Carlsbad Field Office
OCD Artesia

Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NM OIL CONSERVATION
ARTESIA DISTRICT
APR 01 2019
RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM054398

6. If Indian, Allotee or Tribe Name:

1a. Type of work: [✓] DRILL [ ] REENTER

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other

1c. Type of Completion: [ ] Hydraulic Fracturing [✓] Single Zone [ ] Multiple Zone

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

8. Lease Name and Well No.: HOWITZER FEDERAL COM 603H 325315

2. Name of Operator: COG OPERATING LLC 229137

9. API Well No.: 30-015-45832

3a. Address: 600 West Illinois Ave Midland TX 79701

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

10. Field and Pool, or Exploratory: PURPLE SAGE / WOLFCAMP GAS

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: NENE / 1044 FNL / 620 FEL / LAT 32.236791 / LONG -104.034304

At proposed prod. zone: NWNW / 1210 FNL / 200 FWL / LAT 32.236484 / LONG -104.066277

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 12 / T24S / R28E / NMP

14. Distance in miles and direction from nearest town or post office*: 2 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: 80

17. Spacing Unit dedicated to this well: 640

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 920 feet

19. Proposed Depth: 9747 feet / 19938 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 2974 feet

22. Approximate date work will start*: 02/01/2019

23. Estimated duration: 30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

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 requested by the BLM.

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6945	11/08/2018

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	02/26/2019

Title	Office
Assistant Field Manager Lands & Minerals	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.

APPROVED WITH CONDITIONS

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 02/26/2019 RWP 4-11-19.

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 I: 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 wen, 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 directionany 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.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

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 wen 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 win 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 conects this information to anow 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 Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Additional Operator Remarks

Location of Well

1. SHL: NENE / 1044 FNL / 620 FEL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.236791 / LONG: -104.034304 (TVD: 0 feet, MD: 0 feet)
   PPP: NENW / 1210 FNL / 2640 FWL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.236371 / LONG: -104.040925 (TVD: 9702 feet, MD: 12350 feet)
   PPP: NENE / 1210 FNL / 330 FEL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.236337 / LONG: -104.033365 (TVD: 5482 feet, MD: 5500 feet)
   BHL: NWNW / 1210 FNL / 200 FWL / TWSP: 24S / RANGE: 28E / SECTION: 11 / LAT: 32.236484 / LONG: -104.066277 (TVD: 9747 feet, MD: 19938 feet)

BLM Point of Contact

Name: Deborah Ham
Title: Legal Landlaw Examiner
Phone: 5752345965
Email: dham@blm.gov

Approval Date: 02/26/2019

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
WELL NAME & NO.:	Howitzer Federal Com 603H
SURFACE HOLE FOOTAGE:	1044'/N & 620'/E
BOTTOM HOLE FOOTAGE	1210'/N & 200'/W
LOCATION:	Section 12, T.24 S., R.28 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 **285** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

d. If cement falls back, remedial cementing will be done prior to drilling out that string.

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

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

    - Cement to surface. If cement does not circulate see B.1.a, c-d above.

    ❖ In **Medium 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.

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 **3000 (3M)** psi.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8** intermediate casing shoe shall be **5000 (5M)** 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.

MHH 02012019

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. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
    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.

AFMSS

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

Operator Certification Data Report

02/26/2019

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:** 11/05/2018

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: Gerald Herrera

Street Address: 2208 West Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6940

Email address: gherrera@concho.com

AFMSS

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

Application Data Report

02/26/2019

APD ID: 10400036013

Submission Date: 11/08/2018

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 603H

Well Type: OIL WELL

Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400036013

Tie to previous NOS?

Submission Date: 11/08/2018

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: NMNM054398

Lease Acres: 80

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: HOWITZER FEDERAL COM

Well Number: 603H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: PURPLE SAGE

Pool Name: WOLFCAMP GAS

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

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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: MULTIPLE WELL **Multiple Well Pad Name:** HOWITZER FEDERAL COM **Number:** 602H AND 603H

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: 2 Miles **Distance to nearest well:** 920 FT **Distance to lease line:** 200 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: COG_Howitzer_603H_C102_20181106102820.pdf

Well work start Date: 02/01/2019 **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	1044	FNL	620	FEL	24S	28E	12	Aliquot NENE	32.236791	-104.034304	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	2974	0	0
KOP Leg #1	1044	FNL	620	FEL	24S	28E	12	Aliquot NENE	32.236791	-104.034304	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	2974	0	0
PPP Leg #1	1210	FNL	330	FEL	24S	28E	12	Aliquot NENE	32.236337	-104.033365	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	-2508	5500	5482

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

	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	1210	FNL	2640	FWL	24S	28E	12	Aliquot NENW	32.236371	-104.040925	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 054398	-6728	12350	9702
EXIT Leg #1	1210	FNL	330	FWL	24S	28E	11	Aliquot NWNW	32.236483	-104.065853	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-6578	19937	9552
BHL Leg #1	1210	FNL	200	FWL	24S	28E	11	Aliquot NWNW	32.236484	-104.066277	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-6773	19938	9747

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

Pressure Rating (PSI): 3M **Rating Depth:** 9000

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_Howitzer_603H_3M_Choke_20181106093718.pdf

BOP Diagram Attachment:

COG_Howitzer_603H_3M_BOP_20181106093729.pdf

COG_Howitzer_603H_Flex_Hose_20181106093740.pdf

Pressure Rating (PSI): 5M **Rating Depth:** 9747

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_Howitzer_603H_5M_Choke_20181106093806.pdf

BOP Diagram Attachment:

COG_Howitzer_603H_5M_BOP_20181106093817.pdf

COG_Howitzer_603H_Flex_Hose_20181106093826.pdf

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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	2700	0	2700	-6999	-7974	2700	J-55	61	STC	1.28	2.94	DRY	3.61	DRY	3.61
2	INTERMEDIATE	12.25	5.5	NEW	API	N	0	9000	0	9000	-6999	-18749	9000	HCL-80	40	OTHER - BTC	1.32	1.16	DRY	2.63	DRY	2.63
3	PRODUCTION	8.5	5.5	NEW	API	N	0	19938	0	19938	-6999	-24211	19938	P-110	23	OTHER - BTC	2.29	2.71	DRY	3.23	DRY	3.23

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Howitzer_603H_Casing_Prog_20181106094018.pdf

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Howitzer_603H_Casing_Prog_20181106094114.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Howitzer_603H_Casing_Prog_20181106094207.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	2700	1420	1.75	13.5	2485	50	Class C	4% Gel
SURFACE	Tail		0	2700	250	1.34	14.8	335	50	Class C	2% CaCl2
INTERMEDIATE	Lead		0	9000	1390	2.8	11	3892	50	NeoCem	As needed
INTERMEDIATE	Tail		0	9000	300	1.1	16.4	330	50	Tail: Class H	As needed
PRODUCTION	Lead		0	1993	400	2	12.7	800	35	35:65:6 H Blend	As needed

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	19938	3010	1.24	14.4	3732	35	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
2700	9000	OTHER : Brine Diesel Emulsion	8.6	9.4							Brine Diesel Emulsion
0	2700	OTHER : FW Gel	8.4	8.6							FW Gel
9000	19937	OIL-BASED MUD	10.5	12.5							OBM

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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: 6340 **Anticipated Surface Pressure:** 4163.32

Anticipated Bottom Hole Temperature(F): 155

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_Howitzer_603H_H2S_Schem_20181108143008.pdf

COG_Howitzer_603H_H2S_SUP_20181108143016.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Howitzer_603H_AC_Rprt_20181106095033.pdf

COG_Howitzer_603H_Direct_Plan_20181106095042.pdf

Other proposed operations facets description:

Drilling Program Attached.
GCP Attached.

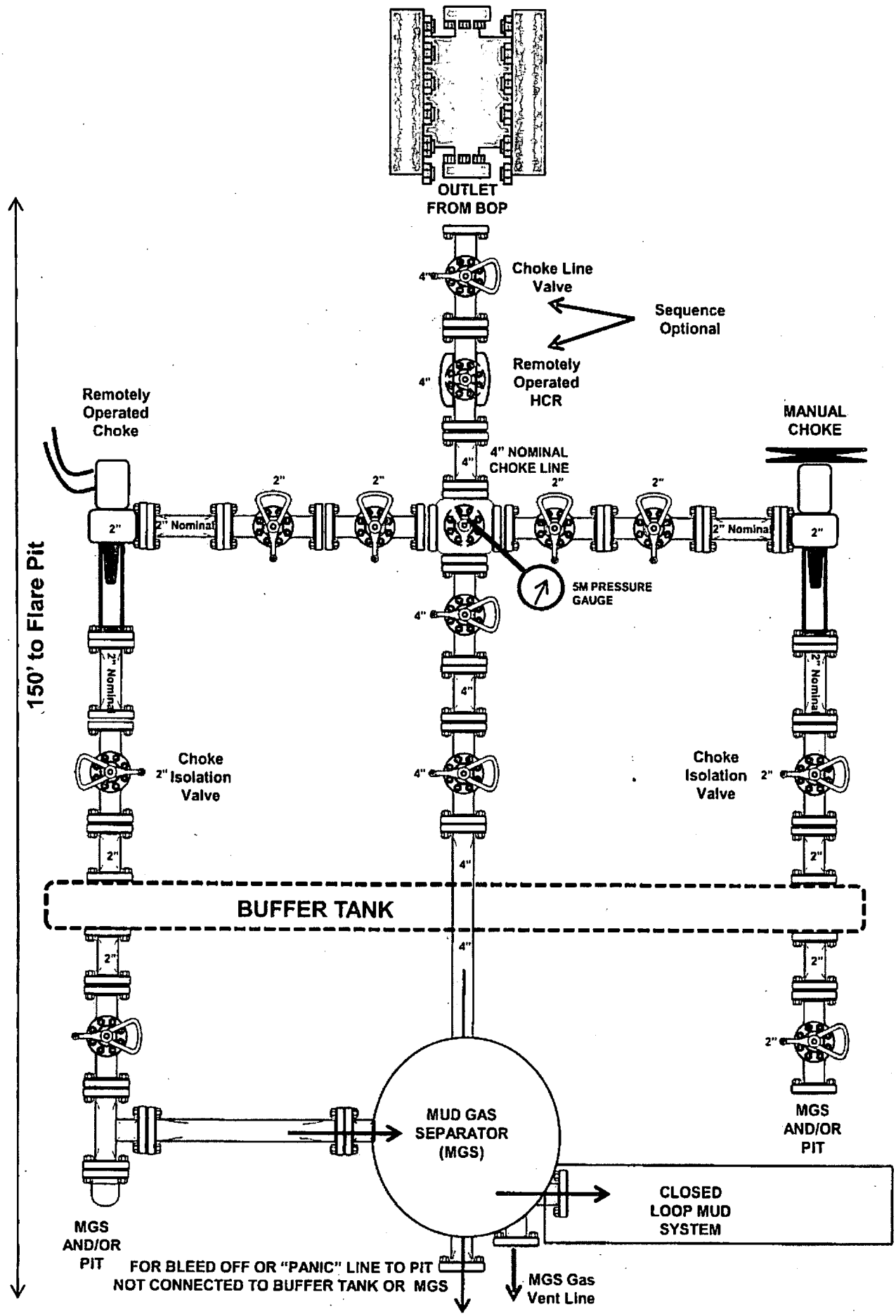
Other proposed operations facets attachment:

COG_Howitzer_603H_Drill_Prog_20181106095052.pdf

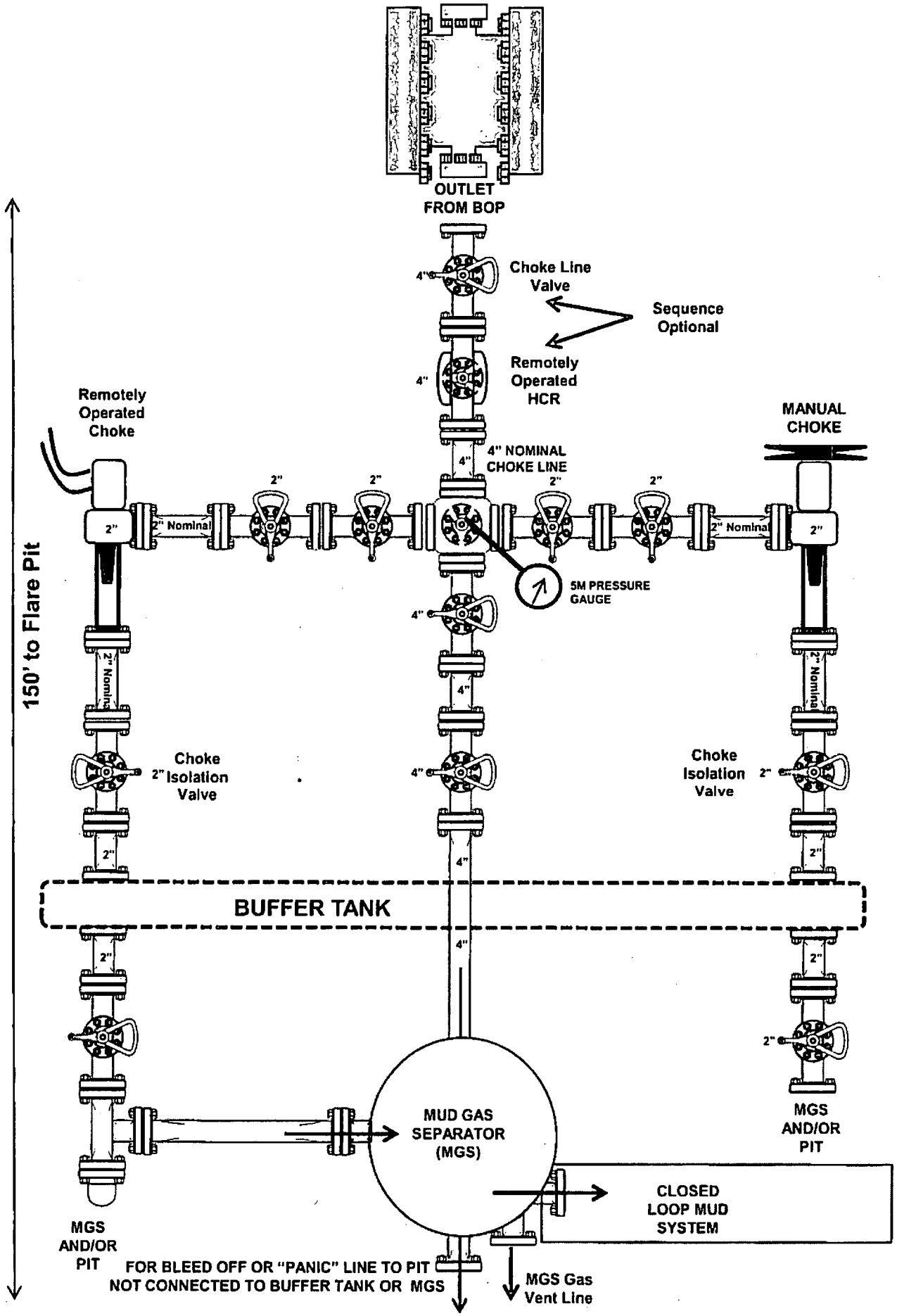
COG_Howitzer_603H_GCP_20181106095102.pdf

Other Variance attachment:

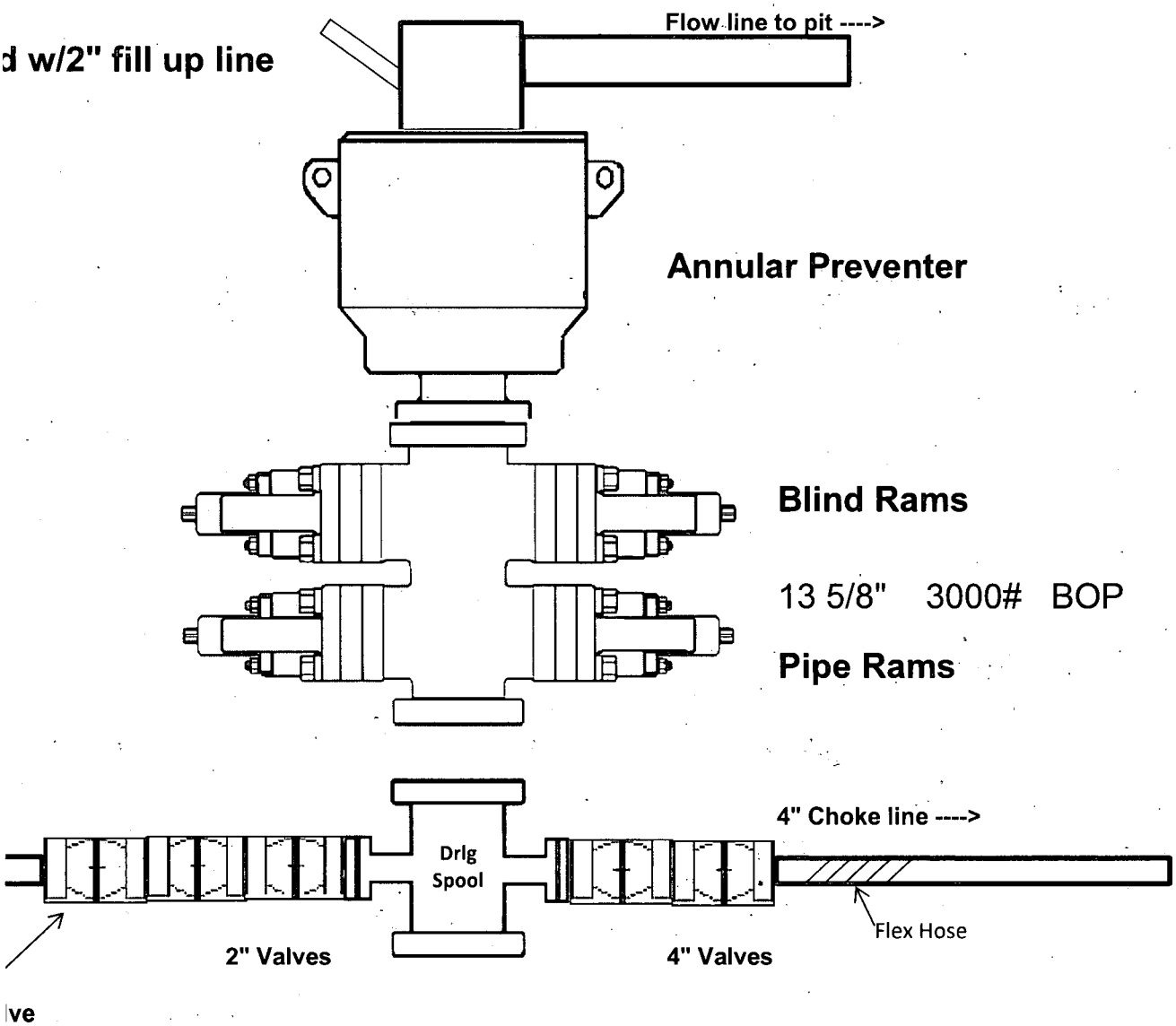
3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



5M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



3,000 psi BOP Schematic



Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	LATSHAW DRILLING	Hose Assembly Type	Choke & Kill
MWH Sales Representative	ABYGAIL LOGAN	Certification	API 7K/FSL LEVEL2
Date Assembled	3/16/2018	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	N/A
Sales Order #	368223	Hose Lot # and Date Code	N/A
Customer Purchase Order #	412528	Hose I.D. (Inches)	3.35"
Assembly Serial # (Pick Ticket #)	454857	Hose O.D. (Inches)	5.77"
Hose Assembly Length	58'	Armor (yes/no)	YES

Fittings

End A		End B	
Stem (Part and Revision #)	R3.5X64-WB	Stem (Part and Revision #)	R3.5X64-WB
Stem (Heat #)	1770131	Stem (Heat #)	1770131
Ferrule (Part and Revision #)	RF3.5X5330	Ferrule (Part and Revision #)	RF3.5X5330
Ferrule (Heat #)	60860852	Ferrule (Heat #)	60860852
Connection Flange,Hammer Union Part	4-1/16 10K	Connection (Part #)	4-1/16 10K
Connection (Heat #)		Connection (Heat #)	
Nut (Part #)		Nut (Part #)	
Nut (Heat #)		Nut (Heat #)	
Dies Used	N/A	Dies Used	5.75"

Hydrostatic Test Requirements

Test Pressure (psi)	10,000	***Hose assembly was tested with ambient water temperature.***
Test Pressure Hold Time (minutes)	16	

Date Tested	Tested By	Approved By
3/16/2018		

Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **LATSHAW DRILLING**	*Customer P.O.#* **412528**
Sales Order # **368223**	*Date Assembled:* **3/16/2018**

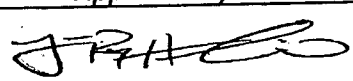
Specifications

Hose Assembly Type:	**Choke & Kill**	*Rig #*	**N/A**
Assembly Serial #	**454857**	*Hose Lot # and Date Code*	**N/A**
Hose Working Pressure (psi)	**N/A**	*Test Pressure (psi)*	**10000**
Hose Assembly Description:	**CK56-SS-5K-6410K-6410K-58.00' FT-TVM**		

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*
	**3/19/2018**

Midwest Hose & Specialty, Inc.

March 16, 2018

Internal Hydrostatic Test Graph

Customer: Latshaw

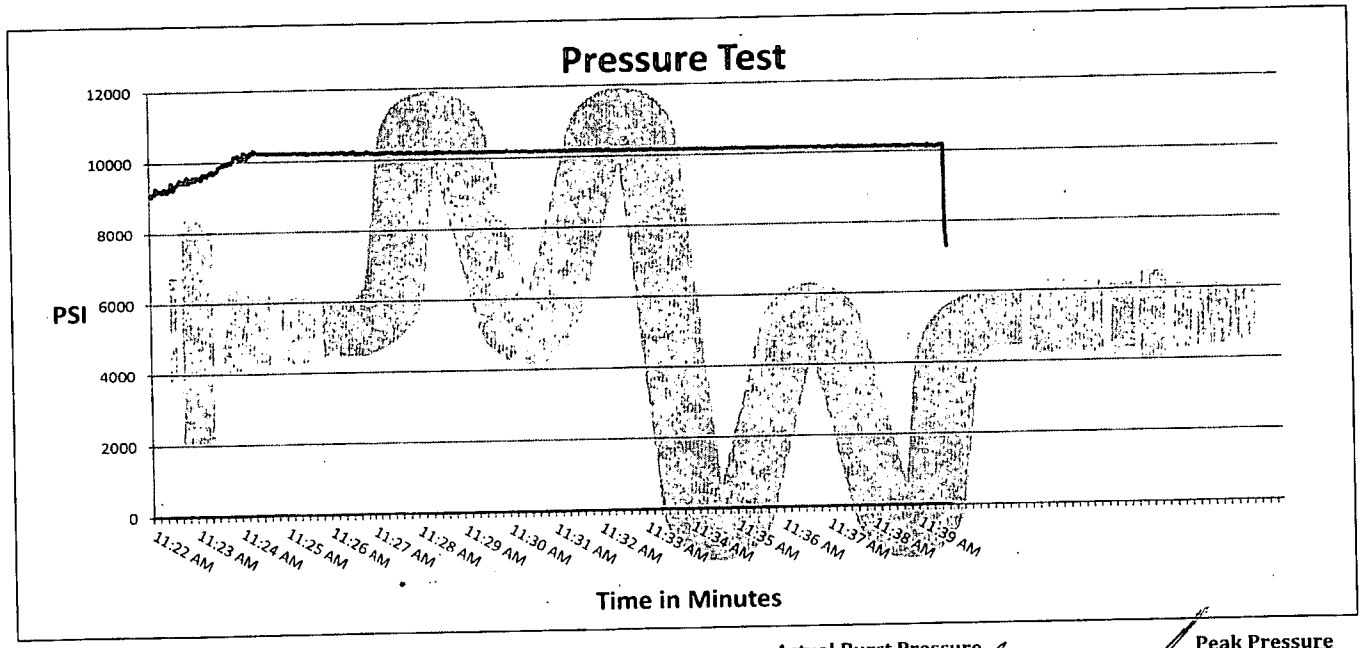
Pick Ticket #: 454857

Hose Specifications

Hose Type	Length
C&K	58'
I.D.	**O.D.**
3.5"	5.22"
Working Pressure	**Burst Pressure**
10000 PSI	Standard Safety Multiplier Applies

Verification

Type of Fitting	Coupling Method
4 1/16 10K	Swage
Die Size	**Final O.D.**
5.75"	5.77"
Hose Serial #	**Hose Assembly Serial #**
43175	454857

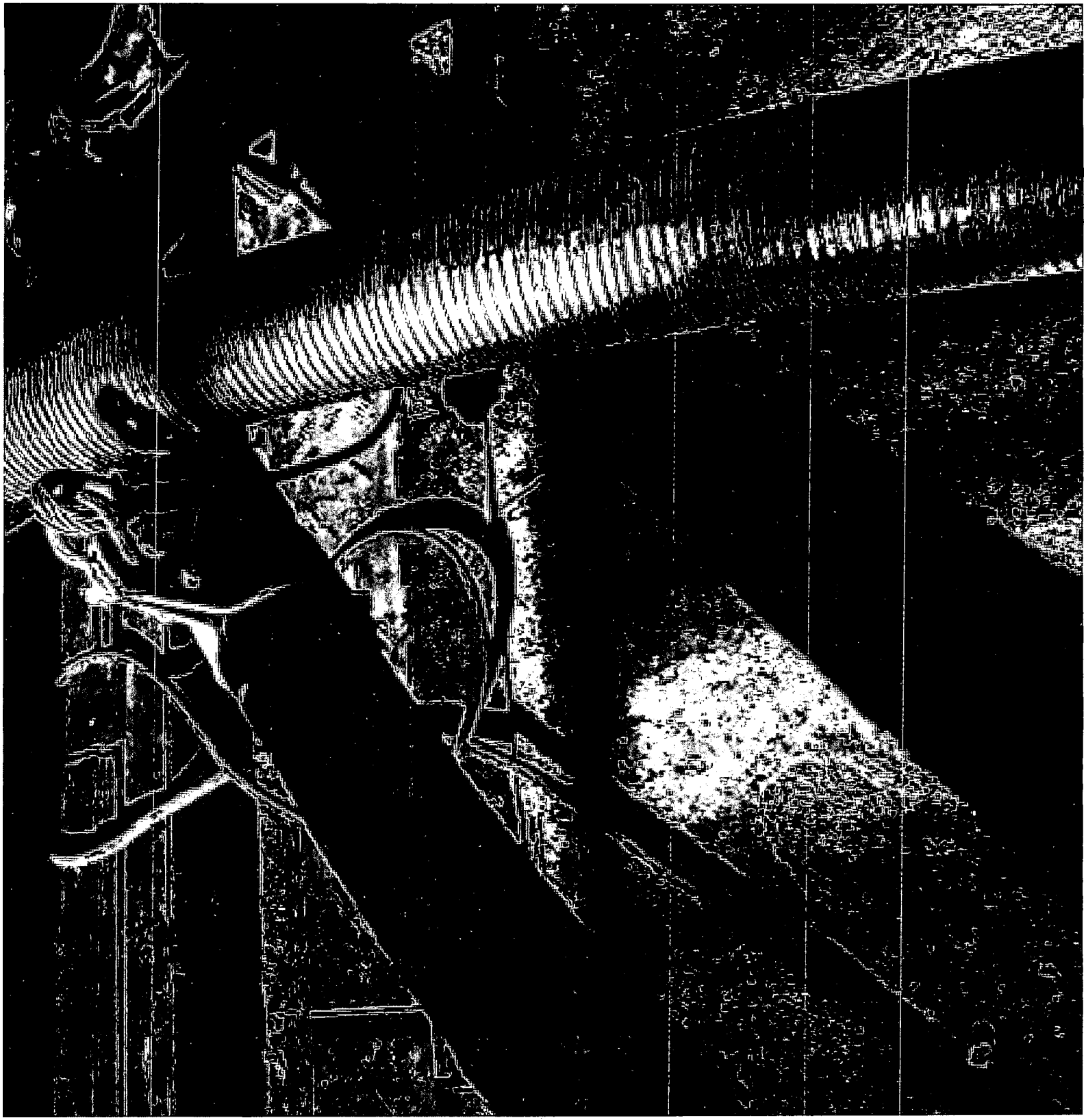


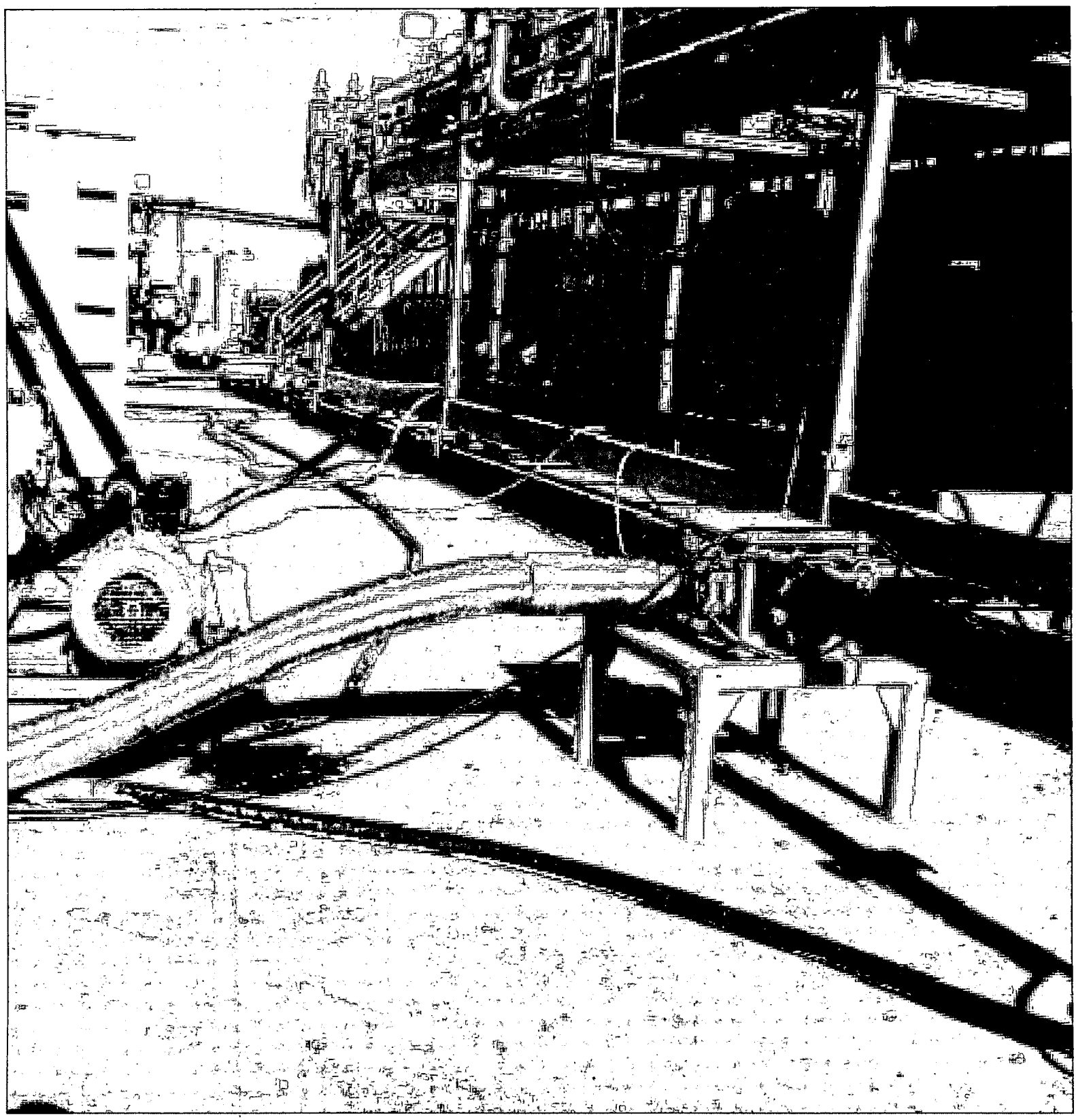
Test Pressure	Time Held at Test Pressure	Actual Burst Pressure	Peak Pressure
10000 PSI	16 Minutes		10400 PSI

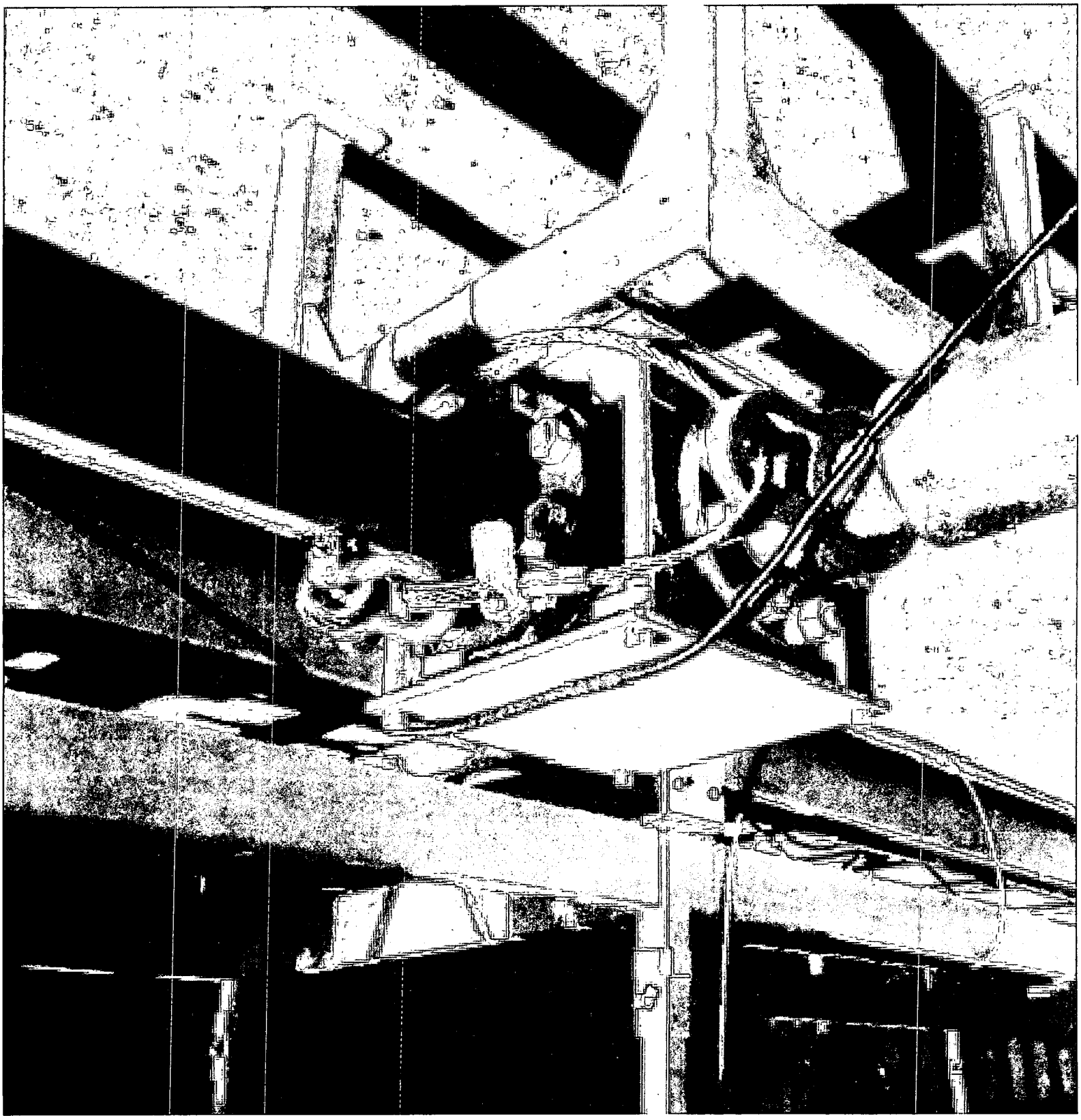
Comments: Hose assembly pressure tested with water at ambient temperature.

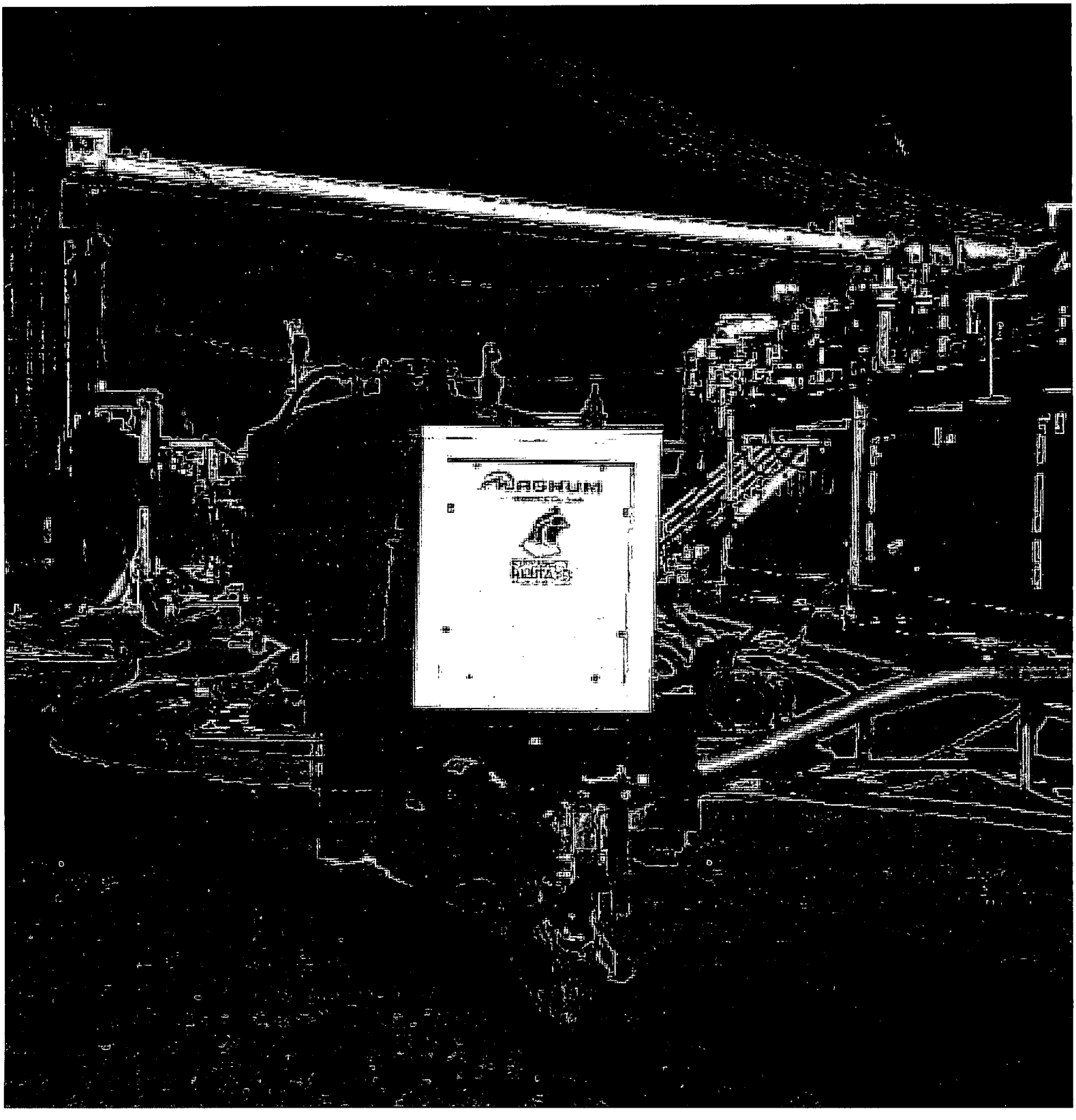
Tested By: *Zach Tillman*

Approved By: *James Hawkins*

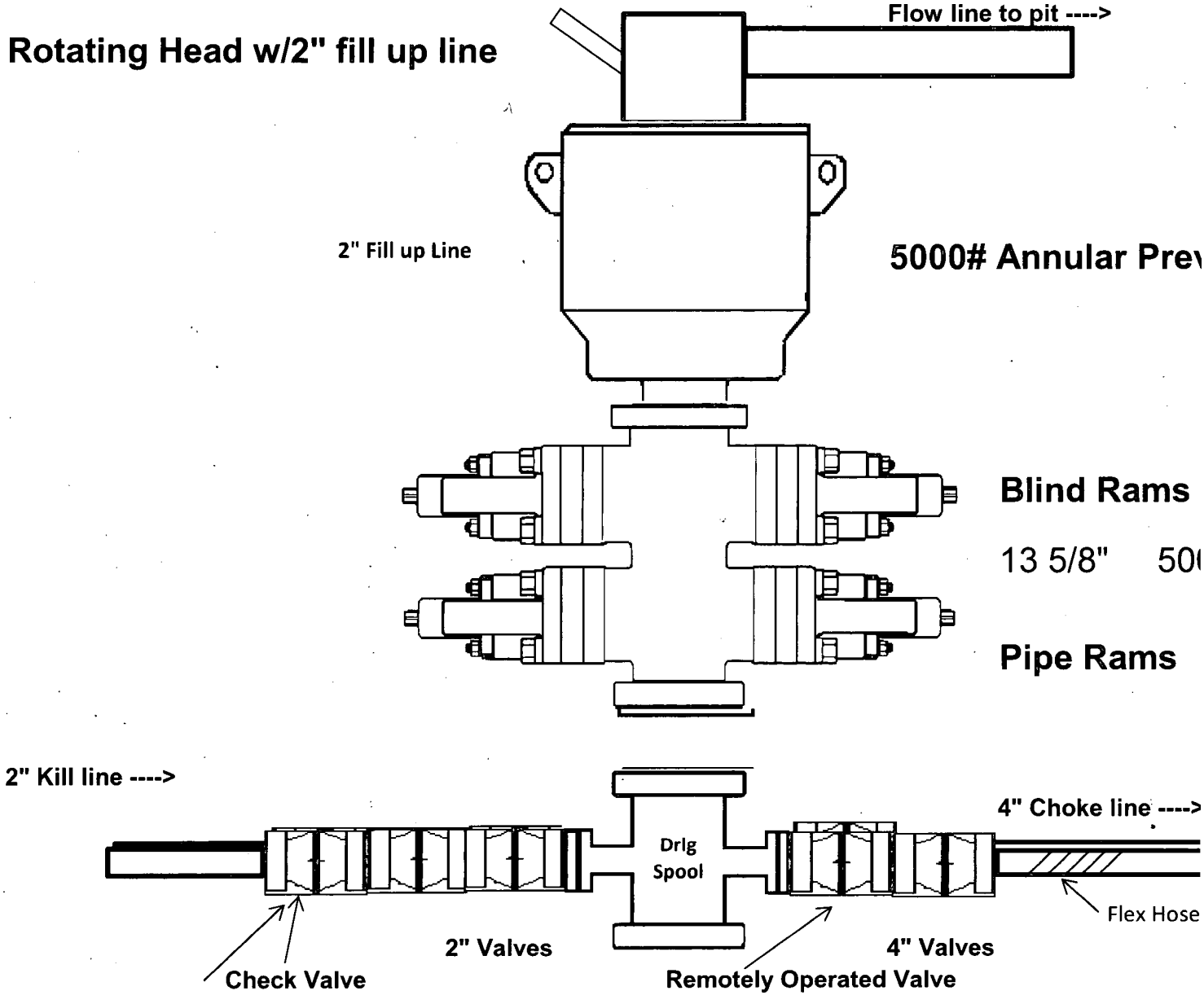







ARAGHUM

5,000 psi BOP Schematic



Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	LATSHAW DRILLING	Hose Assembly Type	Choke & Kill
MWH Sales Representative	ABYGAIL LOGAN	Certification	API 7K/FSL LEVEL2
Date Assembled	3/16/2018	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	N/A
Sales Order #	368223	Hose Lot # and Date Code	N/A
Customer Purchase Order #	412528	Hose I.D. (Inches)	3.35"
Assembly Serial # (Pick Ticket #)	454857	Hose O.D. (Inches)	5.77"
Hose Assembly Length	58'	Armor (yes/no)	YES

Fittings

End A		End B	
Stem (Part and Revision #)	R3.5X64-WB	Stem (Part and Revision #)	R3.5X64-WB
Stem (Heat #)	1770131	Stem (Heat #)	1770131
Ferrule (Part and Revision #)	RF3.5X5330	Ferrule (Part and Revision #)	RF3.5X5330
Ferrule (Heat #)	60860852	Ferrule (Heat #)	60860852
Connection (Flange,Hammer,Union,Part	4-1/16 10K	Connection (Part #)	4-1/16 10K
Connection (Heat #)		Connection (Heat #)	
Nut (Part #)		Nut (Part #)	
Nut (Heat #)		Nut (Heat #)	
Dies Used	N/A	Dies Used	5.75"

Hydrostatic Test Requirements

Test Pressure (psi)	10,000	***Hose assembly was tested with ambient water temperature.***
Test Pressure Hold Time (minutes)	16	

Date Tested	Tested By	Approved By
3/16/2018		

Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **LATSHAW DRILLING**	*Customer P.O.#* **412528**
Sales Order # **368223**	*Date Assembled:* **3/16/2018**

Specifications

Hose Assembly Type:	**Choke & Kill**	*Rig #*	**N/A**
Assembly Serial #	**454857**	*Hose Lot # and Date Code*	**N/A**
Hose Working Pressure (psi)	**N/A**	*Test Pressure (psi)*	**10000**
Hose Assembly Description:	**CK56-SS-5K-6410K-6410K-58.00' FT-TVM**		

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*
	3/19/2018

March 16, 2018

Internal Hydrostatic Test Graph

Midwest Hose & Specialty, Inc.

Customer: Latshaw

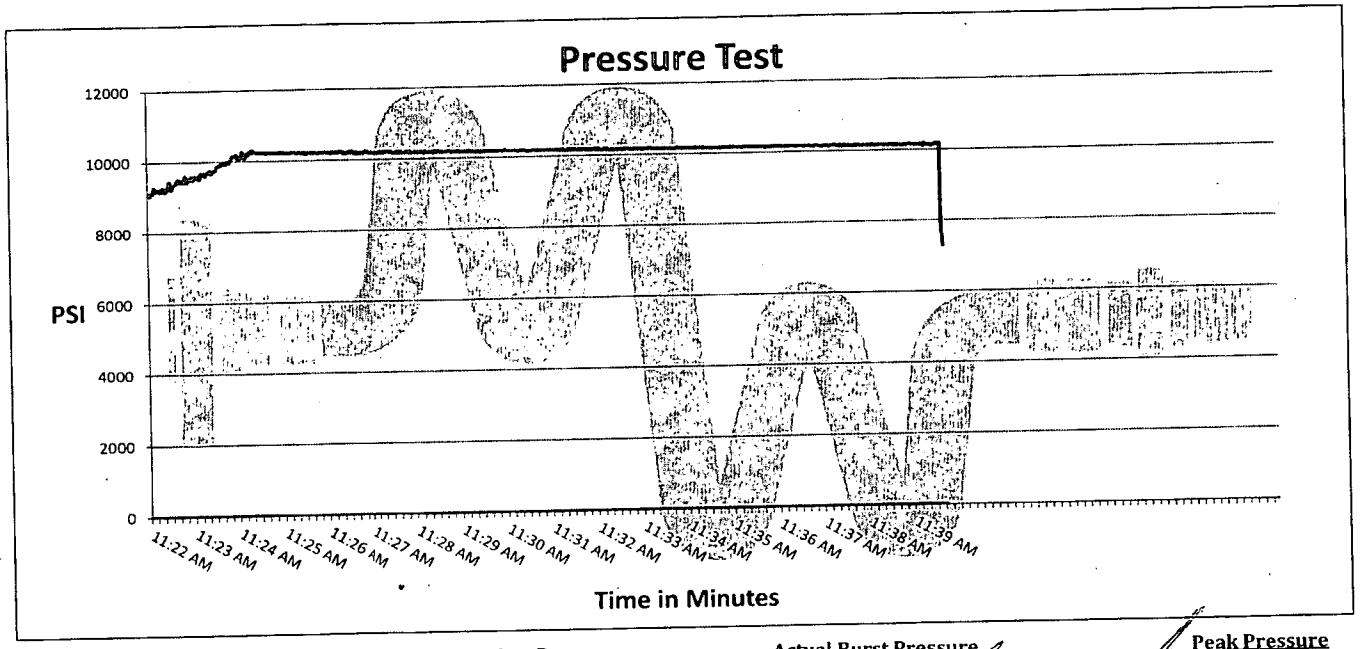
Pick Ticket #: 454857

Hose Specifications

Hose Type	Length
C&K	58'
I.D.	**O.D.**
3.5"	5.22"
Working Pressure	**Burst Pressure**
10000 PSI	Standard Safety Multiplier Applies

Verification

Type of Fitting	Coupling Method
4 1/16 10K	Swage
Die Size	**Final O.D.**
5.75"	5.77"
Hose Serial #	**Hose Assembly Serial #**
43175	454857



Test Pressure
10000 PSI

Time Held at Test Pressure
16 Minutes

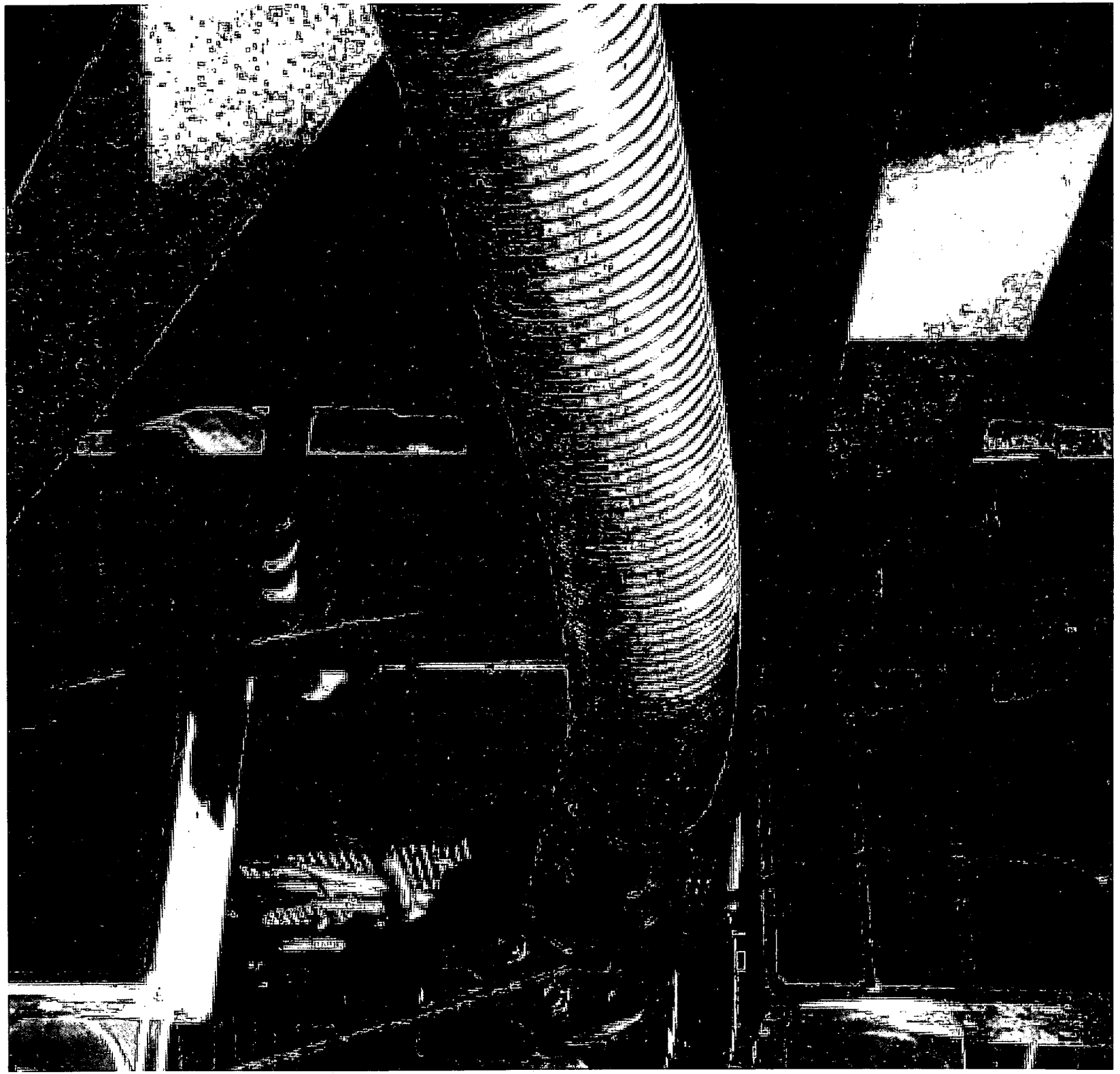
Actual Burst Pressure

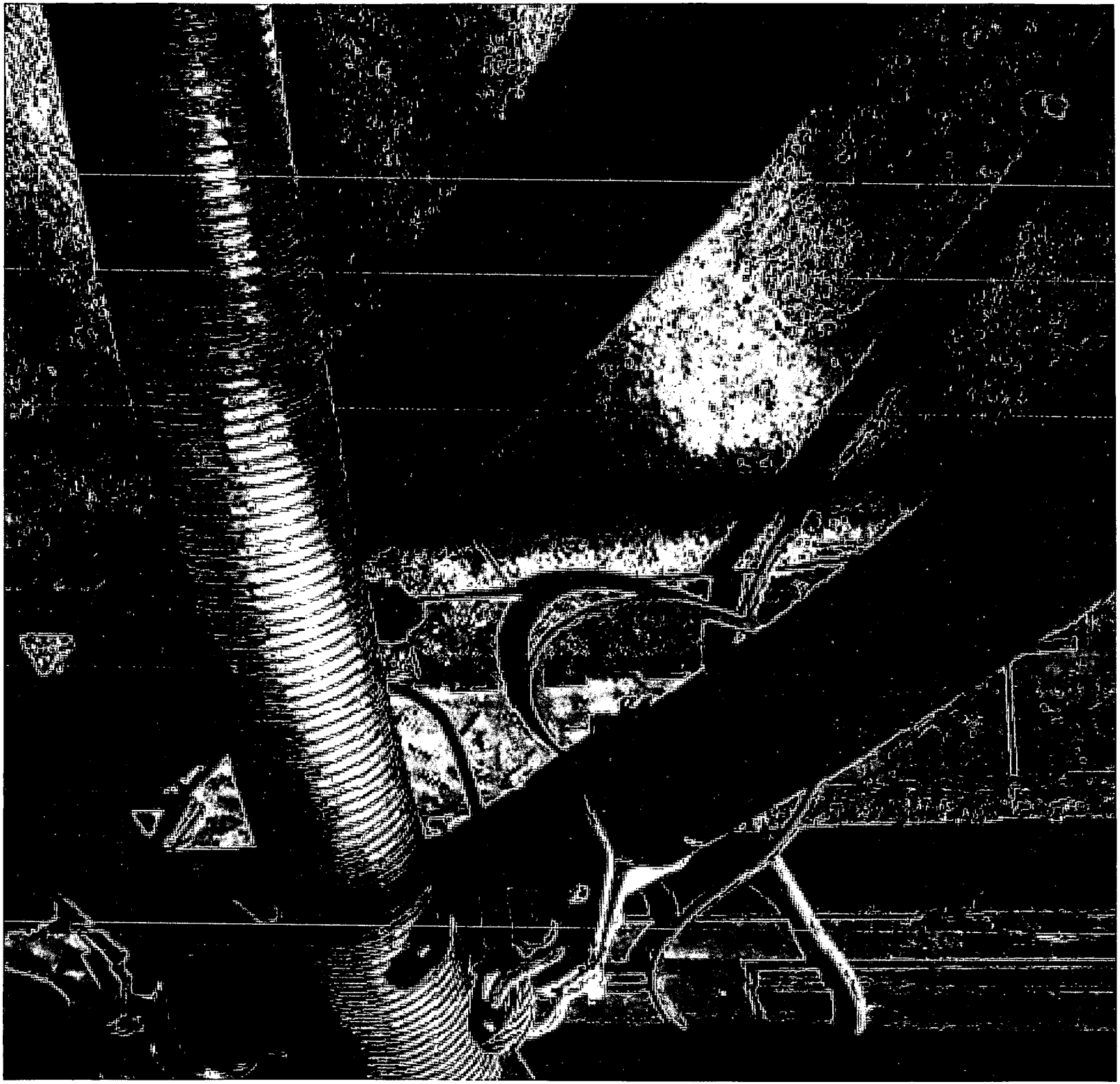
Peak Pressure
10400 PSI

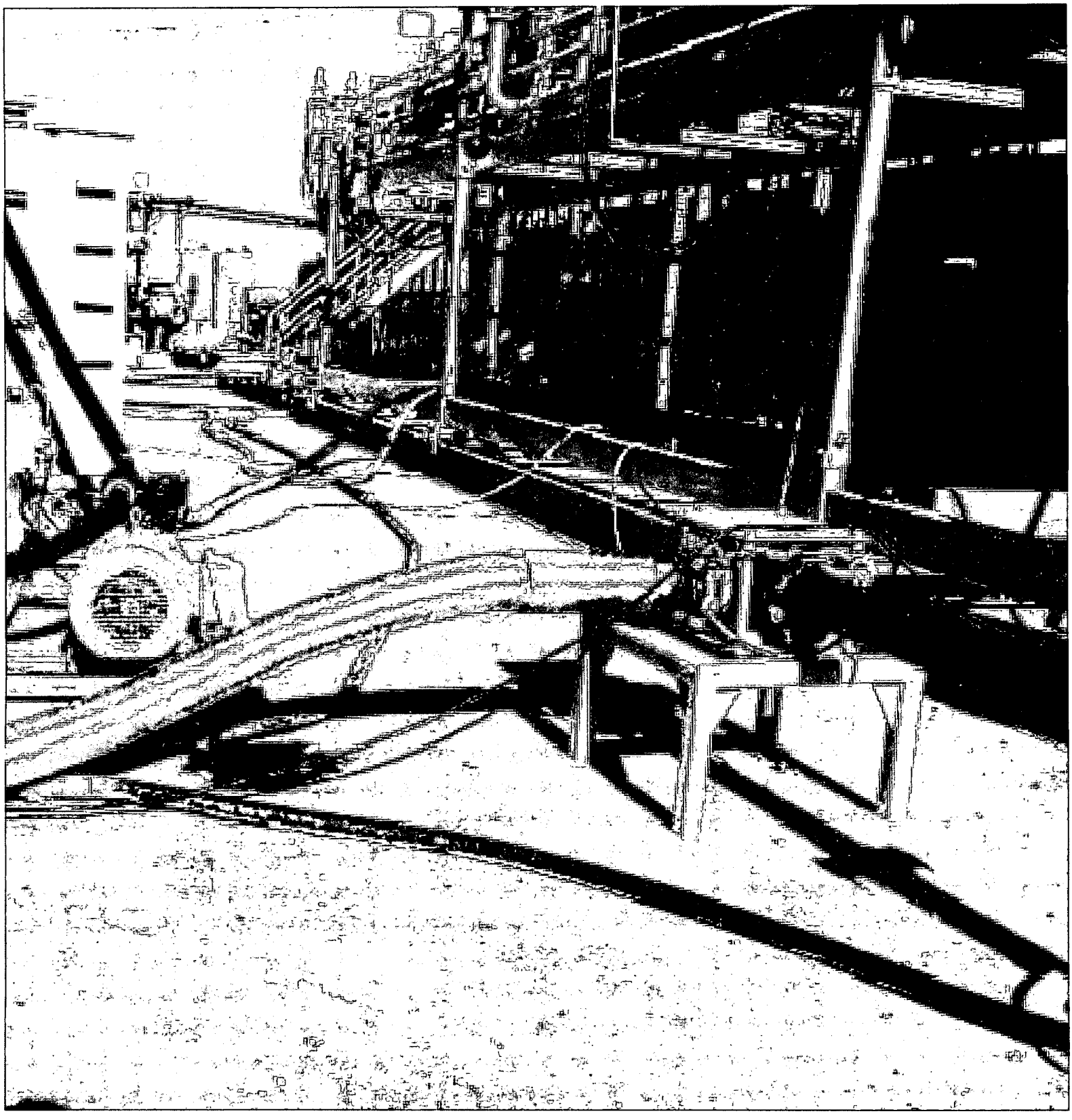
Comments: Hose assembly pressure tested with water at ambient temperature.

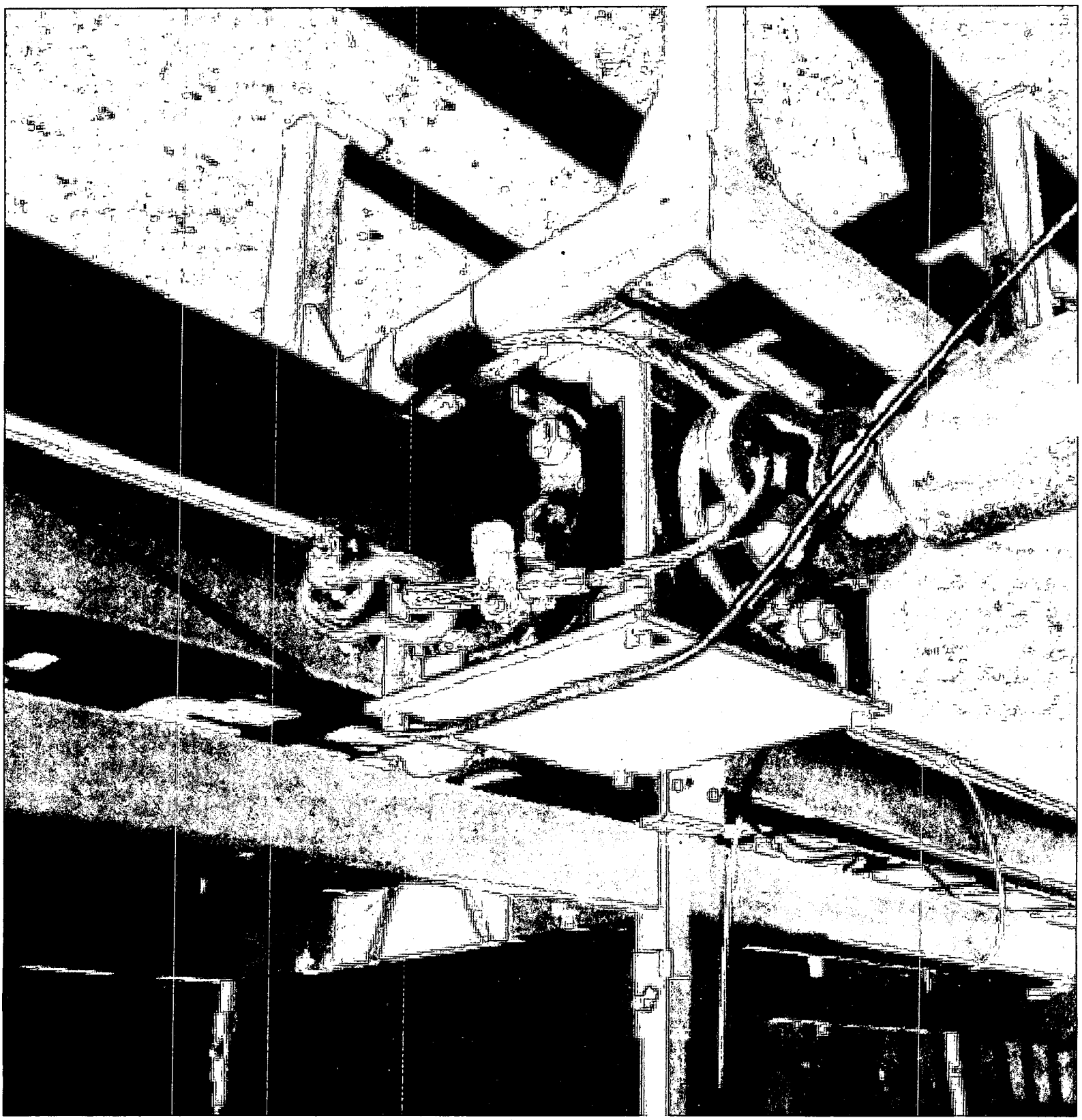
Tested By: Zach Tillman

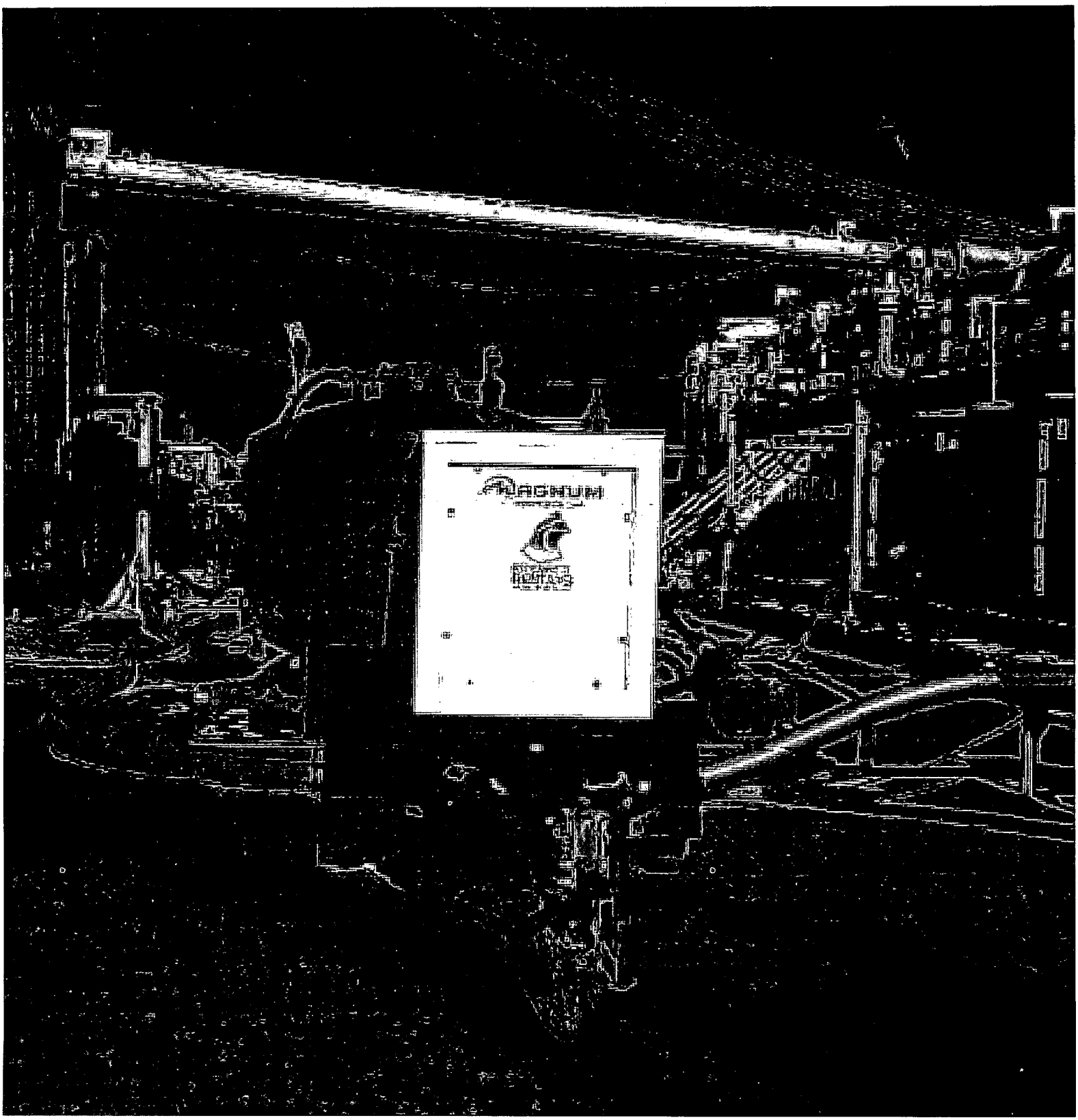
Approved By: James Hawkins










MAGNUM

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 Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	2700	13.375"	61	J55	STC	1.28	2.94	3.61
12.25"	0	9000	9.625"	40	HCL80	BTC	1.32	1.16	2.63
8.5	0	19,938	5.5"	23	P110	BTC	2.29	2.71	3.23
			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 Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	2700	13.375"	61	J55	STC	1.28	2.94	3.61
12.25"	0	9000	9.625"	40	HCL80	BTC	1.32	1.16	2.63
8.5	0	19,938	5.5"	23	P110	BTC	2.29	2.71	3.23
			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 Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	2700	13.375"	61	J55	STC	1.28	2.94	3.61
12.25"	0	9000	9.625"	40	HCL80	BTC	1.32	1.16	2.63
8.5	0	19,938	5.5"	23	P110	BTC	2.29	2.71	3.23
			BLM Minimum Safety Factor				1.125	1	1.6 Dry 1.8 Wet

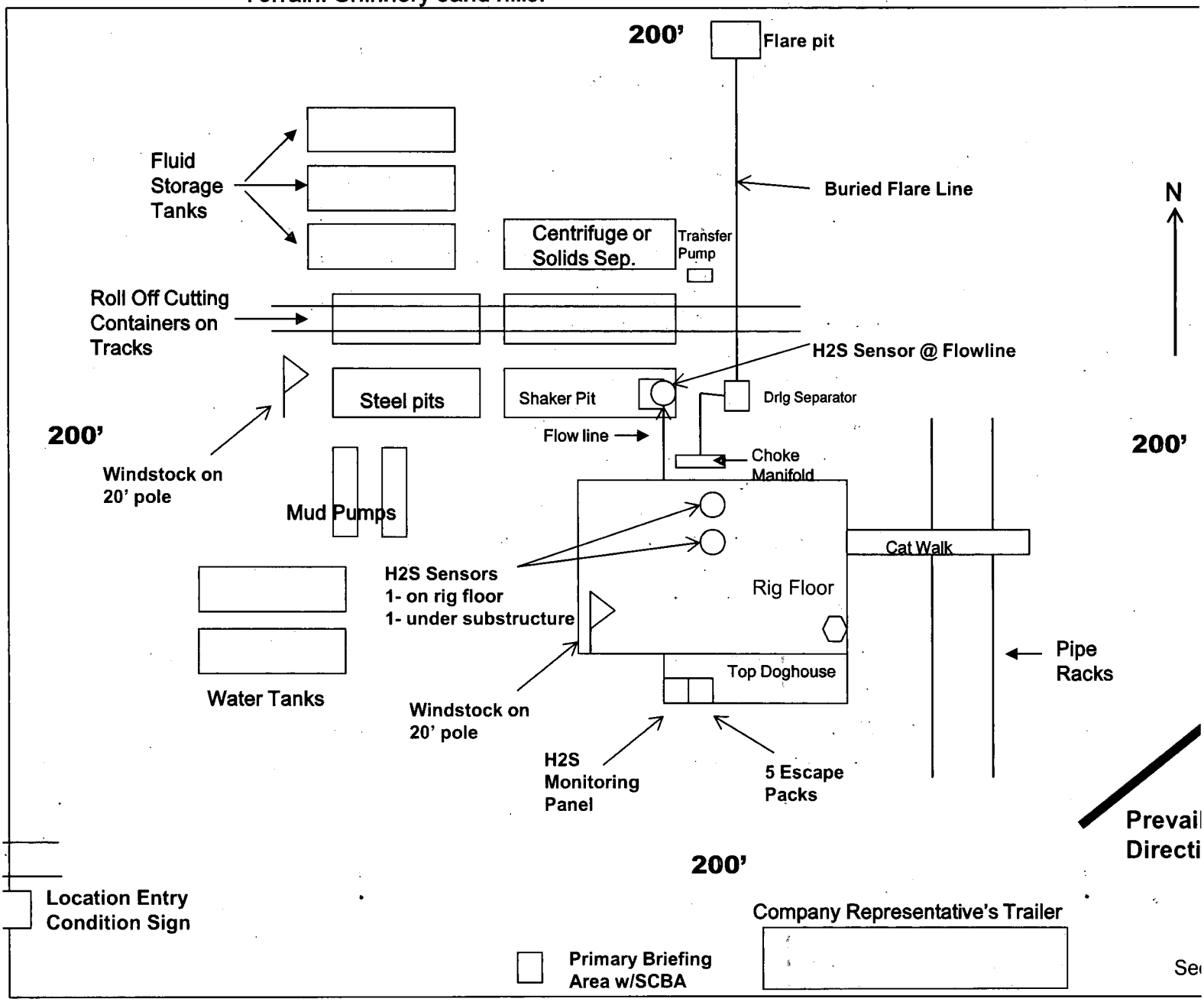
Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Operating LLC

H_2S Equipment Schematic

Terrain: Shinnery sand hills.

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



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.

WARNING

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

CONCHO

Concho Resources, Inc.

Eddy County (NAD27 NME)
(Howitzer) Sec-12_T-24-S_R-28-E
Howitzer Federal Com #603H

OWB
Plan #1

Anticollision Report

02 November, 2018

INTREPID

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 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 1,500.0 usft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 11/02/18

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	9,203.0	Plan #1 (OWB)	MWD	OWSG MWD - Standard
9,203.0	19,937.5	Plan #1 (OWB)	MWD+IFR1+MS	MWD + IFR1 + Multi-Station Correction

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
(Howitzer) Sec-12_T-24-S_R-28-E						
Howitzer Federal Com #602H - OWB - Plan #1	1,916.6	1,916.8	30.0	14.3	1.912	CC
Howitzer Federal Com #602H - OWB - Plan #1	2,000.0	2,000.0	30.0	13.6	1.830	ES, SF
Howitzer Federal Com #605H - OWB - Plan #1	9,202.3	9,190.5	550.0	482.1	8.102	CC
Howitzer Federal Com #605H - OWB - Plan #1	19,937.5	20,073.3	571.9	340.6	2.472	ES, SF
Howitzer Federal Com #606H - OWB - Plan #1	9,202.3	9,179.2	1,100.0	1,036.4	17.294	CC
Howitzer Federal Com #606H - OWB - Plan #1	19,937.5	19,932.0	1,100.2	866.3	4.705	ES, SF

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #602H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9359-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
0.0	0.0	0.2	0.2	0.0	0.0	-0.19	30.0	-0.1	30.0				
100.0	100.0	100.2	100.2	0.2	0.2	-0.19	30.0	-0.1	30.0	29.7	0.32	94.287	
200.0	200.0	200.2	200.2	0.6	0.6	-0.19	30.0	-0.1	30.0	28.8	1.16	25.765	
300.0	300.0	300.2	300.2	1.0	1.0	-0.19	30.0	-0.1	30.0	28.0	2.01	14.921	
400.0	400.0	400.2	400.2	1.4	1.4	-0.19	30.0	-0.1	30.0	27.1	2.86	10.501	
500.0	500.0	500.2	500.2	1.9	1.9	-0.19	30.0	-0.1	30.0	26.3	3.70	8.101	
600.0	600.0	600.2	600.2	2.3	2.3	-0.19	30.0	-0.1	30.0	25.5	4.55	6.594	
700.0	700.0	700.2	700.2	2.7	2.7	-0.19	30.0	-0.1	30.0	24.6	5.40	5.560	
800.0	800.0	800.2	800.2	3.1	3.1	-0.19	30.0	-0.1	30.0	23.8	6.24	4.806	
900.0	900.0	900.2	900.2	3.5	3.5	-0.19	30.0	-0.1	30.0	22.9	7.09	4.233	
1,000.0	1,000.0	1,000.2	1,000.2	4.0	4.0	-0.19	30.0	-0.1	30.0	22.1	7.93	3.781	
1,100.0	1,100.0	1,100.2	1,100.2	4.4	4.4	-0.19	30.0	-0.1	30.0	21.2	8.78	3.417	
1,200.0	1,200.0	1,200.2	1,200.2	4.8	4.8	-0.19	30.0	-0.1	30.0	20.4	9.63	3.116	
1,300.0	1,300.0	1,300.2	1,300.2	5.2	5.2	-0.19	30.0	-0.1	30.0	19.5	10.47	2.865	
1,400.0	1,400.0	1,400.2	1,400.2	5.7	5.7	-0.19	30.0	-0.1	30.0	18.7	11.32	2.650	
1,500.0	1,500.0	1,500.2	1,500.2	6.1	6.1	-0.19	30.0	-0.1	30.0	17.8	12.17	2.466	
1,600.0	1,600.0	1,600.2	1,600.2	6.5	6.5	-0.19	30.0	-0.1	30.0	17.0	13.01	2.306	
1,700.0	1,700.0	1,700.2	1,700.2	6.9	6.9	-0.19	30.0	-0.1	30.0	16.1	13.86	2.165	
1,800.0	1,800.0	1,800.2	1,800.2	7.4	7.4	-0.19	30.0	-0.1	30.0	15.3	14.70	2.040	
1,900.0	1,900.0	1,900.2	1,900.2	7.8	7.8	-0.19	30.0	-0.1	30.0	14.5	15.55	1.929	
1,916.6	1,916.6	1,916.8	1,916.8	7.8	7.8	-0.19	30.0	-0.1	30.0	14.3	15.69	1.912	CC

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #602H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9359-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,000.0	2,000.0	2,000.0	2,000.0	8.2	8.2	-0.19	30.0	-0.1	30.0	13.6	16.40	1.830	ES, SF
2,100.0	2,100.0	2,099.6	2,099.6	8.4	8.5	-108.16	31.0	1.3	31.5	14.6	16.90	1.864	
2,200.0	2,199.8	2,198.8	2,198.7	8.5	8.6	-109.10	33.9	5.6	36.0	18.9	17.11	2.107	
2,300.0	2,299.5	2,297.8	2,297.3	8.5	8.8	-110.21	38.7	12.7	43.6	26.3	17.35	2.513	
2,400.0	2,398.9	2,396.9	2,395.7	8.7	9.0	-110.02	45.3	22.2	53.4	35.7	17.65	3.024	
2,500.0	2,498.4	2,496.4	2,494.4	8.8	9.3	-109.52	52.1	32.2	63.4	45.4	18.00	3.522	
2,600.0	2,597.8	2,595.9	2,593.2	8.9	9.5	-109.16	59.0	42.2	73.4	55.0	18.40	3.991	
2,700.0	2,697.3	2,695.4	2,691.9	9.1	9.8	-108.89	65.8	52.3	83.4	64.6	18.84	4.430	
2,800.0	2,796.7	2,794.9	2,790.7	9.3	10.1	-108.67	72.7	62.3	93.5	74.2	19.31	4.841	
2,900.0	2,896.2	2,894.4	2,889.5	9.5	10.4	-108.50	79.5	72.3	103.5	83.7	19.82	5.221	
3,000.0	2,995.6	2,993.9	2,988.2	9.8	10.7	-108.35	86.4	82.3	113.5	93.2	20.37	5.574	
3,100.0	3,095.1	3,093.4	3,087.0	10.0	11.0	-108.23	93.2	92.3	123.6	102.6	20.95	5.899	
3,200.0	3,194.5	3,192.9	3,185.7	10.3	11.4	-108.13	100.1	102.3	133.6	112.1	21.55	6.199	
3,300.0	3,294.0	3,292.4	3,284.5	10.6	11.7	-108.04	106.9	112.3	143.6	121.5	22.18	6.475	
3,400.0	3,393.4	3,391.9	3,383.2	10.9	12.1	-107.97	113.8	122.3	153.7	130.8	22.84	6.729	
3,500.0	3,492.9	3,491.4	3,482.0	11.2	12.5	-107.90	120.6	132.3	163.7	140.2	23.52	6.962	
3,600.0	3,592.3	3,590.8	3,580.7	11.6	12.9	-107.84	127.5	142.3	173.7	149.5	24.21	7.175	
3,700.0	3,691.8	3,690.3	3,679.5	11.9	13.3	-107.79	134.3	152.3	183.8	158.8	24.93	7.372	
3,800.0	3,791.2	3,789.8	3,778.2	12.3	13.7	-107.74	141.2	162.3	193.8	168.1	25.66	7.552	
3,900.0	3,890.7	3,889.3	3,877.0	12.6	14.1	-107.70	148.0	172.3	203.8	177.4	26.41	7.718	
4,000.0	3,990.1	3,988.8	3,975.7	13.0	14.5	-107.66	154.9	182.3	213.9	186.7	27.17	7.871	
4,100.0	4,089.6	4,088.3	4,074.5	13.4	14.9	-107.62	161.8	192.3	223.9	196.0	27.95	8.012	
4,200.0	4,189.0	4,187.8	4,173.3	13.8	15.4	-107.59	168.6	202.3	233.9	205.2	28.73	8.141	
4,300.0	4,288.5	4,287.3	4,272.0	14.2	15.8	-107.56	175.5	212.3	244.0	214.4	29.53	8.261	
4,400.0	4,387.9	4,386.8	4,370.8	14.6	16.2	-107.53	182.3	222.3	254.0	223.7	30.34	8.372	
4,500.0	4,487.4	4,486.3	4,469.5	15.0	16.7	-107.51	189.2	232.3	264.0	232.9	31.16	8.474	
4,600.0	4,586.9	4,585.8	4,568.3	15.4	17.1	-107.48	196.0	242.3	274.1	242.1	31.99	8.569	
4,700.0	4,686.3	4,685.3	4,667.0	15.8	17.6	-107.46	202.9	252.4	284.1	251.3	32.82	8.656	
4,800.0	4,785.8	4,784.8	4,765.8	16.2	18.0	-107.44	209.7	262.4	294.1	260.5	33.66	8.738	
4,900.0	4,885.2	4,884.3	4,864.5	16.7	18.5	-107.42	216.6	272.4	304.2	269.7	34.51	8.814	
5,000.0	4,984.7	4,983.8	4,963.3	17.1	18.9	-107.41	223.4	282.4	314.2	278.8	35.37	8.884	
5,100.0	5,084.1	5,083.3	5,062.0	17.5	19.4	-107.39	230.3	292.4	324.2	288.0	36.23	8.950	
5,200.0	5,183.6	5,182.8	5,160.8	18.0	19.9	-107.37	237.1	302.4	334.3	297.2	37.09	9.012	
5,300.0	5,283.0	5,282.3	5,259.5	18.4	20.3	-107.36	244.0	312.4	344.3	306.3	37.97	9.069	
5,400.0	5,382.5	5,381.8	5,358.3	18.8	20.8	-107.35	250.8	322.4	354.3	315.5	38.84	9.123	
5,500.0	5,481.9	5,481.3	5,457.0	19.3	21.3	-107.33	257.7	332.4	364.4	324.7	39.72	9.173	
5,600.0	5,581.4	5,580.8	5,555.8	19.7	21.7	-107.32	264.5	342.4	374.4	333.8	40.61	9.220	
5,700.0	5,680.8	5,680.2	5,654.6	20.2	22.2	-107.31	271.4	352.4	384.5	343.0	41.50	9.264	
5,800.0	5,780.3	5,779.7	5,753.3	20.6	22.7	-107.30	278.2	362.4	394.5	352.1	42.39	9.306	
5,900.0	5,879.7	5,879.2	5,852.1	21.1	23.2	-107.29	285.1	372.4	404.5	361.2	43.29	9.345	
6,000.0	5,979.2	5,978.7	5,950.8	21.5	23.6	-107.28	291.9	382.4	414.6	370.4	44.19	9.382	
6,100.0	6,078.6	6,078.2	6,049.6	22.0	24.1	-107.27	298.8	392.4	424.6	379.5	45.09	9.417	
6,200.0	6,178.1	6,177.7	6,148.3	22.4	24.6	-107.26	305.6	402.4	434.6	388.6	45.99	9.450	
6,300.0	6,277.5	6,277.2	6,247.1	22.9	25.1	-107.25	312.5	412.4	444.7	397.8	46.90	9.481	
6,400.0	6,377.0	6,376.7	6,345.8	23.3	25.6	-107.24	319.3	422.4	454.7	406.9	47.81	9.510	
6,500.0	6,476.4	6,476.2	6,444.6	23.8	26.0	-107.23	326.2	432.4	464.7	416.0	48.72	9.538	
6,600.0	6,575.9	6,575.7	6,543.3	24.3	26.5	-107.23	333.0	442.5	474.8	425.1	49.64	9.564	
6,700.0	6,675.3	6,675.2	6,642.1	24.7	27.0	-107.22	339.9	452.5	484.8	434.2	50.56	9.589	
6,800.0	6,774.8	6,774.7	6,740.8	25.2	27.5	-107.21	346.7	462.5	494.8	443.4	51.48	9.613	
6,900.0	6,874.3	6,874.2	6,839.6	25.7	28.0	-107.20	353.6	472.5	504.9	452.5	52.40	9.635	
7,000.0	6,973.7	6,973.7	6,938.4	26.1	28.5	-107.20	360.4	482.5	514.9	461.6	53.32	9.657	
7,100.0	7,073.2	7,073.2	7,037.1	26.6	29.0	-107.19	367.3	492.5	524.9	470.7	54.24	9.677	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #602H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9359-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
7,200.0	7,172.6	7,175.1	7,138.2	27.1	29.5	-107.19	374.2	502.6	534.9	479.7	55.19	9.693	
7,228.1	7,200.5	7,206.3	7,169.3	27.2	29.6	-107.23	376.1	505.5	537.5	482.1	55.46	9.692	
7,300.0	7,272.1	7,286.6	7,249.3	27.5	29.9	-107.46	380.2	511.4	543.2	487.0	56.12	9.678	
7,400.0	7,371.9	7,398.5	7,360.9	27.9	30.4	-107.71	383.7	516.5	548.2	491.2	56.95	9.626	
7,500.0	7,471.9	7,509.6	7,472.1	28.3	30.7	-107.88	384.8	518.1	550.0	492.3	57.62	9.544	
7,528.1	7,500.0	7,537.7	7,500.2	28.3	30.7	-0.30	384.8	518.1	550.0	492.3	57.75	9.523	
7,600.0	7,571.9	7,609.6	7,572.1	28.4	30.9	-0.30	384.8	518.1	550.0	492.0	58.02	9.479	
7,700.0	7,671.9	7,709.6	7,672.1	28.6	31.1	-0.30	384.8	518.1	550.0	491.6	58.42	9.415	
7,800.0	7,771.9	7,809.6	7,772.1	28.8	31.4	-0.30	384.8	518.1	550.0	491.2	58.82	9.351	
7,900.0	7,871.9	7,909.6	7,872.1	28.9	31.6	-0.30	384.8	518.1	550.0	490.8	59.23	9.286	
8,000.0	7,971.9	8,009.6	7,972.1	29.1	31.8	-0.30	384.8	518.1	550.0	490.4	59.65	9.220	
8,100.0	8,071.9	8,109.6	8,072.1	29.3	32.1	-0.30	384.8	518.1	550.0	489.9	60.08	9.154	
8,200.0	8,171.9	8,209.6	8,172.1	29.4	32.3	-0.30	384.8	518.1	550.0	489.5	60.52	9.088	
8,300.0	8,271.9	8,309.6	8,272.1	29.6	32.6	-0.30	384.8	518.1	550.0	489.0	60.97	9.021	
8,400.0	8,371.9	8,409.6	8,372.1	29.8	32.8	-0.30	384.8	518.1	550.0	488.6	61.42	8.954	
8,500.0	8,471.9	8,509.6	8,472.1	30.0	33.1	-0.30	384.8	518.1	550.0	488.1	61.89	8.887	
8,600.0	8,571.9	8,609.6	8,572.1	30.2	33.3	-0.30	384.8	518.1	550.0	487.6	62.36	8.820	
8,700.0	8,671.9	8,709.6	8,672.1	30.4	33.6	-0.30	384.8	518.1	550.0	487.2	62.84	8.753	
8,800.0	8,771.9	8,809.6	8,772.1	30.6	33.9	-0.30	384.8	518.1	550.0	486.7	63.33	8.685	
8,900.0	8,871.9	8,909.6	8,872.1	30.8	34.2	-0.30	384.8	518.1	550.0	486.2	63.82	8.618	
9,000.0	8,971.9	9,009.6	8,972.1	31.1	34.4	-0.30	384.8	518.1	550.0	485.7	64.32	8.551	
9,100.0	9,071.9	9,109.6	9,072.1	31.3	34.7	-0.30	384.8	518.1	550.0	485.2	64.83	8.483	
9,202.3	9,174.2	9,211.9	9,174.4	31.5	35.0	-0.30	384.8	518.1	550.0	484.6	65.36	8.415	
9,250.0	9,221.8	9,259.6	9,222.0	31.6	35.1	89.75	384.8	518.1	550.0	484.4	65.55	8.391	
9,272.9	9,244.7	9,282.4	9,244.9	31.6	35.2	90.00	384.8	518.1	550.0	484.4	65.61	8.383	
9,300.0	9,271.4	9,309.2	9,271.6	31.6	35.3	90.41	384.8	518.1	550.0	484.3	65.66	8.377	
9,350.0	9,320.3	9,358.0	9,320.5	31.5	35.3	91.47	384.8	518.1	550.2	484.5	65.69	8.375	
9,400.0	9,368.0	9,408.2	9,370.6	31.5	35.3	92.76	384.8	515.9	550.7	485.0	65.64	8.390	
9,450.0	9,414.3	9,459.5	9,421.5	31.5	35.3	94.04	384.8	509.2	551.5	485.9	65.56	8.411	
9,500.0	9,458.7	9,512.2	9,472.8	31.5	35.3	95.30	384.8	497.6	552.5	487.0	65.46	8.440	
9,550.0	9,501.0	9,566.2	9,524.2	31.5	35.3	96.54	384.9	480.9	553.8	488.5	65.34	8.476	
9,600.0	9,540.7	9,621.7	9,575.0	31.4	35.3	97.74	384.9	458.8	555.3	490.1	65.19	8.518	
9,650.0	9,577.7	9,678.6	9,624.7	31.4	35.3	98.90	385.0	431.1	557.0	492.0	65.02	8.567	
9,700.0	9,611.6	9,737.0	9,672.5	31.4	35.2	99.99	385.1	397.7	558.8	494.0	64.81	8.622	
9,750.0	9,642.2	9,796.8	9,717.8	31.4	35.2	101.00	385.2	358.6	560.7	496.1	64.59	8.681	
9,800.0	9,669.2	9,858.2	9,759.7	31.3	35.2	101.93	385.3	313.9	562.5	498.2	64.35	8.742	
9,850.0	9,692.5	9,920.9	9,797.4	31.3	35.2	102.76	385.5	263.7	564.2	500.1	64.11	8.801	
9,900.0	9,711.8	9,984.9	9,829.9	31.3	35.1	103.47	385.6	208.7	565.8	501.9	63.90	8.855	
9,950.0	9,727.0	10,050.0	9,856.5	31.3	35.1	104.06	385.8	149.3	567.1	503.4	63.73	8.899	
10,000.0	9,738.1	10,116.0	9,876.5	31.3	35.1	104.50	385.9	86.4	568.2	504.6	63.63	8.930	
10,050.0	9,744.8	10,182.7	9,889.1	31.3	35.1	104.80	386.1	20.9	568.9	505.3	63.60	8.944	
10,100.0	9,747.2	10,249.8	9,894.1	31.3	35.1	104.94	386.3	-45.9	569.2	505.6	63.67	8.940	
10,113.7	9,747.0	10,268.2	9,894.1	31.3	35.1	104.95	386.3	-64.3	569.3	505.6	63.71	8.936	
10,200.0	9,745.3	10,355.0	9,892.4	31.4	35.1	104.95	386.6	-151.1	569.3	505.4	63.85	8.915	
10,300.0	9,743.3	10,455.0	9,890.4	31.5	35.1	104.95	386.8	-251.1	569.3	505.2	64.09	8.882	
10,400.0	9,741.4	10,555.0	9,888.4	31.6	35.2	104.95	387.1	-351.1	569.3	504.9	64.40	8.840	
10,500.0	9,739.4	10,655.0	9,886.4	31.8	35.3	104.95	387.4	-451.1	569.3	504.5	64.78	8.788	
10,600.0	9,737.4	10,755.0	9,884.4	32.0	35.4	104.95	387.6	-551.1	569.3	504.0	65.23	8.727	
10,700.0	9,735.4	10,855.0	9,882.4	32.3	35.6	104.95	387.9	-651.0	569.3	503.5	65.75	8.658	
10,800.0	9,733.4	10,955.0	9,880.4	32.6	35.8	104.95	388.2	-751.0	569.3	502.9	66.34	8.581	
10,900.0	9,731.4	11,055.0	9,878.5	32.9	36.1	104.95	388.4	-851.0	569.3	502.3	66.99	8.497	
11,000.0	9,729.4	11,155.0	9,876.5	33.3	36.4	104.95	388.7	-951.0	569.3	501.5	67.71	8.407	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #602H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9359-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,100.0	9,727.5	11,255.0	9,874.5	33.7	36.7	104.95	389.0	-1,051.0	569.3	500.8	68.49	8.311	
11,200.0	9,725.5	11,355.0	9,872.5	34.1	37.1	104.95	389.2	-1,150.9	569.3	499.9	69.34	8.210	
11,300.0	9,723.5	11,455.0	9,870.5	34.6	37.5	104.95	389.5	-1,250.9	569.3	499.0	70.24	8.105	
11,400.0	9,721.5	11,555.0	9,868.5	35.1	37.9	104.95	389.7	-1,350.9	569.3	498.1	71.19	7.996	
11,500.0	9,719.5	11,655.0	9,866.5	35.6	38.4	104.95	390.0	-1,450.9	569.3	497.1	72.20	7.884	
11,600.0	9,717.5	11,755.0	9,864.6	36.2	38.9	104.95	390.3	-1,550.9	569.3	496.0	73.26	7.770	
11,700.0	9,715.5	11,855.0	9,862.6	36.7	39.5	104.95	390.5	-1,650.8	569.3	494.9	74.37	7.654	
11,800.0	9,713.6	11,955.0	9,860.6	37.3	40.0	104.95	390.8	-1,750.8	569.3	493.7	75.53	7.537	
11,900.0	9,711.6	12,055.0	9,858.6	38.0	40.6	104.95	391.1	-1,850.8	569.3	492.5	76.73	7.419	
12,000.0	9,709.6	12,155.0	9,856.6	38.6	41.2	104.95	391.3	-1,950.8	569.3	491.3	77.97	7.301	
12,100.0	9,707.6	12,255.0	9,854.6	39.3	41.8	104.95	391.6	-2,050.8	569.3	490.0	79.26	7.182	
12,200.0	9,705.6	12,355.0	9,852.6	40.0	42.5	104.95	391.9	-2,150.7	569.3	488.7	80.58	7.064	
12,300.0	9,703.6	12,455.0	9,850.7	40.7	43.1	104.95	392.1	-2,250.7	569.3	487.3	81.94	6.947	
12,400.0	9,701.7	12,555.0	9,848.7	41.4	43.8	104.95	392.4	-2,350.7	569.3	485.9	83.34	6.831	
12,500.0	9,699.7	12,655.0	9,846.7	42.1	44.5	104.95	392.7	-2,450.7	569.3	484.5	84.77	6.716	
12,600.0	9,697.7	12,755.0	9,844.7	42.9	45.2	104.95	392.9	-2,550.7	569.3	483.0	86.23	6.602	
12,700.0	9,695.7	12,855.0	9,842.7	43.7	46.0	104.95	393.2	-2,650.6	569.3	481.5	87.72	6.490	
12,800.0	9,693.7	12,955.0	9,840.7	44.5	46.7	104.95	393.5	-2,750.6	569.3	480.0	89.24	6.379	
12,900.0	9,691.7	13,055.0	9,838.7	45.3	47.5	104.95	393.7	-2,850.6	569.3	478.5	90.78	6.270	
13,000.0	9,689.7	13,155.0	9,836.8	46.1	48.3	104.95	394.0	-2,950.6	569.3	476.9	92.36	6.164	
13,100.0	9,687.8	13,255.0	9,834.8	46.9	49.1	104.95	394.3	-3,050.6	569.3	475.3	93.95	6.059	
13,200.0	9,685.8	13,355.0	9,832.8	47.8	49.9	104.95	394.5	-3,150.5	569.3	473.7	95.57	5.956	
13,300.0	9,683.8	13,455.0	9,830.8	48.6	50.7	104.95	394.8	-3,250.5	569.3	472.0	97.22	5.856	
13,400.0	9,681.8	13,555.0	9,828.8	49.5	51.5	104.95	395.1	-3,350.5	569.3	470.4	98.88	5.757	
13,500.0	9,679.8	13,655.0	9,826.8	50.3	52.4	104.95	395.3	-3,450.5	569.3	468.7	100.56	5.661	
13,600.0	9,677.8	13,755.0	9,824.8	51.2	53.2	104.95	395.6	-3,550.5	569.3	467.0	102.27	5.566	
13,700.0	9,675.8	13,855.0	9,822.9	52.1	54.1	104.95	395.9	-3,650.4	569.3	465.3	103.99	5.474	
13,800.0	9,673.9	13,955.0	9,820.9	53.0	54.9	104.95	396.1	-3,750.4	569.3	463.5	105.72	5.384	
13,900.0	9,671.9	14,055.0	9,818.9	53.9	55.8	104.95	396.4	-3,850.4	569.3	461.8	107.48	5.297	
14,000.0	9,669.9	14,155.0	9,816.9	54.8	56.7	104.95	396.6	-3,950.4	569.3	460.0	109.25	5.211	
14,100.0	9,667.9	14,255.0	9,814.9	55.8	57.6	104.95	396.9	-4,050.4	569.3	458.2	111.03	5.127	
14,200.0	9,665.9	14,355.0	9,812.9	56.7	58.5	104.95	397.2	-4,150.3	569.3	456.4	112.83	5.045	
14,300.0	9,663.9	14,455.0	9,810.9	57.6	59.4	104.95	397.4	-4,250.3	569.3	454.6	114.64	4.966	
14,400.0	9,661.9	14,555.0	9,809.0	58.6	60.3	104.95	397.7	-4,350.3	569.3	452.8	116.47	4.888	
14,500.0	9,660.0	14,655.0	9,807.0	59.5	61.2	104.95	398.0	-4,450.3	569.3	451.0	118.30	4.812	
14,600.0	9,658.0	14,755.0	9,805.0	60.5	62.2	104.95	398.2	-4,550.3	569.3	449.1	120.15	4.738	
14,700.0	9,656.0	14,855.0	9,803.0	61.4	63.1	104.95	398.5	-4,650.2	569.3	447.2	122.01	4.666	
14,800.0	9,654.0	14,955.0	9,801.0	62.4	64.0	104.95	398.8	-4,750.2	569.3	445.4	123.88	4.595	
14,900.0	9,652.0	15,055.0	9,799.0	63.4	65.0	104.95	399.0	-4,850.2	569.3	443.5	125.76	4.526	
15,000.0	9,650.0	15,155.0	9,797.0	64.3	65.9	104.95	399.3	-4,950.2	569.3	441.6	127.65	4.459	
15,100.0	9,648.0	15,255.0	9,795.1	65.3	66.9	104.95	399.6	-5,050.2	569.3	439.7	129.55	4.394	
15,200.0	9,646.1	15,355.0	9,793.1	66.3	67.8	104.95	399.8	-5,150.1	569.3	437.8	131.46	4.330	
15,300.0	9,644.1	15,455.0	9,791.1	67.3	68.8	104.95	400.1	-5,250.1	569.3	435.9	133.38	4.268	
15,400.0	9,642.1	15,555.0	9,789.1	68.3	69.8	104.95	400.4	-5,350.1	569.3	434.0	135.30	4.207	
15,500.0	9,640.1	15,655.0	9,787.1	69.3	70.7	104.95	400.6	-5,450.1	569.3	432.0	137.24	4.148	
15,600.0	9,638.1	15,755.0	9,785.1	70.3	71.7	104.95	400.9	-5,550.1	569.3	430.1	139.18	4.090	
15,700.0	9,636.1	15,855.0	9,783.1	71.3	72.7	104.95	401.2	-5,650.0	569.3	428.1	141.12	4.034	
15,800.0	9,634.1	15,955.0	9,781.2	72.3	73.7	104.95	401.4	-5,750.0	569.3	426.2	143.08	3.979	
15,900.0	9,632.2	16,055.0	9,779.2	73.3	74.7	104.95	401.7	-5,850.0	569.3	424.2	145.04	3.925	
16,000.0	9,630.2	16,155.0	9,777.2	74.3	75.7	104.95	402.0	-5,950.0	569.3	422.3	147.01	3.872	
16,100.0	9,628.2	16,255.0	9,775.2	75.3	76.7	104.95	402.2	-6,049.9	569.3	420.3	148.98	3.821	
16,200.0	9,626.2	16,355.0	9,773.2	76.3	77.7	104.95	402.5	-6,149.9	569.3	418.3	150.96	3.771	

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #602H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9359-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
16,300.0	9,624.2	16,455.0	9,771.2	77.3	78.7	104.95	402.7	-6,249.9	569.3	416.3	152.94	3.722	
16,400.0	9,622.2	16,555.0	9,769.2	78.4	79.7	104.95	403.0	-6,349.9	569.3	414.3	154.93	3.674	
16,500.0	9,620.2	16,655.0	9,767.3	79.4	80.7	104.95	403.3	-6,449.9	569.3	412.3	156.93	3.627	
16,600.0	9,618.3	16,755.0	9,765.3	80.4	81.7	104.95	403.5	-6,549.8	569.3	410.3	158.93	3.582	
16,700.0	9,616.3	16,855.0	9,763.3	81.4	82.7	104.95	403.8	-6,649.8	569.3	408.3	160.93	3.537	
16,800.0	9,614.3	16,955.0	9,761.3	82.5	83.7	104.95	404.1	-6,749.8	569.3	406.3	162.94	3.494	
16,900.0	9,612.3	17,055.0	9,759.3	83.5	84.7	104.95	404.3	-6,849.8	569.3	404.3	164.96	3.451	
17,000.0	9,610.3	17,155.0	9,757.3	84.5	85.8	104.95	404.6	-6,949.8	569.3	402.3	166.98	3.409	
17,100.0	9,608.3	17,255.0	9,755.3	85.6	86.8	104.95	404.9	-7,049.7	569.3	400.3	169.00	3.368	
17,200.0	9,606.4	17,355.0	9,753.4	86.6	87.8	104.95	405.1	-7,149.7	569.3	398.2	171.03	3.328	
17,300.0	9,604.4	17,455.0	9,751.4	87.6	88.8	104.95	405.4	-7,249.7	569.3	396.2	173.06	3.289	
17,400.0	9,602.4	17,555.0	9,749.4	88.7	89.9	104.95	405.7	-7,349.7	569.3	394.2	175.09	3.251	
17,500.0	9,600.4	17,655.0	9,747.4	89.7	90.9	104.95	405.9	-7,449.7	569.3	392.1	177.13	3.214	
17,600.0	9,598.4	17,755.0	9,745.4	90.8	91.9	104.95	406.2	-7,549.6	569.3	390.1	179.17	3.177	
17,700.0	9,596.4	17,855.0	9,743.4	91.8	93.0	104.95	406.5	-7,649.6	569.3	388.0	181.22	3.141	
17,800.0	9,594.4	17,955.0	9,741.4	92.9	94.0	104.95	406.7	-7,749.6	569.3	386.0	183.26	3.106	
17,900.0	9,592.5	18,055.0	9,739.5	93.9	95.0	104.95	407.0	-7,849.6	569.3	383.9	185.32	3.072	
18,000.0	9,590.5	18,155.0	9,737.5	95.0	96.1	104.95	407.3	-7,949.6	569.3	381.9	187.37	3.038	
18,100.0	9,588.5	18,255.0	9,735.5	96.0	97.1	104.95	407.5	-8,049.5	569.3	379.8	189.43	3.005	
18,200.0	9,586.5	18,355.0	9,733.5	97.1	98.2	104.95	407.8	-8,149.5	569.3	377.8	191.49	2.973	
18,300.0	9,584.5	18,455.0	9,731.5	98.1	99.2	104.95	408.1	-8,249.5	569.3	375.7	193.55	2.941	
18,400.0	9,582.5	18,555.0	9,729.5	99.2	100.3	104.95	408.3	-8,349.5	569.3	373.6	195.62	2.910	
18,500.0	9,580.5	18,655.0	9,727.5	100.3	101.3	104.95	408.6	-8,449.5	569.3	371.6	197.68	2.880	
18,600.0	9,578.6	18,755.0	9,725.6	101.3	102.4	104.95	408.9	-8,549.4	569.3	369.5	199.75	2.850	
18,700.0	9,576.6	18,855.0	9,723.6	102.4	103.4	104.95	409.1	-8,649.4	569.3	367.4	201.83	2.821	
18,800.0	9,574.6	18,955.0	9,721.6	103.4	104.5	104.95	409.4	-8,749.4	569.3	365.4	203.90	2.792	
18,900.0	9,572.6	19,055.0	9,719.6	104.5	105.5	104.95	409.6	-8,849.4	569.3	363.3	205.98	2.764	
19,000.0	9,570.6	19,155.0	9,717.6	105.6	106.6	104.95	409.9	-8,949.4	569.3	361.2	208.06	2.736	
19,100.0	9,568.6	19,255.0	9,715.6	106.6	107.6	104.95	410.2	-9,049.3	569.3	359.1	210.14	2.709	
19,200.0	9,566.6	19,355.0	9,713.6	107.7	108.7	104.95	410.4	-9,149.3	569.3	357.0	212.23	2.682	
19,300.0	9,564.7	19,455.0	9,711.7	108.8	109.7	104.95	410.7	-9,249.3	569.3	354.9	214.31	2.656	
19,400.0	9,562.7	19,555.0	9,709.7	109.8	110.8	104.95	411.0	-9,349.3	569.3	352.9	216.40	2.631	
19,500.0	9,560.7	19,655.0	9,707.7	110.9	111.9	104.95	411.2	-9,449.3	569.3	350.8	218.49	2.605	
19,600.0	9,558.7	19,755.0	9,705.7	112.0	112.9	104.95	411.5	-9,549.2	569.3	348.7	220.58	2.581	
19,700.0	9,556.7	19,855.0	9,703.7	113.1	114.0	104.95	411.8	-9,649.2	569.3	346.6	222.68	2.556	
19,800.0	9,554.7	19,955.0	9,701.7	114.1	115.0	104.95	412.0	-9,749.2	569.3	344.5	224.77	2.533	
19,900.0	9,552.7	20,055.0	9,699.7	115.2	116.1	104.95	412.3	-9,849.2	569.3	342.4	226.87	2.509	
19,937.5	9,552.0	20,092.5	9,699.0	115.6	116.5	104.95	412.4	-9,886.7	569.3	341.6	227.65	2.501	

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #605H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9337-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
0.0	0.0	0.0	0.0	0.0	0.0	163.21	-1,079.4	325.7	1,127.5				
100.0	100.0	95.1	95.1	0.2	0.1	163.21	-1,079.4	325.7	1,127.5	1,127.2	0.30	3,789.981	
200.0	200.0	195.1	195.1	0.6	0.5	163.21	-1,079.4	325.7	1,127.5	1,126.3	1.13	997.649	
300.0	300.0	295.1	295.1	1.0	1.0	163.21	-1,079.4	325.7	1,127.5	1,125.5	1.98	570.482	
400.0	400.0	395.1	395.1	1.4	1.4	163.21	-1,079.4	325.7	1,127.5	1,124.6	2.82	399.448	
500.0	500.0	495.1	495.1	1.9	1.8	163.21	-1,079.4	325.7	1,127.5	1,123.8	3.67	307.314	
600.0	600.0	595.1	595.1	2.3	2.2	163.21	-1,079.4	325.7	1,127.5	1,123.0	4.52	249.716	
700.0	700.0	695.1	695.1	2.7	2.7	163.21	-1,079.4	325.7	1,127.5	1,122.1	5.36	210.301	
800.0	800.0	795.1	795.1	3.1	3.1	163.21	-1,079.4	325.7	1,127.5	1,121.3	6.21	181.632	
900.0	900.0	895.1	895.1	3.5	3.5	163.21	-1,079.4	325.7	1,127.5	1,120.4	7.05	159.842	
1,000.0	1,000.0	995.1	995.1	4.0	3.9	163.21	-1,079.4	325.7	1,127.5	1,119.6	7.90	142.720	
1,100.0	1,100.0	1,095.1	1,095.1	4.4	4.4	163.21	-1,079.4	325.7	1,127.5	1,118.7	8.75	128.911	
1,200.0	1,200.0	1,195.1	1,195.1	4.8	4.8	163.21	-1,079.4	325.7	1,127.5	1,117.9	9.59	117.539	
1,300.0	1,300.0	1,295.1	1,295.1	5.2	5.2	163.21	-1,079.4	325.7	1,127.5	1,117.0	10.44	108.010	
1,400.0	1,400.0	1,395.1	1,395.1	5.7	5.6	163.21	-1,079.4	325.7	1,127.5	1,116.2	11.28	99.911	
1,500.0	1,500.0	1,495.1	1,495.1	6.1	6.0	163.21	-1,079.4	325.7	1,127.5	1,115.3	12.13	92.941	
1,600.0	1,600.0	1,595.1	1,595.1	6.5	6.5	163.21	-1,079.4	325.7	1,127.5	1,114.5	12.98	86.881	
1,700.0	1,700.0	1,695.1	1,695.1	6.9	6.9	163.21	-1,079.4	325.7	1,127.5	1,113.6	13.82	81.562	
1,800.0	1,800.0	1,795.1	1,795.1	7.4	7.3	163.21	-1,079.4	325.7	1,127.5	1,112.8	14.67	76.857	
1,900.0	1,900.0	1,895.1	1,895.1	7.8	7.7	163.21	-1,079.4	325.7	1,127.5	1,112.0	15.52	72.666	
2,000.0	2,000.0	1,995.1	1,995.1	8.2	8.2	163.21	-1,079.4	325.7	1,127.5	1,111.1	16.36	68.907	
2,100.0	2,100.0	2,131.4	2,131.3	8.4	8.7	55.65	-1,076.8	327.1	1,125.0	1,107.9	17.09	65.836	
2,200.0	2,199.8	2,268.9	2,268.5	8.5	9.1	55.73	-1,068.3	331.7	1,117.1	1,099.5	17.59	63.523	
2,300.0	2,299.5	2,376.6	2,375.7	8.5	9.5	55.92	-1,058.6	337.0	1,104.9	1,086.9	18.03	61.270	
2,400.0	2,398.9	2,475.8	2,474.2	8.7	9.9	55.99	-1,049.5	342.0	1,091.7	1,073.2	18.49	59.040	
2,500.0	2,498.4	2,574.9	2,572.8	8.8	10.3	56.05	-1,040.4	346.9	1,078.5	1,059.5	18.98	56.823	
2,600.0	2,597.8	2,674.0	2,671.4	8.9	10.6	56.12	-1,031.3	351.9	1,065.3	1,045.8	19.50	54.634	
2,700.0	2,697.3	2,773.1	2,770.0	9.1	11.0	56.19	-1,022.2	356.8	1,052.1	1,032.0	20.05	52.484	
2,800.0	2,796.7	2,872.2	2,868.5	9.3	11.4	56.26	-1,013.1	361.8	1,038.9	1,018.2	20.62	50.384	
2,900.0	2,896.2	2,971.3	2,967.1	9.5	11.8	56.33	-1,004.0	366.7	1,025.6	1,004.4	21.22	48.341	
3,000.0	2,995.6	3,070.4	3,065.7	9.8	12.2	56.41	-994.9	371.7	1,012.4	990.6	21.84	46.361	
3,100.0	3,095.1	3,169.6	3,164.2	10.0	12.6	56.49	-985.8	376.6	999.2	976.7	22.48	44.448	
3,200.0	3,194.5	3,268.7	3,262.8	10.3	13.1	56.56	-976.7	381.6	986.0	962.9	23.14	42.605	
3,300.0	3,294.0	3,367.8	3,361.4	10.6	13.5	56.65	-967.6	386.5	972.8	949.0	23.82	40.834	
3,400.0	3,393.4	3,466.9	3,460.0	10.9	13.9	56.73	-958.5	391.5	959.6	935.1	24.52	39.135	
3,500.0	3,492.9	3,566.0	3,558.5	11.2	14.3	56.81	-949.4	396.4	946.4	921.2	25.23	37.506	
3,600.0	3,592.3	3,665.1	3,657.1	11.6	14.8	56.90	-940.3	401.4	933.2	907.3	25.96	35.947	
3,700.0	3,691.8	3,764.2	3,755.7	11.9	15.2	56.99	-931.2	406.3	920.0	893.3	26.70	34.457	
3,800.0	3,791.2	3,863.4	3,854.2	12.3	15.7	57.09	-922.1	411.3	906.8	879.4	27.45	33.032	
3,900.0	3,890.7	3,962.5	3,952.8	12.6	16.1	57.18	-913.0	416.2	893.6	865.4	28.22	31.671	
4,000.0	3,990.1	4,061.6	4,051.4	13.0	16.5	57.28	-903.9	421.2	880.4	851.5	28.99	30.371	
4,100.0	4,089.6	4,160.7	4,150.0	13.4	17.0	57.38	-894.8	426.1	867.3	837.5	29.77	29.130	
4,200.0	4,189.0	4,259.8	4,248.5	13.8	17.4	57.49	-885.7	431.1	854.1	823.5	30.56	27.944	
4,300.0	4,288.5	4,358.9	4,347.1	14.2	17.9	57.59	-876.6	436.0	840.9	809.5	31.36	26.812	
4,400.0	4,387.9	4,458.1	4,445.7	14.6	18.3	57.71	-867.5	441.0	827.7	795.5	32.17	25.730	
4,500.0	4,487.4	4,557.2	4,544.3	15.0	18.8	57.82	-858.4	445.9	814.5	781.6	32.98	24.696	
4,600.0	4,586.9	4,656.3	4,642.8	15.4	19.2	57.94	-849.3	450.9	801.4	767.6	33.80	23.707	
4,700.0	4,686.3	4,755.4	4,741.4	15.8	19.7	58.06	-840.2	455.8	788.2	753.6	34.63	22.762	
4,800.0	4,785.8	4,854.5	4,840.0	16.2	20.2	58.19	-831.1	460.8	775.0	739.6	35.46	21.857	
4,900.0	4,885.2	4,953.6	4,938.5	16.7	20.6	58.32	-822.0	465.7	761.9	725.6	36.30	20.991	
5,000.0	4,984.7	5,052.7	5,037.1	17.1	21.1	58.46	-812.9	470.7	748.7	711.6	37.14	20.161	
5,100.0	5,084.1	5,151.9	5,135.7	17.5	21.5	58.60	-803.8	475.6	735.6	697.6	37.98	19.366	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #605H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9337-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
5,200.0	5,183.6	5,251.0	5,234.3	18.0	22.0	58.74	-794.7	480.6	722.4	683.6	38.83	18.604	
5,300.0	5,283.0	5,350.1	5,332.8	18.4	22.5	58.89	-785.6	485.5	709.3	669.6	39.68	17.873	
5,400.0	5,382.5	5,449.2	5,431.4	18.8	22.9	59.05	-776.5	490.5	696.2	655.6	40.54	17.171	
5,500.0	5,481.9	5,548.3	5,530.0	19.3	23.4	59.21	-767.4	495.5	683.0	641.6	41.40	16.497	
5,600.0	5,581.4	5,647.4	5,628.5	19.7	23.9	59.38	-758.3	500.4	669.9	627.6	42.26	15.850	
5,700.0	5,680.8	5,746.5	5,727.1	20.2	24.3	59.56	-749.2	505.4	656.8	613.6	43.13	15.228	
5,800.0	5,780.3	5,845.7	5,825.7	20.6	24.8	59.74	-740.1	510.3	643.7	599.7	44.00	14.629	
5,900.0	5,879.7	5,944.8	5,924.3	21.1	25.3	59.93	-731.0	515.3	630.6	585.7	44.87	14.053	
6,000.0	5,979.2	6,033.0	6,012.1	21.5	25.6	60.16	-723.5	519.3	618.1	572.4	45.71	13.523	
6,100.0	6,078.6	6,118.6	6,097.5	22.0	26.0	60.54	-718.5	522.0	607.9	561.4	46.52	13.068	
6,200.0	6,178.1	6,200.0	6,178.8	22.4	26.3	61.06	-715.9	523.5	600.0	552.7	47.29	12.689	
6,300.0	6,277.5	6,293.8	6,272.6	22.9	26.6	61.84	-715.2	523.8	594.4	546.3	48.07	12.366	
6,400.0	6,377.0	6,393.3	6,372.1	23.3	27.0	62.73	-715.2	523.8	589.5	540.6	48.88	12.060	
6,500.0	6,476.4	6,492.7	6,471.5	23.8	27.3	63.64	-715.2	523.8	584.8	535.1	49.70	11.765	
6,600.0	6,575.9	6,592.2	6,571.0	24.3	27.7	64.56	-715.2	523.8	580.2	529.7	50.53	11.482	
6,700.0	6,675.3	6,691.6	6,670.4	24.7	28.1	65.50	-715.2	523.8	575.8	524.4	51.36	11.210	
6,800.0	6,774.8	6,791.1	6,769.9	25.2	28.4	66.45	-715.2	523.8	571.5	519.3	52.20	10.949	
6,900.0	6,874.3	6,890.5	6,869.4	25.7	28.8	67.41	-715.2	523.8	567.4	514.3	53.03	10.698	
7,000.0	6,973.7	6,990.0	6,968.8	26.1	29.1	68.39	-715.2	523.8	563.4	509.5	53.88	10.457	
7,100.0	7,073.2	7,089.4	7,068.3	26.6	29.5	69.38	-715.2	523.8	559.6	504.9	54.72	10.226	
7,200.0	7,172.6	7,188.9	7,167.7	27.1	29.9	70.38	-715.2	523.8	556.0	500.4	55.57	10.005	
7,228.1	7,200.5	7,216.8	7,195.6	27.2	30.0	70.66	-715.2	523.8	555.0	499.2	55.81	9.944	
7,300.0	7,272.1	7,288.4	7,267.2	27.5	30.2	71.27	-715.2	523.8	552.9	496.5	56.40	9.802	
7,400.0	7,371.9	7,388.2	7,367.0	27.9	30.6	71.84	-715.2	523.8	550.9	493.7	57.18	9.634	
7,500.0	7,471.9	7,488.2	7,467.0	28.3	31.0	72.09	-715.2	523.8	550.0	492.1	57.93	9.496	
7,528.1	7,500.0	7,516.3	7,495.1	28.3	31.1	179.70	-715.2	523.8	550.0	491.9	58.10	9.466	
7,600.0	7,571.9	7,588.2	7,567.0	28.4	31.3	179.70	-715.2	523.8	550.0	491.5	58.49	9.404	
7,700.0	7,671.9	7,688.2	7,667.0	28.6	31.7	179.70	-715.2	523.8	550.0	491.0	59.03	9.317	
7,800.0	7,771.9	7,788.2	7,767.0	28.8	32.1	179.70	-715.2	523.8	550.0	490.4	59.58	9.231	
7,900.0	7,871.9	7,888.2	7,867.0	28.9	32.5	179.70	-715.2	523.8	550.0	489.9	60.14	9.146	
8,000.0	7,971.9	7,988.2	7,967.0	29.1	32.8	179.70	-715.2	523.8	550.0	489.3	60.70	9.061	
8,100.0	8,071.9	8,088.2	8,067.0	29.3	33.2	179.70	-715.2	523.8	550.0	488.7	61.27	8.977	
8,200.0	8,171.9	8,188.2	8,167.0	29.4	33.6	179.70	-715.2	523.8	550.0	488.2	61.84	8.894	
8,300.0	8,271.9	8,288.2	8,267.0	29.6	34.0	179.70	-715.2	523.8	550.0	487.6	62.42	8.811	
8,400.0	8,371.9	8,388.2	8,367.0	29.8	34.4	179.70	-715.2	523.8	550.0	487.0	63.00	8.730	
8,500.0	8,471.9	8,488.2	8,467.0	30.0	34.7	179.70	-715.2	523.8	550.0	486.4	63.59	8.649	
8,600.0	8,571.9	8,588.2	8,567.0	30.2	35.1	179.70	-715.2	523.8	550.0	485.8	64.19	8.568	
8,700.0	8,671.9	8,688.2	8,667.0	30.4	35.5	179.70	-715.2	523.8	550.0	485.2	64.79	8.489	
8,800.0	8,771.9	8,788.2	8,767.0	30.6	35.9	179.70	-715.2	523.8	550.0	484.6	65.40	8.410	
8,900.0	8,871.9	8,888.2	8,867.0	30.8	36.3	179.70	-715.2	523.8	550.0	484.0	66.01	8.332	
9,000.0	8,971.9	8,988.2	8,967.0	31.1	36.7	179.70	-715.2	523.8	550.0	483.4	66.63	8.255	
9,100.0	9,071.9	9,088.2	9,067.0	31.3	37.0	179.70	-715.2	523.8	550.0	482.8	67.25	8.179	
9,202.3	9,174.2	9,190.5	9,169.3	31.5	37.4	179.70	-715.2	523.8	550.0	482.1	67.89	8.102	CC
9,250.0	9,221.8	9,238.1	9,216.9	31.6	37.6	-90.65	-715.2	523.8	550.0	481.9	68.13	8.073	
9,300.0	9,271.4	9,287.7	9,266.5	31.6	37.8	-91.30	-715.2	523.8	550.1	481.8	68.31	8.053	
9,350.0	9,320.3	9,336.6	9,315.4	31.5	38.0	-92.34	-715.2	523.8	550.5	482.0	68.48	8.038	
9,400.0	9,368.0	9,387.5	9,366.3	31.5	38.0	-93.62	-715.2	521.6	551.2	482.7	68.48	8.049	
9,450.0	9,414.3	9,439.7	9,418.0	31.5	38.0	-94.90	-715.2	514.7	552.1	483.7	68.44	8.067	
9,500.0	9,458.7	9,493.3	9,470.2	31.5	38.0	-96.14	-715.2	502.7	553.4	485.0	68.39	8.091	
9,550.0	9,501.0	9,548.3	9,522.4	31.5	38.0	-97.36	-715.1	485.4	554.8	486.5	68.32	8.121	
9,600.0	9,540.7	9,604.7	9,573.9	31.4	38.0	-98.53	-715.0	462.5	556.5	488.2	68.23	8.156	
9,650.0	9,577.7	9,662.6	9,624.2	31.4	38.0	-99.64	-715.0	433.9	558.2	490.1	68.10	8.197	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #605H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9337-MWD+IFR1+MS — **Offset Well Error:** 0.0 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)	Rule Assigned: Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,700.0	9,611.6	9,722.0	9,672.6	31.4	38.0	-100.68	-714.9	399.4	560.1	492.1	67.95	8.243	
9,750.0	9,642.2	9,782.9	9,718.1	31.4	38.0	-101.64	-714.8	359.1	561.9	494.1	67.77	8.291	
9,800.0	9,669.2	9,845.2	9,760.0	31.3	38.1	-102.51	-714.7	313.1	563.7	496.1	67.58	8.341	
9,850.0	9,692.5	9,908.7	9,797.4	31.3	38.1	-103.26	-714.5	261.7	565.3	497.9	67.39	8.389	
9,900.0	9,711.8	9,973.5	9,829.4	31.3	38.1	-103.88	-714.4	205.4	566.7	499.5	67.22	8.431	
9,950.0	9,727.0	10,039.3	9,855.2	31.3	38.1	-104.37	-714.2	145.0	567.9	500.8	67.10	8.463	
10,000.0	9,738.1	10,105.8	9,874.0	31.3	38.1	-104.72	-714.0	81.2	568.7	501.7	67.05	8.482	
10,050.0	9,744.8	10,172.8	9,885.4	31.3	38.1	-104.91	-713.9	15.2	569.2	502.1	67.08	8.485	
10,100.0	9,747.2	10,240.0	9,889.1	31.3	38.1	-104.94	-713.7	-51.9	569.2	502.0	67.20	8.471	
10,112.1	9,747.1	10,256.3	9,888.7	31.3	38.1	-104.93	-713.6	-68.2	569.2	502.0	67.24	8.465	
10,113.7	9,747.0	10,255.7	9,888.8	31.3	38.1	-104.93	-713.6	-67.6	569.2	502.0	67.24	8.466	
10,200.0	9,745.3	10,342.1	9,887.2	31.4	38.1	-104.94	-713.4	-153.9	569.2	501.8	67.44	8.441	
10,300.0	9,743.3	10,442.1	9,885.3	31.5	38.1	-104.95	-713.1	-253.9	569.3	501.5	67.73	8.405	
10,400.0	9,741.4	10,542.1	9,883.4	31.6	38.1	-104.96	-712.9	-353.9	569.3	501.2	68.10	8.360	
10,500.0	9,739.4	10,642.1	9,881.5	31.8	38.3	-104.97	-712.6	-453.8	569.3	500.8	68.53	8.307	
10,600.0	9,737.4	10,742.1	9,879.7	32.0	38.5	-104.98	-712.4	-553.8	569.3	500.3	69.03	8.248	
10,700.0	9,735.4	10,842.1	9,877.8	32.3	38.8	-104.99	-712.1	-653.8	569.4	499.8	69.60	8.181	
10,800.0	9,733.4	10,942.1	9,875.9	32.6	39.1	-105.00	-711.8	-753.8	569.4	499.2	70.23	8.107	
10,900.0	9,731.4	11,042.1	9,874.0	32.9	39.5	-105.01	-711.6	-853.8	569.4	498.5	70.93	8.028	
11,000.0	9,729.4	11,142.1	9,872.1	33.3	39.9	-105.02	-711.3	-953.8	569.5	497.8	71.69	7.944	
11,100.0	9,727.5	11,242.1	9,870.2	33.7	40.3	-105.03	-711.0	-1,053.7	569.5	497.0	72.50	7.855	
11,200.0	9,725.5	11,342.1	9,868.4	34.1	40.7	-105.04	-710.8	-1,153.7	569.5	496.1	73.37	7.762	
11,300.0	9,723.5	11,442.1	9,866.5	34.6	41.2	-105.05	-710.5	-1,253.7	569.5	495.2	74.30	7.665	
11,400.0	9,721.5	11,542.1	9,864.6	35.1	41.7	-105.06	-710.2	-1,353.7	569.6	494.3	75.28	7.566	
11,500.0	9,719.5	11,642.1	9,862.7	35.6	42.2	-105.07	-710.0	-1,453.7	569.6	493.3	76.31	7.464	
11,600.0	9,717.5	11,742.1	9,860.8	36.2	42.7	-105.08	-709.7	-1,553.6	569.6	492.2	77.39	7.360	
11,700.0	9,715.5	11,842.1	9,858.9	36.7	43.3	-105.09	-709.4	-1,653.6	569.6	491.1	78.52	7.255	
11,800.0	9,713.6	11,942.1	9,857.1	37.3	43.9	-105.10	-709.2	-1,753.6	569.7	490.0	79.69	7.148	
11,900.0	9,711.6	12,042.1	9,855.2	38.0	44.5	-105.11	-708.9	-1,853.6	569.7	488.8	80.91	7.041	
12,000.0	9,709.6	12,142.1	9,853.3	38.6	45.1	-105.12	-708.6	-1,953.6	569.7	487.6	82.16	6.934	
12,100.0	9,707.6	12,242.1	9,851.4	39.3	45.7	-105.13	-708.4	-2,053.6	569.7	486.3	83.46	6.827	
12,200.0	9,705.6	12,342.1	9,849.5	40.0	46.4	-105.14	-708.1	-2,153.5	569.8	485.0	84.79	6.720	
12,300.0	9,703.6	12,442.1	9,847.7	40.7	47.0	-105.15	-707.8	-2,253.5	569.8	483.6	86.16	6.614	
12,400.0	9,701.7	12,542.1	9,845.8	41.4	47.7	-105.16	-707.6	-2,353.5	569.8	482.3	87.56	6.508	
12,500.0	9,699.7	12,642.1	9,843.9	42.1	48.4	-105.17	-707.3	-2,453.5	569.9	480.9	88.99	6.404	
12,600.0	9,697.7	12,742.1	9,842.0	42.9	49.2	-105.18	-707.0	-2,553.5	569.9	479.4	90.45	6.300	
12,700.0	9,695.7	12,842.1	9,840.1	43.7	49.9	-105.19	-706.8	-2,653.4	569.9	478.0	91.94	6.199	
12,800.0	9,693.7	12,942.1	9,838.2	44.5	50.6	-105.20	-706.5	-2,753.4	569.9	476.5	93.46	6.098	
12,900.0	9,691.7	13,042.1	9,836.4	45.3	51.4	-105.21	-706.3	-2,853.4	570.0	475.0	95.01	5.999	
13,000.0	9,689.7	13,142.1	9,834.5	46.1	52.2	-105.22	-706.0	-2,953.4	570.0	473.4	96.58	5.902	
13,100.0	9,687.8	13,242.1	9,832.6	46.9	53.0	-105.23	-705.7	-3,053.4	570.0	471.8	98.17	5.806	
13,200.0	9,685.8	13,342.1	9,830.7	47.8	53.8	-105.24	-705.5	-3,153.4	570.0	470.3	99.79	5.712	
13,300.0	9,683.8	13,442.1	9,828.8	48.6	54.6	-105.25	-705.2	-3,253.3	570.1	468.6	101.43	5.620	
13,400.0	9,681.8	13,542.1	9,826.9	49.5	55.4	-105.26	-704.9	-3,353.3	570.1	467.0	103.09	5.530	
13,500.0	9,679.8	13,642.1	9,825.1	50.3	56.2	-105.27	-704.7	-3,453.3	570.1	465.4	104.77	5.442	
13,600.0	9,677.8	13,742.1	9,823.2	51.2	57.1	-105.28	-704.4	-3,553.3	570.2	463.7	106.46	5.355	
13,700.0	9,675.8	13,842.1	9,821.3	52.1	57.9	-105.29	-704.1	-3,653.3	570.2	462.0	108.18	5.271	
13,800.0	9,673.9	13,942.1	9,819.4	53.0	58.8	-105.30	-703.9	-3,753.2	570.2	460.3	109.91	5.188	
13,900.0	9,671.9	14,042.1	9,817.5	53.9	59.6	-105.31	-703.6	-3,853.2	570.2	458.6	111.66	5.107	
14,000.0	9,669.9	14,142.1	9,815.7	54.8	60.5	-105.32	-703.3	-3,953.2	570.3	456.8	113.42	5.028	
14,100.0	9,667.9	14,242.1	9,813.8	55.8	61.4	-105.33	-703.1	-4,053.2	570.3	455.1	115.20	4.950	
14,200.0	9,665.9	14,342.1	9,811.9	56.7	62.3	-105.34	-702.8	-4,153.2	570.3	453.3	116.99	4.875	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #605H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9337-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
14,300.0	9,663.9	14,442.1	9,810.0	57.6	63.2	-105.35	-702.5	-4,253.2	570.3	451.5	118.80	4.801	
14,400.0	9,661.9	14,542.1	9,808.1	58.6	64.1	-105.36	-702.3	-4,353.1	570.4	449.8	120.61	4.729	
14,500.0	9,660.0	14,642.1	9,806.2	59.5	65.0	-105.37	-702.0	-4,453.1	570.4	448.0	122.44	4.658	
14,600.0	9,658.0	14,742.1	9,804.4	60.5	65.9	-105.38	-701.7	-4,553.1	570.4	446.1	124.29	4.590	
14,700.0	9,656.0	14,842.1	9,802.5	61.4	66.8	-105.39	-701.5	-4,653.1	570.5	444.3	126.14	4.522	
14,800.0	9,654.0	14,942.1	9,800.6	62.4	67.7	-105.40	-701.2	-4,753.1	570.5	442.5	128.00	4.457	
14,900.0	9,652.0	15,042.1	9,798.7	63.4	68.7	-105.41	-700.9	-4,853.0	570.5	440.6	129.88	4.393	
15,000.0	9,650.0	15,142.1	9,796.8	64.3	69.6	-105.42	-700.7	-4,953.0	570.5	438.8	131.76	4.330	
15,100.0	9,648.0	15,242.1	9,794.9	65.3	70.6	-105.43	-700.4	-5,053.0	570.6	436.9	133.65	4.269	
15,200.0	9,646.1	15,342.1	9,793.1	66.3	71.5	-105.44	-700.1	-5,153.0	570.6	435.0	135.55	4.209	
15,300.0	9,644.1	15,442.1	9,791.2	67.3	72.5	-105.45	-699.9	-5,253.0	570.6	433.2	137.46	4.151	
15,400.0	9,642.1	15,542.1	9,789.3	68.3	73.4	-105.46	-699.6	-5,353.0	570.6	431.3	139.38	4.094	
15,500.0	9,640.1	15,642.1	9,787.4	69.3	74.4	-105.47	-699.4	-5,452.9	570.7	429.4	141.31	4.039	
15,600.0	9,638.1	15,742.1	9,785.5	70.3	75.3	-105.48	-699.1	-5,552.9	570.7	427.5	143.24	3.984	
15,700.0	9,636.1	15,842.1	9,783.7	71.3	76.3	-105.49	-698.8	-5,652.9	570.7	425.5	145.18	3.931	
15,800.0	9,634.1	15,942.1	9,781.8	72.3	77.3	-105.50	-698.6	-5,752.9	570.8	423.6	147.13	3.879	
15,900.0	9,632.2	16,042.1	9,779.9	73.3	78.3	-105.51	-698.3	-5,852.9	570.8	421.7	149.08	3.829	
16,000.0	9,630.2	16,142.1	9,778.0	74.3	79.3	-105.52	-698.0	-5,952.8	570.8	419.8	151.04	3.779	
16,100.0	9,628.2	16,242.1	9,776.1	75.3	80.2	-105.53	-697.8	-6,052.8	570.8	417.8	153.01	3.731	
16,200.0	9,626.2	16,342.1	9,774.2	76.3	81.2	-105.54	-697.5	-6,152.8	570.9	415.9	154.98	3.683	
16,300.0	9,624.2	16,442.1	9,772.4	77.3	82.2	-105.55	-697.2	-6,252.8	570.9	413.9	156.96	3.637	
16,400.0	9,622.2	16,542.1	9,770.5	78.4	83.2	-105.56	-697.0	-6,352.8	570.9	412.0	158.94	3.592	
16,500.0	9,620.2	16,642.1	9,768.6	79.4	84.2	-105.57	-696.7	-6,452.8	570.9	410.0	160.93	3.548	
16,600.0	9,618.3	16,742.1	9,766.7	80.4	85.2	-105.58	-696.4	-6,552.7	571.0	408.1	162.92	3.505	
16,700.0	9,616.3	16,842.1	9,764.8	81.4	86.2	-105.59	-696.2	-6,652.7	571.0	406.1	164.92	3.462	
16,800.0	9,614.3	16,942.1	9,762.9	82.5	87.2	-105.60	-695.9	-6,752.7	571.0	404.1	166.93	3.421	
16,900.0	9,612.3	17,042.1	9,761.1	83.5	88.2	-105.61	-695.6	-6,852.7	571.1	402.1	168.93	3.380	
17,000.0	9,610.3	17,142.1	9,759.2	84.5	89.2	-105.62	-695.4	-6,952.7	571.1	400.1	170.95	3.341	
17,100.0	9,608.3	17,242.1	9,757.3	85.6	90.3	-105.63	-695.1	-7,052.6	571.1	398.2	172.96	3.302	
17,200.0	9,606.4	17,342.1	9,755.4	86.6	91.3	-105.64	-694.8	-7,152.6	571.1	396.2	174.98	3.264	
17,300.0	9,604.4	17,442.1	9,753.5	87.6	92.3	-105.65	-694.6	-7,252.6	571.2	394.2	177.01	3.227	
17,400.0	9,602.4	17,542.1	9,751.6	88.7	93.3	-105.66	-694.3	-7,352.6	571.2	392.2	179.04	3.190	
17,500.0	9,600.4	17,642.1	9,749.8	89.7	94.3	-105.67	-694.0	-7,452.6	571.2	390.2	181.07	3.155	
17,600.0	9,598.4	17,742.1	9,747.9	90.8	95.4	-105.68	-693.8	-7,552.6	571.3	388.2	183.10	3.120	
17,700.0	9,596.4	17,842.1	9,746.0	91.8	96.4	-105.69	-693.5	-7,652.5	571.3	386.1	185.14	3.086	
17,800.0	9,594.4	17,942.1	9,744.1	92.9	97.4	-105.70	-693.3	-7,752.5	571.3	384.1	187.18	3.052	
17,900.0	9,592.5	18,042.1	9,742.2	93.9	98.4	-105.71	-693.0	-7,852.5	571.3	382.1	189.23	3.019	
18,000.0	9,590.5	18,142.1	9,740.4	95.0	99.5	-105.72	-692.7	-7,952.5	571.4	380.1	191.28	2.987	
18,100.0	9,588.5	18,242.1	9,738.5	96.0	100.5	-105.73	-692.5	-8,052.5	571.4	378.1	193.33	2.956	
18,200.0	9,586.5	18,342.1	9,736.6	97.1	101.5	-105.74	-692.2	-8,152.4	571.4	376.0	195.38	2.925	
18,300.0	9,584.5	18,442.1	9,734.7	98.1	102.6	-105.75	-691.9	-8,252.4	571.5	374.0	197.44	2.894	
18,400.0	9,582.5	18,542.1	9,732.8	99.2	103.6	-105.76	-691.7	-8,352.4	571.5	372.0	199.50	2.865	
18,500.0	9,580.5	18,642.1	9,730.9	100.3	104.7	-105.77	-691.4	-8,452.4	571.5	369.9	201.56	2.835	
18,600.0	9,578.6	18,742.1	9,729.1	101.3	105.7	-105.78	-691.1	-8,552.4	571.5	367.9	203.63	2.807	
18,700.0	9,576.6	18,842.1	9,727.2	102.4	106.7	-105.79	-690.9	-8,652.4	571.6	365.9	205.69	2.779	
18,800.0	9,574.6	18,942.1	9,725.3	103.4	107.8	-105.80	-690.6	-8,752.3	571.6	363.8	207.76	2.751	
18,900.0	9,572.6	19,042.1	9,723.4	104.5	108.8	-105.81	-690.3	-8,852.3	571.6	361.8	209.84	2.724	
19,000.0	9,570.6	19,142.1	9,721.5	105.6	109.9	-105.82	-690.1	-8,952.3	571.6	359.7	211.91	2.698	
19,100.0	9,568.6	19,242.1	9,719.6	106.6	110.9	-105.83	-689.8	-9,052.3	571.7	357.7	213.99	2.672	
19,200.0	9,566.6	19,342.1	9,717.8	107.7	112.0	-105.84	-689.5	-9,152.3	571.7	355.6	216.06	2.646	
19,300.0	9,564.7	19,442.1	9,715.9	108.8	113.0	-105.85	-689.3	-9,252.2	571.7	353.6	218.15	2.621	
19,400.0	9,562.7	19,542.1	9,714.0	109.8	114.1	-105.86	-689.0	-9,352.2	571.8	351.5	220.23	2.596	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #605H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9337-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
19,500.0	9,560.7	19,642.1	9,712.1	110.9	115.1	-105.87	-688.7	-9,452.2	571.8	349.5	222.31	2.572	
19,600.0	9,558.7	19,742.1	9,710.2	112.0	116.2	-105.88	-688.5	-9,552.2	571.8	347.4	224.40	2.548	
19,700.0	9,556.7	19,842.1	9,708.4	113.1	117.2	-105.89	-688.2	-9,652.2	571.8	345.4	226.49	2.525	
19,800.0	9,554.7	19,942.1	9,706.5	114.1	118.3	-105.90	-687.9	-9,752.2	571.9	343.3	228.58	2.502	
19,900.0	9,552.7	20,042.1	9,704.6	115.2	119.4	-105.91	-687.7	-9,852.1	571.9	341.2	230.67	2.479	
19,901.0	9,552.7	20,043.1	9,704.6	115.2	119.4	-105.91	-687.7	-9,853.2	571.9	341.2	230.69	2.479	
19,937.5	9,552.0	20,073.3	9,704.0	115.6	119.7	-105.91	-687.6	-9,883.4	571.9	340.6	231.35	2.472	ES, SF

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9194-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
0.0	0.0	0.0	0.0	0.0	0.0	163.63	-1,109.4	325.8	1,156.3				
100.0	100.0	94.2	94.2	0.2	0.1	163.63	-1,109.4	325.8	1,156.2	1,156.0	0.30	3,903.971	
200.0	200.0	194.2	194.2	0.6	0.5	163.63	-1,109.4	325.8	1,156.2	1,155.1	1.13	1,026.575	
300.0	300.0	294.2	294.2	1.0	1.0	163.63	-1,109.4	325.8	1,156.2	1,154.3	1.97	586.174	
400.0	400.0	394.2	394.2	1.4	1.4	163.63	-1,109.4	325.8	1,156.2	1,153.4	2.82	410.199	
500.0	500.0	494.2	494.2	1.9	1.8	163.63	-1,109.4	325.8	1,156.2	1,152.6	3.66	315.487	
600.0	600.0	594.2	594.2	2.3	2.2	163.63	-1,109.4	325.8	1,156.2	1,151.7	4.51	256.307	
700.0	700.0	694.2	694.2	2.7	2.7	163.63	-1,109.4	325.8	1,156.2	1,150.9	5.36	215.822	
800.0	800.0	794.2	794.2	3.1	3.1	163.63	-1,109.4	325.8	1,156.2	1,150.0	6.20	186.383	
900.0	900.0	894.2	894.2	3.5	3.5	163.63	-1,109.4	325.8	1,156.2	1,149.2	7.05	164.011	
1,000.0	1,000.0	994.2	994.2	4.0	3.9	163.63	-1,109.4	325.8	1,156.2	1,148.4	7.90	146.434	
1,100.0	1,100.0	1,094.2	1,094.2	4.4	4.4	163.63	-1,109.4	325.8	1,156.2	1,147.5	8.74	132.259	
1,200.0	1,200.0	1,194.2	1,194.2	4.8	4.8	163.63	-1,109.4	325.8	1,156.2	1,146.7	9.59	120.587	
1,300.0	1,300.0	1,294.2	1,294.2	5.2	5.2	163.63	-1,109.4	325.8	1,156.2	1,145.8	10.43	110.808	
1,400.0	1,400.0	1,394.2	1,394.2	5.7	5.6	163.63	-1,109.4	325.8	1,156.2	1,145.0	11.28	102.496	
1,500.0	1,500.0	1,494.2	1,494.2	6.1	6.0	163.63	-1,109.4	325.8	1,156.2	1,144.1	12.13	95.344	
1,600.0	1,600.0	1,594.2	1,594.2	6.5	6.5	163.63	-1,109.4	325.8	1,156.2	1,143.3	12.97	89.125	
1,700.0	1,700.0	1,694.2	1,694.2	6.9	6.9	163.63	-1,109.4	325.8	1,156.2	1,142.4	13.82	83.667	
1,800.0	1,800.0	1,794.2	1,794.2	7.4	7.3	163.63	-1,109.4	325.8	1,156.2	1,141.6	14.67	78.840	
1,900.0	1,900.0	1,894.2	1,894.2	7.8	7.7	163.63	-1,109.4	325.8	1,156.2	1,140.7	15.51	74.539	
2,000.0	2,000.0	1,994.2	1,994.2	8.2	8.2	163.63	-1,109.4	325.8	1,156.2	1,139.9	16.36	70.683	
2,068.0	2,068.0	2,046.9	2,046.9	8.4	8.3	56.05	-1,109.6	326.1	1,156.2	1,139.5	16.67	69.372	
2,100.0	2,100.0	2,071.0	2,071.0	8.4	8.4	56.07	-1,109.9	326.5	1,156.2	1,139.4	16.80	68.803	
2,200.0	2,199.8	2,146.3	2,146.3	8.5	8.5	56.14	-1,111.7	328.8	1,156.4	1,139.4	16.99	68.048	
2,300.0	2,299.5	2,221.7	2,221.5	8.5	8.6	56.27	-1,114.7	332.6	1,156.7	1,139.6	17.17	67.386	
2,400.0	2,398.9	2,312.3	2,311.8	8.7	8.8	56.43	-1,119.4	338.7	1,157.8	1,140.4	17.41	66.491	
2,500.0	2,498.4	2,412.3	2,411.3	8.8	9.0	56.61	-1,124.8	345.6	1,159.1	1,141.3	17.73	65.387	
2,600.0	2,597.8	2,512.2	2,510.9	8.9	9.2	56.78	-1,130.1	352.5	1,160.3	1,142.3	18.08	64.175	
2,700.0	2,697.3	2,612.1	2,610.4	9.1	9.4	56.96	-1,135.4	359.4	1,161.6	1,143.1	18.47	62.875	
2,800.0	2,796.7	2,712.1	2,710.0	9.3	9.7	57.13	-1,140.8	366.2	1,162.9	1,144.0	18.91	61.510	
2,900.0	2,896.2	2,812.0	2,809.5	9.5	10.0	57.31	-1,146.1	373.1	1,164.2	1,144.8	19.37	60.099	
3,000.0	2,995.6	2,911.9	2,909.1	9.8	10.2	57.48	-1,151.5	380.0	1,165.5	1,145.6	19.87	58.659	
3,100.0	3,095.1	3,011.8	3,008.6	10.0	10.5	57.66	-1,156.8	386.9	1,166.8	1,146.4	20.40	57.205	
3,200.0	3,194.5	3,111.8	3,108.2	10.3	10.8	57.83	-1,162.1	393.8	1,168.2	1,147.2	20.95	55.751	
3,300.0	3,294.0	3,211.7	3,207.7	10.6	11.2	58.00	-1,167.5	400.7	1,169.5	1,148.0	21.53	54.308	
3,400.0	3,393.4	3,311.6	3,307.3	10.9	11.5	58.17	-1,172.8	407.5	1,170.9	1,148.7	22.14	52.884	
3,500.0	3,492.9	3,411.6	3,406.8	11.2	11.8	58.35	-1,178.1	414.4	1,172.2	1,149.5	22.77	51.486	
3,600.0	3,592.3	3,511.5	3,506.4	11.6	12.2	58.52	-1,183.5	421.3	1,173.6	1,150.2	23.42	50.121	
3,700.0	3,691.8	3,611.4	3,605.9	11.9	12.5	58.69	-1,188.8	428.2	1,175.0	1,150.9	24.08	48.791	
3,800.0	3,791.2	3,711.3	3,705.5	12.3	12.9	58.86	-1,194.2	435.1	1,176.4	1,151.6	24.77	47.500	
3,900.0	3,890.7	3,811.3	3,805.0	12.6	13.3	59.03	-1,199.5	442.0	1,177.8	1,152.3	25.47	46.250	
4,000.0	3,990.1	3,911.2	3,904.6	13.0	13.7	59.20	-1,204.8	448.9	1,179.2	1,153.0	26.18	45.042	
4,100.0	4,089.6	4,011.1	4,004.1	13.4	14.0	59.37	-1,210.2	455.7	1,180.6	1,153.7	26.91	43.877	
4,200.0	4,189.0	4,111.1	4,103.7	13.8	14.4	59.54	-1,215.5	462.6	1,182.1	1,154.4	27.65	42.753	
4,300.0	4,288.5	4,211.0	4,203.2	14.2	14.8	59.71	-1,220.9	469.5	1,183.5	1,155.1	28.40	41.672	
4,400.0	4,387.9	4,310.9	4,302.7	14.6	15.2	59.88	-1,226.2	476.4	1,185.0	1,155.8	29.16	40.632	
4,500.0	4,487.4	4,410.8	4,402.3	15.0	15.6	60.04	-1,231.5	483.3	1,186.4	1,156.5	29.94	39.631	
4,600.0	4,586.9	4,510.8	4,501.8	15.4	16.0	60.21	-1,236.9	490.2	1,187.9	1,157.2	30.72	38.670	
4,700.0	4,686.3	4,610.7	4,601.4	15.8	16.5	60.38	-1,242.2	497.0	1,189.4	1,157.9	31.51	37.747	
4,800.0	4,785.8	4,710.6	4,700.9	16.2	16.9	60.55	-1,247.6	503.9	1,190.9	1,158.6	32.31	36.860	
4,900.0	4,885.2	4,810.6	4,800.5	16.7	17.3	60.71	-1,252.9	510.8	1,192.4	1,159.3	33.12	36.008	
5,000.0	4,984.7	4,910.5	4,900.0	17.1	17.7	60.88	-1,258.2	517.7	1,193.9	1,160.0	33.93	35.189	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9194-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
5,100.0	5,084.1	5,053.9	5,043.1	17.5	18.3	61.22	-1,263.9	524.9	1,193.7	1,158.8	34.90	34.207	
5,200.0	5,183.6	5,188.5	5,177.8	18.0	18.7	61.75	-1,265.2	526.7	1,189.9	1,154.1	35.76	33.275	
5,300.0	5,283.0	5,288.0	5,277.2	18.4	19.0	62.19	-1,265.2	526.7	1,184.9	1,148.4	36.49	32.469	
5,400.0	5,382.5	5,387.5	5,376.7	18.8	19.3	62.64	-1,265.2	526.7	1,180.1	1,142.8	37.24	31.691	
5,500.0	5,481.9	5,486.9	5,476.1	19.3	19.6	63.09	-1,265.2	526.7	1,175.3	1,137.3	37.99	30.938	
5,600.0	5,581.4	5,586.4	5,575.6	19.7	19.9	63.54	-1,265.2	526.7	1,170.6	1,131.8	38.75	30.211	
5,700.0	5,680.8	5,685.8	5,675.0	20.2	20.2	64.00	-1,265.2	526.7	1,165.9	1,126.4	39.51	29.509	
5,800.0	5,780.3	5,785.3	5,774.5	20.6	20.5	64.46	-1,265.2	526.7	1,161.4	1,121.1	40.28	28.830	
5,900.0	5,879.7	5,884.7	5,873.9	21.1	20.8	64.93	-1,265.2	526.7	1,156.9	1,115.8	41.06	28.174	
6,000.0	5,979.2	5,984.2	5,973.4	21.5	21.1	65.39	-1,265.2	526.7	1,152.5	1,110.6	41.85	27.540	
6,100.0	6,078.6	6,083.6	6,072.8	22.0	21.4	65.87	-1,265.2	526.7	1,148.1	1,105.5	42.64	26.928	
6,200.0	6,178.1	6,183.1	6,172.3	22.4	21.8	66.34	-1,265.2	526.7	1,143.9	1,100.4	43.43	26.337	
6,300.0	6,277.5	6,282.5	6,271.7	22.9	22.1	66.82	-1,265.2	526.7	1,139.7	1,095.5	44.23	25.766	
6,400.0	6,377.0	6,382.0	6,371.2	23.3	22.4	67.30	-1,265.2	526.7	1,135.6	1,090.6	45.04	25.214	
6,500.0	6,476.4	6,481.4	6,470.6	23.8	22.7	67.79	-1,265.2	526.7	1,131.6	1,085.7	45.85	24.680	
6,600.0	6,575.9	6,580.9	6,570.1	24.3	23.1	68.28	-1,265.2	526.7	1,127.7	1,081.0	46.67	24.165	
6,700.0	6,675.3	6,680.3	6,669.5	24.7	23.4	68.77	-1,265.2	526.7	1,123.8	1,076.3	47.48	23.667	
6,800.0	6,774.8	6,779.8	6,769.0	25.2	23.8	69.27	-1,265.2	526.7	1,120.1	1,071.8	48.31	23.186	
6,900.0	6,874.3	6,879.2	6,868.5	25.7	24.1	69.77	-1,265.2	526.7	1,116.4	1,067.2	49.14	22.720	
7,000.0	6,973.7	6,978.7	6,967.9	26.1	24.4	70.27	-1,265.2	526.7	1,112.8	1,062.8	49.97	22.271	
7,100.0	7,073.2	7,078.1	7,067.4	26.6	24.8	70.78	-1,265.2	526.7	1,109.3	1,058.5	50.80	21.836	
7,200.0	7,172.6	7,177.6	7,166.8	27.1	25.1	71.29	-1,265.2	526.7	1,105.9	1,054.2	51.64	21.415	
7,228.1	7,200.5	7,205.5	7,194.7	27.2	25.2	71.43	-1,265.2	526.7	1,104.9	1,053.1	51.88	21.300	
7,300.0	7,272.1	7,277.1	7,266.3	27.5	25.5	71.71	-1,265.2	526.7	1,102.8	1,050.4	52.46	21.024	
7,400.0	7,371.9	7,376.9	7,366.1	27.9	25.8	71.98	-1,265.2	526.7	1,100.9	1,047.7	53.22	20.687	
7,500.0	7,471.9	7,476.9	7,466.1	28.3	26.2	72.10	-1,265.2	526.7	1,100.1	1,046.1	53.94	20.393	
7,528.1	7,500.0	7,505.0	7,494.2	28.3	26.3	179.70	-1,265.2	526.7	1,100.0	1,045.9	54.11	20.328	
7,600.0	7,571.9	7,576.9	7,566.1	28.4	26.6	179.70	-1,265.2	526.7	1,100.0	1,045.5	54.48	20.190	
7,700.0	7,671.9	7,676.9	7,666.1	28.6	26.9	179.70	-1,265.2	526.7	1,100.0	1,045.0	55.00	19.999	
7,800.0	7,771.9	7,776.9	7,766.1	28.8	27.3	179.70	-1,265.2	526.7	1,100.0	1,044.5	55.53	19.809	
7,900.0	7,871.9	7,876.9	7,866.1	28.9	27.7	179.70	-1,265.2	526.7	1,100.0	1,043.9	56.07	19.620	
8,000.0	7,971.9	7,976.9	7,966.1	29.1	28.0	179.70	-1,265.2	526.7	1,100.0	1,043.4	56.61	19.432	
8,100.0	8,071.9	8,076.9	8,066.1	29.3	28.4	179.70	-1,265.2	526.7	1,100.0	1,042.9	57.16	19.245	
8,200.0	8,171.9	8,176.9	8,166.1	29.4	28.8	179.70	-1,265.2	526.7	1,100.0	1,042.3	57.71	19.060	
8,300.0	8,271.9	8,276.9	8,266.1	29.6	29.1	179.70	-1,265.2	526.7	1,100.0	1,041.7	58.28	18.876	
8,400.0	8,371.9	8,376.9	8,366.1	29.8	29.5	179.70	-1,265.2	526.7	1,100.0	1,041.2	58.84	18.694	
8,500.0	8,471.9	8,476.9	8,466.1	30.0	29.9	179.70	-1,265.2	526.7	1,100.0	1,040.6	59.42	18.513	
8,600.0	8,571.9	8,576.9	8,566.1	30.2	30.2	179.70	-1,265.2	526.7	1,100.0	1,040.0	60.00	18.334	
8,700.0	8,671.9	8,676.9	8,666.1	30.4	30.6	179.70	-1,265.2	526.7	1,100.0	1,039.4	60.58	18.157	
8,800.0	8,771.9	8,776.9	8,766.1	30.6	31.0	179.70	-1,265.2	526.7	1,100.0	1,038.8	61.17	17.982	
8,900.0	8,871.9	8,876.9	8,866.1	30.8	31.4	179.70	-1,265.2	526.7	1,100.0	1,038.2	61.77	17.808	
9,000.0	8,971.9	8,976.9	8,966.1	31.1	31.8	179.70	-1,265.2	526.7	1,100.0	1,037.6	62.37	17.636	
9,100.0	9,071.9	9,076.9	9,066.1	31.3	32.1	179.70	-1,265.2	526.7	1,100.0	1,037.0	62.98	17.466	
9,202.3	9,174.2	9,179.2	9,168.4	31.5	32.5	179.70	-1,265.2	526.7	1,100.0	1,036.4	63.61	17.294	CC
9,250.0	9,221.8	9,227.4	9,216.6	31.6	32.6	-90.50	-1,265.2	525.7	1,100.0	1,036.3	63.72	17.262	
9,300.0	9,271.4	9,278.3	9,267.2	31.6	32.6	-90.57	-1,265.2	520.5	1,100.0	1,036.3	63.71	17.266	
9,350.0	9,320.3	9,329.3	9,317.3	31.5	32.6	-90.62	-1,265.2	510.8	1,100.0	1,036.3	63.69	17.271	
9,400.0	9,368.0	9,380.4	9,366.4	31.5	32.6	-90.68	-1,265.1	496.6	1,100.1	1,036.4	63.67	17.277	
9,450.0	9,414.3	9,431.6	9,414.1	31.5	32.6	-90.73	-1,265.1	478.1	1,100.1	1,036.4	63.64	17.285	
9,500.0	9,458.7	9,482.9	9,460.0	31.5	32.6	-90.77	-1,265.0	455.4	1,100.1	1,036.5	63.61	17.293	
9,550.0	9,501.0	9,534.2	9,503.8	31.5	32.6	-90.81	-1,264.9	428.6	1,100.1	1,036.5	63.58	17.301	
9,600.0	9,540.7	9,585.7	9,545.1	31.4	32.6	-90.84	-1,264.9	397.9	1,100.1	1,036.5	63.55	17.310	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9194-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,650.0	9,577.7	9,637.1	9,583.5	31.4	32.6	-90.86	-1,264.8	363.7	1,100.1	1,036.6	63.53	17.317	
9,700.0	9,611.6	9,688.6	9,618.6	31.4	32.6	-90.88	-1,264.7	326.1	1,100.1	1,036.6	63.51	17.323	
9,750.0	9,642.2	9,740.1	9,650.3	31.4	32.6	-90.89	-1,264.6	285.5	1,100.1	1,036.6	63.49	17.326	
9,800.0	9,669.2	9,791.7	9,678.2	31.3	32.6	-90.89	-1,264.5	242.2	1,100.1	1,036.6	63.49	17.327	
9,850.0	9,692.5	9,843.2	9,702.2	31.3	32.6	-90.89	-1,264.3	196.6	1,100.1	1,036.6	63.50	17.324	
9,900.0	9,711.8	9,894.7	9,721.9	31.3	32.6	-90.88	-1,264.2	149.0	1,100.1	1,036.6	63.53	17.316	
9,950.0	9,727.0	9,946.2	9,737.2	31.3	32.7	-90.86	-1,264.1	99.8	1,100.1	1,036.5	63.57	17.304	
10,000.0	9,738.1	9,997.7	9,748.1	31.3	32.7	-90.84	-1,263.9	49.5	1,100.1	1,036.5	63.64	17.287	
10,050.0	9,744.8	10,049.1	9,754.4	31.3	32.7	-90.81	-1,263.8	-1.5	1,100.1	1,036.4	63.72	17.265	
10,100.0	9,747.2	10,100.5	9,756.1	31.3	32.8	-90.77	-1,263.7	-52.8	1,100.1	1,036.3	63.81	17.239	
10,113.2	9,747.1	10,113.8	9,755.9	31.3	32.8	-90.76	-1,263.6	-66.1	1,100.1	1,036.2	63.84	17.231	
10,113.7	9,747.0	10,114.3	9,755.9	31.3	32.8	-90.76	-1,263.6	-66.6	1,100.1	1,036.2	63.84	17.231	
10,200.0	9,745.3	10,200.6	9,754.2	31.4	32.9	-90.76	-1,263.4	-152.9	1,100.1	1,036.0	64.06	17.174	
10,300.0	9,743.3	10,300.6	9,752.2	31.5	33.1	-90.76	-1,263.1	-252.9	1,100.1	1,035.7	64.37	17.089	
10,400.0	9,741.4	10,400.6	9,750.2	31.6	33.3	-90.76	-1,262.9	-352.8	1,100.1	1,035.3	64.77	16.985	
10,500.0	9,739.4	10,500.6	9,748.2	31.8	33.6	-90.76	-1,262.6	-452.8	1,100.1	1,034.9	65.24	16.863	
10,600.0	9,737.4	10,600.6	9,746.2	32.0	33.9	-90.76	-1,262.4	-552.8	1,100.1	1,034.3	65.78	16.725	
10,700.0	9,735.4	10,700.6	9,744.2	32.3	34.2	-90.76	-1,262.1	-652.8	1,100.1	1,033.7	66.39	16.571	
10,800.0	9,733.4	10,800.6	9,742.2	32.6	34.6	-90.76	-1,261.8	-752.8	1,100.1	1,033.0	67.06	16.404	
10,900.0	9,731.4	10,900.6	9,740.3	32.9	35.0	-90.76	-1,261.6	-852.7	1,100.1	1,032.3	67.81	16.223	
11,000.0	9,729.4	11,000.6	9,738.3	33.3	35.4	-90.76	-1,261.3	-952.7	1,100.1	1,031.5	68.62	16.032	
11,100.0	9,727.5	11,100.6	9,736.3	33.7	35.9	-90.76	-1,261.0	-1,052.7	1,100.1	1,030.6	69.49	15.831	
11,200.0	9,725.5	11,200.6	9,734.3	34.1	36.4	-90.76	-1,260.8	-1,152.7	1,100.1	1,029.7	70.42	15.621	
11,300.0	9,723.5	11,300.6	9,732.3	34.6	36.9	-90.76	-1,260.5	-1,252.7	1,100.1	1,028.7	71.41	15.405	
11,400.0	9,721.5	11,400.6	9,730.3	35.1	37.4	-90.76	-1,260.2	-1,352.6	1,100.1	1,027.6	72.46	15.183	
11,500.0	9,719.5	11,500.6	9,728.3	35.6	38.0	-90.76	-1,260.0	-1,452.6	1,100.1	1,026.5	73.55	14.957	
11,600.0	9,717.5	11,600.6	9,726.4	36.2	38.6	-90.76	-1,259.7	-1,552.6	1,100.1	1,025.4	74.70	14.727	
11,700.0	9,715.5	11,700.6	9,724.4	36.7	39.2	-90.76	-1,259.4	-1,652.6	1,100.1	1,024.2	75.90	14.495	
11,800.0	9,713.6	11,800.6	9,722.4	37.3	39.8	-90.76	-1,259.2	-1,752.6	1,100.1	1,023.0	77.14	14.261	
11,900.0	9,711.6	11,900.6	9,720.4	38.0	40.5	-90.76	-1,258.9	-1,852.5	1,100.1	1,021.7	78.42	14.028	
12,000.0	9,709.6	12,000.6	9,718.4	38.6	41.2	-90.76	-1,258.7	-1,952.5	1,100.1	1,020.4	79.75	13.794	
12,100.0	9,707.6	12,100.6	9,716.4	39.3	41.9	-90.76	-1,258.4	-2,052.5	1,100.1	1,019.0	81.12	13.562	
12,200.0	9,705.6	12,200.6	9,714.5	40.0	42.6	-90.76	-1,258.1	-2,152.5	1,100.1	1,017.6	82.52	13.331	
12,300.0	9,703.6	12,300.6	9,712.5	40.7	43.3	-90.76	-1,257.9	-2,252.5	1,100.1	1,016.1	83.96	13.103	
12,400.0	9,701.7	12,400.6	9,710.5	41.4	44.0	-90.76	-1,257.6	-2,352.4	1,100.1	1,014.7	85.44	12.876	
12,500.0	9,699.7	12,500.6	9,708.5	42.1	44.8	-90.76	-1,257.3	-2,452.4	1,100.1	1,013.2	86.94	12.653	
12,600.0	9,697.7	12,600.6	9,706.5	42.9	45.6	-90.76	-1,257.1	-2,552.4	1,100.1	1,011.6	88.48	12.434	
12,700.0	9,695.7	12,700.6	9,704.5	43.7	46.4	-90.76	-1,256.8	-2,652.4	1,100.1	1,010.1	90.04	12.218	
12,800.0	9,693.7	12,800.6	9,702.5	44.5	47.2	-90.76	-1,256.5	-2,752.4	1,100.1	1,008.5	91.64	12.005	
12,900.0	9,691.7	12,900.6	9,700.6	45.3	48.0	-90.76	-1,256.3	-2,852.3	1,100.1	1,006.9	93.26	11.797	
13,000.0	9,689.7	13,000.6	9,698.6	46.1	48.8	-90.76	-1,256.0	-2,952.3	1,100.1	1,005.2	94.90	11.592	
13,100.0	9,687.8	13,100.6	9,696.6	46.9	49.7	-90.76	-1,255.7	-3,052.3	1,100.1	1,003.5	96.57	11.392	
13,200.0	9,685.8	13,200.6	9,694.6	47.8	50.5	-90.76	-1,255.5	-3,152.3	1,100.1	1,001.9	98.26	11.196	
13,300.0	9,683.8	13,300.6	9,692.6	48.6	51.4	-90.76	-1,255.2	-3,252.3	1,100.1	1,000.1	99.97	11.005	
13,400.0	9,681.8	13,400.6	9,690.6	49.5	52.2	-90.76	-1,255.0	-3,352.2	1,100.1	998.4	101.70	10.817	
13,500.0	9,679.8	13,500.6	9,688.6	50.3	53.1	-90.76	-1,254.7	-3,452.2	1,100.1	996.7	103.45	10.634	
13,600.0	9,677.8	13,600.6	9,686.7	51.2	54.0	-90.76	-1,254.4	-3,552.2	1,100.1	994.9	105.22	10.456	
13,700.0	9,675.8	13,700.6	9,684.7	52.1	54.9	-90.76	-1,254.2	-3,652.2	1,100.1	993.1	107.00	10.281	
13,800.0	9,673.9	13,800.6	9,682.7	53.0	55.8	-90.76	-1,253.9	-3,752.2	1,100.1	991.3	108.80	10.111	
13,900.0	9,671.9	13,900.6	9,680.7	53.9	56.7	-90.76	-1,253.6	-3,852.1	1,100.1	989.5	110.62	9.945	
14,000.0	9,669.9	14,000.6	9,678.7	54.8	57.6	-90.76	-1,253.4	-3,952.1	1,100.1	987.7	112.45	9.783	
14,100.0	9,667.9	14,100.6	9,676.7	55.8	58.5	-90.76	-1,253.1	-4,052.1	1,100.1	985.8	114.30	9.625	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD, 9194-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 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
14,200.0	9,665.9	14,200.6	9,674.8	56.7	59.5	-90.76	-1,252.8	-4,152.1	1,100.1	984.0	116.16	9.471	
14,300.0	9,663.9	14,300.6	9,672.8	57.6	60.4	-90.76	-1,252.6	-4,252.1	1,100.1	982.1	118.03	9.321	
14,400.0	9,661.9	14,400.6	9,670.8	58.6	61.4	-90.76	-1,252.3	-4,352.0	1,100.1	980.2	119.92	9.174	
14,500.0	9,660.0	14,500.6	9,668.8	59.5	62.3	-90.76	-1,252.0	-4,452.0	1,100.1	978.3	121.81	9.031	
14,600.0	9,658.0	14,600.6	9,666.8	60.5	63.3	-90.76	-1,251.8	-4,552.0	1,100.1	976.4	123.72	8.892	
14,700.0	9,656.0	14,700.6	9,664.8	61.4	64.2	-90.76	-1,251.5	-4,652.0	1,100.1	974.5	125.64	8.756	
14,800.0	9,654.0	14,800.6	9,662.8	62.4	65.2	-90.76	-1,251.3	-4,752.0	1,100.1	972.6	127.57	8.624	
14,900.0	9,652.0	14,900.6	9,660.9	63.4	66.2	-90.76	-1,251.0	-4,851.9	1,100.1	970.6	129.50	8.495	
15,000.0	9,650.0	15,000.6	9,658.9	64.3	67.1	-90.76	-1,250.7	-4,951.9	1,100.1	968.7	131.45	8.369	
15,100.0	9,648.0	15,100.6	9,656.9	65.3	68.1	-90.76	-1,250.5	-5,051.9	1,100.1	966.7	133.41	8.247	
15,200.0	9,646.1	15,200.6	9,654.9	66.3	69.1	-90.76	-1,250.2	-5,151.9	1,100.1	964.8	135.37	8.127	
15,300.0	9,644.1	15,300.6	9,652.9	67.3	70.1	-90.76	-1,249.9	-5,251.9	1,100.1	962.8	137.34	8.010	
15,400.0	9,642.1	15,400.6	9,650.9	68.3	71.1	-90.76	-1,249.7	-5,351.8	1,100.1	960.8	139.32	7.896	
15,500.0	9,640.1	15,500.6	9,649.0	69.3	72.1	-90.76	-1,249.4	-5,451.8	1,100.1	958.8	141.31	7.785	
15,600.0	9,638.1	15,600.6	9,647.0	70.3	73.1	-90.76	-1,249.1	-5,551.8	1,100.1	956.8	143.30	7.677	
15,700.0	9,636.1	15,700.6	9,645.0	71.3	74.1	-90.76	-1,248.9	-5,651.8	1,100.1	954.8	145.31	7.571	
15,800.0	9,634.1	15,800.6	9,643.0	72.3	75.1	-90.76	-1,248.6	-5,751.8	1,100.1	952.8	147.31	7.468	
15,900.0	9,632.2	15,900.6	9,641.0	73.3	76.1	-90.76	-1,248.4	-5,851.7	1,100.1	950.8	149.33	7.367	
16,000.0	9,630.2	16,000.6	9,639.0	74.3	77.1	-90.76	-1,248.1	-5,951.7	1,100.1	948.8	151.35	7.269	
16,100.0	9,628.2	16,100.6	9,637.0	75.3	78.1	-90.76	-1,247.8	-6,051.7	1,100.1	946.8	153.37	7.173	
16,200.0	9,626.2	16,200.6	9,635.1	76.3	79.1	-90.76	-1,247.6	-6,151.7	1,100.1	944.7	155.40	7.079	
16,300.0	9,624.2	16,300.6	9,633.1	77.3	80.1	-90.76	-1,247.3	-6,251.7	1,100.1	942.7	157.44	6.988	
16,400.0	9,622.2	16,400.6	9,631.1	78.4	81.1	-90.76	-1,247.0	-6,351.6	1,100.1	940.7	159.48	6.898	
16,500.0	9,620.2	16,500.6	9,629.1	79.4	82.2	-90.76	-1,246.8	-6,451.6	1,100.1	938.6	161.53	6.811	
16,600.0	9,618.3	16,600.6	9,627.1	80.4	83.2	-90.76	-1,246.5	-6,551.6	1,100.1	936.6	163.58	6.725	
16,700.0	9,616.3	16,700.6	9,625.1	81.4	84.2	-90.76	-1,246.2	-6,651.6	1,100.2	934.5	165.64	6.642	
16,800.0	9,614.3	16,800.6	9,623.1	82.5	85.2	-90.76	-1,246.0	-6,751.6	1,100.2	932.5	167.70	6.560	
16,900.0	9,612.3	16,900.6	9,621.2	83.5	86.3	-90.76	-1,245.7	-6,851.5	1,100.2	930.4	169.76	6.480	
17,000.0	9,610.3	17,000.6	9,619.2	84.5	87.3	-90.76	-1,245.4	-6,951.5	1,100.2	928.3	171.83	6.402	
17,100.0	9,608.3	17,100.6	9,617.2	85.6	88.3	-90.76	-1,245.2	-7,051.5	1,100.2	926.2	173.91	6.326	
17,200.0	9,606.4	17,200.6	9,615.2	86.6	89.4	-90.76	-1,244.9	-7,151.5	1,100.2	924.2	175.98	6.252	
17,300.0	9,604.4	17,300.6	9,613.2	87.6	90.4	-90.76	-1,244.7	-7,251.5	1,100.2	922.1	178.06	6.178	
17,400.0	9,602.4	17,400.6	9,611.2	88.7	91.5	-90.76	-1,244.4	-7,351.4	1,100.2	920.0	180.15	6.107	
17,500.0	9,600.4	17,500.6	9,609.3	89.7	92.5	-90.76	-1,244.1	-7,451.4	1,100.2	917.9	182.23	6.037	
17,600.0	9,598.4	17,600.6	9,607.3	90.8	93.5	-90.76	-1,243.9	-7,551.4	1,100.2	915.8	184.32	5.969	
17,700.0	9,596.4	17,700.6	9,605.3	91.8	94.6	-90.76	-1,243.6	-7,651.4	1,100.2	913.7	186.42	5.902	
17,800.0	9,594.4	17,800.6	9,603.3	92.9	95.6	-90.76	-1,243.3	-7,751.4	1,100.2	911.6	188.52	5.836	
17,900.0	9,592.5	17,900.6	9,601.3	93.9	96.7	-90.76	-1,243.1	-7,851.3	1,100.2	909.5	190.62	5.772	
18,000.0	9,590.5	18,000.6	9,599.3	95.0	97.7	-90.76	-1,242.8	-7,951.3	1,100.2	907.4	192.72	5.709	
18,100.0	9,588.5	18,100.6	9,597.3	96.0	98.8	-90.76	-1,242.5	-8,051.3	1,100.2	905.3	194.82	5.647	
18,200.0	9,586.5	18,200.6	9,595.4	97.1	99.8	-90.76	-1,242.3	-8,151.3	1,100.2	903.2	196.93	5.587	
18,300.0	9,584.5	18,300.6	9,593.4	98.1	100.9	-90.76	-1,242.0	-8,251.3	1,100.2	901.1	199.04	5.527	
18,400.0	9,582.5	18,400.6	9,591.4	99.2	102.0	-90.76	-1,241.7	-8,351.2	1,100.2	899.0	201.16	5.469	
18,500.0	9,580.5	18,500.6	9,589.4	100.3	103.0	-90.76	-1,241.5	-8,451.2	1,100.2	896.9	203.27	5.412	
18,600.0	9,578.6	18,600.6	9,587.4	101.3	104.1	-90.76	-1,241.2	-8,551.2	1,100.2	894.8	205.39	5.356	
18,700.0	9,576.6	18,700.6	9,585.4	102.4	105.1	-90.76	-1,241.0	-8,651.2	1,100.2	892.7	207.51	5.302	
18,800.0	9,574.6	18,800.6	9,583.4	103.4	106.2	-90.76	-1,240.7	-8,751.1	1,100.2	890.5	209.63	5.248	
18,900.0	9,572.6	18,900.6	9,581.5	104.5	107.2	-90.76	-1,240.4	-8,851.1	1,100.2	888.4	211.76	5.195	
19,000.0	9,570.6	19,000.6	9,579.5	105.6	108.3	-90.76	-1,240.2	-8,951.1	1,100.2	886.3	213.89	5.144	
19,100.0	9,568.6	19,100.6	9,577.5	106.6	109.4	-90.76	-1,239.9	-9,051.1	1,100.2	884.2	216.02	5.093	
19,200.0	9,566.6	19,200.6	9,575.5	107.7	110.4	-90.76	-1,239.6	-9,151.1	1,100.2	882.0	218.15	5.043	
19,300.0	9,564.7	19,300.6	9,573.5	108.8	111.5	-90.76	-1,239.4	-9,251.0	1,100.2	879.9	220.28	4.994	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

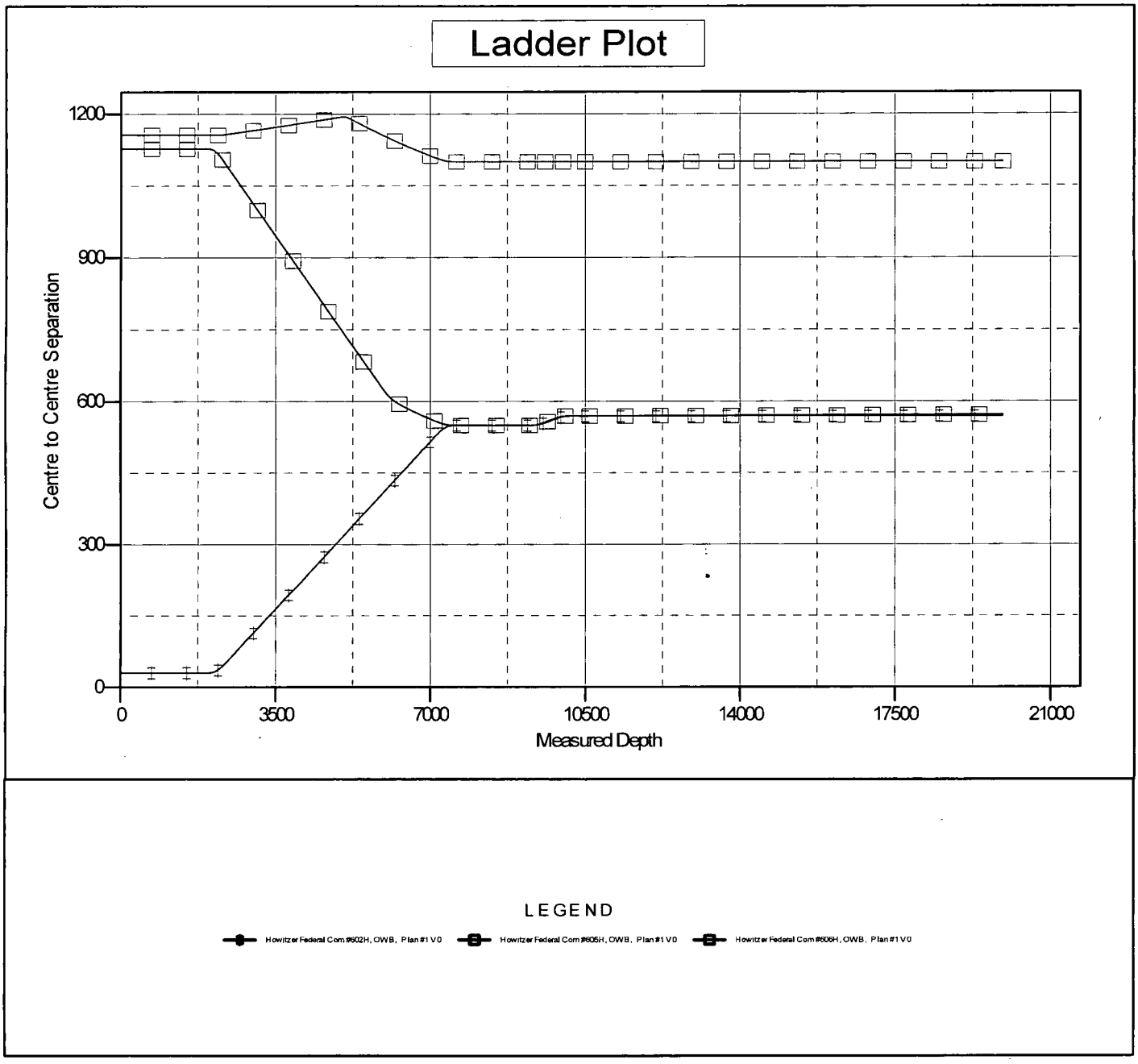
Survey Program: 0-MWD, 9194-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

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
19,400.0	9,562.7	19,400.6	9,571.5	109.8	112.6	-90.76	-1,239.1	-9,351.0	1,100.2	877.8	222.41	4.947	
19,500.0	9,560.7	19,500.6	9,569.6	110.9	113.6	-90.76	-1,238.8	-9,451.0	1,100.2	875.6	224.55	4.899	
19,600.0	9,558.7	19,600.6	9,567.6	112.0	114.7	-90.76	-1,238.6	-9,551.0	1,100.2	873.5	226.69	4.853	
19,700.0	9,556.7	19,700.6	9,565.6	113.1	115.8	-90.76	-1,238.3	-9,651.0	1,100.2	871.4	228.83	4.808	
19,800.0	9,554.7	19,800.6	9,563.6	114.1	116.8	-90.76	-1,238.0	-9,750.9	1,100.2	869.2	230.97	4.763	
19,900.0	9,552.7	19,900.6	9,561.6	115.2	117.9	-90.76	-1,237.8	-9,850.9	1,100.2	867.1	233.12	4.719	
19,901.7	9,552.7	19,902.3	9,561.6	115.2	117.9	-90.76	-1,237.8	-9,852.7	1,100.2	867.0	233.15	4.719	
19,937.5	9,552.0	19,932.0	9,561.0	115.6	118.3	-90.76	-1,237.7	-9,882.3	1,100.2	866.3	233.86	4.705	ES, SF

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB @ 2999.4usft (Latshaw 44)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Howitzer Federal Com #603H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.16°

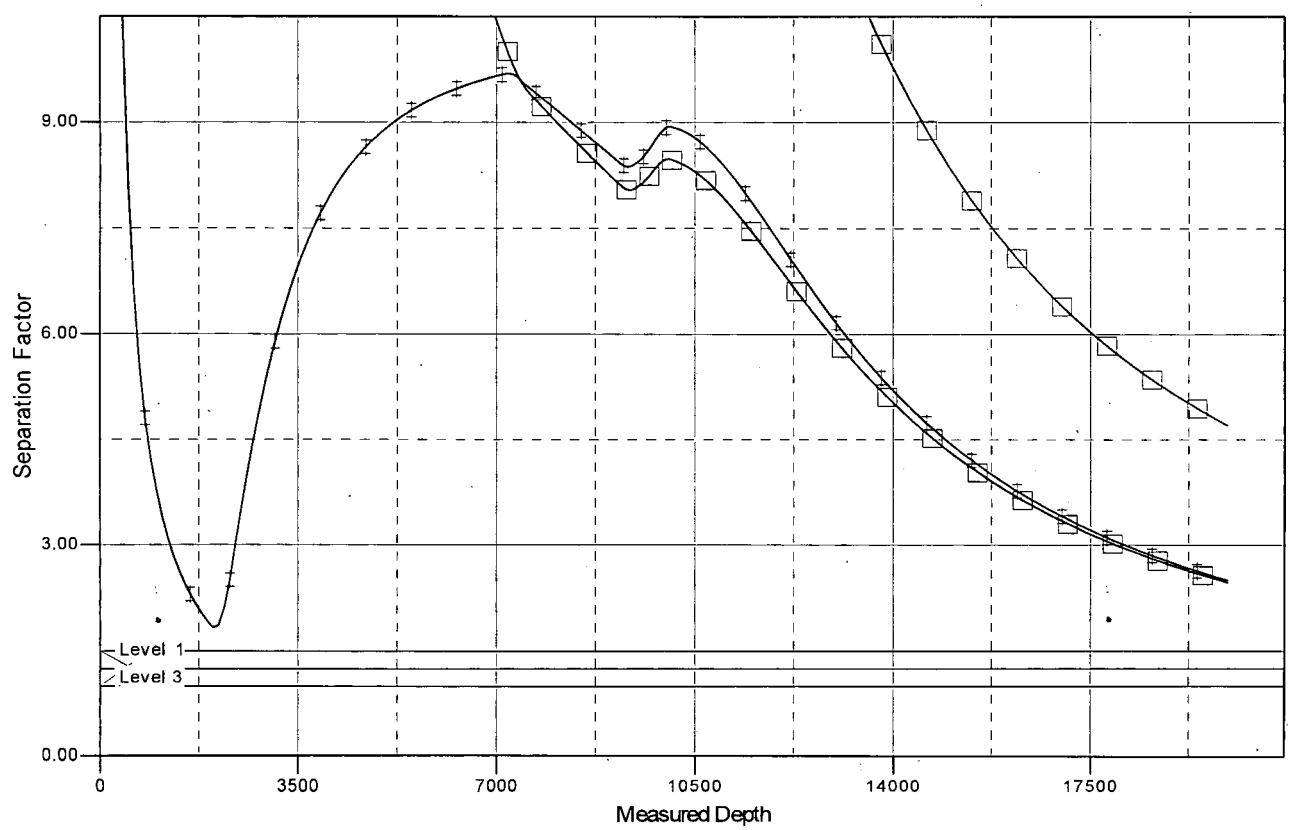


Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Project:	Eddy County (NAD27 NME)	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Reference Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB @ 2999.4usft (Latshaw 44)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Howitzer Federal Com #603H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.16°

Separation Factor Plot



LEGEND

Howitzer Federal Com #602H, OWB, Plan #1 V0 | Howitzer Federal Com #605H, OWB, Plan #1 V0 | Howitzer Federal Com #606H, OWB, Plan #1 V0

CONCHO

Concho Resources, Inc.

Eddy County (NAD27 NME)
(Howitzer) Sec-12_T-24-S_R-28-E
Howitzer Federal Com #603H

OWB

Plan: Plan #1

Standard Planning Report

02 November, 2018

INTREPID

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

Project Eddy County (NAD27 NME)

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 (Howitzer) Sec-12_T-24-S_R-28-E

Site Position:		**Northing:**	448,838.70 usft	**Latitude:**	32° 14' 1.022 N
From:	Map	**Easting:**	592,936.40 usft	**Longitude:**	104° 1' 57.970 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.16 °

Well Howitzer Federal Com #603H

Well Position	**+N/-S**	1,109.4 usft	**Northing:**	449,948.10 usft	**Latitude:**	32° 14' 12.010 N
	+E/-W	-325.8 usft	**Easting:**	592,610.60 usft	**Longitude:**	104° 2' 1.727 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	2,974.4 usft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/31/18	7.02	59.98	47,758.77209852

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	269.20

Plan Survey Tool Program **Date** 11/02/18

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	9,203.0	Plan #1 (OWB)	MWD OWSG MWD - Standard	
2	9,203.0	19,937.5	Plan #1 (OWB)	MWD+IFR1+MS MWD + IFR1 + Multi-Statior	

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,300.0	6.00	107.60	2,299.5	-4.7	15.0	2.00	2.00	0.00	107.60	
7,228.1	6.00	107.60	7,200.5	-160.5	506.0	0.00	0.00	0.00	0.00	
7,528.1	0.00	0.00	7,500.0	-165.2	521.0	2.00	-2.00	0.00	180.00	
9,202.3	0.00	0.00	9,174.2	-165.2	521.0	0.00	0.00	0.00	0.00	
10,113.7	91.14	270.15	9,747.0	-163.7	-63.4	10.00	10.00	-9.86	270.15	
19,937.5	91.14	270.15	9,552.0	-137.6	-9,885.2	0.00	0.00	0.00	0.00	PBHL (Howitzer Fe

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
NUDGE - Build 2.00									
2,100.0	2.00	107.60	2,100.0	-0.5	1.7	-1.7	2.00	2.00	0.00
2,200.0	4.00	107.60	2,199.8	-2.1	6.7	-6.6	2.00	2.00	0.00
2,300.0	6.00	107.60	2,299.5	-4.7	15.0	-14.9	2.00	2.00	0.00
HOLD - 4928.1 at 2300.0 MD									
2,400.0	6.00	107.60	2,398.9	-7.9	24.9	-24.8	0.00	0.00	0.00
2,500.0	6.00	107.60	2,498.4	-11.1	34.9	-34.7	0.00	0.00	0.00
2,600.0	6.00	107.60	2,597.8	-14.2	44.9	-44.6	0.00	0.00	0.00
2,700.0	6.00	107.60	2,697.3	-17.4	54.8	-54.6	0.00	0.00	0.00
2,800.0	6.00	107.60	2,796.7	-20.5	64.8	-64.5	0.00	0.00	0.00
2,900.0	6.00	107.60	2,896.2	-23.7	74.7	-74.4	0.00	0.00	0.00
3,000.0	6.00	107.60	2,995.6	-26.9	84.7	-84.3	0.00	0.00	0.00
3,100.0	6.00	107.60	3,095.1	-30.0	94.7	-94.2	0.00	0.00	0.00
3,200.0	6.00	107.60	3,194.5	-33.2	104.6	-104.2	0.00	0.00	0.00
3,300.0	6.00	107.60	3,294.0	-36.3	114.6	-114.1	0.00	0.00	0.00
3,400.0	6.00	107.60	3,393.4	-39.5	124.6	-124.0	0.00	0.00	0.00
3,500.0	6.00	107.60	3,492.9	-42.7	134.5	-133.9	0.00	0.00	0.00
3,600.0	6.00	107.60	3,592.3	-45.8	144.5	-143.8	0.00	0.00	0.00
3,700.0	6.00	107.60	3,691.8	-49.0	154.5	-153.8	0.00	0.00	0.00
3,800.0	6.00	107.60	3,791.2	-52.1	164.4	-163.7	0.00	0.00	0.00
3,900.0	6.00	107.60	3,890.7	-55.3	174.4	-173.6	0.00	0.00	0.00
4,000.0	6.00	107.60	3,990.1	-58.5	184.4	-183.5	0.00	0.00	0.00
4,100.0	6.00	107.60	4,089.6	-61.6	194.3	-193.4	0.00	0.00	0.00
4,200.0	6.00	107.60	4,189.0	-64.8	204.3	-203.4	0.00	0.00	0.00
4,300.0	6.00	107.60	4,288.5	-67.9	214.2	-213.3	0.00	0.00	0.00
4,400.0	6.00	107.60	4,387.9	-71.1	224.2	-223.2	0.00	0.00	0.00
4,500.0	6.00	107.60	4,487.4	-74.3	234.2	-233.1	0.00	0.00	0.00
4,600.0	6.00	107.60	4,586.9	-77.4	244.1	-243.0	0.00	0.00	0.00
4,700.0	6.00	107.60	4,686.3	-80.6	254.1	-253.0	0.00	0.00	0.00
4,800.0	6.00	107.60	4,785.8	-83.7	264.1	-262.9	0.00	0.00	0.00
4,900.0	6.00	107.60	4,885.2	-86.9	274.0	-272.8	0.00	0.00	0.00
5,000.0	6.00	107.60	4,984.7	-90.1	284.0	-282.7	0.00	0.00	0.00
5,100.0	6.00	107.60	5,084.1	-93.2	294.0	-292.6	0.00	0.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
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)
5,200.0	6.00	107.60	5,183.6	-96.4	303.9	-302.6	0.00	0.00	0.00
5,300.0	6.00	107.60	5,283.0	-99.5	313.9	-312.5	0.00	0.00	0.00
5,400.0	6.00	107.60	5,382.5	-102.7	323.9	-322.4	0.00	0.00	0.00
5,500.0	6.00	107.60	5,481.9	-105.9	333.8	-332.3	0.00	0.00	0.00
5,600.0	6.00	107.60	5,581.4	-109.0	343.8	-342.2	0.00	0.00	0.00
5,700.0	6.00	107.60	5,680.8	-112.2	353.7	-352.1	0.00	0.00	0.00
5,800.0	6.00	107.60	5,780.3	-115.3	363.7	-362.1	0.00	0.00	0.00
5,900.0	6.00	107.60	5,879.7	-118.5	373.7	-372.0	0.00	0.00	0.00
6,000.0	6.00	107.60	5,979.2	-121.7	383.6	-381.9	0.00	0.00	0.00
6,100.0	6.00	107.60	6,078.6	-124.8	393.6	-391.8	0.00	0.00	0.00
6,200.0	6.00	107.60	6,178.1	-128.0	403.6	-401.7	0.00	0.00	0.00
6,300.0	6.00	107.60	6,277.5	-131.1	413.5	-411.7	0.00	0.00	0.00
6,400.0	6.00	107.60	6,377.0	-134.3	423.5	-421.6	0.00	0.00	0.00
6,500.0	6.00	107.60	6,476.4	-137.5	433.5	-431.5	0.00	0.00	0.00
6,600.0	6.00	107.60	6,575.9	-140.6	443.4	-441.4	0.00	0.00	0.00
6,700.0	6.00	107.60	6,675.3	-143.8	453.4	-451.3	0.00	0.00	0.00
6,800.0	6.00	107.60	6,774.8	-146.9	463.3	-461.3	0.00	0.00	0.00
6,900.0	6.00	107.60	6,874.3	-150.1	473.3	-471.2	0.00	0.00	0.00
7,000.0	6.00	107.60	6,973.7	-153.3	483.3	-481.1	0.00	0.00	0.00
7,100.0	6.00	107.60	7,073.2	-156.4	493.2	-491.0	0.00	0.00	0.00
7,200.0	6.00	107.60	7,172.6	-159.6	503.2	-500.9	0.00	0.00	0.00
7,228.1	6.00	107.60	7,200.5	-160.5	506.0	-503.7	0.00	0.00	0.00
DROP - -2.00									
7,300.0	4.56	107.60	7,272.1	-162.5	512.3	-510.0	2.00	-2.00	0.00
7,400.0	2.56	107.60	7,371.9	-164.3	518.2	-515.9	2.00	-2.00	0.00
7,500.0	0.56	107.60	7,471.9	-165.2	520.8	-518.5	2.00	-2.00	0.00
7,528.1	0.00	0.00	7,500.0	-165.2	521.0	-518.6	2.00	-2.00	0.00
HOLD - 1674.2 at 7528.1 MD									
7,600.0	0.00	0.00	7,571.9	-165.2	521.0	-518.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,671.9	-165.2	521.0	-518.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,771.9	-165.2	521.0	-518.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,871.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,971.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,100.0	0.00	0.00	8,071.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,200.0	0.00	0.00	8,171.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,271.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,371.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,471.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,600.0	0.00	0.00	8,571.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,700.0	0.00	0.00	8,671.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,800.0	0.00	0.00	8,771.9	-165.2	521.0	-518.6	0.00	0.00	0.00
8,900.0	0.00	0.00	8,871.9	-165.2	521.0	-518.6	0.00	0.00	0.00
9,000.0	0.00	0.00	8,971.9	-165.2	521.0	-518.6	0.00	0.00	0.00
9,100.0	0.00	0.00	9,071.9	-165.2	521.0	-518.6	0.00	0.00	0.00
9,202.3	0.00	0.00	9,174.2	-165.2	521.0	-518.6	0.00	0.00	0.00
KOP - DLS 10.00 TFO 270.15									
9,250.0	4.77	270.15	9,221.8	-165.2	519.0	-516.6	10.00	10.00	0.00
9,300.0	9.77	270.15	9,271.4	-165.2	512.7	-510.3	10.00	10.00	0.00
9,350.0	14.77	270.15	9,320.3	-165.2	502.0	-499.7	10.00	10.00	0.00
9,400.0	19.77	270.15	9,368.0	-165.1	487.2	-484.8	10.00	10.00	0.00
9,450.0	24.77	270.15	9,414.3	-165.1	468.2	-465.9	10.00	10.00	0.00
9,500.0	29.77	270.15	9,458.7	-165.0	445.3	-443.0	10.00	10.00	0.00
9,550.0	34.77	270.15	9,501.0	-164.9	418.7	-416.3	10.00	10.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
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)
9,600.0	39.77	270.15	9,540.7	-164.9	388.4	-386.1	10.00	10.00	0.00
9,650.0	44.77	270.15	9,577.7	-164.8	354.8	-352.4	10.00	10.00	0.00
9,700.0	49.77	270.15	9,611.6	-164.7	318.1	-315.7	10.00	10.00	0.00
9,750.0	54.77	270.15	9,642.2	-164.6	278.5	-276.2	10.00	10.00	0.00
9,800.0	59.77	270.15	9,669.2	-164.5	236.5	-234.2	10.00	10.00	0.00
9,850.0	64.77	270.15	9,692.5	-164.3	192.2	-189.9	10.00	10.00	0.00
9,900.0	69.77	270.15	9,711.8	-164.2	146.1	-143.8	10.00	10.00	0.00
9,950.0	74.77	270.15	9,727.0	-164.1	98.5	-96.2	10.00	10.00	0.00
10,000.0	79.77	270.15	9,738.1	-164.0	49.8	-47.5	10.00	10.00	0.00
10,050.0	84.77	270.15	9,744.8	-163.8	0.2	2.0	10.00	10.00	0.00
10,100.0	89.77	270.15	9,747.2	-163.7	-49.7	52.0	10.00	10.00	0.00
10,113.7	91.14	270.15	9,747.0	-163.7	-63.4	65.6	10.00	10.00	0.00
EOC - 9823.8 hold at 10113.7 MD									
10,200.0	91.14	270.15	9,745.3	-163.4	-149.7	151.9	0.00	0.00	0.00
10,300.0	91.14	270.15	9,743.3	-163.2	-249.7	251.9	0.00	0.00	0.00
10,400.0	91.14	270.15	9,741.4	-162.9	-349.6	351.9	0.00	0.00	0.00
10,500.0	91.14	270.15	9,739.4	-162.6	-449.6	451.8	0.00	0.00	0.00
10,600.0	91.14	270.15	9,737.4	-162.4	-549.6	551.8	0.00	0.00	0.00
10,700.0	91.14	270.15	9,735.4	-162.1	-649.6	651.8	0.00	0.00	0.00
10,800.0	91.14	270.15	9,733.4	-161.8	-749.6	751.7	0.00	0.00	0.00
10,900.0	91.14	270.15	9,731.4	-161.6	-849.5	851.7	0.00	0.00	0.00
11,000.0	91.14	270.15	9,729.4	-161.3	-949.5	951.7	0.00	0.00	0.00
11,100.0	91.14	270.15	9,727.5	-161.0	-1,049.5	1,051.6	0.00	0.00	0.00
11,200.0	91.14	270.15	9,725.5	-160.8	-1,149.5	1,151.6	0.00	0.00	0.00
11,300.0	91.14	270.15	9,723.5	-160.5	-1,249.5	1,251.6	0.00	0.00	0.00
11,400.0	91.14	270.15	9,721.5	-160.2	-1,349.4	1,351.5	0.00	0.00	0.00
11,500.0	91.14	270.15	9,719.5	-160.0	-1,449.4	1,451.5	0.00	0.00	0.00
11,600.0	91.14	270.15	9,717.5	-159.7	-1,549.4	1,551.5	0.00	0.00	0.00
11,700.0	91.14	270.15	9,715.5	-159.5	-1,649.4	1,651.4	0.00	0.00	0.00
11,800.0	91.14	270.15	9,713.6	-159.2	-1,749.4	1,751.4	0.00	0.00	0.00
11,900.0	91.14	270.15	9,711.6	-158.9	-1,849.3	1,851.4	0.00	0.00	0.00
12,000.0	91.14	270.15	9,709.6	-158.7	-1,949.3	1,951.3	0.00	0.00	0.00
12,100.0	91.14	270.15	9,707.6	-158.4	-2,049.3	2,051.3	0.00	0.00	0.00
12,200.0	91.14	270.15	9,705.6	-158.1	-2,149.3	2,151.3	0.00	0.00	0.00
12,300.0	91.14	270.15	9,703.6	-157.9	-2,249.3	2,251.2	0.00	0.00	0.00
12,400.0	91.14	270.15	9,701.7	-157.6	-2,349.2	2,351.2	0.00	0.00	0.00
12,500.0	91.14	270.15	9,699.7	-157.3	-2,449.2	2,451.2	0.00	0.00	0.00
12,600.0	91.14	270.15	9,697.7	-157.1	-2,549.2	2,551.1	0.00	0.00	0.00
12,700.0	91.14	270.15	9,695.7	-156.8	-2,649.2	2,651.1	0.00	0.00	0.00
12,800.0	91.14	270.15	9,693.7	-156.5	-2,749.2	2,751.1	0.00	0.00	0.00
12,900.0	91.14	270.15	9,691.7	-156.3	-2,849.1	2,851.0	0.00	0.00	0.00
13,000.0	91.14	270.15	9,689.7	-156.0	-2,949.1	2,951.0	0.00	0.00	0.00
13,100.0	91.14	270.15	9,687.8	-155.7	-3,049.1	3,051.0	0.00	0.00	0.00
13,200.0	91.14	270.15	9,685.8	-155.5	-3,149.1	3,150.9	0.00	0.00	0.00
13,300.0	91.14	270.15	9,683.8	-155.2	-3,249.1	3,250.9	0.00	0.00	0.00
13,400.0	91.14	270.15	9,681.8	-154.9	-3,349.0	3,350.9	0.00	0.00	0.00
13,500.0	91.14	270.15	9,679.8	-154.7	-3,449.0	3,450.8	0.00	0.00	0.00
13,600.0	91.14	270.15	9,677.8	-154.4	-3,549.0	3,550.8	0.00	0.00	0.00
13,700.0	91.14	270.15	9,675.8	-154.1	-3,649.0	3,650.8	0.00	0.00	0.00
13,800.0	91.14	270.15	9,673.9	-153.9	-3,749.0	3,750.7	0.00	0.00	0.00
13,900.0	91.14	270.15	9,671.9	-153.6	-3,848.9	3,850.7	0.00	0.00	0.00
14,000.0	91.14	270.15	9,669.9	-153.4	-3,948.9	3,950.7	0.00	0.00	0.00
14,100.0	91.14	270.15	9,667.9	-153.1	-4,048.9	4,050.6	0.00	0.00	0.00
14,200.0	91.14	270.15	9,665.9	-152.8	-4,148.9	4,150.6	0.00	0.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
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)
14,300.0	91.14	270.15	9,663.9	-152.6	-4,248.9	4,250.6	0.00	0.00	0.00
14,400.0	91.14	270.15	9,661.9	-152.3	-4,348.8	4,350.5	0.00	0.00	0.00
14,500.0	91.14	270.15	9,660.0	-152.0	-4,448.8	4,450.5	0.00	0.00	0.00
14,600.0	91.14	270.15	9,658.0	-151.8	-4,548.8	4,550.5	0.00	0.00	0.00
14,700.0	91.14	270.15	9,656.0	-151.5	-4,648.8	4,650.4	0.00	0.00	0.00
14,800.0	91.14	270.15	9,654.0	-151.2	-4,748.8	4,750.4	0.00	0.00	0.00
14,900.0	91.14	270.15	9,652.0	-151.0	-4,848.7	4,850.4	0.00	0.00	0.00
15,000.0	91.14	270.15	9,650.0	-150.7	-4,948.7	4,950.3	0.00	0.00	0.00
15,100.0	91.14	270.15	9,648.0	-150.4	-5,048.7	5,050.3	0.00	0.00	0.00
15,200.0	91.14	270.15	9,646.1	-150.2	-5,148.7	5,150.3	0.00	0.00	0.00
15,300.0	91.14	270.15	9,644.1	-149.9	-5,248.7	5,250.2	0.00	0.00	0.00
15,400.0	91.14	270.15	9,642.1	-149.6	-5,348.6	5,350.2	0.00	0.00	0.00
15,500.0	91.14	270.15	9,640.1	-149.4	-5,448.6	5,450.2	0.00	0.00	0.00
15,600.0	91.14	270.15	9,638.1	-149.1	-5,548.6	5,550.1	0.00	0.00	0.00
15,700.0	91.14	270.15	9,636.1	-148.8	-5,648.6	5,650.1	0.00	0.00	0.00
15,800.0	91.14	270.15	9,634.1	-148.6	-5,748.6	5,750.1	0.00	0.00	0.00
15,900.0	91.14	270.15	9,632.2	-148.3	-5,848.5	5,850.0	0.00	0.00	0.00
16,000.0	91.14	270.15	9,630.2	-148.0	-5,948.5	5,950.0	0.00	0.00	0.00
16,100.0	91.14	270.15	9,628.2	-147.8	-6,048.5	6,050.0	0.00	0.00	0.00
16,200.0	91.14	270.15	9,626.2	-147.5	-6,148.5	6,149.9	0.00	0.00	0.00
16,300.0	91.14	270.15	9,624.2	-147.2	-6,248.5	6,249.9	0.00	0.00	0.00
16,400.0	91.14	270.15	9,622.2	-147.0	-6,348.4	6,349.9	0.00	0.00	0.00
16,500.0	91.14	270.15	9,620.2	-146.7	-6,448.4	6,449.8	0.00	0.00	0.00
16,600.0	91.14	270.15	9,618.3	-146.5	-6,548.4	6,549.8	0.00	0.00	0.00
16,700.0	91.14	270.15	9,616.3	-146.2	-6,648.4	6,649.8	0.00	0.00	0.00
16,800.0	91.14	270.15	9,614.3	-145.9	-6,748.4	6,749.7	0.00	0.00	0.00
16,900.0	91.14	270.15	9,612.3	-145.7	-6,848.3	6,849.7	0.00	0.00	0.00
17,000.0	91.14	270.15	9,610.3	-145.4	-6,948.3	6,949.7	0.00	0.00	0.00
17,100.0	91.14	270.15	9,608.3	-145.1	-7,048.3	7,049.6	0.00	0.00	0.00
17,200.0	91.14	270.15	9,606.4	-144.9	-7,148.3	7,149.6	0.00	0.00	0.00
17,300.0	91.14	270.15	9,604.4	-144.6	-7,248.3	7,249.6	0.00	0.00	0.00
17,400.0	91.14	270.15	9,602.4	-144.3	-7,348.2	7,349.5	0.00	0.00	0.00
17,500.0	91.14	270.15	9,600.4	-144.1	-7,448.2	7,449.5	0.00	0.00	0.00
17,600.0	91.14	270.15	9,598.4	-143.8	-7,548.2	7,549.5	0.00	0.00	0.00
17,700.0	91.14	270.15	9,596.4	-143.5	-7,648.2	7,649.4	0.00	0.00	0.00
17,800.0	91.14	270.15	9,594.4	-143.3	-7,748.2	7,749.4	0.00	0.00	0.00
17,900.0	91.14	270.15	9,592.5	-143.0	-7,848.1	7,849.4	0.00	0.00	0.00
18,000.0	91.14	270.15	9,590.5	-142.7	-7,948.1	7,949.3	0.00	0.00	0.00
18,100.0	91.14	270.15	9,588.5	-142.5	-8,048.1	8,049.3	0.00	0.00	0.00
18,200.0	91.14	270.15	9,586.5	-142.2	-8,148.1	8,149.3	0.00	0.00	0.00
18,300.0	91.14	270.15	9,584.5	-141.9	-8,248.1	8,249.2	0.00	0.00	0.00
18,400.0	91.14	270.15	9,582.5	-141.7	-8,348.0	8,349.2	0.00	0.00	0.00
18,500.0	91.14	270.15	9,580.5	-141.4	-8,448.0	8,449.2	0.00	0.00	0.00
18,600.0	91.14	270.15	9,578.6	-141.1	-8,548.0	8,549.1	0.00	0.00	0.00
18,700.0	91.14	270.15	9,576.6	-140.9	-8,648.0	8,649.1	0.00	0.00	0.00
18,800.0	91.14	270.15	9,574.6	-140.6	-8,748.0	8,749.1	0.00	0.00	0.00
18,900.0	91.14	270.15	9,572.6	-140.4	-8,847.9	8,849.0	0.00	0.00	0.00
19,000.0	91.14	270.15	9,570.6	-140.1	-8,947.9	8,949.0	0.00	0.00	0.00
19,100.0	91.14	270.15	9,568.6	-139.8	-9,047.9	9,049.0	0.00	0.00	0.00
19,200.0	91.14	270.15	9,566.6	-139.6	-9,147.9	9,148.9	0.00	0.00	0.00
19,300.0	91.14	270.15	9,564.7	-139.3	-9,247.9	9,248.9	0.00	0.00	0.00
19,400.0	91.14	270.15	9,562.7	-139.0	-9,347.8	9,348.9	0.00	0.00	0.00
19,500.0	91.14	270.15	9,560.7	-138.8	-9,447.8	9,448.8	0.00	0.00	0.00
19,600.0	91.14	270.15	9,558.7	-138.5	-9,547.8	9,548.8	0.00	0.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
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)
19,700.0	91.14	270.15	9,556.7	-138.2	-9,647.8	9,648.8	0.00	0.00	0.00
19,800.0	91.14	270.15	9,554.7	-138.0	-9,747.8	9,748.7	0.00	0.00	0.00
19,900.0	91.14	270.15	9,552.7	-137.7	-9,847.7	9,848.7	0.00	0.00	0.00
19,937.5	91.14	270.15	9,552.0	-137.6	-9,885.2	9,886.2	0.00	0.00	0.00
TD at 19937.5									

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 (Howitzer Federa	0.00	0.00	9,552.0	-137.9	-9,755.2	449,810.20	582,855.40	32° 14' 10.900 N	104° 3' 55.310 W
- plan misses target center by 2.6usft at 19807.5usft MD (9554.6 TVD, -137.9 N, -9755.3 E)									
- Point									
PBHL (Howitzer Fede	-1.14	270.15	9,552.0	-137.6	-9,885.2	449,810.50	582,725.40	32° 14' 10.906 N	104° 3' 56.824 W
- plan hits target center									
- Rectangle (sides W60.0 H10,179.0 D20.0)									
FTP (Howitzer Federa	0.00	0.00	9,747.0	-164.6	290.9	449,783.50	592,901.50	32° 14' 10.373 N	104° 1' 58.345 W
- plan misses target center by 94.7usft at 9796.3usft MD (9667.3 TVD, -164.5 N, 239.7 E)									
- Point									

Formations

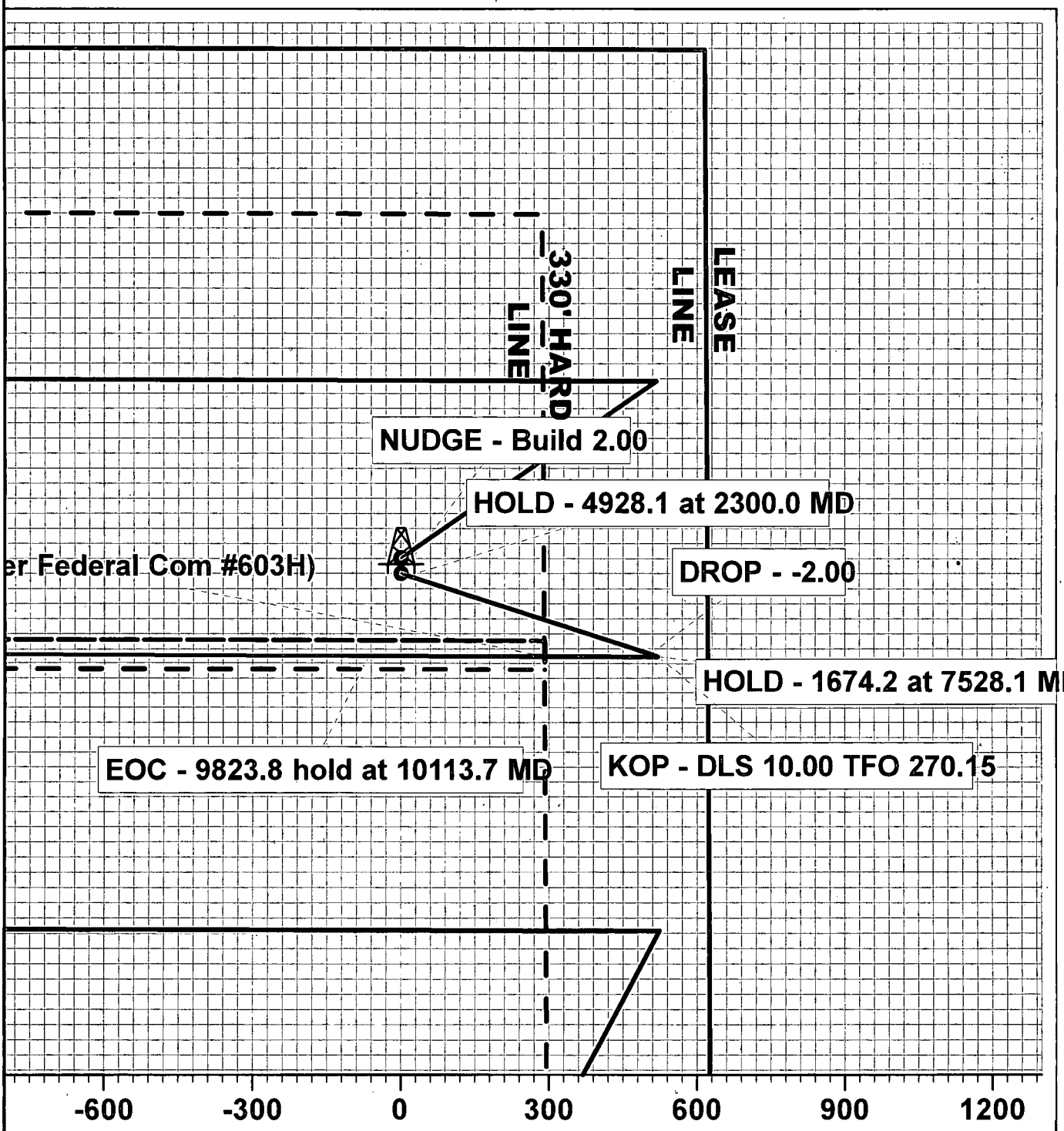
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
96.0	96.0	Rustler			
96.0	96.0	TOS			
2,558.0	2,556.0	BOS (Fletcher)			
2,768.1	2,765.0	LMAR (Top Delaware)			
2,821.4	2,818.0	BLCN			
3,687.1	3,679.0	CYCN			
4,914.9	4,900.0	BYCN			
6,457.3	6,434.0	Bone Sprg (BSGL)			
6,758.0	6,733.0	U Avalon Sh			
7,082.8	7,056.0	L Avalon Sh			
7,233.6	7,206.0	B Avalon Sh			
7,460.1	7,432.0	FBSG_sand			
8,260.1	8,232.0	SBSG_sand			
8,584.1	8,556.0	SBSG_sand_Base			
9,350.8	9,321.0	TBSG_sand			
9,741.1	9,637.0	WFMP			

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Howitzer Federal Com #603H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 2999.4usft (Latshaw 44)
Project:	Eddy County (NAD27 NME)	**MD Reference:**	KB @ 2999.4usft (Latshaw 44)
Site:	(Howitzer) Sec-12_T-24-S_R-28-E	**North Reference:**	Grid
Well:	Howitzer Federal Com #603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,000.0	2,000.0	0.0	0.0	NUDGE - Build 2.00
2,300.0	2,299.5	-4.7	15.0	HOLD - 4928.1 at 2300.0 MD
7,228.1	7,200.5	-160.5	506.0	DROP - -2.00
7,528.1	7,500.0	-165.2	521.0	HOLD - 1674.2 at 7528.1 MD
9,202.3	9,174.2	-165.2	521.0	KOP - DLS 10.00 TFO 270.15
10,113.7	9,747.0	-163.7	-63.4	EOC - 9823.8 hold at 10113.7 MD
19,937.5	9,552.0	-137.6	-9,885.2	TD at 19937.5

INTREPID


330' HARD LINE
LEASE LINE
NUDGE - Build 2.00
HOLD - 4928.1 at 2300.0 MD
er Federal Com #603H)
DROP - -2.00
HOLD - 1674.2 at 7528.1 MD
EOC - 9823.8 hold at 10113.7 MD
KOP - DLS 10.00 TFO 270.15
-600
-300
0
300
600
900
1200

COG Operating, LLC - Howitzer Federal Com 603H

1. Geologic Formations

TVD of target	9,747'	Pilot hole depth	NA
MD at TD:	19,938'	Deepest expected fresh water:	47'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	N/A	Water	
Top of Salt	96	Salt	
Base of Salt	2556	Salt	
Lamar	2765	Salt Water	
Bell Canyon	2818	Salt Water	
Cherry Canyon	3679	Oil/Gas	
Brushy Canyon	4900	Oil/Gas	
Bone Spring Lime	6434	Oil/Gas	
U. Avalon Shale	6733	Oil/Gas	
L. Avalon Shale	7056	Oil/Gas	
1st Bone Spring Sand	7432	Oil/Gas	
2nd Bone Spring Sand	8232	Oil/Gas	
3rd Bone Spring Sand	9321	Oil/Gas	
Wolfcamp	9637	Oil/Gas	

2. Casing Program

Hole Size	Casing From	Casing To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	2700	13.375"	61	J55	STC	1.28	2.94	3.61
12.25"	0	9000	9.625"	40	HCL80	BTC	1.32	1.16	2.63
8.5	0	19,938	5.5"	23	P110	BTC	2.29	2.71	3.23
			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

	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.	1420	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter. Stage1	1390	11	2.8	19	48	Lead: NeoCem
	300	16.4	1.1	5	8	Tail: Class H
5.5 Prod	400	12.7	2	10.6	16	Lead: 35:65:6 H Blend
	3010	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	8,500'	35%

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"	3M	Annular	x	1500 psi
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8 1/2"	13-5/8"	5M	5M Annular	x	2500 psi
			Blind Ram	x	5M
			Pipe Ram	x	
			Double Ram	x	
			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.

Y	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	8.4 - 8.6	28-29	N/C
Surf csg	Int shoe	Diesel Brine Emul	8.6 - 9.4	30-40	N/C
Int shoe	Lateral TD	OBM	10.5 - 12.5	30-40	20

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.
N	Are 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	

APD ID: 10400036013 **Submission Date:** 11/08/2018

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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_HOWITZER_603H_Ex_Rd_20181106095121.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_Howitzer_603H_Rd_Plats_20181108141615.pdf

New road type: TWO-TRACK

Length: 322.9 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

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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_Howitzer_603H_1Mile_Data_20181108141552.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: 1) A Central Tank Battery and production facilities are proposed in Section 12. T24S. R28E. Production will be sent to the proposed Howitzer Federal Com Central Tank Battery facility. A buried flow line of approximately 129.1' of 3.5" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Howitzer Federal Com Central Tank Battery location. We plan to install a 2" buried steel pipe transporting Gas Lift Gas from the Howitzer Federal Com Central Tank Battery to the dual well pad that includes the Howitzer Federal Com 602H and 603H wells. The buried Gas Lift Gas pipe of approximately 129.1' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road.

Production Facilities map:

COG_Howitzer_603H_Flowline_20181108141659.pdf

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

COG_Howitzer_CTB_Layout_20181108141737.pdf
COG_HOWITZER_603H_Layout_20181108141816.pdf

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 H2O

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 H2O

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_Howitzer_603H_Brine_H20_20181108141950.pdf
COG_Howitzer_603H_Fresh_H20_20181108142002.pdf

Water source comments: Fresh water will be obtained from Santa Fe Energy, Partners water well located in Section 24. T24S. R28E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E.
New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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 Oscar Vasquez Johnson caliche pit located in Section 1, T24S, R28E. (575) 361-3784.
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

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

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

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments: GCP attached.

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Howitzer_603H_Flowline_20181108142113.pdf

COG_Howitzer_603H_Prod_Facil_20181108142122.pdf

COG_Howitzer_CTB_Layout_20181108142132.pdf

COG_HOWITZER_603H_Layout_20181108142142.pdf

Comments: 1) A Central Tank Battery and production facilities are proposed in Section 12. T24S. R28E. Production will be sent to the proposed Howitzer Federal Com Central Tank Battery facility. A buried flow line of approximately 129.1' of 3.5" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Howitzer Federal Com Central Tank Battery location. We plan to install a 2" buried steel pipe transporting Gas Lift Gas from the Howitzer Federal Com Central Tank Battery to the dual well pad that includes the Howitzer Federal Com 602H and 603H wells. The buried Gas Lift Gas pipe of approximately 129.1' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road.

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: HOWITZER FEDERAL COM

Multiple Well Pad Number: 602H AND 603H

Recontouring attachment:

Drainage/Erosion control construction: If needed, immediately following pad construction approximately 400' of straw waddles will be placed on the north side and on the east side of the location to reduce sediment impacts to fragile/sensitive soils.

Drainage/Erosion control reclamation: Reclaim north 80'

Well pad proposed disturbance (acres): 3.67

Well pad interim reclamation (acres): 0.01

Well pad long term disturbance (acres): 2.94

Road proposed disturbance (acres): 0.1

Road interim reclamation (acres): 0.1

Road long term disturbance (acres): 0.1

Powerline proposed disturbance (acres): 0

Powerline interim reclamation (acres): 0

Powerline long term disturbance (acres): 0

Pipeline proposed disturbance (acres): 0.04

Pipeline interim reclamation (acres): 0.04

Pipeline long term disturbance (acres): 0.04

Other proposed disturbance (acres): 0.04

Other interim reclamation (acres): 0.04

Other long term disturbance (acres): 0.04

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

Total proposed disturbance: 3.85 **Total interim reclamation:** 0.19 **Total long term disturbance:** 3.12

Disturbance Comments:

Reconstruction method: New construction of pad.

Topsoil redistribution: 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:

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

Seed cultivar:

Seed use location:

PLS pounds per acre: **Proposed seeding season:**

Seed Summary	
Seed Type	**Pounds/Acre**

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Gerald **Last Name:** Herrera

Phone: (432)260-7399 **Email:** gherrera@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_Howitzer_603H_Closed_Loop_20181108142459.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: STATE GOVERNMENT

Other surface owner description:

BIA Local Office:

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office: STATE OF NEW MEXICO

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Section 12 - Other Information

Right of Way needed? NO **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite completed on 8/27/2018 by Rand French (COG) and Jeff Robertson (BLM).

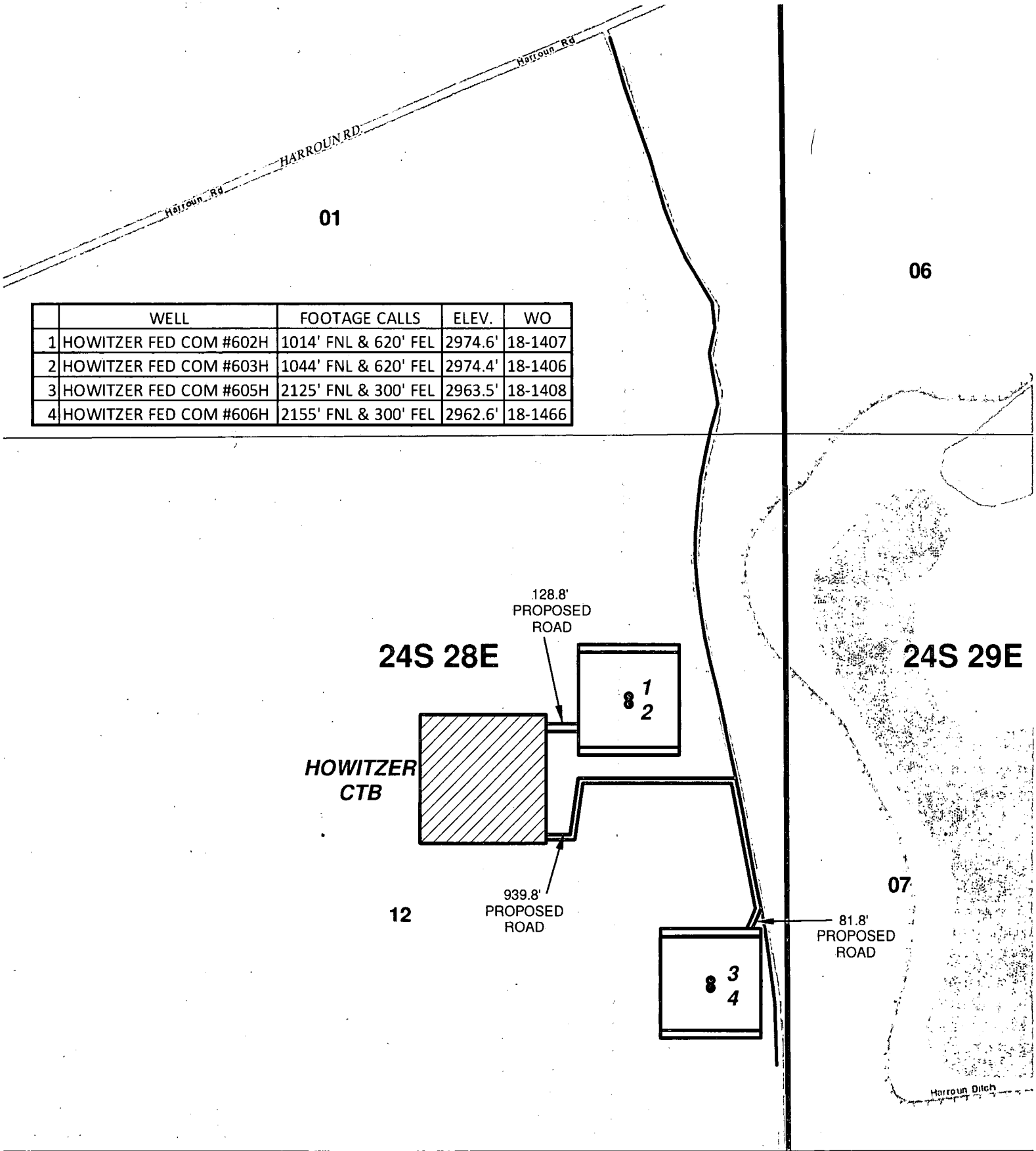
Other SUPO Attachment

COG_Howitzer_603H_Certif_20181105163212.pdf
COG_Howitzer_603H_SUP_20181108142519.pdf
COG_Howitzer_603H_1Mile_Data_20181108142530.pdf
COG_Howitzer_603H_Brine_H20_20181108142542.pdf
COG_Howitzer_603H_C102_20181108142550.pdf
COG_Howitzer_603H_Closed_Loop_20181108142559.pdf
COG_HOWITZER_603H_Ex_Rd_20181108142610.pdf
COG_Howitzer_603H_Flowline_20181108142623.pdf
COG_Howitzer_603H_Fresh_H20_20181108142637.pdf
COG_Howitzer_603H_Prod_Facil_20181108142652.pdf
COG_Howitzer_603H_Rd_Plats_20181108142706.pdf
COG_Howitzer_CTB_Layout_20181108142720.pdf

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM **Well Number:** 603H

COG_HOWITZER_603H_Layout_20181108142731.pdf



	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12 | TOWNSHIP: 24 S. | RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 | LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | VICINITY | 11/5/2018 | A.M.

N

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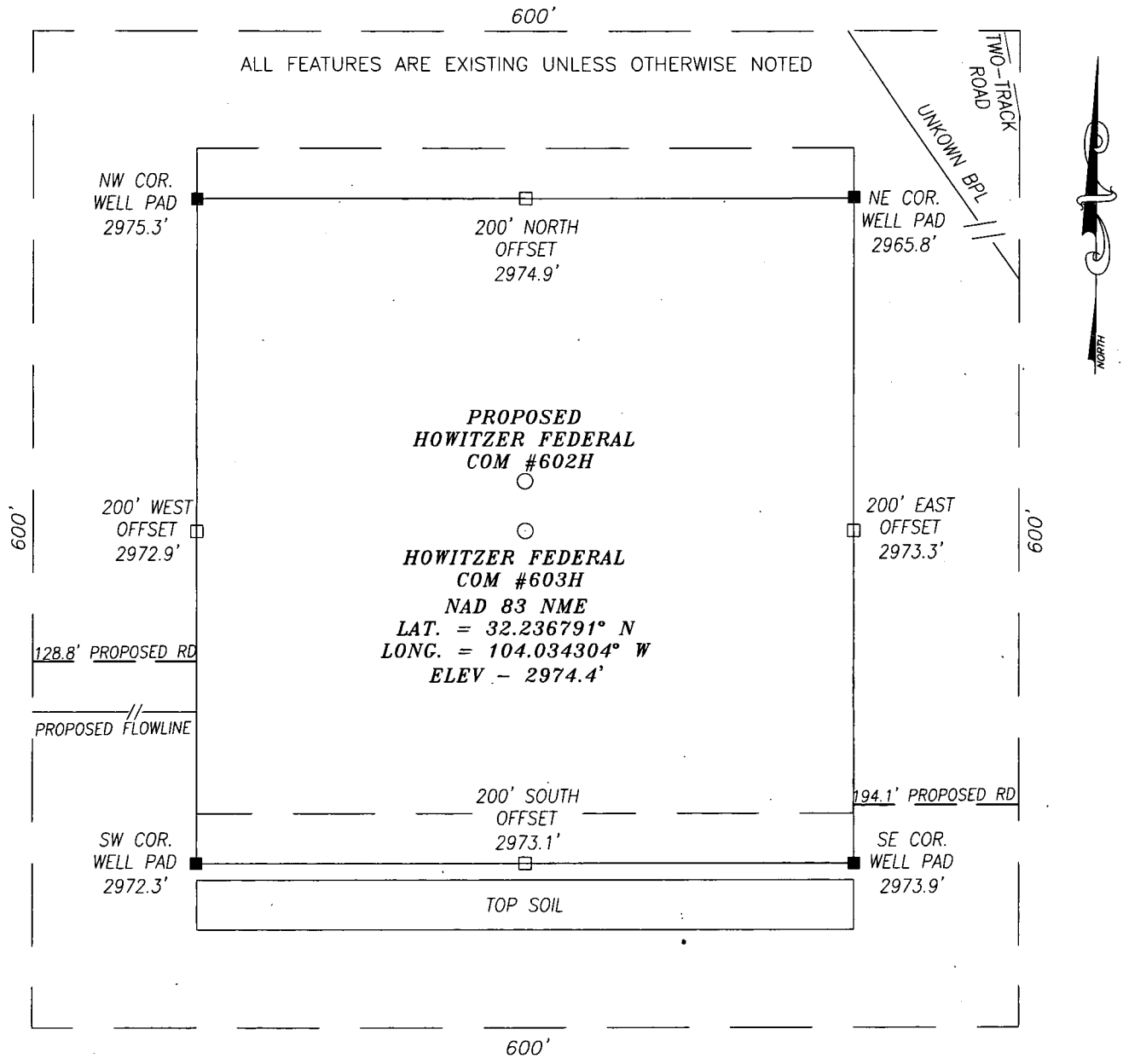
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOUTHERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD; THE PROPOSED WELL LIES APPROX. 0.4 MI. TO THE SOUTH.

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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 11/6/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

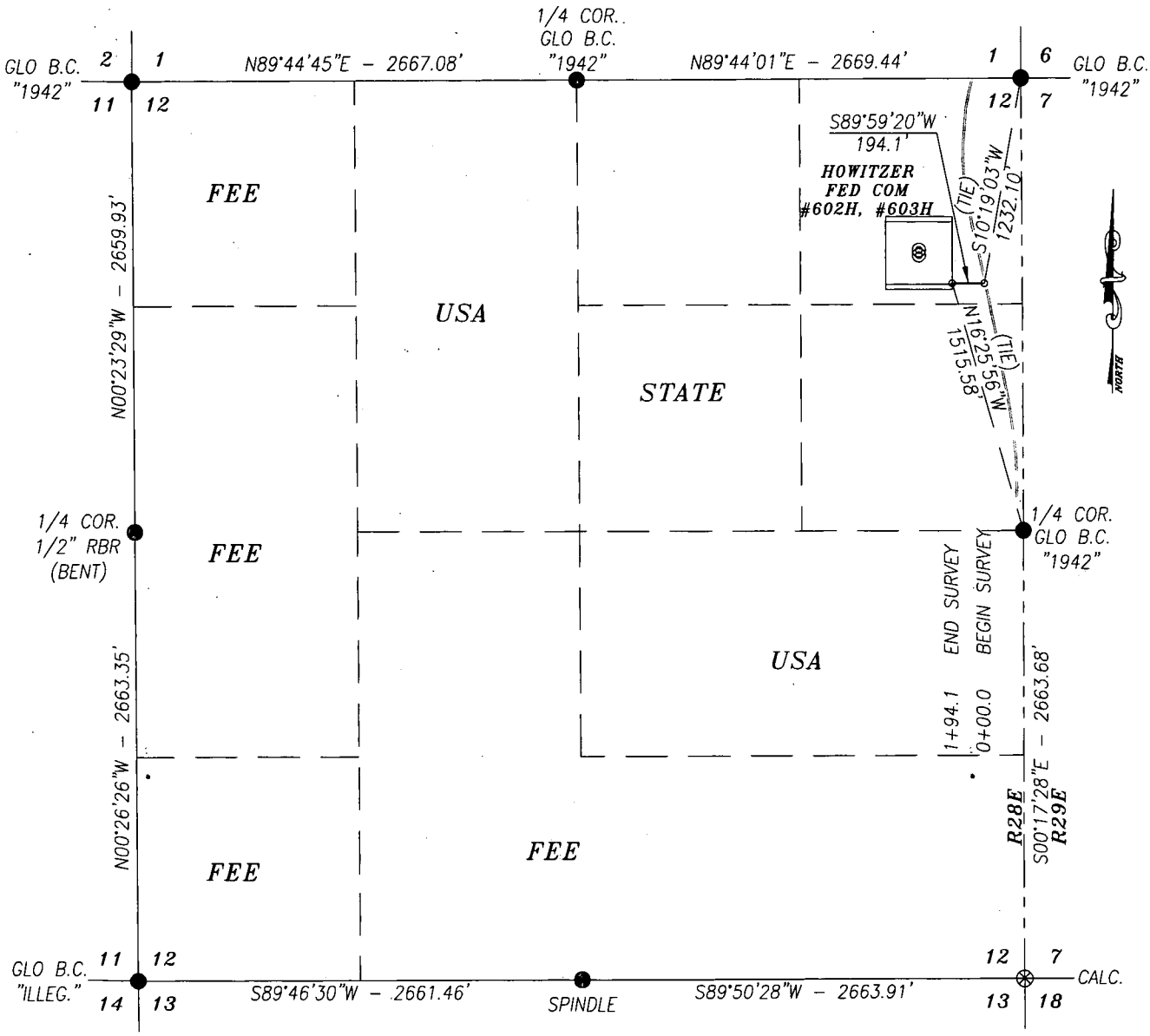
COG OPERATING, LLC

HOWITZER FEDERAL COM #603H WELL LOCATED 1044 FEET FROM THE NORTH LINE AND 620 FEET FROM THE EAST LINE OF SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 20, 2018		PAGE: 1 OF 1
DRAFTING DATE: NOVEMBER 6, 2018		
APPROVED BY: CH	DRAWN BY: AF	FILE: 18-1466

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM AN EXISTING CALICHE ROAD
TO THE HOWITZER FEDERAL COM #602H & #603H IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S10°19'03"W 1232.10 FEET FROM THE NORTHEAST CORNER; THEN S89°59'20"W 194.1 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES N16°25'56"W 1515.58 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 194.1 FEET OR 11.76 RODS IN LENGTH, CONTAINING 0.134 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

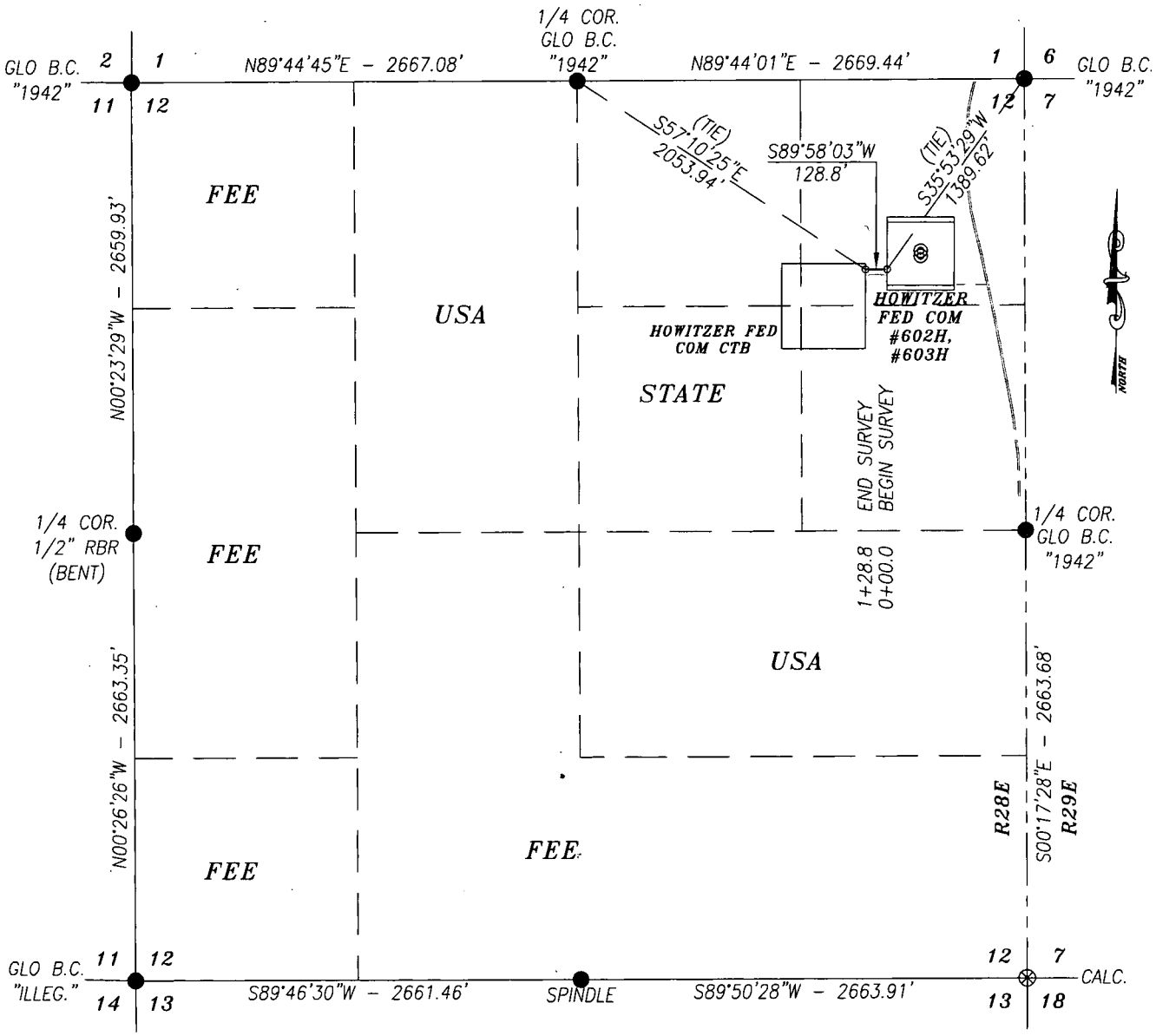
HARCROW SURVEYING, LLC

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM THE HOWITZER FEDERAL COM #602H & #603H TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S35°53'29"W 1389.62 FEET FROM THE NORTHEAST CORNER; THEN S89°58'03" 128.8 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S57°10'25"E 2053.94 FEET FROM NORTH QUARTER CORNER.

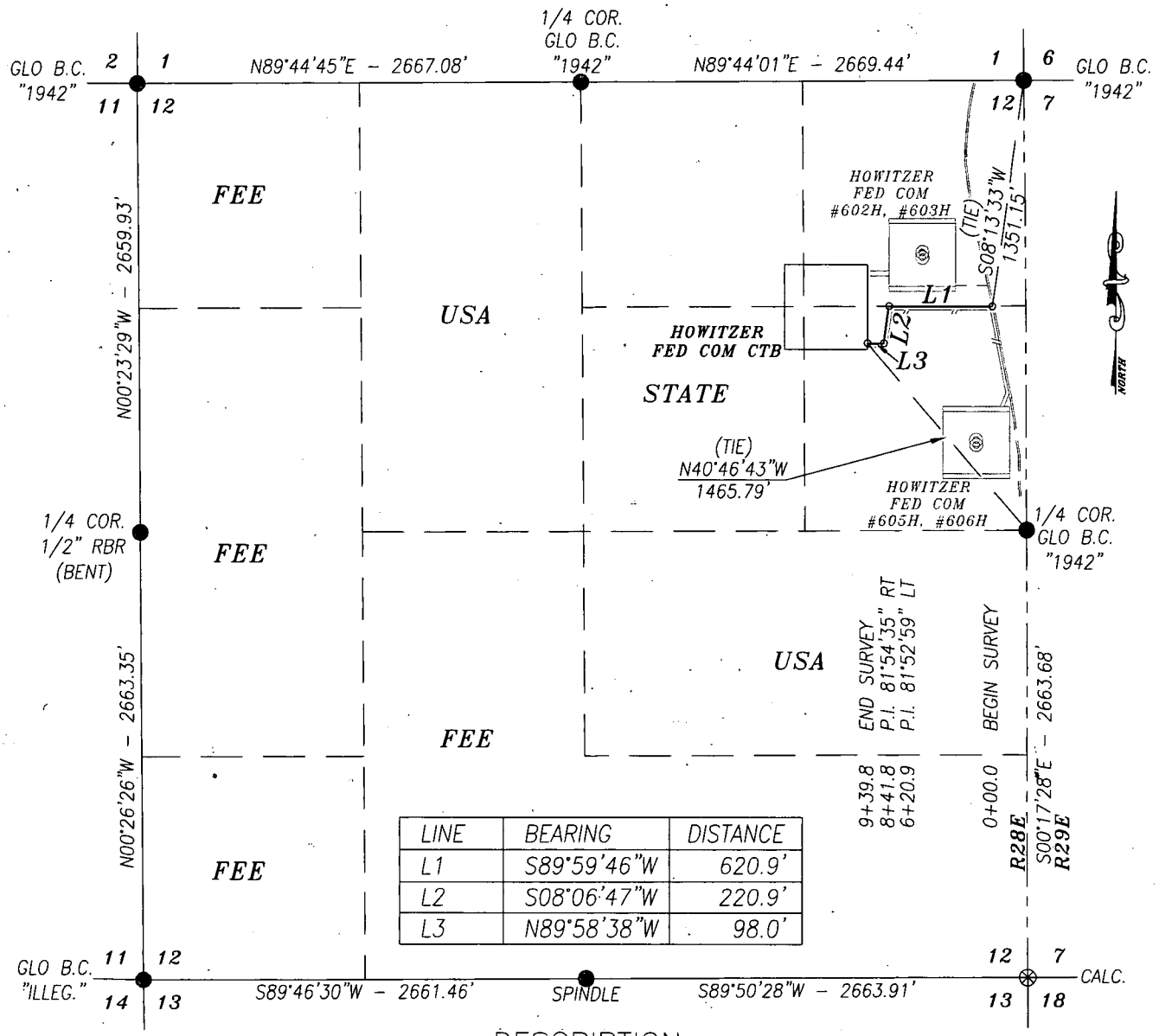
SAID STRIP OF LAND BEING 128.8 FEET OR 7.81 RODS IN LENGTH, CONTAINING 0.089 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM AN EXISTING CALICHE ROAD
TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



LINE	BEARING	DISTANCE
L1	S89°59'46"W	620.9'
L2	S08°06'47"W	220.9'
L3	N89°58'38"W	98.0'

DESCRIPTION

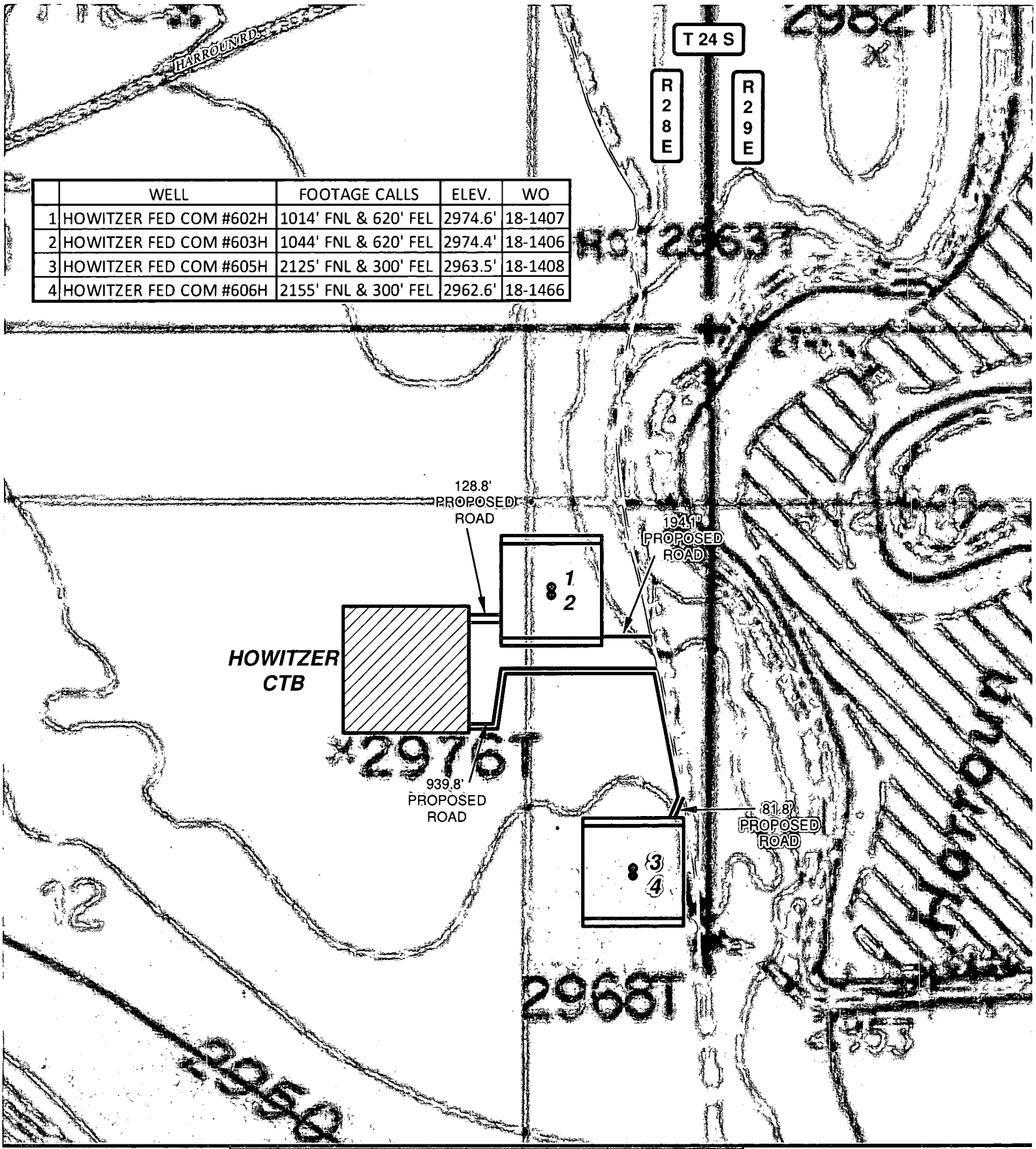
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S08°13'33"W 1,351.15 FEET FROM THE NORTHEAST CORNER; THEN S89°59'46" 620.9 FEET, THEN S08°06'47"W 220.9 FEET, THEN N89°58'38"W 98.0 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES N40°46'43"E 1465.79 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 939.8 FEET OR 56.96 RODS IN LENGTH, CONTAINING 0.647 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC



	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12 TOWNSHIP: 24 S. RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP TOPO 11/5/2018 A.M.

N

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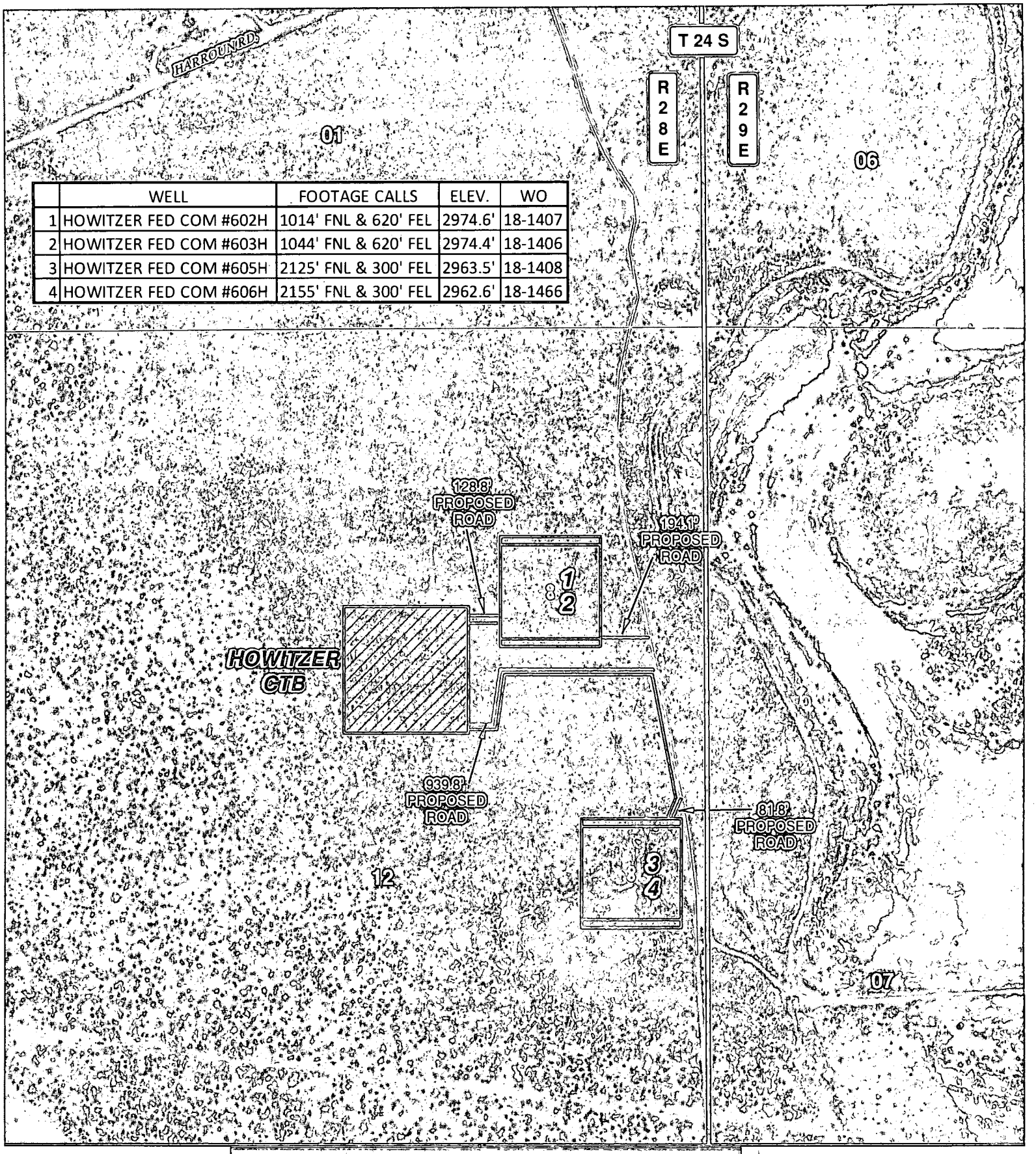

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LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12	TOWNSHIP: 24 S.	RANGE: 28 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1077, 1406-1408, 1466	LEASE: HOWITZER FED COM	

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP IMAGERY 11/5/2018 A.M.

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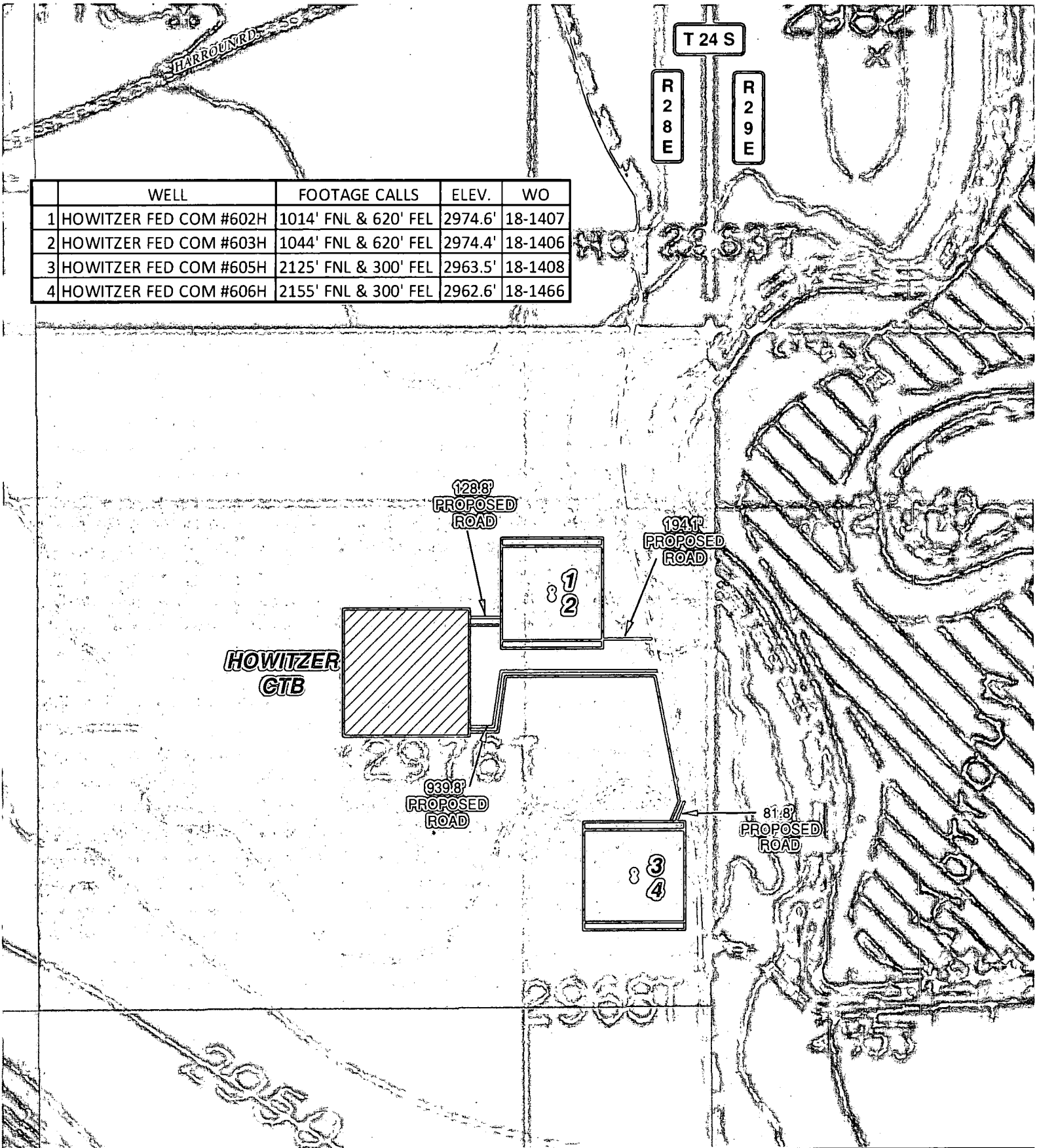

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LEGEND

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

HOWITZER FEDERAL COM

SECTION: 12 | TOWNSHIP: 24 S. | RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 | LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | LAND STATUS | 11/5/2018 | A.M.

N

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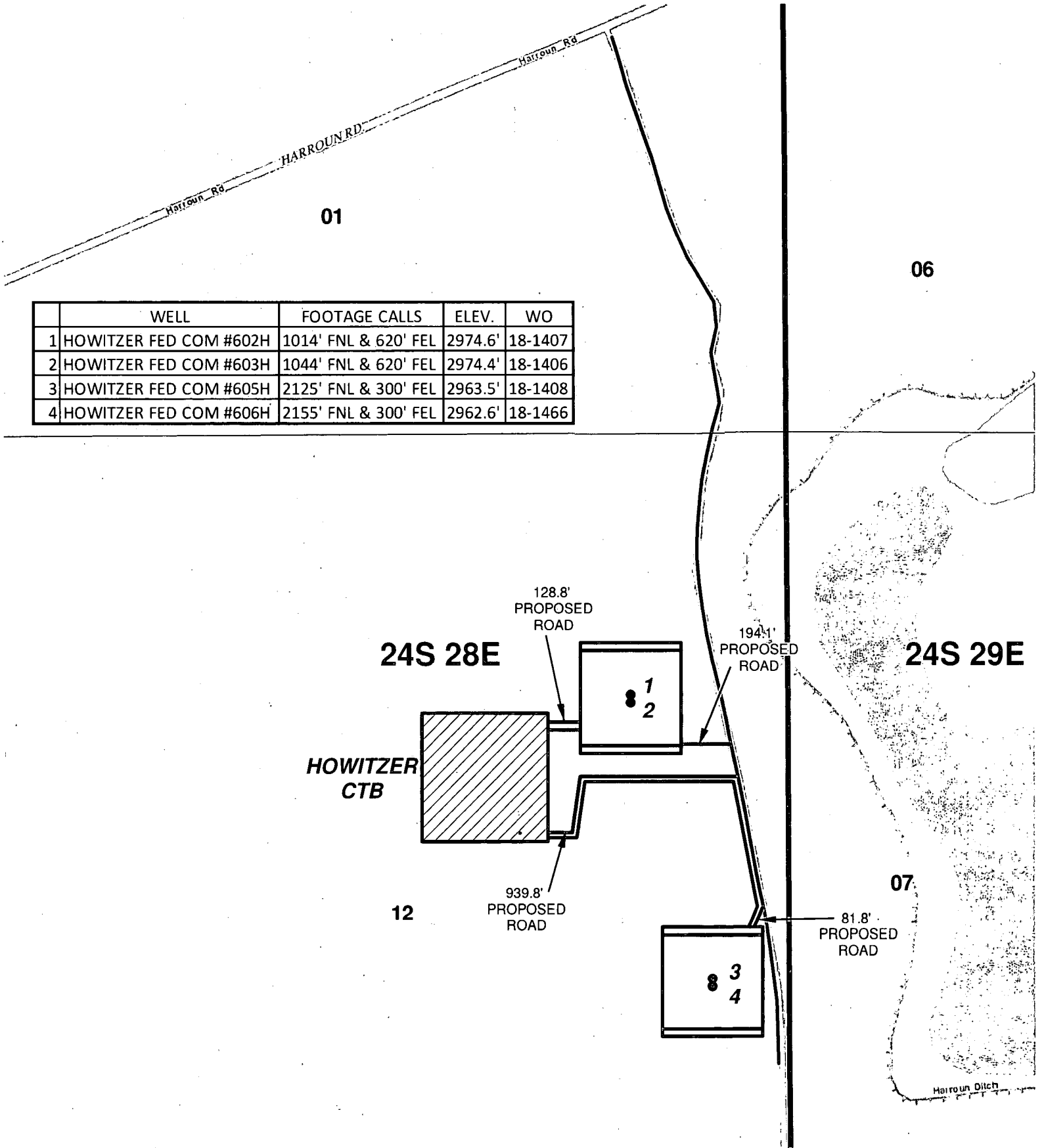

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LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12 | TOWNSHIP: 24 S. | RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 | LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | VICINITY | 11/5/2018 | A.M.

N

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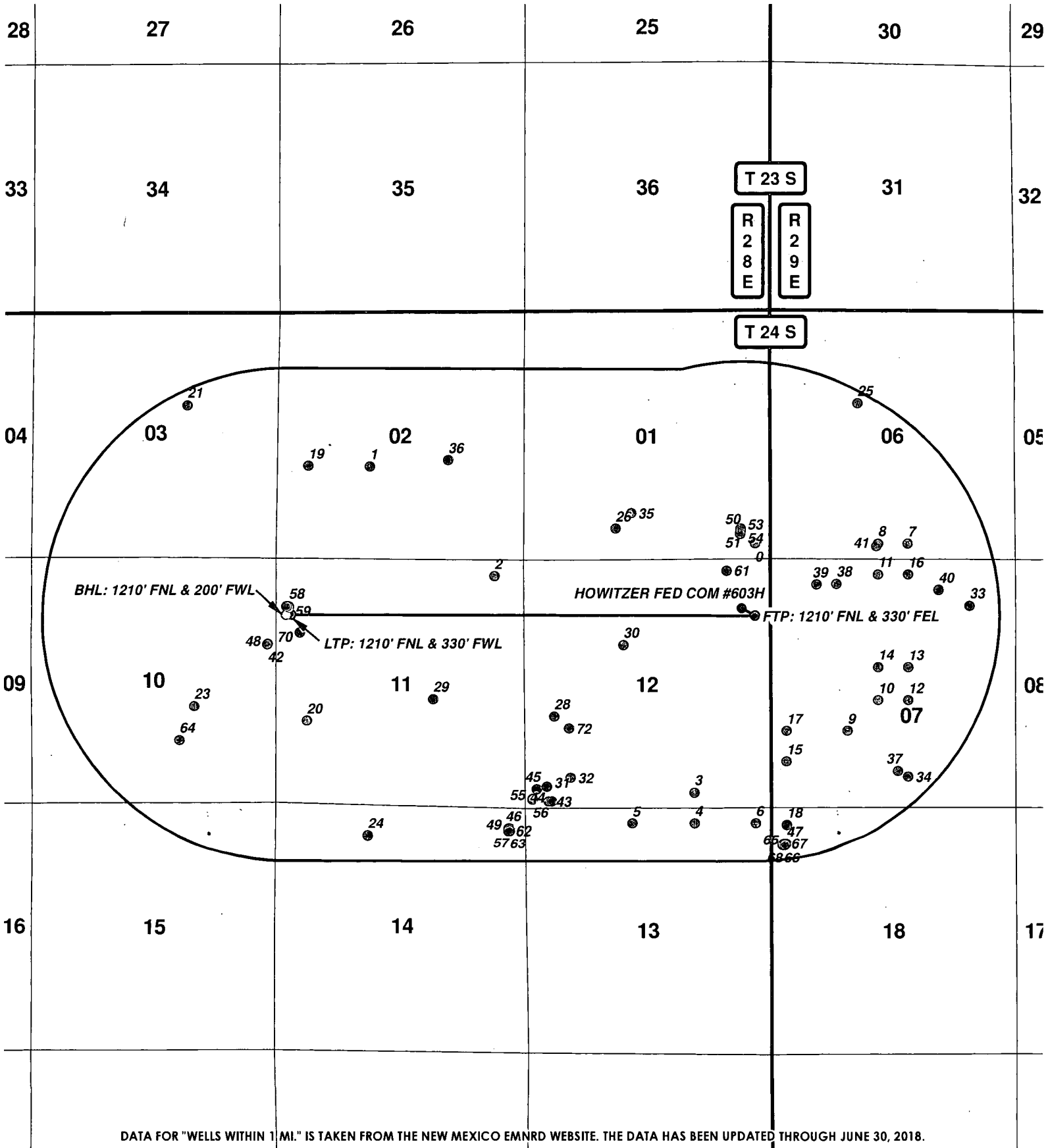

DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH JUNE 30, 2018.

LEGEND

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

HOWITZER FEDERAL COM #603H			
SEC: 12	TWP: 24 S.	RGE: 28 E.	ELEVATION: 2974.4'
STATE: NEW MEXICO	COUNTY: EDDY		1044' FNL & 620' FEL
W.O. # 18-1406	LEASE: HOWITZER FED COM		SURVEY: N.M.P.M

0 2,500 5,000 7,500 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,750 FT

1 MILE MAP 10/29/2018 A.M.

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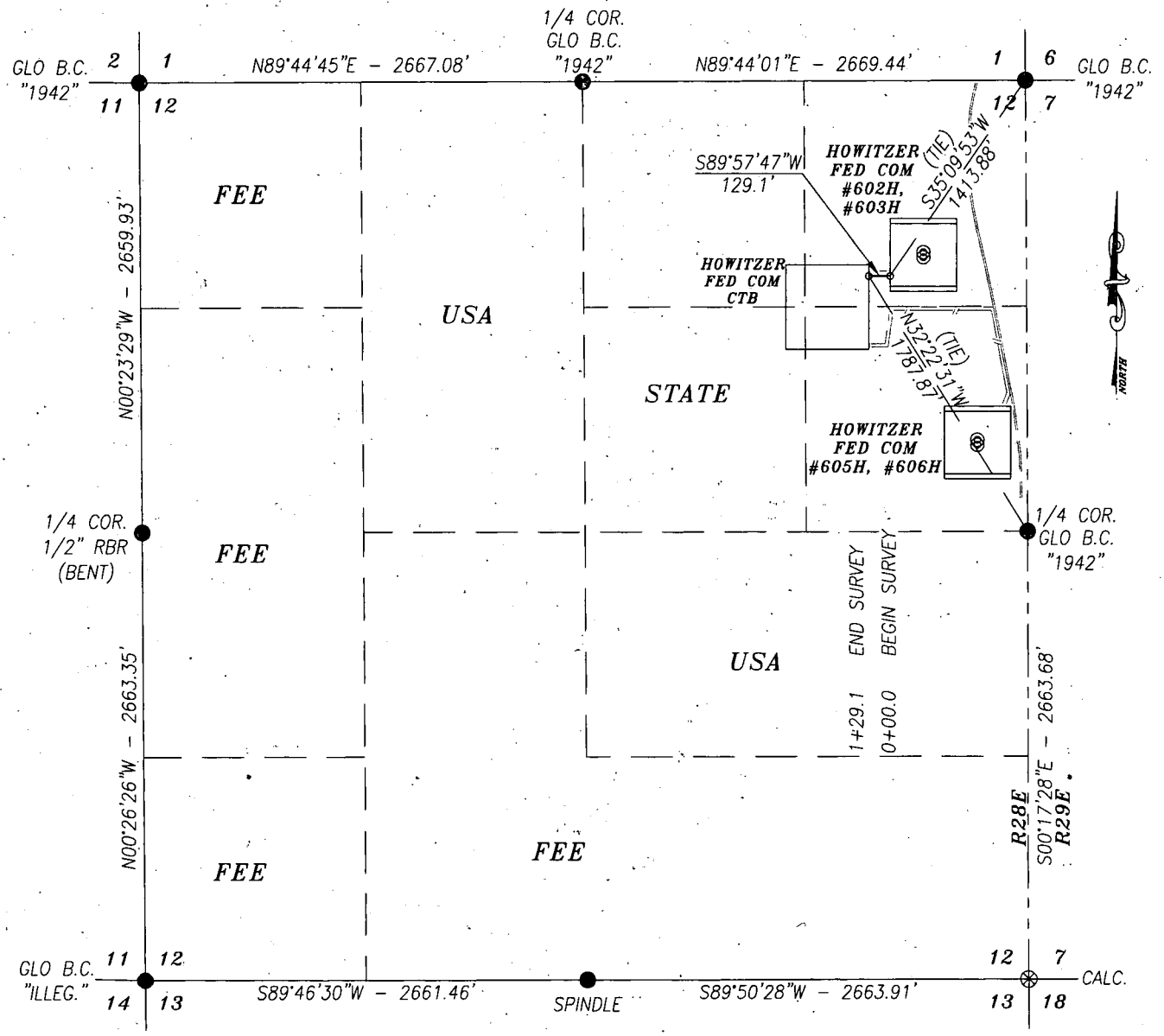
HOWITZER FEDERAL COM #603H 1 MILE DATA (18-1406)

	OPERATOR	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	LATITUDE	LONGITUDE	COMPL_STAT
	C L HAY	3001502486	1	24.0S	28E	330	S	330	E	32.240593	-104.033367	Plugged
	RICHARDSON & BASS	3001502487	2	24.0S	28E	1980	S	1980	W	32.245228	-104.060384	Plugged
	ALBERT SCHABEL	3001502489	11	24.0S	28E	355	N	645	E	32.238717	-104.051652	Plugged
	SOUTHERN CALIFORNIA PETROLEUM CORP	3001502490	12	24.0S	28E	330	S	1650	E	32.225945	-104.037625	Plugged
	CALVIN F TENNISON	3001502494	13	24.0S	28E	330	N	1650	E	32.224131	-104.03762	Plugged
	DEKALB AGRICULTURAL ASSOCIATION INC	3001502496	13	24.0S	28E	330	N	2310	W	32.22413	-104.041967	Plugged
	AUSTIN GAS PURCHASING	3001502500	13	24.0S	28E	330	N	330	E	32.224131	-104.033331	Plugged
	EL CAPITAN OIL CO	3001503693	6	24.0S	29E	330	S	2310	E	32.240543	-104.022688	Plugged
	TENNESSEE GAS TRANSMISSION	3001503694	6	24.0S	29E	330	S	2310	W	32.240554	-104.024786	Plugged
	GIANT OPERATING LLC	3001503695	7	24.0S	29E	1650	S	1650	W	32.22956	-104.026909	Active
	TENNECO OIL CO	3001503696	7	24.0S	29E	2310	S	2310	W	32.231369	-104.024768	Plugged
	SOUTHERN CALIFORNIA PETROLEUM CORP	3001503697	7	24.0S	29E	330	N	2310	W	32.23874	-104.024783	Plugged
	CALVIN F TENNISON	3001503698	7	24.0S	29E	2310	S	2310	E	32.231364	-104.022679	Plugged
	GIANT OPERATING LLC	3001503699	7	24.0S	29E	2310	N	2310	E	32.233286	-104.02268	Plugged
	GIANT OPERATING LLC	3001503701	7	24.0S	29E	2310	N	2310	W	32.233297	-104.024772	Active
	GIANT OPERATING LLC	3001503702	7	24.0S	29E	990	S	330	W	32.227757	-104.031194	Active
	TENNECO OIL CO	3001503703	7	24.0S	29E	330	N	2310	E	32.238729	-104.022684	Plugged
	ANTWEIL MORRIS	3001503704	7	24.0S	29E	1650	S	330	W	32.229572	-104.031198	Plugged
	ANTWEIL MORRIS	3001503707	18	24.0S	29E	370	N	330	W	32.224019	-104.031187	Plugged
	PHILLIPS PETROLEUM CO	3001521030	2	24.0S	28E	1980	S	660	W	32.245274	-104.064674	Plugged
	COG OPERATING LLC	3001521786	11	24.0S	28E	1780	S	660	W	32.230284	-104.064806	Active
	BRECK OPERATING CORP	3001522853	3	24.0S	28E	1980	N	1980	E	32.248856	-104.073179	Active
	MATADOR PRODUCTION COMPANY	3001523099	10	24.0S	28E	660	N	2310	E	32.23809	-104.074447	Plugged
	MATADOR PRODUCTION COMPANY	3001523299	10	24.0S	28E	2080	S	1773	E	32.231166	-104.072712	Active
	MATADOR PRODUCTION COMPANY	3001523752	14	24.0S	28E	660	N	1980	W	32.223477	-104.06055	Active
	TEXACO EXPLORATION & PRODUCTION INC	3001523757	6	24.0S	29E	1980	N	1880	W	32.248842	-104.026201	Plugged
	HARVEY E YATES CO	3001523779	1	24.0S	28E	660	S	1980	W	32.241491	-104.043114	Plugged
	DINERO OPERATING CO	3001523797	10	24.0S	28E	660	N	1980	W	32.238104	-104.07772	Plugged
	DINERO OPERATING CO	3001523839	12	24.0S	28E	1980	S	630	W	32.23048	-104.047468	Plugged
	COG OPERATING LLC	3001523850	11	24.0S	28E	2310	S	1980	E	32.231537	-104.055955	Active
	COG OPERATING LLC	3001524300	12	24.0S	28E	1830	N	2140	W	32.234647	-104.042581	Active
	BETTIS BOYAL & STOVALL	3001524433	12	24.0S	28E	467	S	467	W	32.226321	-104.047977	Plugged
	DEVON ENERGY PRODUCTION COMPANY, LP	3001524945	12	24.0S	28E	660	S	990	W	32.226851	-104.04628	Plugged
	EASTLAND OIL CO	3001525320	7	24.0S	29E	990	N	990	E	32.236892	-104.018393	Plugged
	KAISER-FRANCIS OIL CO	3001525658	7	24.0S	29E	660	S	2310	E	32.226828	-104.022677	Active
	DEVON ENERGY PRODUCTION COMPANY, LP	3001526249	1	24.0S	28E	990	S	2310	W	32.2424	-104.042036	Plugged
	KAISER-FRANCIS OIL CO	3001526279	2	24.0S	28E	2130	S	1650	E	32.245583	-104.054888	Active
	D S HARROUN	3001526707	7	24.0S	29E	787	S	2530	E	32.227179	-104.023392	Plugged
	MEWBOURNE OIL CO	3001526865	7	24.0S	29E	534	N	1414	W	32.238195	-104.027694	Active
	DOMINION OKLAHOMA TEXAS EXPL. & PROD INC	3001527045	7	24.0S	29E	550	N	990	W	32.238158	-104.029072	Plugged
	MEWBOURNE OIL CO	3001529229	7	24.0S	29E	660	N	1650	E	32.237811	-104.020538	Active
	COG OPERATING LLC	3001537148	6	24.0S	29E	330	S	2260	W	32.240394	-104.024907	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001542660	10	24.0S	28E	1733	N	204	E	32.234797	-104.06756	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543171	12	24.0S	28E	215	S	550	W	32.225466	-104.047848	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543172	12	24.0S	28E	215	S	620	W	32.225465	-104.04762	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543419	12	24.0S	28E	470	S	285	W	32.226168	-104.048699	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543463	14	24.0S	28E	378	N	300	E	32.223855	-104.05059	New (Not drilled or compl)
001	MATADOR PRODUCTION COMPANY	3001543654	18	24.0S	29E	716	N	380	W	32.222881	-104.031197	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543693	10	24.0S	28E	1753	N	205	E	32.234742	-104.067564	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543756	14	24.0S	28E	379	N	330	E	32.223854	-104.050687	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543820	1	24.0S	28E	661	S	661	E	32.241324	-104.034392	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543821	1	24.0S	28E	691	S	661	E	32.241406	-104.034391	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543822	1	24.0S	28E	631	S	662	E	32.241241	-104.034396	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543823	1	24.0S	28E	721	S	661	E	32.241489	-104.03439	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543824	1	24.0S	28E	601	S	662	E	32.241159	-104.034397	New (Not drilled or compl)

MEWBOURNE OIL CO	3001543845	12 24.0S	28E	270 S	200 W	32.225619	-104.048983	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543846	12 24.0S	28E	250 S	200 W	32.225564	-104.048984	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543870	14 24.0S	28E	410 N	330 E	32.223768	-104.050686	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543940	11 24.0S	28E	933 N	254 W	32.23699	-104.066052	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543966	11 24.0S	28E	934 N	224 W	32.236988	-104.06615	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543993	11 24.0S	28E	963 N	255 W	32.236908	-104.06605	New (Not drilled or compl)
MEWBOURNE OIL CO	3001544048	12 24.0S	28E	185 N	950 E	32.239	-104.035363	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544162	14 24.0S	28E	429 N	330 E	32.223716	-104.050685	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544163	14 24.0S	28E	428 N	300 E	32.223717	-104.050587	New (Not drilled or compl)
ALPHA SWD OPERATING LLC	3001544237	10 24.0S	28E	1457 S	2093 E	32.229147	-104.07375	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544241	18 24.0S	29E	712 N	352 W	32.222892	-104.031288	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544242	18 24.0S	29E	742 N	321 W	32.222809	-104.031387	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544244	18 24.0S	29E	712 N	321 W	32.222892	-104.031389	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544245	18 24.0S	29E	742 N	290 W	32.222809	-104.031488	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544247	18 24.0S	29E	742 N	351 W	32.222809	-104.03129	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544514	11 24.0S	28E	1489 N	490 W	32.235461	-104.065299	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544533	11 24.0S	28E	934 N	194 W	32.236988	-104.066247	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544571	12 24.0S	28E	1779 S	975 W	32.229762	-104.046408	New (Not drilled or compl)

PIPELINE PLAT
COG OPERATING, LLC.

A PROPOSED PIPELINE FROM THE HOWITZER FEDERAL COM #602H & #603H
TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

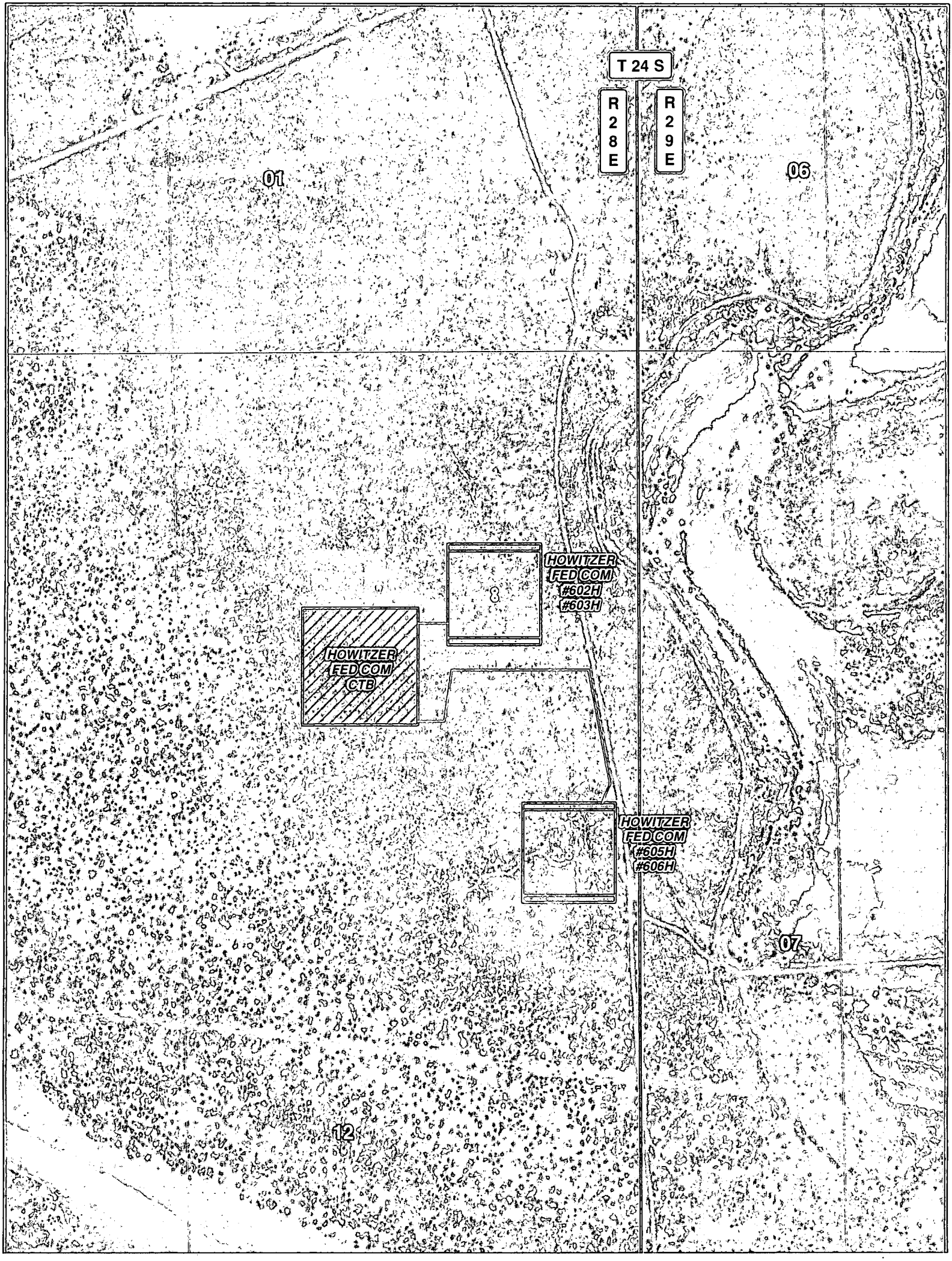
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

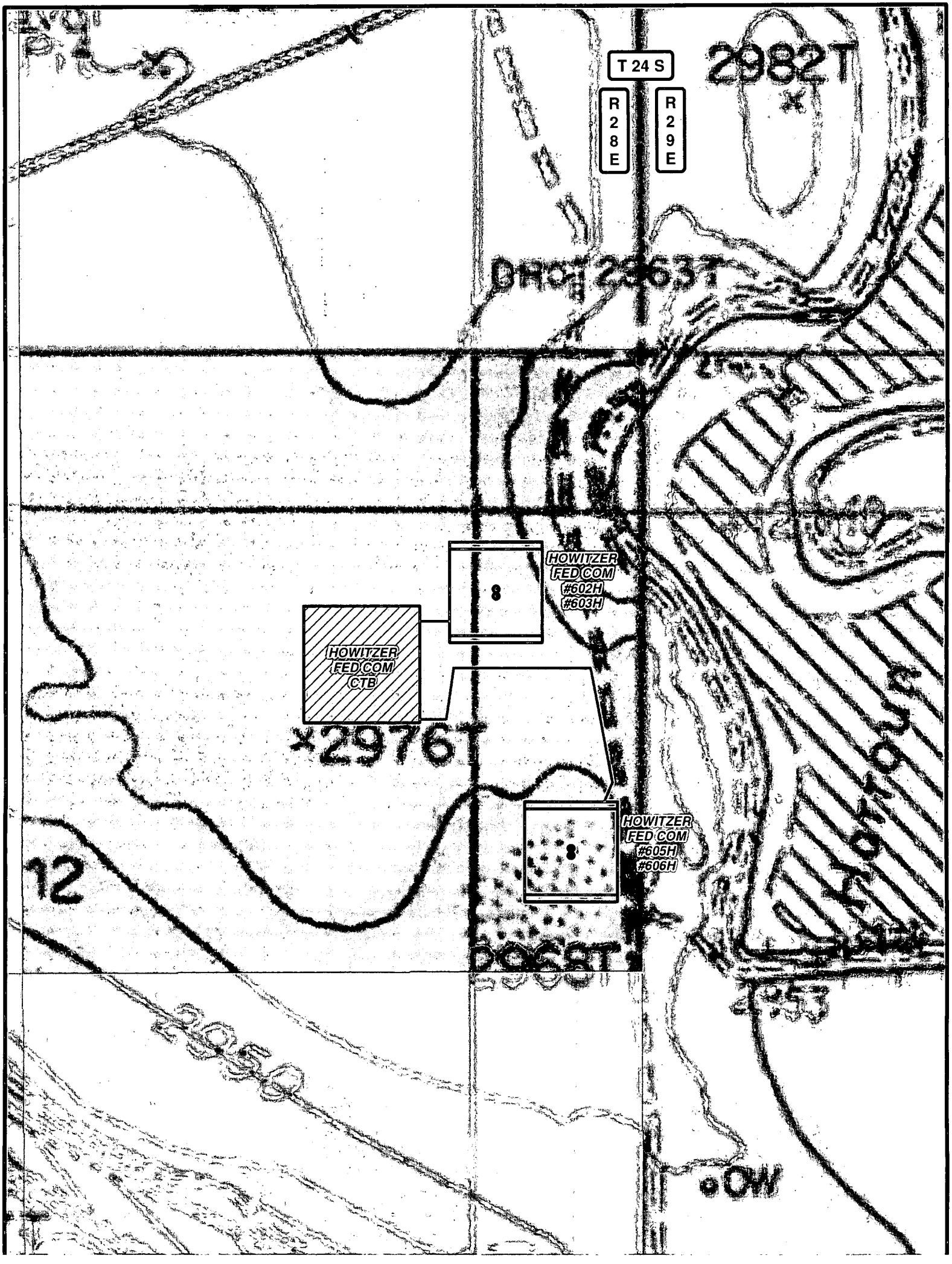
BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S35°09'53"W 1413.88 FEET FROM THE NORTHEAST CORNER; THEN S89°57'47"W 129.1 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES N32°22'31"W 1787.87 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 129.1 FEET OR 7.82 RODS IN LENGTH, CONTAINING 0.089 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC


T 24 S
R 28 E
R 29 E
01
06
07
12
8
HOWITZER FED COM #602H #603H
HOWITZER FED COM CTB
HOWITZER FED COM #605H #606H

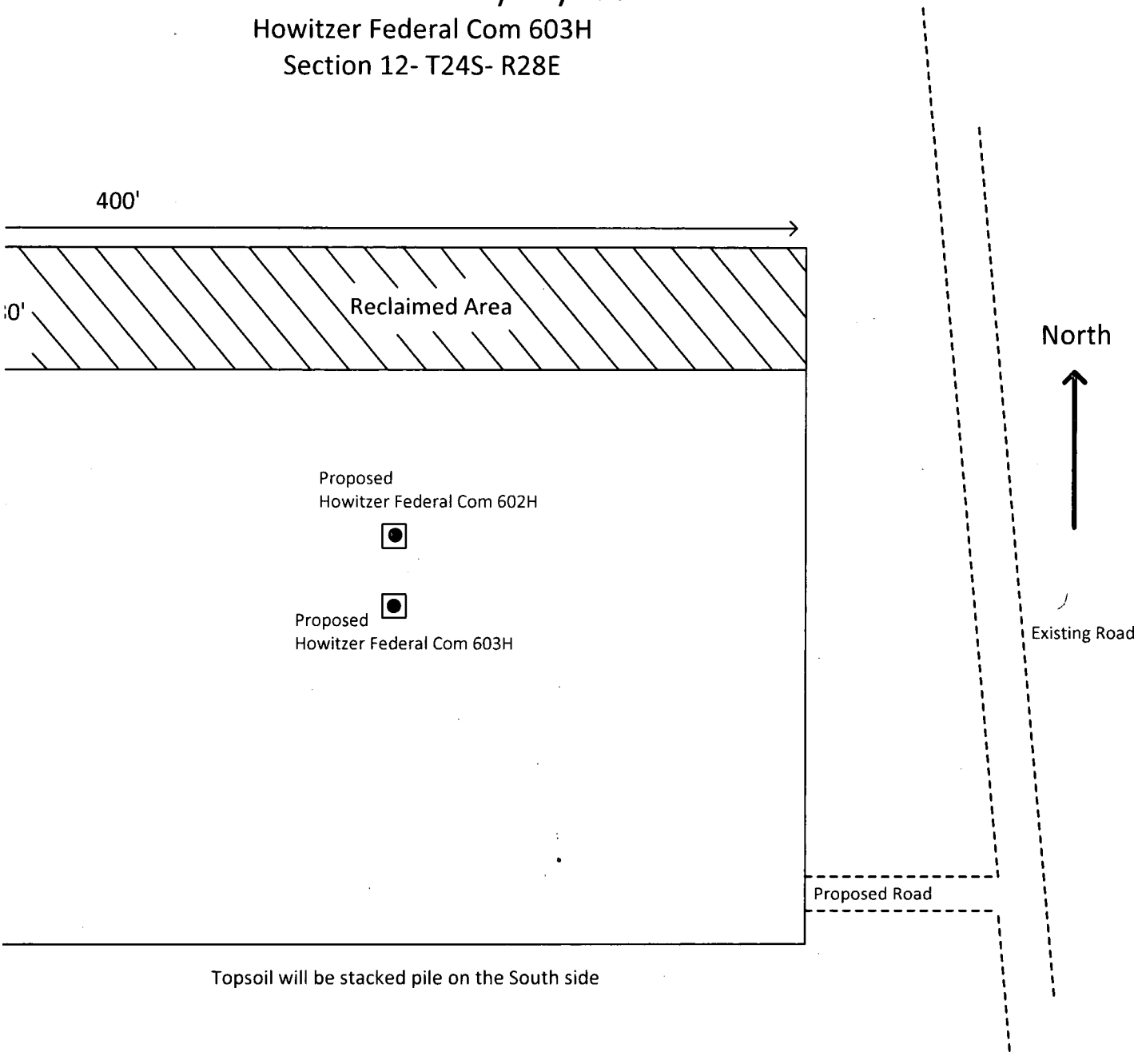

T 24 S
R 28 E
R 29 E
2982T
DRY 2963T
HOWITZER FED COM #602H #603H
8
HOWITZER FED COM CTB
X2976T
HOWITZER FED COM #605H #606H
8
12
DRY 2968T
DRY

Well Site Layout

Production Facility Layout

Howitzer Federal Com 603H
Section 12- T24S- R28E

Exhibit 3



Topsoil will be stacked pile on the South side

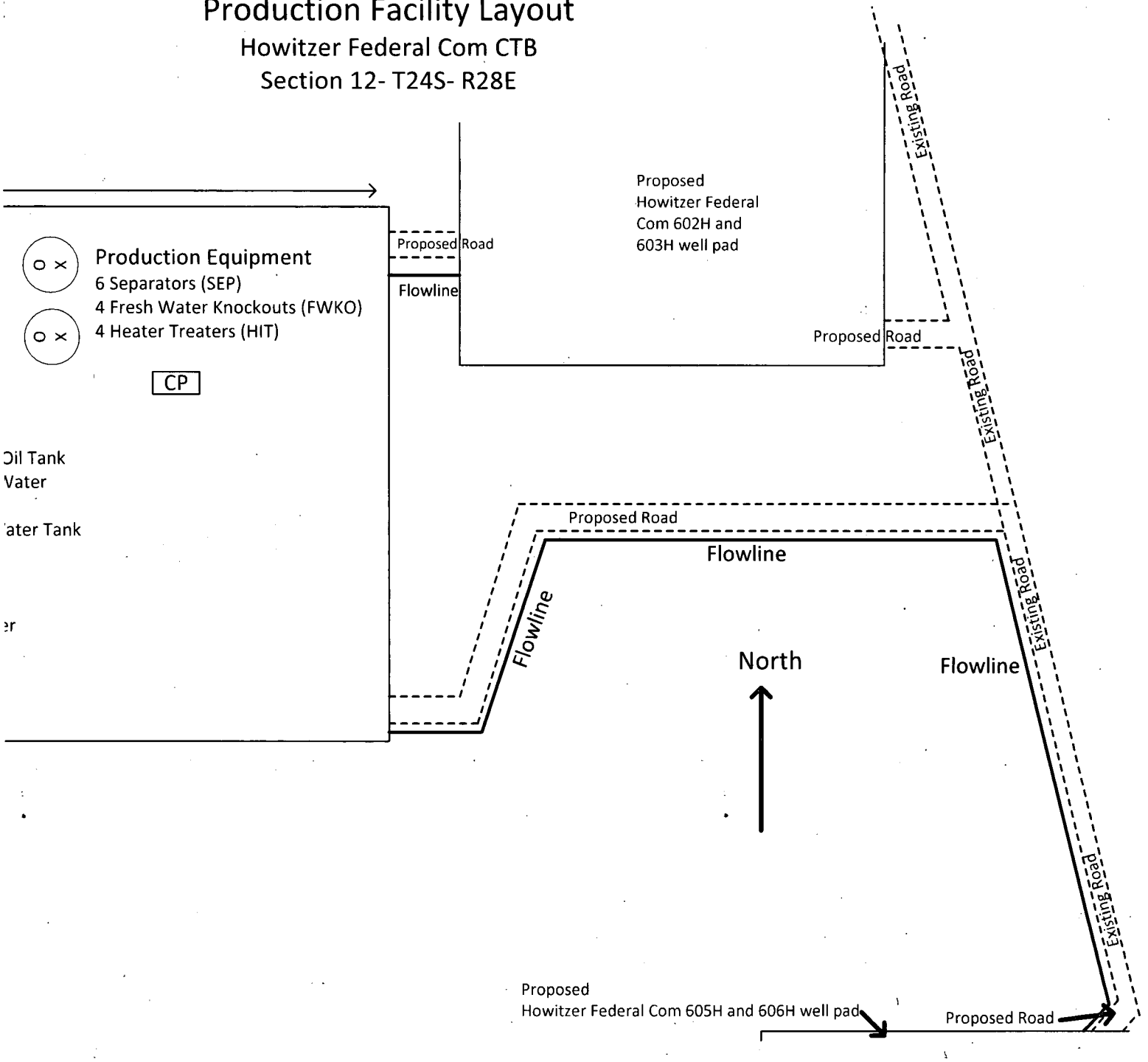
Well Site Layout

Production Facility Layout

Howitzer Federal Com CTB

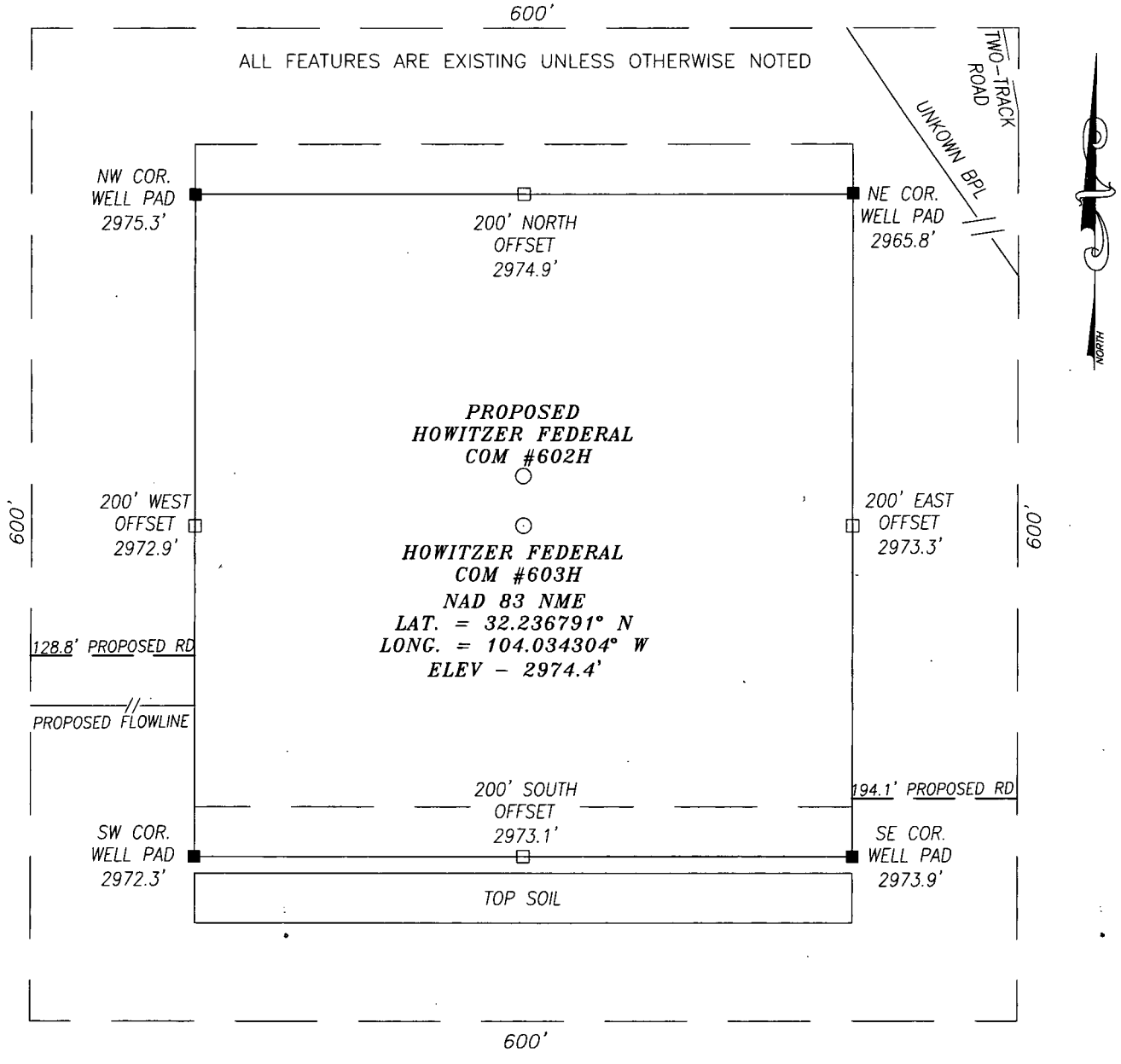
Section 12- T24S- R28E

Exhibit 3



SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOUTHERLY) ON CALICHE RD. FOR APPROX. 0.15 MI.. TO A PROPOSED ROAD; THE PROPOSED WELL LIES APPROX. 0.4 MI. TO THE SOUTH.

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

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 11/6/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

COG OPERATING, LLC

HOWITZER FEDERAL COM #603H WELL LOCATED 1044 FEET FROM THE NORTH LINE AND 620 FEET FROM THE EAST LINE OF SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 20, 2018		PAGE: 1 OF 1
DRAFTING DATE: NOVEMBER 6, 2018		
APPROVED BY: CH	DRAWN BY: AF	FILE: 18-1466

CONCHO

Howitzer Fed Com #603H
To Malaga I Brine

Date: 11/6/2018
Author: Whytnie McDonald
State: New Mexico
County: Eddy

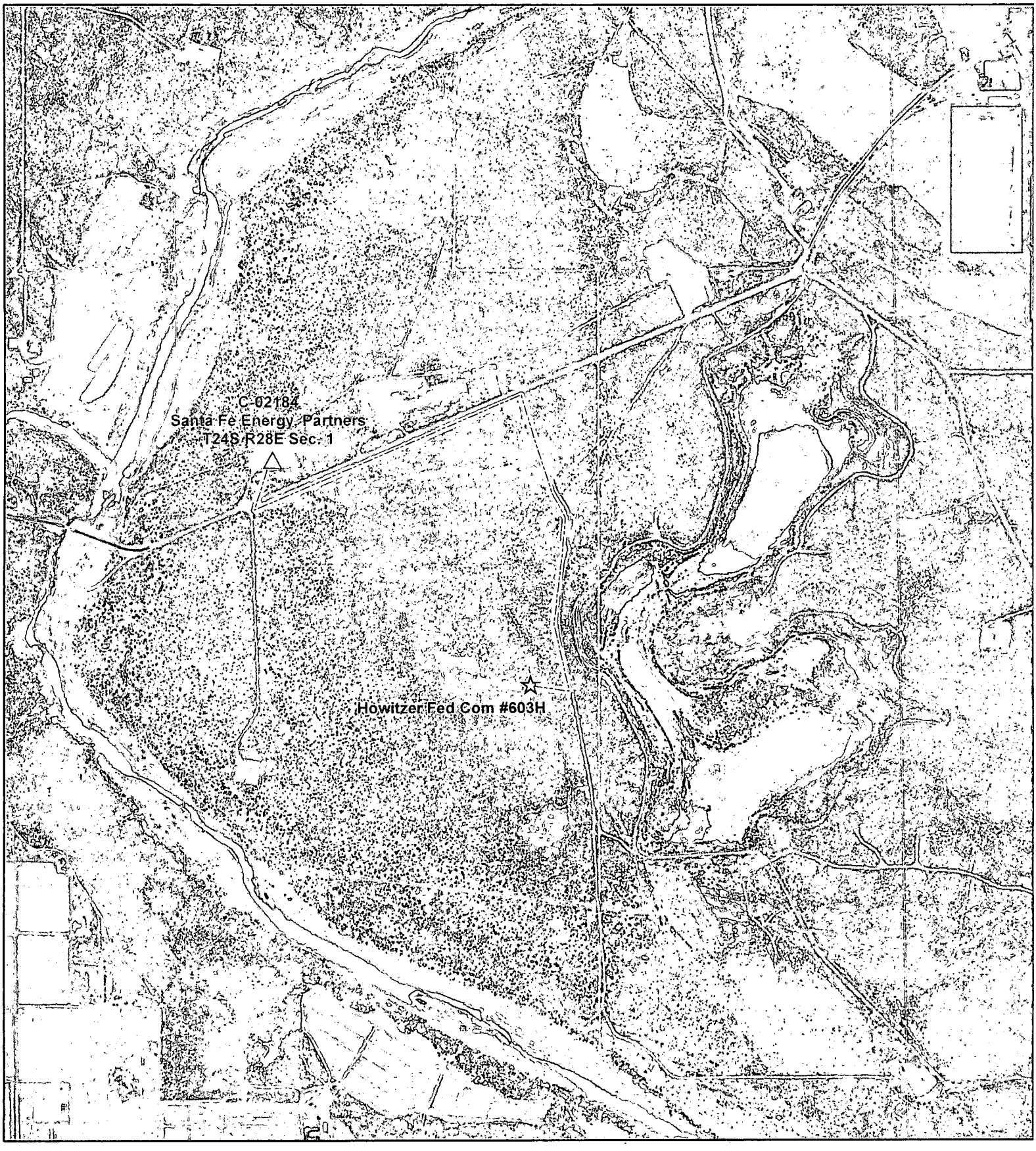
Disclaimer: This is not a legal survey document

Map Legend

Route

N
W E
S

0 0.2 0.4 0.8 1.2 1.6
Miles



CONCHO

Howitzer Fed Com #603H
Water Transfer Route

Date: 11/6/2018
Author: Whytnie McDonald
State: New Mexico
County: Eddy

Disclaimer: This is not a legal survey document

Map Legend

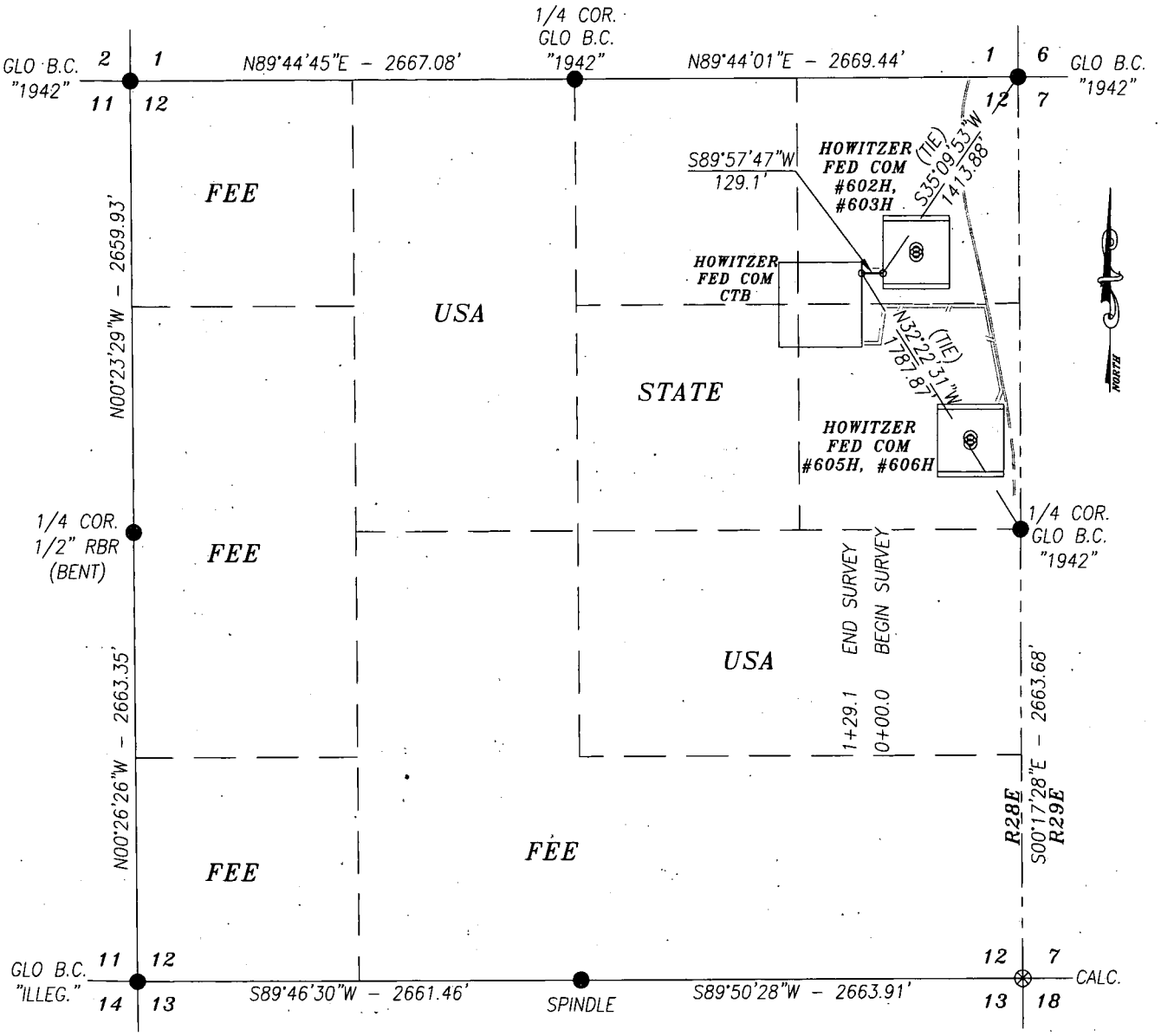
Route

N
W E
S

0 0.075 0.15 0.3 0.45 0.6
Miles

PIPELINE PLAT
COG OPERATING, LLC.

A PROPOSED PIPELINE FROM THE HOWITZER FEDERAL COM #602H & #603H
TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



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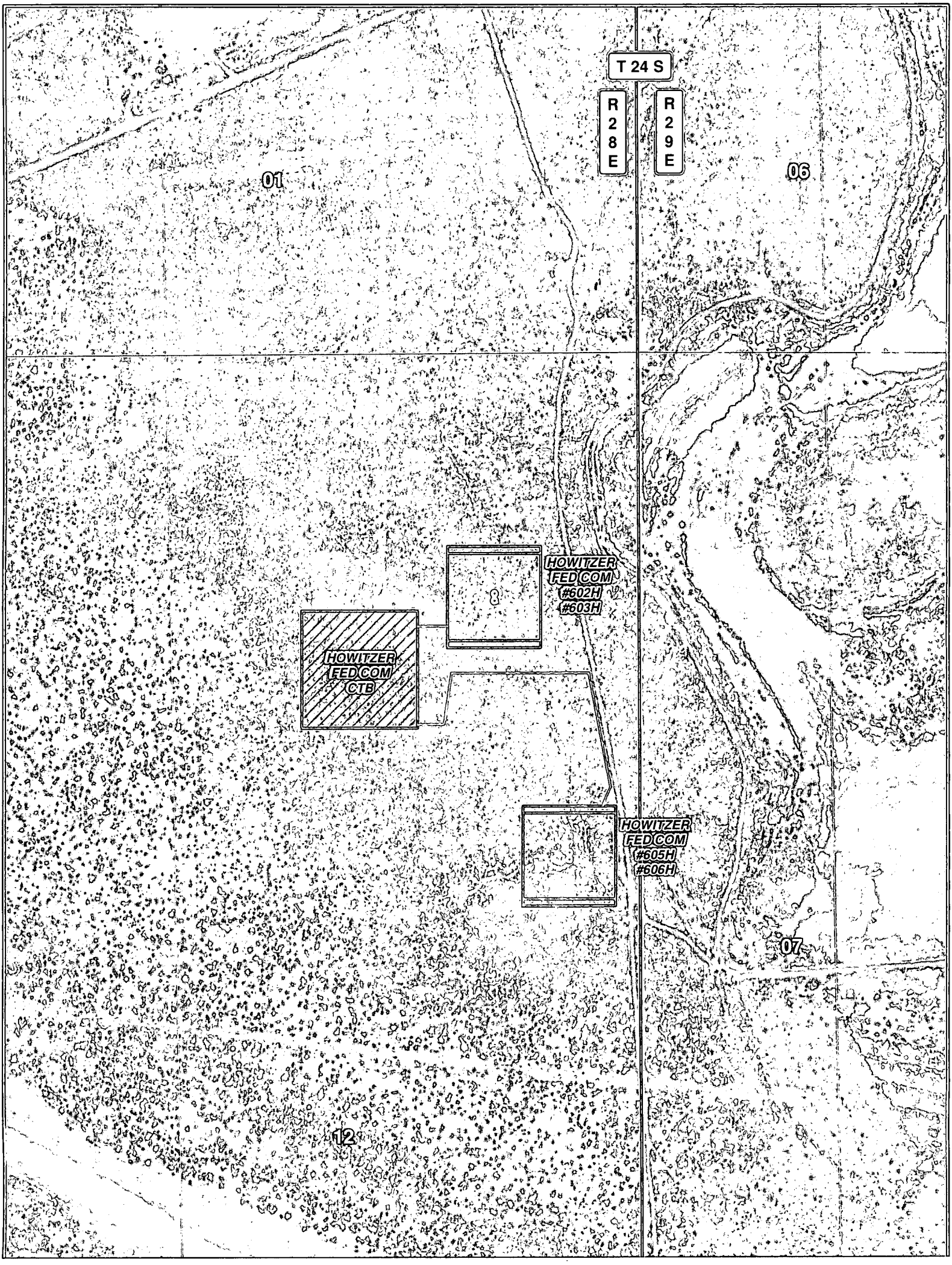
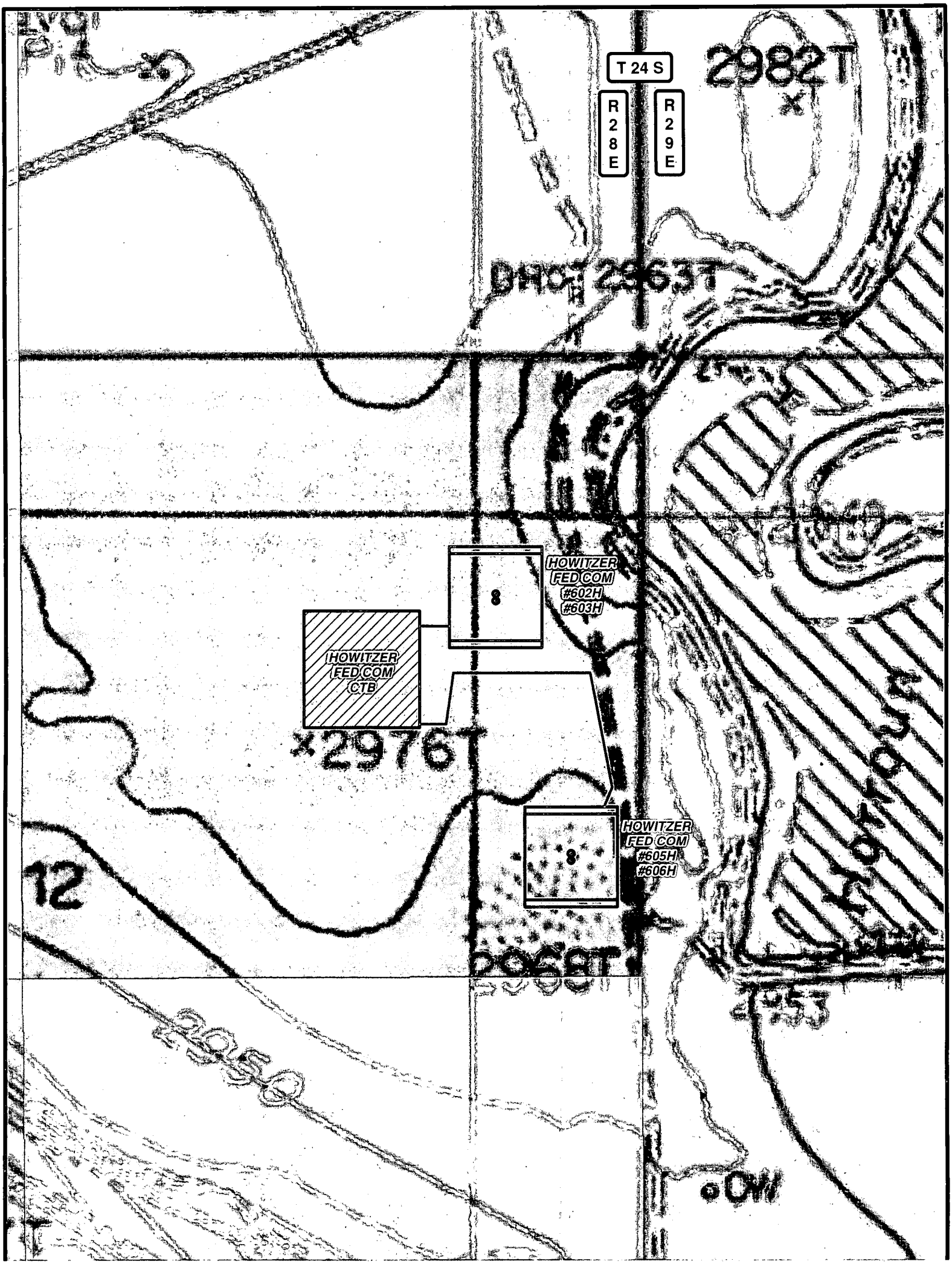
HARCROW SURVEYING, LLC


T 24 S
R 28 E
R 29 E
01
06
07
12
HOWITZER FED COM #602H #603H
HOWITZER FED COM CTB
HOWITZER FED COM #605H #606H


T 24 S
R 28 E
R 29 E
2982T
DHC 2963T
HOWITZER FED COM #602H #603H
HOWITZER FED COM CTB
2976T
HOWITZER FED COM #605H #606H
12
2965
2953
OM

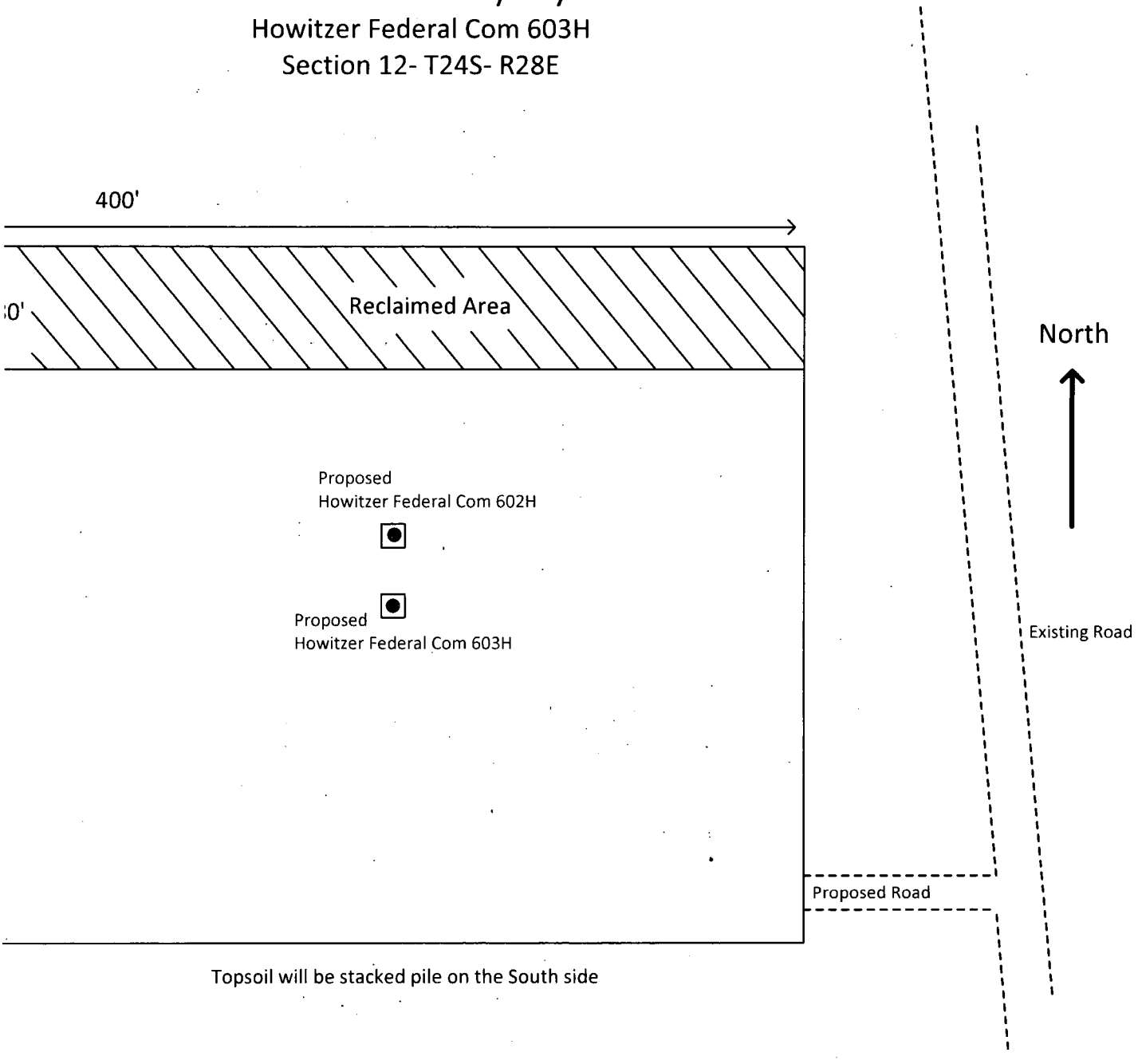
Well Site Layout

Production Facility Layout

Howitzer Federal Com 603H

Section 12- T24S- R28E

Exhibit 3



Topsoil will be stacked pile on the South side

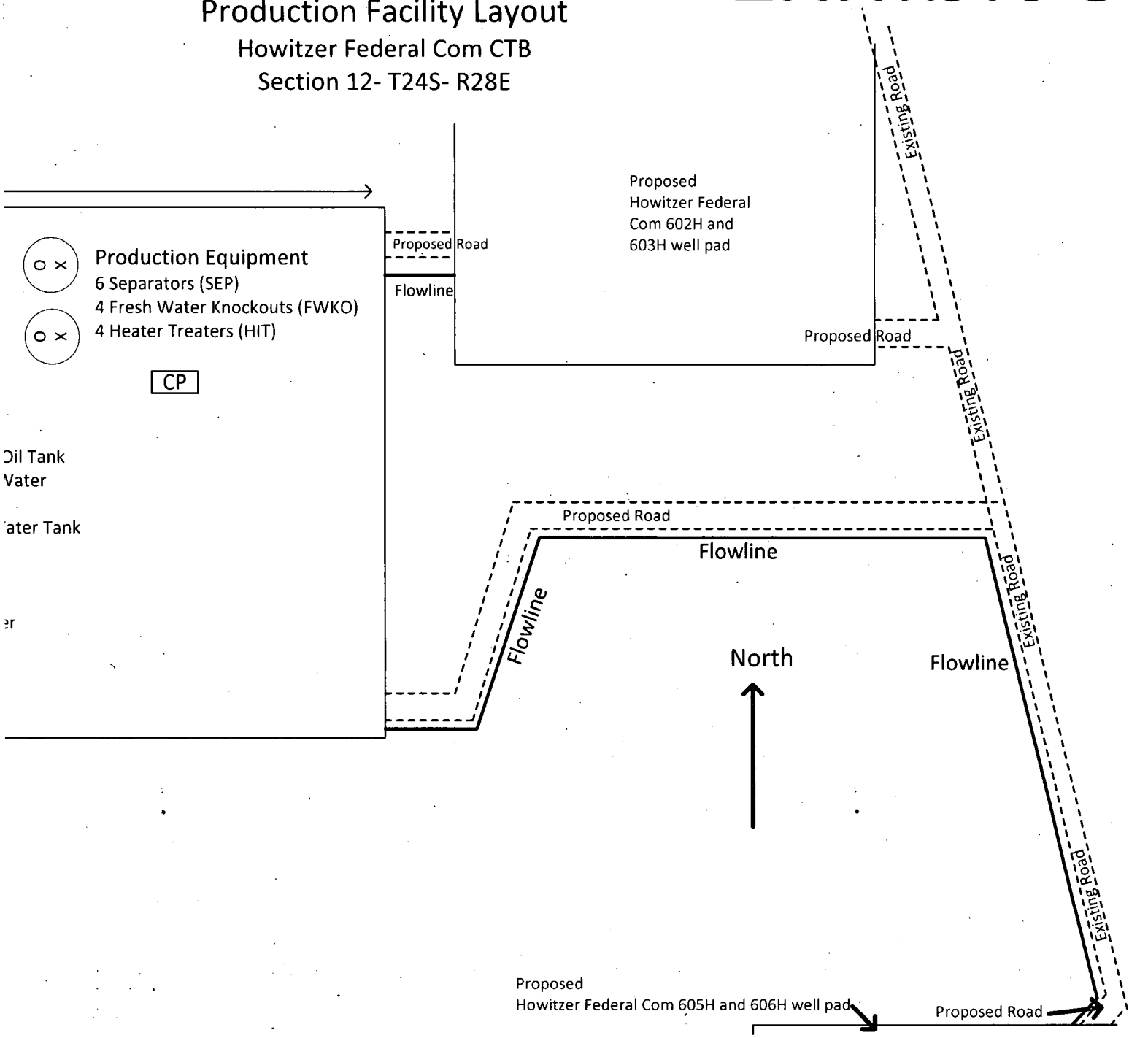
Well Site Layout

Production Facility Layout

Howitzer Federal Com CTB

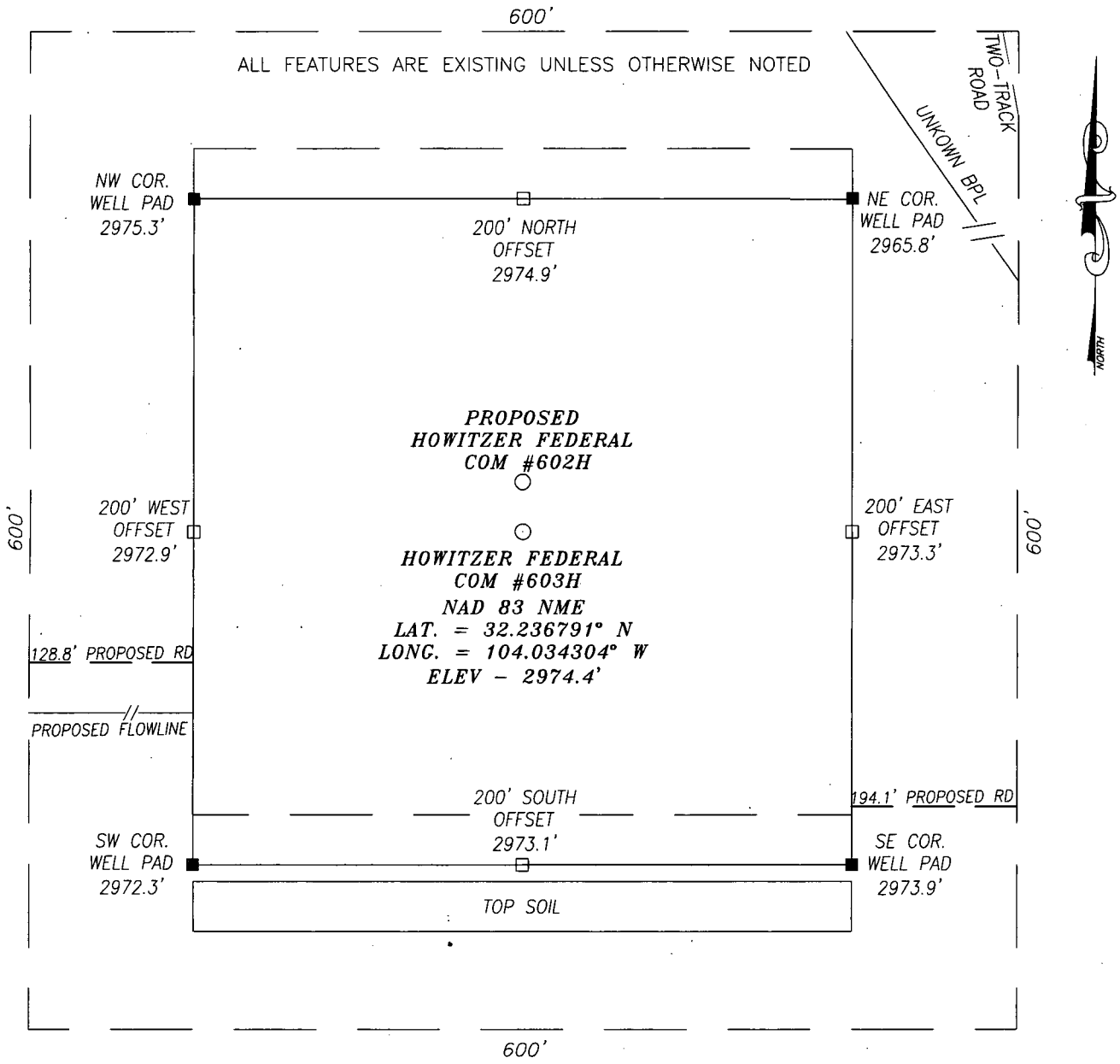
Section 12- T24S- R28E

Exhibit 3



SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



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100 0 100 200 Feet
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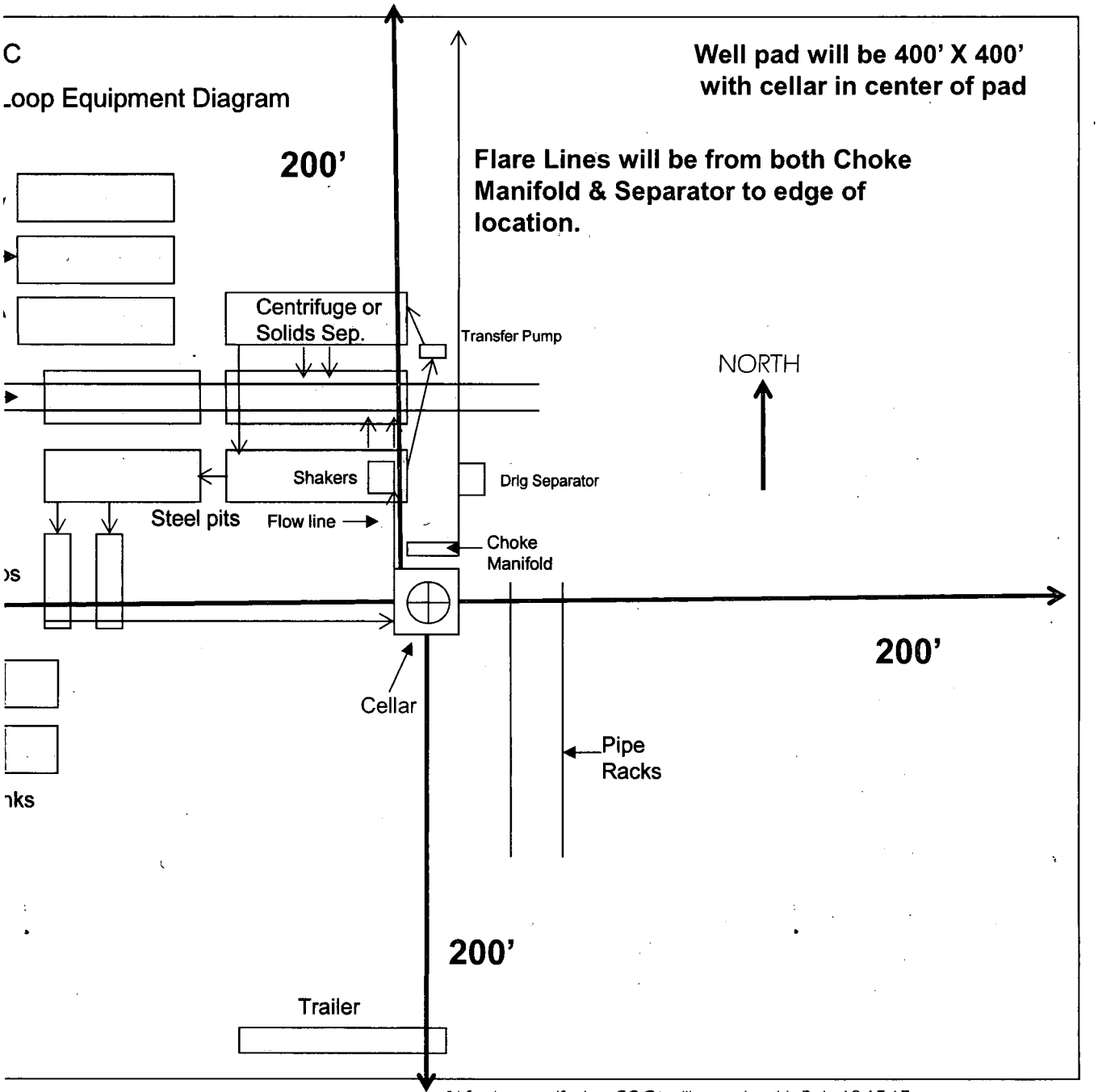
CHAD HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 11/6/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

COG OPERATING, LLC

HOWITZER FEDERAL COM #603H WELL LOCATED 1044 FEET FROM THE NORTH LINE AND 620 FEET FROM THE EAST LINE OF SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 20, 2018		PAGE: 1 OF 1
DRAFTING DATE: NOVEMBER 6, 2018		
APPROVED BY: CH	DRAWN BY: AF	FILE: 18-1466



"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 November, 2018.

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): Gerald Herrera
Telephone: (432) 260-7399. E-mail: gherrera@concho.com

Surface Use & Operating Plan

Howitzer Federal Com #603H

- Surface Owner: COG Operating LLC,
- New Road: 322.9'
- Flow Line: Will follow road to proposed Howitzer Federal Com Central Tank Battery facility located in Section 12. T24S. R28E.
- Tank Battery Facilities: Will utilize facilities at the Howitzer Federal Com Central Tank Battery
- Well Pad: Multiple. Howitzer Federal Com 602H and 603H share a pad

Well Site Information

- V Door: East
- Topsoil: South
- Interim Reclamation: North

Attachments

- C102
- Closed Loop System
- CTB Layout
- Flowlines
- Production Facility Layout
- Brine H20
- Existing Roads
- Fresh H20

- 1Mile Map and Data
- Maps and Plats
- Well Site Layout

Notes

Onsite: On-site was done by Rand French (COG); Jeffery Robertson (BLM); on August 27th, 2018.

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.

B. All roads to the location are shown on the maps and road plats. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in well layout map. The road shown in the well layout will be used to access the well.

C. Directions to location: See 600 x 600 plat

D. Based on current road maintenance performed on other roads serving existing wells, we anticipate maintaining the lease roads leading to the proposed well pad at least once a year on dry conditions and twice a year in wetter conditions.

2. Proposed Access Road:

The Location Verification Map shows that 322.9' of new road will be required for this location. If any road is required it will be constructed as follows:

The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

A. The average grade will be less than 1%.

B. No turnouts are planned.

C. No cattleguard, culvert, gates, low water crossings or fence cuts are necessary.

D. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from Oscar Vasquez Johnson caliche pit located in Section 1, T24S, R28E. (575) 361-3784.

3. Location of Existing Well:

The One-Mile Radius Map shows existing wells within a one-mile radius of the proposed wellbore.

4. Location of Existing and/or Proposed Facilities:

A. COG Operating LLC does not operate an oil production facility on this lease.

1) A Central Tank Battery and production facilities are proposed in Section 12. T24S. R28E. Production will be sent to the proposed Howitzer Federal Com Central Tank Battery facility. A buried flow line of approximately 129.1' of 3.5" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Howitzer Federal Com Central Tank Battery location. We plan to install a 2" buried steel pipe transporting Gas Lift Gas from the Howitzer Federal Com Central Tank Battery to the dual well pad that includes the Howitzer Federal Com 602H and 603H wells. The buried Gas Lift Gas pipe of approximately 129.1' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road.

2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.

3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from Oscar Vasquez Johnson caliche pit located in Section 1, T24S, R28E. (575) 361-3784. Any additional construction materials will be purchased from contractors.

4) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.

5) If the well is productive, rehabilitation plans will include the following:

- The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

5. Location and Type of Water Supply:

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. Fresh water will be obtained from Santa Fe Energy, Partners water well located in Section 24. T24S. R28E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E., or if necessary commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in road maps. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

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

Obtaining caliche: One primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well site. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

B. An approximate 160' X 160' area is used within the proposed well site to remove caliche.

C. Subsoil is removed and stockpiled within the surveyed well pad.

D. When caliche is found, material will be stock piled within the pad site to build the location and road.

E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.

F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced.

G. Neither caliche, nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in the Well Site Layout or survey plat.

In the event that no caliche is found onsite, the caliche will be hauled from Oscar Vasquez Johnson caliche pit located in Section 1, T24S, R28E. (575) 361-3784.

7. Methods of Handling Water Disposal:

A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to R360's disposal site.

B. Drilling fluids will be contained in steel mud pits.

C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility..

D. It is anticipated that the disposal of produced water will be trucked to the Willow 17 State SWD #1 Section 17, T25S, R28E., or Apple 5 State SWD #1 Section 5, T26S, R28E.

E. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.

F. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).

G. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

8. Ancillary Facilities:

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

9. Well Site Layout:

A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.

B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

10. Plans for Restoration of the Surface:

A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

11. Sedimentation and Erosion Control

Immediately following construction approximately 400' of straw waddles will be placed on the north side and east side of the location, to reduce sediment impacts to fragile/sensitive soils.

B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recountoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be re-seeded with a BLM approved mixture and re-vegetated as per BLM orders. When required by BLM, the well pad site will be restored to match pre-construction grades.

12. Surface Ownership:

A. The surface is owned by the State of New Mexico. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas. The surface owner was notified before staking this well.

B. The proposed road routes and surface location will be restored as directed by the BLM.

13. Other Information:

A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.

B. There is no permanent or live water in the immediate area.

C. There are no dwellings within 2 miles of this location.

D. If needed, a Cultural Resources Examination is being prepared by Lone Mountain Archaeological Services, Inc., 2625 Pennsylvania NE, Suite 2000, Albuquerque, NM 87110, Office 505-881-0011 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

14. Bond Coverage:

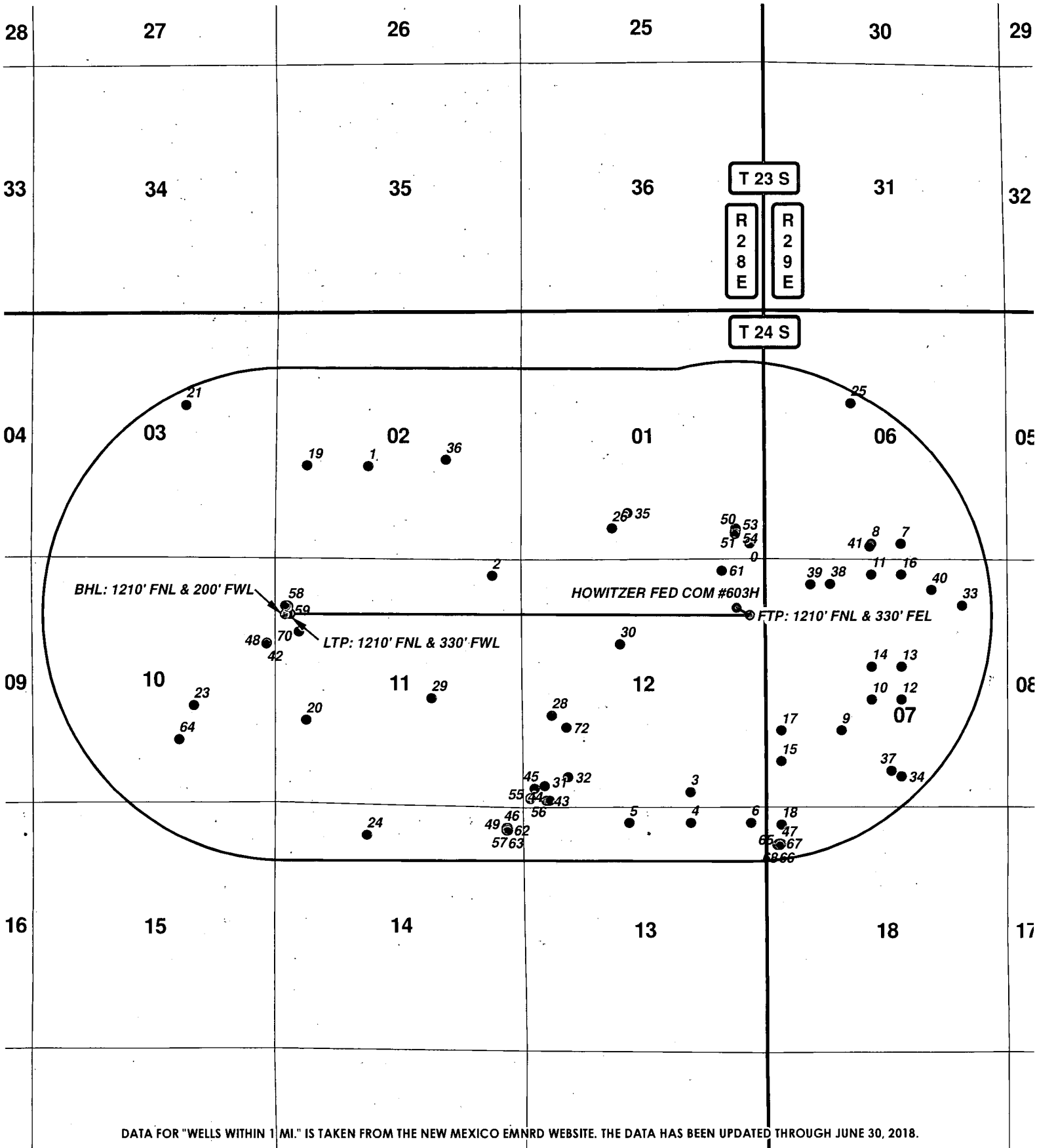
Bond Coverage is Statewide Bonds # NMB000740 and NMB000215

14. Lessee's and Operator's Representative:

The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

Seth Wild
Drilling Superintendent
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
(432) 221-0414 (office)
(432) 525-3633(cell)

Ray Peterson
Drilling Manager
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
Phone (432) 685-4304 (office)
(432) 818-2254 (business)



DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH JUNE 30, 2018.

LEGEND

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

HOWITZER FEDERAL COM #603H			
SEC: 12	TWP: 24 S.	RGE: 28 E.	ELEVATION: 2974.4'
STATE: NEW MEXICO	COUNTY: EDDY		1044' FNL & 620' FEL
W.O. # 18-1406	LEASE: HOWITZER FED COM		SURVEY: N.M.P.M

0 2,500 5,000 7,500 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,750 FT

1 MILE MAP 10/29/2018 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

HOWITZER FEDERAL COM #603H 1 MILE DATA (18-1406)

	OPERATOR	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	LATITUDE	LONGITUDE	COMPL_STAT
	C L HAY	3001502486	1	24.0S	28E	330	S	330	E	32.240593	-104.033367	Plugged
	RICHARDSON & BASS	3001502487	2	24.0S	28E	1980	S	1980	W	32.245228	-104.060384	Plugged
	ALBERT SCHABEL	3001502489	11	24.0S	28E	355	N	645	E	32.238717	-104.051652	Plugged
	SOUTHERN CALIFORNIA PETROLEUM CORP	3001502490	12	24.0S	28E	330	S	1650	E	32.225945	-104.037625	Plugged
	CALVIN F TENNISON	3001502494	13	24.0S	28E	330	N	1650	E	32.224131	-104.03762	Plugged
	DEKALB AGRICULTURAL ASSOCIATION INC	3001502496	13	24.0S	28E	330	N	2310	W	32.22413	-104.041967	Plugged
	AUSTIN GAS PURCHASING	3001502500	13	24.0S	28E	330	N	330	E	32.224131	-104.033331	Plugged
	EL CAPITAN OIL CO	3001503693	6	24.0S	29E	330	S	2310	E	32.240543	-104.022688	Plugged
	TENNESSEE GAS TRANSMISSION	3001503694	6	24.0S	29E	330	S	2310	W	32.240554	-104.024786	Plugged
	GIANT OPERATING LLC	3001503695	7	24.0S	29E	1650	S	1650	W	32.22956	-104.026909	Active
	TENNECO OIL CO	3001503696	7	24.0S	29E	2310	S	2310	W	32.231369	-104.024768	Plugged
	SOUTHERN CALIFORNIA PETROLEUM CORP	3001503697	7	24.0S	29E	330	N	2310	W	32.23874	-104.024783	Plugged
	CALVIN F TENNISON	3001503698	7	24.0S	29E	2310	S	2310	E	32.231364	-104.022679	Plugged
	GIANT OPERATING LLC	3001503699	7	24.0S	29E	2310	N	2310	E	32.233286	-104.02268	Plugged
	GIANT OPERATING LLC	3001503701	7	24.0S	29E	2310	N	2310	W	32.233297	-104.024772	Active
	GIANT OPERATING LLC	3001503702	7	24.0S	29E	990	S	330	W	32.227757	-104.031194	Active
	TENNECO OIL CO	3001503703	7	24.0S	29E	330	N	2310	E	32.238729	-104.022684	Plugged
	ANTWEIL MORRIS	3001503704	7	24.0S	29E	1650	S	330	W	32.229572	-104.031198	Plugged
	ANTWEIL MORRIS	3001503707	18	24.0S	29E	370	N	330	W	32.224019	-104.031187	Plugged
	PHILLIPS PETROLEUM CO	3001521030	2	24.0S	28E	1980	S	660	W	32.245274	-104.064674	Plugged
	COG OPERATING LLC	3001521786	11	24.0S	28E	1780	S	660	W	32.230284	-104.064806	Active
	BRECK OPERATING CORP	3001522853	3	24.0S	28E	1980	N	1980	E	32.248856	-104.073179	Active
	MATADOR PRODUCTION COMPANY	3001523099	10	24.0S	28E	660	N	2310	E	32.23809	-104.074447	Plugged
	MATADOR PRODUCTION COMPANY	3001523299	10	24.0S	28E	2080	S	1773	E	32.231166	-104.072712	Active
	MATADOR PRODUCTION COMPANY	3001523752	14	24.0S	28E	660	N	1980	W	32.223477	-104.06055	Active
	TEXACO EXPLORATION & PRODUCTION INC	3001523757	6	24.0S	29E	1980	N	1880	W	32.248842	-104.026201	Plugged
	HARVEY E YATES CO	3001523779	1	24.0S	28E	660	S	1980	W	32.241491	-104.043114	Plugged
	DINERO OPERATING CO	3001523797	10	24.0S	28E	660	N	1980	W	32.238104	-104.07772	Plugged
	DINERO OPERATING CO	3001523839	12	24.0S	28E	1980	S	630	W	32.23048	-104.047468	Plugged
	COG OPERATING LLC	3001523850	11	24.0S	28E	2310	S	1980	E	32.231537	-104.055955	Active
	COG OPERATING LLC	3001524300	12	24.0S	28E	1830	N	2140	W	32.234647	-104.042581	Active
	BETTIS BOYAL & STOVALL	3001524433	12	24.0S	28E	467	S	467	W	32.226321	-104.047977	Plugged
	DEVON ENERGY PRODUCTION COMPANY, LP	3001524945	12	24.0S	28E	660	S	990	W	32.226851	-104.04628	Plugged
	EASTLAND OIL CO	3001525320	7	24.0S	29E	990	N	990	E	32.236892	-104.018393	Plugged
	KAISER-FRANCIS OIL CO	3001525658	7	24.0S	29E	660	S	2310	E	32.226828	-104.022677	Active
	DEVON ENERGY PRODUCTION COMPANY, LP	3001526249	1	24.0S	28E	990	S	2310	W	32.2424	-104.042036	Plugged
	KAISER-FRANCIS OIL CO	3001526279	2	24.0S	28E	2130	S	1650	E	32.245583	-104.054888	Active
	D S HARROUN	3001526707	7	24.0S	29E	787	S	2530	E	32.227179	-104.023392	Plugged
	MEWBOURNE OIL CO	3001526865	7	24.0S	29E	534	N	1414	W	32.238195	-104.027694	Active
	DOMINION OKLAHOMA TEXAS EXPL. & PROD INC	3001527045	7	24.0S	29E	550	N	990	W	32.238158	-104.029072	Plugged
	MEWBOURNE OIL CO	3001529229	7	24.0S	29E	660	N	1650	E	32.237811	-104.020538	Active
	COG OPERATING LLC	3001537148	6	24.0S	29E	330	S	2260	W	32.240394	-104.024907	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001542660	10	24.0S	28E	1733	N	204	E	32.234797	-104.06756	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543171	12	24.0S	28E	215	S	550	W	32.225466	-104.047848	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543172	12	24.0S	28E	215	S	620	W	32.225465	-104.04762	New (Not drilled or compl)
	MEWBOURNE OIL CO	3001543419	12	24.0S	28E	470	S	285	W	32.226168	-104.048699	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543463	14	24.0S	28E	378	N	300	E	32.223855	-104.05059	New (Not drilled or compl)
001	MATADOR PRODUCTION COMPANY	3001543654	18	24.0S	29E	716	N	380	W	32.222881	-104.031197	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543693	10	24.0S	28E	1753	N	205	E	32.234742	-104.067564	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543756	14	24.0S	28E	379	N	330	E	32.223854	-104.050687	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543820	1	24.0S	28E	661	S	661	E	32.241324	-104.034392	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543821	1	24.0S	28E	691	S	661	E	32.241406	-104.034391	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543822	1	24.0S	28E	631	S	662	E	32.241241	-104.034396	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543823	1	24.0S	28E	721	S	661	E	32.241489	-104.03439	New (Not drilled or compl)
	MATADOR PRODUCTION COMPANY	3001543824	1	24.0S	28E	601	S	662	E	32.241159	-104.034397	New (Not drilled or compl)

MEWBOURNE OIL CO	3001543845	12	24.0S	28E	270 S	200 W	32.225619	-104.048983	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543846	12	24.0S	28E	250 S	200 W	32.225564	-104.048984	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543870	14	24.0S	28E	410 N	330 E	32.223768	-104.050686	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543940	11	24.0S	28E	933 N	254 W	32.23699	-104.066052	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543966	11	24.0S	28E	934 N	224 W	32.236988	-104.06615	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543993	11	24.0S	28E	963 N	255 W	32.236908	-104.06605	New (Not drilled or compl)
MEWBOURNE OIL CO	3001544048	12	24.0S	28E	185 N	950 E	32.239	-104.035363	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544162	14	24.0S	28E	429 N	330 E	32.223716	-104.050685	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544163	14	24.0S	28E	428 N	300 E	32.223717	-104.050587	New (Not drilled or compl)
ALPHA SWD OPERATING LLC	3001544237	10	24.0S	28E	1457 S	2093 E	32.229147	-104.07375	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544241	18	24.0S	29E	712 N	352 W	32.222892	-104.031288	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544242	18	24.0S	29E	742 N	321 W	32.222809	-104.031387	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544244	18	24.0S	29E	712 N	321 W	32.222892	-104.031389	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544245	18	24.0S	29E	742 N	290 W	32.222809	-104.031488	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544247	18	24.0S	29E	742 N	351 W	32.222809	-104.03129	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544514	11	24.0S	28E	1489 N	490 W	32.235461	-104.065299	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544533	11	24.0S	28E	934 N	194 W	32.236988	-104.066247	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544571	12	24.0S	28E	1779 S	975 W	32.229762	-104.046408	New (Not drilled or compl)

CONCHO

Howitzer Fed Com #603H
To Malaga I Brine

Date: 11/6/2018
Author: Whytnie McDonald
State: New Mexico
County: Eddy

Disclaimer: This is not a legal survey document

Map Legend

Route

N
W E
S

0 0.2 0.4 0.8 1.2 1.6
Miles

NM OIL CONSERVATION
ARTESIA DISTRICT
APR 01 2019
RECEIVED

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015	98220	Purple sage; Wolfcamp

Property Code	Property Name	Well Number
	HOWITZER FEDERAL COM	603H
OGRID No.	**Operator Name**	**Elevation**
229137	COG OPERATING, LLC	2974.4'

Surface Location

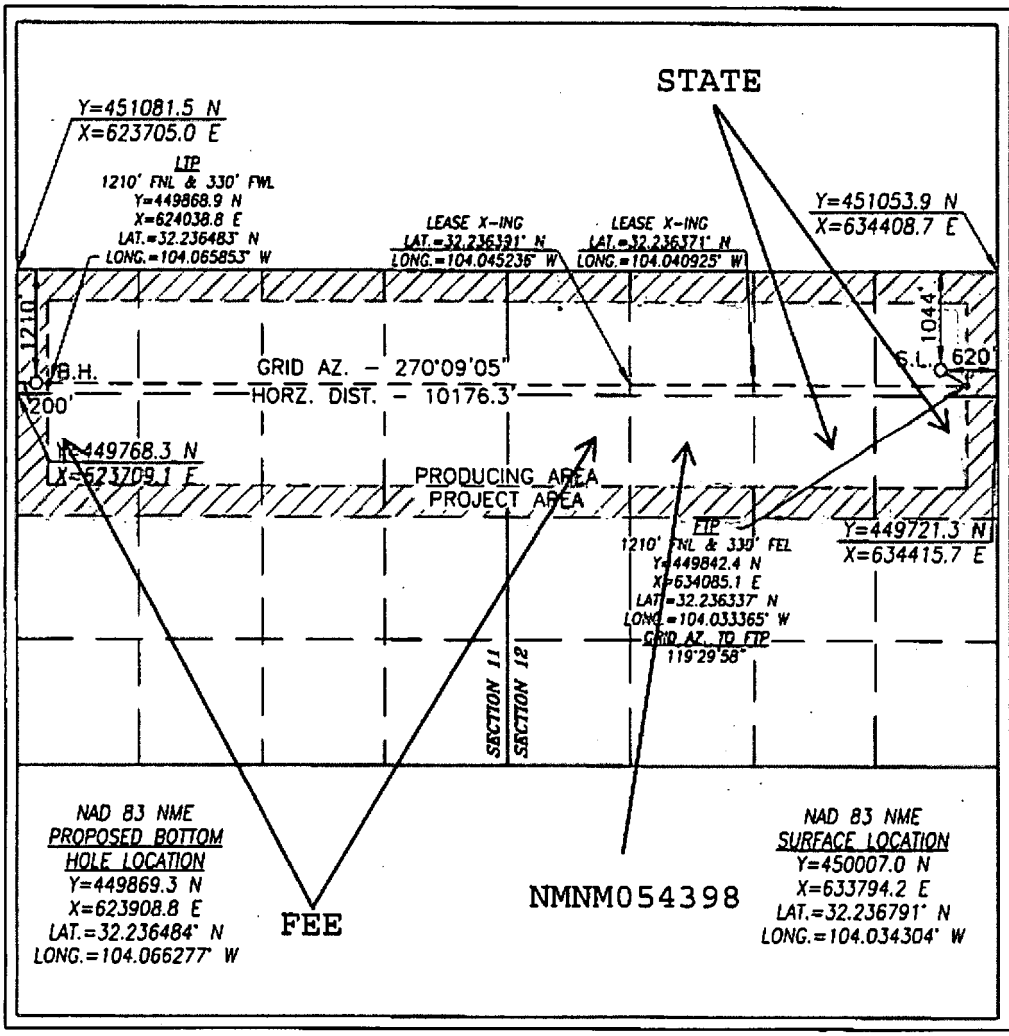
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	12	24-S	28-E		1044	NORTH	620	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	11	24-S	28-E		1210	NORTH	200	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
640			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Mayte Reyes 10/30/18
Signature Date

Mayte Reyes
Printed Name

mreyes1@concho.com
E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

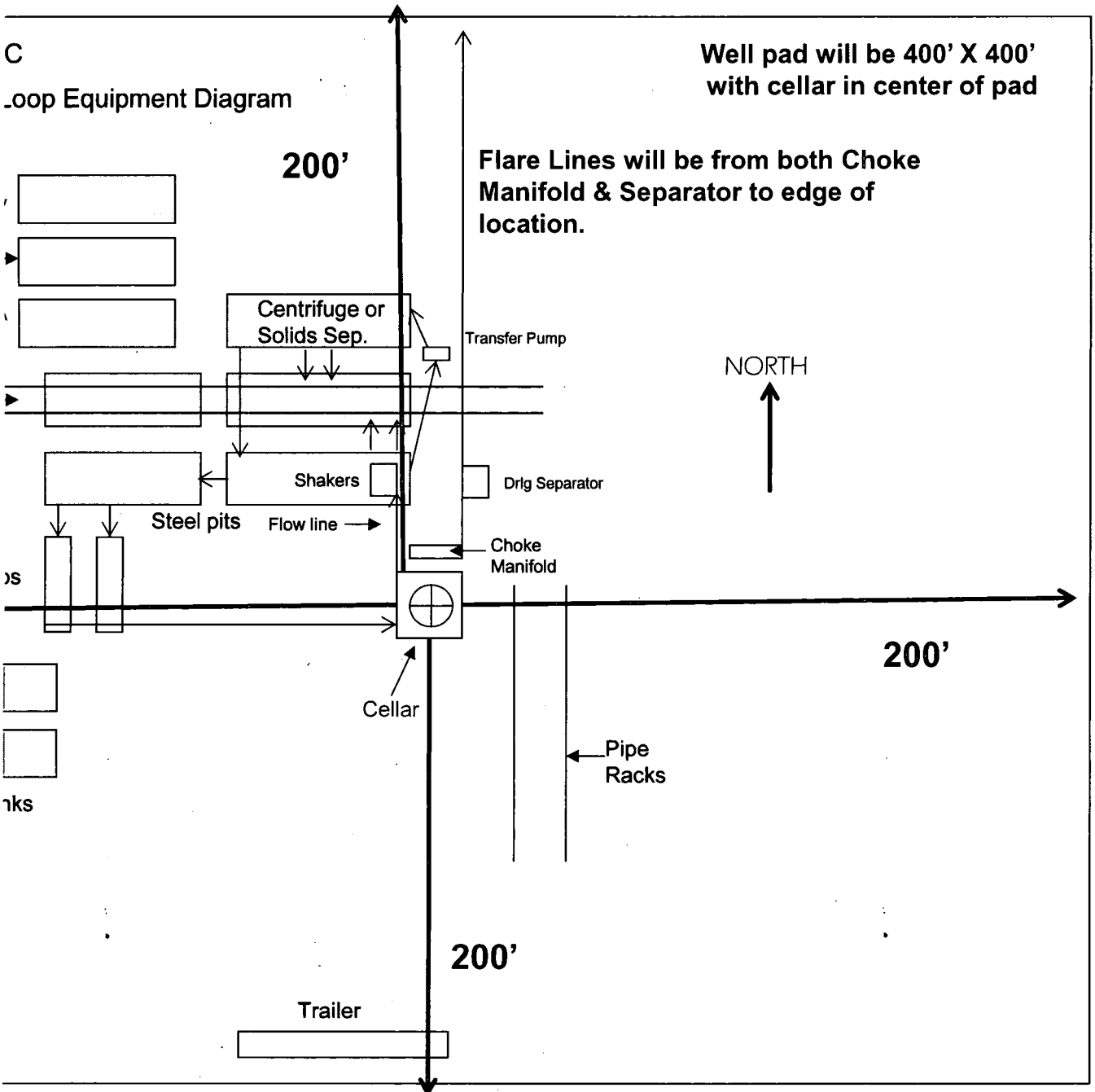
OCTOBER 20, 2018
Date of Survey

Signature & Seal of Professional Surveyor

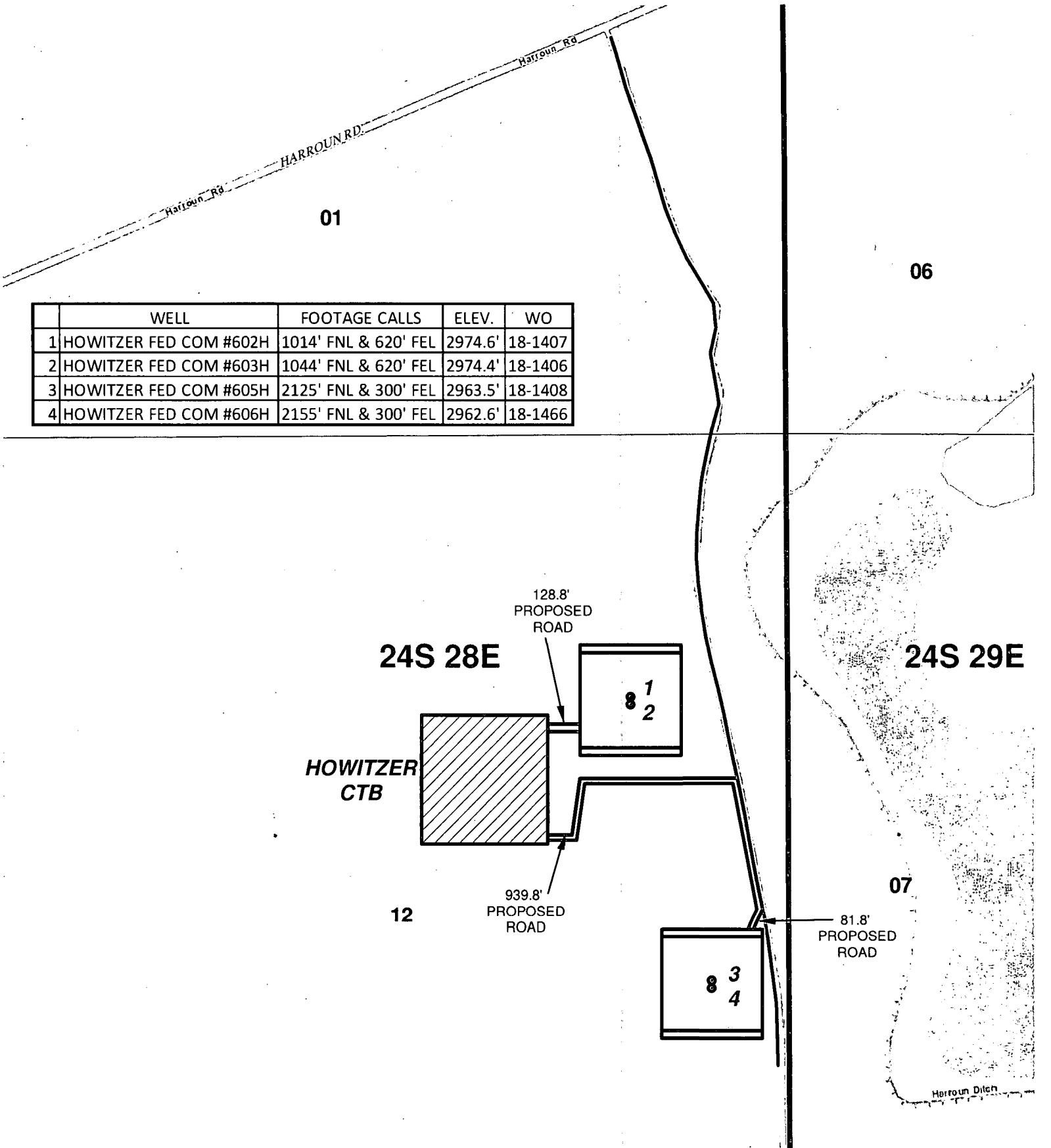
CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 10/30/18
Certificate No. CHAD HARCROW 17777

W.O. # 18-1406 DRAWN BY: AM



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



	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12	TOWNSHIP: 24 S.	RANGE: 28 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1077, 1406-1408, 1466	LEASE: HOWITZER FED COM	

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP VICINITY 11/5/2018 A.M.

N

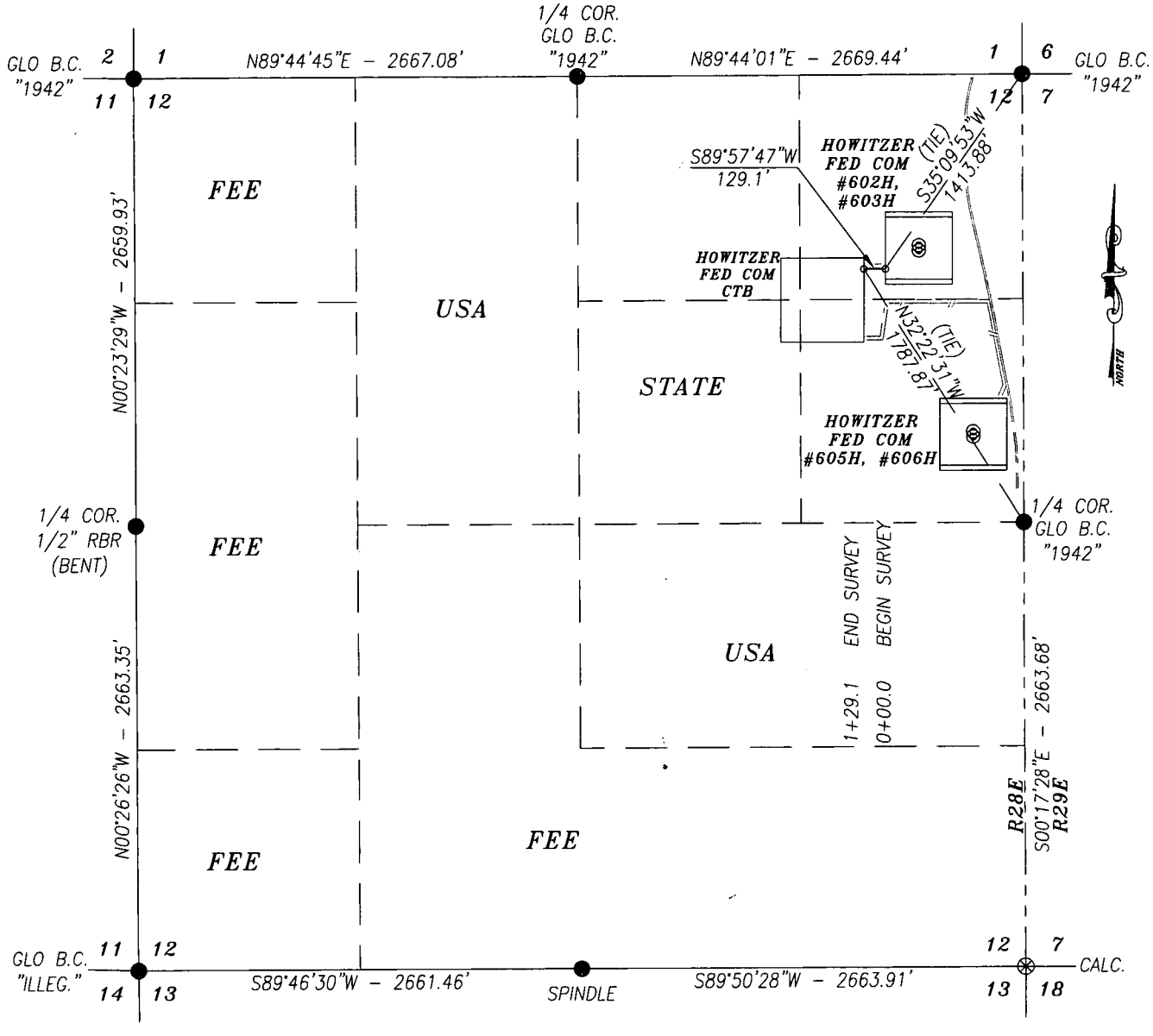
CONCHO

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

PIPELINE PLAT
COG OPERATING, LLC.

A PROPOSED PIPELINE FROM THE HOWITZER FEDERAL COM #602H & #603H
TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

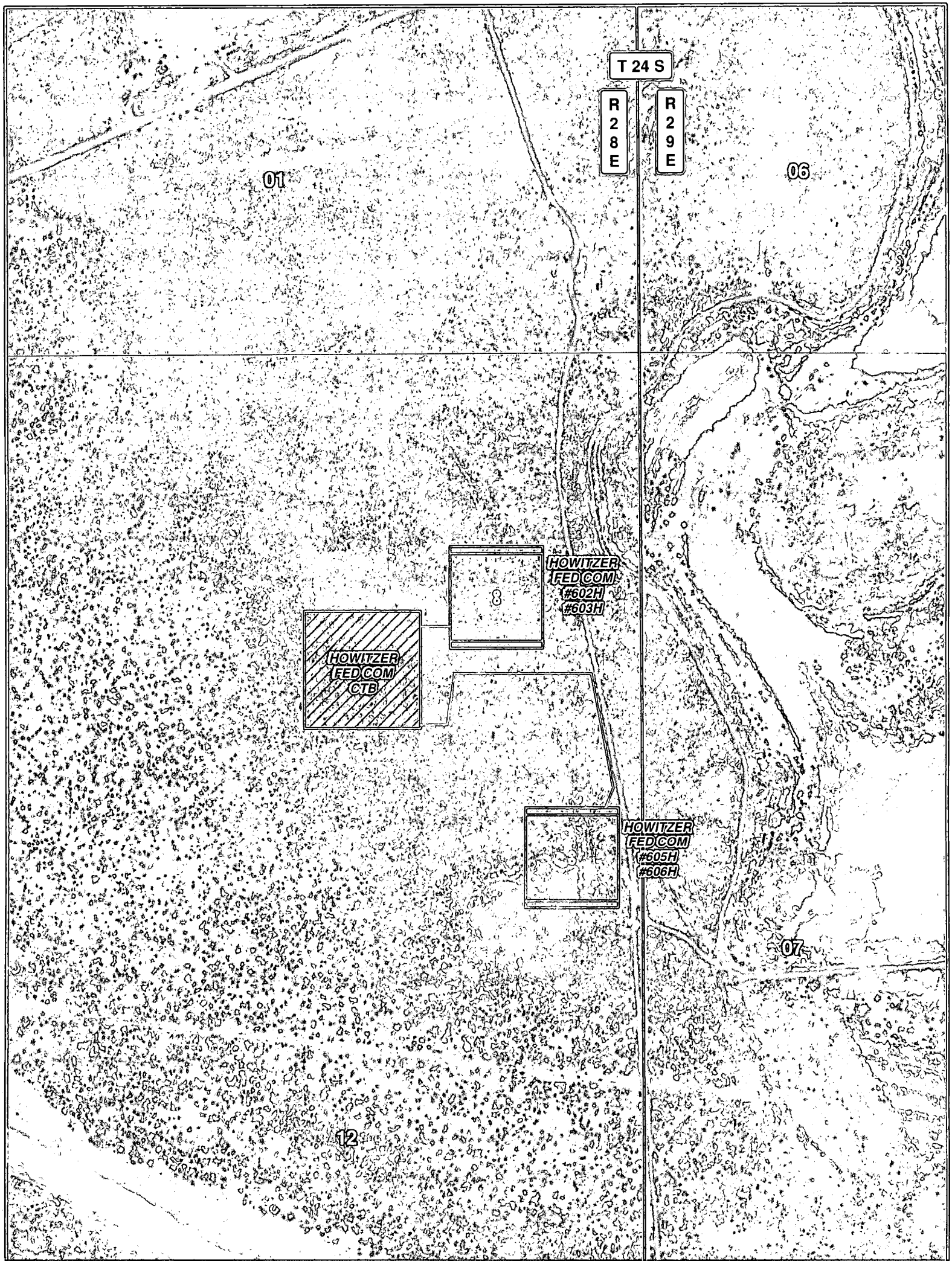
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

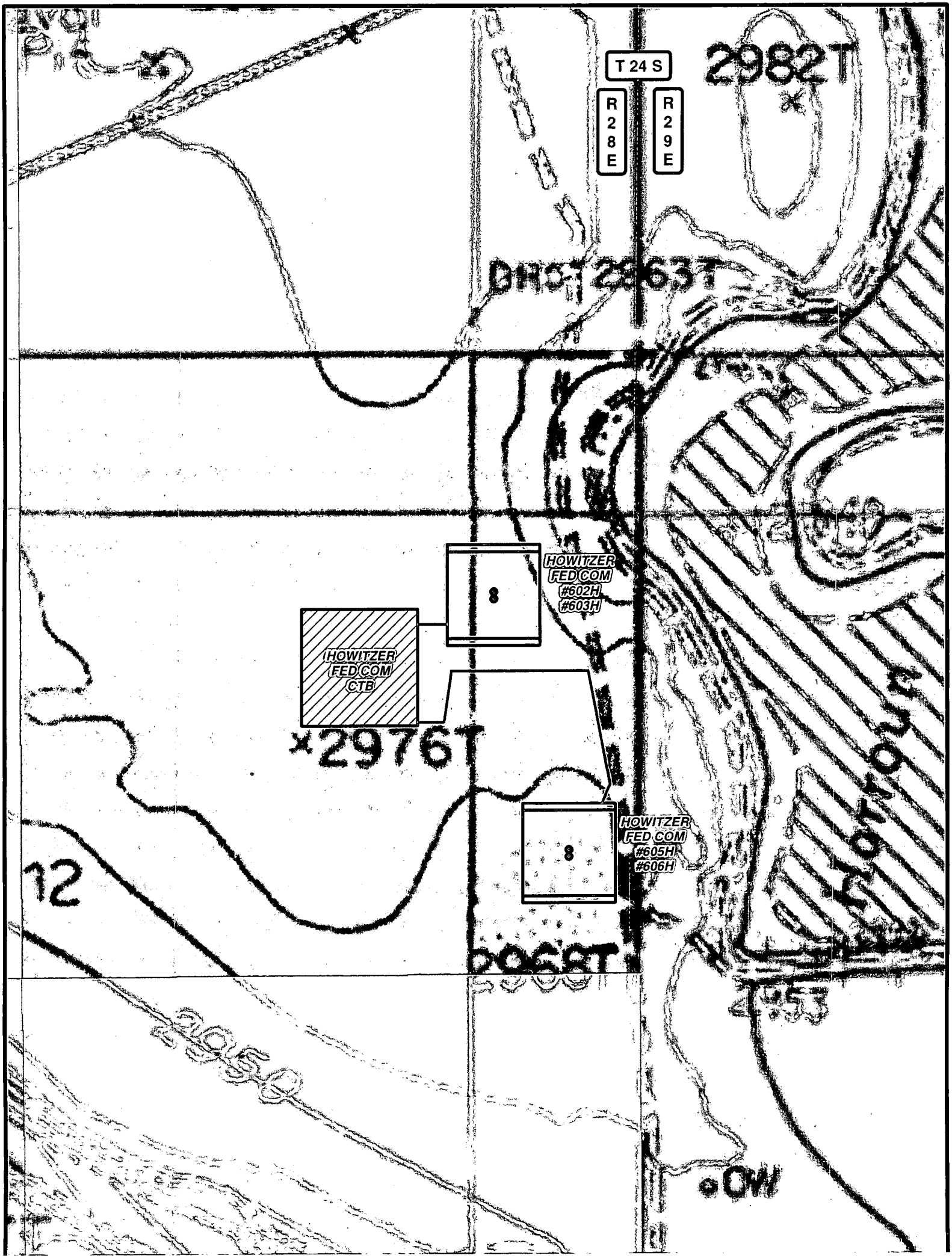
BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S35°09'53"W 1413.88 FEET FROM THE NORTHEAST CORNER; THEN S89°57'47"W 129.1 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES N32°22'31"W 1787.87 FEET FROM EAST QUARTER CORNER.

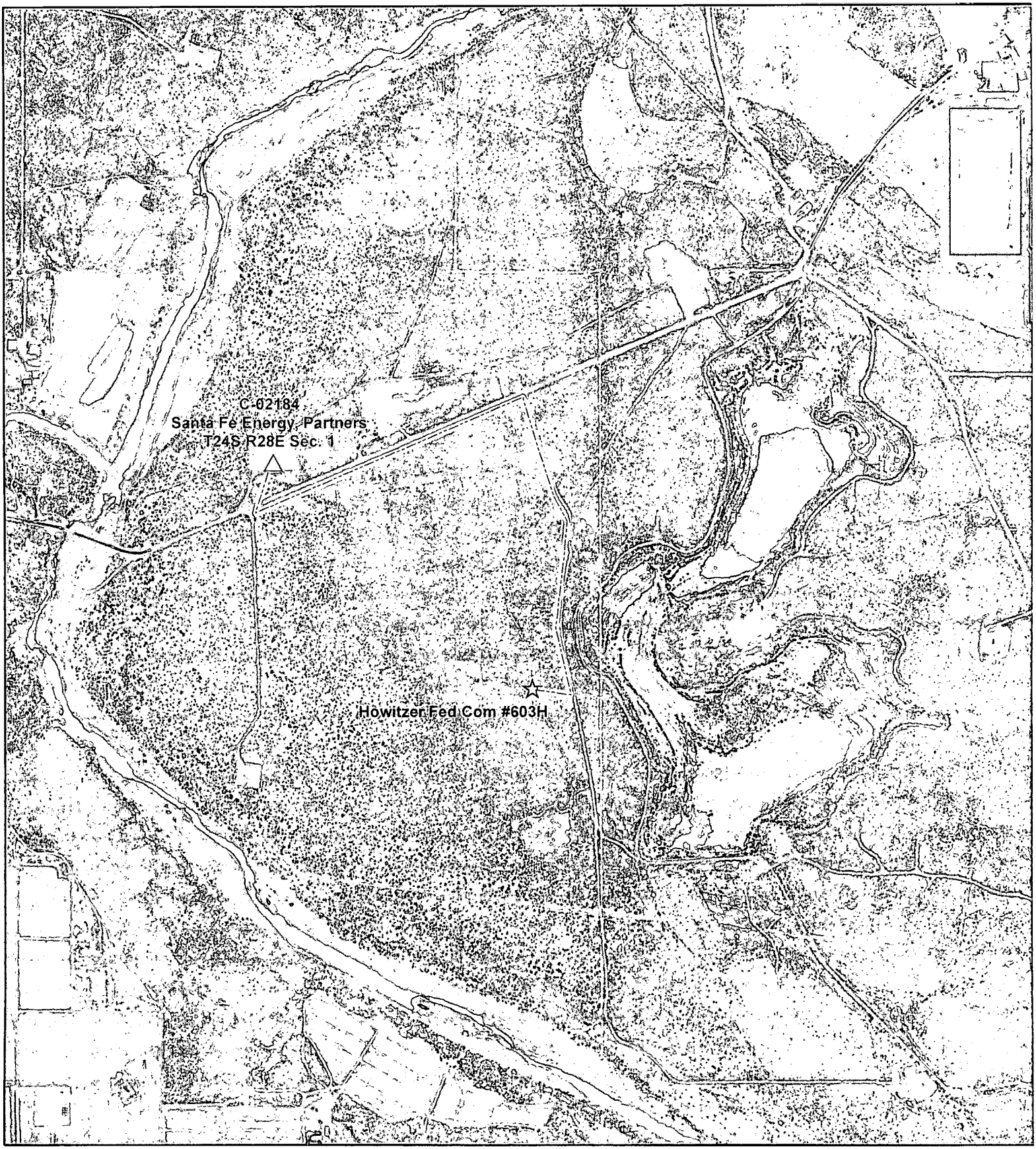
SAID STRIP OF LAND BEING 129.1 FEET OR 7.82 RODS IN LENGTH, CONTAINING 0.089 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC


T 24 S
R 28 E
R 29 E
01
06
07
12
8
HOWITZER FED COM #602H #603H
HOWITZER FED COM CTB
HOWITZER FED COM #605H #606H


T 24 S
R 28 E
R 29 E
2982T
DHOT 2963T
HOWITZER FED COM #602H #603H
8
HOWITZER FED COM CTB
2976T
HOWITZER FED COM #605H #606H
8
12
2965T
2955
OW



CONCHO

Howitzer Fed Com #603H
Water Transfer Route

Date: 11/6/2018
Author: Whytnie McDonald
State: New Mexico
County: Eddy

Disclaimer: This is not a legal survey document

Map Legend

Route

N
W E
S

0 0.075 0.15 0.3 0.45 0.6
Miles

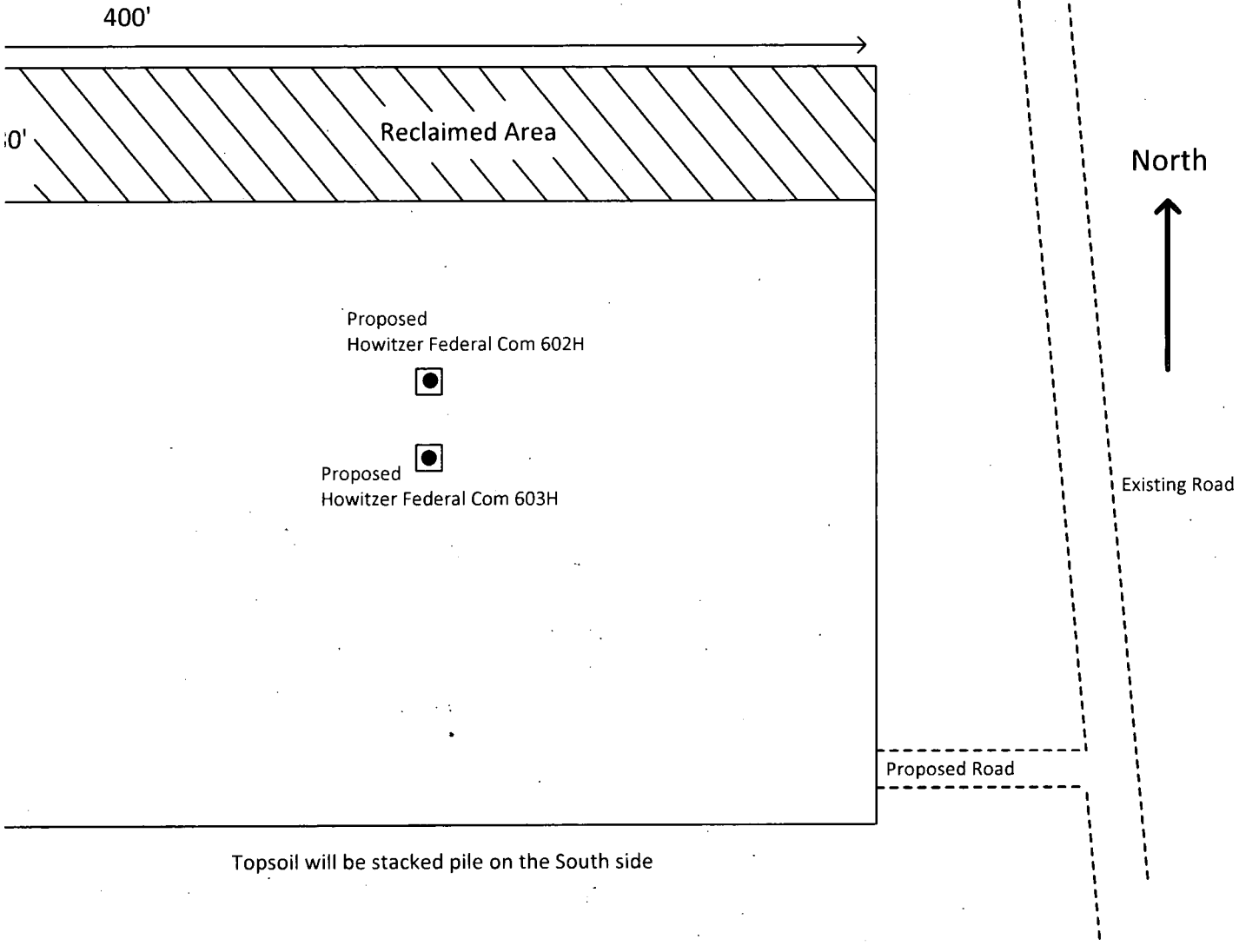
Well Site Layout

Production Facility Layout

Howitzer Federal Com 603H

Section 12- T24S- R28E

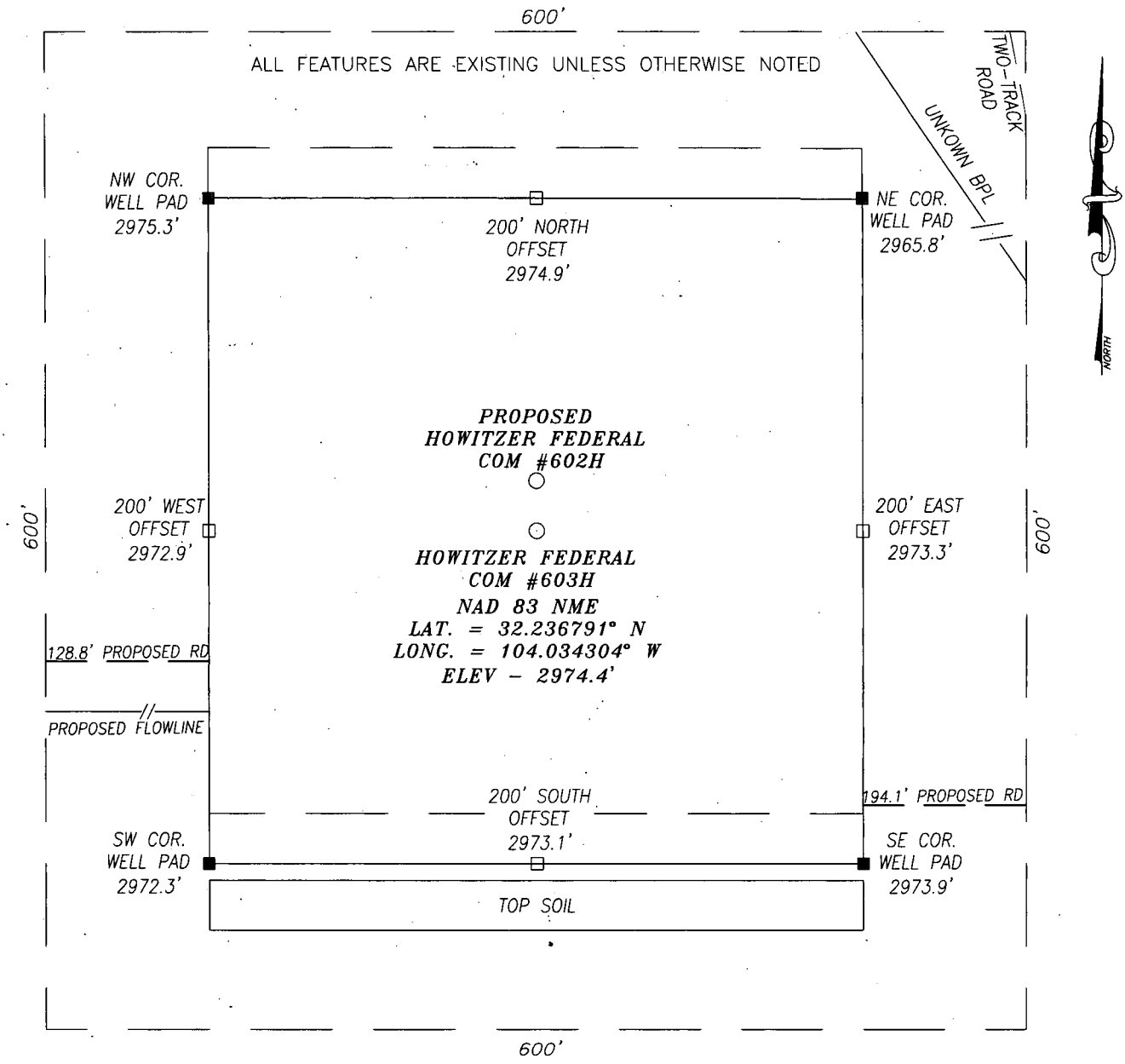
Exhibit 3



Topsoil will be stacked pile on the South side

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOUTHERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD; THE PROPOSED WELL LIES APPROX. 0.4 MI. TO THE SOUTH.

HARCROW SURVEYING, LLC
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PH: (575) 746-2158 FAX: (575) 746-2158
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 11/6/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

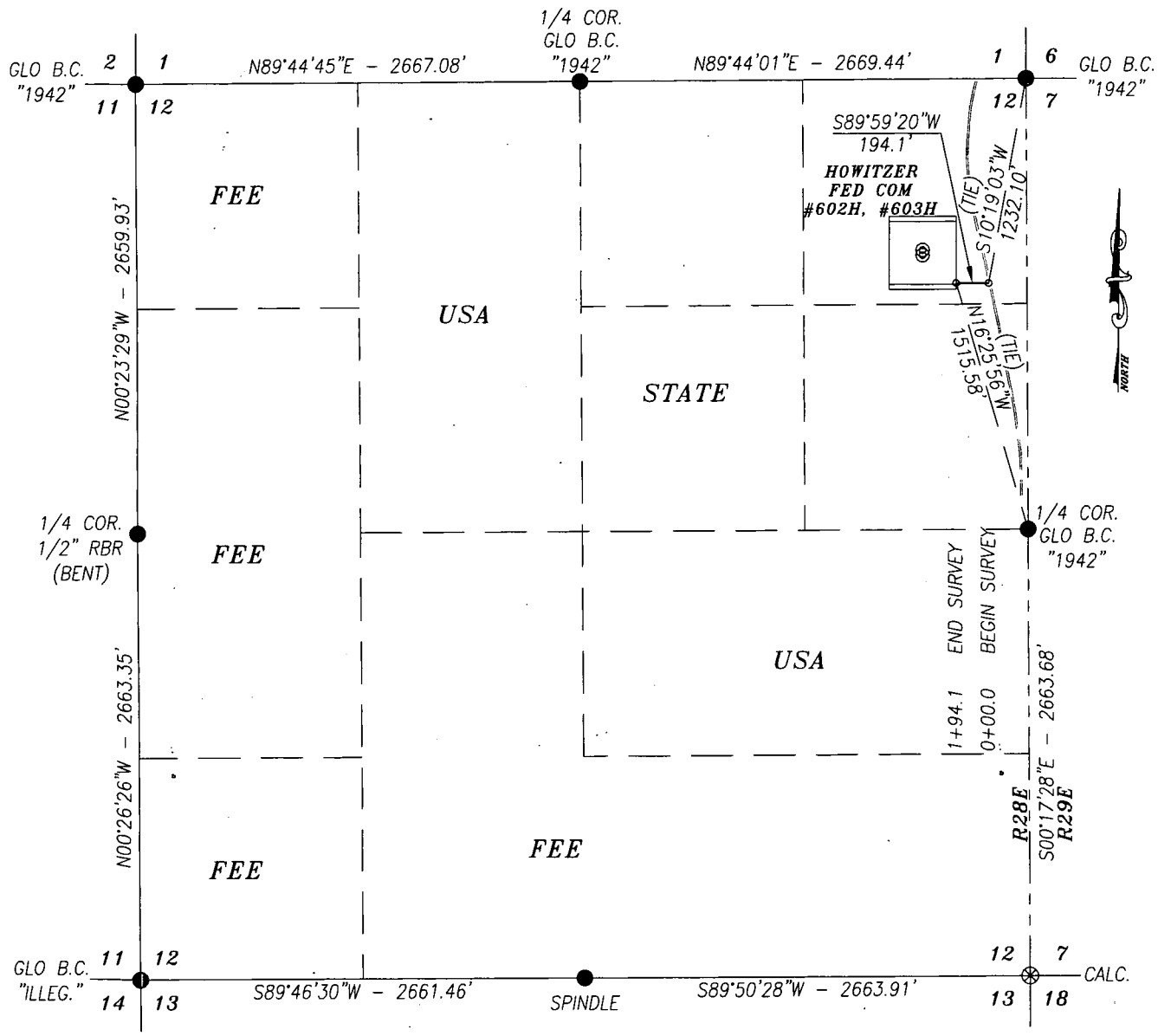
COG OPERATING, LLC

HOWITZER FEDERAL COM #603H WELL LOCATED 1044 FEET FROM THE NORTH LINE AND 620 FEET FROM THE EAST LINE OF SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 20, 2018		PAGE: 1 OF 1
DRAFTING DATE: NOVEMBER 6, 2018		
APPROVED BY: CH	DRAWN BY: AF	FILE: 18-1466

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM AN EXISTING CALICHE ROAD
TO THE HOWITZER FEDERAL COM #602H & #603H IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S10°19'03"W 1232.10 FEET FROM THE NORTHEAST CORNER; THEN S89°59'20"W 194.1 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES N16°25'56"W 1515.58 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 194.1 FEET OR 11.76 RODS IN LENGTH, CONTAINING 0.134 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

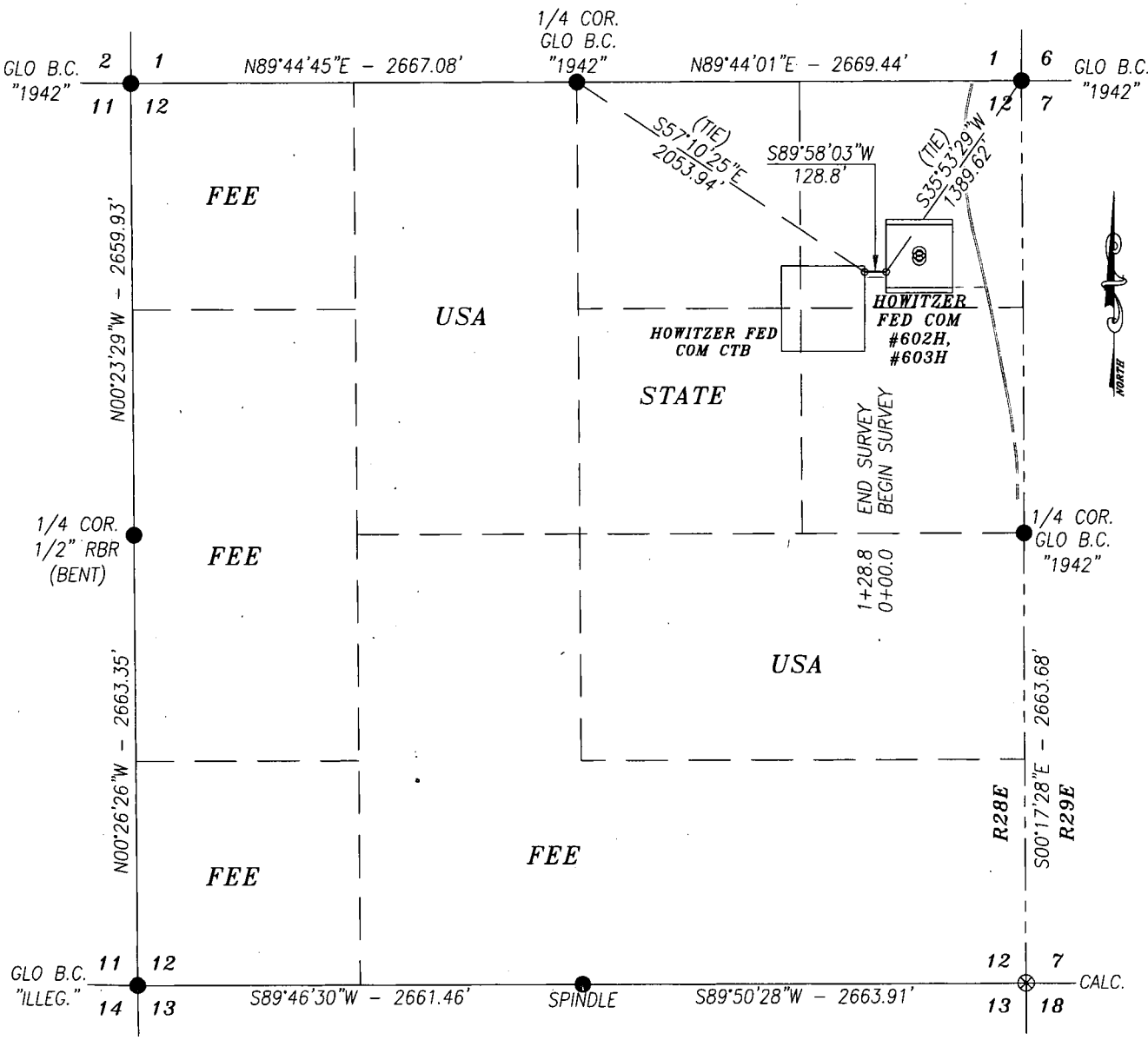
HARCROW SURVEYING, LLC

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM THE HOWITZER FEDERAL COM #602H & #603H TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S35°53'29"W 1389.62 FEET FROM THE NORTHEAST CORNER; THEN S89°58'03" 128.8 FEET, TO A POINT IN THE NE/4 NE/4 OF SAID SECTION, WHICH LIES S57°10'25"E 2053.94 FEET FROM NORTH QUARTER CORNER.

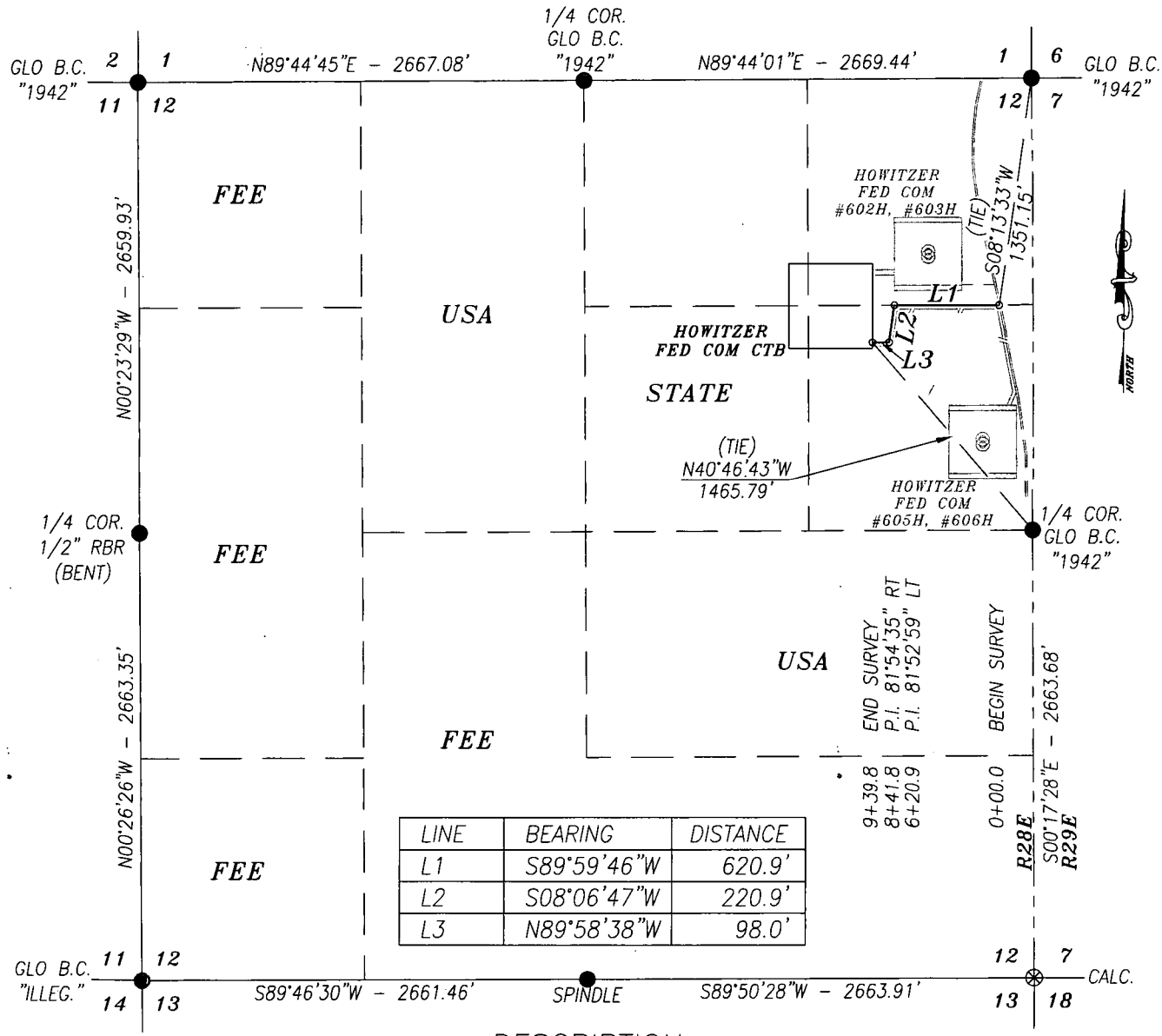
SAID STRIP OF LAND BEING 128.8 FEET OR 7.81 RODS IN LENGTH, CONTAINING 0.089 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE NE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC

ACCESS ROAD PLAT
COG OPERATING, LLC.

A PROPOSED ACCESS ROAD FROM AN EXISTING CALICHE ROAD
TO THE HOWITZER FEDERAL COM CENTRAL TANK BATTERY IN
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



LINE	BEARING	DISTANCE
L1	S89°59'46"W	620.9'
L2	S08°06'47"W	220.9'
L3	N89°58'38"W	98.0'

DESCRIPTION

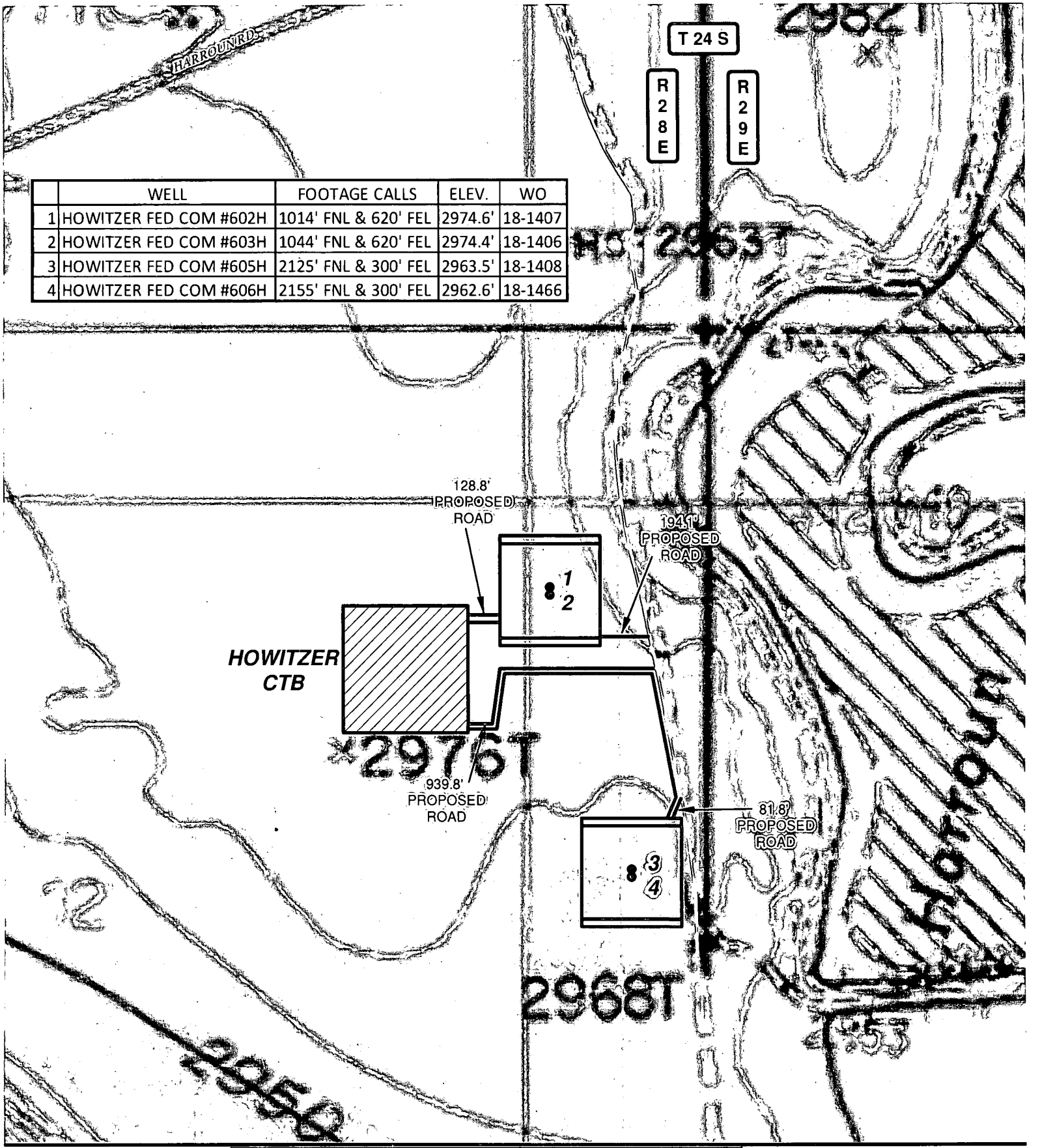
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S08°13'33"W 1351.15 FEET FROM THE NORTHEAST CORNER; THEN S89°59'46" 620.9 FEET, THEN S08°06'47"W 220.9 FEET, THEN N89°58'38"W 98.0 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES N40°46'43"E 1465.79 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 939.8 FEET OR 56.96 RODS IN LENGTH, CONTAINING 0.647 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.

BASIS OF BEARING:

HARCROW SURVEYING, LLC



	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12 | TOWNSHIP: 24 S. | RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 | LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | TOPO | 11/5/2018 | A.M.

N

CONCHO

COG OPERATING, LLC

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TEXAS FIRM NO. 10194089
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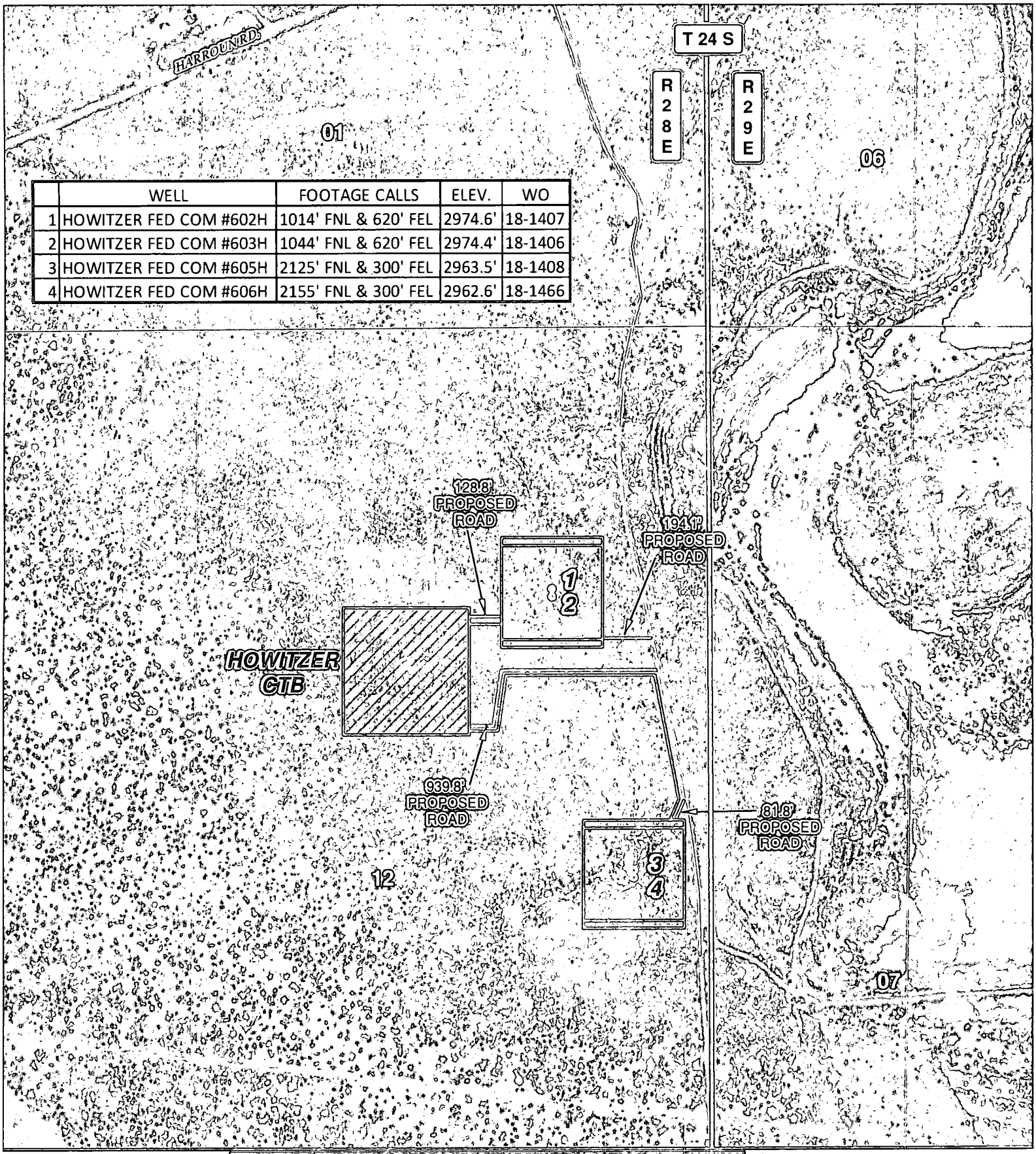

	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12	TOWNSHIP: 24 S.	RANGE: 28 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1077, 1406-1408, 1466	LEASE: HOWITZER FED COM	

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | IMAGERY | 11/5/2018 | A.M.

N

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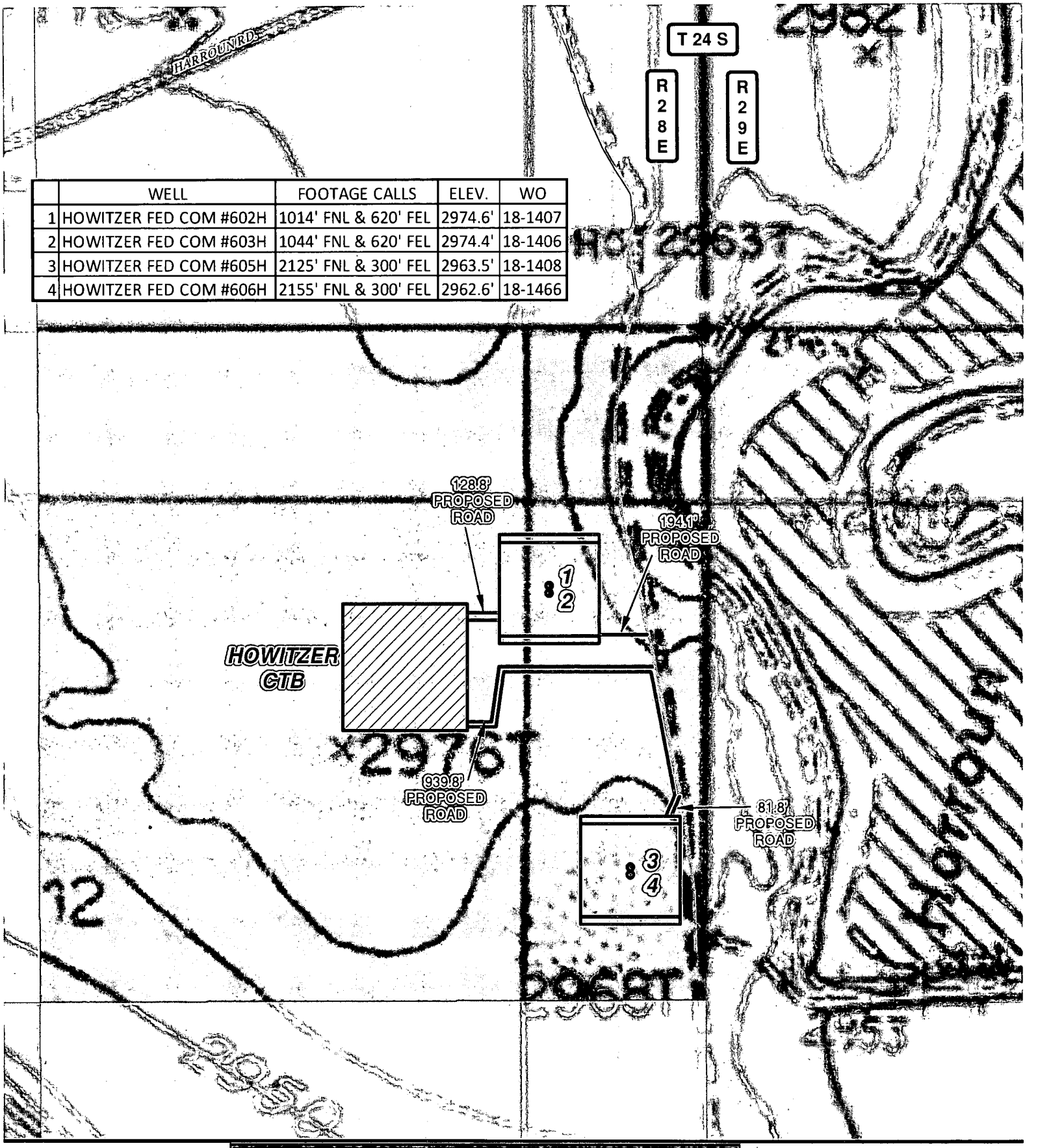

	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

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

HOWITZER FEDERAL COM

SECTION: 12 TOWNSHIP: 24 S. RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP LAND STATUS 11/5/2018 A.M.

N

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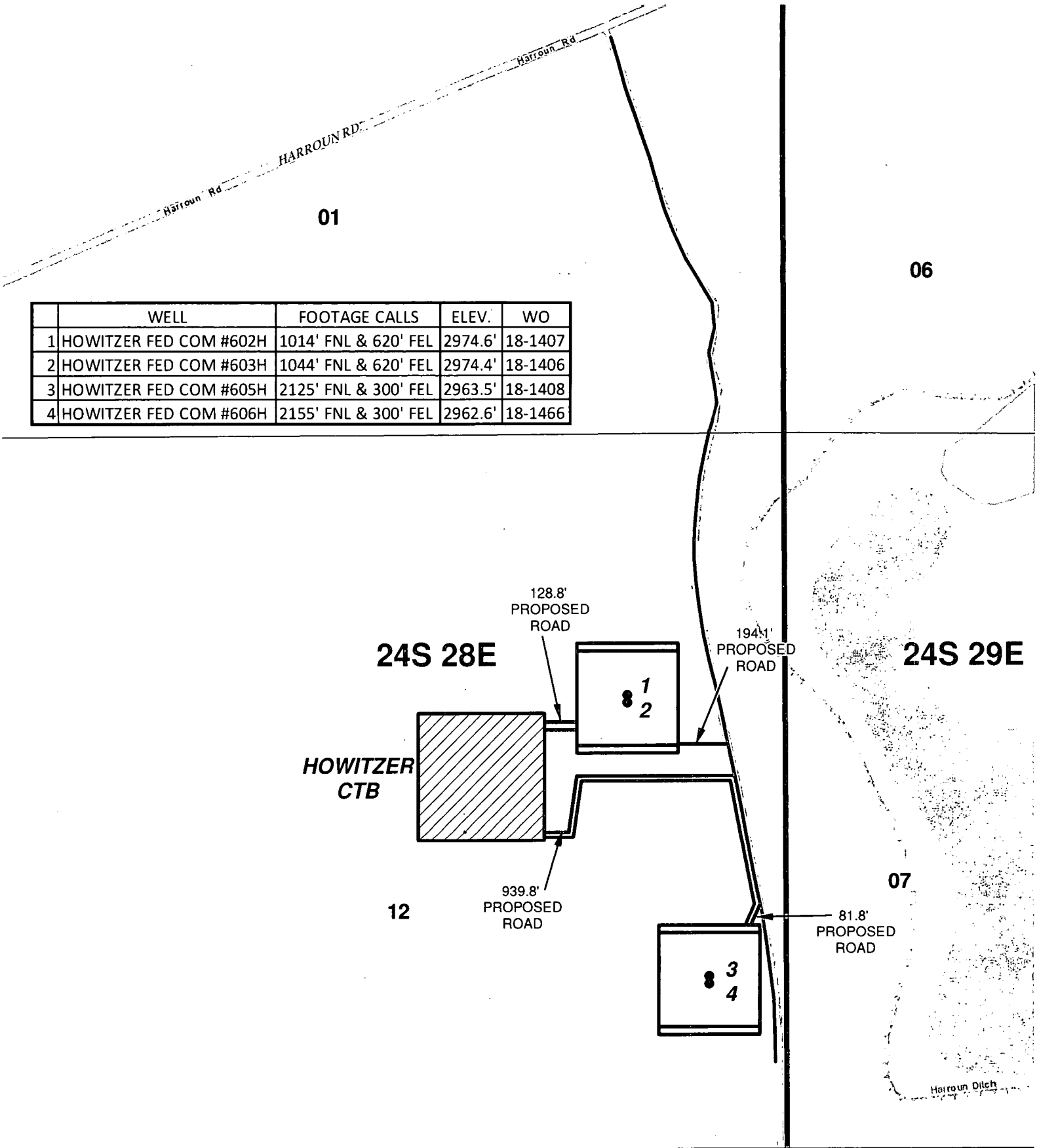

	WELL	FOOTAGE CALLS	ELEV.	WO
1	HOWITZER FED COM #602H	1014' FNL & 620' FEL	2974.6'	18-1407
2	HOWITZER FED COM #603H	1044' FNL & 620' FEL	2974.4'	18-1406
3	HOWITZER FED COM #605H	2125' FNL & 300' FEL	2963.5'	18-1408
4	HOWITZER FED COM #606H	2155' FNL & 300' FEL	2962.6'	18-1466

LEGEND

- WELL
- WELLPAD
- BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED FLOWLINE

HOWITZER FEDERAL COM

SECTION: 12 | TOWNSHIP: 24 S. | RANGE: 28 E.

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

W.O. # 18-1077, 1406-1408, 1466 | LEASE: HOWITZER FED COM

0 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP | VICINITY | 11/5/2018 | A.M.

N

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c.harcrow@harcrowsurveying.com

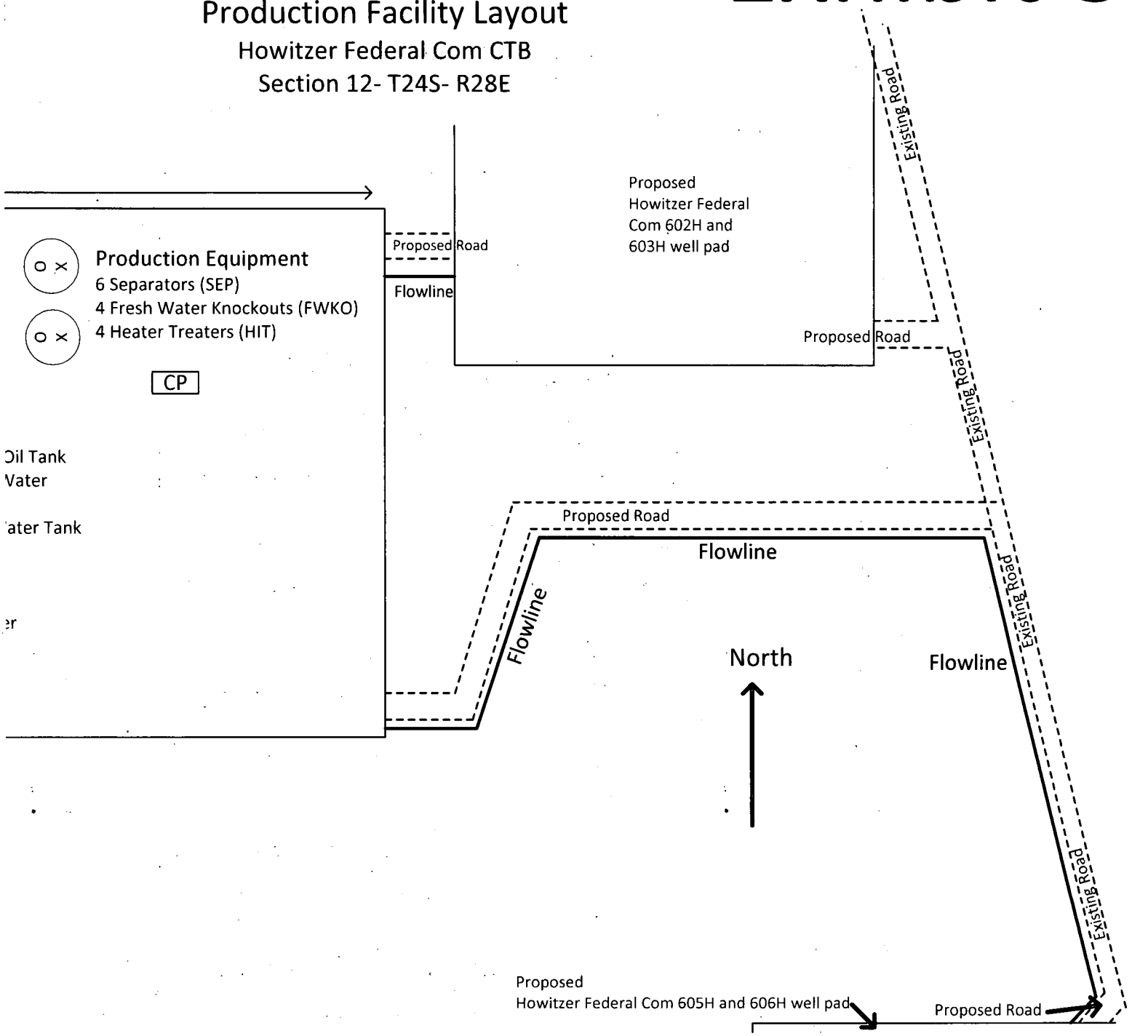
Well Site Layout

Exhibit 3

Production Facility Layout

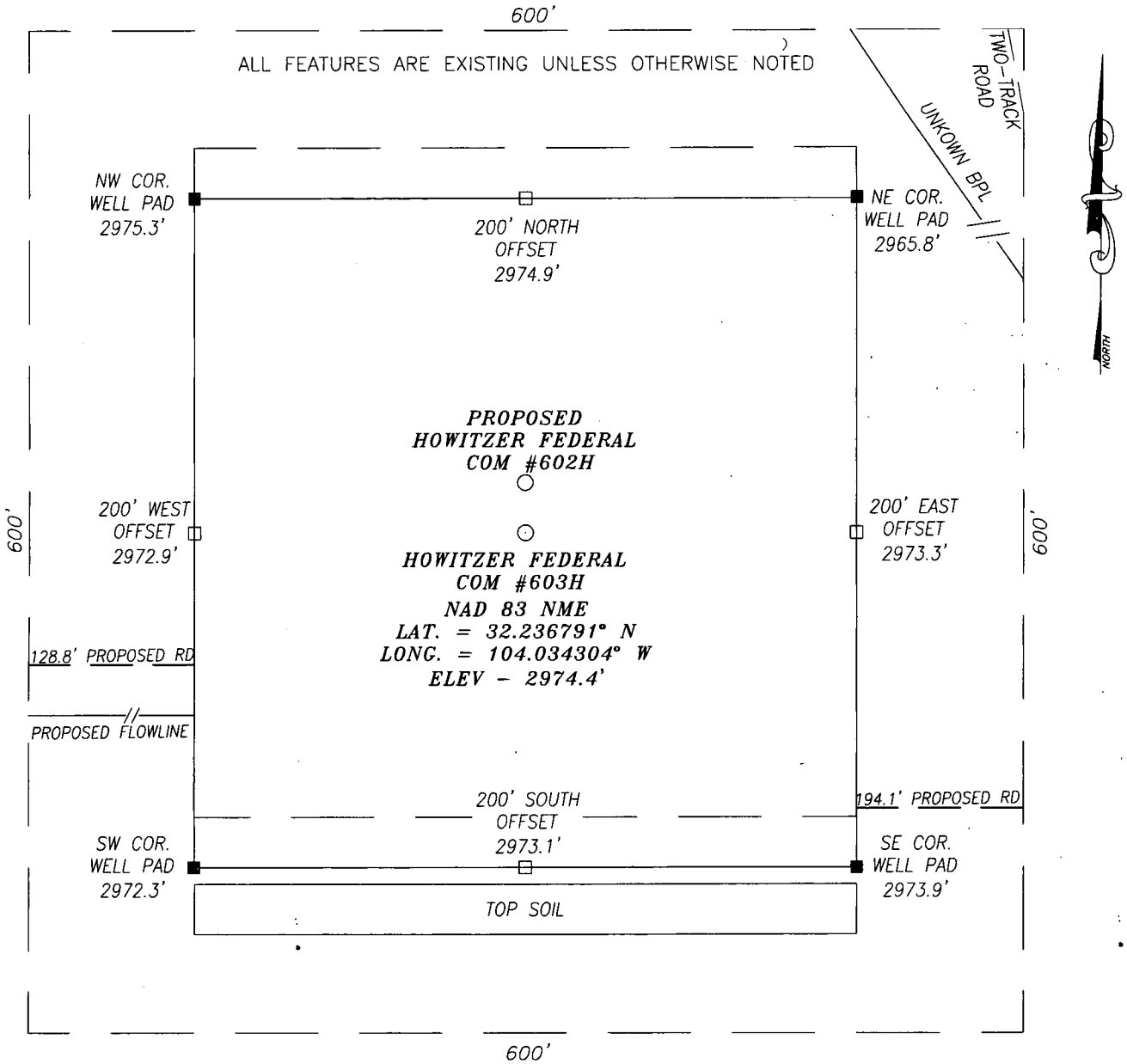
Howitzer Federal Com CTB

Section 12- T24S- R28E



SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOUTHERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD; THE PROPOSED WELL LIES APPROX. 0.4 MI. TO THE SOUTH.

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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 11/6/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

COG OPERATING, LLC

HOWITZER FEDERAL COM #603H WELL LOCATED 1044 FEET FROM THE NORTH LINE AND 620 FEET FROM THE EAST LINE OF SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: OCTOBER 20, 2018		PAGE: 1 OF 1
DRAFTING DATE: NOVEMBER 6, 2018		
APPROVED BY: CH	DRAWN BY: AF	FILE: 18-1466

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:

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 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

02/26/2019

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: