

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
**APPLICATION FOR PERMIT TO DRILL OR REENTER**

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

P/P  
[H]  
V.P.M.  
**HOBBS OCD**  
MAY 31 2019  
**RECEIVED**

1a. Type of work:  DRILL  REENTER  
1b. Type of Well:  Oil Well  Gas Well  Other  
1c. Type of Completion:  Hydraulic Fracturing  Single Zone  Multiple Zone

5. Lease Serial No  
NMNM123535  
6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.  
BROT HELM FEDERAL COM  
702H (22572X)

2. Name of Operator  
COG OPERATING LLC (229137)

9. API Well No.  
70-018-46069

3a. Address  
600 West Illinois Ave Midland TX 79701

1b. Phone No. (include area code)  
(432)883-7443

10. Field and Pool, or Exploratory  
WILDCAT / WOLFCAMP (98116)

4. Location of Well (Report location clearly and in accordance with any State requirements.)  
At surface NENE / 250 FNL / 1195 FEL / LAT 32.180563 / LONG -103.436103  
At proposed prod zone NENE / 50 FSL / 1000 FEL / LAT 32.152373 / LONG -103.435446

11. Sec., T R M or Blk and Survey or Area  
SEC 35 / T24S / R34E / NMP

14. Distance in miles and direction from nearest town or post office\*  
15 miles  
12. County or Parish  
LEA  
13. State  
NM

15. Distance from proposed location to nearest property or lease line, ft (Also to nearest drig unit line, if any) 100 feet  
16. No of acres in lease 320  
17. Spacing Unit dedicated to this well 320

18. Distance from proposed location\* to nearest well, drilling, completed, applied for, on this lease, ft. 310 feet  
19. Proposed Depth 12760 feet / 22933 feet  
20. BLM/BIA Bond No in file FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, Gl, etc) 3416 feet  
22. Approximate date work will start\* 07/01/2019  
23. Estimated duration 30 days

24. Attachments

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

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

25. Signature (Electronic Submission) Name (Printed/Typed) Date  
Stan Wagner / Ph: (432)253-9685 02/22/2019

Title  
Regulatory Advisor

Approved by (Signature) (Electronic Submission) Name (Printed/Typed) Date  
Cody Layton / Ph: (575)234-5959 05/24/2019

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

GCP Rec 05/28/19

**APPROVED WITH CONDITIONS**

Ka 06/09/19

**Additional Operator Remarks**

**Location of Well**

I. SHL: NENE / 250 FNL / 1195 FEL / TWSP: 24S / RANGE: 34E / SECTION: 35 / LAT: 32.180563 / LONG: -103.436103 ( TVD: 0 feet, MD: 0 feet )

PPP: NENE / 100 FNL / 1000 FEL / TWSP: 24S / RANGE: 34E / SECTION: 35 / LAT: 32.180975 / LONG: -103.435475 ( TVD: 12184 feet, MD: 12188 feet )

BHL: NENE / 50 FSL / 1000 FEL / TWSP: 35S / RANGE: 34E / SECTION: 2 / LAT: 32.152373 / LONG: -103.435446 ( TVD: 12760 feet, MD: 22933 feet )

**BLM Point of Contact**

Name: Priscilla Perez

Title: Legal Instruments Examiner

Phone: 5752345934

Email: pperez@blm.gov

(Form 3160-3, page 3)

**Approval Date: 05/24/2019**

## COG Operating, LLC - Brot Helm Federal Com 702H

### 1. Geologic Formations

TVD of target	12,770' EOL	Pilot hole depth	NA
MD at TD:	22,933'	Deepest expected fresh water:	600'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	917	Water	
Top of Salt	1459	Salt	
Base of Salt	5234	Salt	
Lamar	5514	Salt Water	
Bell Canyon	5554	Salt Water	
Cherry Canyon	6534	Oil/Gas	
Brushy Canyon	8164	Oil/Gas	
Bone Spring Lime	9386	Oil/Gas	
1st Bone Spring Sand	10571	Oil/Gas	
2nd Bone Spring Sand	11156	Oil/Gas	
3rd Bone Spring Sand	12186	Oil/Gas	
Wolfcamp	12626	Target Oil/Gas	
Wolfcamp B	13041	Not Penetrated	
Wolfcamp C	13151	Not Penetrated	

### 2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	945	13.375"	54.5	J55	STC	2.67	7.46	9.98
12.25"	0	12000	9.625"	47	HCL80	BTC	1.47	1.04	1.99
8.5	0	22,933	5.5"	23	P110	BTC	1.75	2.07	2.47
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 - Brot Helm Federal Com 702H**

	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? If yes, does production casing cement tie back a minimum of 50' above the Reef? Is well within the designated 4 string boundary?	N
Is well located in SOPA but not in R-111-P? If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA? 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?	N
Is well located in high Cave/Karst? If yes, are there two strings cemented to surface? (For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst? If yes, are there three strings cemented to surface?	N

**COG Operating, LLC - Brot Helm Federal Com 702H**

**3. Cementing Program**

Casing	# Sk	Wt. lb/ gal	Yld ft3/ sack	H <sub>2</sub> O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	380	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.	970	11	2.8	19	48	Lead: NeoCem
Stage1	300	16.4	1.1	5	8	Tail: Class H
<b>DV Tool @ 5525'</b>						
Inter.	780	11	2.8	19	48	Lead: NeoCem
Stage2	115	14.8	1.35	6.34	8	Tail: Class C + 2% Cacl
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	11,500'	35%

**COG Operating, LLC - Brot Helm Federal Com 702H**

**4. Pressure Control Equipment**

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	5M	Annular	x	2500 psi
			Blind Ram		5M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8-3/4"	13-5/8"	10M	5M Annular	x	5000 psi
			Blind Ram		10M
			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.

**COG Operating, LLC - Brot Helm Federal Com 702H**

**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	

**COG Operating, LLC - Brot Helm Federal Com 702H**

**7. Drilling Conditions**

<b>Condition</b>	<b>Specify what type and where?</b>
BH Pressure at deepest TVD	8305 psi at 12770' TVD
Abnormal Temperature	NO 180 Deg. F.

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

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

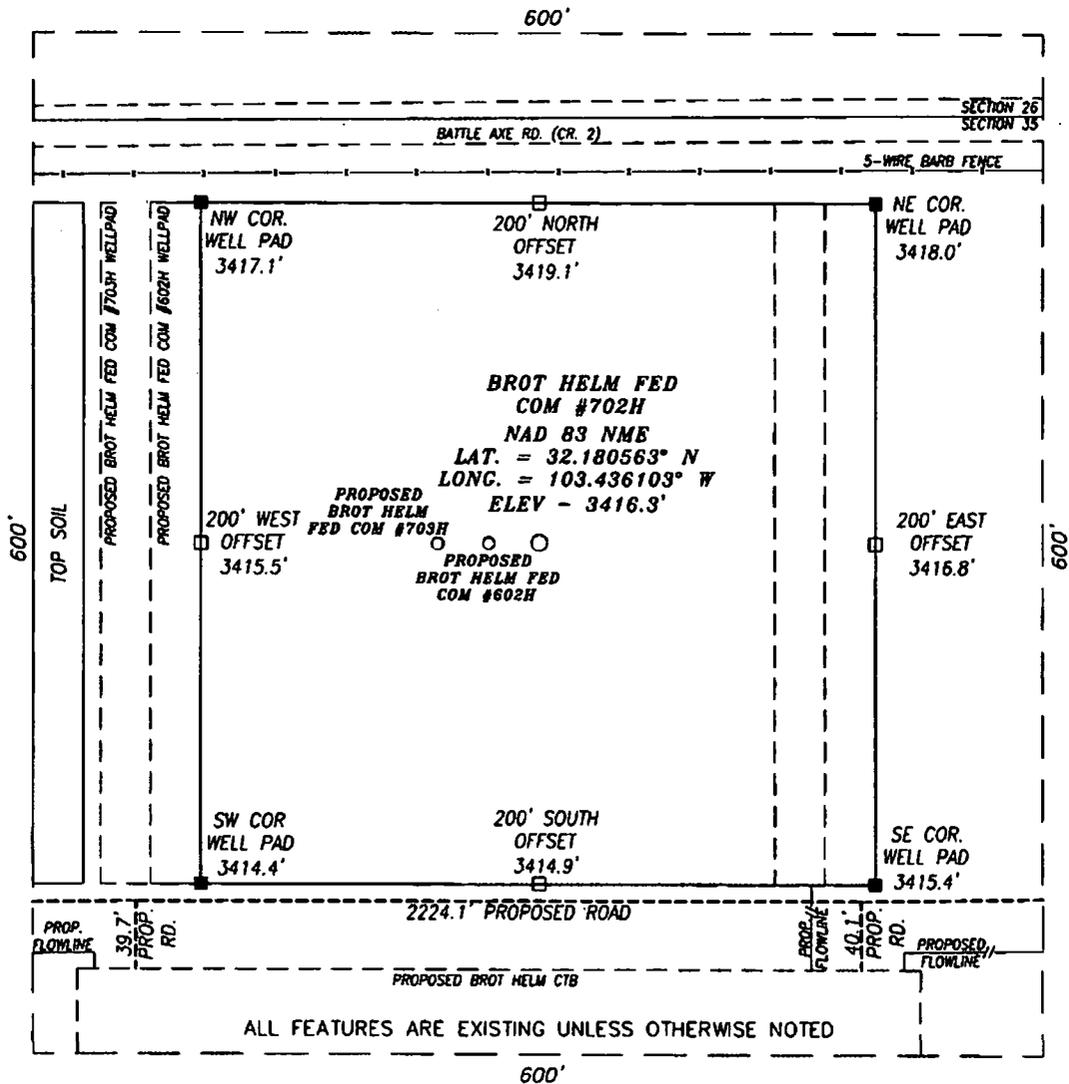
Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be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

**8. Other Facets of Operation**

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

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan
x	5M Annular Variance

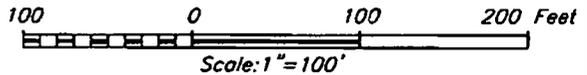
SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,  
LEA COUNTY NEW MEXICO



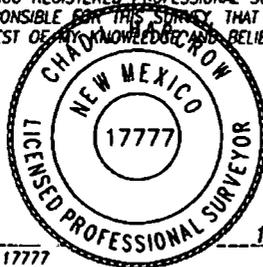
ALL FEATURES ARE EXISTING UNLESS OTHERWISE NOTED

**DIRECTIONS TO LOCATION**  
FROM THE INTERSECTION OF STATE HWY. 128 & BATTLE AXE RD. (CR. 2), GO SOUTHWEST ON BATTLE AXE RD. FOR APPROX. 0.4 MI.; THEN TURN RIGHT (WEST) AND GO APPROX. 1.2 MILES TO A CALICHE ROAD; THEN TURN LEFT (SOUTH) AND GO APPROX. 450 FEET TO A PROPOSED ROAD. PROPOSED WELL LIES APPROX. 1395 FEET WESTNORTHWEST.

**HARCROW SURVEYING, LLC**  
2314 W. MAIN ST, ARTESIA, N.M. 88210  
PH: (575) 746-2158  
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

1/25/19  
DATE

<b>COG OPERATING, LLC</b>	
BROT HELM FEDERAL COM #702H WELL LOCATED 250 FEET FROM THE NORTH LINE AND 1195 FEET FROM THE EAST LINE OF SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	600S
DRAFTING DATE: JANUARY 11, 2019	PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: AM FILE: 18-1835

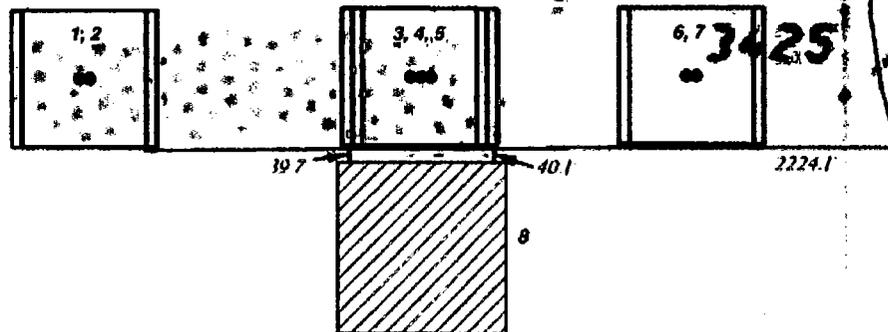


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	WELL	FOOTAGE	ELEV.	WO
1	BROT HELM FED COM #704H	250' FNL & 2235' FEL	3418.1'	18-1838
2	BROT HELM FED COM #603H	250' FNL & 2205' FEL	3416.9'	18-1837
3	BROT HELM FED COM #703H	250' FNL & 1255' FEL	3415.9'	18-1836
4	BROT HELM FED COM #602H	250' FNL & 1225' FEL	3415.9'	18-1834
5	BROT HELM FED COM #702H	250' FNL & 1195' FEL	3416.3'	18-1835
6	BROT HELM FED COM #601H	250' FNL & 437' FEL	3420.6'	18-1832
7	BROT HELM FED COM #701H	250' FNL & 407' FEL	3420.2'	18-1833
8	BROT HELM CTB	750' FNL & 1225' FEL	3412.6'	18-1809

Gravel  
Pit



**LEGEND**

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD

**BROT HELM FEDERAL COM WELLS**

SECTION: 35      TOWNSHIP: 24 S.      RANGE: 34 E.  
 STATE: NEW MEXICO      COUNTY: LEA      SURVEY: N.M.P.M.  
 W.O. # 18-1832-1838, 1809      LEASE: BROT HELM

0      500      1,000 FEET

0      0.03250.065      0.13 Miles

1 IN = 500 FT

LOCATION MAP      TOPO      1/10/2019      A.M.

**CONCHO**

COG OPERATING, LLC



**HARCROW SURVEYING, LLC.**  
 2314 W. MAIN ST, ARTESIA, NM 88210  
 PH: (575) 745-2158 FAX: (575) 745-2151  
 c.harcrow@harcrowsurveying.com

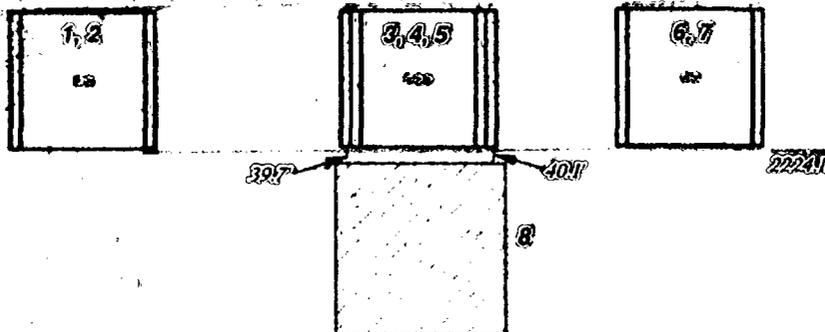
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	WELL	FOOTAGE	ELEV.	WO
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2	BROT HELM FED COM #603H	250' FNL & 2205' FEL	3416.9'	18-1837
3	BROT HELM FED COM #703H	250' FNL & 1255' FEL	3415.9'	18-1836
4	BROT HELM FED COM #602H	250' FNL & 1225' FEL	3415.9'	18-1834
5	BROT HELM FED COM #702H	250' FNL & 1195' FEL	3416.3'	18-1835
6	BROT HELM FED COM #601H	250' FNL & 437' FEL	3420.6'	18-1832
7	BROT HELM FED COM #701H	250' FNL & 407' FEL	3420.2'	18-1833
8	BROT HELM CTB	750' FNL & 1225' FEL	3412.6'	18-1809

26

25



RTMP/EA/AF/PC CH-59

35

33

**LEGEND**

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD

**BROT HELM FEDERAL COM WELLS**

SECTION: 35 TOWNSHIP: 24 S. RANGE: 34 E.  
 STATE: NEW MEXICO COUNTY: LEA SURVEY: N.M.P.M.  
 W.O. # 18-1832-1838, 1809 LEASE: BROT HELM

0 500 1,000 FEET

0 0.03250.065 0.13 Miles

1 IN = 500 FT

LOCATION MAP

IMAGERY

1/10/2019

A.M.

**CONCHO**

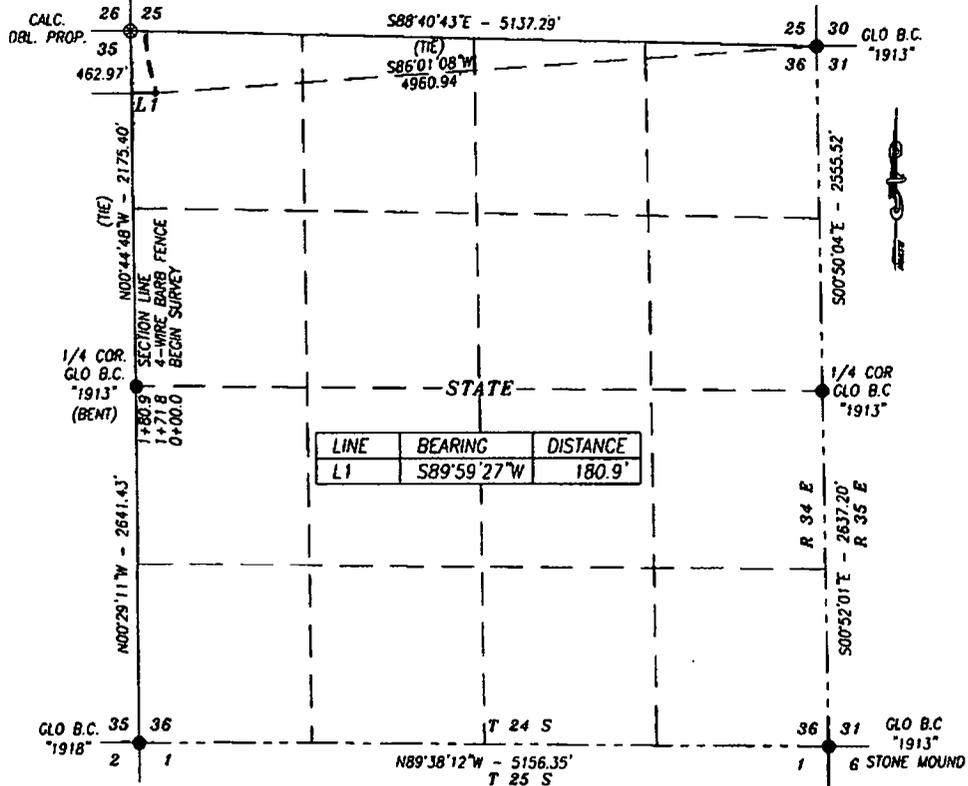
COG OPERATING, LLC



HARCROW SURVEYING, LLC.  
 2314 W. MAIN ST., ARTESIA, NM 88210  
 PH: (575) 746-2158 FAX: (575) 746-2151  
 c.harcrow@harcrowsurveying.com

**ACCESS ROAD PLAT  
COG OPERATING, LLC**

A PROPOSED ACCESS ROAD FROM AN EXISTING ROAD TO  
THE BROT HELM FED COM WELLS IN  
**SECTION 36, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,**  
LEA COUNTY, NEW MEXICO.



LINE	BEARING	DISTANCE
L1	S89°59'27\"W	180.9'

**DESCRIPTION**

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 36, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA 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 NW/4 NW/4 OF SAID SECTION, WHICH LIES S86°01'08\"W 4960.94 FEET FROM THE NORTHEAST CORNER; THEN S89°59'27\"W 180.9 FEET, TO A POINT ON THE WEST LINE OF SAID SECTION, WHICH LIES N00°44'48\"W 2175.40 FEET FROM WEST QUARTER CORNER.

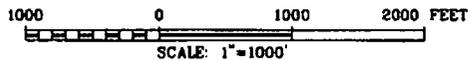
SAID STRIP OF LAND BEING 180.9 FEET OR 10.96 RODS IN LENGTH, CONTAINING 0.125 ACRES MORE OR LESS AND BEING ENTIRELY IN THE NW/4 NW/4.

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

**HARCROW SURVEYING, LLC**  
2314 W. MAIN ST. ARTESIA, N.M. 88210  
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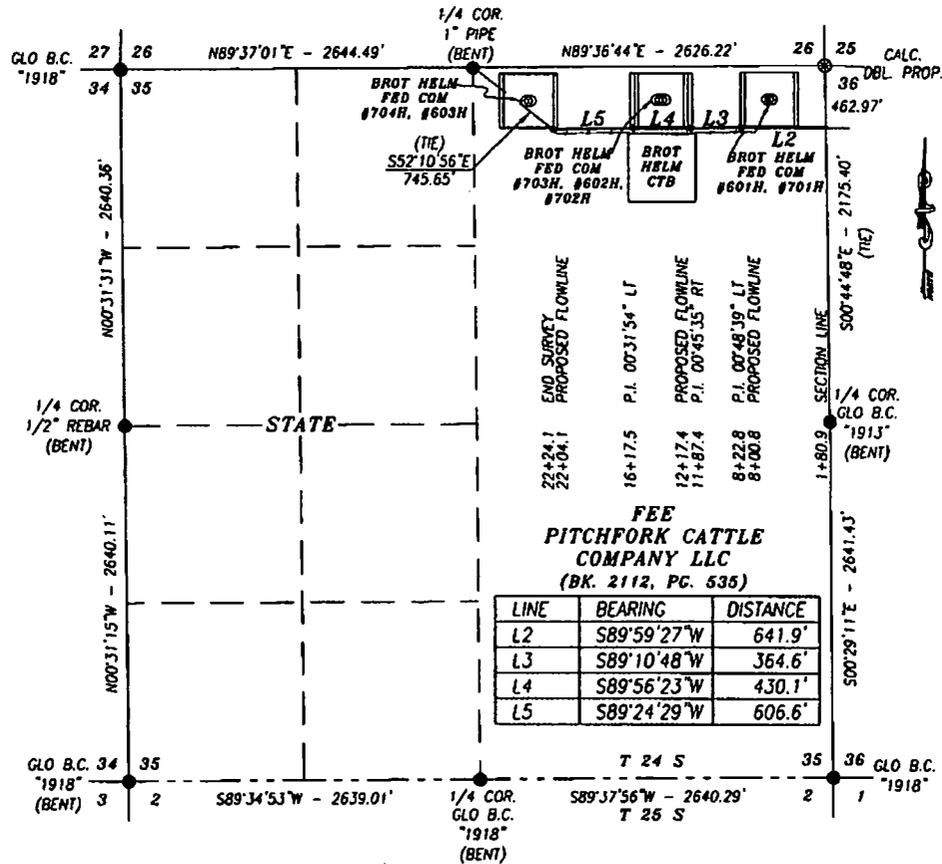
**CERTIFICATION**  
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777  
DATE 1/25/19

<b>COG OPERATING, LLC</b>	
SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 36, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	WELL ACCESS ROAD
DRAFTING DATE: JANUARY 8, 2019	PAGE 1 OF 2
APPROVED BY: CH	DRAWN BY: AM FILE: 18-1810

**ACCESS ROAD PLAT**  
**COG OPERATING, LLC**  
 A PROPOSED ACCESS ROAD FROM AN EXISTING ROAD TO  
 THE BROT HELM FED COM WELLS IN  
**SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,**  
 LEA COUNTY, NEW MEXICO.



**DESCRIPTION**

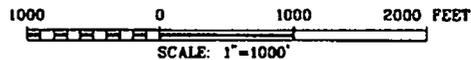
A STRIP OF LAND 30.0 FEET WIDE AND 2043.2 FEET OR 123.83 RODS OR 0.387 MILES IN LENGTH CROSSING FEE LAND IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, LEA COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

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

**HARCROW SURVEYING, LLC**  
 2314 W. MAIN ST. ARTESIA, N.M. 88210  
 PH: (575) 746-2158  
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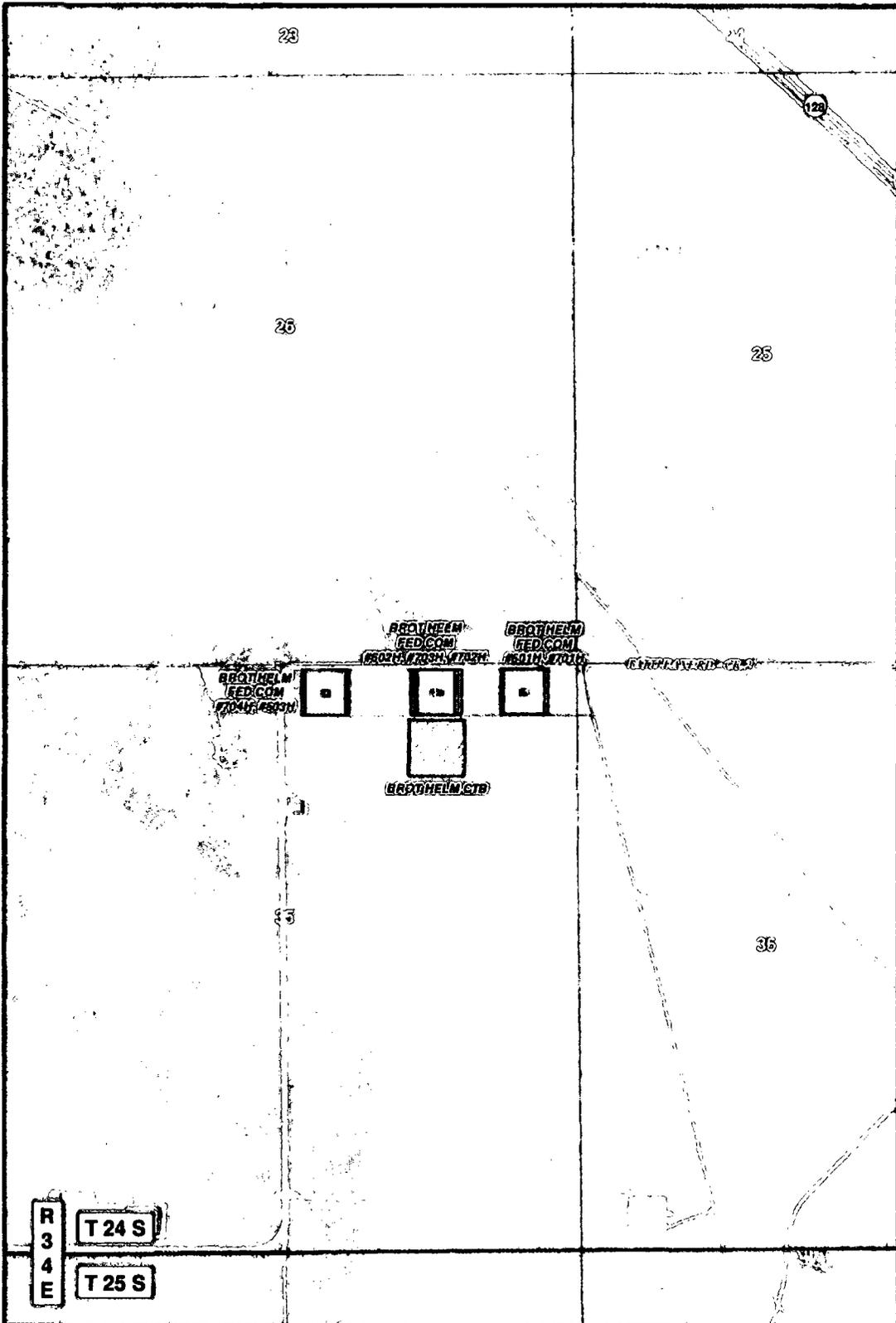


**CERTIFICATION**  
 I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



*Chad Harcrow*  
 CHAD HARCROW N.M.P.S. NO. 17777  
 DATE 1/25/19

<b>COG OPERATING, LLC</b>	
SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	WELL ACCESS ROAD
DRAFTING DATE: JANUARY 8, 2019	PAGE 2 OF 2
APPROVED BY: CH	DRAWN BY: AM
	FILE: 18-1810



R 34 E  
T 24 S  
T 25 S

**LEGEND**

- WELL
- WELLPAD
- ▨ TANK BATTERY
- ACCESS ROAD
- EXISTING ROAD

**BROT HELM FED COM ACCESS ROAD**

SECTIONS: 35 & 38	TOWNSHIP: 24 S.	RANGE: 34 E.
STATE: NEW MEXICO	COUNTY: LEA	SURVEY: N.M.P.M
W.O. # 18-1810	LEASE: BROT HELM FED COM	

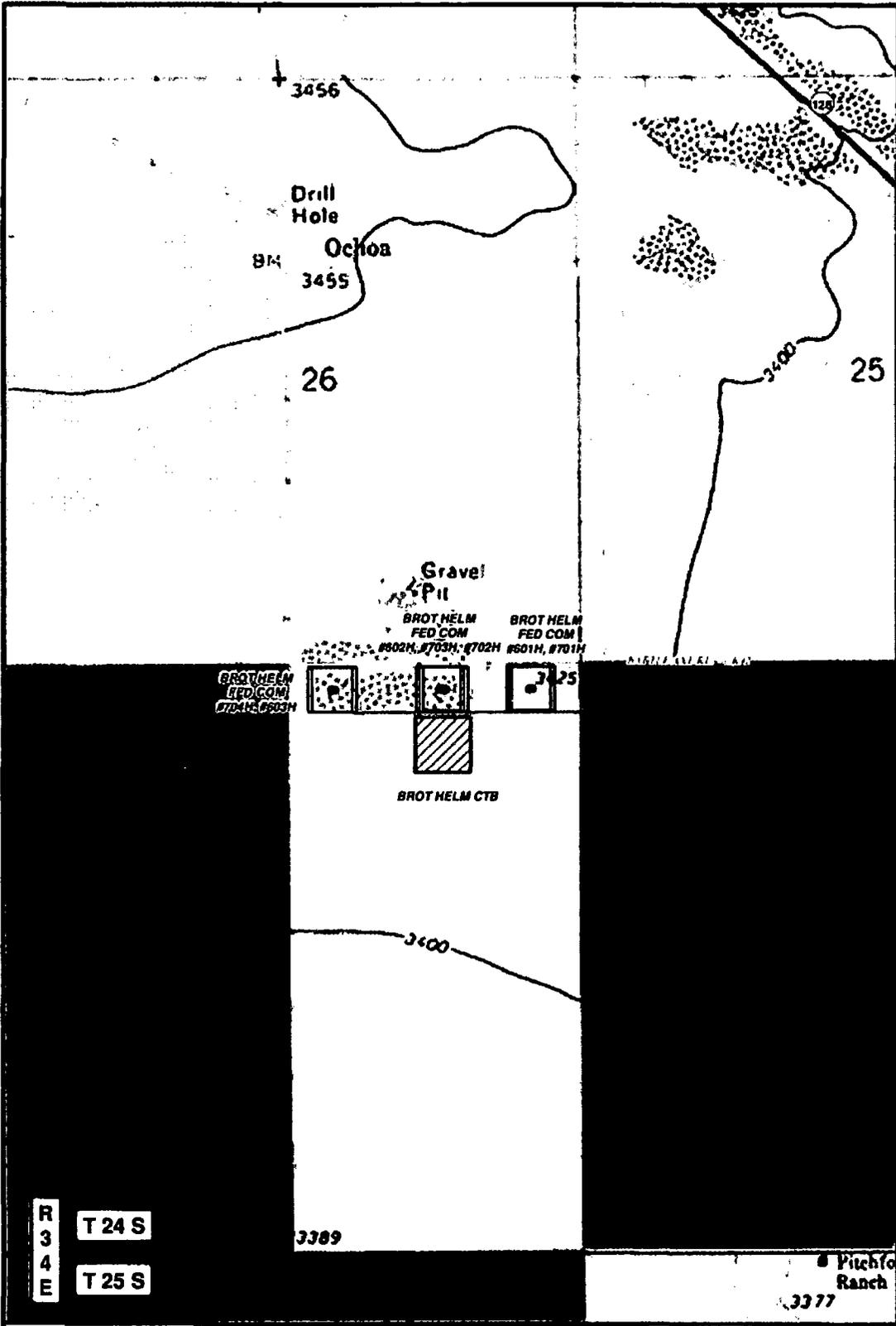
0 0.075 0.15 0.3 Miles 1 IN = 1,000 FT

ACCESS ROAD MAP      IMAGERY      1/8 2019      A.M.

**CONCHO**  
COG OPERATING, LLC

---

**HSI** HARCROW SURVEYING, LLC  
2316 W. MAIN ST., ARVESDA, CA 94026  
PH: (878) 296-2358 FAX: (973) 745-2158  
e.harcrow@harcrowsurveying.com



R  
3  
4  
E

T 24 S

T 25 S

**LEGEND**

- WELL
- WELLPAD
- ▨ TANK BATTERY
- ACCESS ROAD
- EXISTING ROAD
- PRIVATE
- STATE OF NM
- US BLM

BROT HELM FED COM ACCESS ROAD

SECTIONS: 35 & 38	TOWNSHIP: 24 S.	RANGE: 34 E.
STATE: NEW MEXICO	COUNTY: LEA	SURVEY: N.M.P.M
W.O. # 18-1810	LEASE: BROT HELM FED COM	

0 2,500 FEET

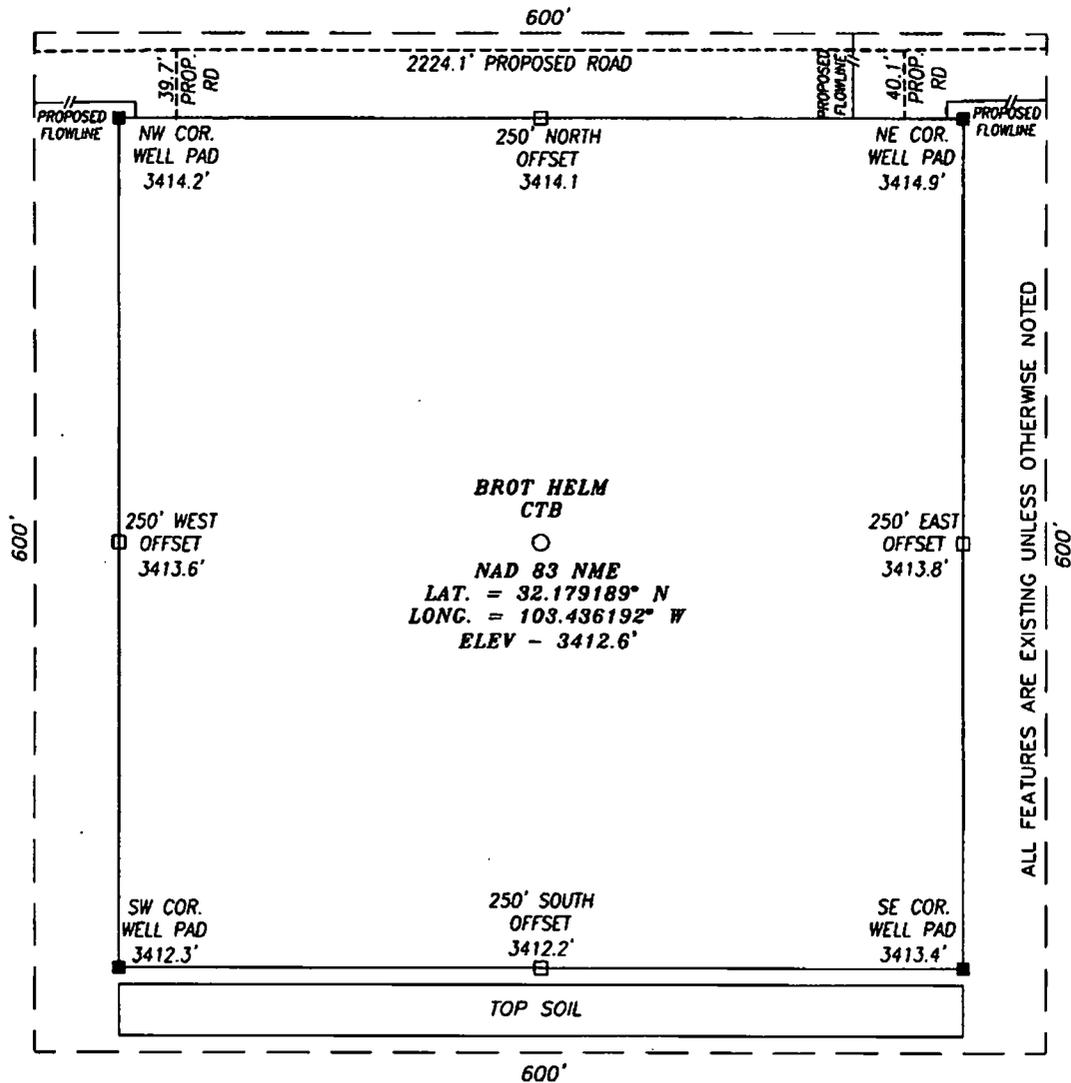
0 0.075 0.15 0.3 Miles 1 IN = 1,000 FT

ACCESS ROAD MAP LAND STATUS 1/8/2019 A.M.

**CONCHO**  
COG OPERATING, LLC

**HSI** HARCROW SURVEYING, LLC  
2314 W. MAIN ST, ARIZONA, NM 88210  
PH: (505) 746-2150 FAX: (505) 746-2150  
charcrow@harcrowsurveying.com

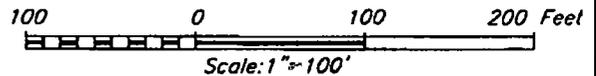
SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,  
LEA COUNTY NEW MEXICO



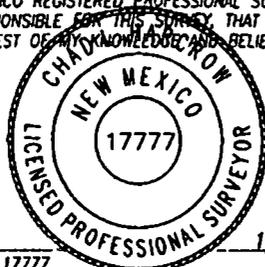
ALL FEATURES ARE EXISTING UNLESS OTHERWISE NOTED

**DIRECTIONS TO LOCATION**  
FROM THE INTERSECTION OF STATE HWY. 128 & BATTLE AXE RD. (CR. 2), GO SOUTHWEST ON BATTLE AXE RD. FOR APPROX. 0.4 MI.; THEN TURN RIGHT (WEST) AND GO APPROX. 1.2 MILES TO A CALICHE ROAD; THEN TURN LEFT (SOUTH) AND GO APPROX. 450 FEET TO A PROPOSED ROAD. PROPOSED WELL LIES APPROX. 1435 FEET WESTSOUTHWEST.

**HARCROW SURVEYING, LLC**  
2314 W. MAIN ST, ARTESIA, N.M. 88210  
PH: (575) 746-2158  
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.



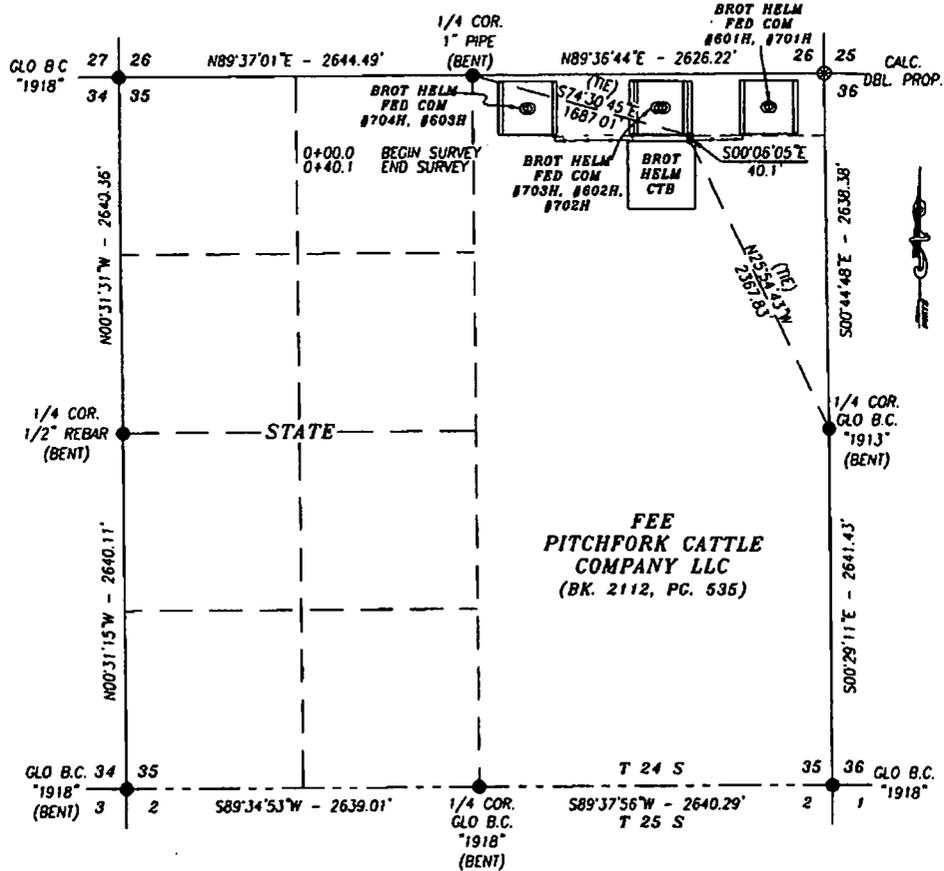
*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777

1/25/19  
DATE

<b>COG OPERATING, LLC</b>	
BROT HELM CTB LOCATED 750 FEET FROM THE NORTH LINE AND 1225 FEET FROM THE EAST LINE OF SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	600S
DRAFTING DATE: JANUARY 17, 2019	PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: AM FILE: 18-1809

**ACCESS ROAD PLAT  
COG OPERATING, LLC**

A PROPOSED ACCESS ROAD FROM A PROPOSED ROAD TO THE BROT HELM CTB IN  
**SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,**  
LEA COUNTY, NEW MEXICO.



**DESCRIPTION**

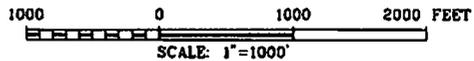
A STRIP OF LAND 30.0 FEET WIDE AND 40.1 FEET OR 2.43 RODS OR 0.008 MILES IN LENGTH CROSSING FEE LAND IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, LEA COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

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

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



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

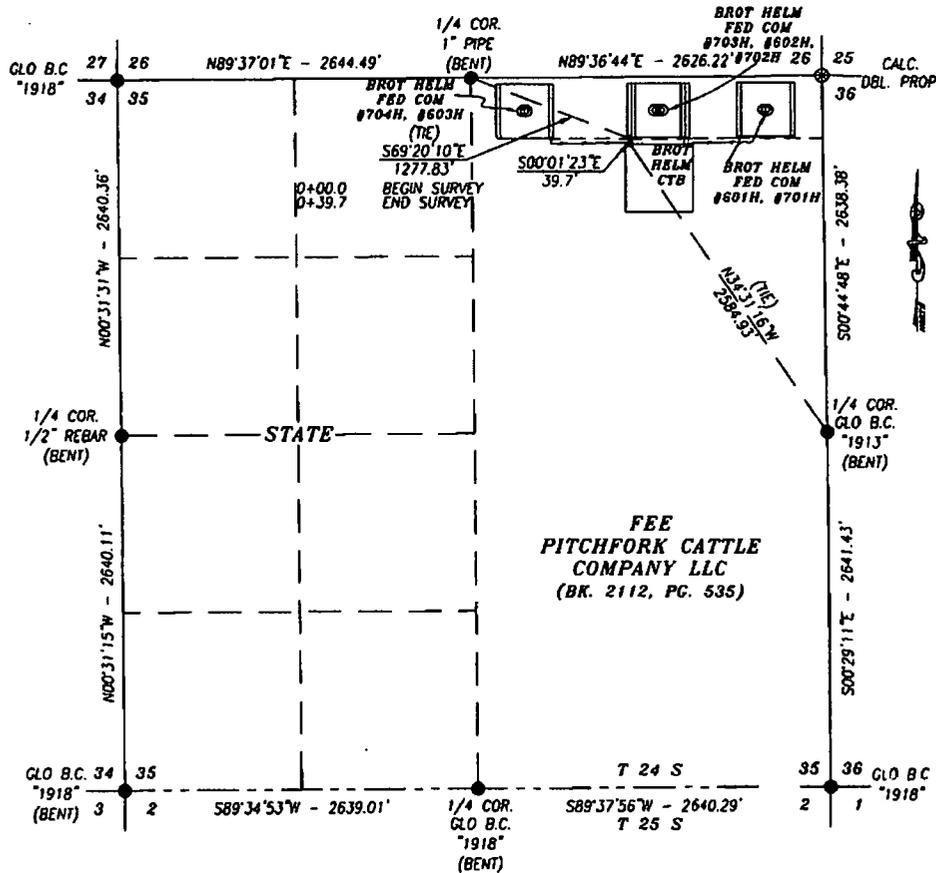


*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777  
DATE 1/25/19

<b>COG OPERATING, LLC</b>	
SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	CTB ROAD 1
DRAFTING DATE: JANUARY 8, 2019	PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: AM
	FILE: 18-1810

**ACCESS ROAD PLAT  
COG OPERATING, LLC**

A PROPOSED ACCESS ROAD FROM A PROPOSED ROAD TO THE BROT HELM CTB IN  
SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,  
LEA COUNTY, NEW MEXICO.



**DESCRIPTION**

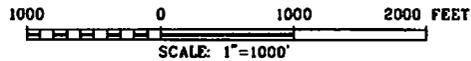
A STRIP OF LAND 30.0 FEET WIDE AND 39.7 FEET OR 2.41 RODS OR 0.008 MILES IN LENGTH CROSSING FEE LAND IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, LEA COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

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

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



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

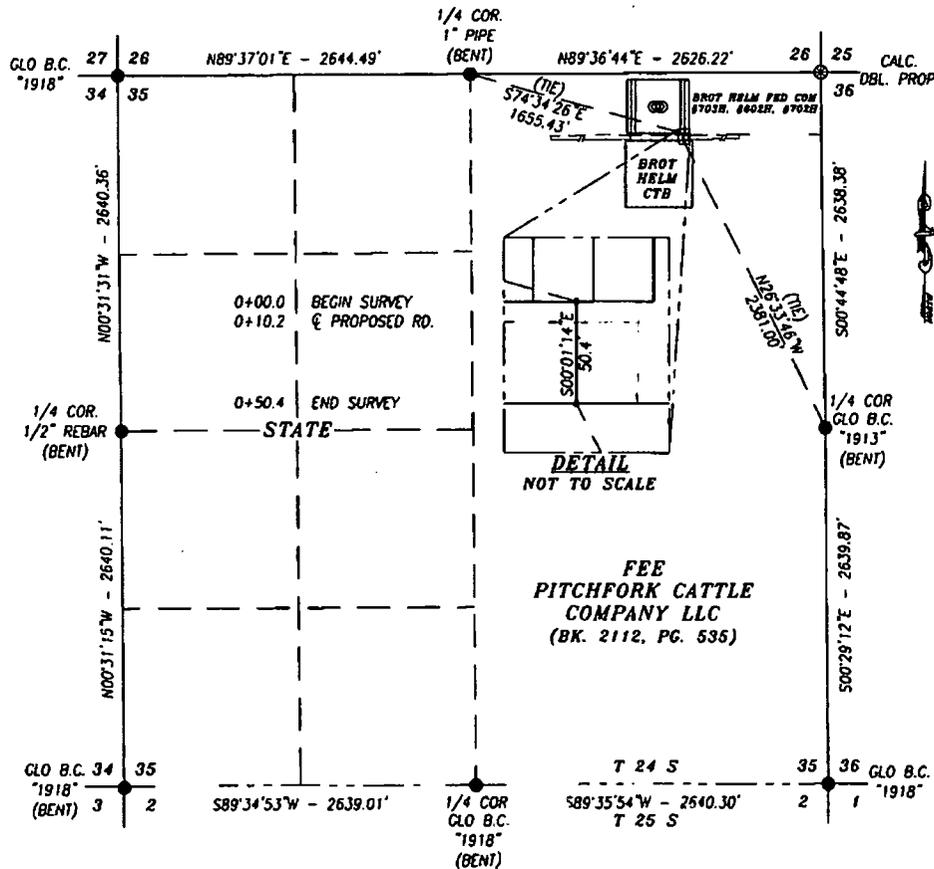


*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777  
DATE 1/25/19

<b>COG OPERATING, LLC</b>	
SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	CTB ROAD 2
DRAFTING DATE: JANUARY 8, 2019	PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: AM FILE: 18-1810

**PIPELINE PLAT  
COG OPERATING, LLC**

A PROPOSED FLOWLINE FROM THE BROTH HELM FED COM #703H, #602H, & #7020H  
TO THE BROTH HELM CTB IN  
**SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, N.M.P.M.,**  
LEA COUNTY,  
NEW MEXICO.



**DESCRIPTION**

A STRIP OF LAND 30.0 FEET WIDE AND 50.4 FEET OR 3.05 RODS OR 0.010 MILES IN LENGTH CROSSING FEE LAND IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, LEA COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

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

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

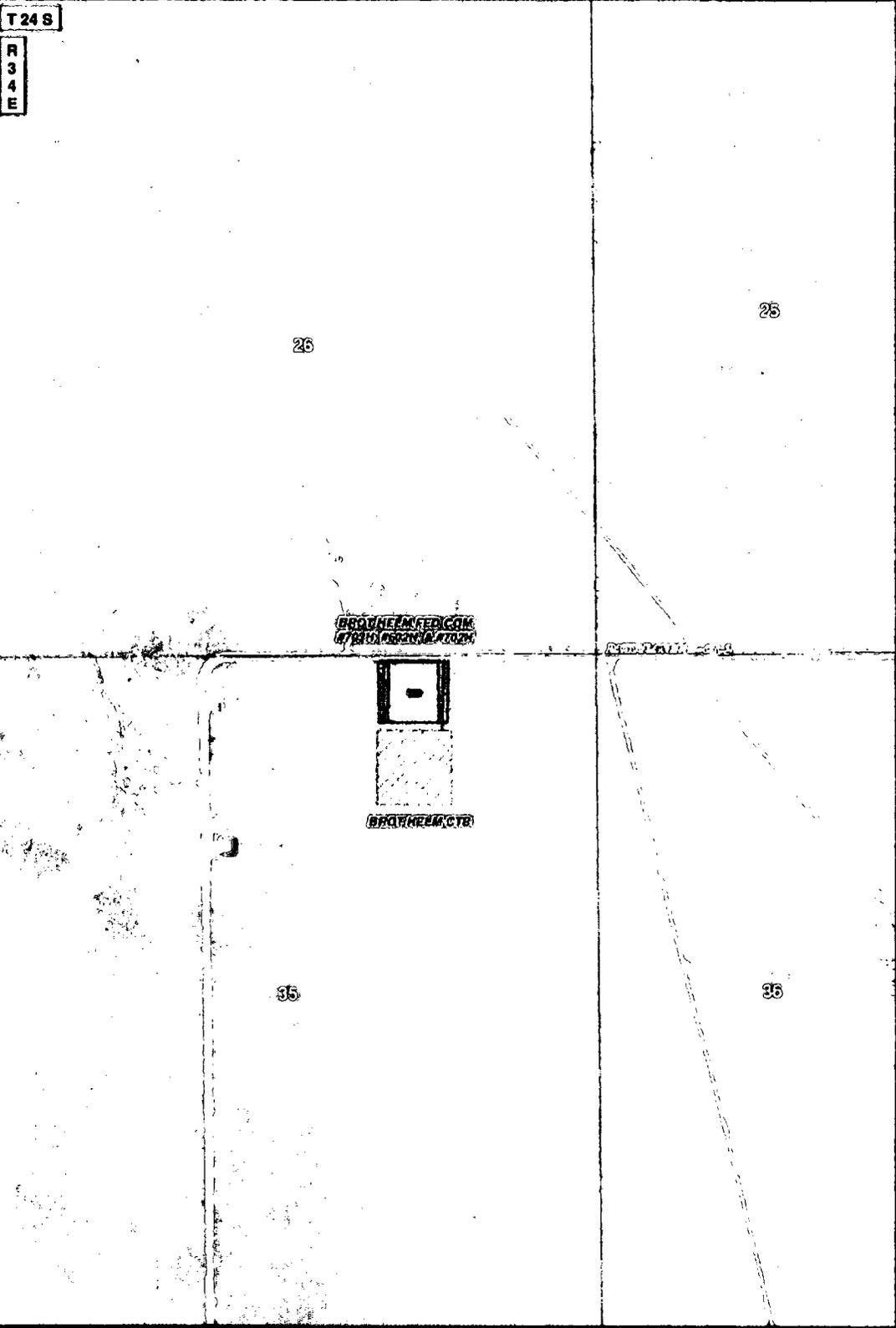


**CERTIFICATION**  
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



*Chad Harcrow*  
CHAD HARCROW N.M.P.S. NO. 17777  
DATE 1/25/19

<b>COG OPERATING, LLC</b>	
SURVEY OF A PROPOSED PIPELINE LOCATED IN SECTION 35, TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM, LEA COUNTY, NEW MEXICO	
SURVEY DATE: DECEMBER 17, 2018	FLOWLINE
DRAFTING DATE: JANUARY 17, 2019	PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: AM
	FILE: 18-1812



**LEGEND**

- WELL
- WELLPAD
- PIPELINE
- ▨ TANK BATTERY

**BROT HELM FED COM #703H, #603H, & #702H TO CTB**

SECTION: 35	TOWNSHIP: 24 S.	RANGE: 34 E.
STATE: NEW MEXICO	COUNTY: LEA	SURVEY: N.M.P.M
W.O. # 18-1812	LEASE: BROT HELM	

0 750 1,500 FEET

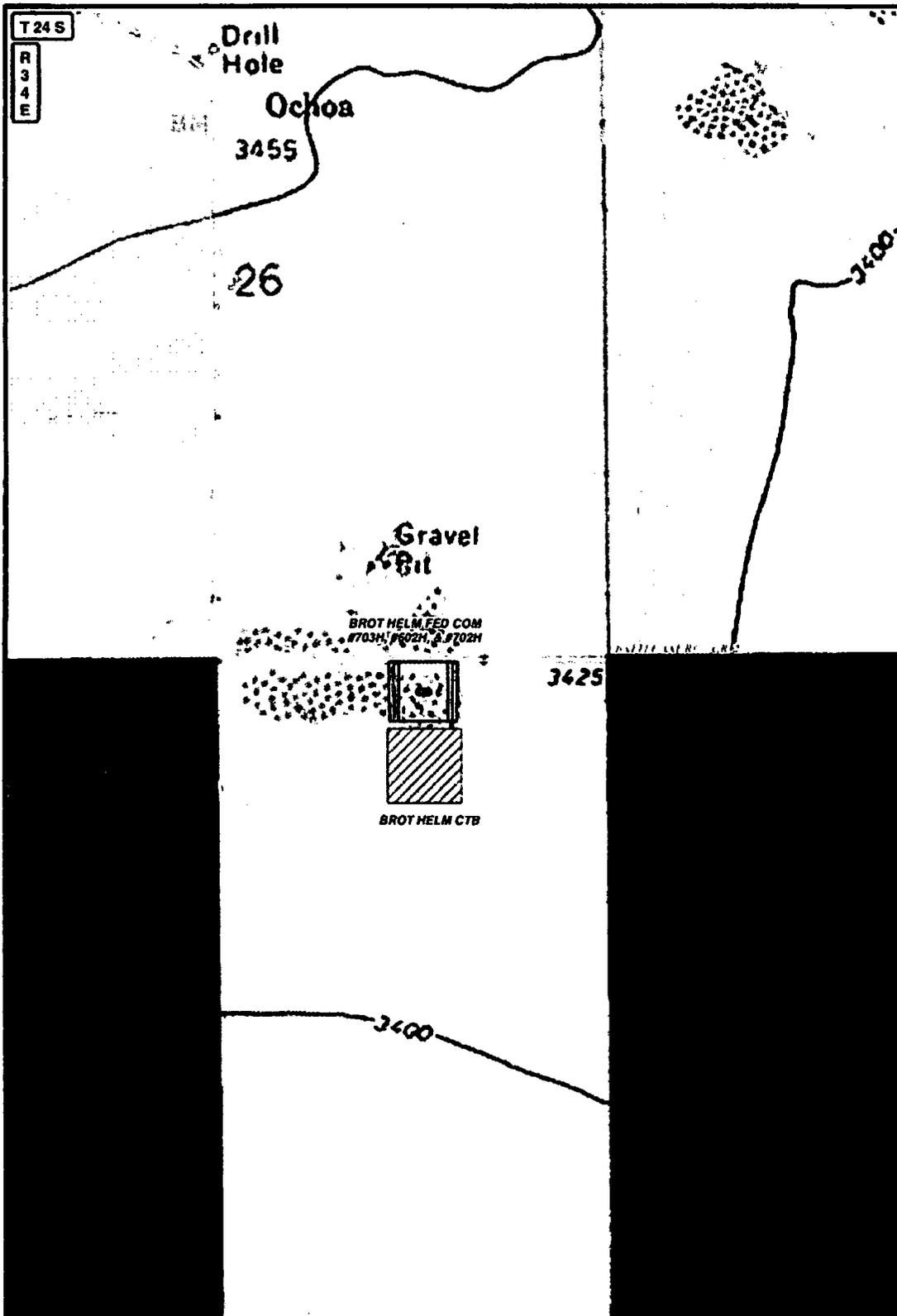
0 0.05 0.1 0.2 Miles

1 IN = 750 FT

PIPELINE OVERVIEW IMAGERY 1/17/2019 A.M.

**CONCHO**  
COG OPERATING, LLC

**HS** HARCROW SURVEYING, LLC  
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c.harcrow@harcrowsurveying.com



T24S  
R34E

Drill Hole  
Ochoa  
3455

26

Gravel Pit

BROT HELM FED COM  
#703H, #603H, & #702H

3425



BROT HELM CTB

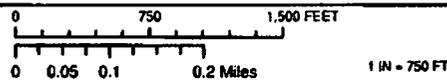
3400

**LEGEND**

- WELL
- WELLPAD
- PIPELINE
- ▨ TANK BATTERY
- PRIVATE
- STATE OF NM
- US BLM

BROT HELM FED COM #703H, #603H, & #702H TO CTB

SECTION: 35      TOWNSHIP: 24 S.      RANGE: 34 E.  
STATE: NEW MEXICO      COUNTY: LEA      SURVEY: N.M.P.M.  
W.O. # 18-1812      LEASE: BROT HELM



PIPELINE OVERVIEW      LAND STATUS      1.17.2019      A.M.

**CONCHO**  
COG OPERATING, LLC

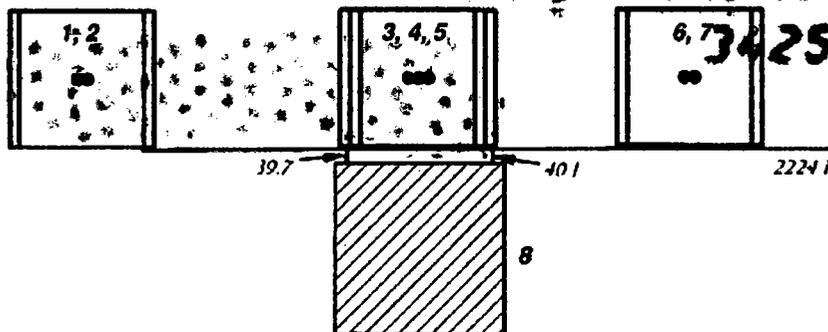
**HC** MARCROW SURVEYING, LLC  
2314 W. MAIN ST. ARTESIA, NM 88210  
PH: (505) 746-8150 FAX: (505) 746-8150  
cmarcrow@marcrowsurveying.com

T 24 S

R  
3  
4  
E

	WELL	FOOTAGE	ELEV.	WO
1	BROT HELM FED COM #704H	250' FNL & 2235' FEL	3418.1'	18-1838
2	BROT HELM FED COM #603H	250' FNL & 2205' FEL	3416.9'	18-1837
3	BROT HELM FED COM #703H	250' FNL & 1255' FEL	3415.9'	18-1836
4	BROT HELM FED COM #602H	250' FNL & 1225' FEL	3415.9'	18-1834
5	BROT HELM FED COM #702H	250' FNL & 1195' FEL	3416.3'	18-1835
6	BROT HELM FED COM #601H	250' FNL & 437' FEL	3420.6'	18-1832
7	BROT HELM FED COM #701H	250' FNL & 407' FEL	3420.2'	18-1833
8	BROT HELM CTB	750' FNL & 1225' FEL	3412.6'	18-1809

Gravel  
Pit



RAFFL INLRD CR 2

**LEGEND**

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

**BROT HELM FEDERAL COM WELLS**

SECTION: 35      TOWNSHIP: 24 S.      RANGE: 34 E.  
 STATE: NEW MEXICO      COUNTY: LEA      SURVEY: N.M.P.M.  
 W.O. # 18-1832-1838, 1809      LEASE: BROT HELM

0      500      1,000 FEET

0      0.03250.065      0.13 Miles

1 IN = 500 FT

LOCATION MAP

LAND STATUS

1/10/2019

A.M

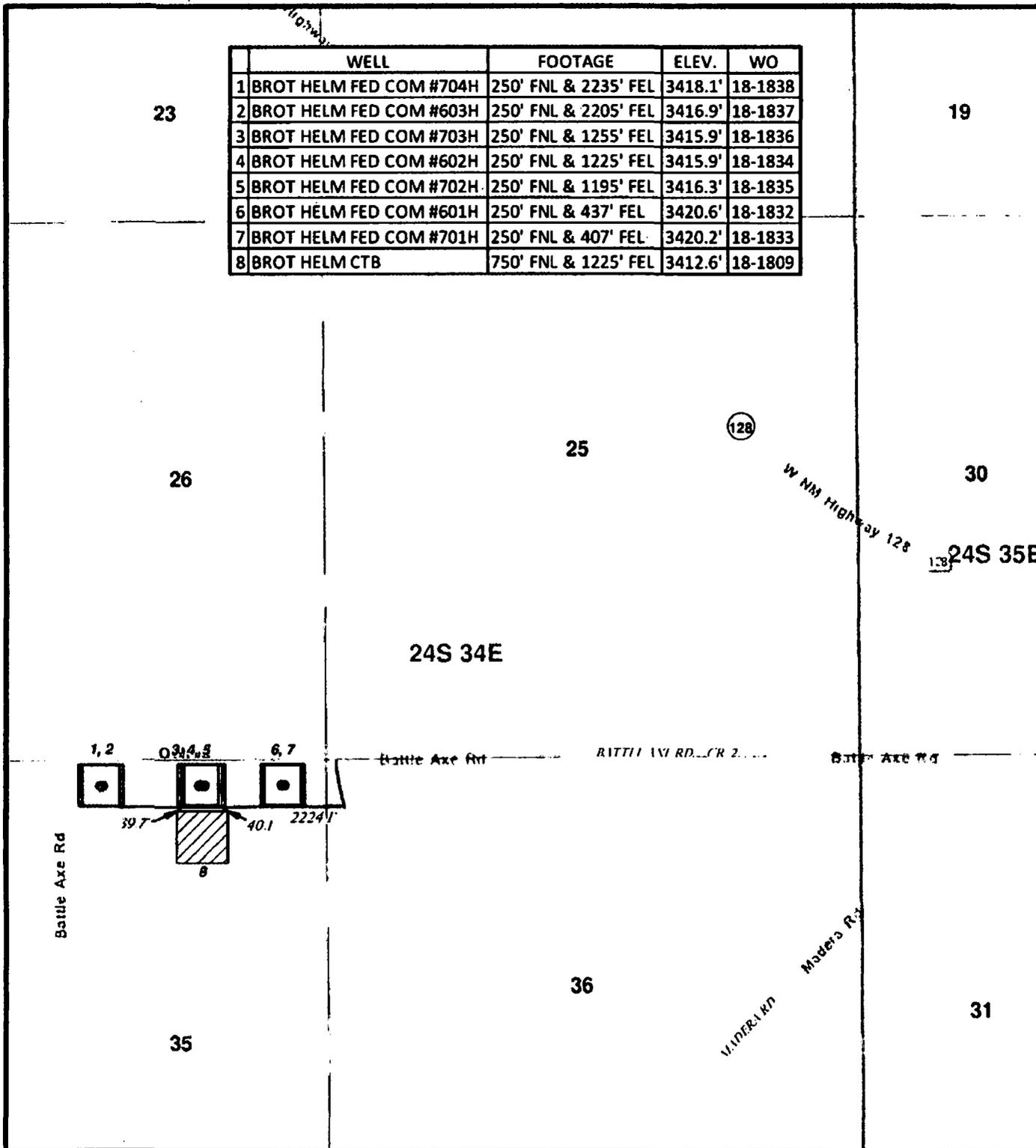
**CONCHO**

COG OPERATING, LLC



HARCROW SURVEYING, LLC.  
 2314 W. MAIN ST, ARTESIA, NM 88210  
 PH: (575) 746-3158 FAX: (575) 746-2158  
 c.harcrow@harcrowsurveying.com

	WELL	FOOTAGE	ELEV.	WO
1	BROT HELM FED COM #704H	250' FNL & 2235' FEL	3418.1'	18-1838
2	BROT HELM FED COM #603H	250' FNL & 2205' FEL	3416.9'	18-1837
3	BROT HELM FED COM #703H	250' FNL & 1255' FEL	3415.9'	18-1836
4	BROT HELM FED COM #602H	250' FNL & 1225' FEL	3415.9'	18-1834
5	BROT HELM FED COM #702H	250' FNL & 1195' FEL	3416.3'	18-1835
6	BROT HELM FED COM #601H	250' FNL & 437' FEL	3420.6'	18-1832
7	BROT HELM FED COM #701H	250' FNL & 407' FEL	3420.2'	18-1833
8	BROT HELM CTB	750' FNL & 1225' FEL	3412.6'	18-1809

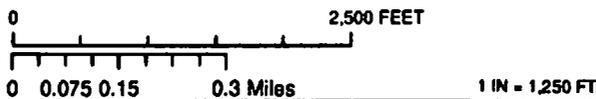


**LEGEND**

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- - - PROPOSED ROAD

**BROT HELM FEDERAL COM WELLS**

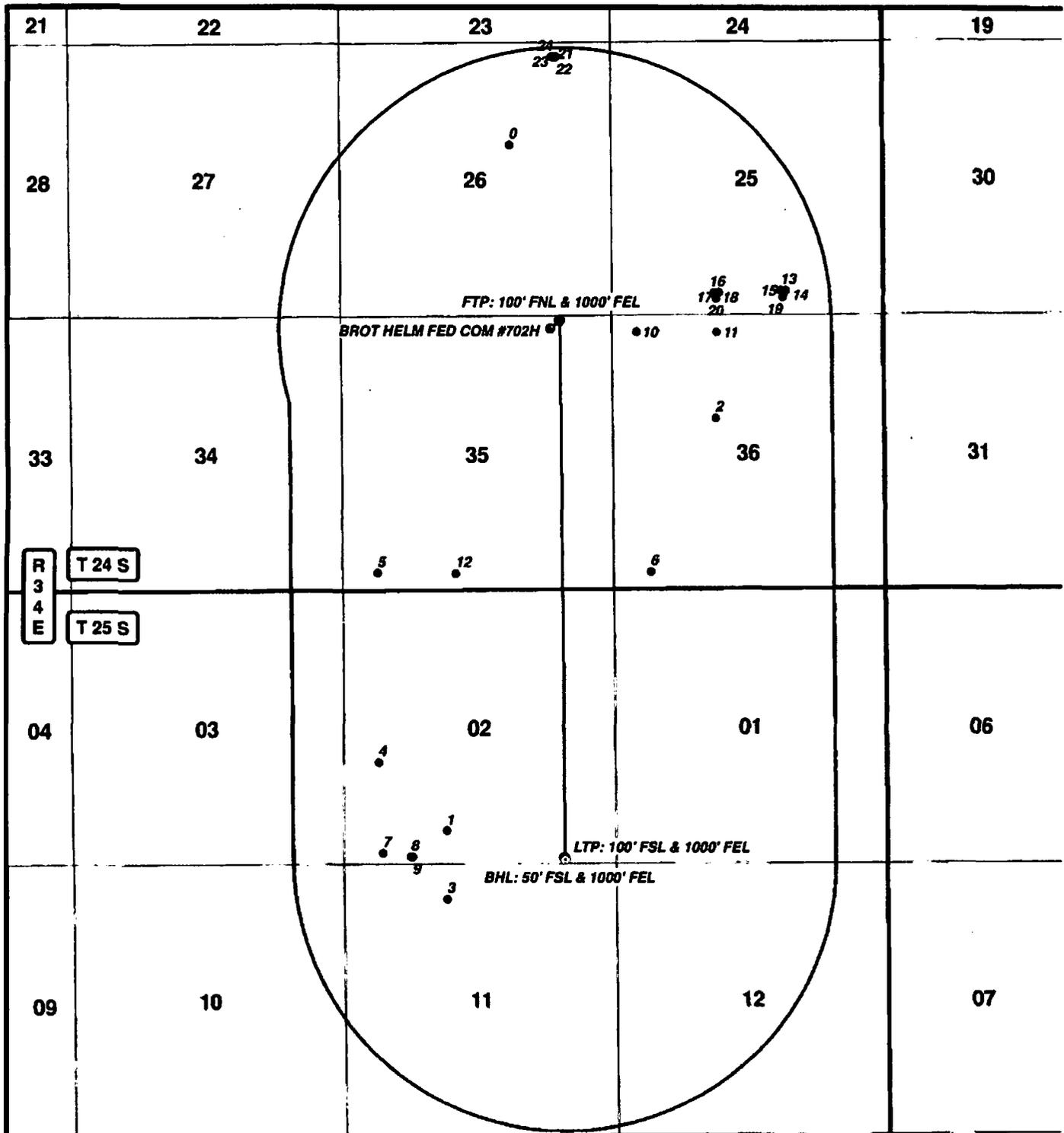
SECTION: 35      TOWNSHIP: 24 S.      RANGE: 34 E.  
 STATE: NEW MEXICO      COUNTY: LEA      SURVEY: N.M.P.M  
 W.O. # 18-1832-1838, 1809      LEASE: BROT HELM



LOCATION MAP      VICINITY      1/10/2019      A.M.

**CONCHO**  
 COG OPERATING, LLC

**HARCROW SURVEYING, LLC.**  
 2314 W. MAIN ST, ARTESIA, NM 88210  
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 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

**BROT HELM FEDERAL COM #702H**

SEC: 35	TWP: 24 S.	RGE: 34 E.	ELEVATION: 3416.3'
STATE: NEW MEXICO		COUNTY: LEA	250' FNL & 1195' FEL
W.O. # 18-1835		LEASE: BROT HELM	SURVEY: N.M.P.M

0 2,500 5,000 FEET



0 0.175 0.35 0.7 Miles

1 IN = 2,500 FT

1 MILE MAP

1/11/2019

A.M.



COG OPERATING, LLC



**HARCROW SURVEYING, LLC.**  
 2314 W. MAIN ST, ARTESIA, NM 88210  
 PH: (575) 746-2158 FAX: (575) 746-2158  
 c.harcrow@harcrowsurveying.com

## BROT HELM FEDERAL COM #703H 1 MILE DATA (18 1836)

FID WELL NAME	OPERATOR	API	SECTION	TOWNSHIP	RANGE	FTG	NS	CD	FTG	EW	EW	CD	LATITUDE	LONGITUDE	COMPL_STAT
0 W A PAGE 001	TAYLOR POWELL & WALLRICH	3002508493	26	24.0S	34E	1980	N		1980	E			32.190323	-103.438623	Plugged
1 SOUTHEAST BELL LAKE 001	JAKE L HAMON	3002520395	2	25.0S	34E	660	S		1980	W			32.154021	-103.442843	Plugged
2 PITCHFORK 36 STATE 001	ENRON OIL & GAS CO	3002528135	36	24.0S	34E	1980	N		1980	W			32.175789	-103.425755	Plugged
3 PITCHFORK FEDERAL 001	SUN EXPLORATION & PRODUCTION CO	3002529665	11	25.0S	34E	660	N		1980	W			32.150393	-103.442848	Plugged
4 JEWEL 2 STATE 001	ENRON OIL & GAS CO	3002529718	2	25.0S	34E	1980	S		660	W			32.157655	-103.447119	Plugged
5 ORANGE RAIDER BPV STATE 001H	COG OPERATING LLC	3002539712	35	24.0S	34E	330	S		660	W			32.167681	-103.447067	New (Not drilled or compl)
6 BLACK RAIDER BQK STATE 001H	EOG Y RESOURCES, INC.	3002540088	36	24.0S	34E	330	S		660	W			32.167638	-103.429888	New (Not drilled or compl)
7 TUMBLING D:ICE 2 STATE COM 001H	EOG RESOURCES INC	3002541459	2	25.0S	34E	220	S		760	W			32.152848	-103.446866	New (Not drilled or compl)
8 TUMBLING D:ICE 2 STATE COM 701C	EOG RESOURCES INC	3002542378	2	25.0S	34E	151	S		1297	W			32.152654	-103.445124	New (Not drilled or compl)
9 TUMBLING D:ICE 2 STATE COM 702C	EOG RESOURCES INC	3002542379	2	25.0S	34E	151	S		1327	W			32.152654	-103.445026	New (Not drilled or compl)
10 TELECASTER BASS 36 STATE 001H	COG OPERATING LLC	3002542990	36	24.0S	34E	330	N		425	W			32.180341	-103.430699	New (Not drilled or compl)
11 TELECASTER BASS 36 STATE 002H	COG OPERATING LLC	3002542991	36	24.0S	34E	330	N		1980	W			32.180311	-103.425648	New (Not drilled or compl)
12 ORANGE RAIDER BPV STATE 004H	COG OPERATING LLC	3002543025	35	24.0S	34E	315	S		2165	W			32.167628	-103.44218	New (Not drilled or compl)
13 KNIFE FIGHT FEE T 001H	MARATHON OIL PERMIAN LLC	3002543794	26	24.0S	34E	180	N		2310	E			32.195254	-103.439535	New (Not drilled or compl)
14 VEXING FEE WCA 001H	COG OPERATING LLC	3002544014	25	24.0S	34E	490	S		2030	E			32.182542	-103.421617	New (Not drilled or compl)
15 VEXING FEE WCA 002H	COG OPERATING LLC	3002544015	25	24.0S	34E	490	S		1930	E			32.18254	-103.421292	New (Not drilled or compl)
16 VEXING FEE WCY 001H	COG OPERATING LLC	3002544016	25	24.0S	34E	490	S		1980	E			32.182541	-103.421455	New (Not drilled or compl)
17 SUPER FEE WCA 001H	COG OPERATING LLC	3002544029	25	24.0S	34E	433	S		1930	W			32.18241	-103.425809	New (Not drilled or compl)
18 SUPER FEE WCA 002H	COG OPERATING LLC	3002544030	25	24.0S	34E	434	S		2030	W			32.182411	-103.425484	New (Not drilled or compl)
19 SUPER FEE WCY 001H	COG OPERATING LLC	3002544031	25	24.0S	34E	434	S		1980	W			32.182412	-103.425647	New (Not drilled or compl)
20 BASEBALL CAP FEDERAL COM 024H	COG OPERATING LLC	3002544152	25	24.0S	34E	360	S		1980	E			32.182184	-103.421456	New (Not drilled or compl)
21 BASEBALL CAP FEDERAL COM 026H	COG OPERATING LLC	3002544153	25	24.0S	34E	320	S		1980	W			32.182098	-103.425648	
22 DEE BOOT FEE 24 34 26 WXY 003H	MARATHON OIL PERMIAN LLC	3002544162	26	24.0S	34E	271	N		1205	E			32.194995	103.435946	New (Not drilled or compl)
23 DEE BOOT FEE 24 34 26 WXY 019H	MARATHON OIL PERMIAN LLC	3002544163	26	24.0S	34E	271	N		1115	E			32.194994	-103.435654	New (Not drilled or compl)
24 DEE BOOT FEE 24 34 26 TB 007H	MARATHON OIL PERMIAN LLC	3002544165	26	24.0S	34E	271	N		1145	E			32.194994	-103.435752	New (Not drilled or compl)
25 DEE BOOT FEE 24 34 26 WA 006H	MARATHON OIL PERMIAN LLC	3002544212	26	24.0S	34E	271	N		1175	E			32.194994	-103.435849	New (Not drilled or compl)

*Surface Use Plan  
COG Operating LLC  
Brot Helm Federal Com 702H  
SHL: 250' FNL & 1195' FEL    ULA  
Section 35, T24S, R34E  
BHL: 50' FSL & 1000' FEL    UL P  
Section 2, T25S, R34E  
Lea County, New Mexico*

---

# Surface Use & Operating Plan

## Brot Helm Federal Com #702H

- Surface Owner: Rupert F. Madera  
P.O. Box 2795  
Ruidoso, NM 88355  
(575) 390-2861
- New Road: 2224.1'
- Flow Line: 50.4'
- Tank Battery Facilities: 750' FNL & 1225' FEL, Sec. 35-T24S-R34E
- Well Pad: Multiple. Brot Helm Federal Com 602H, 702H, and 703H share a well pad.

### Well Site Information

- V Door: East
- Topsoil: West
- Interim Reclamation: North and West

### Attachments

- C102
- Closed Loop System
- Layout
- Brine H2O
- Fresh H2O
- Existing Roads

*Surface Use Plan  
COG Operating LLC  
Brot Helm Federal Com 702H  
SHL: 250' FNL & 1195' FEL    UL A  
Section 35, T24S, R34E  
BHL: 50' FSL & 1000' FEL    UL P  
Section 2, T25S, R34E  
Lea County, New Mexico*

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

### **Notes**

**Onsite:** On-site was done by Gerald Herrera (COG); Jeffery Robertson (BLM); on December 13<sup>th</sup>, 2018.

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## **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 2224.1' of new road will be required for this location. When a 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 obtained from Rupert F. Madera caliche pit located 750' FSL & 1560' FEL Section 26, T24S, R34E.

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**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 will be constructed 750' FNL & 1225' FEL of Section 35, T24S, R34E. Production from 7 producing Brot Helm Federal wells will be routed to the CTB.

**Planned Pipeline Installation:**

- 7, buried 4-inch FP 601HT production flowlines from each wellhead to CTB
- 1, buried 6-inch poly line for gas-lift supply from CTB to wellhead
- 1, buried 10-inch poly line for produced water transfer from CTB to an existing pipeline connection in Section 26.

Above pipeline routes shown on attached plats.

- 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, caliche will be obtained from Madera caliche pit located 750' FSL & 1560' FEL, Section 26, T24S, R34E. 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 the Viking Helmet Frac Pond located in Section

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30. T24S, R35E. Brine water will be obtained from the Malaga II Brine station in Section 12. T23S. R28E., 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.
- H. 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.

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- 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. 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.
- E. 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).
- F. 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.

**7. Ancillary Facilities:**

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

**8. 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.

**9. 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,

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and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

#### **10. Sedimentation and Erosion Control**

Due to the relatively flat surface No waddles will be needed to reduce sediment impacts to fragile/sensitive soils.

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

#### **11. Surface Ownership:**

- A. The surface is privately owned by Rupert F. Madera, P.O. Box 2795, Ruidoso NM 88355, (575) 390-2861. 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.

#### **12. Other Information:**

- A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of NM, LLC., 2030 North Canal, Carlsbad, New Mexico, 88220, phone number 575-885-1352 and the results will be forwarded to your office in the near future. **Otherwise, COG will be participating in the Permian Basin MOA Program.**

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**13. 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)

**PECOS DISTRICT  
DRILLING OPERATIONS  
CONDITIONS OF APPROVAL**

<b>OPERATOR'S NAME:</b>	<b>COG Operating LLC</b>
<b>LEASE NO.:</b>	<b>NMNM123535</b>
<b>WELL NAME &amp; NO.:</b>	<b>Brot Helm Federal Com 702H</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>250' FNL &amp; 1195' FEL</b>
<b>BOTTOM HOLE FOOTAGE:</b>	<b>50' FSL &amp; 1000' FEL</b>
<b>LOCATION:</b>	<b>Section 35, T 24S, R 34E, NMPM</b>
<b>COUNTY:</b>	<b>Lea County, New Mexico</b>

H2S	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Variance	<input type="radio"/> None	<input type="radio"/> Flex Hose	<input checked="" type="radio"/> Other
Wellhead	<input checked="" type="radio"/> Conventional	<input type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input checked="" type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit

**A. HYDROGEN SULFIDE**

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

**B. CASING**

1. The 13-3/8" surface casing shall be set at approximately 1105' (a minimum of 25' into the Rustler Anhydrite and above the salt) and cemented to surface.
  - a. If cement does not circulate to 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 6 hours after pumping cement, ideally between 8-10 hours after completing the cement job.
  - b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
  - c. If cement falls back, remedial cementing will be done prior to drilling out that string.
  - d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The 9-5/8" intermediate casing shall be cemented to surface. This casing must always be kept at least 1/3 full in order to meet BLM collapse requirements.
  - a. If cement does not circulate to surface, see B.1.a, c & d.
  - b. Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.
    - i. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with the second stage.
    - ii. Second stage via DV tool: Cement to surface. If cement does not circulate, contact the appropriate BLM office.
3. The 5-1/2" production casing shall be cemented with at least 200' tie-back into the previous casing. 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 5000 (5M) psi.
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be 10,000 (10M) psi. Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi).

#### **D. SPECIAL REQUIREMENTS**

1. 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.
2. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

**DR 5/13/2019**

## GENERAL REQUIREMENTS

1. 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
2. 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.
3. 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.
4. The record of the drilling rate along with the GR/N well log (one log per well pad is acceptable) 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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
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: The flex line must meet the requirements of API 16C. 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. 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.
  - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
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, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
- 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. 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.
- f. 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. This test shall be performed prior to the test at full stack pressure.
- g. 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**

- 1. 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**

- 2. 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.
- 3. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	COG OPERATING LLC.
LEASE NO.:	NMNM123535
WELL NAME & NO.:	702H- BROT HELMS FEDERAL COM
SURFACE HOLE FOOTAGE:	250'N & 1195'E
BOTTOM HOLE FOOTAGE:	50'S & 1000'E
LOCATION:	Section. 35.,T24S.,R.34E., NMP
COUNTY:	LEA County, New Mexico

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

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- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
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- Construction**
  - Notification
  - Topsoil
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- Road Section Diagram**
- Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
- Interim Reclamation**
- Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

## **II. PERMIT EXPIRATION**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **IV. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## V. SPECIAL REQUIREMENT(S)

### **Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken:**

Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

**Ground-level Abandoned Well Marker to avoid raptor perching:** Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

### **Timing Limitation Exceptions:**

The Carlsbad Field Office will publish an annual map of where the LPC timing and noise stipulations and conditions of approval (Limitations) will apply for the identified year (between March 1 and June 15) based on the latest survey information. The LPC Timing Area map will identify areas which are Habitat Areas (HA), Isolated Population Area (IPA), and Primary Population Area (PPA). The LPC Timing Area map will also have an area in red crosshatch. The red crosshatch area is the only area where an operator is required to submit a request for exception to the LPC Limitations. If an operator is operating outside the red crosshatch area, the LPC Limitations do not apply for that year and an exception to LPC Limitations is not required.

### **Hydrology**

The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the

fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

When crossing ephemeral drainages the pipeline will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

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

A leak detection plan will be submitted to the BLM Carlsbad Field Office for approval prior to pipeline installation. The method could incorporate gauges to detect pressure drops, siting valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

## **VI. CONSTRUCTION**

### **A. NOTIFICATION**

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

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

### **B. TOPSOIL**

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

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

### **C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

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

### **D. FEDERAL MINERAL MATERIALS PIT**

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

### **E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

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

### **F. EXCLOSURE FENCING (CELLARS & PITS)**

**Exclosure Fencing**

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

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

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

**Surfacing**

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

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

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

**Crowning**

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

**Ditching**

Ditching shall be required on both sides of the road.

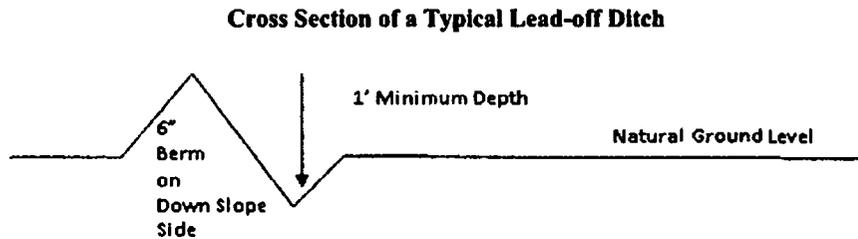
**Turnouts**

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

**Drainage**

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

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



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

#### Formula for Spacing Interval of Lead-off Ditches

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

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

#### **Cattle guards**

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

#### **Fence Requirement**

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

#### **Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

**Construction Steps**

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

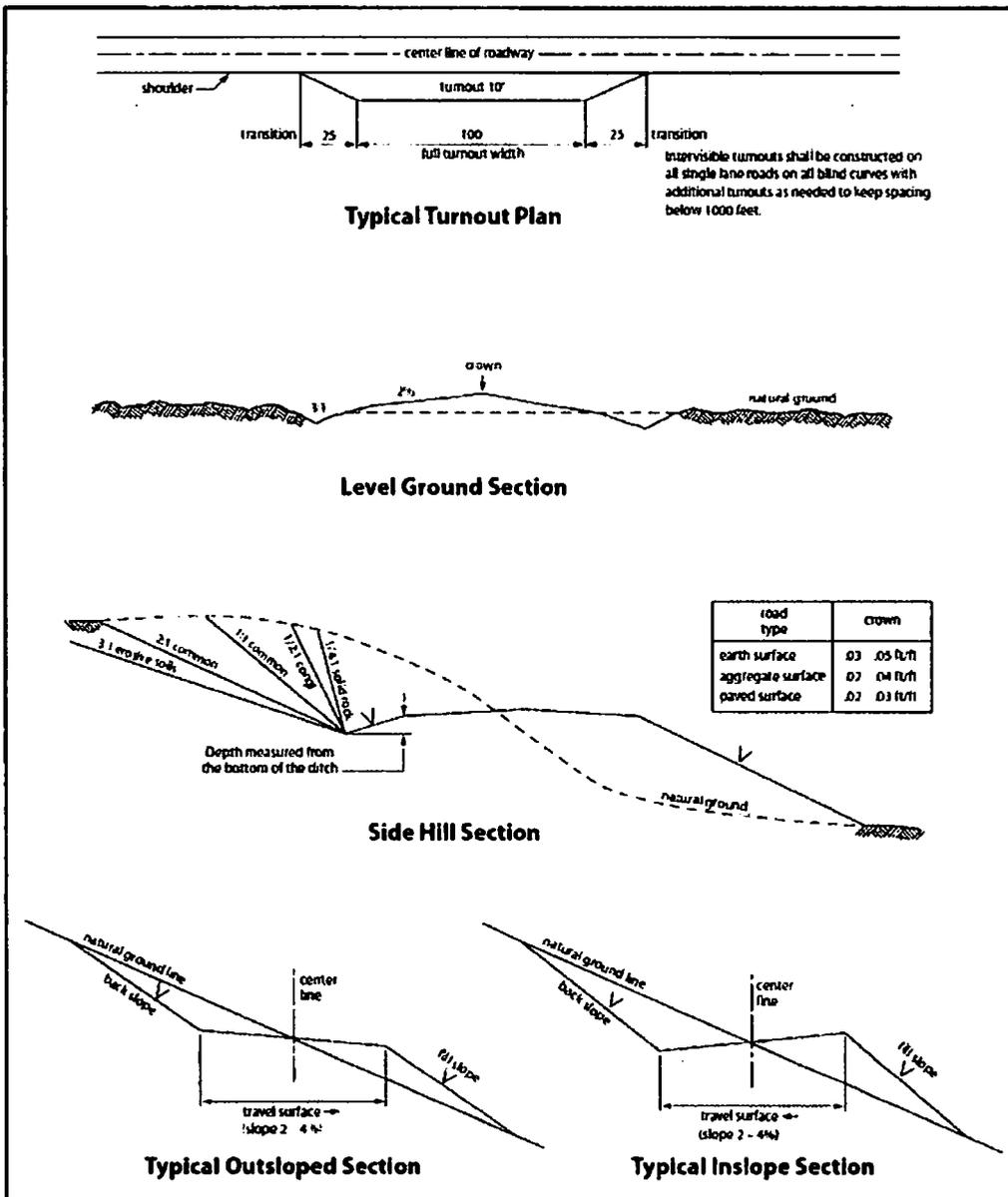


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. PRODUCTION (POST DRILLING)

### A. WELL STRUCTURES & FACILITIES

#### Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

#### Exclosure Netting (Open-top Tanks)

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### Chemical and Fuel Secondary Containment and Exclosure Screening

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

#### Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

**Painting Requirement**

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, Shale Green from the BLM Standard Environmental Color Chart (CC-001: June 2008).

**B. PIPELINES**

**BURIED PIPELINE STIPULATIONS**

A copy of the application (Grant, APD, or Sundry Notice) and attachments, including conditions of approval, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C.6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of

the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil or other pollutant, wherever found, shall be the responsibility of holder, regardless of fault. Upon failure of holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve holder of any responsibility as provided herein.

5. All construction and maintenance activity will be confined to the authorized right-of-way.

6. The pipeline will be buried with a minimum cover of 36 inches between the top of the pipe and ground level.

7. The maximum allowable disturbance for construction in this right-of-way will be 30 feet:

- Blading of vegetation within the right-of-way will be allowed: maximum width of blading operations will not exceed 20 feet. The trench is included in this area. (*Blading is defined as the complete removal of brush and ground vegetation.*)
- Clearing of brush species within the right-of-way will be allowed: maximum width of clearing operations will not exceed 30 feet. The trench and bladed area are included in this area. (*Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface.*)
- The remaining area of the right-of-way (if any) shall only be disturbed by compressing the vegetation. (*Compressing can be caused by vehicle tires, placement of equipment, etc.*)

8. The holder shall stockpile an adequate amount of topsoil where blading is allowed. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles from trench construction. The topsoil will be evenly distributed over the bladed area for the preparation of seeding.

9. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

10. Vegetation, soil, and rocks left as a result of construction or maintenance activity will be randomly scattered on this right-of-way and will not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. The entire right-of-way shall be recontoured to match the surrounding landscape. The backfilled soil shall be compacted and a 6 inch berm will be left over the ditch line to allow for settling back to grade.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. The holder will reseed all disturbed areas. Seeding will be done according to the attached seeding requirements, using the following seed mix.

- |                                                        |                                                  |
|--------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> seed mixture 1                | <input type="checkbox"/> seed mixture 3          |
| <input type="checkbox"/> seed mixture 2                | <input type="checkbox"/> seed mixture 4          |
| <input checked="" type="checkbox"/> seed mixture 2/LPC | <input type="checkbox"/> Aplomado Falcon Mixture |

13. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be color which simulates "Standard Environmental Colors" - Shale Green, Munsell Soil Color No. 5Y 4/2.

14. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. All signs and information thereon will be posted in a permanent, conspicuous manner, and will be maintained in a legible condition for the life of the pipeline.

15. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder before maintenance begins. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway. As determined necessary during the life of the pipeline, the Authorized Officer may ask the holder to construct temporary deterrence structures.

16. Any cultural and/or paleontological resources (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

17. The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes associated roads, pipeline corridor and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

18. Escape Ramps - The operator will construct and maintain pipeline/utility trenches [that are not otherwise fenced, screened, or netted] to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in the trenches according to the following criteria:

- a. Any trench left open for eight (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, the contractor/operator shall inspect the trench for wildlife, remove all trapped wildlife, and release them at least 100 yards from the trench.
- b. For trenches left open for eight (8) hours or more, earthen escape ramps (built at no more than a 30 degree slope and spaced no more than 500 feet apart) shall be placed in the trench.

19. Special Stipulations:

**Wildlife Mitigation Measures**

**Timing Limitation Stipulation/Condition of Approval for Lesser Prairie-Chicken:** Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, geophysical exploration other than 3-D operations, and pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise.

**Timing Limitation Exceptions:**

The Carlsbad Field Office will publish an annual map of where the LPC timing and noise stipulations and conditions of approval (Limitations) will apply for the identified year (between March 1 and June 15) based on the latest survey information. The LPC Timing Area map will identify areas which are Habitat Areas (HA), Isolated Population Area (IPA), and Primary Population Area (PPA). The LPC Timing Area map will also have an area in red crosshatch. The red crosshatch area is the only area where an operator is required to submit a request for exception to the LPC Limitations. If an operator is operating outside the red crosshatch area, the LPC Limitations do not apply for that year and an exception to LPC Limitations is not required.

## **VIII. INTERIM RECLAMATION**

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

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

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

loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

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

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

## **IX. FINAL ABANDONMENT & RECLAMATION**

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

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

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

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

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

**Seed Mixture for LPC Sand/Shinnery Sites**

Holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed shall be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed shall be either certified or registered seed. The seed container shall be tagged in accordance with State law(s) and available for inspection by the Authorized Officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). Holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. Seeding shall be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth may not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

<u>Species</u>	<u>lb/acre</u>
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

\*Pounds of pure live seed:

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