouring attachment:

Drainage/Erosion control construction: No sedimentation or erosion control will be necessary on this location as it is generally flat with little to no slope or cut and fill.

Drainage/Erosion control reclamation: No sedimentation or erosion control will be necessary on this location as it is generally flat with little to no slope or cut and fill.

Wellpad long term disturbance (acres): 1.55

Wellpad short term disturbance (acres): 2.2

Access road long term disturbance (acres): 0.18

Access road short term disturbance (acres): 0.18

Pipeline long term disturbance (acres): 1.3578972

Pipeline short term disturbance (acres): 1.3578972

Other long term disturbance (acres): 0

Other short term disturbance (acres): 0

Total long term disturbance: 3.087897

Total short term disturbance: 3.7378972

Reconstruction method: After well is completed, the pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease.

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Topsoil redistribution: The stockpiled topsoil will be spread out on reclaimed area and reseeded with a BLM approved seed mixture.

Soil treatment: Interim reclamation as identified during on-site.

Existing Vegetation at the well pad: Grassland area with sandy topsoil. Vegetation is moderately sparse with Native prairie grasses, some mesquite and shinnery oak.

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Grassland area with sandy topsoil. Vegetation is moderately sparse with Native prairie grasses, some mesquite and shinnery oak.

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Grassland area with sandy topsoil. Vegetation is moderately sparse with Native prairie grasses, some mesquite and shinnery oak.

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: Grassland area with sandy topsoil. Vegetation is moderately sparse with Native prairie grasses, some mesquite and shinnery oak.

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary

Total pounds/Acre:

Seed Type

Pounds/Acre

Seed reclamation attachment:

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Operator Contact/Responsible Official Contact Info

First Name:

Last Name:

Phone:

Email:

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: Approved EPA and BLM requirements and policies for weed control methods will be followed.

Weed treatment plan attachment:

Monitoring plan description: Evaluation of growth will be made after the completion of one full growing season after seeding. -OR- BLM representative will be contacted prior to commencing construction of well pad and road. BLM representative will also be contacted prior to commencing reclamation work.

Monitoring plan attachment:

Success standards: 80% coverage by 2nd growing season of native species with less than 5% invasive species.

Pit closure description: N/A

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Disturbance type: NEW ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Disturbance type: EXISTING ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Operator Name: COG OPERATING LLC

Well Name: DODD FEDERAL UNIT

Well Number: 912H

Disturbance type: PIPELINE

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Section 12 - Other Information

Right of Way needed? NO

Use APD as ROW?

ROW Type(s):

ROW Applications

SUPO Additional Information: 1. It will be necessary to run electric power if this well is productive. Power will be provided by CVE. There will be no necessary electric line construction for this well. CVE operates an existing primary line parallel to the well pad; therefor no poles will be set off the well pad disturbance. There is no permanent or live water in the immediate area. 2. There are no dwellings within 2 miles of this location. 3. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of New Mexico, LLC. Carlsbad, NM, 88220. 506 E Chapman Rd., phone # 575.887.7667 and the results will be forwarded to your office in the near future. Otherwise, COG will be participating in the Permian Basin MOA Program.

Use a previously conducted onsite? YES

Previous Onsite information: Onsite performed on 12/12/2016 by Nick Franke(BLM), Cassandra Brooks(BLM), Curtis Griffin(COG), Jason Morgan(RRC).

Other SUPO Attachment

Operator Name: COG OPERATING LLC

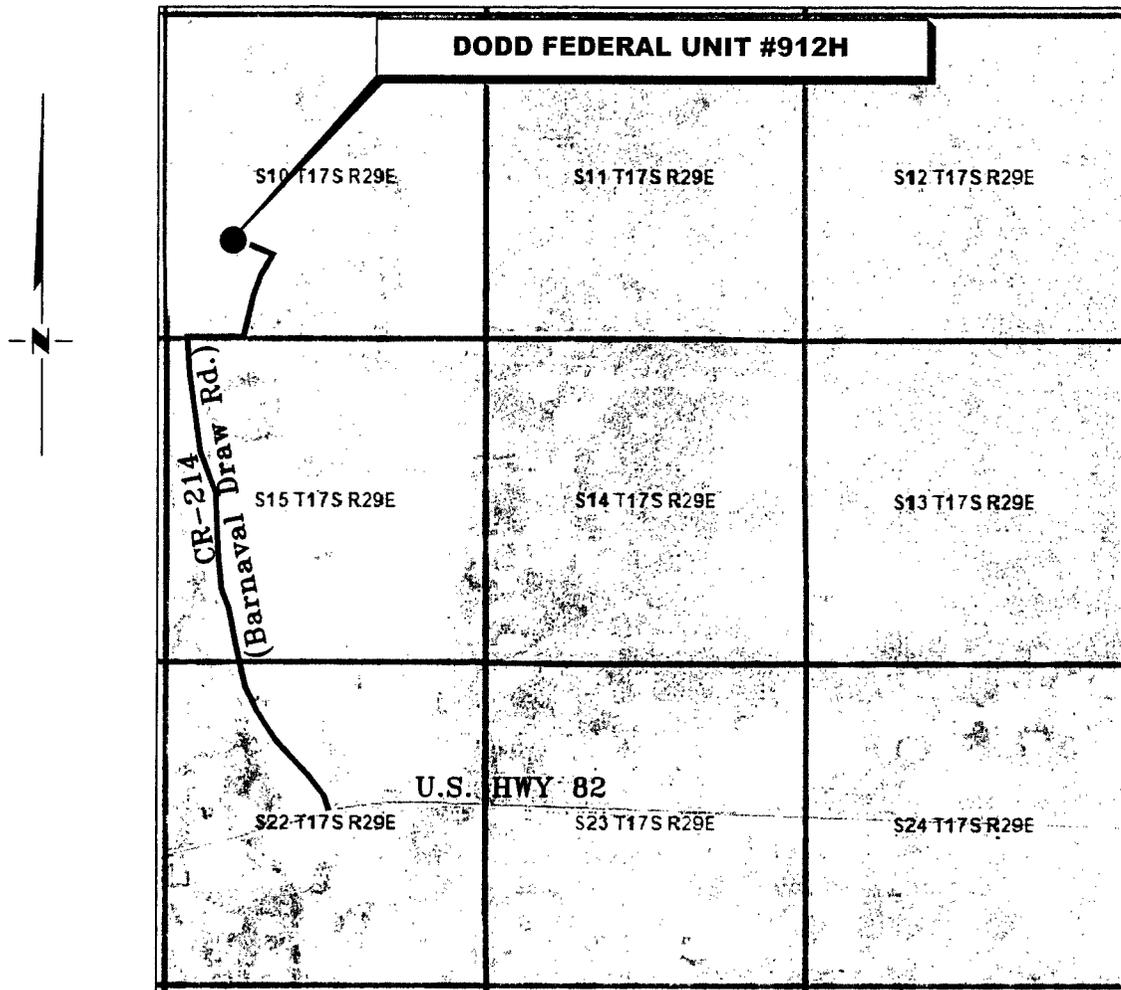
Well Name: DODD FEDERAL UNIT

Well Number: 912H

Dodd_Federal_Unit_912H_Flowlines_Map_04-18-2017.pdf

VICINITY MAP

NOT TO SCALE



*SECTION 10, TWP. 17 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO*

OPERATOR: COG Operating, LLC
 LEASE: Dodd Federal Unit
 WELL NO.: 912H

LOCATION: 1760' FSL & 1170' FWL
 ELEVATION: 3577'

Firm No.. TX 10193838 NM 4655451

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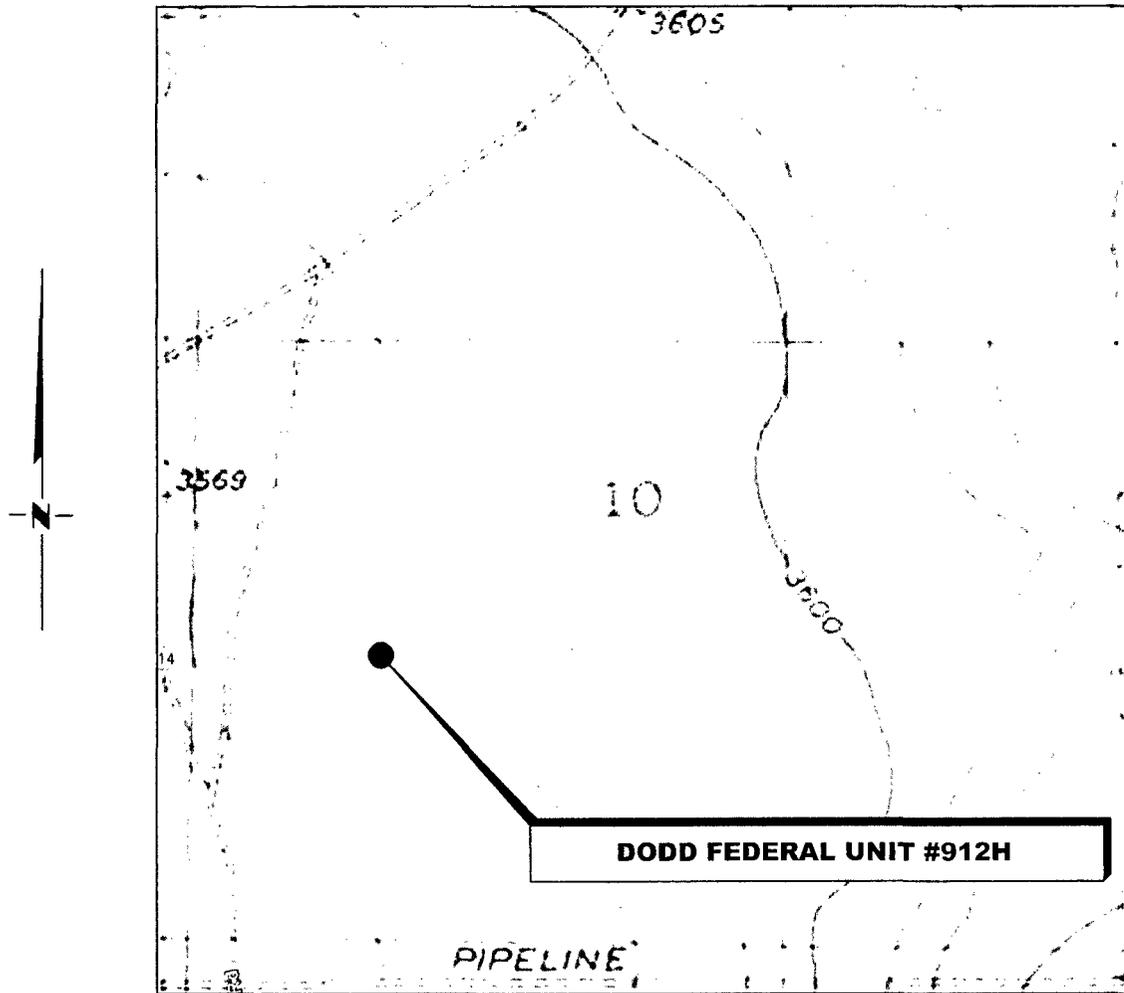
NO.	REVISION	DATE
JOB NO.: LS1609300R		
DWG. NO.: 1609300VM		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
DATE: 3-08-2017
SURVEYED BY: JM/HD
DRAWN BY: LPS
APPROVED BY: RMH
SHEET: 1 OF 1

LOCATION VERIFICATION MAP



SECTION 10, TWP. 17 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO

OPERATOR: COG Operating, LLC
 LEASE: Dodd Federal Unit
 WELL NO.: 912H
 ELEVATION: 3577'

LOCATION: 1760' FSL & 1170' FWL
 CONTOUR INTERVAL: 10'
 USGS TOPO. SOURCE MAP:
Red Lake SE, NM (1955)

Firm No.: TX 10193838 NM 4655451

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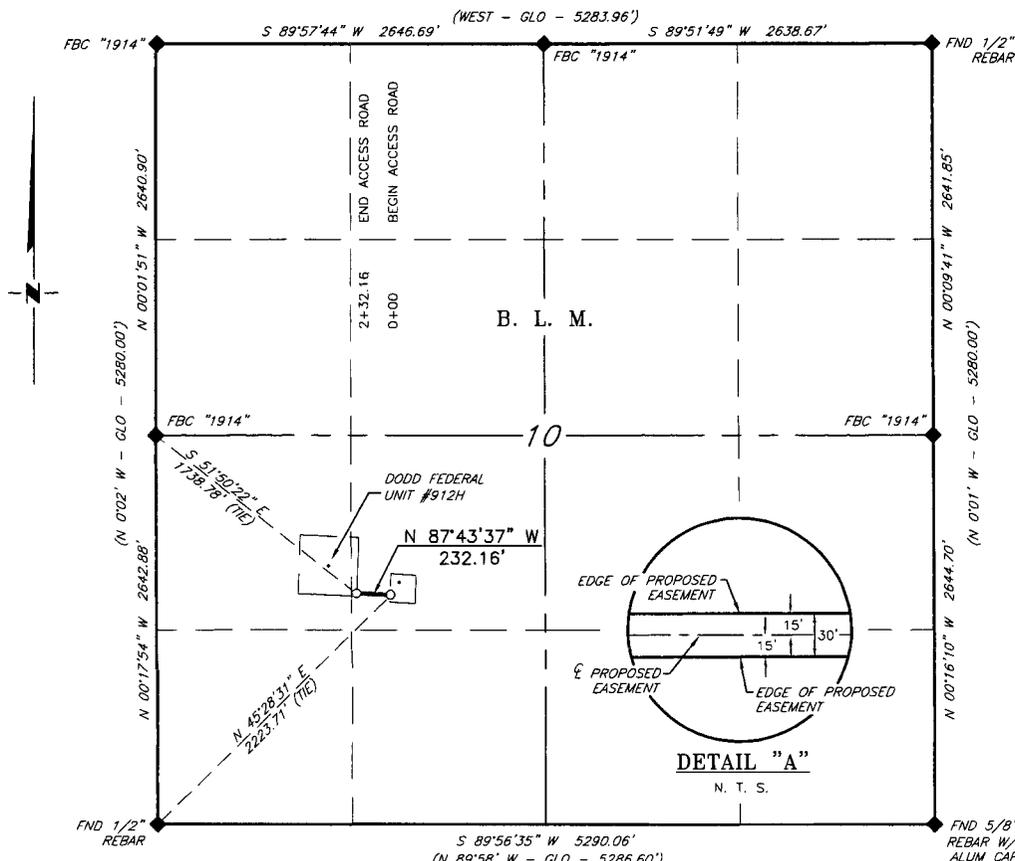
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JOB NO.: LS1609300R		
DWG. NO.: 1609300LVM		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
 DATE: 3-08-2017
 SURVEYED BY: JM/JF
 DRAWN BY: LPS
 APPROVED BY: RMH
 SHEET: 1 OF 1

**COG OPERATING, LLC
PROPOSED ACCESS ROAD
FOR THE DODD FEDERAL UNIT #912H
SECTION 10, T17S, R29E,
N. M. P. M., EDDY CO., NEW MEXICO**



DESCRIPTION

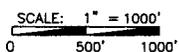
A strip of land 30 feet wide, being 232.16 feet or 14.070 rods in length, lying in Section 10, Township 17 South, Range 29 East, N. M. P. M., Eddy County, New Mexico, being 15 feet left and 15 feet right of the following described survey of a centerline across B. L. M. land:

BEGINNING at Engr. Sta. 0+00, a point in the Southwest quarter of Section 10, which bears N 45°28'31" E, 2,223.71 feet, from a 1/2" rebar, found for the Southwest corner of Section 10;

Thence N 87°43'37" W, 232.16 feet, to Engr. Sta. 2+32.16, the End of Survey, a point in the Southwest quarter of Section 10, which bears S 51°50'22" E, 1,738.78 feet, from a brass cap, stamped "1914", found for the West quarter corner of Section 10.

Said strip of land contains 0.160 acres, more or less, and is allocated by forties as follows:

NE 1/4 SW 1/4	14.070 Rods	0.160 Acres
---------------	-------------	-------------



BEARINGS ARE GRID NAD 27
NM EAST
DISTANCES ARE HORIZ. GROUND.

- LEGEND**
- () RECORD DATA - GLO
 - ◆ FOUND MONUMENT AS NOTED
 - PROPOSED ACCESS ROAD

I, R. M. Howett, a N. M. Professional Surveyor, hereby certify that I prepared this plat from an actual survey made on the ground under my direct supervision, said survey and plat meet the Min. Stds. for Land Surveying in the State of N. M. and are true and correct to the best of my knowledge and belief.



Firm No. TX 10193838 NM 4655451 Robert M. Howett NM PS 19680 Copyright 2016 - All Rights Reserved

NO.	REVISION	DATE
JOB NO.: LS1609300R		
DWG. NO.: 1609300RD		



308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
DATE: 3-08-2017
SURVEYED BY: JM/JF
DRAWN BY: LPS
APPROVED BY: RMH
SHEET: 1 OF 1

NEW ACCESS ROAD PLAN

1. Proposed Access Road:

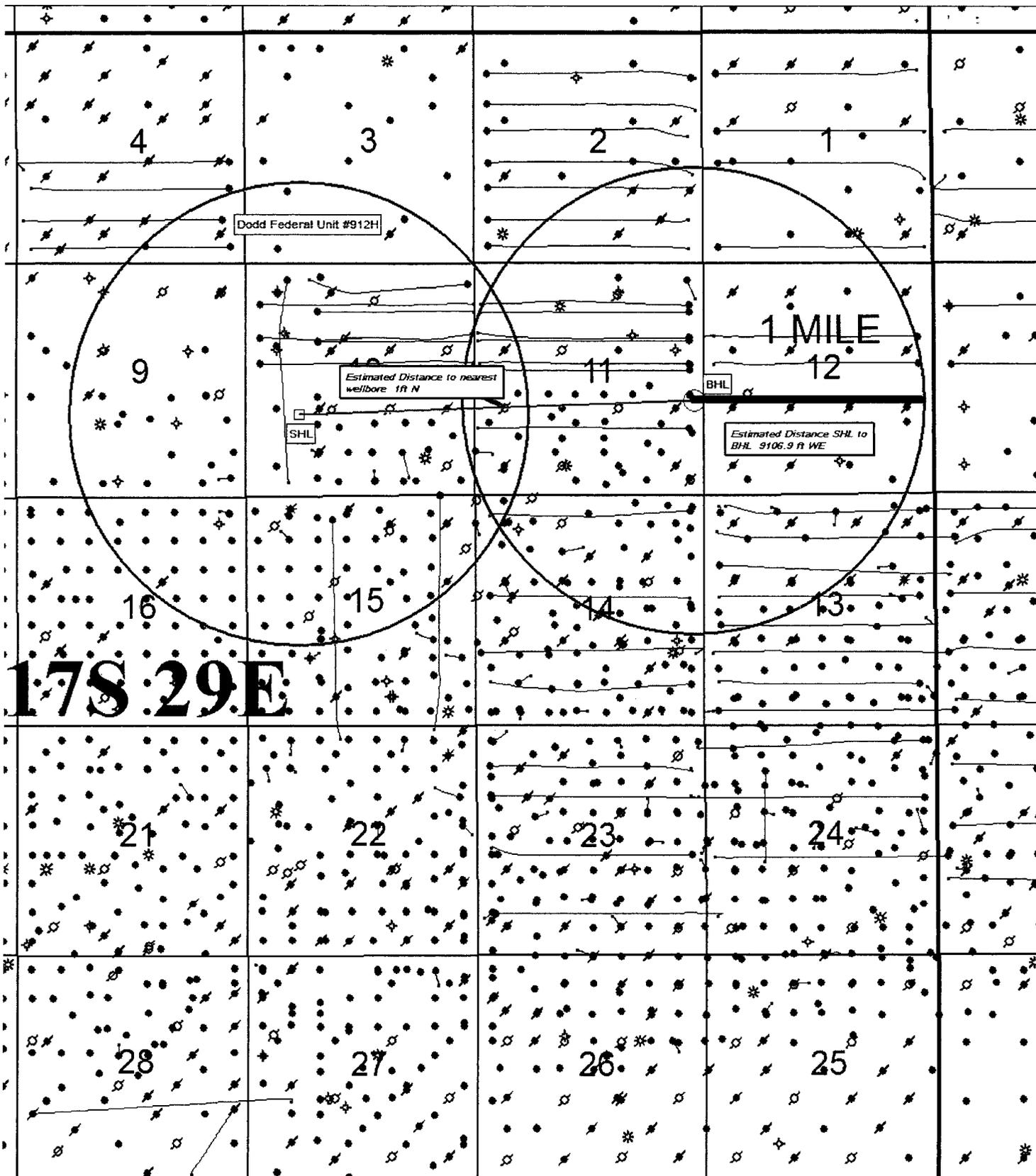
The Access Road Plat shows the footage of new access road will be required for this location. The new access road will be constructed as follows:

- A. The maximum width of the running surface will be 20'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.
- B. The average grade will be less than 1%.
- C. No turnouts are planned.
- D. No culverts, cattleguard, gates, low water crossings or fence cuts are necessary.
- E. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. Secondary and Tertiary candidate sources are identified the "Offsite topsoil source description" in Section 2 of the SUPO.

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

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

- A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.
- B. An approximate 120' X 120' area is used within the proposed well site to remove caliche.
- C. Subsoil is removed and piled alongside the 120' by 120' area within the pad site.
- D. When caliche is found, material will be stock piled within the pad site to build the location and road.
- E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.
- F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.



17S 29E

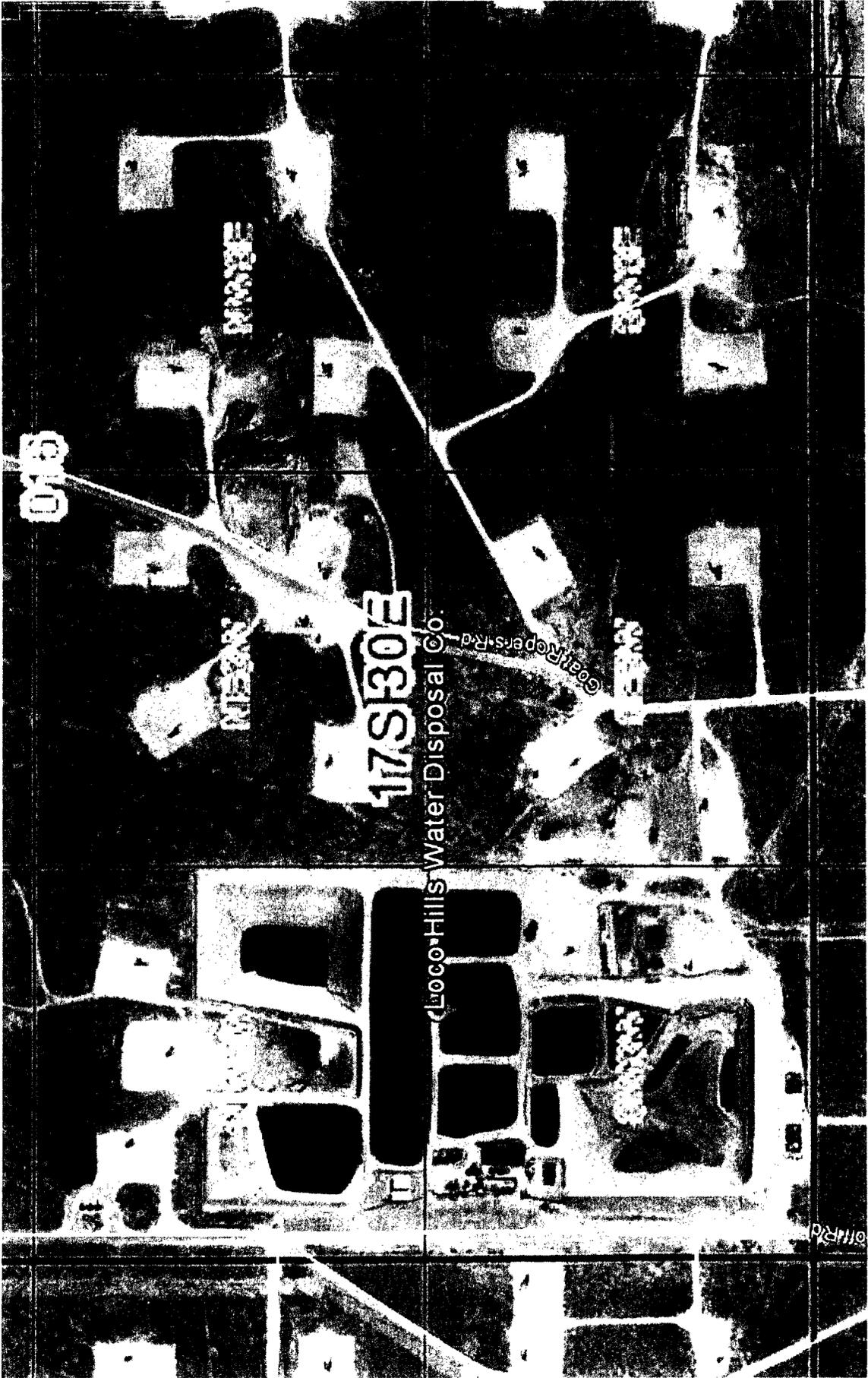


SENM AREA
Eddy County, New Mexico

Dodd Federal Unit #912H
Sec. 10, T17S-R29E
SHL 1860' FSL & 1240' FWL
Sec. 11, T17S-R29E
BHL 2170' FSL 220' FEL

Author: raskew SENM	Scale:	Date: 13 February, 2017 ra_dodd_federal_unit 512H_1m_radius.gmp
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Loco Hills Water Disposal Co. Water Well Map



Caswell Ranch Water Supply Map



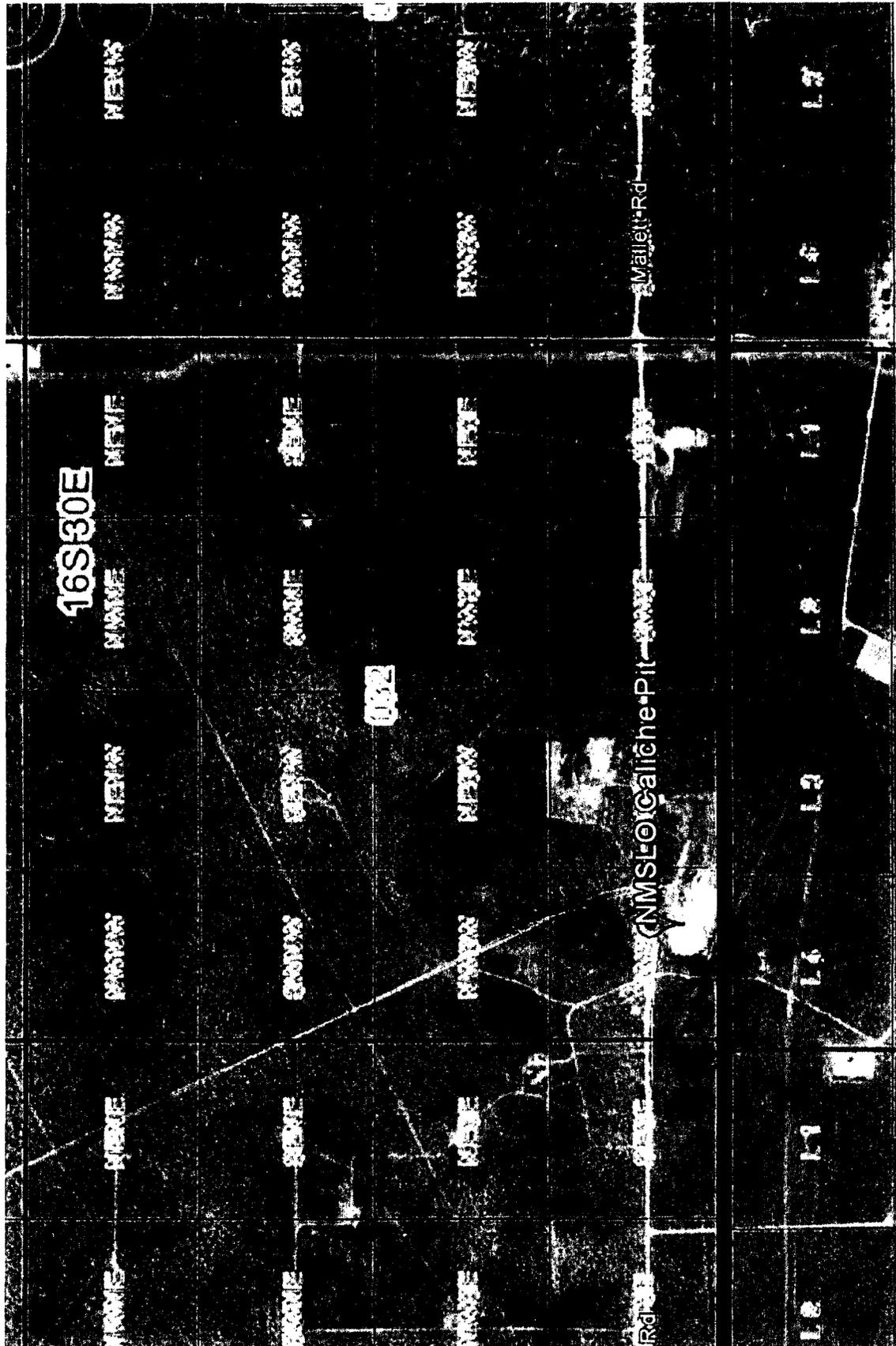
WELL SITE AND ROAD CONSTRUCTION

1. Source of Construction Materials and Location “Turn-Over” Procedure:

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by “turning over” the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

- A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.**
- B. An approximate 120’ X 120’ area is used within the proposed well site to remove caliche.**
- C. Subsoil is removed and piled alongside the 120’ by 120’ area within the pad site.**
- D. When caliche is found, material will be stock piled within the pad site to build the location and road.**
- E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.**
- F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.**
 - In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit.

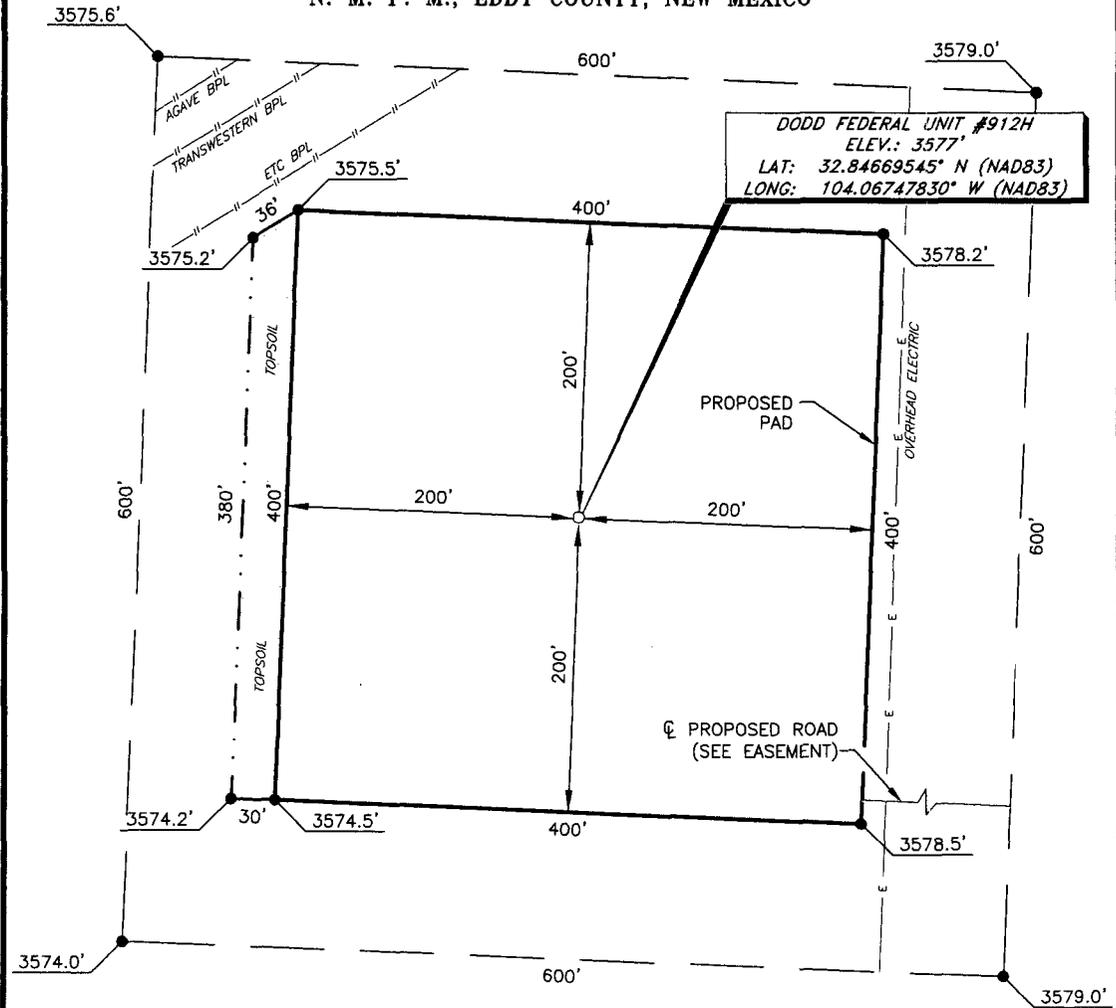
NMSLO Caliche Pit



Caswell Ranch Caliche Pit Map



COG OPERATING, LLC
 DODD FEDERAL UNIT #912H
 (1760' FSL & 1170' FWL)
 SECTION 10, T17S, R29E
 N. M. P. M., EDDY COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION

From the intersection of US HWY-82 and CR-214 (Barnaval Draw Rd.);
 Go North on CR-214 approx. 1.5 miles to a lease road on the right;
 Turn right and go East approx. 0.2 miles to lease road on the left;
 Turn left and go North approx. 0.3 miles to lease road on the left;
 Turn left and go West approx. 200 feet to a proposed road on the southwest corner of an existing well pad;
 Continue left and go Northwest on proposed road approx. 415 feet to location on the right.



SCALE: 1" = 100'
 0 50 100

BEARINGS ARE
 NAD 83 GRID - NM EAST
 DISTANCES ARE GROUND

I, R. M. Howett, a N. M. Professional Surveyor, hereby certify that I prepared this unclassified survey of a well location from an actual survey made on the ground under my direct supervision, said survey and plat meet the Min. Stds. for Land Surveying in the State of N. M. and are true and correct to the best of my knowledge and belief.

Robert M. Howett
 NM PS 19680

Firm No.: TX 10193838 NM 4655451

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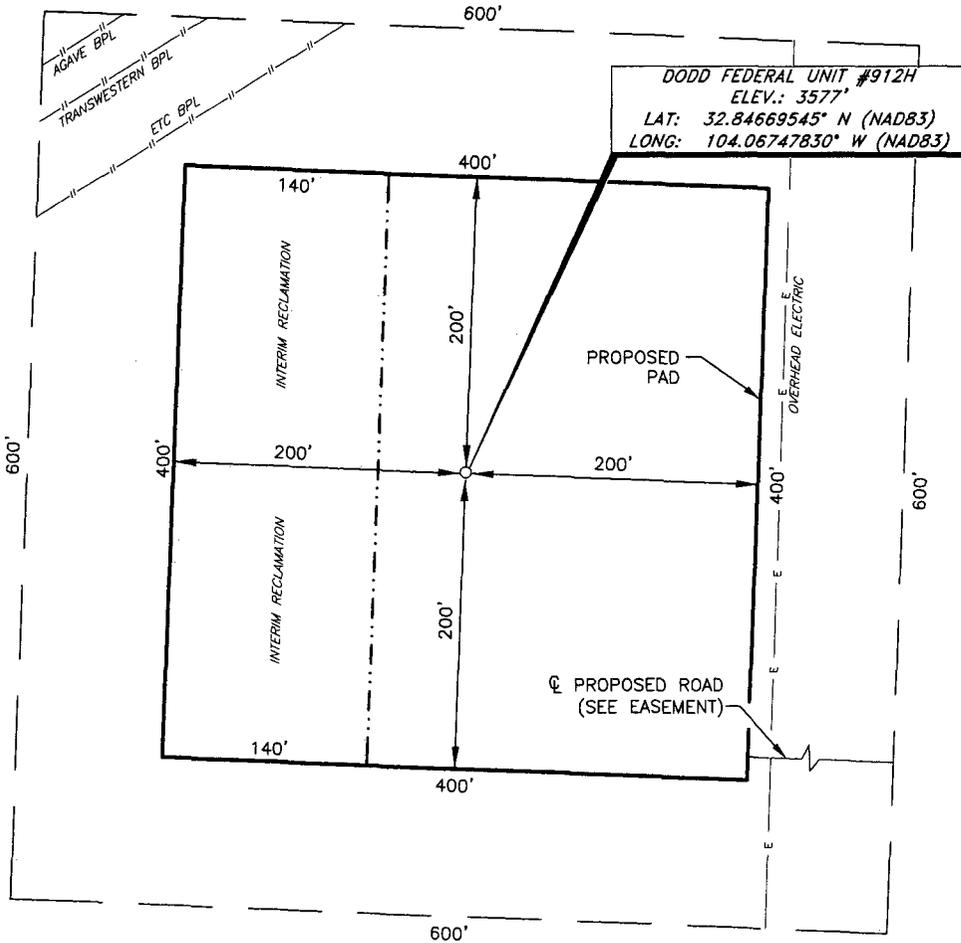
NO.	REVISION	DATE
JOB NO.: LS1609300R		
DWG. NO.: 1609300PAD		

RRC

308 W. BROADWAY ST. HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'
DATE: 3-08-2017
SURVEYED BY: JM/HD
DRAWN BY: LPS
APPROVED BY: RMH
SHEET: 1 OF 1

COG OPERATING, LLC
 DODD FEDERAL UNIT #912H
 INTERIM RECLAMATION
 (1760' FSL & 1170' FWL)
 SECTION 10, T17S, R29E
 N. M. P. M., EDDY COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION

From the intersection of US HWY-82 and CR-214 (Barnaval Draw Rd.);
 Go North on CR-214 approx. 1.5 miles to a lease road on the right;
 Turn right and go East approx. 0.2 miles to lease road on the left;
 Turn left and go North approx. 0.3 miles to least road on the left;
 Turn left and go West approx. 200 feet to a proposed road on the southwest
 corner of an existing well pad;
 Continue left and go Northwest on proposed road approx. 415 feet to location on
 the right.

SCALE: 1" = 100'
 0 50 100

BEARINGS ARE
 NAD 83 GRID - NM EAST
 DISTANCES ARE GROUND

Firm No.: TX 10193838 NM 4655451

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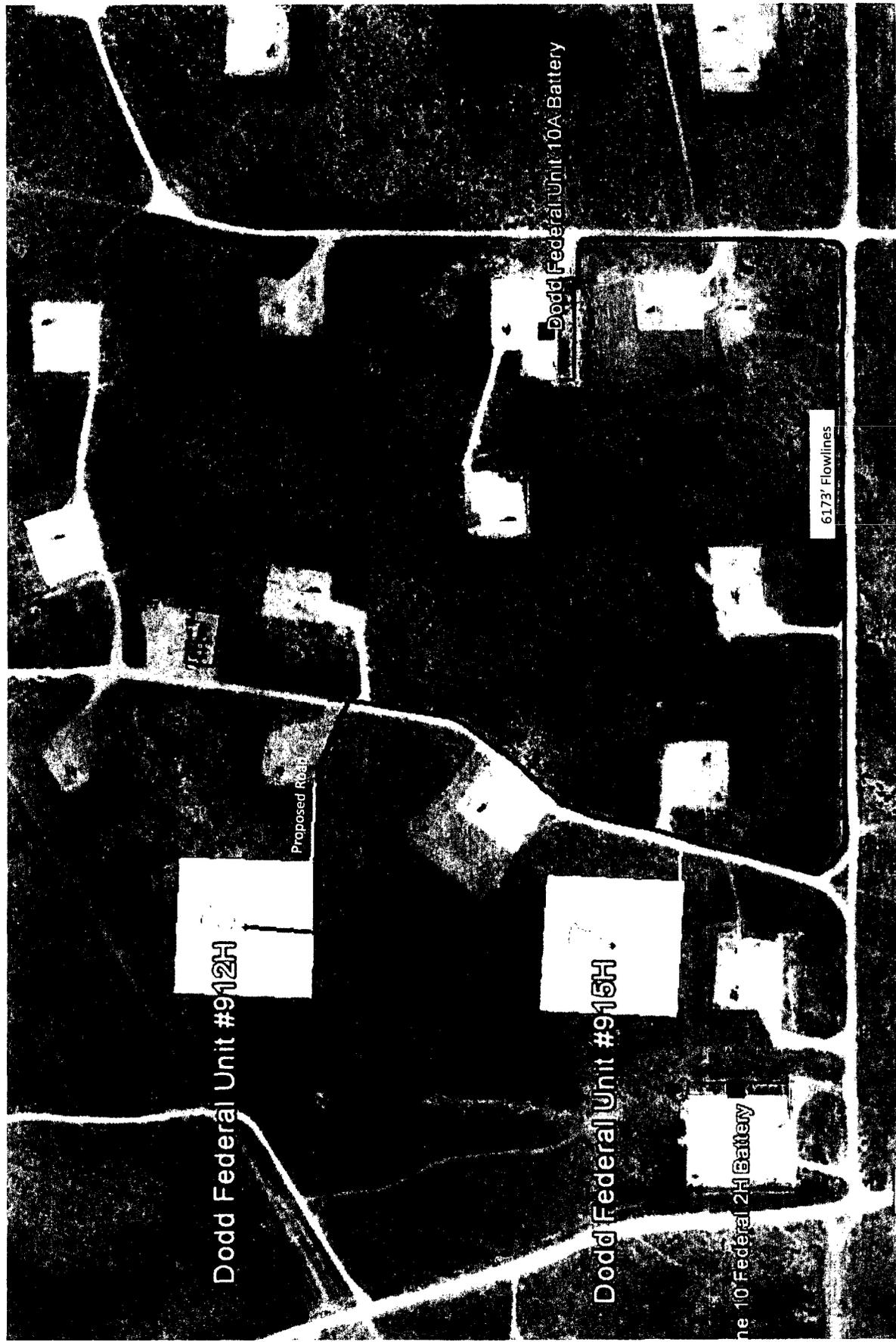
NO.	REVISION	DATE
JOB NO.: LS1609300R		
DWG. NO.: 1609300PAD		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'
DATE: 3-08-2017
SURVEYED BY: JM/HD
DRAWN BY: LPS
APPROVED BY: RMH
SHEET: 1 OF 1

Dodd Federal Unit #912H Surface Flowlines Map



Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number:

Injection well name:

Assigned injection well API number?

Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: