

# 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

## APPLICATION FOR PERMIT TO DRILL OR REENTER

APR 01 2019

DISTRICT II-ARTESIA O.C.D.

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMMN 054398	
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		6. If Indian, Allottee or Tribe Name	
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		7. If Unit or CA Agreement, Name and No.	
2. Name of Operator COG OPERATING LLC		8. Lease Name and Well No. HOWITZER FEDERAL COM 605H	
3a. Address 600 West Illinois Ave Midland TX 79701		9. API-Well No. 30-015-45833	
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 SENE / 2125 FNL / 300 FEL / LAT 32.233822 / LONG -104.03326 At proposed prod. zone SWNW / 1760 FNL / 200 FWL / LAT 32.234972 / LONG -104.066276		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. 2046 feet	19. Proposed Depth 9899 feet / 20074 feet	20. BLM/BIA Bond No. in file FED: NMB000215	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 2963 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)

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Well plat certified by a registered surveyor.</li> <li>2. A Drilling Plan.</li> <li>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).</li> </ul> | <ul style="list-style-type: none"> <li>4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).</li> <li>5. Operator certification.</li> <li>6. Such other site specific information and/or plans as may be requested by the BLM.</li> </ul> |
|---|---|

25. Signature (Electronic Submission)	Name (Printed/Typed) Mayte Reyes / Ph: (575)748-6945	Date 11/09/2018
Title Regulatory Analyst		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575)234-5959	Date 02/26/2019
Title Assistant Field Manager Lands & Minerals Office CARLSBAD		

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

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

APPROVED WITH CONDITIONS

Approval Date: 02/26/2019

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

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

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

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

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

**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 well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

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

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

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

The BLM connects this information to an 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 Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

## Additional Operator Remarks

### Location of Well

1. SHL: SENE / 2125 FNL / 300 FEL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.233822 / LONG: -104.03326 ( TVD: 0 feet, MD: 0 feet )  
PPP: SENW / 1760 FNL / 2640 FWL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.234859 / LONG: -104.040919 ( TVD: 9852 feet, MD: 12200 feet )  
PPP: SENE / 1760 FNL / 330 FEL / TWSP: 24S / RANGE: 28E / SECTION: 12 / LAT: 32.234825 / LONG: -104.03336 ( TVD: 9887-feet, MD: 10200 feet )  
BHL: SWNW / 1760 FNL / 200 FWL / TWSP: 24S / RANGE: 28E / SECTION: 11 / LAT: 32.234972 / LONG: -104.066276 ( TVD: 9899 feet, MD: 20074 feet )

### BLM Point of Contact

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

CONFIDENTIAL

## 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.

CONFIDENTIAL

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
WELL NAME & NO.:	Howitzer Federal Com 605H
SURFACE HOLE FOOTAGE:	2125'/N & 300'/E
BOTTOM HOLE FOOTAGE:	1760'/N & 200'/W
LOCATION:	Section 12, T.24 S., R.28 E., NMPM
COUNTY:	Eddy County, New Mexico

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

### A. HYDROGEN SULFIDE

1. Hydrogen Sulfide (H<sub>2</sub>S) monitors shall be installed prior to drilling out the surface shoe. If H<sub>2</sub>S 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 2<sup>nd</sup> 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.



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:** 11/08/2018

**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



APD ID: 10400036159

Submission Date: 11/09/2018

Highlighted data  
reflects the most  
recent changes

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 605H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

### Section 1 - General

APD ID: 10400036159

Tie to previous NOS?

Submission Date: 11/09/2018

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: 605H

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: 605H

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: 605H AND 606H

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: 2046 FT

Distance to lease line: 200 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: COG\_Howitz\_605H\_C102\_20181108160806.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	2125	FNL	300	FEL	24S	28E	12	Aliquot SENE	32.233822	-104.03326	EDD Y	NEW MEXI CO	NEW MEXI CO	S	STATE	2963	0	0
KOP Leg #1	2125	FNL	300	FEL	24S	28E	12	Aliquot SENE	32.233822	-104.03326	EDD Y	NEW MEXI CO	NEW MEXI CO	S	STATE	2963	0	0
PPP Leg #1	1760	FNL	330	FEL	24S	28E	12	Aliquot SENE	32.234825	-104.03336	EDD Y	NEW MEXI CO	NEW MEXI CO	S	STATE	-6924	10200	9887

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 605H

	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	176 0	FNL	264 0	FWL	24S	28E	12	Aliquot SENW	32.23485 9	- 104.0409 19	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 054398	- 688 9	122 00	985 2
EXIT Leg #1	176 0	FNL	330	FWL	24S	28E	11	Aliquot SWN W	32.23497 1	- 104.0658 55	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	- 674 6	198 00	970 9
BHL Leg #1	176 0	FNL	200	FWL	24S	28E	11	Aliquot SWN W	32.23497 2	- 104.0662 76	EDD Y	NEW MEXI CO	NEW MEXI CO	F	FEE	- 693 6	200 74	989 9

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

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

**Rating Depth:** 9140

**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\_Howitz\_605H\_3M\_Choke\_20181109075620.pdf

**BOP Diagram Attachment:**

COG\_Howitz\_605H\_3M\_BOP\_20181109075630.pdf

COG\_Howitz\_605H\_Flex\_Hose\_20181109075643.pdf

---

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

**Rating Depth:** 9899

**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\_Howitz\_605H\_5M\_Choke\_20181109075920.pdf

**BOP Diagram Attachment:**

COG\_Howitz\_605H\_5M\_BOP\_20181109075928.pdf

COG\_Howitz\_605H\_Flex\_Hose\_20181109075938.pdf

---

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 605H

**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	9.625	NEW	API	N	0	9140	0	9140	-6999	-18749	9140	HCL-80	40	OTHER - BTC	1.3	1.14	DRY	2.59	DRY	2.59
3	PRODUCTION	8.5	5.5	NEW	API	N	0	20074	0	20074	-6999	-24211	20074	P-110	23	OTHER - BTC	2.26	2.67	DRY	3.18	DRY	3.18

**Casing Attachments**

Casing ID: 1      String Type: SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG\_Howitz\_605H\_Casing\_Prog\_20181109080019.pdf

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 605H

### Casing Attachments

Casing ID: 2 String Type: INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG\_Howitz\_605H\_Casing\_Prog\_20181109080011.pdf

Casing ID: 3 String Type: PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG\_Howitz\_605H\_Casing\_Prog\_20181109080004.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	9140	1420	2.8	11	3976	50	NeoCem	As needed
INTERMEDIATE	Tail		0	9140	300	1.1	16.4	330	50	Tail: Class H	As needed
PRODUCTION	Lead		0	2007	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: 605H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Tail		0	2007 4	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	9140	OTHER : Brine Diesel Emulsion	8.6	9.4							Brine Diesel Emulsion
0	2700	OTHER : FW Gel	8.6	8.8							FW Gel
9140	2007 4	OIL-BASED MUD	10.5	12.5							OBM

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

## 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:** 6435

**Anticipated Surface Pressure:** 4257.21

**Anticipated Bottom Hole Temperature(F):** 155

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards attachment:**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations plan:**

COG\_Howitzzer\_605H\_H2S\_Schem\_20181109080531.pdf

COG\_Howitzzer\_605H\_H2S\_SUP\_20181109080540.pdf

## Section 8 - Other Information

**Proposed horizontal/directional/multi-lateral plan submission:**

COG\_Howitzzer\_605H\_AC\_Rprt\_20181109080558.pdf

COG\_Howitzzer\_605H\_Direct\_Plan\_20181109080606.pdf

**Other proposed operations facets description:**

Drilling Program Attached.

GCP Attached.

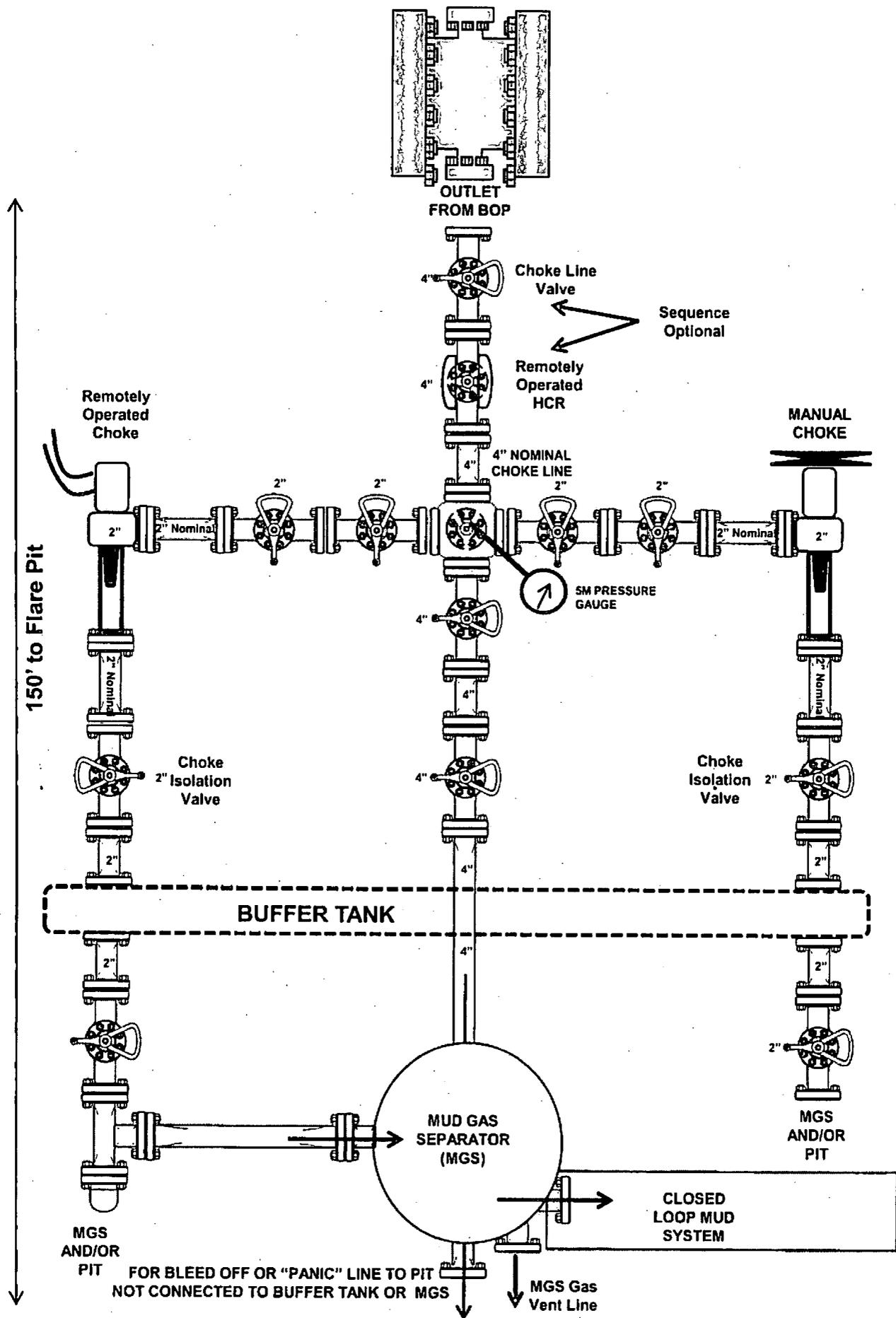
**Other proposed operations facets attachment:**

COG\_Howitzzer\_605H\_GCP\_20181109080617.pdf

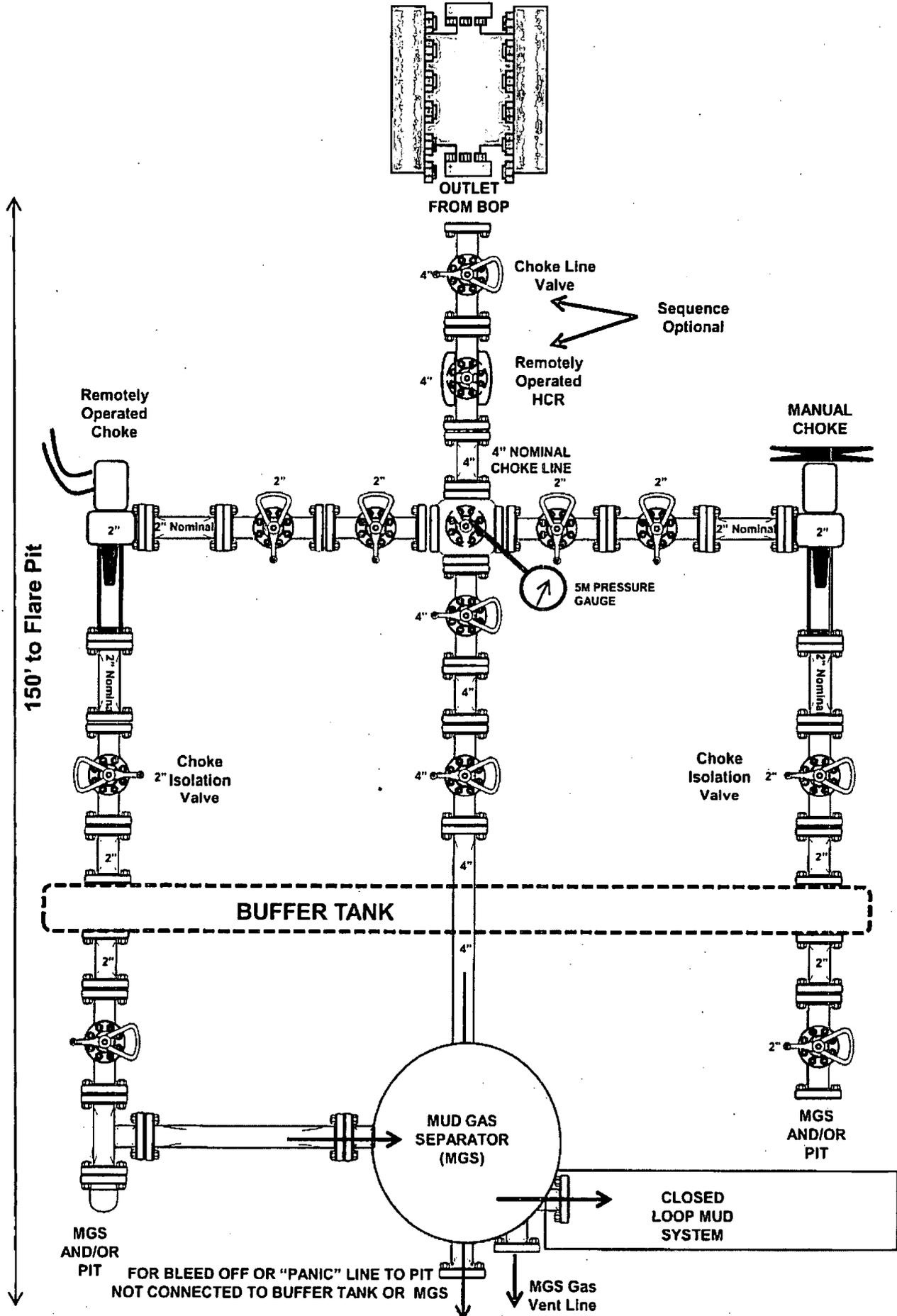
COG\_Howitzzer\_605H\_Drill\_Prog\_20181109080629.pdf

**Other Variance attachment:**

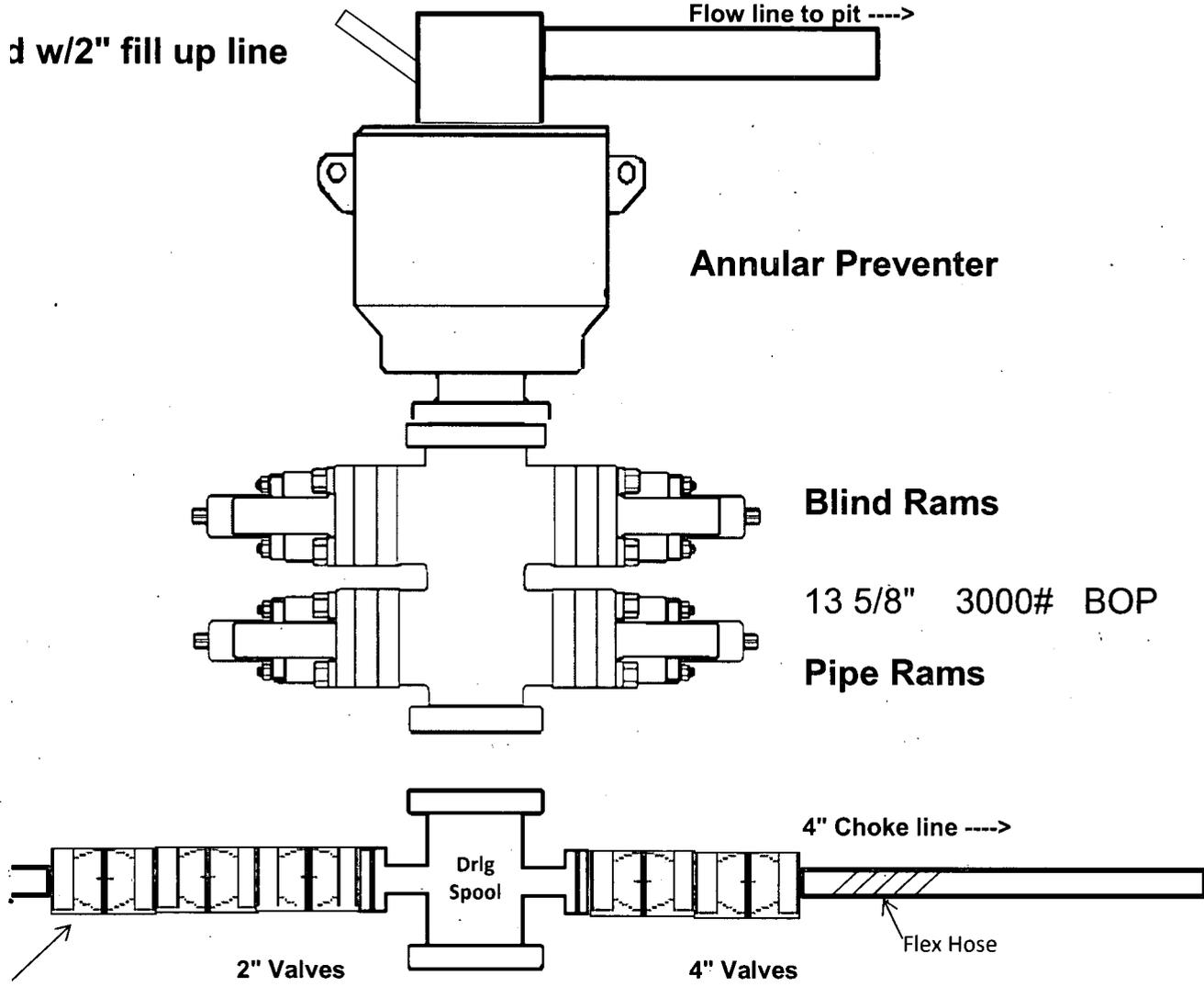
# 3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



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



# 3,000 psi BOP Schematic



ive



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

### Specifications

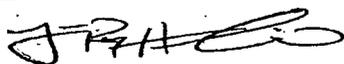
Hose Assembly Type: <b>Choke &amp; Kill</b>	Rig # <b>N/A</b>
Assembly Serial # <b>454857</b>	Hose Lot # and Date Code <b>N/A</b>
Hose Working Pressure (psi) <b>N/A</b>	Test Pressure (psi) <b>10000</b>
Hose Assembly Description:	<b>CK56-SS-5K-6410K-6410K-58.00' FT-TVM</b>

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:

<b>Approved By</b>	<b>Date</b>
	<b>3/19/2018</b>



Midwest Hose & Specialty, Inc.

# Internal Hydrostatic Test Graph

March 16, 2018

Customer: Latshaw

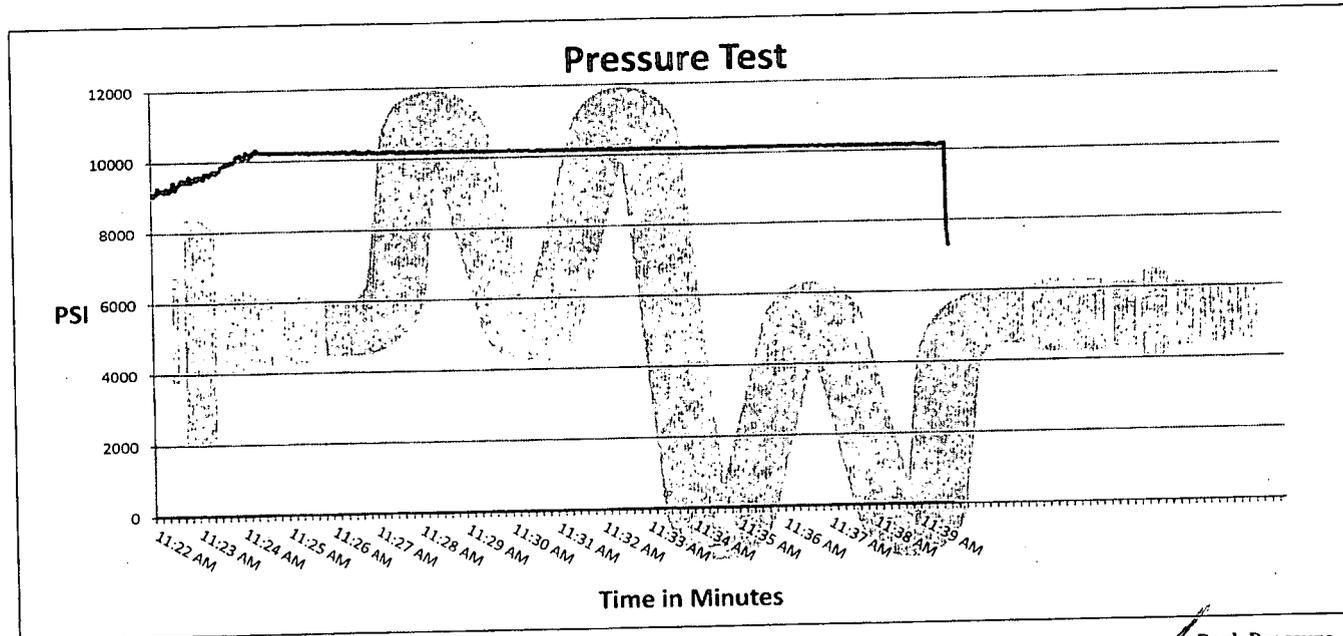
Pick Ticket #: 454857

### Hose Specifications

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

### Verification

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



**Test Pressure**  
10000 PSI

**Time Held at Test Pressure**  
16 Minutes

**Actual Burst Pressure**

**Peak Pressure**  
10400 PSI

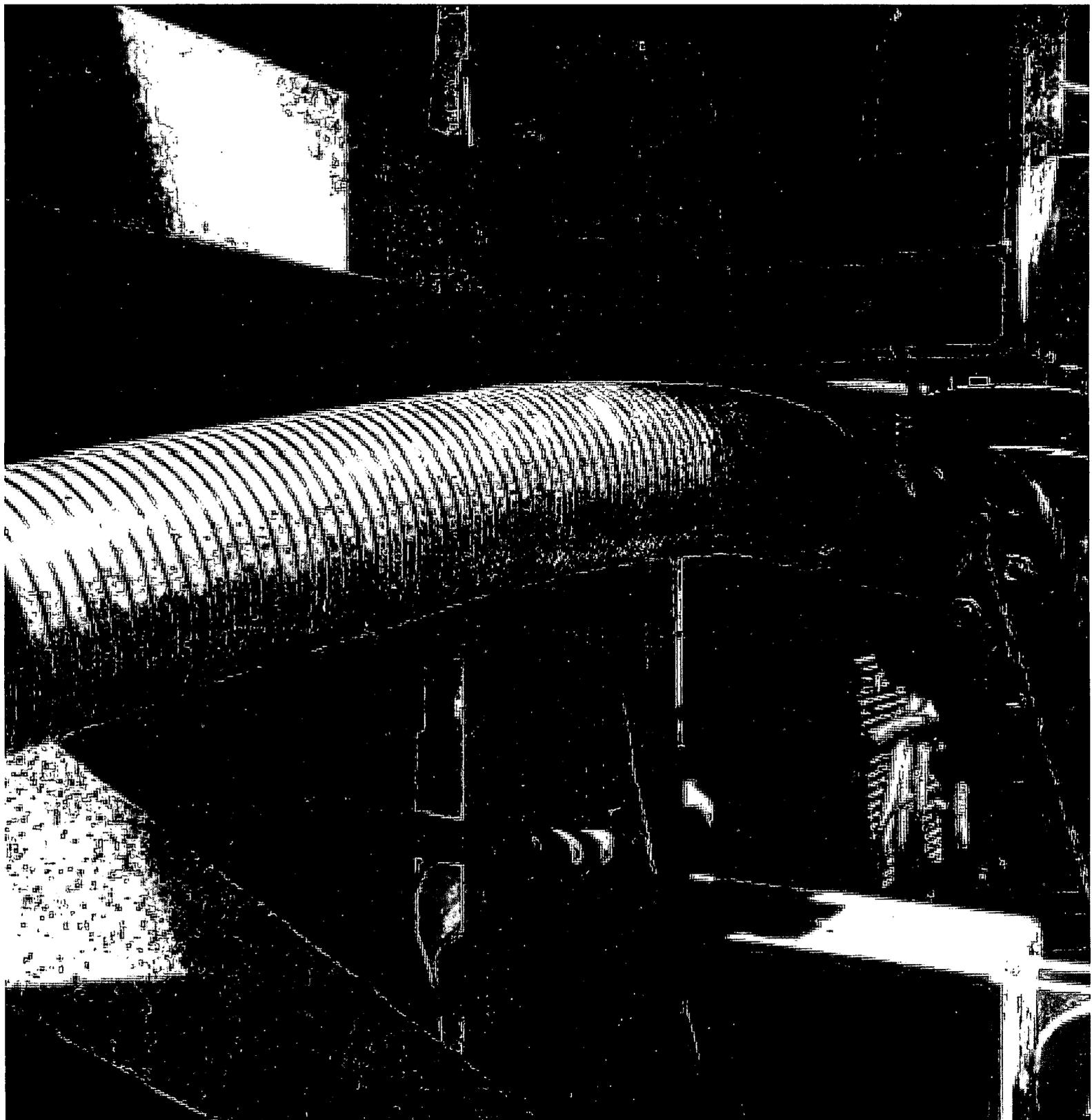
Comments: Hose assembly pressure tested with water at ambient temperature.

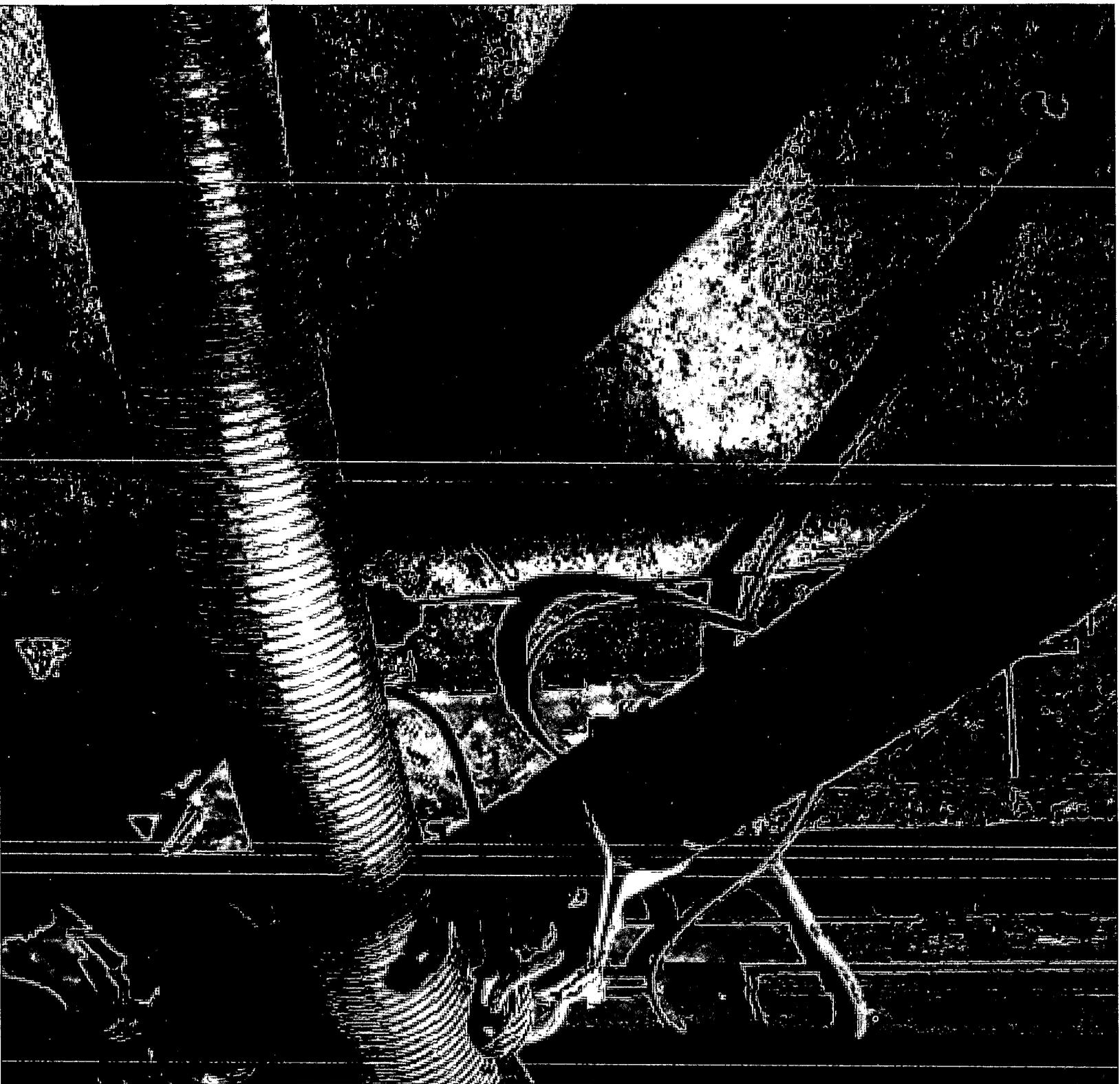
Tested By: Zach Tillman

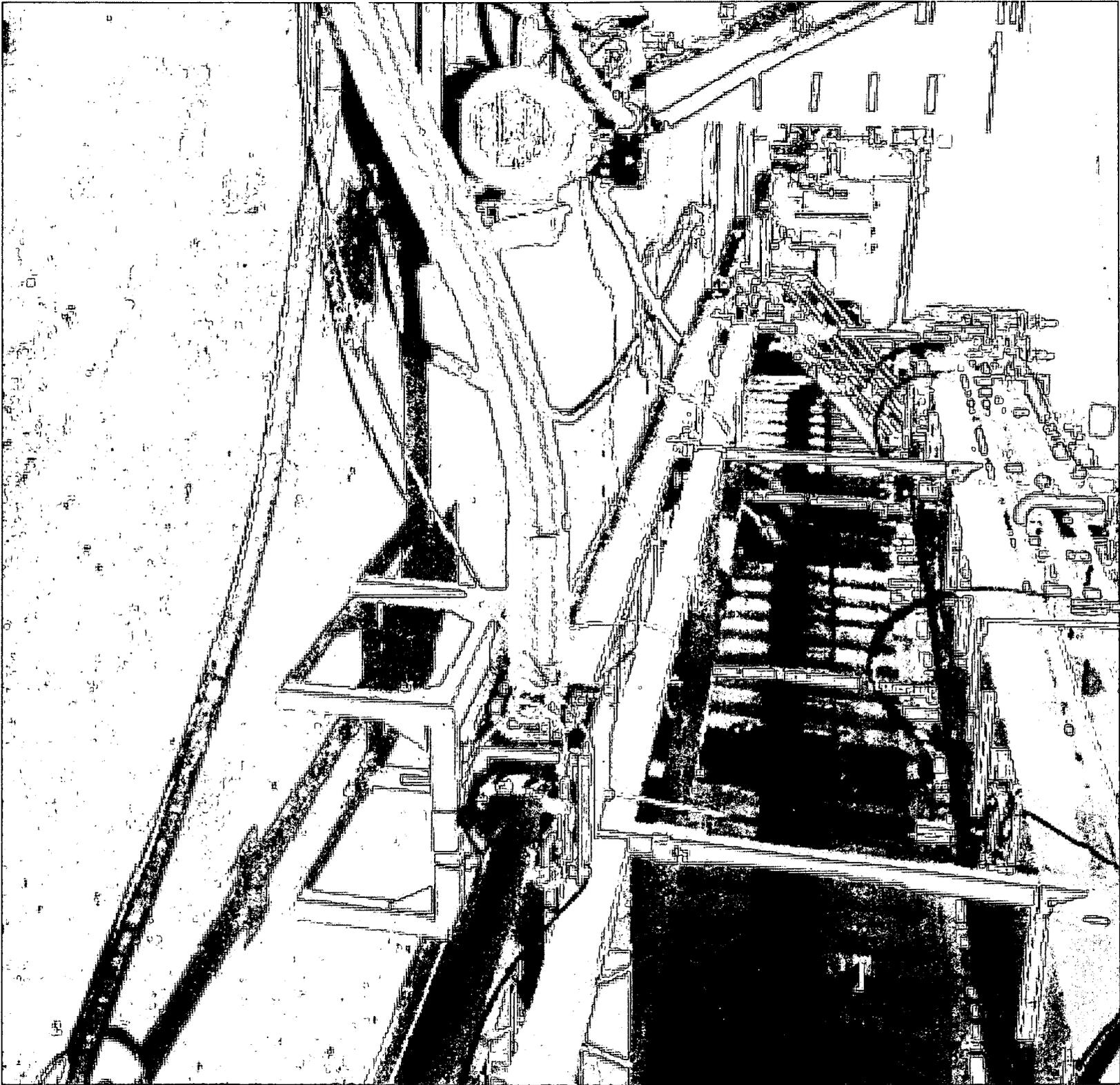
Approved By: James Hawkins

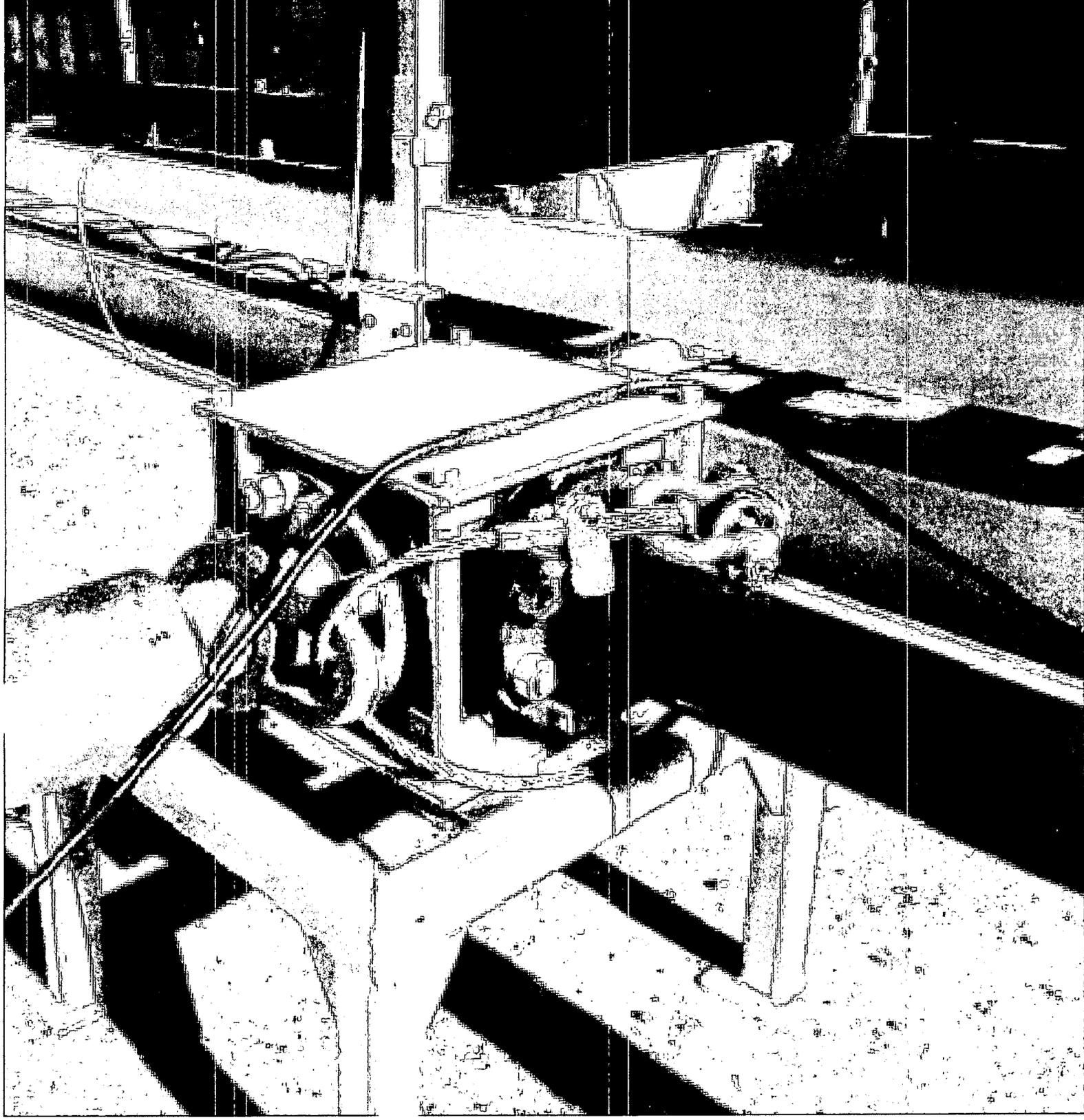
*[Handwritten signature of Zach Tillman]*

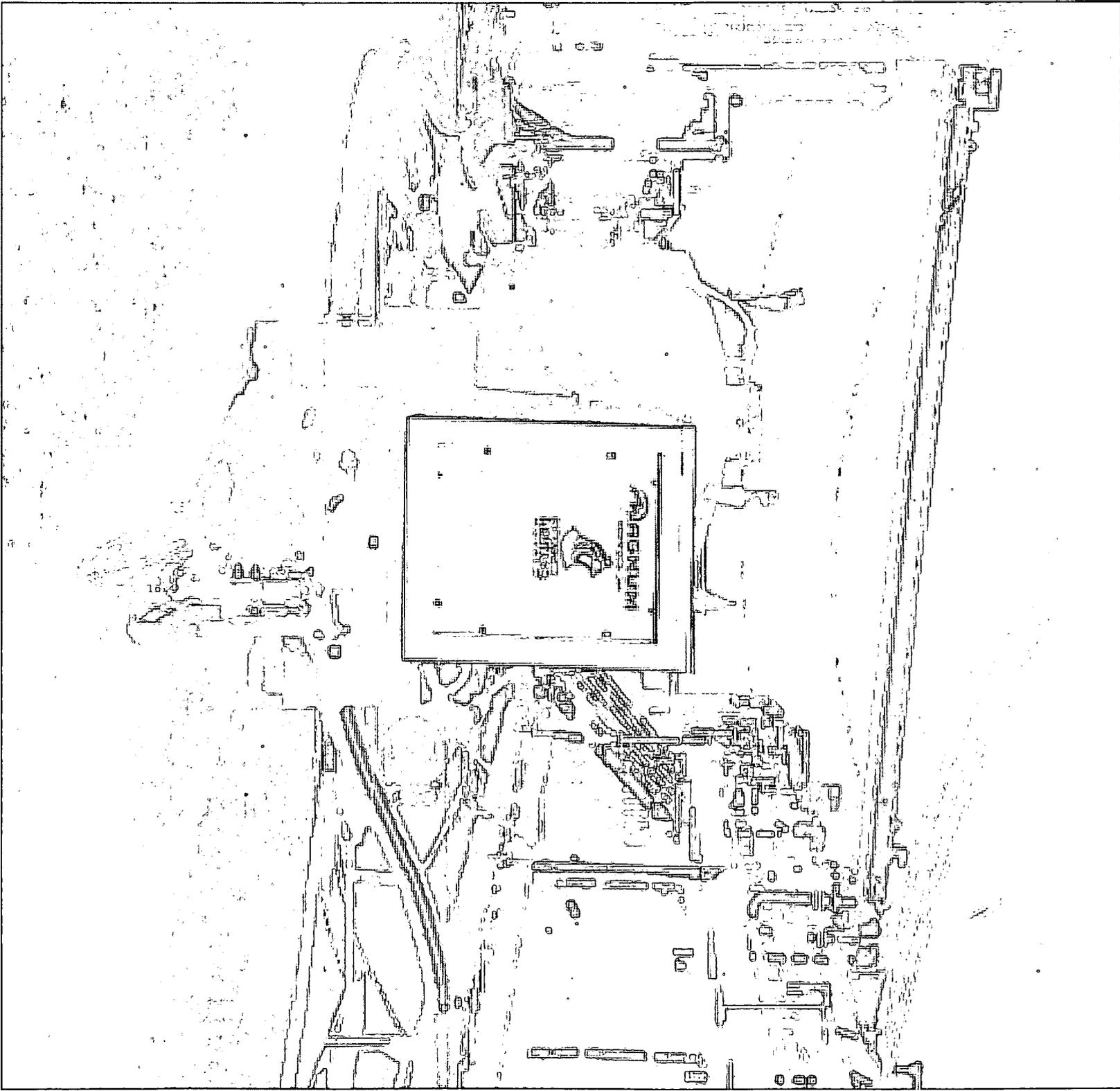
*[Handwritten signature of James Hawkins]*











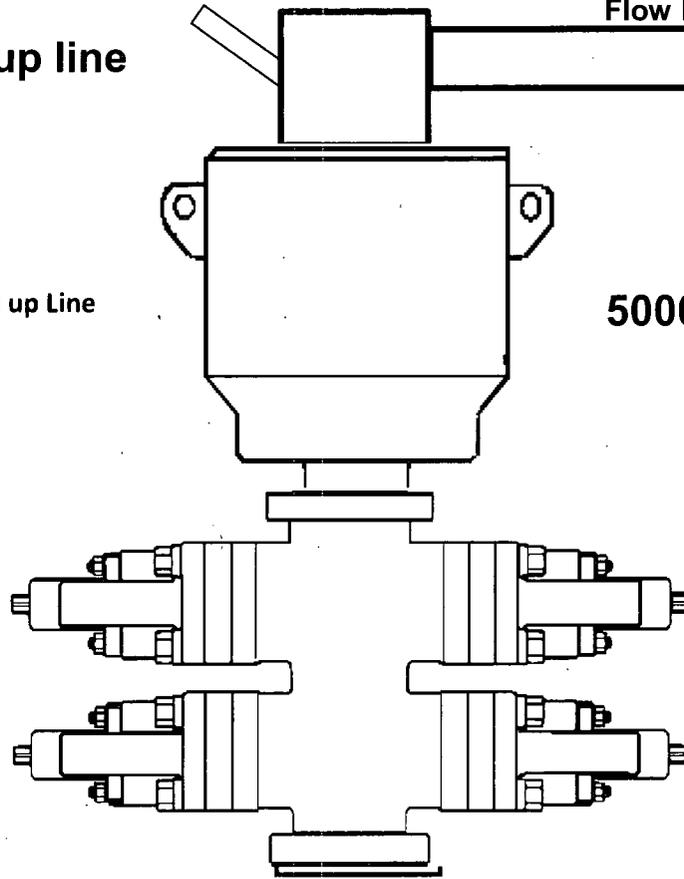
# 5,000 psi BOP Schematic

Rotating Head w/2" fill up line

Flow line to pit ---->

2" Fill up Line

5000# Annular Prev



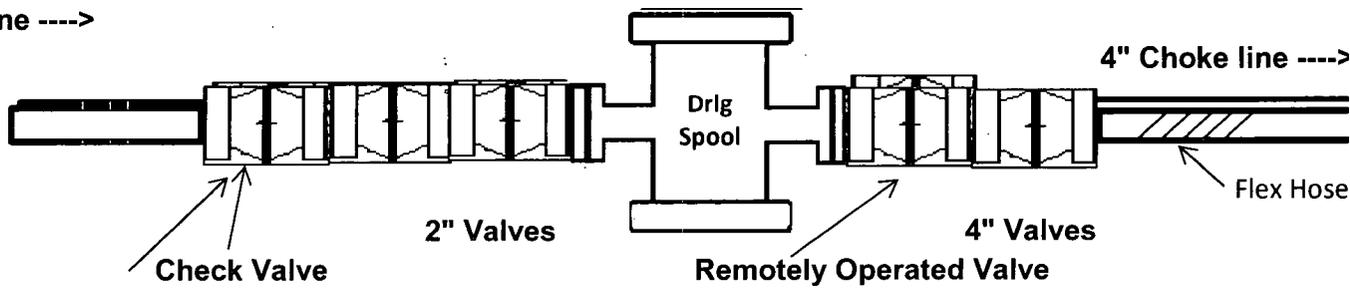
Blind Rams

13 5/8" 500

Pipe Rams

2" Kill line ---->

4" Choke line ---->



Check Valve

2" Valves

Remotely Operated Valve

4" Valves

Flex Hose



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.

## Internal Hydrostatic Test Graph

March 16, 2018

Customer: tatshaw

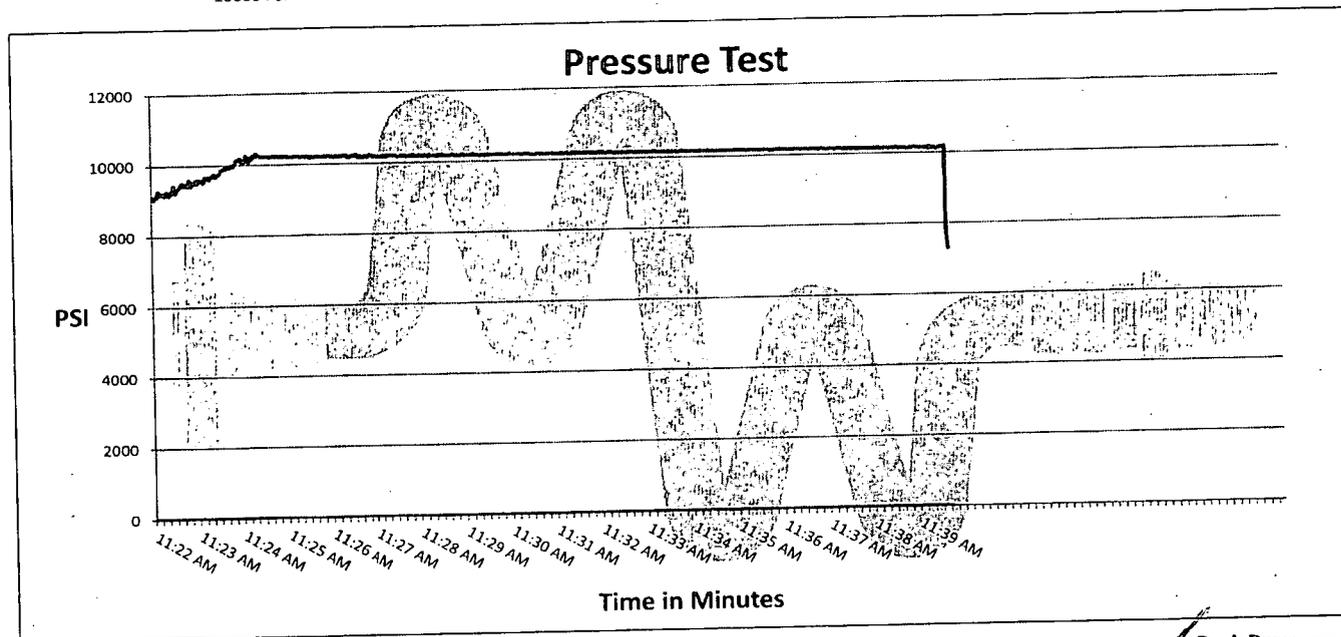
Pick Ticket #: 454857

### Hose Specifications

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

### Verification

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



Test Pressure  
10000 PSI

Time Held at Test Pressure  
16 Minutes

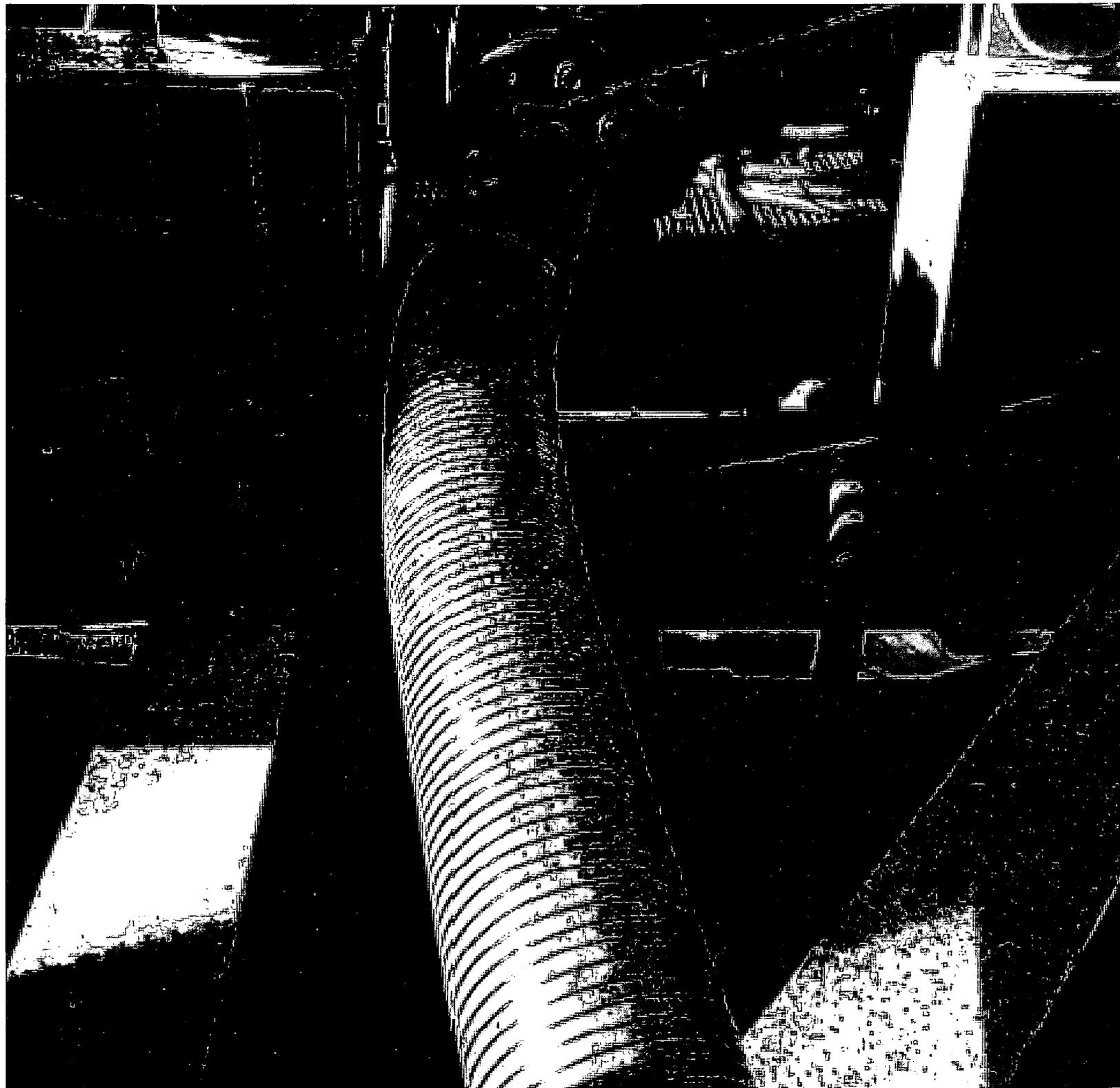
Actual Burst Pressure

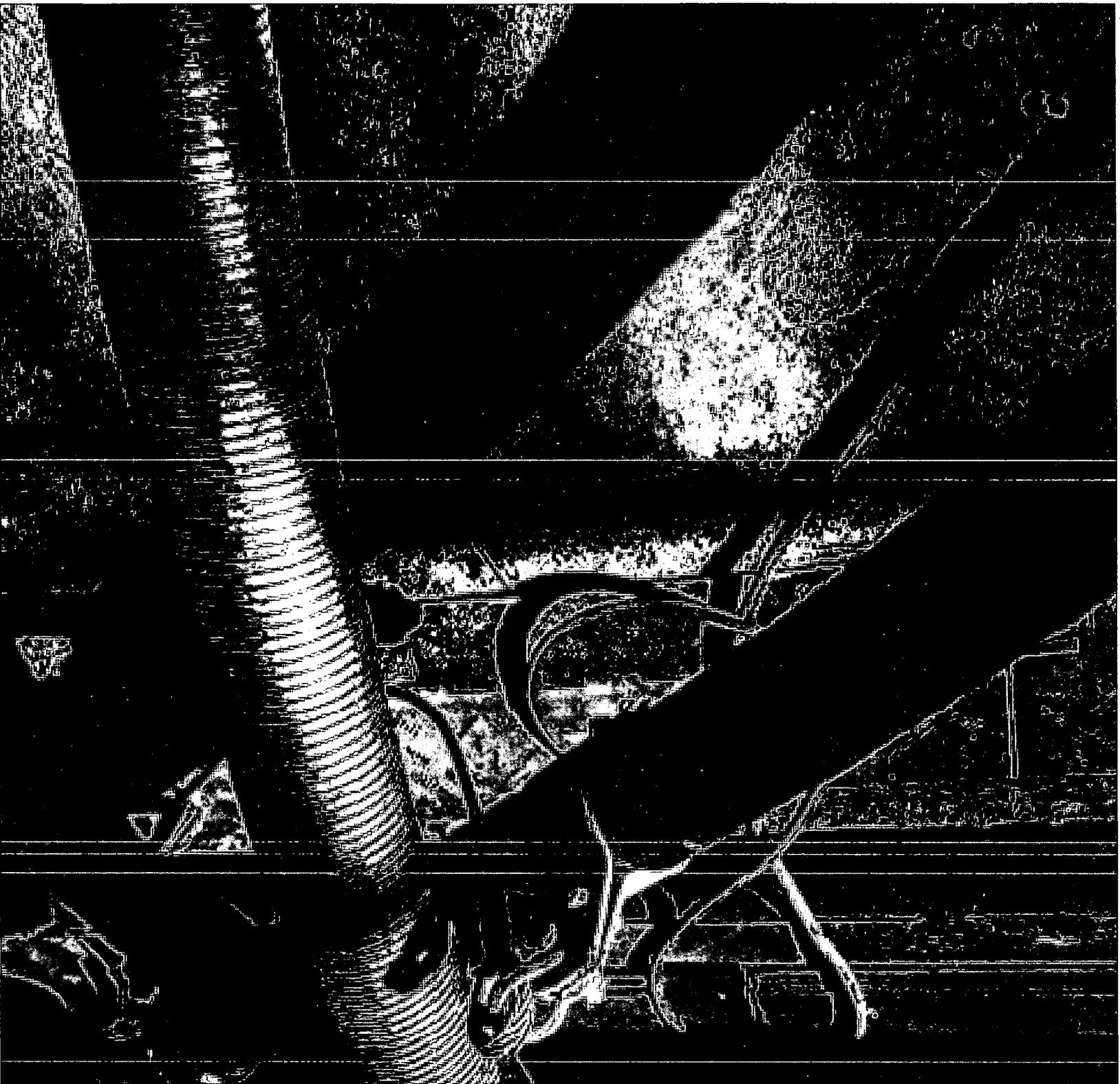
Peak Pressure  
10400 PSI

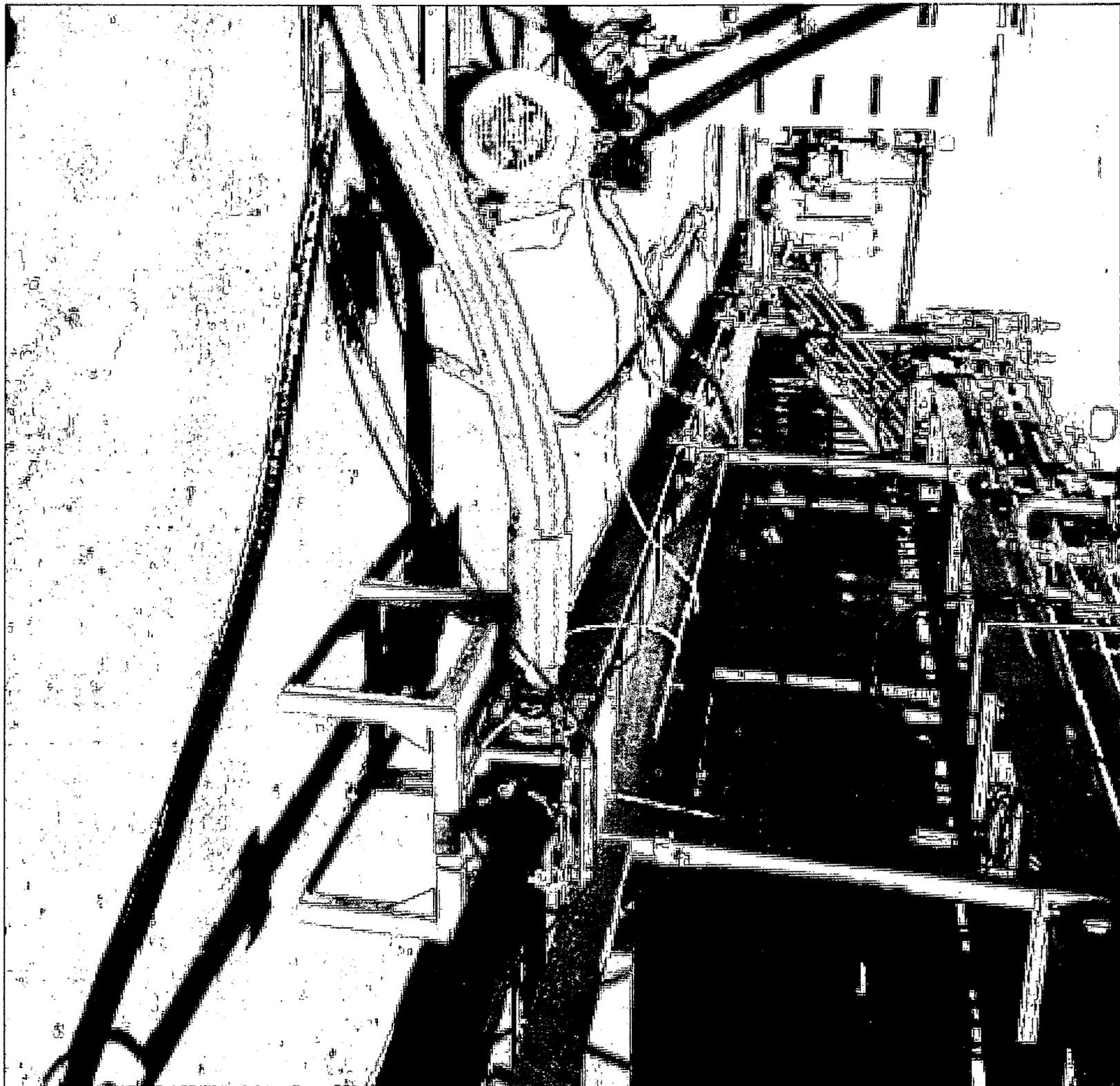
Comments: Hose assembly pressure tested with water at ambient temperature.

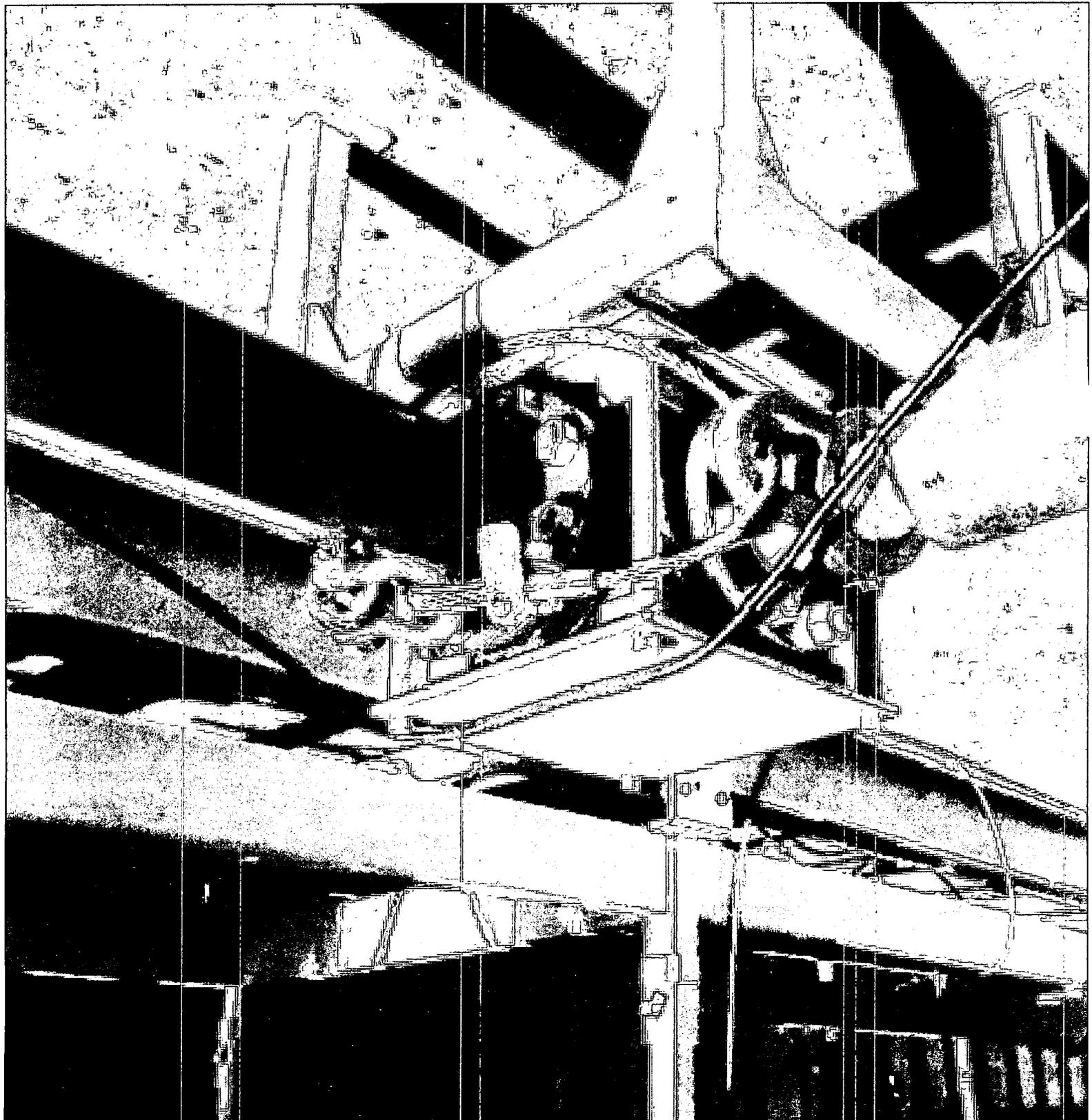
Tested By: Zach Tillman

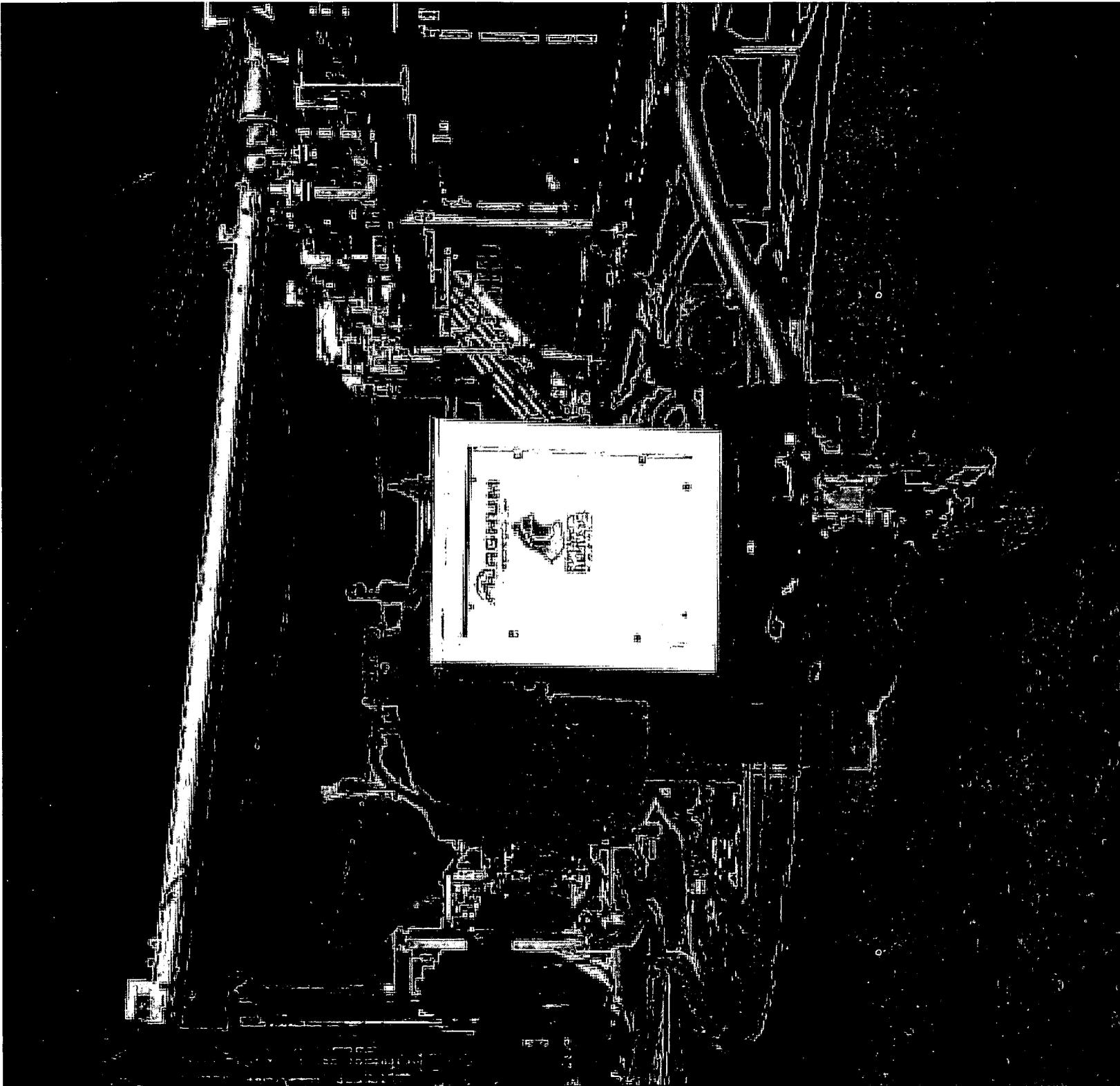
Approved By: James Hawkins











**Casing Program**

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

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

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

## Casing Program

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

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

**Casing Program**

Hole Size	Casing 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	9140	9.625"	40	HCL80	BTC	1.30	1.14	2.59
8.5	0	20,074	5.5"	23	P110	BTC	2.26	2.67	3.18
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	9140	9.625"	40	HCL80	BTC	1.30	1.14	2.59
8.5	0	20,074	5.5"	23	P110	BTC	2.26	2.67	3.18
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

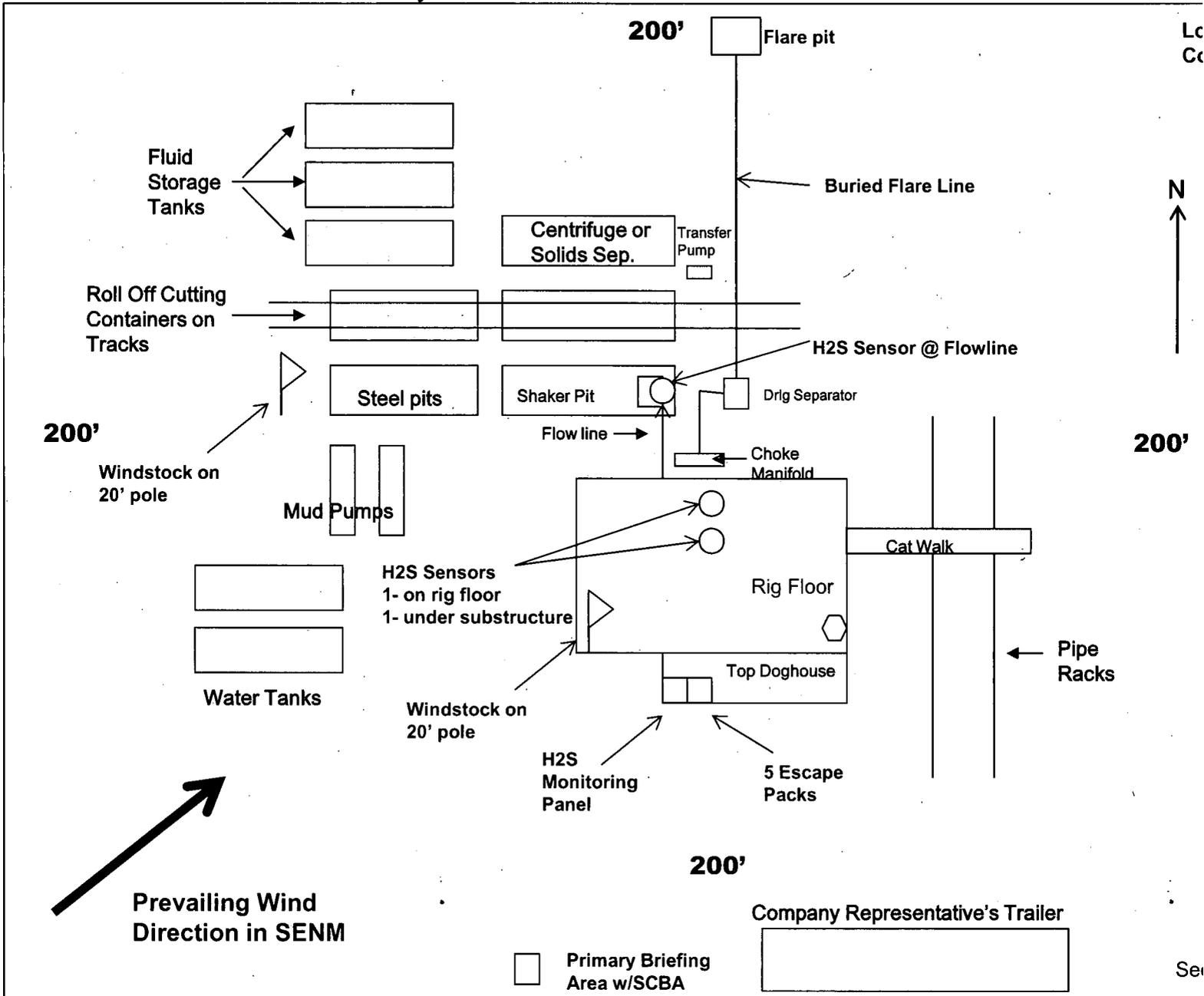
**Casing Program**

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	9140	9.625"	40	HCL80	BTC	1.30	1.14	2.59
8.5	0	20,074	5.5"	23	P110	BTC	2.26	2.67	3.18
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<sub>2</sub>S 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<sub>2</sub>S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H<sub>2</sub>S 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 H<sub>2</sub>S 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<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H<sub>2</sub>S zone (within 3 days or 500 feet) and weekly H<sub>2</sub>S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H<sub>2</sub>S 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<sub>2</sub>S SAFETY EQUIPMENT AND SYSTEMS**

Note: All H<sub>2</sub>S 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 H<sub>2</sub>S. If H<sub>2</sub>S greater than 100 ppm is encountered in the gas stream we will shut in and install H<sub>2</sub>S equipment.

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

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

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

# **W A R N I N G**

**YOU ARE ENTERING AN H<sub>2</sub>S AREA  
AUTHORIZED PERSONNEL ONLY**

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

**COG OPERATING LLC**

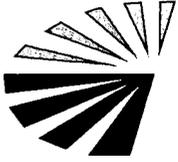
**1-575-748-6940**

## EMERGENCY CALL LIST

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

## EMERGENCY RESPONSE NUMBERS

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



C O N C H O

## **Concho Resources, Inc.**

Eddy County (NAD27 NME)  
(Howitzer) Sec-12\_T-24-S\_R-28-E  
Howitzer Federal Com #605H

OWB  
Plan #1

## **Anticollision Report**

02 November, 2018

 **INTREPID**

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	Stations	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,500.0 usft	<b>Error Surface:</b>	Pedal Curve
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	Date	11/02/18		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	9,337.3	Plan #1 (OWB)	MWD	OWSG MWD - Standard
9,337.3	20,073.3	Plan #1 (OWB)	MWD+IFR1+MS	MWD + IFR1 + Multi-Station Correction

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
Offset Well - Wellbore - Design						
(Howitzer) Sec-12_T-24-S_R-28-E						
Howitzer Federal Com #602H - OWB - Plan #1	6,069.6	6,025.0	1,026.5	978.3	21.297	CC
Howitzer Federal Com #602H - OWB - Plan #1	20,073.3	20,086.1	1,100.0	863.9	4.659	ES, SF
Howitzer Federal Com #603H - OWB - Plan #1	9,113.2	9,125.0	550.0	482.6	8.160	CC
Howitzer Federal Com #603H - OWB - Plan #1	20,073.3	19,931.1	571.9	340.6	2.472	ES, SF
Howitzer Federal Com #606H - OWB - Plan #1	2,000.0	1,999.1	30.0	13.6	1.833	CC, ES, SF

<b>Offset Design:</b> (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													Offset Well Error:	0.0 usft
<b>Reference Measured Depth (usft)</b>	<b>Vertical Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Vertical Depth (usft)</b>	<b>Semi Major Axis Reference (usft)</b>	<b>Semi Major Axis Offset (usft)</b>	<b>Highside Toolface (°)</b>	<b>Offset Wellbore Centre +N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Minimum Separation (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>	
0.0	0.0	5.1	5.1	0.0	0.0	-16.37	1,109.4	-325.8	1,156.2					
100.0	100.0	105.1	105.1	0.1	0.2	-16.37	1,109.4	-325.8	1,156.2	1,155.9	0.33	3,544.411		
200.0	200.0	205.1	205.1	0.6	0.6	-16.37	1,109.4	-325.8	1,156.2	1,155.1	1.17	986.194		
300.0	300.0	305.1	305.1	1.0	1.0	-16.37	1,109.4	-325.8	1,156.2	1,154.2	2.02	572.782		
400.0	400.0	405.1	405.1	1.4	1.4	-16.37	1,109.4	-325.8	1,156.2	1,153.4	2.86	403.595		
500.0	500.0	505.1	505.1	1.8	1.9	-16.37	1,109.4	-325.8	1,156.2	1,152.5	3.71	311.566		
600.0	600.0	605.1	605.1	2.3	2.3	-16.37	1,109.4	-325.8	1,156.2	1,151.7	4.56	253.713		
700.0	700.0	705.1	705.1	2.7	2.7	-16.37	1,109.4	-325.8	1,156.2	1,150.8	5.40	213.980		
800.0	800.0	805.1	805.1	3.1	3.1	-16.37	1,109.4	-325.8	1,156.2	1,150.0	6.25	185.007		
900.0	900.0	905.1	905.1	3.5	3.6	-16.37	1,109.4	-325.8	1,156.2	1,149.2	7.10	162.945		
1,000.0	1,000.0	1,005.1	1,005.1	4.0	4.0	-16.37	1,109.4	-325.8	1,156.2	1,148.3	7.94	145.583		
1,100.0	1,100.0	1,105.1	1,105.1	4.4	4.4	-16.37	1,109.4	-325.8	1,156.2	1,147.5	8.79	131.565		
1,200.0	1,200.0	1,205.1	1,205.1	4.8	4.8	-16.37	1,109.4	-325.8	1,156.2	1,146.6	9.63	120.010		
1,300.0	1,300.0	1,305.1	1,305.1	5.2	5.3	-16.37	1,109.4	-325.8	1,156.2	1,145.8	10.48	110.320		
1,400.0	1,400.0	1,405.1	1,405.1	5.6	5.7	-16.37	1,109.4	-325.8	1,156.2	1,144.9	11.33	102.079		
1,500.0	1,500.0	1,505.1	1,505.1	6.1	6.1	-16.37	1,109.4	-325.8	1,156.2	1,144.1	12.17	94.983		
1,600.0	1,600.0	1,605.1	1,605.1	6.5	6.5	-16.37	1,109.4	-325.8	1,156.2	1,143.2	13.02	88.809		
1,700.0	1,700.0	1,705.1	1,705.1	6.9	6.9	-16.37	1,109.4	-325.8	1,156.2	1,142.4	13.87	83.389		
1,800.0	1,800.0	1,805.1	1,805.1	7.3	7.4	-16.37	1,109.4	-325.8	1,156.2	1,141.5	14.71	78.593		
1,900.0	1,900.0	1,905.1	1,905.1	7.8	7.8	-16.37	1,109.4	-325.8	1,156.2	1,140.7	15.56	74.318		
2,000.0	2,000.0	2,000.0	2,000.0	8.2	8.2	-16.37	1,109.4	-325.8	1,156.3	1,139.9	16.38	70.578		

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	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	
2,015.3	2,015.3	2,018.1	2,018.1	8.2	8.2	-44.91	1,109.4	-325.8	1,156.2	1,139.7	16.49	70.109		
2,100.0	2,100.0	2,093.4	2,093.4	8.6	8.5	-44.91	1,110.3	-324.5	1,155.5	1,138.5	17.03	67.870		
2,200.0	2,199.8	2,182.3	2,182.2	8.9	8.6	-44.90	1,112.7	-321.0	1,153.3	1,135.8	17.51	65.853		
2,300.0	2,299.4	2,271.1	2,270.7	9.2	8.8	-44.89	1,116.6	-315.2	1,149.6	1,131.6	18.02	63.813		
2,400.0	2,398.9	2,361.1	2,360.1	9.6	9.0	-44.75	1,122.2	-307.1	1,145.6	1,127.1	18.54	61.781		
2,500.0	2,498.4	2,460.9	2,459.2	10.0	9.2	-44.54	1,129.1	-297.0	1,142.0	1,122.9	19.13	59.701		
2,600.0	2,597.8	2,560.8	2,558.3	10.3	9.4	-44.33	1,136.0	-287.0	1,138.4	1,118.7	19.74	57.664		
2,700.0	2,697.3	2,660.6	2,657.4	10.7	9.7	-44.11	1,142.9	-276.9	1,134.9	1,114.5	20.38	55.678		
2,800.0	2,796.7	2,760.5	2,756.5	11.1	10.0	-43.89	1,149.7	-266.9	1,131.3	1,110.3	21.05	53.752		
2,900.0	2,896.2	2,860.3	2,855.6	11.5	10.3	-43.68	1,156.6	-256.9	1,127.8	1,106.0	21.73	51.892		
3,000.0	2,995.6	2,960.2	2,954.7	11.9	10.6	-43.46	1,163.5	-246.8	1,124.2	1,101.8	22.44	50.102		
3,100.0	3,095.1	3,060.0	3,053.8	12.4	10.9	-43.24	1,170.3	-236.8	1,120.7	1,097.6	23.16	48.384		
3,200.0	3,194.5	3,159.8	3,152.9	12.8	11.3	-43.02	1,177.2	-226.7	1,117.3	1,093.4	23.90	46.738		
3,300.0	3,294.0	3,259.7	3,252.0	13.2	11.6	-42.79	1,184.1	-216.7	1,113.8	1,089.1	24.66	45.165		
3,400.0	3,393.4	3,359.5	3,351.1	13.6	12.0	-42.57	1,191.0	-206.7	1,110.3	1,084.9	25.43	43.663		
3,500.0	3,492.9	3,459.4	3,450.2	14.1	12.4	-42.34	1,197.8	-196.6	1,106.9	1,080.7	26.21	42.230		
3,600.0	3,592.3	3,559.2	3,549.3	14.5	12.8	-42.12	1,204.7	-186.6	1,103.5	1,076.5	27.00	40.864		
3,700.0	3,691.8	3,659.1	3,648.4	14.9	13.2	-41.89	1,211.6	-176.5	1,100.1	1,072.3	27.81	39.563		
3,800.0	3,791.2	3,758.9	3,747.5	15.4	13.6	-41.66	1,218.5	-166.5	1,096.7	1,068.1	28.62	38.323		
3,900.0	3,890.7	3,858.8	3,846.6	15.8	14.0	-41.43	1,225.3	-156.5	1,093.3	1,063.9	29.44	37.141		
4,000.0	3,990.1	3,958.6	3,945.7	16.3	14.4	-41.19	1,232.2	-146.4	1,090.0	1,059.7	30.26	36.016		
4,100.0	4,089.6	4,058.4	4,044.8	16.7	14.8	-40.96	1,239.1	-136.4	1,086.7	1,055.6	31.10	34.944		
4,200.0	4,189.0	4,158.3	4,143.9	17.2	15.2	-40.72	1,246.0	-126.3	1,083.3	1,051.4	31.94	33.921		
4,300.0	4,288.5	4,258.1	4,243.0	17.6	15.7	-40.49	1,252.8	-116.3	1,080.1	1,047.3	32.78	32.946		
4,400.0	4,387.9	4,358.0	4,342.1	18.1	16.1	-40.25	1,259.7	-106.3	1,076.8	1,043.1	33.63	32.016		
4,500.0	4,487.4	4,457.8	4,441.2	18.5	16.6	-40.01	1,266.6	-96.2	1,073.5	1,039.0	34.49	31.129		
4,600.0	4,586.9	4,557.7	4,540.4	19.0	17.0	-39.77	1,273.5	-86.2	1,070.3	1,034.9	35.35	30.281		
4,700.0	4,686.3	4,657.5	4,639.5	19.4	17.5	-39.52	1,280.3	-76.1	1,067.1	1,030.9	36.21	29.471		
4,800.0	4,785.8	4,757.4	4,738.6	19.9	17.9	-39.28	1,287.2	-66.1	1,063.9	1,026.8	37.07	28.697		
4,900.0	4,885.2	4,857.2	4,837.7	20.4	18.4	-39.03	1,294.1	-56.1	1,060.7	1,022.8	37.94	27.956		
5,000.0	4,984.7	4,957.1	4,936.8	20.8	18.8	-38.79	1,301.0	-46.0	1,057.5	1,018.7	38.81	27.247		
5,100.0	5,084.1	5,056.9	5,035.9	21.3	19.3	-38.54	1,307.8	-36.0	1,054.4	1,014.7	39.69	26.568		
5,200.0	5,183.6	5,156.7	5,135.0	21.8	19.7	-38.29	1,314.7	-25.9	1,051.3	1,010.7	40.56	25.918		
5,300.0	5,283.0	5,256.6	5,234.1	22.2	20.2	-38.03	1,321.6	-15.9	1,048.2	1,006.7	41.44	25.294		
5,400.0	5,382.5	5,356.4	5,333.2	22.7	20.7	-37.78	1,328.5	-5.9	1,045.1	1,002.8	42.32	24.695		
5,500.0	5,481.9	5,456.3	5,432.3	23.2	21.2	-37.53	1,335.3	4.2	1,042.0	998.8	43.20	24.121		
5,600.0	5,581.4	5,556.1	5,531.4	23.6	21.6	-37.27	1,342.2	14.2	1,039.0	994.9	44.08	23.569		
5,700.0	5,680.8	5,656.0	5,630.5	24.1	22.1	-37.01	1,349.1	24.3	1,036.0	991.0	44.97	23.039		
5,800.0	5,780.3	5,755.8	5,729.6	24.6	22.6	-36.75	1,356.0	34.3	1,033.0	987.1	45.85	22.529		
5,900.0	5,879.7	5,855.7	5,828.7	25.0	23.1	-36.49	1,362.8	44.3	1,030.0	983.3	46.74	22.039		
5,966.2	5,945.6	5,921.8	5,894.3	25.4	23.4	-36.32	1,367.4	51.0	1,028.1	980.7	47.32	21.725		
6,000.0	5,979.2	5,955.5	5,927.8	25.5	23.5	-36.21	1,369.7	54.4	1,027.2	979.6	47.62	21.573		
6,069.6	6,048.6	6,025.0	5,996.7	25.8	23.9	-35.97	1,374.5	61.4	1,026.5	978.3	48.20	21.297 CC		
6,100.0	6,078.9	6,055.3	6,026.8	25.9	24.0	-35.85	1,376.6	64.4	1,026.7	978.2	48.46	21.188		
6,200.0	6,178.8	6,154.9	6,125.7	26.3	24.5	-35.40	1,383.4	74.4	1,029.0	979.7	49.28	20.882		
6,266.2	6,245.0	6,220.7	6,190.9	26.5	24.8	-6.52	1,388.0	81.0	1,032.1	982.3	49.80	20.726		
6,300.0	6,278.8	6,254.2	6,224.3	26.7	25.0	-6.32	1,390.3	84.4	1,034.1	984.0	50.06	20.656		
6,400.0	6,378.8	6,353.5	6,322.8	27.0	25.4	-5.73	1,397.1	94.4	1,039.9	989.1	50.86	20.447		
6,500.0	6,478.8	6,452.7	6,421.3	27.4	25.9	-5.15	1,403.9	104.4	1,045.8	994.2	51.65	20.247		
6,600.0	6,578.8	6,552.0	6,519.8	27.7	26.4	-4.58	1,410.8	114.4	1,051.9	999.4	52.45	20.054		
6,700.0	6,678.8	6,651.3	6,618.3	28.1	26.9	-4.01	1,417.6	124.3	1,058.0	1,004.8	53.25	19.868		
6,800.0	6,778.8	6,750.5	6,716.8	28.4	27.4	-3.44	1,424.4	134.3	1,064.3	1,010.2	54.05	19.689		

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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+FR1+MS													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
		Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
6,900.0	6,878.8	6,849.8	6,815.4	28.8	27.9	-2.89	1,431.3	144.3	1,070.6	1,015.8	54.86	19.517		
7,000.0	6,978.8	6,949.0	6,913.9	29.2	28.4	-2.34	1,438.1	154.3	1,077.1	1,021.4	55.66	19.350		
7,100.0	7,078.8	7,048.3	7,012.4	29.5	28.8	-1.79	1,444.9	164.3	1,083.7	1,027.2	56.47	19.190		
7,200.0	7,178.8	7,147.5	7,110.9	29.9	29.3	-1.26	1,451.8	174.3	1,090.3	1,033.0	57.28	19.036		
7,300.0	7,278.8	7,272.3	7,235.0	30.3	29.9	-0.70	1,459.0	184.7	1,095.9	1,037.8	58.14	18.849		
7,400.0	7,378.8	7,399.3	7,361.7	30.6	30.4	-0.38	1,463.1	190.8	1,099.2	1,040.2	58.97	18.641		
7,500.0	7,478.8	7,521.5	7,483.9	31.0	30.7	-0.30	1,464.2	192.4	1,100.0	1,040.4	59.64	18.444		
7,600.0	7,578.8	7,621.5	7,583.9	31.4	30.9	-0.30	1,464.2	192.4	1,100.0	1,039.8	60.25	18.256		
7,700.0	7,678.8	7,721.5	7,683.9	31.8	31.1	-0.30	1,464.2	192.4	1,100.0	1,039.1	60.88	18.069		
7,800.0	7,778.8	7,821.5	7,783.9	32.1	31.4	-0.30	1,464.2	192.4	1,100.0	1,038.5	61.51	17.884		
7,900.0	7,878.8	7,921.5	7,883.9	32.5	31.6	-0.30	1,464.2	192.4	1,100.0	1,037.9	62.14	17.701		
8,000.0	7,978.8	8,021.5	7,983.9	32.9	31.9	-0.30	1,464.2	192.4	1,100.0	1,037.2	62.78	17.521		
8,100.0	8,078.8	8,121.5	8,083.9	33.3	32.1	-0.30	1,464.2	192.4	1,100.0	1,036.6	63.43	17.343		
8,200.0	8,178.8	8,221.5	8,183.9	33.6	32.4	-0.30	1,464.2	192.4	1,100.0	1,035.9	64.08	17.167		
8,300.0	8,278.8	8,321.5	8,283.9	34.0	32.6	-0.30	1,464.2	192.4	1,100.0	1,035.3	64.73	16.994		
8,400.0	8,378.8	8,421.5	8,383.9	34.4	32.9	-0.30	1,464.2	192.4	1,100.0	1,034.6	65.39	16.823		
8,500.0	8,478.8	8,521.5	8,483.9	34.8	33.1	-0.30	1,464.2	192.4	1,100.0	1,034.0	66.05	16.655		
8,600.0	8,578.8	8,621.5	8,583.9	35.2	33.4	-0.30	1,464.2	192.4	1,100.0	1,033.3	66.71	16.489		
8,700.0	8,678.8	8,721.5	8,683.9	35.5	33.6	-0.30	1,464.2	192.4	1,100.0	1,032.6	67.38	16.325		
8,800.0	8,778.8	8,821.5	8,783.9	35.9	33.9	-0.30	1,464.2	192.4	1,100.0	1,032.0	68.05	16.164		
8,900.0	8,878.8	8,921.5	8,883.9	36.3	34.2	-0.30	1,464.2	192.4	1,100.0	1,031.3	68.73	16.005		
9,000.0	8,978.8	9,021.5	8,983.9	36.7	34.5	-0.30	1,464.2	192.4	1,100.0	1,030.6	69.41	15.848		
9,100.0	9,078.8	9,121.5	9,083.9	37.1	34.7	-0.30	1,464.2	192.4	1,100.0	1,029.9	70.10	15.693		
9,200.0	9,178.8	9,221.5	9,183.9	37.5	35.0	-0.30	1,464.2	192.4	1,100.0	1,029.2	70.78	15.541		
9,300.0	9,278.8	9,321.5	9,283.9	37.9	35.3	-0.30	1,464.2	192.4	1,100.0	1,028.6	71.44	15.397		
9,337.3	9,316.1	9,358.7	9,321.2	38.0	35.3	-0.30	1,464.2	192.4	1,100.0	1,028.4	71.65	15.354		
9,350.0	9,328.8	9,371.3	9,333.7	38.0	35.3	89.55	1,464.2	192.2	1,100.0	1,028.3	71.67	15.348		
9,400.0	9,378.7	9,420.5	9,382.9	38.0	35.3	89.55	1,464.2	189.0	1,100.0	1,028.3	71.67	15.348		
9,450.0	9,428.1	9,469.8	9,431.6	38.0	35.3	89.56	1,464.2	181.6	1,100.0	1,028.4	71.66	15.350		
9,500.0	9,476.6	9,519.1	9,479.4	38.0	35.3	89.57	1,464.2	170.1	1,100.0	1,028.4	71.65	15.353		
9,550.0	9,524.0	9,568.4	9,526.2	38.0	35.3	89.58	1,464.3	154.5	1,100.0	1,028.4	71.63	15.356		
9,600.0	9,569.7	9,617.7	9,571.4	38.0	35.3	89.59	1,464.3	134.9	1,100.0	1,028.4	71.61	15.361		
9,650.0	9,613.5	9,667.0	9,614.8	38.0	35.3	89.61	1,464.4	111.4	1,100.0	1,028.4	71.59	15.366		
9,700.0	9,655.1	9,716.4	9,656.1	38.0	35.2	89.64	1,464.5	84.3	1,100.0	1,028.4	71.56	15.371		
9,750.0	9,694.0	9,765.8	9,694.9	38.0	35.2	89.66	1,464.6	53.8	1,100.0	1,028.5	71.54	15.377		
9,800.0	9,730.1	9,815.3	9,730.9	38.0	35.2	89.69	1,464.6	19.9	1,100.0	1,028.5	71.51	15.382		
9,850.0	9,763.1	9,864.8	9,764.0	38.1	35.2	89.72	1,464.7	-16.9	1,100.0	1,028.5	71.50	15.386		
9,900.0	9,792.6	9,914.3	9,793.7	38.1	35.2	89.75	1,464.9	-56.5	1,100.0	1,028.5	71.48	15.388		
9,950.0	9,818.5	9,963.9	9,820.0	38.1	35.1	89.78	1,465.0	-98.6	1,100.0	1,028.5	71.48	15.388		
10,000.0	9,840.6	10,013.6	9,842.5	38.1	35.1	89.82	1,465.1	-142.8	1,100.0	1,028.5	71.49	15.386		
10,050.0	9,858.7	10,063.3	9,861.1	38.1	35.1	89.85	1,465.2	-188.9	1,100.0	1,028.5	71.51	15.382		
10,100.0	9,872.7	10,113.1	9,875.7	38.1	35.1	89.89	1,465.3	-236.5	1,100.0	1,028.4	71.55	15.374		
10,150.0	9,882.4	10,162.9	9,886.2	38.1	35.1	89.93	1,465.5	-285.2	1,100.0	1,028.4	71.60	15.363		
10,200.0	9,887.8	10,212.8	9,892.3	38.1	35.1	89.97	1,465.6	-334.7	1,100.0	1,028.3	71.67	15.348		
10,238.8	9,889.1	10,251.6	9,894.1	38.1	35.1	90.00	1,465.7	-373.5	1,100.0	1,028.3	71.73	15.335		
10,248.1	9,889.0	10,260.9	9,894.2	38.1	35.1	90.01	1,465.7	-382.7	1,100.0	1,028.2	71.75	15.331		
10,300.0	9,888.0	10,312.8	9,893.2	38.1	35.1	90.01	1,465.9	-434.6	1,100.0	1,028.1	71.85	15.309		
10,400.0	9,886.1	10,412.8	9,891.2	38.1	35.1	90.00	1,466.1	-534.6	1,100.0	1,027.9	72.11	15.255		
10,500.0	9,884.2	10,512.8	9,889.2	38.1	35.2	90.00	1,466.4	-634.6	1,100.0	1,027.6	72.43	15.187		
10,600.0	9,882.3	10,612.8	9,887.2	38.2	35.3	89.99	1,466.6	-734.6	1,100.0	1,027.2	72.82	15.105		
10,700.0	9,880.4	10,712.8	9,885.3	38.4	35.4	89.98	1,466.9	-834.5	1,100.0	1,026.7	73.28	15.012		
10,800.0	9,878.6	10,812.8	9,883.3	38.7	35.5	89.98	1,467.2	-934.5	1,100.0	1,026.2	73.80	14.906		

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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+HFR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning			
		Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)						
10,900.0	9,876.7	10,912.8	9,881.3	39.0	35.7	89.97	1,467.4	-1,034.5	1,100.0	1,025.6	74.38	14.789				
11,000.0	9,874.8	11,012.8	9,879.3	39.3	36.0	89.97	1,467.7	-1,134.5	1,100.0	1,025.0	75.02	14.662				
11,100.0	9,872.9	11,112.8	9,877.3	39.7	36.3	89.96	1,468.0	-1,234.5	1,100.0	1,024.3	75.73	14.525				
11,200.0	9,871.0	11,212.8	9,875.3	40.1	36.6	89.96	1,468.2	-1,334.4	1,100.0	1,023.5	76.49	14.380				
11,300.0	9,869.2	11,312.8	9,873.3	40.5	36.9	89.95	1,468.5	-1,434.4	1,100.0	1,022.7	77.32	14.227				
11,400.0	9,867.3	11,412.8	9,871.4	41.0	37.3	89.95	1,468.8	-1,534.4	1,100.0	1,021.8	78.19	14.068				
11,500.0	9,865.4	11,512.8	9,869.4	41.5	37.8	89.94	1,469.0	-1,634.4	1,100.0	1,020.9	79.12	13.903				
11,600.0	9,863.5	11,612.8	9,867.4	42.0	38.2	89.94	1,469.3	-1,734.4	1,100.0	1,019.9	80.10	13.732				
11,700.0	9,861.6	11,712.8	9,865.4	42.5	38.7	89.93	1,469.6	-1,834.3	1,100.0	1,018.9	81.13	13.558				
11,800.0	9,859.7	11,812.8	9,863.4	43.0	39.2	89.93	1,469.8	-1,934.3	1,100.0	1,017.8	82.21	13.380				
11,900.0	9,857.9	11,912.8	9,861.4	43.6	39.8	89.92	1,470.1	-2,034.3	1,100.0	1,016.6	83.33	13.200				
12,000.0	9,856.0	12,012.8	9,859.4	44.2	40.3	89.91	1,470.4	-2,134.3	1,100.0	1,015.5	84.50	13.017				
12,100.0	9,854.1	12,112.8	9,857.5	44.8	40.9	89.91	1,470.6	-2,234.3	1,100.0	1,014.3	85.71	12.834				
12,200.0	9,852.2	12,212.8	9,855.5	45.4	41.5	89.90	1,470.9	-2,334.2	1,100.0	1,013.0	86.96	12.649				
12,300.0	9,850.3	12,312.8	9,853.5	46.1	42.2	89.90	1,471.2	-2,434.2	1,100.0	1,011.7	88.25	12.464				
12,400.0	9,848.4	12,412.8	9,851.5	46.8	42.8	89.89	1,471.4	-2,534.2	1,100.0	1,010.4	89.58	12.280				
12,500.0	9,846.6	12,512.8	9,849.5	47.4	43.5	89.89	1,471.7	-2,634.2	1,100.0	1,009.0	90.94	12.096				
12,600.0	9,844.7	12,612.8	9,847.5	48.1	44.2	89.88	1,472.0	-2,734.2	1,100.0	1,007.7	92.33	11.913				
12,700.0	9,842.8	12,712.8	9,845.5	48.9	44.9	89.88	1,472.2	-2,834.1	1,100.0	1,006.2	93.76	11.732				
12,800.0	9,840.9	12,812.8	9,843.6	49.6	45.7	89.87	1,472.5	-2,934.1	1,100.0	1,004.8	95.22	11.552				
12,900.0	9,839.0	12,912.8	9,841.6	50.3	46.4	89.87	1,472.8	-3,034.1	1,100.0	1,003.3	96.70	11.375				
13,000.0	9,837.2	13,012.8	9,839.6	51.1	47.2	89.86	1,473.0	-3,134.1	1,100.0	1,001.8	98.22	11.199				
13,100.0	9,835.3	13,112.8	9,837.6	51.8	47.9	89.86	1,473.3	-3,234.1	1,100.0	1,000.2	99.76	11.026				
13,200.0	9,833.4	13,212.8	9,835.6	52.6	48.7	89.85	1,473.5	-3,334.0	1,100.0	998.7	101.33	10.855				
13,300.0	9,831.5	13,312.8	9,833.6	53.4	49.5	89.84	1,473.8	-3,434.0	1,100.0	997.1	102.92	10.688				
13,400.0	9,829.6	13,412.8	9,831.6	54.2	50.3	89.84	1,474.1	-3,534.0	1,100.0	995.4	104.54	10.522				
13,500.0	9,827.7	13,512.8	9,829.7	55.0	51.2	89.83	1,474.3	-3,634.0	1,100.0	993.8	106.18	10.360	*			
13,600.0	9,825.9	13,612.8	9,827.7	55.9	52.0	89.83	1,474.6	-3,734.0	1,100.0	992.2	107.83	10.201				
13,700.0	9,824.0	13,712.8	9,825.7	56.7	52.8	89.82	1,474.9	-3,833.9	1,100.0	990.5	109.51	10.044				
13,800.0	9,822.1	13,812.8	9,823.7	57.5	53.7	89.82	1,475.1	-3,933.9	1,100.0	988.8	111.21	9.891				
13,900.0	9,820.2	13,912.8	9,821.7	58.4	54.6	89.81	1,475.4	-4,033.9	1,100.0	987.1	112.93	9.740				
14,000.0	9,818.3	14,012.8	9,819.7	59.3	55.4	89.81	1,475.7	-4,133.9	1,100.0	985.3	114.66	9.593				
14,100.0	9,816.4	14,112.8	9,817.7	60.1	56.3	89.80	1,475.9	-4,233.9	1,100.0	983.6	116.42	9.449				
14,200.0	9,814.6	14,212.8	9,815.8	61.0	57.2	89.80	1,476.2	-4,333.8	1,100.0	981.8	118.18	9.307				
14,300.0	9,812.7	14,312.8	9,813.8	61.9	58.1	89.79	1,476.5	-4,433.8	1,100.0	980.0	119.97	9.169				
14,400.0	9,810.8	14,412.8	9,811.8	62.8	59.0	89.79	1,476.7	-4,533.8	1,100.0	978.2	121.76	9.034				
14,500.0	9,808.9	14,512.8	9,809.8	63.7	59.9	89.78	1,477.0	-4,633.8	1,100.0	976.4	123.58	8.901				
14,600.0	9,807.0	14,612.8	9,807.8	64.6	60.8	89.77	1,477.3	-4,733.8	1,100.0	974.6	125.40	8.772				
14,700.0	9,805.2	14,712.8	9,805.8	65.5	61.8	89.77	1,477.5	-4,833.7	1,100.0	972.8	127.24	8.645				
14,800.0	9,803.3	14,812.8	9,803.8	66.4	62.7	89.76	1,477.8	-4,933.7	1,100.0	970.9	129.09	8.521				
14,900.0	9,801.4	14,912.8	9,801.9	67.4	63.6	89.76	1,478.1	-5,033.7	1,100.0	969.0	130.95	8.400				
15,000.0	9,799.5	15,012.8	9,799.9	68.3	64.6	89.75	1,478.3	-5,133.7	1,100.0	967.2	132.82	8.282				
15,100.0	9,797.6	15,112.8	9,797.9	69.2	65.5	89.75	1,478.6	-5,233.7	1,100.0	965.3	134.71	8.166				
15,200.0	9,795.7	15,212.8	9,795.9	70.2	66.5	89.74	1,478.9	-5,333.6	1,100.0	963.4	136.60	8.052				
15,300.0	9,793.9	15,312.8	9,793.9	71.1	67.4	89.74	1,479.1	-5,433.6	1,100.0	961.5	138.51	7.942				
15,400.0	9,792.0	15,412.8	9,791.9	72.1	68.4	89.73	1,479.4	-5,533.6	1,100.0	959.6	140.42	7.833				
15,500.0	9,790.1	15,512.8	9,789.9	73.0	69.4	89.73	1,479.6	-5,633.6	1,100.0	957.7	142.35	7.728				
15,600.0	9,788.2	15,612.8	9,788.0	74.0	70.3	89.72	1,479.9	-5,733.6	1,100.0	955.7	144.28	7.624				
15,700.0	9,786.3	15,712.8	9,786.0	74.9	71.3	89.72	1,480.2	-5,833.5	1,100.0	953.8	146.22	7.523				
15,800.0	9,784.4	15,812.8	9,784.0	75.9	72.3	89.71	1,480.4	-5,933.5	1,100.0	951.8	148.17	7.424				
15,900.0	9,782.6	15,912.8	9,782.0	76.9	73.3	89.71	1,480.7	-6,033.5	1,100.0	949.9	150.12	7.327				
16,000.0	9,780.7	16,012.8	9,780.0	77.9	74.3	89.70	1,481.0	-6,133.5	1,100.0	947.9	152.09	7.233				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27-NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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-HFR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between		Minimum Separation (usft)	Separation Factor	Warning			
							+N/-S (usft)	+E/-W (usft)	Centres (usft)	Ellipses (usft)						
16,100.0	9,778.8	16,112.8	9,778.0	78.8	75.2	89.69	1,481.2	-6,233.5	1,100.0	945.9	154.06	7.140				
16,200.0	9,776.9	16,212.8	9,776.0	79.8	76.2	89.69	1,481.5	-6,333.4	1,100.0	944.0	156.04	7.050				
16,300.0	9,775.0	16,312.8	9,774.1	80.8	77.2	89.68	1,481.8	-6,433.4	1,100.0	942.0	158.02	6.961				
16,400.0	9,773.1	16,412.8	9,772.1	81.8	78.2	89.68	1,482.0	-6,533.4	1,100.0	940.0	160.01	6.875				
16,500.0	9,771.3	16,512.8	9,770.1	82.8	79.2	89.67	1,482.3	-6,633.4	1,100.0	938.0	162.01	6.790				
16,600.0	9,769.4	16,612.8	9,768.1	83.8	80.3	89.67	1,482.6	-6,733.4	1,100.0	936.0	164.01	6.707				
16,700.0	9,767.5	16,712.8	9,766.1	84.8	81.3	89.66	1,482.8	-6,833.3	1,100.0	934.0	166.02	6.626				
16,800.0	9,765.6	16,812.8	9,764.1	85.8	82.3	89.66	1,483.1	-6,933.3	1,100.0	932.0	168.04	6.546				
16,900.0	9,763.7	16,912.8	9,762.1	86.8	83.3	89.65	1,483.4	-7,033.3	1,100.0	929.9	170.06	6.469				
17,000.0	9,761.9	17,012.8	9,760.2	87.8	84.3	89.65	1,483.6	-7,133.3	1,100.0	927.9	172.08	6.392				
17,100.0	9,760.0	17,112.8	9,758.2	88.8	85.3	89.64	1,483.9	-7,233.3	1,100.0	925.9	174.11	6.318				
17,200.0	9,758.1	17,212.8	9,756.2	89.8	86.3	89.64	1,484.2	-7,333.2	1,100.0	923.9	176.15	6.245				
17,300.0	9,756.2	17,312.8	9,754.2	90.8	87.4	89.63	1,484.4	-7,433.2	1,100.0	921.8	178.18	6.173				
17,400.0	9,754.3	17,412.8	9,752.2	91.9	88.4	89.62	1,484.7	-7,533.2	1,100.0	919.8	180.23	6.103				
17,500.0	9,752.4	17,512.8	9,750.2	92.9	89.4	89.62	1,485.0	-7,633.2	1,100.0	917.7	182.28	6.035				
17,600.0	9,750.6	17,612.8	9,748.2	93.9	90.5	89.61	1,485.2	-7,733.2	1,100.0	915.7	184.33	5.968				
17,700.0	9,748.7	17,712.8	9,746.3	94.9	91.5	89.61	1,485.5	-7,833.1	1,100.0	913.6	186.39	5.902				
17,800.0	9,746.8	17,812.8	9,744.3	95.9	92.5	89.60	1,485.8	-7,933.1	1,100.0	911.6	188.45	5.837				
17,900.0	9,744.9	17,912.8	9,742.3	97.0	93.6	89.60	1,486.0	-8,033.1	1,100.0	909.5	190.51	5.774				
18,000.0	9,743.0	18,012.8	9,740.3	98.0	94.6	89.59	1,486.3	-8,133.1	1,100.0	907.4	192.58	5.712				
18,100.0	9,741.1	18,112.8	9,738.3	99.0	95.6	89.59	1,486.5	-8,233.1	1,100.0	905.4	194.65	5.651				
18,200.0	9,739.3	18,212.8	9,736.3	100.1	96.7	89.58	1,486.8	-8,333.0	1,100.0	903.3	196.72	5.592				
18,300.0	9,737.4	18,312.8	9,734.3	101.1	97.7	89.58	1,487.1	-8,433.0	1,100.0	901.2	198.80	5.533				
18,400.0	9,735.5	18,412.8	9,732.4	102.1	98.8	89.57	1,487.3	-8,533.0	1,100.0	899.1	200.88	5.476				
18,500.0	9,733.6	18,512.8	9,730.4	103.2	99.8	89.57	1,487.6	-8,633.0	1,100.0	897.0	202.97	5.420				
18,600.0	9,731.7	18,612.8	9,728.4	104.2	100.9	89.56	1,487.9	-8,733.0	1,100.0	895.0	205.06	5.364				
18,700.0	9,729.9	18,712.8	9,726.4	105.3	101.9	89.55	1,488.1	-8,832.9	1,100.0	892.9	207.15	5.310				
18,800.0	9,728.0	18,812.8	9,724.4	106.3	103.0	89.55	1,488.4	-8,932.9	1,100.0	890.8	209.24	5.257				
18,900.0	9,726.1	18,912.8	9,722.4	107.3	104.0	89.54	1,488.7	-9,032.9	1,100.0	888.7	211.34	5.205				
19,000.0	9,724.2	19,012.8	9,720.4	108.4	105.1	89.54	1,488.9	-9,132.9	1,100.0	886.6	213.43	5.154				
19,100.0	9,722.3	19,112.8	9,718.5	109.4	106.1	89.53	1,489.2	-9,232.9	1,100.0	884.5	215.54	5.104				
19,200.0	9,720.4	19,212.8	9,716.5	110.5	107.2	89.53	1,489.5	-9,332.8	1,100.0	882.4	217.64	5.054				
19,300.0	9,718.6	19,312.8	9,714.5	111.5	108.2	89.52	1,489.7	-9,432.8	1,100.0	880.3	219.75	5.006				
19,400.0	9,716.7	19,412.8	9,712.5	112.6	109.3	89.52	1,490.0	-9,532.8	1,100.0	878.2	221.86	4.958				
19,500.0	9,714.8	19,512.8	9,710.5	113.6	110.3	89.51	1,490.3	-9,632.8	1,100.0	876.1	223.97	4.912				
19,600.0	9,712.9	19,612.8	9,708.5	114.7	111.4	89.51	1,490.5	-9,732.8	1,100.0	873.9	226.08	4.866				
19,700.0	9,711.0	19,712.8	9,706.5	115.7	112.5	89.50	1,490.8	-9,832.7	1,100.0	871.8	228.20	4.821				
19,800.0	9,709.1	19,812.8	9,704.6	116.8	113.5	89.50	1,491.1	-9,932.7	1,100.0	869.7	230.31	4.776				
19,900.0	9,707.3	19,912.8	9,702.6	117.9	114.6	89.49	1,491.3	-10,032.7	1,100.0	867.6	232.43	4.733				
20,000.0	9,705.4	20,012.8	9,700.6	118.9	115.7	89.48	1,491.6	-10,132.7	1,100.0	865.5	234.55	4.690				
20,073.3	9,704.0	20,086.1	9,699.1	119.7	116.4	89.48	1,491.8	-10,206.0	1,100.0	863.9	236.11	4.659 ES, SF				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #603H - OWB - Plan #1													Offset Site Error:	0.0 usft		
Survey Program: 0-MWD, 9203-MWD+IFR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	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	4.9	4.9	0.0	0.0	-16.79	1,079.4	-325.7	1,127.5							
100.0	100.0	104.9	104.9	0.1	0.2	-16.79	1,079.4	-325.7	1,127.5	1,127.1	0.33	3,465.171				
200.0	200.0	204.9	204.9	0.6	0.6	-16.79	1,079.4	-325.7	1,127.5	1,126.3	1.17	962.340				
300.0	300.0	304.9	304.9	1.0	1.0	-16.79	1,079.4	-325.7	1,127.5	1,125.5	2.02	558.759				
400.0	400.0	404.9	404.9	1.4	1.4	-16.79	1,079.4	-325.7	1,127.5	1,124.6	2.86	393.665				
500.0	500.0	504.9	504.9	1.8	1.9	-16.79	1,079.4	-325.7	1,127.5	1,123.8	3.71	303.880				
600.0	600.0	604.9	604.9	2.3	2.3	-16.79	1,079.4	-325.7	1,127.5	1,122.9	4.56	247.444				
700.0	700.0	704.9	704.9	2.7	2.7	-16.79	1,079.4	-325.7	1,127.5	1,122.1	5.40	208.687				
800.0	800.0	804.9	804.9	3.1	3.1	-16.79	1,079.4	-325.7	1,127.5	1,121.2	6.25	180.427				
900.0	900.0	904.9	904.9	3.5	3.6	-16.79	1,079.4	-325.7	1,127.5	1,120.4	7.10	158.908				
1,000.0	1,000.0	1,004.9	1,004.9	4.0	4.0	-16.79	1,079.4	-325.7	1,127.5	1,119.5	7.94	141.975				
1,100.0	1,100.0	1,104.9	1,104.9	4.4	4.4	-16.79	1,079.4	-325.7	1,127.5	1,118.7	8.79	128.303				
1,200.0	1,200.0	1,204.9	1,204.9	4.8	4.8	-16.79	1,079.4	-325.7	1,127.5	1,117.8	9.63	117.033				
1,300.0	1,300.0	1,304.9	1,304.9	5.2	5.3	-16.79	1,079.4	-325.7	1,127.5	1,117.0	10.48	107.583				
1,400.0	1,400.0	1,404.9	1,404.9	5.6	5.7	-16.79	1,079.4	-325.7	1,127.5	1,116.1	11.33	99.545				
1,500.0	1,500.0	1,504.9	1,504.9	6.1	6.1	-16.79	1,079.4	-325.7	1,127.5	1,115.3	12.17	92.625				
1,600.0	1,600.0	1,604.9	1,604.9	6.5	6.5	-16.79	1,079.4	-325.7	1,127.5	1,114.4	13.02	86.604				
1,700.0	1,700.0	1,704.9	1,704.9	6.9	6.9	-16.79	1,079.4	-325.7	1,127.5	1,113.6	13.86	81.318				
1,800.0	1,800.0	1,804.9	1,804.9	7.3	7.4	-16.79	1,079.4	-325.7	1,127.5	1,112.8	14.71	76.641				
1,900.0	1,900.0	1,904.9	1,904.9	7.8	7.8	-16.79	1,079.4	-325.7	1,127.5	1,111.9	15.56	72.472				
2,000.0	2,000.0	2,006.3	2,006.3	8.2	8.2	-16.79	1,079.4	-325.7	1,127.5	1,111.1	16.40	68.760				
2,100.0	2,100.0	2,134.8	2,134.7	8.6	8.4	-45.32	1,078.4	-322.7	1,124.8	1,107.8	17.00	66.167				
2,200.0	2,199.8	2,262.7	2,262.3	8.9	8.5	-45.30	1,075.8	-314.2	1,117.3	1,099.9	17.40	64.199				
2,300.0	2,299.4	2,370.1	2,369.2	9.2	8.6	-45.34	1,072.4	-303.8	1,105.4	1,087.5	17.84	61.957				
2,400.0	2,398.9	2,469.2	2,467.7	9.6	8.7	-45.27	1,069.3	-293.9	1,092.1	1,073.8	18.31	59.651				
2,500.0	2,498.4	2,568.3	2,566.3	10.0	8.9	-45.21	1,066.2	-284.0	1,078.9	1,060.1	18.81	57.368				
2,600.0	2,597.8	2,667.5	2,664.9	10.3	9.1	-45.14	1,063.0	-274.1	1,065.7	1,046.4	19.34	55.116				
2,700.0	2,697.3	2,766.6	2,763.5	10.7	9.2	-45.07	1,059.9	-264.3	1,052.5	1,032.6	19.89	52.910				
2,800.0	2,796.7	2,865.7	2,862.0	11.1	9.5	-45.00	1,056.8	-254.4	1,039.3	1,018.8	20.48	50.758				
2,900.0	2,896.2	2,964.8	2,960.6	11.5	9.7	-44.93	1,053.6	-244.5	1,026.1	1,005.0	21.08	48.670				
3,000.0	2,995.6	3,063.9	3,059.2	11.9	9.9	-44.85	1,050.5	-234.6	1,012.9	991.2	21.71	46.650				
3,100.0	3,095.1	3,163.0	3,157.7	12.4	10.2	-44.78	1,047.4	-224.7	999.7	977.3	22.36	44.703				
3,200.0	3,194.5	3,262.1	3,256.3	12.8	10.5	-44.70	1,044.3	-214.9	986.5	963.4	23.03	42.829				
3,300.0	3,294.0	3,361.3	3,354.9	13.2	10.8	-44.62	1,041.1	-205.0	973.2	949.5	23.72	41.032				
3,400.0	3,393.4	3,460.4	3,453.5	13.6	11.1	-44.53	1,038.0	-195.1	960.0	935.6	24.42	39.309				
3,500.0	3,492.9	3,559.5	3,552.0	14.1	11.4	-44.45	1,034.9	-185.2	946.8	921.7	25.14	37.660				
3,600.0	3,592.3	3,658.6	3,650.6	14.5	11.8	-44.36	1,031.7	-175.4	933.6	907.8	25.87	36.084				
3,700.0	3,691.8	3,757.7	3,749.2	14.9	12.1	-44.27	1,028.6	-165.5	920.5	893.8	26.62	34.579				
3,800.0	3,791.2	3,856.8	3,847.8	15.4	12.5	-44.18	1,025.5	-155.6	907.3	879.9	27.38	33.141				
3,900.0	3,890.7	3,955.9	3,946.3	15.8	12.9	-44.08	1,022.3	-145.7	894.1	865.9	28.14	31.769				
4,000.0	3,990.1	4,055.1	4,044.9	16.3	13.2	-43.98	1,019.2	-135.9	880.9	852.0	28.92	30.459				
4,100.0	4,089.6	4,154.2	4,143.5	16.7	13.6	-43.88	1,016.1	-126.0	867.7	838.0	29.71	29.209				
4,200.0	4,189.0	4,253.3	4,242.0	17.2	14.0	-43.78	1,012.9	-116.1	854.5	824.0	30.50	28.016				
4,300.0	4,288.5	4,352.4	4,340.6	17.6	14.4	-43.67	1,009.8	-106.2	841.3	810.0	31.30	26.876				
4,400.0	4,387.9	4,451.5	4,439.2	18.1	14.8	-43.56	1,006.7	-96.4	828.2	796.0	32.11	25.789				
4,500.0	4,487.4	4,550.6	4,537.8	18.5	15.2	-43.44	1,003.5	-86.5	815.0	782.0	32.93	24.749				
4,600.0	4,586.9	4,649.7	4,636.3	19.0	15.6	-43.33	1,000.4	-76.6	801.8	768.1	33.75	23.756				
4,700.0	4,686.3	4,748.9	4,734.9	19.4	16.0	-43.20	997.3	-66.7	788.6	754.1	34.58	22.807				
4,800.0	4,785.8	4,848.0	4,833.5	19.9	16.4	-43.08	994.1	-56.9	775.5	740.1	35.41	21.898				
4,900.0	4,885.2	4,947.1	4,932.0	20.4	16.9	-42.94	991.0	-47.0	762.3	726.1	36.25	21.029				
5,000.0	4,984.7	5,046.2	5,030.6	20.8	17.3	-42.81	987.9	-37.1	749.2	712.1	37.09	20.197				
5,100.0	5,084.1	5,145.3	5,129.2	21.3	17.7	-42.67	984.7	-27.2	736.0	698.1	37.94	19.399				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #603H - OWB - Plan #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD, 9203-MWD-HFR1+MS													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance		Minimum Separation (usft)	Separation Factor	Warning	
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
5,200.0	5,183.6	5,244.4	5,227.8	21.8	18.1	-42.52	981.6	-17.3	722.9	684.1	38.79	18.635		
5,300.0	5,283.0	5,343.6	5,326.3	22.2	18.6	-42.37	978.5	-7.5	709.7	670.1	39.65	17.902		
5,400.0	5,382.5	5,442.7	5,424.9	22.7	19.0	-42.21	975.4	2.4	696.6	656.1	40.50	17.198		
5,500.0	5,481.9	5,541.8	5,523.5	23.2	19.5	-42.05	972.2	12.3	683.5	642.1	41.36	16.522		
5,600.0	5,581.4	5,640.9	5,622.0	23.6	19.9	-41.88	969.1	22.2	670.3	628.1	42.23	15.873		
5,700.0	5,680.8	5,740.0	5,720.6	24.1	20.3	-41.71	966.0	32.0	657.2	614.1	43.10	15.250		
5,800.0	5,780.3	5,839.1	5,819.2	24.6	20.8	-41.52	962.8	41.9	644.1	600.1	43.97	14.650		
5,900.0	5,879.7	5,938.2	5,917.8	25.0	21.2	-41.33	959.7	51.8	631.0	586.1	44.84	14.072		
5,966.2	5,945.6	6,003.8	5,983.0	25.4	21.5	-41.20	957.6	58.3	622.3	576.9	45.42	13.702		
6,000.0	5,979.2	6,037.4	6,016.4	25.5	21.7	-41.06	956.6	61.7	618.0	572.3	45.71	13.522		
6,100.0	6,078.9	6,136.7	6,115.1	25.9	22.1	-40.53	953.4	71.6	607.1	560.6	46.54	13.045		
6,200.0	6,178.8	6,236.1	6,214.0	26.3	22.6	-39.81	950.3	81.5	598.9	551.6	47.37	12.643		
6,266.2	6,245.0	6,302.0	6,279.5	26.5	22.9	-10.68	948.2	88.0	595.0	547.1	47.91	12.421		
6,300.0	6,278.8	6,335.6	6,312.9	26.7	23.1	-10.38	947.1	91.4	593.4	545.2	48.18	12.316		
6,400.0	6,378.8	6,435.0	6,411.8	27.0	23.5	-9.48	944.0	101.3	588.5	539.5	49.00	12.011		
6,500.0	6,478.8	6,534.5	6,510.8	27.4	24.0	-8.57	940.9	111.2	583.8	534.0	49.82	11.718		
6,600.0	6,578.8	6,634.0	6,609.7	27.7	24.4	-7.65	937.7	121.1	579.2	528.6	50.65	11.436		
6,700.0	6,678.8	6,733.4	6,708.6	28.1	24.9	-6.71	934.6	131.0	574.8	523.4	51.48	11.166		
6,800.0	6,778.8	6,832.9	6,807.5	28.4	25.4	-5.76	931.4	140.9	570.6	518.3	52.32	10.906		
6,900.0	6,878.8	6,932.3	6,906.4	28.8	25.8	-4.79	928.3	150.8	566.5	513.4	53.16	10.656		
7,000.0	6,978.8	7,031.8	7,005.3	29.2	26.3	-3.81	925.1	160.7	562.6	508.6	54.01	10.417		
7,100.0	7,078.8	7,131.2	7,104.2	29.5	26.7	-2.82	922.0	170.7	558.9	504.0	54.86	10.187		
7,200.0	7,178.8	7,230.5	7,202.9	29.9	27.2	-1.82	918.9	180.5	555.3	499.6	55.71	9.967		
7,300.0	7,278.8	7,324.2	7,296.3	30.3	27.6	-1.01	916.4	188.4	552.4	495.9	56.52	9.774		
7,400.0	7,378.8	7,418.3	7,390.3	30.6	28.0	-0.51	914.8	193.3	550.7	493.4	57.28	9.614		
7,500.0	7,478.8	7,512.7	7,484.6	31.0	28.3	-0.30	914.2	195.2	550.0	492.0	58.00	9.483		
7,539.8	7,518.6	7,551.6	7,523.5	31.2	28.4	-0.30	914.2	195.3	550.0	491.8	58.23	9.446		
7,600.0	7,578.8	7,611.8	7,583.7	31.4	28.5	-0.30	914.2	195.3	550.0	491.5	58.55	9.393		
7,700.0	7,678.8	7,711.8	7,683.7	31.8	28.6	-0.30	914.2	195.3	550.0	490.9	59.10	9.307		
7,800.0	7,778.8	7,811.8	7,783.7	32.1	28.8	-0.30	914.2	195.3	550.0	490.4	59.65	9.221		
7,900.0	7,878.8	7,911.8	7,883.7	32.5	28.9	-0.30	914.2	195.3	550.0	489.8	60.20	9.136		
8,000.0	7,978.8	8,011.8	7,983.7	32.9	29.1	-0.30	914.2	195.3	550.0	489.2	60.77	9.051		
8,100.0	8,078.8	8,111.8	8,083.7	33.3	29.3	-0.30	914.2	195.3	550.0	488.7	61.33	8.967		
8,200.0	8,178.8	8,211.8	8,183.7	33.6	29.5	-0.30	914.2	195.3	550.0	488.1	61.91	8.884		
8,300.0	8,278.8	8,311.8	8,283.7	34.0	29.7	-0.30	914.2	195.3	550.0	487.5	62.49	8.802		
8,400.0	8,378.8	8,411.8	8,383.7	34.4	29.8	-0.30	914.2	195.3	550.0	486.9	63.07	8.720		
8,500.0	8,478.8	8,511.8	8,483.7	34.8	30.0	-0.30	914.2	195.3	550.0	486.3	63.67	8.639		
8,600.0	8,578.8	8,611.8	8,583.7	35.2	30.2	-0.30	914.2	195.3	550.0	485.7	64.26	8.559		
8,700.0	8,678.8	8,711.8	8,683.7	35.5	30.4	-0.30	914.2	195.3	550.0	485.1	64.86	8.479		
8,800.0	8,778.8	8,811.8	8,783.7	35.9	30.7	-0.30	914.2	195.3	550.0	484.5	65.47	8.401		
8,900.0	8,878.8	8,911.8	8,883.7	36.3	30.9	-0.30	914.2	195.3	550.0	483.9	66.08	8.323		
9,000.0	8,978.8	9,011.8	8,983.7	36.7	31.1	-0.30	914.2	195.3	550.0	483.3	66.70	8.246		
9,100.0	9,078.8	9,111.8	9,083.7	37.1	31.3	-0.30	914.2	195.3	550.0	482.7	67.32	8.170		
9,113.2	9,092.0	9,125.0	9,096.9	37.1	31.3	-0.30	914.2	195.3	550.0	482.6	67.40	8.160 CC		
9,200.0	9,178.8	9,211.7	9,183.6	37.5	31.5	-0.31	914.2	195.2	550.0	482.1	67.94	8.096		
9,300.0	9,278.8	9,309.7	9,281.0	37.9	31.6	-1.34	914.2	185.2	550.2	481.8	68.36	8.049		
9,337.3	9,316.1	9,345.0	9,315.4	38.0	31.5	-2.14	914.2	177.6	550.5	482.0	68.49	8.037		
9,350.0	9,328.8	9,356.8	9,326.8	38.0	31.5	87.39	914.2	174.6	550.6	482.1	68.51	8.037		
9,400.0	9,378.7	9,402.8	9,370.6	38.0	31.5	86.17	914.3	160.6	551.3	482.8	68.48	8.051		
9,450.0	9,428.1	9,447.9	9,412.4	38.0	31.5	84.98	914.3	143.4	552.2	483.8	68.43	8.070		
9,500.0	9,476.6	9,492.4	9,452.0	38.0	31.5	83.84	914.4	123.4	553.3	485.0	68.37	8.094		
9,550.0	9,524.0	9,536.1	9,489.5	38.0	31.5	82.74	914.4	100.7	554.6	486.3	68.28	8.122		

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design:(Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #603H - OWB - Plan #1													Offset Site Error:	0.0 usft		
Survey Program: 0-MWD, 9203-MWD+IFR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning			
9,600.0	9,569.7	9,579.3	9,524.6	38.0	31.4	81.70	914.5	75.7	556.0	487.9	68.18	8.155				
9,650.0	9,613.5	9,621.9	9,557.3	38.0	31.4	80.72	914.6	48.4	557.5	489.5	68.06	8.191				
9,700.0	9,655.1	9,664.0	9,587.6	38.0	31.4	79.81	914.7	19.1	559.1	491.1	67.93	8.230				
9,750.0	9,694.0	9,705.8	9,615.3	38.0	31.4	78.97	914.7	-12.1	560.6	492.8	67.78	8.271				
9,800.0	9,730.1	9,750.0	9,642.2	38.0	31.4	78.15	914.8	-47.2	562.1	494.5	67.65	8.310				
9,850.0	9,763.1	9,788.1	9,663.1	38.1	31.3	77.51	914.9	-79.0	563.5	496.1	67.48	8.351				
9,900.0	9,792.6	9,828.8	9,683.1	38.1	31.3	76.90	915.0	-114.4	564.9	497.5	67.34	8.388				
9,950.0	9,818.5	9,869.2	9,700.4	38.1	31.3	76.37	915.1	-151.0	566.1	498.9	67.22	8.421				
10,000.0	9,840.6	9,909.5	9,715.0	38.1	31.3	75.93	915.2	-188.5	567.1	500.0	67.13	8.448				
10,050.0	9,858.7	9,950.0	9,727.0	38.1	31.3	75.57	915.3	-227.2	568.0	500.9	67.06	8.469				
10,100.0	9,872.7	9,989.5	9,736.1	38.1	31.3	75.31	915.4	-265.6	568.6	501.6	67.04	8.482				
10,150.0	9,882.4	10,029.4	9,742.5	38.1	31.3	75.14	915.5	-305.0	569.0	502.0	67.06	8.486				
10,200.0	9,887.8	10,069.2	9,746.2	38.1	31.3	75.06	915.6	-344.6	569.2	502.1	67.12	8.481				
10,248.1	9,889.0	10,107.4	9,747.1	38.1	31.3	75.06	915.7	-382.8	569.2	502.0	67.22	8.468				
10,255.7	9,888.8	10,113.7	9,747.0	38.1	31.3	75.07	915.7	-389.1	569.2	502.0	67.24	8.466				
10,300.0	9,888.0	10,157.8	9,746.2	38.1	31.4	75.06	915.9	-433.2	569.2	501.9	67.34	8.454				
10,400.0	9,886.1	10,257.8	9,744.2	38.1	31.5	75.05	916.1	-533.2	569.3	501.7	67.60	8.421				
10,500.0	9,884.2	10,357.8	9,742.2	38.1	31.6	75.04	916.4	-633.1	569.3	501.3	67.94	8.380				
10,600.0	9,882.3	10,457.8	9,740.2	38.2	31.7	75.03	916.7	-733.1	569.3	501.0	68.34	8.330				
10,700.0	9,880.4	10,557.8	9,738.2	38.4	31.9	75.02	916.9	-833.1	569.3	500.5	68.81	8.273				
10,800.0	9,878.6	10,657.8	9,736.2	38.7	32.2	75.01	917.2	-933.1	569.4	500.0	69.35	8.209				
10,900.0	9,876.7	10,757.8	9,734.3	39.0	32.5	75.00	917.4	-1,033.1	569.4	499.4	69.96	8.139				
11,000.0	9,874.8	10,857.8	9,732.3	39.3	32.8	74.99	917.7	-1,133.0	569.4	498.8	70.63	8.062				
11,100.0	9,872.9	10,957.8	9,730.3	39.7	33.1	74.98	918.0	-1,233.0	569.4	498.1	71.36	7.980				
11,200.0	9,871.0	11,057.8	9,728.3	40.1	33.5	74.97	918.2	-1,333.0	569.5	497.3	72.15	7.893				
11,300.0	9,869.2	11,157.8	9,726.3	40.5	33.9	74.96	918.5	-1,433.0	569.5	496.5	73.00	7.801				
11,400.0	9,867.3	11,257.8	9,724.3	41.0	34.4	74.95	918.8	-1,533.0	569.5	495.6	73.91	7.706				
11,500.0	9,865.4	11,357.8	9,722.3	41.5	34.9	74.94	919.0	-1,632.9	569.5	494.7	74.86	7.608				
11,600.0	9,863.5	11,457.8	9,720.4	42.0	35.4	74.93	919.3	-1,732.9	569.6	493.7	75.87	7.507				
11,700.0	9,861.6	11,557.8	9,718.4	42.5	35.9	74.92	919.6	-1,832.9	569.6	492.7	76.93	7.404				
11,800.0	9,859.7	11,657.8	9,716.4	43.0	36.5	74.91	919.8	-1,932.9	569.6	491.6	78.04	7.299				
11,900.0	9,857.9	11,757.8	9,714.4	43.6	37.1	74.90	920.1	-2,032.9	569.7	490.5	79.20	7.193				
12,000.0	9,856.0	11,857.8	9,712.4	44.2	37.7	74.89	920.4	-2,132.8	569.7	489.3	80.39	7.086				
12,100.0	9,854.1	11,957.8	9,710.4	44.8	38.3	74.88	920.6	-2,232.8	569.7	488.1	81.63	6.979				
12,200.0	9,852.2	12,057.8	9,708.4	45.4	39.0	74.87	920.9	-2,332.8	569.7	486.8	82.91	6.872				
12,300.0	9,850.3	12,157.8	9,706.5	46.1	39.7	74.86	921.2	-2,432.8	569.8	485.5	84.22	6.765				
12,400.0	9,848.4	12,257.8	9,704.5	46.8	40.4	74.85	921.4	-2,532.7	569.8	484.2	85.58	6.658				
12,500.0	9,846.6	12,357.8	9,702.5	47.4	41.1	74.84	921.7	-2,632.7	569.8	482.9	86.96	6.552				
12,600.0	9,844.7	12,457.8	9,700.5	48.1	41.8	74.83	922.0	-2,732.7	569.8	481.5	88.38	6.448				
12,700.0	9,842.8	12,557.8	9,698.5	48.9	42.6	74.82	922.2	-2,832.7	569.9	480.0	89.83	6.344				
12,800.0	9,840.9	12,657.8	9,696.5	49.6	43.4	74.81	922.5	-2,932.7	569.9	478.6	91.31	6.241				
12,900.0	9,839.0	12,757.8	9,694.5	50.3	44.1	74.80	922.8	-3,032.6	569.9	477.1	92.82	6.140				
13,000.0	9,837.2	12,857.8	9,692.6	51.1	44.9	74.79	923.0	-3,132.6	570.0	475.6	94.35	6.041				
13,100.0	9,835.3	12,957.8	9,690.6	51.8	45.8	74.78	923.3	-3,232.6	570.0	474.1	95.91	5.943				
13,200.0	9,833.4	13,057.8	9,688.6	52.6	46.6	74.77	923.5	-3,332.6	570.0	472.5	97.50	5.846				
13,300.0	9,831.5	13,157.8	9,686.6	53.4	47.4	74.76	923.8	-3,432.6	570.0	470.9	99.11	5.752				
13,400.0	9,829.6	13,257.8	9,684.6	54.2	48.3	74.75	924.1	-3,532.5	570.1	469.3	100.74	5.659				
13,500.0	9,827.7	13,357.8	9,682.6	55.0	49.1	74.74	924.3	-3,632.5	570.1	467.7	102.39	5.568				
13,600.0	9,825.9	13,457.8	9,680.6	55.9	50.0	74.73	924.6	-3,732.5	570.1	466.1	104.06	5.479				
13,700.0	9,824.0	13,557.8	9,678.7	56.7	50.9	74.72	924.9	-3,832.5	570.1	464.4	105.75	5.392				
13,800.0	9,822.1	13,657.8	9,676.7	57.5	51.7	74.71	925.1	-3,932.5	570.2	462.7	107.45	5.306				
13,900.0	9,820.2	13,757.8	9,674.7	58.4	52.6	74.70	925.4	-4,032.4	570.2	461.0	109.18	5.223				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #603H - OWB - Plan #1													Offset Site Error:	0.0 usft		
Survey Program: 0-MWD, 9203-MWD+FR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	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			
14,000.0	9,818.3	13,857.8	9,672.7	59.3	53.5	74.69	925.7	-4,132.4	570.2	459.3	110.92	5.141				
14,100.0	9,816.4	13,957.8	9,670.7	60.1	54.5	74.68	925.9	-4,232.4	570.3	457.6	112.68	5.061				
14,200.0	9,814.6	14,057.8	9,668.7	61.0	55.4	74.67	926.2	-4,332.4	570.3	455.8	114.45	4.983				
14,300.0	9,812.7	14,157.8	9,666.8	61.9	56.3	74.66	926.5	-4,432.4	570.3	454.1	116.24	4.906				
14,400.0	9,810.8	14,257.8	9,664.8	62.8	57.2	74.65	926.7	-4,532.3	570.3	452.3	118.04	4.832				
14,500.0	9,808.9	14,357.8	9,662.8	63.7	58.2	74.64	927.0	-4,632.3	570.4	450.5	119.85	4.759				
14,600.0	9,807.0	14,457.8	9,660.8	64.6	59.1	74.63	927.3	-4,732.3	570.4	448.7	121.67	4.688				
14,700.0	9,805.2	14,557.8	9,658.8	65.5	60.1	74.62	927.5	-4,832.3	570.4	446.9	123.51	4.618				
14,800.0	9,803.3	14,657.8	9,656.8	66.4	61.0	74.61	927.8	-4,932.3	570.4	445.1	125.36	4.551				
14,900.0	9,801.4	14,757.8	9,654.8	67.4	62.0	74.60	928.1	-5,032.2	570.5	443.3	127.22	4.484				
15,000.0	9,799.5	14,857.8	9,652.9	68.3	62.9	74.59	928.3	-5,132.2	570.5	441.4	129.09	4.420				
15,100.0	9,797.6	14,957.8	9,650.9	69.2	63.9	74.58	928.6	-5,232.2	570.5	439.6	130.96	4.356				
15,200.0	9,795.7	15,057.8	9,648.9	70.2	64.9	74.57	928.9	-5,332.2	570.6	437.7	132.85	4.295				
15,300.0	9,793.9	15,157.8	9,646.9	71.1	65.9	74.56	929.1	-5,432.2	570.6	435.8	134.75	4.234				
15,400.0	9,792.0	15,257.8	9,644.9	72.1	66.9	74.55	929.4	-5,532.1	570.6	434.0	136.66	4.175				
15,500.0	9,790.1	15,357.8	9,642.9	73.0	67.8	74.54	929.7	-5,632.1	570.6	432.1	138.57	4.118				
15,600.0	9,788.2	15,457.8	9,640.9	74.0	68.8	74.53	929.9	-5,732.1	570.7	430.2	140.49	4.062				
15,700.0	9,786.3	15,557.8	9,639.0	74.9	69.8	74.52	930.2	-5,832.1	570.7	428.3	142.42	4.007				
15,800.0	9,784.4	15,657.8	9,637.0	75.9	70.8	74.51	930.4	-5,932.1	570.7	426.4	144.36	3.953				
15,900.0	9,782.6	15,757.8	9,635.0	76.9	71.8	74.50	930.7	-6,032.0	570.7	424.4	146.31	3.901				
16,000.0	9,780.7	15,857.8	9,633.0	77.9	72.8	74.49	931.0	-6,132.0	570.8	422.5	148.26	3.850				
16,100.0	9,778.8	15,957.8	9,631.0	78.8	73.9	74.48	931.2	-6,232.0	570.8	420.6	150.21	3.800				
16,200.0	9,776.9	16,057.8	9,629.0	79.8	74.9	74.47	931.5	-6,332.0	570.8	418.6	152.18	3.751				
16,300.0	9,775.0	16,157.8	9,627.0	80.8	75.9	74.46	931.8	-6,432.0	570.9	416.7	154.15	3.703				
16,400.0	9,773.1	16,257.8	9,625.1	81.8	76.9	74.45	932.0	-6,531.9	570.9	414.8	156.12	3.657				
16,500.0	9,771.3	16,357.8	9,623.1	82.8	77.9	74.44	932.3	-6,631.9	570.9	412.8	158.11	3.611				
16,600.0	9,769.4	16,457.8	9,621.1	83.8	78.9	74.43	932.6	-6,731.9	570.9	410.8	160.09	3.566				
16,700.0	9,767.5	16,557.8	9,619.1	84.8	80.0	74.42	932.8	-6,831.9	571.0	408.9	162.08	3.523				
16,800.0	9,765.6	16,657.8	9,617.1	85.8	81.0	74.41	933.1	-6,931.9	571.0	406.9	164.08	3.480				
16,900.0	9,763.7	16,757.8	9,615.1	86.8	82.0	74.40	933.4	-7,031.8	571.0	404.9	166.08	3.438				
17,000.0	9,761.9	16,857.8	9,613.1	87.8	83.1	74.39	933.6	-7,131.8	571.0	403.0	168.09	3.397				
17,100.0	9,760.0	16,957.8	9,611.2	88.8	84.1	74.38	933.9	-7,231.8	571.1	401.0	170.10	3.357				
17,200.0	9,758.1	17,057.8	9,609.2	89.8	85.1	74.37	934.2	-7,331.8	571.1	399.0	172.11	3.318				
17,300.0	9,756.2	17,157.8	9,607.2	90.8	86.2	74.36	934.4	-7,431.8	571.1	397.0	174.13	3.280				
17,400.0	9,754.3	17,257.8	9,605.2	91.9	87.2	74.35	934.7	-7,531.7	571.2	395.0	176.16	3.242				
17,500.0	9,752.4	17,357.8	9,603.2	92.9	88.3	74.34	935.0	-7,631.7	571.2	393.0	178.18	3.206				
17,600.0	9,750.6	17,457.8	9,601.2	93.9	89.3	74.33	935.2	-7,731.7	571.2	391.0	180.21	3.170				
17,700.0	9,748.7	17,557.8	9,599.2	94.9	90.3	74.32	935.5	-7,831.7	571.2	389.0	182.25	3.134				
17,800.0	9,746.8	17,657.8	9,597.3	95.9	91.4	74.31	935.8	-7,931.7	571.3	387.0	184.28	3.100				
17,900.0	9,744.9	17,757.8	9,595.3	97.0	92.4	74.30	936.0	-8,031.6	571.3	385.0	186.32	3.066				
18,000.0	9,743.0	17,857.8	9,593.3	98.0	93.5	74.29	936.3	-8,131.6	571.3	383.0	188.37	3.033				
18,100.0	9,741.1	17,957.8	9,591.3	99.0	94.5	74.28	936.5	-8,231.6	571.4	380.9	190.42	3.001				
18,200.0	9,739.3	18,057.8	9,589.3	100.1	95.6	74.27	936.8	-8,331.6	571.4	378.9	192.47	2.969				
18,300.0	9,737.4	18,157.8	9,587.3	101.1	96.6	74.26	937.1	-8,431.6	571.4	376.9	194.52	2.938				
18,400.0	9,735.5	18,257.8	9,585.3	102.1	97.7	74.25	937.3	-8,531.5	571.4	374.9	196.57	2.907				
18,500.0	9,733.6	18,357.8	9,583.4	103.2	98.8	74.24	937.6	-8,631.5	571.5	372.8	198.63	2.877				
18,600.0	9,731.7	18,457.8	9,581.4	104.2	99.8	74.23	937.9	-8,731.5	571.5	370.8	200.69	2.848				
18,700.0	9,729.9	18,557.8	9,579.4	105.3	100.9	74.22	938.1	-8,831.5	571.5	368.8	202.76	2.819				
18,800.0	9,728.0	18,657.8	9,577.4	106.3	101.9	74.21	938.4	-8,931.5	571.6	366.7	204.82	2.790				
18,900.0	9,726.1	18,757.8	9,575.4	107.3	103.0	74.20	938.7	-9,031.4	571.6	364.7	206.89	2.763				
19,000.0	9,724.2	18,857.8	9,573.4	108.4	104.1	74.19	938.9	-9,131.4	571.6	362.6	208.96	2.735				
19,100.0	9,722.3	18,957.8	9,571.5	109.4	105.1	74.18	939.2	-9,231.4	571.6	360.6	211.04	2.709				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design: (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #603H - OWB - Plan #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD, 9203-MWD+IFR1+MS													Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance		Minimum Separation (usft)	Separation Factor	Warning	
		Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
19,200.0	9,720.4	19,057.8	9,569.5	110.5	106.2	74.17	939.5	-9,331.4	571.7	358.6	213.11	2.682		
19,300.0	9,718.6	19,157.8	9,567.5	111.5	107.3	74.16	939.7	-9,431.4	571.7	356.5	215.19	2.657		
19,400.0	9,716.7	19,257.8	9,565.5	112.6	108.3	74.15	940.0	-9,531.3	571.7	354.5	217.27	2.631		
19,500.0	9,714.8	19,357.8	9,563.5	113.6	109.4	74.14	940.3	-9,631.3	571.7	352.4	219.35	2.607		
19,600.0	9,712.9	19,457.8	9,561.5	114.7	110.5	74.13	940.5	-9,731.3	571.8	350.3	221.43	2.582		
19,700.0	9,711.0	19,557.8	9,559.5	115.7	111.5	74.12	940.8	-9,831.3	571.8	348.3	223.52	2.558		
19,800.0	9,709.1	19,657.8	9,557.6	116.8	112.6	74.11	941.1	-9,931.3	571.8	346.2	225.61	2.535		
19,900.0	9,707.3	19,757.8	9,555.6	117.9	113.7	74.10	941.3	-10,031.2	571.9	344.2	227.70	2.512		
20,000.0	9,705.4	19,857.8	9,553.6	118.9	114.7	74.09	941.6	-10,131.2	571.9	342.1	229.79	2.489		
20,073.3	9,704.0	19,931.1	9,552.1	119.7	115.5	74.09	941.8	-10,204.5	571.9	340.6	231.32	2.472 ES, SF		

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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-HFR1+MS													Offset Well Error:		0.0 usft
Reference	Vertical	Measured	Vertical	Semi Major Axis		Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning		
Depth	Depth	Depth	Depth	Reference	Offset	Toolface	+N/-S	+E/-W	Between	Between	Separation	Factor			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	Centres	Ellipses	(usft)				
0.0	0.0	0.0	0.0	0.0	0.0	179.81	-30.0	0.1	30.0						
100.0	100.0	99.1	99.1	0.1	0.1	179.81	-30.0	0.1	30.0	29.7	0.29	103.224			
200.0	200.0	199.1	199.1	0.6	0.6	179.81	-30.0	0.1	30.0	28.9	1.13	26.447			
300.0	300.0	299.1	299.1	1.0	1.0	179.81	-30.0	0.1	30.0	28.0	1.98	15.147			
400.0	400.0	399.1	399.1	1.4	1.4	179.81	-30.0	0.1	30.0	27.2	2.83	10.613			
500.0	500.0	499.1	499.1	1.8	1.8	179.81	-30.0	0.1	30.0	26.3	3.67	8.168			
600.0	600.0	599.1	599.1	2.3	2.3	179.81	-30.0	0.1	30.0	25.5	4.52	6.638			
700.0	700.0	699.1	699.1	2.7	2.7	179.81	-30.0	0.1	30.0	24.6	5.37	5.591			
800.0	800.0	799.1	799.1	3.1	3.1	179.81	-30.0	0.1	30.0	23.8	6.21	4.830			
900.0	900.0	899.1	899.1	3.5	3.5	179.81	-30.0	0.1	30.0	22.9	7.06	4.251			
1,000.0	1,000.0	999.1	999.1	4.0	4.0	179.81	-30.0	0.1	30.0	22.1	7.90	3.796			
1,100.0	1,100.0	1,099.1	1,099.1	4.4	4.4	179.81	-30.0	0.1	30.0	21.2	8.75	3.428			
1,200.0	1,200.0	1,199.1	1,199.1	4.8	4.8	179.81	-30.0	0.1	30.0	20.4	9.60	3.126			
1,300.0	1,300.0	1,299.1	1,299.1	5.2	5.2	179.81	-30.0	0.1	30.0	19.6	10.44	2.873			
1,400.0	1,400.0	1,399.1	1,399.1	5.6	5.6	179.81	-30.0	0.1	30.0	18.7	11.29	2.657			
1,500.0	1,500.0	1,499.1	1,499.1	6.1	6.1	179.81	-30.0	0.1	30.0	17.9	12.14	2.472			
1,600.0	1,600.0	1,599.1	1,599.1	6.5	6.5	179.81	-30.0	0.1	30.0	17.0	12.98	2.311			
1,700.0	1,700.0	1,699.1	1,699.1	6.9	6.9	179.81	-30.0	0.1	30.0	16.2	13.83	2.170			
1,800.0	1,800.0	1,799.1	1,799.1	7.3	7.3	179.81	-30.0	0.1	30.0	15.3	14.67	2.044			
1,900.0	1,900.0	1,899.1	1,899.1	7.8	7.8	179.81	-30.0	0.1	30.0	14.5	15.52	1.933			
2,000.0	2,000.0	1,999.1	1,999.1	8.2	8.2	179.81	-30.0	0.1	30.0	13.6	16.37	1.833 CC, ES, SF			
2,100.0	2,100.0	2,098.4	2,098.4	8.6	8.5	150.36	-31.0	1.4	32.6	15.6	17.02	1.915			
2,200.0	2,199.8	2,197.3	2,197.1	8.9	8.6	148.27	-34.2	5.5	40.4	22.9	17.50	2.309			
2,300.0	2,299.4	2,295.9	2,295.4	9.2	8.8	146.38	-39.1	11.9	53.2	35.2	18.00	2.956			
2,400.0	2,398.9	2,394.8	2,394.0	9.6	9.0	145.85	-44.4	18.7	67.8	49.3	18.53	3.658			
2,500.0	2,498.4	2,493.8	2,492.5	10.0	9.2	145.51	-49.7	25.5	82.4	63.3	19.09	4.316			
2,600.0	2,597.8	2,592.7	2,591.1	10.3	9.4	145.27	-55.0	32.3	97.0	77.3	19.68	4.930			
2,700.0	2,697.3	2,691.6	2,689.6	10.7	9.6	145.09	-60.3	39.1	111.6	91.3	20.28	5.503			
2,800.0	2,796.7	2,790.5	2,788.2	11.1	9.9	144.96	-65.6	46.0	126.2	105.3	20.91	6.037			
2,900.0	2,896.2	2,889.5	2,886.7	11.5	10.2	144.85	-70.9	52.8	140.8	119.3	21.55	6.534			
3,000.0	2,995.6	2,988.4	2,985.3	11.9	10.5	144.76	-76.1	59.6	155.4	133.2	22.22	6.997			
3,100.0	3,095.1	3,087.3	3,083.8	12.4	10.8	144.69	-81.4	66.4	170.0	147.1	22.89	7.428			
3,200.0	3,194.5	3,186.2	3,182.4	12.8	11.1	144.63	-86.7	73.2	184.6	161.1	23.58	7.829			
3,300.0	3,294.0	3,285.2	3,280.9	13.2	11.4	144.57	-92.0	80.0	199.3	175.0	24.29	8.203			
3,400.0	3,393.4	3,384.1	3,379.5	13.6	11.7	144.53	-97.3	86.8	213.9	188.9	25.01	8.552			
3,500.0	3,492.9	3,483.0	3,478.0	14.1	12.1	144.49	-102.6	93.7	228.5	202.7	25.74	8.878			
3,600.0	3,592.3	3,582.0	3,576.6	14.5	12.4	144.46	-107.9	100.5	243.1	216.6	26.47	9.182			
3,700.0	3,691.8	3,680.9	3,675.1	14.9	12.8	144.42	-113.1	107.3	257.7	230.5	27.22	9.466			
3,800.0	3,791.2	3,779.8	3,773.7	15.4	13.2	144.40	-118.4	114.1	272.3	244.3	27.98	9.732			
3,900.0	3,890.7	3,878.7	3,872.2	15.8	13.5	144.37	-123.7	120.9	286.9	258.2	28.74	9.981			
4,000.0	3,990.1	3,977.7	3,970.8	16.3	13.9	144.35	-129.0	127.7	301.5	272.0	29.52	10.215			
4,100.0	4,089.6	4,076.6	4,069.3	16.7	14.3	144.33	-134.3	134.5	316.1	285.8	30.30	10.435			
4,200.0	4,189.0	4,175.5	4,167.9	17.2	14.7	144.31	-139.6	141.4	330.7	299.7	31.08	10.641			
4,300.0	4,288.5	4,274.4	4,266.4	17.6	15.1	144.30	-144.9	148.2	345.3	313.5	31.87	10.835			
4,400.0	4,387.9	4,373.4	4,365.0	18.1	15.5	144.28	-150.1	155.0	360.0	327.3	32.67	11.018			
4,500.0	4,487.4	4,472.3	4,463.5	18.5	15.9	144.27	-155.4	161.8	374.6	341.1	33.47	11.191			
4,600.0	4,586.9	4,571.2	4,562.1	19.0	16.3	144.25	-160.7	168.6	389.2	354.9	34.28	11.354			
4,700.0	4,686.3	4,670.2	4,660.6	19.4	16.7	144.24	-166.0	175.4	403.8	368.7	35.09	11.508			
4,800.0	4,785.8	4,769.1	4,759.2	19.9	17.1	144.23	-171.3	182.2	418.4	382.5	35.90	11.653			
4,900.0	4,885.2	4,868.0	4,857.7	20.4	17.5	144.22	-176.6	189.1	433.0	396.3	36.72	11.792			
5,000.0	4,984.7	4,973.3	4,962.6	20.8	18.0	144.26	-181.8	195.9	447.3	409.7	37.59	11.899			
5,100.0	5,084.1	5,084.9	5,074.1	21.3	18.4	144.64	-185.1	200.1	459.1	420.6	38.46	11.936			

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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													Offset Well Error:		0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	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	5,193.5	5,182.7	21.8	18.7	145.35	-185.8	201.0	468.4	429.1	39.25	11.932			
5,300.0	5,283.0	5,292.9	5,282.1	22.2	19.0	146.06	-185.8	201.0	477.0	437.1	39.98	11.933			
5,400.0	5,382.5	5,392.4	5,381.6	22.7	19.3	146.75	-185.8	201.0	485.8	445.1	40.70	11.935			
5,500.0	5,481.9	5,491.8	5,481.0	23.2	19.6	147.41	-185.8	201.0	494.6	453.1	41.43	11.937			
5,600.0	5,581.4	5,591.3	5,580.5	23.6	19.9	148.05	-185.8	201.0	503.4	461.2	42.16	11.940			
5,700.0	5,680.8	5,690.7	5,679.9	24.1	20.2	148.67	-185.8	201.0	512.3	469.4	42.90	11.942			
5,800.0	5,780.3	5,790.2	5,779.4	24.6	20.5	149.27	-185.8	201.0	521.3	477.6	43.64	11.946			
5,900.0	5,879.7	5,889.6	5,878.8	25.0	20.8	149.84	-185.8	201.0	530.3	485.9	44.38	11.949			
5,966.2	5,945.6	5,955.4	5,944.7	25.4	21.0	150.21	-185.8	201.0	536.3	491.4	44.88	11.951			
6,000.0	5,979.2	5,989.1	5,978.3	25.5	21.1	150.42	-185.8	201.0	539.2	494.1	45.12	11.950			
6,100.0	6,078.9	6,088.8	6,078.0	25.9	21.4	150.87	-185.8	201.0	545.8	500.0	45.84	11.908			
6,200.0	6,178.8	6,188.7	6,177.9	26.3	21.8	151.11	-185.8	201.0	549.3	502.8	46.55	11.802			
6,266.2	6,245.0	6,254.9	6,244.1	26.5	22.0	179.70	-185.8	201.0	550.0	503.0	47.01	11.701			
6,300.0	6,278.8	6,288.7	6,277.9	26.7	22.1	179.70	-185.8	201.0	550.0	502.8	47.24	11.643			
6,400.0	6,378.8	6,388.7	6,377.9	27.0	22.4	179.70	-185.8	201.0	550.0	502.1	47.95	11.471			
6,500.0	6,478.8	6,488.7	6,477.9	27.4	22.8	179.70	-185.8	201.0	550.0	501.3	48.66	11.304			
6,600.0	6,578.8	6,588.7	6,577.9	27.7	23.1	179.70	-185.8	201.0	550.0	500.6	49.37	11.140			
6,700.0	6,678.8	6,688.7	6,677.9	28.1	23.4	179.70	-185.8	201.0	550.0	499.9	50.09	10.980			
6,800.0	6,778.8	6,788.7	6,777.9	28.4	23.8	179.70	-185.8	201.0	550.0	499.2	50.82	10.824			
6,900.0	6,878.8	6,888.7	6,877.9	28.8	24.1	179.70	-185.8	201.0	550.0	498.5	51.54	10.671			
7,000.0	6,978.8	6,988.7	6,977.9	29.2	24.5	179.70	-185.8	201.0	550.0	497.7	52.27	10.522			
7,100.0	7,078.8	7,088.7	7,077.9	29.5	24.8	179.70	-185.8	201.0	550.0	497.0	53.01	10.376			
7,200.0	7,178.8	7,188.7	7,177.9	29.9	25.2	179.70	-185.8	201.0	550.0	496.3	53.75	10.233			
7,300.0	7,278.8	7,288.7	7,277.9	30.3	25.5	179.70	-185.8	201.0	550.0	495.5	54.49	10.094			
7,400.0	7,378.8	7,388.7	7,377.9	30.6	25.9	179.70	-185.8	201.0	550.0	494.8	55.23	9.958			
7,500.0	7,478.8	7,488.7	7,477.9	31.0	26.2	179.70	-185.8	201.0	550.0	494.0	55.98	9.825			
7,600.0	7,578.8	7,588.7	7,577.9	31.4	26.6	179.70	-185.8	201.0	550.0	493.3	56.73	9.695			
7,700.0	7,678.8	7,688.7	7,677.9	31.8	27.0	179.70	-185.8	201.0	550.0	492.5	57.48	9.568			
7,800.0	7,778.8	7,788.7	7,777.9	32.1	27.3	179.70	-185.8	201.0	550.0	491.8	58.24	9.444			
7,900.0	7,878.8	7,888.7	7,877.9	32.5	27.7	179.70	-185.8	201.0	550.0	491.0	58.99	9.323			
8,000.0	7,978.8	7,988.7	7,977.9	32.9	28.1	179.70	-185.8	201.0	550.0	490.3	59.75	9.204			
8,100.0	8,078.8	8,088.7	8,077.9	33.3	28.4	179.70	-185.8	201.0	550.0	489.5	60.52	9.088			
8,200.0	8,178.8	8,188.7	8,177.9	33.6	28.8	179.70	-185.8	201.0	550.0	488.7	61.28	8.975			
8,300.0	8,278.8	8,288.7	8,277.9	34.0	29.2	179.70	-185.8	201.0	550.0	488.0	62.05	8.864			
8,400.0	8,378.8	8,388.7	8,377.9	34.4	29.5	179.70	-185.8	201.0	550.0	487.2	62.82	8.756			
8,500.0	8,478.8	8,488.7	8,477.9	34.8	29.9	179.70	-185.8	201.0	550.0	486.4	63.59	8.649			
8,600.0	8,578.8	8,588.7	8,577.9	35.2	30.3	179.70	-185.8	201.0	550.0	485.6	64.36	8.546			
8,700.0	8,678.8	8,688.7	8,677.9	35.5	30.7	179.70	-185.8	201.0	550.0	484.9	65.14	8.444			
8,800.0	8,778.8	8,788.7	8,777.9	35.9	31.0	179.70	-185.8	201.0	550.0	484.1	65.91	8.344			
8,900.0	8,878.8	8,888.7	8,877.9	36.3	31.4	179.70	-185.8	201.0	550.0	483.3	66.69	8.247			
9,000.0	8,978.8	8,988.7	8,977.9	36.7	31.8	179.70	-185.8	201.0	550.0	482.5	67.47	8.152			
9,100.0	9,078.8	9,088.7	9,077.9	37.1	32.2	179.70	-185.8	201.0	550.0	481.8	68.25	8.058			
9,200.0	9,178.8	9,188.7	9,177.9	37.5	32.6	179.70	-185.8	201.0	550.0	481.0	69.04	7.967			
9,275.4	9,254.2	9,264.2	9,253.3	37.8	32.6	-179.85	-185.8	196.7	550.0	480.6	69.36	7.929			
9,300.0	9,278.8	9,288.6	9,277.3	37.9	32.6	-179.49	-185.8	193.2	550.0	480.5	69.46	7.918			
9,337.3	9,316.1	9,324.7	9,312.8	38.0	32.6	-178.75	-185.8	186.1	550.1	480.5	69.60	7.904			
9,350.0	9,328.8	9,336.8	9,324.5	38.0	32.6	-88.61	-185.8	183.3	550.2	480.5	69.62	7.903			
9,400.0	9,378.7	9,384.0	9,369.7	38.0	32.6	-87.48	-185.7	169.8	550.5	481.0	69.59	7.911			
9,450.0	9,428.1	9,430.3	9,412.9	38.0	32.6	-86.37	-185.7	152.9	551.1	481.6	69.56	7.923			
9,500.0	9,476.6	9,475.9	9,453.9	38.0	32.6	-85.30	-185.6	133.0	551.9	482.4	69.51	7.940			
9,550.0	9,524.0	9,520.9	9,492.6	38.0	32.6	-84.27	-185.6	110.2	552.9	483.4	69.45	7.961			
9,600.0	9,569.7	9,565.2	9,529.0	38.0	32.6	-83.28	-185.5	84.9	553.9	484.6	69.37	7.985			

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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+HR1+MS													Rule Assigned:		Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	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	9,613.5	9,609.0	9,562.8	38.0	32.6	-82.34	-185.4	57.1	555.1	485.8	69.27	8.013				
9,700.0	9,655.1	9,650.0	9,592.6	38.0	32.6	-81.50	-185.4	28.9	556.3	487.2	69.15	8.046				
9,750.0	9,694.0	9,695.0	9,622.8	38.0	32.6	-80.64	-185.3	-4.5	557.6	488.5	69.04	8.076				
9,800.0	9,730.1	9,737.4	9,648.7	38.0	32.6	-79.89	-185.2	-38.0	558.8	489.9	68.92	8.109				
9,850.0	9,763.1	9,779.4	9,672.0	38.1	32.6	-79.20	-185.1	-73.0	560.1	491.3	68.79	8.142				
9,900.0	9,792.6	9,821.2	9,692.4	38.1	32.6	-78.59	-185.0	-109.4	561.2	492.6	68.67	8.173				
9,950.0	9,818.5	9,862.6	9,710.1	38.1	32.6	-78.05	-184.9	-146.9	562.3	493.7	68.56	8.201				
10,000.0	9,840.6	9,900.0	9,723.6	38.1	32.6	-77.62	-184.8	-181.7	563.3	494.8	68.46	8.228				
10,050.0	9,858.7	9,944.9	9,736.9	38.1	32.7	-77.21	-184.7	-224.5	564.1	495.6	68.43	8.243				
10,100.0	9,872.7	9,985.7	9,746.0	38.1	32.7	-76.90	-184.6	-264.4	564.7	496.3	68.41	8.254				
10,150.0	9,882.4	10,026.5	9,752.2	38.1	32.7	-76.69	-184.5	-304.7	565.2	496.8	68.44	8.259				
10,200.0	9,887.8	10,067.2	9,755.5	38.1	32.7	-76.55	-184.4	-345.2	565.5	497.0	68.50	8.255				
10,248.1	9,889.0	10,106.5	9,756.0	38.1	32.8	-76.50	-184.3	-384.5	565.6	497.0	68.61	8.244				
10,300.0	9,888.0	10,158.4	9,755.0	38.1	32.8	-76.49	-184.1	-436.4	565.6	496.9	68.76	8.226				
10,400.0	9,886.1	10,258.4	9,753.0	38.1	33.0	-76.48	-183.9	-536.4	565.7	496.6	69.10	8.187				
10,500.0	9,884.2	10,358.4	9,751.0	38.1	33.2	-76.47	-183.6	-636.3	565.7	496.2	69.50	8.139				
10,600.0	9,882.3	10,458.4	9,749.0	38.2	33.5	-76.46	-183.3	-736.3	565.7	495.7	69.97	8.085				
10,700.0	9,880.4	10,558.4	9,747.1	38.4	33.7	-76.45	-183.1	-836.3	565.7	495.2	70.51	8.024				
10,800.0	9,878.6	10,658.4	9,745.1	38.7	34.1	-76.44	-182.8	-936.3	565.8	494.7	71.11	7.956				
10,900.0	9,876.7	10,758.4	9,743.1	39.0	34.4	-76.43	-182.5	-1,036.3	565.8	494.0	71.77	7.883				
11,000.0	9,874.8	10,858.4	9,741.1	39.3	34.8	-76.42	-182.3	-1,136.2	565.8	493.3	72.49	7.805				
11,100.0	9,872.9	10,958.4	9,739.1	39.7	35.2	-76.41	-182.0	-1,236.2	565.8	492.6	73.27	7.722				
11,200.0	9,871.0	11,058.4	9,737.1	40.1	35.7	-76.40	-181.7	-1,336.2	565.9	491.8	74.11	7.635				
11,300.0	9,869.2	11,158.4	9,735.1	40.5	36.1	-76.39	-181.5	-1,436.2	565.9	490.9	75.00	7.545				
11,400.0	9,867.3	11,258.4	9,733.2	41.0	36.7	-76.38	-181.2	-1,536.2	565.9	490.0	75.95	7.451				
11,500.0	9,865.4	11,358.4	9,731.2	41.5	37.2	-76.37	-181.0	-1,636.1	565.9	489.0	76.94	7.355				
11,600.0	9,863.5	11,458.4	9,729.2	42.0	37.7	-76.36	-180.7	-1,736.1	566.0	488.0	77.99	7.257				
11,700.0	9,861.6	11,558.4	9,727.2	42.5	38.3	-76.35	-180.4	-1,836.1	566.0	486.9	79.08	7.157				
11,800.0	9,859.7	11,658.4	9,725.2	43.0	38.9	-76.34	-180.2	-1,936.1	566.0	485.8	80.22	7.056				
11,900.0	9,857.9	11,758.4	9,723.2	43.6	39.6	-76.33	-179.9	-2,036.1	566.0	484.6	81.40	6.954				
12,000.0	9,856.0	11,858.4	9,721.2	44.2	40.2	-76.32	-179.6	-2,136.0	566.1	483.4	82.62	6.852				
12,100.0	9,854.1	11,958.4	9,719.3	44.8	40.9	-76.31	-179.4	-2,236.0	566.1	482.2	83.88	6.749				
12,200.0	9,852.2	12,058.4	9,717.3	45.4	41.6	-76.30	-179.1	-2,336.0	566.1	480.9	85.18	6.646				
12,300.0	9,850.3	12,158.4	9,715.3	46.1	42.3	-76.29	-178.8	-2,436.0	566.1	479.6	86.51	6.544				
12,400.0	9,848.4	12,258.4	9,713.3	46.8	43.0	-76.28	-178.6	-2,536.0	566.2	478.3	87.88	6.443				
12,500.0	9,846.6	12,358.4	9,711.3	47.4	43.7	-76.27	-178.3	-2,635.9	566.2	476.9	89.28	6.342				
12,600.0	9,844.7	12,458.4	9,709.3	48.1	44.5	-76.26	-178.0	-2,735.9	566.2	475.5	90.71	6.242				
12,700.0	9,842.8	12,558.4	9,707.4	48.9	45.3	-76.25	-177.8	-2,835.9	566.2	474.1	92.17	6.143				
12,800.0	9,840.9	12,658.4	9,705.4	49.6	46.0	-76.24	-177.5	-2,935.9	566.3	472.6	93.66	6.046				
12,900.0	9,839.0	12,758.4	9,703.4	50.3	46.8	-76.23	-177.3	-3,035.9	566.3	471.1	95.18	5.950				
13,000.0	9,837.2	12,858.4	9,701.4	51.1	47.6	-76.22	-177.0	-3,135.8	566.3	469.6	96.72	5.855				
13,100.0	9,835.3	12,958.4	9,699.4	51.8	48.5	-76.21	-176.7	-3,235.8	566.3	468.1	98.29	5.762				
13,200.0	9,833.4	13,058.4	9,697.4	52.6	49.3	-76.20	-176.5	-3,335.8	566.4	466.5	99.88	5.671				
13,300.0	9,831.5	13,158.4	9,695.4	53.4	50.1	-76.19	-176.2	-3,435.8	566.4	464.9	101.49	5.581				
13,400.0	9,829.6	13,258.4	9,693.5	54.2	51.0	-76.18	-175.9	-3,535.8	566.4	463.3	103.13	5.492				
13,500.0	9,827.7	13,358.4	9,691.5	55.0	51.9	-76.17	-175.7	-3,635.7	566.4	461.7	104.78	5.406				
13,600.0	9,825.9	13,458.4	9,689.5	55.9	52.7	-76.16	-175.4	-3,735.7	566.5	460.0	106.45	5.321				
13,700.0	9,824.0	13,558.4	9,687.5	56.7	53.6	-76.15	-175.1	-3,835.7	566.5	458.4	108.14	5.238				
13,800.0	9,822.1	13,658.4	9,685.5	57.5	54.5	-76.14	-174.9	-3,935.7	566.5	456.7	109.85	5.157				
13,900.0	9,820.2	13,758.4	9,683.5	58.4	55.4	-76.13	-174.6	-4,035.7	566.5	455.0	111.58	5.078				
14,000.0	9,818.3	13,858.4	9,681.5	59.3	56.3	-76.12	-174.3	-4,135.6	566.6	453.3	113.32	5.000				
14,100.0	9,816.4	13,958.4	9,679.6	60.1	57.2	-76.11	-174.1	-4,235.6	566.6	451.5	115.08	4.924				

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

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
14,200.0	9,814.6	14,058.4	9,677.6	61.0	58.2	-76.10	-173.8	-4,335.6	566.6	449.8	116.85	4.849				
14,300.0	9,812.7	14,158.4	9,675.6	61.9	59.1	-76.09	-173.6	-4,435.6	566.7	448.0	118.63	4.776				
14,400.0	9,810.8	14,258.4	9,673.6	62.8	60.0	-76.08	-173.3	-4,535.6	566.7	446.2	120.43	4.705				
14,500.0	9,808.9	14,358.4	9,671.6	63.7	61.0	-76.07	-173.0	-4,635.5	566.7	444.5	122.24	4.636				
14,600.0	9,807.0	14,458.4	9,669.6	64.6	61.9	-76.06	-172.8	-4,735.5	566.7	442.7	124.07	4.568				
14,700.0	9,805.2	14,558.4	9,667.7	65.5	62.9	-76.05	-172.5	-4,835.5	566.8	440.9	125.90	4.502				
14,800.0	9,803.3	14,658.4	9,665.7	66.4	63.8	-76.04	-172.2	-4,935.5	566.8	439.0	127.75	4.437				
14,900.0	9,801.4	14,758.4	9,663.7	67.4	64.8	-76.03	-172.0	-5,035.5	566.8	437.2	129.60	4.373				
15,000.0	9,799.5	14,858.4	9,661.7	68.3	65.7	-76.02	-171.7	-5,135.4	566.8	435.4	131.47	4.312				
15,100.0	9,797.6	14,958.4	9,659.7	69.2	66.7	-76.01	-171.4	-5,235.4	566.9	433.5	133.34	4.251				
15,200.0	9,795.7	15,058.4	9,657.7	70.2	67.7	-76.00	-171.2	-5,335.4	566.9	431.7	135.23	4.192				
15,300.0	9,793.9	15,158.4	9,655.7	71.1	68.7	-75.99	-170.9	-5,435.4	566.9	429.8	137.12	4.134				
15,400.0	9,792.0	15,258.4	9,653.8	72.1	69.7	-75.98	-170.6	-5,535.4	566.9	427.9	139.03	4.078				
15,500.0	9,790.1	15,358.4	9,651.8	73.0	70.6	-75.97	-170.4	-5,635.3	567.0	426.0	140.94	4.023				
15,600.0	9,788.2	15,458.4	9,649.8	74.0	71.6	-75.96	-170.1	-5,735.3	567.0	424.1	142.86	3.969				
15,700.0	9,786.3	15,558.4	9,647.8	74.9	72.6	-75.95	-169.9	-5,835.3	567.0	422.2	144.78	3.916				
15,800.0	9,784.4	15,658.4	9,645.8	75.9	73.6	-75.94	-169.6	-5,935.3	567.0	420.3	146.72	3.865				
15,900.0	9,782.6	15,758.4	9,643.8	76.9	74.6	-75.93	-169.3	-6,035.3	567.1	418.4	148.66	3.815				
16,000.0	9,780.7	15,858.4	9,641.8	77.9	75.6	-75.92	-169.1	-6,135.2	567.1	416.5	150.60	3.765				
16,100.0	9,778.8	15,958.4	9,639.9	78.8	76.6	-75.91	-168.8	-6,235.2	567.1	414.6	152.56	3.717				
16,200.0	9,776.9	16,058.4	9,637.9	79.8	77.7	-75.90	-168.5	-6,335.2	567.1	412.6	154.52	3.670				
16,300.0	9,775.0	16,158.4	9,635.9	80.8	78.7	-75.89	-168.3	-6,435.2	567.2	410.7	156.48	3.625				
16,400.0	9,773.1	16,258.4	9,633.9	81.8	79.7	-75.88	-168.0	-6,535.1	567.2	408.7	158.45	3.580				
16,500.0	9,771.3	16,358.4	9,631.9	82.8	80.7	-75.87	-167.7	-6,635.1	567.2	406.8	160.43	3.536				
16,600.0	9,769.4	16,458.4	9,629.9	83.8	81.7	-75.86	-167.5	-6,735.1	567.2	404.8	162.41	3.493				
16,700.0	9,767.5	16,558.4	9,628.0	84.8	82.8	-75.85	-167.2	-6,835.1	567.3	402.9	164.40	3.451				
16,800.0	9,765.6	16,658.4	9,626.0	85.8	83.8	-75.84	-166.9	-6,935.1	567.3	400.9	166.39	3.409				
16,900.0	9,763.7	16,758.4	9,624.0	86.8	84.8	-75.83	-166.7	-7,035.0	567.3	398.9	168.39	3.369				
17,000.0	9,761.9	16,858.4	9,622.0	87.8	85.8	-75.82	-166.4	-7,135.0	567.3	397.0	170.39	3.330				
17,100.0	9,760.0	16,958.4	9,620.0	88.8	86.9	-75.81	-166.2	-7,235.0	567.4	395.0	172.39	3.291				
17,200.0	9,758.1	17,058.4	9,618.0	89.8	87.9	-75.80	-165.9	-7,335.0	567.4	393.0	174.40	3.253				
17,300.0	9,756.2	17,158.4	9,616.0	90.8	88.9	-75.79	-165.6	-7,435.0	567.4	391.0	176.42	3.216				
17,400.0	9,754.3	17,258.4	9,614.1	91.9	90.0	-75.78	-165.4	-7,534.9	567.5	389.0	178.43	3.180				
17,500.0	9,752.4	17,358.4	9,612.1	92.9	91.0	-75.77	-165.1	-7,634.9	567.5	387.0	180.46	3.145				
17,600.0	9,750.6	17,458.4	9,610.1	93.9	92.1	-75.76	-164.8	-7,734.9	567.5	385.0	182.48	3.110				
17,700.0	9,748.7	17,558.4	9,608.1	94.9	93.1	-75.75	-164.6	-7,834.9	567.5	383.0	184.51	3.076				
17,800.0	9,746.8	17,658.4	9,606.1	95.9	94.1	-75.74	-164.3	-7,934.9	567.6	381.0	186.54	3.043				
17,900.0	9,744.9	17,758.4	9,604.1	97.0	95.2	-75.73	-164.0	-8,034.8	567.6	379.0	188.58	3.010				
18,000.0	9,743.0	17,858.4	9,602.1	98.0	96.2	-75.72	-163.8	-8,134.8	567.6	377.0	190.62	2.978				
18,100.0	9,741.1	17,958.4	9,600.2	99.0	97.3	-75.71	-163.5	-8,234.8	567.6	375.0	192.66	2.946				
18,200.0	9,739.3	18,058.4	9,598.2	100.1	98.3	-75.70	-163.2	-8,334.8	567.7	373.0	194.70	2.916				
18,300.0	9,737.4	18,158.4	9,596.2	101.1	99.4	-75.69	-163.0	-8,434.8	567.7	370.9	196.75	2.885				
18,400.0	9,735.5	18,258.4	9,594.2	102.1	100.5	-75.68	-162.7	-8,534.7	567.7	368.9	198.80	2.856				
18,500.0	9,733.6	18,358.4	9,592.2	103.2	101.5	-75.67	-162.5	-8,634.7	567.7	366.9	200.85	2.827				
18,600.0	9,731.7	18,458.4	9,590.2	104.2	102.6	-75.66	-162.2	-8,734.7	567.8	364.9	202.91	2.798				
18,700.0	9,729.9	18,558.4	9,588.3	105.3	103.6	-75.65	-161.9	-8,834.7	567.8	362.8	204.97	2.770				
18,800.0	9,728.0	18,658.4	9,586.3	106.3	104.7	-75.64	-161.7	-8,934.7	567.8	360.8	207.03	2.743				
18,900.0	9,726.1	18,758.4	9,584.3	107.3	105.7	-75.63	-161.4	-9,034.6	567.8	358.8	209.09	2.716				
19,000.0	9,724.2	18,858.4	9,582.3	108.4	106.8	-75.62	-161.1	-9,134.6	567.9	356.7	211.16	2.689				
19,100.0	9,722.3	18,958.4	9,580.3	109.4	107.9	-75.61	-160.9	-9,234.6	567.9	354.7	213.23	2.663				
19,200.0	9,720.4	19,058.4	9,578.3	110.5	108.9	-75.60	-160.6	-9,334.6	567.9	352.6	215.30	2.638				
19,300.0	9,718.6	19,158.4	9,576.3	111.5	110.0	-75.59	-160.3	-9,434.6	568.0	350.6	217.37	2.613				

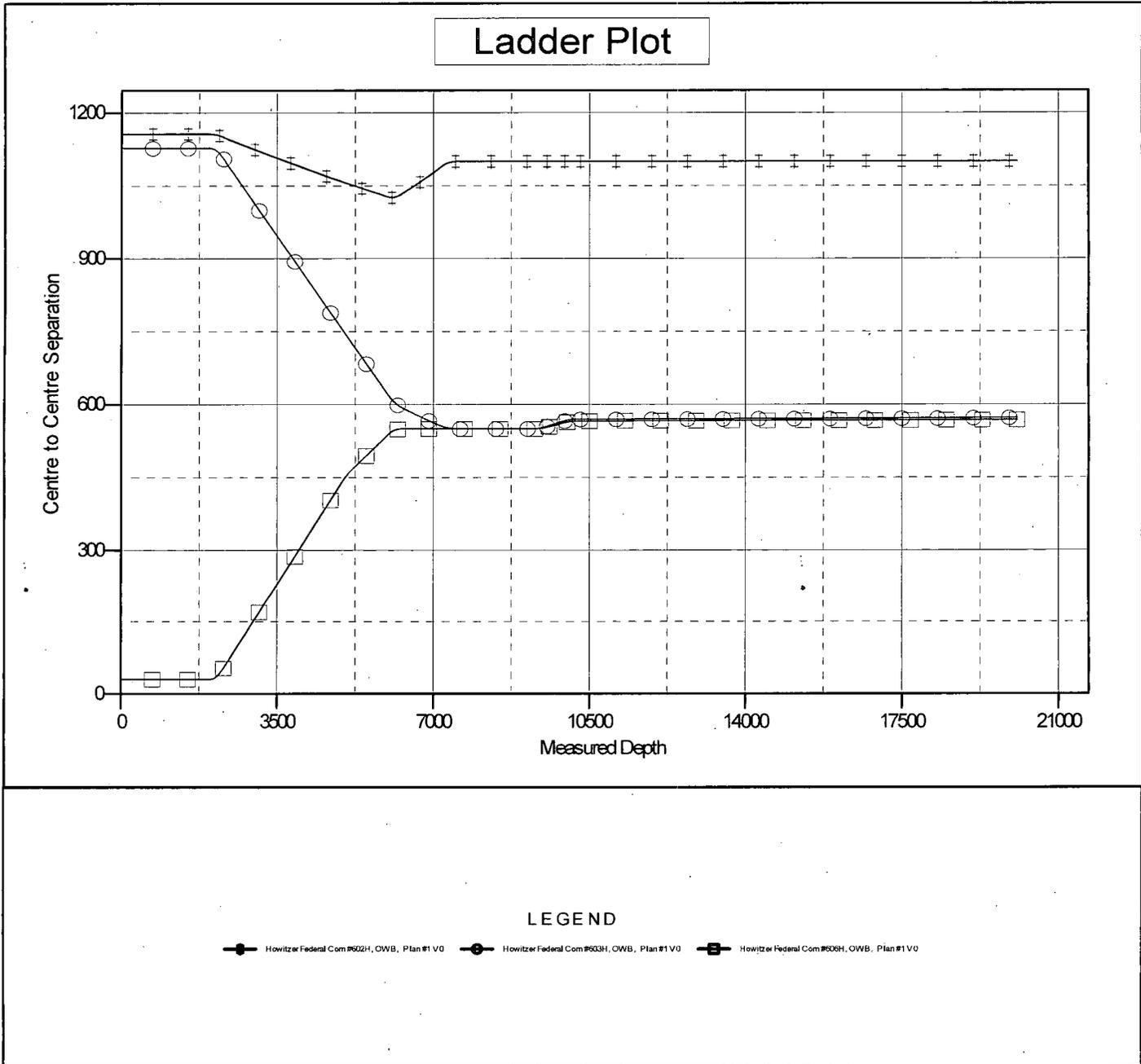
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design:</b> (Howitzer) Sec-12_T-24-S_R-28-E - Howitzer Federal Com #606H - OWB - Plan #1													<b>Offset Site Error:</b>	0.0 usft
<b>Survey Program:</b> 0-MWD, 9194-MWD+IFR1+MS													<b>Offset Well Error:</b>	0.0 usft
<b>Reference</b>													<b>Rule Assigned:</b>	
<b>Measured Depth (usft)</b>	<b>Vertical Depth (usft)</b>	<b>Measured Depth (usft)</b>	<b>Vertical Depth (usft)</b>	<b>Semi Major Axis</b>		<b>Highside Toolface (°)</b>	<b>Offset Wellbore Centre</b>		<b>Distance</b>		<b>Minimum Separation (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>	
				<b>Reference (usft)</b>	<b>Offset (usft)</b>		<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Between Centres (usft)</b>	<b>Between Ellipses (usft)</b>				
19,400.0	9,716.7	19,258.4	9,574.4	112.6	111.1	-75.58	-160.1	-9,534.5	568.0	348.5	219.44	2.588		
19,500.0	9,714.8	19,358.4	9,572.4	113.6	112.1	-75.57	-159.8	-9,634.5	568.0	346.5	221.52	2.564		
19,600.0	9,712.9	19,458.4	9,570.4	114.7	113.2	-75.56	-159.5	-9,734.5	568.0	344.4	223.60	2.540		
19,700.0	9,711.0	19,558.4	9,568.4	115.7	114.3	-75.55	-159.3	-9,834.5	568.1	342.4	225.68	2.517		
19,800.0	9,709.1	19,658.4	9,566.4	116.8	115.3	-75.54	-159.0	-9,934.5	568.1	340.3	227.76	2.494		
19,900.0	9,707.3	19,758.4	9,564.4	117.9	116.4	-75.53	-158.8	-10,034.4	568.1	338.3	229.84	2.472		
20,000.0	9,705.4	19,858.4	9,562.4	118.9	117.5	-75.52	-158.5	-10,134.4	568.1	336.2	231.93	2.450		
20,073.3	9,704.0	19,931.7	9,561.0	119.7	118.2	-75.51	-158.3	-10,207.7	568.2	334.7	233.46	2.434		

<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

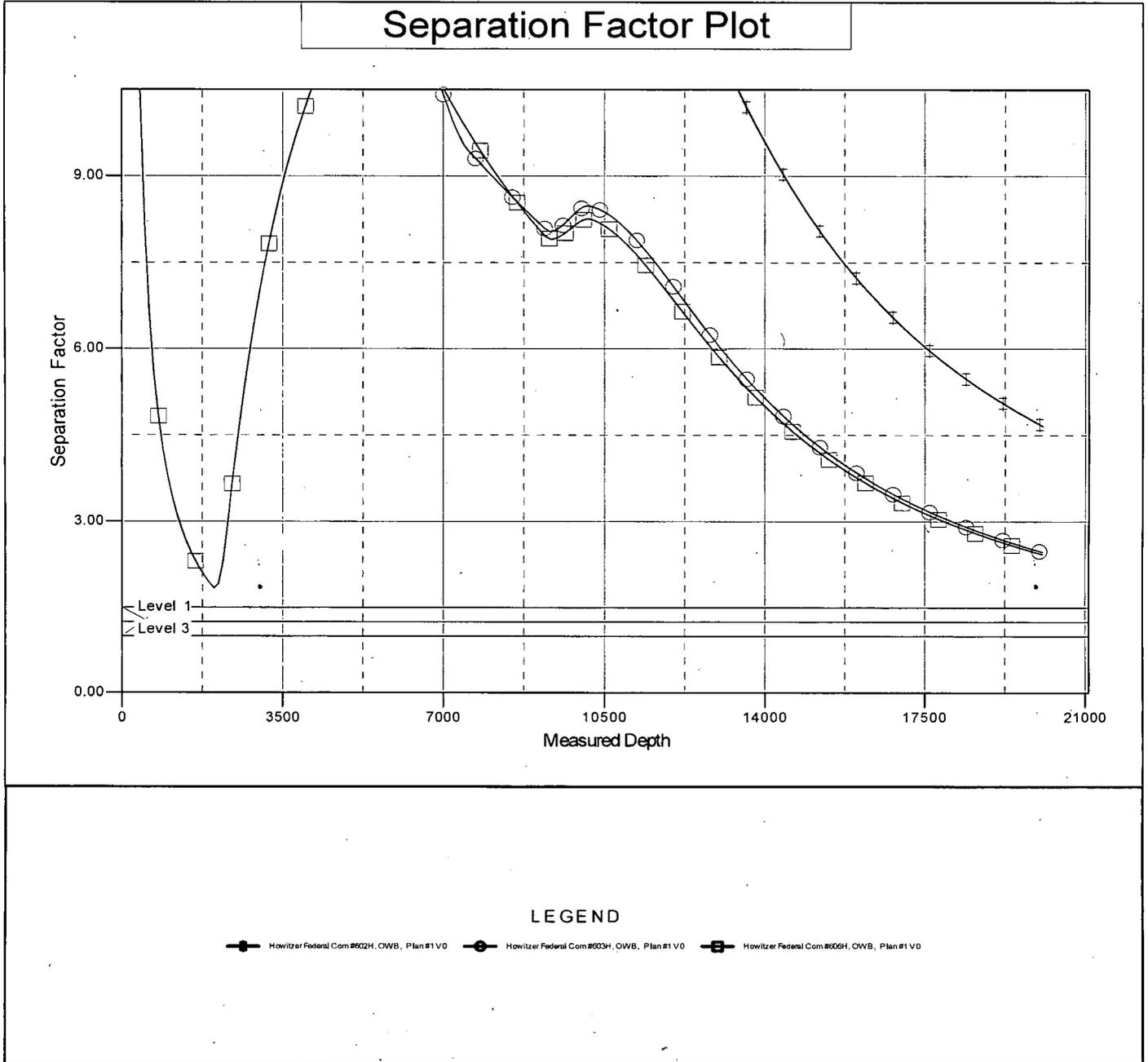
Reference Depths are relative to KB @ 2994.5usft (Precision 106)      Coordinates are relative to: Howitzer Federal Com #605H  
 Offset Depths are relative to Offset Datum      Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30  
 Central Meridian is 104° 20' 0.000 W      Grid Convergence at Surface is: 0.16°

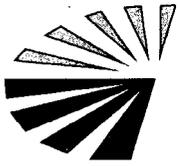


<b>Company:</b>	Concho Resources, Inc.	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Project:</b>	Eddy County (NAD27 NME)	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Reference Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	OWB	<b>Database:</b>	EDM 5000.15 Single User Db
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to KB @ 2994.5usft (Precision 106)  
 Offset Depths are relative to Offset Datum  
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Howitzer Federal Com #605H  
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30'  
 Grid Convergence at Surface is: 0.16°





C O N C H O

## **Concho Resources, Inc.**

Eddy County (NAD27 NME)  
(Howitzer) Sec-12\_T-24-S\_R-28-E  
Howitzer Federal Com #605H

**OWB**

**Plan: Plan #1**

## **Standard Planning Report**

**02 November, 2018**

**INTREPID**

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	Plan #1		

<b>Project</b>	Eddy County (NAD27 NME)		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	New Mexico East 3001		

<b>Site</b>	(Howitzer) Sec-12_T-24-S_R-28-E				
<b>Site Position:</b>	<b>Northing:</b>	448,838.70 usft	<b>Latitude:</b>	32° 14' 1.022 N	
<b>From:</b> Map	<b>Easting:</b>	592,936.40 usft	<b>Longitude:</b>	104° 1' 57.970 W	
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.16 °

<b>Well</b>	Howitzer Federal Com #605H					
<b>Well Position</b>	<b>+N/-S</b>	30.0 usft	<b>Northing:</b>	448,868.70 usft	<b>Latitude:</b>	32° 14' 1.319 N
	<b>+E/-W</b>	-0.1 usft	<b>Easting:</b>	592,936.30 usft	<b>Longitude:</b>	104° 1' 57.970 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	2,963.5 usft

<b>Wellbore</b>	OWB
-----------------	-----

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/31/18	7.02	59.98	47,757.16198132

<b>Design</b>	Plan #1
---------------	---------

<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	272.20

Plan Survey Tool Program		Date			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.0	9,337.3 Plan #1 (OWB)	MWD OWSG MWD - Standard		
2	9,337.3	20,073.3 Plan #1 (OWB)	MWD+IFR1+MS MWD + IFR1 + Multi-Station		

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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	28.55	2,299.4	13.8	7.5	2.00	2.00	0.00	28.55	
5,966.2	6.00	28.55	5,945.6	350.4	190.6	0.00	0.00	0.00	0.00	
6,266.2	0.00	0.00	6,245.0	364.2	198.1	2.00	-2.00	0.00	180.00	
9,337.3	0.00	0.00	9,316.1	364.2	198.1	0.00	0.00	0.00	0.00	
10,248.1	91.08	270.15	9,889.0	365.7	-385.6	10.00	10.00	-9.86	270.15	
20,073.3	91.08	270.15	9,704.0	391.8	-10,209.1	0.00	0.00	0.00	0.00	PBHL (Howitzer Fe

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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
<b>NUDGE - Build 2.00</b>									
2,100.0	2.00	28.55	2,100.0	1.5	0.8	-0.8	2.00	2.00	0.00
2,200.0	4.00	28.55	2,199.8	6.1	3.3	-3.1	2.00	2.00	0.00
2,300.0	6.00	28.55	2,299.4	13.8	7.5	-7.0	2.00	2.00	0.00
<b>HOLD - 3666.2 at 2300.0 MD</b>									
2,400.0	6.00	28.55	2,398.9	23.0	12.5	-11.6	0.00	0.00	0.00
2,500.0	6.00	28.55	2,498.4	32.1	17.5	-16.2	0.00	0.00	0.00
2,600.0	6.00	28.55	2,597.8	41.3	22.5	-20.9	0.00	0.00	0.00
2,700.0	6.00	28.55	2,697.3	50.5	27.5	-25.5	0.00	0.00	0.00
2,800.0	6.00	28.55	2,796.7	59.7	32.5	-30.2	0.00	0.00	0.00
2,900.0	6.00	28.55	2,896.2	68.9	37.5	-34.8	0.00	0.00	0.00
3,000.0	6.00	28.55	2,995.6	78.1	42.5	-39.4	0.00	0.00	0.00
3,100.0	6.00	28.55	3,095.1	87.2	47.5	-44.1	0.00	0.00	0.00
3,200.0	6.00	28.55	3,194.5	96.4	52.5	-48.7	0.00	0.00	0.00
3,300.0	6.00	28.55	3,294.0	105.6	57.4	-53.4	0.00	0.00	0.00
3,400.0	6.00	28.55	3,393.4	114.8	62.4	-58.0	0.00	0.00	0.00
3,500.0	6.00	28.55	3,492.9	124.0	67.4	-62.6	0.00	0.00	0.00
3,600.0	6.00	28.55	3,592.3	133.1	72.4	-67.3	0.00	0.00	0.00
3,700.0	6.00	28.55	3,691.8	142.3	77.4	-71.9	0.00	0.00	0.00
3,800.0	6.00	28.55	3,791.2	151.5	82.4	-76.6	0.00	0.00	0.00
3,900.0	6.00	28.55	3,890.7	160.7	87.4	-81.2	0.00	0.00	0.00
4,000.0	6.00	28.55	3,990.1	169.9	92.4	-85.8	0.00	0.00	0.00
4,100.0	6.00	28.55	4,089.6	179.1	97.4	-90.5	0.00	0.00	0.00
4,200.0	6.00	28.55	4,189.0	188.2	102.4	-95.1	0.00	0.00	0.00
4,300.0	6.00	28.55	4,288.5	197.4	107.4	-99.7	0.00	0.00	0.00
4,400.0	6.00	28.55	4,387.9	206.6	112.4	-104.4	0.00	0.00	0.00
4,500.0	6.00	28.55	4,487.4	215.8	117.4	-109.0	0.00	0.00	0.00
4,600.0	6.00	28.55	4,586.9	225.0	122.4	-113.7	0.00	0.00	0.00
4,700.0	6.00	28.55	4,686.3	234.1	127.4	-118.3	0.00	0.00	0.00
4,800.0	6.00	28.55	4,785.8	243.3	132.4	-122.9	0.00	0.00	0.00
4,900.0	6.00	28.55	4,885.2	252.5	137.4	-127.6	0.00	0.00	0.00
5,000.0	6.00	28.55	4,984.7	261.7	142.4	-132.2	0.00	0.00	0.00
5,100.0	6.00	28.55	5,084.1	270.9	147.4	-136.9	0.00	0.00	0.00

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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	28.55	5,183.6	280.1	152.4	-141.5	0.00	0.00	0.00
5,300.0	6.00	28.55	5,283.0	289.2	157.3	-146.1	0.00	0.00	0.00
5,400.0	6.00	28.55	5,382.5	298.4	162.3	-150.8	0.00	0.00	0.00
5,500.0	6.00	28.55	5,481.9	307.6	167.3	-155.4	0.00	0.00	0.00
5,600.0	6.00	28.55	5,581.4	316.8	172.3	-160.1	0.00	0.00	0.00
5,700.0	6.00	28.55	5,680.8	326.0	177.3	-164.7	0.00	0.00	0.00
5,800.0	6.00	28.55	5,780.3	335.1	182.3	-169.3	0.00	0.00	0.00
5,900.0	6.00	28.55	5,879.7	344.3	187.3	-174.0	0.00	0.00	0.00
5,966.2	6.00	28.55	5,945.6	350.4	190.6	-177.0	0.00	0.00	0.00
<b>DROP - -2.00</b>									
6,000.0	5.32	28.55	5,979.2	353.3	192.2	-178.5	2.00	-2.00	0.00
6,100.0	3.32	28.55	6,078.9	360.0	195.8	-181.9	2.00	-2.00	0.00
6,200.0	1.32	28.55	6,178.8	363.5	197.8	-183.7	2.00	-2.00	0.00
6,266.2	0.00	0.00	6,245.0	364.2	198.1	-184.0	2.00	-2.00	0.00
<b>HOLD - 3071.1 at 6266.2 MD</b>									
6,300.0	0.00	0.00	6,278.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,378.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,478.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,578.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,678.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,778.8	364.2	198.1	-184.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,878.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,000.0	0.00	0.00	6,978.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,078.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,178.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,278.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,378.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,478.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,578.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,678.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,778.8	364.2	198.1	-184.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,878.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,000.0	0.00	0.00	7,978.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,078.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,178.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,278.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,378.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,478.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,578.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,678.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,778.8	364.2	198.1	-184.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,878.8	364.2	198.1	-184.0	0.00	0.00	0.00
9,000.0	0.00	0.00	8,978.8	364.2	198.1	-184.0	0.00	0.00	0.00
9,100.0	0.00	0.00	9,078.8	364.2	198.1	-184.0	0.00	0.00	0.00
9,200.0	0.00	0.00	9,178.8	364.2	198.1	-184.0	0.00	0.00	0.00
9,300.0	0.00	0.00	9,278.8	364.2	198.1	-184.0	0.00	0.00	0.00
9,337.3	0.00	0.00	9,316.1	364.2	198.1	-184.0	0.00	0.00	0.00
<b>KOP - DLS 10.00 TFO 270.15</b>									
9,350.0	1.27	270.15	9,328.8	364.2	198.0	-183.9	10.00	10.00	0.00
9,400.0	6.27	270.15	9,378.7	364.2	194.7	-180.6	10.00	10.00	0.00
9,450.0	11.27	270.15	9,428.1	364.2	187.1	-173.0	10.00	10.00	0.00
9,500.0	16.27	270.15	9,476.6	364.3	175.2	-161.1	10.00	10.00	0.00
9,550.0	21.27	270.15	9,524.0	364.3	159.1	-145.0	10.00	10.00	0.00

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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	26.27	270.15	9,569.7	364.3	138.9	-124.9	10.00	10.00	0.00	
9,650.0	31.27	270.15	9,613.5	364.4	114.9	-100.8	10.00	10.00	0.00	
9,700.0	36.27	270.15	9,655.1	364.5	87.1	-73.1	10.00	10.00	0.00	
9,750.0	41.27	270.15	9,694.0	364.6	55.8	-41.8	10.00	10.00	0.00	
9,800.0	46.27	270.15	9,730.1	364.7	21.2	-7.2	10.00	10.00	0.00	
9,850.0	51.27	270.15	9,763.1	364.8	-16.4	30.4	10.00	10.00	0.00	
9,900.0	56.27	270.15	9,792.6	364.9	-56.7	70.7	10.00	10.00	0.00	
9,950.0	61.27	270.15	9,818.5	365.0	-99.4	113.4	10.00	10.00	0.00	
10,000.0	66.27	270.15	9,840.6	365.1	-144.3	158.2	10.00	10.00	0.00	
10,050.0	71.27	270.15	9,858.7	365.2	-190.9	204.7	10.00	10.00	0.00	
10,100.0	76.27	270.15	9,872.7	365.3	-238.9	252.7	10.00	10.00	0.00	
10,150.0	81.27	270.15	9,882.4	365.5	-287.9	301.7	10.00	10.00	0.00	
10,200.0	86.27	270.15	9,887.8	365.6	-337.6	351.4	10.00	10.00	0.00	
10,248.1	91.08	270.15	9,889.0	365.7	-385.6	399.4	10.00	10.00	0.00	
<b>EOC - 9825.3 hold at 10248.1 MD</b>										
10,300.0	91.08	270.15	9,888.0	365.9	-437.5	451.3	0.00	0.00	0.00	
10,400.0	91.08	270.15	9,886.1	366.1	-537.5	551.2	0.00	0.00	0.00	
10,500.0	91.08	270.15	9,884.2	366.4	-637.5	651.1	0.00	0.00	0.00	
10,600.0	91.08	270.15	9,882.3	366.7	-737.5	751.0	0.00	0.00	0.00	
10,700.0	91.08	270.15	9,880.4	366.9	-837.5	850.9	0.00	0.00	0.00	
10,800.0	91.08	270.15	9,878.6	367.2	-937.5	950.8	0.00	0.00	0.00	
10,900.0	91.08	270.15	9,876.7	367.5	-1,037.4	1,050.8	0.00	0.00	0.00	
11,000.0	91.08	270.15	9,874.8	367.7	-1,137.4	1,150.7	0.00	0.00	0.00	
11,100.0	91.08	270.15	9,872.9	368.0	-1,237.4	1,250.6	0.00	0.00	0.00	
11,200.0	91.08	270.15	9,871.0	368.3	-1,337.4	1,350.5	0.00	0.00	0.00	
11,300.0	91.08	270.15	9,869.2	368.5	-1,437.4	1,450.4	0.00	0.00	0.00	
11,400.0	91.08	270.15	9,867.3	368.8	-1,537.3	1,550.4	0.00	0.00	0.00	
11,500.0	91.08	270.15	9,865.4	369.1	-1,637.3	1,650.3	0.00	0.00	0.00	
11,600.0	91.08	270.15	9,863.5	369.3	-1,737.3	1,750.2	0.00	0.00	0.00	
11,700.0	91.08	270.15	9,861.6	369.6	-1,837.3	1,850.1	0.00	0.00	0.00	
11,800.0	91.08	270.15	9,859.7	369.9	-1,937.3	1,950.0	0.00	0.00	0.00	
11,900.0	91.08	270.15	9,857.9	370.1	-2,037.3	2,050.0	0.00	0.00	0.00	
12,000.0	91.08	270.15	9,856.0	370.4	-2,137.2	2,149.9	0.00	0.00	0.00	
12,100.0	91.08	270.15	9,854.1	370.7	-2,237.2	2,249.8	0.00	0.00	0.00	
12,200.0	91.08	270.15	9,852.2	370.9	-2,337.2	2,349.7	0.00	0.00	0.00	
12,300.0	91.08	270.15	9,850.3	371.2	-2,437.2	2,449.6	0.00	0.00	0.00	
12,400.0	91.08	270.15	9,848.4	371.4	-2,537.2	2,549.5	0.00	0.00	0.00	
12,500.0	91.08	270.15	9,846.6	371.7	-2,637.1	2,649.5	0.00	0.00	0.00	
12,600.0	91.08	270.15	9,844.7	372.0	-2,737.1	2,749.4	0.00	0.00	0.00	
12,700.0	91.08	270.15	9,842.8	372.2	-2,837.1	2,849.3	0.00	0.00	0.00	
12,800.0	91.08	270.15	9,840.9	372.5	-2,937.1	2,949.2	0.00	0.00	0.00	
12,900.0	91.08	270.15	9,839.0	372.8	-3,037.1	3,049.1	0.00	0.00	0.00	
13,000.0	91.08	270.15	9,837.2	373.0	-3,137.1	3,149.1	0.00	0.00	0.00	
13,100.0	91.08	270.15	9,835.3	373.3	-3,237.0	3,249.0	0.00	0.00	0.00	
13,200.0	91.08	270.15	9,833.4	373.6	-3,337.0	3,348.9	0.00	0.00	0.00	
13,300.0	91.08	270.15	9,831.5	373.8	-3,437.0	3,448.8	0.00	0.00	0.00	
13,400.0	91.08	270.15	9,829.6	374.1	-3,537.0	3,548.7	0.00	0.00	0.00	
13,500.0	91.08	270.15	9,827.7	374.4	-3,637.0	3,648.6	0.00	0.00	0.00	
13,600.0	91.08	270.15	9,825.9	374.6	-3,736.9	3,748.6	0.00	0.00	0.00	
13,700.0	91.08	270.15	9,824.0	374.9	-3,836.9	3,848.5	0.00	0.00	0.00	
13,800.0	91.08	270.15	9,822.1	375.2	-3,936.9	3,948.4	0.00	0.00	0.00	
13,900.0	91.08	270.15	9,820.2	375.4	-4,036.9	4,048.3	0.00	0.00	0.00	
14,000.0	91.08	270.15	9,818.3	375.7	-4,136.9	4,148.2	0.00	0.00	0.00	
14,100.0	91.08	270.15	9,816.4	376.0	-4,236.9	4,248.2	0.00	0.00	0.00	

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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)
14,200.0	91.08	270.15	9,814.6	376.2	-4,336.8	4,348.1	0.00	0.00	0.00
14,300.0	91.08	270.15	9,812.7	376.5	-4,436.8	4,448.0	0.00	0.00	0.00
14,400.0	91.08	270.15	9,810.8	376.8	-4,536.8	4,547.9	0.00	0.00	0.00
14,500.0	91.08	270.15	9,808.9	377.0	-4,636.8	4,647.8	0.00	0.00	0.00
14,600.0	91.08	270.15	9,807.0	377.3	-4,736.8	4,747.8	0.00	0.00	0.00
14,700.0	91.08	270.15	9,805.2	377.5	-4,836.7	4,847.7	0.00	0.00	0.00
14,800.0	91.08	270.15	9,803.3	377.8	-4,936.7	4,947.6	0.00	0.00	0.00
14,900.0	91.08	270.15	9,801.4	378.1	-5,036.7	5,047.5	0.00	0.00	0.00
15,000.0	91.08	270.15	9,799.5	378.3	-5,136.7	5,147.4	0.00	0.00	0.00
15,100.0	91.08	270.15	9,797.6	378.6	-5,236.7	5,247.3	0.00	0.00	0.00
15,200.0	91.08	270.15	9,795.7	378.9	-5,336.7	5,347.3	0.00	0.00	0.00
15,300.0	91.08	270.15	9,793.9	379.1	-5,436.6	5,447.2	0.00	0.00	0.00
15,400.0	91.08	270.15	9,792.0	379.4	-5,536.6	5,547.1	0.00	0.00	0.00
15,500.0	91.08	270.15	9,790.1	379.7	-5,636.6	5,647.0	0.00	0.00	0.00
15,600.0	91.08	270.15	9,788.2	379.9	-5,736.6	5,746.9	0.00	0.00	0.00
15,700.0	91.08	270.15	9,786.3	380.2	-5,836.6	5,846.9	0.00	0.00	0.00
15,800.0	91.08	270.15	9,784.4	380.5	-5,936.6	5,946.8	0.00	0.00	0.00
15,900.0	91.08	270.15	9,782.6	380.7	-6,036.5	6,046.7	0.00	0.00	0.00
16,000.0	91.08	270.15	9,780.7	381.0	-6,136.5	6,146.6	0.00	0.00	0.00
16,100.0	91.08	270.15	9,778.8	381.3	-6,236.5	6,246.5	0.00	0.00	0.00
16,200.0	91.08	270.15	9,776.9	381.5	-6,336.5	6,346.4	0.00	0.00	0.00
16,300.0	91.08	270.15	9,775.0	381.8	-6,436.5	6,446.4	0.00	0.00	0.00
16,400.0	91.08	270.15	9,773.1	382.1	-6,536.4	6,546.3	0.00	0.00	0.00
16,500.0	91.08	270.15	9,771.3	382.3	-6,636.4	6,646.2	0.00	0.00	0.00
16,600.0	91.08	270.15	9,769.4	382.6	-6,736.4	6,746.1	0.00	0.00	0.00
16,700.0	91.08	270.15	9,767.5	382.9	-6,836.4	6,846.0	0.00	0.00	0.00
16,800.0	91.08	270.15	9,765.6	383.1	-6,936.4	6,946.0	0.00	0.00	0.00
16,900.0	91.08	270.15	9,763.7	383.4	-7,036.4	7,045.9	0.00	0.00	0.00
17,000.0	91.08	270.15	9,761.9	383.6	-7,136.3	7,145.8	0.00	0.00	0.00
17,100.0	91.08	270.15	9,760.0	383.9	-7,236.3	7,245.7	0.00	0.00	0.00
17,200.0	91.08	270.15	9,758.1	384.2	-7,336.3	7,345.6	0.00	0.00	0.00
17,300.0	91.08	270.15	9,756.2	384.4	-7,436.3	7,445.6	0.00	0.00	0.00
17,400.0	91.08	270.15	9,754.3	384.7	-7,536.3	7,545.5	0.00	0.00	0.00
17,500.0	91.08	270.15	9,752.4	385.0	-7,636.2	7,645.4	0.00	0.00	0.00
17,600.0	91.08	270.15	9,750.6	385.2	-7,736.2	7,745.3	0.00	0.00	0.00
17,700.0	91.08	270.15	9,748.7	385.5	-7,836.2	7,845.2	0.00	0.00	0.00
17,800.0	91.08	270.15	9,746.8	385.8	-7,936.2	7,945.1	0.00	0.00	0.00
17,900.0	91.08	270.15	9,744.9	386.0	-8,036.2	8,045.1	0.00	0.00	0.00
18,000.0	91.08	270.15	9,743.0	386.3	-8,136.2	8,145.0	0.00	0.00	0.00
18,100.0	91.08	270.15	9,741.1	386.6	-8,236.1	8,244.9	0.00	0.00	0.00
18,200.0	91.08	270.15	9,739.3	386.8	-8,336.1	8,344.8	0.00	0.00	0.00
18,300.0	91.08	270.15	9,737.4	387.1	-8,436.1	8,444.7	0.00	0.00	0.00
18,400.0	91.08	270.15	9,735.5	387.4	-8,536.1	8,544.7	0.00	0.00	0.00
18,500.0	91.08	270.15	9,733.6	387.6	-8,636.1	8,644.6	0.00	0.00	0.00
18,600.0	91.08	270.15	9,731.7	387.9	-8,736.0	8,744.5	0.00	0.00	0.00
18,700.0	91.08	270.15	9,729.9	388.2	-8,836.0	8,844.4	0.00	0.00	0.00
18,800.0	91.08	270.15	9,728.0	388.4	-8,936.0	8,944.3	0.00	0.00	0.00
18,900.0	91.08	270.15	9,726.1	388.7	-9,036.0	9,044.2	0.00	0.00	0.00
19,000.0	91.08	270.15	9,724.2	389.0	-9,136.0	9,144.2	0.00	0.00	0.00
19,100.0	91.08	270.15	9,722.3	389.2	-9,236.0	9,244.1	0.00	0.00	0.00
19,200.0	91.08	270.15	9,720.4	389.5	-9,335.9	9,344.0	0.00	0.00	0.00
19,300.0	91.08	270.15	9,718.6	389.7	-9,435.9	9,443.9	0.00	0.00	0.00
19,400.0	91.08	270.15	9,716.7	390.0	-9,535.9	9,543.8	0.00	0.00	0.00
19,500.0	91.08	270.15	9,714.8	390.3	-9,635.9	9,643.8	0.00	0.00	0.00

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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)
19,600.0	91.08	270.15	9,712.9	390.5	-9,735.9	9,743.7	0.00	0.00	0.00
19,700.0	91.08	270.15	9,711.0	390.8	-9,835.8	9,843.6	0.00	0.00	0.00
19,800.0	91.08	270.15	9,709.1	391.1	-9,935.8	9,943.5	0.00	0.00	0.00
19,900.0	91.08	270.15	9,707.3	391.3	-10,035.8	10,043.4	0.00	0.00	0.00
20,000.0	91.08	270.15	9,705.4	391.6	-10,135.8	10,143.4	0.00	0.00	0.00
20,073.3	91.08	270.15	9,704.0	391.8	-10,209.1	10,216.6	0.00	0.00	0.00

TD at 20073.3

**Design Targets**
**Target Name**

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LTP (Howitzer Federa - plan misses target center by 2.4usft at 19943.3usft MD (9706.4 TVD, 391.5 N, -10079.1 E) - Point	0.00	0.00	9,704.0	391.4	-10,079.1	449,260.10	582,857.20	32° 14' 5.456 N	104° 3' 55.305 W
PBHL (Howitzer Fede - plan hits target center - Rectangle (sides W60.0 H10,179.0 D20.0)	-1.08	270.15	9,704.0	391.8	-10,209.1	449,260.50	582,727.20	32° 14' 5.463 N	104° 3' 56.819 W
FTP (Howitzer Federa - plan misses target center by 103.3usft at 9934.0usft MD (9810.6 TVD, 364.9 N, -85.5 E) - Point	0.00	0.00	9,899.0	364.8	-31.9	449,233.50	592,904.40	32° 14' 4.930 N	104° 1' 58.330 W

**Formations**

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
91.0	91.0	Rustler			
91.0	91.0	TOS			
2,552.9	2,551.0	BOS (Fletcher)			
2,763.1	2,760.0	LMAR (Top Delaware)			
2,816.4	2,813.0	BLCN			
3,682.1	3,674.0	CYCN			
4,909.8	4,895.0	BYCN			
6,450.2	6,429.0	Bone Sprg (BSGL)			
6,749.2	6,728.0	U Avalon Sh			
7,072.2	7,051.0	L Avalon Sh			
7,222.2	7,201.0	B Avalon Sh			
7,448.2	7,427.0	FBSG_sand			
8,248.2	8,227.0	SBSG_sand			
8,572.2	8,551.0	SBSG_sand_Base			
9,337.2	9,316.0	TBSG_sand			
9,675.5	9,635.0	WFMP			

<b>Database:</b>	EDM 5000.15 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Howitzer Federal Com #605H
<b>Company:</b>	Concho Resources, Inc.	<b>TVD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Project:</b>	Eddy County (NAD27 NME)	<b>MD Reference:</b>	KB @ 2994.5usft (Precision 106)
<b>Site:</b>	(Howitzer) Sec-12_T-24-S_R-28-E	<b>North Reference:</b>	Grid
<b>Well:</b>	Howitzer Federal Com #605H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	Plan #1		

**Plan Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,000.0	2,000.0	0.0	0.0	NUDGE - Build 2.00
2,300.0	2,299.4	13.8	7.5	HOLD - 3666.2 at 2300.0 MD
5,966.2	5,945.6	350.4	190.6	DROP - -2.00
6,266.2	6,245.0	364.2	198.1	HOLD - 3071.1 at 6266.2 MD
9,337.3	9,316.1	364.2	198.1	KOP - DLS 10.00 TFO 270.15
10,248.1	9,889.0	365.7	-385.6	EOC - 9825.3 hold at 10248.1 MD
20,073.3	9,704.0	391.8	-10,209.1	TD at 20073.3

# COG Operating, LLC - Howitzer Federal Com 605H

## 1. Geologic Formations

TVD of target	9,899'	Pilot hole depth	NA
MD at TD:	20,074'	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	91	Salt	
Base of Salt	2551	Salt	
Lamar	2760	Salt Water	
Bell Canyon	2813	Salt Water	
Cherry Canyon	3674	Oil/Gas	
Brushy Canyon	4895	Oil/Gas	
Bone Spring Lime	6429	Oil/Gas	
U. Avalon Shale	6728	Oil/Gas	
L. Avalon Shale	7051	Oil/Gas	
1st Bone Spring Sand	7427	Oil/Gas	
2nd Bone Spring Sand	8227	Oil/Gas	
3rd Bone Spring Sand	9316	Oil/Gas	
Wolfcamp	9635	Target Oil/Gas	

## 2. Casing Program

Hole Size	Casing		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	9140	9.625"	40	HCL80	BTC	1.30	1.14	2.59
8.5	0	20,074	5.5"	23	P110	BTC	2.26	2.67	3.18
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 - Howitzer Federal Com 605H**

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 <sup>nd</sup> 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 <sub>2</sub> O 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% CaCl <sub>2</sub>
Inter. Stage1	1420	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%
1 <sup>st</sup> Intermediate	0'	50%
Production	8,640'	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	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	6435 psi at 9899' TVD
Abnormal Temperature	NO 155 Deg. F.

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

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

Hydrogen Sulfide (H <sub>2</sub> S) monitors will be installed prior to drilling out the surface shoe. If H <sub>2</sub> S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H <sub>2</sub> S is present
Y	H <sub>2</sub> S Plan attached

8. Other Facets of Operation

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

x	H <sub>2</sub> S Plan.
x	BOP & Choke Schematics.
x	Directional Plan
x	5M Annular Variance



APD ID: 10400036159

Submission Date: 11/09/2018

Highlighted data reflects the most recent changes

Operator Name: COG OPERATING LLC

Well Name: HOWITZER FEDERAL COM

Well Number: 605H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

### Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG\_HOWITZER\_605H\_Ex\_Rd\_20181109080647.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\_Howitzzer\_605H\_Rd\_Plats\_20181109080707.pdf

New road type: TWO-TRACK

Length: 1021.6 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:** 605H

**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\_Howitzler\_605H\_1\_Mile\_Data\_20181109080807.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:** 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 1512.8' 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 605H and 606H wells. The buried Gas Lift Gas pipe of approximately 1512.8' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road.

**Production Facilities map:**

COG\_Howitzler\_605H\_Flowline\_20181109080837.pdf

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

COG\_Howitz\_605H\_Prod\_Facil\_20181109080904.pdf

COG\_Howitz\_CTB\_Layout\_20181109080917.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

**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\_Howitz\_605H\_Brine\_H2O\_20181109081944.pdf

COG\_Howitz\_605H\_Fresh\_H2O\_20181109081955.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 equipment:**

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

**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:** 605H

**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:** 605H

**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\_Howitzler\_605H\_Flowline\_20181109081415.pdf

COG\_HOWITZER\_605H\_Layout\_20181109081426.pdf

COG\_Howitzler\_605H\_Prod\_Facil\_20181109081434.pdf

COG\_Howitzler\_CTB\_Layout\_20181109081445.pdf

**Comments:** 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 1512.8' 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 605H and 606H wells. The buried Gas Lift Gas pipe of approximately 1512.8' 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:** 605H AND 606H

**Recontouring attachment:**

**Drainage/Erosion control construction:** Immediately following construction approximately 400' of straw waddles will be placed on the east side and 200' on the southeast side of the location, to reduce sediment impacts to fragile/sensitive soils.

**Drainage/Erosion control reclamation:** Reclaim east side 80', southeast side 80'

**Well pad proposed disturbance (acres):** 3.67

**Road proposed disturbance (acres):** 0.33

**Powerline proposed disturbance (acres):** 0

**Pipeline proposed disturbance (acres):** 0.49

**Other proposed disturbance (acres):** 0.49

**Well pad interim reclamation (acres):** 0.15

**Road interim reclamation (acres):** 0.33

**Powerline interim reclamation (acres):** 0

**Pipeline interim reclamation (acres):** 0.49

**Other interim reclamation (acres):** 0.49

**Total interim reclamation:** 1.46

**Well pad long term disturbance (acres):** 2.35

**Road long term disturbance (acres):** 0.33

**Powerline long term disturbance (acres):** 0

**Pipeline long term disturbance (acres):** 0.49

**Other long term disturbance (acres):** 0.49

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

**Total proposed disturbance:** 4.98

**Total long term disturbance:** 3.66

**Disturbance Comments:**

**Reconstruction method:** New construction of pad.

**Topsoil redistribution:** Reclaim east side 80', southeast side 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:** 605H

**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\_Howitzzer\_605H\_Closed\_Loop\_20181109082353.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:** 605H

**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\_Howitzzer\_605H\_SUP\_20181109082946.pdf

COG\_Howitzzer\_605H\_C102\_20181109082955.pdf

COG\_Howitzzer\_605H\_1\_Mile\_Data\_20181109083009.pdf

COG\_Howitzzer\_605H\_Brine\_H2O\_20181109083022.pdf

COG\_Howitzzer\_605H\_Certif\_20181109083032.pdf

COG\_Howitzzer\_605H\_Closed\_Loop\_20181109083039.pdf

COG\_Howitzzer\_605H\_Ex\_Rd\_20181109083050.pdf

COG\_Howitzzer\_605H\_Flowline\_20181109083102.pdf

COG\_Howitzzer\_605H\_Fresh\_H2O\_20181109083113.pdf

COG\_Howitzzer\_605H\_Layout\_20181109083125.pdf

COG\_Howitzzer\_605H\_Prod\_Facil\_20181109083135.pdf

COG\_Howitzzer\_605H\_Rd\_Plats\_20181109083150.pdf

**Operator Name:** COG OPERATING LLC

**Well Name:** HOWITZER FEDERAL COM

**Well Number:** 605H

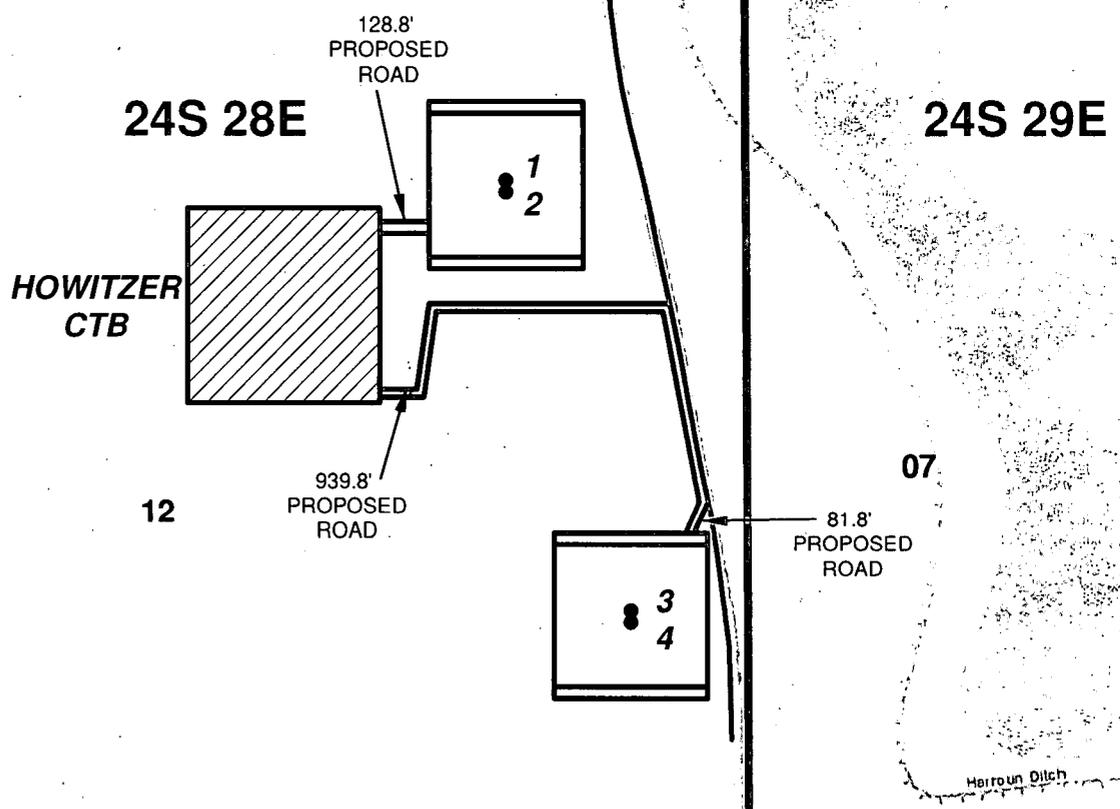
COG\_Howitzer\_CTB\_Layout\_20181109083206.pdf

HARROUN RD  
 Harroun Rd

01

06

	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

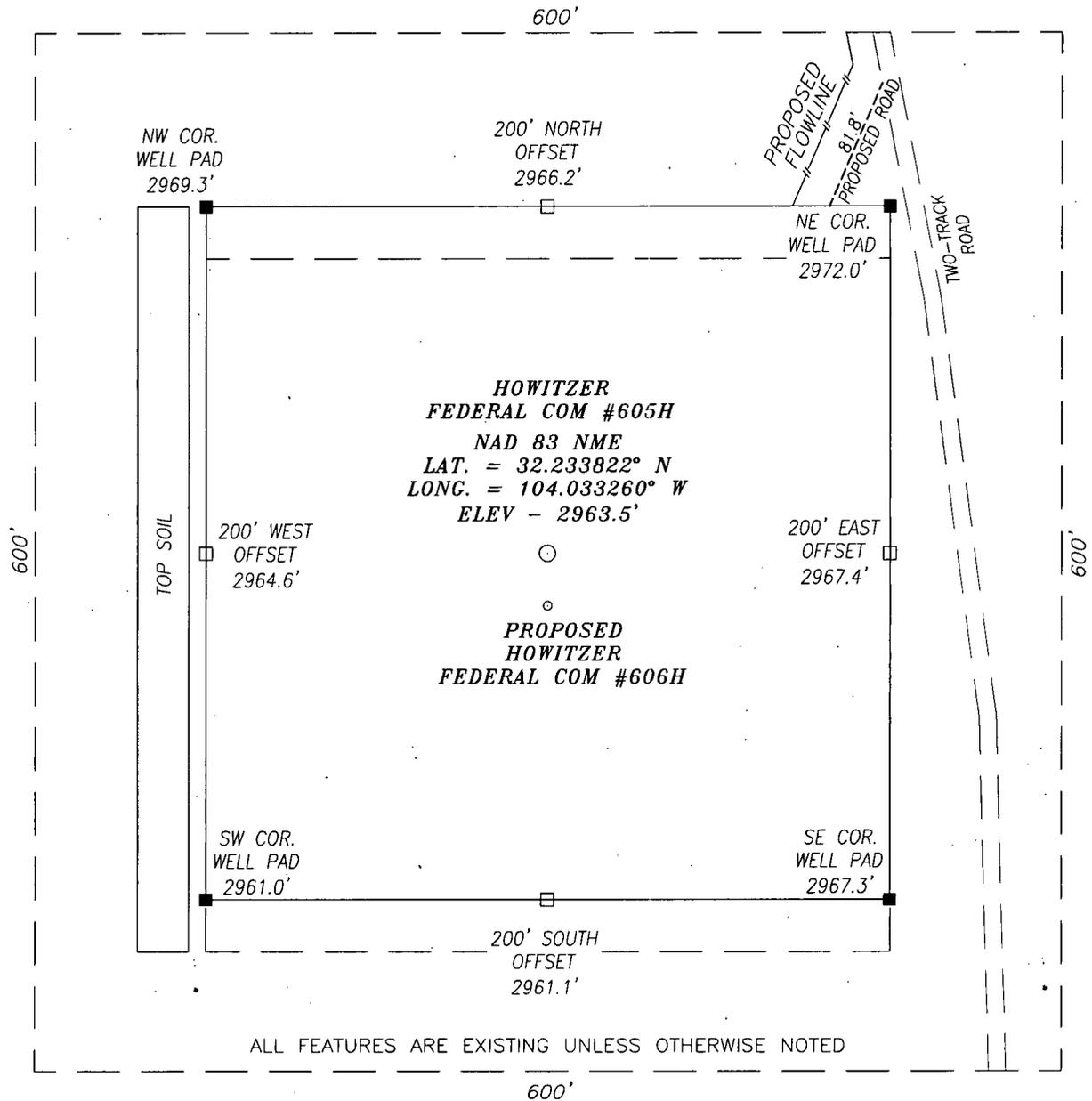
LOCATION MAP VICINITY 11/5/2018 A.M.

**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

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO



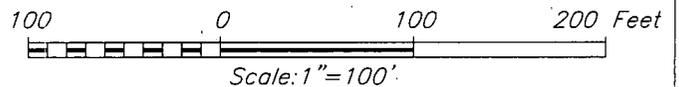
ALL FEATURES ARE EXISTING UNLESS OTHERWISE NOTED

**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 (SOURHTERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD LIES APPROX. 0.6 MI. TO THE SOUTH.

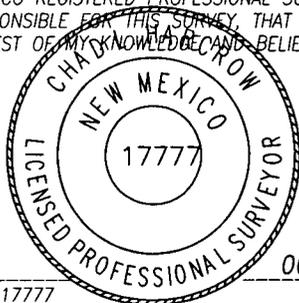
**HARCROW SURVEYING, LLC**

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



**CERTIFICATION**

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



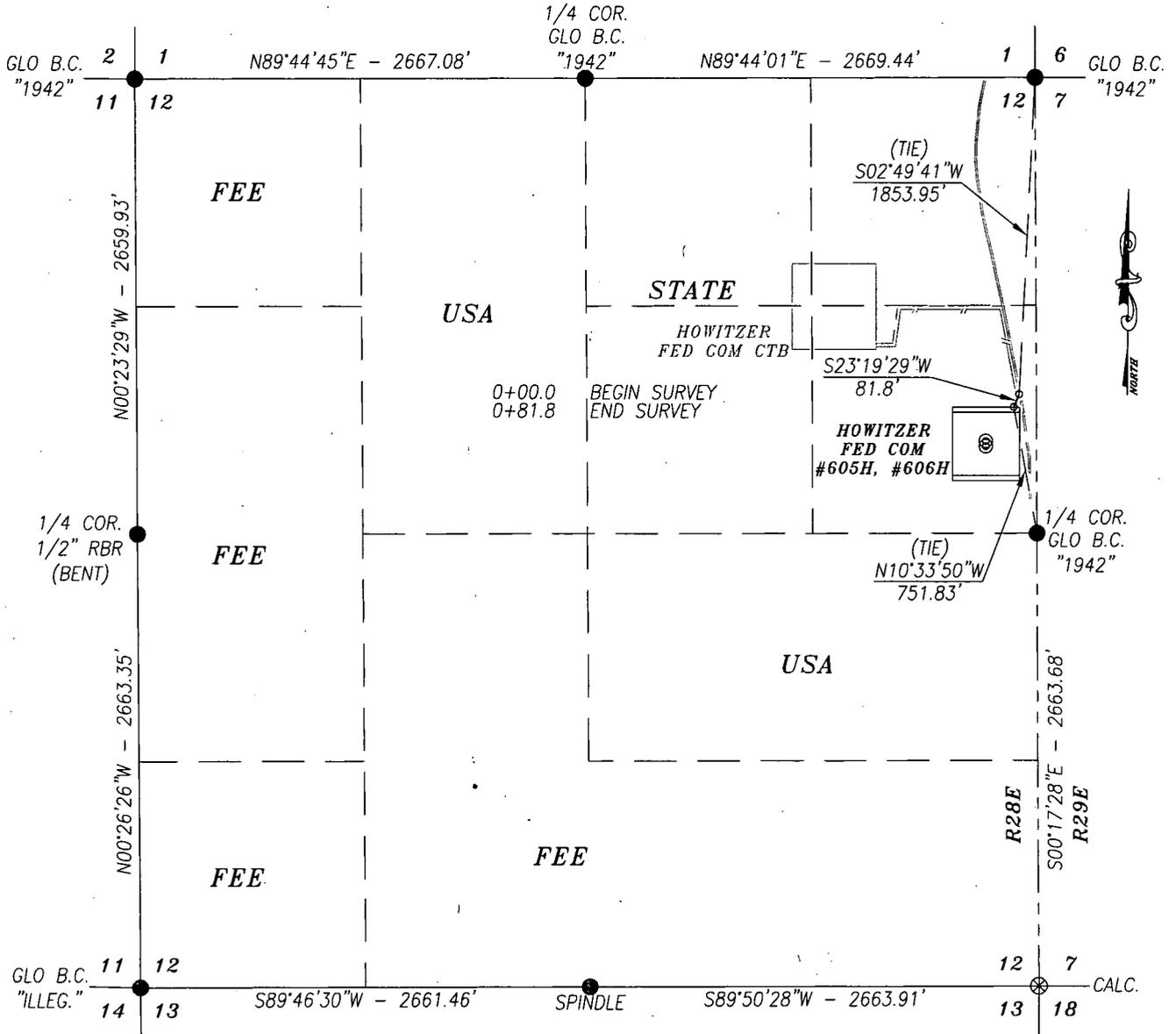
*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777

00/00/18  
DATE

<b>COG OPERATING, LLC</b>		
HOWITZER FEDERAL COM #605H WELL LOCATED 2125 FEET FROM THE NORTH LINE AND 300 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 #605H & #606H 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:

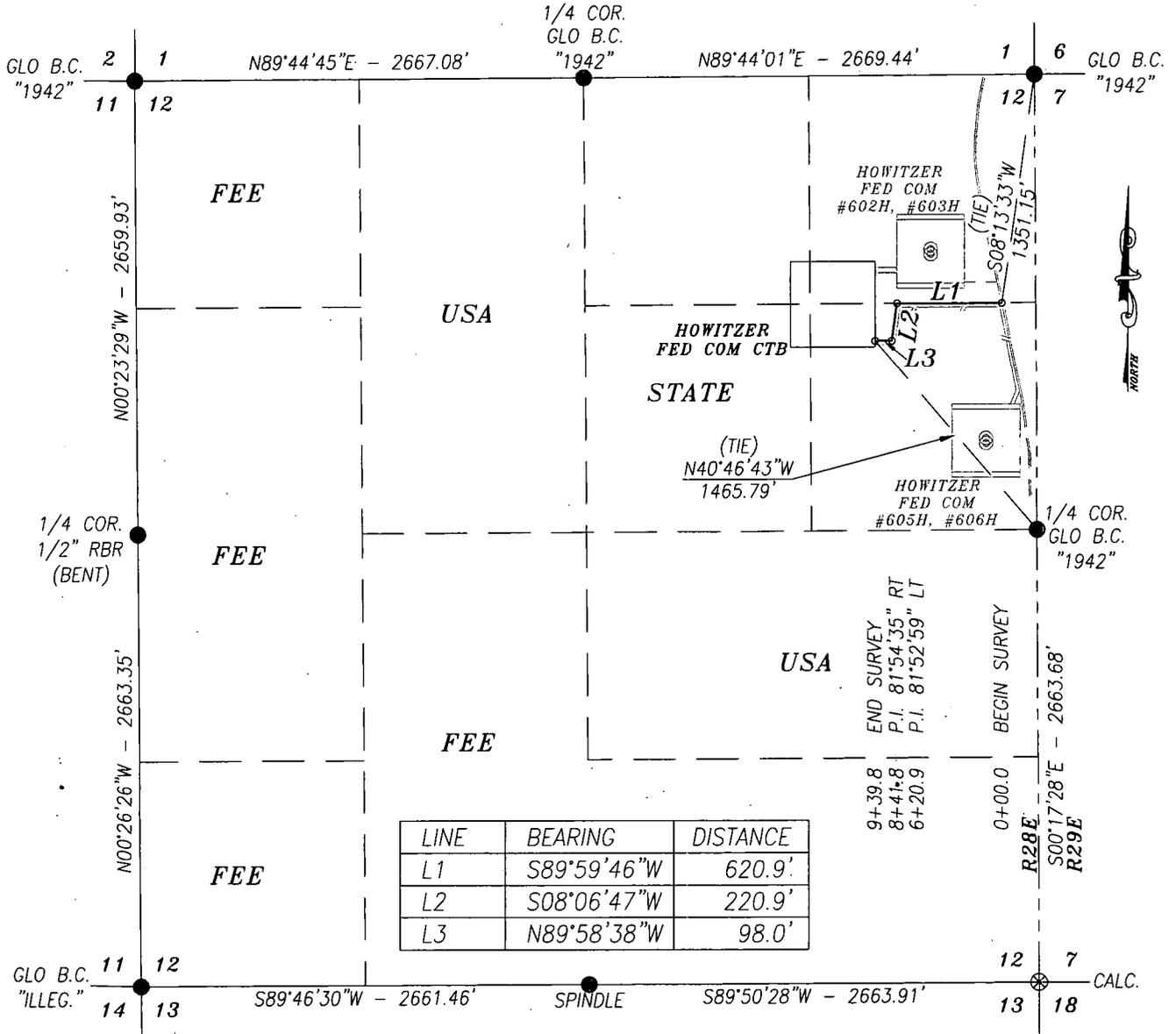
BEGINNING AT A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES  $S02^{\circ}49'41''W$  1853.95 FEET FROM THE NORTHEAST CORNER; THEN  $S23^{\circ}19'29''W$  81.8 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES  $N10^{\circ}33'50''W$  751.83 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 81.8 FEET OR 4.96 RODS IN LENGTH, CONTAINING 0.056 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.



# 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.



## DESCRIPTION

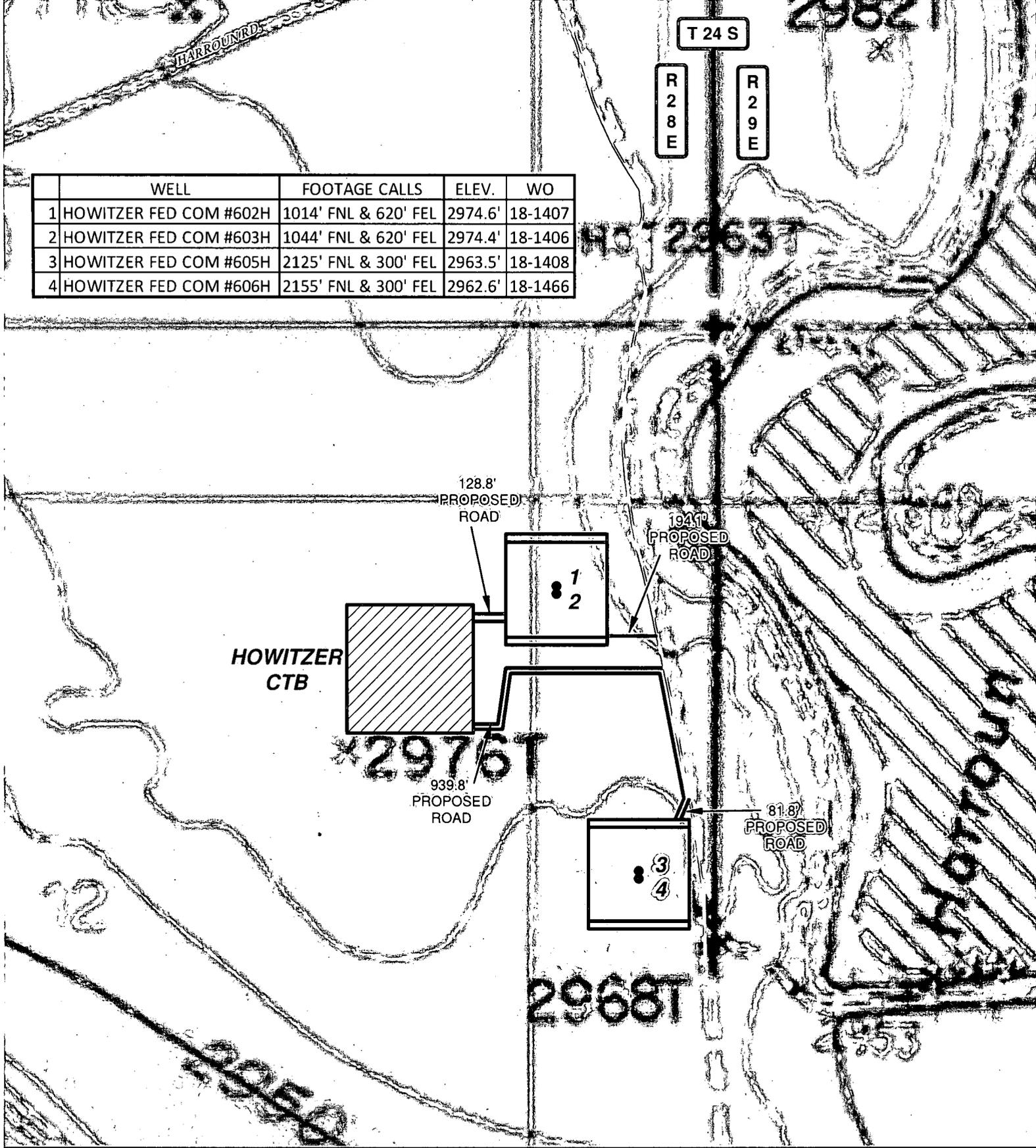
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

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.



	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.

  
**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

HARROUNDRS

T 24 S

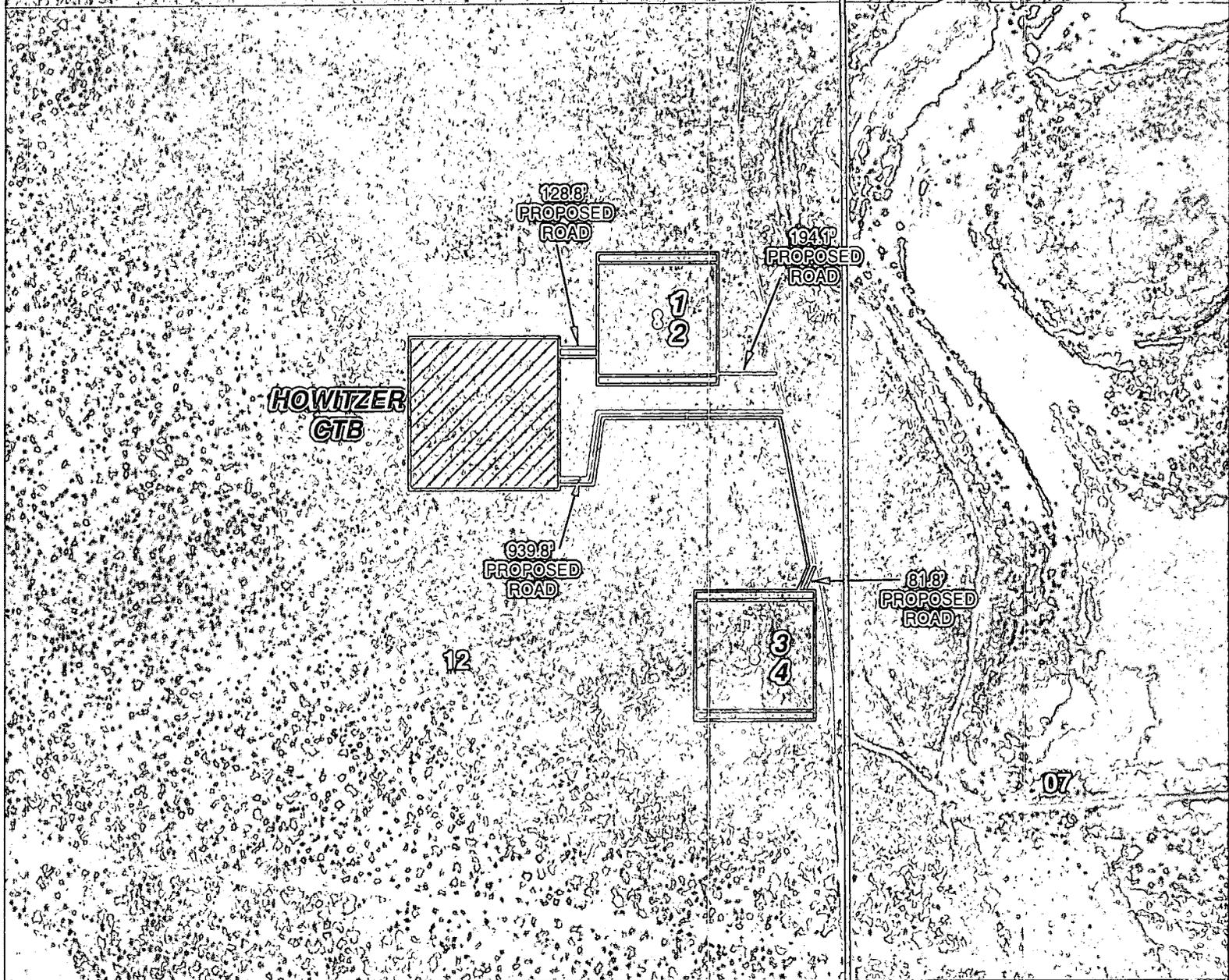
R 28 E

R 29 E

01

06

	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 0.03250.065 0.13 Miles 1 IN = 500 FT

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

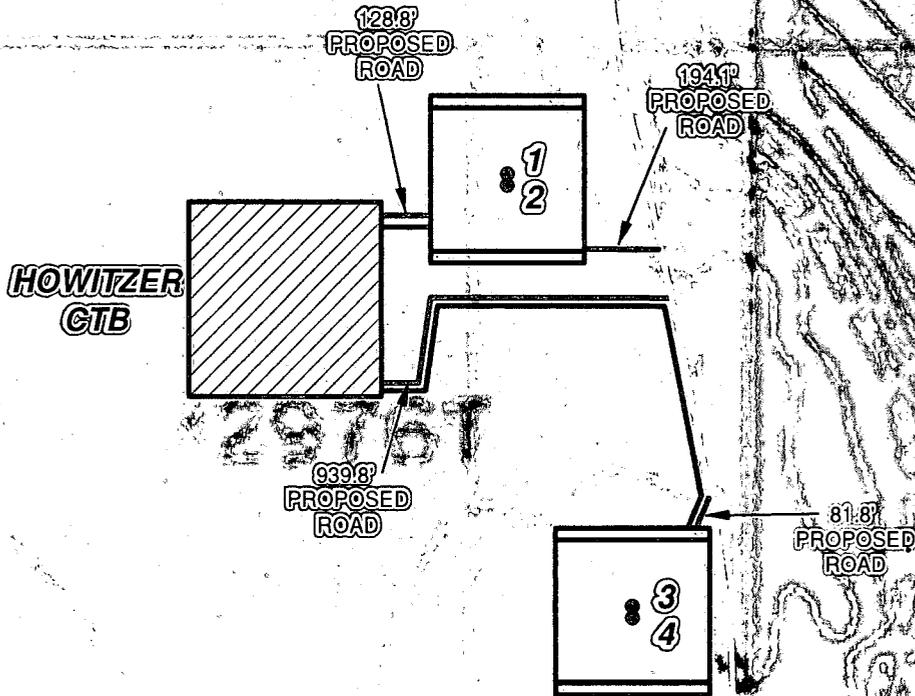
**CONCHO**

COG OPERATING, LLC

---

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

	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
- IIS RIM

**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.



COG OPERATING, LLC



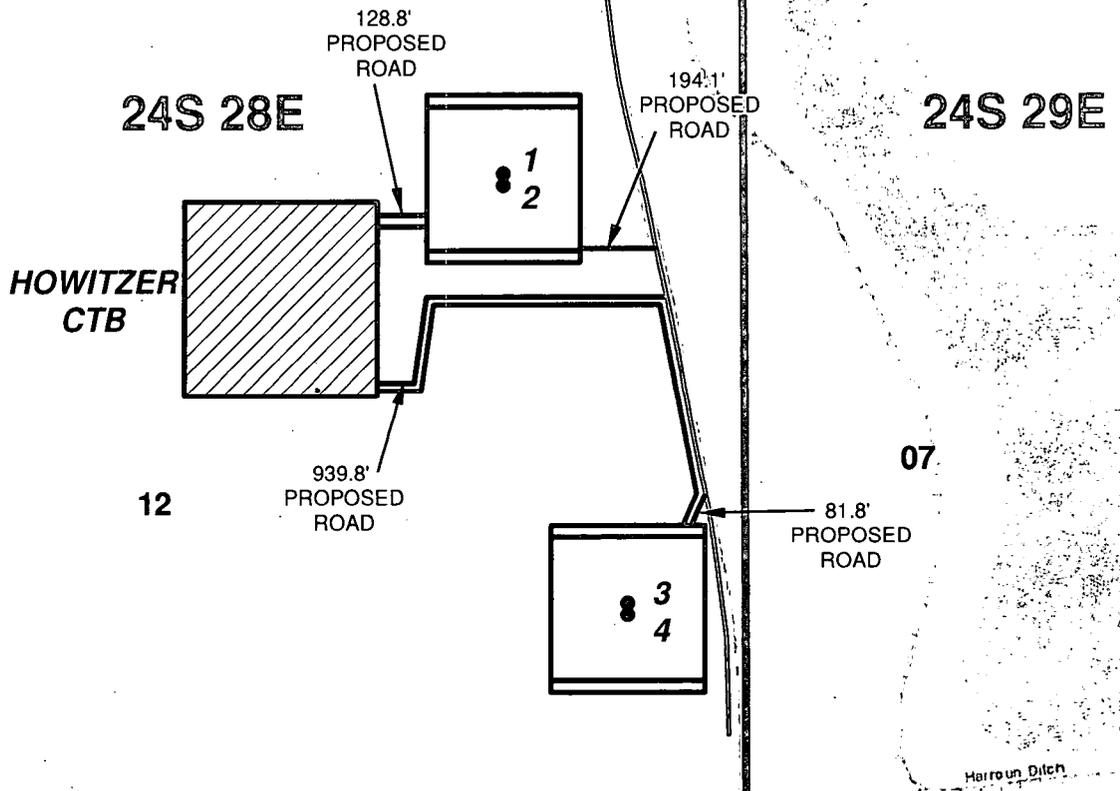
**HARCROW SURVEYING, LLC.**  
 2314 W. MAIN ST, ARTESIA, NM 88210  
 PH: (575) 746-2158 FAX: (575) 746-2158  
 TEXAS FIRM NO. 10194089  
 c.harcrow@harcrowsurveying.com

HARROUN RD  
 Harroun Rd

01

06

	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

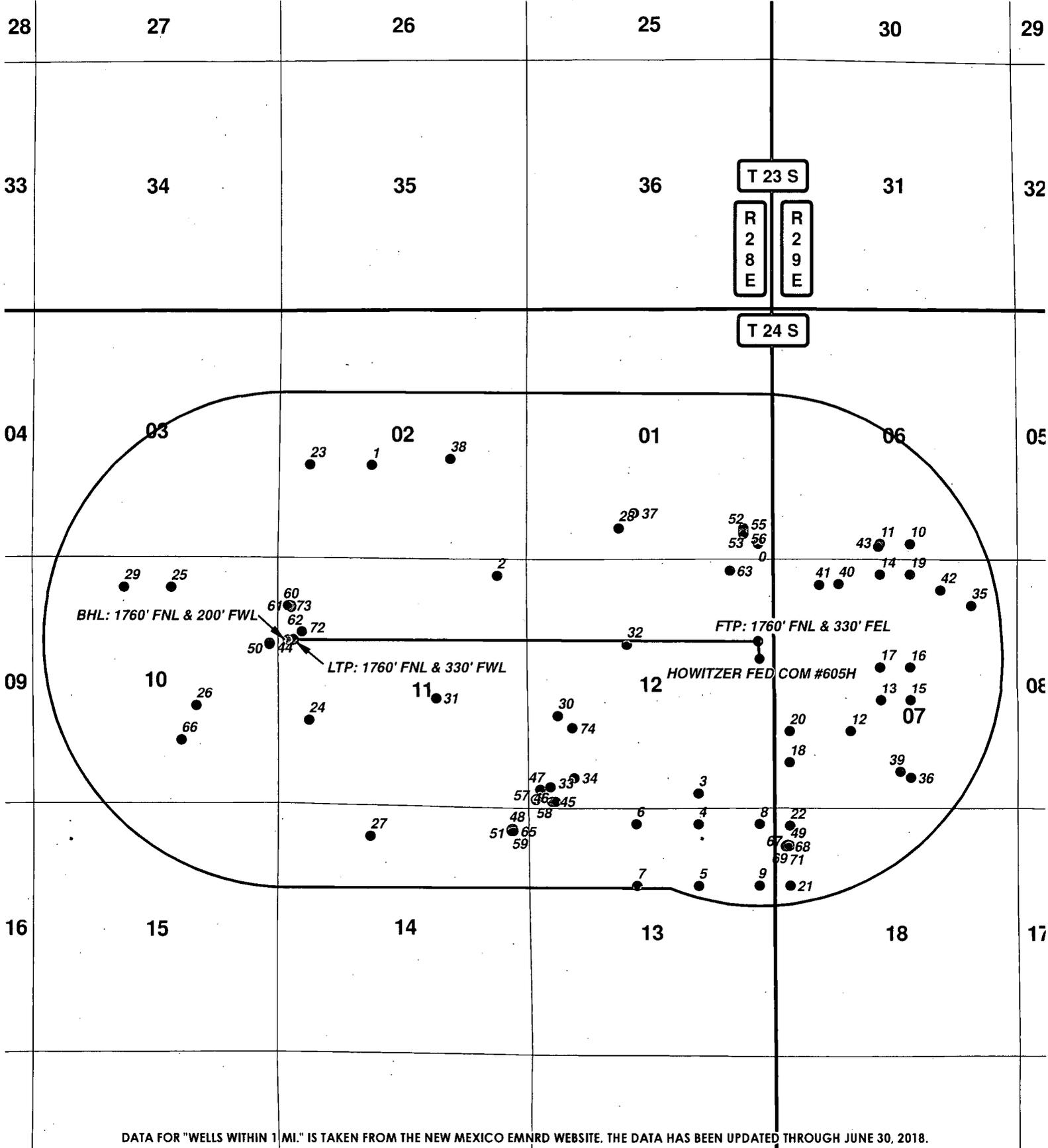
LOCATION MAP VICINITY 11/5/2018 A.M.

**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



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 #605H			
SEC: 12	TWP: 24 S.	RGE: 28 E.	ELEVATION: 2963.5'
STATE: NEW MEXICO	COUNTY: EDDY	2125' FNL & 300' FEL	
W.O. # 18-1408	LEASE: HOWITZER FED COM	SURVEY: N.M.P.M	
1 MILE MAP      10/23/2018      A.M.			



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 #605H 1 MILE DATA (18-1408)

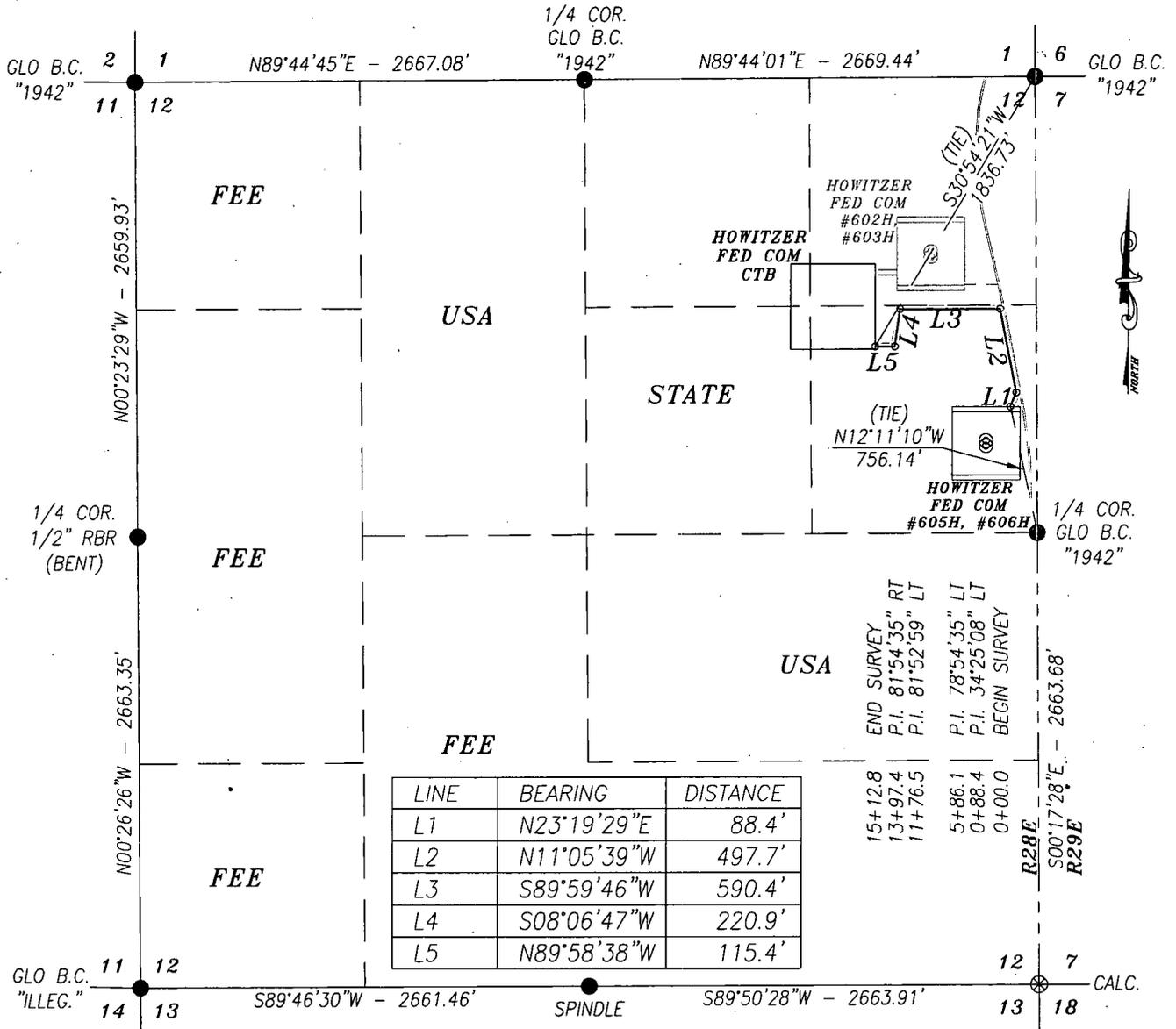
OPERATOR	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	LATITUDE	LONGITUDE	COMPL_STAT
C L HAY	3001502486	1	24.0S	28E	330 S		330 E		32.240593	-104.033367	Plugged
RICHARDSON & BASS	3001502487	2	24.0S	28E	1980 S		1980 W		32.245228	-104.060384	Plugged
ALBERT SCHABEL	3001502489	11	24.0S	28E	355 N		645 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	-104.037612	Plugged
AUSTIN GAS PURCHASING	3001502495	13	24.0S	28E	1650 N		1650 E		32.220503	-104.037612	Plugged
DEKALB AGRICULTURAL ASSOCIATION INC	3001502496	13	24.0S	28E	330 N		2310 W		32.22413	-104.041967	Plugged
DEKALB AGRICULTURAL ASSOCIATION INC	3001502498	13	24.0S	28E	1650 N		2310 W		32.220502	-104.041907	Plugged
AUSTIN GAS PURCHASING	3001502500	13	24.0S	28E	330 N		330 E		32.224131	-104.033331	Plugged
AUSTIN GAS PURCHASING	3001502501	13	24.0S	28E	1650 N		330 E		32.220503	-104.033323	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	-104.022679	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	3001503705	18	24.0S	29E	1650 N		330 W		32.2205	-104.031179	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
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
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)
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)

001

MATADOR PRODUCTION COMPANY	3001543823	1 24.05	28E	721 S	661 E	32.241489	-104.03439	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543824	1 24.05	28E	601 S	662 E	32.241159	-104.034397	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543845	12 24.05	28E	270 S	200 W	32.225619	-104.048983	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543846	12 24.05	28E	250 S	200 W	32.225564	-104.048984	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543870	14 24.05	28E	410 N	330 E	32.223768	-104.050686	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543940	11 24.05	28E	933 N	254 W	32.236999	-104.066052	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543966	11 24.05	28E	934 N	224 W	32.236988	-104.06615	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543993	11 24.05	28E	963 N	255 W	32.236908	-104.06605	New (Not drilled or compl)
MEWBOURNE OIL CO	3001544048	12 24.05	28E	185 N	950 E	32.239	-104.035363	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544162	14 24.05	28E	429 N	330 E	32.223716	-104.050685	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544163	14 24.05	28E	428 N	300 E	32.223717	-104.050587	New (Not drilled or compl)
ALPHA SWD OPERATING LLC	3001544237	10 24.05	28E	1457 S	2093 E	32.229147	-104.07375	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544241	18 24.05	29E	712 N	352 W	32.222892	-104.031288	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544242	18 24.05	29E	742 N	321 W	32.222809	-104.031387	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544244	18 24.05	29E	712 N	321 W	32.222892	-104.031389	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544245	18 24.05	29E	742 N	290 W	32.222809	-104.031488	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544247	18 24.05	29E	742 N	351 W	32.222809	-104.03129	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544514	11 24.05	28E	1489 N	490 W	32.235461	-104.065299	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544533	11 24.05	28E	934 N	194 W	32.236988	-104.066247	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544571	12 24.05	28E	1779 S	975 W	32.229762	-104.046408	New (Not drilled or compl)

# PIPELINE PLAT COG OPERATING, LLC.

A PROPOSED PIPELINE 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.



## 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 N12°11'10"W 756.14 FEET FROM THE EAST QUARTER CORNER; THEN N23°19'29"E 88.4 FEET, THEN N11°05'39"W 497.7 FEET, THEN S89°59'46"W 590.4 FEET, THEN S08°06'47"W 220.9 FEET, N89°58'38"W 115.4 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S30°54'21"W 1836.73 FEET FROM THE NORTHEAST CORNER.

SAID STRIP OF LAND BEING 1512.8 FEET OR 91.68 RODS IN LENGTH, CONTAINING 1.042 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.



T 24 S

R 2 8 E

R 2 9 E

01

06

HOWITZER  
FEDCOM  
CTB

8

HOWITZER  
FEDCOM  
#602H  
#603H

3

HOWITZER  
FEDCOM  
#605H  
#606H

07

12

T 24 S

2982T

R 2 8 E

R 2 9 E

DHC 2963T

HOWITZER  
FED COM  
CTB

HOWITZER  
FED COM  
#602H  
#603H

\*2976T

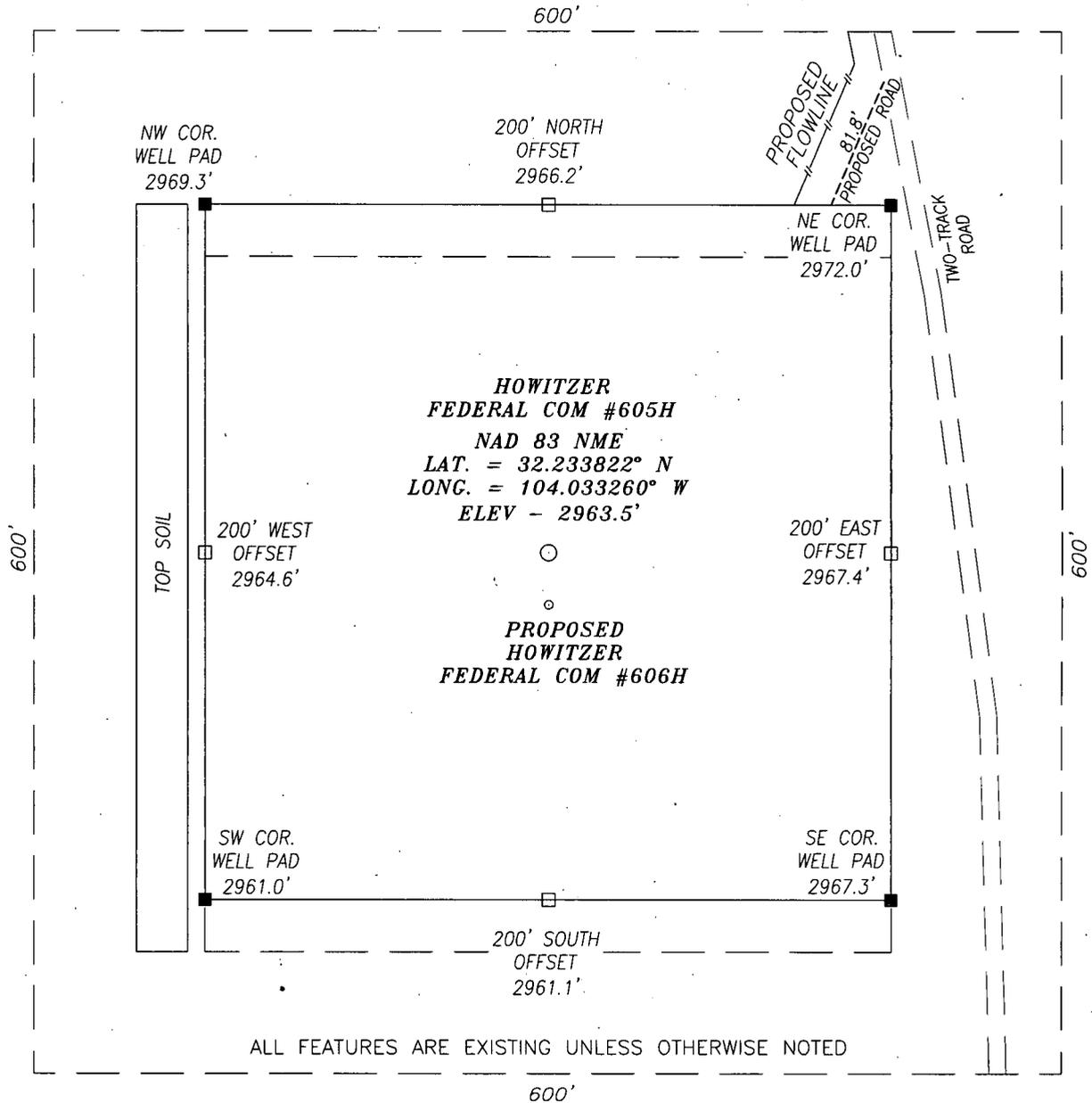
HOWITZER  
FED COM  
#605H  
#606H

2968T

12

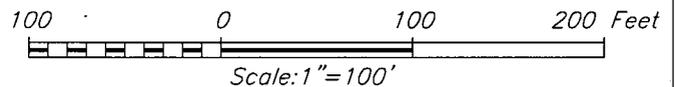
OW

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO

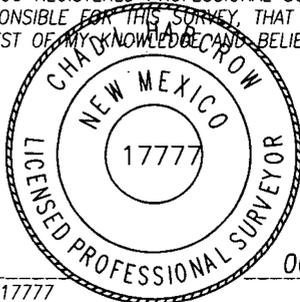


**DIRECTIONS TO LOCATION**  
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD. FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOURHTERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD LIES APPROX. 0.6 MI. TO THE SOUTH.

**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



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



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

00/00/18  
DATE

<b>COG OPERATING, LLC</b>		
HOWITZER FEDERAL COM #605H WELL LOCATED 2125 FEET FROM THE NORTH LINE AND 300 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

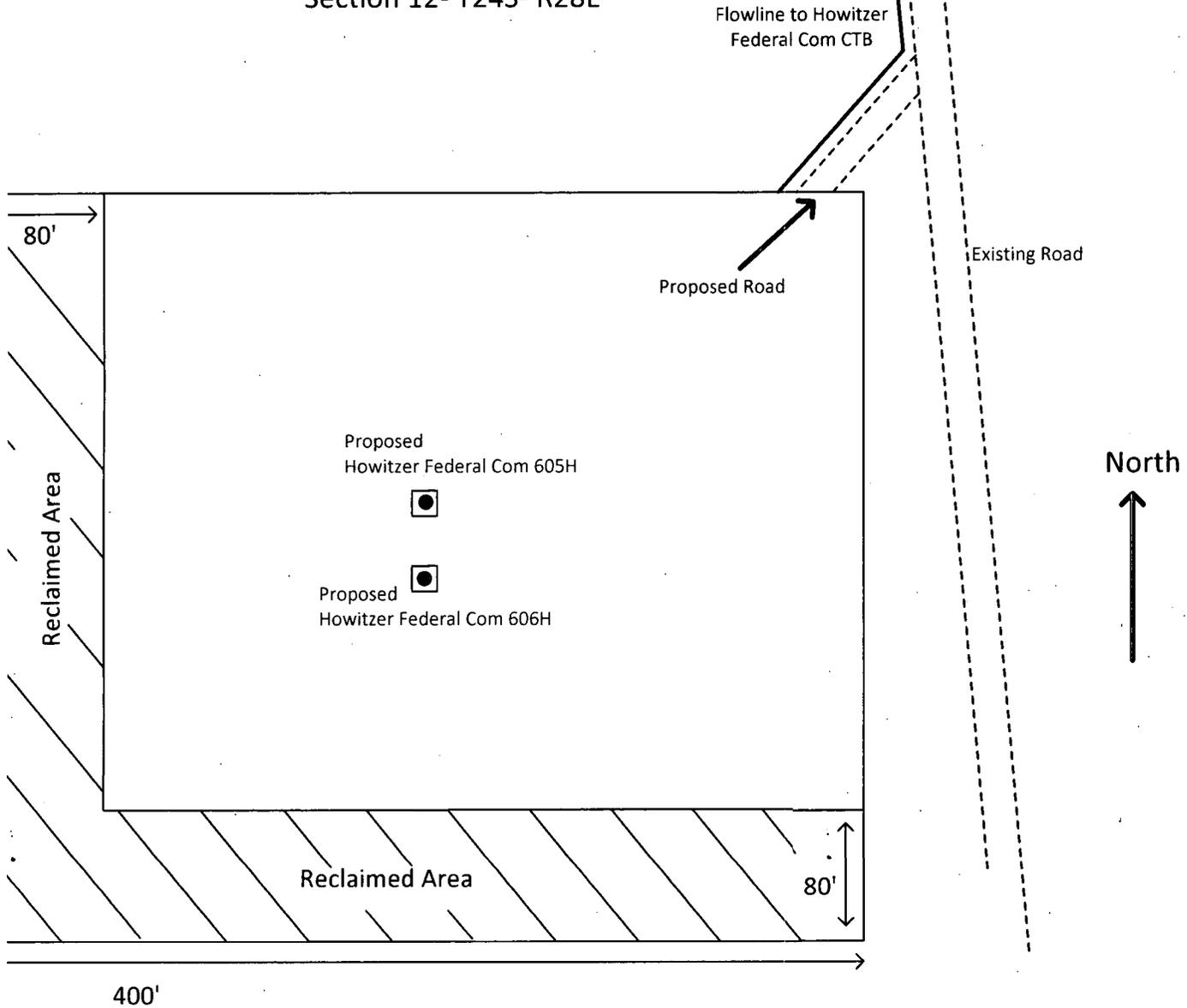
# Well Site Layout

## Production Facility Layout

Howitzer Federal Com 605H

Section 12- T24S- R28E

# Exhibit 3



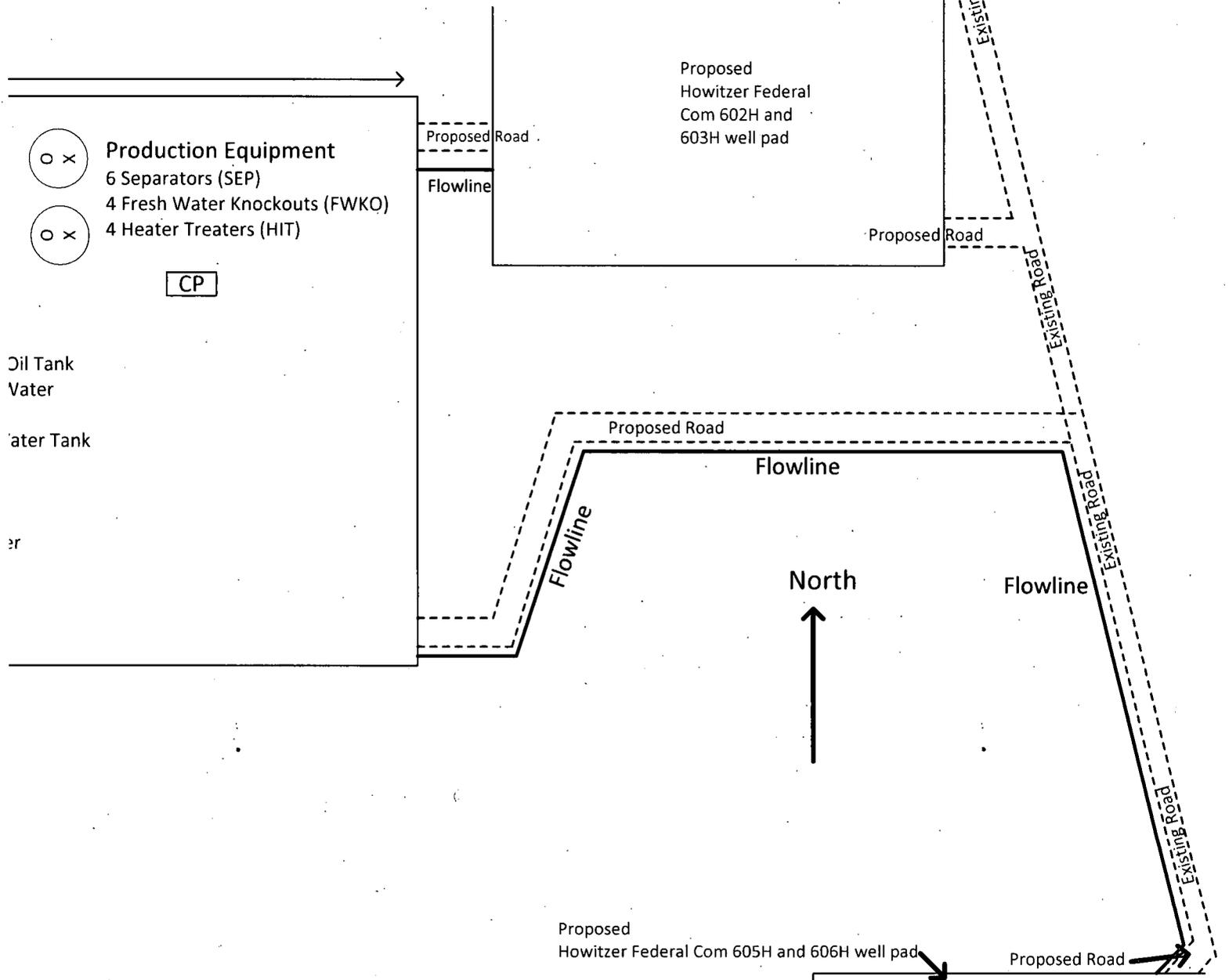
# Well Site Layout

## Production Facility Layout

Howitzer Federal Com CTB

Section 12- T24S- R28E

# Exhibit 3







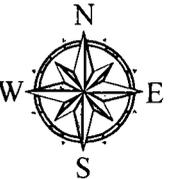
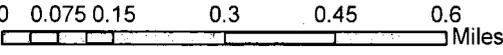
 **CONCHO**

**Howitzer Fed Com #605H  
Water Transfer Route**

Date: 11/6/2018  
Author: Whitney McDonald  
State: New Mexico  
County: Eddy  
Disclaimer: This is not a legal survey document

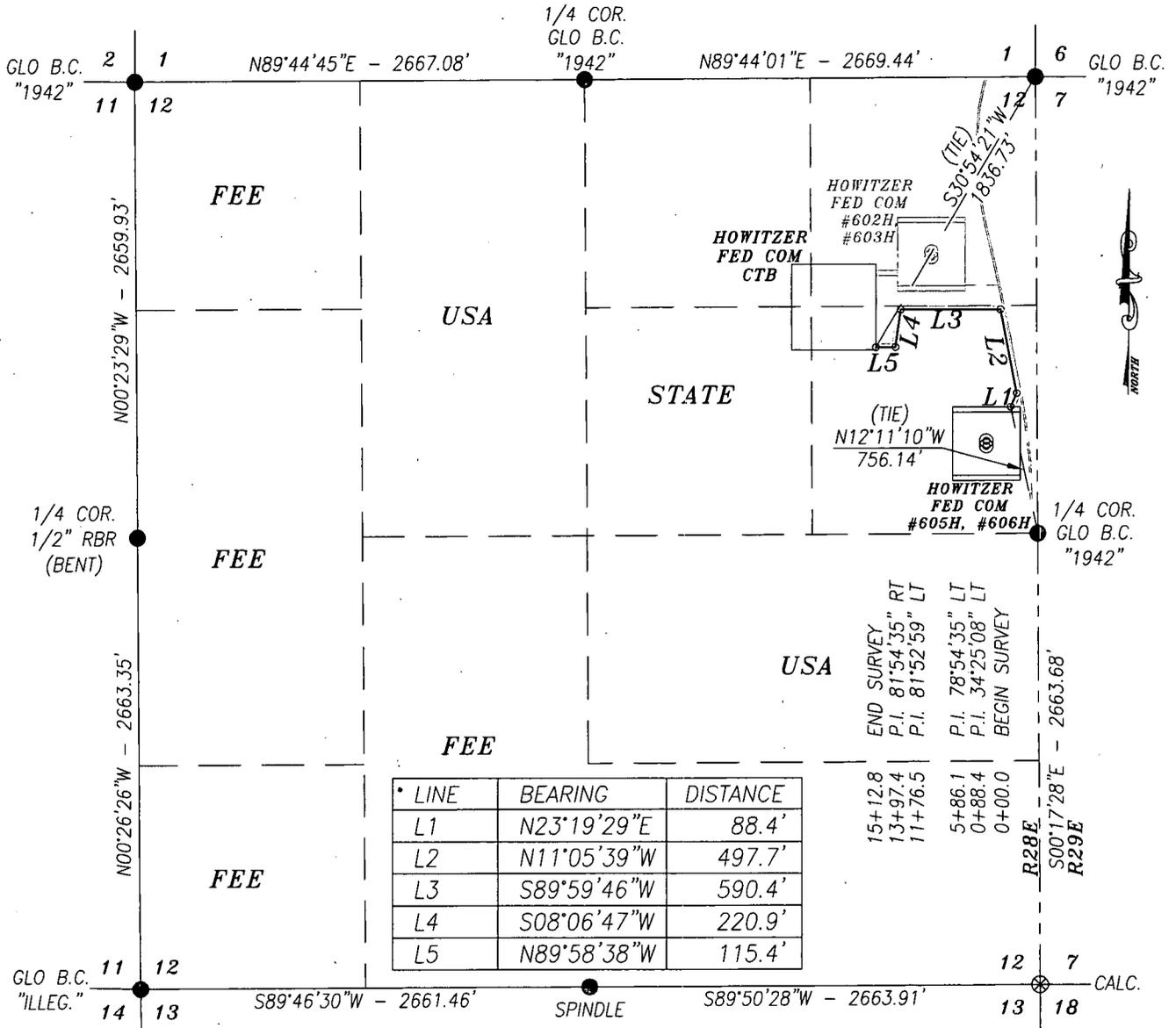
**Map Legend**

 Route



# PIPELINE PLAT COG OPERATING, LLC.

A PROPOSED PIPELINE 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	N23°19'29"E	88.4'
L2	N11°05'39"W	497.7'
L3	S89°59'46"W	590.4'
L4	S08°06'47"W	220.9'
L5	N89°58'38"W	115.4'

### 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 N12°11'10"W 756.14 FEET FROM THE EAST QUARTER CORNER; THEN N23°19'29"E 88.4 FEET, THEN N11°05'39"W 497.7 FEET, THEN S89°59'46"W 590.4 FEET, THEN S08°06'47"W 220.9 FEET, N89°58'38"W 115.4 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S30°54'21"W 1836.73 FEET FROM THE NORTHEAST CORNER.

SAID STRIP OF LAND BEING 1512.8 FEET OR 91.68 RODS IN LENGTH, CONTAINING 1.042 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.

T 24 S

R 2 8 E

R 2 9 E

01

06

HOWITZER  
FEDCOM  
CTB

8

HOWITZER  
FEDCOM  
#602H  
#603H

HOWITZER  
FEDCOM  
#605H  
#606H

07

12

T 24 S

2982T

R 28 E

R 29 E

DN 07 2963T

HOWITZER  
FED.COM  
CTB

8

HOWITZER  
FED.COM  
#602H  
#603H

\*2976T

8

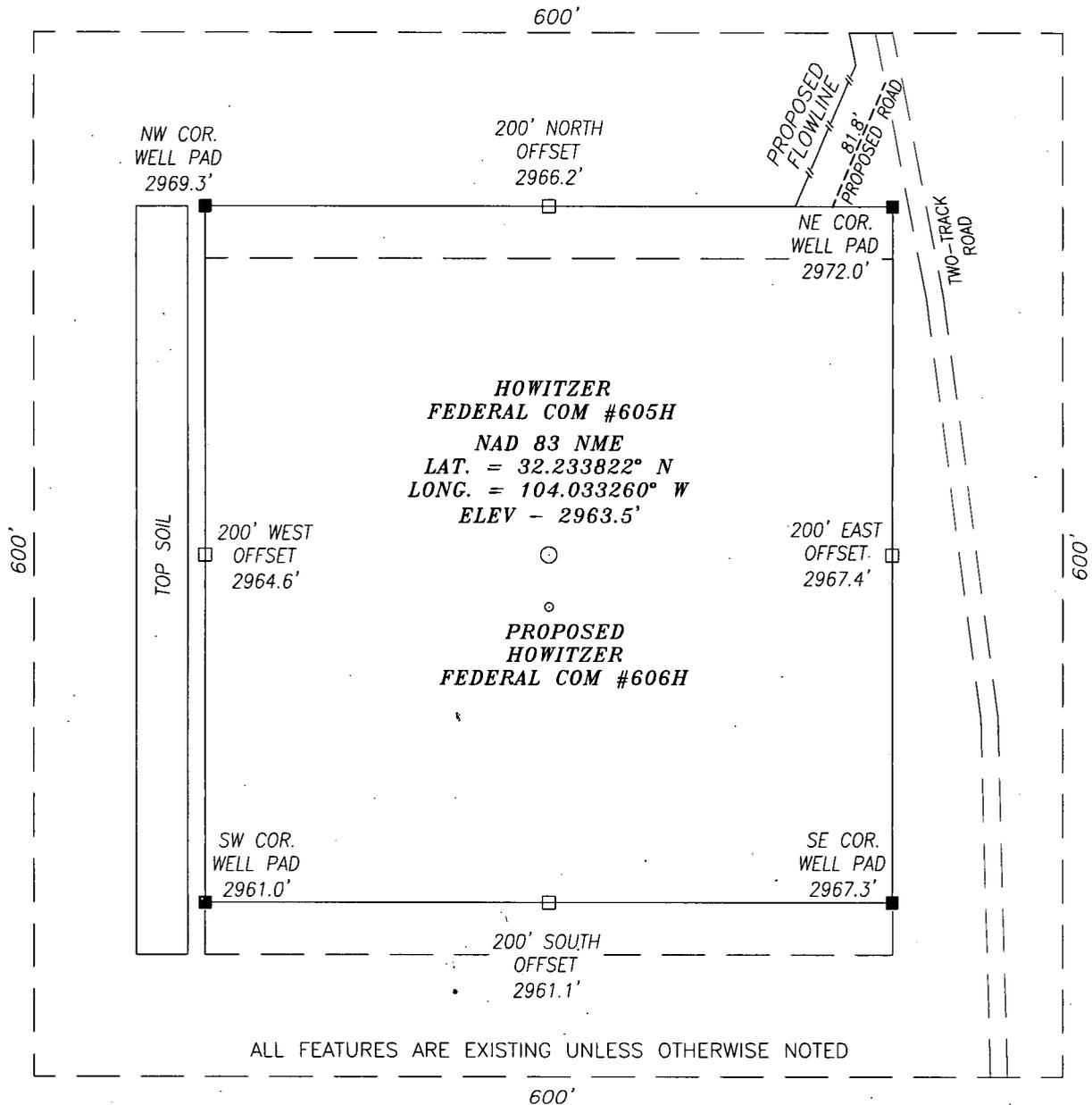
HOWITZER  
FED.COM  
#605H  
#606H

DN 06 2968T

12

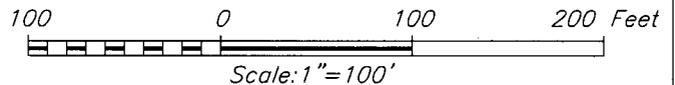
OW

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO

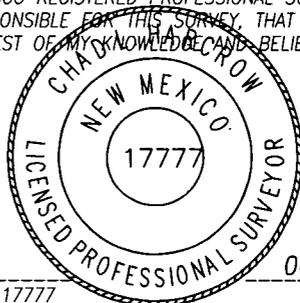


**DIRECTIONS TO LOCATION**  
BEGINNING AT THE INTERSECTION OF BRAMBLE RD. AND HARROUN RD. GO EASTERLY ON HARROUN RD. FOR APPROX. 1.6 MI.; THEN GO RIGHT (SOURHTERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD LIES APPROX. 0.6 MI. TO THE SOUTH.

**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



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



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

00/00/18  
DATE

<b>COG OPERATING, LLC</b>		
HOWITZER FEDERAL COM #605H WELL LOCATED 2125 FEET FROM THE NORTH LINE AND 300 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

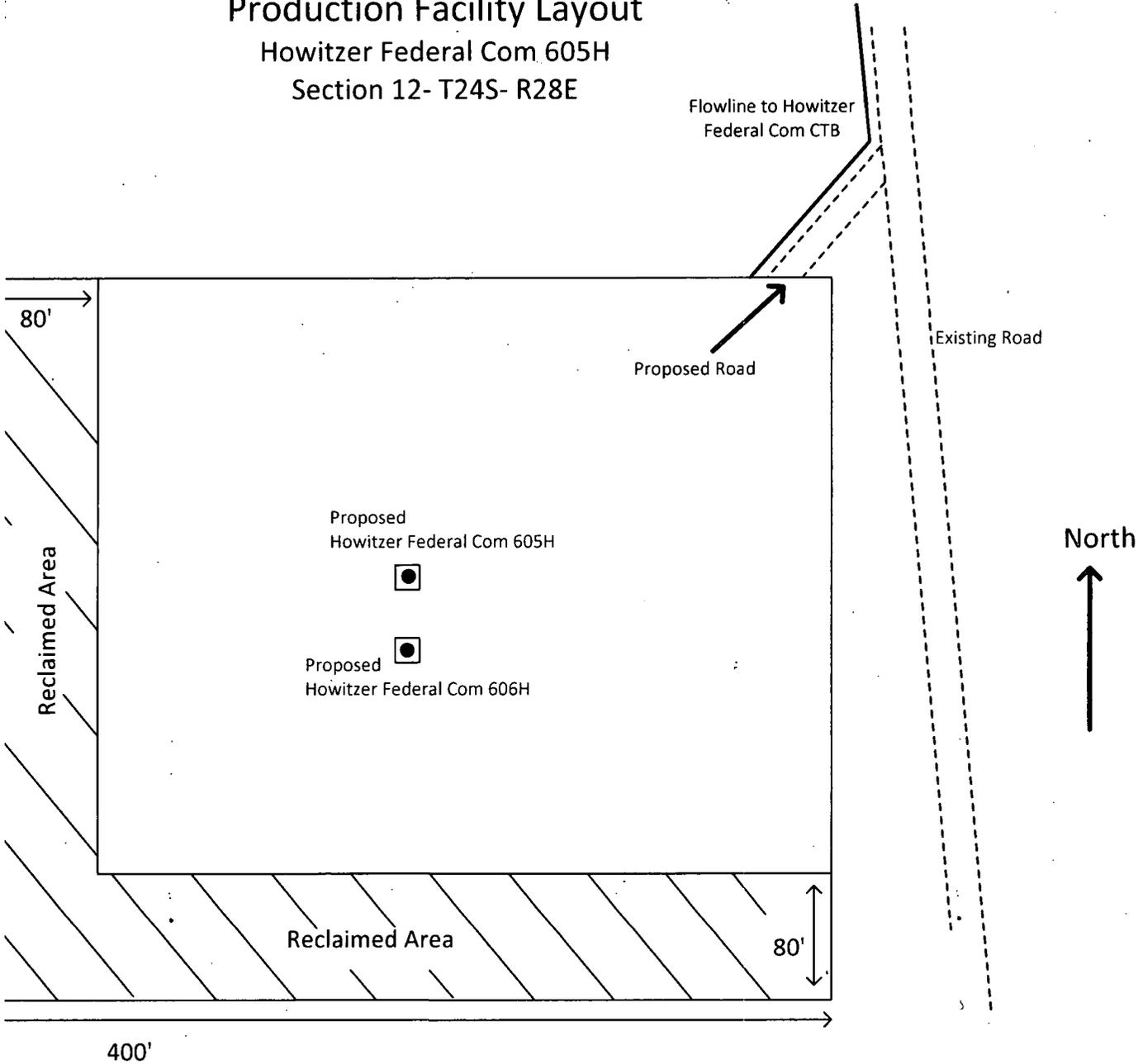
# Well Site Layout

## Production Facility Layout

Howitzer Federal Com 605H

Section 12- T24S- R28E

# Exhibit 3



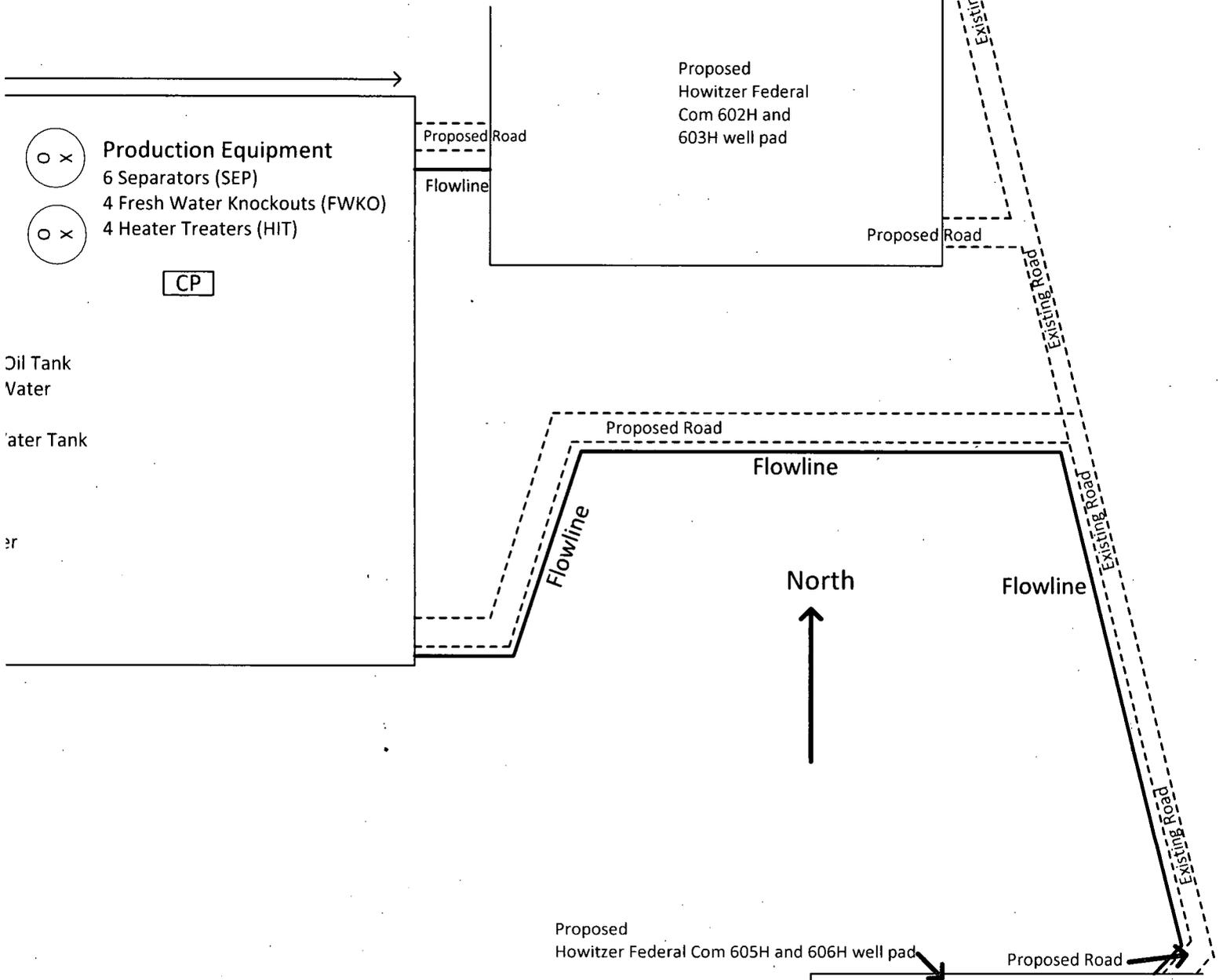
# Well Site Layout

## Production Facility Layout

Howitzer Federal Com CTB

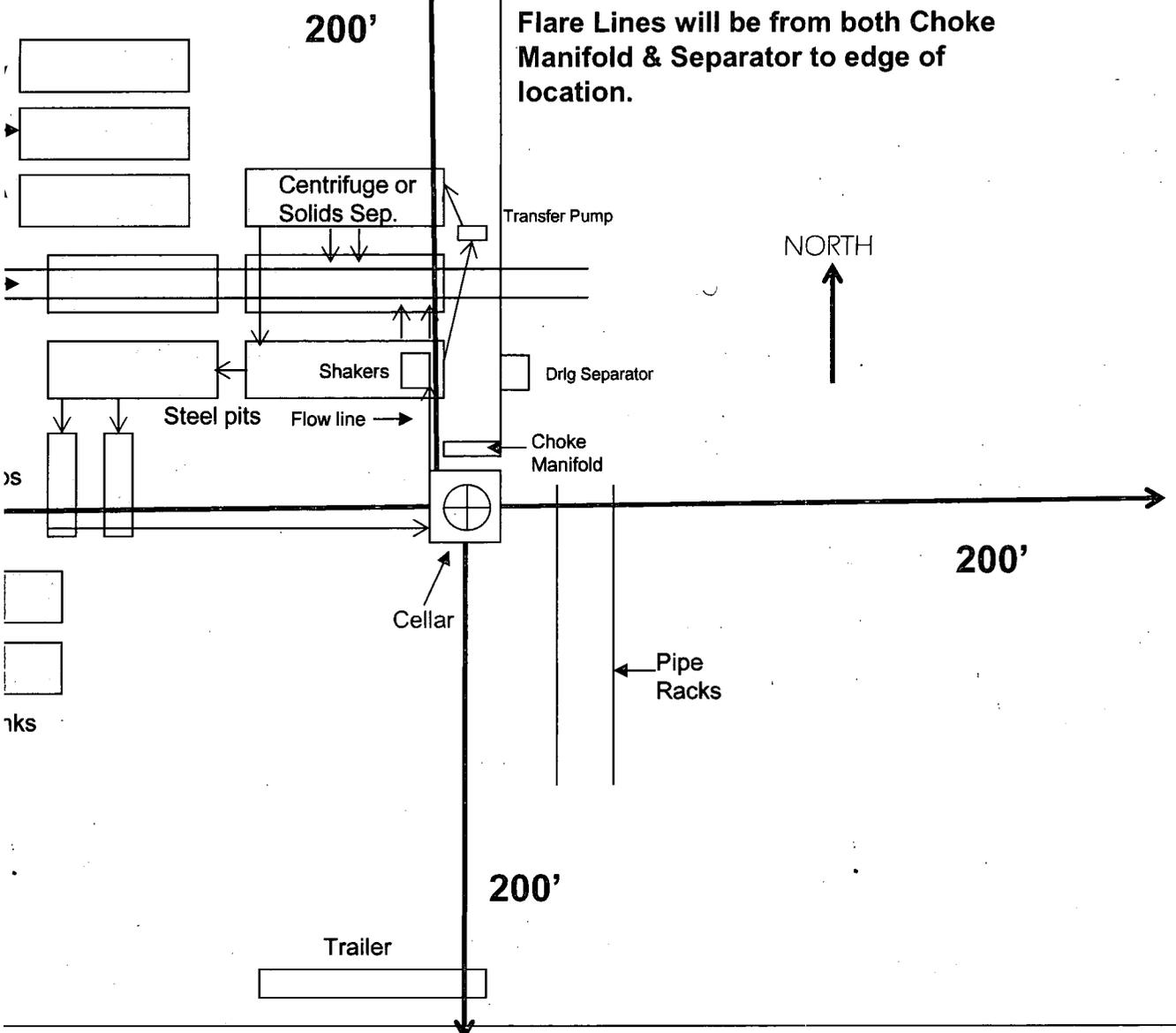
Section 12- T24S- R28E

# Exhibit 3



C  
Loop Equipment Diagram

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



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

# Surface Use & Operating Plan

## Howitzer Federal Com #605H

- Surface Owner: COG Operating LLC,
- New Road: 1021.6'
- 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 605H and 606H 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 H2O
- Existing Roads
- Fresh H2O

*Surface Use Plan  
COG Operating LLC  
Howitzer Federal Com #605H  
SHL: 2125' FNL & 300' FEL UL H  
Section 12, T24S, R28E  
BHL: 1760' FNL & 200' FWL UL E  
Section 11, T24S, R28E  
Eddy County, New Mexico*

---

- 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 27<sup>th</sup>, 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 1021.6' 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 1512.8' 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 605H and 606H wells. The buried Gas Lift Gas pipe of approximately 1512.8' 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 east side and 200' on the southeast 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 recontoured 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 reseeded 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.

*Surface Use Plan*  
*COG Operating LLC*  
*Howitzer Federal Com #605H*  
*SHL: 2125' FNL & 300' FEL UL H*  
*Section 12, T24S, R28E*  
*BHL: 1760' FNL & 200' FWL UL E*  
*Section 11, T24S, R28E*  
*Eddy County, New Mexico*

---

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)

APR 01 2019

DISTRICT I  
1825 N. FRENCH DR., ROSBOS, NM 86240  
Phone: (575) 833-0181 Fax: (575) 393-0790

State of New Mexico  
Energy, Minerals & Natural Resources Department

DISTRICT II  
811 S. FIRST ST., ARTESIA, NM 86210  
Phone: (575) 748-1283 Fax: (575) 748-9720

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

DISTRICT III  
1090 RIO BRAZOS RD., AZTEC, NM 87410  
Phone: (505) 334-0178 Fax: (505) 334-0170

DISTRICT IV  
1220 S. ST. FRANCIS DR., SANTA FE, NM 87506  
Phone: (505) 476-3460 Fax: (505) 476-3468

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015	Pool Code 98220	Pool Name Purple Sage; Wolfcamp
Property Code	Property Name HOWITZER FEDERAL COM	Well Number 605H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 2963.5'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	12	24-S	28-E		2125	NORTH	300	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
E	11	24-S	28-E		1760	NORTH	200	WEST	EDDY

Dedicated Acres 640	Joint or Infill	Consolidation Code	Order No.
------------------------	-----------------	--------------------	-----------

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

STATE

EIP  
1760' FNL & 330' FWL  
Y=449292.4 N  
X=634088.0 E  
LAT.=32.234825' N  
LONG.=104.033360' W  
GRID AZ. TO EIP  
155°00'09"

LIP  
1760' FNL & 330' FWL  
Y=449318.9 N  
X=624040.5 E  
LAT.=32.234971' N  
LONG.=104.065855' W

LEASE X-ING  
LAT.=32.234825' N  
LONG.=104.045228' W

LEASE X-ING  
LAT.=32.234855' N  
LONG.=104.040919' W

GRID AZ. - 270°09'03"  
HORZ. DIST. - 10177.5'

NAD 83 NME  
PROPOSED BOTTOM  
HOLE LOCATION  
Y=449319.2 N  
X=623910.5 E  
LAT.=32.234972' N  
LONG.=104.066276' W

NAD 83 NME  
SURFACE LOCATION  
Y=448927.6 N  
X=634119.9 E  
LAT.=32.233822' N  
LONG.=104.033260' W

NMNM054398

FEE

**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 unless 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**

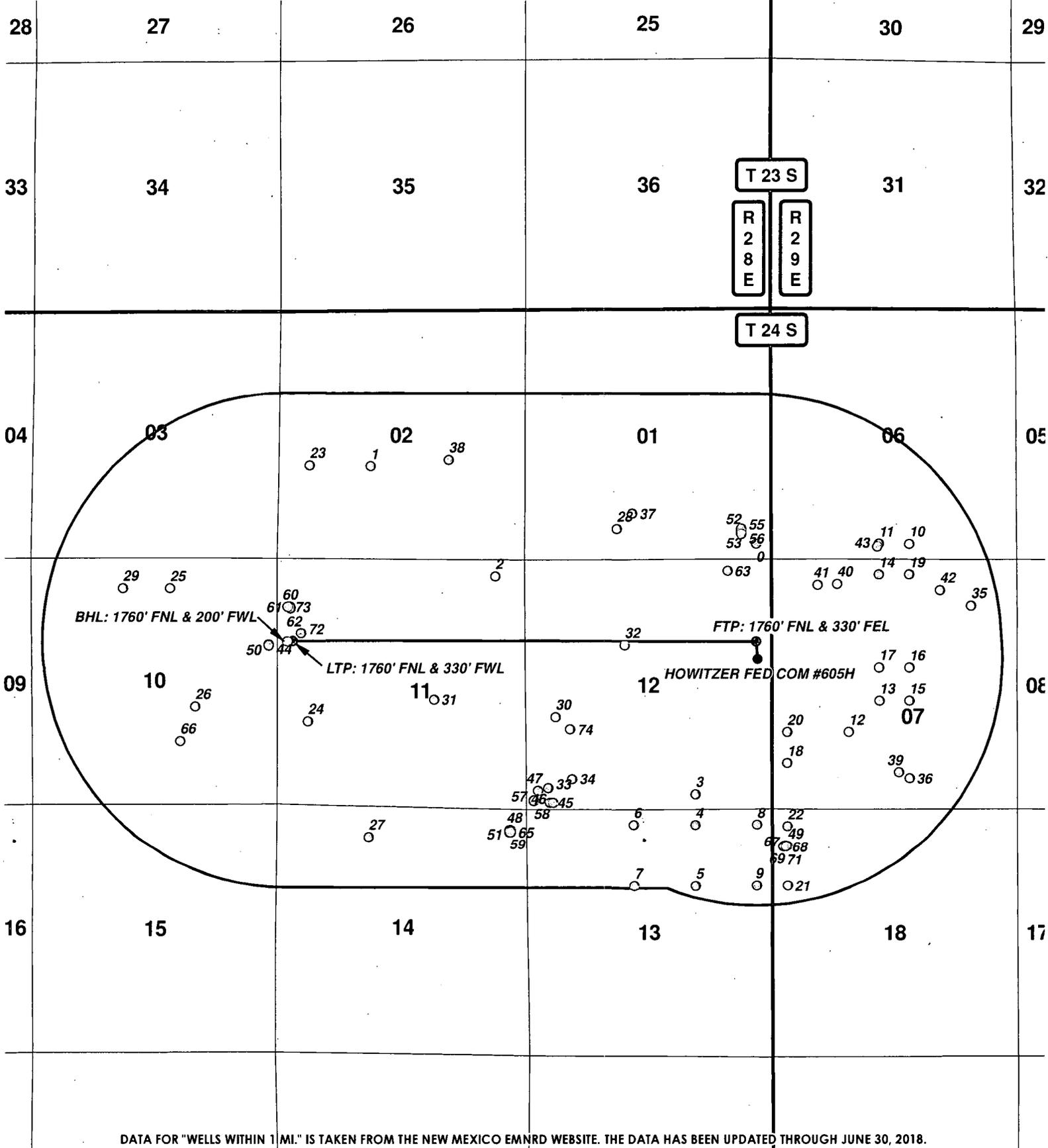
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

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. # 18-1408 DRAWN BY: AM



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 #605H**

SEC: 12	TWP: 24 S.	RGE: 28 E.	ELEVATION: 2963.5'
STATE: NEW MEXICO		COUNTY: EDDY	
W.O. # 18-1408		LEASE: HOWITZER FED COM	
SURVEY: N.M.P.M			

1 MILE MAP 10/29/2018

**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 #605H 1 MILE DATA (18-1408)

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	-104.037612	Plugged
AUSTIN GAS PURCHASING	3001502495	13	24.0S	28E	1650	N	1650	E	32.220503	-104.037612	Plugged
DEKALB AGRICULTURAL ASSOCIATION INC	3001502496	13	24.0S	28E	330	N	2310	W	32.22413	-104.041967	Plugged
DEKALB AGRICULTURAL ASSOCIATION INC	3001502498	13	24.0S	28E	1650	N	2310	W	32.220502	-104.041907	Plugged
AUSTIN GAS PURCHASING	3001502500	13	24.0S	28E	330	N	330	E	32.224131	-104.033331	Plugged
AUSTIN GAS PURCHASING	3001502501	13	24.0S	28E	1650	N	330	E	32.220503	-104.033323	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	32.229572	-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	3001503705	18	24.0S	29E	1650	N	330	W	32.2205	-104.031179	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
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
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
BETTI'S 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)
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)

001

MATADOR PRODUCTION COMPANY	3001543823	1 24.05	28E	721 S	661 E	32.241489	-104.03439	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543824	1 24.05	28E	601 S	662 E	32.241159	-104.034397	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543845	12 24.05	28E	270 S	200 W	32.225619	-104.048983	New (Not drilled or compl)
MEWBOURNE OIL CO	3001543846	12 24.05	28E	250 S	200 W	32.225564	-104.048984	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543870	14 24.05	28E	410 N	330 E	32.223768	-104.050686	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543940	11 24.05	28E	933 N	254 W	32.23699	-104.066052	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543966	11 24.05	28E	934 N	224 W	32.236988	-104.06615	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001543993	11 24.05	28E	963 N	255 W	32.236908	-104.06605	New (Not drilled or compl)
MEWBOURNE OIL CO	3001544048	12 24.05	28E	185 N	950 E	32.239	-104.035363	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544162	14 24.05	28E	429 N	330 E	32.223716	-104.050685	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544163	14 24.05	28E	428 N	300 E	32.223717	-104.050587	New (Not drilled or compl)
ALPHA SWD OPERATING LLC	3001544237	10 24.05	28E	1457 S	2093 E	32.229147	-104.07375	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544241	18 24.05	29E	712 N	352 W	32.222892	-104.031288	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544242	18 24.05	29E	742 N	321 W	32.222809	-104.031387	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544244	18 24.05	29E	712 N	321 W	32.222892	-104.031389	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544245	18 24.05	29E	742 N	290 W	32.222809	-104.031488	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544247	18 24.05	29E	742 N	351 W	32.222809	-104.03129	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544514	11 24.05	28E	1489 N	490 W	32.235461	-104.065299	New (Not drilled or compl)
MATADOR PRODUCTION COMPANY	3001544533	11 24.05	28E	934 N	194 W	32.236988	-104.066247	New (Not drilled or compl)
BLACK RIVER WATER MANAGEMENT COMPANY, LLC	3001544571	12 24.05	28E	1779 S	975 W	32.229762	-104.046408	New (Not drilled or compl)

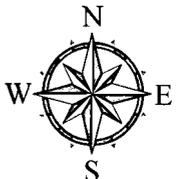
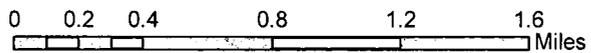


**Map Legend**

 Route

**Howitzer Fed Com #605H  
To Malaga I Brine**

Date: 11/6/2018  
Author: Whytne McDonald  
State: New Mexico  
County: Eddy  
Disclaimer: This is not a legal survey document



Surface Use Plan  
COG Operating LLC  
Howitzer Federal Com 605H  
SHL: 2125' FNL & 300' FEL UL H  
Section 12, T24S, R28E  
BHL: 1760' FNL & 200' FWL UL E  
Section 11, T24S, R28E  
Eddy County, New Mexico

---

### OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 5<sup>th</sup> 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

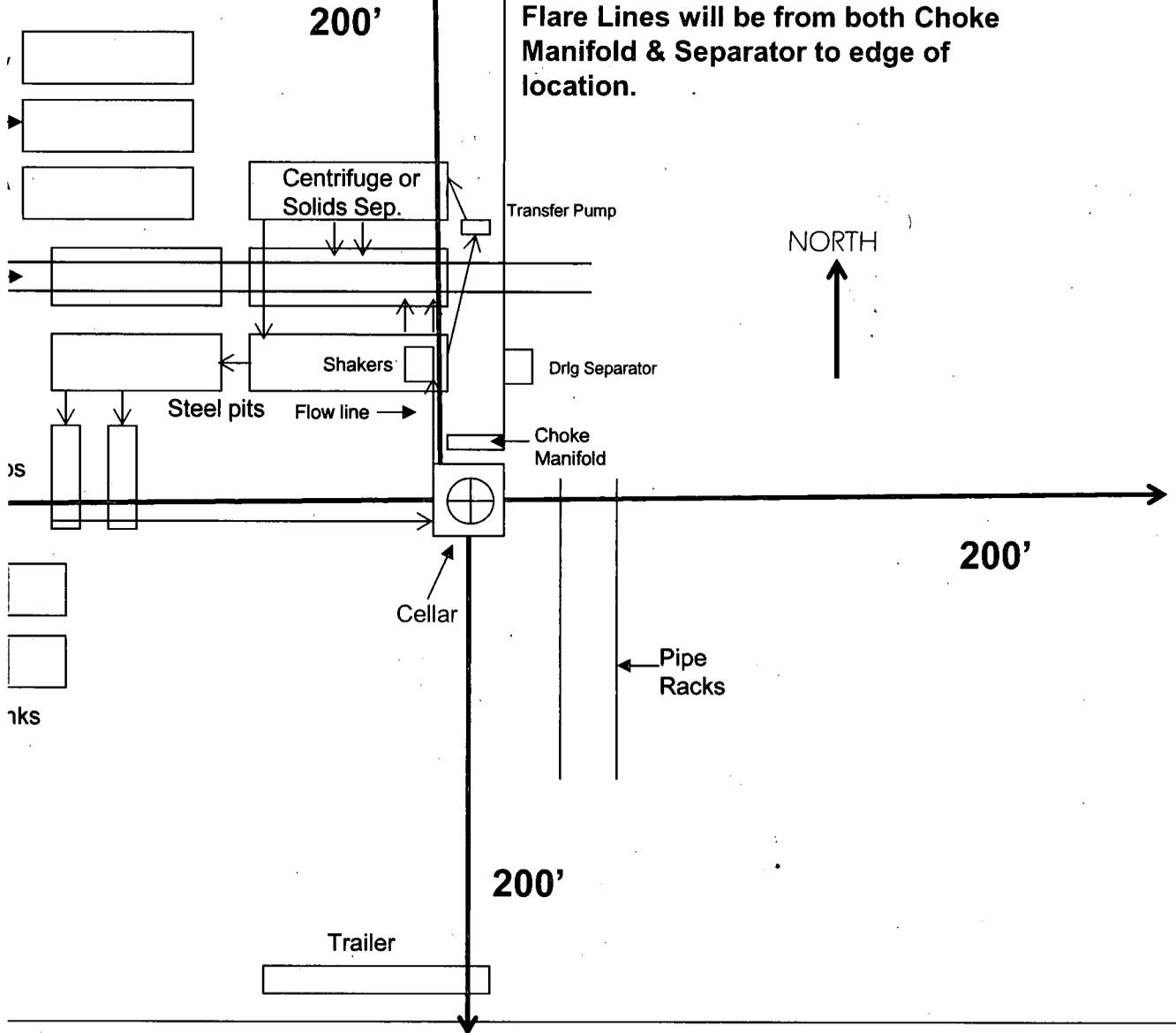
E-mail: [mreyes1@concho.com](mailto:mreyes1@concho.com)

Field Representative (if not above signatory): Gerald Herrera

Telephone: (432) 260-7399. E-mail: [gherrera@concho.com](mailto:gherrera@concho.com)

C  
Loop Equipment Diagram

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



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

HARROUN RD.  
HARROUN RD.  
HARROUN RD.

01

06

	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

24S 28E

24S 29E

HOWITZER  
CTB

12

07

128.8'  
PROPOSED  
ROAD

939.8'  
PROPOSED  
ROAD

81.8'  
PROPOSED  
ROAD

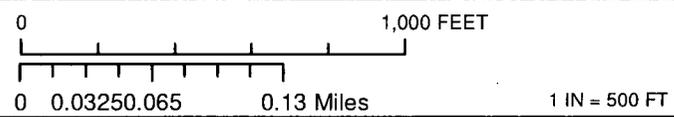
Harroun Ditch

**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



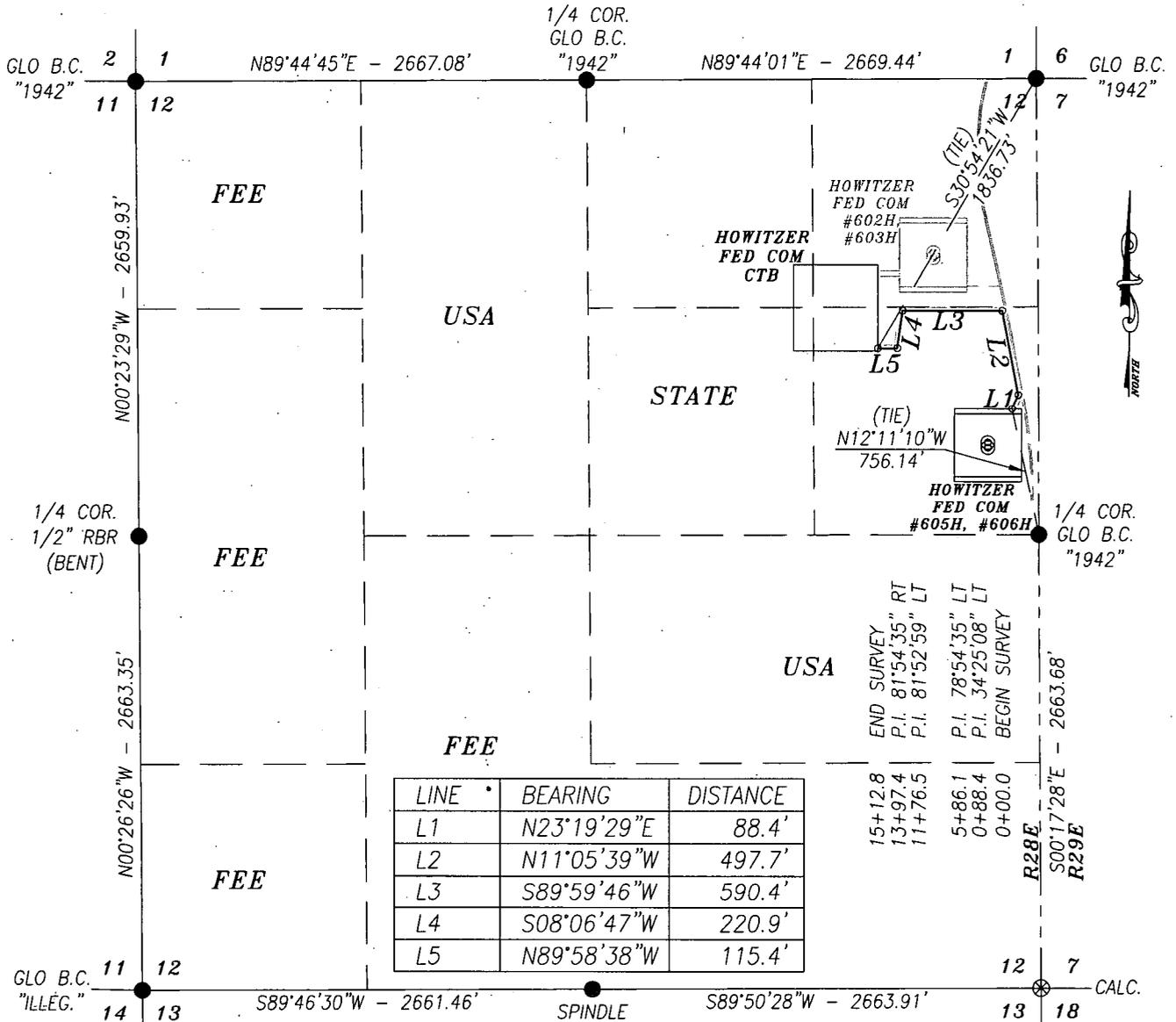
LOCATION MAP      VICINITY      11/5/2018      A.M.



**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 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.



## 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 N12°11'10"W 756.14 FEET FROM THE EAST QUARTER CORNER; THEN N23°19'29"E 88.4 FEET, THEN N11°05'39"W 497.7 FEET, THEN S89°59'46"W 590.4 FEET, THEN S08°06'47"W 220.9 FEET, N89°58'38"W 115.4 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S30°54'21"W 1836.73 FEET FROM THE NORTHEAST CORNER.

SAID STRIP OF LAND BEING 1512.8 FEET OR 91.68 RODS IN LENGTH, CONTAINING 1.042 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.



T 24 S

R 2 8 E

R 2 9 E

01

06

HOWITZER  
FEDCOM  
CTB

8

HOWITZER  
FEDCOM  
#602H  
#603H

HOWITZER  
FEDCOM  
#605H  
#606H

07

12

T 24 S

2982T

R 28 E

R 29 E

2983T

HOWITZER  
FED COM  
CTB

8

HOWITZER  
FED COM  
#602H  
#603H

\*2976T

8

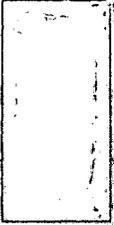
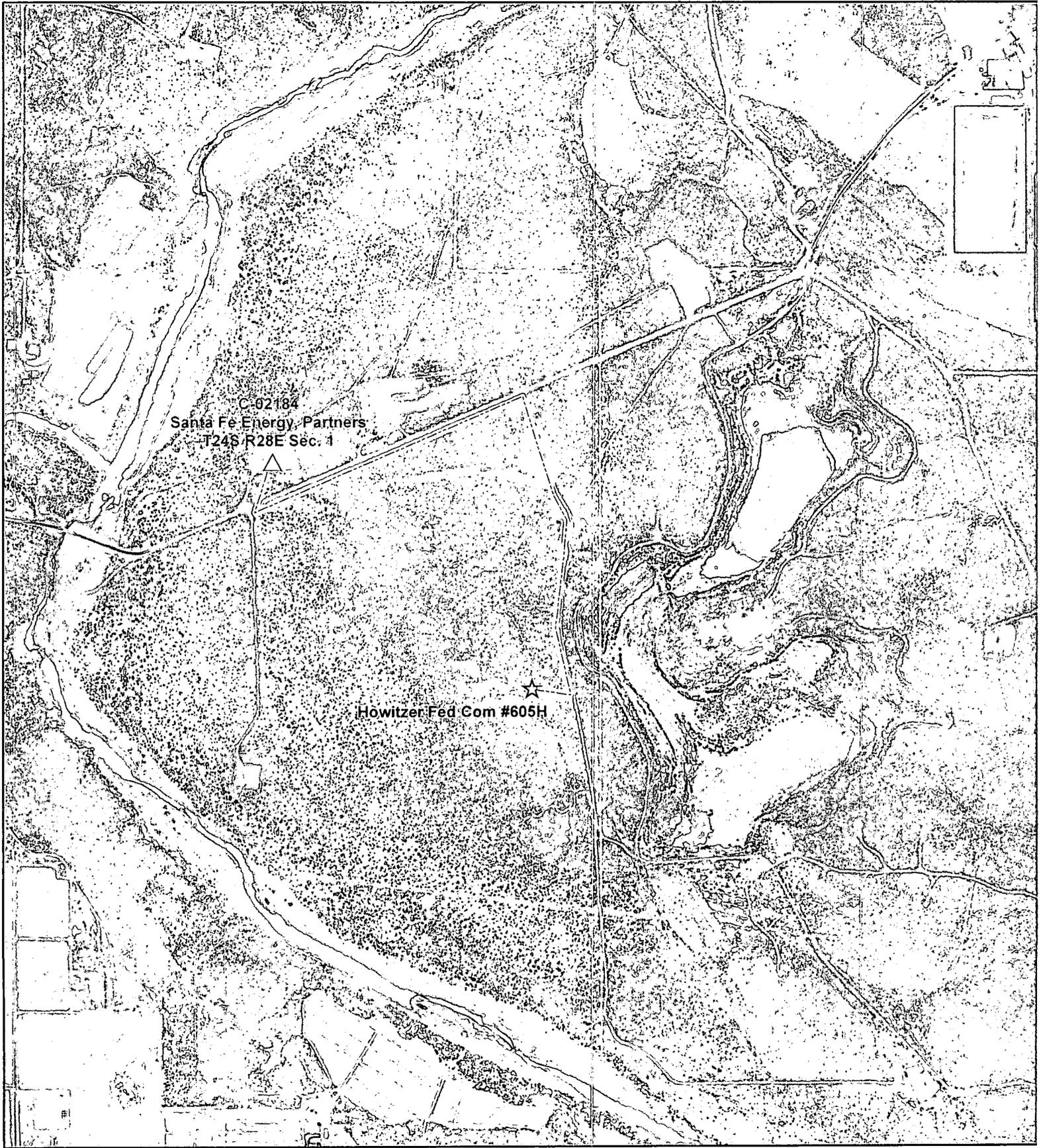
HOWITZER  
FED COM  
#605H  
#606H

12

2968T

2950

00W



C-02184  
 Santa Fe Energy Partners  
 T24S R28E Sec. 1

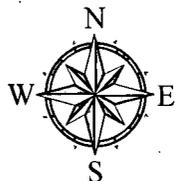
★  
 Howitzer Fed Com #605H



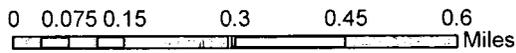
**Map Legend**

**Howitzer Fed Com #605H  
 Water Transfer Route**

Route

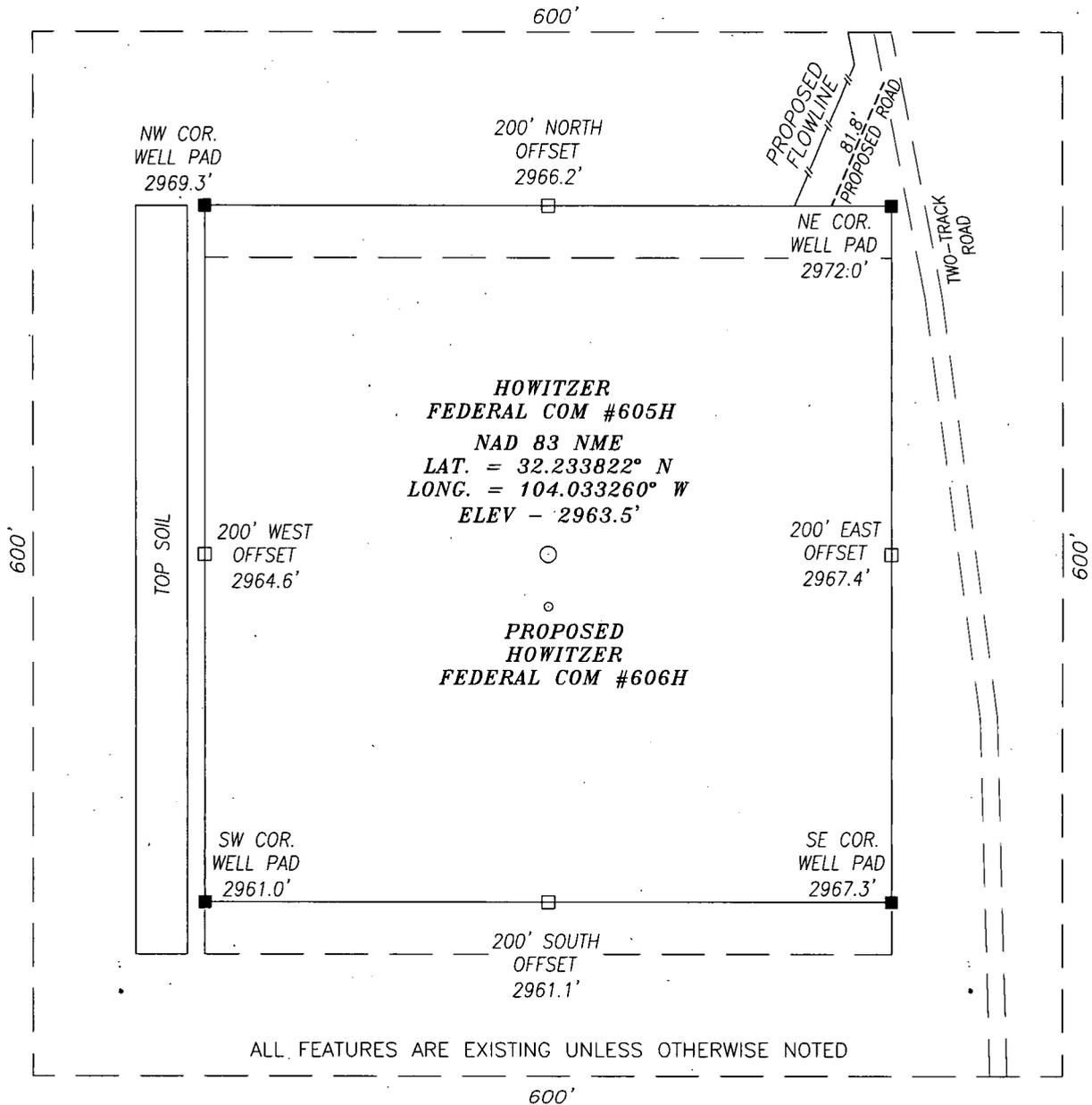


Date: 11/6/2018  
 Author: Whytne McDonald  
 State: New Mexico  
 County: Eddy



Disclaimer: This is not a legal survey document

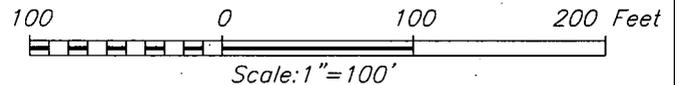
SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO



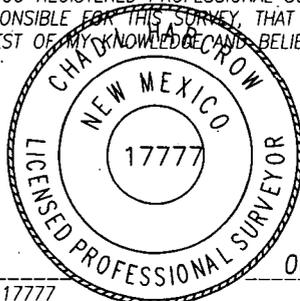
ALL FEATURES ARE EXISTING UNLESS OTHERWISE NOTED

**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 (SOURHTERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD LIES APPROX. 0.6 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



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



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

00/00/18  
DATE

<b>COG OPERATING, LLC</b>		
HOWITZER FEDERAL COM #605H WELL LOCATED 2125 FEET FROM THE NORTH LINE AND 300 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

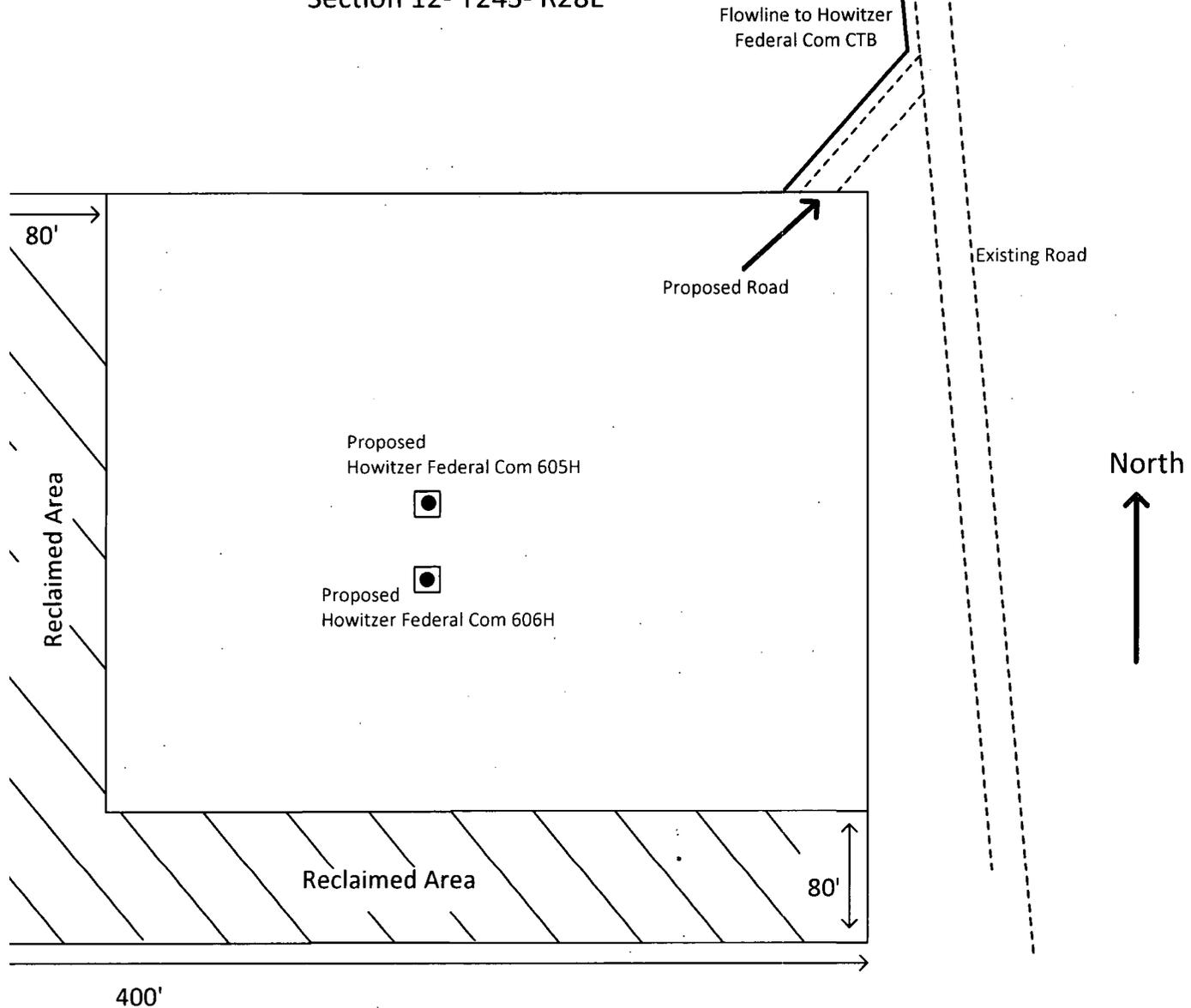
# Well Site Layout

## Production Facility Layout

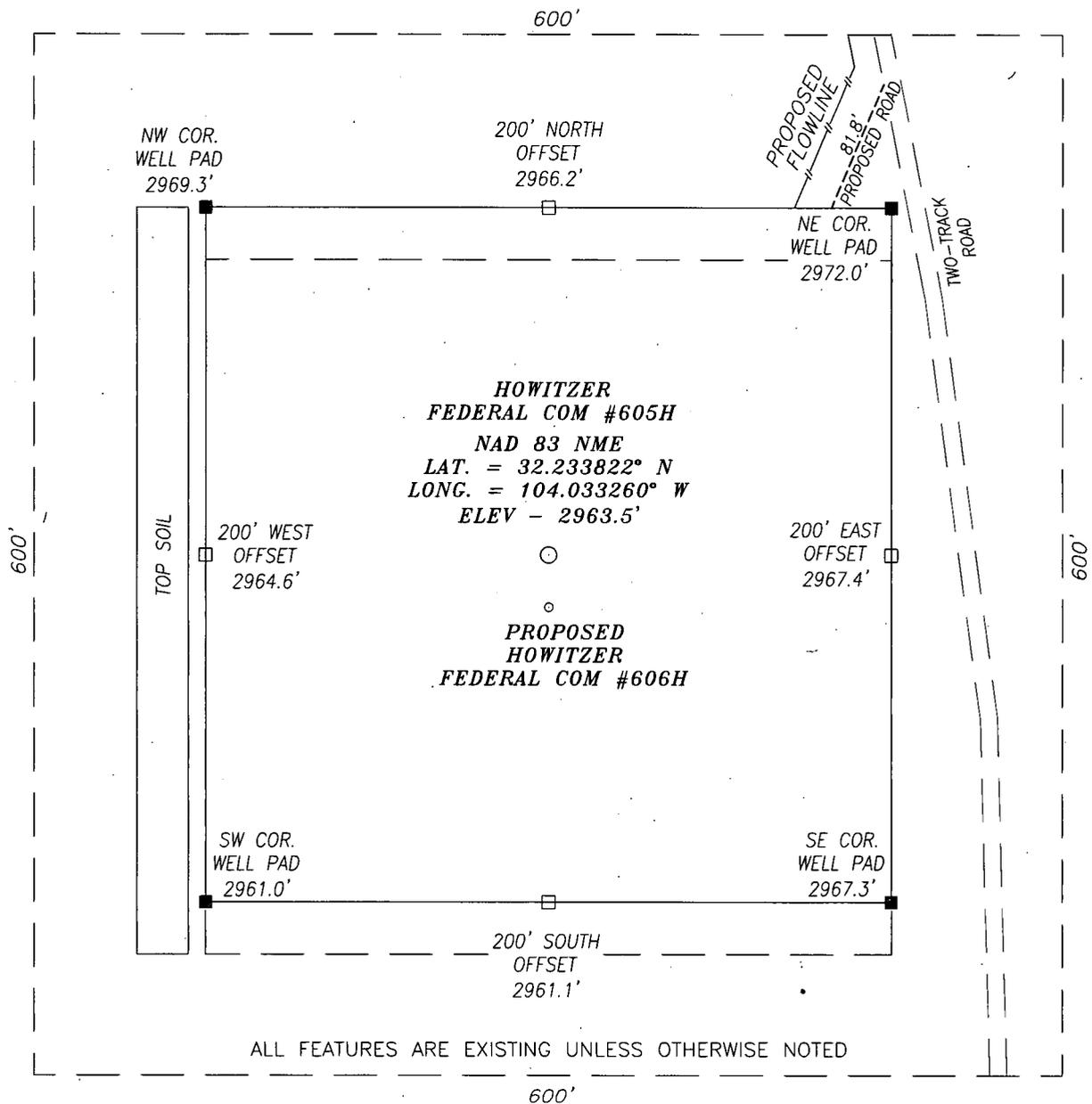
Howitzer Federal Com 605H

Section 12- T24S- R28E

# Exhibit 3



SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO



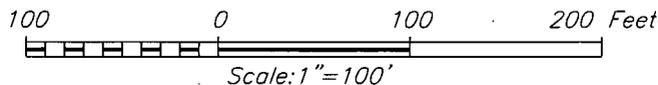
ALL FEATURES ARE EXISTING UNLESS OTHERWISE NOTED

**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 (SOURHTERLY) ON CALICHE RD. FOR APPROX. 0.15 MI. TO A PROPOSED ROAD LIES APPROX. 0.6 MI. TO THE SOUTH.

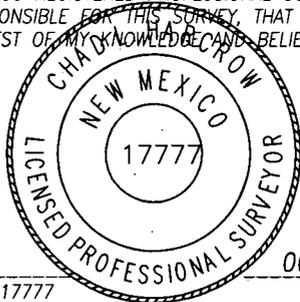
**HARCROW SURVEYING, LLC**

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



**CERTIFICATION**

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



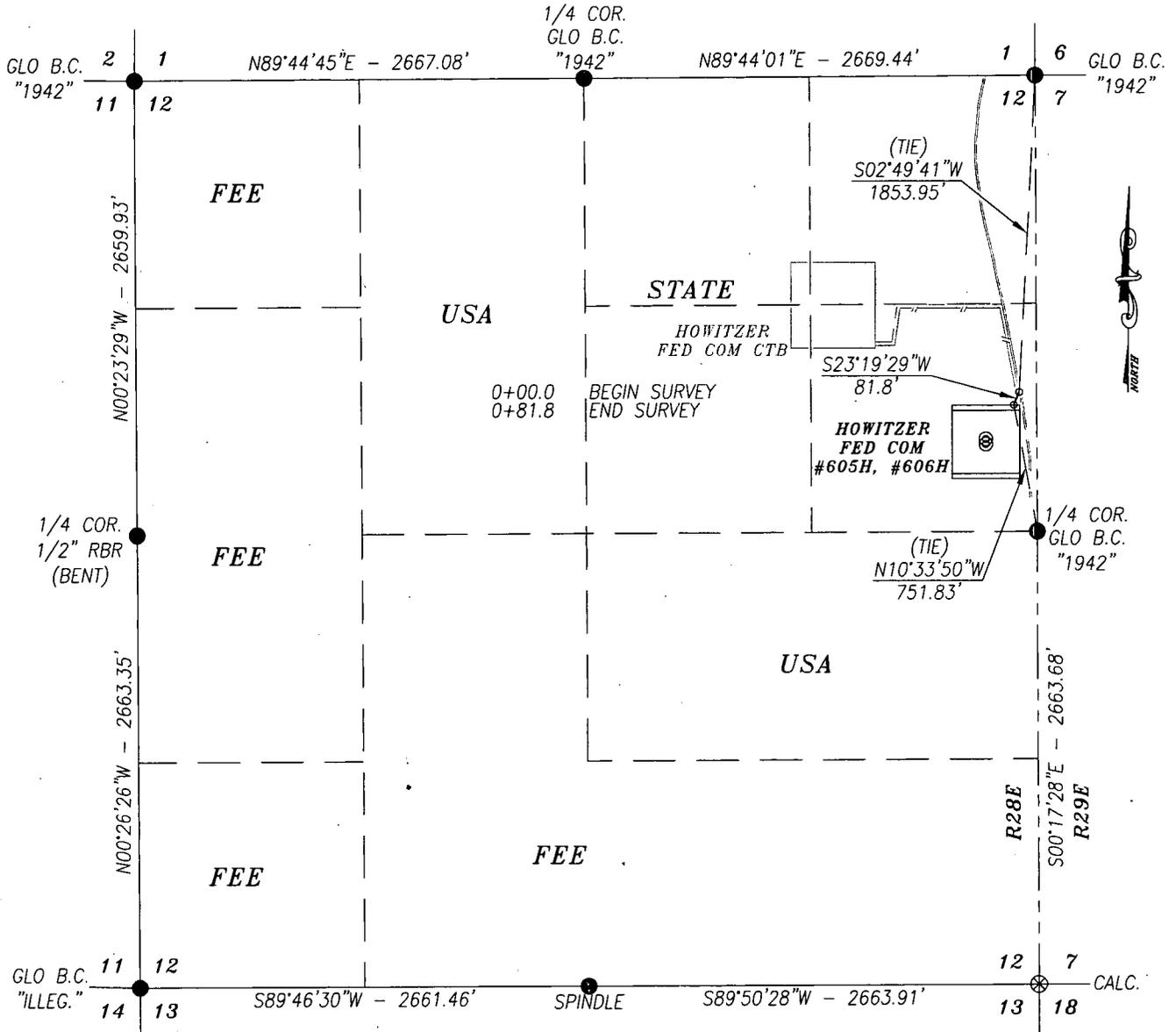
*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777

00/00/18  
DATE

<b>COG OPERATING, LLC</b>		
HOWITZER FEDERAL COM #605H WELL LOCATED 2125 FEET FROM THE NORTH LINE AND 300 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 #605H & #606H 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:

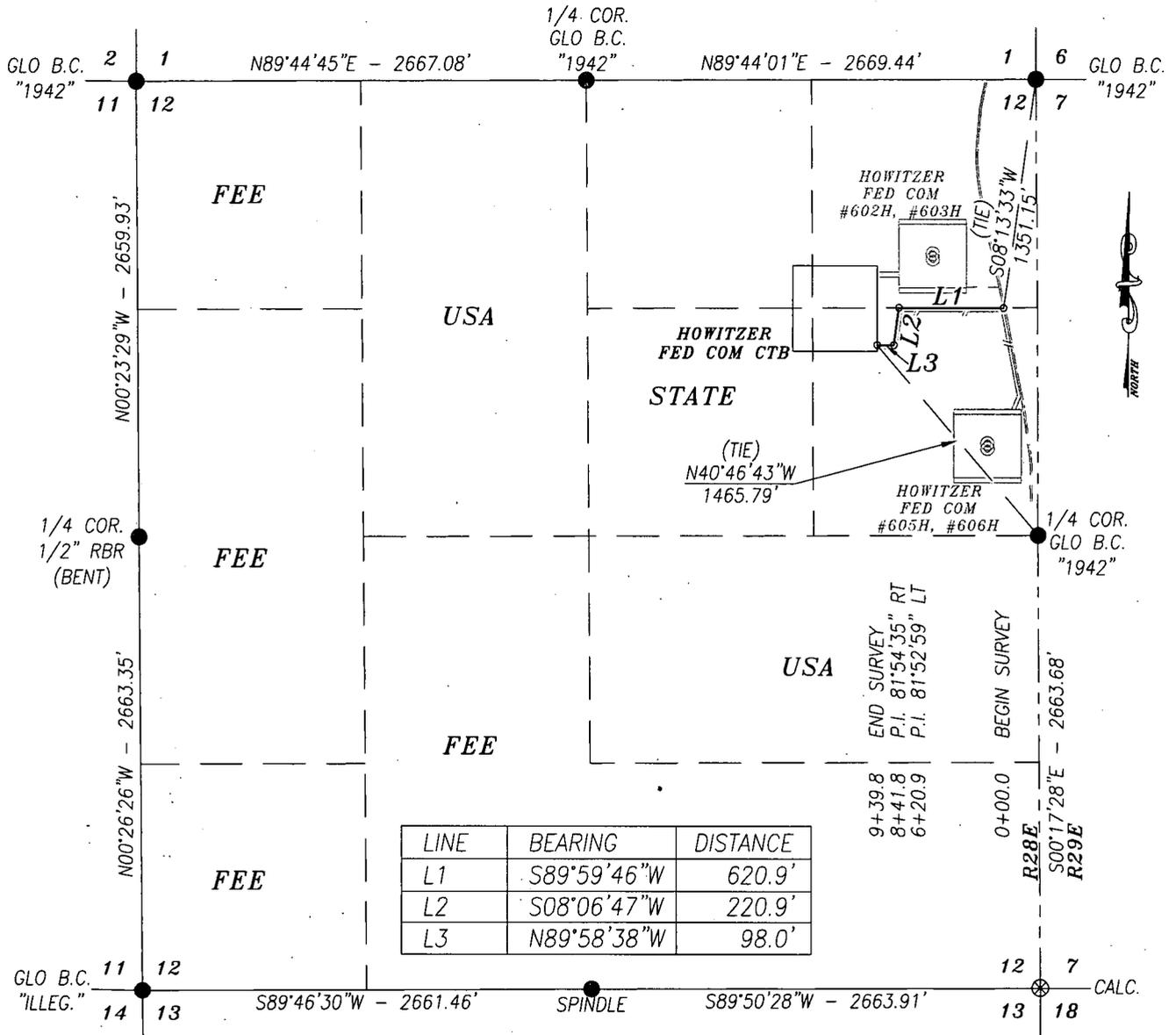
BEGINNING AT A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES S02°49'41"W 1853.95 FEET FROM THE NORTHEAST CORNER; THEN S23°19'29"W 81.8 FEET, TO A POINT IN THE SE/4 NE/4 OF SAID SECTION, WHICH LIES N10°33'50"W 751.83 FEET FROM EAST QUARTER CORNER.

SAID STRIP OF LAND BEING 81.8 FEET OR 4.96 RODS IN LENGTH, CONTAINING 0.056 ACRES MORE OR LESS AND BEING LOCATED ENTIRELY IN THE SE/4 NE/4.



# 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.



## DESCRIPTION

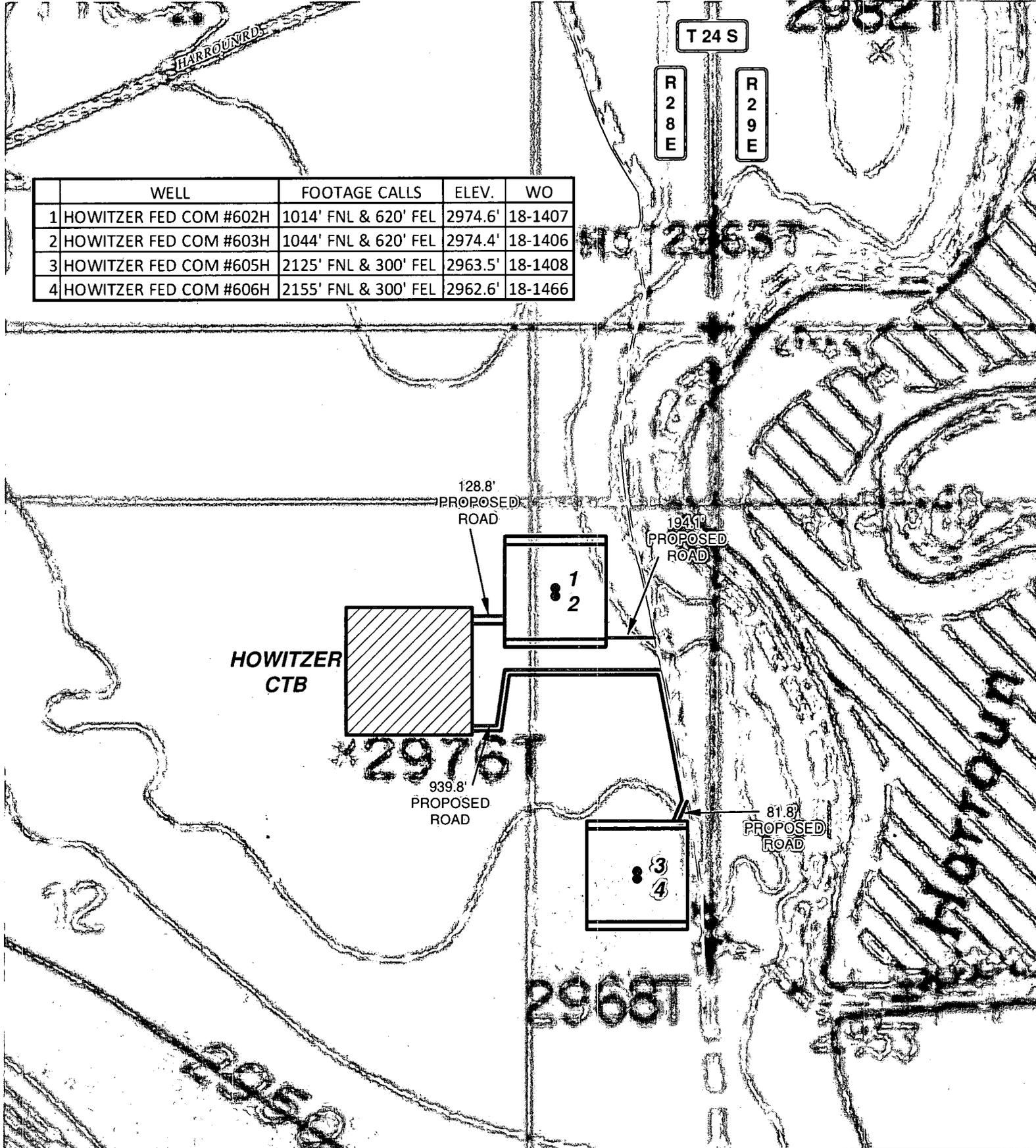
A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 12, TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

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.



	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 0.03250.065 0.13 Miles		1 IN = 500 FT
LOCATION MAP	TOPO	11/5/2018 A.M.

**CONCHO**  
 COG OPERATING, LLC

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

HARROUNDS

T 24 S

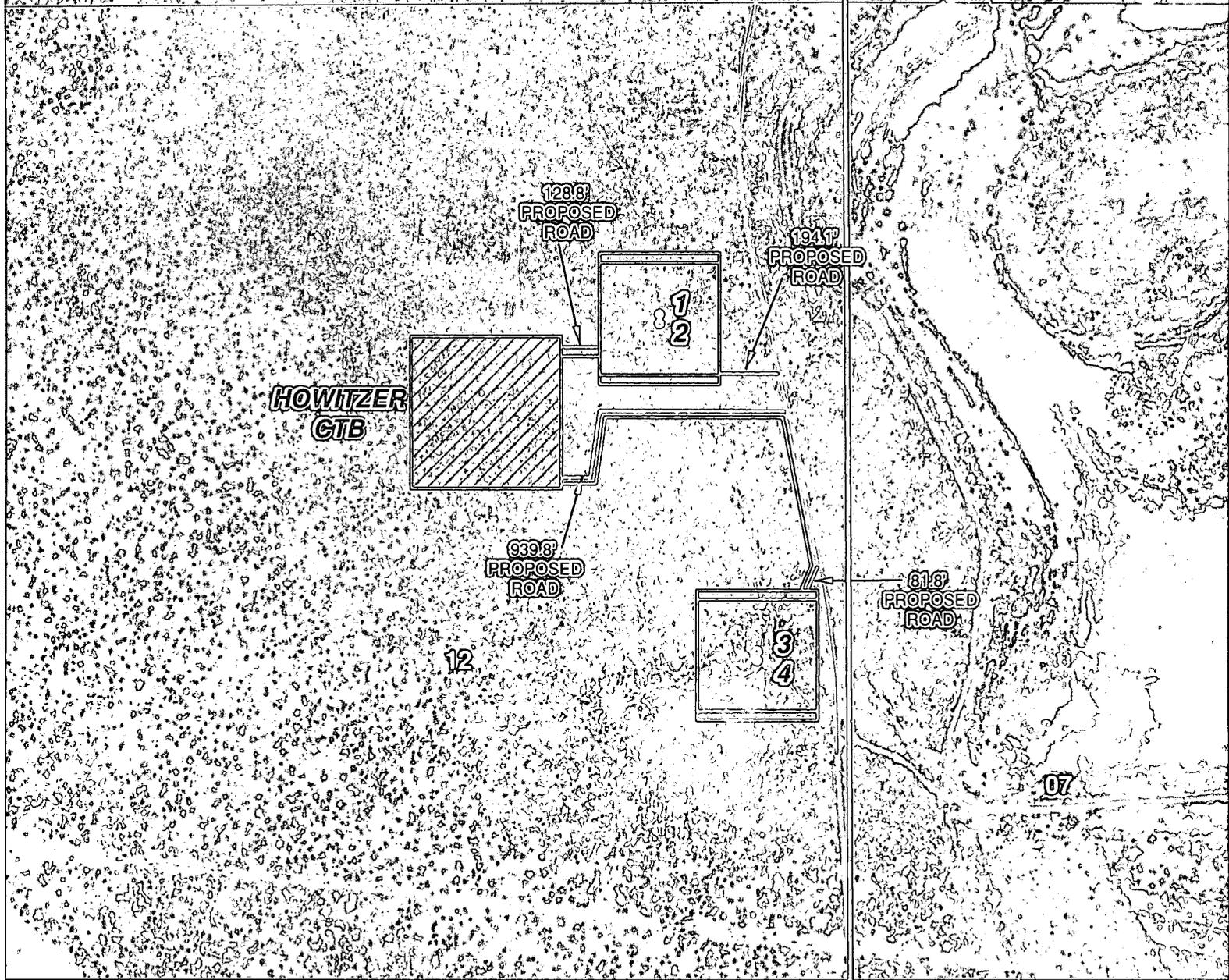
R 28 E

R 29 E

01

06

	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 = 50 FT

LOCATION MAP IMAGERY 11/3/2013 A.M.



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

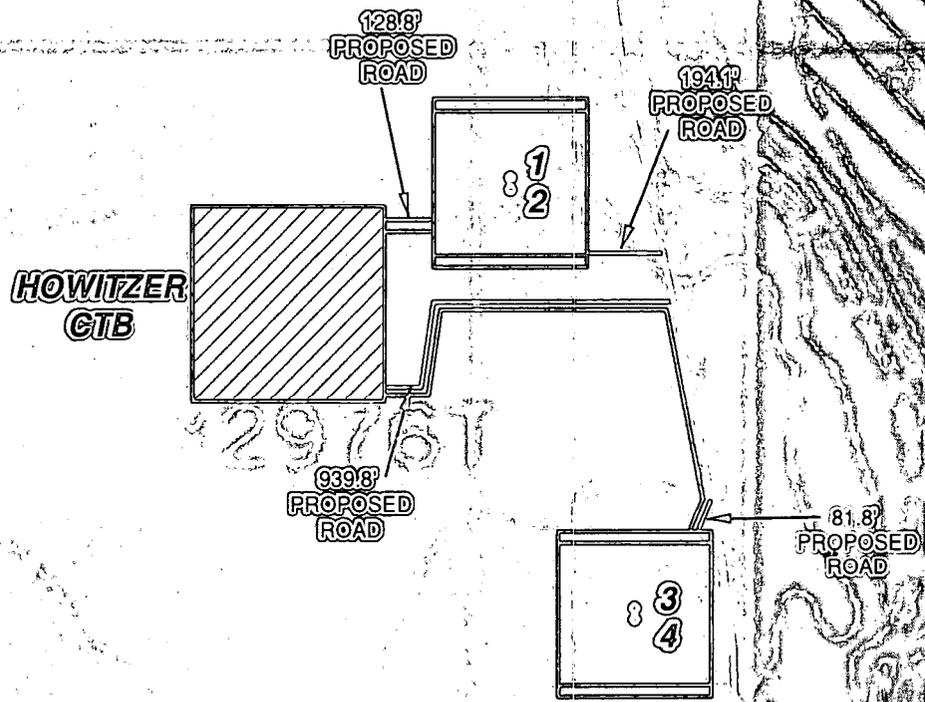
HARROUN RD. 33

T 24 S

R 28 E

R 29 E

	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
- IIS RIM

**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

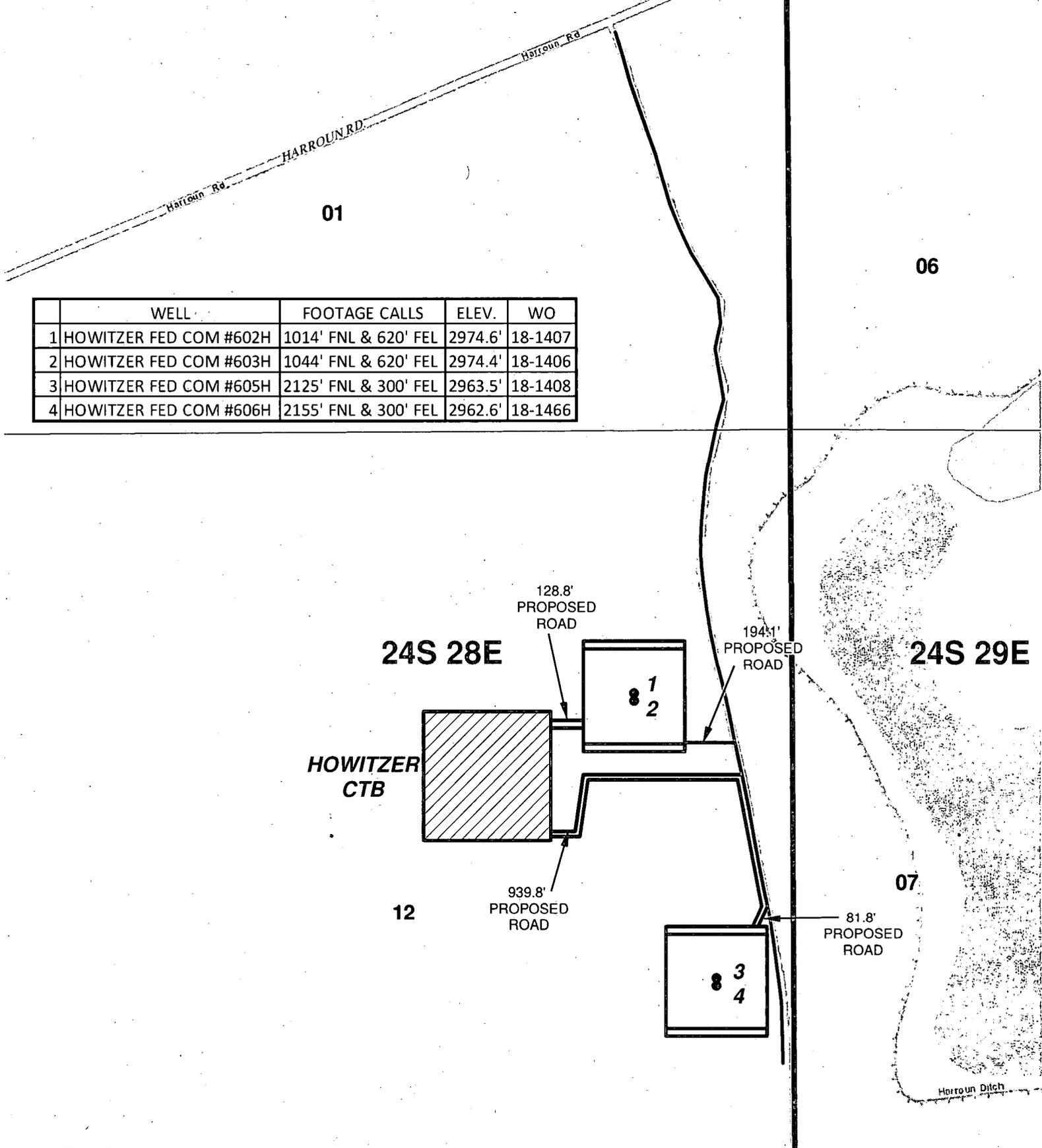
0 1,000 FEET

0 0.03250.065 0.13 Miles 1 IN = 500 FT

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

**CONCHO**
  
 COG OPERATING, LLC

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



	WELL	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 0.03250.065 0.13 Miles

1 IN = 500 FT

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

**CONCHO**  
COG OPERATING, LLC

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

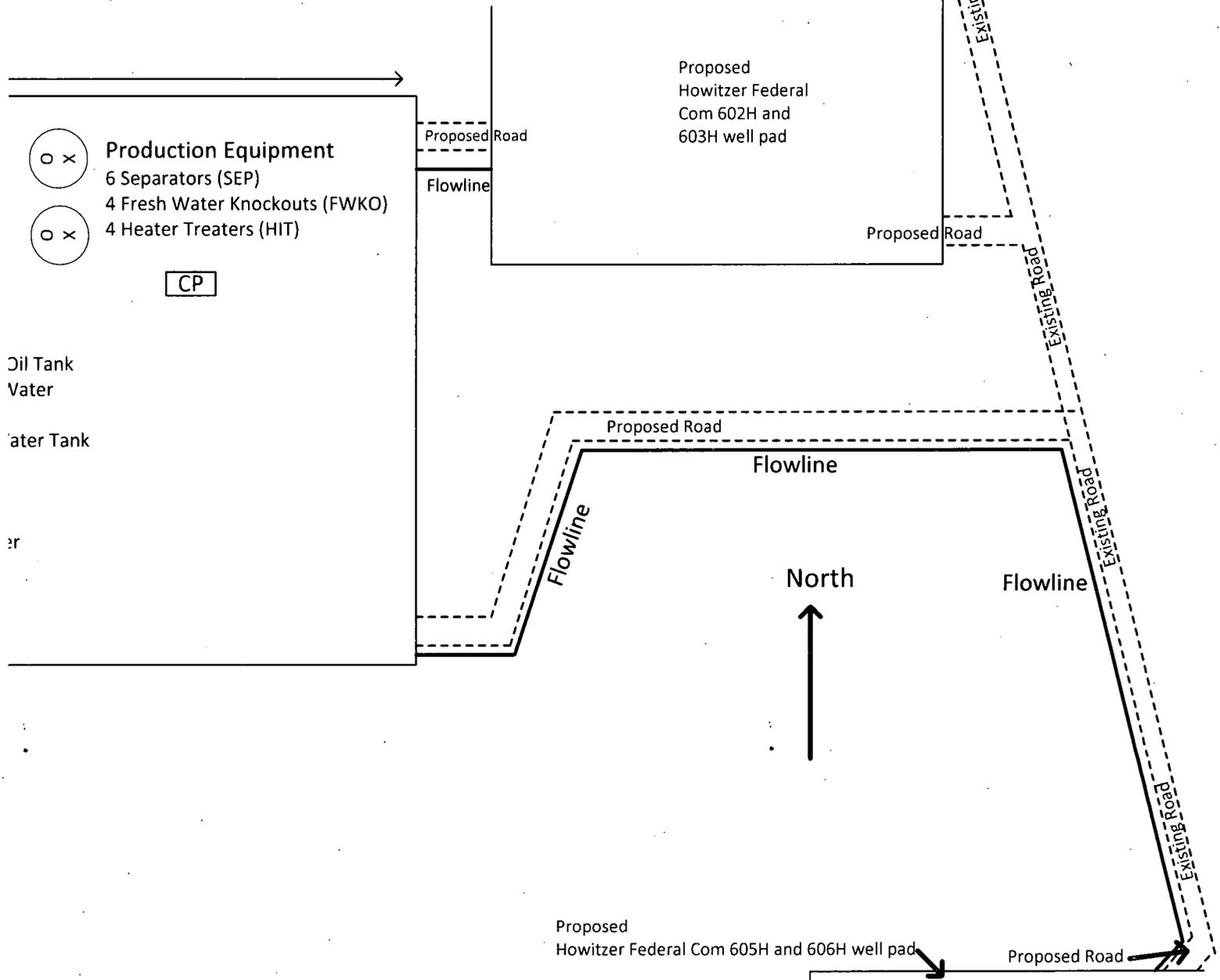
# Well Site Layout

## Production Facility Layout

Howitzer Federal Com CTB

Section 12- T24S- R28E

# Exhibit 3



**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 manufacturer's information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

### **Section 3 - Unlined Pits**

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

### **Section 4 - Injection**

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

**Injection well type:**

**Injection well number:**

**Assigned injection well API number?**

**Injection well new surface disturbance (acres):**

**Minerals protection information:**

**Mineral protection attachment:**

**Underground Injection Control (UIC) Permit?**

**UIC Permit attachment:**

**Injection well name:**

**Injection well API number:**

### **Section 5 - Surface Discharge**

**Would you like to utilize Surface Discharge PWD options? NO**

**Produced Water Disposal (PWD) Location:**

**PWD surface owner:**

**PWD disturbance (acres):**

**Surface discharge PWD discharge volume (bbl/day):**

**Surface Discharge NPDES Permit?**

**Surface Discharge NPDES Permit attachment:**

**Surface Discharge site facilities information:**

**Surface discharge site facilities map:**

### **Section 6 - Other**

**Would you like to utilize Other PWD options? NO**

**Produced Water Disposal (PWD) Location:**

**PWD surface owner:**

**PWD disturbance (acres):**

**Other PWD discharge volume (bbl/day):**

**Other PWD type description:**

**Other PWD type attachment:**

**Have other regulatory requirements been met?**

**Other regulatory requirements attachment:**



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

**Bond 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: