

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM112907
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		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG OPERATING LLC		7. If Unit or CA Agreement, Name and No. 316775
3a. Address 600 West Illinois Ave Midland TX 79701		8. Lease Name and Well No. ROADRUNNER FEDERAL COM 13H
3b. Phone No. (include area code) 229137 (432)683-7443		9. API Well No. 30-015-44863
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface SESW / 210 FSL / 2025 FWL / LAT 32.094125 / LONG -104.248471 At proposed prod. zone NENW / 200 FNL / 1850 FWL / LAT 32.122122 / LONG -104.248971		10. Field and Pool or Exploration Unit BONE SPRING 97494
11. Sec., T. R. M. or Blk. and Survey or Area SEC 25 / T25S / R26E / NMP		12. County or Parish EDDY
13. State NM		14. Distance in miles and direction from nearest town or post office* 10 miles
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 200 feet	16. No. of acres in lease 440	17. Spacing Unit dedicated to this well 320
18. Distance from proposed location* to nearest well, drilling, completed, 526 feet applied for, on this lease, ft.	19. Proposed Depth 7650 feet / 17789 feet	20. BLM/BIA Bond No. on file FED: NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3242 feet	22. Approximate date work will start* 03/01/2018	23. Estimated duration 30 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) Mayte Reyes / Ph: (575)748-6945	Date 12/20/2017
Title Regulatory Analyst		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575)234-5959	Date 03/22/2018
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)

APPROVED WITH CONDITIONS
Approval Date: 03/22/2018

NEW OIL CONSERVATION
ARTESIA DISTRICT
APR 05 2018
RECEIVED

RW 4-6-18

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications.

Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease.

The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

Additional Operator Remarks

Location of Well

1. SHL: SESW / 210 FSL / 2025 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.094125 / LONG: -104.248471 (TVD: 0 feet, MD: 0 feet)
PPP: NESW / 2640 FSL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 24 / LAT: 32.115397 / LONG: -104.248986 (TVD: 7643 feet, MD: 15200 feet)
PPP: NENW / 1320 FNL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.10448 / LONG: -104.249009 (TVD: 3600 feet, MD: 3650 feet)
PPP: SESW / 330 FSL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.094456 / LONG: -104.24903 (TVD: 1000 feet, MD: 1000 feet)
BHL: NENW / 200 FNL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 24 / LAT: 32.122122 / LONG: -104.248971 (TVD: 7650 feet, MD: 17789 feet)

BLM Point of Contact

Name: Judith Yeager

Title: Legal Instruments Examiner

Phone: 5752345936

Email: jyeager@blm.gov

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). **Contact** the above listed Bureau of Land Management office for further information.

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING LLC
LEASE NO.:	NMNM112907
WELL NAME & NO.:	Roadrunner Federal Com 3H
SURFACE HOLE FOOTAGE:	210'/S & 1995'/W
BOTTOM HOLE FOOTAGE:	200'/N & 1850'/W
LOCATION:	Section 25, T.25 S., R.26 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 type="radio"/> None	<input checked="" 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. Hydrogen Sulfide (H₂S) monitors shall be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The 13 3/8 inch surface casing shall be set at approximately **245** 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.

- ❖ In **Medium/High Cave/Karst Areas** if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
2. The minimum required fill of cement behind the **9 5/8** inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above.
3. The minimum required fill of cement behind the **5 1/2** inch production casing is:
- Cement should tie-back at least **200** feet into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M) psi Annular. 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).**
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8** inch intermediate casing shoe shall be **3000 (3M) psi.**

D. SPECIAL REQUIREMENT(S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the

anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.

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

Waste Minimization Plan (WMP)

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

MHH 03222018

GENERAL REQUIREMENTS

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

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

☒ Chaves and Roosevelt Counties

Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.

During office hours call (575) 627-0272.

After office hours call (575)

☒ Eddy County

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,

(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)

393-3612

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

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

A. CASING

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

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

B. PRESSURE CONTROL

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

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

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

PECOS DISTRICT SURFACE USE CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG OPERATING LLC
LEASE NO.:	NMNM112907
WELL NAME & NO.:	Roadrunner Federal Com 13H
SURFACE HOLE FOOTAGE:	210'/S & 2025'/W
BOTTOM HOLE FOOTAGE:	200'/N & 1850'/W
LOCATION:	Section 25, T.25 S., R.26 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
 - Water Quality
 - Tank Battery
- ☐ **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 for APDs

****** 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.)
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

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 Drilling:

Kick off for directional 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 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.

Water Quality:

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:

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

VI. CONSTRUCTION

A. NOTIFICATION

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

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

B. TOPSOIL

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

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

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

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

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

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

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

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

Surfacing

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

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

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

Crowning

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

Ditching

Ditching shall be required on both sides of the road.

Turnouts

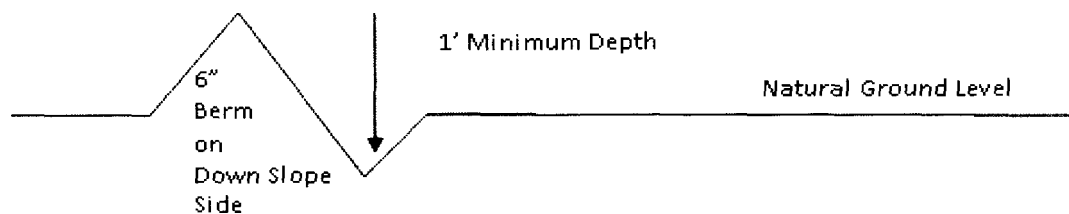
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

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

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

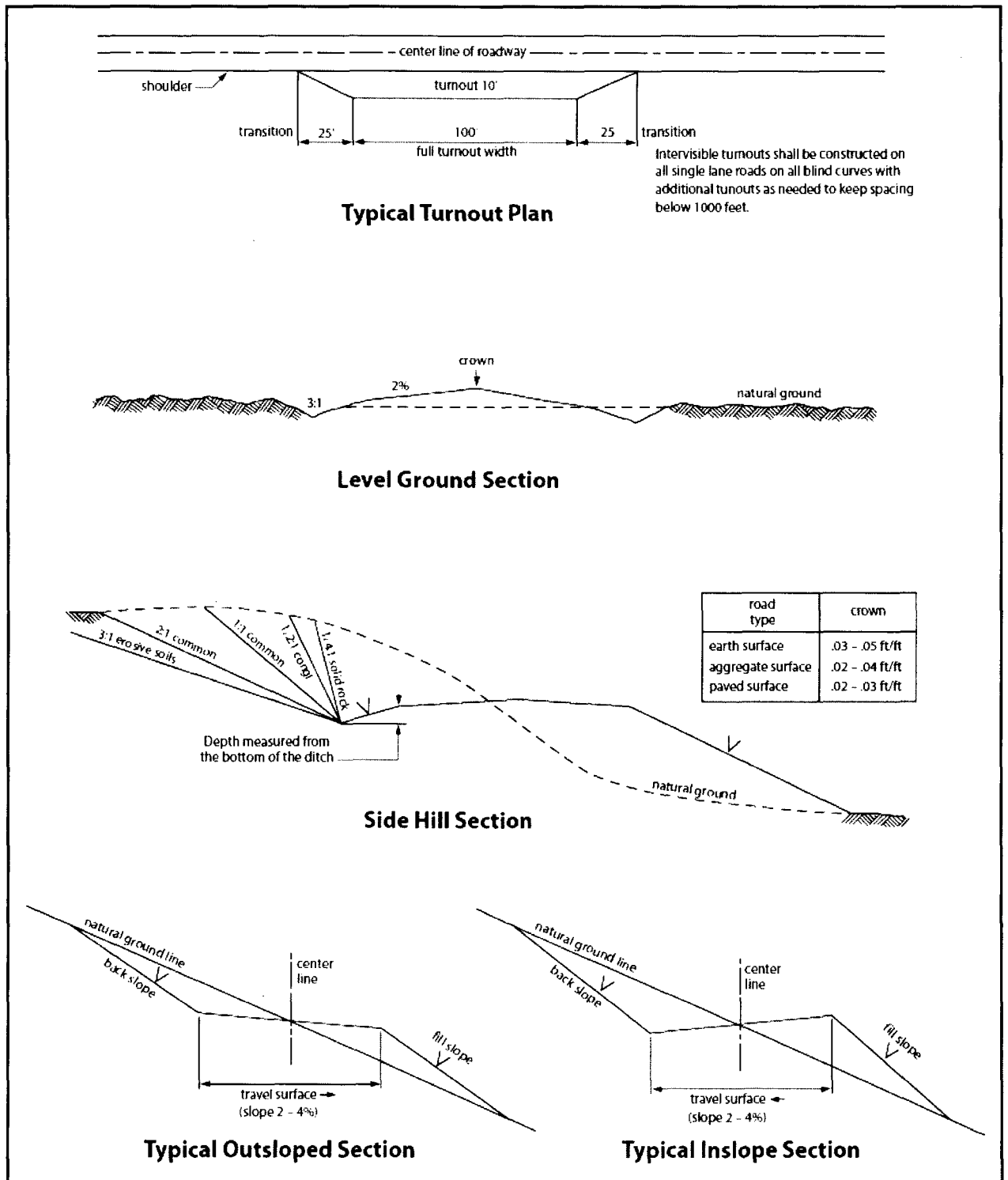


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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



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

Operator Certification Data Report

03/27/2018

Operator Certification

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

NAME: Mayte Reyes

Signed on: 12/19/2017

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

Field Representative

Representative Name: Rand French

Street Address: 2208 West Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6940

Email address: rfrench@concho.com



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

Application Data Report

03/27/2018

APD ID: 10400025686

Submission Date: 12/20/2017

Highlighted data
reflects the most
recent changes

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - General

APD ID: 10400025686

Tie to previous NOS?

Submission Date: 12/20/2017

BLM Office: CARLSBAD

User: Mayte Reyes

Title: Regulatory Analyst

Federal/Indian APD: FED

Is the first lease penetrated for production Federal or Indian? FED

Lease number: NMNM112907

Lease Acres: 440

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? NO

APD Operator: COG OPERATING LLC

Operator letter of designation:

Operator Info

Operator Organization Name: COG OPERATING LLC

Operator Address: 600 West Illinois Ave

Zip: 79701

Operator PO Box:

Operator City: Midland

State: TX

Operator Phone: (432)683-7443

Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO

Mater Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: WILDCAT

Pool Name: BONE SPRING

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

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

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:

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 10 Miles

Distance to nearest well: 526 FT

Distance to lease line: 200 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: COG_Roadrunner_13H_C102_20171219111959.pdf

Well work start Date: 03/01/2018

Duration: 30 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	210	FSL	202 5	FWL	25S	26E	25	Aliquot SESW	32.09412 5	- 104.2484 71	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	324 2	0	0
KOP Leg #1	210	FSL	202 5	FWL	25S	26E	25	Aliquot SESW	32.09412 5	- 104.2484 71	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	324 2	0	0
PPP Leg #1	330	FSL	185 0	FWL	25S	26E	25	Aliquot SESW	32.09445 6	- 104.2490 3	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	224 2	100 0	100 0

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

	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
PPP Leg #1	132 0	FNL	185 0	FWL	25S	26E	25	Aliquot NENW	32.10448	- 104.2490 09	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 112907	-358	365 0	360 0
PPP Leg #1	264 0	FSL	185 0	FWL	25S	26E	24	Aliquot NESW	32.11539 7	- 104.2489 86	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 096835	- 440 1	152 00	764 3
EXIT Leg #1	330	FNL	185 0	FWL	25S	26E	24	Aliquot NENW	32.12176 5	- 104.2489 72	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 026105	- 439 8	175 00	764 0
BHL Leg #1	200	FNL	185 0	FWL	25S	26E	24	Aliquot NENW	32.12212 2	- 104.2489 71	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 026105	- 440 8	177 89	765 0

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Pressure Rating (PSI): 2M

Rating Depth: 1910

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

Requesting Variance? YES

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

Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested. Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

Choke Diagram Attachment:

COG_Roadrunner_13H_2M_Choke_20171219130039.pdf

BOP Diagram Attachment:

COG_Roadrunner_13H_2M_BOP_20171219130046.pdf

COG_Roadrunner_13H_FlexHose_20171219130053.pdf

Pressure Rating (PSI): 3M

Rating Depth: 7650

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

Requesting Variance? YES

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

Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested. Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

Choke Diagram Attachment:

COG_Roadrunner_13H_3M_Choke_20171219130145.pdf

BOP Diagram Attachment:

COG_Roadrunner_13H_3M_BOP_20171219130224.pdf

COG_Roadrunner_13H_FlexHose_20171219130239.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

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	200	0	200	-6999	-7974	200	J-55	54.5	STC	12.35	3.33	DRY	47.16	DRY	47.16
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	1910	0	1910	-6999	-18749	1910	J-55	40	LTC	2.54	1.33	DRY	6.81	DRY	6.81
3	PRODUCTION	8.75	5.5	NEW	API	N	0	17789	0	17789	-6999	-24211	17789	P-110	17	LTC	2	3.58	DRY	3.42	DRY	3.42

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_13H_CasingRpt_20171219131121.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_13H_CasingRpt_20171219131137.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_13H_CasingRpt_20171219131144.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	200	80	1.75	13.5	140	50	Class C	4% Gel + 1% CaCl ₂
SURFACE	Tail		0	200	250	1.34	14.8	335	50	Class C	2% CaCl ₂
INTERMEDIATE	Lead		0	1910	280	2	12.7	560	50	Lead: 35:65:6 C Blend	As needed
INTERMEDIATE	Tail		0	1910	250	1.34	14.8	335	50	Tail: Class C	2% CaCl
PRODUCTION	Lead		0	1778 9	800	2.5	11.9	2000	25	50:50:10 H Blend	As needed

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	1778 9	2710	1.24	14.4	3360	25	50:50:2 Class H Blend	As needed

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

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

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

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
200	1910	OTHER : Saturated Brine	10	10.2							Saturated Brine
0	200	OTHER : FW Gel	8.6	8.8							FW Gel
1910	1778 9	OTHER : Cut Brine	8.6	9.4							Cut Brine

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Section 6 - Test, Logging, Coring

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

None planned

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

CNL,GR

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 3740

Anticipated Surface Pressure: 2057

Anticipated Bottom Hole Temperature(F): 135

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:

COG_Roadrunner_13H_H2SSchem_20171219131245.pdf

COG_Roadrunner_13H_H2S_SUP_20171219131310.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Roadrunner_13H_AC_Rpt_20171219131325.PDF

COG_Roadrunner_13H_DirectRpt_20171219131331.pdf

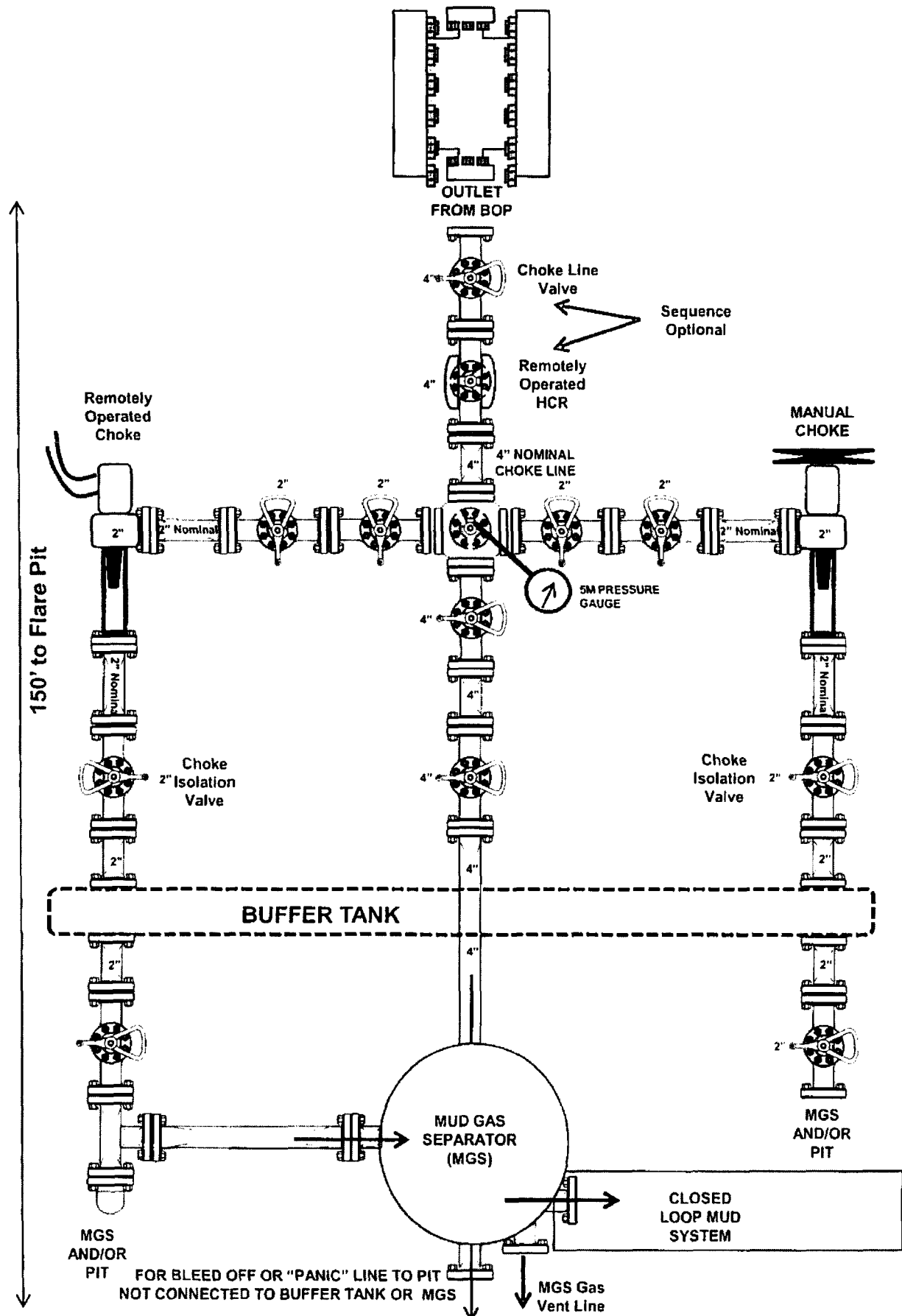
Other proposed operations facets description:

Other proposed operations facets attachment:

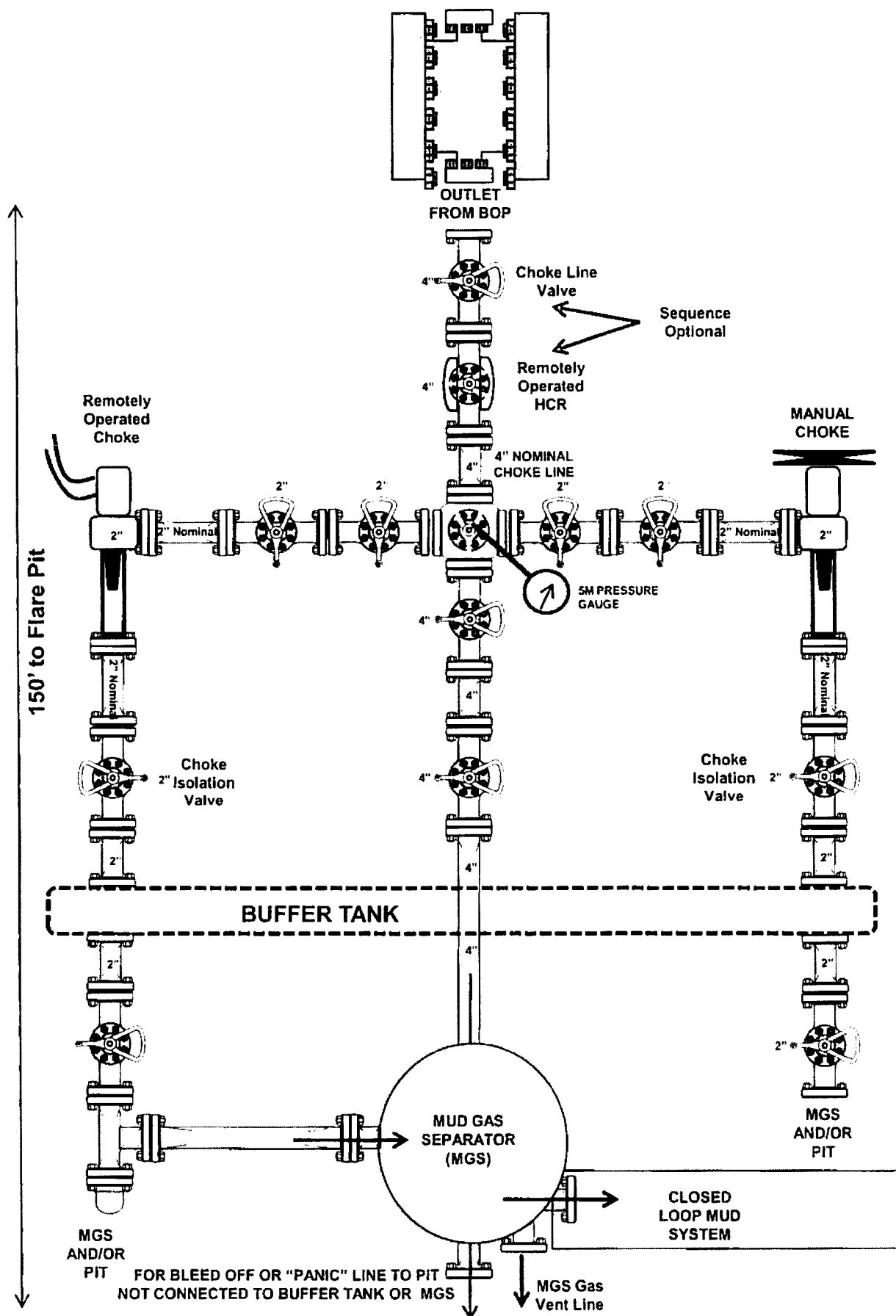
COG_Roadrunner_13H_DrillRpt_20171219131344.pdf

Other Variance attachment:

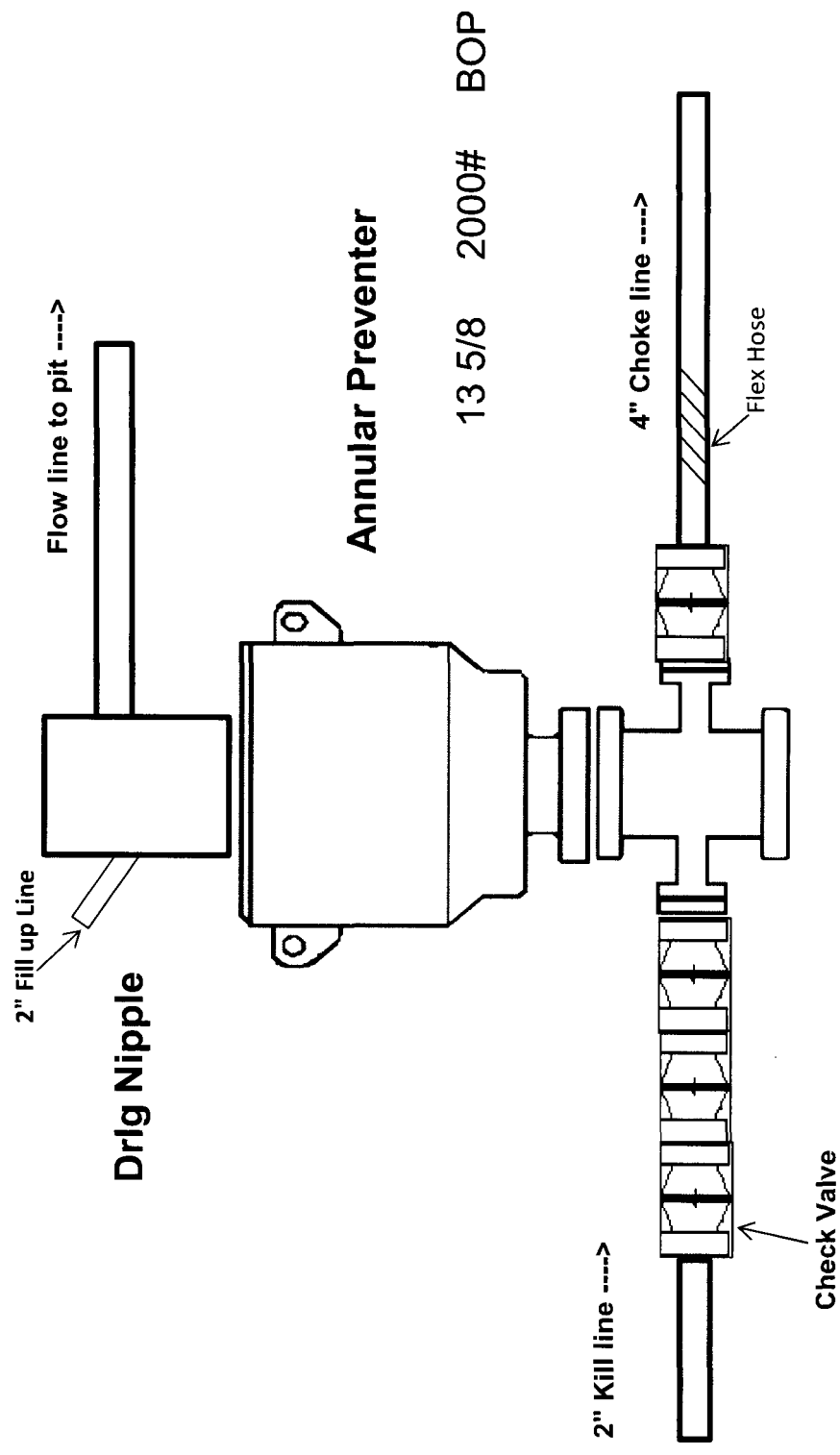
2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



2,000 psi BOP Schematic





Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: LATSHAW DRILLING

Customer P.O.# RIG#44

Sales Order # 242739

Date Assembled: 2/9/2015

Specifications

Hose Assembly Type:

Choke & Kill

Assembly Serial #

292614-1

Hose Lot # and Date Code

10900-08/13

Hose Working Pressure (psi)

10000

Test Pressure (psi)

15000

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

Oklahoma City, OK 73129

Comments:

Approved By

Date

2/10/2015



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: LATSHAW DRILLING	Customer P.O.# RIG#44
Sales Order # 242739	Date Assembled: 2/9/2015

Specifications

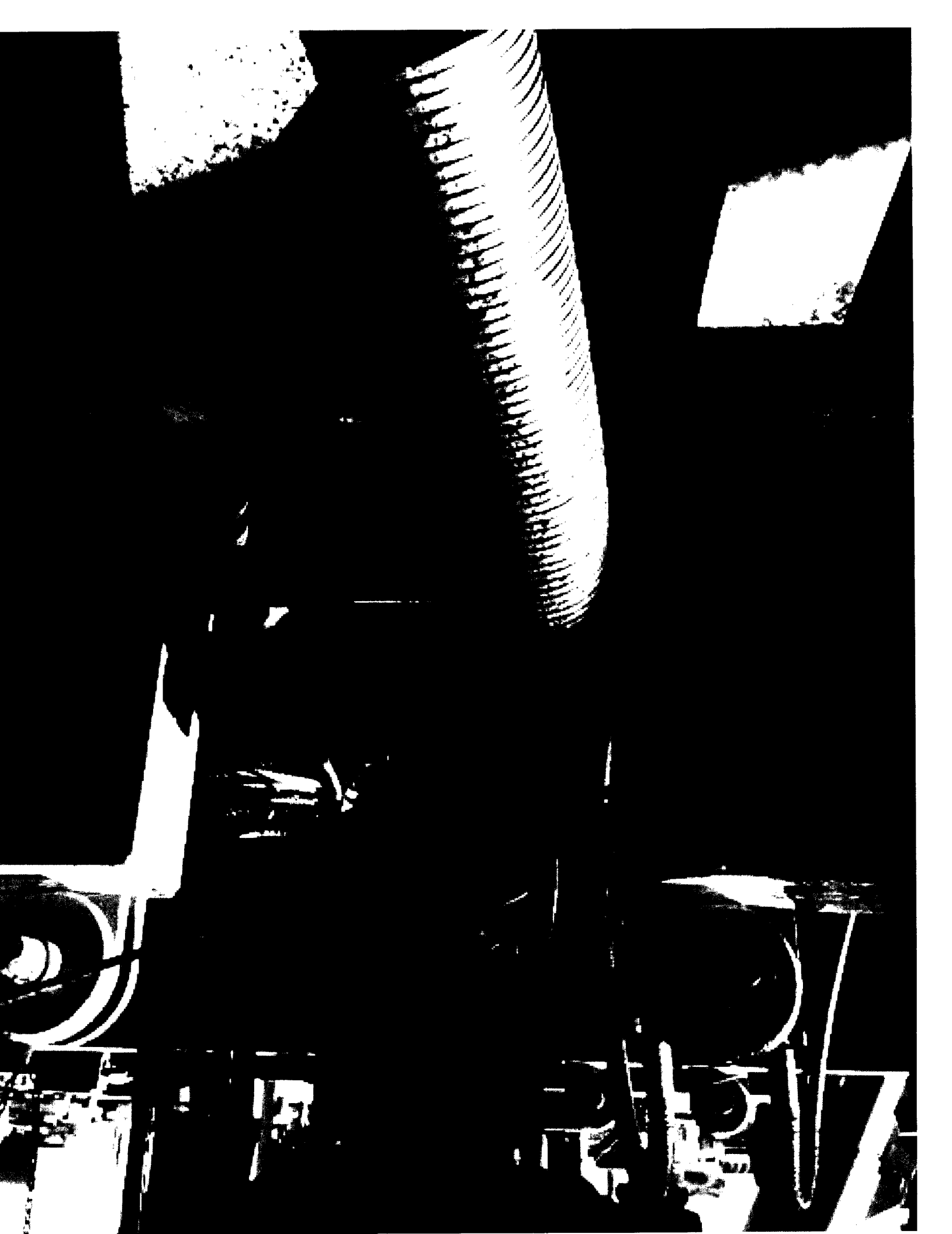
Hose Assembly Type:	Choke & Kill
Assembly Serial # 292614-2	Hose Lot # and Date Code 11794-10/14
Hose Working Pressure (psi) 10000	Test Pressure (psi) 15000

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

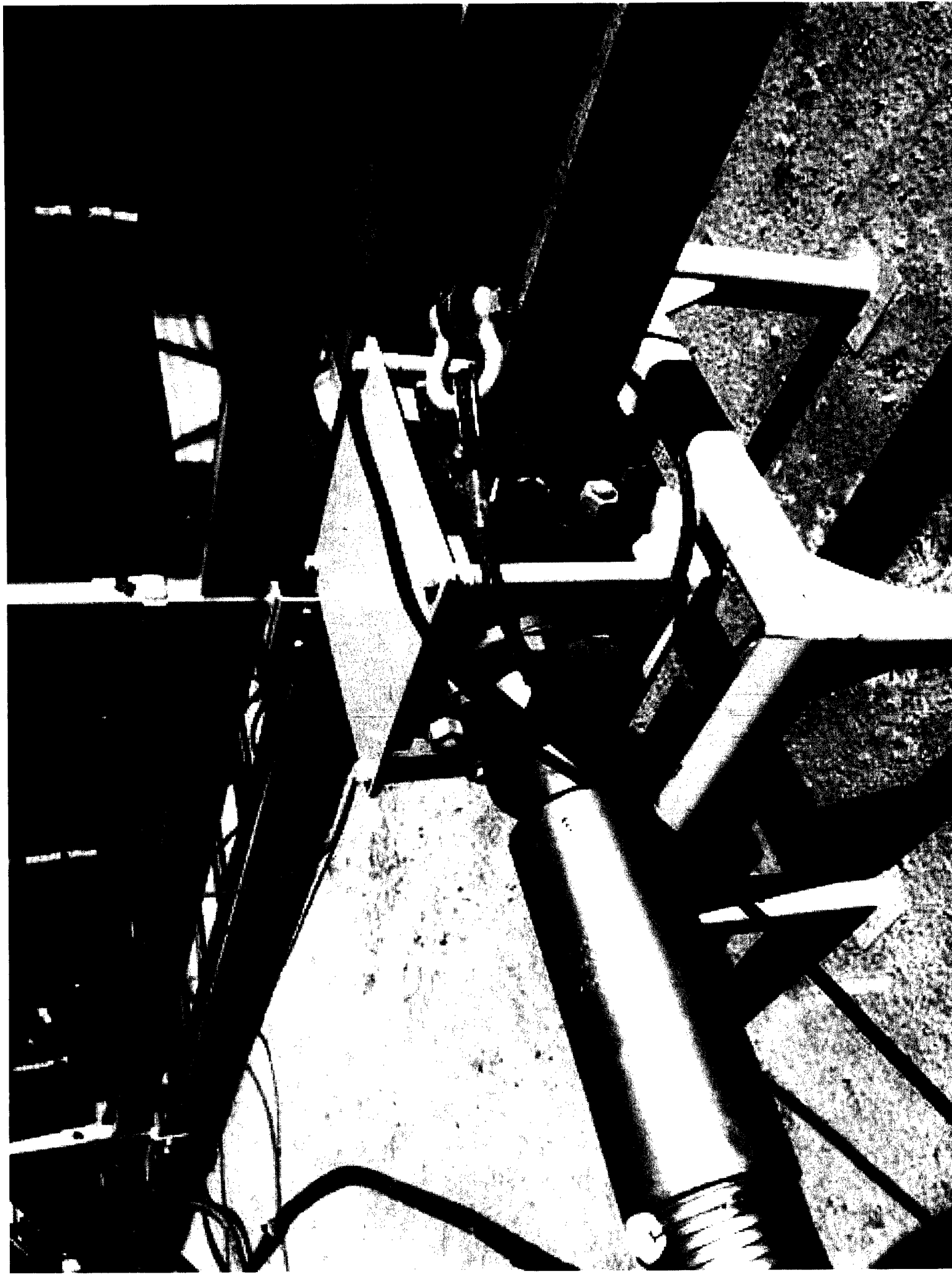
Comments:

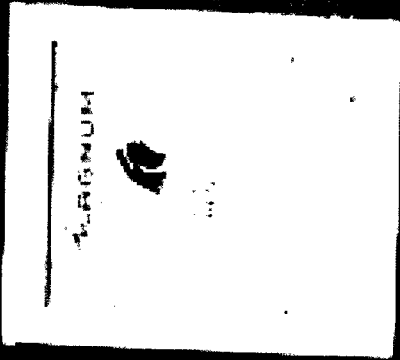
Approved By	Date
	2/10/2015



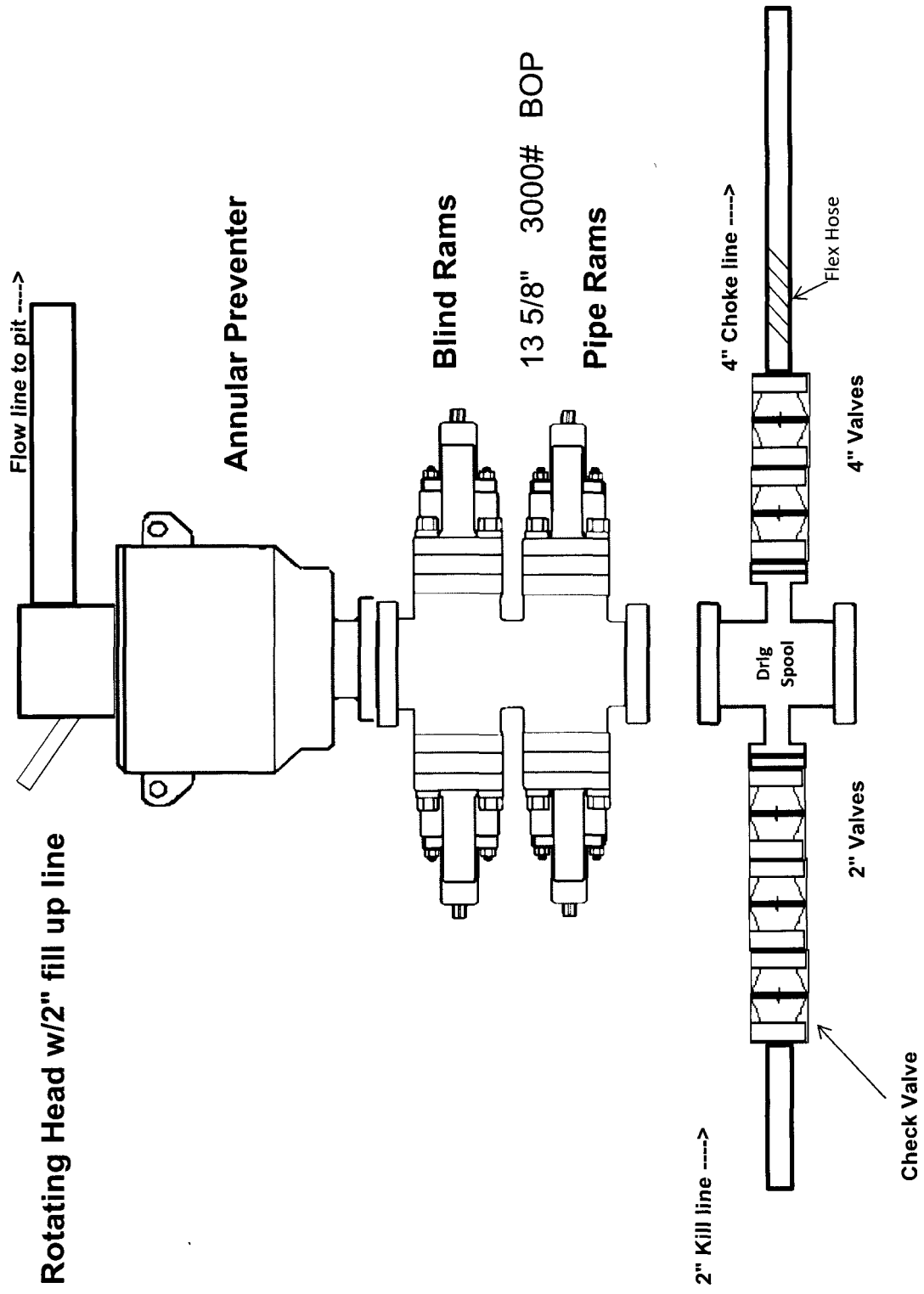








3,000 psi BOP Schematic





Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: LATSHAW DRILLING

Customer P.O.# RIG#44

Sales Order # 242739

Date Assembled: 2/9/2015

Specifications

Hose Assembly Type: Choke & Kill

Assembly Serial # 292614-1

Hose Lot # and Date Code 10900-08/13

Hose Working Pressure (psi) 10000

Test Pressure (psi) 15000

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

Oklahoma City, OK 73129

Comments:

Approved By

Date

2/10/2015



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: LATSHAW DRILLING

Customer P.O.# RIG#44

Sales Order # 242739

Date Assembled: 2/9/2015

Specifications

Hose Assembly Type: Choke & Kill

Assembly Serial # 292614-2

Hose Lot # and Date Code 11794-10/14

Hose Working Pressure (psi) 10000

Test Pressure (psi) 15000

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

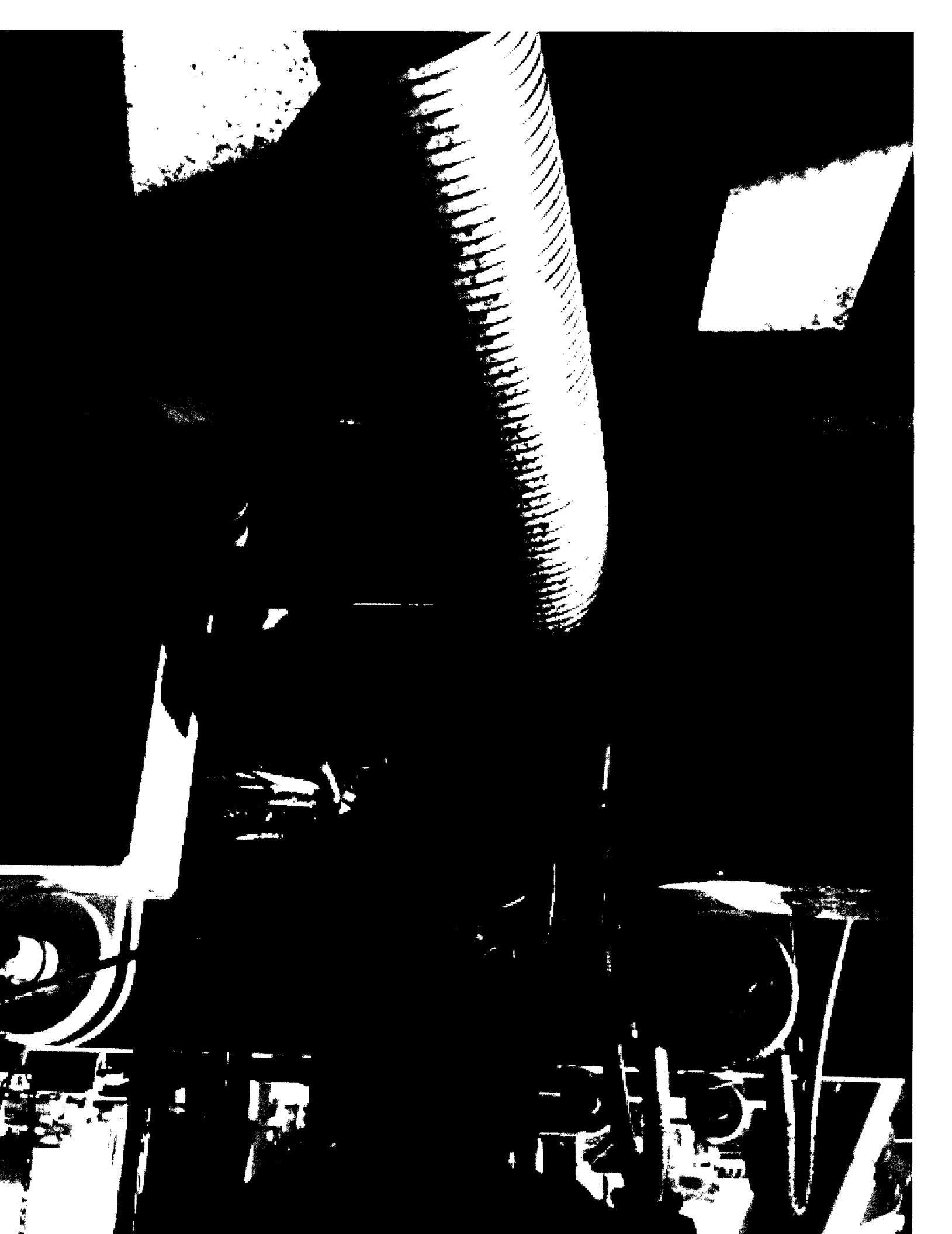
Oklahoma City, OK 73129

Comments:

Approved By

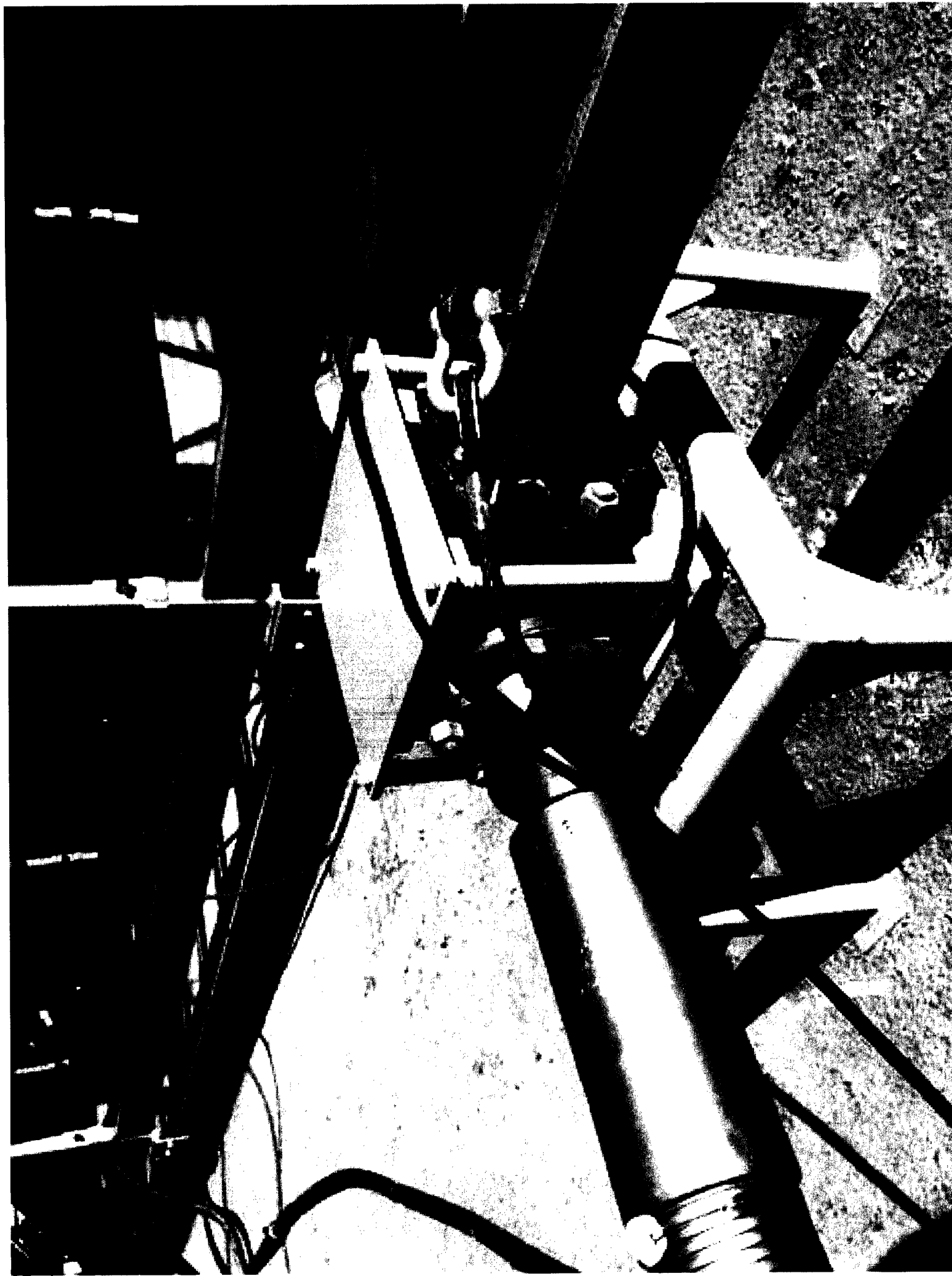
Date

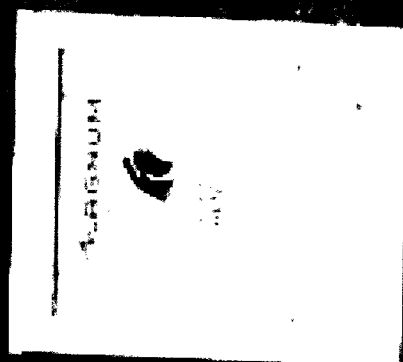
2/10/2015











Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body
	From	To							
13.5"	0	975	10.75"	45.5	N80	BTC	5.54	1.20	23.44
9.875"	0	11750	7.625"	29.7	P110	BTC	1.29	1.11	3.11
6.75"	0	11250	5.5"	23	P110	BTC	1.95	2.04	3.25
6.75"	11250	17,212	5"	18	P110	BTC	1.95	2.04	3.25
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

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

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

Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	875	13.375"	54.5	J55	STC	2.82	1.27	10.78
12.25"	0	4000	9.625"	40	J55	LTC	1.22	1.00	3.25
12.25"	4000	4875	9.625"	40	L80	LTC	1.21	1.45	5.73
8.75"	0	14,768	5.5"	17	P110	LTC	1.50	2.69	2.54
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	200	13.375"	54.5	J55	STC	12.35	3.33	47.16
12.25"	0	1910	9.625"	40	J55	LTC	2.54	1.33	6.81
8.75"	0	17,789	5.5"	17	P110	LTC	2.00	3.58	3.42
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	200	13.375"	54.5	J55	STC	12.35	3.33	47.16
12.25"	0	1910	9.625"	40	J55	LTC	2.54	1.33	6.81
8.75"	0	17,789	5.5"	17	P110	LTC	2.00	3.58	3.42
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	200	13.375"	54.5	J55	STC	12.35	3.33	47.16
12.25"	0	1910	9.625"	40	J55	LTC	2.54	1.33	6.81
8.75"	0	17,789	5.5"	17	P110	LTC	2.00	3.58	3.42
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

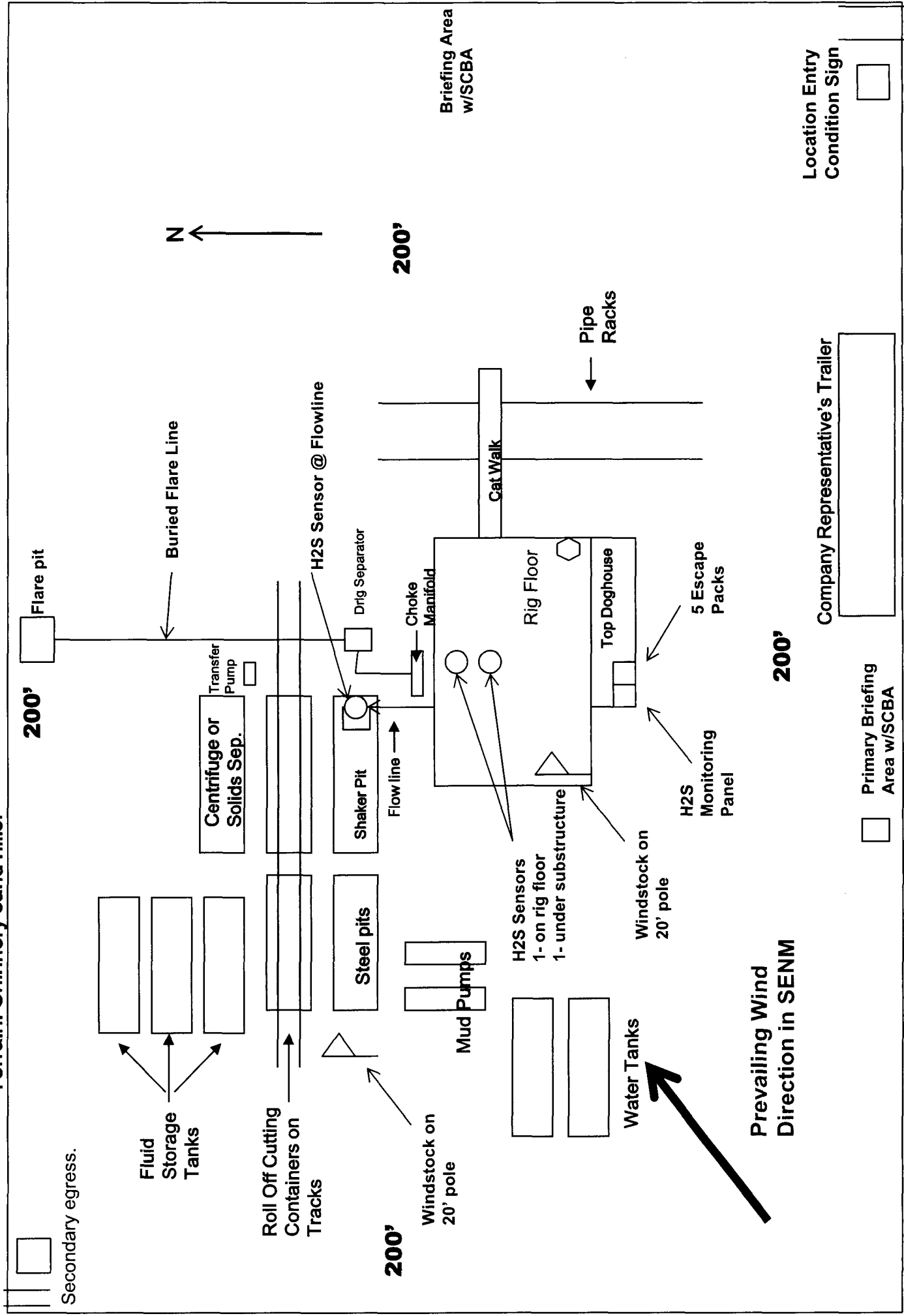
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Operating LLC

H₂S Equipment Schematic

Terrain: Shinnery sand hills.

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



Location Entry
Condition Sign

Company Representative's Trailer

☐ Primary Briefing
Area w/SCBA

☐

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

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

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

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

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

2. H₂S SAFETY EQUIPMENT AND SYSTEMS

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

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

- b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.
- c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.
- d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.
- e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.
- f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- g. Communication:
Company vehicles equipped with cellular telephone.

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

W A R N I N G

**YOU ARE ENTERING AN H₂S AREA
AUTHORIZED PERSONNEL ONLY**

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

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

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

EMERGENCY RESPONSE NUMBERS

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

COG OPERATING, LLC

Eddy County, NM (NAD27) NMZ

Roadrunner Fed COM

#13H

OH

Plan #1

Anticollision Report

13 December, 2017

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well #13H
Project:	Eddy County, NM (NAD27) NMZ	TVD Reference:	RKB @ 3266.60usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	MD Reference:	RKB @ 3266.60usft (Rig KB = 25')
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#13H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.000 sigma
Reference Wellbore	OH	Database:	EDM 5000.14 Single User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

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

Survey Tool Program **Date** 12/13/17

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	17,788.85	Plan #1 (OH)	MWD	MWD v3:standard declination

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						
Roadrunner Fed COM						
#23H - OH - Plan #1	1,000.00	1,000.30	30.00	25.79	7.117	CC
#23H - OH - Plan #1	7,200.00	7,200.22	34.50	3.62	1.117	Level 2, ES, SF
#3H - OH - Plan #1	1,301.27	1,300.00	29.97	24.62	5.595	CC
#3H - OH - Plan #1	6,908.91	6,910.36	30.09	0.46	1.016	Level 2, ES, SF

Offset Design Roadrunner Fed COM - #23H - OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (")	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.30	0.30	0.00	0.00	90.19	-0.10	30.00	30.00				
100.00	100.00	100.30	100.30	0.08	0.08	90.19	-0.10	30.00	30.00	29.83	.169	177.255	
200.00	200.00	200.30	200.30	0.31	0.31	90.19	-0.10	30.00	30.00	29.38	.619	48.483	
300.00	300.00	300.30	300.30	0.53	0.53	90.19	-0.10	30.00	30.00	28.93	1.058	28.082	
400.00	400.00	400.30	400.30	0.76	0.76	90.19	-0.10	30.00	30.00	28.48	1.518	19.765	
500.00	500.00	500.30	500.30	0.98	0.98	90.19	-0.10	30.00	30.00	28.03	1.967	15.249	
600.00	600.00	600.30	600.30	1.21	1.21	90.19	-0.10	30.00	30.00	27.58	2.417	12.413	
700.00	700.00	700.30	700.30	1.43	1.43	90.19	-0.10	30.00	30.00	27.13	2.866	10.466	
800.00	800.00	800.30	800.30	1.66	1.66	90.19	-0.10	30.00	30.00	26.68	3.316	9.047	
900.00	900.00	900.30	900.30	1.88	1.88	90.19	-0.10	30.00	30.00	26.23	3.766	7.967	
1,000.00	1,000.00	1,000.30	1,000.30	2.11	2.11	90.19	-0.10	30.00	30.00	25.79	4.215	7.117	CC
1,100.00	1,099.99	1,100.29	1,100.29	2.31	2.33	-134.00	-0.10	30.00	30.60	25.96	4.640	6.595	
1,200.00	1,199.96	1,200.26	1,200.26	2.49	2.56	-137.31	-0.10	30.00	32.47	27.43	5.047	6.435	
1,300.00	1,299.86	1,300.16	1,300.16	2.68	2.78	-142.03	-0.10	30.00	35.80	30.34	5.461	6.556	
1,400.00	1,399.73	1,400.03	1,400.03	2.88	3.01	-146.64	-0.10	30.00	40.06	34.18	5.881	6.812	
1,500.00	1,499.59	1,499.89	1,499.89	3.09	3.23	-150.34	-0.10	30.00	44.53	38.22	6.305	7.062	
1,600.00	1,599.45	1,600.51	1,600.50	3.30	3.43	-152.90	-0.76	29.41	48.37	41.66	6.708	7.211	
1,700.00	1,699.31	1,701.25	1,701.20	3.52	3.61	-154.20	-2.73	27.64	50.72	43.63	7.094	7.150	
1,800.00	1,799.18	1,802.05	1,801.91	3.73	3.80	-154.54	-6.02	24.67	51.52	44.03	7.486	6.881	
1,900.00	1,899.04	1,902.03	1,901.75	3.96	3.99	-154.45	-9.90	21.17	51.56	43.67	7.888	6.536	
2,000.00	1,998.90	2,002.03	2,001.62	4.18	4.19	-154.36	-13.79	17.67	51.60	43.30	8.296	6.219	
2,100.00	2,098.77	2,102.03	2,101.48	4.41	4.39	-154.26	-17.68	14.17	51.64	42.93	8.710	5.929	
2,200.00	2,198.63	2,202.03	2,201.34	4.64	4.60	-154.17	-21.57	10.67	51.68	42.55	9.128	5.661	

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #23H - OH - Plan #1													Offset Site Error:	0.00 usft
Survey Program: 0-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)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
2,300.00	2,298.49	2,302.03	2,301.21	4.87	4.81	-154.08	-25.46	7.16	51.72	42.17	9.551	5.415		
2,400.00	2,398.36	2,402.03	2,401.07	5.10	5.02	-153.99	-29.35	3.66	51.76	41.78	9.977	5.188		
2,500.00	2,498.22	2,502.03	2,500.93	5.34	5.24	-153.90	-33.24	0.16	51.80	41.39	10.407	4.977		
2,600.00	2,598.08	2,602.03	2,600.79	5.57	5.46	-153.81	-37.13	-3.34	51.84	41.00	10.840	4.782		
2,700.00	2,697.94	2,702.03	2,700.66	5.81	5.68	-153.72	-41.02	-6.84	51.88	40.61	11.275	4.601		
2,800.00	2,797.81	2,802.03	2,800.52	6.04	5.90	-153.63	-44.91	-10.34	51.92	40.21	11.713	4.433		
2,900.00	2,897.67	2,902.03	2,900.38	6.28	6.13	-153.54	-48.80	-13.85	51.96	39.81	12.152	4.276		
3,000.00	2,997.53	3,002.03	3,000.25	6.52	6.36	-153.45	-52.69	-17.35	52.01	39.41	12.594	4.129		
3,100.00	3,097.40	3,102.03	3,100.11	6.76	6.58	-153.36	-56.58	-20.85	52.05	39.01	13.037	3.992		
3,200.00	3,197.26	3,202.03	3,199.97	7.00	6.81	-153.27	-60.46	-24.35	52.09	38.61	13.482	3.864		
3,300.00	3,297.12	3,302.03	3,299.84	7.24	7.04	-153.18	-64.35	-27.85	52.13	38.20	13.928	3.743		
3,400.00	3,396.99	3,402.03	3,399.70	7.48	7.27	-153.09	-68.24	-31.36	52.17	37.80	14.376	3.629		
3,500.00	3,496.85	3,502.03	3,499.56	7.72	7.51	-153.01	-72.13	-34.86	52.21	37.39	14.824	3.522		
3,600.00	3,596.71	3,602.03	3,599.42	7.96	7.74	-152.92	-76.02	-38.36	52.26	36.98	15.274	3.421		
3,700.00	3,696.57	3,702.03	3,699.29	8.20	7.97	-152.83	-79.91	-41.86	52.30	36.57	15.725	3.326		
3,800.00	3,796.44	3,802.03	3,799.15	8.44	8.21	-152.74	-83.80	-45.36	52.34	36.17	16.177	3.236		
3,900.00	3,896.30	3,902.03	3,899.01	8.68	8.44	-152.65	-87.69	-48.87	52.38	35.76	16.629	3.150		
4,000.00	3,996.16	4,002.03	3,998.88	8.92	8.68	-152.56	-91.58	-52.37	52.43	35.34	17.083	3.069		
4,100.00	4,096.03	4,102.03	4,098.74	9.16	8.91	-152.47	-95.47	-55.87	52.47	34.93	17.537	2.992		
4,200.00	4,195.89	4,202.03	4,198.60	9.40	9.15	-152.39	-99.36	-59.37	52.51	34.52	17.992	2.919		
4,300.00	4,295.75	4,302.03	4,298.46	9.65	9.39	-152.30	-103.25	-62.87	52.56	34.11	18.447	2.849		
4,400.00	4,395.61	4,402.03	4,398.33	9.89	9.63	-152.21	-107.14	-66.38	52.60	33.70	18.903	2.783		
4,500.00	4,495.48	4,502.03	4,498.19	10.13	9.86	-152.12	-111.03	-69.88	52.64	33.28	19.360	2.719		
4,600.00	4,595.34	4,602.03	4,598.05	10.37	10.10	-152.04	-114.92	-73.38	52.69	32.87	19.817	2.659		
4,700.00	4,695.20	4,702.03	4,697.92	10.62	10.34	-151.95	-118.80	-76.88	52.73	32.45	20.275	2.601		
4,800.00	4,795.07	4,802.03	4,797.78	10.86	10.58	-151.86	-122.69	-80.38	52.77	32.04	20.733	2.545		
4,900.00	4,894.93	4,902.03	4,897.64	11.10	10.82	-151.77	-126.58	-83.89	52.82	31.63	21.192	2.492		
5,005.22	5,000.00	5,007.24	5,002.71	11.36	11.07	-151.68	-130.68	-87.57	52.86	31.19	21.675	2.439		
5,100.00	5,094.69	5,102.03	5,097.36	11.59	11.30	-151.59	-134.36	-90.89	52.22	30.10	22.115	2.361		
5,200.00	5,194.65	5,201.99	5,197.19	11.81	11.54	-149.69	-138.25	-94.39	50.06	27.47	22.593	2.216		
5,305.22	5,299.86	5,307.11	5,302.16	12.03	11.79	76.27	-142.34	-98.07	46.25	23.15	23.099	2.002		
5,400.00	5,394.65	5,401.76	5,396.69	12.20	12.02	80.06	-146.02	-101.39	42.24	18.68	23.561	1.793		
5,500.00	5,494.65	5,501.40	5,496.20	12.38	12.26	84.69	-149.76	-104.75	38.39	14.33	24.065	1.595		
5,600.00	5,594.65	5,600.88	5,595.61	12.56	12.49	88.53	-152.39	-107.12	35.86	11.31	24.550	1.461 Level 3		
5,700.00	5,694.65	5,700.45	5,695.17	12.74	12.71	90.71	-153.74	-108.34	34.63	9.63	24.997	1.385 Level 3		
5,773.64	5,768.29	5,773.88	5,768.59	12.88	12.86	91.04	-153.93	-108.51	34.46	9.17	25.287	1.363 Level 3		
5,800.00	5,794.65	5,800.23	5,794.95	12.93	12.91	91.04	-153.93	-108.51	34.46	9.07	25.386	1.357 Level 3		
5,880.41	5,875.06	5,880.64	5,875.36	13.08	13.06	91.04	-153.93	-108.51	34.46	8.77	25.691	1.341 Level 3		
5,900.00	5,894.65	5,900.23	5,894.95	13.12	13.09	91.04	-153.93	-108.51	34.46	8.69	25.765	1.337 Level 3		
5,922.03	5,916.67	5,922.26	5,916.97	13.16	13.13	91.04	-153.93	-108.51	34.46	8.61	25.849	1.333 Level 3		
6,000.00	5,994.65	6,000.23	5,994.95	13.30	13.28	91.04	-153.93	-108.51	34.46	8.31	26.146	1.318 Level 3		
6,078.87	6,073.52	6,079.10	6,073.82	13.45	13.43	91.04	-153.93	-108.51	34.46	8.01	26.448	1.303 Level 3		
6,100.00	6,094.65	6,100.23	6,094.95	13.49	13.47	91.04	-153.93	-108.51	34.46	7.93	26.529	1.299 Level 3		
6,178.87	6,173.52	6,179.10	6,173.82	13.64	13.62	91.04	-153.93	-108.51	34.46	7.62	26.833	1.284 Level 3		
6,200.00	6,194.65	6,200.23	6,194.95	13.68	13.66	91.04	-153.93	-108.51	34.46	7.54	26.914	1.280 Level 3		
6,278.87	6,273.52	6,279.10	6,273.82	13.83	13.81	91.04	-153.93	-108.51	34.46	7.24	27.220	1.266 Level 3		
6,300.00	6,294.65	6,300.23	6,294.95	13.88	13.85	91.04	-153.93	-108.51	34.46	7.15	27.301	1.262 Level 3		
6,378.87	6,373.52	6,379.10	6,373.82	14.03	14.00	91.04	-153.93	-108.51	34.46	6.85	27.608	1.248 Level 2		
6,400.00	6,394.65	6,400.23	6,394.95	14.07	14.04	91.04	-153.93	-108.51	34.46	6.77	27.690	1.244 Level 2		
6,480.41	6,475.06	6,480.64	6,475.36	14.22	14.20	91.04	-153.93	-108.51	34.46	6.45	28.005	1.230 Level 2		
6,500.00	6,494.65	6,500.23	6,494.95	14.26	14.24	91.04	-153.93	-108.51	34.46	6.37	28.081	1.227 Level 2		
6,522.03	6,516.67	6,522.26	6,516.97	14.30	14.28	91.04	-153.93	-108.51	34.46	6.29	28.168	1.223 Level 2		

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #23H - OH - Plan #1													Offset Site Error: 0.00 usft	
Survey Program: 0-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)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
6,600.00	6,594.65	6,600.23	6,594.95	14.45	14.43	91.04	-153.93	-108.51	34.46	5.98	28.474	1.210	Level 2	
6,678.87	6,673.52	6,679.10	6,673.82	14.61	14.59	91.04	-153.93	-108.51	34.46	5.67	28.785	1.197	Level 2	
6,700.00	6,694.65	6,700.23	6,694.95	14.65	14.63	91.04	-153.93	-108.51	34.46	5.59	28.868	1.194	Level 2	
6,778.87	6,773.52	6,779.10	6,773.82	14.80	14.78	91.04	-153.93	-108.51	34.46	5.28	29.181	1.181	Level 2	
6,800.00	6,794.65	6,800.23	6,794.95	14.85	14.82	91.04	-153.93	-108.51	34.46	5.19	29.264	1.177	Level 2	
6,878.87	6,873.52	6,879.10	6,873.82	15.00	14.98	91.04	-153.93	-108.51	34.46	4.88	29.578	1.165	Level 2	
6,900.00	6,894.65	6,900.23	6,894.95	15.04	15.02	91.04	-153.93	-108.51	34.46	4.79	29.662	1.162	Level 2	
6,978.87	6,973.52	6,979.10	6,973.82	15.20	15.18	91.04	-153.93	-108.51	34.46	4.48	29.976	1.149	Level 2	
7,000.00	6,994.65	7,000.23	6,994.95	15.24	15.22	91.04	-153.93	-108.51	34.46	4.40	30.060	1.146	Level 2	
7,080.41	7,075.06	7,080.64	7,075.36	15.40	15.38	91.04	-153.93	-108.51	34.46	4.07	30.382	1.134	Level 2	
7,100.00	7,094.65	7,100.23	7,094.95	15.44	15.42	91.04	-153.93	-108.51	34.46	4.00	30.461	1.131	Level 2	
7,120.59	7,115.24	7,120.82	7,115.54	15.48	15.46	91.04	-153.93	-108.51	34.46	3.91	30.543	1.128	Level 2	
7,177.89	7,172.54	7,178.12	7,172.84	15.59	15.57	91.04	-153.93	-108.51	34.46	3.68	30.774	1.120	Level 2	
7,200.00	7,194.64	7,200.22	7,194.94	15.64	15.62	94.98	-153.93	-108.51	34.50	3.62	30.874	1.117	Level 2, ES, SF	
7,225.00	7,219.57	7,225.16	7,219.87	15.68	15.67	97.93	-153.93	-108.51	34.70	3.69	31.014	1.119	Level 2	
7,250.00	7,244.37	7,249.96	7,244.67	15.73	15.71	102.84	-153.93	-108.51	35.27	4.09	31.177	1.131	Level 2	
7,275.00	7,268.98	7,274.56	7,269.28	15.77	15.76	109.36	-153.93	-108.51	36.51	5.16	31.352	1.165	Level 2	
7,300.00	7,293.32	7,301.10	7,293.62	15.80	15.82	116.89	-153.93	-108.51	38.80	7.28	31.524	1.231	Level 2	
7,325.00	7,317.33	7,322.92	7,317.63	15.84	15.86	124.70	-153.93	-108.51	42.48	10.82	31.663	1.342	Level 3	
7,350.00	7,340.95	7,346.53	7,341.25	15.87	15.91	132.09	-153.93	-108.51	47.76	15.99	31.774	1.503		
7,375.00	7,364.10	7,369.68	7,364.40	15.90	15.95	138.63	-153.93	-108.51	54.73	22.88	31.855	1.718		
7,400.00	7,386.72	7,407.69	7,387.02	15.93	16.03	144.15	-153.93	-108.51	63.35	31.40	31.949	1.983		
7,425.00	7,408.76	7,414.35	7,409.06	15.96	16.04	148.69	-153.93	-108.51	73.54	41.57	31.972	2.300		
7,450.00	7,430.16	7,435.74	7,430.46	15.99	16.09	152.36	-153.93	-108.51	85.19	53.17	32.022	2.660		
7,475.00	7,450.84	7,456.43	7,451.14	16.02	16.13	155.31	-153.93	-108.51	98.19	66.12	32.071	3.062		
7,500.00	7,470.77	7,476.35	7,471.07	16.04	16.17	157.66	-153.93	-108.51	112.46	80.34	32.121	3.501		
7,525.00	7,489.87	7,504.55	7,490.17	16.07	16.23	159.53	-153.93	-108.51	127.90	95.71	32.190	3.973		
7,550.00	7,508.11	7,513.69	7,508.41	16.09	16.24	161.00	-153.93	-108.51	144.44	112.22	32.222	4.483		
7,575.00	7,525.42	7,531.01	7,525.72	16.11	16.28	162.14	-153.93	-108.51	162.01	129.74	32.271	5.020		
7,600.00	7,541.77	7,547.36	7,542.07	16.13	16.31	162.99	-153.93	-108.51	180.53	148.21	32.319	5.586		
7,625.00	7,557.11	7,562.69	7,557.41	16.15	16.34	163.60	-153.93	-108.51	199.95	167.58	32.365	6.178		
7,650.00	7,571.39	7,576.98	7,571.69	16.17	16.37	163.96	-153.93	-108.51	220.18	187.77	32.409	6.794		
7,675.00	7,584.58	7,609.83	7,584.88	16.21	16.44	164.10	-153.93	-108.51	241.18	208.69	32.490	7.423		
7,700.00	7,596.64	7,602.23	7,596.94	16.29	16.42	163.98	-153.93	-108.51	262.87	230.38	32.487	8.092		
7,725.00	7,607.54	7,613.13	7,607.84	16.39	16.44	163.59	-153.93	-108.51	285.19	252.67	32.520	8.770		
7,750.00	7,617.25	7,622.83	7,617.55	16.50	16.46	162.86	-153.93	-108.51	308.07	275.52	32.550	9.464		
7,775.00	7,625.73	7,631.32	7,626.03	16.62	16.48	161.68	-153.93	-108.51	331.45	298.87	32.576	10.174		
7,800.00	7,632.98	7,638.56	7,633.28	16.75	16.50	159.83	-153.93	-108.51	355.25	322.65	32.598	10.898		
7,825.00	7,638.96	7,644.54	7,639.26	16.88	16.51	156.96	-153.93	-108.51	379.41	346.80	32.616	11.633		
7,850.00	7,643.67	7,649.25	7,643.97	17.03	16.52	152.26	-153.93	-108.51	403.87	371.24	32.630	12.377		
7,875.00	7,647.08	7,652.66	7,647.38	17.19	16.52	143.96	-153.93	-108.51	428.55	395.91	32.639	13.130		
7,900.00	7,649.19	7,654.77	7,649.49	17.35	16.53	127.52	-153.93	-108.51	453.38	420.74	32.644	13.888		
7,925.00	7,650.00	7,655.58	7,650.30	17.53	16.53	94.81	-153.93	-108.51	478.30	445.65	32.646	14.651		
7,928.39	7,650.00	7,655.59	7,650.30	17.56	16.53	89.16	-153.93	-108.51	481.68	449.03	32.646	14.755		
8,000.00	7,649.93	7,655.51	7,650.23	18.11	16.53	89.31	-153.93	-108.51	553.07	520.42	32.642	16.943		
8,086.46	7,649.84	7,655.43	7,650.14	18.88	16.53	89.43	-153.93	-108.51	639.15	606.51	32.638	19.583		
8,100.00	7,649.83	7,655.41	7,650.13	19.01	16.53	89.42	-153.93	-108.51	652.61	619.98	32.637	19.996		
8,200.00	7,649.73	7,655.31	7,650.03	20.03	16.53	89.33	-153.93	-108.51	752.18	719.54	32.636	23.047		
8,300.00	7,649.63	7,655.21	7,649.93	21.16	16.53	89.24	-153.93	-108.51	851.85	819.21	32.640	26.098		
8,400.00	7,649.52	7,655.11	7,649.82	22.38	16.53	89.15	-153.93	-108.51	951.59	918.94	32.648	29.147		
8,500.00	7,649.42	7,655.01	7,649.72	23.69	16.53	89.06	-153.93	-108.51	1,051.37	1,018.72	32.658	32.194		
8,600.00	7,649.32	7,654.90	7,649.62	25.06	16.53	88.98	-153.93	-108.51	1,151.20	1,118.53	32.670	35.237		

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #23H - OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-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)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
8,700.00	7,649.22	9,944.13	8,889.19	26.49	28.25	180.00	1,096.79	-172.31	1,239.67	1,207.00	32.678	37.936	
8,800.00	7,649.12	10,044.13	8,889.09	27.97	29.64	180.00	1,196.79	-172.21	1,239.67	1,206.20	33.471	37.038	
8,900.00	7,649.02	10,144.13	8,888.98	29.50	31.09	180.00	1,296.79	-172.11	1,239.67	1,205.36	34.307	36.134	
9,000.00	7,648.92	10,244.13	8,888.88	31.06	32.57	180.00	1,396.79	-172.00	1,239.66	1,204.48	35.185	35.233	
9,100.00	7,648.81	10,344.13	8,888.77	32.64	34.09	180.00	1,496.79	-171.90	1,239.66	1,203.56	36.101	34.339	
9,200.00	7,648.71	10,444.13	8,888.67	34.26	35.64	180.00	1,596.79	-171.79	1,239.66	1,202.60	37.052	33.457	
9,300.00	7,648.61	10,544.13	8,888.56	35.90	37.22	180.00	1,696.79	-171.69	1,239.65	1,201.62	38.036	32.592	
9,400.00	7,648.51	10,644.13	8,888.46	37.55	38.82	180.00	1,796.79	-171.58	1,239.65	1,200.60	39.050	31.745	
9,500.00	7,648.41	10,744.13	8,888.35	39.23	40.45	180.00	1,896.79	-171.48	1,239.65	1,199.56	40.091	30.920	
9,600.00	7,648.31	10,844.13	8,888.25	40.92	42.09	180.00	1,996.79	-171.37	1,239.64	1,198.48	41.159	30.118	
9,700.00	7,648.21	10,944.13	8,888.14	42.62	43.75	180.00	2,096.79	-171.27	1,239.64	1,197.39	42.250	29.340	
9,800.00	7,648.10	11,044.13	8,888.04	44.34	45.42	-180.00	2,196.79	-171.16	1,239.64	1,196.27	43.364	28.587	
9,900.00	7,648.00	11,144.13	8,887.94	46.06	47.11	-180.00	2,296.79	-171.06	1,239.63	1,195.14	44.497	27.859	
10,000.00	7,647.90	11,244.13	8,887.83	47.80	48.81	-180.00	2,396.79	-170.95	1,239.63	1,193.98	45.650	27.155	
10,100.00	7,647.80	11,344.13	8,887.73	49.54	50.52	-180.00	2,496.79	-170.85	1,239.63	1,192.81	46.820	26.476	
10,200.00	7,647.70	11,444.13	8,887.62	51.29	52.24	-180.00	2,596.79	-170.74	1,239.62	1,191.62	48.006	25.822	
10,300.00	7,647.60	11,544.13	8,887.52	53.05	53.97	-180.00	2,696.79	-170.64	1,239.62	1,190.41	49.207	25.192	
10,400.00	7,647.50	11,644.13	8,887.41	54.81	55.70	-180.00	2,796.79	-170.53	1,239.62	1,189.19	50.423	24.585	
10,500.00	7,647.39	11,744.13	8,887.31	56.58	57.44	-180.00	2,896.79	-170.43	1,239.61	1,187.96	51.651	24.000	
10,600.00	7,647.29	11,844.13	8,887.20	58.36	59.19	-180.00	2,996.79	-170.32	1,239.61	1,186.72	52.891	23.437	
10,700.00	7,647.19	11,944.13	8,887.10	60.13	60.95	-180.00	3,096.79	-170.22	1,239.61	1,185.47	54.142	22.895	
10,800.00	7,647.09	12,044.13	8,886.99	61.92	62.71	-180.00	3,196.79	-170.12	1,239.60	1,184.20	55.404	22.374	
10,900.00	7,646.99	12,144.13	8,886.89	63.70	64.48	-180.00	3,296.79	-170.01	1,239.60	1,182.92	56.676	21.872	
11,000.00	7,646.89	12,244.13	8,886.78	65.49	66.25	-180.00	3,396.79	-169.91	1,239.60	1,181.64	57.957	21.388	
11,100.00	7,646.79	12,344.13	8,886.68	67.29	68.02	-180.00	3,496.79	-169.80	1,239.59	1,180.35	59.247	20.923	
11,200.00	7,646.68	12,444.13	8,886.57	69.09	69.80	-180.00	3,596.79	-169.70	1,239.59	1,179.05	60.544	20.474	
11,300.00	7,646.58	12,544.13	8,886.47	70.88	71.58	-180.00	3,696.79	-169.59	1,239.59	1,177.74	61.849	20.042	
11,400.00	7,646.48	12,644.13	8,886.36	72.69	73.37	-180.00	3,796.79	-169.49	1,239.58	1,176.42	63.161	19.626	
11,500.00	7,646.38	12,744.13	8,886.26	74.49	75.16	-180.00	3,896.79	-169.38	1,239.58	1,175.10	64.480	19.224	
11,600.00	7,646.28	12,844.13	8,886.16	76.30	76.95	-180.00	3,996.79	-169.28	1,239.58	1,173.77	65.805	18.837	
11,700.00	7,646.18	12,944.13	8,886.05	78.11	78.75	-180.00	4,096.79	-169.17	1,239.57	1,172.44	67.136	18.464	
11,800.00	7,646.08	13,044.13	8,885.95	79.92	80.54	-180.00	4,196.79	-169.07	1,239.57	1,171.10	68.472	18.103	
11,900.00	7,645.97	13,144.13	8,885.84	81.73	82.34	-180.00	4,296.79	-168.96	1,239.57	1,169.75	69.814	17.755	
12,000.00	7,645.87	13,244.13	8,885.74	83.54	84.14	-180.00	4,396.79	-168.86	1,239.56	1,168.40	71.161	17.419	
12,100.00	7,645.77	13,344.13	8,885.63	85.36	85.95	-180.00	4,496.79	-168.75	1,239.56	1,167.05	72.512	17.095	
12,200.00	7,645.67	13,444.13	8,885.53	87.18	87.75	-180.00	4,596.78	-168.65	1,239.56	1,165.69	73.867	16.781	
12,300.00	7,645.57	13,544.13	8,885.42	89.00	89.56	-180.00	4,696.78	-168.54	1,239.55	1,164.33	75.227	16.478	
12,400.00	7,645.47	13,644.13	8,885.32	90.82	91.37	-180.00	4,796.78	-168.44	1,239.55	1,162.96	76.591	16.184	
12,500.00	7,645.36	13,744.13	8,885.21	92.64	93.18	-180.00	4,896.78	-168.34	1,239.55	1,161.59	77.958	15.900	
12,600.00	7,645.26	13,844.13	8,885.11	94.46	94.99	-180.00	4,996.78	-168.23	1,239.55	1,160.22	79.329	15.625	
12,700.00	7,645.16	13,944.13	8,885.00	96.28	96.81	-180.00	5,096.78	-168.13	1,239.54	1,158.84	80.703	15.359	
12,800.00	7,645.06	14,044.13	8,884.90	98.11	98.62	-180.00	5,196.78	-168.02	1,239.54	1,157.46	82.081	15.101	
12,900.00	7,644.96	14,144.13	8,884.79	99.93	100.44	-180.00	5,296.78	-167.92	1,239.54	1,156.07	83.461	14.852	
13,000.00	7,644.86	14,244.13	8,884.69	101.76	102.26	-180.00	5,396.78	-167.81	1,239.53	1,154.69	84.845	14.609	
13,100.00	7,644.76	14,344.13	8,884.58	103.59	104.08	-180.00	5,496.78	-167.71	1,239.53	1,153.30	86.231	14.375	
13,200.00	7,644.65	14,444.13	8,884.48	105.41	105.90	-180.00	5,596.78	-167.60	1,239.53	1,151.91	87.619	14.147	
13,300.00	7,644.55	14,544.13	8,884.37	107.24	107.72	-180.00	5,696.78	-167.50	1,239.52	1,150.51	89.011	13.926	
13,400.00	7,644.45	14,644.13	8,884.27	109.07	109.54	-180.00	5,796.78	-167.39	1,239.52	1,149.11	90.404	13.711	
13,500.00	7,644.35	14,744.13	8,884.17	110.90	111.36	-180.00	5,896.78	-167.29	1,239.52	1,147.72	91.800	13.502	
13,600.00	7,644.25	14,844.13	8,884.06	112.73	113.19	-180.00	5,996.78	-167.18	1,239.51	1,146.31	93.198	13.300	
13,700.00	7,644.15	14,944.13	8,883.96	114.56	115.01	-180.00	6,096.78	-167.08	1,239.51	1,144.91	94.599	13.103	
13,800.00	7,644.05	15,044.13	8,883.85	116.40	116.84	-180.00	6,196.78	-166.97	1,239.51	1,143.50	96.001	12.911	

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2,000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #23H - OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,900.00	7,643.94	15,144.13	8,883.75	118.23	118.67	-180.00	6,296.78	-166.87	1,239.50	1,142.10	97.405	12.725	
14,000.00	7,643.84	15,244.13	8,883.64	120.06	120.49	-180.00	6,396.78	-166.76	1,239.50	1,140.69	98.811	12.544	
14,100.00	7,643.74	15,344.13	8,883.54	121.90	122.32	-180.00	6,496.78	-166.66	1,239.50	1,139.28	100.218	12.368	
14,200.00	7,643.64	15,444.13	8,883.43	123.73	124.15	-179.99	6,596.78	-166.56	1,239.49	1,137.87	101.627	12.196	
14,300.00	7,643.54	15,544.13	8,883.33	125.56	125.98	-179.99	6,696.78	-166.45	1,239.49	1,136.45	103.038	12.029	
14,400.00	7,643.44	15,644.13	8,883.22	127.40	127.81	-179.99	6,796.78	-166.35	1,239.49	1,135.04	104.451	11.867	
14,500.00	7,643.34	15,744.13	8,883.12	129.24	129.64	-179.99	6,896.78	-166.24	1,239.48	1,133.62	105.865	11.708	
14,600.00	7,643.23	15,844.13	8,883.01	131.07	131.47	-179.99	6,996.78	-166.14	1,239.48	1,132.20	107.280	11.554	
14,700.00	7,643.13	15,944.13	8,882.91	132.91	133.30	-179.99	7,096.78	-166.03	1,239.48	1,130.78	108.697	11.403	
14,800.00	7,643.03	16,044.13	8,882.80	134.75	135.13	-179.99	7,196.78	-165.93	1,239.47	1,129.36	110.115	11.256	
14,900.00	7,642.93	16,144.13	8,882.70	136.58	136.97	-179.99	7,296.78	-165.82	1,239.47	1,127.94	111.534	11.113	
15,000.00	7,642.83	16,244.13	8,882.59	138.42	138.80	-179.99	7,396.78	-165.72	1,239.47	1,126.51	112.954	10.973	
15,100.00	7,642.73	16,344.13	8,882.49	140.26	140.63	-179.99	7,496.78	-165.61	1,239.46	1,125.09	114.376	10.837	
15,200.00	7,642.63	16,444.13	8,882.39	142.10	142.47	-179.99	7,596.78	-165.51	1,239.46	1,123.66	115.799	10.704	
15,300.00	7,642.52	16,544.13	8,882.28	143.94	144.30	-179.99	7,696.78	-165.40	1,239.46	1,122.23	117.223	10.574	
15,400.00	7,642.42	16,644.13	8,882.18	145.77	146.14	-179.99	7,796.78	-165.30	1,239.45	1,120.81	118.647	10.447	
15,500.00	7,642.32	16,744.13	8,882.07	147.61	147.97	-179.99	7,896.78	-165.19	1,239.45	1,119.38	120.073	10.322	
15,600.00	7,642.22	16,844.13	8,881.97	149.45	149.81	-179.99	7,996.78	-165.09	1,239.45	1,117.95	121.500	10.201	
15,700.00	7,642.12	16,944.13	8,881.86	151.29	151.64	-179.99	8,096.78	-164.98	1,239.44	1,116.52	122.928	10.083	
15,800.00	7,642.02	17,044.13	8,881.76	153.13	153.48	-179.99	8,196.78	-164.88	1,239.44	1,115.08	124.357	9.967	
15,900.00	7,641.92	17,144.13	8,881.65	154.97	155.32	-179.99	8,296.78	-164.77	1,239.44	1,113.65	125.786	9.854	
16,000.00	7,641.81	17,244.13	8,881.55	156.81	157.15	-179.99	8,396.78	-164.67	1,239.43	1,112.22	127.217	9.743	
16,100.00	7,641.71	17,344.13	8,881.44	158.65	158.99	-179.99	8,496.78	-164.57	1,239.43	1,110.78	128.648	9.634	
16,200.00	7,641.61	17,444.13	8,881.34	160.50	160.83	-179.99	8,596.78	-164.46	1,239.43	1,109.35	130.080	9.528	
16,300.00	7,641.51	17,544.13	8,881.23	162.34	162.67	-179.99	8,696.78	-164.36	1,239.42	1,107.91	131.513	9.424	
16,400.00	7,641.41	17,644.13	8,881.13	164.18	164.50	-179.99	8,796.78	-164.25	1,239.42	1,106.47	132.946	9.323	
16,500.00	7,641.31	17,744.13	8,881.02	166.02	166.34	-179.99	8,896.78	-164.15	1,239.42	1,105.04	134.381	9.223	
16,600.00	7,641.21	17,844.13	8,880.92	167.86	168.18	-179.99	8,996.78	-164.04	1,239.41	1,103.60	135.816	9.126	
16,700.00	7,641.10	17,944.13	8,880.81	169.70	170.02	-179.99	9,096.78	-163.94	1,239.41	1,102.16	137.251	9.030	
16,800.00	7,641.00	18,044.13	8,880.71	171.55	171.86	-179.99	9,196.78	-163.83	1,239.41	1,100.72	138.688	8.937	
16,900.00	7,640.90	18,144.13	8,880.61	173.39	173.70	-179.99	9,296.78	-163.73	1,239.40	1,099.28	140.124	8.845	
17,000.00	7,640.80	18,244.13	8,880.50	175.23	175.54	-179.99	9,396.78	-163.62	1,239.40	1,097.84	141.562	8.755	
17,100.00	7,640.70	18,344.13	8,880.40	177.07	177.38	-179.99	9,496.78	-163.52	1,239.40	1,096.40	143.000	8.667	
17,200.00	7,640.60	18,444.13	8,880.29	178.92	179.22	-179.99	9,596.78	-163.41	1,239.39	1,094.96	144.439	8.581	
17,300.00	7,640.50	18,544.13	8,880.19	180.76	181.06	-179.99	9,696.78	-163.31	1,239.39	1,093.51	145.878	8.496	
17,400.00	7,640.39	18,644.13	8,880.08	182.60	182.90	-179.99	9,796.78	-163.20	1,239.39	1,092.07	147.318	8.413	
17,500.00	7,640.29	18,744.13	8,879.98	184.45	184.74	-179.99	9,896.78	-163.10	1,239.38	1,090.63	148.758	8.332	
17,600.00	7,640.19	18,844.13	8,879.87	186.29	186.58	-179.99	9,996.78	-162.99	1,239.38	1,089.18	150.199	8.252	
17,700.00	7,640.09	18,944.13	8,879.77	188.13	188.42	-179.99	10,096.78	-162.89	1,239.38	1,087.74	151.640	8.173	
17,760.54	7,640.03	19,004.67	8,879.70	189.25	189.54	-179.99	10,157.32	-162.83	1,239.38	1,086.86	152.513	8.126	
17,789.02	7,640.00	19,020.51	8,879.90	189.77	189.83	-180.00	10,173.16	-162.68	1,239.65	1,086.87	152.775	8.114	

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #3H - OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-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)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.20	-0.20	0.00	0.00	-90.00	0.00	-30.00	30.00				
100.00	100.00	100.20	99.80	0.08	0.08	-90.00	0.00	-30.00	30.00	29.83	.169	177.489	
200.00	200.00	200.20	199.80	0.31	0.31	-90.00	0.00	-30.00	30.00	29.38	.619	48.500	
300.00	300.00	300.20	299.80	0.53	0.53	-90.00	0.00	-30.00	30.00	28.93	1.068	28.088	
400.00	400.00	400.20	399.80	0.76	0.76	-90.00	0.00	-30.00	30.00	28.48	1.518	19.768	
500.00	500.00	500.20	499.80	0.98	0.98	-90.00	0.00	-30.00	30.00	28.03	1.967	15.250	
600.00	600.00	600.20	599.80	1.21	1.21	-90.00	0.00	-30.00	30.00	27.58	2.417	12.414	
700.00	700.00	700.20	699.80	1.43	1.43	-90.00	0.00	-30.00	30.00	27.13	2.866	10.467	
800.00	800.00	800.20	799.80	1.66	1.66	-90.00	0.00	-30.00	30.00	26.68	3.316	9.048	
900.00	900.00	900.20	899.80	1.88	1.88	-90.00	0.00	-30.00	30.00	26.23	3.765	7.968	
1,000.00	1,000.00	999.80	999.80	2.11	2.11	-90.00	0.00	-30.00	30.00	25.79	4.214	7.119	
1,100.00	1,099.99	1,099.44	1,099.44	2.31	2.31	47.01	-0.63	-30.59	30.00	25.38	4.613	6.502	
1,200.00	1,199.96	1,199.09	1,199.05	2.49	2.49	47.03	-2.53	-32.36	29.99	25.01	4.975	6.027	
1,300.00	1,299.86	1,298.73	1,298.60	2.68	2.68	47.05	-5.69	-35.31	29.97	24.62	5.352	5.600	
1,301.27	1,301.13	1,300.00	1,299.86	2.68	2.68	47.05	-5.74	-35.36	29.97	24.62	5.357	5.595 CC	
1,400.00	1,399.73	1,401.64	1,398.04	2.88	2.89	45.90	-10.12	-39.44	30.56	24.81	5.750	5.315	
1,500.00	1,499.59	1,501.65	1,497.78	3.09	3.10	43.64	-15.22	-44.20	31.80	25.64	6.155	5.166	
1,600.00	1,599.45	1,601.67	1,597.52	3.30	3.31	41.55	-20.33	-48.95	33.08	26.51	6.569	5.036	
1,700.00	1,699.31	1,701.68	1,697.27	3.52	3.54	39.62	-25.43	-53.71	34.41	27.42	6.990	4.923	
1,800.00	1,799.18	1,801.70	1,797.01	3.73	3.77	37.84	-30.53	-58.47	35.77	28.35	7.416	4.823	
1,900.00	1,899.04	1,901.71	1,896.75	3.96	4.00	36.19	-35.63	-63.22	37.16	29.32	7.847	4.736	
2,000.00	1,998.90	2,001.73	1,996.49	4.18	4.23	34.66	-40.73	-67.98	38.59	30.30	8.281	4.660	
2,100.00	2,098.77	2,101.74	2,096.23	4.41	4.47	33.24	-45.83	-72.74	40.03	31.32	8.717	4.592	
2,200.00	2,198.63	2,201.76	2,195.97	4.64	4.71	31.92	-50.93	-77.49	41.50	32.35	9.156	4.533	
2,300.00	2,298.49	2,301.77	2,295.71	4.87	4.95	30.69	-56.03	-82.25	43.00	33.40	9.597	4.480	
2,400.00	2,398.36	2,401.79	2,395.45	5.10	5.20	29.54	-61.13	-87.01	44.51	34.47	10.039	4.433	
2,500.00	2,498.22	2,501.80	2,495.20	5.34	5.44	28.47	-66.23	-91.76	46.03	35.55	10.482	4.392	
2,600.00	2,598.08	2,601.82	2,594.94	5.57	5.69	27.47	-71.33	-96.52	47.57	36.65	10.926	4.354	
2,700.00	2,697.94	2,701.83	2,694.68	5.81	5.94	26.53	-76.44	-101.28	49.13	37.76	11.372	4.320	
2,800.00	2,797.81	2,798.15	2,794.42	6.04	6.18	25.65	-81.54	-106.03	50.70	38.89	11.809	4.293	
2,900.00	2,897.67	2,901.87	2,894.16	6.28	6.44	24.82	-86.64	-110.79	52.27	40.01	12.265	4.262	
3,000.00	2,997.53	3,001.88	2,993.90	6.52	6.69	24.04	-91.74	-115.55	53.86	41.15	12.712	4.237	
3,100.00	3,097.40	3,098.10	3,093.64	6.76	6.93	23.31	-96.84	-120.30	55.46	42.31	13.151	4.217	
3,200.00	3,197.26	3,201.91	3,193.38	7.00	7.19	22.61	-101.94	-125.06	57.07	43.46	13.609	4.194	
3,300.00	3,297.12	3,301.93	3,293.13	7.24	7.44	21.96	-107.04	-129.82	58.68	44.63	14.058	4.175	
3,400.00	3,396.99	3,401.94	3,392.87	7.48	7.70	21.34	-112.14	-134.57	60.31	45.80	14.507	4.157	
3,500.00	3,496.85	3,501.96	3,492.61	7.72	7.95	20.75	-117.24	-139.33	61.94	46.98	14.957	4.141	
3,600.00	3,596.71	3,601.97	3,592.35	7.96	8.20	20.19	-122.34	-144.09	63.57	48.16	15.407	4.126	
3,700.00	3,696.57	3,701.99	3,692.09	8.20	8.46	19.66	-127.44	-148.84	65.21	49.35	15.858	4.112	
3,800.00	3,796.44	3,802.00	3,791.83	8.44	8.71	19.16	-132.55	-153.60	66.86	50.55	16.309	4.099	
3,900.00	3,896.30	3,902.02	3,891.57	8.68	8.97	18.68	-137.65	-158.36	68.51	51.75	16.760	4.088	
4,000.00	3,996.16	3,997.97	3,991.31	8.92	9.21	18.22	-142.75	-163.11	70.16	52.96	17.202	4.079	
4,100.00	4,096.03	4,099.05	4,092.20	9.16	9.47	17.97	-147.36	-167.42	71.12	53.46	17.659	4.072	
4,200.00	4,195.89	4,200.23	4,193.28	9.40	9.71	18.16	-150.68	-170.51	70.41	52.29	18.117	3.886	
4,300.00	4,295.75	4,301.36	4,294.37	9.65	9.93	18.83	-152.69	-172.39	68.02	49.45	18.574	3.662	
4,400.00	4,395.61	4,402.37	4,395.37	9.89	10.14	20.08	-153.40	-173.05	63.99	44.97	19.019	3.365	
4,500.00	4,495.48	4,502.28	4,495.28	10.13	10.31	21.82	-153.40	-173.05	59.10	39.64	19.461	3.037	
4,600.00	4,595.34	4,602.14	4,595.14	10.37	10.50	23.87	-153.40	-173.05	54.28	34.37	19.911	2.726	
4,700.00	4,695.20	4,702.00	4,695.00	10.62	10.68	26.32	-153.40	-173.05	49.54	29.16	20.371	2.432	
4,800.00	4,795.07	4,801.87	4,794.87	10.86	10.86	29.28	-153.40	-173.05	44.90	24.06	20.845	2.154	
4,900.00	4,894.93	4,901.73	4,894.73	11.10	11.05	32.91	-153.40	-173.05	40.42	19.08	21.336	1.894	
5,005.22	5,000.00	5,006.80	4,999.80	11.36	11.24	37.69	-153.40	-173.05	35.92	14.04	21.879	1.642	

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #3H - OH - Plan #1														Offset Site Error:	0.00 usft
Survey Program: 0-MWD														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)							
5,100.00	5,094.69	5,101.49	5,094.49	11.59	11.42	42.14	-153.40	-173.05	32.71	10.34	22.373	1.462	Level 3		
5,200.00	5,194.65	5,201.45	5,194.45	11.81	11.61	45.52	-153.40	-173.05	30.76	7.89	22.864	1.345	Level 3		
5,305.22	5,299.86	5,306.66	5,299.66	12.03	11.81	-90.18	-153.40	-173.05	30.09	6.78	23.308	1.291	Level 3		
5,400.00	5,394.65	5,401.45	5,394.45	12.20	11.99	-90.18	-153.40	-173.05	30.09	6.42	23.667	1.271	Level 3		
5,500.00	5,494.65	5,501.45	5,494.45	12.38	12.19	-90.18	-153.40	-173.05	30.09	6.04	24.048	1.251	Level 3		
5,600.00	5,594.65	5,601.45	5,594.45	12.56	12.38	-90.18	-153.40	-173.05	30.09	5.65	24.432	1.231	Level 2		
5,700.00	5,694.65	5,701.45	5,694.45	12.74	12.58	-90.18	-153.40	-173.05	30.09	5.27	24.817	1.212	Level 2		
5,800.00	5,794.65	5,801.45	5,794.45	12.93	12.77	-90.18	-153.40	-173.05	30.09	4.88	25.205	1.194	Level 2		
5,900.00	5,894.65	5,901.45	5,894.45	13.12	12.97	-90.18	-153.40	-173.05	30.09	4.49	25.594	1.175	Level 2		
6,000.00	5,994.65	6,001.45	5,994.45	13.30	13.17	-90.18	-153.40	-173.05	30.09	4.10	25.986	1.158	Level 2		
6,100.00	6,094.65	6,101.45	6,094.45	13.49	13.37	-90.18	-153.40	-173.05	30.09	3.71	26.380	1.141	Level 2		
6,200.00	6,194.65	6,201.45	6,194.45	13.68	13.57	-90.18	-153.40	-173.05	30.09	3.31	26.775	1.124	Level 2		
6,300.00	6,294.65	6,301.45	6,294.45	13.88	13.77	-90.18	-153.40	-173.05	30.09	2.91	27.172	1.107	Level 2		
6,400.00	6,394.65	6,401.45	6,394.45	14.07	13.97	-90.18	-153.40	-173.05	30.09	2.52	27.570	1.091	Level 2		
6,500.00	6,494.65	6,501.45	6,494.45	14.26	14.17	-90.18	-153.40	-173.05	30.09	2.12	27.970	1.076	Level 2		
6,600.00	6,594.65	6,601.45	6,594.45	14.45	14.37	-90.18	-153.40	-173.05	30.09	1.71	28.372	1.060	Level 2		
6,700.00	6,694.65	6,701.45	6,694.45	14.65	14.57	-90.18	-153.40	-173.05	30.09	1.31	28.775	1.046	Level 2		
6,800.00	6,794.65	6,801.45	6,794.45	14.85	14.78	-90.18	-153.40	-173.05	30.09	0.91	29.179	1.031	Level 2		
6,900.00	6,894.65	6,901.45	6,894.45	15.04	14.98	-90.17	-153.39	-173.05	30.09	0.50	29.584	1.017	Level 2		
6,908.91	6,903.56	6,910.36	6,903.36	15.06	15.00	-89.94	-153.28	-173.05	30.09	0.46	29.624	1.016	Level 2, ES, SF		
7,000.00	6,994.65	6,999.97	6,992.23	15.24	15.16	-70.87	-142.88	-173.04	31.91	1.70	30.214	1.056	Level 2		
7,100.00	7,094.65	7,090.60	7,078.54	15.44	15.28	-38.61	-115.68	-173.01	50.71	20.74	29.977	1.692			
7,177.89	7,172.54	7,152.68	7,133.99	15.59	15.36	-24.64	-87.85	-172.98	81.59	52.41	29.179	2.796			
7,200.00	7,194.64	7,169.04	7,147.95	15.64	15.37	-18.63	-79.34	-172.97	91.95	63.00	28.951	3.176			
7,225.00	7,219.57	7,187.28	7,163.18	15.68	15.39	-16.05	-69.29	-172.96	103.56	74.87	28.696	3.609			
7,250.00	7,244.37	7,205.29	7,177.82	15.73	15.41	-14.01	-58.80	-172.95	114.98	86.53	28.444	4.042			
7,275.00	7,268.98	7,223.09	7,191.89	15.77	15.43	-12.36	-47.91	-172.94	126.15	97.96	28.194	4.474			
7,300.00	7,293.32	7,240.68	7,205.39	15.80	15.44	-11.00	-36.62	-172.93	137.05	109.10	27.945	4.904			
7,325.00	7,317.33	7,258.10	7,218.33	15.84	15.46	-9.86	-24.98	-172.92	147.64	119.94	27.697	5.330			
7,350.00	7,340.95	7,275.00	7,230.48	15.87	15.48	-8.90	-13.23	-172.91	157.91	130.47	27.435	5.756			
7,375.00	7,364.10	7,292.43	7,242.57	15.90	15.49	-8.05	-0.67	-172.89	167.83	140.62	27.208	6.168			
7,400.00	7,386.72	7,309.38	7,253.87	15.93	15.51	-7.32	11.96	-172.88	177.39	150.43	26.968	6.578			
7,425.00	7,408.76	7,325.00	7,263.89	15.96	15.52	-6.71	23.95	-172.87	186.59	159.91	26.681	6.993			
7,450.00	7,430.16	7,342.90	7,274.88	15.99	15.53	-6.10	38.07	-172.85	195.39	168.89	26.501	7.373			
7,475.00	7,450.84	7,359.49	7,284.58	16.02	15.55	-5.59	51.53	-172.84	203.81	177.53	26.276	7.756			
7,500.00	7,470.77	7,375.00	7,293.23	16.04	15.56	-5.15	64.41	-172.83	211.82	185.79	26.025	8.139			
7,525.00	7,489.87	7,392.37	7,302.41	16.07	15.57	-4.72	79.15	-172.81	219.41	193.56	25.851	8.487			
7,550.00	7,508.11	7,408.68	7,310.53	16.09	15.61	-4.34	93.29	-172.80	226.58	200.93	25.652	8.833			
7,575.00	7,525.42	7,425.00	7,318.17	16.11	15.67	-3.99	107.71	-172.78	233.32	207.85	25.467	9.162			
7,600.00	7,541.77	7,441.08	7,325.22	16.13	15.73	-3.67	122.16	-172.77	239.63	214.34	25.290	9.475			
7,625.00	7,557.11	7,457.18	7,331.78	16.15	15.79	-3.37	136.86	-172.75	245.49	220.37	25.129	9.769			
7,650.00	7,571.39	7,475.00	7,338.46	16.17	15.87	-3.07	153.39	-172.74	250.92	225.90	25.023	10.028			
7,675.00	7,584.58	7,489.21	7,343.34	16.21	15.94	-2.83	166.73	-172.72	255.88	231.02	24.852	10.296			
7,700.00	7,596.64	7,505.15	7,348.34	16.29	16.01	-2.59	181.86	-172.71	260.38	235.65	24.739	10.525			
7,725.00	7,607.54	7,521.05	7,352.82	16.39	16.09	-2.35	197.12	-172.69	264.43	239.79	24.644	10.730			
7,750.00	7,617.25	7,536.91	7,356.78	16.50	16.18	-2.13	212.48	-172.68	268.01	243.44	24.567	10.909			
7,775.00	7,625.73	7,550.00	7,359.67	16.62	16.25	-1.96	225.25	-172.66	271.14	246.67	24.478	11.077			
7,800.00	7,632.98	7,568.55	7,363.15	16.75	16.36	-1.72	243.47	-172.65	273.76	249.29	24.474	11.186			
7,825.00	7,638.96	7,584.34	7,365.56	16.88	16.45	-1.53	259.06	-172.63	275.93	251.47	24.458	11.282			
7,850.00	7,643.67	7,600.00	7,367.44	17.03	16.55	-1.34	274.62	-172.61	277.62	253.16	24.463	11.348			
7,875.00	7,647.08	7,615.86	7,368.82	17.19	16.66	-1.15	290.41	-172.60	278.83	254.34	24.491	11.385			
7,900.00	7,649.19	7,631.60	7,369.67	17.35	16.76	-0.97	306.13	-172.58	279.57	255.03	24.540	11.392			

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #3H - OH - Plan #1													Offset Site Error:	0.00 usft
Survey Program: 0-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		
7,925.00	7,650.00	7,654.28	7,370.01	17.53	16.92	-0.81	320.29	-172.57	279.82	255.19	24.627	11.362		
7,928.39	7,650.00	7,650.90	7,370.01	17.56	16.90	-0.77	323.68	-172.56	279.82	255.20	24.625	11.363		
8,000.00	7,649.93	7,720.69	7,369.93	18.11	17.45	-0.15	395.22	-172.49	279.80	254.92	24.876	11.248		
8,036.96	7,649.89	7,757.64	7,369.90	18.44	17.77	0.03	432.17	-172.45	279.80	254.77	25.030	11.178		
8,086.46	7,649.84	7,807.14	7,369.85	18.88	18.22	0.12	481.67	-172.40	279.80	254.55	25.242	11.084		
8,100.00	7,649.83	7,820.68	7,369.83	19.01	18.35	0.12	495.21	-172.39	279.80	254.49	25.308	11.056		
8,200.00	7,649.73	7,920.68	7,369.73	20.03	19.39	0.12	595.21	-172.29	279.80	253.98	25.820	10.836		
8,300.00	7,649.63	8,020.68	7,369.63	21.16	20.54	0.12	695.21	-172.19	279.80	253.39	26.404	10.597		
8,400.00	7,649.52	8,120.68	7,369.53	22.38	21.78	0.12	795.21	-172.09	279.80	252.74	27.056	10.342		
8,500.00	7,649.42	8,220.68	7,369.43	23.69	23.11	0.12	895.21	-171.99	279.80	252.03	27.769	10.076		
8,600.00	7,649.32	8,320.68	7,369.32	25.06	24.50	0.12	995.21	-171.89	279.80	251.26	28.540	9.804		
8,700.00	7,649.22	8,420.68	7,369.22	26.49	25.95	0.11	1,095.21	-171.78	279.80	250.43	29.364	9.529		
8,800.00	7,649.12	8,520.68	7,369.12	27.97	27.45	0.11	1,195.21	-171.68	279.80	249.56	30.237	9.253		
8,900.00	7,649.02	8,620.68	7,369.02	29.50	28.99	0.11	1,295.21	-171.58	279.80	248.64	31.154	8.981		
9,000.00	7,648.92	8,720.68	7,368.92	31.06	30.56	0.11	1,395.21	-171.48	279.80	247.68	32.113	8.713		
9,100.00	7,648.81	8,820.68	7,368.82	32.64	32.17	0.11	1,495.21	-171.38	279.80	246.69	33.108	8.451		
9,200.00	7,648.71	8,920.68	7,368.72	34.26	33.80	0.11	1,595.21	-171.28	279.80	245.66	34.138	8.196		
9,300.00	7,648.61	9,020.68	7,368.61	35.90	35.45	0.11	1,695.21	-171.18	279.80	244.60	35.199	7.949		
9,400.00	7,648.51	9,120.68	7,368.51	37.55	37.12	0.11	1,795.21	-171.08	279.80	243.51	36.288	7.711		
9,500.00	7,648.41	9,220.68	7,368.41	39.23	38.80	0.10	1,895.21	-170.98	279.80	242.40	37.402	7.481		
9,600.00	7,648.31	9,320.68	7,368.31	40.92	40.50	0.10	1,995.21	-170.88	279.80	241.26	38.541	7.260		
9,700.00	7,648.21	9,420.68	7,368.21	42.62	42.21	0.10	2,095.21	-170.77	279.80	240.10	39.700	7.048		
9,800.00	7,648.10	9,520.68	7,368.11	44.34	43.94	0.10	2,195.20	-170.67	279.80	238.92	40.880	6.844		
9,900.00	7,648.00	9,620.68	7,368.01	46.06	45.67	0.10	2,295.20	-170.57	279.80	237.72	42.078	6.650		
10,000.00	7,647.90	9,720.68	7,367.90	47.80	47.41	0.10	2,395.20	-170.47	279.80	236.51	43.292	6.463		
10,100.00	7,647.80	9,820.68	7,367.80	49.54	49.17	0.10	2,495.20	-170.37	279.80	235.28	44.522	6.285		
10,200.00	7,647.70	9,920.68	7,367.70	51.29	50.92	0.10	2,595.20	-170.27	279.80	234.03	45.765	6.114		
10,300.00	7,647.60	10,020.68	7,367.60	53.05	52.69	0.09	2,695.20	-170.17	279.80	232.78	47.021	5.950		
10,400.00	7,647.50	10,120.68	7,367.50	54.81	54.46	0.09	2,795.20	-170.07	279.80	231.51	48.290	5.794		
10,500.00	7,647.39	10,220.68	7,367.40	56.58	56.23	0.09	2,895.20	-169.97	279.80	230.23	49.569	5.645		
10,600.00	7,647.29	10,320.68	7,367.29	58.36	58.01	0.09	2,995.20	-169.86	279.80	228.94	50.858	5.502		
10,700.00	7,647.19	10,420.68	7,367.19	60.13	59.80	0.09	3,095.20	-169.76	279.80	227.64	52.157	5.365		
10,800.00	7,647.09	10,520.68	7,367.09	61.92	61.58	0.09	3,195.20	-169.66	279.80	226.33	53.464	5.233		
10,900.00	7,646.99	10,620.68	7,366.99	63.70	63.38	0.09	3,295.20	-169.56	279.80	225.02	54.780	5.108		
11,000.00	7,646.89	10,720.68	7,366.89	65.49	65.17	0.09	3,395.20	-169.46	279.80	223.70	56.103	4.987		
11,100.00	7,646.79	10,820.68	7,366.79	67.29	66.97	0.08	3,495.20	-169.36	279.80	222.37	57.432	4.872		
11,200.00	7,646.68	10,920.68	7,366.69	69.09	68.77	0.08	3,595.20	-169.26	279.80	221.03	58.769	4.761		
11,300.00	7,646.58	11,020.68	7,366.58	70.88	70.57	0.08	3,695.20	-169.16	279.80	219.69	60.112	4.655		
11,400.00	7,646.48	11,120.68	7,366.48	72.69	72.38	0.08	3,795.20	-169.06	279.80	218.34	61.460	4.553		
11,500.00	7,646.38	11,220.68	7,366.38	74.49	74.19	0.08	3,895.20	-168.96	279.80	216.98	62.813	4.454		
11,600.00	7,646.28	11,320.68	7,366.28	76.30	76.00	0.08	3,995.20	-168.85	279.80	215.63	64.172	4.360		
11,700.00	7,646.18	11,420.68	7,366.18	78.11	77.81	0.08	4,095.20	-168.75	279.80	214.26	65.535	4.269		
11,800.00	7,646.08	11,520.68	7,366.08	79.92	79.62	0.08	4,195.20	-168.65	279.80	212.90	66.903	4.182		
11,900.00	7,645.97	11,620.68	7,365.98	81.73	81.44	0.07	4,295.20	-168.55	279.80	211.52	68.274	4.098		
12,000.00	7,645.87	11,720.68	7,365.87	83.54	83.25	0.07	4,395.20	-168.45	279.80	210.15	69.650	4.017		
12,100.00	7,645.77	11,820.68	7,365.77	85.36	85.07	0.07	4,495.20	-168.35	279.80	208.77	71.029	3.939		
12,200.00	7,645.67	11,920.68	7,365.67	87.18	86.89	0.07	4,595.20	-168.25	279.80	207.39	72.412	3.864		
12,300.00	7,645.57	12,020.68	7,365.57	89.00	88.71	0.07	4,695.20	-168.15	279.80	206.00	73.798	3.791		
12,400.00	7,645.47	12,120.68	7,365.47	90.82	90.54	0.07	4,795.20	-168.05	279.80	204.61	75.187	3.721		
12,500.00	7,645.36	12,220.68	7,365.37	92.64	92.36	0.07	4,895.20	-167.94	279.80	203.22	76.579	3.654		
12,600.00	7,645.26	12,320.68	7,365.27	94.46	94.18	0.07	4,995.20	-167.84	279.80	201.82	77.973	3.588		
12,700.00	7,645.16	12,420.68	7,365.16	96.28	96.01	0.06	5,095.20	-167.74	279.80	200.43	79.371	3.525		

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

Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Offset Design Roadrunner Fed COM - #3H - OH - Plan #1													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)						
12,800.00	7,645.06	12,520.68	7,365.06	98.11	97.84	0.06	5,195.20	-167.64	279.80	199.03	80.770	3.464		
12,900.00	7,644.96	12,620.68	7,364.96	99.93	99.66	0.06	5,295.20	-167.54	279.80	197.63	82.172	3.405		
13,000.00	7,644.86	12,720.68	7,364.86	101.76	101.49	0.06	5,395.20	-167.44	279.80	196.22	83.577	3.348		
13,100.00	7,644.76	12,820.68	7,364.76	103.59	103.32	0.06	5,495.20	-167.34	279.80	194.82	84.983	3.292		
13,200.00	7,644.65	12,920.68	7,364.66	105.41	105.15	0.06	5,595.20	-167.24	279.80	193.41	86.392	3.239		
13,300.00	7,644.55	13,020.68	7,364.56	107.24	106.98	0.06	5,695.20	-167.14	279.80	192.00	87.802	3.187		
13,400.00	7,644.45	13,120.68	7,364.45	109.07	108.81	0.06	5,795.20	-167.04	279.80	190.58	89.214	3.136		
13,500.00	7,644.35	13,220.68	7,364.35	110.90	110.64	0.05	5,895.20	-166.93	279.80	189.17	90.628	3.087		
13,600.00	7,644.25	13,320.68	7,364.25	112.73	112.48	0.05	5,995.20	-166.83	279.80	187.75	92.044	3.040		
13,700.00	7,644.15	13,420.68	7,364.15	114.56	114.31	0.05	6,095.20	-166.73	279.80	186.34	93.461	2.994		
13,800.00	7,644.05	13,520.68	7,364.05	116.40	116.14	0.05	6,195.20	-166.63	279.80	184.92	94.879	2.949		
13,900.00	7,643.94	13,620.68	7,363.95	118.23	117.98	0.05	6,295.20	-166.53	279.80	183.50	96.299	2.906		
14,000.00	7,643.84	13,720.68	7,363.85	120.06	119.81	0.05	6,395.20	-166.43	279.80	182.08	97.721	2.863		
14,100.00	7,643.74	13,820.68	7,363.74	121.90	121.65	0.05	6,495.20	-166.33	279.80	180.65	99.144	2.822		
14,200.00	7,643.64	13,920.68	7,363.64	123.73	123.48	0.05	6,595.20	-166.23	279.80	179.23	100.568	2.782		
14,300.00	7,643.54	14,020.68	7,363.54	125.56	125.32	0.04	6,695.20	-166.13	279.80	177.81	101.993	2.743		
14,400.00	7,643.44	14,120.68	7,363.44	127.40	127.16	0.04	6,795.20	-166.02	279.80	176.38	103.420	2.705		
14,500.00	7,643.34	14,220.68	7,363.34	129.24	128.99	0.04	6,895.20	-165.92	279.80	174.95	104.847	2.669		
14,600.00	7,643.23	14,320.68	7,363.24	131.07	130.83	0.04	6,995.20	-165.82	279.80	173.52	106.276	2.633		
14,700.00	7,643.13	14,420.68	7,363.13	132.91	132.67	0.04	7,095.20	-165.72	279.80	172.09	107.705	2.598		
14,800.00	7,643.03	14,520.68	7,363.03	134.75	134.51	0.04	7,195.20	-165.62	279.80	170.66	109.136	2.564		
14,900.00	7,642.93	14,620.68	7,362.93	136.58	136.34	0.04	7,295.20	-165.52	279.80	169.23	110.568	2.531		
15,000.00	7,642.83	14,720.68	7,362.83	138.42	138.18	0.03	7,395.20	-165.42	279.80	167.80	112.000	2.498		
15,100.00	7,642.73	14,820.68	7,362.73	140.26	140.02	0.03	7,495.20	-165.32	279.80	166.37	113.434	2.467		
15,200.00	7,642.63	14,920.68	7,362.63	142.10	141.86	0.03	7,595.20	-165.22	279.80	164.93	114.868	2.436		
15,300.00	7,642.52	15,020.68	7,362.53	143.94	143.70	0.03	7,695.20	-165.12	279.80	163.50	116.303	2.406		
15,400.00	7,642.42	15,120.68	7,362.42	145.77	145.54	0.03	7,795.20	-165.01	279.80	162.06	117.739	2.376		
15,500.00	7,642.32	15,220.68	7,362.32	147.61	147.38	0.03	7,895.20	-164.91	279.80	160.62	119.175	2.348		
15,600.00	7,642.22	15,320.68	7,362.22	149.45	149.22	0.03	7,995.20	-164.81	279.80	159.19	120.613	2.320		
15,700.00	7,642.12	15,420.68	7,362.12	151.29	151.06	0.03	8,095.20	-164.71	279.80	157.75	122.051	2.292		
15,800.00	7,642.02	15,520.68	7,362.02	153.13	152.90	0.02	8,195.20	-164.61	279.80	156.31	123.489	2.266		
15,900.00	7,641.92	15,620.68	7,361.92	154.97	154.74	0.02	8,295.20	-164.51	279.80	154.87	124.929	2.240		
16,000.00	7,641.81	15,720.68	7,361.82	156.81	156.58	0.02	8,395.20	-164.41	279.80	153.43	126.369	2.214		
16,100.00	7,641.71	15,820.68	7,361.71	158.65	158.43	0.02	8,495.20	-164.31	279.80	151.99	127.809	2.189		
16,200.00	7,641.61	15,920.68	7,361.61	160.50	160.27	0.02	8,595.20	-164.21	279.80	150.55	129.250	2.165		
16,300.00	7,641.51	16,020.68	7,361.51	162.34	162.11	0.02	8,695.20	-164.10	279.80	149.11	130.692	2.141		
16,400.00	7,641.41	16,120.68	7,361.41	164.18	163.95	0.02	8,795.20	-164.00	279.80	147.66	132.134	2.118		
16,500.00	7,641.31	16,220.68	7,361.31	166.02	165.79	0.02	8,895.20	-163.90	279.80	146.22	133.577	2.095		
16,600.00	7,641.21	16,320.68	7,361.21	167.86	167.64	0.01	8,995.20	-163.80	279.80	144.78	135.021	2.072		
16,700.00	7,641.10	16,420.68	7,361.11	169.70	169.48	0.01	9,095.20	-163.70	279.80	143.33	136.465	2.050		
16,800.00	7,641.00	16,520.68	7,361.00	171.55	171.32	0.01	9,195.20	-163.60	279.80	141.89	137.909	2.029		
16,900.00	7,640.90	16,620.68	7,360.90	173.39	173.17	0.01	9,295.20	-163.50	279.80	140.45	139.354	2.008		
17,000.00	7,640.80	16,720.68	7,360.80	175.23	175.01	0.01	9,395.20	-163.40	279.80	139.00	140.799	1.987		
17,100.00	7,640.70	16,820.68	7,360.70	177.07	176.85	0.01	9,495.20	-163.30	279.80	137.55	142.245	1.967		
17,200.00	7,640.60	16,920.68	7,360.60	178.92	178.70	0.01	9,595.20	-163.20	279.80	136.11	143.691	1.947		
17,300.00	7,640.50	17,020.68	7,360.50	180.76	180.54	0.01	9,695.20	-163.09	279.80	134.66	145.137	1.928		
17,400.00	7,640.39	17,120.68	7,360.40	182.60	182.38	0.00	9,795.20	-162.99	279.80	133.22	146.584	1.909		
17,500.00	7,640.29	17,220.68	7,360.29	184.45	184.23	0.00	9,895.20	-162.89	279.80	131.77	148.032	1.890		
17,600.00	7,640.19	17,320.68	7,360.19	186.29	186.07	0.00	9,995.20	-162.79	279.80	130.32	149.480	1.872		
17,700.00	7,640.09	17,420.68	7,360.09	188.13	187.92	0.00	10,095.20	-162.69	279.80	128.87	150.928	1.854		
17,789.02	7,640.00	17,509.70	7,360.00	189.77	189.56	0.00	10,184.22	-162.60	279.80	127.58	152.217	1.838		

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

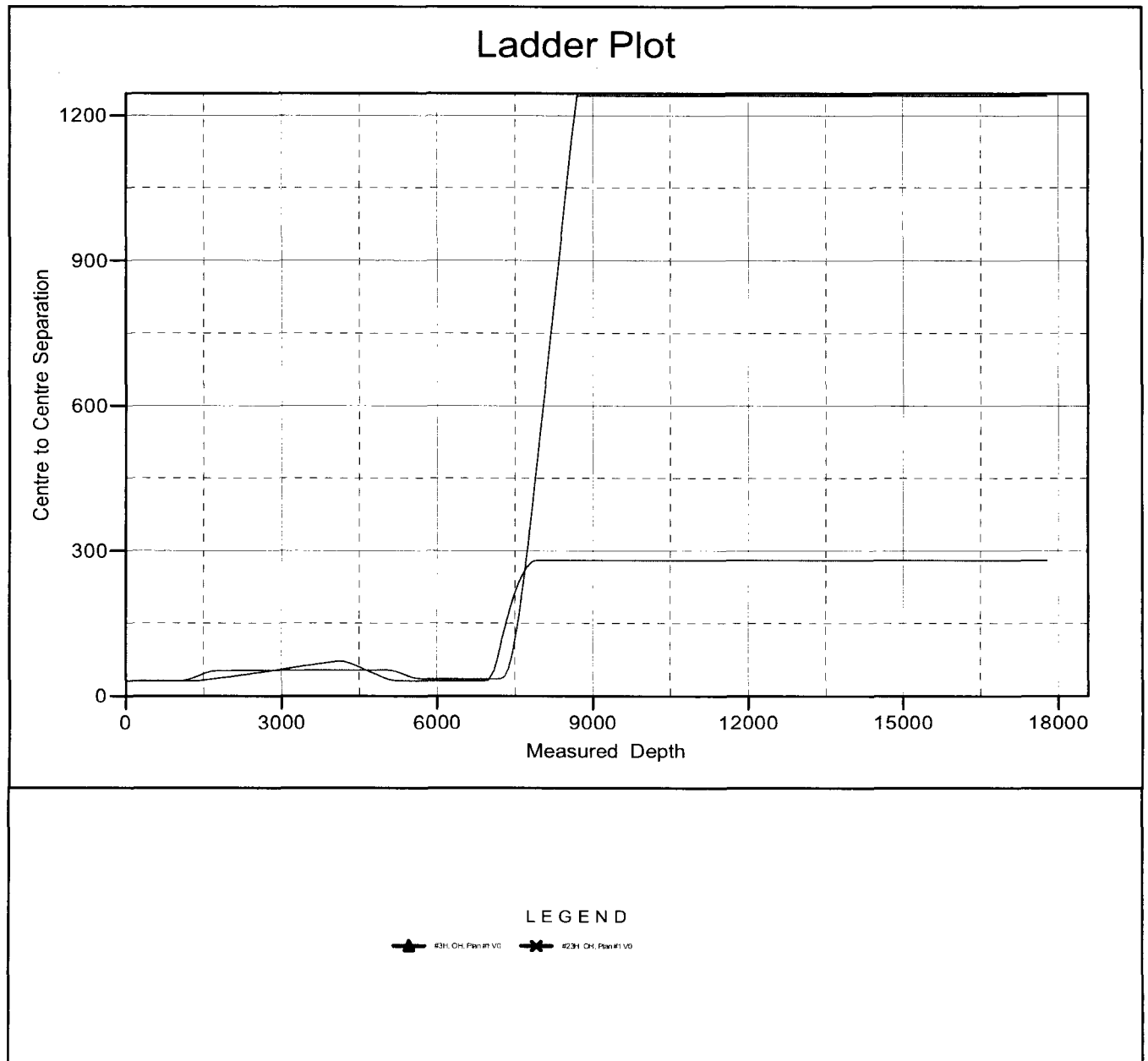
Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB @ 3266.60usft (Rig KB = 25')
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: #13H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.05°



Anticollision Report

Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Reference Site: Roadrunner Fed COM
Site Error: 0.00 usft
Reference Well: #13H
Well Error: 0.00 usft
Reference Wellbore: OH
Reference Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2,000 sigma
Database: EDM 5000.14 Single User Db
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB @ 3266.60usft (Rig KB = 25')

Offset Depths are relative to Offset Datum

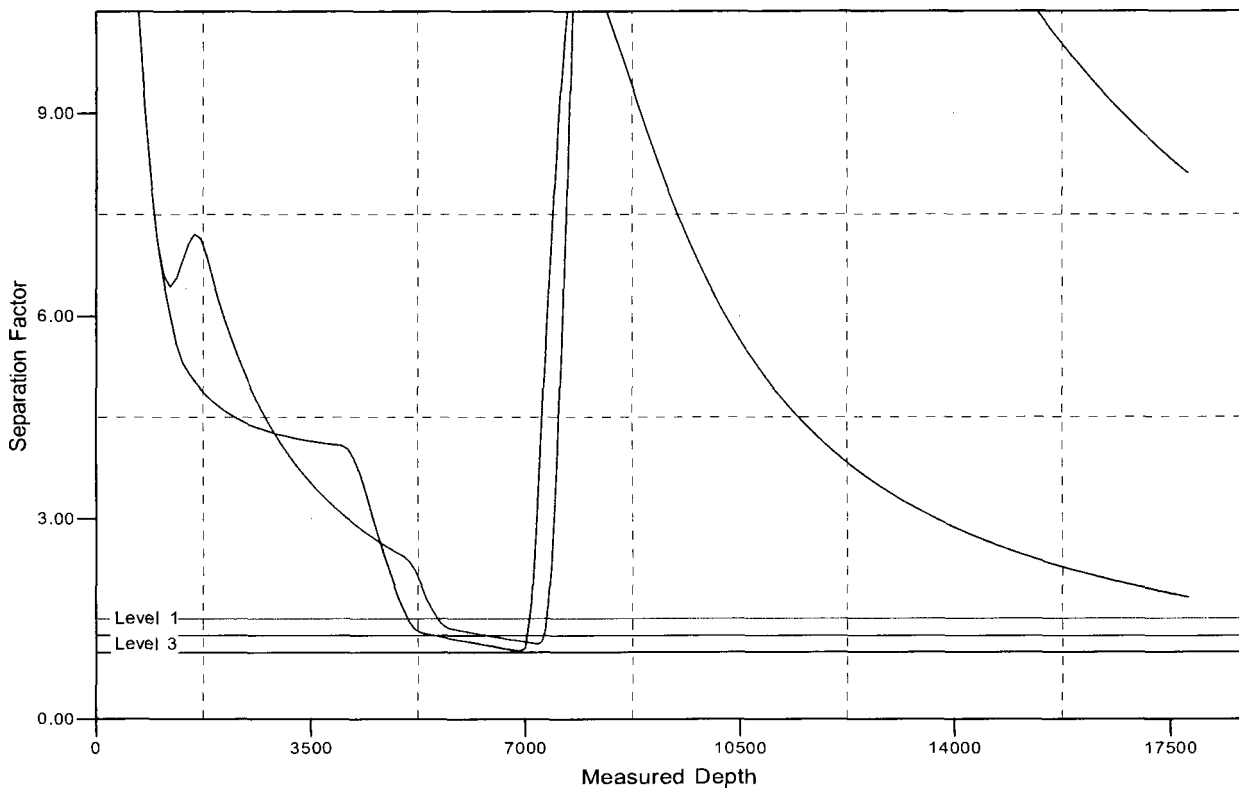
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: #13H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Grid Convergence at Surface is: 0.05°

Separation Factor Plot



LEGEND

—●— #13H: OH: Plan #1 V0 - - - - - #23H: OH: Plan #1 V0

COG OPERATING, LLC

Eddy County, NM (NAD27) NMZ

Roadrunner Fed COM

#13H

OH

Plan: Plan #1

Standard Planning Report

13 December, 2017

Planning Report

Database: EDM 5000.14 Single User Db
Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Site: Roadrunner Fed COM
Well: #13H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy County, NM (NAD27) NMZ		
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 Roadrunner Fed COM
Site Position:
From: Map
Position Uncertainty: 0.00 usft
Northing: 397,932.60 usft
Easting: 526,403.60 usft
Slot Radius: 13-3/16 "
Latitude: 32° 5' 38.414 N
Longitude: 104° 14' 53.059 W
Grid Convergence: 0.05 °

Well #13H
Well Position
+N/-S 0.00 usft
+E/-W 30.00 usft
Position Uncertainty 0.00 usft
Northing: 397,932.60 usft
Easting: 526,433.60 usft
Wellhead Elevation:
Latitude: 32° 5' 38.414 N
Longitude: 104° 14' 52.710 W
Ground Level: 3,241.60 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/13/17	7.20	59.83	47,739.05867550

Design Plan #1

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	0.06

Plan Survey Tool Program Date 12/13/17

Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1 0.00	17,788.85	Plan #1 (OH)	MWD	
			MWD v3:standard declination	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	3.00	223.00	1,299.86	-5.74	-5.36	1.00	1.00	0.00	223.00	
5,005.22	3.00	223.00	5,000.00	-147.56	-137.61	0.00	0.00	0.00	0.00	
5,305.22	0.00	0.00	5,299.86	-153.31	-142.96	1.00	-1.00	45.67	180.00	
7,177.89	0.00	0.00	7,172.54	-153.31	-142.96	0.00	0.00	0.00	0.00	
7,928.39	90.06	356.90	7,650.00	323.96	-168.81	12.00	12.00	0.00	356.90	
8,086.46	90.06	0.06	7,649.84	481.95	-173.00	2.00	0.00	2.00	90.03	
17,789.02	90.06	0.06	7,640.00	10,184.50	-162.60	0.00	0.00	0.00	0.00	PBHL(RFC#13H)

Planning Report

Database: EDM 5000.14 Single User Db
Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Site: Roadrunner Fed COM
Well: #13H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
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	1.00	223.00	1,099.99	-0.64	-0.60	-0.64	1.00	1.00	0.00
1,200.00	2.00	223.00	1,199.96	-2.55	-2.38	-2.56	1.00	1.00	0.00
1,300.00	3.00	223.00	1,299.86	-5.74	-5.36	-5.75	1.00	1.00	0.00
1,400.00	3.00	223.00	1,399.73	-9.57	-8.92	-9.58	0.00	0.00	0.00
1,500.00	3.00	223.00	1,499.59	-13.40	-12.49	-13.41	0.00	0.00	0.00
1,600.00	3.00	223.00	1,599.45	-17.23	-16.06	-17.24	0.00	0.00	0.00
1,700.00	3.00	223.00	1,699.31	-21.05	-19.63	-21.07	0.00	0.00	0.00
1,800.00	3.00	223.00	1,799.18	-24.88	-23.20	-24.91	0.00	0.00	0.00
1,900.00	3.00	223.00	1,899.04	-28.71	-26.77	-28.74	0.00	0.00	0.00
2,000.00	3.00	223.00	1,998.90	-32.54	-30.34	-32.57	0.00	0.00	0.00
2,100.00	3.00	223.00	2,098.77	-36.36	-33.91	-36.40	0.00	0.00	0.00
2,200.00	3.00	223.00	2,198.63	-40.19	-37.48	-40.23	0.00	0.00	0.00
2,300.00	3.00	223.00	2,298.49	-44.02	-41.05	-44.06	0.00	0.00	0.00
2,400.00	3.00	223.00	2,398.36	-47.85	-44.62	-47.89	0.00	0.00	0.00
2,500.00	3.00	223.00	2,498.22	-51.67	-48.19	-51.72	0.00	0.00	0.00
2,600.00	3.00	223.00	2,598.08	-55.50	-51.76	-55.56	0.00	0.00	0.00
2,700.00	3.00	223.00	2,697.94	-59.33	-55.33	-59.39	0.00	0.00	0.00
2,800.00	3.00	223.00	2,797.81	-63.16	-58.89	-63.22	0.00	0.00	0.00
2,900.00	3.00	223.00	2,897.67	-66.98	-62.46	-67.05	0.00	0.00	0.00
3,000.00	3.00	223.00	2,997.53	-70.81	-66.03	-70.88	0.00	0.00	0.00
3,100.00	3.00	223.00	3,097.40	-74.64	-69.60	-74.71	0.00	0.00	0.00
3,200.00	3.00	223.00	3,197.26	-78.47	-73.17	-78.54	0.00	0.00	0.00
3,300.00	3.00	223.00	3,297.12	-82.29	-76.74	-82.38	0.00	0.00	0.00
3,400.00	3.00	223.00	3,396.99	-86.12	-80.31	-86.21	0.00	0.00	0.00
3,500.00	3.00	223.00	3,496.85	-89.95	-83.88	-90.04	0.00	0.00	0.00
3,600.00	3.00	223.00	3,596.71	-93.78	-87.45	-93.87	0.00	0.00	0.00
3,700.00	3.00	223.00	3,696.57	-97.61	-91.02	-97.70	0.00	0.00	0.00
3,800.00	3.00	223.00	3,796.44	-101.43	-94.59	-101.53	0.00	0.00	0.00
3,900.00	3.00	223.00	3,896.30	-105.26	-98.16	-105.36	0.00	0.00	0.00
4,000.00	3.00	223.00	3,996.16	-109.09	-101.73	-109.19	0.00	0.00	0.00
4,100.00	3.00	223.00	4,096.03	-112.92	-105.30	-113.03	0.00	0.00	0.00
4,200.00	3.00	223.00	4,195.89	-116.74	-108.86	-116.86	0.00	0.00	0.00
4,300.00	3.00	223.00	4,295.75	-120.57	-112.43	-120.69	0.00	0.00	0.00
4,400.00	3.00	223.00	4,395.61	-124.40	-116.00	-124.52	0.00	0.00	0.00
4,500.00	3.00	223.00	4,495.48	-128.23	-119.57	-128.35	0.00	0.00	0.00
4,600.00	3.00	223.00	4,595.34	-132.05	-123.14	-132.18	0.00	0.00	0.00
4,700.00	3.00	223.00	4,695.20	-135.88	-126.71	-136.01	0.00	0.00	0.00
4,800.00	3.00	223.00	4,795.07	-139.71	-130.28	-139.85	0.00	0.00	0.00
4,900.00	3.00	223.00	4,894.93	-143.54	-133.85	-143.68	0.00	0.00	0.00
5,005.22	3.00	223.00	5,000.00	-147.56	-137.61	-147.71	0.00	0.00	0.00
5,100.00	2.05	223.00	5,094.69	-150.62	-140.45	-150.77	1.00	-1.00	0.00
5,200.00	1.05	223.00	5,194.65	-152.60	-142.30	-152.75	1.00	-1.00	0.00
5,305.22	0.00	0.00	5,299.86	-153.31	-142.96	-153.46	1.00	-1.00	130.21

Planning Report

Database: EDM 5000.14 Single User Db
Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Site: Roadrunner Fed COM
Well: #13H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
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)
5,400.00	0.00	0.00	5,394.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
5,500.00	0.00	0.00	5,494.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
5,600.00	0.00	0.00	5,594.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
5,700.00	0.00	0.00	5,694.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
5,800.00	0.00	0.00	5,794.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
5,900.00	0.00	0.00	5,894.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,000.00	0.00	0.00	5,994.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,100.00	0.00	0.00	6,094.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,200.00	0.00	0.00	6,194.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,300.00	0.00	0.00	6,294.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,400.00	0.00	0.00	6,394.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,500.00	0.00	0.00	6,494.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,600.00	0.00	0.00	6,594.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,700.00	0.00	0.00	6,694.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,800.00	0.00	0.00	6,794.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
6,900.00	0.00	0.00	6,894.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
7,000.00	0.00	0.00	6,994.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
7,100.00	0.00	0.00	7,094.65	-153.31	-142.96	-153.46	0.00	0.00	0.00
7,177.89	0.00	0.00	7,172.54	-153.31	-142.96	-153.46	0.00	0.00	0.00
KOP: 7177.89' MD, 7172.54' TVD									
7,200.00	2.65	356.90	7,194.64	-152.80	-142.99	-152.95	12.00	12.00	-14.02
7,225.00	5.65	356.90	7,219.57	-150.99	-143.09	-151.14	12.00	12.00	0.00
7,250.00	8.65	356.90	7,244.37	-147.88	-143.25	-148.03	12.00	12.00	0.00
7,275.00	11.65	356.90	7,268.98	-143.48	-143.49	-143.63	12.00	12.00	0.00
7,300.00	14.65	356.90	7,293.32	-137.80	-143.80	-137.95	12.00	12.00	0.00
7,325.00	17.65	356.90	7,317.33	-130.86	-144.18	-131.01	12.00	12.00	0.00
7,350.00	20.65	356.90	7,340.95	-122.67	-144.62	-122.82	12.00	12.00	0.00
7,375.00	23.65	356.90	7,364.10	-113.25	-145.13	-113.41	12.00	12.00	0.00
7,400.00	26.65	356.90	7,386.72	-102.65	-145.70	-102.80	12.00	12.00	0.00
7,425.00	29.65	356.90	7,408.76	-90.87	-146.34	-91.02	12.00	12.00	0.00
7,450.00	32.65	356.90	7,430.16	-77.96	-147.04	-78.11	12.00	12.00	0.00
7,475.00	35.65	356.90	7,450.84	-63.94	-147.80	-64.10	12.00	12.00	0.00
7,500.00	38.65	356.90	7,470.77	-48.87	-148.62	-49.02	12.00	12.00	0.00
7,525.00	41.65	356.90	7,489.87	-32.77	-149.49	-32.93	12.00	12.00	0.00
7,550.00	44.65	356.90	7,508.11	-15.70	-150.41	-15.86	12.00	12.00	0.00
7,575.00	47.65	356.90	7,525.42	2.30	-151.39	2.14	12.00	12.00	0.00
7,600.00	50.65	356.90	7,541.77	21.18	-152.41	21.02	12.00	12.00	0.00
7,625.00	53.65	356.90	7,557.11	40.89	-153.48	40.73	12.00	12.00	0.00
7,650.00	56.65	356.90	7,571.39	61.38	-154.59	61.22	12.00	12.00	0.00
7,675.00	59.65	356.90	7,584.58	82.58	-155.74	82.42	12.00	12.00	0.00
7,700.00	62.65	356.90	7,596.64	104.44	-156.92	104.28	12.00	12.00	0.00
7,725.00	65.65	356.90	7,607.54	126.91	-158.14	126.74	12.00	12.00	0.00
7,736.16	66.99	356.90	7,612.02	137.11	-158.69	136.94	12.00	12.00	0.00
FTP(RFC#13H)									
7,750.00	68.65	356.90	7,617.25	149.91	-159.38	149.74	12.00	12.00	0.00
7,775.00	71.65	356.90	7,625.73	173.39	-160.65	173.22	12.00	12.00	0.00
7,800.00	74.65	356.90	7,632.98	197.28	-161.95	197.11	12.00	12.00	0.00
7,825.00	77.65	356.90	7,638.96	221.51	-163.26	221.34	12.00	12.00	0.00
7,850.00	80.65	356.90	7,643.67	246.03	-164.59	245.85	12.00	12.00	0.00
7,875.00	83.65	356.90	7,647.08	270.75	-165.93	270.58	12.00	12.00	0.00
7,900.00	86.65	356.90	7,649.19	295.62	-167.27	295.45	12.00	12.00	0.00
7,925.00	89.65	356.90	7,650.00	320.57	-168.63	320.40	12.00	12.00	0.00
7,928.39	90.06	356.90	7,650.00	323.96	-168.81	323.78	12.00	12.00	0.00

Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well #13H
Company:	COG OPERATING, LLC	TVD Reference:	RKB @ 3266.60usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	MD Reference:	RKB @ 3266.60usft (Rig KB = 25')
Site:	Roadrunner Fed COM	North Reference:	Grid
Well:	#13H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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)
EOC: 7928.39' MD, 7650.00' TVD, 90.06° INC, 356.90° AZ, 323.78' VS									
8,000.00	90.06	358.33	7,649.93	395.50	-171.79	395.32	2.00	0.00	2.00
8,086.46	90.06	0.06	7,649.84	481.95	-173.00	481.77	2.00	0.00	2.00
8,100.00	90.06	0.06	7,649.83	495.49	-172.98	495.31	0.00	0.00	0.00
8,200.00	90.06	0.06	7,649.73	595.49	-172.88	595.31	0.00	0.00	0.00
8,300.00	90.06	0.06	7,649.63	695.49	-172.77	695.31	0.00	0.00	0.00
8,400.00	90.06	0.06	7,649.52	795.49	-172.66	795.31	0.00	0.00	0.00
8,500.00	90.06	0.06	7,649.42	895.49	-172.56	895.31	0.00	0.00	0.00
8,600.00	90.06	0.06	7,649.32	995.49	-172.45	995.31	0.00	0.00	0.00
8,700.00	90.06	0.06	7,649.22	1,095.49	-172.34	1,095.31	0.00	0.00	0.00
8,800.00	90.06	0.06	7,649.12	1,195.49	-172.23	1,195.31	0.00	0.00	0.00
8,900.00	90.06	0.06	7,649.02	1,295.49	-172.13	1,295.31	0.00	0.00	0.00
9,000.00	90.06	0.06	7,648.92	1,395.49	-172.02	1,395.31	0.00	0.00	0.00
9,100.00	90.06	0.06	7,648.81	1,495.49	-171.91	1,495.31	0.00	0.00	0.00
9,200.00	90.06	0.06	7,648.71	1,595.49	-171.81	1,595.31	0.00	0.00	0.00
9,300.00	90.06	0.06	7,648.61	1,695.49	-171.70	1,695.31	0.00	0.00	0.00
9,400.00	90.06	0.06	7,648.51	1,795.49	-171.59	1,795.31	0.00	0.00	0.00
9,500.00	90.06	0.06	7,648.41	1,895.49	-171.48	1,895.31	0.00	0.00	0.00
9,600.00	90.06	0.06	7,648.31	1,995.49	-171.38	1,995.31	0.00	0.00	0.00
9,700.00	90.06	0.06	7,648.21	2,095.49	-171.27	2,095.31	0.00	0.00	0.00
9,800.00	90.06	0.06	7,648.10	2,195.49	-171.16	2,195.31	0.00	0.00	0.00
9,900.00	90.06	0.06	7,648.00	2,295.49	-171.06	2,295.31	0.00	0.00	0.00
10,000.00	90.06	0.06	7,647.90	2,395.49	-170.95	2,395.31	0.00	0.00	0.00
10,100.00	90.06	0.06	7,647.80	2,495.49	-170.84	2,495.31	0.00	0.00	0.00
10,200.00	90.06	0.06	7,647.70	2,595.49	-170.73	2,595.31	0.00	0.00	0.00
10,300.00	90.06	0.06	7,647.60	2,695.49	-170.63	2,695.31	0.00	0.00	0.00
10,400.00	90.06	0.06	7,647.50	2,795.49	-170.52	2,795.31	0.00	0.00	0.00
10,500.00	90.06	0.06	7,647.39	2,895.49	-170.41	2,895.31	0.00	0.00	0.00
10,600.00	90.06	0.06	7,647.29	2,995.49	-170.31	2,995.31	0.00	0.00	0.00
10,700.00	90.06	0.06	7,647.19	3,095.49	-170.20	3,095.31	0.00	0.00	0.00
10,800.00	90.06	0.06	7,647.09	3,195.49	-170.09	3,195.31	0.00	0.00	0.00
10,900.00	90.06	0.06	7,646.99	3,295.49	-169.98	3,295.31	0.00	0.00	0.00
11,000.00	90.06	0.06	7,646.89	3,395.49	-169.88	3,395.31	0.00	0.00	0.00
11,100.00	90.06	0.06	7,646.79	3,495.49	-169.77	3,495.31	0.00	0.00	0.00
11,200.00	90.06	0.06	7,646.68	3,595.49	-169.66	3,595.31	0.00	0.00	0.00
11,300.00	90.06	0.06	7,646.58	3,695.49	-169.55	3,695.31	0.00	0.00	0.00
11,400.00	90.06	0.06	7,646.48	3,795.49	-169.45	3,795.31	0.00	0.00	0.00
11,500.00	90.06	0.06	7,646.38	3,895.49	-169.34	3,895.31	0.00	0.00	0.00
11,600.00	90.06	0.06	7,646.28	3,995.49	-169.23	3,995.31	0.00	0.00	0.00
11,700.00	90.06	0.06	7,646.18	4,095.49	-169.13	4,095.31	0.00	0.00	0.00
11,800.00	90.06	0.06	7,646.08	4,195.49	-169.02	4,195.31	0.00	0.00	0.00
11,900.00	90.06	0.06	7,645.97	4,295.49	-168.91	4,295.31	0.00	0.00	0.00
12,000.00	90.06	0.06	7,645.87	4,395.49	-168.80	4,395.31	0.00	0.00	0.00
12,100.00	90.06	0.06	7,645.77	4,495.49	-168.70	4,495.31	0.00	0.00	0.00
12,200.00	90.06	0.06	7,645.67	4,595.49	-168.59	4,595.31	0.00	0.00	0.00
12,300.00	90.06	0.06	7,645.57	4,695.49	-168.48	4,695.31	0.00	0.00	0.00
12,400.00	90.06	0.06	7,645.47	4,795.49	-168.38	4,795.31	0.00	0.00	0.00
12,500.00	90.06	0.06	7,645.36	4,895.49	-168.27	4,895.31	0.00	0.00	0.00
12,600.00	90.06	0.06	7,645.26	4,995.49	-168.16	4,995.31	0.00	0.00	0.00
12,700.00	90.06	0.06	7,645.16	5,095.49	-168.05	5,095.31	0.00	0.00	0.00
12,800.00	90.06	0.06	7,645.06	5,195.49	-167.95	5,195.31	0.00	0.00	0.00
12,900.00	90.06	0.06	7,644.96	5,295.49	-167.84	5,295.31	0.00	0.00	0.00
13,000.00	90.06	0.06	7,644.86	5,395.49	-167.73	5,395.31	0.00	0.00	0.00

Planning Report

Database: EDM 5000.14 Single User Db
Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Site: Roadrunner Fed COM
Well: #13H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
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)
13,100.00	90.06	0.06	7,644.76	5,495.49	-167.63	5,495.31	0.00	0.00	0.00
13,200.00	90.06	0.06	7,644.65	5,595.49	-167.52	5,595.31	0.00	0.00	0.00
13,300.00	90.06	0.06	7,644.55	5,695.49	-167.41	5,695.31	0.00	0.00	0.00
13,400.00	90.06	0.06	7,644.45	5,795.49	-167.30	5,795.31	0.00	0.00	0.00
13,500.00	90.06	0.06	7,644.35	5,895.49	-167.20	5,895.31	0.00	0.00	0.00
13,600.00	90.06	0.06	7,644.25	5,995.49	-167.09	5,995.31	0.00	0.00	0.00
13,700.00	90.06	0.06	7,644.15	6,095.49	-166.98	6,095.31	0.00	0.00	0.00
13,800.00	90.06	0.06	7,644.05	6,195.49	-166.88	6,195.31	0.00	0.00	0.00
13,900.00	90.06	0.06	7,643.94	6,295.48	-166.77	6,295.31	0.00	0.00	0.00
14,000.00	90.06	0.06	7,643.84	6,395.48	-166.66	6,395.31	0.00	0.00	0.00
14,100.00	90.06	0.06	7,643.74	6,495.48	-166.55	6,495.31	0.00	0.00	0.00
14,200.00	90.06	0.06	7,643.64	6,595.48	-166.45	6,595.31	0.00	0.00	0.00
14,300.00	90.06	0.06	7,643.54	6,695.48	-166.34	6,695.31	0.00	0.00	0.00
14,400.00	90.06	0.06	7,643.44	6,795.48	-166.23	6,795.31	0.00	0.00	0.00
14,500.00	90.06	0.06	7,643.34	6,895.48	-166.13	6,895.31	0.00	0.00	0.00
14,600.00	90.06	0.06	7,643.23	6,995.48	-166.02	6,995.31	0.00	0.00	0.00
14,700.00	90.06	0.06	7,643.13	7,095.48	-165.91	7,095.31	0.00	0.00	0.00
14,800.00	90.06	0.06	7,643.03	7,195.48	-165.80	7,195.31	0.00	0.00	0.00
14,900.00	90.06	0.06	7,642.93	7,295.48	-165.70	7,295.31	0.00	0.00	0.00
15,000.00	90.06	0.06	7,642.83	7,395.48	-165.59	7,395.31	0.00	0.00	0.00
15,100.00	90.06	0.06	7,642.73	7,495.48	-165.48	7,495.31	0.00	0.00	0.00
15,200.00	90.06	0.06	7,642.63	7,595.48	-165.37	7,595.31	0.00	0.00	0.00
15,300.00	90.06	0.06	7,642.52	7,695.48	-165.27	7,695.31	0.00	0.00	0.00
15,400.00	90.06	0.06	7,642.42	7,795.48	-165.16	7,795.31	0.00	0.00	0.00
15,500.00	90.06	0.06	7,642.32	7,895.48	-165.05	7,895.31	0.00	0.00	0.00
15,600.00	90.06	0.06	7,642.22	7,995.48	-164.95	7,995.31	0.00	0.00	0.00
15,700.00	90.06	0.06	7,642.12	8,095.48	-164.84	8,095.31	0.00	0.00	0.00
15,800.00	90.06	0.06	7,642.02	8,195.48	-164.73	8,195.31	0.00	0.00	0.00
15,900.00	90.06	0.06	7,641.92	8,295.48	-164.62	8,295.31	0.00	0.00	0.00
16,000.00	90.06	0.06	7,641.81	8,395.48	-164.52	8,395.31	0.00	0.00	0.00
16,100.00	90.06	0.06	7,641.71	8,495.48	-164.41	8,495.31	0.00	0.00	0.00
16,200.00	90.06	0.06	7,641.61	8,595.48	-164.30	8,595.31	0.00	0.00	0.00
16,300.00	90.06	0.06	7,641.51	8,695.48	-164.20	8,695.31	0.00	0.00	0.00
16,400.00	90.06	0.06	7,641.41	8,795.48	-164.09	8,795.31	0.00	0.00	0.00
16,500.00	90.06	0.06	7,641.31	8,895.48	-163.98	8,895.31	0.00	0.00	0.00
16,600.00	90.06	0.06	7,641.21	8,995.48	-163.87	8,995.31	0.00	0.00	0.00
16,700.00	90.06	0.06	7,641.10	9,095.48	-163.77	9,095.31	0.00	0.00	0.00
16,800.00	90.06	0.06	7,641.00	9,195.48	-163.66	9,195.31	0.00	0.00	0.00
16,900.00	90.06	0.06	7,640.90	9,295.48	-163.55	9,295.31	0.00	0.00	0.00
17,000.00	90.06	0.06	7,640.80	9,395.48	-163.45	9,395.31	0.00	0.00	0.00
17,100.00	90.06	0.06	7,640.70	9,495.48	-163.34	9,495.31	0.00	0.00	0.00
17,200.00	90.06	0.06	7,640.60	9,595.48	-163.23	9,595.31	0.00	0.00	0.00
17,300.00	90.06	0.06	7,640.50	9,695.48	-163.12	9,695.31	0.00	0.00	0.00
17,400.00	90.06	0.06	7,640.39	9,795.48	-163.02	9,795.31	0.00	0.00	0.00
17,500.00	90.06	0.06	7,640.29	9,895.48	-162.91	9,895.31	0.00	0.00	0.00
17,600.00	90.06	0.06	7,640.19	9,995.48	-162.80	9,995.31	0.00	0.00	0.00
17,658.83	90.06	0.06	7,640.13	10,054.31	-162.74	10,054.13	0.00	0.00	0.00
LTP(RFC13H)									
17,700.00	90.06	0.06	7,640.09	10,095.48	-162.70	10,095.30	0.00	0.00	0.00
17,789.02	90.06	0.06	7,640.00	10,184.50	-162.60	10,184.32	0.00	0.00	0.00
TD: 17789.02' MD, 7640.00' TVD - PBHL(RFC13H)									

Planning Report

Database: EDM 5000.14 Single User Db
Company: COG OPERATING, LLC
Project: Eddy County, NM (NAD27) NMZ
Site: Roadrunner Fed COM
Well: #13H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #13H
TVD Reference: RKB @ 3266.60usft (Rig KB = 25')
MD Reference: RKB @ 3266.60usft (Rig KB = 25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Design Targets

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
LTP(RFC13H)	0.00	0.00	7,640.00	10,054.31	-162.75	407,986.91	526,270.85	32° 7' 17.918 N	104° 14' 54.510 W
- plan misses target center by 0.13usft at 17658.83usft MD (7640.13 TVD, 10054.31 N, -162.74 E)									
- Point									
PBHL(RFC#13H)	0.00	0.00	7,640.00	10,184.50	-162.60	408,117.10	526,271.00	32° 7' 19.207 N	104° 14' 54.507 W
- plan hits target center									
- Point									
FTP(RFC#13H)	0.00	0.00	7,650.00	120.30	-173.20	398,052.90	526,260.40	32° 5' 39.606 N	104° 14' 54.722 W
- plan misses target center by 43.99usft at 7736.16usft MD (7612.02 TVD, 137.11 N, -158.69 E)									
- Point									

Plan Annotations

Measured	Vertical	Local Coordinates		
Depth	Depth	+N/-S	+E/-W	Comment
(usft)	(usft)	(usft)	(usft)	
7,177.89	7,172.54	-153.31	-142.96	KOP: 7177.89' MD, 7172.54' TVD
7,928.39	7,650.00	323.96	-168.81	EOC: 7928.39' MD, 7650.00' TVD, 90.06° INC, 356.90° AZ, 323.78' VS
17,789.02	7,640.00	10,184.50	-162.60	TD: 17789.02' MD, 7640.00' TVD

T G M
 Azimuths to Grid North
 True North: -0.04°
 Magnetic North: 7.16°
 Magnetic Field
 Strength: 47739.1snT
 Dip Angle: 59.83°
 Date: 12/13/2017
 Model: IGRF2015



COG OPERATING, LLC
 #13H
 Eddy County, NM (NAD27) NMZ
 Plan #1



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

Ground Elev: 3241.60 RKB @ 3266.60usft (Rig KB = 25')
 Northing 397932.60 Easting 526433.60
 Latitude 32° 5' 38.414 N Longitude 104° 14' 52.710 W

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting
LTP(RFC#13H)	7640.00	10054.31	-162.75	407986.91	526270.85
PBHL(RFC#13H)	7640.00	10184.50	-162.60	408117.10	526271.00
FTP(RFC#13H)	7650.00	120.30	-173.20	398052.90	526260.40

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	0.00	
3	1300.00	3.00	223.00	1299.86	-5.74	-5.36	1.00	223.00	-5.75	
4	5005.21	3.00	223.00	5000.00	-147.56	-137.61	0.00	0.00	-147.71	
5	5305.21	0.00	0.00	5299.86	-153.31	-142.96	1.00	180.00	-153.46	
6	7177.89	0.00	0.00	7172.54	-153.31	-142.96	0.00	0.00	-153.46	
7	7928.39	90.06	356.90	7650.00	323.96	-168.81	12.00	356.90	323.78	
8	8086.46	90.06	0.06	7649.84	481.95	-173.00	2.00	90.03	481.77	
9	17789.02	90.06	0.06	7640.00	10184.50	-162.60	0.00	0.00	10184.32	PBHL(RFC#13H)

KOP: 7177.89' MD, 7172.54' TVD

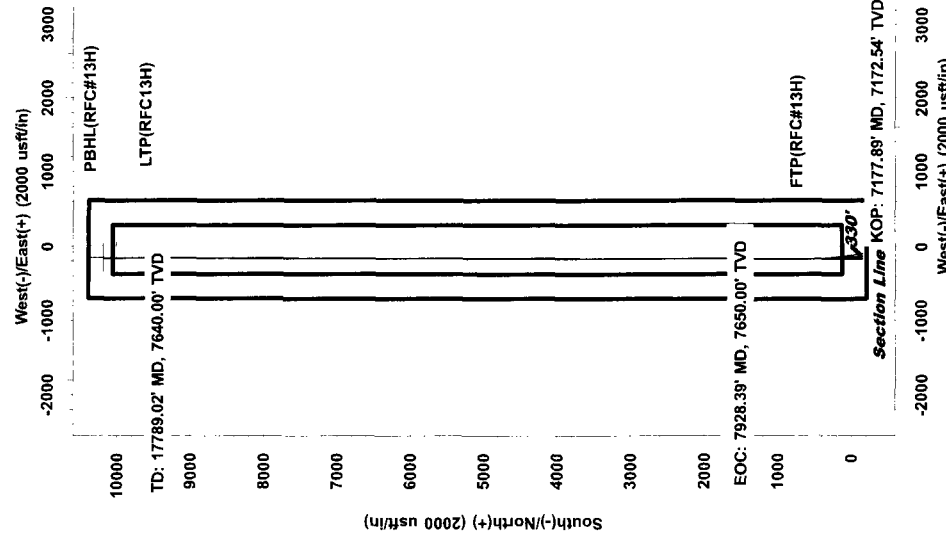
FTP(RFC#13H)

EOC: 7928.39' MD, 7650.00' TVD, 90.06° INC, 356.90° AZ, 323.78° VS

#13H/Plan #1

TD: 17789.02' MD, 7640.00' TVD

Vertical Section at 0.06° (1000 usft/in)



PBHL(RFC#13H)

LTP(RFC#13H)

17:23, December 13 2017

Well Planning: Gabriel Cruz

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

1. Geologic Formations

TVD of target	7,650' EOL	Pilot hole depth	NA
MD at TD:	17,789'	Deepest expected fresh water:	100'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	175	Water	
Top of Salt	258	Salt	
Base of Salt	1692	Salt	
Lamar	1882	Salt Water	
Bell Canyon	1927	Salt Water	
Cherry Canyon	2788	Oil/Gas	
Brushy Canyon	3874	Oil/Gas	
Bone Spring Lime	5448	Oil/Gas	
U. Avalon Shale	5750	Oil/Gas	
L. Avalon Shale	5976	Oil/Gas	
1st Bone Spring Sand	6408	Oil/Gas	
2nd Bone Spring Sand	7382	Target Oil/Gas	
3rd Bone Spring Sand	X	Not Penetrated	
Wolfcamp	X	Not Penetrated	

2. Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	200	13.375"	54.5	J55	STC	12.35	3.33	47.16
12.25"	0	1910	9.625"	40	J55	LTC	2.54	1.33	6.81
8.75"	0	17,789	5.5"	17	P110	LTC	2.00	3.58	3.42
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft ³ / sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	80	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl ₂
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl ₂
Inter.	280	12.7	2.0	9.6	16	Lead: 35:65:6 C Blend
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
5.5 Prod	800	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	2710	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1 st Intermediate	0'	50%
Production	1,410'	25% OH in Lateral (KOP to EOL) – 40% OH in Vertical

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
---	---

BOP Installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf csg	9-5/8" Int shoe	Saturated Brine	10 - 10.2	28-34	N/C
9-5/8" Int shoe	Lateral TD	Cut Brine	8.6 - 9.4	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
Y	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

COG Operating, LLC - ROADRUNNER FEDERAL COM 13H

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	3740 psi at 7650' TVD
Abnormal Temperature	NO 135 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

N	H ₂ S is present
Y	H ₂ S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
N	Is casing pre-set?

x	H ₂ S Plan.
x	BOP & Choke Schematics.
x	Directional Plan



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

SUPO Data Report

03/27/2018

APD ID: 10400025686

Submission Date: 12/20/2017

Highlighted data
reflects the most
recent changes

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Roadrunner_13H_Exist_Rd_20171219131359.pdf

Existing Road Purpose: ACCESS

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:

COG_Roadrunner_13H_Roads_20171219131418.pdf

New road type: TWO-TRACK

Length: 325.4

Feet

Width (ft.): 30

Max slope (%): 33

Max grade (%): 1

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 14

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? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Access surfacing type: OTHER

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Blading

Access other construction information: No turnouts are planned. Re-routing access road around proposed well location.

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: None necessary.

Road Drainage Control Structures (DCS) description: None needed.

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:

COG_Roadrunner_13H_1Mile_20171219131448.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: Production will be sent to the Roadrunner CTB 3 facility located in Section 36, T25S, R26E. A surface flowline of 106.3' of 3.5" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the road to the facility at the Roadrunner CTB 3 location. We plan to install a 4" surface polyethylene pipe transporting Gas Lift Gas from the Roadrunner CTB 3 to the Roadrunner Federal Com 13H. The surface Gas Lift Gas pipe of approximately 106.3' under a maximum pressure of 125 psi will be installed no farther than 10 fet from the edge of the road. CTB ROW #NM-134463

Production Facilities map:

COG_Roadrunner_CTB_3_20171219104540.pdf

COG_Roadrunner_13H_ProdFacil_20171219131531.pdf

COG_Roadrunner_13H_Flowline_20171220162911.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING

Water source type: OTHER

Describe type: Brine Water

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: COMMERCIAL

Water source transport method: TRUCKING

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 30000

Source volume (acre-feet): 3.866793

Source volume (gal): 1260000

Water source use type: STIMULATION, SURFACE CASING

Water source type: OTHER

Describe type: Fresh Water

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: PIPELINE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 450000

Source volume (acre-feet): 58.001892

Source volume (gal): 18900000

Water source and transportation map:

COG_Roadrunner_13H_FreshH2O_20171219131547.pdf

COG_Roadrunner_13H_BrineH2O_20171219131555.pdf

Water source comments: Fresh water will be obtained from Black River Encampment Assoc., C-100 water well located in Section 24. T24S. R26E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E., and will be provided by Malaga Brine Station.

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:

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

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:

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: Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be obtained from Concho SRO caliche pit located in Section 17, T26S, R28E Phone 575-748-6940.

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling fluids and produced oil and water during drilling and completion operations

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

Safe containment description: All drilling waste will be stored safely and disposed of properly

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: SEWAGE

Waste content description: Human waste and gray water

Amount of waste: 250 gallons

Waste disposal frequency : Weekly

Safe containment description: Waste will be properly contained and disposed of properly at a state approved disposal facility

Safe containmant attachment:

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: GARBAGE

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

Amount of waste: 125 pounds

Waste disposal frequency : Weekly

Safe containment description: Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

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

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Roll off cuttings containers on tracks

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

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: YES

Ancillary Facilities attachment:

COG_Roadrunner_13H_GCP_20171219131626.pdf

Comments: GCP attached.

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Roadrunner_CTB_3_20171219104219.pdf

COG_Roadrunner_13H_ProdFacil_20171219131640.pdf

COG_Roadrunner_13H_Flowline_20171220163002.pdf

Comments: Production will be sent to the Roadrunner CTB 3 facility located in Section 36, T25S, R26E. A surface flowline of 106.3' of 3.5" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the road to the facility at the Roadrunner CTB 3 location. We plan to install a 4" surface polyethylene pipe transporting Gas Lift Gas from the Roadrunner CTB 3 to the Roadrunner Federal Com 3H and 13H well pad. The surface Gas Lift Gas pipe of approximately 106.3' under a maximum pressure of 125 psi will be installed no farther than 10 fet from the edge of the road. CTB ROW #NM-134463

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name:

Multiple Well Pad Number:

Recontouring attachment:

Drainage/Erosion control construction: Immediately following pad construction approximately 400' of straw waddles will be placed on the south and 320' on the South side of the location to reduce sediment impacts to fragile/sensitive soils.

Drainage/Erosion control reclamation: Reclaim the north 80' and west side 80'

Well pad proposed disturbance (acres): 3.67	Well pad interim reclamation (acres): 0.15	Well pad long term disturbance (acres): 2.35
Road proposed disturbance (acres): 0.1	Road interim reclamation (acres): 0.1	Road long term disturbance (acres): 0.1
Powerline proposed disturbance (acres): 0.01	Powerline interim reclamation (acres): 0.01	Powerline long term disturbance (acres): 0.01
Pipeline proposed disturbance (acres): 0.01	Pipeline interim reclamation (acres): 0.01	Pipeline long term disturbance (acres): 0.01
Other proposed disturbance (acres): 0	Other interim reclamation (acres): 0	Other long term disturbance (acres): 0
Total proposed disturbance: 3.79	Total interim reclamation: 0.27	Total long term disturbance: 2.47

Reconstruction method: New construction of pad.

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Topsoil redistribution: North 80' and West 80'

Soil treatment: None

Existing Vegetation at the well pad: Shinnery Oak/Mesquite grassland

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: N/A

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:

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre
------------------	--------------------

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Rand

Last Name: French

Phone: (432)254-5556

Email: rfrench@concho.com

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

COG_Roadrunner_13H_ClosedLoop_20171219131653.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM

Well Number: 13H

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Fee Owner: Mark Forehand

Fee Owner Address: 112 East Cherry, Carlsbad, NM 88220

Phone: (575)885-1108

Email:

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: Agreement

Surface Access Agreement Need description: COG Operating LLC and Mark Forehand have agreed on a Surface Use Agreement.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Section 12 - Other Information

Right of Way needed? NO

Use APD as ROW?

ROW Type(s):

ROW Applications

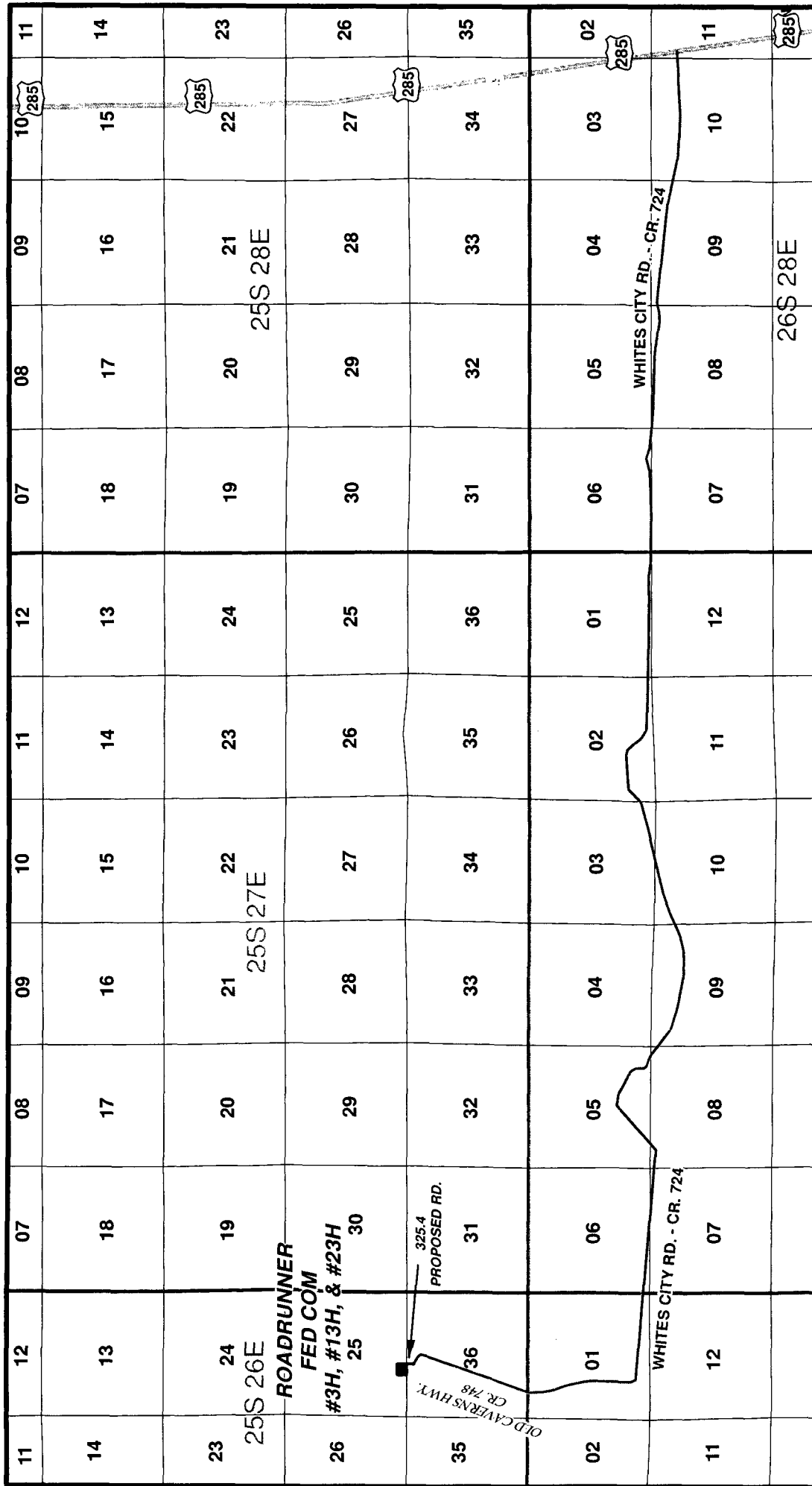
SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite completed on 10/26/2017 by Gerald Herrera (COG) and Jeff Robertson (BLM).

Other SUPO Attachment

COG_Roadrunner_13H_Certif_20171219131827.pdf



CONCHO

COG OPERATING, LLC

H

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

ROADRUNNER FEDERAL COM #3H, #13H, & #23H

SEC: 25 TWP: 25 S. RGE: 26 E.

STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M

W.O. # 17-1376, 1383, 1384 LEASE: ROADRUNNER FED COM

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

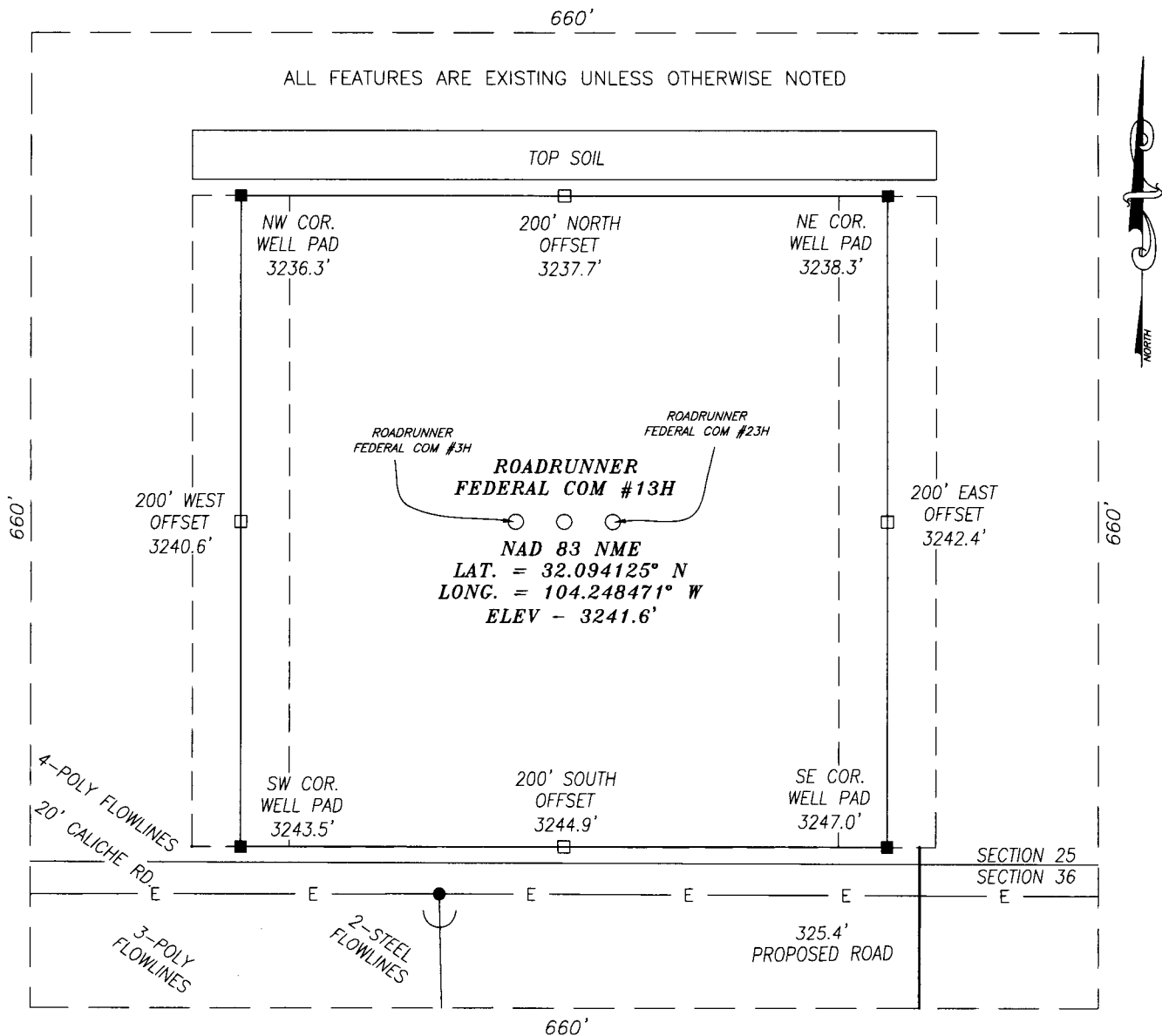
0 0.5 1 2 Miles

0 20,000 FEET

1 IN = 6,000 FT

LOCATION MAP VICINITY MAP 11/4/2017 V.D.

SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF WHITES CITY RD (C.R. 724) AND OLD CAVERNS (HWY. C.R. 748), GO NORTH FOR APPROX. 1.8 MILES TO PRICKLY PEAR RD.; THEN TURN LEFT (NORTHWESTERLY) AND GO APPROX 485 FEET TO A PROPOSED ROAD FOR THE ROADRUNNER FED COM #3H, #13H, #23H WELL PAD. PROPOSED WELL IS APPROX 325.4 FEET NORTH.

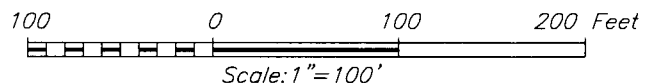
HARCROW SURVEYING, LLC

2314 W. MAIN ST, ARTESIA, N.M. 88210

PH: (575) 746-2158 FAX: (575) 746-2158

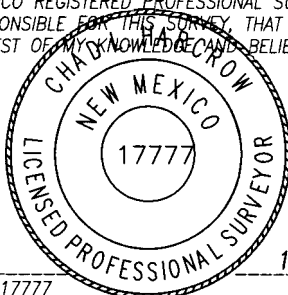
Texas Firm No. 10194089

c.harcrow@harcrowsurveying.com



CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



Chad Harcrow

CHAD HARCROW N.M.P.S. NO. 17777

11/6/17
DATE

COG OPERATING, LLC

ROADRUNNER FEDERAL COM #13H WELL
LOCATED 210 FEET FROM THE SOUTH LINE
AND 205 FEET FROM THE WEST LINE OF SECTION 25,
TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 26, 2017

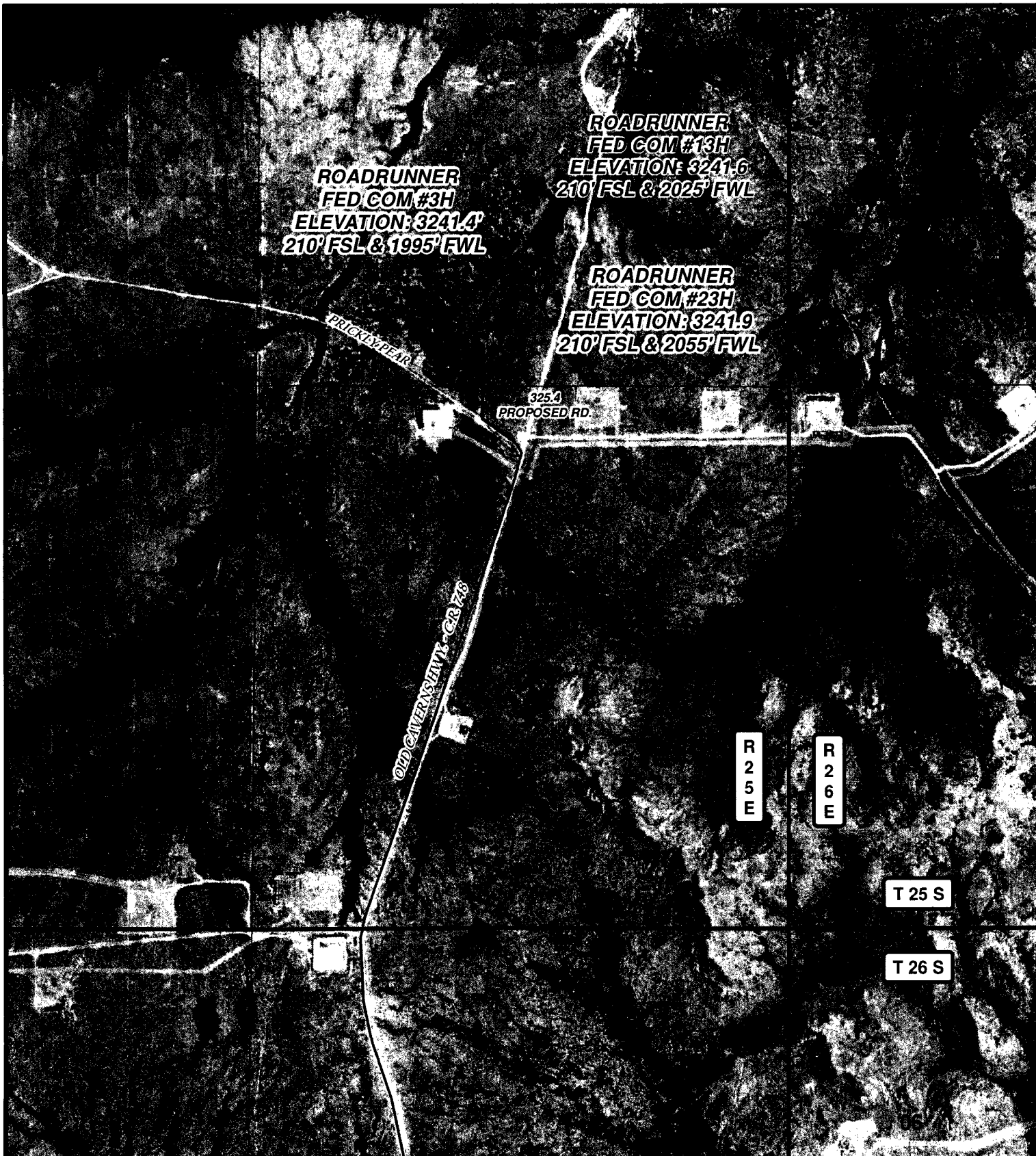
PAGE: 1 OF 1

DRAFTING DATE: NOVEMBER 4, 2017

APPROVED BY: CH

DRAWN BY: VD

FILE: 17-1383



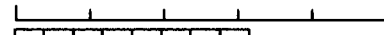
LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

ROADRUNNER FEDERAL COM #3H, #13H, & #23H

SEC: 25 TWP: 25 S. RGE: 26 E.
STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M
W.O. # 17-1376, 1383, 1384 LEASE: ROADRUNNER FED COM

0 2,500 FEET



0 0.075 0.15 0.3 Miles

1 IN = 1,250 FT

LOCATION MAP

IMAGERY

11/4/2017

V.D.

CONCHO

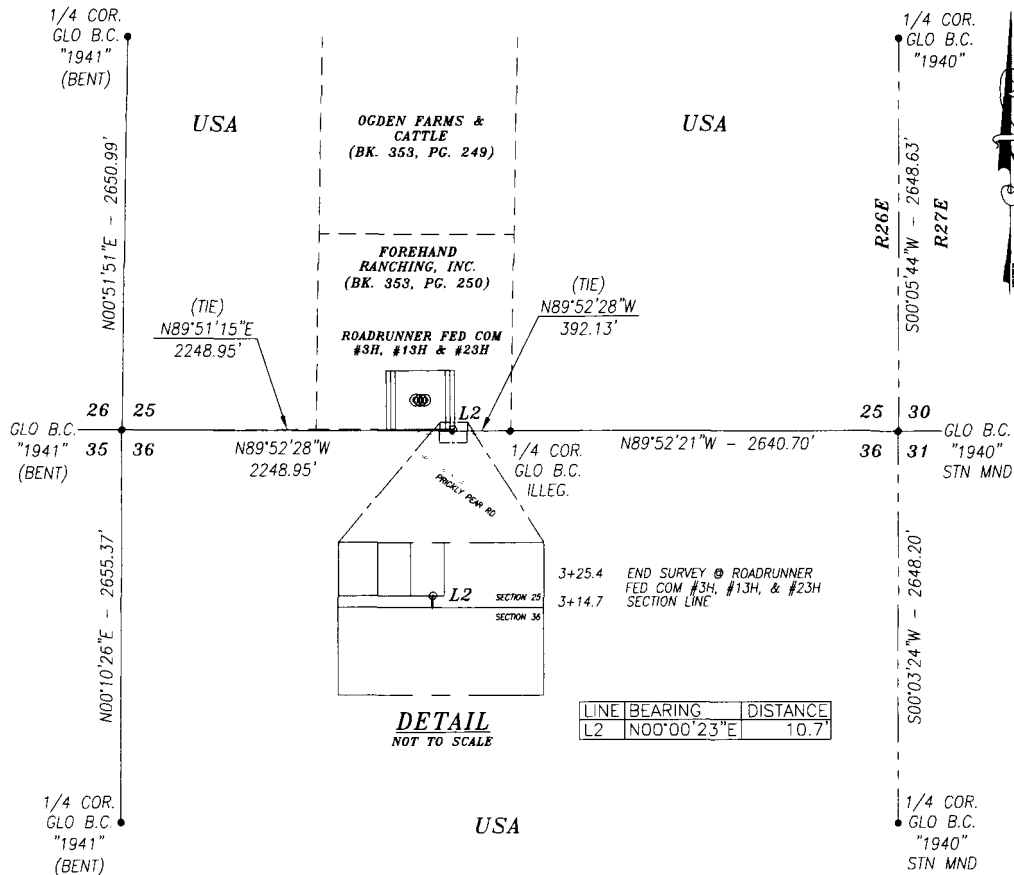
COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

ACCESS ROAD PLAT COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM PRICKLY PEAR ROAD TO
THE ROADRUNNER FED COM #3H, #13H & #23H IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

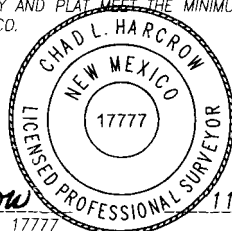
A STRIP OF LAND 30.0 FEET WIDE AND 10.7 FEET OR 0.65 RODS OR 0.002 MILES IN LENGTH CROSSING FEE LAND IN SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

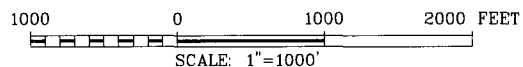


Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777

11/6/17
DATE

HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210
PH: (575) 746-2158 FAX: (575) 746-2158
c.harcrow@harcrowsurveying.com



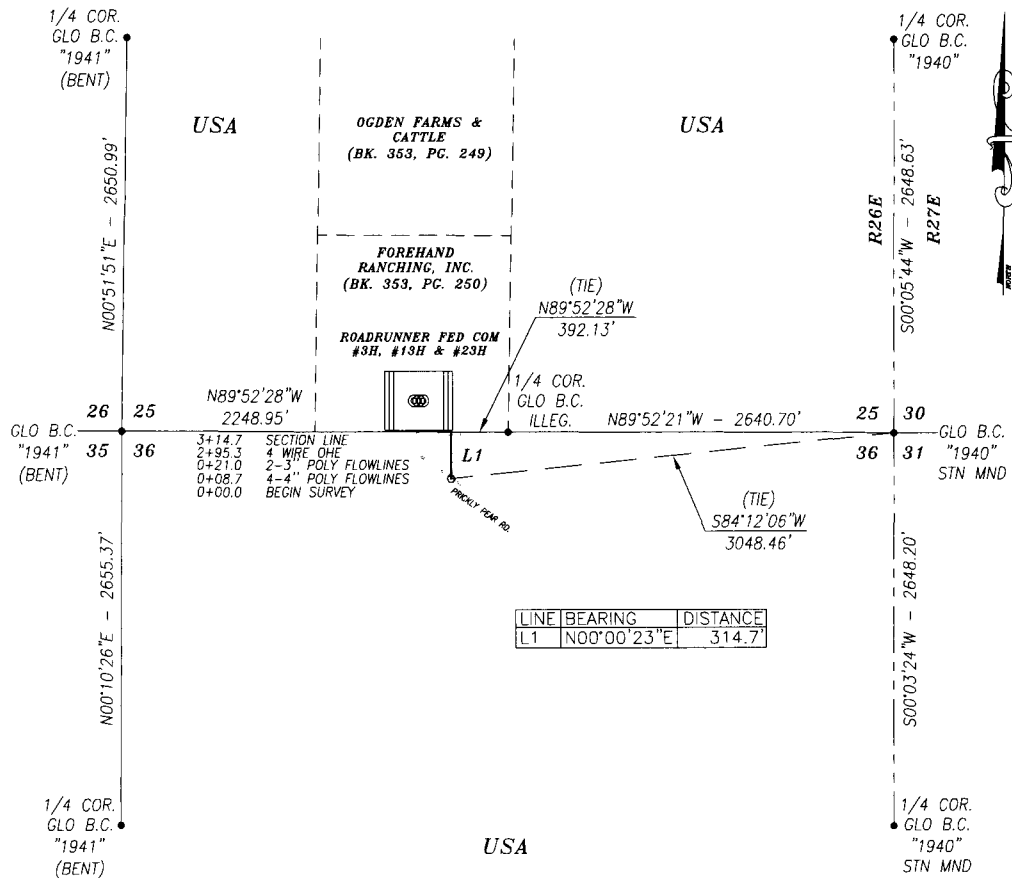
COG OPERATING, LLC

SURVEY OF A PROPOSED ROAD LOCATED IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 26, 2017	
DRAFTING DATE: NOVEMBER 4, 2017	PAGE 2 OF 2
APPROVED BY: CH	DRAWN BY: VD
	FILE: 17-1386

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM PRICKLY PEAR ROAD TO
THE ROADRUNNER FED COM #3H, #13H & #23H IN
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 314.7 FEET OR 19.07 RODS OR 0.060 MILES IN LENGTH CROSSING USA LAND IN SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow

CHAD HARCROW N.M.P.S. NO. 17777

11/6/17
DATE

HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210

PH: (575) 746-2158 FAX: (575) 746-2158

c.harcrow@harcrowsurveying.com



1000 0 1000 2000 FEET

SCALE: 1"=1000'

COG OPERATING, LLC

SURVEY OF A PROPOSED ROAD LOCATED IN
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 26, 2017

DRAFTING DATE: NOVEMBER 4, 2017

APPROVED BY: CH

DRAWN BY: VD

PAGE 1 OF 2

FILE: 17-1385

**ROADRUNNER
FED COM #3H
ELEVATION: 3241.4'
210' FSL & 1995' FWL**

**ROADRUNNER
FED COM #13H
ELEVATION: 3241.6
210' FSL & 2025' FWL**

**ROADRUNNER
FED COM #23H
ELEVATION: 3241.9
210' FSL & 2055' FWL**

PRICKLY PEAR

325.4
PROPOSED RD.

OLD CAVERNS HWY. - CR. 748

R
2
5
E

R
2
6
E

FOREHAND

COTTONWOOD

T 25 S

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

ROADRUNNER FEDERAL COM #3H, #13H, & #23H ACCESS ROAD

SEC: 25 TWP: 25 S. RGE: 26 E.
STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M
W.O. # 17-1385 LEASE: ROADRUNNER FED COM

0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

LOCATION MAP LAND STATUS 11/4/2017 V.D.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

**ROADRUNNER
FED COM #3H
ELEVATION: 3241.4'
210' FSL & 1995' FWL**

**ROADRUNNER
FED COM #13H
ELEVATION: 3241.6
210' FSL & 2025' FWL**

**ROADRUNNER
FED COM #23H
ELEVATION: 3241.9
210' FSL & 2055' FWL**

325.4
PROPOSED RD.

OLD CANYON HWY - CR 748

R
2
5
E

R
2
6
E

T 25 S

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

ROADRUNNER FEDERAL COM #3H, #13H, & #23H ACCESS ROAD

SEC: 25 TWP: 25 S. RGE: 26 E.
STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M
W.O. # 17-1385 LEASE: ROADRUNNER FED COM

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP

IMAGERY

11/4/2017

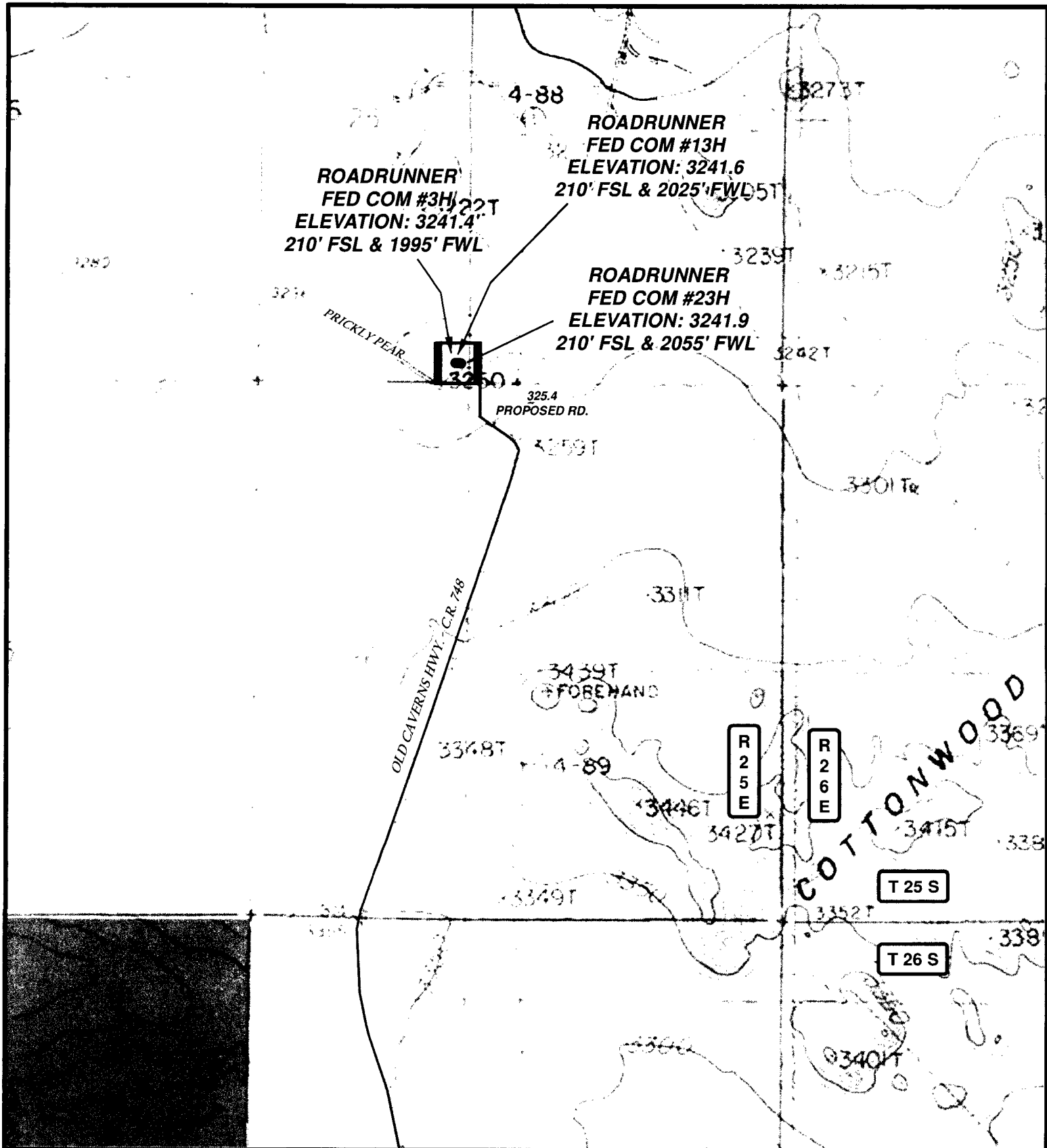
V.D.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

ROADRUNNER FEDERAL COM #3H, #13H, & #23H

SEC: 25 TWP: 25 S. RGE: 26 E.
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M
 W.O. # 17-1376, 1383, 1384 LEASE: ROADRUNNER FED COM

0 2,500 FEET

0 0.075 0.15 0.3 Miles

1 IN = 1,250 FT

LOCATION MAP

LAND STATUS

11/4/2017

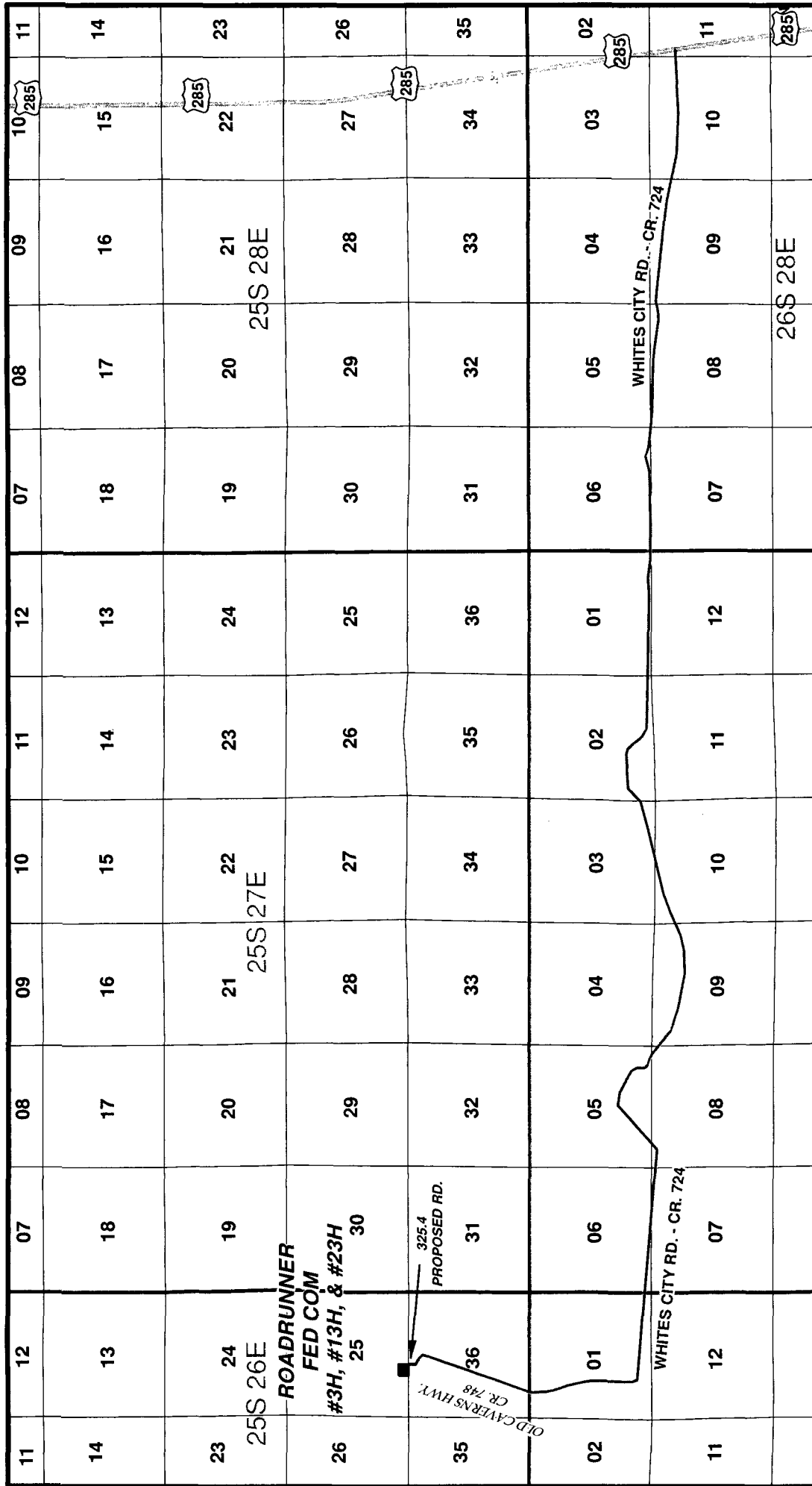
V.D.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
 2314 W. MAIN ST. ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST. ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

ROADRUNNER FEDERAL COM #3H, #13H, & #23H

SEC: 25 TWP: 25 S. RGE: 26 E.

STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M

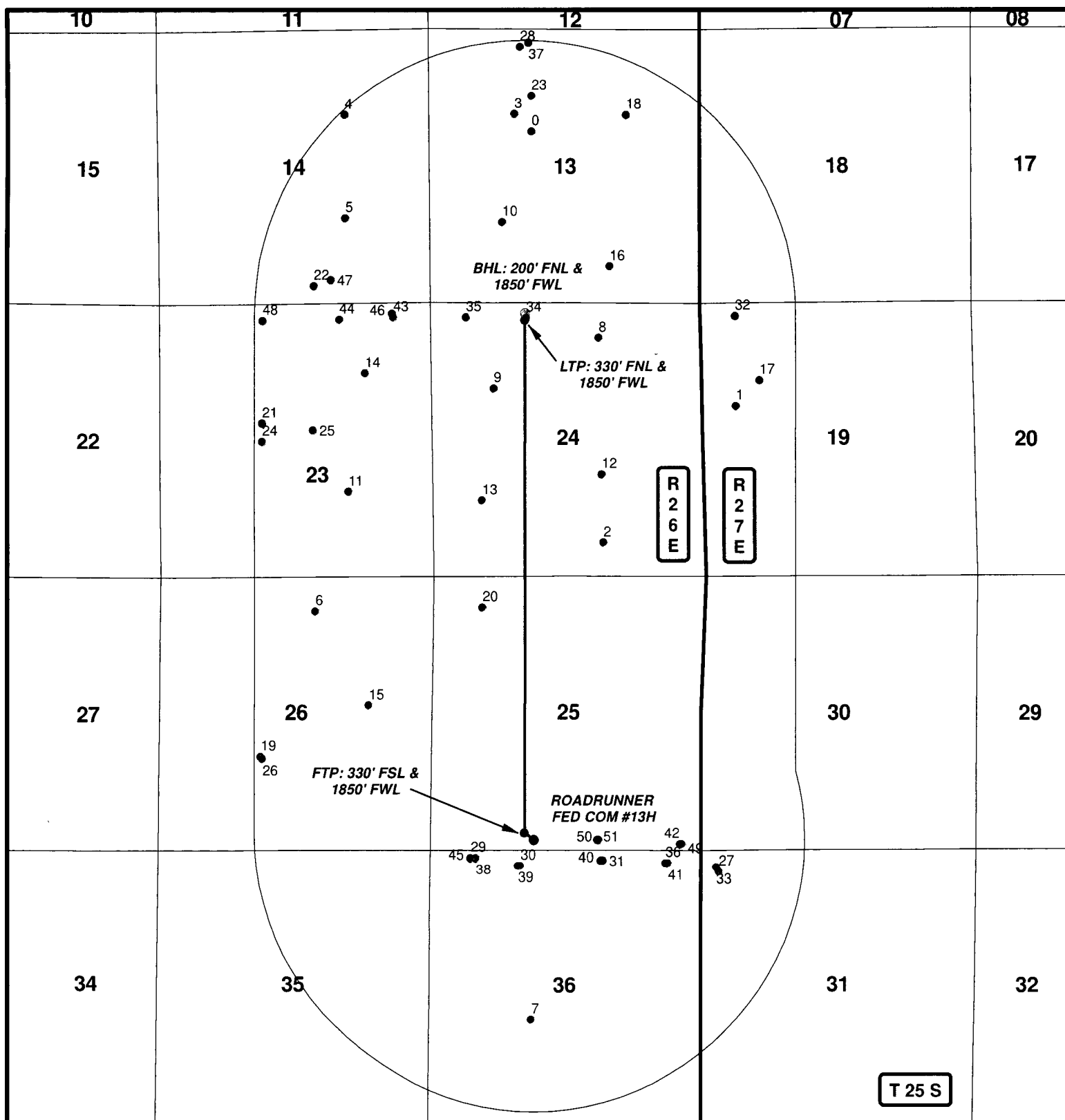
W.O. # 17-1376, 1383, 1384 LEASE: ROADRUNNER FED COM

LOCATION MAP VICINITY MAP 11/4/2017 V.D.

0 0.5 1 2 Miles

1 IN = 6,000 FT

0 20,000 FEET



DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH SEPTEMBER 16, 2017.

LEGEND

- WELL
- ⊙ BOTTOMHOLE
- WELLS WITHIN 1 MI.
- 1 MI. BUFFER

ROADRUNNER FEDERAL COM #13H

SEC: 25	TWP: 25 S.	RGE: 25 E.	ELEVATION: 3241.6'
STATE: NEW MEXICO		COUNTY: EDDY	210' FSL & 2025' FWL
W.O. # 17-1383		LEASE: ROADRUNNER FED COM	SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,500 FT

LOCATION MAP

1 MILE MAP

11/4/2017

V.D.

CONCHO

COG OPERATING, LLC



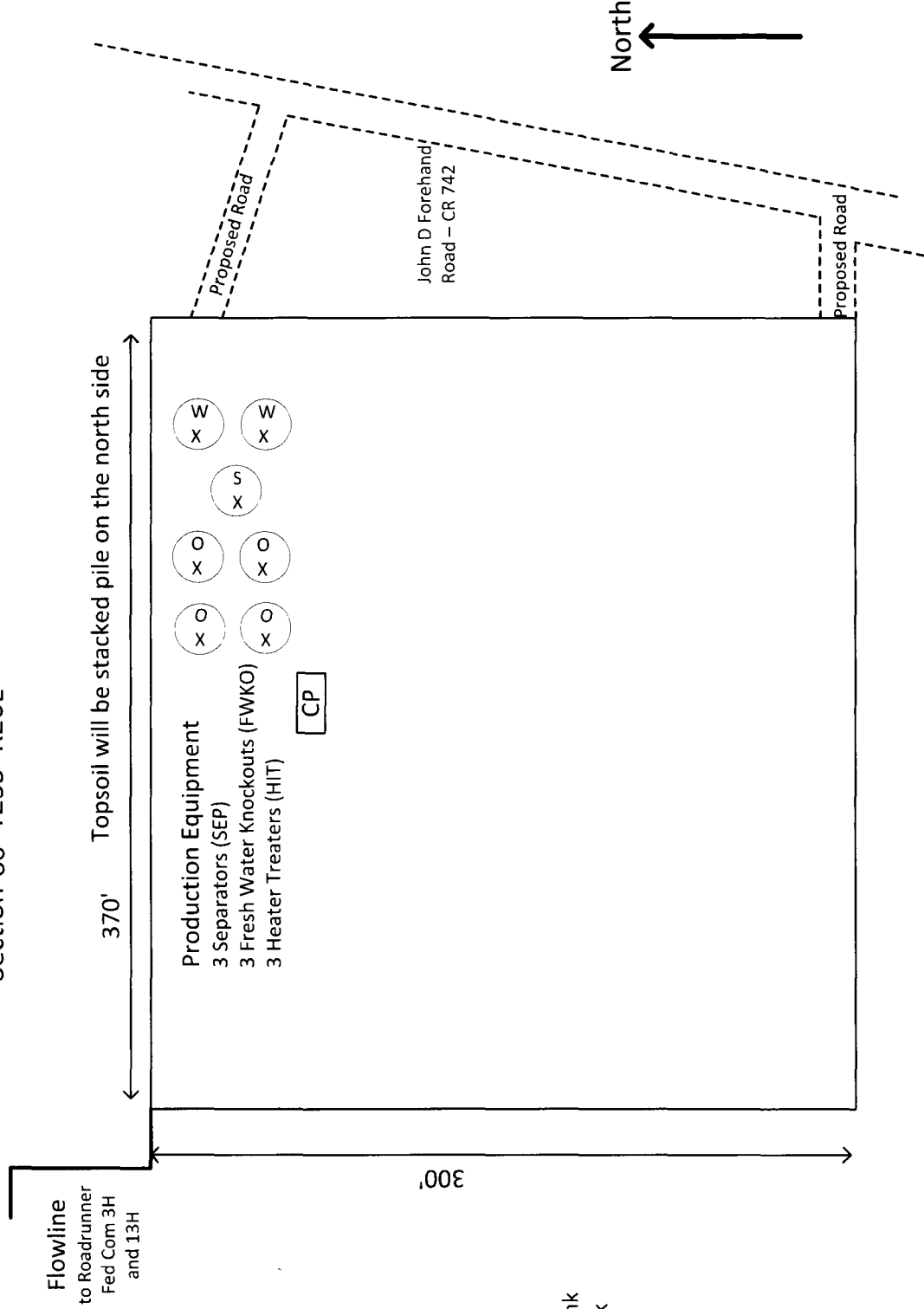
HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

ROADRUNNER FEDERAL COM #13H 1 MILE DATA

FID	API	OPERATOR	RANGE	SECTION	TOWNSHIP	WELL_NAME	COMPL_STAT	EW_CD	FTG_EW	FTG_NS	LATITUDE	LONGITUDE	INS_CD	
0	3001521029	BILL & PATSY RICH	26E	13	25.05	SULPHATE SISTER 001	Plugged	W	1980	32.131768	-104.248557	N		
1	3001521053	ROBERT N ENFIELD	27E	19	25.05	BOLTON FEDERAL 001	Plugged	W	660	32.117171	-104.235674	N		
2	3001521186	BEARD OIL CO	26E	24	25.05	GRIFFETH FED 001	Plugged	E	1980	660	32.109931	-104.244051	S	
3	3001523492	CHEVRON U S A INC	26E	13	25.05	FEDERAL 13 COM 001	Plugged	W	1650	32.132681	-104.249634	N		
4	3001524865	CIMAREX ENERGY CO. OF COLORADO	26E	14	25.05	WHITE CITY 14 FEDERAL 001	Active	E	1650	32.132646	-104.260346	N		
5	3001525661	BILL & PATSY RICH	26E	14	25.05	WHITE CITY 14 FEDERAL 002	Plugged	E	1650	32.127179	-104.260312	S		
6	3001529474	CHEVRON U S A INC	26E	26	25.05	CABLE 26 002	Plugged	E	2310	660	32.106284	-104.262253	N	
7	3001529560	COG OPERATING LLC	26E	36	25.05	COTTONWOOD 36 STATE SWD 001	Plugged	W	1980	32.084475	-104.248667	S		
8	3001533001	COG OPERATING LLC	26E	24	25.05	LIGHTNING 24 FEDERAL COM 001	Active	E	1980	660	32.120816	-104.244344	N	
9	3001533094	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.05	LIBERTY 24 FEDERAL COM 001	Active	W	1200	1650	32.11813	-104.250968	N	
10	3001533344	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	FEDERAL 13 COM 002	Active	W	1400	1565	32.126965	-104.25041	S	
11	3001533563	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	WIGEON 23 FEDERAL COM 001	Active	E	1650	32.112644	-104.260142	S		
12	3001533578	COG OPERATING LLC	26E	24	25.05	LIGHTNING 24 FEDERAL COM 002	Active	E	1980	32.11356	-104.244149	S		
13	3001533683	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.05	LIBERTY 24 FEDERAL COM 002	Active	W	940	1475	32.112183	-104.251728	S	
14	3001533684	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	WIGEON 23 FEDERAL COM 002	TA	E	1300	1350	32.118942	-104.259094	N	
15	3001533685	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.05	BUFFLEHEAD 26 FEDERAL COM 001	New (Not drilled or compl)	E	1250	2475	32.10131	-104.258903	N	
16	3001533785	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	FEDERAL 13 COM 003	Active	E	1750	725	32.124619	-104.243643	S	
17	3001533981	OXY USA INC	27E	19	25.05	MARINE 19 FEDERAL 001	Plugged	W	1130	1480	32.118558	-104.234186	N	
18	3001534199	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	FEDERAL 13 COM 004	Active	E	1400	1620	32.132629	-104.242588	N	
19	3001534332	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.05	GOLDENEYE 26 FEDERAL COM 001K	New (Not drilled or compl)	W	1981	1781	32.098578	-104.265706	S	
20	3001534716	CIMAREX ENERGY CO. OF COLORADO	26E	25	25.05	FREEDOM 25 FEE 001C	New (Not drilled or compl)	W	990	660	32.106491	-104.251699	N	
21	3001536335	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	PINTAIL 23 FEDERAL 003	Active	W	1980	2310	32.116289	-104.265571	N	
22	3001536336	CIMAREX ENERGY CO. OF COLORADO	26E	14	25.05	WHITE CITY 14 FEDERAL 004	Active	E	2280	330	32.123594	-104.262309	S	
23	3001536571	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	FEDERAL 13 COM 006	New (Not drilled or compl)	W	1980	1310	32.133662	-104.248543	N	
24	3001536717	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	PINTAIL 23 FEDERAL 004	New (Not drilled or compl)	W	1980	2600	32.115319	-104.265573	S	
25	3001537303	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	WIGEON 23 FEDERAL 003	Plugged	E	2310	2460	32.115923	-104.262375	S	
26	3001538098	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.05	GOLDENEYE 26 FEDERAL COM 001	New (Not drilled or compl)	W	1980	1780	32.09846	-104.265596	S	
27	3001538643	COG OPERATING LLC	27E	31	25.05	JACK FEDERAL 001H	New (Not drilled or compl)	W	380	330	32.092415	-104.236801	N	
28	3001541849	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	MARQUARDT FEDERAL 011H	New (Not drilled or compl)	W	1750	360	32.136298	-104.24929	N	
29	3001541970	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 002	New (Not drilled or compl)	W	800	210	32.093161	-104.252462	N	
30	3001541971	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 003H	New (Not drilled or compl)	W	1770	350	32.092743	-104.249319	N	
31	3001541981	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 004H	New (Not drilled or compl)	E	1870	190	32.093004	-104.244105	N	
32	3001542030	OXY USA INC	27E	19	25.05	PEACHES 19 FEDERAL 004H	New (Not drilled or compl)	W	660	150	32.121966	-104.235735	N	
33	3001542132	COG OPERATING LLC	27E	31	25.05	JACK FEDERAL 002H	New (Not drilled or compl)	W	330	240	32.092662	-104.236965	N	
34	3001542261	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.05	LIBERTY 24 FEDERAL COM 003H	New (Not drilled or compl)	W	1830	330	32.121889	-104.248925	N	
35	3001542262	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.05	LIBERTY 24 FEDERAL COM 004H	New (Not drilled or compl)	W	660	330	32.121919	-104.252723	N	
36	3001542497	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 005H	New (Not drilled or compl)	E	660	190	32.09287	-104.240178	N	
37	3001542778	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.05	FEDERAL 13 COM 009H	New (Not drilled or compl)	W	1920	273	32.13652	-104.248738	N	
38	3001542989	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 012H	New (Not drilled or compl)	W	900	210	32.093162	-104.252138	N	
39	3001543045	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 013H	New (Not drilled or compl)	W	1720	350	32.092748	-104.249481	N	
40	3001543046	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 014H	New (Not drilled or compl)	E	1920	190	32.09301	-104.244267	N	
41	3001543047	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 015H	New (Not drilled or compl)	E	610	190	32.092864	-104.240016	N	
42	3001543133	COG OPERATING LLC	26E	25	25.05	ROAD RUNNER FEDERAL COM 001H	New (Not drilled or compl)	E	380	190	32.093883	-104.239249	S	
43	3001543156	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	WIGEON 23 FEDERAL COM 004H	New (Not drilled or compl)	E	757	305	32.121921	-104.257322	N	
44	3001543157	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	WIGEON 23 FEDERAL COM 005H	New (Not drilled or compl)	E	1802	334	32.121792	-104.260714	N	
45	3001543202	COG OPERATING LLC	26E	36	25.05	CRAIG STATE 002H	New (Not drilled or compl)	W	800	210	32.093161	-104.252462	N	
46	3001543760	CIMAREX ENERGY CO.	26E	23	25.05	WHITE CITY 14 FEDERAL 015H	New (Not drilled or compl)	E	781	237	32.122106	-104.257399	N	
47	3001543761	CIMAREX ENERGY CO.	26E	14	25.05	WHITE CITY 14 FEDERAL 016H	New (Not drilled or compl)	E	1943	440	32.123912	-104.261228	S	
48	3001543773	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.05	PINTAIL 23 26 FEDERAL COM 010H	New (Not drilled or compl)	W	1980	330	32.121732	-104.26556	N	
49	3001543900	COG OPERATING LLC	26E	25	25.05	ROAD RUNNER FEDERAL COM 011H	New (Not drilled or compl)	E	350	190	32.09388	-104.239152	S	
50	3001544147	COG OPERATING LLC	26E	25	25.05	ROAD RUNNER FEDERAL COM 002H	New (Not drilled or compl)	E	1965	210	32.094114	-104.244387	S	

Well Site Layout
Production Facility Layout
Roadrunner CTB 3
Section 36- T25S- R26E

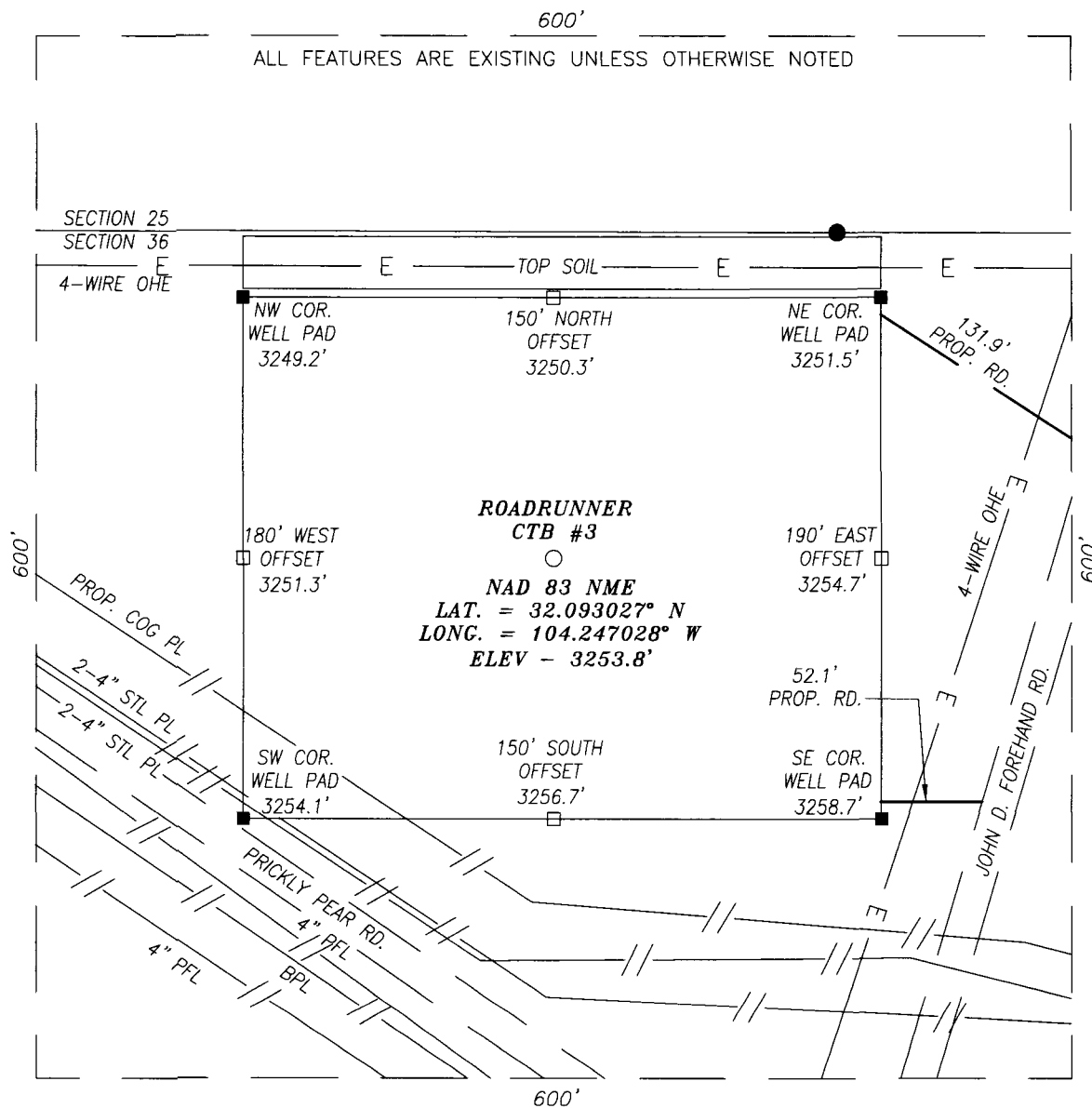
Exhibit 3



Legend

- O** = 750 BBL Steel Oil Tank
- W** = 750 BBL Steel Water Tank
- S** = 750 BBL Steel Water Tank
- H** = 6' x 20' Heater
- X** = Valve
- SEP** = Separator
- FWKO** = Fresh Water Knockout
- HIT** = Heater
- CP** = Control Panel

SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION:

FROM THE INTERSECTION OF WHITES CITY RD. (C.R. 724) AND JOHN D. FOREHAND RD. (C.R.R. 742) GO NORTH ON JOHN D. FOREHAND RD. FOR APPROX. 1.9 MI.; THE PROPOSED CENTRAL TANK BATTERY LIES APPROX. 315.0 FEET TO THE WEST.

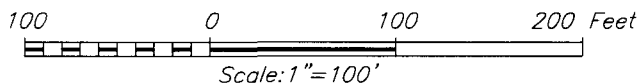
HARCROW SURVEYING, LLC

2314 W. MAIN ST, ARTESIA, N.M. 88210

PH: (575) 746-2158 FAX: (575) 746-2158

Texas Firm No. 10194089

c.harcrow@harcrowsurveying.com



CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



Chad Harrow

CHAD HARCROW N.M.P.S. NO. 17777

11/14/17
DATE

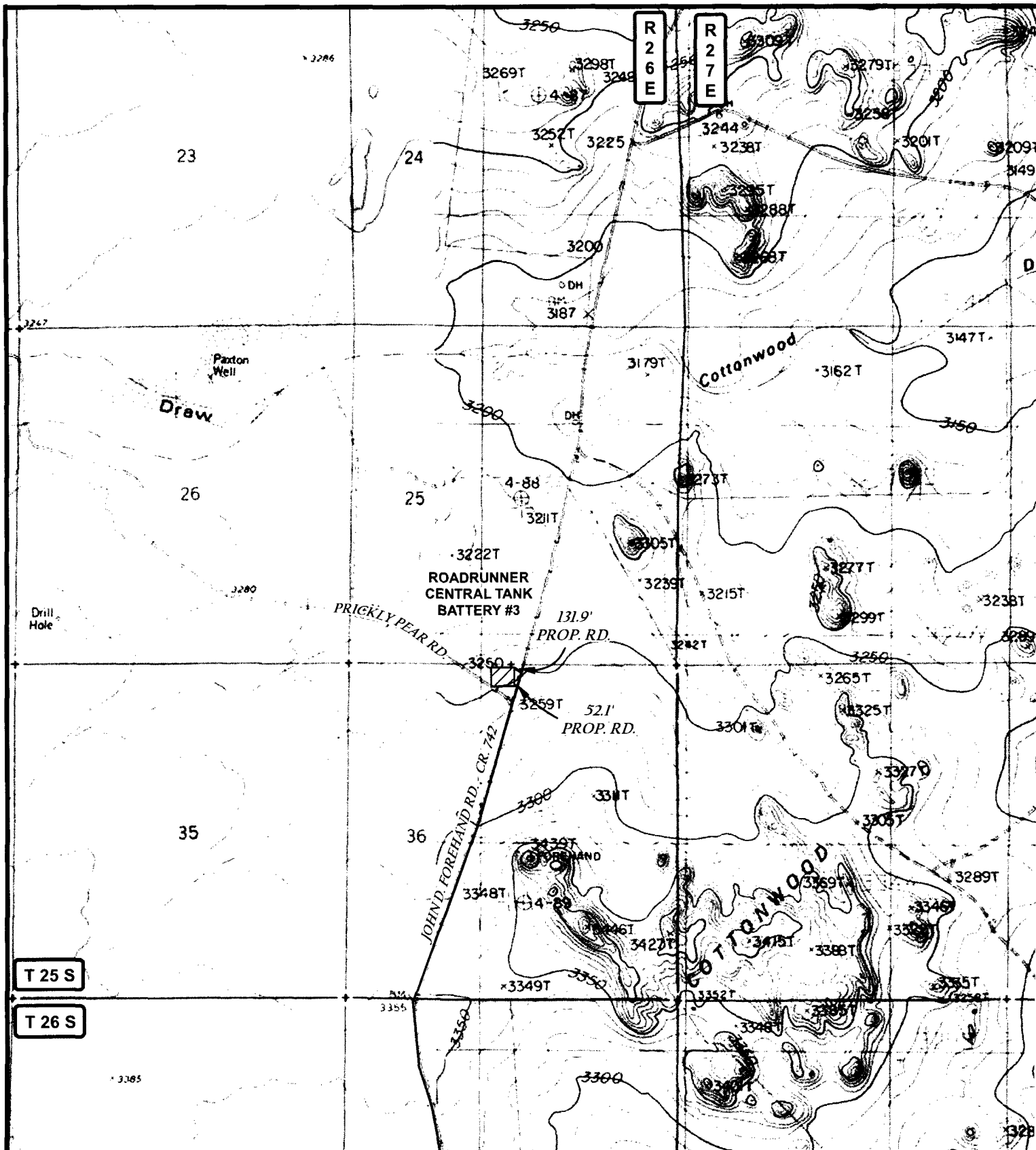
COG OPERATING, LLC

CRAIG CENTRAL TANK BATTERY #2
LOCATED 188 FEET FROM THE NORTH LINE
AND 2477 FEET FROM THE WEST LINE OF SECTION 36,
TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: NOVEMBER 8, 2017 PAGE: 1 OF 1

DRAFTING DATE: NOVEMBER 10, 2017

APPROVED BY: CH DRAWN BY: JH FILE: 17-1429



LEGEND



TANKBATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429		LEASE: ROADRUNNER

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles

1 IN = 2,000 FT

LOCATION MAP

TOPO

11/10/2017

J.H.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



LEGEND



TANK BATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36 TOWNSHIP: 25 S. RANGE: 26 E.

STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M

W.O. # 17-1429

LEASE: ROADRUNNER

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles 1 IN = 2,000 FT

LOCATION MAP

IMAGERY

11/10/2017

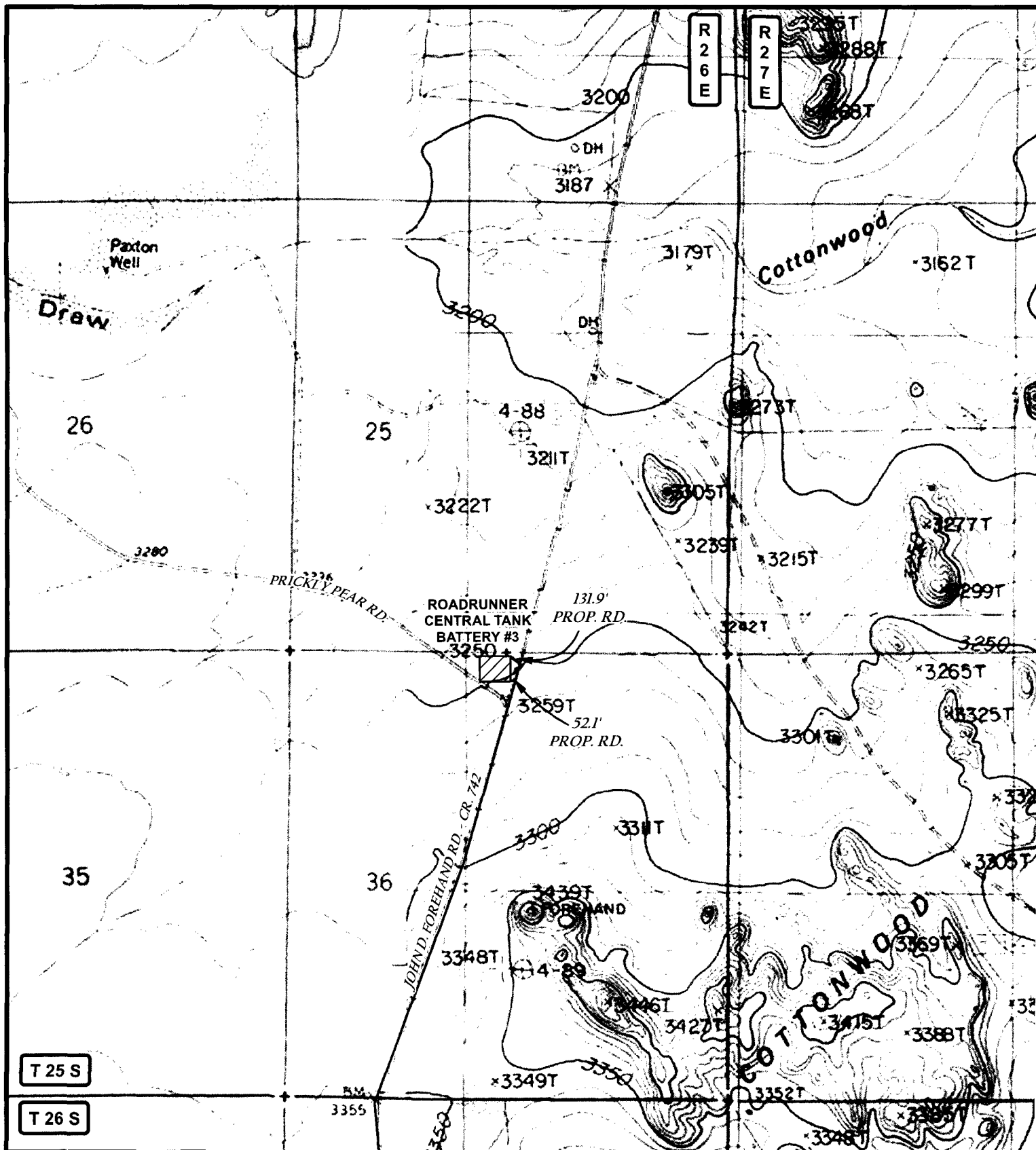
J.H.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



LEGEND



TANKBATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36

TOWNSHIP: 25 S.

RANGE: 26 E.

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1429

LEASE: ROADRUNNER

0 2,500 FEET

0 0.1 0.2 0.4 Miles

1 IN = 1,500 FT

LOCATION MAP

TOPO ROAD

11/10/2017

J.H.

CONCHO

COG OPERATING, LLC



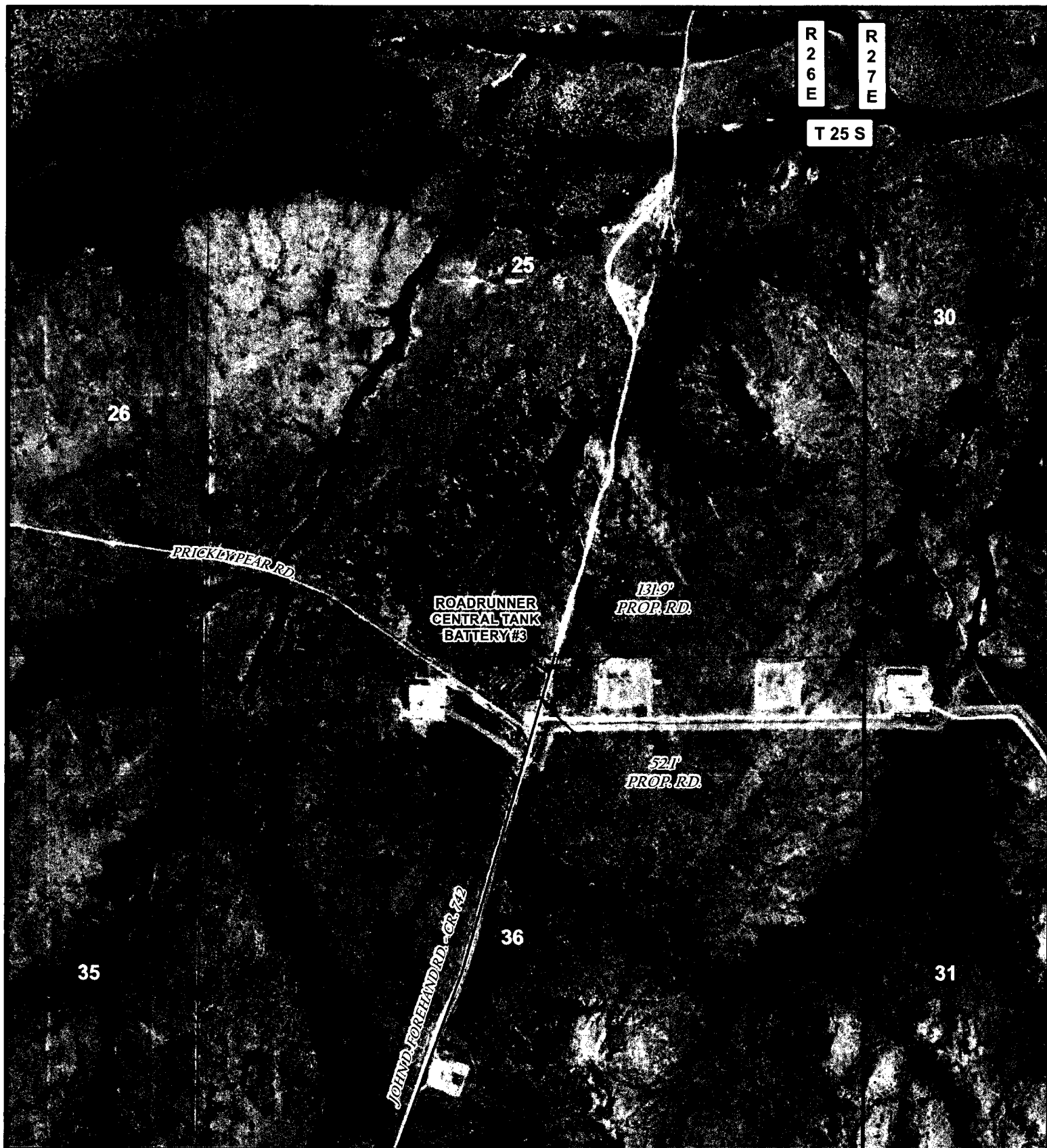
HARCROW SURVEYING, LLC.

2314 W. MAIN ST, ARTESIA, NM 88210

PH: (575) 746-2158 FAX: (575) 746-2158

TEXAS FIRM NO. 10194089

c.harcrow@harcrowsurveying.com



LEGEND



TANK BATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429	LEASE: ROADRUNNER	

0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

LOCATION MAP

IMAGERY ROAD

11/10/2017

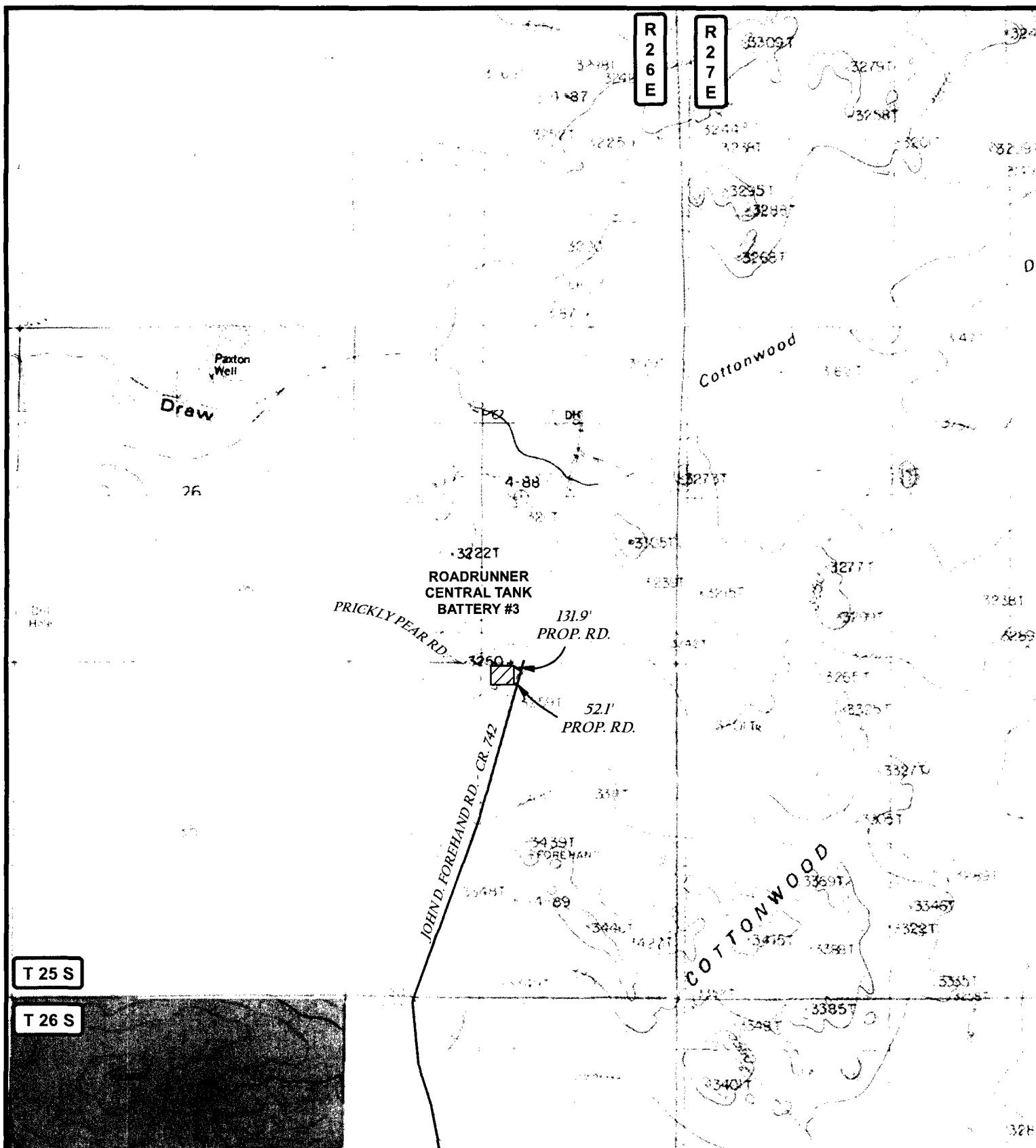
J.H.



COG OPERATING, LLC



HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



T 25 S

T 26 S

LEGEND



TANK BATTERY



EXISTING ROAD



PROPOSED ROAD

PRIVATE

STATE OF NM

US BLM

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36

TOWNSHIP: 25 S.

RANGE: 26 E.

STATE: NEW MEXICO

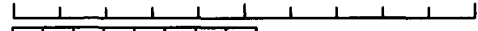
COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1429

LEASE: ROADRUNNER

0 2,500 5,000 FEET



0 0.125 0.25 0.5 Miles

1 IN = 2,000 FT

LOCATION MAP

LAND STATUS

11/10/2017

J.H.

CONCHO

COG OPERATING, LLC



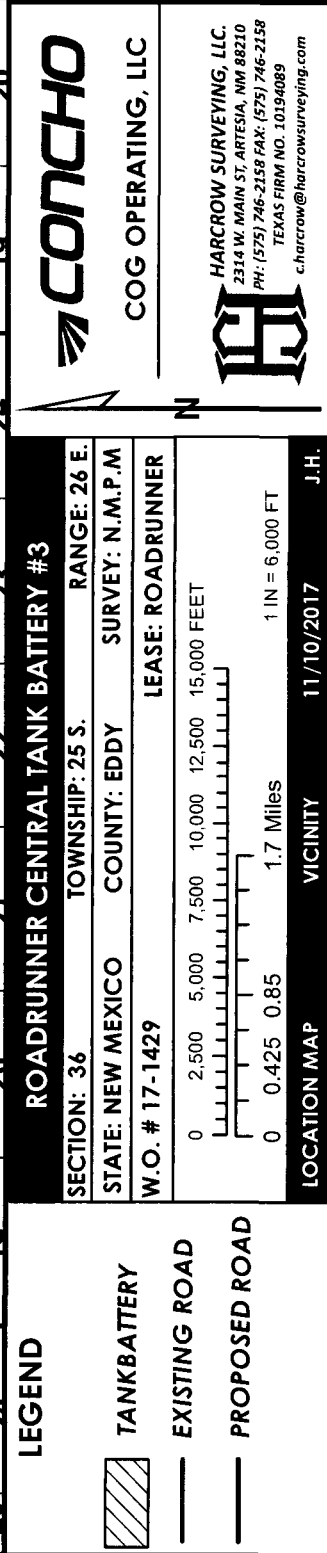
HARCROW SURVEYING, LLC.

2314 W. MAIN ST, ARTESIA, NM 88210

PH: (575) 746-2158 FAX: (575) 746-2158

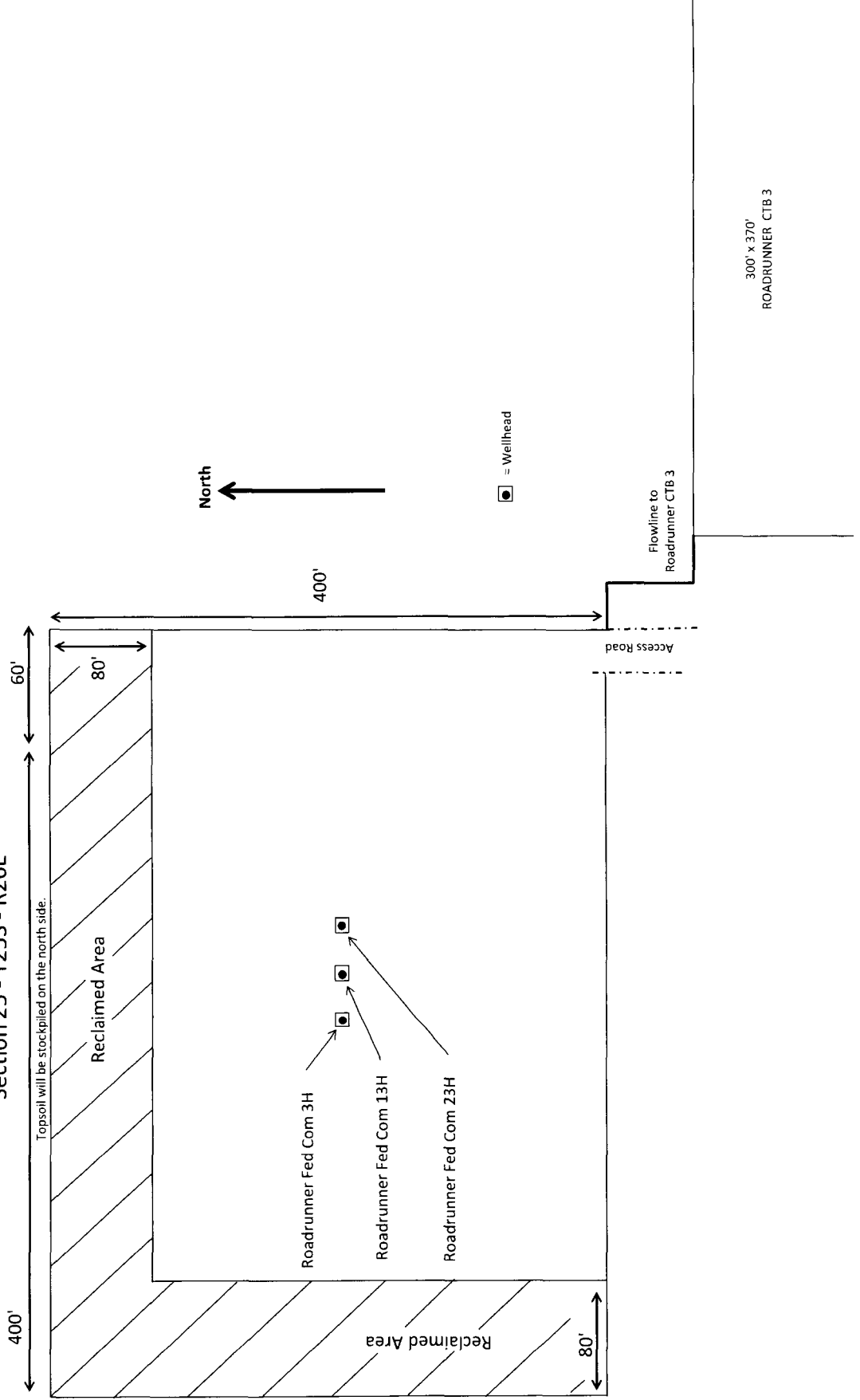
TEXAS FIRM NO. 10194089

c.harcrow@harcrowsurveying.com



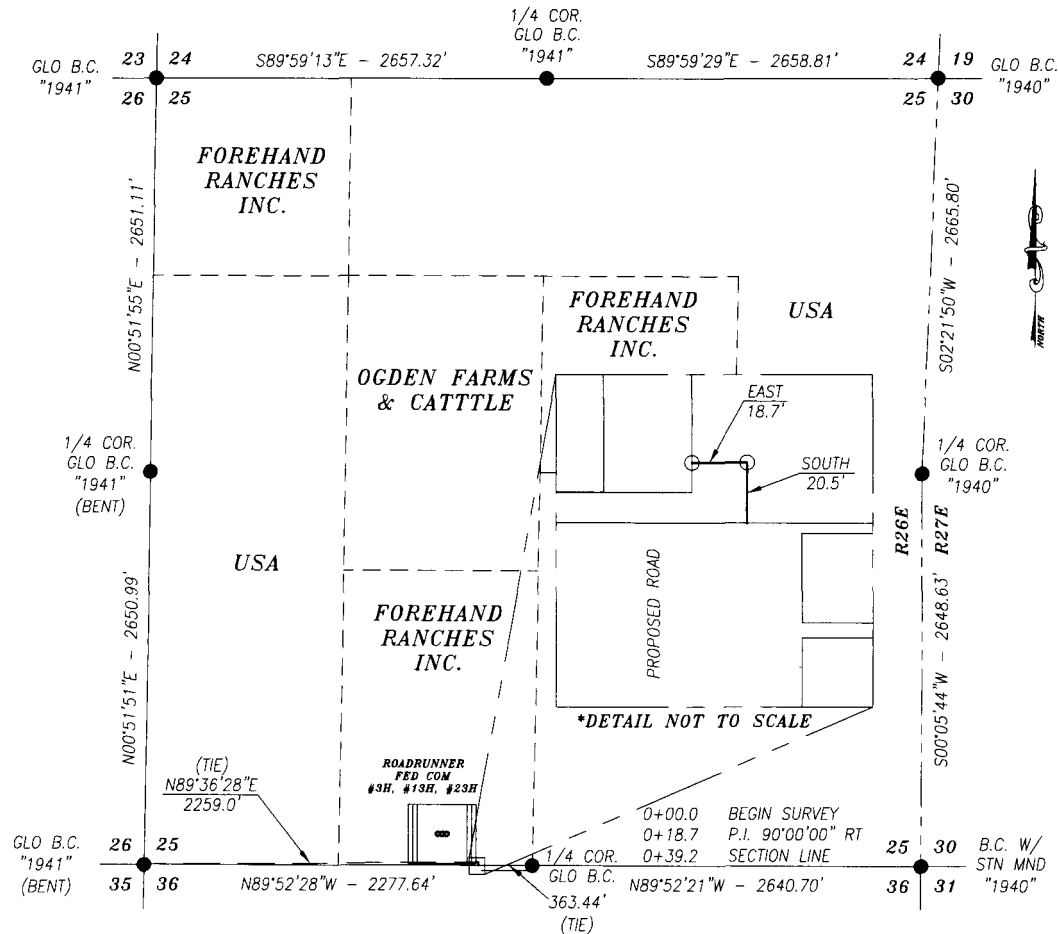
Well Site Layout
Production Facility Layout
Roadrunner Federal Com #13H
Section 25 - T25S - R26E

Exhibit 3



FLOWLINE PLAT **COG OPERATING, LLC**

A PROPOSED FLOWLINE FROM THE ROADRUNNER FED COM #3H, #13H, #23H TO THE
ROADRUNNER CTB #3 IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 39.2 FEET OR 2.38 RODS OR 0.007 MILES IN LENGTH CROSSING FEE LAND IN SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

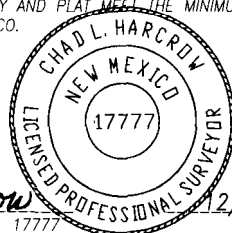
HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210
PH: (575) 746-2158 FAX: (575) 746-2158
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com



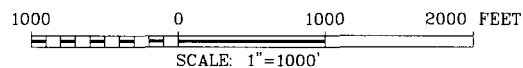
CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777

12/20/17
DATE



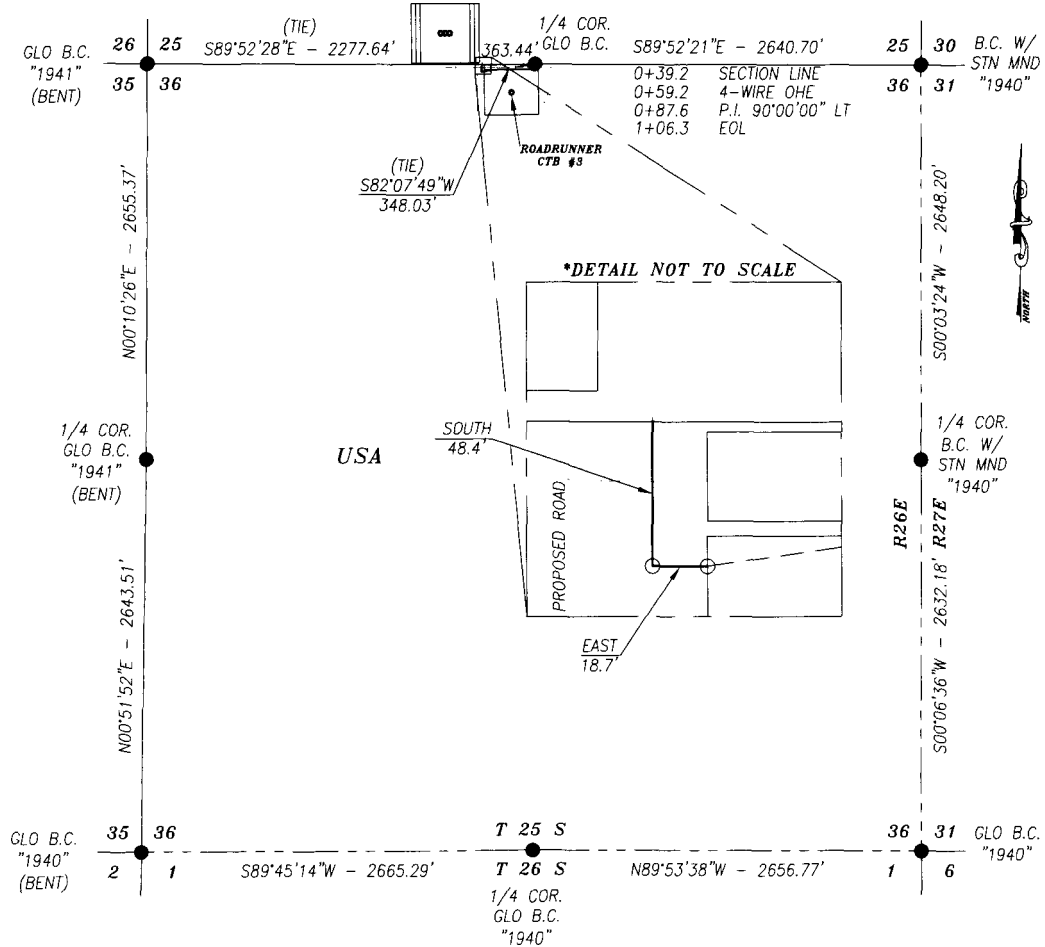
COG OPERATING, LLC

SURVEY OF A PROPOSED FLOWLINE LOCATED IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 20, 2017	
DRAFTING DATE: DECEMBER 19, 2017	PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: AM FILE: 17-1596

FLOWLINE PLAT COG OPERATING, LLC

A PROPOSED FLOWLINE FROM THE ROADRUNNER FED COM #3H, #13H, #23H TO THE
ROADRUNNER CTB #3 IN
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 67.1 FEET OR 4.07 RODS OR 0.013 MILES IN LENGTH CROSSING USA LAND IN SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow

CHAD HARCROW N.M.P.S. NO. 17777

DATE

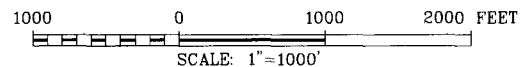
HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210

PH: (575) 746-2158 FAX: (575) 746-2158

Texas Firm No. 10194089

c.harcrow@harcrowsurveying.com



COG OPERATING, LLC

SURVEY OF A PROPOSED FLOWLINE LOCATED IN SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 20, 2017

DRAFTING DATE: DECEMBER 19, 2017

APPROVED BY: CH DRAWN BY: AM

PAGE 2 OF 2

FILE: 17-1596

T 25 S

R
2
5
EROADRUNNER
FED COM #3HROADRUNNER
FED COM #13HROADRUNNER
FED COM #23H106.3'
PROPOSED
FLOWLINE325.4'
PROPOSED RD.ROADRUNNER
CTB #3

JOIND. FOR INDRD. CR-12

LEGEND



WELL



WELLPAD

EXISTING ROAD

PROPOSED ROAD

PROPOSED FLOWLINE

ROADRUNNER FEDERAL COM #3H, #13H, & #23H FLOWLINE

SECTIONS: 25 & 36

TOWNSHIP: 25 S.

RANGE: 26 E

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1596

LEASE: ROADRUNNER FED COM

0 0.05 0.1 0.2 Miles

1 IN = 750 FT

LOCATION MAP

IMAGERY

12/18/2017

A.M.

CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

T 25 S

R 26 E

4-88

3211T

3305T

3222T

3239T

3236

ROADRUNNER
FED COM #3H

ROADRUNNER
FED COM #13H

ROADRUNNER
FED COM #23H

106.3'
PROPOSED
FLOWLINE

325.4
PROPOSED RD.

ROADRUNNER
CTB #3

3259T

JOHN D. FOREHAND RD. - CR. 742

3311T

3439T

LEGEND

• WELL

WELLPAD

EXISTING ROAD

PROPOSED ROAD

PROPOSED FLOWLINE

PRIVATE

STATE OF NM

US BLM

ROADRUNNER FEDERAL COM #3H, #13H, & #23H FLOWLINE

SECTIONS: 25 & 36

TOWNSHIP: 25 S.

RANGE: 26 E

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1596

LEASE: ROADRUNNER FED COM

0 0.05 0.1 0.2 Miles

1 IN = 750 FT

LOCATION MAP

LAND STATUS

12/20/2017

A.M.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



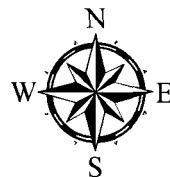
**Roadrunner Fed Com #13H
Water Transfer Route**

Date: 11/14/2017
 Author: Whyte McDonald
 State: New Mexico
 County: Eddy

Disclaimer: This is not a legal survey document

Map Legend

— Route



0 0.5 1 2 3 4 Miles

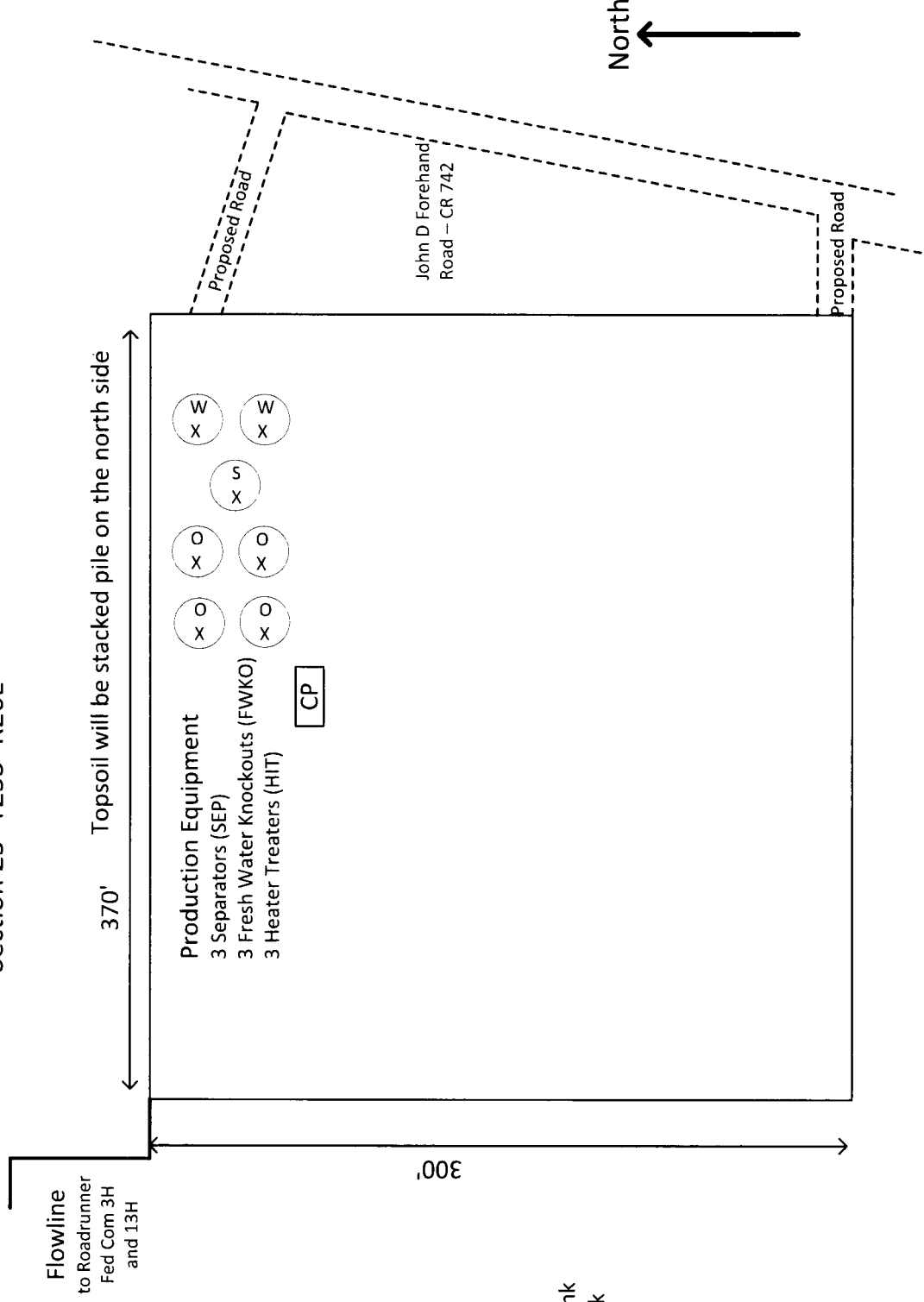
Well Site Layout

Production Facility Layout

Roadrunner CTB 3

Section 25- T25S- R26E

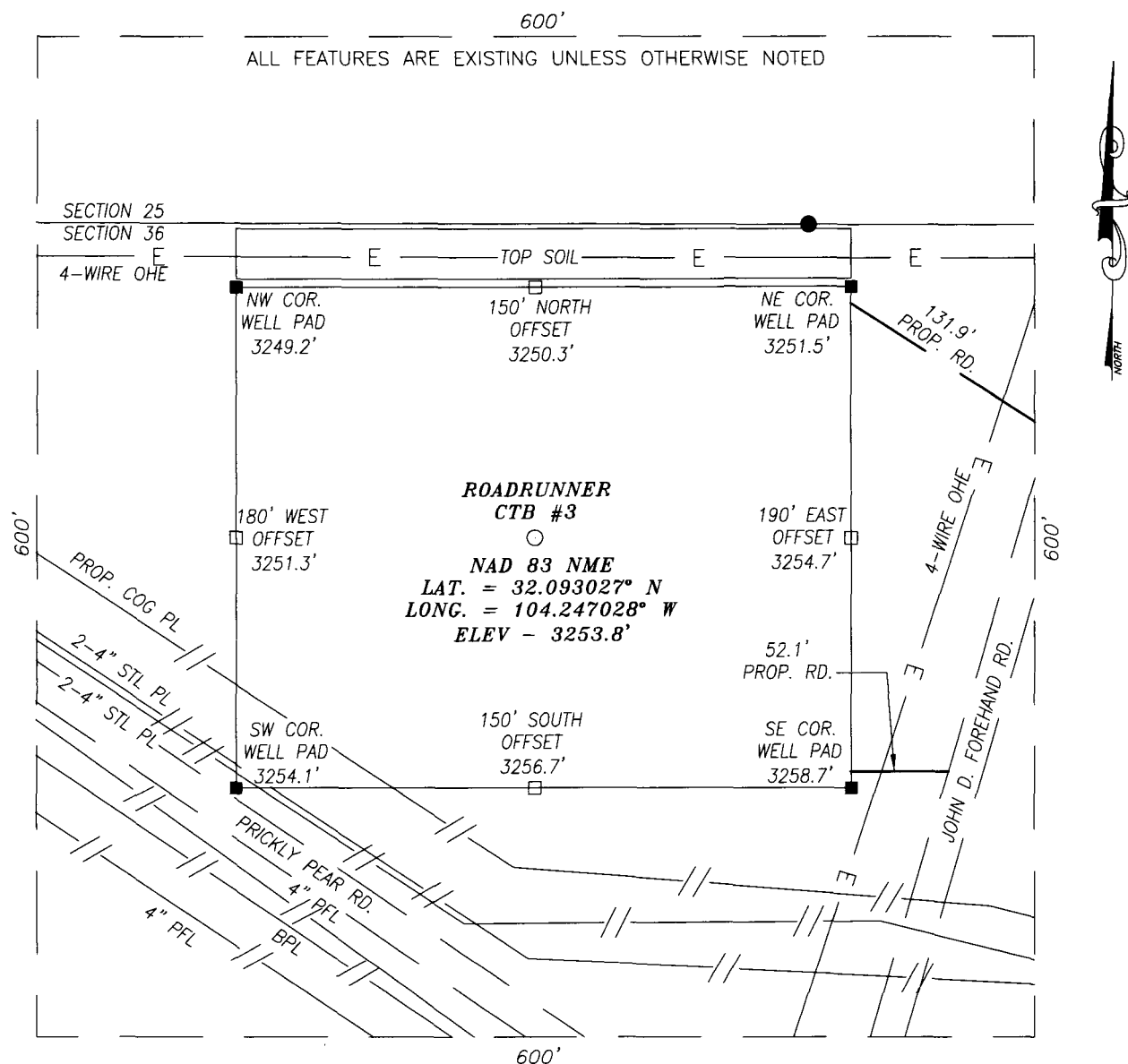
Exhibit 3



Legend

- O = 750 BBL Steel Oil Tank
- W = 750 BBL Steel Water Tank
- S = 750 BBL Steel Water Tank
- H = 6' x 20' Heater
- X = Valve
- SEP = Separator
- FWKO = Fresh Water Knockout
- HIT = Heater
- CP = Control Panel

SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION:

FROM THE INTERSECTION OF WHITES CITY RD. (C.R. 724) AND JOHN D. FOREHAND RD. (C.R.R. 742) GO NORTH ON JOHN D. FOREHAND RD. FOR APPROX. 1.9 MI.; THE PROPOSED CENTRAL TANK BATTERY LIES APPROX. 315.0 FEET TO THE WEST.

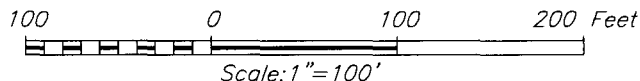
HARCROW SURVEYING, LLC

2314 W. MAIN ST, ARTESIA, N.M. 88210

PH: (575) 746-2158 FAX: (575) 746-2158

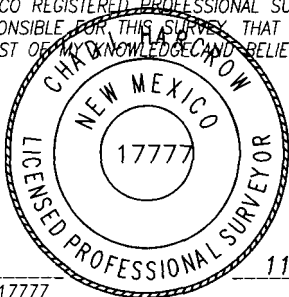
Texas Firm No. 10194089

c.harcrow@harcrowsurveying.com



CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY. THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



Chad Harcrow

CHAD HARCROW N.M.P.S. NO. 17777

11/14/17
DATE

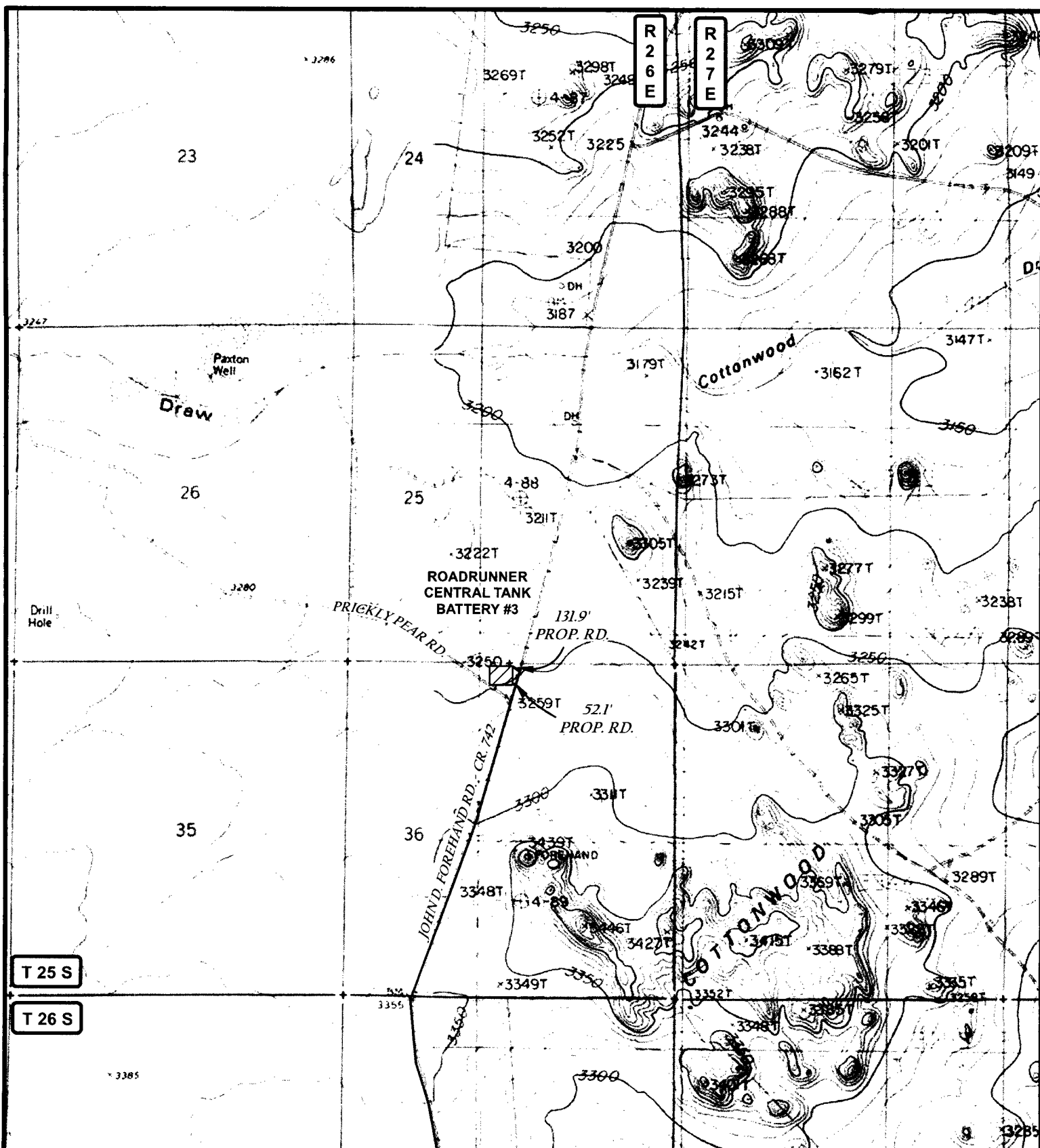
COG OPERATING, LLC

CRAIG CENTRAL TANK BATTERY #2
LOCATED 188 FEET FROM THE NORTH LINE
AND 2477 FEET FROM THE WEST LINE OF SECTION 36,
TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: NOVEMBER 8, 2017 PAGE: 1 OF 1

DRAFTING DATE: NOVEMBER 10, 2017

APPROVED BY: CH DRAWN BY: JH FILE: 17-1429



LEGEND



TANKBATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36

TOWNSHIP: 25 S.

RANGE: 26 E.

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M.

W.O. # 17-1429

LEASE: ROADRUNNER

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles

1 IN = 2,000 FT

LOCATION MAP

TOPO

11/10/2017

J.H.

CONCHO

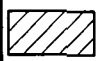


COG OPERATING, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

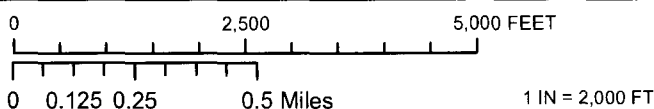


LEGEND

-  TANK BATTERY
-  EXISTING ROAD
-  PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429	LEASE: ROADRUNNER	



LOCATION MAP

IMAGERY

11/10/2017

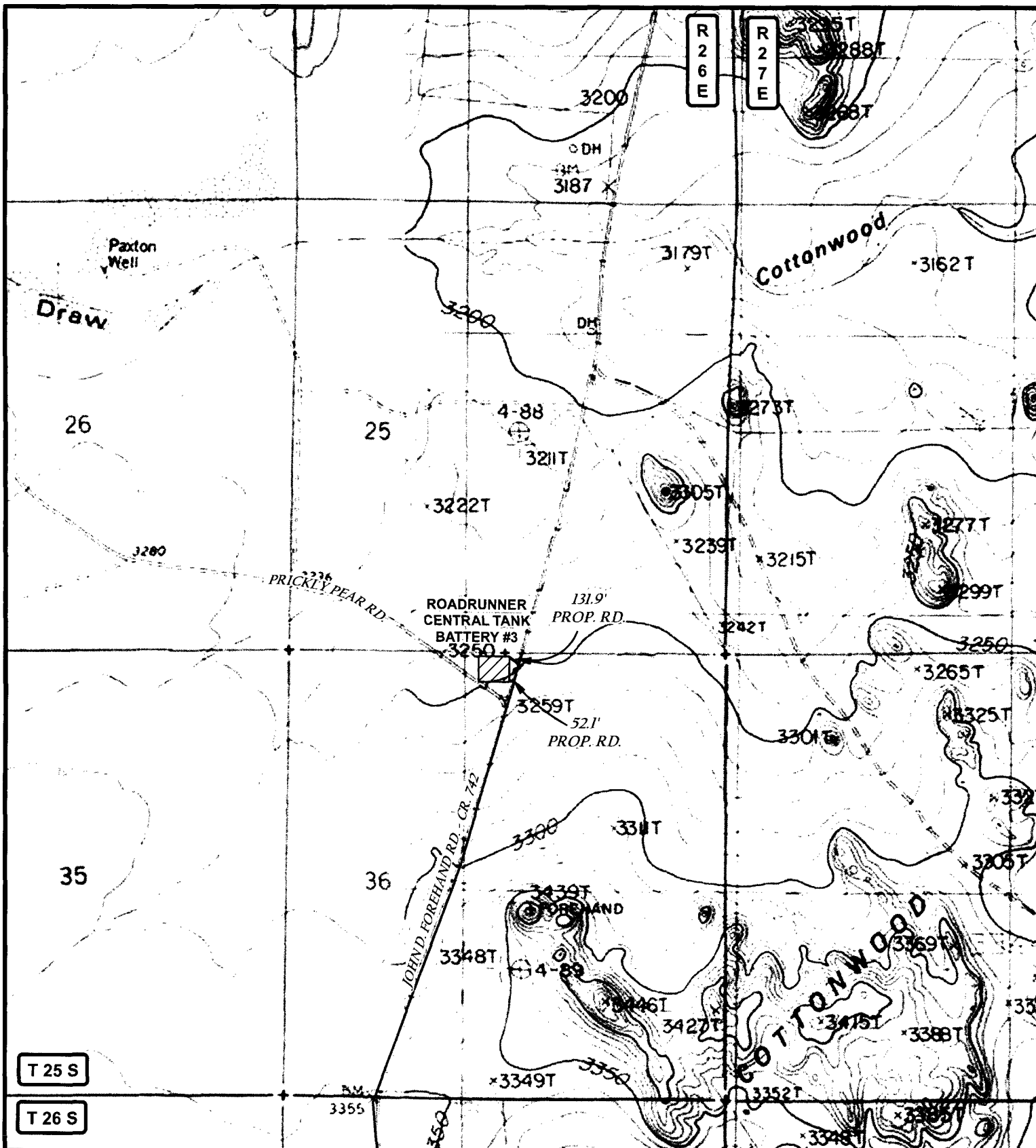
J.H.

 **CONCHO**




COG OPERATING, LLC



HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



LEGEND

-  TANKBATTERY
-  EXISTING ROAD
-  PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429		LEASE: ROADRUNNER

0 2,500 FEET

0 0.1 0.2 0.4 Miles

1 IN = 1,500 FT

LOCATION MAP

TOPO ROAD

11/10/2017

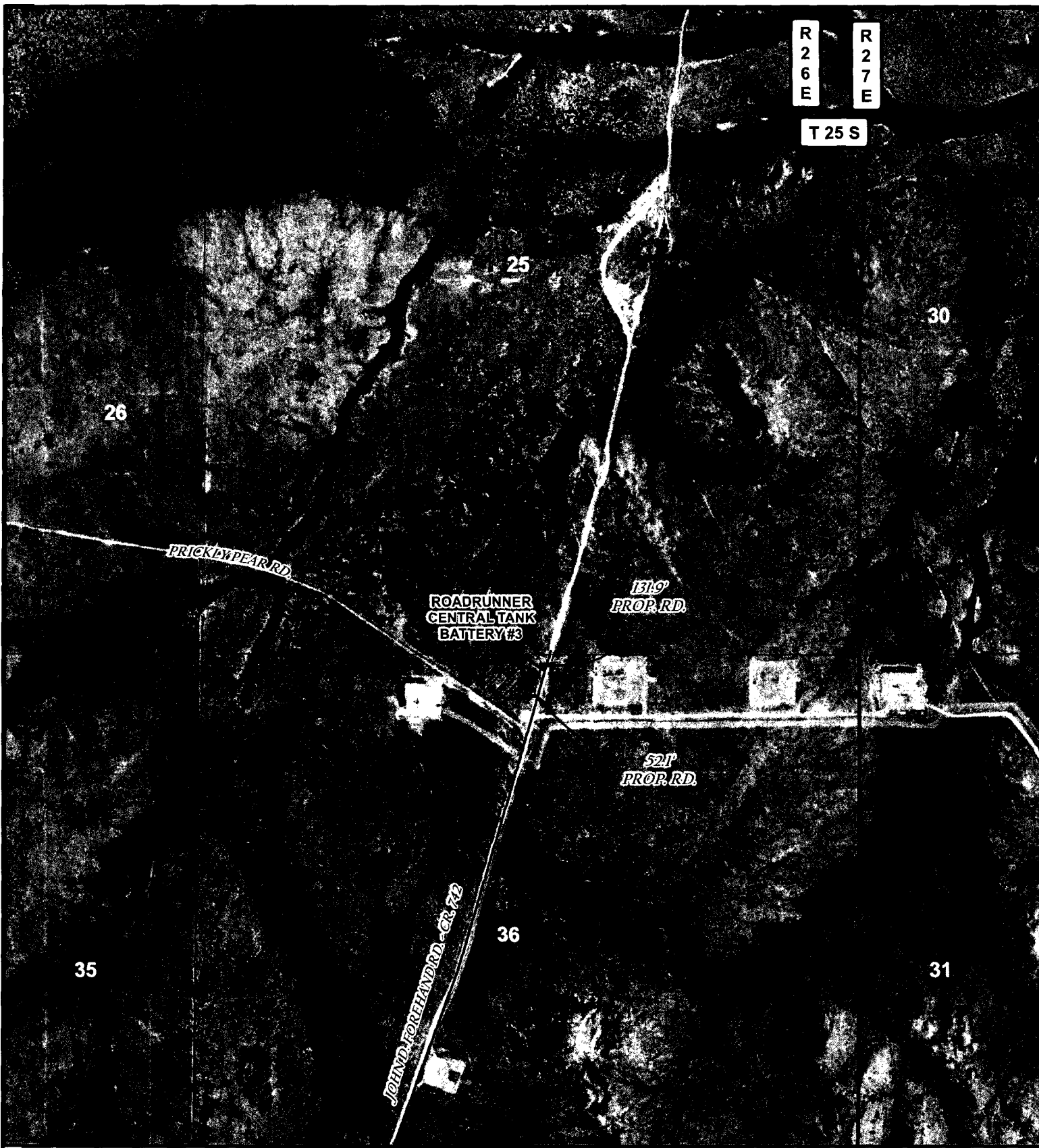
J.H.

 **CONCHO**

COG OPERATING, LLC



HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



LEGEND



TANK BATTERY



EXISTING ROAD



PROPOSED ROAD

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429	LEASE: ROADRUNNER	

0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

LOCATION MAP

IMAGERY ROAD

11/10/2017

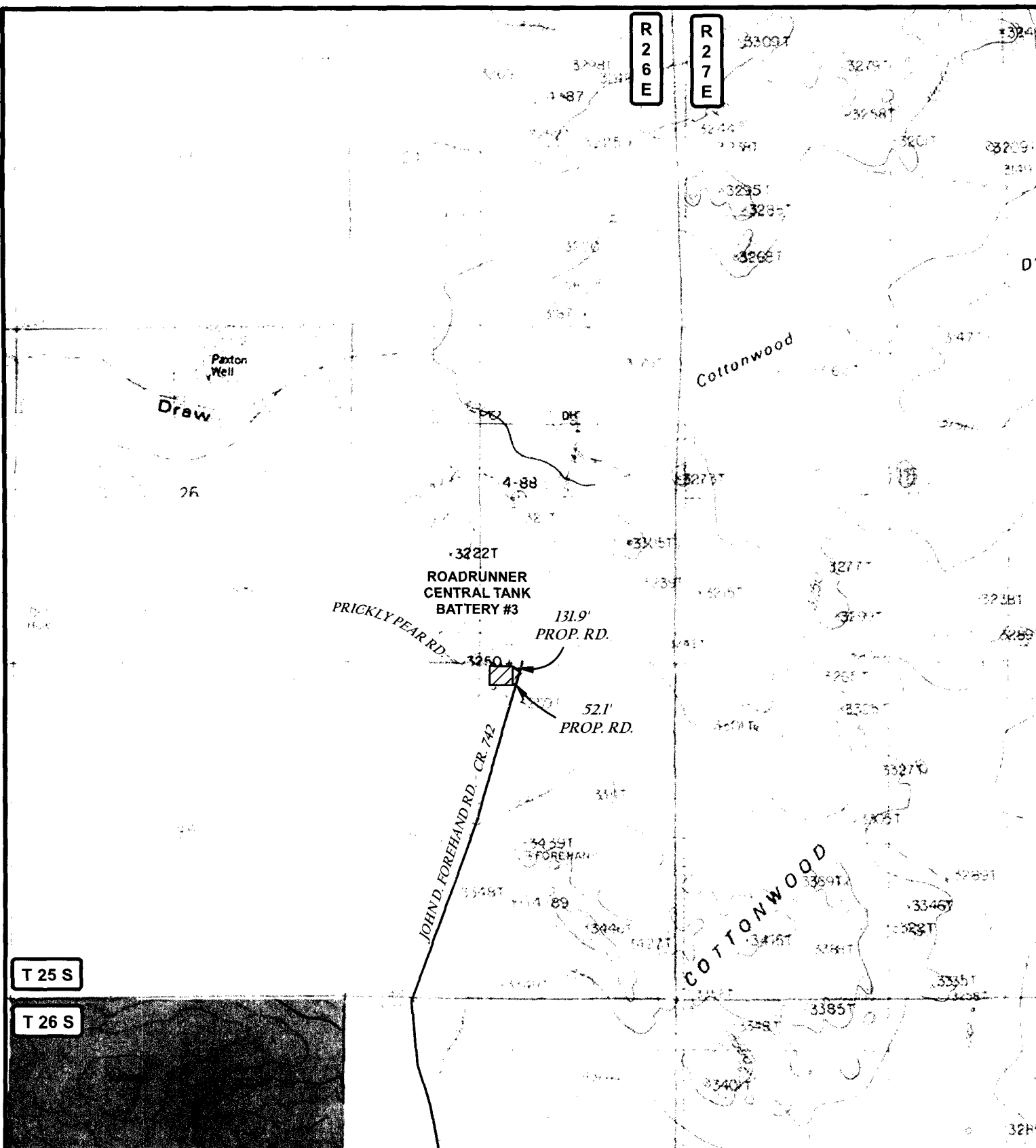
J.H.

CONCHO

COG OPERATING, LLC









HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



T 25 S

T 26 S

LEGEND

-  TANK BATTERY
-  EXISTING ROAD
-  PROPOSED ROAD
-  PRIVATE
-  STATE OF NM
-  US BLM

ROADRUNNER CENTRAL TANK BATTERY #3

SECTION: 36	TOWNSHIP: 25 S.	RANGE: 26 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 17-1429	LEASE: ROADRUNNER	

0 2,500 5,000 FEET

0 0.125 0.25 0.5 Miles 1 IN = 2,000 FT

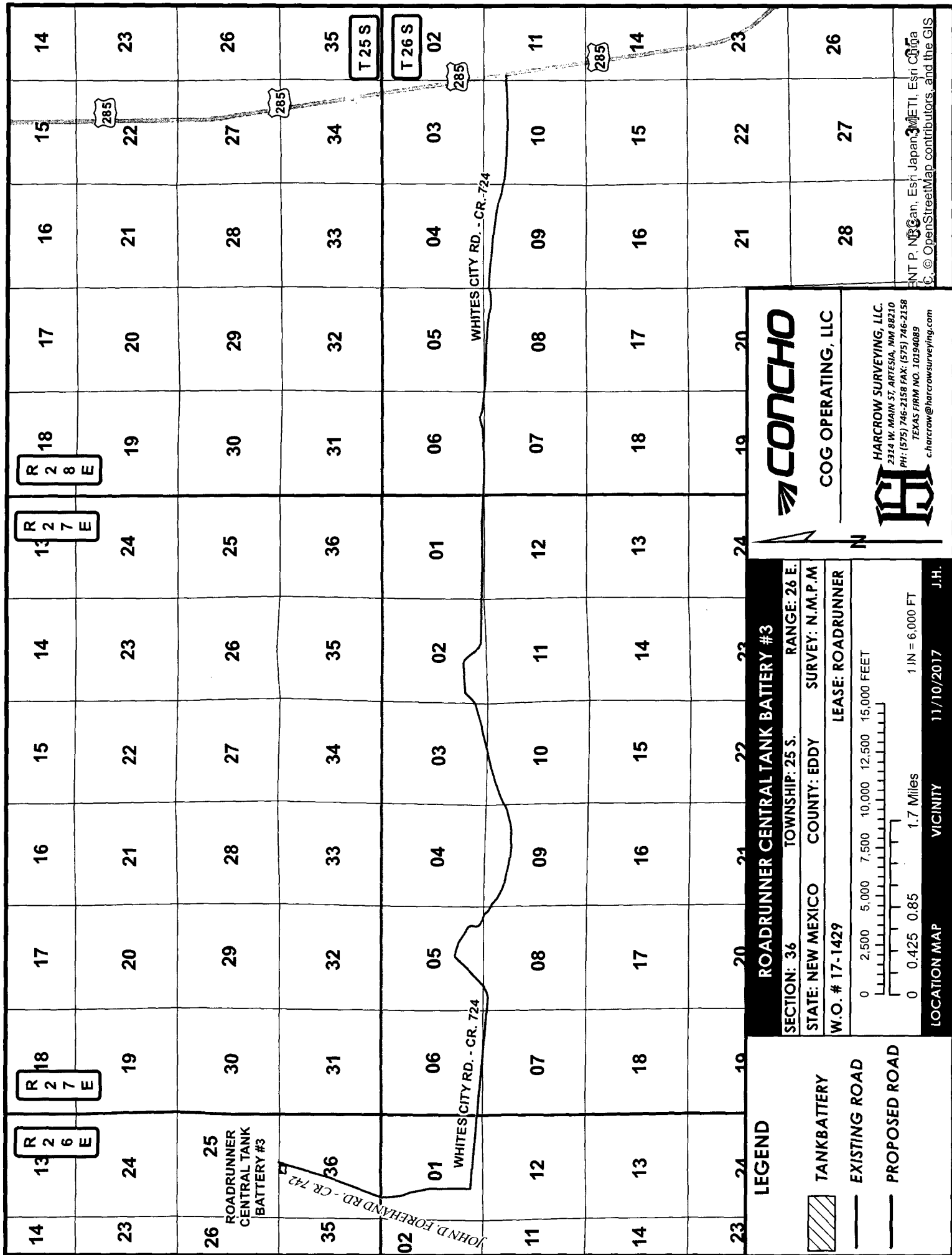
LOCATION MAP LAND STATUS 11/10/2017 J.H.

 **CONCHO**

COG OPERATING, LLC

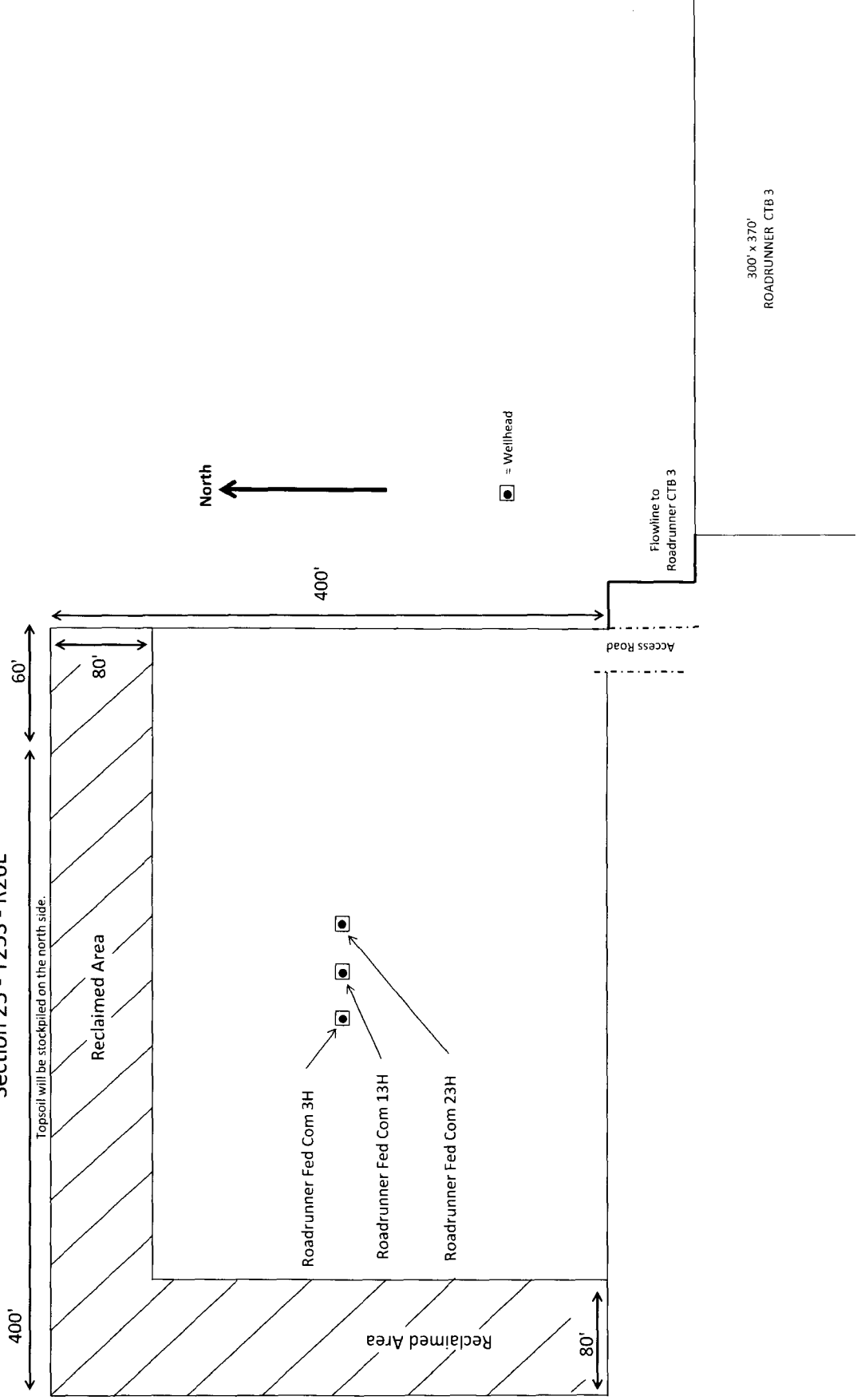


HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 746-2158 FAX: (575) 746-2158
 TEXAS FIRM NO. 10194089
 c.harcrow@harcrowsurveying.com



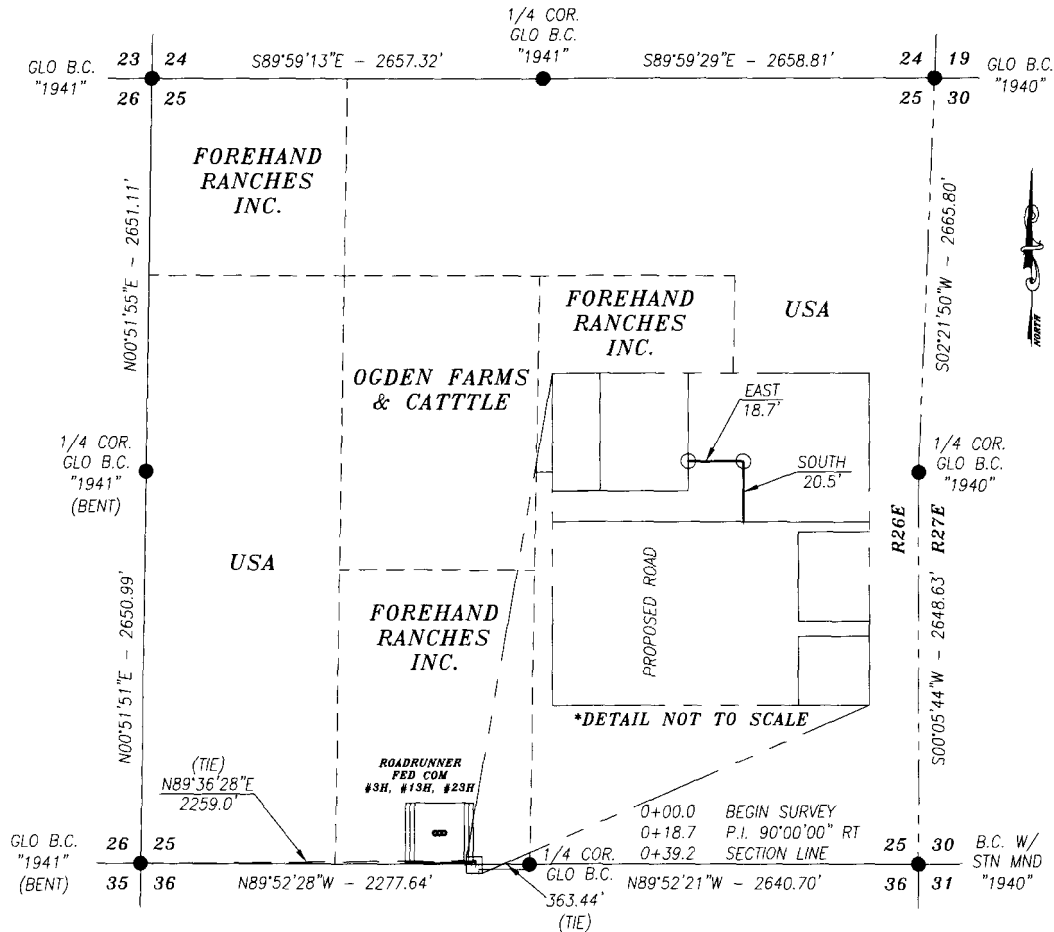
Well Site Layout
Production Facility Layout
Roadrunner Federal Com #13H
Section 25 - T25S - R26E

Exhibit 3



FLOWLINE PLAT
COG OPERATING, LLC

A PROPOSED FLOWLINE FROM THE ROADRUNNER FED COM #3H, #13H, #23H TO THE
ROADRUNNER CTB #3 IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 39.2 FEET OR 2.38 RODS OR 0.007 MILES IN LENGTH CROSSING FEE LAND IN SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

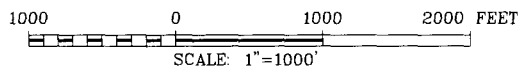


Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777

12/20/17
DATE

HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210
PH: (575) 746-2158 FAX: (575) 746-2158
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com



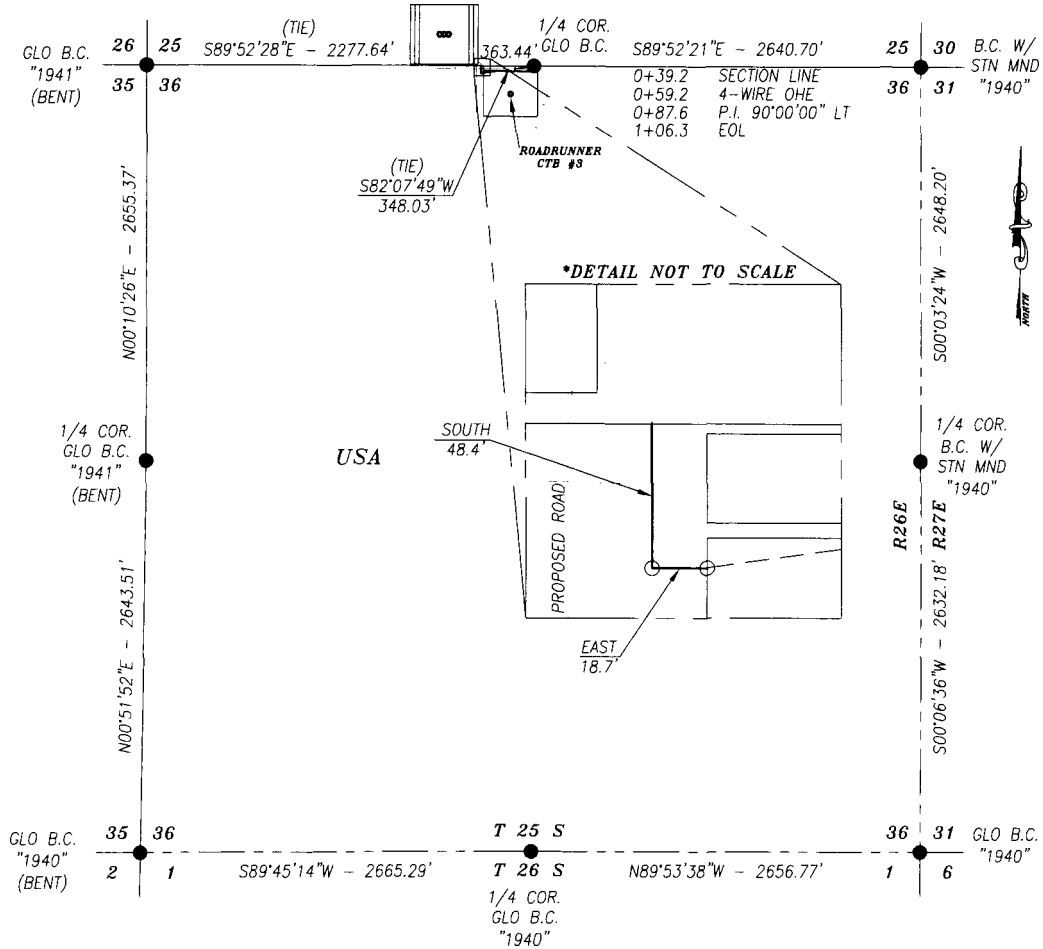
COG OPERATING, LLC

SURVEY OF A PROPOSED FLOWLINE LOCATED IN
SECTION 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 20, 2017	
DRAFTING DATE: DECEMBER 19, 2017	PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: AM FILE: 17-1596

FLOWLINE PLAT
COG OPERATING, LLC

A PROPOSED FLOWLINE FROM THE ROADRUNNER FED COM #3H, #13H, #23H TO THE
ROADRUNNER CTB #3 IN
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 67.1 FEET OR 4.07 RODS OR 0.013 MILES IN LENGTH CROSSING USA LAND IN SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777

12/20/17
DATE

HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210
PH: (575) 746-2158 FAX: (575) 746-2158
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com



1000 0 1000 2000 FEET
SCALE: 1"=1000'

COG OPERATING, LLC

SURVEY OF A PROPOSED FLOWLINE LOCATED IN
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 20, 2017	
DRAFTING DATE: DECEMBER 19, 2017	PAGE 2 OF 2
APPROVED BY: CH	DRAWN BY: AM
	FILE: 17-1596

T 25 S

R
2
5
EROADRUNNER
FED COM #3HROADRUNNER
FED COM #13HROADRUNNER
FED COM #23H106.3'
PROPOSED
FLOWLINE325.4
PROPOSED RD.ROADRUNNER
CTB #3

JOHN FOREHAND RD. CR-72

LEGEND



WELL



WELLPAD



EXISTING ROAD



PROPOSED ROAD



PROPOSED FLOWLINE

ROADRUNNER FEDERAL COM #3H, #13H, & #23H FLOWLINE

SECTIONS: 25 & 36

TOWNSHIP: 25 S.

RANGE: 26 E

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1596

LEASE: ROADRUNNER FED COM

0 0.05 0.1 0.2 Miles

1 IN = 750 FT

LOCATION MAP

IMAGERY

12/18/2017

A.M.

 **CONCHO**

COG OPERATING, LLC



HARCROW SURVEYING, LLC.

2314 W. MAIN ST, ARTESIA, NM 88210

PH: (575) 746-2158 FAX: (575) 746-2158

TEXAS FIRM NO. 10194089

c.harcrow@harcrowsurveying.com

T 25 S

R 25 E

4-88

3211T

3305T

3222T

3239T

3236

ROADRUNNER
FED COM #3H

ROADRUNNER
FED COM #13H

ROADRUNNER
FED COM #23H

106.3'
PROPOSED
FLOWLINE

325.4
PROPOSED RD.

ROADRUNNER
CTB #3

JOHN D. FOREHAND RD. - CR. 742

3259T

3311T

3439T

LEGEND

• WELL

WELLPAD

EXISTING ROAD

PROPOSED ROAD

PROPOSED FLOWLINE

PRIVATE

STATE OF NM

US BLM

ROADRUNNER FEDERAL COM #3H, #13H, & #23H FLOWLINE

SECTIONS: 25 & 36

TOWNSHIP: 25 S.

RANGE: 26 E

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 17-1596

LEASE: ROADRUNNER FED COM

0 0.05 0.1 0.2 Miles

1 IN = 750 FT

LOCATION MAP

LAND STATUS

12/20/2017

A.M.

CONCHO

COG OPERATING, LLC



HARCROW SURVEYING, LLC.

2314 W. MAIN ST, ARTESIA, NM 88210

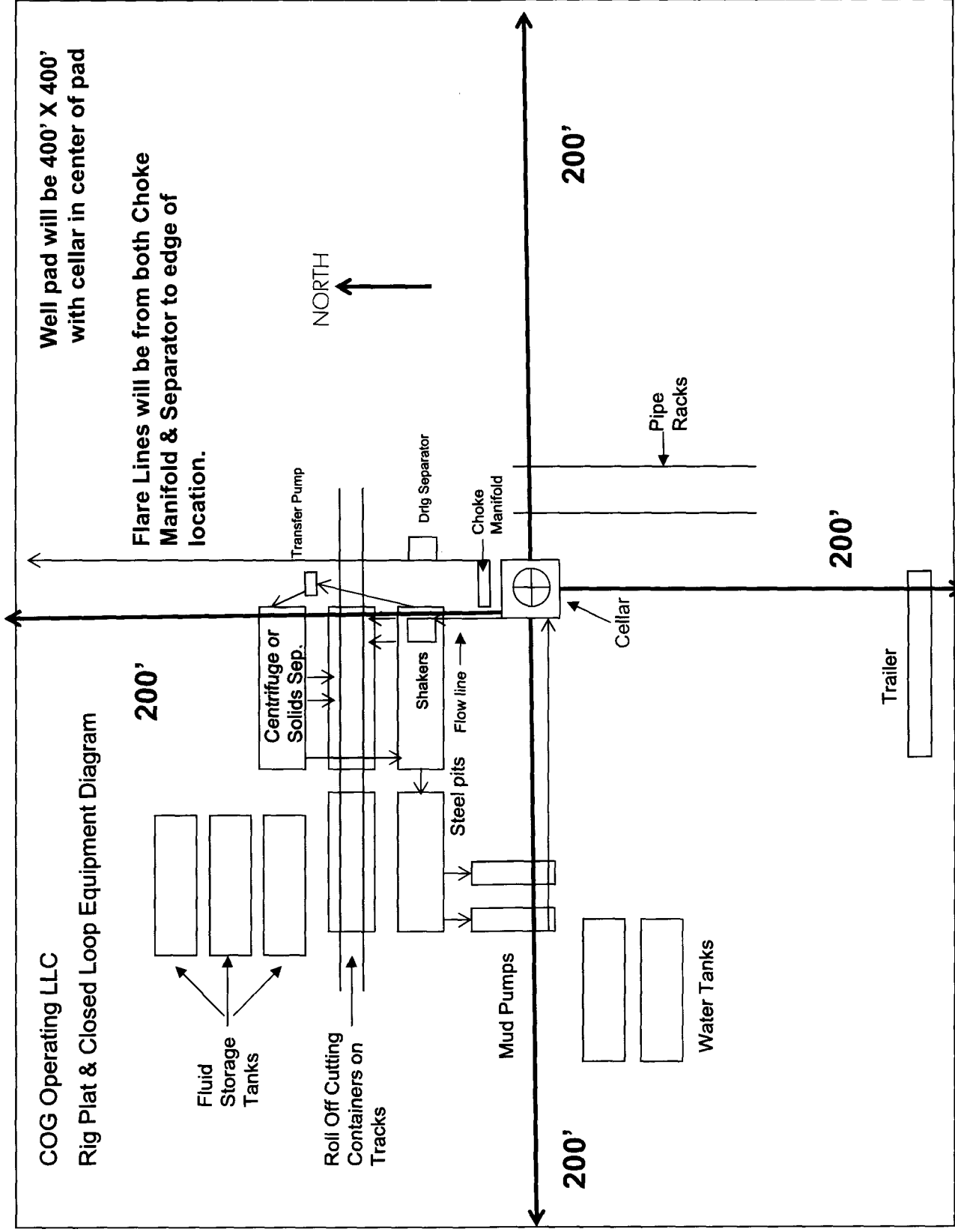
PH: (575) 746-2158 FAX: (575) 746-2158

TEXAS FIRM NO. 10194089

c.harcrow@harcrowsurveying.com

COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

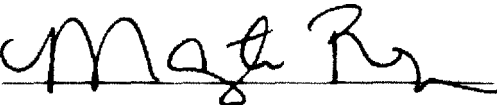


"I further certify that COG will comply with Rule 19.15.17 NIMAC by using a Closed Loop System."

*Surface Use Plan
COG Operating LLC
Roadrunner Federal Com 3H
SHL: 210' FSL & 1995' FWL UL N
Section 25, T25S, R26E
BHL: 200' FNL & 1850' FWL UL C
Section 24, T25S, R26E
Eddy County, New Mexico*

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently 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 COG Operating LLC, 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. Executed this 5th day of December, 2017.

Signed: 

Printed Name: Mayte Reyes

Position: Regulatory Analyst

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6945

E-mail: mreyes1@concho.com

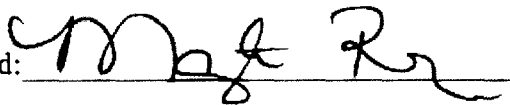
Field Representative (if not above signatory): Rand French

Telephone: (575) 748-6940. E-mail: rfrench@concho.com

Surface Use Plan
COG Operating LLC
Roadrunner Federal Com 13H
SHL: 210' FSL & 2025' FWL UL N
Section 25, T25S, R26E
BHL: 200' FNL & 1850' FWL UL C
Section 24, T25S, R26E
Eddy County, New Mexico

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently 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 COG Operating LLC, 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. Executed this 5th day of December, 2017.

Signed: 

Printed Name: Mayte Reyes

Position: Regulatory Analyst

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6945

E-mail: mreyes1@concho.com

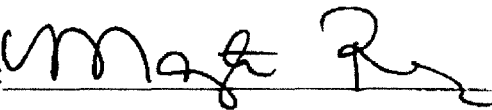
Field Representative (if not above signatory): Rand French

Telephone: (575) 748-6940. E-mail: rfrench@concho.com

Surface Use Plan
COG Operating LLC
Roadrunner Federal Com 23H
SHL: 210' FSL & 2055' FWL UL N
Section 25, T25S, R26E
BHL: 200' FNL & 1850' FWL UL C
Section 24, T25S, R26E
Eddy County, New Mexico

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently 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 COG Operating LLC, 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. Executed this 5th day of December, 2017.

Signed: 

Printed Name: Mayte Reyes

Position: Regulatory Analyst

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6945

E-mail: mreyes1@concho.com

Field Representative (if not above signatory): Rand French

Telephone: (575) 748-6940. E-mail: rfrench@concho.com



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

PWD Data Report

03/27/2018

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:



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

Bond Info Data Report

03/27/2018

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: