Form 3160-3
(March 2012)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM112907

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No. 316975
ROADRUNNER FEDERAL COM 3H

2. Name of Operator
COG OPERATING LLC 229137

9. API Well No.
30-015-44862

3a. Address
600 West Illinois Ave Midland TX 79701

3b. Phone No. *(include area code)*
(432)683-7443

10. Field and Pool, or Exploratory
~~WILDCAT~~ / BONE SPRING Cottonwood Draw 97494

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface SESW / 210 FSL / 1995 FWL / LAT 32.094125 / LONG -104.248568
At proposed prod. zone NENW / 200 FNL / 1850 FWL / LAT 32.122122 / LONG -104.248971

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 25 / T25S / R26E / NMP

14. Distance in miles and direction from nearest town or post office*
10 miles

12. County or Parish
EDDY

13. State
NM

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, applied for, on this lease, ft.
512 feet

19. Proposed Depth
7370 feet / 17510 feet

20. BLM/BIA Bond No. on file
FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3241 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.
2. A Drilling Plan.
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).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6945	12/20/2017

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	03/22/2018

Title	Office
Supervisor Multiple Resources	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

NM OIL CONSERVATION
ARTESIA DISTRICT
APR 05 2018

RECEIVED

RLP 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.

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Approval Date: 03/22/2018

Additional Operator Remarks

Location of Well

1. SHL: SESW / 210 FSL / 1995 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.094125 / LONG: -104.248568 (TVD: 0 **feet,** MD: 0 **feet**)
   PPP: NESW / 2640 FSL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 24 / LAT: 32.115397 / LONG: -104.2**48986 (** TVD: 7363 fe**et,** MD: 14900 feet)
   PPP: NENW / 1320 FNL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.10448 / LONG: -104.249**009** (TV**D: 7367 fe**et, MD: 11000 feet)
   PPP: SESW / 330 FSL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.094456 / LONG: **-10**4.24903 (**TVD**: 1000 feet, MD: 1000 feet)
   BHL: NENW / 200 FNL / 1850 FWL / TWSP: 25S / RANGE: 26E / SECTION: 24 / LAT: 32.122122 / **LONG**: -**104.2**48971 (**T**VD: 7370 feet, MD: 17510 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	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	○ Medium	◉ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	
Other	☐4 String Area	☐Capitan Reef	☐WIPP

A. Hydrogen Sulfide

1. Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

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

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, situating values 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 values, 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.

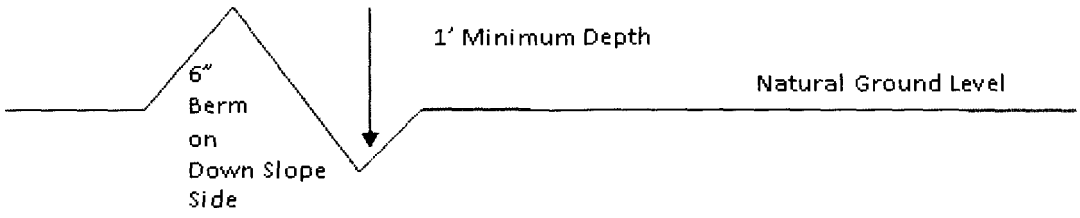
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

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 foot road with 4% road slope: $\frac{400'}{4\%} + 100' = 200'$ 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

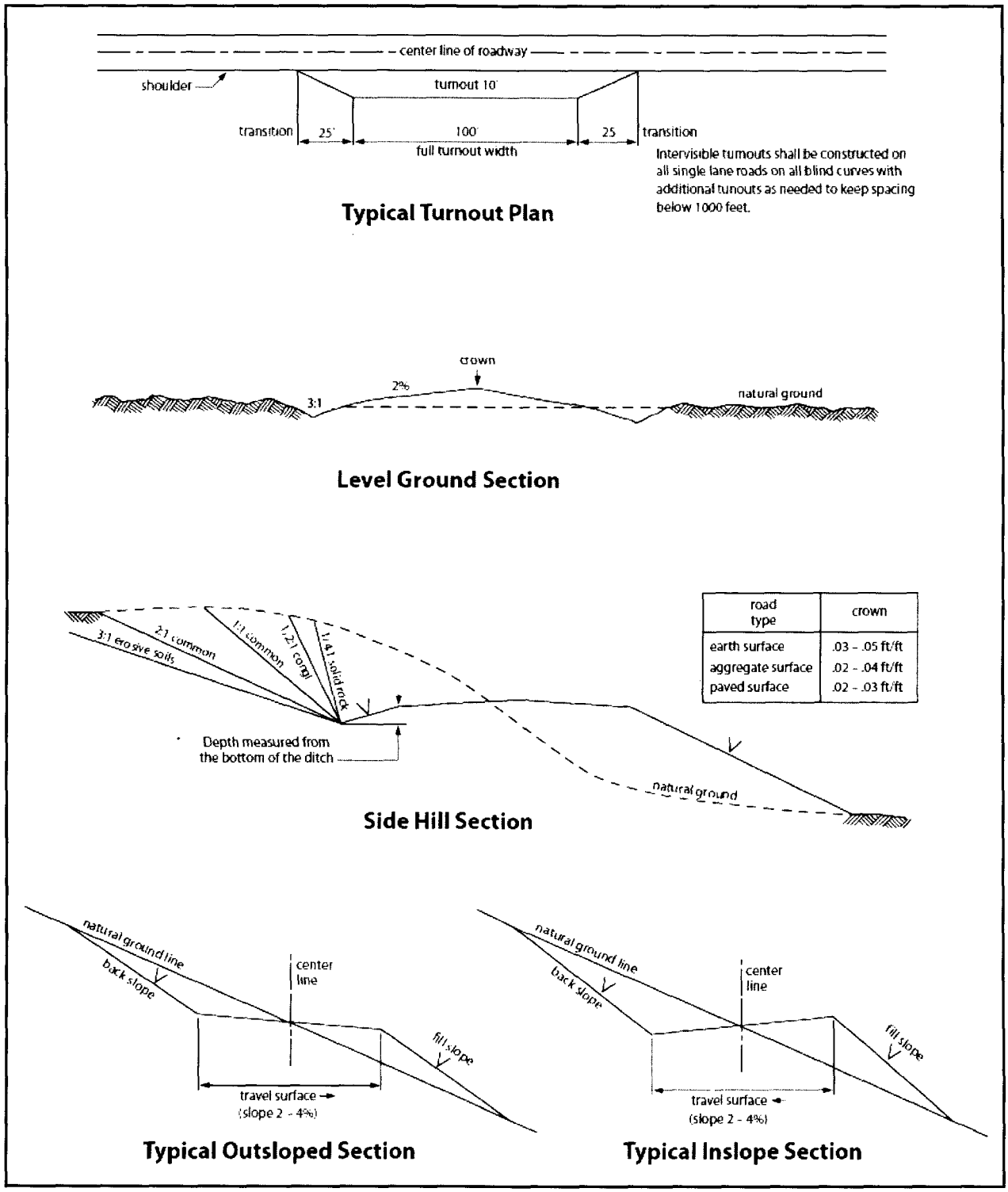


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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 of duney 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:

Species	lb/acre
Plains lovegrass (Eragrostis intermedia)	0.5
Sand dropseed (Sporobolus cryptandrus)	1.0
Sideoats grama (Bouteloua curtipendula)	5.0
Plains bristlegrass (Setaria macrostachya)	2.0

*Pounds of pure live seed:

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

AFMSS

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

...ator 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:** 12/12/2017

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

AFMSS

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

Application Data Report
03/27/2018

APD ID: 10400025454
Submission Date: 12/20/2017
Operator Name: COG OPERATING LLC
Well Name: ROADRUNNER FEDERAL COM
Well Number: 3H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes
Show Final Text

Section 1 - General

APD ID: 10400025454
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: 3H
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:** 3H

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:** 512 FT **Distance to lease line:** 200 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: COG_Roadrunner_3H_C102_20171212105526.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	1995	FWL	25S	26E	25	Aliquot SESW	32.094125	-104.248568	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	3241	0	0
KOP Leg #1	210	FSL	1995	FWL	25S	26E	25	Aliquot SESW	32.094125	-104.248568	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	3241	0	0
PPP Leg #1	330	FSL	1850	FWL	25S	26E	25	Aliquot SESW	32.094456	-104.249003	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	2241	10000	10000

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

	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	1320	FNL	1850	FWL	25S	26E	25	Aliquot NENW	32.10448	-104.249009	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 112907	-4126	11000	7367
PPP Leg #1	2640	FSL	1850	FWL	25S	26E	24	Aliquot NESW	32.115397	-104.248986	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 096835	-4122	14900	7363
EXIT Leg #1	330	FNL	1850	FWL	25S	26E	24	Aliquot NENW	32.121765	-104.248972	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 026105	-4119	17200	7360
BHL Leg #1	200	FNL	1850	FWL	25S	26E	24	Aliquot NENW	32.122122	-104.248971	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 026105	-4129	17510	7370

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

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_3H_2M_Choke_20171219102027.pdf

BOP Diagram Attachment:

COG_Roadrunner_3H_2M_BOP_20171219102037.pdf

COG_Roadrunner_3H_FlexHose_20171219102045.pdf

Pressure Rating (PSI): 3M **Rating Depth:** 7370

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_3H_3M_Choke_20171219102107.pdf

BOP Diagram Attachment:

COG_Roadrunner_3H_3M_BOP_20171219102113.pdf

COG_Roadrunner_3H_FlexHose_20171219102120.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

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	1.38	DRY	6.81	DRY	6.81
3	PRODUCTION	8.75	5.5	NEW	API	N	0	17510	0	17510	-6999	-24211	17510	P-110	17	LTC	2.08	3.71	DRY	3.55	DRY	3.55

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_3H_CasingRpt_20171219102228.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_3H_CasingRpt_20171219102242.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Roadrunner_3H_CasingRpt_20171219102429.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% CaCl2
SURFACE	Tail		0	200	250	1.34	14.8	335	50	Class C	2% CaCl2
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	17510	760	2.5	11.9	1900	25	50:50:10 H Blend	As needed

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	17510	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	17510	OTHER : Cut Brine	8.6	9.4							Cut Brine

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

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: 3605 **Anticipated Surface Pressure:** 1983.6

Anticipated Bottom Hole Temperature(F): 135

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Roadrunner_3H_H2S_SUP_20171219103034.pdf

COG_Roadrunner_3H_H2SSchem_20171219103043.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Roadrunner_3H_AC_Rpt_20171219103109.PDF

COG_Roadrunner_3H_DirectRpt_20171219103116.pdf

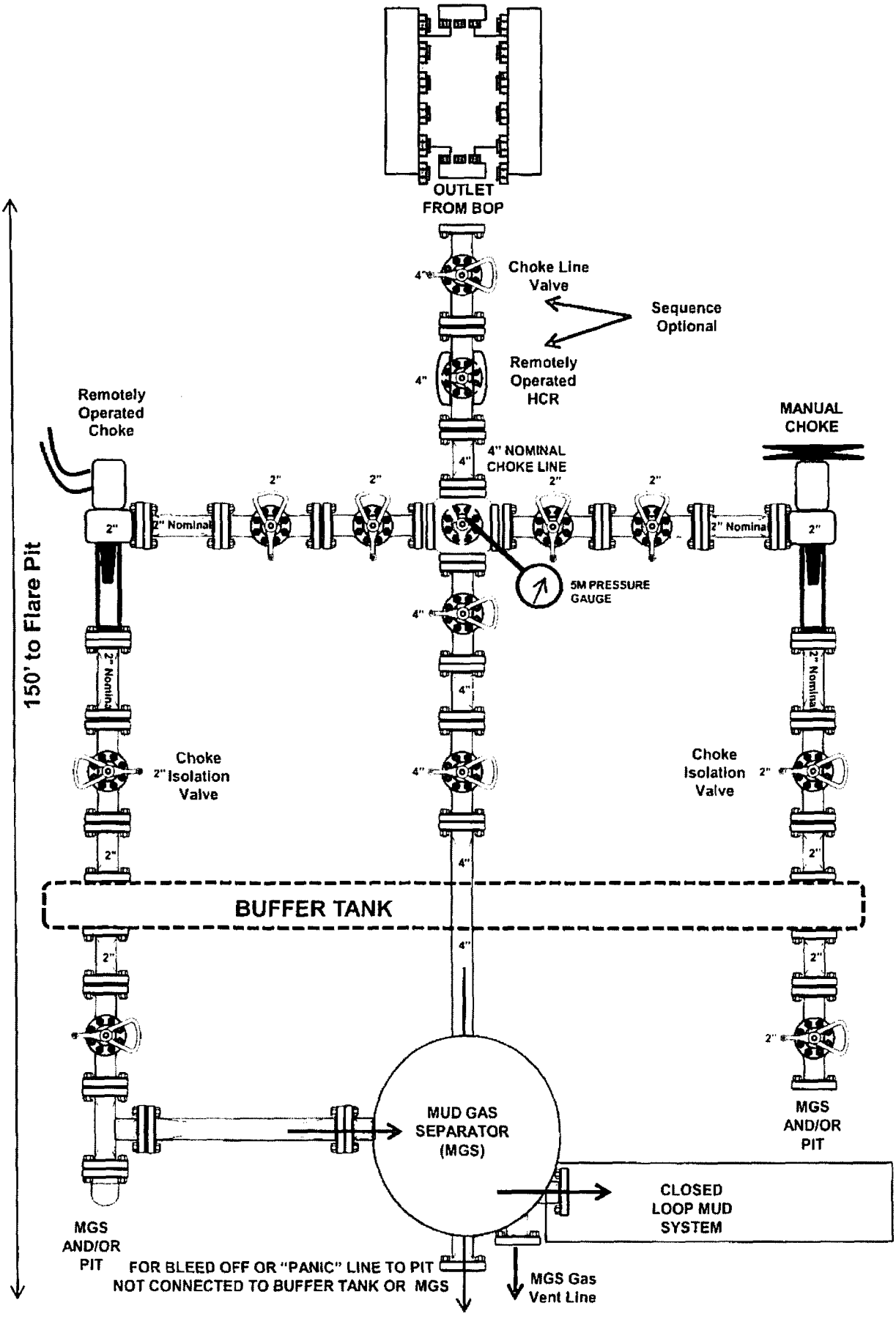
Other proposed operations facets description:

Other proposed operations facets attachment:

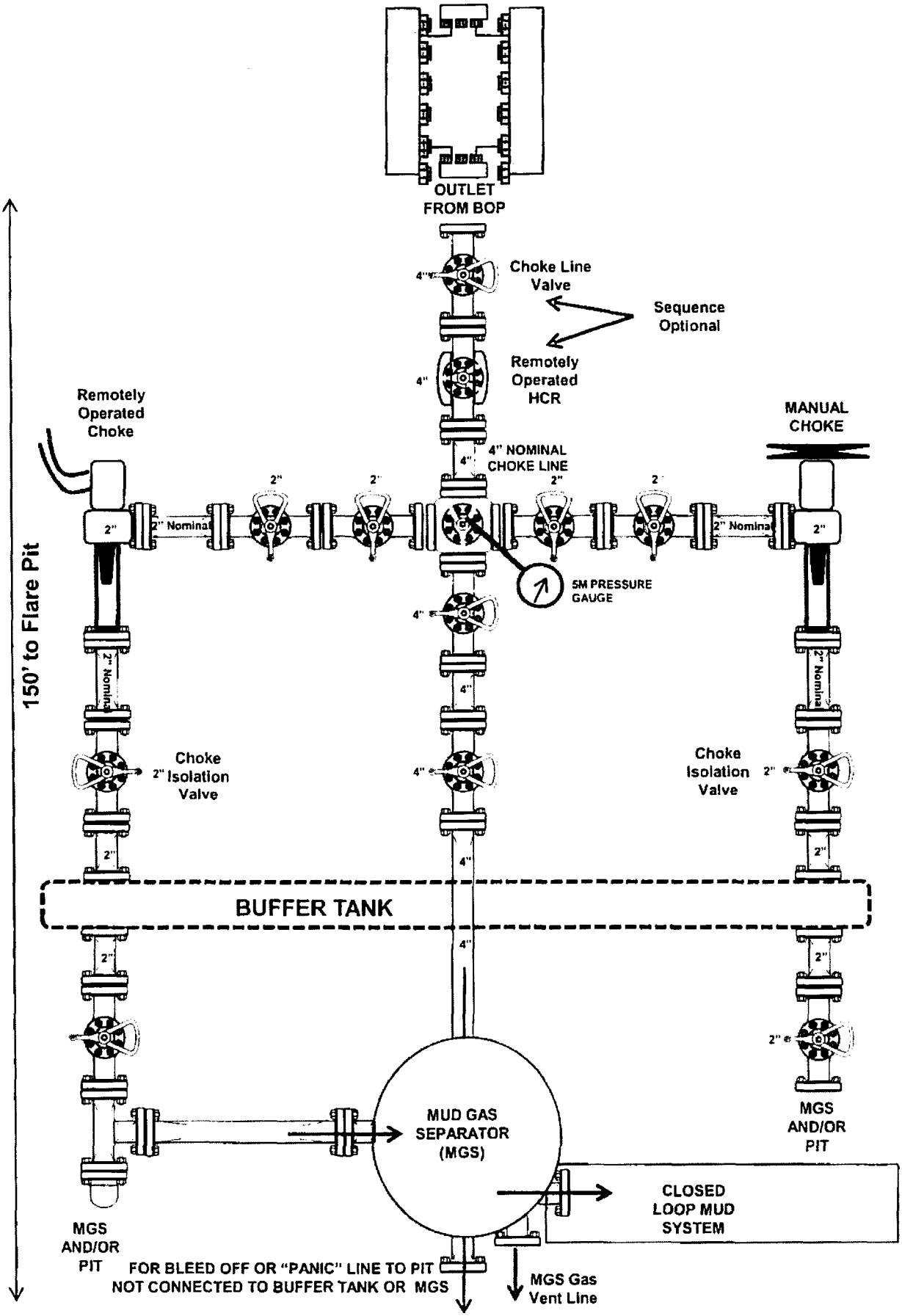
COG_Roadrunner_3H_DrillRpt_20171219103103.pdf

Other Variance attachment:

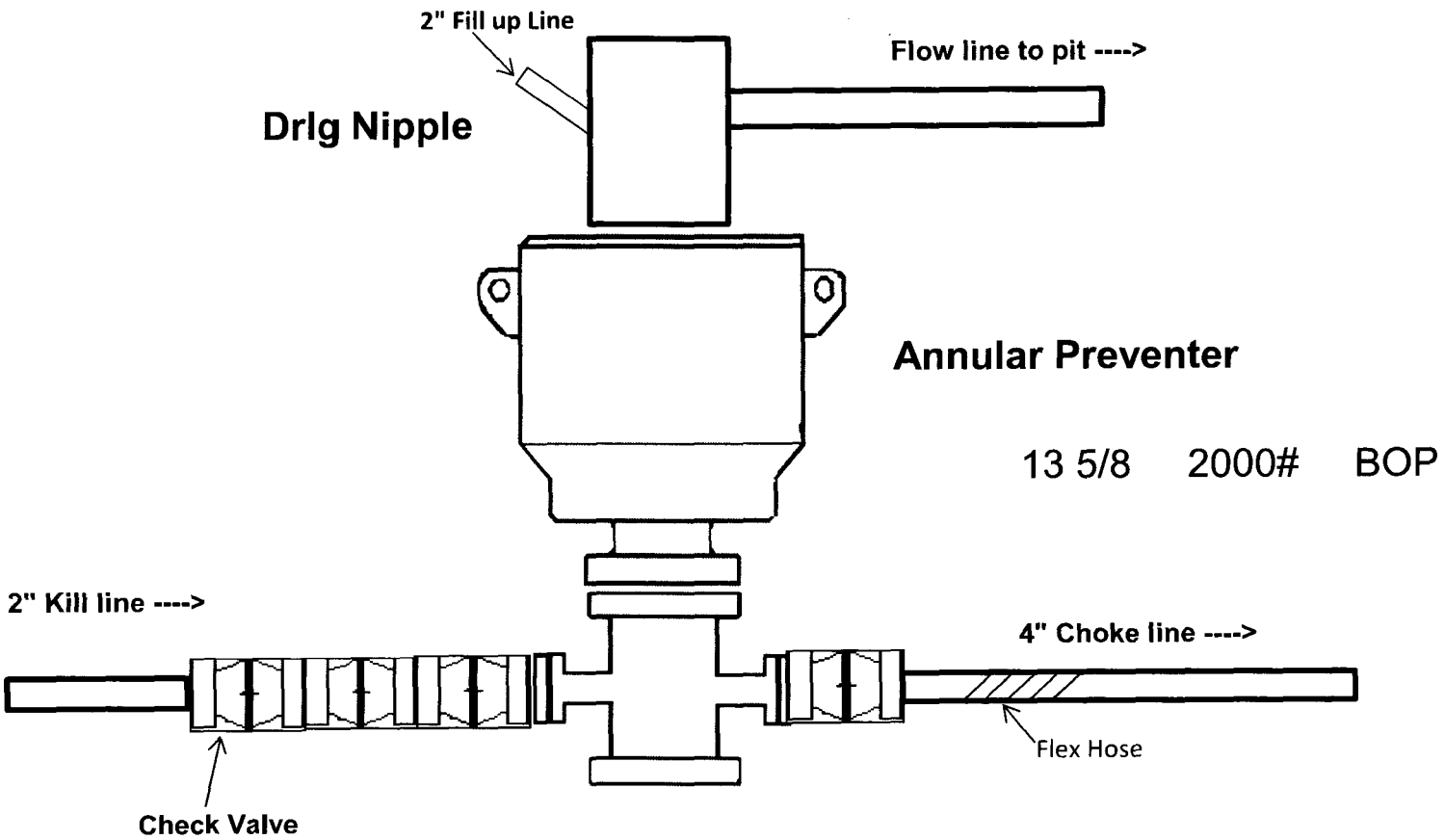
2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



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

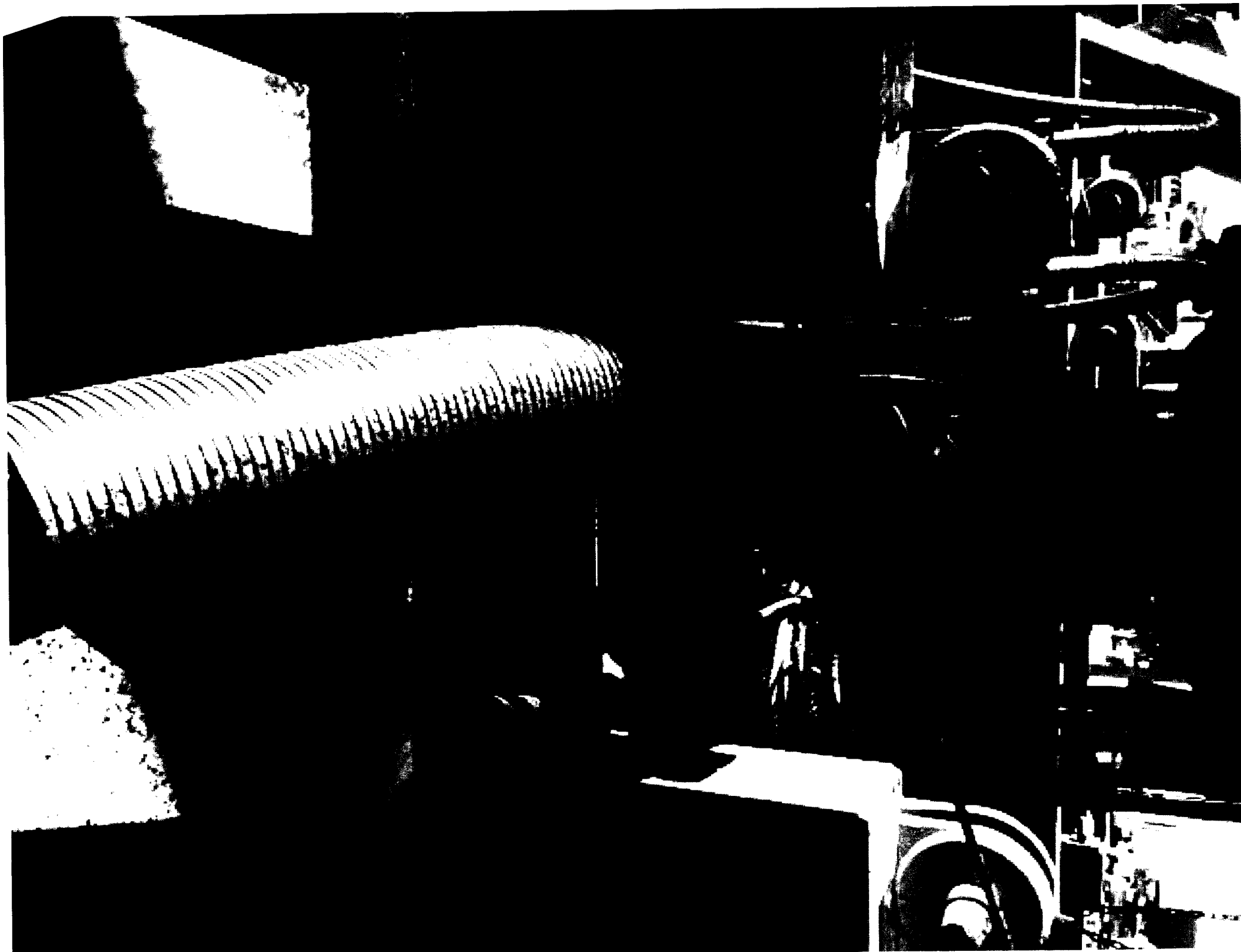
Hose Assembly Type:	Choke & Kill		
Assembly Serial #	**292614-2**	*Hose Lot # and Date Code*	**11794-10/14**
Hose Working Pressure (psi)	**10000**	*Test Pressure (psi)*	**15000**

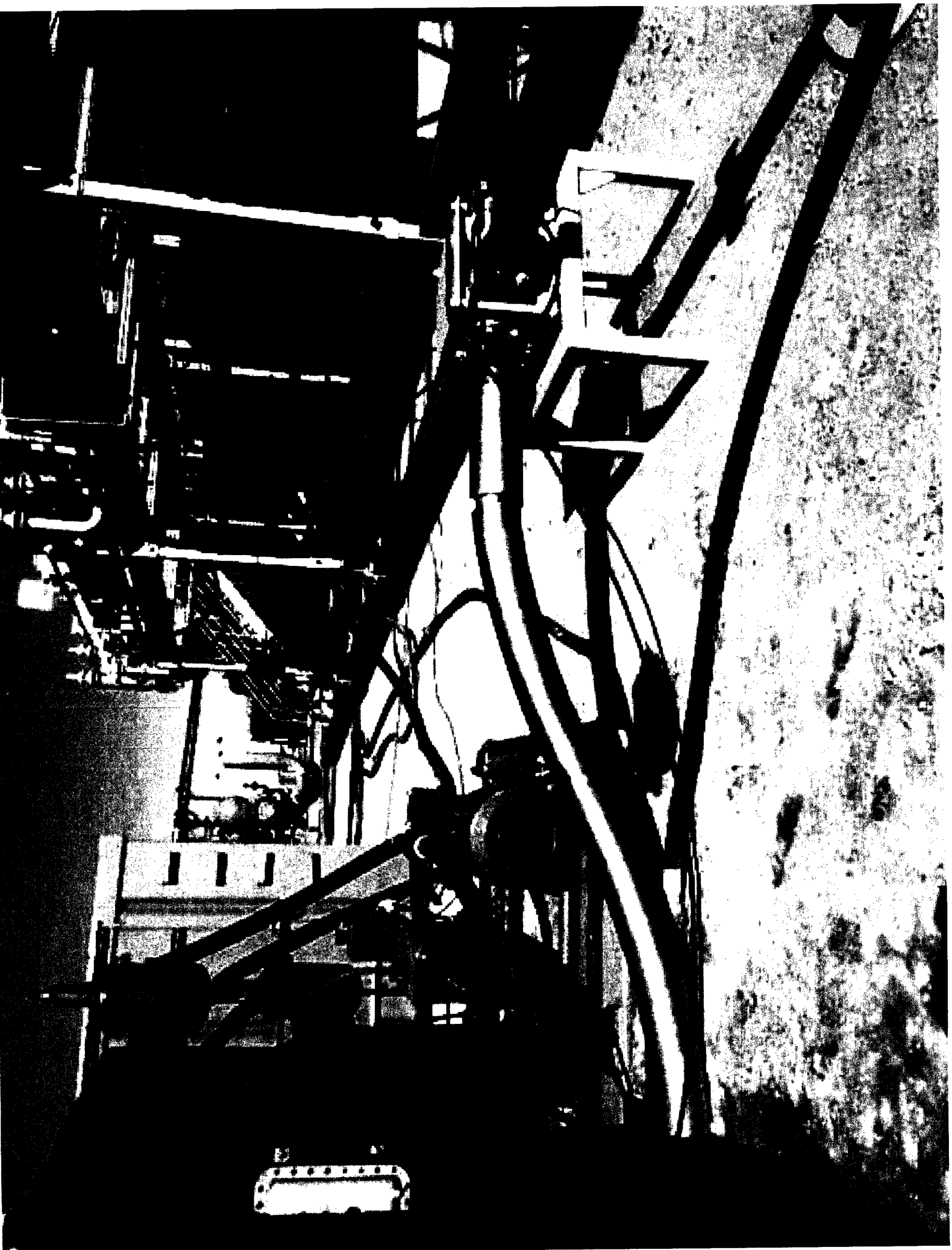
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

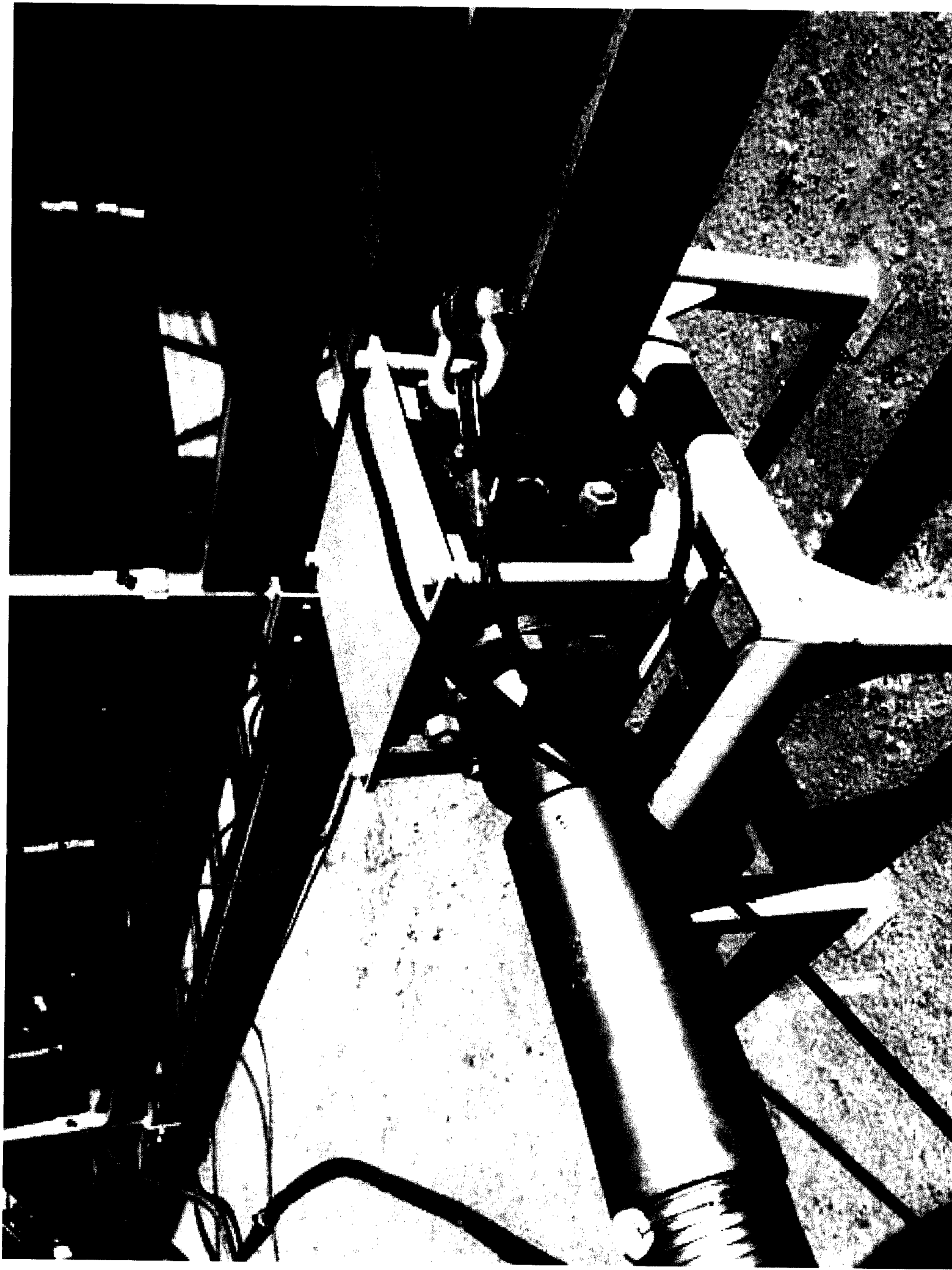
Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

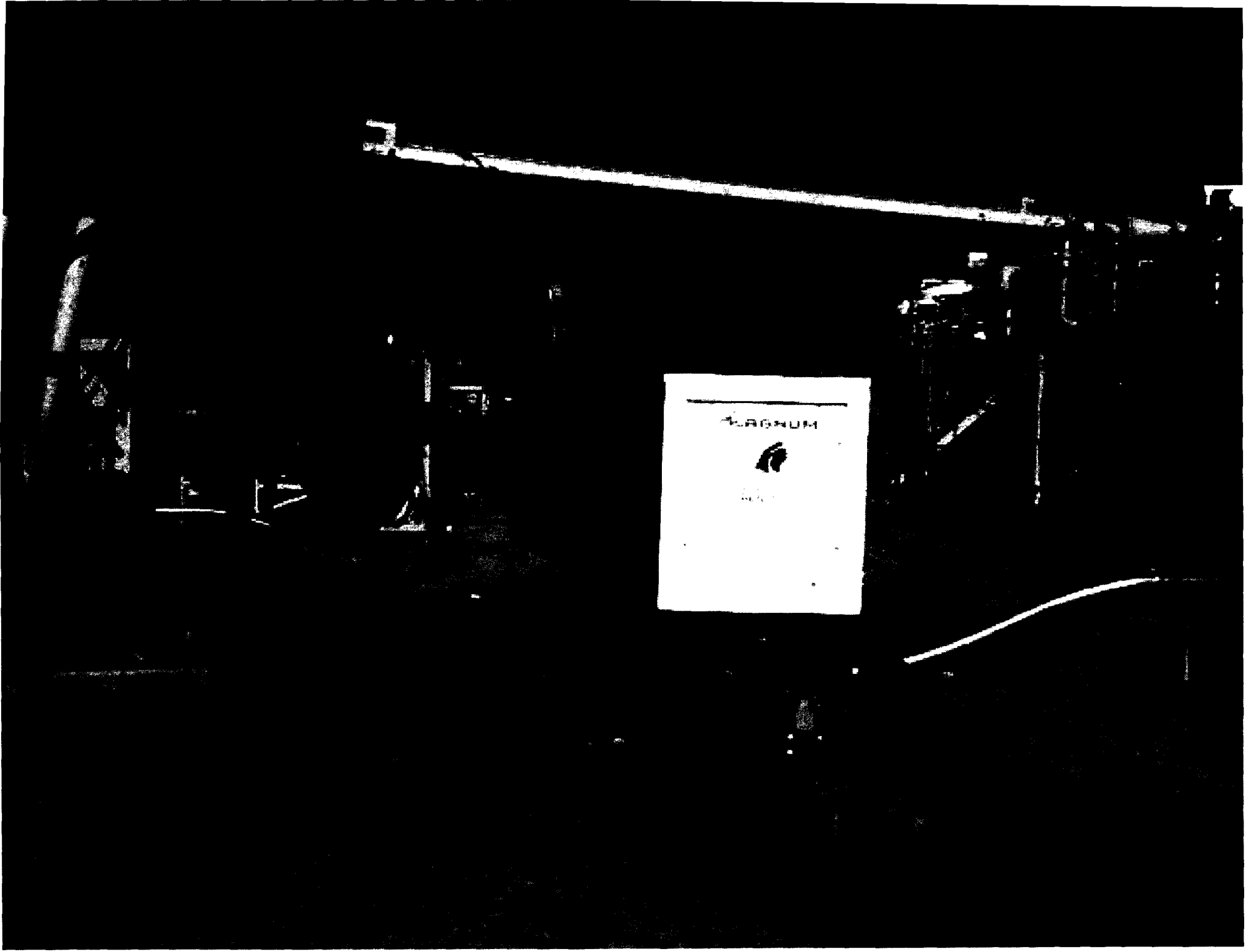
Comments:

Approved By	*Date*
	2/10/2015

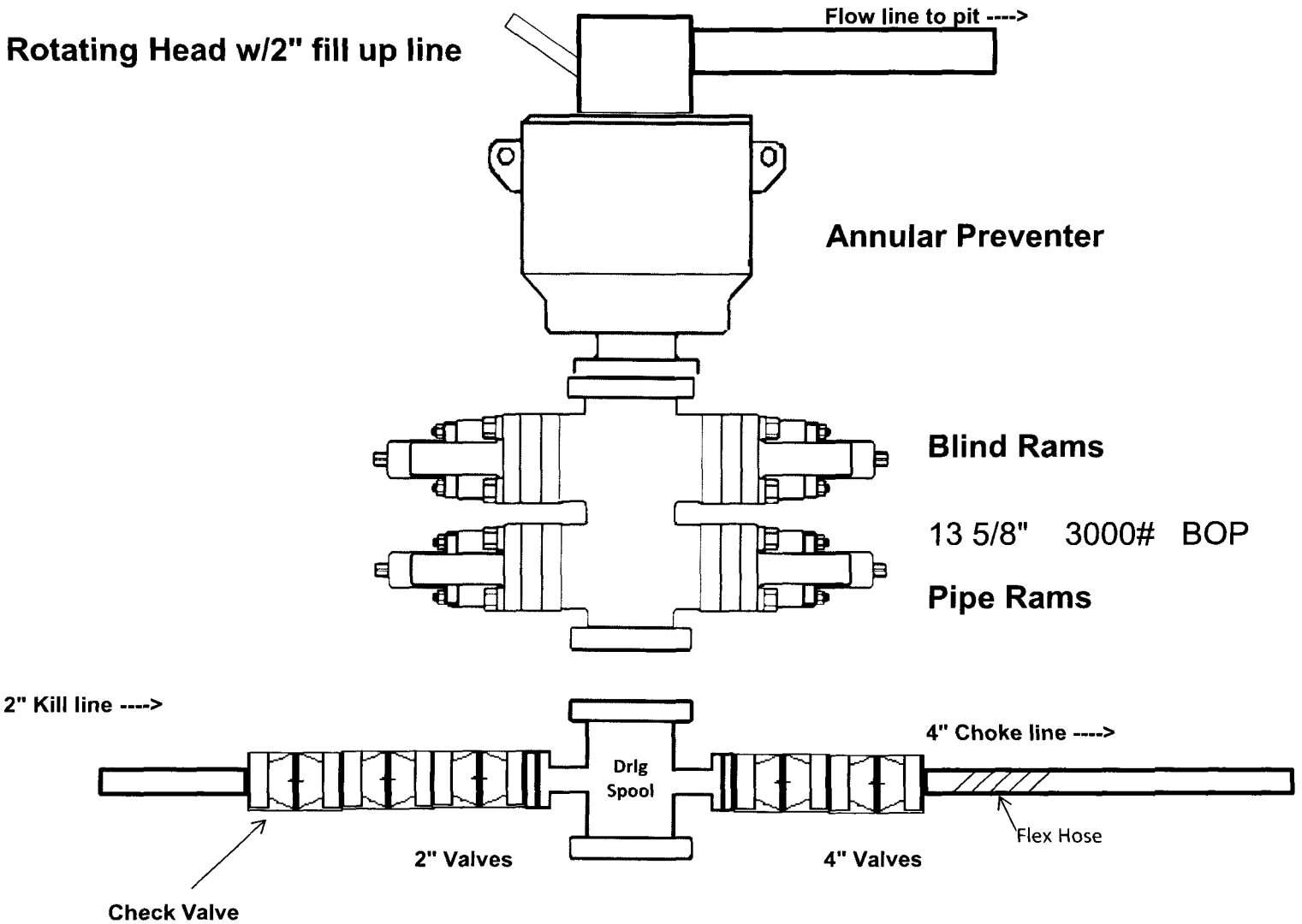







MAGNUM

3,000 psi BOP Schematic



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

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Sales Order # **242739**	*Date Assembled:* **2/9/2015**

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Hose Working Pressure (psi)	**10000**	*Test Pressure (psi)*	**15000**

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Comments:

Approved By	*Date*
	2/10/2015

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Certificate of Conformity

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Specifications

Hose Assembly Type:	**Choke & Kill**		
Assembly Serial #	**292614-2**	*Hose Lot # and Date Code*	**11794-10/14**
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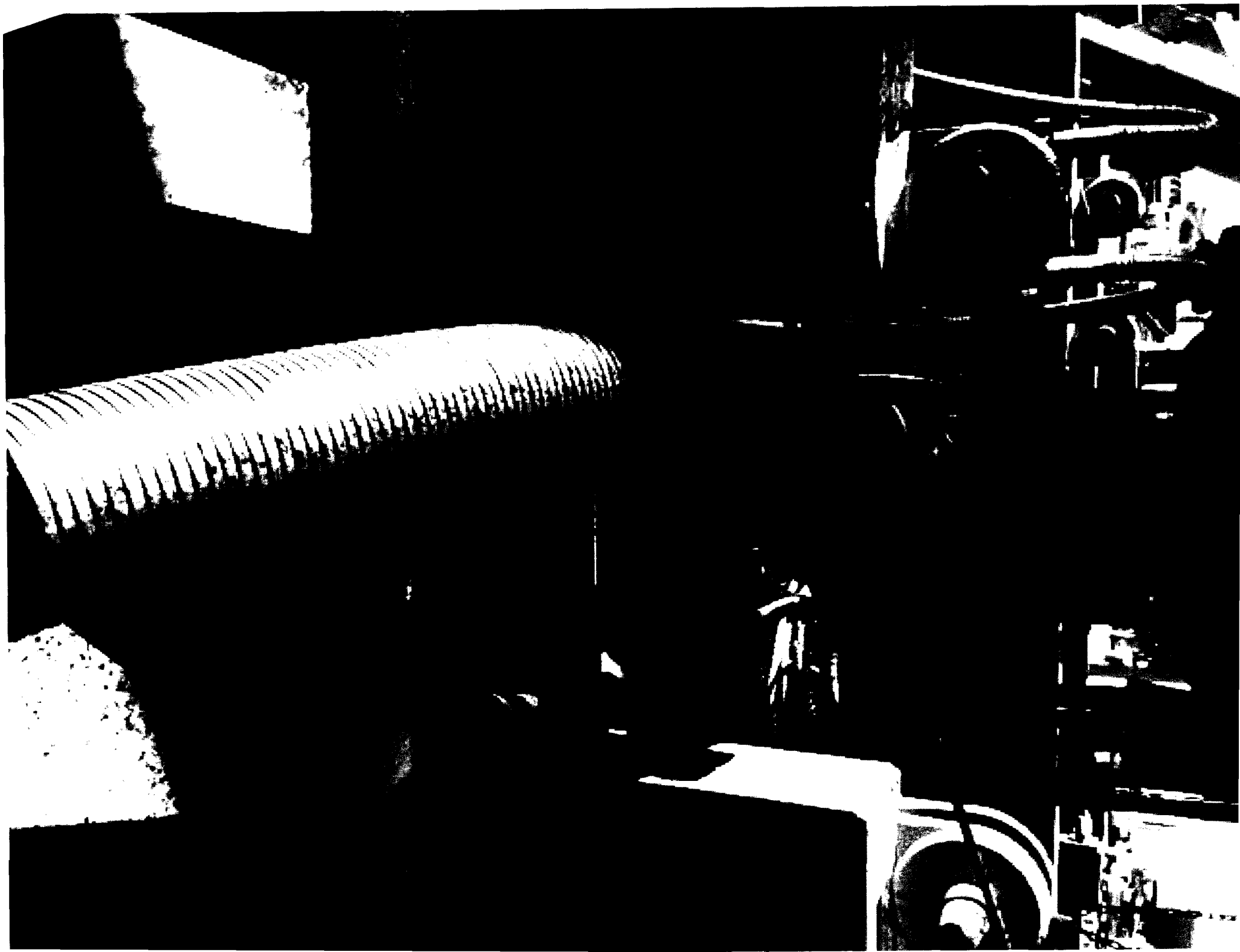
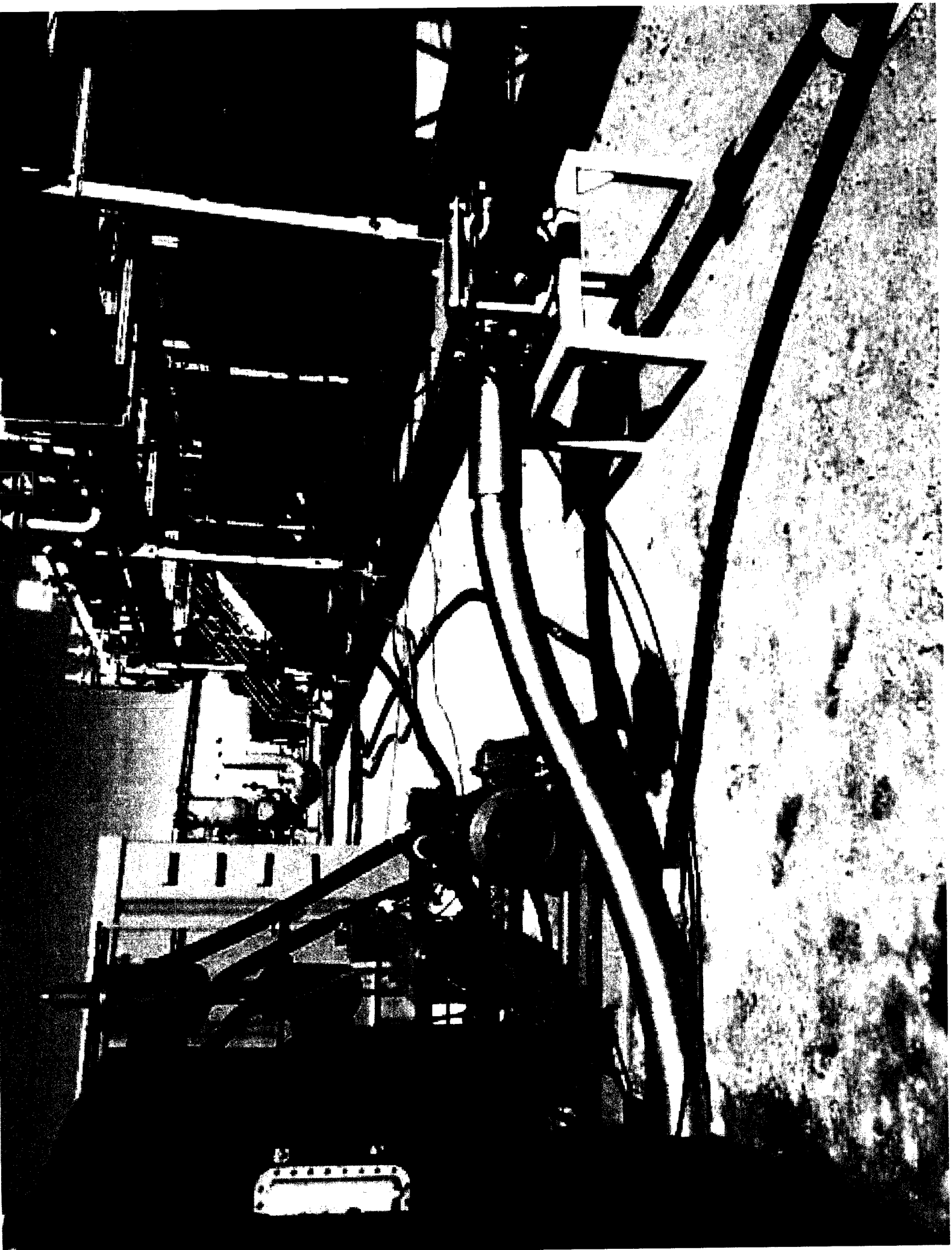
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

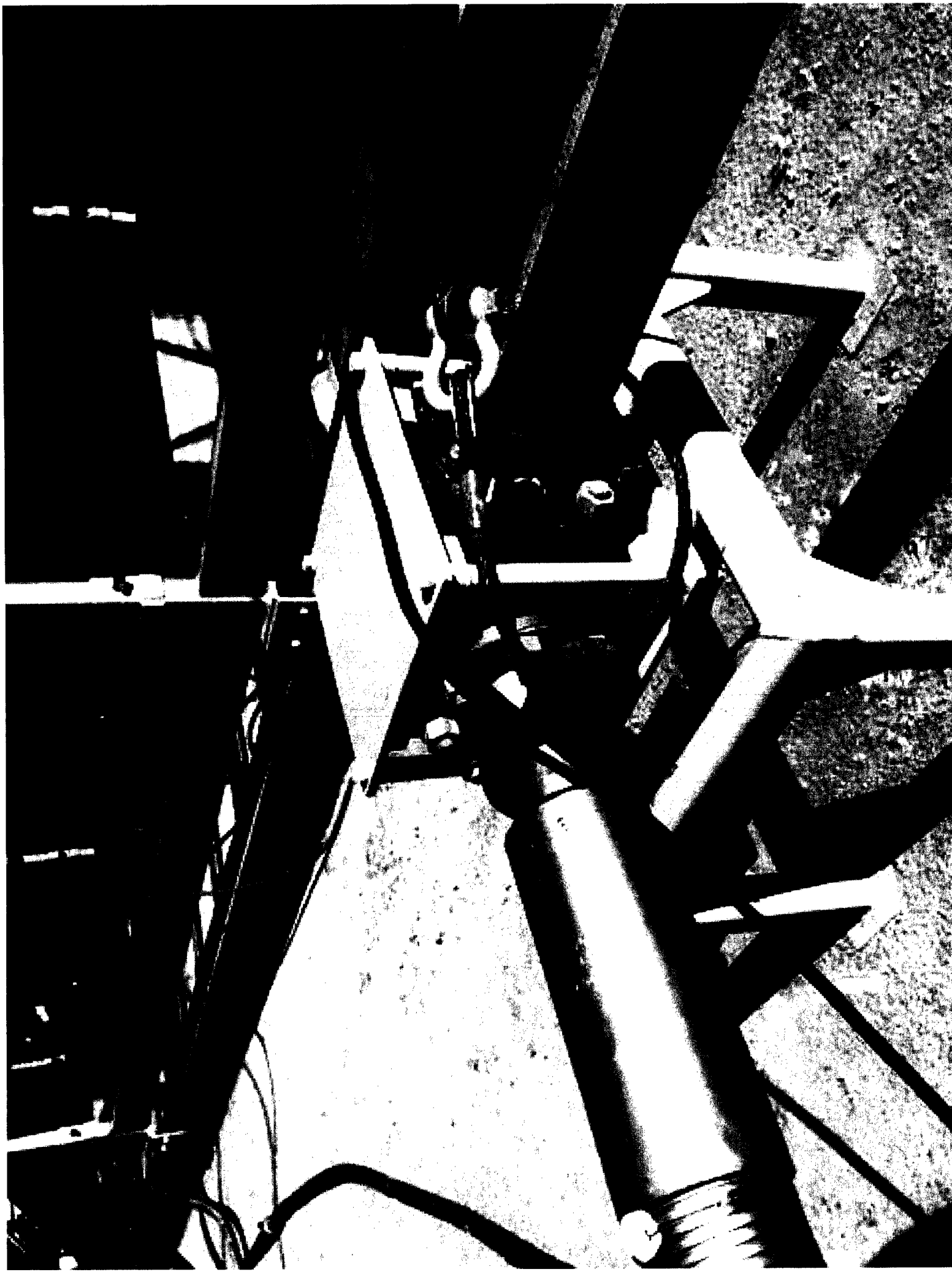
Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

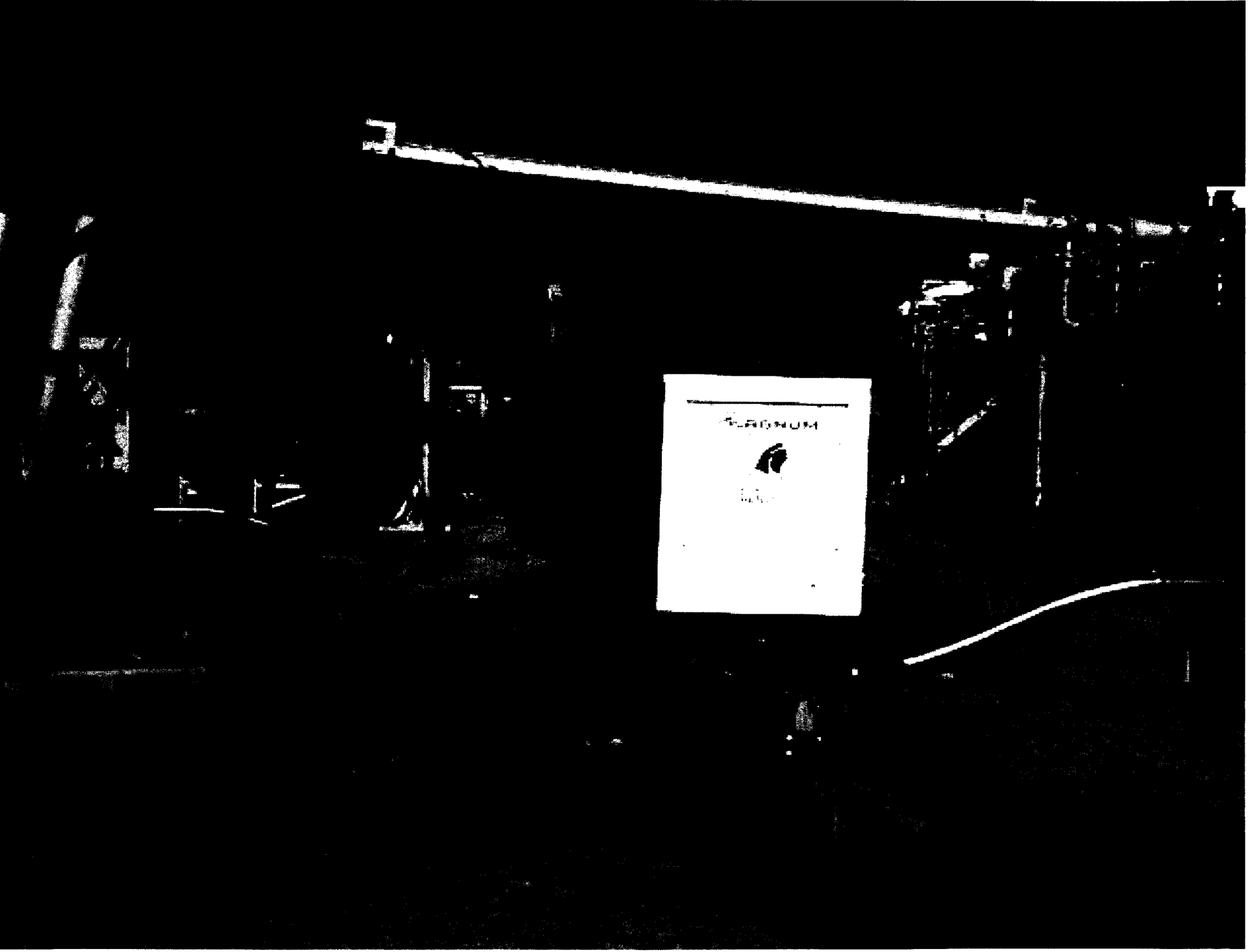
Comments:

Approved By	*Date*
	2/10/2015








FORUM

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 From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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 From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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	1.38	6.81
8.75"	0	17,510	5.5"	17	P110	LTC	2.08	3.71	3.55
			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 From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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	1.38	6.81
8.75"	0	17,510	5.5"	17	P110	LTC	2.08	3.71	3.55
			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 From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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	1.38	6.81
8.75"	0	17,510	5.5"	17	P110	LTC	2.08	3.71	3.55
			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
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

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

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

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

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

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

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

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

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

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

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

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

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

g. Communication:
Company vehicles equipped with cellular telephone.

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

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

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

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

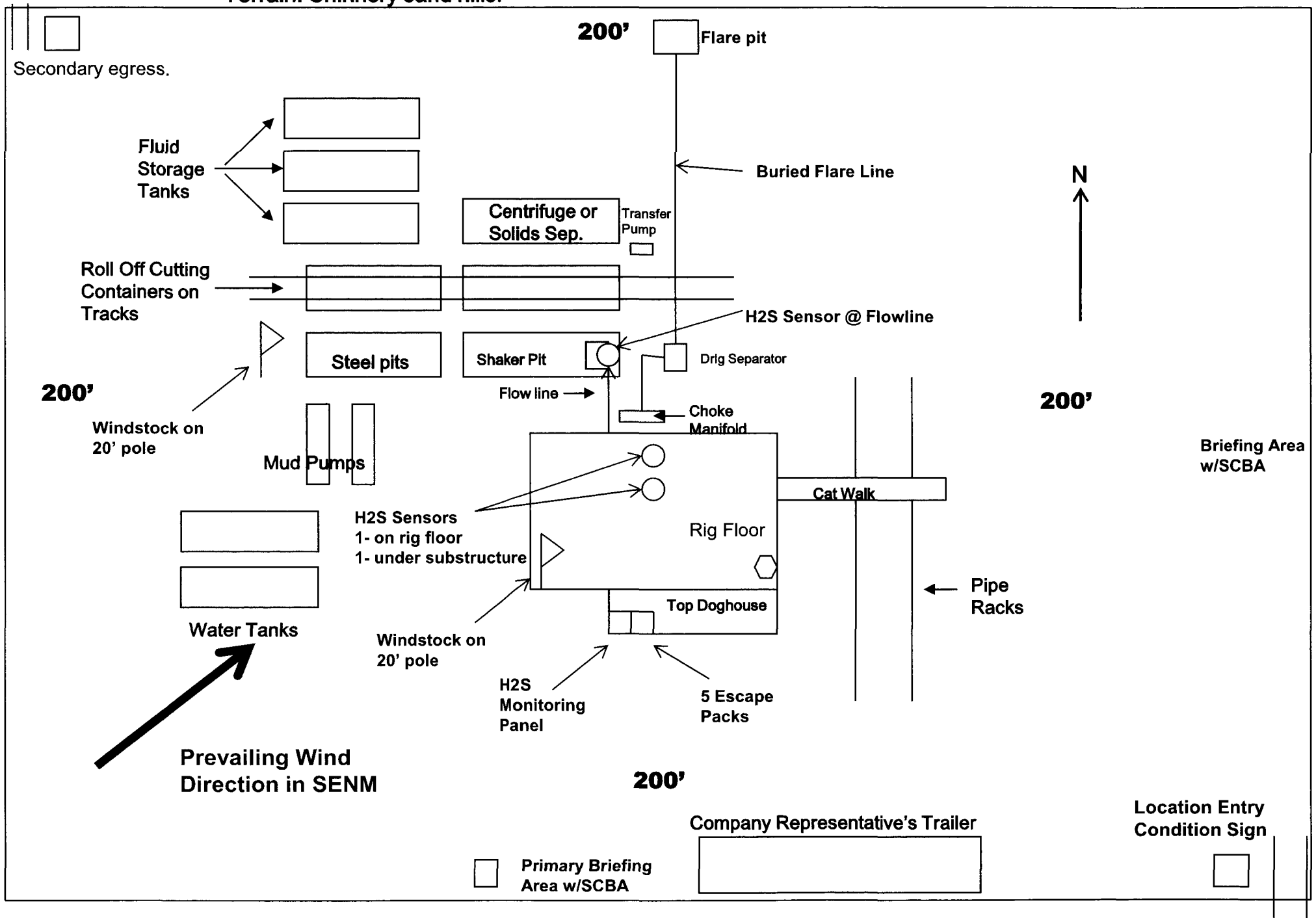
	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

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

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

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



COG OPERATING, LLC

Eddy County, NM (NAD27) NMZ
Roadrunner Fed COM
#3H

OH
Plan #1

Anticollision Report

13 December, 2017

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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	17,509.98	Plan #1 (OH)	MWD	MWD v3:standard declination

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Roadrunner Fed COM						
#13H - OH - Plan #1	1,306.28	1,307.57	29.97	24.59	5.570	CC
#13H - OH - Plan #1	6,950.00	6,948.46	30.19	0.34	1.011	Level 2, ES, SF
#23H - OH - Plan #1	1,000.00	1,000.50	60.00	55.78	14.233	CC
#23H - OH - Plan #1	6,950.00	6,948.69	64.61	34.80	2.167	ES
#23H - OH - Plan #1	6,975.00	6,973.47	64.86	34.91	2.166	SF

Offset Design Roadrunner Fed COM - #13H - OH - Plan #1 **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.20	0.20	0.00	0.00	90.00	0.00	30.00	30.00				
100.00	100.00	100.20	100.20	0.08	0.08	90.00	0.00	30.00	30.00	29.83	.169	177.489	
200.00	200.00	200.20	200.20	0.31	0.31	90.00	0.00	30.00	30.00	29.38	.619	48.500	
300.00	300.00	300.20	300.20	0.53	0.53	90.00	0.00	30.00	30.00	28.93	1.068	28.088	
400.00	400.00	400.20	400.20	0.76	0.76	90.00	0.00	30.00	30.00	28.48	1.518	19.768	
500.00	500.00	500.20	500.20	0.98	0.98	90.00	0.00	30.00	30.00	28.03	1.967	15.250	
600.00	600.00	600.20	600.20	1.21	1.21	90.00	0.00	30.00	30.00	27.58	2.417	12.414	
700.00	700.00	700.20	700.20	1.43	1.43	90.00	0.00	30.00	30.00	27.13	2.866	10.467	
800.00	800.00	800.20	800.20	1.66	1.66	90.00	0.00	30.00	30.00	26.68	3.316	9.048	
900.00	900.00	900.20	900.20	1.88	1.88	90.00	0.00	30.00	30.00	26.23	3.765	7.968	
1,000.00	1,000.00	1,000.20	1,000.20	2.11	2.11	90.00	0.00	30.00	30.00	25.79	4.215	7.118	
1,100.00	1,099.99	1,100.56	1,100.55	2.31	2.31	-132.99	-0.65	29.40	30.00	25.38	4.615	6.499	
1,200.00	1,199.96	1,200.92	1,200.88	2.49	2.49	-132.97	-2.58	27.60	29.99	25.01	4.979	6.023	
1,300.00	1,299.86	1,301.28	1,301.14	2.68	2.68	-132.95	-5.79	24.60	29.97	24.62	5.357	5.595	
1,306.28	1,306.13	1,307.57	1,307.43	2.69	2.70	-132.94	-6.04	24.37	29.97	24.59	5.381	5.570	CC
1,400.00	1,399.68	1,401.27	1,400.99	2.88	2.88	-134.14	-9.62	21.03	30.57	24.82	5.750	5.317	
1,500.00	1,499.43	1,501.25	1,500.84	3.09	3.09	-136.39	-13.45	17.46	31.82	25.66	6.156	5.169	
1,600.00	1,599.19	1,601.24	1,600.69	3.31	3.30	-138.48	-17.27	13.89	33.10	26.53	6.570	5.038	
1,700.00	1,698.94	1,701.22	1,700.53	3.53	3.52	-140.40	-21.10	10.32	34.43	27.44	6.991	4.925	
1,800.00	1,798.70	1,801.20	1,800.38	3.76	3.74	-142.19	-24.93	6.76	35.79	28.37	7.417	4.825	
1,900.00	1,898.46	1,901.19	1,900.23	3.99	3.96	-143.83	-28.75	3.19	37.18	29.34	7.848	4.738	
2,000.00	1,998.21	2,001.17	2,000.08	4.23	4.19	-145.36	-32.58	-0.38	38.61	30.32	8.281	4.662	

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

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

Offset Design Roadrunner Fed COM - #13H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,100.00	2,097.97	2,101.16	2,099.92	4.47	4.41	-146.78	-36.41	-3.95	40.05	31.34	8.718	4.594	
2,200.00	2,197.73	2,201.14	2,199.77	4.71	4.64	-148.10	-40.23	-7.52	41.53	32.37	9.157	4.535	
2,300.00	2,297.48	2,301.13	2,299.62	4.95	4.87	-149.33	-44.06	-11.09	43.02	33.42	9.597	4.482	
2,400.00	2,397.24	2,401.11	2,399.47	5.19	5.11	-150.48	-47.89	-14.66	44.53	34.49	10.039	4.435	
2,500.00	2,497.00	2,501.10	2,499.31	5.44	5.34	-151.55	-51.72	-18.23	46.05	35.57	10.483	4.393	
2,600.00	2,596.75	2,601.08	2,599.16	5.69	5.57	-152.55	-55.54	-21.79	47.60	36.67	10.927	4.356	
2,700.00	2,696.51	2,701.07	2,699.01	5.93	5.81	-153.48	-59.37	-25.36	49.15	37.78	11.372	4.322	
2,800.00	2,796.26	2,801.05	2,798.86	6.18	6.05	-154.36	-63.20	-28.93	50.72	38.90	11.818	4.292	
2,900.00	2,896.02	2,901.04	2,898.71	6.43	6.28	-155.19	-67.02	-32.50	52.30	40.03	12.265	4.264	
3,000.00	2,995.78	3,001.02	2,998.55	6.68	6.52	-155.97	-70.85	-36.07	53.89	41.17	12.712	4.239	
3,100.00	3,095.53	3,101.01	3,098.40	6.93	6.76	-156.70	-74.68	-39.64	55.49	42.32	13.160	4.216	
3,200.00	3,195.29	3,200.99	3,198.25	7.19	7.00	-157.40	-78.51	-43.21	57.09	43.48	13.609	4.195	
3,300.00	3,295.05	3,300.98	3,298.10	7.44	7.24	-158.05	-82.33	-46.78	58.71	44.65	14.058	4.176	
3,400.00	3,394.80	3,400.96	3,397.94	7.69	7.48	-158.67	-86.16	-50.34	60.33	45.82	14.507	4.159	
3,500.00	3,494.56	3,500.95	3,497.79	7.95	7.72	-159.26	-89.99	-53.91	61.96	47.00	14.957	4.142	
3,600.00	3,594.32	3,600.93	3,597.64	8.20	7.96	-159.81	-93.81	-57.48	63.59	48.19	15.407	4.128	
3,700.00	3,694.07	3,700.92	3,697.49	8.45	8.20	-160.34	-97.64	-61.05	65.23	49.38	15.858	4.114	
3,800.00	3,793.83	3,800.90	3,797.34	8.71	8.44	-160.85	-101.47	-64.62	66.88	50.57	16.309	4.101	
3,900.00	3,893.59	3,900.88	3,897.18	8.96	8.68	-161.33	-105.29	-68.19	68.53	51.77	16.760	4.089	
4,006.67	4,000.00	4,007.54	4,003.70	9.24	8.94	-161.81	-109.38	-72.00	70.30	53.06	17.241	4.077	
4,100.00	4,093.15	4,100.86	4,096.89	9.47	9.17	-162.03	-112.95	-75.33	71.12	53.46	17.664	4.027	
4,200.00	4,193.05	4,200.86	4,196.75	9.71	9.41	-161.84	-116.78	-78.90	70.41	52.29	18.119	3.886	
4,300.00	4,293.01	4,300.83	4,296.58	9.93	9.65	-161.18	-120.60	-82.46	68.03	49.46	18.577	3.662	
4,406.67	4,399.68	4,407.40	4,403.01	10.14	9.91	63.17	-124.68	-86.27	63.70	44.65	19.056	3.343	
4,500.00	4,493.00	4,500.60	4,496.08	10.31	10.13	64.80	-128.25	-89.59	59.14	39.67	19.468	3.038	
4,600.00	4,593.00	4,600.46	4,595.80	10.49	10.38	66.85	-132.07	-93.16	54.32	34.40	19.918	2.727	
4,700.00	4,693.00	4,700.32	4,695.53	10.67	10.62	69.30	-135.89	-96.72	49.58	29.20	20.378	2.433	
4,800.00	4,793.00	4,800.19	4,795.25	10.86	10.86	72.26	-139.72	-100.29	44.94	24.09	20.851	2.155	
4,900.00	4,893.00	4,900.05	4,894.98	11.04	11.10	75.88	-143.54	-103.85	40.46	19.11	21.341	1.896	
5,000.00	4,993.00	4,999.91	4,994.71	11.23	11.35	80.38	-147.36	-107.42	36.17	14.31	21.855	1.655	
5,100.00	5,093.00	5,099.38	5,094.07	11.42	11.58	85.10	-150.60	-110.44	32.74	10.36	22.375	1.463	Level 3
5,200.00	5,193.00	5,198.95	5,193.60	11.61	11.81	88.49	-152.59	-112.29	30.77	7.91	22.862	1.346	Level 3
5,300.00	5,293.00	5,311.88	5,293.20	11.80	12.04	89.82	-153.31	-112.96	30.09	6.78	23.308	1.291	Level 3
5,400.00	5,393.00	5,401.45	5,393.20	11.99	12.20	89.82	-153.31	-112.96	30.09	6.42	23.667	1.271	Level 3
5,500.00	5,493.00	5,501.45	5,493.20	12.18	12.38	89.82	-153.31	-112.96	30.09	6.04	24.048	1.251	Level 3
5,600.00	5,593.00	5,601.45	5,593.20	12.38	12.56	89.82	-153.31	-112.96	30.09	5.65	24.431	1.231	Level 2
5,700.00	5,693.00	5,701.45	5,693.20	12.57	12.75	89.82	-153.31	-112.96	30.09	5.27	24.817	1.212	Level 2
5,800.00	5,793.00	5,801.45	5,793.20	12.77	12.93	89.82	-153.31	-112.96	30.09	4.88	25.205	1.194	Level 2
5,900.00	5,893.00	5,901.45	5,893.20	12.97	13.12	89.82	-153.31	-112.96	30.09	4.49	25.594	1.175	Level 2
6,000.00	5,993.00	6,001.45	5,993.20	13.16	13.31	89.82	-153.31	-112.96	30.09	4.10	25.986	1.158	Level 2
6,100.00	6,093.00	6,101.45	6,093.20	13.36	13.50	89.82	-153.31	-112.96	30.09	3.71	26.379	1.141	Level 2
6,200.00	6,193.00	6,201.45	6,193.20	13.56	13.69	89.82	-153.31	-112.96	30.09	3.31	26.775	1.124	Level 2
6,300.00	6,293.00	6,301.45	6,293.20	13.76	13.88	89.82	-153.31	-112.96	30.09	2.91	27.171	1.107	Level 2
6,400.00	6,393.00	6,401.45	6,393.20	13.96	14.07	89.82	-153.31	-112.96	30.09	2.52	27.570	1.091	Level 2
6,500.00	6,493.00	6,501.45	6,493.20	14.17	14.26	89.82	-153.31	-112.96	30.09	2.12	27.970	1.076	Level 2
6,600.00	6,593.00	6,601.45	6,593.20	14.37	14.46	89.82	-153.31	-112.96	30.09	1.71	28.371	1.060	Level 2
6,700.00	6,693.00	6,701.45	6,693.20	14.57	14.65	89.82	-153.31	-112.96	30.09	1.31	28.774	1.046	Level 2
6,800.00	6,793.00	6,801.45	6,793.20	14.78	14.85	89.82	-153.31	-112.96	30.09	0.91	29.179	1.031	Level 2
6,899.54	6,892.54	6,901.91	6,892.74	14.98	15.05	89.82	-153.31	-112.96	30.09	0.50	29.584	1.017	Level 2
6,910.36	6,903.36	6,908.91	6,903.56	15.00	15.06	90.00	-153.31	-112.96	30.09	0.46	29.624	1.016	Level 2
6,925.00	6,917.99	6,923.54	6,918.19	15.03	15.09	91.06	-153.31	-112.96	30.09	0.39	29.699	1.013	Level 2
6,950.00	6,942.91	6,948.46	6,943.11	15.08	15.14	94.80	-153.31	-112.96	30.19	0.34	29.853	1.011	Level 2, ES, SF

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

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

Offset Design Roadrunner Fed COM - #13H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
6,975.00	6,967.69	6,973.24	6,967.89	15.12	15.19	100.83	-153.31	-112.96	30.65	0.61	30.036	1.020	Level 2
7,000.00	6,992.26	7,002.19	6,992.46	15.16	15.24	108.69	-153.31	-112.96	31.83	1.60	30.238	1.053	Level 2
7,025.00	7,016.56	7,022.11	7,016.76	15.20	15.28	117.57	-153.31	-112.96	34.20	3.79	30.407	1.125	Level 2
7,050.00	7,040.52	7,046.07	7,040.72	15.23	15.33	126.47	-153.31	-112.96	38.11	7.56	30.545	1.248	Level 2
7,075.00	7,064.08	7,069.63	7,064.28	15.27	15.38	134.57	-153.31	-112.96	43.74	13.10	30.640	1.428	Level 3
7,100.00	7,087.16	7,107.29	7,087.36	15.30	15.45	141.45	-153.31	-112.96	51.13	20.40	30.733	1.664	
7,125.00	7,109.71	7,115.27	7,109.91	15.33	15.47	147.05	-153.31	-112.96	60.19	29.43	30.753	1.957	
7,150.00	7,131.67	7,137.22	7,131.87	15.35	15.51	151.52	-153.31	-112.96	70.79	39.99	30.797	2.299	
7,175.00	7,152.97	7,158.52	7,153.17	15.38	15.55	155.05	-153.31	-112.96	82.82	51.97	30.841	2.685	
7,200.00	7,173.56	7,179.41	7,174.05	15.41	15.60	157.88	-153.30	-112.96	96.16	65.27	30.887	3.113	
7,225.00	7,193.38	7,205.05	7,199.69	15.43	15.64	160.75	-152.54	-113.00	110.15	79.25	30.908	3.564	
7,250.00	7,212.37	7,231.78	7,226.31	15.45	15.69	163.05	-150.27	-113.13	124.23	93.35	30.888	4.022	
7,275.00	7,230.48	7,259.71	7,253.96	15.48	15.74	164.95	-146.32	-113.34	138.31	107.49	30.821	4.488	
7,300.00	7,247.67	7,289.01	7,282.65	15.50	15.79	166.57	-140.45	-113.66	152.31	121.61	30.700	4.961	
7,325.00	7,263.89	7,319.82	7,312.39	15.52	15.83	167.97	-132.40	-114.09	166.14	135.63	30.518	5.444	
7,350.00	7,279.09	7,352.35	7,343.14	15.54	15.88	169.22	-121.83	-114.67	179.73	149.46	30.269	5.938	
7,375.00	7,293.23	7,386.78	7,374.83	15.56	15.92	170.34	-108.40	-115.39	192.98	163.03	29.947	6.444	
7,400.00	7,306.27	7,423.34	7,407.32	15.59	15.96	171.38	-91.69	-116.30	205.79	176.25	29.546	6.965	
7,425.00	7,318.17	7,462.24	7,440.38	15.67	16.00	172.33	-71.23	-117.41	218.06	188.99	29.063	7.503	
7,450.00	7,328.91	7,503.71	7,473.65	15.76	16.05	173.23	-46.54	-118.74	229.64	201.14	28.500	8.058	
7,475.00	7,338.46	7,547.93	7,506.63	15.87	16.09	174.08	-17.15	-120.33	240.42	212.55	27.863	8.629	
7,500.00	7,346.78	7,595.04	7,538.61	15.99	16.13	174.90	17.37	-122.20	250.22	223.05	27.172	9.209	
7,525.00	7,353.85	7,645.10	7,568.68	16.11	16.17	175.68	57.30	-124.37	258.90	232.44	26.457	9.786	
7,550.00	7,359.67	7,698.04	7,595.74	16.25	16.29	176.43	102.70	-126.83	266.28	240.51	25.769	10.333	
7,575.00	7,364.20	7,753.62	7,618.55	16.40	16.52	177.17	153.28	-129.56	272.19	247.02	25.173	10.813	
7,600.00	7,367.44	7,811.40	7,635.87	16.55	16.81	177.88	208.29	-132.54	276.49	251.75	24.743	11.174	
7,625.00	7,369.37	7,870.78	7,646.59	16.72	17.16	178.58	266.57	-135.70	279.06	254.51	24.548	11.368	
7,650.02	7,370.00	7,929.48	7,650.00	16.89	17.56	179.24	325.04	-138.87	279.82	255.20	24.626	11.363	
7,700.00	7,369.95	7,979.35	7,649.95	17.27	17.95	179.71	374.87	-141.11	279.80	255.00	24.798	11.283	
7,757.64	7,369.90	8,036.96	7,649.89	17.77	18.44	-179.97	432.45	-142.62	279.80	254.77	25.030	11.178	
7,800.00	7,369.85	8,079.32	7,649.85	18.14	18.82	-179.88	474.81	-143.00	279.80	254.59	25.209	11.099	
7,900.00	7,369.75	8,179.32	7,649.75	19.15	19.82	-179.88	574.81	-142.90	279.80	254.09	25.708	10.884	
8,000.00	7,369.65	8,279.32	7,649.65	20.28	20.92	-179.88	674.81	-142.79	279.80	253.52	26.278	10.648	
8,100.00	7,369.55	8,379.32	7,649.54	21.51	22.13	-179.88	774.81	-142.69	279.80	252.88	26.916	10.395	
8,200.00	7,369.45	8,479.32	7,649.44	22.82	23.42	-179.88	874.81	-142.58	279.80	252.18	27.617	10.131	
8,300.00	7,369.35	8,579.32	7,649.34	24.20	24.78	-179.88	974.81	-142.47	279.80	251.42	28.376	9.860	
8,400.00	7,369.24	8,679.32	7,649.24	25.64	26.20	-179.89	1,074.81	-142.36	279.80	250.61	29.190	9.586	
8,500.00	7,369.14	8,779.32	7,649.14	27.13	27.67	-179.89	1,174.81	-142.26	279.80	249.74	30.053	9.310	
8,600.00	7,369.04	8,879.32	7,649.04	28.67	29.18	-179.89	1,274.81	-142.15	279.80	248.84	30.961	9.037	
8,700.00	7,368.94	8,979.32	7,648.94	30.23	30.73	-179.89	1,374.81	-142.04	279.80	247.89	31.912	8.768	
8,800.00	7,368.84	9,079.32	7,648.83	31.83	32.32	-179.89	1,474.81	-141.93	279.80	246.90	32.900	8.505	
8,900.00	7,368.74	9,179.32	7,648.73	33.45	33.92	-179.89	1,574.81	-141.83	279.80	245.87	33.923	8.248	
9,000.00	7,368.63	9,279.32	7,648.63	35.10	35.56	-179.89	1,674.81	-141.72	279.80	244.82	34.977	7.999	
9,100.00	7,368.53	9,379.32	7,648.53	36.77	37.21	-179.89	1,774.81	-141.61	279.80	243.74	36.060	7.759	
9,200.00	7,368.43	9,479.32	7,648.43	38.45	38.88	-179.90	1,874.81	-141.51	279.80	242.63	37.170	7.528	
9,300.00	7,368.33	9,579.32	7,648.33	40.15	40.57	-179.90	1,974.81	-141.40	279.80	241.49	38.303	7.305	
9,400.00	7,368.23	9,679.32	7,648.23	41.86	42.27	-179.90	2,074.81	-141.29	279.80	240.34	39.459	7.091	
9,500.00	7,368.13	9,779.32	7,648.12	43.58	43.98	-179.90	2,174.81	-141.18	279.80	239.16	40.635	6.886	
9,600.00	7,368.03	9,879.32	7,648.02	45.31	45.71	-179.90	2,274.81	-141.08	279.80	237.97	41.829	6.689	
9,700.00	7,367.92	9,979.32	7,647.92	47.05	47.44	-179.90	2,374.81	-140.97	279.80	236.76	43.040	6.501	
9,800.00	7,367.82	10,079.32	7,647.82	48.80	49.18	-179.90	2,474.81	-140.86	279.80	235.53	44.266	6.321	
9,900.00	7,367.72	10,179.32	7,647.72	50.56	50.93	-179.90	2,574.81	-140.76	279.80	234.29	45.507	6.148	

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

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

Offset Design Roadrunner Fed COM - #13H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,000.00	7,367.62	10,279.32	7,647.62	52.32	52.68	-179.91	2,674.81	-140.65	279.80	233.04	46.761	5.984	
10,100.00	7,367.52	10,379.32	7,647.52	54.09	54.45	-179.91	2,774.81	-140.54	279.80	231.77	48.026	5.826	
10,200.00	7,367.42	10,479.32	7,647.41	55.86	56.22	-179.91	2,874.81	-140.43	279.80	230.49	49.303	5.675	
10,300.00	7,367.32	10,579.32	7,647.31	57.64	57.99	-179.91	2,974.81	-140.33	279.80	229.21	50.591	5.531	
10,400.00	7,367.21	10,679.32	7,647.21	59.43	59.77	-179.91	3,074.81	-140.22	279.80	227.91	51.887	5.392	
10,500.00	7,367.11	10,779.32	7,647.11	61.21	61.55	-179.91	3,174.81	-140.11	279.80	226.60	53.193	5.260	
10,600.00	7,367.01	10,879.32	7,647.01	63.00	63.33	-179.91	3,274.81	-140.01	279.80	225.29	54.507	5.133	
10,700.00	7,366.91	10,979.32	7,646.91	64.80	65.12	-179.91	3,374.81	-139.90	279.80	223.97	55.828	5.012	
10,800.00	7,366.81	11,079.32	7,646.81	66.60	66.92	-179.92	3,474.81	-139.79	279.80	222.64	57.157	4.895	
10,900.00	7,366.71	11,179.32	7,646.70	68.40	68.71	-179.92	3,574.81	-139.68	279.80	221.31	58.492	4.784	
11,000.00	7,366.61	11,279.32	7,646.60	70.20	70.51	-179.92	3,674.81	-139.58	279.80	219.96	59.833	4.676	
11,100.00	7,366.50	11,379.32	7,646.50	72.00	72.31	-179.92	3,774.81	-139.47	279.80	218.62	61.181	4.573	
11,200.00	7,366.40	11,479.32	7,646.40	73.81	74.12	-179.92	3,874.81	-139.36	279.80	217.27	62.533	4.474	
11,300.00	7,366.30	11,579.32	7,646.30	75.62	75.92	-179.92	3,974.81	-139.26	279.80	215.91	63.891	4.379	
11,400.00	7,366.20	11,679.32	7,646.20	77.43	77.73	-179.92	4,074.81	-139.15	279.80	214.55	65.253	4.288	
11,500.00	7,366.10	11,779.32	7,646.10	79.25	79.54	-179.92	4,174.81	-139.04	279.80	213.18	66.619	4.200	
11,600.00	7,366.00	11,879.32	7,645.99	81.06	81.36	-179.93	4,274.81	-138.93	279.80	211.81	67.990	4.115	
11,700.00	7,365.90	11,979.32	7,645.89	82.88	83.17	-179.93	4,374.81	-138.83	279.80	210.43	69.365	4.034	
11,800.00	7,365.79	12,079.32	7,645.79	84.70	84.98	-179.93	4,474.81	-138.72	279.80	209.05	70.744	3.955	
11,900.00	7,365.69	12,179.32	7,645.69	86.52	86.80	-179.93	4,574.81	-138.61	279.80	207.67	72.126	3.879	
12,000.00	7,365.59	12,279.32	7,645.59	88.34	88.62	-179.93	4,674.81	-138.51	279.80	206.29	73.511	3.806	
12,100.00	7,365.49	12,379.32	7,645.49	90.16	90.44	-179.93	4,774.81	-138.40	279.80	204.90	74.899	3.736	
12,200.00	7,365.39	12,479.32	7,645.39	91.98	92.26	-179.93	4,874.81	-138.29	279.80	203.51	76.291	3.668	
12,300.00	7,365.29	12,579.32	7,645.28	93.81	94.08	-179.93	4,974.81	-138.18	279.80	202.11	77.685	3.602	
12,400.00	7,365.19	12,679.32	7,645.18	95.63	95.91	-179.94	5,074.81	-138.08	279.80	200.72	79.082	3.538	
12,500.00	7,365.08	12,779.32	7,645.08	97.46	97.73	-179.94	5,174.81	-137.97	279.80	199.32	80.481	3.477	
12,600.00	7,364.98	12,879.32	7,644.98	99.29	99.55	-179.94	5,274.81	-137.86	279.80	197.92	81.882	3.417	
12,700.00	7,364.88	12,979.32	7,644.88	101.11	101.38	-179.94	5,374.81	-137.75	279.80	196.51	83.286	3.359	
12,800.00	7,364.78	13,079.32	7,644.78	102.94	103.21	-179.94	5,474.81	-137.65	279.80	195.11	84.692	3.304	
12,900.00	7,364.68	13,179.32	7,644.68	104.77	105.04	-179.94	5,574.81	-137.54	279.80	193.70	86.100	3.250	
13,000.00	7,364.58	13,279.32	7,644.57	106.60	106.86	-179.94	5,674.81	-137.43	279.80	192.29	87.510	3.197	
13,100.00	7,364.47	13,379.32	7,644.47	108.43	108.69	-179.94	5,774.81	-137.33	279.80	190.88	88.922	3.147	
13,200.00	7,364.37	13,479.32	7,644.37	110.27	110.52	-179.95	5,874.80	-137.22	279.80	189.46	90.335	3.097	
13,300.00	7,364.27	13,579.32	7,644.27	112.10	112.35	-179.95	5,974.80	-137.11	279.80	188.05	91.751	3.050	
13,400.00	7,364.17	13,679.32	7,644.17	113.93	114.19	-179.95	6,074.80	-137.00	279.80	186.63	93.168	3.003	
13,500.00	7,364.07	13,779.32	7,644.07	115.76	116.02	-179.95	6,174.80	-136.90	279.80	185.21	94.586	2.958	
13,600.00	7,363.97	13,879.32	7,643.97	117.60	117.85	-179.95	6,274.80	-136.79	279.80	183.79	96.006	2.914	
13,700.00	7,363.87	13,979.32	7,643.86	119.43	119.68	-179.95	6,374.80	-136.68	279.80	182.37	97.427	2.872	
13,800.00	7,363.76	14,079.32	7,643.76	121.27	121.52	-179.95	6,474.80	-136.58	279.80	180.95	98.849	2.831	
13,900.00	7,363.66	14,179.32	7,643.66	123.10	123.35	-179.95	6,574.80	-136.47	279.80	179.53	100.273	2.790	
14,000.00	7,363.56	14,279.32	7,643.56	124.94	125.19	-179.96	6,674.80	-136.36	279.80	178.10	101.698	2.751	
14,100.00	7,363.46	14,379.32	7,643.46	126.78	127.02	-179.96	6,774.80	-136.25	279.80	176.67	103.124	2.713	
14,200.00	7,363.36	14,479.32	7,643.36	128.61	128.86	-179.96	6,874.80	-136.15	279.80	175.25	104.552	2.676	
14,300.00	7,363.26	14,579.32	7,643.26	130.45	130.69	-179.96	6,974.80	-136.04	279.80	173.82	105.980	2.640	
14,400.00	7,363.16	14,679.32	7,643.15	132.29	132.53	-179.96	7,074.80	-135.93	279.80	172.39	107.410	2.605	
14,500.00	7,363.05	14,779.32	7,643.05	134.12	134.37	-179.96	7,174.80	-135.83	279.80	170.96	108.840	2.571	
14,600.00	7,362.95	14,879.32	7,642.95	135.96	136.20	-179.96	7,274.80	-135.72	279.80	169.53	110.271	2.537	
14,700.00	7,362.85	14,979.32	7,642.85	137.80	138.04	-179.96	7,374.80	-135.61	279.80	168.10	111.704	2.505	
14,800.00	7,362.75	15,079.32	7,642.75	139.64	139.88	-179.97	7,474.80	-135.50	279.80	166.66	113.137	2.473	
14,900.00	7,362.65	15,179.32	7,642.65	141.48	141.72	-179.97	7,574.80	-135.40	279.80	165.23	114.571	2.442	
15,000.00	7,362.55	15,279.32	7,642.55	143.32	143.55	-179.97	7,674.80	-135.29	279.80	163.79	116.006	2.412	
15,100.00	7,362.45	15,379.32	7,642.44	145.16	145.39	-179.97	7,774.80	-135.18	279.80	162.36	117.442	2.382	

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

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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*

Offset Design Roadrunner Fed COM - #13H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
15,200.00	7,362.34	15,479.32	7,642.34	147.00	147.23	-179.97	7,874.80	-135.08	279.80	160.92	118.878	2.354	
15,300.00	7,362.24	15,579.32	7,642.24	148.84	149.07	-179.97	7,974.80	-134.97	279.80	159.48	120.315	2.326	
15,400.00	7,362.14	15,679.32	7,642.14	150.68	150.91	-179.97	8,074.80	-134.86	279.80	158.05	121.753	2.298	
15,500.00	7,362.04	15,779.32	7,642.04	152.52	152.75	-179.97	8,174.80	-134.75	279.80	156.61	123.192	2.271	
15,600.00	7,361.94	15,879.32	7,641.94	154.36	154.59	-179.98	8,274.80	-134.65	279.80	155.17	124.631	2.245	
15,700.00	7,361.84	15,979.32	7,641.84	156.20	156.43	-179.98	8,374.80	-134.54	279.80	153.73	126.071	2.219	
15,800.00	7,361.74	16,079.32	7,641.73	158.05	158.27	-179.98	8,474.80	-134.43	279.80	152.29	127.511	2.194	
15,900.00	7,361.63	16,179.32	7,641.63	159.89	160.11	-179.98	8,574.80	-134.33	279.80	150.85	128.952	2.170	
16,000.00	7,361.53	16,279.32	7,641.53	161.73	161.96	-179.98	8,674.80	-134.22	279.80	149.41	130.394	2.146	
16,100.00	7,361.43	16,379.32	7,641.43	163.57	163.80	-179.98	8,774.80	-134.11	279.80	147.96	131.836	2.122	
16,200.00	7,361.33	16,479.32	7,641.33	165.41	165.64	-179.98	8,874.80	-134.00	279.80	146.52	133.279	2.099	
16,300.00	7,361.23	16,579.32	7,641.23	167.26	167.48	-179.98	8,974.80	-133.90	279.80	145.08	134.722	2.077	
16,400.00	7,361.13	16,679.32	7,641.13	169.10	169.32	-179.99	9,074.80	-133.79	279.80	143.63	136.166	2.055	
16,500.00	7,361.02	16,779.32	7,641.02	170.94	171.16	-179.99	9,174.80	-133.68	279.80	142.19	137.610	2.033	
16,600.00	7,360.92	16,879.32	7,640.92	172.79	173.01	-179.99	9,274.80	-133.57	279.80	140.74	139.055	2.012	
16,700.00	7,360.82	16,979.32	7,640.82	174.63	174.85	-179.99	9,374.80	-133.47	279.80	139.30	140.500	1.991	
16,800.00	7,360.72	17,079.32	7,640.72	176.47	176.69	-179.99	9,474.80	-133.36	279.80	137.85	141.946	1.971	
16,900.00	7,360.62	17,179.32	7,640.62	178.32	178.54	-179.99	9,574.80	-133.25	279.80	136.41	143.392	1.951	
17,000.00	7,360.52	17,279.32	7,640.52	180.16	180.38	-179.99	9,674.80	-133.15	279.80	134.96	144.838	1.932	
17,100.00	7,360.42	17,379.32	7,640.42	182.00	182.22	-179.99	9,774.80	-133.04	279.80	133.51	146.285	1.913	
17,200.00	7,360.31	17,479.32	7,640.31	183.85	184.07	-180.00	9,874.80	-132.93	279.80	132.07	147.732	1.894	
17,300.00	7,360.21	17,579.32	7,640.21	185.69	185.91	-180.00	9,974.80	-132.82	279.80	130.62	149.180	1.876	
17,400.00	7,360.11	17,679.32	7,640.11	187.54	187.75	-180.00	10,074.80	-132.72	279.80	129.17	150.628	1.858	
17,509.98	7,360.00	17,789.30	7,640.00	189.56	189.78	180.00	10,184.78	-132.60	279.80	127.58	152.221	1.838	

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

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 Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.50	0.50	0.00	0.00	90.10	-0.10	60.00	60.00				
100.00	100.00	100.50	100.50	0.08	0.09	90.10	-0.10	60.00	60.00	59.83	.170	353.569	
200.00	200.00	200.50	200.50	0.31	0.31	90.10	-0.10	60.00	60.00	59.38	.619	96.895	
300.00	300.00	300.50	300.50	0.53	0.53	90.10	-0.10	60.00	60.00	58.93	1.069	56.140	
400.00	400.00	400.50	400.50	0.76	0.76	90.10	-0.10	60.00	60.00	58.48	1.518	39.518	
500.00	500.00	500.50	500.50	0.98	0.98	90.10	-0.10	60.00	60.00	58.03	1.968	30.491	
600.00	600.00	600.50	600.50	1.21	1.21	90.10	-0.10	60.00	60.00	57.58	2.417	24.821	
700.00	700.00	700.50	700.50	1.43	1.43	90.10	-0.10	60.00	60.00	57.13	2.867	20.929	
800.00	800.00	800.50	800.50	1.66	1.66	90.10	-0.10	60.00	60.00	56.68	3.316	18.092	
900.00	900.00	900.50	900.50	1.88	1.88	90.10	-0.10	60.00	60.00	56.23	3.766	15.932	
1,000.00	1,000.00	1,000.50	1,000.50	2.11	2.11	90.10	-0.10	60.00	60.00	55.78	4.215	14.233 CC	
1,100.00	1,099.99	1,100.49	1,100.49	2.31	2.33	-133.50	-0.10	60.00	60.60	55.96	4.640	13.059	
1,200.00	1,199.96	1,200.46	1,200.46	2.49	2.56	-135.23	-0.10	60.00	62.43	57.38	5.047	12.370	
1,300.00	1,299.86	1,300.36	1,300.36	2.68	2.78	-137.90	-0.10	60.00	65.60	60.14	5.461	12.012	
1,400.00	1,399.68	1,400.18	1,400.18	2.88	3.01	-141.20	-0.10	60.00	70.25	64.37	5.883	11.942	
1,500.00	1,499.43	1,499.93	1,499.93	3.09	3.23	-144.51	-0.10	60.00	75.82	69.51	6.309	12.017	
1,600.00	1,599.19	1,600.87	1,600.87	3.31	3.43	-147.03	-0.76	59.41	80.87	74.16	6.715	12.043	
1,700.00	1,698.94	1,702.00	1,701.96	3.53	3.61	-148.62	-2.75	57.62	84.57	77.47	7.104	11.904	
1,800.00	1,798.70	1,803.26	1,803.12	3.76	3.80	-149.48	-6.06	54.63	86.82	79.31	7.501	11.573	
1,900.00	1,898.46	1,903.20	1,902.92	3.99	3.99	-150.00	-9.95	51.13	88.37	80.46	7.907	11.177	
2,000.00	1,998.21	2,003.18	2,002.77	4.23	4.19	-150.51	-13.84	47.63	89.93	81.61	8.318	10.811	
2,100.00	2,097.97	2,103.17	2,102.62	4.47	4.40	-150.99	-17.73	44.13	91.50	82.76	8.735	10.475	
2,200.00	2,197.73	2,203.15	2,202.46	4.71	4.60	-151.47	-21.62	40.63	93.07	83.92	9.157	10.164	
2,300.00	2,297.48	2,303.14	2,302.31	4.95	4.81	-151.92	-25.50	37.13	94.65	85.07	9.583	9.877	
2,400.00	2,397.24	2,403.12	2,402.16	5.19	5.03	-152.36	-29.39	33.62	96.24	86.23	10.013	9.612	
2,500.00	2,497.00	2,503.11	2,502.01	5.44	5.24	-152.79	-33.28	30.12	97.83	87.39	10.445	9.366	
2,600.00	2,596.75	2,603.09	2,601.86	5.69	5.46	-153.20	-37.17	26.62	99.43	88.55	10.880	9.139	
2,700.00	2,696.51	2,703.08	2,701.70	5.93	5.68	-153.60	-41.06	23.12	101.03	89.71	11.318	8.927	
2,800.00	2,796.26	2,803.06	2,801.55	6.18	5.91	-153.99	-44.95	19.62	102.64	90.88	11.757	8.730	
2,900.00	2,896.02	2,903.05	2,901.40	6.43	6.13	-154.37	-48.84	16.12	104.25	92.05	12.198	8.547	
3,000.00	2,995.78	3,003.03	3,001.25	6.68	6.36	-154.73	-52.73	12.62	105.87	93.23	12.641	8.375	
3,100.00	3,095.53	3,103.02	3,101.09	6.93	6.59	-155.08	-56.61	9.11	107.49	94.40	13.084	8.215	
3,200.00	3,195.29	3,203.00	3,200.94	7.19	6.81	-155.43	-60.50	5.61	109.11	95.58	13.529	8.065	
3,300.00	3,295.05	3,302.99	3,300.79	7.44	7.04	-155.76	-64.39	2.11	110.74	96.76	13.976	7.924	
3,400.00	3,394.80	3,402.97	3,400.64	7.69	7.28	-156.08	-68.28	-1.39	112.37	97.95	14.423	7.791	
3,500.00	3,494.56	3,502.96	3,500.48	7.95	7.51	-156.40	-72.17	-4.89	114.01	99.13	14.870	7.667	
3,600.00	3,594.32	3,602.94	3,600.33	8.20	7.74	-156.70	-76.06	-8.39	115.64	100.32	15.319	7.549	
3,700.00	3,694.07	3,702.93	3,700.18	8.45	7.98	-157.00	-79.95	-11.89	117.28	101.52	15.768	7.438	
3,800.00	3,793.83	3,802.91	3,800.03	8.71	8.21	-157.29	-83.83	-15.40	118.93	102.71	16.218	7.333	
3,900.00	3,893.59	3,902.89	3,899.88	8.96	8.44	-157.57	-87.72	-18.90	120.58	103.91	16.669	7.234	
4,006.67	4,000.00	4,009.55	4,006.39	9.24	8.70	-157.86	-91.87	-22.63	122.34	105.19	17.150	7.133	
4,100.00	4,093.15	4,102.87	4,099.58	9.47	8.92	-157.98	-95.50	-25.90	123.17	105.60	17.571	7.010	
4,200.00	4,193.05	4,202.87	4,199.44	9.71	9.15	-157.80	-99.39	-29.40	122.51	104.49	18.023	6.797	
4,300.00	4,293.01	4,302.84	4,299.27	9.93	9.39	-157.30	-103.28	-32.90	120.23	101.76	18.477	6.507	
4,406.67	4,399.68	4,409.41	4,405.70	10.14	9.64	66.63	-107.42	-36.63	116.05	97.10	18.947	6.125	
4,500.00	4,493.00	4,502.61	4,498.77	10.31	9.87	67.68	-111.05	-39.90	111.63	92.28	19.347	5.770	
4,600.00	4,593.00	4,602.47	4,598.49	10.49	10.10	68.89	-114.93	-43.40	106.93	87.15	19.780	5.406	
4,700.00	4,693.00	4,702.33	4,698.22	10.67	10.34	70.22	-118.82	-46.89	102.29	82.08	20.216	5.060	
4,800.00	4,793.00	4,802.20	4,797.95	10.86	10.58	71.67	-122.70	-50.39	97.71	77.05	20.657	4.730	
4,900.00	4,893.00	4,902.06	4,897.67	11.04	10.82	73.26	-126.58	-53.89	93.20	72.10	21.103	4.416	
5,000.00	4,993.00	5,001.92	4,997.40	11.23	11.06	75.01	-130.47	-57.38	88.76	67.21	21.554	4.118	
5,100.00	5,093.00	5,101.79	5,097.12	11.42	11.30	76.95	-134.35	-60.88	84.42	62.41	22.010	3.836	

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

Anticollision Report

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

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 Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,193.00	5,201.65	5,196.85	11.61	11.54	79.09	-138.24	-64.38	80.19	57.71	22.473	3.568	
5,300.00	5,293.00	5,301.51	5,296.58	11.80	11.78	81.47	-142.12	-67.88	76.07	53.13	22.942	3.316	
5,400.00	5,393.00	5,401.37	5,396.30	11.99	12.02	84.11	-146.00	-71.37	72.11	48.69	23.419	3.079	
5,500.00	5,493.00	5,500.85	5,495.65	12.18	12.26	86.93	-149.74	-74.73	68.44	44.54	23.901	2.864	
5,600.00	5,593.00	5,599.98	5,594.72	12.38	12.49	89.11	-152.37	-77.10	65.96	41.60	24.365	2.707	
5,700.00	5,693.00	5,699.20	5,693.92	12.57	12.71	90.29	-153.73	-78.33	64.72	39.92	24.804	2.609	
5,776.21	5,769.21	5,775.00	5,769.71	12.72	12.86	90.47	-153.93	-78.51	64.54	39.43	25.109	2.570	
5,800.00	5,793.00	5,801.22	5,793.50	12.77	12.91	90.47	-153.93	-78.51	64.54	39.33	25.205	2.561	
5,900.00	5,893.00	5,901.22	5,893.50	12.97	13.09	90.47	-153.93	-78.51	64.54	38.94	25.595	2.522	
6,000.00	5,993.00	6,001.22	5,993.50	13.16	13.28	90.47	-153.93	-78.51	64.54	38.55	25.987	2.484	
6,100.00	6,093.00	6,101.22	6,093.50	13.36	13.47	90.47	-153.93	-78.51	64.54	38.16	26.380	2.447	
6,200.00	6,193.00	6,201.22	6,193.50	13.56	13.66	90.47	-153.93	-78.51	64.54	37.76	26.775	2.410	
6,300.00	6,293.00	6,301.22	6,293.50	13.76	13.85	90.47	-153.93	-78.51	64.54	37.37	27.172	2.375	
6,400.00	6,393.00	6,401.22	6,393.50	13.96	14.05	90.47	-153.93	-78.51	64.54	36.97	27.570	2.341	
6,500.00	6,493.00	6,501.22	6,493.50	14.17	14.24	90.47	-153.93	-78.51	64.54	36.57	27.970	2.307	
6,600.00	6,593.00	6,601.22	6,593.50	14.37	14.43	90.47	-153.93	-78.51	64.54	36.17	28.372	2.275	
6,700.00	6,693.00	6,701.22	6,693.50	14.57	14.63	90.47	-153.93	-78.51	64.54	35.76	28.775	2.243	
6,800.00	6,793.00	6,801.22	6,793.50	14.78	14.83	90.47	-153.93	-78.51	64.54	35.36	29.179	2.212	
6,899.54	6,892.54	6,901.68	6,893.04	14.98	15.02	90.47	-153.93	-78.51	64.54	34.95	29.584	2.182	
6,925.00	6,917.99	6,923.77	6,918.49	15.03	15.07	91.02	-153.93	-78.51	64.55	34.86	29.689	2.174	
6,950.00	6,942.91	6,948.69	6,943.41	15.08	15.12	92.76	-153.93	-78.51	64.61	34.80	29.812	2.167 ES	
6,975.00	6,967.69	6,973.47	6,968.19	15.12	15.16	95.61	-153.93	-78.51	64.86	34.91	29.947	2.166 SF	
7,000.00	6,992.26	7,001.96	6,992.76	15.16	15.22	99.46	-153.93	-78.51	65.47	35.37	30.100	2.175	
7,025.00	7,016.56	7,022.35	7,017.06	15.20	15.26	104.16	-153.93	-78.51	66.70	36.46	30.242	2.206	
7,050.00	7,040.52	7,046.31	7,041.02	15.23	15.31	109.46	-153.93	-78.51	68.85	38.46	30.389	2.266	
7,075.00	7,064.08	7,069.86	7,064.58	15.27	15.36	115.07	-153.93	-78.51	72.19	41.66	30.527	2.365	
7,100.00	7,087.16	7,107.05	7,087.66	15.30	15.43	120.68	-153.93	-78.51	76.96	46.29	30.675	2.509	
7,125.00	7,109.71	7,115.50	7,110.21	15.33	15.45	126.03	-153.93	-78.51	83.33	52.58	30.748	2.710	
7,150.00	7,131.67	7,137.45	7,132.17	15.35	15.49	130.93	-153.93	-78.51	91.36	60.53	30.831	2.963	
7,175.00	7,152.97	7,158.76	7,153.47	15.38	15.53	135.28	-153.93	-78.51	101.04	70.14	30.899	3.270	
7,200.00	7,173.56	7,179.34	7,174.06	15.41	15.57	139.03	-153.93	-78.51	112.32	81.36	30.957	3.628	
7,225.00	7,193.38	7,200.84	7,193.88	15.43	15.62	142.20	-153.93	-78.51	125.09	94.08	31.012	4.034	
7,250.00	7,212.37	7,218.15	7,212.87	15.45	15.65	144.84	-153.93	-78.51	139.27	108.21	31.055	4.485	
7,275.00	7,230.48	7,236.27	7,230.98	15.48	15.69	146.99	-153.93	-78.51	154.74	123.64	31.100	4.976	
7,300.00	7,247.67	7,253.46	7,248.17	15.50	15.72	148.70	-153.93	-78.51	171.40	140.26	31.142	5.504	
7,325.00	7,263.89	7,269.67	7,264.39	15.52	15.75	150.00	-153.93	-78.51	189.16	157.98	31.183	6.066	
7,350.00	7,279.09	7,284.87	7,279.59	15.54	15.78	150.92	-153.93	-78.51	207.93	176.71	31.222	6.660	
7,375.00	7,293.23	7,300.99	7,293.73	15.56	15.82	151.47	-153.93	-78.51	227.61	196.35	31.262	7.281	
7,400.00	7,306.27	7,312.05	7,306.77	15.59	15.84	151.65	-153.93	-78.51	248.14	216.85	31.292	7.930	
7,425.00	7,318.17	7,323.96	7,318.67	15.67	15.86	151.43	-153.93	-78.51	269.42	238.10	31.324	8.601	
7,450.00	7,328.91	7,334.70	7,329.41	15.76	15.88	150.77	-153.93	-78.51	291.39	260.04	31.352	9.294	
7,475.00	7,338.46	7,344.24	7,338.96	15.87	15.90	149.56	-153.93	-78.51	313.96	282.58	31.377	10.006	
7,500.00	7,346.78	7,352.56	7,347.28	15.99	15.92	147.66	-153.93	-78.51	337.06	305.66	31.398	10.735	
7,525.00	7,353.85	7,359.64	7,354.35	16.11	15.93	144.80	-153.93	-78.51	360.62	329.21	31.415	11.479	
7,550.00	7,359.67	7,365.45	7,360.17	16.25	15.95	140.56	-153.93	-78.51	384.57	353.14	31.429	12.236	
7,575.00	7,364.20	7,369.98	7,364.70	16.40	15.95	134.20	-153.93	-78.51	408.82	377.38	31.439	13.004	
7,600.00	7,367.44	7,373.22	7,367.94	16.55	15.96	124.51	-153.93	-78.51	433.31	401.87	31.445	13.780	
7,625.00	7,369.37	7,375.16	7,369.87	16.72	15.97	109.85	-153.93	-78.51	457.97	426.53	31.447	14.563	
7,650.02	7,370.00	7,375.79	7,370.50	16.89	15.97	89.57	-153.93	-78.51	482.75	451.30	31.445	15.352	
7,700.00	7,369.95	7,375.74	7,370.45	17.27	15.97	89.52	-153.93	-78.51	532.32	500.88	31.439	16.932	
7,800.00	7,369.85	7,375.64	7,370.35	18.14	15.97	89.43	-153.93	-78.51	631.70	600.26	31.433	20.097	
7,900.00	7,369.75	7,375.53	7,370.25	19.15	15.97	89.34	-153.93	-78.51	731.25	699.81	31.432	23.264	

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

Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

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 Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,000.00	7,369.65	7,375.43	7,370.15	20.28	15.97	89.25	-153.93	-78.51	830.90	799.47	31.436	26.432	
8,100.00	7,369.55	7,375.33	7,370.05	21.51	15.97	89.16	-153.93	-78.51	930.63	899.19	31.443	29.598	
8,200.00	7,369.45	7,375.23	7,369.95	22.82	15.97	89.07	-153.93	-78.51	1,030.42	998.96	31.453	32.761	
8,300.00	7,369.35	7,375.13	7,369.85	24.20	15.97	88.98	-153.93	-78.51	1,130.24	1,098.77	31.465	35.920	
8,400.00	7,369.24	7,375.03	7,369.74	25.64	15.96	88.89	-153.93	-78.51	1,230.09	1,198.61	31.480	39.076	
8,500.00	7,369.14	7,374.93	7,369.64	27.13	15.96	88.80	-153.93	-78.51	1,329.96	1,298.46	31.496	42.226	
8,600.00	7,369.04	7,374.82	7,369.54	28.67	15.96	88.71	-153.93	-78.51	1,429.85	1,398.33	31.515	45.370	
8,700.00	7,368.94	10,223.46	8,888.90	30.23	32.26	-179.98	1,376.12	-142.02	1,519.46	1,484.95	34.506	44.034	
8,800.00	7,368.84	10,323.46	8,888.79	31.83	33.77	-179.98	1,476.12	-141.92	1,519.46	1,484.03	35.430	42.886	
8,900.00	7,368.74	10,423.46	8,888.69	33.45	35.32	-179.98	1,576.12	-141.81	1,519.45	1,483.07	36.390	41.755	
9,000.00	7,368.63	10,523.46	8,888.59	35.10	36.89	-179.98	1,676.12	-141.71	1,519.45	1,482.07	37.381	40.647	
9,100.00	7,368.53	10,623.46	8,888.48	36.77	38.49	-179.98	1,776.12	-141.60	1,519.45	1,481.04	38.404	39.565	
9,200.00	7,368.43	10,723.46	8,888.38	38.45	40.11	-179.98	1,876.12	-141.50	1,519.44	1,479.99	39.453	38.512	
9,300.00	7,368.33	10,823.46	8,888.27	40.15	41.75	-179.98	1,976.12	-141.39	1,519.44	1,478.91	40.529	37.490	
9,400.00	7,368.23	10,923.46	8,888.17	41.86	43.40	-179.98	2,076.12	-141.29	1,519.44	1,477.81	41.628	36.500	
9,500.00	7,368.13	11,023.46	8,888.06	43.58	45.07	-179.98	2,176.12	-141.18	1,519.44	1,476.69	42.749	35.543	
9,600.00	7,368.03	11,123.46	8,887.96	45.31	46.76	-179.98	2,276.12	-141.08	1,519.43	1,475.54	43.890	34.619	
9,700.00	7,367.92	11,223.46	8,887.85	47.05	48.46	-179.98	2,376.12	-140.97	1,519.43	1,474.38	45.050	33.728	
9,800.00	7,367.82	11,323.46	8,887.75	48.80	50.16	-179.98	2,476.12	-140.87	1,519.43	1,473.20	46.227	32.869	
9,900.00	7,367.72	11,423.46	8,887.64	50.56	51.88	-179.98	2,576.12	-140.77	1,519.42	1,472.00	47.420	32.042	
10,000.00	7,367.62	11,523.46	8,887.54	52.32	53.61	-179.98	2,676.12	-140.66	1,519.42	1,470.79	48.628	31.246	
10,100.00	7,367.52	11,623.46	8,887.43	54.09	55.34	-179.98	2,776.12	-140.56	1,519.42	1,469.57	49.849	30.480	
10,200.00	7,367.42	11,723.46	8,887.33	55.86	57.08	-179.98	2,876.12	-140.45	1,519.41	1,468.33	51.084	29.744	
10,300.00	7,367.32	11,823.46	8,887.22	57.64	58.83	-179.98	2,976.12	-140.35	1,519.41	1,467.08	52.330	29.035	
10,400.00	7,367.21	11,923.46	8,887.12	59.43	60.59	-179.98	3,076.12	-140.24	1,519.41	1,465.82	53.587	28.354	
10,500.00	7,367.11	12,023.46	8,887.01	61.21	62.35	-179.98	3,176.12	-140.14	1,519.40	1,464.55	54.855	27.699	
10,600.00	7,367.01	12,123.46	8,886.91	63.00	64.11	-179.98	3,276.12	-140.03	1,519.40	1,463.27	56.132	27.068	
10,700.00	7,366.91	12,223.46	8,886.81	64.80	65.88	-179.98	3,376.11	-139.93	1,519.40	1,461.98	57.418	26.462	
10,800.00	7,366.81	12,323.46	8,886.70	66.60	67.66	-179.98	3,476.11	-139.82	1,519.39	1,460.68	58.713	25.878	
10,900.00	7,366.71	12,423.46	8,886.60	68.40	69.43	-179.98	3,576.11	-139.72	1,519.39	1,459.37	60.015	25.317	
11,000.00	7,366.61	12,523.46	8,886.49	70.20	71.21	-179.98	3,676.11	-139.61	1,519.39	1,458.06	61.325	24.776	
11,100.00	7,366.50	12,623.46	8,886.39	72.00	73.00	-179.98	3,776.11	-139.51	1,519.38	1,456.74	62.642	24.255	
11,200.00	7,366.40	12,723.46	8,886.28	73.81	74.79	-179.98	3,876.11	-139.40	1,519.38	1,455.41	63.965	23.753	
11,300.00	7,366.30	12,823.46	8,886.18	75.62	76.58	-179.98	3,976.11	-139.30	1,519.38	1,454.08	65.294	23.270	
11,400.00	7,366.20	12,923.46	8,886.07	77.43	78.37	-179.98	4,076.11	-139.19	1,519.37	1,452.74	66.629	22.803	
11,500.00	7,366.10	13,023.46	8,885.97	79.25	80.17	-179.98	4,176.11	-139.09	1,519.37	1,451.40	67.970	22.354	
11,600.00	7,366.00	13,123.46	8,885.86	81.06	81.97	-179.98	4,276.11	-138.99	1,519.37	1,450.05	69.315	21.920	
11,700.00	7,365.90	13,223.46	8,885.76	82.88	83.77	-179.98	4,376.11	-138.88	1,519.36	1,448.70	70.665	21.501	
11,800.00	7,365.79	13,323.46	8,885.65	84.70	85.57	-179.98	4,476.11	-138.78	1,519.36	1,447.34	72.020	21.096	
11,900.00	7,365.69	13,423.46	8,885.55	86.52	87.38	-179.98	4,576.11	-138.67	1,519.36	1,445.98	73.379	20.706	
12,000.00	7,365.59	13,523.46	8,885.44	88.34	89.19	-179.98	4,676.11	-138.57	1,519.35	1,444.61	74.742	20.328	
12,100.00	7,365.49	13,623.46	8,885.34	90.16	91.00	-179.99	4,776.11	-138.46	1,519.35	1,443.24	76.109	19.963	
12,200.00	7,365.39	13,723.46	8,885.23	91.98	92.81	-179.99	4,876.11	-138.36	1,519.35	1,441.87	77.480	19.610	
12,300.00	7,365.29	13,823.46	8,885.13	93.81	94.62	-179.99	4,976.11	-138.25	1,519.34	1,440.49	78.854	19.268	
12,400.00	7,365.19	13,923.46	8,885.02	95.63	96.43	-179.99	5,076.11	-138.15	1,519.34	1,439.11	80.231	18.937	
12,500.00	7,365.08	14,023.46	8,884.92	97.46	98.25	-179.99	5,176.11	-138.04	1,519.34	1,437.73	81.612	18.617	
12,600.00	7,364.98	14,123.46	8,884.82	99.29	100.07	-179.99	5,276.11	-137.94	1,519.33	1,436.34	82.995	18.306	
12,700.00	7,364.88	14,223.46	8,884.71	101.11	101.88	-179.99	5,376.11	-137.83	1,519.33	1,434.95	84.381	18.006	
12,800.00	7,364.78	14,323.46	8,884.61	102.94	103.70	-179.99	5,476.11	-137.73	1,519.33	1,433.56	85.770	17.714	
12,900.00	7,364.68	14,423.46	8,884.50	104.77	105.52	-179.99	5,576.11	-137.62	1,519.32	1,432.16	87.161	17.431	
13,000.00	7,364.58	14,523.46	8,884.40	106.60	107.34	-179.99	5,676.11	-137.52	1,519.32	1,430.77	88.555	17.157	
13,100.00	7,364.47	14,623.46	8,884.29	108.43	109.16	-179.99	5,776.11	-137.41	1,519.32	1,429.37	89.951	16.890	

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

Anticollision Report

Company:	COG OPERATING, LLC	***Local Co-ordinate Reference:***	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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

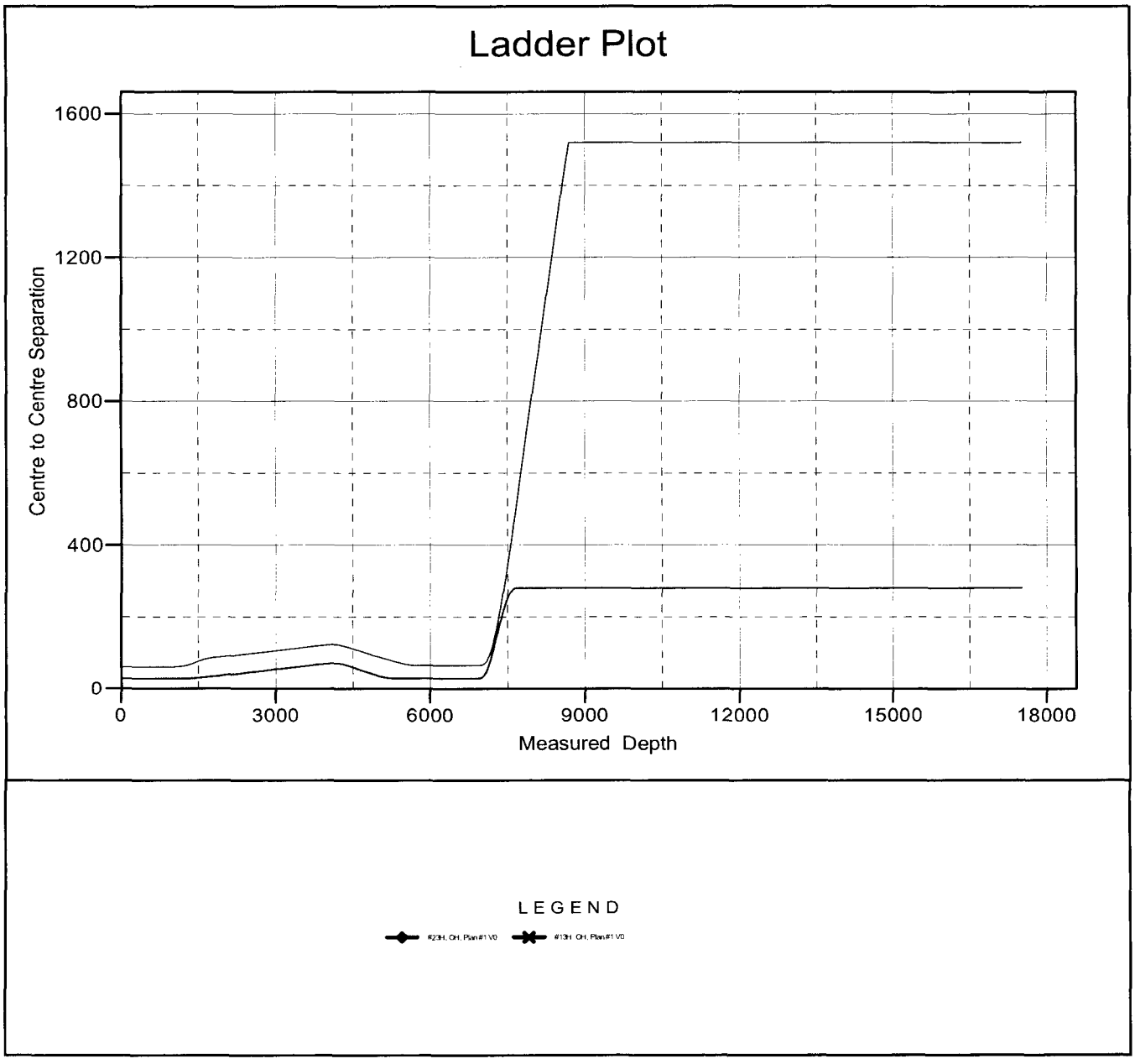
Offset Design Roadrunner Fed COM - #23H - OH - Plan #1 — **Offset Site Error:** 0.00 usft

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

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,200.00	7,364.37	14,723.46	8,884.19	110.27	110.99	-179.99	5,876.11	-137.31	1,519.31	1,427.97	91.350	16.632	
13,300.00	7,364.27	14,823.46	8,884.08	112.10	112.81	-179.99	5,976.11	-137.20	1,519.31	1,426.56	92.750	16.381	
13,400.00	7,364.17	14,923.46	8,883.98	113.93	114.64	-179.99	6,076.11	-137.10	1,519.31	1,425.16	94.152	16.137	
13,500.00	7,364.07	15,023.46	8,883.87	115.76	116.46	-179.99	6,176.11	-137.00	1,519.30	1,423.75	95.557	15.899	
13,600.00	7,363.97	15,123.46	8,883.77	117.60	118.29	-179.99	6,276.11	-136.89	1,519.30	1,422.34	96.963	15.669	
13,700.00	7,363.87	15,223.46	8,883.66	119.43	120.11	-179.99	6,376.11	-136.79	1,519.30	1,420.93	98.371	15.445	
13,800.00	7,363.76	15,323.46	8,883.56	121.27	121.94	-179.99	6,476.11	-136.68	1,519.30	1,419.51	99.781	15.226	
13,900.00	7,363.66	15,423.46	8,883.45	123.10	123.77	-179.99	6,576.11	-136.58	1,519.29	1,418.10	101.192	15.014	
14,000.00	7,363.56	15,523.46	8,883.35	124.94	125.60	-179.99	6,676.11	-136.47	1,519.29	1,416.68	102.605	14.807	
14,100.00	7,363.46	15,623.46	8,883.24	126.78	127.43	-179.99	6,776.11	-136.37	1,519.29	1,415.27	104.019	14.606	
14,200.00	7,363.36	15,723.46	8,883.14	128.61	129.26	-179.99	6,876.11	-136.26	1,519.28	1,413.85	105.435	14.410	
14,300.00	7,363.26	15,823.46	8,883.04	130.45	131.09	-179.99	6,976.11	-136.16	1,519.28	1,412.43	106.852	14.219	
14,400.00	7,363.16	15,923.46	8,882.93	132.29	132.92	-179.99	7,076.11	-136.05	1,519.28	1,411.01	108.270	14.032	
14,500.00	7,363.05	16,023.46	8,882.83	134.12	134.75	-179.99	7,176.11	-135.95	1,519.27	1,409.58	109.690	13.851	
14,600.00	7,362.95	16,123.46	8,882.72	135.96	136.59	-179.99	7,276.11	-135.84	1,519.27	1,408.16	111.111	13.673	
14,700.00	7,362.85	16,223.46	8,882.62	137.80	138.42	-179.99	7,376.11	-135.74	1,519.27	1,406.73	112.533	13.501	
14,800.00	7,362.75	16,323.46	8,882.51	139.64	140.25	-179.99	7,476.11	-135.63	1,519.26	1,405.31	113.956	13.332	
14,900.00	7,362.65	16,423.46	8,882.41	141.48	142.09	-179.99	7,576.11	-135.53	1,519.26	1,403.88	115.381	13.167	
15,000.00	7,362.55	16,523.46	8,882.30	143.32	143.92	-179.99	7,676.11	-135.42	1,519.26	1,402.45	116.806	13.007	
15,100.00	7,362.45	16,623.46	8,882.20	145.16	145.76	-179.99	7,776.11	-135.32	1,519.25	1,401.02	118.232	12.850	
15,200.00	7,362.34	16,723.46	8,882.09	147.00	147.59	-179.99	7,876.11	-135.22	1,519.25	1,399.59	119.660	12.696	
15,300.00	7,362.24	16,823.46	8,881.99	148.84	149.43	-179.99	7,976.11	-135.11	1,519.25	1,398.16	121.088	12.547	
15,400.00	7,362.14	16,923.46	8,881.88	150.68	151.26	-179.99	8,076.11	-135.01	1,519.24	1,396.73	122.517	12.400	
15,500.00	7,362.04	17,023.46	8,881.78	152.52	153.10	-179.99	8,176.11	-134.90	1,519.24	1,395.29	123.947	12.257	
15,600.00	7,361.94	17,123.46	8,881.67	154.36	154.94	-179.99	8,276.11	-134.80	1,519.24	1,393.86	125.378	12.117	
15,700.00	7,361.84	17,223.46	8,881.57	156.20	156.77	-179.99	8,376.11	-134.69	1,519.23	1,392.42	126.810	11.980	
15,800.00	7,361.74	17,323.46	8,881.46	158.05	158.61	-179.99	8,476.11	-134.59	1,519.23	1,390.99	128.243	11.847	
15,900.00	7,361.63	17,423.46	8,881.36	159.89	160.45	-179.99	8,576.11	-134.48	1,519.23	1,389.55	129.676	11.716	
16,000.00	7,361.53	17,523.46	8,881.26	161.73	162.29	-179.99	8,676.11	-134.38	1,519.22	1,388.11	131.110	11.587	
16,100.00	7,361.43	17,623.46	8,881.15	163.57	164.12	-179.99	8,776.11	-134.27	1,519.22	1,386.68	132.545	11.462	
16,200.00	7,361.33	17,723.46	8,881.05	165.41	165.96	-179.99	8,876.11	-134.17	1,519.22	1,385.24	133.980	11.339	
16,300.00	7,361.23	17,823.46	8,880.94	167.26	167.80	-179.99	8,976.11	-134.06	1,519.21	1,383.80	135.416	11.219	
16,400.00	7,361.13	17,923.46	8,880.84	169.10	169.64	-179.99	9,076.11	-133.96	1,519.21	1,382.36	136.853	11.101	
16,500.00	7,361.02	18,023.46	8,880.73	170.94	171.48	-179.99	9,176.11	-133.85	1,519.21	1,380.92	138.291	10.986	
16,600.00	7,360.92	18,123.46	8,880.63	172.79	173.32	-179.99	9,276.11	-133.75	1,519.20	1,379.48	139.729	10.873	
16,700.00	7,360.82	18,223.46	8,880.52	174.63	175.16	-179.99	9,376.11	-133.64	1,519.20	1,378.03	141.167	10.762	
16,800.00	7,360.72	18,323.46	8,880.42	176.47	177.00	-179.99	9,476.11	-133.54	1,519.20	1,376.59	142.606	10.653	
16,900.00	7,360.62	18,423.46	8,880.31	178.32	178.84	-179.99	9,576.11	-133.44	1,519.19	1,375.15	144.046	10.547	
17,000.00	7,360.52	18,523.46	8,880.21	180.16	180.68	-179.99	9,676.11	-133.33	1,519.19	1,373.70	145.486	10.442	
17,100.00	7,360.42	18,623.46	8,880.10	182.00	182.52	-179.99	9,776.11	-133.23	1,519.19	1,372.26	146.927	10.340	
17,200.00	7,360.31	18,723.46	8,880.00	183.85	184.36	-179.99	9,876.11	-133.12	1,519.18	1,370.82	148.368	10.239	
17,300.00	7,360.21	18,823.46	8,879.89	185.69	186.20	-179.99	9,976.11	-133.02	1,519.18	1,369.37	149.810	10.141	
17,400.00	7,360.11	18,923.46	8,879.79	187.54	188.04	-179.99	10,076.11	-132.91	1,519.18	1,367.93	151.253	10.044	
17,486.29	7,360.02	19,009.75	8,879.70	189.13	189.63	-179.99	10,162.39	-132.82	1,519.18	1,366.68	152.497	9.962	
17,509.98	7,360.00	19,017.95	8,879.87	189.56	189.78	-180.00	10,170.60	-132.70	1,519.44	1,366.76	152.672	9.952	

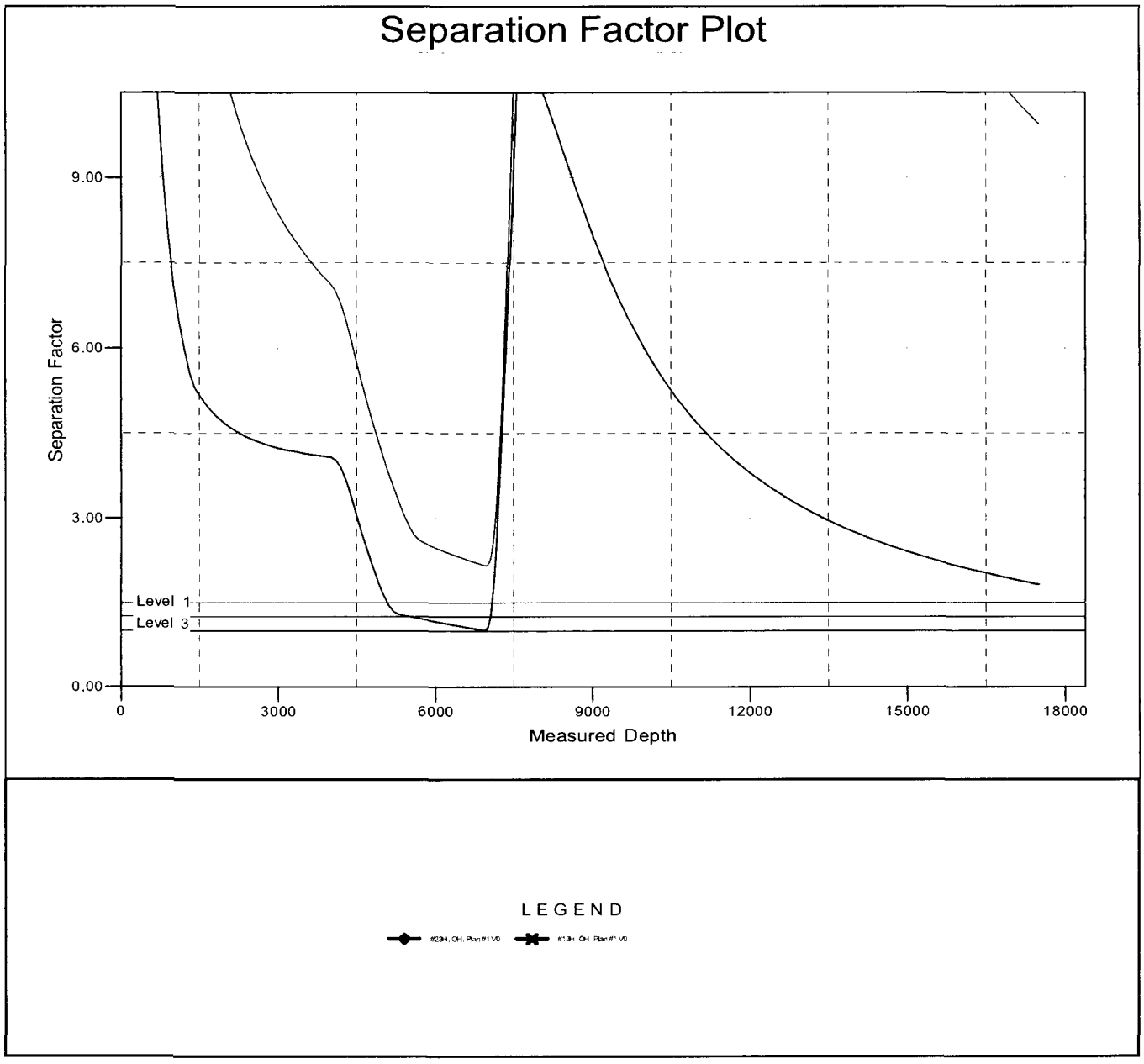
Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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 Depths are relative to RKB @ 3266.40usft (Rig KB = 25')	Coordinates are relative to: #3H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.05°



Company:	COG OPERATING, LLC	**Local Co-ordinate Reference:**	Well #3H
Project:	Eddy County, NM (NAD27) NMZ	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Reference Site:	Roadrunner Fed COM	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#3H	**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 Depths are relative to RKB @ 3266.40usft (Rig KB = 25')	Coordinates are relative to: #3H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.05°



COG OPERATING, LLC

Eddy County, NM (NAD27) NMZ
Roadrunner Fed COM
#3H

OH

Plan: Plan #1

Standard Planning Report

13 December, 2017

Planning Report

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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:		**Northing:**	397,932.60 usft	**Latitude:**	32° 5' 38.414 N
From:	Map	**Easting:**	526,403.60 usft	**Longitude:**	104° 14' 53.059 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.05 °

Well #3H

Well Position	**+N/-S**	0.00 usft	**Northing:**	397,932.60 usft	**Latitude:**	32° 5' 38.414 N
	+E/-W	0.00 usft	**Easting:**	526,403.60 usft	**Longitude:**	104° 14' 53.059 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,241.40 usft

Wellbore OH

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	12/13/17	7.20	59.83	47,739.04951962

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	17,509.98	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	
1,400.00	4.00	223.00	1,399.68	-10.21	-9.52	1.00	1.00	0.00	223.00	
4,006.67	4.00	223.00	4,000.00	-143.19	-133.53	0.00	0.00	0.00	0.00	
4,406.67	0.00	0.00	4,399.68	-153.40	-143.05	1.00	-1.00	0.00	180.00	
6,899.54	0.00	0.00	6,892.54	-153.40	-143.05	0.00	0.00	0.00	0.00	
7,650.02	90.06	0.06	7,370.00	324.55	-142.56	12.00	12.00	0.01	0.06	
17,509.98	90.06	0.06	7,360.00	10,184.50	-132.60	0.00	0.00	0.00	0.00	PBHL(RFC#3H)

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**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)
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	4.00	223.00	1,399.68	-10.21	-9.52	-10.22	1.00	1.00	0.00
1,500.00	4.00	223.00	1,499.43	-15.31	-14.28	-15.32	0.00	0.00	0.00
1,600.00	4.00	223.00	1,599.19	-20.41	-19.03	-20.43	0.00	0.00	0.00
1,700.00	4.00	223.00	1,698.94	-25.51	-23.79	-25.54	0.00	0.00	0.00
1,800.00	4.00	223.00	1,798.70	-30.61	-28.55	-30.64	0.00	0.00	0.00
1,900.00	4.00	223.00	1,898.46	-35.72	-33.31	-35.75	0.00	0.00	0.00
2,000.00	4.00	223.00	1,998.21	-40.82	-38.06	-40.86	0.00	0.00	0.00
2,100.00	4.00	223.00	2,097.97	-45.92	-42.82	-45.96	0.00	0.00	0.00
2,200.00	4.00	223.00	2,197.73	-51.02	-47.58	-51.07	0.00	0.00	0.00
2,300.00	4.00	223.00	2,297.48	-56.12	-52.34	-56.18	0.00	0.00	0.00
2,400.00	4.00	223.00	2,397.24	-61.22	-57.09	-61.28	0.00	0.00	0.00
2,500.00	4.00	223.00	2,497.00	-66.33	-61.85	-66.39	0.00	0.00	0.00
2,600.00	4.00	223.00	2,596.75	-71.43	-66.61	-71.50	0.00	0.00	0.00
2,700.00	4.00	223.00	2,696.51	-76.53	-71.36	-76.60	0.00	0.00	0.00
2,800.00	4.00	223.00	2,796.26	-81.63	-76.12	-81.71	0.00	0.00	0.00
2,900.00	4.00	223.00	2,896.02	-86.73	-80.88	-86.82	0.00	0.00	0.00
3,000.00	4.00	223.00	2,995.78	-91.83	-85.64	-91.92	0.00	0.00	0.00
3,100.00	4.00	223.00	3,095.53	-96.94	-90.39	-97.03	0.00	0.00	0.00
3,200.00	4.00	223.00	3,195.29	-102.04	-95.15	-102.14	0.00	0.00	0.00
3,300.00	4.00	223.00	3,295.05	-107.14	-99.91	-107.24	0.00	0.00	0.00
3,400.00	4.00	223.00	3,394.80	-112.24	-104.67	-112.35	0.00	0.00	0.00
3,500.00	4.00	223.00	3,494.56	-117.34	-109.42	-117.46	0.00	0.00	0.00
3,600.00	4.00	223.00	3,594.32	-122.44	-114.18	-122.56	0.00	0.00	0.00
3,700.00	4.00	223.00	3,694.07	-127.55	-118.94	-127.67	0.00	0.00	0.00
3,800.00	4.00	223.00	3,793.83	-132.65	-123.70	-132.78	0.00	0.00	0.00
3,900.00	4.00	223.00	3,893.59	-137.75	-128.45	-137.88	0.00	0.00	0.00
4,006.67	4.00	223.00	4,000.00	-143.19	-133.53	-143.33	0.00	0.00	0.00
4,100.00	3.07	223.00	4,093.15	-147.40	-137.45	-147.54	1.00	-1.00	0.00
4,200.00	2.07	223.00	4,193.05	-150.67	-140.50	-150.82	1.00	-1.00	0.00
4,300.00	1.07	223.00	4,293.01	-152.67	-142.37	-152.82	1.00	-1.00	0.00
4,406.67	0.00	0.00	4,399.68	-153.40	-143.05	-153.55	1.00	-1.00	0.00
4,500.00	0.00	0.00	4,493.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
4,600.00	0.00	0.00	4,593.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
4,700.00	0.00	0.00	4,693.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
4,800.00	0.00	0.00	4,793.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
4,900.00	0.00	0.00	4,893.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,000.00	0.00	0.00	4,993.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,100.00	0.00	0.00	5,093.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,200.00	0.00	0.00	5,193.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,300.00	0.00	0.00	5,293.00	-153.40	-143.05	-153.55	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**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)
5,400.00	0.00	0.00	5,393.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,500.00	0.00	0.00	5,493.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,600.00	0.00	0.00	5,593.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,700.00	0.00	0.00	5,693.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,800.00	0.00	0.00	5,793.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
5,900.00	0.00	0.00	5,893.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,000.00	0.00	0.00	5,993.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,100.00	0.00	0.00	6,093.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,200.00	0.00	0.00	6,193.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,300.00	0.00	0.00	6,293.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,400.00	0.00	0.00	6,393.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,500.00	0.00	0.00	6,493.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,600.00	0.00	0.00	6,593.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,700.00	0.00	0.00	6,693.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,800.00	0.00	0.00	6,793.00	-153.40	-143.05	-153.55	0.00	0.00	0.00
6,899.54	0.00	0.00	6,892.54	-153.40	-143.05	-153.55	0.00	0.00	0.00
KOP: 6899.54' MD, 6892.54' TVD									
6,925.00	3.06	0.06	6,917.99	-152.72	-143.05	-152.87	12.00	12.00	0.00
6,950.00	6.06	0.06	6,942.91	-150.73	-143.04	-150.88	12.00	12.00	0.00
6,975.00	9.06	0.06	6,967.69	-147.45	-143.04	-147.60	12.00	12.00	0.00
7,000.00	12.06	0.06	6,992.26	-142.87	-143.04	-143.02	12.00	12.00	0.00
7,025.00	15.06	0.06	7,016.56	-137.01	-143.03	-137.16	12.00	12.00	0.00
7,050.00	18.06	0.06	7,040.52	-129.89	-143.02	-130.04	12.00	12.00	0.00
7,075.00	21.06	0.06	7,064.08	-121.52	-143.01	-121.67	12.00	12.00	0.00
7,100.00	24.06	0.06	7,087.16	-111.93	-143.00	-112.08	12.00	12.00	0.00
7,125.00	27.06	0.06	7,109.71	-101.15	-142.99	-101.30	12.00	12.00	0.00
7,150.00	30.06	0.06	7,131.67	-89.20	-142.98	-89.35	12.00	12.00	0.00
7,175.00	33.06	0.06	7,152.97	-76.12	-142.97	-76.27	12.00	12.00	0.00
7,200.00	36.06	0.06	7,173.56	-61.94	-142.95	-62.09	12.00	12.00	0.00
7,225.00	39.06	0.06	7,193.38	-46.70	-142.94	-46.85	12.00	12.00	0.00
7,250.00	42.06	0.06	7,212.37	-30.45	-142.92	-30.60	12.00	12.00	0.00
7,275.00	45.06	0.06	7,230.48	-13.23	-142.91	-13.38	12.00	12.00	0.00
7,300.00	48.06	0.06	7,247.67	4.92	-142.89	4.77	12.00	12.00	0.00
7,325.00	51.06	0.06	7,263.89	23.95	-142.87	23.80	12.00	12.00	0.00
7,350.00	54.06	0.06	7,279.09	43.79	-142.85	43.64	12.00	12.00	0.00
7,375.00	57.06	0.06	7,293.23	64.41	-142.83	64.26	12.00	12.00	0.00
7,400.00	60.06	0.06	7,306.27	85.73	-142.81	85.58	12.00	12.00	0.00
7,425.00	63.06	0.06	7,318.17	107.71	-142.78	107.56	12.00	12.00	0.00
7,450.00	66.06	0.06	7,328.91	130.28	-142.76	130.13	12.00	12.00	0.00
7,456.46	66.83	0.06	7,331.49	136.21	-142.75	136.06	12.00	12.00	0.00
FTP(RFC#3H)									
7,475.00	69.06	0.06	7,338.46	153.39	-142.74	153.24	12.00	12.00	0.00
7,500.00	72.06	0.06	7,346.78	176.96	-142.71	176.81	12.00	12.00	0.00
7,525.00	75.06	0.06	7,353.85	200.93	-142.69	200.78	12.00	12.00	0.00
7,550.00	78.06	0.06	7,359.67	225.25	-142.66	225.10	12.00	12.00	0.00
7,575.00	81.06	0.06	7,364.20	249.83	-142.64	249.68	12.00	12.00	0.00
7,600.00	84.06	0.06	7,367.44	274.62	-142.61	274.47	12.00	12.00	0.00
7,625.00	87.06	0.06	7,369.37	299.54	-142.59	299.39	12.00	12.00	0.00
7,650.02	90.06	0.06	7,370.00	324.55	-142.56	324.40	12.00	12.00	0.00
EOC: 7650.02' MD, 7370.00' TVD, 90.06° INC, 0.06° AZ, 326.37' VS									
7,700.00	90.06	0.06	7,369.95	374.53	-142.51	374.38	0.00	0.00	0.00
7,800.00	90.06	0.06	7,369.85	474.53	-142.41	474.38	0.00	0.00	0.00
7,900.00	90.06	0.06	7,369.75	574.53	-142.31	574.38	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**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)
8,000.00	90.06	0.06	7,369.65	674.53	-142.21	674.38	0.00	0.00	0.00
8,100.00	90.06	0.06	7,369.55	774.53	-142.11	774.38	0.00	0.00	0.00
8,200.00	90.06	0.06	7,369.45	874.53	-142.01	874.38	0.00	0.00	0.00
8,300.00	90.06	0.06	7,369.35	974.53	-141.91	974.38	0.00	0.00	0.00
8,400.00	90.06	0.06	7,369.24	1,074.53	-141.81	1,074.38	0.00	0.00	0.00
8,500.00	90.06	0.06	7,369.14	1,174.53	-141.70	1,174.38	0.00	0.00	0.00
8,600.00	90.06	0.06	7,369.04	1,274.53	-141.60	1,274.38	0.00	0.00	0.00
8,700.00	90.06	0.06	7,368.94	1,374.53	-141.50	1,374.38	0.00	0.00	0.00
8,800.00	90.06	0.06	7,368.84	1,474.53	-141.40	1,474.38	0.00	0.00	0.00
8,900.00	90.06	0.06	7,368.74	1,574.53	-141.30	1,574.38	0.00	0.00	0.00
9,000.00	90.06	0.06	7,368.63	1,674.53	-141.20	1,674.38	0.00	0.00	0.00
9,100.00	90.06	0.06	7,368.53	1,774.52	-141.10	1,774.38	0.00	0.00	0.00
9,200.00	90.06	0.06	7,368.43	1,874.52	-141.00	1,874.38	0.00	0.00	0.00
9,300.00	90.06	0.06	7,368.33	1,974.52	-140.90	1,974.38	0.00	0.00	0.00
9,400.00	90.06	0.06	7,368.23	2,074.52	-140.80	2,074.38	0.00	0.00	0.00
9,500.00	90.06	0.06	7,368.13	2,174.52	-140.69	2,174.38	0.00	0.00	0.00
9,600.00	90.06	0.06	7,368.03	2,274.52	-140.59	2,274.38	0.00	0.00	0.00
9,700.00	90.06	0.06	7,367.92	2,374.52	-140.49	2,374.38	0.00	0.00	0.00
9,800.00	90.06	0.06	7,367.82	2,474.52	-140.39	2,474.38	0.00	0.00	0.00
9,900.00	90.06	0.06	7,367.72	2,574.52	-140.29	2,574.38	0.00	0.00	0.00
10,000.00	90.06	0.06	7,367.62	2,674.52	-140.19	2,674.38	0.00	0.00	0.00
10,100.00	90.06	0.06	7,367.52	2,774.52	-140.09	2,774.38	0.00	0.00	0.00
10,200.00	90.06	0.06	7,367.42	2,874.52	-139.99	2,874.38	0.00	0.00	0.00
10,300.00	90.06	0.06	7,367.32	2,974.52	-139.89	2,974.38	0.00	0.00	0.00
10,400.00	90.06	0.06	7,367.21	3,074.52	-139.78	3,074.38	0.00	0.00	0.00
10,500.00	90.06	0.06	7,367.11	3,174.52	-139.68	3,174.38	0.00	0.00	0.00
10,600.00	90.06	0.06	7,367.01	3,274.52	-139.58	3,274.38	0.00	0.00	0.00
10,700.00	90.06	0.06	7,366.91	3,374.52	-139.48	3,374.38	0.00	0.00	0.00
10,800.00	90.06	0.06	7,366.81	3,474.52	-139.38	3,474.38	0.00	0.00	0.00
10,900.00	90.06	0.06	7,366.71	3,574.52	-139.28	3,574.38	0.00	0.00	0.00
11,000.00	90.06	0.06	7,366.61	3,674.52	-139.18	3,674.38	0.00	0.00	0.00
11,100.00	90.06	0.06	7,366.50	3,774.52	-139.08	3,774.38	0.00	0.00	0.00
11,200.00	90.06	0.06	7,366.40	3,874.52	-138.98	3,874.38	0.00	0.00	0.00
11,300.00	90.06	0.06	7,366.30	3,974.52	-138.88	3,974.38	0.00	0.00	0.00
11,400.00	90.06	0.06	7,366.20	4,074.52	-138.77	4,074.38	0.00	0.00	0.00
11,500.00	90.06	0.06	7,366.10	4,174.52	-138.67	4,174.38	0.00	0.00	0.00
11,600.00	90.06	0.06	7,366.00	4,274.52	-138.57	4,274.37	0.00	0.00	0.00
11,700.00	90.06	0.06	7,365.90	4,374.52	-138.47	4,374.37	0.00	0.00	0.00
11,800.00	90.06	0.06	7,365.79	4,474.52	-138.37	4,474.37	0.00	0.00	0.00
11,900.00	90.06	0.06	7,365.69	4,574.52	-138.27	4,574.37	0.00	0.00	0.00
12,000.00	90.06	0.06	7,365.59	4,674.52	-138.17	4,674.37	0.00	0.00	0.00
12,100.00	90.06	0.06	7,365.49	4,774.52	-138.07	4,774.37	0.00	0.00	0.00
12,200.00	90.06	0.06	7,365.39	4,874.52	-137.97	4,874.37	0.00	0.00	0.00
12,300.00	90.06	0.06	7,365.29	4,974.52	-137.86	4,974.37	0.00	0.00	0.00
12,400.00	90.06	0.06	7,365.19	5,074.52	-137.76	5,074.37	0.00	0.00	0.00
12,500.00	90.06	0.06	7,365.08	5,174.52	-137.66	5,174.37	0.00	0.00	0.00
12,600.00	90.06	0.06	7,364.98	5,274.52	-137.56	5,274.37	0.00	0.00	0.00
12,700.00	90.06	0.06	7,364.88	5,374.52	-137.46	5,374.37	0.00	0.00	0.00
12,800.00	90.06	0.06	7,364.78	5,474.52	-137.36	5,474.37	0.00	0.00	0.00
12,900.00	90.06	0.06	7,364.68	5,574.52	-137.26	5,574.37	0.00	0.00	0.00
13,000.00	90.06	0.06	7,364.58	5,674.52	-137.16	5,674.37	0.00	0.00	0.00
13,100.00	90.06	0.06	7,364.47	5,774.52	-137.06	5,774.37	0.00	0.00	0.00
13,200.00	90.06	0.06	7,364.37	5,874.52	-136.96	5,874.37	0.00	0.00	0.00
13,300.00	90.06	0.06	7,364.27	5,974.52	-136.85	5,974.37	0.00	0.00	0.00

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**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)
13,400.00	90.06	0.06	7,364.17	6,074.52	-136.75	6,074.37	0.00	0.00	0.00
13,500.00	90.06	0.06	7,364.07	6,174.52	-136.65	6,174.37	0.00	0.00	0.00
13,600.00	90.06	0.06	7,363.97	6,274.52	-136.55	6,274.37	0.00	0.00	0.00
13,700.00	90.06	0.06	7,363.87	6,374.52	-136.45	6,374.37	0.00	0.00	0.00
13,800.00	90.06	0.06	7,363.76	6,474.52	-136.35	6,474.37	0.00	0.00	0.00
13,900.00	90.06	0.06	7,363.66	6,574.52	-136.25	6,574.37	0.00	0.00	0.00
14,000.00	90.06	0.06	7,363.56	6,674.52	-136.15	6,674.37	0.00	0.00	0.00
14,100.00	90.06	0.06	7,363.46	6,774.52	-136.05	6,774.37	0.00	0.00	0.00
14,200.00	90.06	0.06	7,363.36	6,874.52	-135.94	6,874.37	0.00	0.00	0.00
14,300.00	90.06	0.06	7,363.26	6,974.52	-135.84	6,974.37	0.00	0.00	0.00
14,400.00	90.06	0.06	7,363.16	7,074.52	-135.74	7,074.37	0.00	0.00	0.00
14,500.00	90.06	0.06	7,363.05	7,174.52	-135.64	7,174.37	0.00	0.00	0.00
14,600.00	90.06	0.06	7,362.95	7,274.52	-135.54	7,274.37	0.00	0.00	0.00
14,700.00	90.06	0.06	7,362.85	7,374.52	-135.44	7,374.37	0.00	0.00	0.00
14,800.00	90.06	0.06	7,362.75	7,474.52	-135.34	7,474.37	0.00	0.00	0.00
14,900.00	90.06	0.06	7,362.65	7,574.52	-135.24	7,574.37	0.00	0.00	0.00
15,000.00	90.06	0.06	7,362.55	7,674.52	-135.14	7,674.37	0.00	0.00	0.00
15,100.00	90.06	0.06	7,362.45	7,774.52	-135.04	7,774.37	0.00	0.00	0.00
15,200.00	90.06	0.06	7,362.34	7,874.52	-134.93	7,874.37	0.00	0.00	0.00
15,300.00	90.06	0.06	7,362.24	7,974.52	-134.83	7,974.37	0.00	0.00	0.00
15,400.00	90.06	0.06	7,362.14	8,074.52	-134.73	8,074.37	0.00	0.00	0.00
15,500.00	90.06	0.06	7,362.04	8,174.52	-134.63	8,174.37	0.00	0.00	0.00
15,600.00	90.06	0.06	7,361.94	8,274.52	-134.53	8,274.37	0.00	0.00	0.00
15,700.00	90.06	0.06	7,361.84	8,374.52	-134.43	8,374.37	0.00	0.00	0.00
15,800.00	90.06	0.06	7,361.74	8,474.52	-134.33	8,474.37	0.00	0.00	0.00
15,900.00	90.06	0.06	7,361.63	8,574.52	-134.23	8,574.37	0.00	0.00	0.00
16,000.00	90.06	0.06	7,361.53	8,674.52	-134.13	8,674.37	0.00	0.00	0.00
16,100.00	90.06	0.06	7,361.43	8,774.52	-134.02	8,774.37	0.00	0.00	0.00
16,200.00	90.06	0.06	7,361.33	8,874.52	-133.92	8,874.37	0.00	0.00	0.00
16,300.00	90.06	0.06	7,361.23	8,974.52	-133.82	8,974.37	0.00	0.00	0.00
16,400.00	90.06	0.06	7,361.13	9,074.52	-133.72	9,074.37	0.00	0.00	0.00
16,500.00	90.06	0.06	7,361.02	9,174.52	-133.62	9,174.37	0.00	0.00	0.00
16,600.00	90.06	0.06	7,360.92	9,274.52	-133.52	9,274.37	0.00	0.00	0.00
16,700.00	90.06	0.06	7,360.82	9,374.52	-133.42	9,374.37	0.00	0.00	0.00
16,800.00	90.06	0.06	7,360.72	9,474.52	-133.32	9,474.37	0.00	0.00	0.00
16,900.00	90.06	0.06	7,360.62	9,574.52	-133.22	9,574.37	0.00	0.00	0.00
17,000.00	90.06	0.06	7,360.52	9,674.52	-133.12	9,674.37	0.00	0.00	0.00
17,100.00	90.06	0.06	7,360.42	9,774.52	-133.01	9,774.37	0.00	0.00	0.00
17,200.00	90.06	0.06	7,360.31	9,874.52	-132.91	9,874.37	0.00	0.00	0.00
17,300.00	90.06	0.06	7,360.21	9,974.52	-132.81	9,974.37	0.00	0.00	0.00
17,379.79	90.06	0.06	7,360.13	10,054.31	-132.73	10,054.17	0.00	0.00	0.00
LTP(RFC#3H)									
17,400.00	90.06	0.06	7,360.11	10,074.52	-132.71	10,074.37	0.00	0.00	0.00
17,509.98	90.06	0.06	7,360.00	10,184.50	-132.60	10,184.35	0.00	0.00	0.00
TD: 17509.98' MD, 7360.00' TVD - PBHL(RFC#3H)									

Database:	EDM 5000.14 Single User Db	**Local Co-ordinate Reference:**	Well #3H
Company:	COG OPERATING, LLC	**TVD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Project:	Eddy County, NM (NAD27) NMZ	**MD Reference:**	RKB @ 3266.40usft (Rig KB = 25')
Site:	Roadrunner Fed COM	**North Reference:**	Grid
Well:	#3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LTP(RFC#3H)	0.00	0.00	7,360.00	10,054.31	-132.75	407,986.91	526,270.85	32° 7' 17.918 N	104° 14' 54.510 W
- plan misses target center by 0.13usft at 17379.79usft MD (7360.13 TVD, 10054.31 N, -132.73 E)									
- Point									
PBHL(RFC#3H)	0.00	0.00	7,360.00	10,184.50	-132.60	408,117.10	526,271.00	32° 7' 19.207 N	104° 14' 54.507 W
- plan hits target center									
- Point									
FTP(RFC#3H)	0.00	0.00	7,370.00	120.30	-143.20	398,052.90	526,260.40	32° 5' 39.606 N	104° 14' 54.722 W
- plan misses target center by 41.66usft at 7456.46usft MD (7331.49 TVD, 136.21 N, -142.75 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
6,899.54	6,892.54	-153.40	-143.05	KOP: 6899.54' MD, 6892.54' TVD
7,650.02	7,370.00	324.55	-142.56	EOC: 7650.02' MD, 7370.00' TVD, 90.06° INC, 0.06° AZ, 326.37' VS
17,509.98	7,360.00	10,184.50	-132.60	TD: 17509.98' MD, 7360.00' TVD

Azimuths to Grid North
True North: -0.04°
Magnetic North: 7.16°

Magnetic Field
Strength: 47739.0snT
Dip Angle: 59.83°
Date: 12/13/2017
Model: IGRF2015

ENERGY SERVICES, LLC.

COG OPERATING, LLC
#3H
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: 3241.40 RKB @ 3266.40usft (Rig KB = 25')

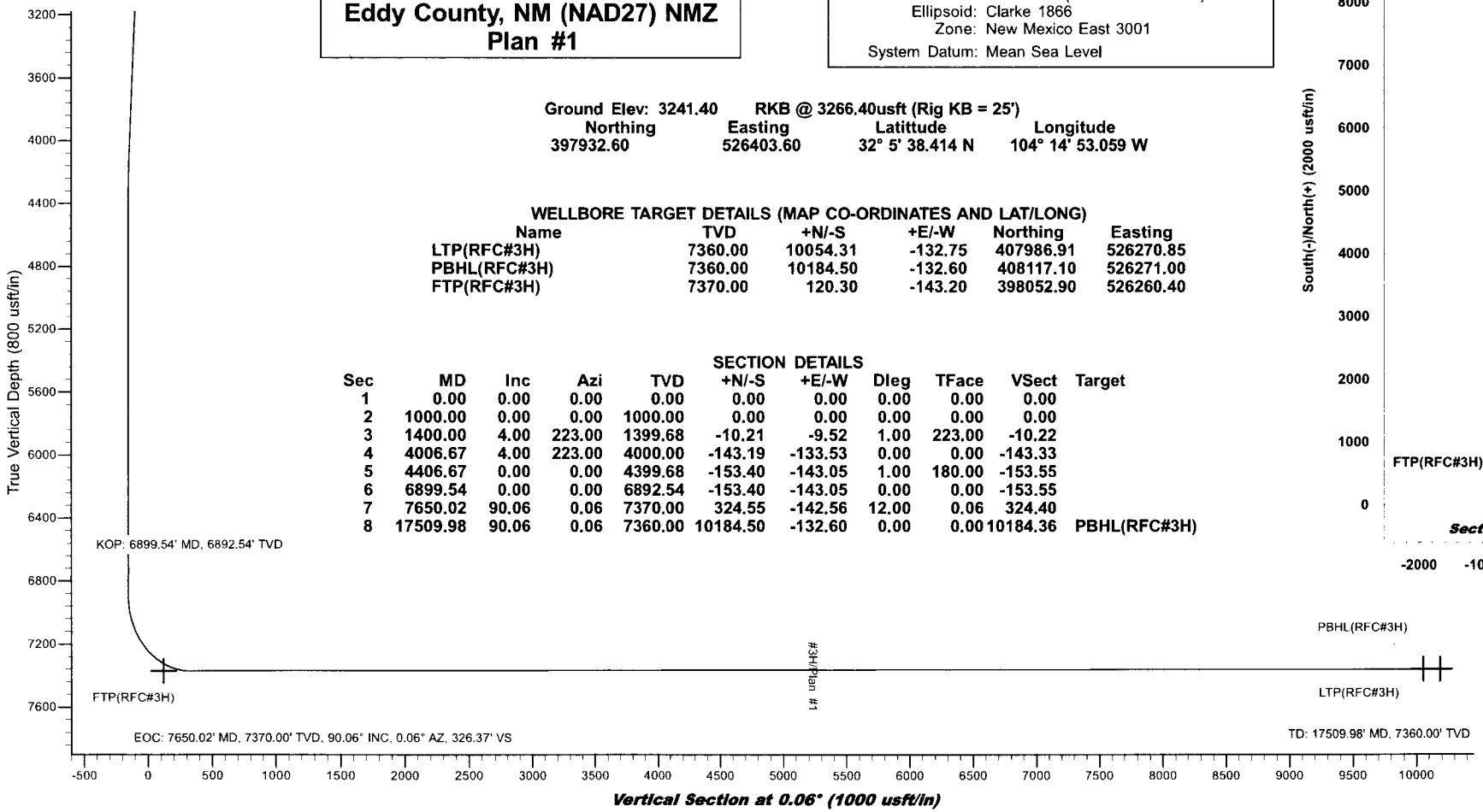
Northing	Easting	Latittude	Longitude
397932.60	526403.60	32° 5' 38.414 N	104° 14' 53.059 W

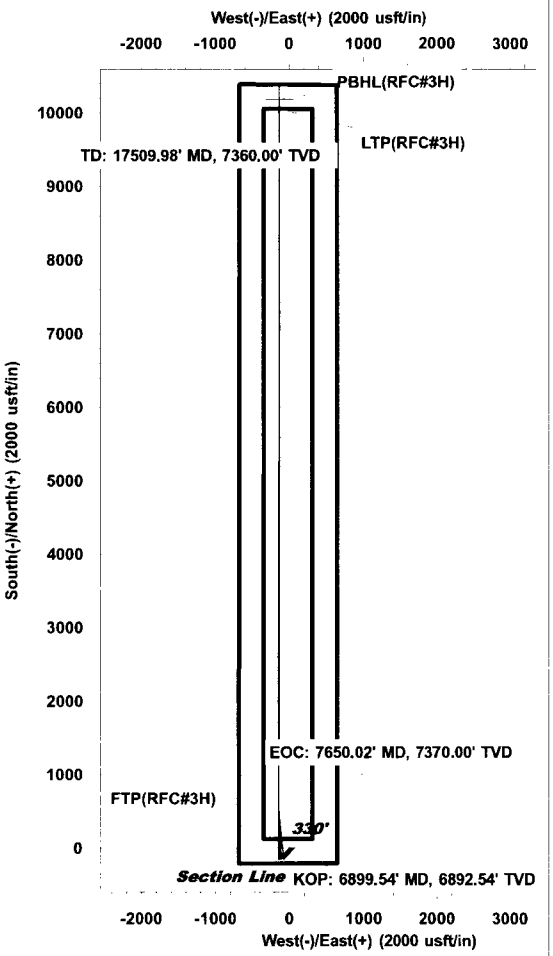
WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting
LTP(RFC#3H)	7360.00	10054.31	-132.75	407986.91	526270.85
PBHL(RFC#3H)	7360.00	10184.50	-132.60	408117.10	526271.00
FTP(RFC#3H)	7370.00	120.30	-143.20	398052.90	526260.40

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	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	1400.00	4.00	223.00	1399.68	-10.21	-9.52	1.00	223.00	-10.22	
4	4006.67	4.00	223.00	4000.00	-143.19	-133.53	0.00	0.00	-143.33	
5	4406.67	0.00	0.00	4399.68	-153.40	-143.05	1.00	180.00	-153.55	
6	6899.54	0.00	0.00	6892.54	-153.40	-143.05	0.00	0.00	-153.55	
7	7650.02	90.06	0.06	7370.00	324.55	-142.56	12.00	0.06	324.40	
8	17509.98	90.06	0.06	7360.00	10184.50	-132.60	0.00	0.00	10184.36	PBHL(RFC#3H)





17:09, December 13 2017

Well Planning: Gabriel Cruz

COG Operating, LLC - ROADRUNNER FEDERAL COM 3H

1. Geologic Formations

TVD of target	7,370' EOL	Pilot hole depth	NA
MD at TD:	17,510'	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 From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
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	1.38	6.81
8.75"	0	17,510	5.5"	17	P110	LTC	2.08	3.71	3.55
			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 3H

	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 3rd 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 2nd 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?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	80	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl2
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
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	760	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%
1st Intermediate	0'	50%
Production	1,410'	25% OH in Lateral (KOP to EOL) – 40% OH in Vertical

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.

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	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	3605 psi at 7370' 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	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

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

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

APD ID: 10400025454 **Submission Date:** 12/20/2017

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Roadrunner_3H_Exist_Rd_20171219103131.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_3H_Roads_20171219103515.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:** 3H

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_3H_1Mile_20171219103547.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 3H. 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_3H_ProdFacil_20171219103600.pdf

COG_Roadrunner_CTB_3_20171219104540.pdf

COG_Roadrunner_3H_Flowline_20171220163139.pdf

Operator Name: COG OPERATING LLC

Well Name: ROADRUNNER FEDERAL COM **Well Number:** 3H

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_3H_FreshH2O_20171219103620.pdf

COG_Roadrunner_3H_BrineH2O_20171219103631.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:**

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:

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:** 3H

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: YES

Ancillary Facilities attachment:

COG_Roadrunner_3H_GCP_20171219104106.pdf

Comments: GCP attached.

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Roadrunner_3H_ProdFacil_20171219104121.pdf

COG_Roadrunner_CTB_3_20171219104219.pdf

COG_Roadrunner_3H_Flowline_20171220163227.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
Road proposed disturbance (acres): 0.1
Powerline proposed disturbance (acres): 0.01
Pipeline proposed disturbance (acres): 0.01
Other proposed disturbance (acres): 0

Total proposed disturbance: 3.79

Well pad interim reclamation (acres): 0.15
Road interim reclamation (acres): 0.1
Powerline interim reclamation (acres): 0.01
Pipeline interim reclamation (acres): 0.01
Other interim reclamation (acres): 0

Total interim reclamation: 0.27

Well pad long term disturbance (acres): 2.35
Road long term disturbance (acres): 0.1
Powerline long term disturbance (acres): 0.01
Pipeline long term disturbance (acres): 0.01
Other long term disturbance (acres): 0

Total long term disturbance: 2.47

Reconstruction method: New construction of pad.

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:** 3H

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_3H_ClosedLoop_20171219105820.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:** 3H

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

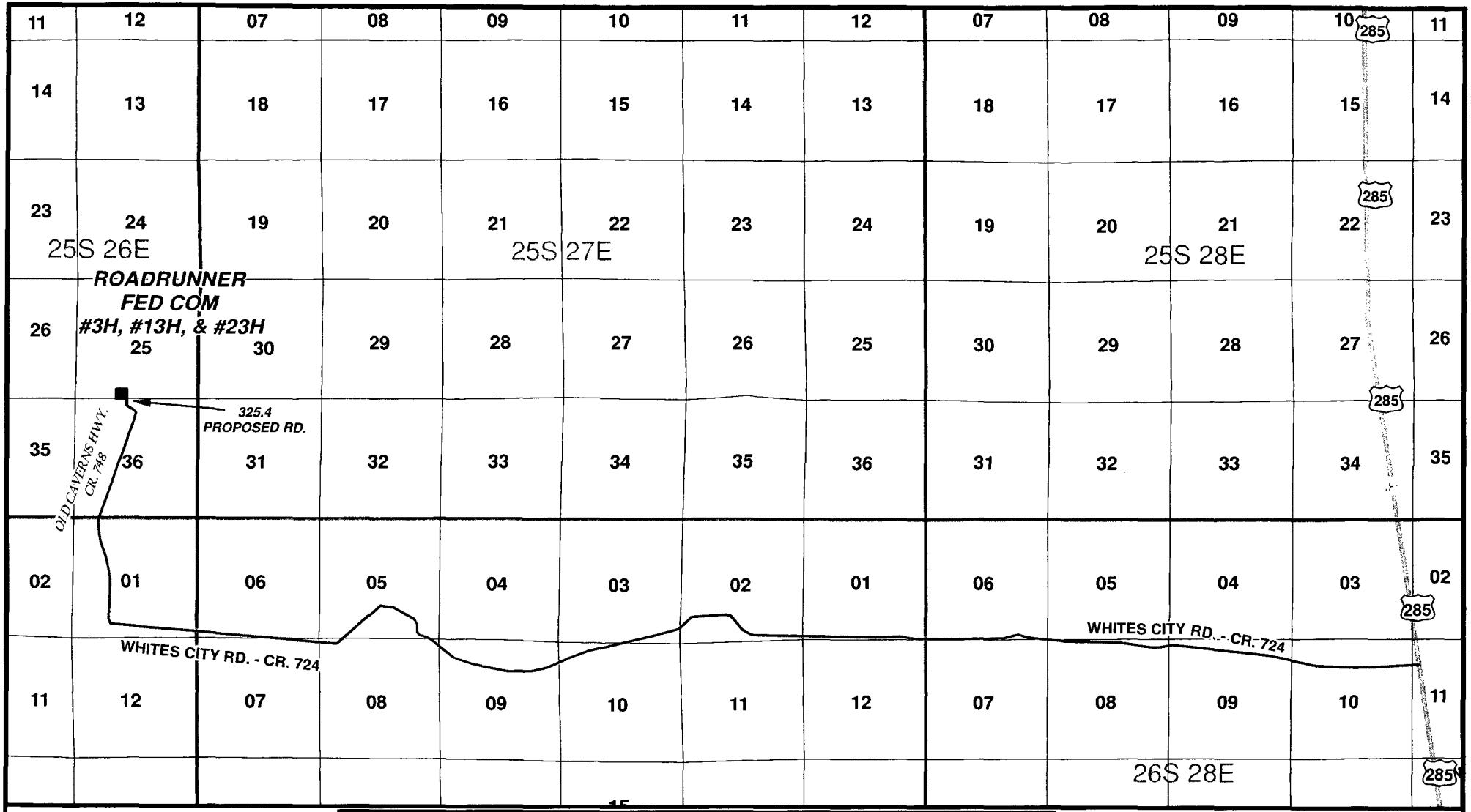
SUPO Additional Information:

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_3H_Certif_20171219111034.pdf



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 20,000 FEET

0 0.5 1 2 Miles

1 IN = 6,000 FT

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

N

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COG OPERATING, LLC

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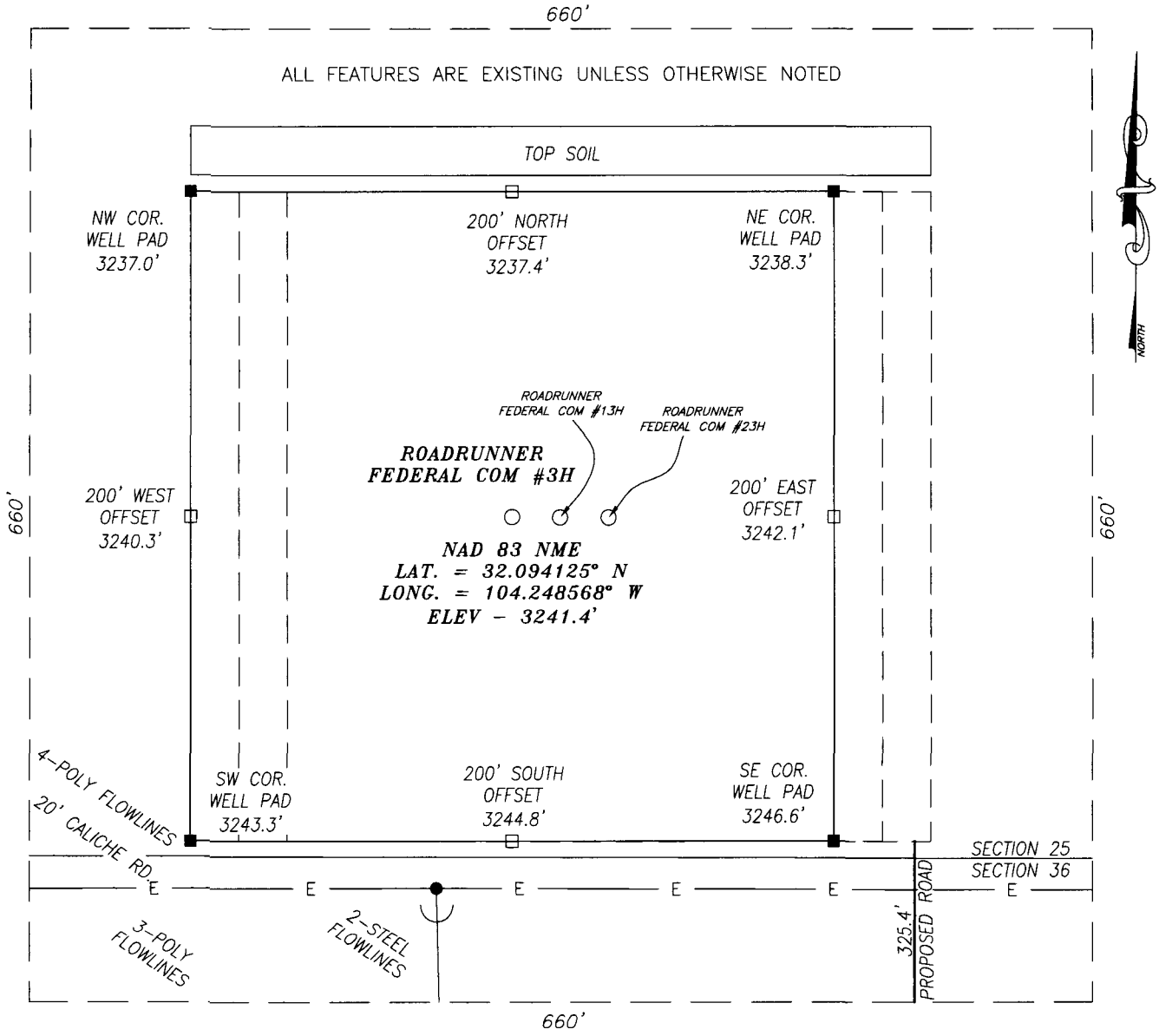
c.harcrow@harcrowsurveying.com

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.

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100 0 100 200 Feet

Scale: 1"=100'

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 NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

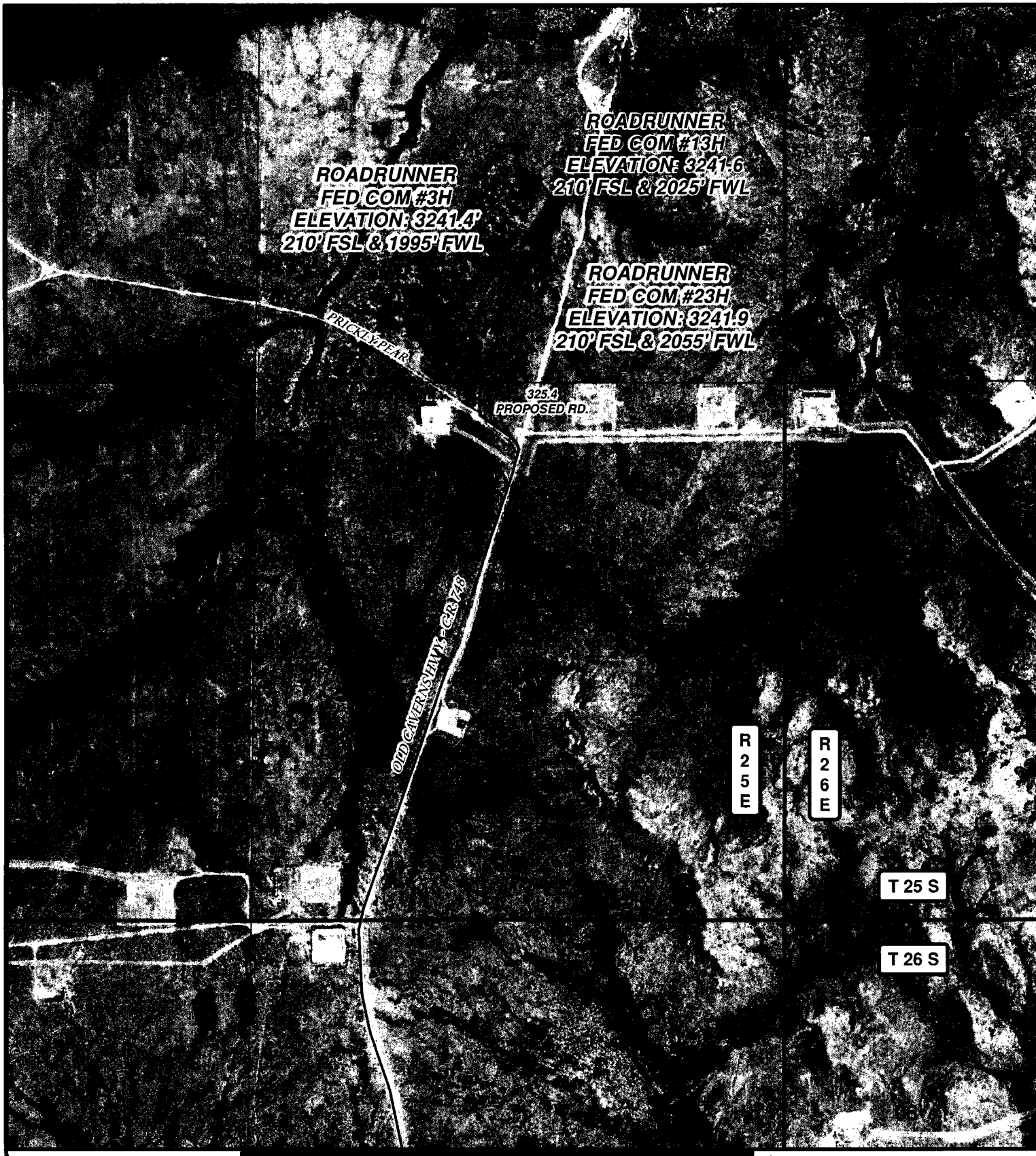
Chad Harcrow 11/6/17

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

COG OPERATING, LLC

ROADRUNNER FEDERAL COM #3H WELL LOCATED 210 FEET FROM THE SOUTH LINE AND 1995 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: 17-1376



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.

N

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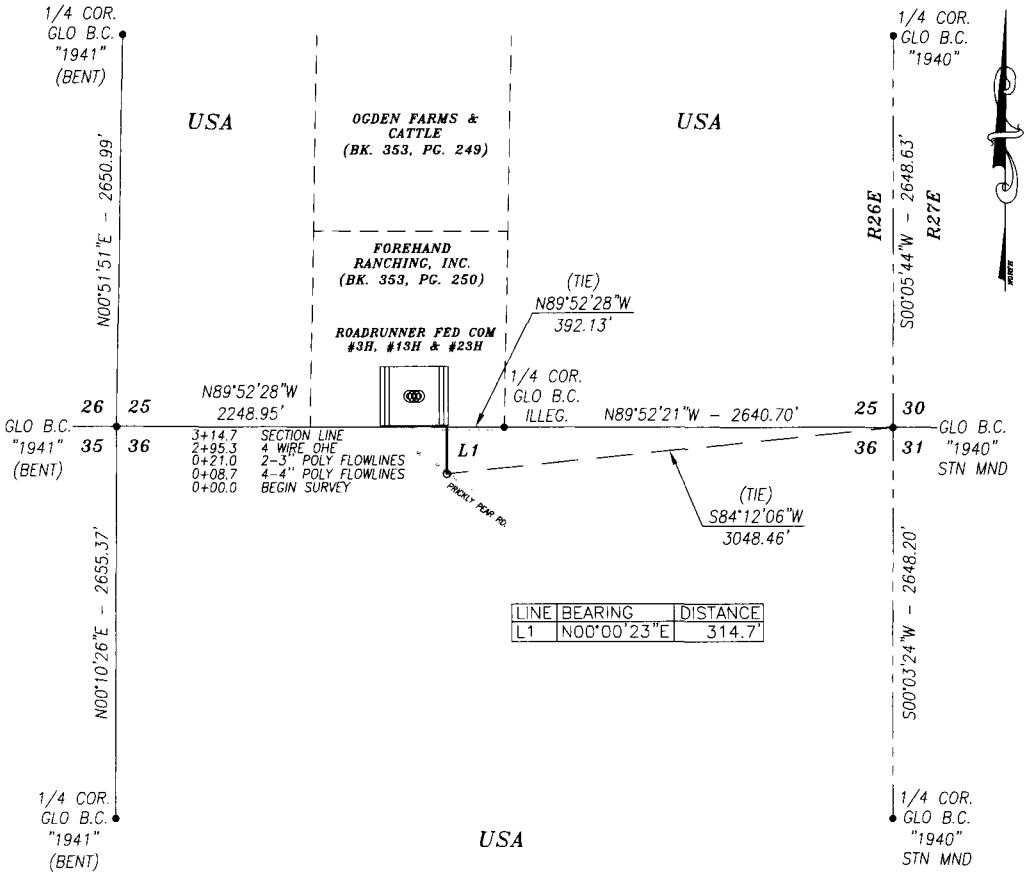
ACCESS ROAD PLAT
COG OPERATING, LLC.

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.



LINE	BEARING	DISTANCE
L1	N00°00'23"E	314.7'

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 11/6/17
CHAD HARCROW N.M.P.S. NO. 17777 DATE

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

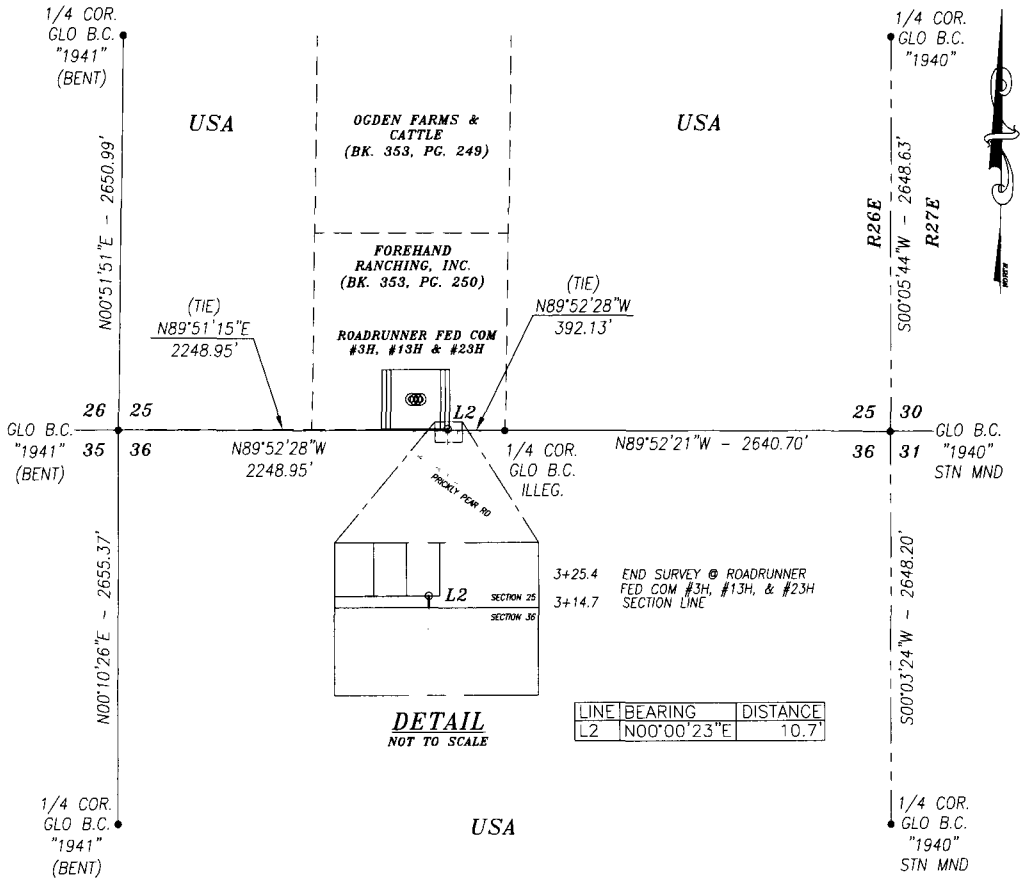
COG OPERATING, LLC

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		PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: VD	FILE: 17-1385

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 11/6/17
CHAD HARCROW N.M.P.S. NO. 17777 DATE

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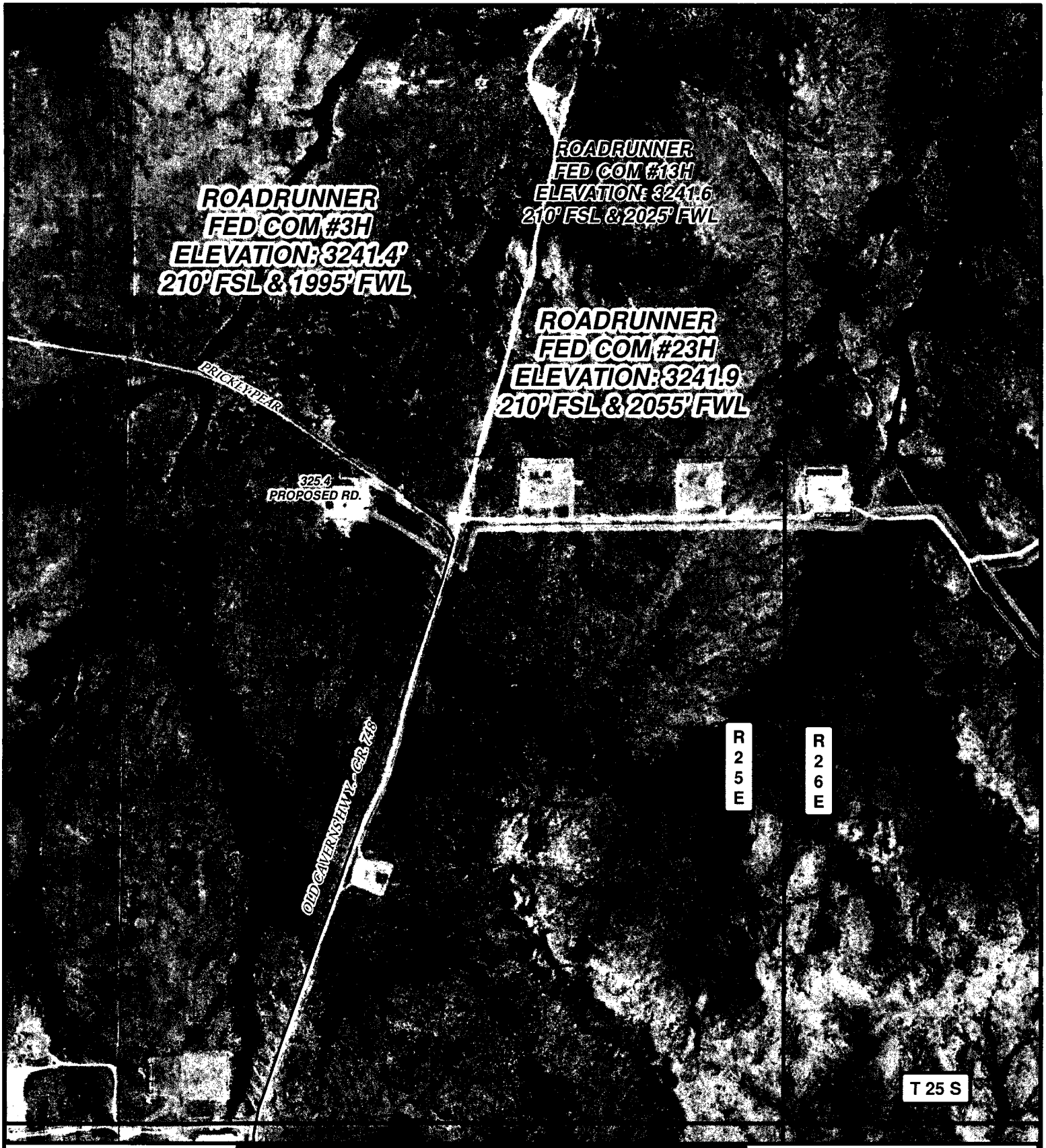
1000 0 1000 2000 FEET
SCALE: 1"=1000'

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: 17-1385



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.

N

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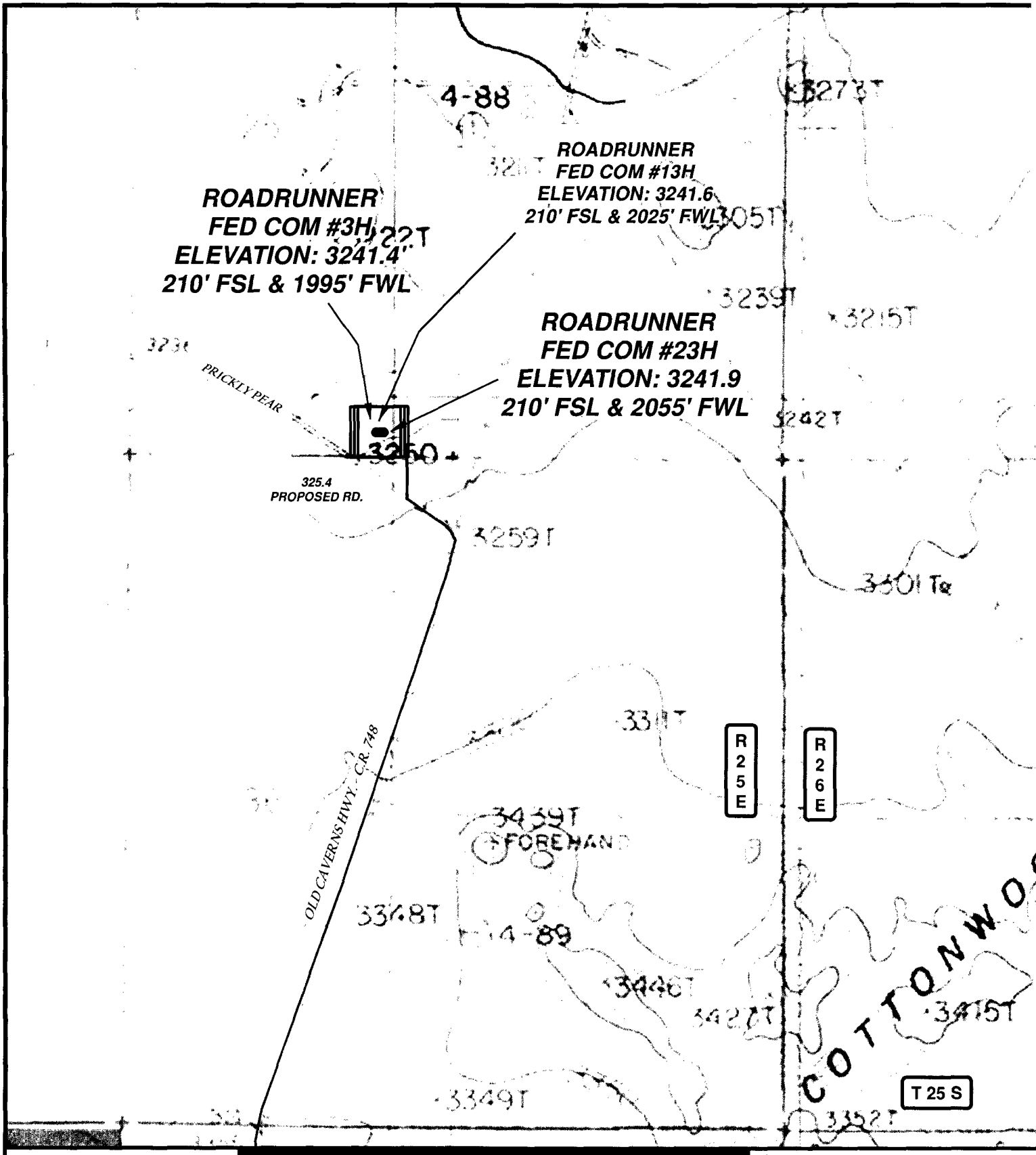

LEGEND

- 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.

N

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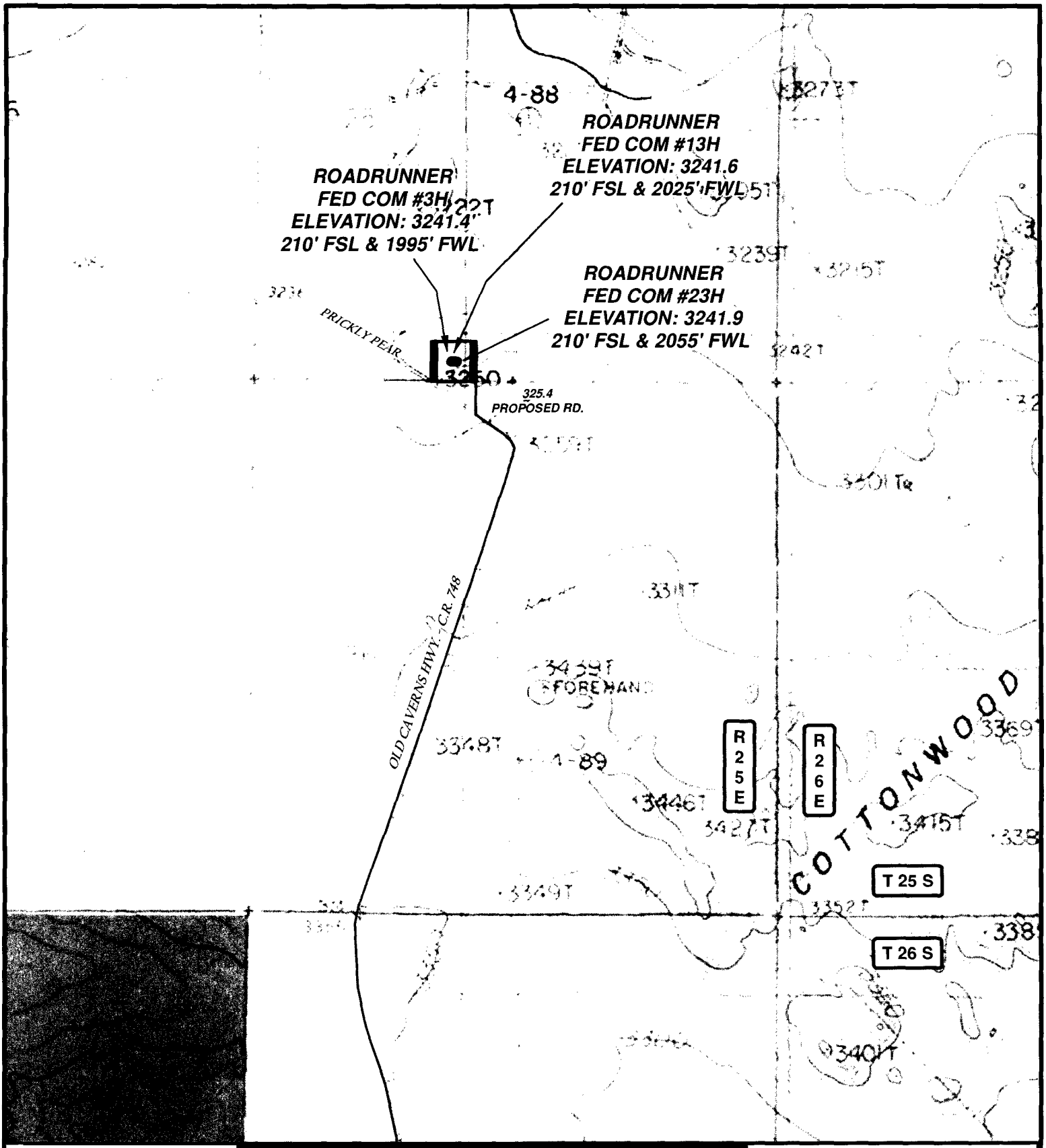

LEGEND

- 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.

N

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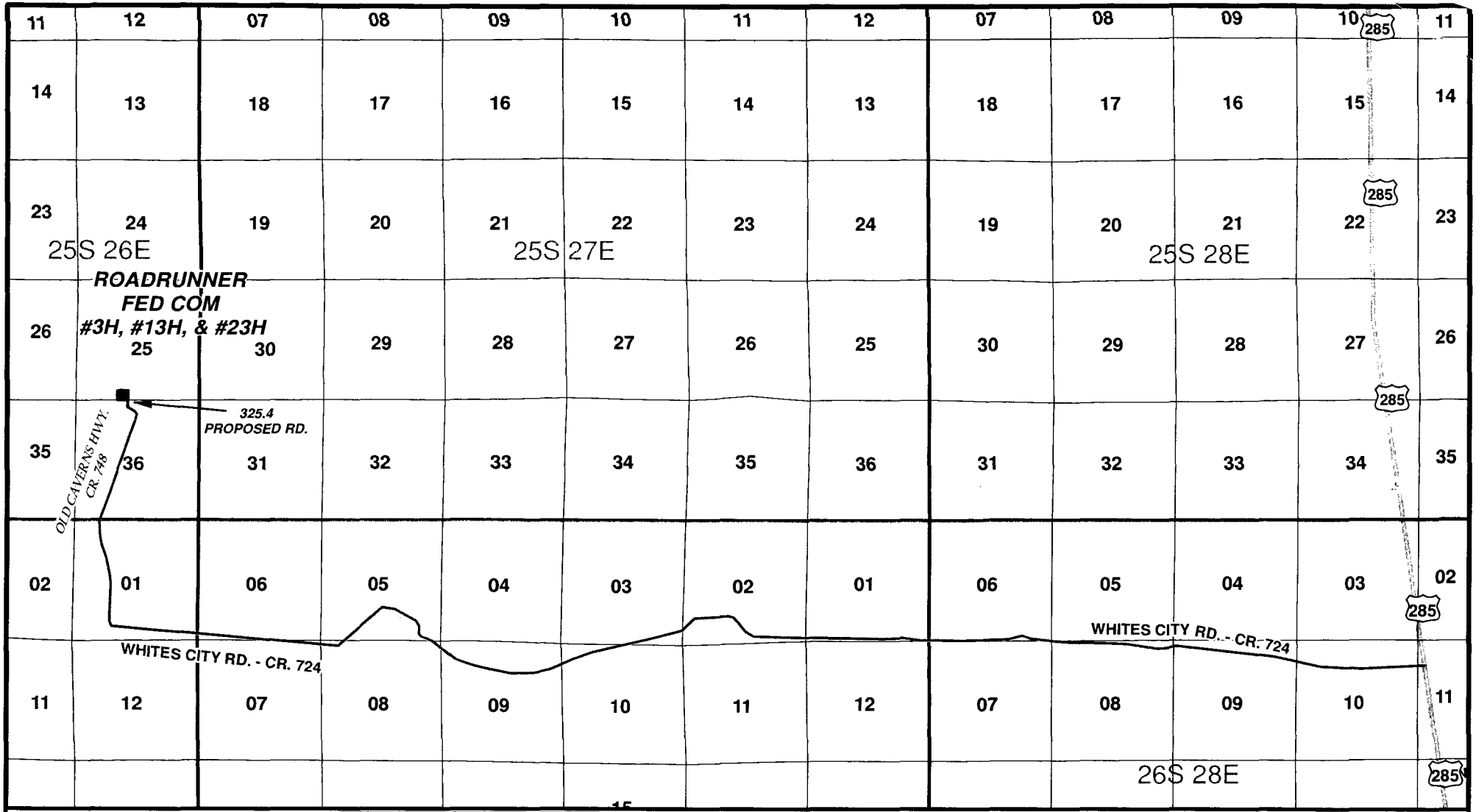

LEGEND

- 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 20,000 FEET

0 0.5 1 2 Miles 1 IN = 6,000 FT

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

N

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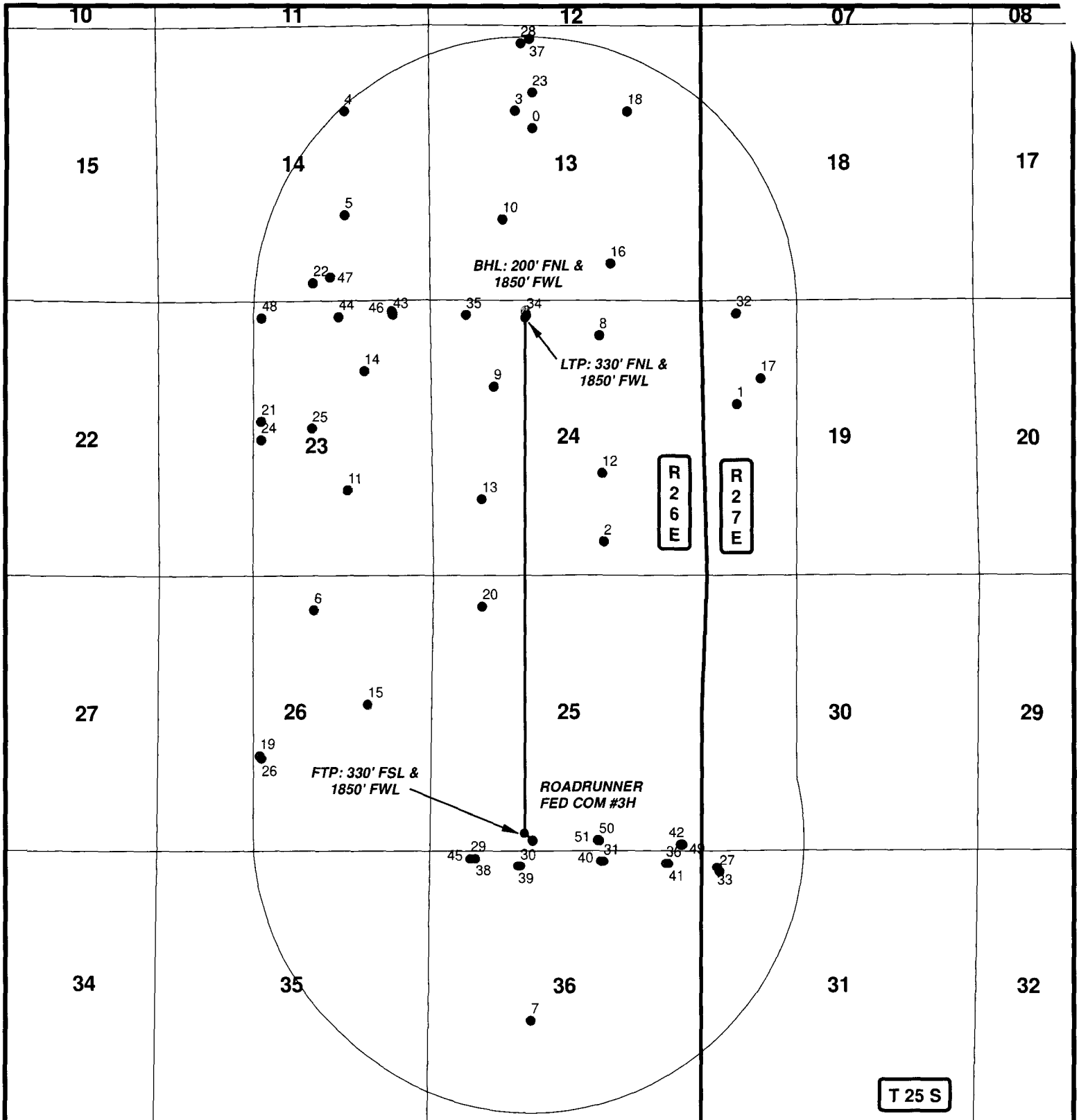

DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH SEPTEMBER 16, 2017.

LEGEND

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

ROADRUNNER FEDEREAL COM #3H

SEC: 25	TWP: 25 S.	RGE: 25 E.	ELEVATION: 3241.4'
STATE: NEW MEXICO		COUNTY: EDDY	210' FSL & 1995' FWL
W.O. # 17-1376	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.

N

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ROADRUNNER FEDEREAL COM #3H 1 MILE DATA

FID	API	OPERATOR	RANGE	SECTION	TOWNSHIP	WELL_NAME	COMPL_STAT	EW_CD	FTG_EW	FTG_NS	LATITUDE	LONGITUDE	NS_CD
0	3001521029	BILL & PATSY RICH	26E	13	25.0S	SULPHATE SISTER 001	Plugged	W	1980	1980	32.131768	-104.248557	N
1	3001521053	ROBERT N ENFIELD	27E	19	25.0S	BOLTON FEDERAL 001	Plugged	W	660	1980	32.117171	-104.235674	N
2	3001521186	BEARD OIL CO	26E	24	25.0S	GRIFFETH FED 001	Plugged	E	1980	660	32.109931	-104.244051	S
3	3001523492	CHEVRON U S A INC	26E	13	25.0S	FEDERAL 13 COM 001	Plugged	W	1650	1650	32.132681	-104.249634	N
4	3001524865	CIMAREX ENERGY CO. OF COLORADO	26E	14	25.0S	WHITE CITY 14 FEDERAL 001	Active	E	1650	1650	32.132646	-104.260346	N
5	3001525661	BILL & PATSY RICH	26E	14	25.0S	WHITE CITY 14 FEDERAL 002	Plugged	E	1650	1650	32.127179	-104.260312	S
6	3001529474	CHEVRON U S A INC	26E	26	25.0S	CABLE 26 002	Plugged	E	2310	660	32.106284	-104.262253	N
7	3001529560	COG OPERATING LLC	26E	36	25.0S	COTTONWOOD 36 STATE SWD 001	Plugged	W	1980	1980	32.084475	-104.248667	S
8	3001533001	COG OPERATING LLC	26E	24	25.0S	LIGHTNING 24 FEDERAL COM 001	Active	E	1980	660	32.120816	-104.244344	N
9	3001533094	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.0S	LIBERTY 24 FEDERAL COM 001	Active	W	1200	1650	32.11813	-104.250968	N
10	3001533344	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.0S	FEDERAL 13 COM 002	Active	W	1400	1565	32.126965	-104.25041	S
11	3001533563	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.0S	WIGEON 23 FEDERAL COM 001	Active	E	1650	1650	32.112644	-104.260142	S
12	3001533578	COG OPERATING LLC	26E	24	25.0S	LIGHTNING 24 FEDERAL COM 002	Active	E	1980	1980	32.11356	-104.244149	S
13	3001533683	CIMAREX ENERGY CO. OF COLORADO	26E	24	25.0S	LIBERTY 24 FEDERAL COM 002	Active	W	940	1475	32.112183	-104.251728	S
14	3001533684	CIMAREX ENERGY CO. OF COLORADO	26E	23	25.0S	WIGEON 23 FEDERAL COM 002	TA	E	1300	1350	32.118942	-104.259094	N
15	3001533685	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.0S	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	25.0S	FEDERAL 13 COM 003	Active	E	1750	725	32.124619	-104.243643	S
17	3001533981	OXY USA INC	27E	19	25.0S	MARINE 19 FEDERAL 001	Plugged	W	1130	1480	32.118558	-104.234186	N
18	3001534199	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.0S	FEDERAL 13 COM 004	Active	E	1400	1620	32.132629	-104.242588	N
19	3001534332	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.0S	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	25.0S	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	25.0S	PINTAIL 23 FEDERAL 003	Active	W	1980	2310	32.116289	-104.265571	N
22	3001536336	CIMAREX ENERGY CO. OF COLORADO	26E	14	25.0S	WHITE CITY 14 FEDERAL 004	Active	E	2280	330	32.123594	-104.262309	S
23	3001536571	CIMAREX ENERGY CO. OF COLORADO	26E	13	25.0S	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	25.0S	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	25.0S	WIGEON 23 FEDERAL 003	Plugged	E	2310	2460	32.115923	-104.262375	N
26	3001538098	CIMAREX ENERGY CO. OF COLORADO	26E	26	25.0S	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	25.0S	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	25.0S	MARQUARDT FEDERAL 011H	New (Not drilled or compl)	W	1750	360	32.136298	-104.24929	N
29	3001541970	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 002	New (Not drilled or compl)	W	800	210	32.093161	-104.252462	N
30	3001541971	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 003H	New (Not drilled or compl)	W	1770	350	32.092743	-104.249319	N
31	3001541981	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 004H	New (Not drilled or compl)	E	1870	190	32.093004	-104.244105	N
32	3001542030	OXY USA INC	27E	19	25.0S	PEACHES 19 FEDERAL 004H	New (Not drilled or compl)	W	660	150	32.121966	-104.235735	N
33	3001542132	COG OPERATING LLC	27E	31	25.0S	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	25.0S	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	25.0S	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	25.0S	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	25.0S	FEDERAL 13 COM 009H	New (Not drilled or compl)	W	1920	273	32.13652	-104.248738	N
38	3001542989	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 012H	New (Not drilled or compl)	W	900	210	32.093162	-104.252138	N
39	3001543045	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 013H	New (Not drilled or compl)	W	1720	350	32.092748	-104.249481	N
40	3001543046	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 014H	New (Not drilled or compl)	E	1920	190	32.09301	-104.244267	N
41	3001543047	COG OPERATING LLC	26E	36	25.0S	CRAIG STATE 015H	New (Not drilled or compl)	E	610	190	32.092864	-104.240016	N
42	3001543133	COG OPERATING LLC	26E	25	25.0S	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	25.0S	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	25.0S	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	25.0S	CRAIG STATE 002H	New (Not drilled or compl)	W	800	210	32.093161	-104.252462	N
46	3001543760	CIMAREX ENERGY CO.	26E	23	25.0S	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	25.0S	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	25.0S	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	25.0S	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	25.0S	ROAD RUNNER FEDERAL COM 002H	New (Not drilled or compl)	E	1965	210	32.094114	-104.244387	S

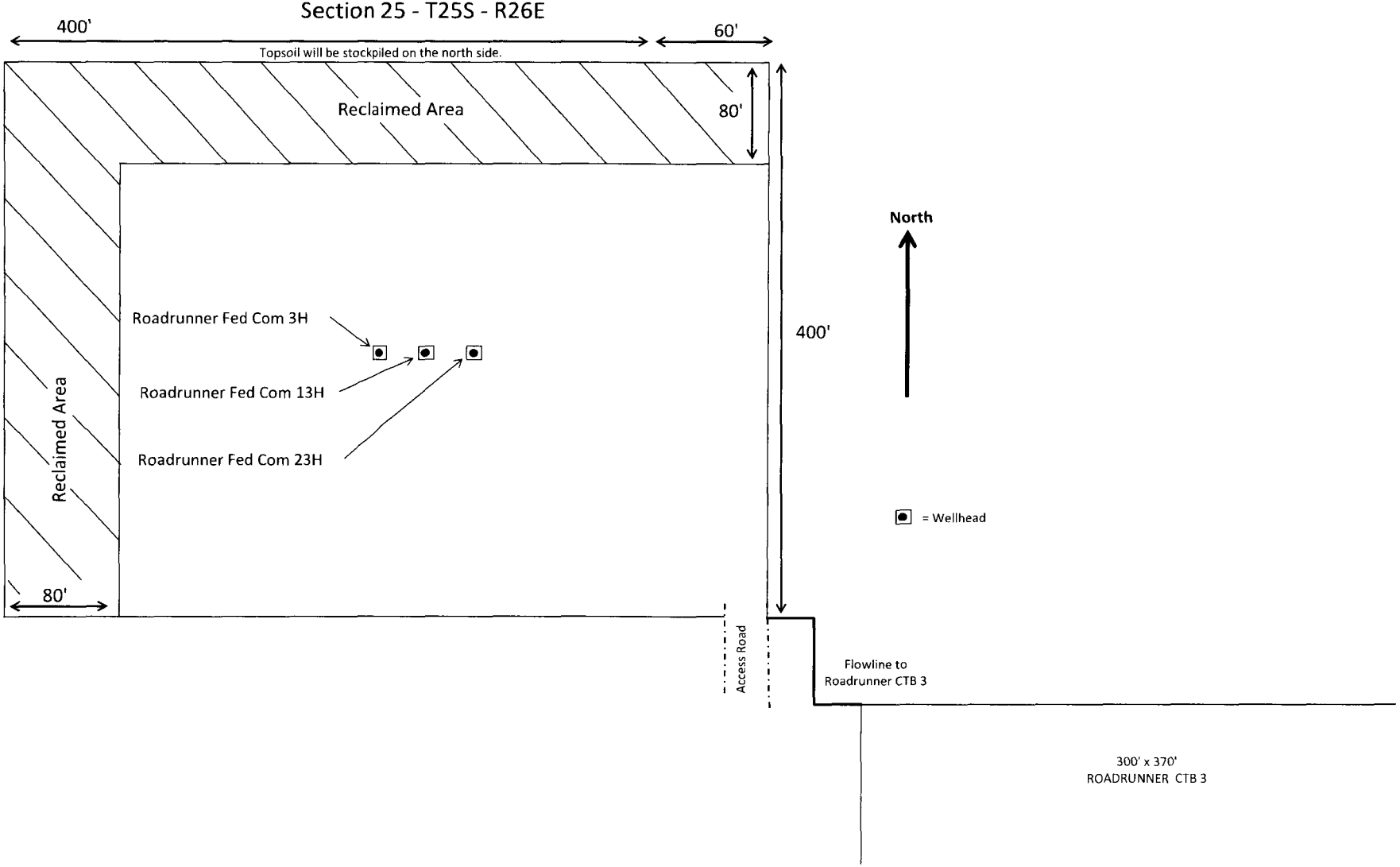
CONCHO

COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well SIte Layout
Production Facility Layout

Roadrunner Federal Com #3H
Section 25 - T25S - R26E

Exhibit 3



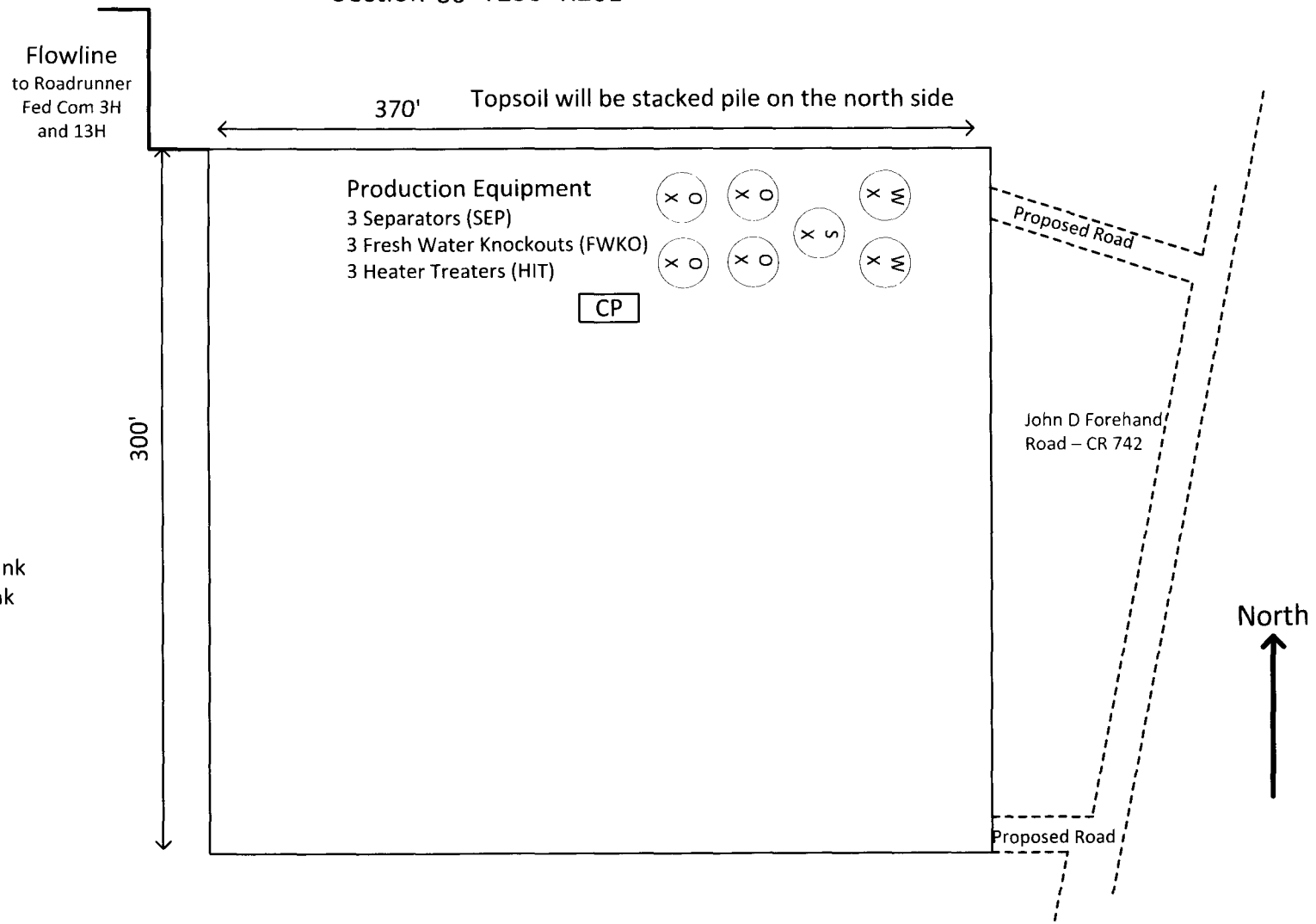
CONCHO
COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well Site Layout

Production Facility Layout

Roadrunner CTB 3
Section 36- T25S- R26E

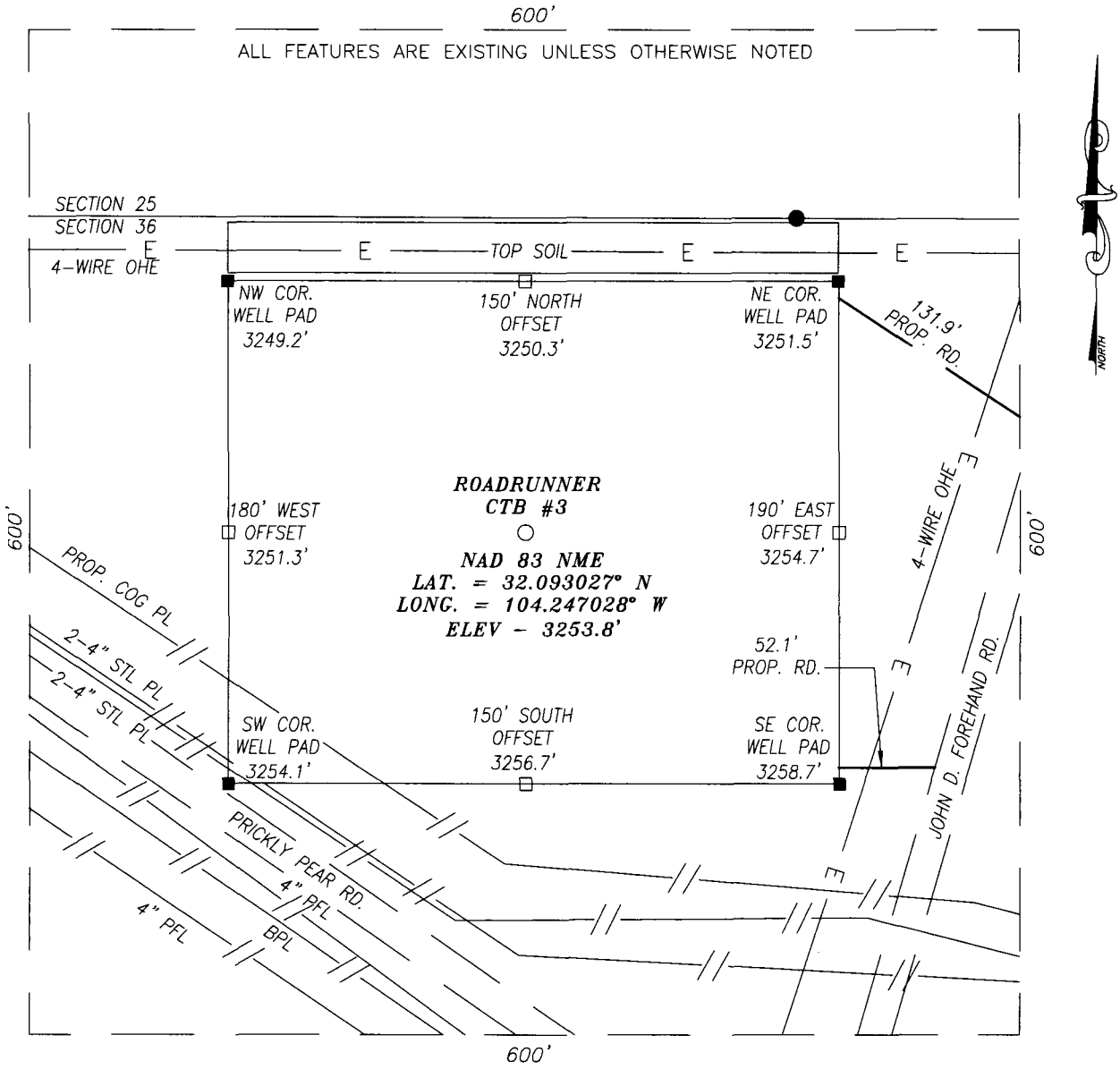
Exhibit 3



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
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Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com

100 0 100 200 Feet

Scale: 1"=100'

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 NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

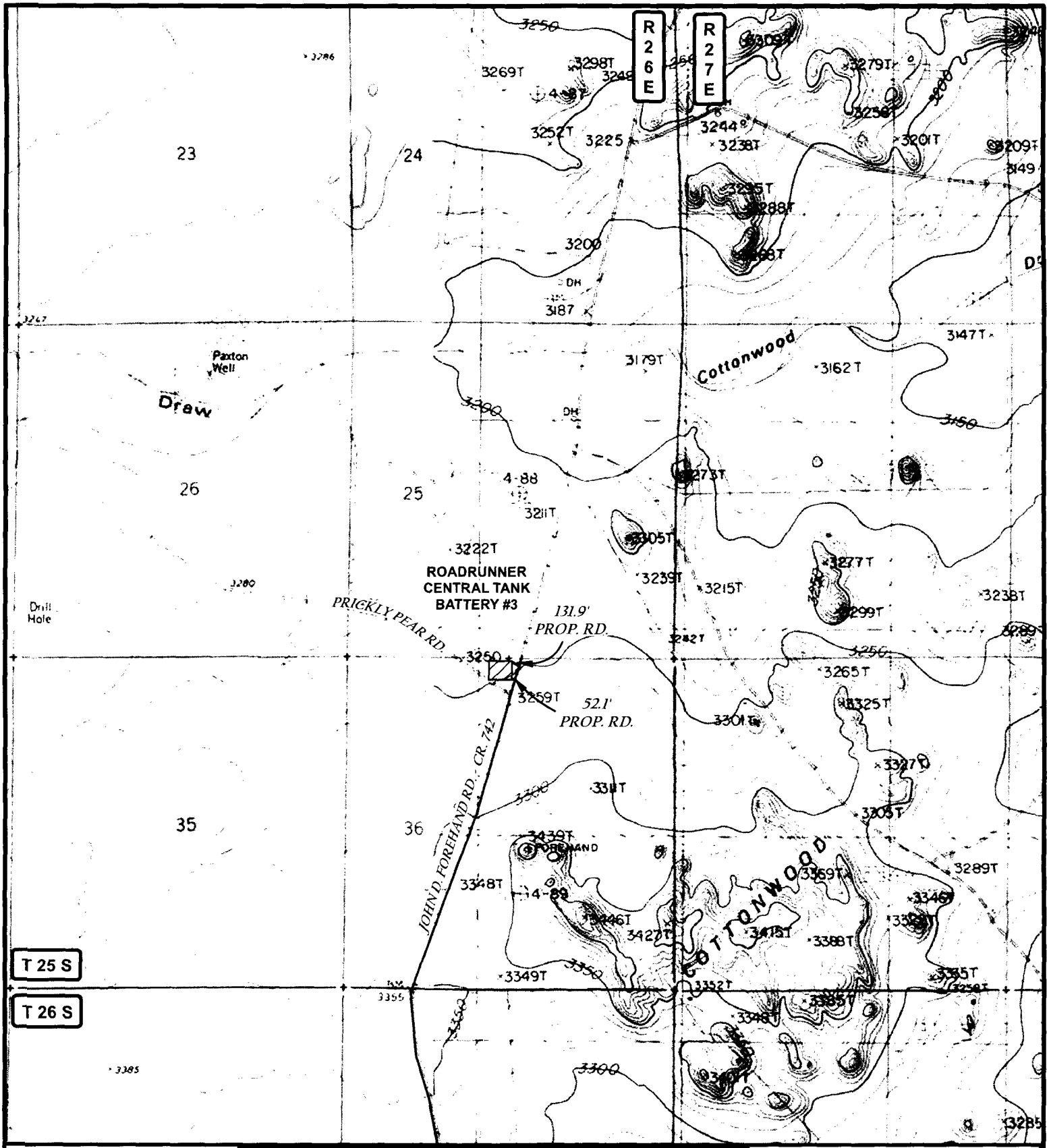
Chad Harcrow 11/14/17

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

N

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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 IMAGERY 11/10/2017 J.H.

N

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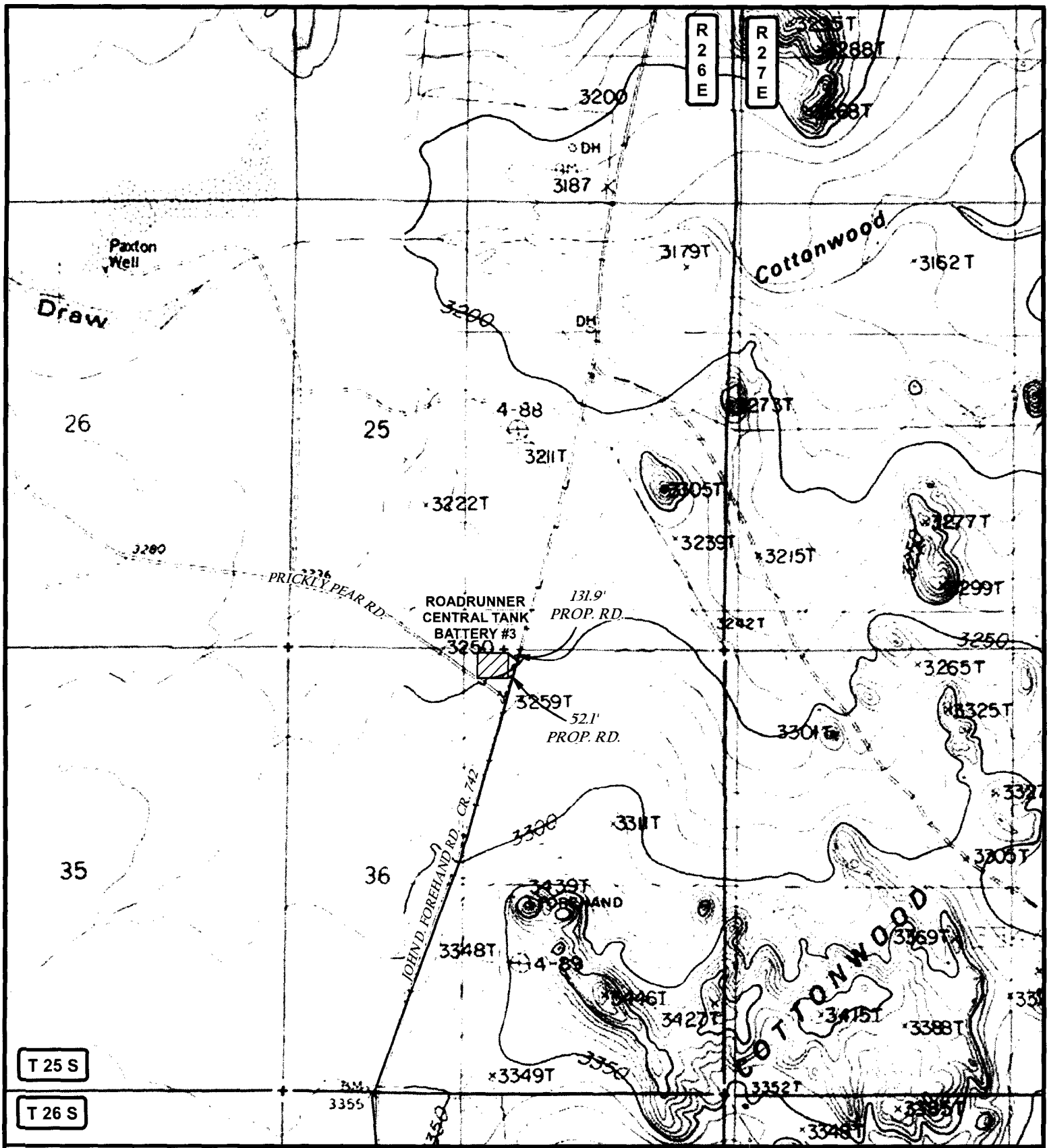

LEGEND

- 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.

N

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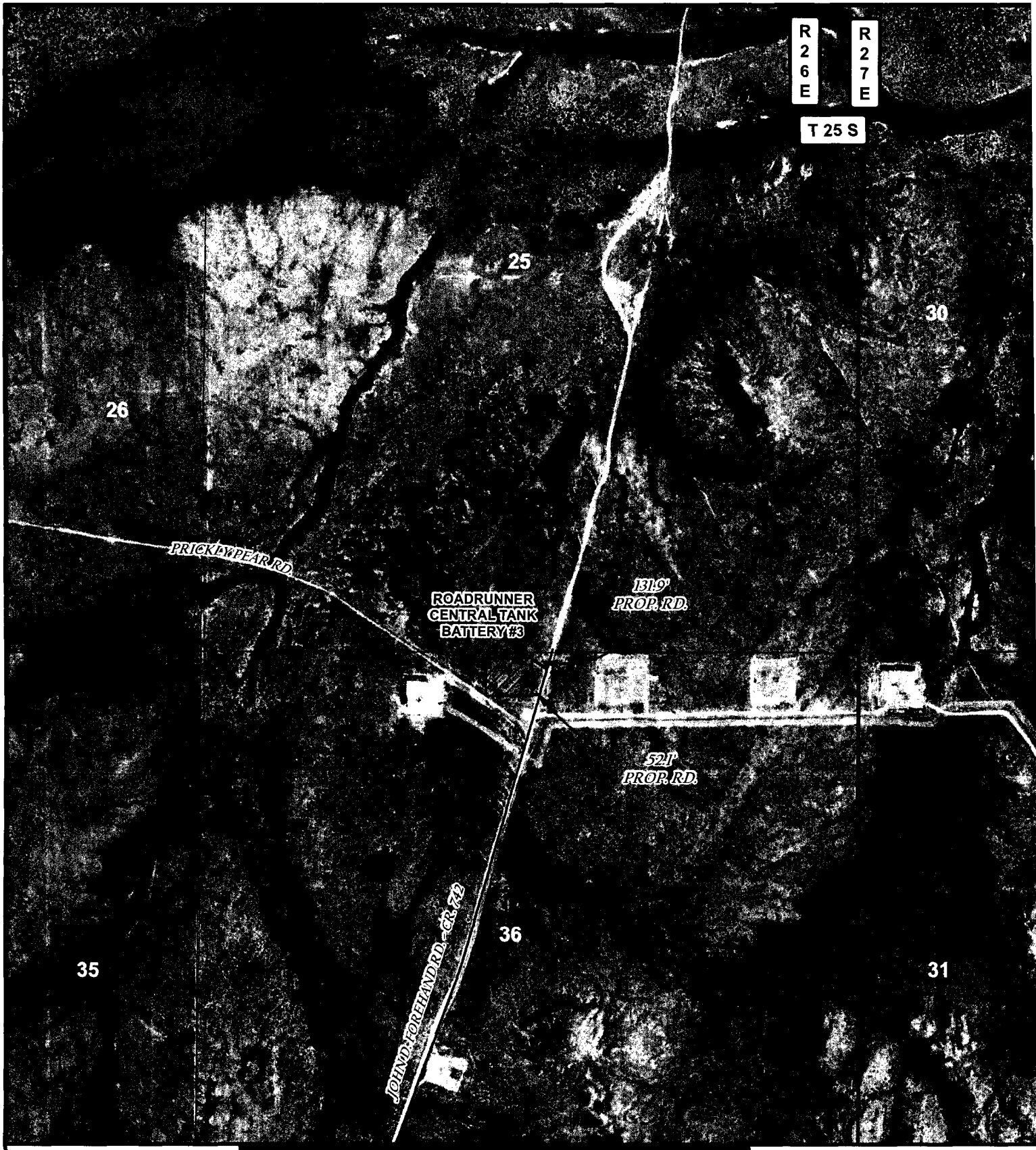

LEGEND

- 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 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP | IMAGERY ROAD | 11/10/2017 | J.H.

N

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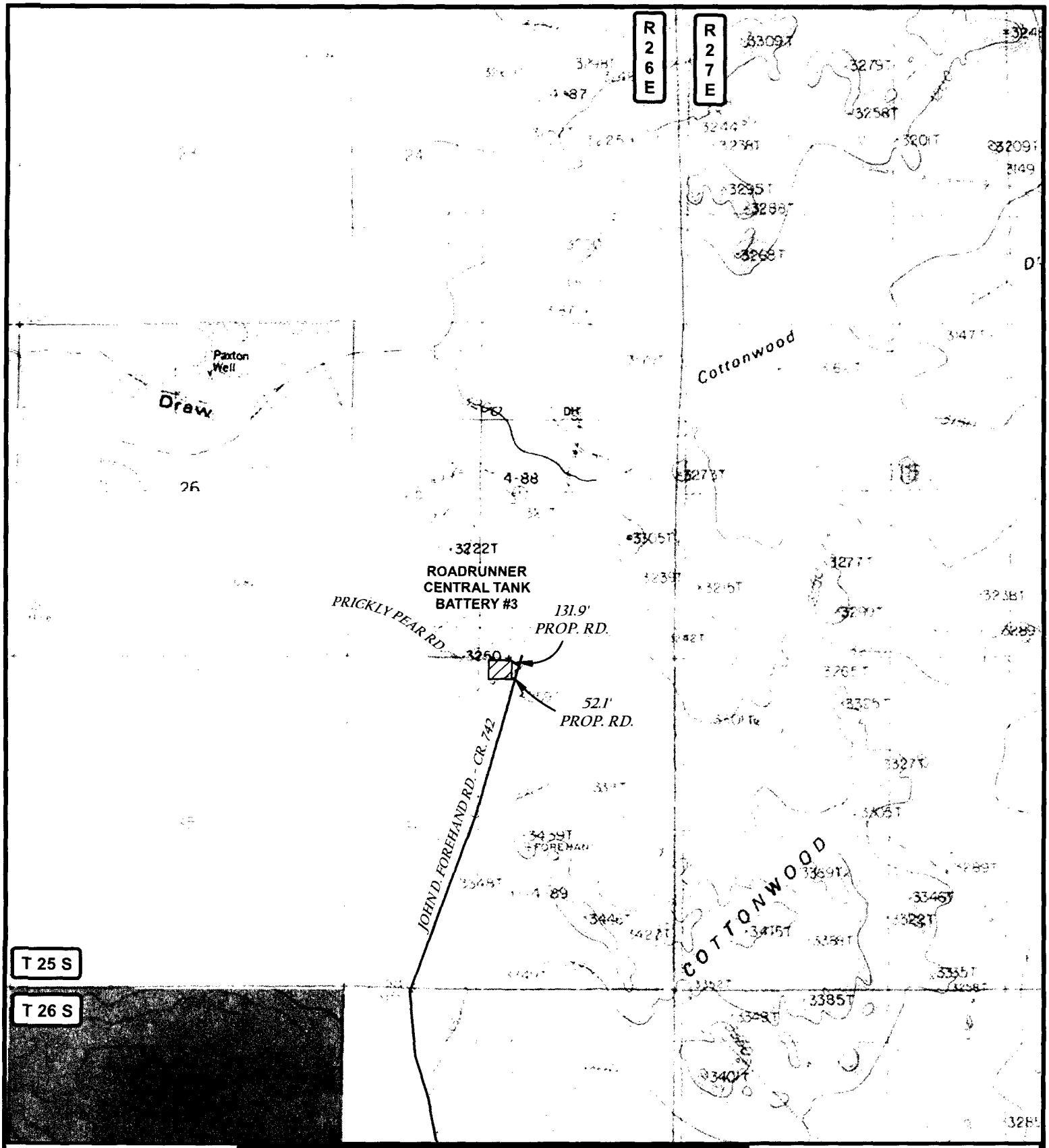

LEGEND

- TANKBATTERY
- 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.

N

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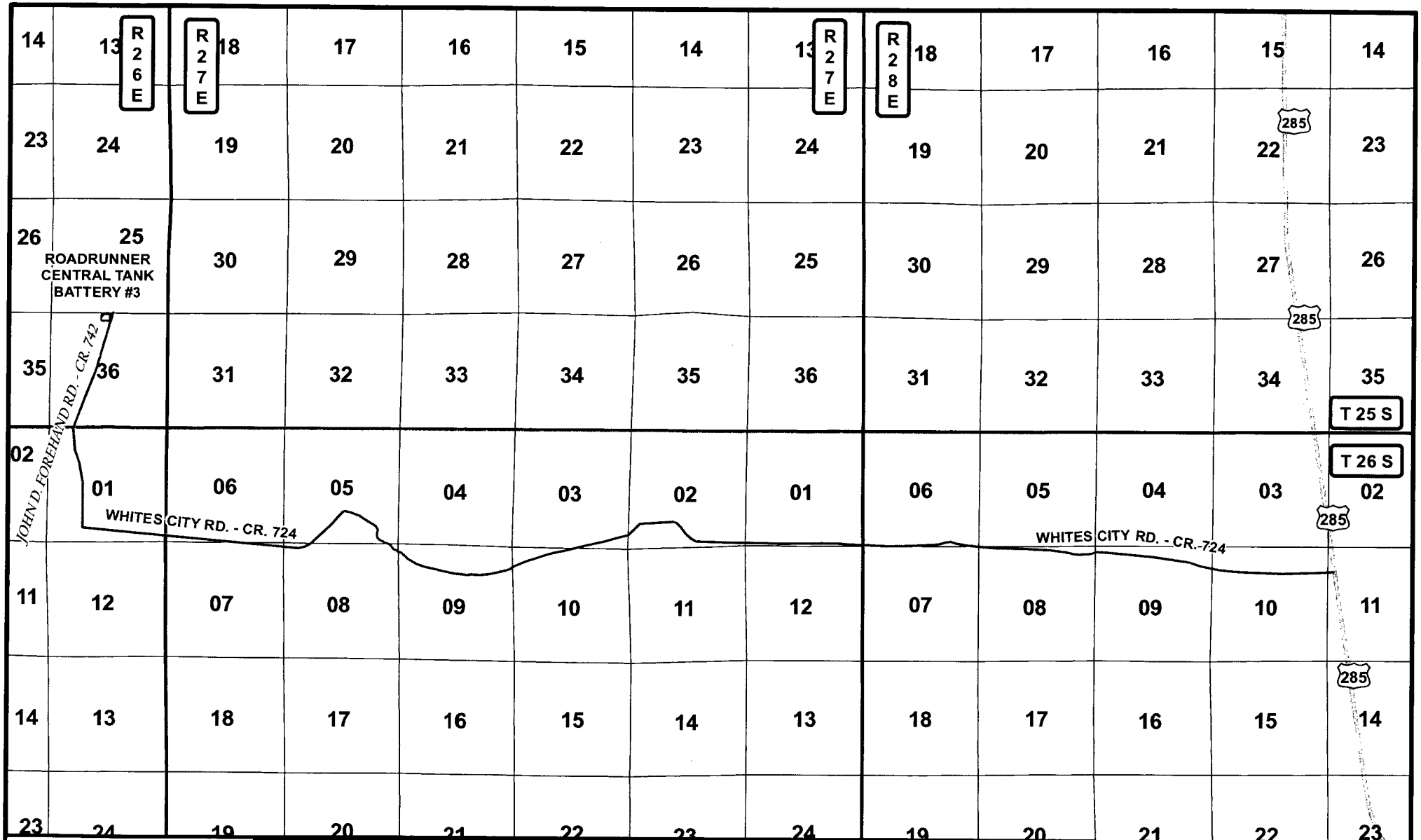

LEGEND

- 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 7,500 10,000 12,500 15,000 FEET

0 0.425 0.85 1.7 Miles

1 IN = 6,000 FT

LOCATION MAP | VICINITY | 11/10/2017 | J.H.

N

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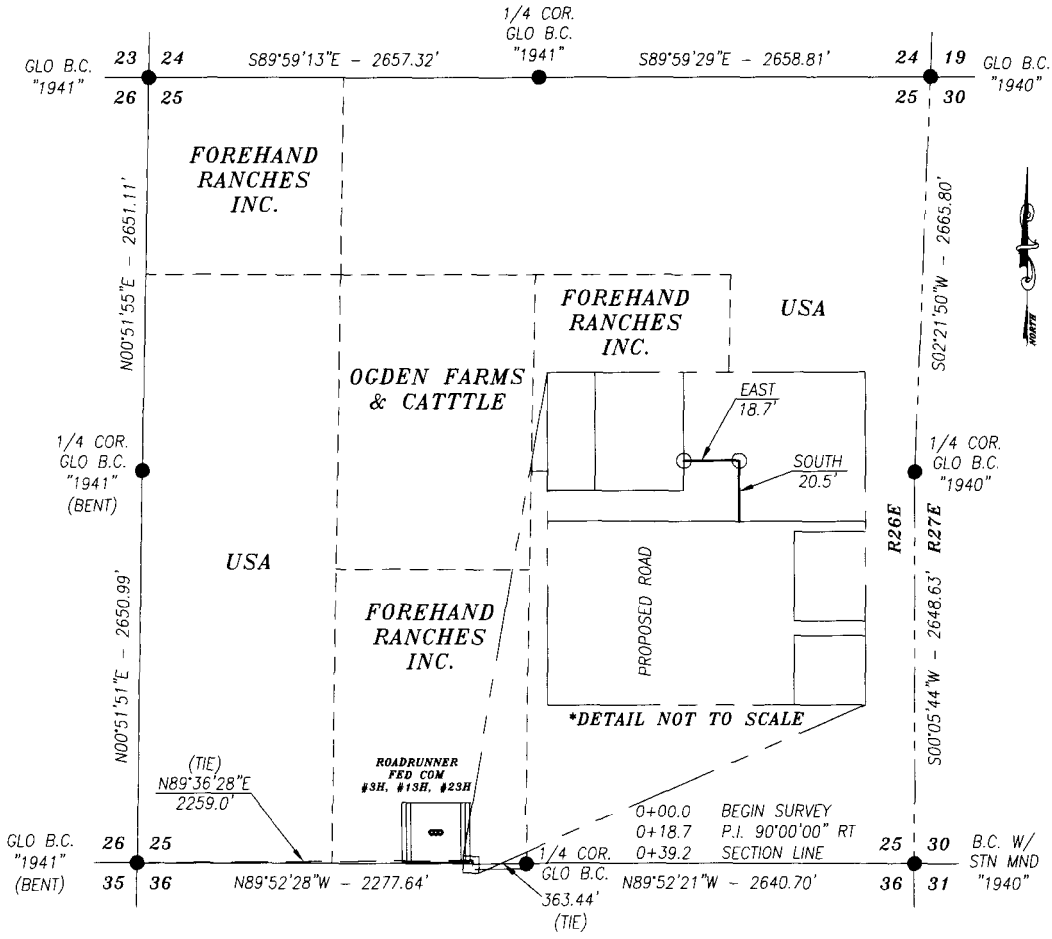
FLOWLINE PLAT
COG OPERATING, LLC

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 12/20/17
CHAD HARCROW N.M.P.S. NO. 17777 DATE

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c.harcrow@harcrowsurveying.com

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

COG OPERATING, LLC

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

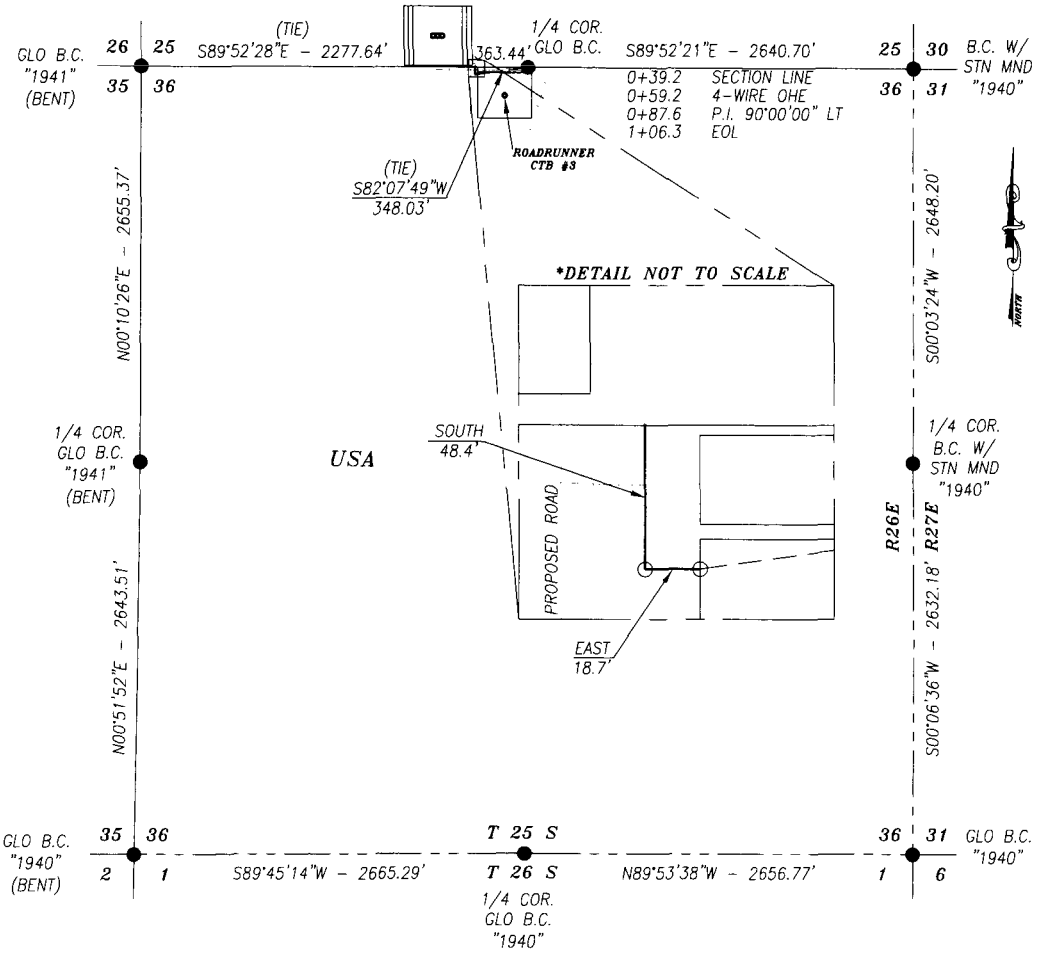
SURVEY DATE: DECEMBER 20, 2017		
DRAFTING DATE: DECEMBER 19, 2017		PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: AM	FILE: 17-1596

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 12/20/17
CHAD HARCROW N.M.P.S. NO. 17777 DATE

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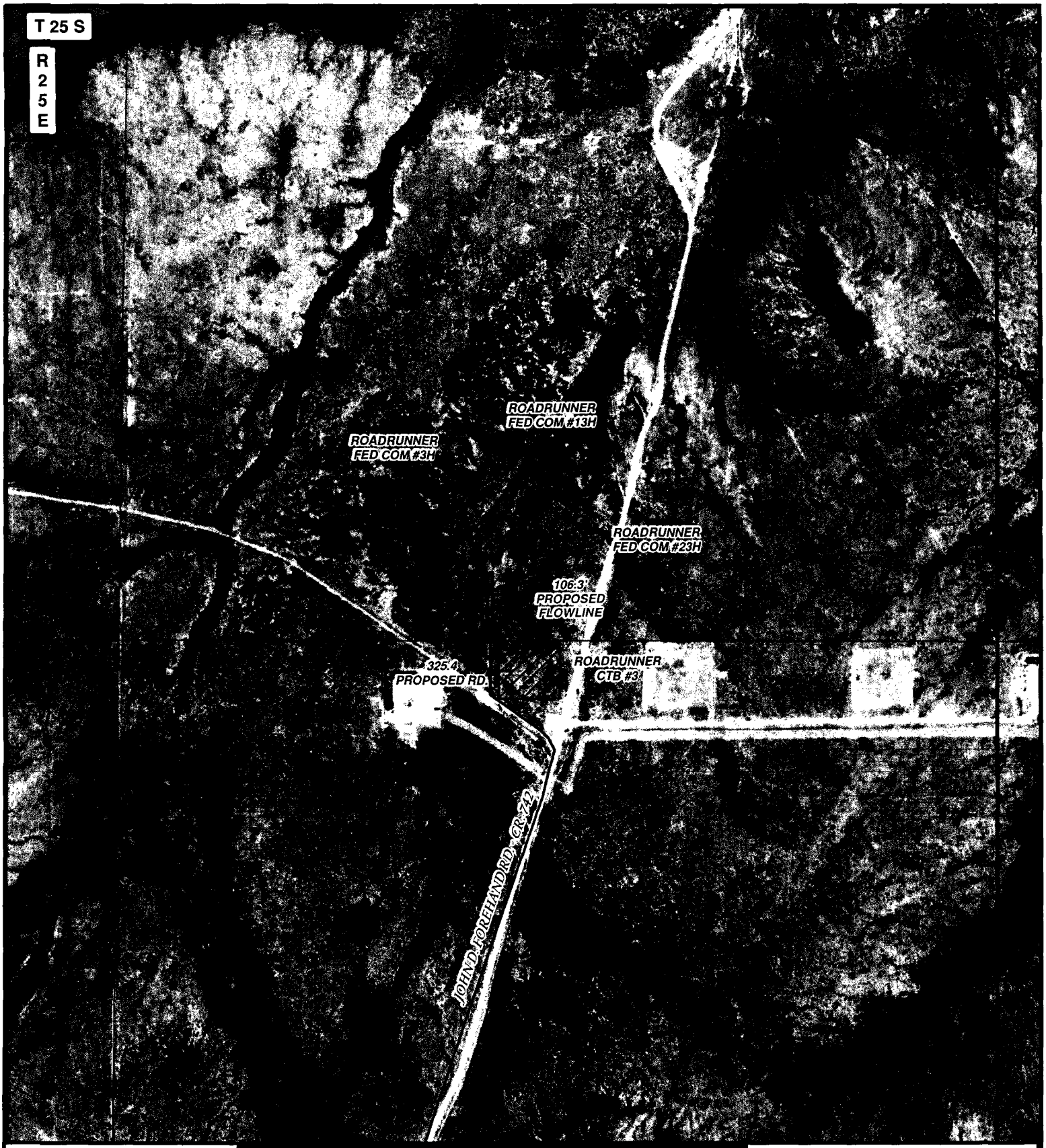
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com

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



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.

N

CONCHO

COG OPERATING, LLC

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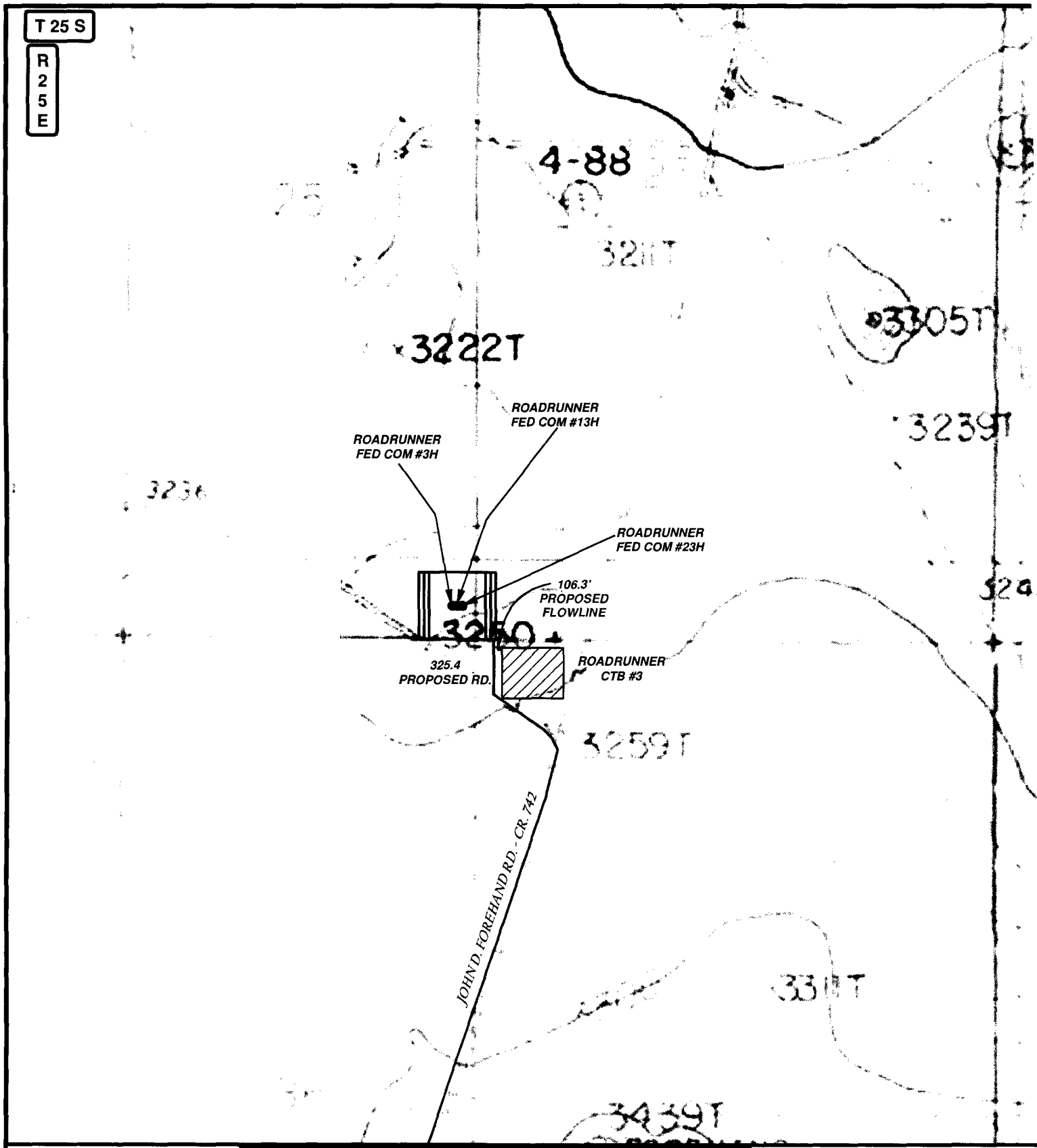


LEGEND

- 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.

N

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
Water Transfer Route

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

Disclaimer: This is not a legal survey document

Map Legend

Route

N
W E
S

0 0.5 1 2 3 4 Miles

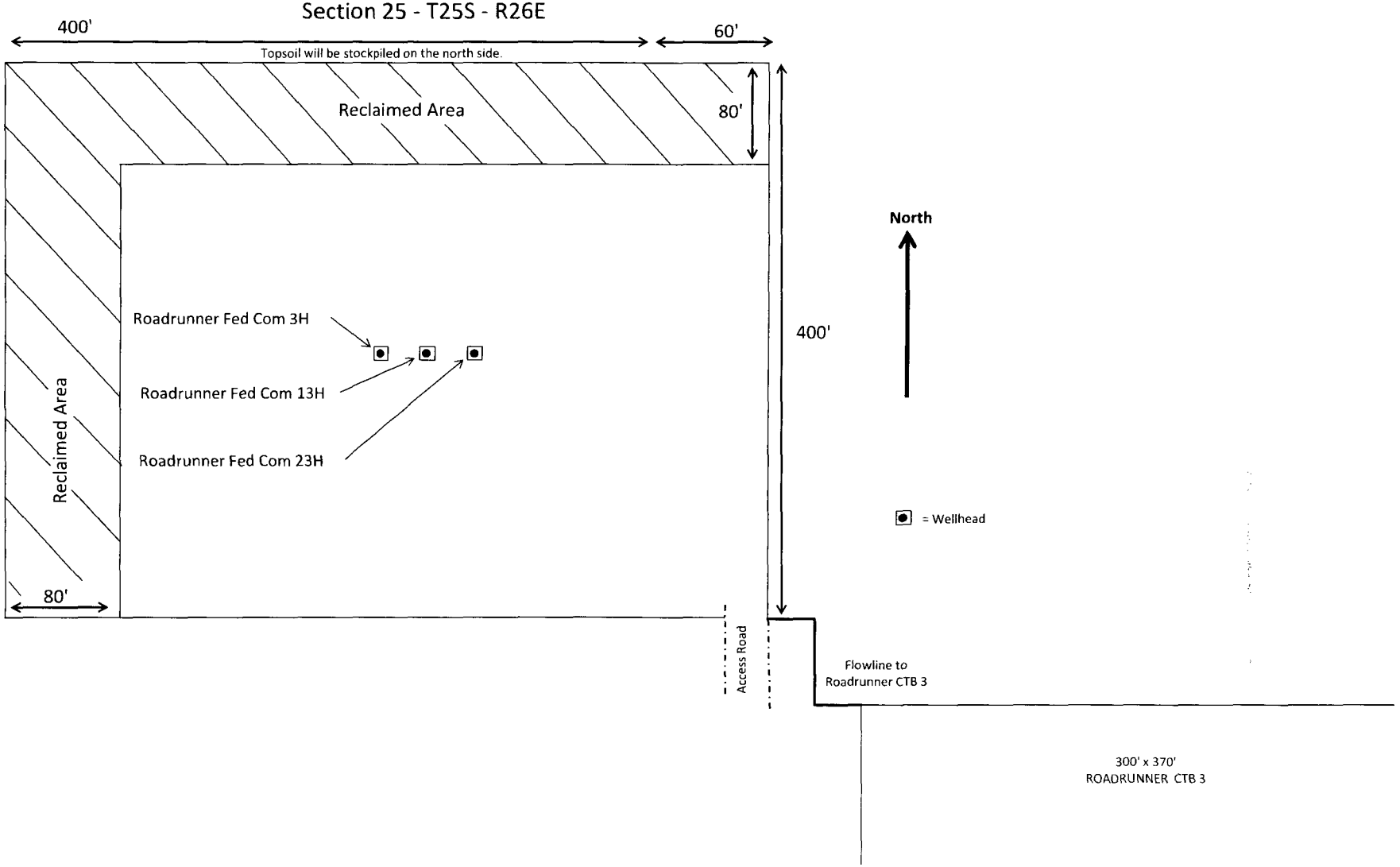
CONCHO

COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well SIte Layout
Production Facility Layout

Roadrunner Federal Com #3H
Section 25 - T25S - R26E

Exhibit 3



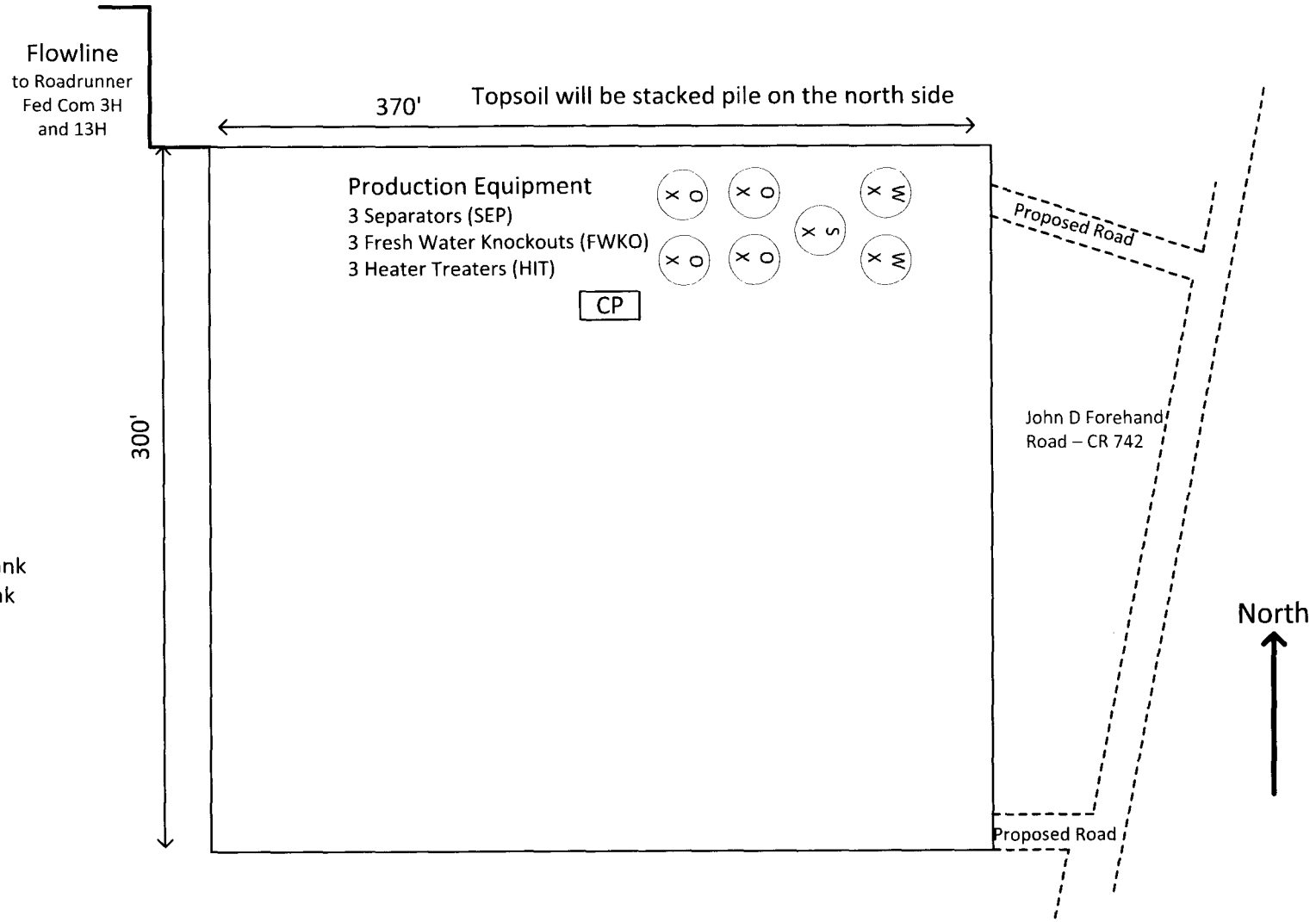
CONCHO
COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well Site Layout

Production Facility Layout

Roadrunner CTB 3
Section 25- T25S- R26E

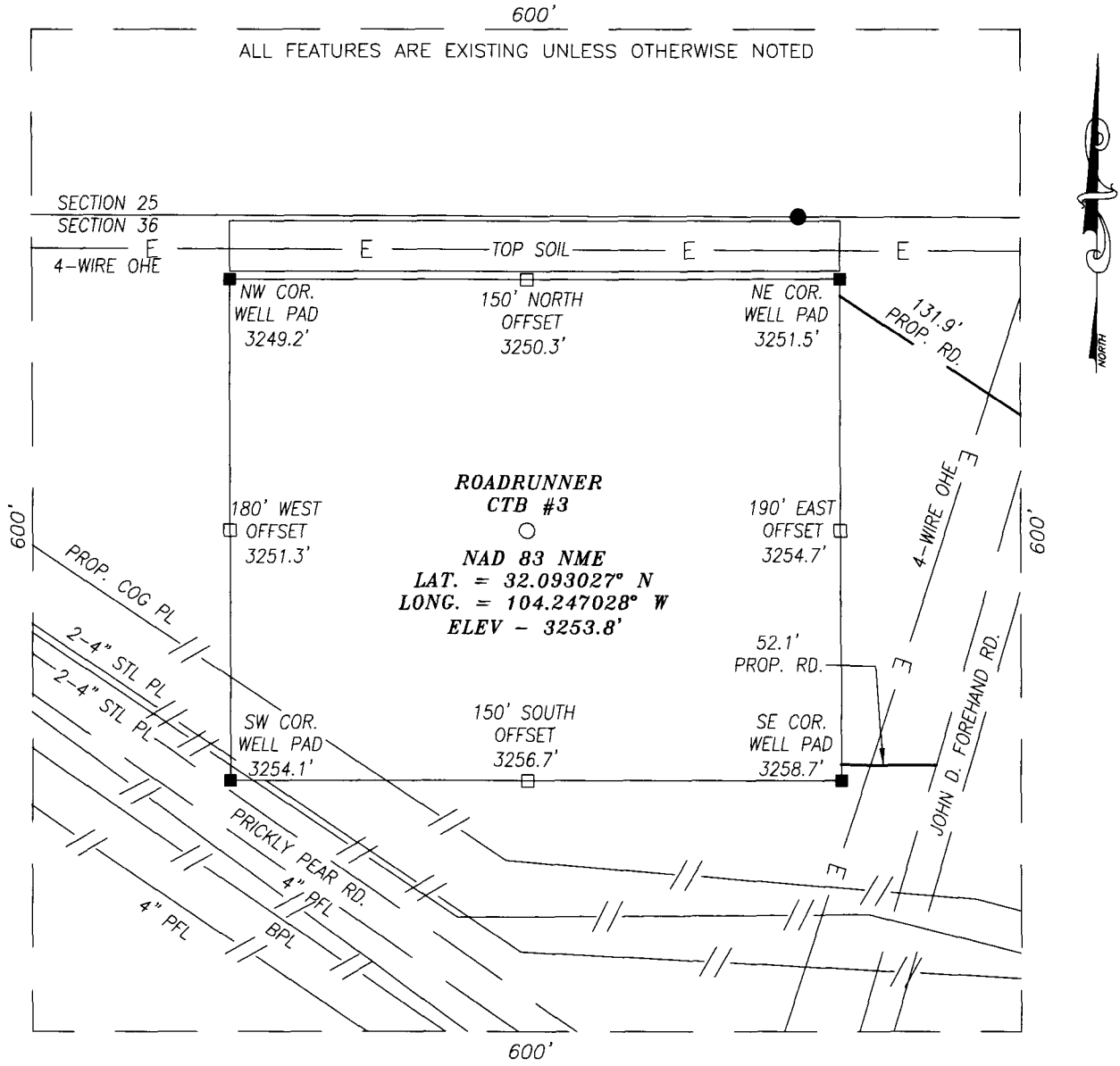
Exhibit 3



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.

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100 0 100 200 Feet

Scale: 1"=100'

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 NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

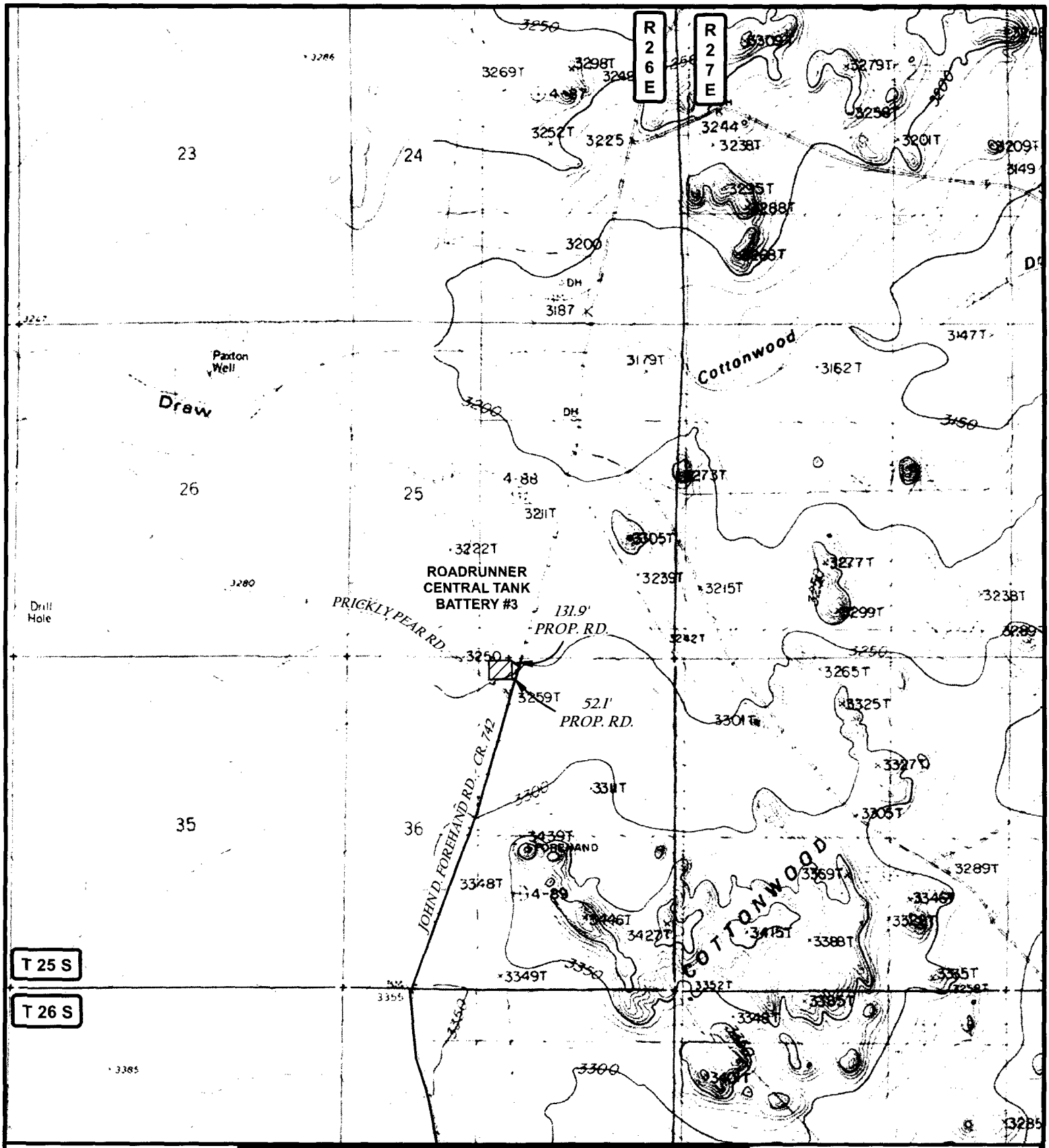
Chad Harcrow 11/14/17

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

N

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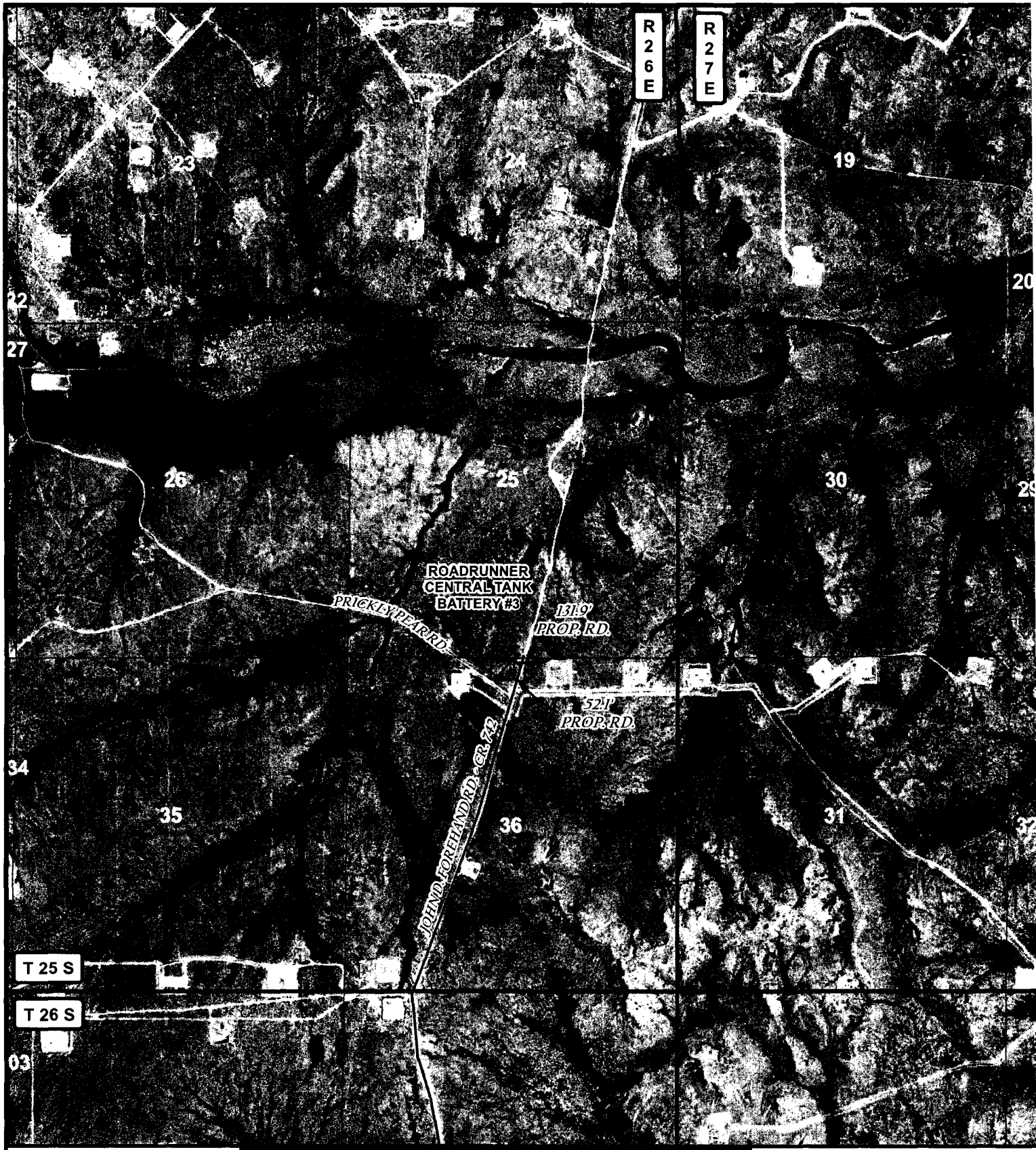

LEGEND

- 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 | IMAGERY | 11/10/2017 | J.H.

N

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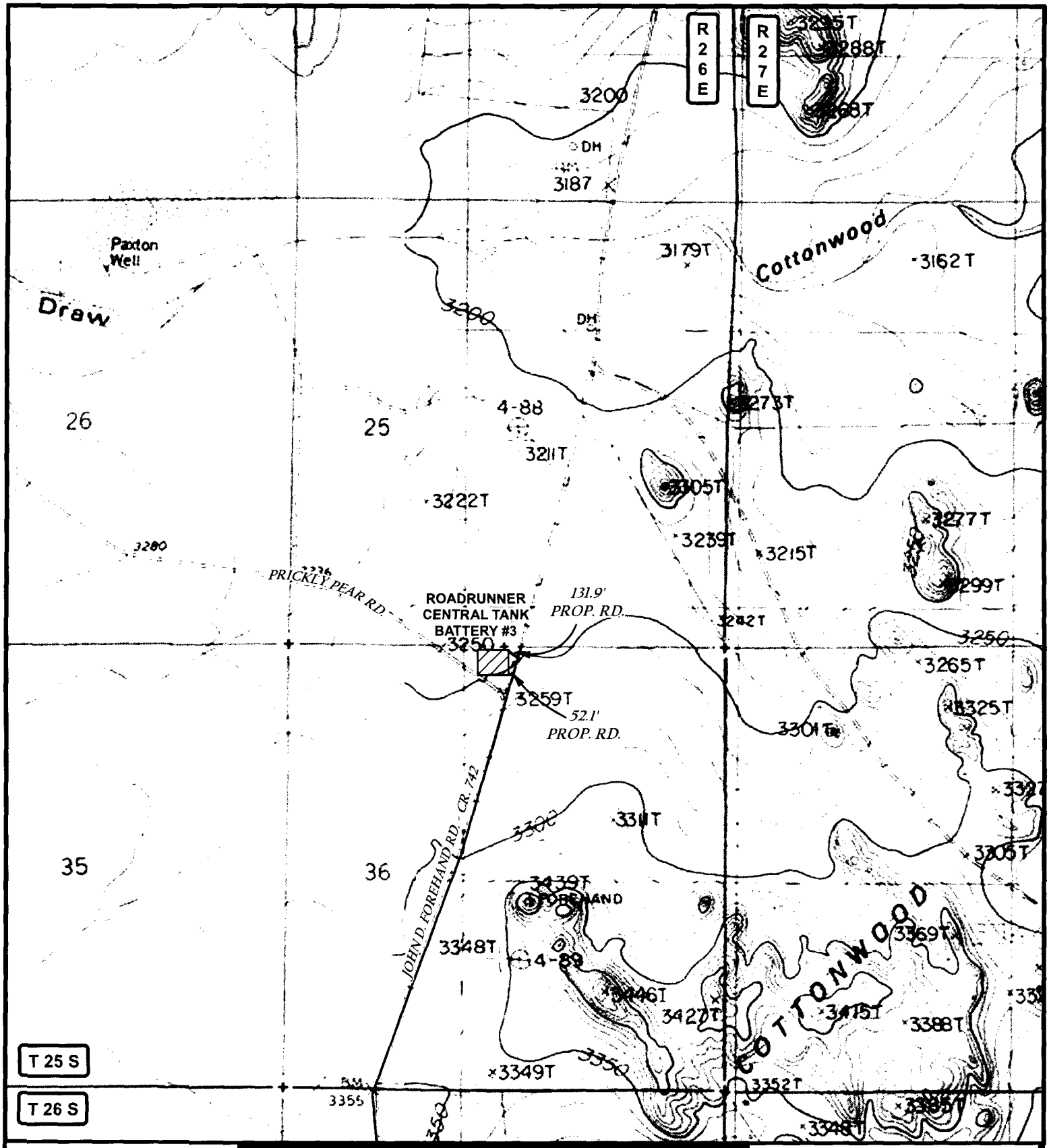

LEGEND

- 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.

N

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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 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP | IMAGERY ROAD | 11/10/2017 | J.H.

N

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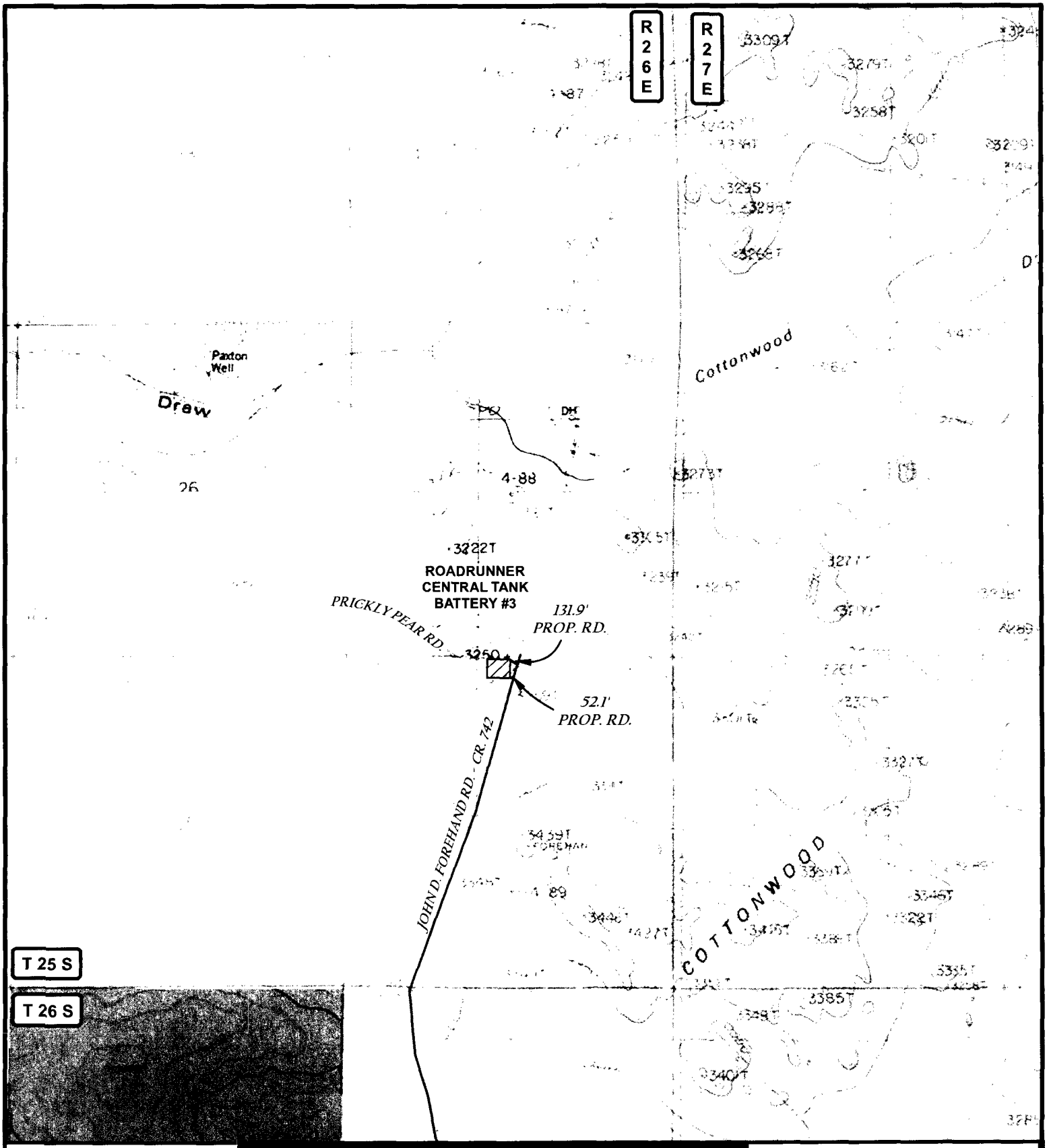

LEGEND

- TANKBATTERY
- 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.

N

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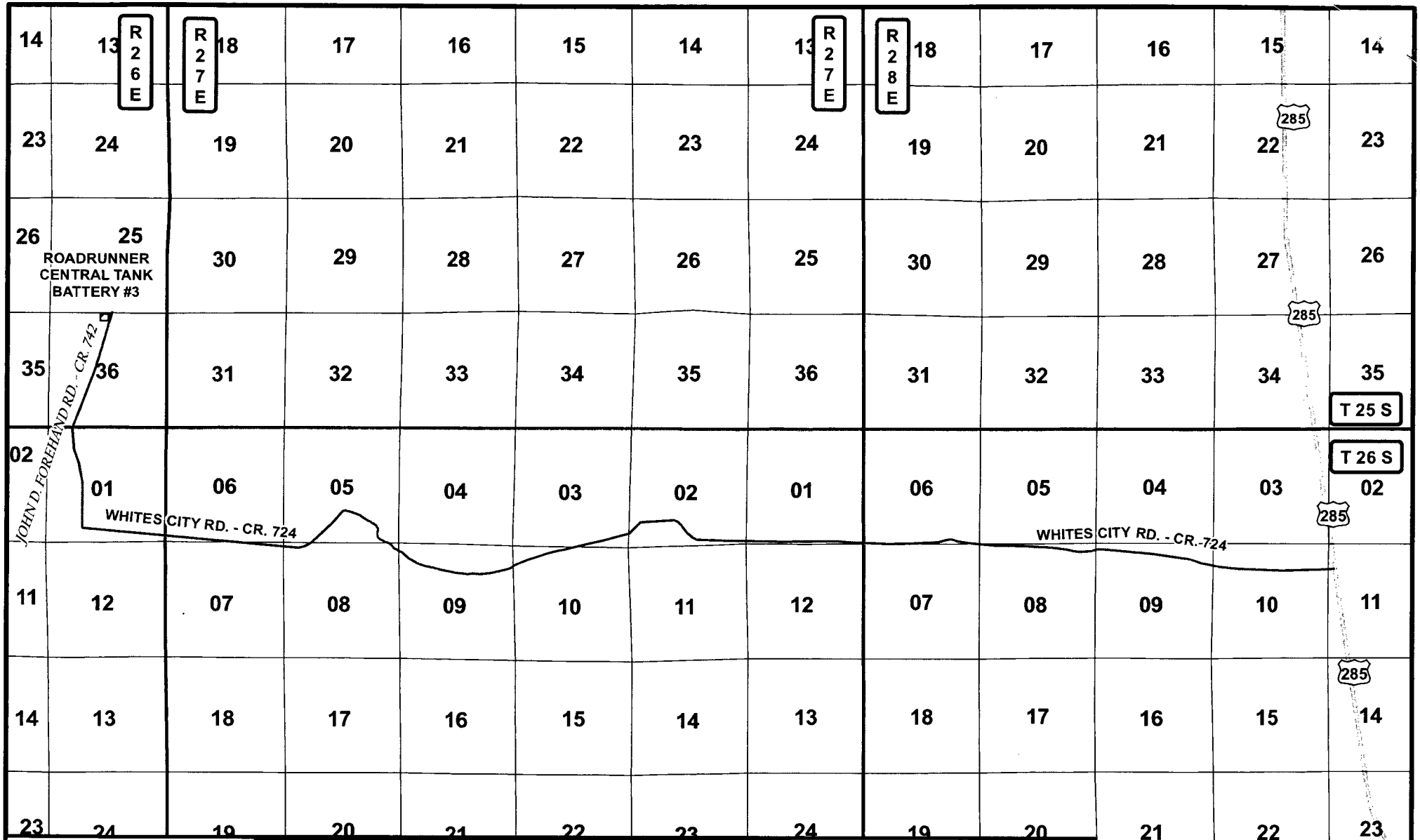

LEGEND

- 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 7,500 10,000 12,500 15,000 FEET

0 0.425 0.85 1.7 Miles

1 IN = 6,000 FT

LOCATION MAP | VICINITY | 11/10/2017 | J.H.

N

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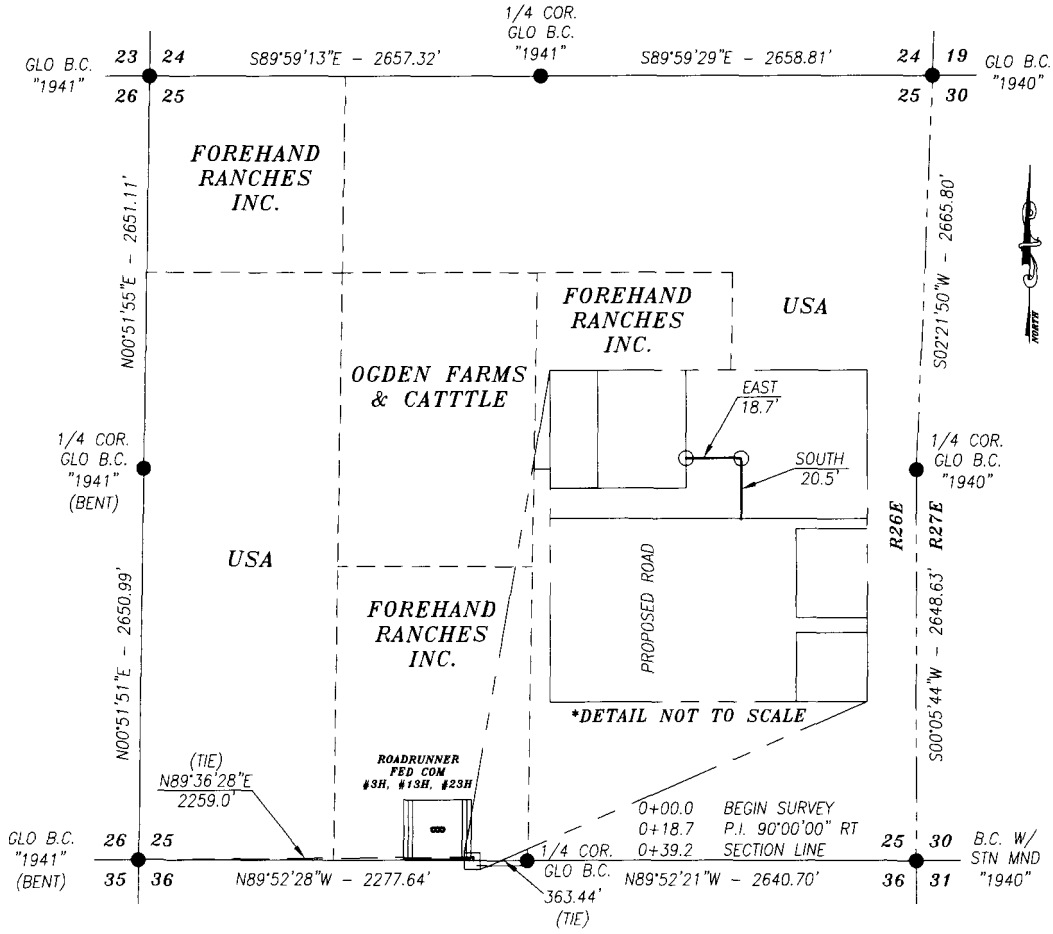
FLOWLINE PLAT
COG OPERATING, LLC

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 12/20/17

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

HARCROW SURVEYING, LLC
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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 25, TOWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM, EDDY COUNTY, NEW MEXICO

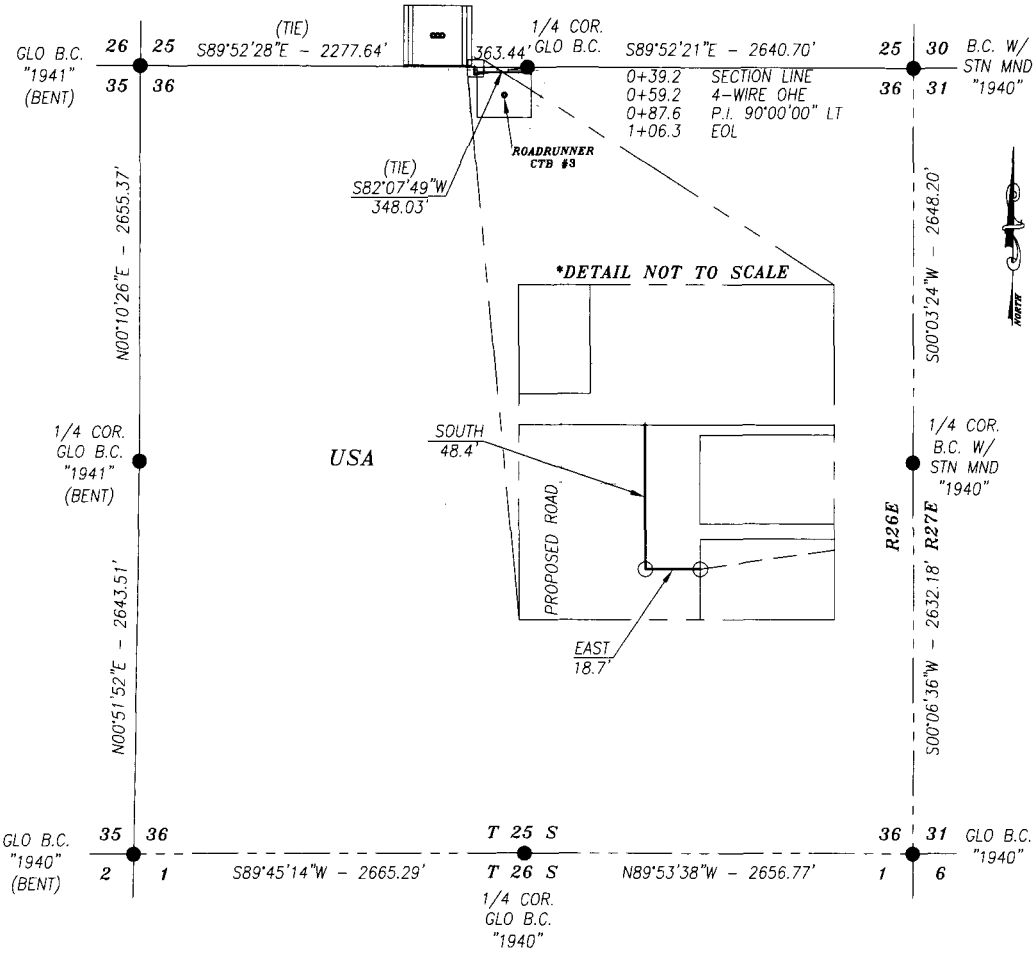
SURVEY DATE: DECEMBER 20, 2017		
DRAFTING DATE: DECEMBER 19, 2017		PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: AM	FILE: 17-1596

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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 12/20/17

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

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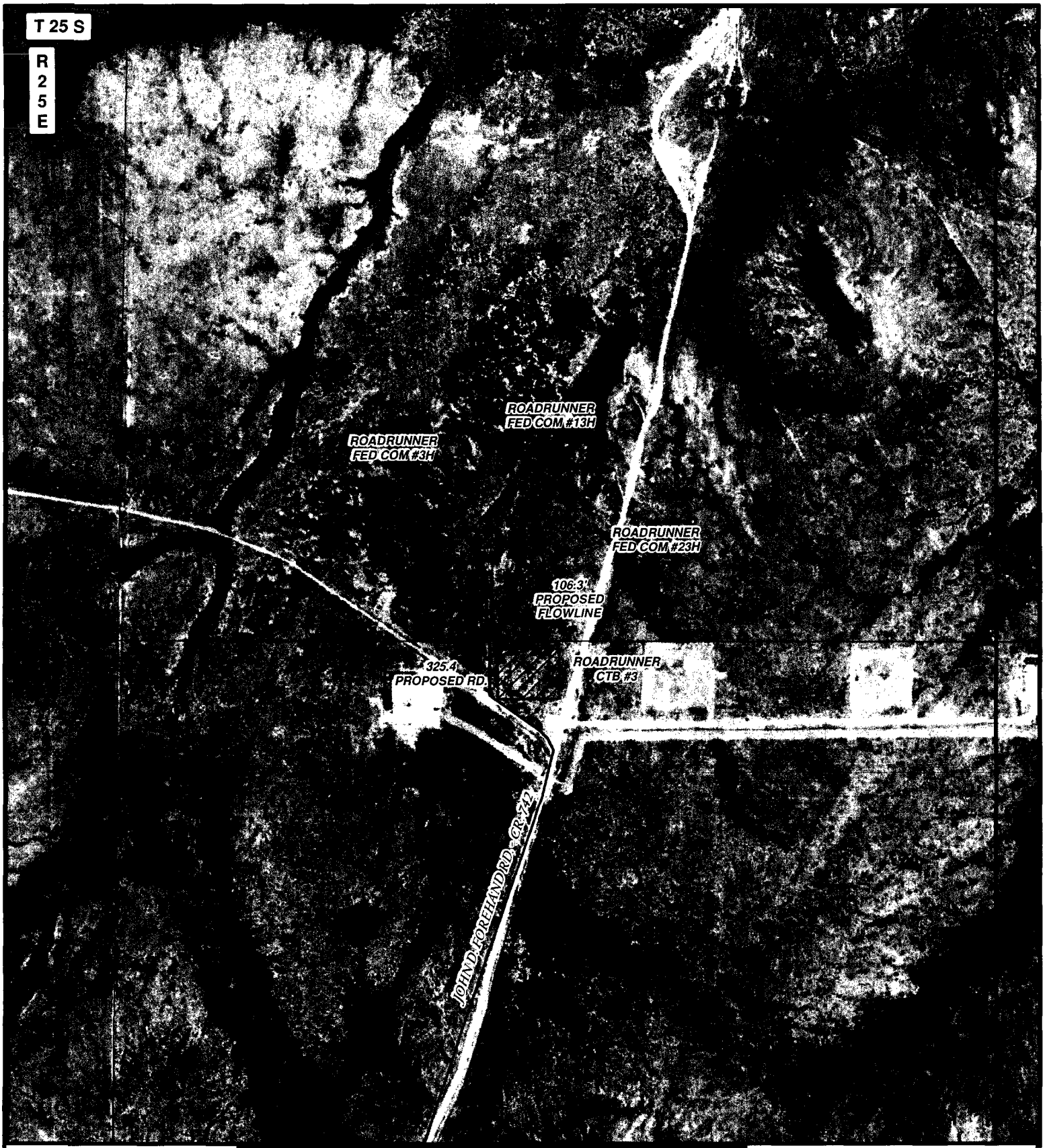
PH: (575) 746-2158 FAX: (575) 746-2158
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com

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



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.

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COG OPERATING, LLC

N

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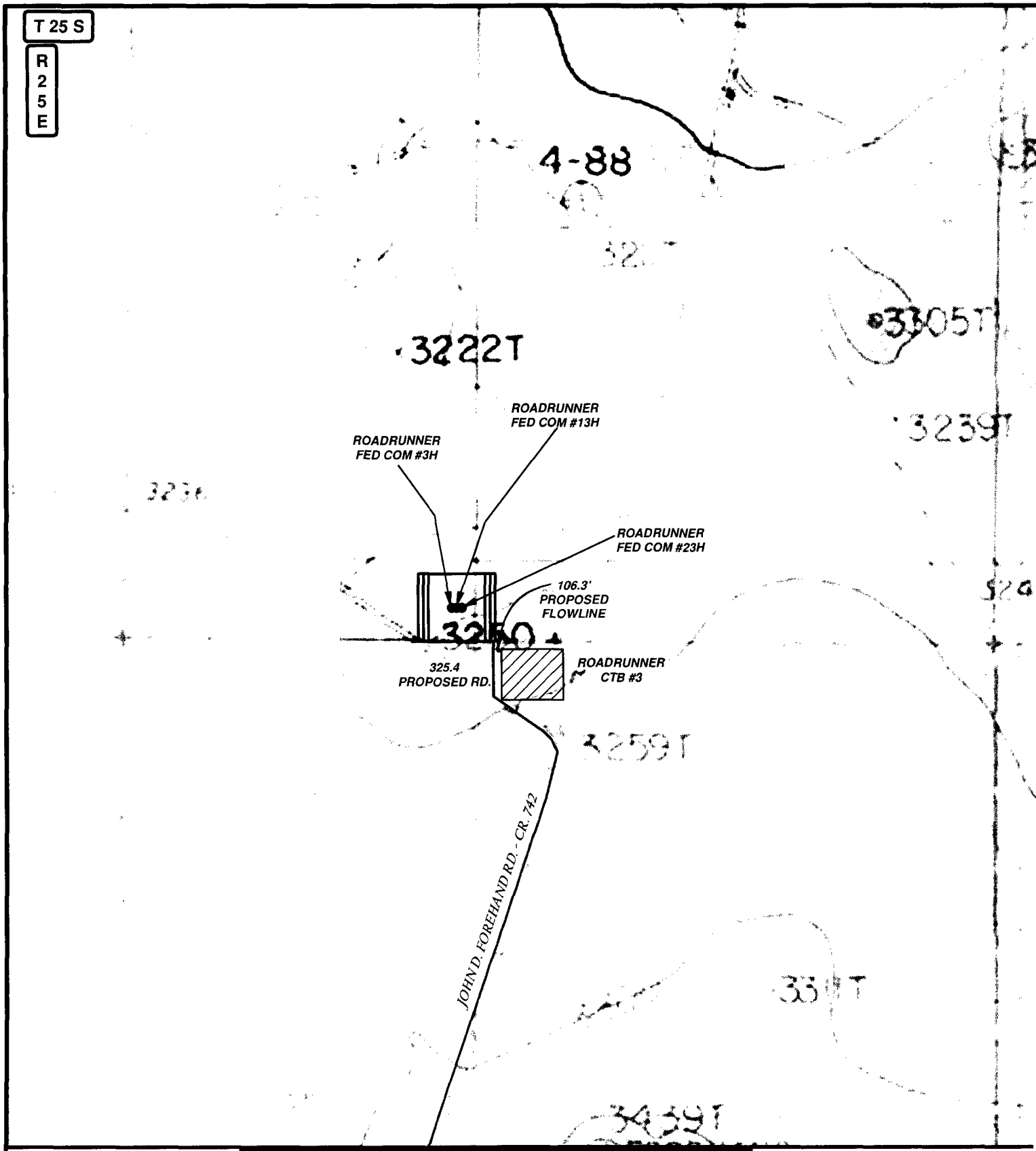

LEGEND

- 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.

N

CONCHO

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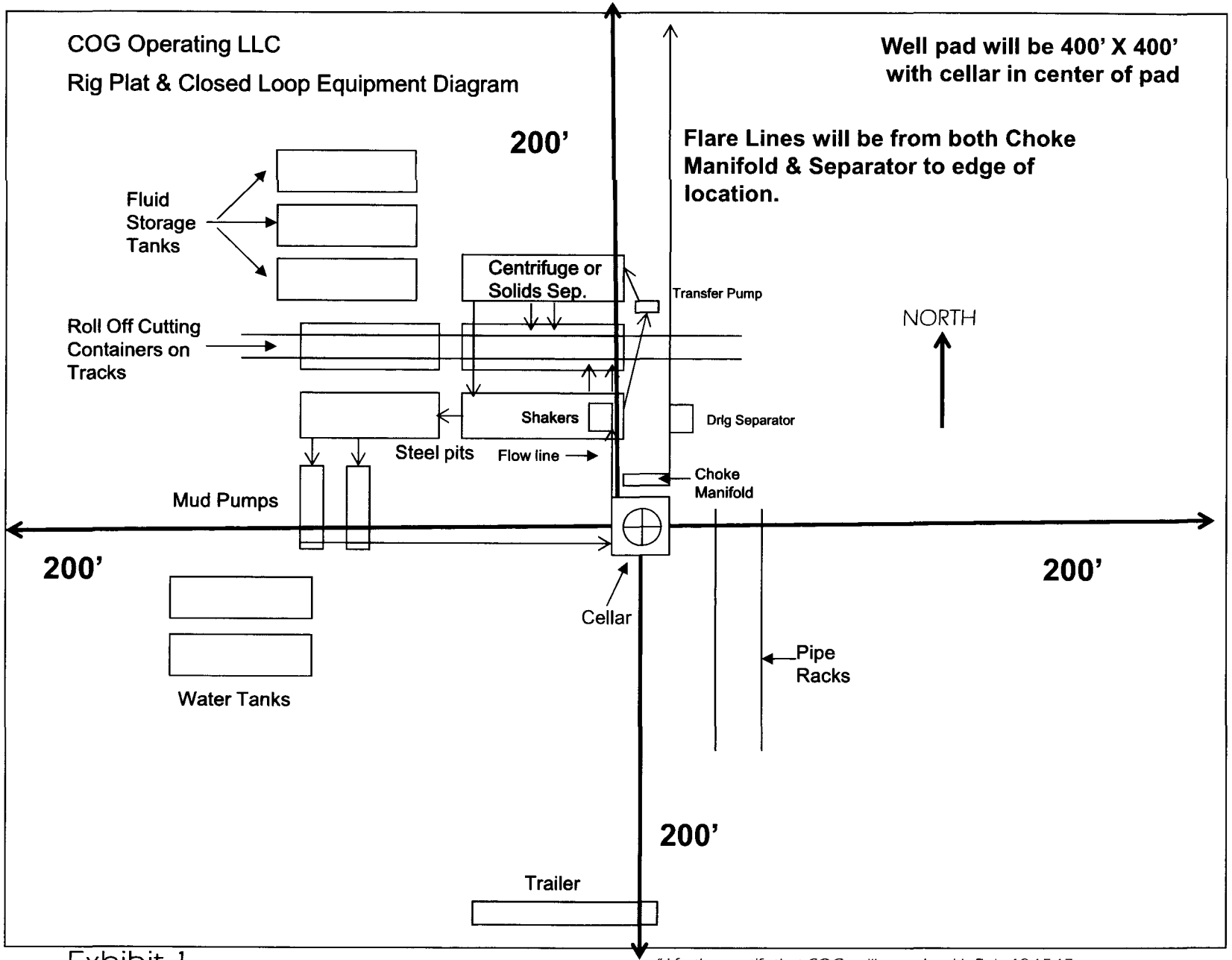

Exhibit 1

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

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: Mayte Reyes

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

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: Mayte Reyes

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

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: Mayte Reyes

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

AFMSS

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:

Decribe 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:

Decribe 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:

AFMSS

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: