Form 3160-3
(March 2012)

OCD Artesia

ATS-16-586

NM OIL CONSERVATION
ARTESIA DISTRICT
JUN 06 2016
RECEIVED

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: SHL: Surface BHL: NMNM126965

6. If Indian, Allotee or Tribe Name:

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

1a. Type of Work: [x] DRILL [ ] REENTER

1b. Type of Well: [x] Oil Well [ ] Gas Well [ ] Other [x] Single Zone [ ] Multiple Zone

8. Lease Name and Well No.: Graham Nash Federal Com #13H

2. Name of Operator: COG Operating LLC.

9. API Well No.: 30 015 43811

3a. Address: 2208 West Main Street, Artesia, NM 88210

3b. Phone No. (include area code): 575-748-6940

UNORTHODOX LOCATION

10. Field and Pool, or Exploratory: Hay Hollow; Bone Spring

4. Location of Well (Report location clearly and in accordance with any State requirements.*)
At surface: 200' FSL & 1550' FWL Unit Letter N (SESW) Section 21-T26S-R28E
At proposed prod. Zone: 330' FSL & 2100' FWL Lot 2 (SENW) Section 33-T26S-R28E

11. Sec., T.R.M. or Blk and Survey or Area: Section 21 - T26S - R28E

14. Distance in miles and direction from nearest town or post office*: Approximately 19 miles from Malaga

12. County or Parish: Eddy County

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any): 200'

16. No. of acres in lease: NMNM126965: 23.77

17. Spacing Unit dedicated to this well: 223.77

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.: SHL: 881' BHL: None

19. Proposed Depth: TVD: 9,100' MD: 16,336'

20. BLM/BIA Bond No. on file: NMB000740 & NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 2988.8' GL

22. Approximate date work will start*: 6/1/2016

23. Estimated duration: 30 days

Closed Loop System

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

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

25. Signature: Mayte Reyes | Name (Printed/Typed): Mayte Reyes | Date: 2-3-2016

Title: Regulatory Analyst

Approved by (Signature): James A. Amos | Name (Printed/Typed): | Date: JUN 1 - 2016

Title: FIELD MANAGER | Office: CARLSBAD FIELD OFFICE

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations theron.

APPROVAL FOR TWO YEARS

Conditions of approval, if any, are attached.

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

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 3rd day of February, 2016.

Signed: Melanie J Wilson

Printed Name: Melanie J. Wilson
Position: Regulatory Coordinator
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6940
Field Representative (if not above signatory): Rand French
E-mail: mwilson@concho.com

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

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

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

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

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

NM OIL CONSERVATION
ARTESIA DISTRICT
JUN 06 2016

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

☐ AMENDED REPORT

RECEIVED

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015- 43911	30215	Hay Hollow; Bone Spring

Property Code	Property Name	Well Number
316279	GRAHAM NASH FEDERAL COM	13H

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	2988.8'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	21	26-S	28-E		200	SOUTH	1550	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
K F	33	26-S	28-E	2	330	SOUTH	2100	WEST	EDDY

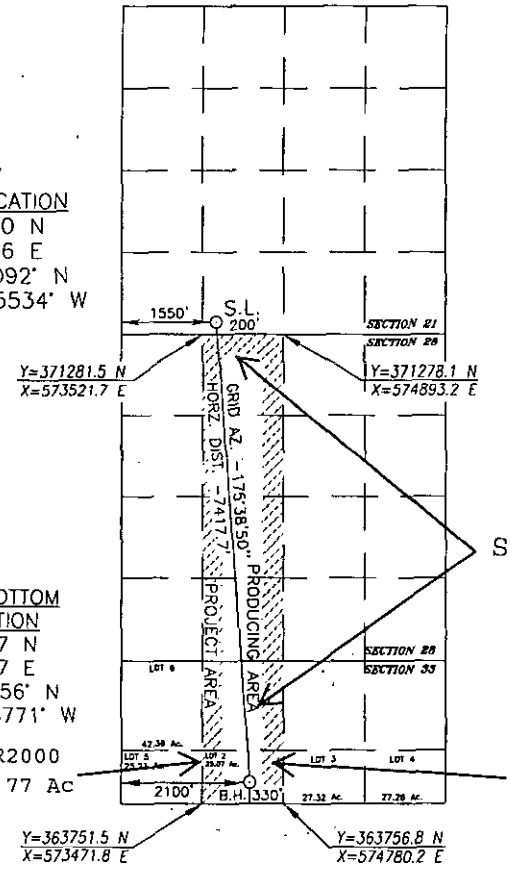
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
223.77			

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

NAD 27
SURFACE LOCATION
Y=371481.0 N
X=573699.6 E
LAT.=32.021092° N
LONG.=104.095534° W

NAD 27
PROPOSED BOTTOM HOLE LOCATION
Y=364084.7 N
X=574262.7 E
LAT.=32.000756° N
LONG.=104.093771° W

As per LR2000
Lot 2 23.77 Ac



OPERATOR CERTIFICATION

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

Melanie J Wilson 2/3/16
Signature Date

Melanie J Wilson
Printed Name

mwilson@concho.com
E-mail Address

SURVEYOR CERTIFICATION

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

JANUARY 22, 2016
Date of Survey

Signature & Seal of Professional Surveyor

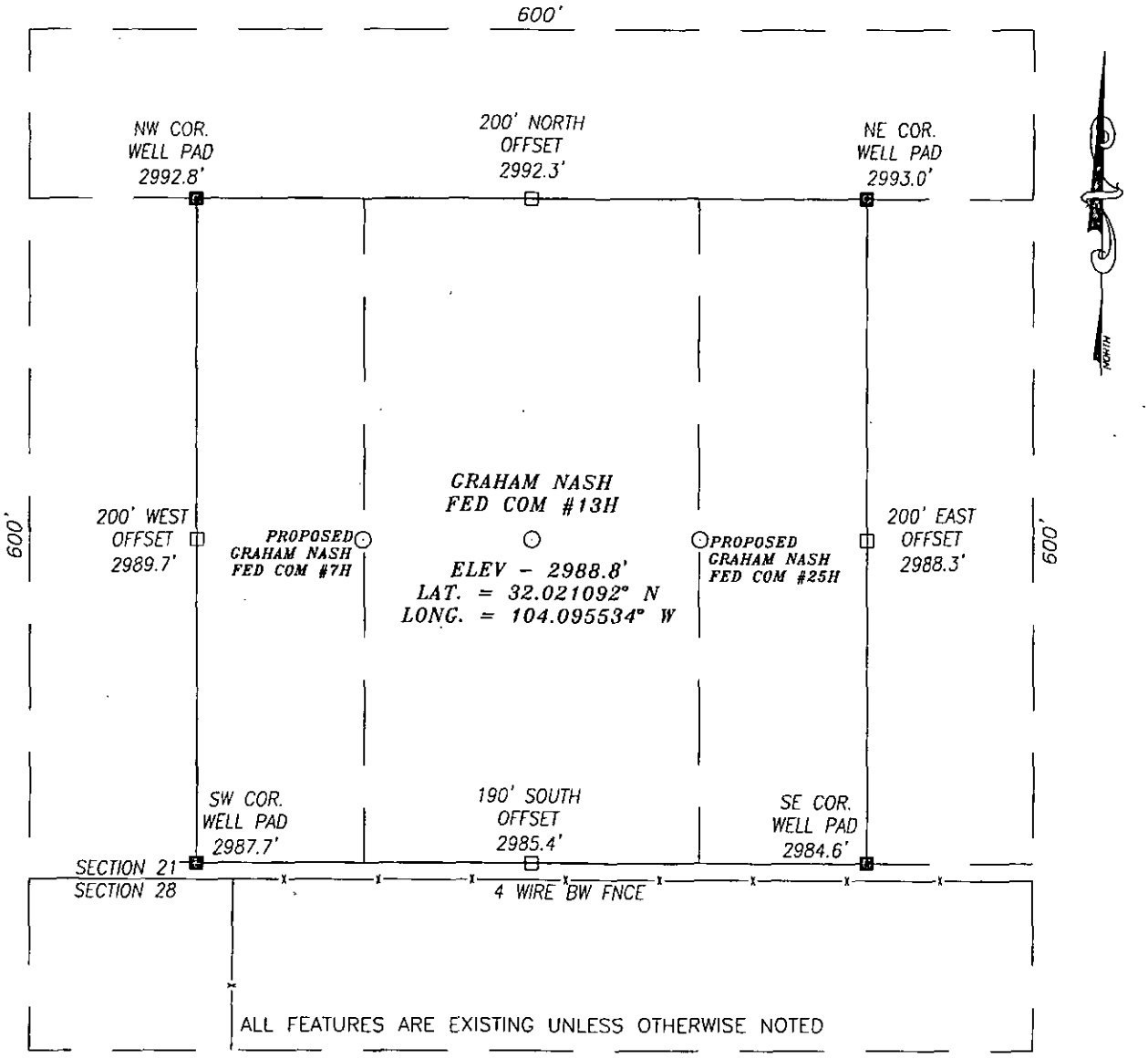
CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 1/29/16
Certificate No. CHAD HARCROW 17777

W.O. # 16-29 DRAWN BY: AF

SECTION 21, TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



NOTE: TOP SOIL LOCATED WEST OF #7H WELL PAD 600'

DIRECTIONS TO LOCATION

FROM THE INTERSECTON OF WHITE CITY RD (CR-724) AND HIGHWAY 285 GO WEST ON WHITE CITY RD. APPROX. 3.0 MILES; THEN TURN LEFT (SOUTH) AND GO APPROX. 3.1 MILES AND TURN LEFT (EAST) THEN GO APPROX. 1.1 MILES TO THE EXISTING GRAHAM NASH ST COM #8H PAD; THEN FROM THE NORTHEAST CORNER OF THE #8H PAD PROPOSED WELL IS APPROX. 685 FEET EASTNORTHEAST.

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

100 0 100 200 Feet

Scale: 1"=100'

CERTIFICATION

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

CHAD L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 2/3/16

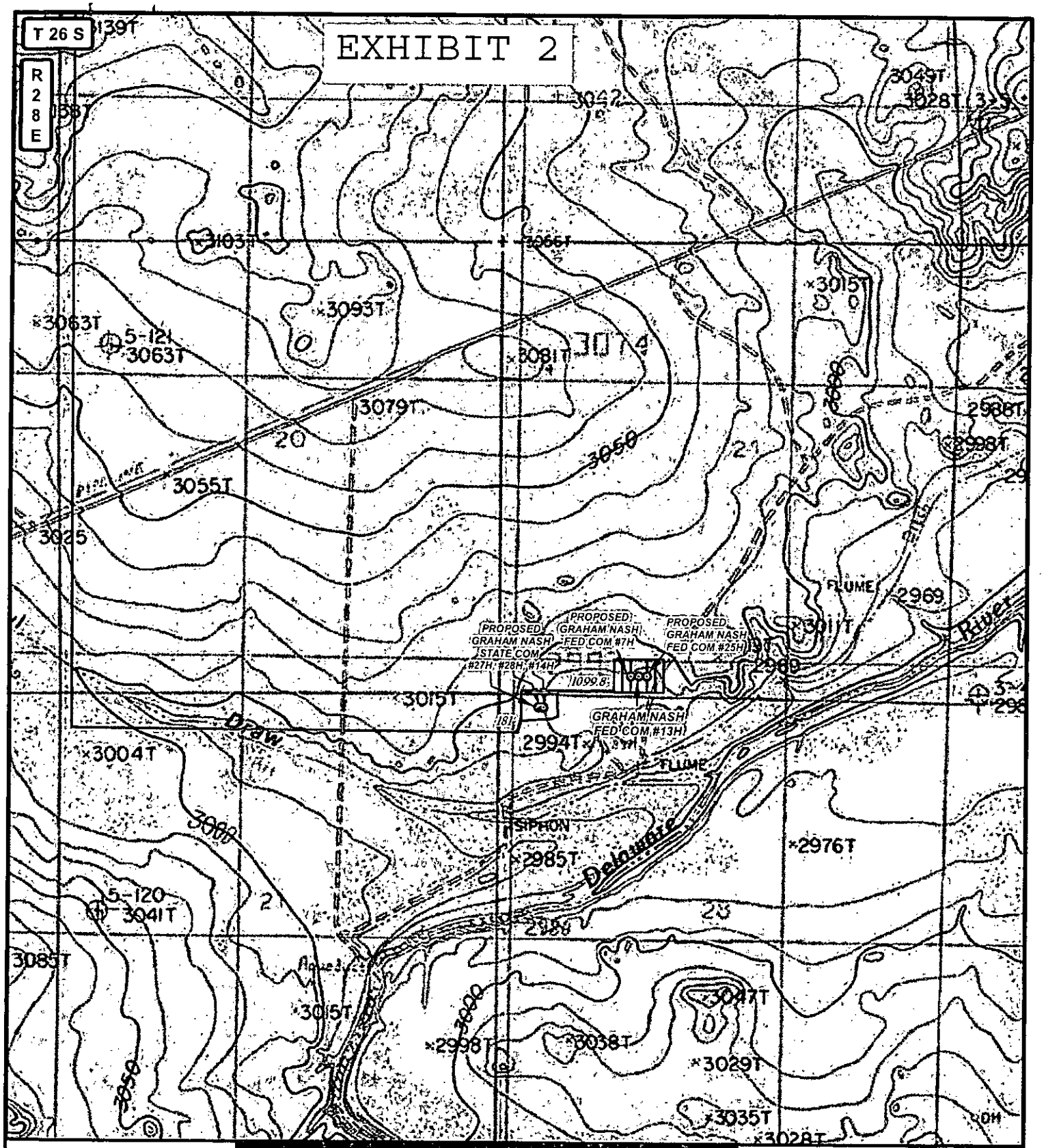
CHAD HARCROW N.M.P.S. NO. 17777 DATE

COG OPERATING, LLC

GRAHAM NASH FEDERAL COM #13H WELL
LOCATED 200 FEET FROM THE SOUTH LINE
AND 1550 FEET FROM THE WEST LINE OF SECTION 21,
TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: JAN 22, 2016		PAGE: 1 OF 1
DRAFTING DATE: JAN 26, 2016		
APPROVED BY: CH	DRAWN BY: AF	FILE: 16-29

EXHIBIT 2



LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO	COUNTY: EDDY		200' FSL & 1550' FWL
W.O. #16-29	LEASE: GRAHAM NASH FED COM	SURVEY: N.M.P.M	

0 2,500 FEET

0 0.1 0.2 0.4 Miles 1 IN = 1,500 FT

LOCATION MAP | TOPO ROAD | 01/27/2016 | A.F.

N

CONCHO

COG OPERATING, LLC

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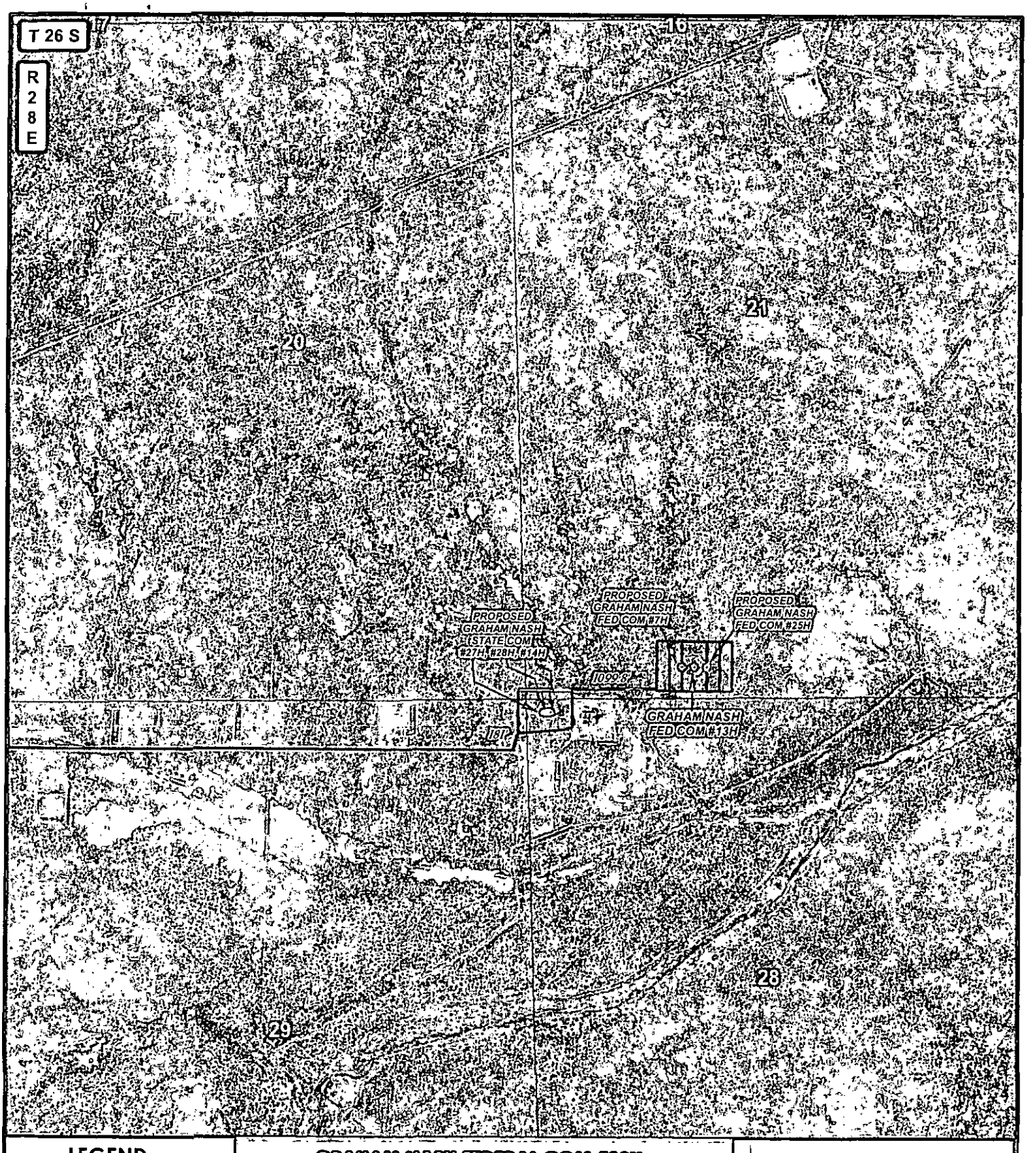

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO		COUNTY: EDDY	200' FSL & 1550' FWL
W.O. #16-29	LEASE: GRAHAM NASH FED COM		SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP | IMAGERY ROAD | 01/27/2016 | A.F.

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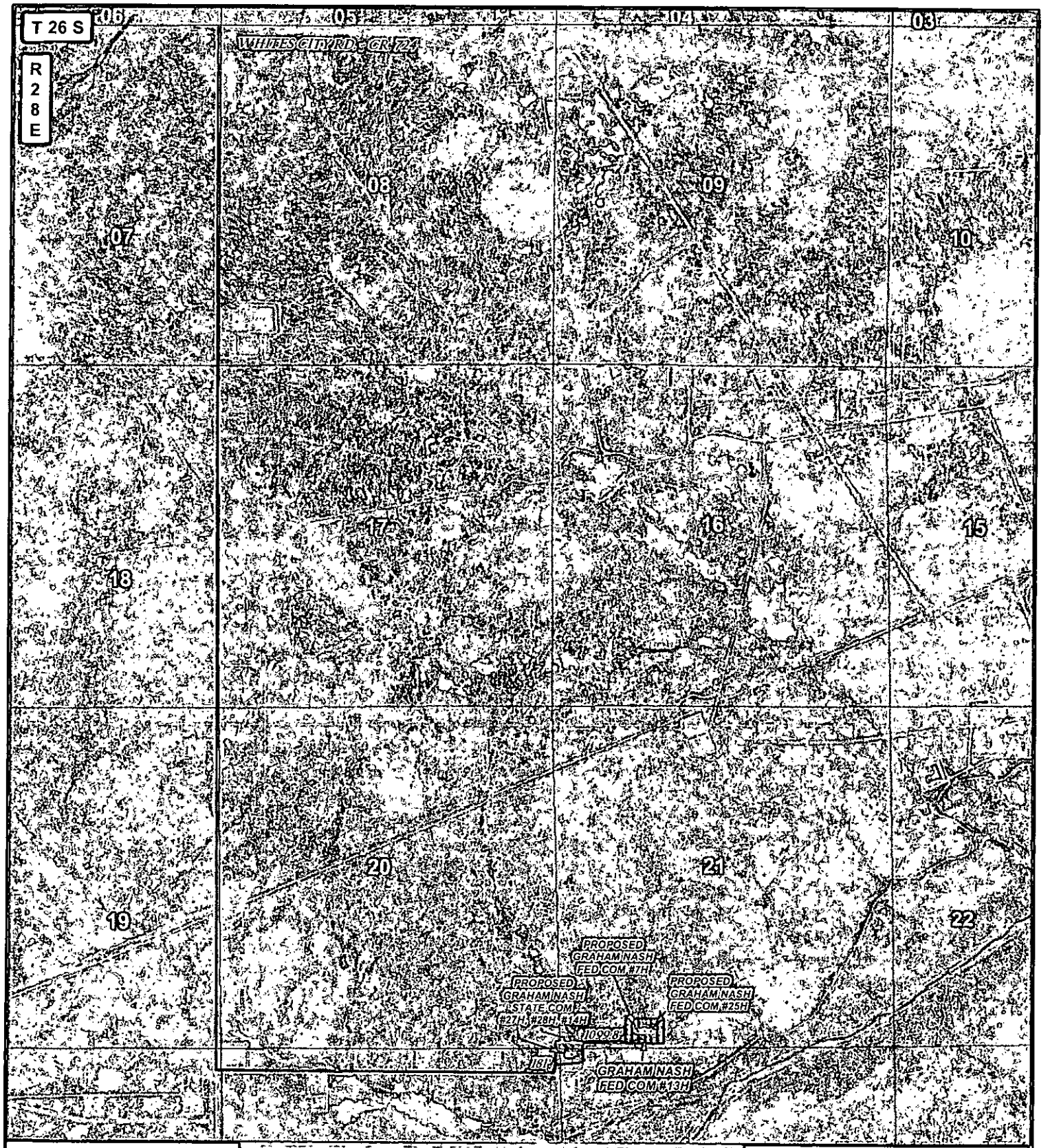

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO	COUNTY: EDDY	200' FSL & 1550' FWL	
W.O. #16-29	LEASE: GRAHAM NASH FED COM	SURVEY: N.M.P.M	

0 2,500 5,000 FEET

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

LOCATION MAP IMAGERY 01/27/2016 A.F.

N

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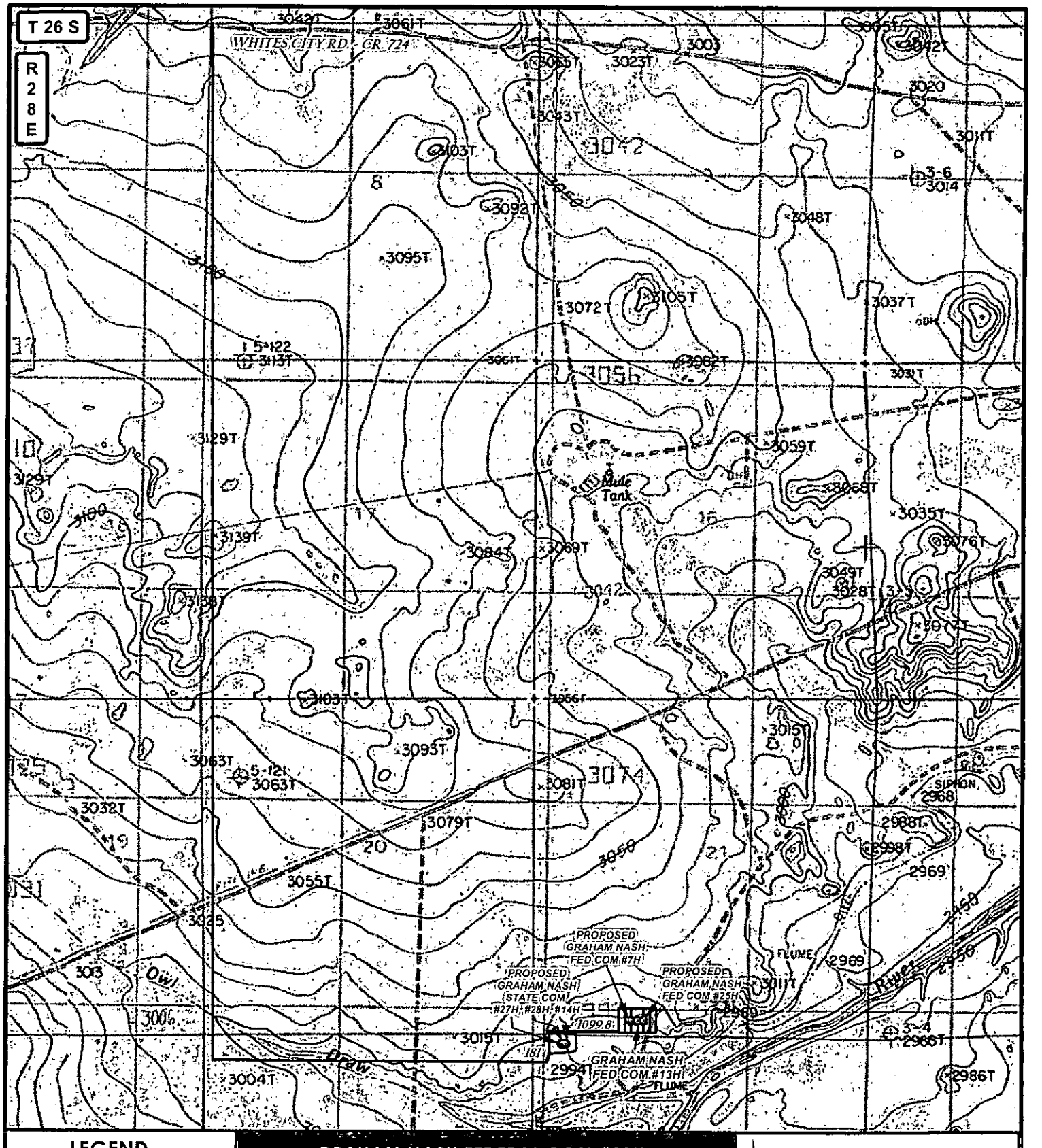

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO		COUNTY: EDDY	200' FSL & 1550' FWL
W.O. #16-29	LEASE: GRAHAM NASH FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

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

LOCATION MAP | TOPO | 01/27/2016 | A.F.

N

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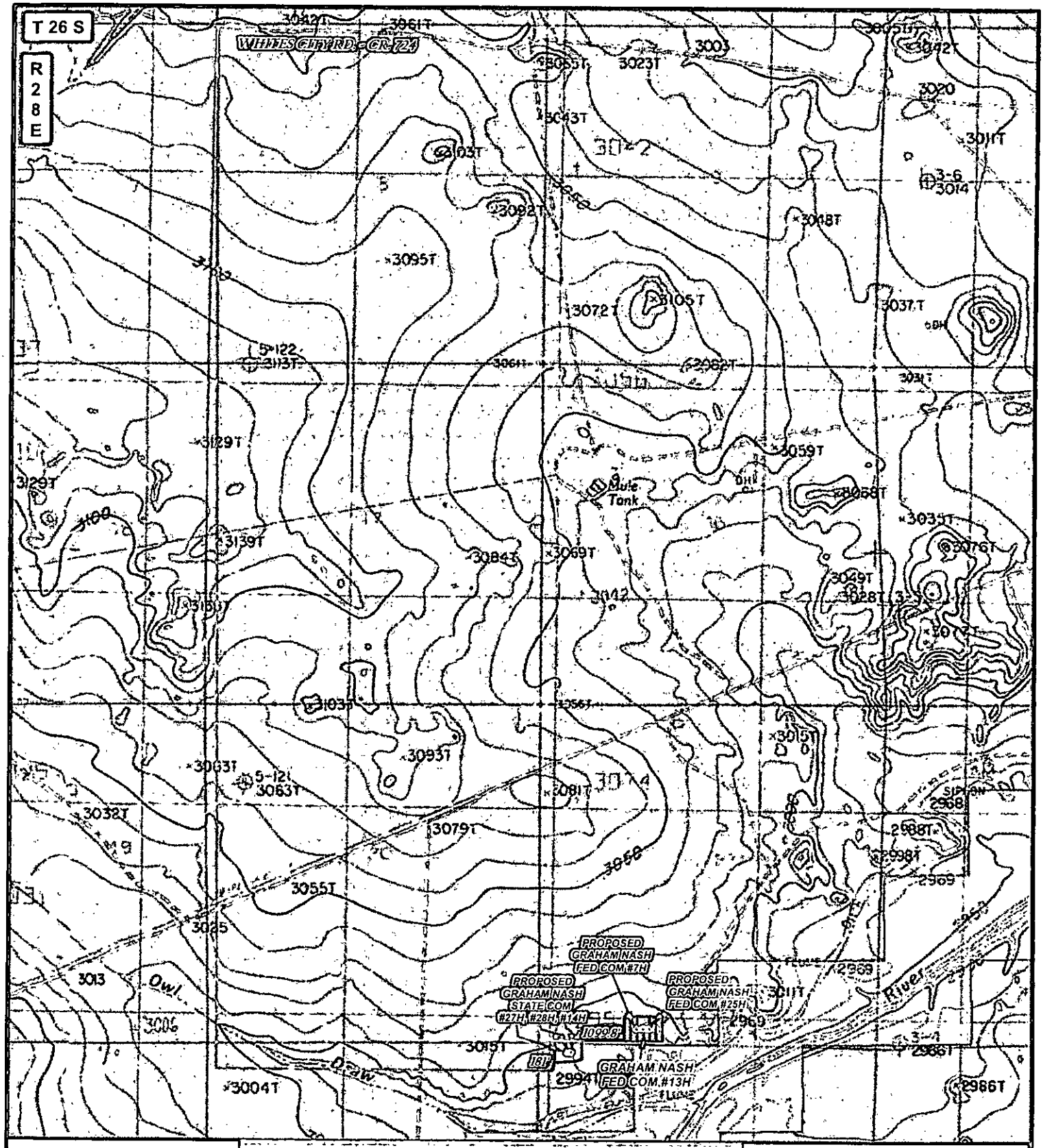

LEGEND

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

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO	COUNTY: EDDY		200' FSL & 1550' FWL
W.O. #16-29	LEASE: GRAHAM NASH FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

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

LOCATION MAP | LAND STATUS | 01/27/2016 | A.F.

N

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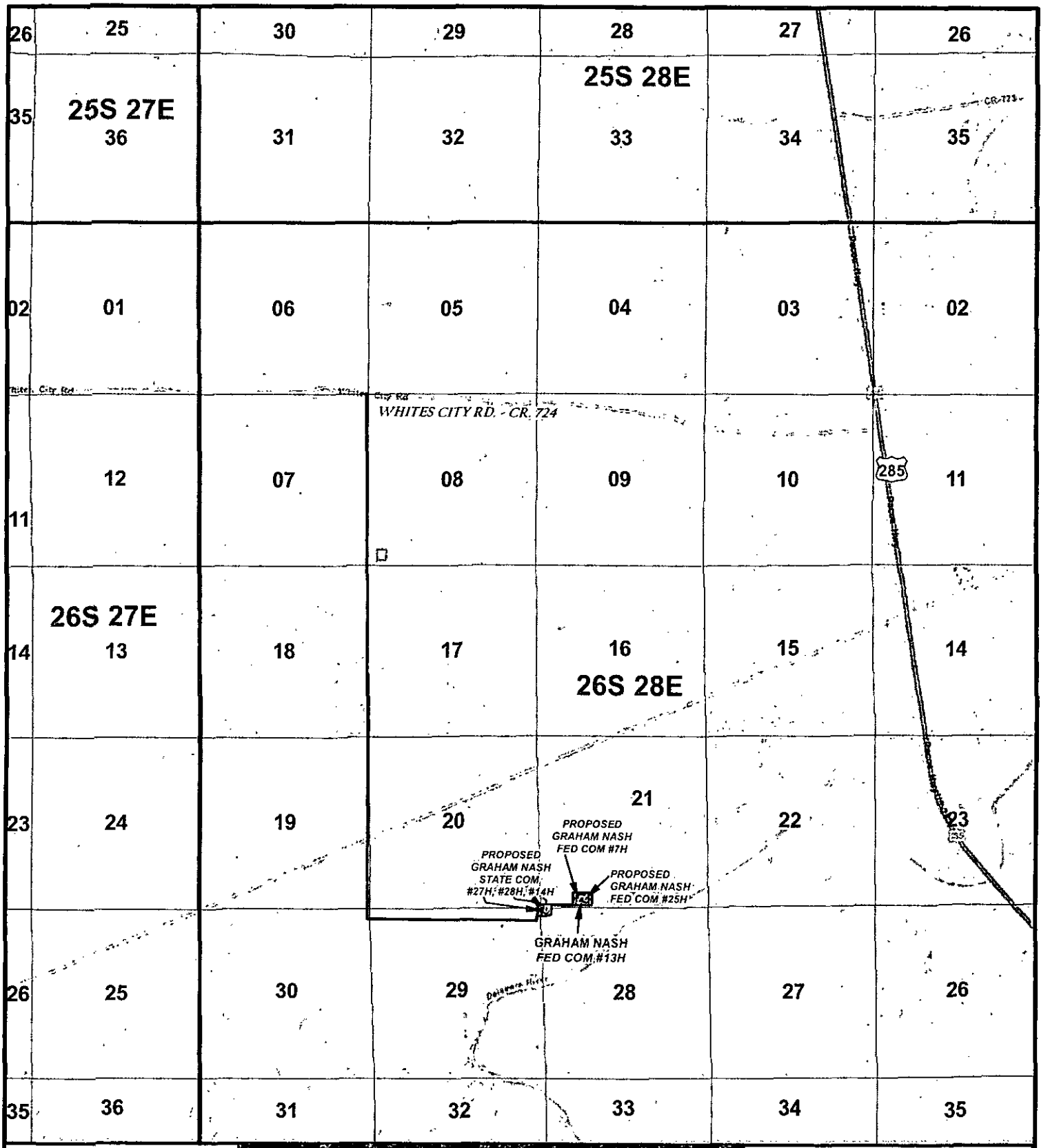

LEGEND

- WELL
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

GRAHAM NASH FEDERAL COM #13H

SEC: 21 TWP:26 S. RGE:28 E. ELEVATION:2988.8'

STATE: NEW MEXICO COUNTY: EDDY 200' FSL & 1550' FWL

W.O. #16-29 LEASE: GRAHAM NASH FED COM SURVEY: N.M.P.M

0 2,500 5,000 7,500 10,000 FEET

0 0.275 0.55 1.1 Miles 1 IN = 4,000 FT

VICINITY MAP 01/27/2016 A.F.

CONCHO

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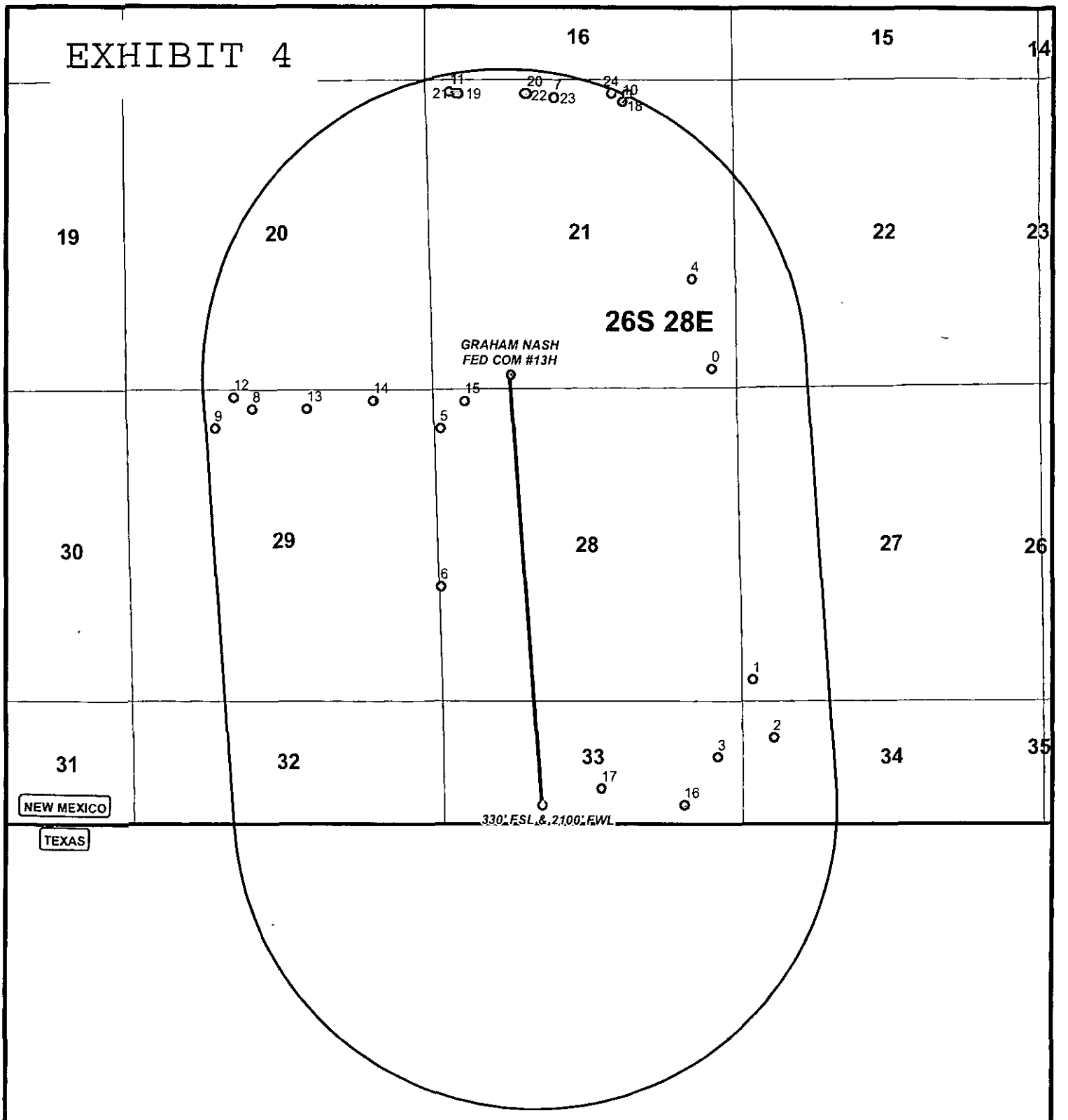
EXHIBIT 4



DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH AUGUST 9, 2015.

LEGEND

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

GRAHAM NASH FEDERAL COM #13H

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2988.8'
STATE: NEW MEXICO		COUNTY: EDDY	200' FSL & 1550' FWL
W.O. #16-29	LEASE: GRAHAM NASH FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.15 0.3 0.6 Miles

1 IN = 2,250 FT

1 MILE MAP | 01/27/2016 | A.F.

N

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GRAHAM NASH FEDERAL COM #13H

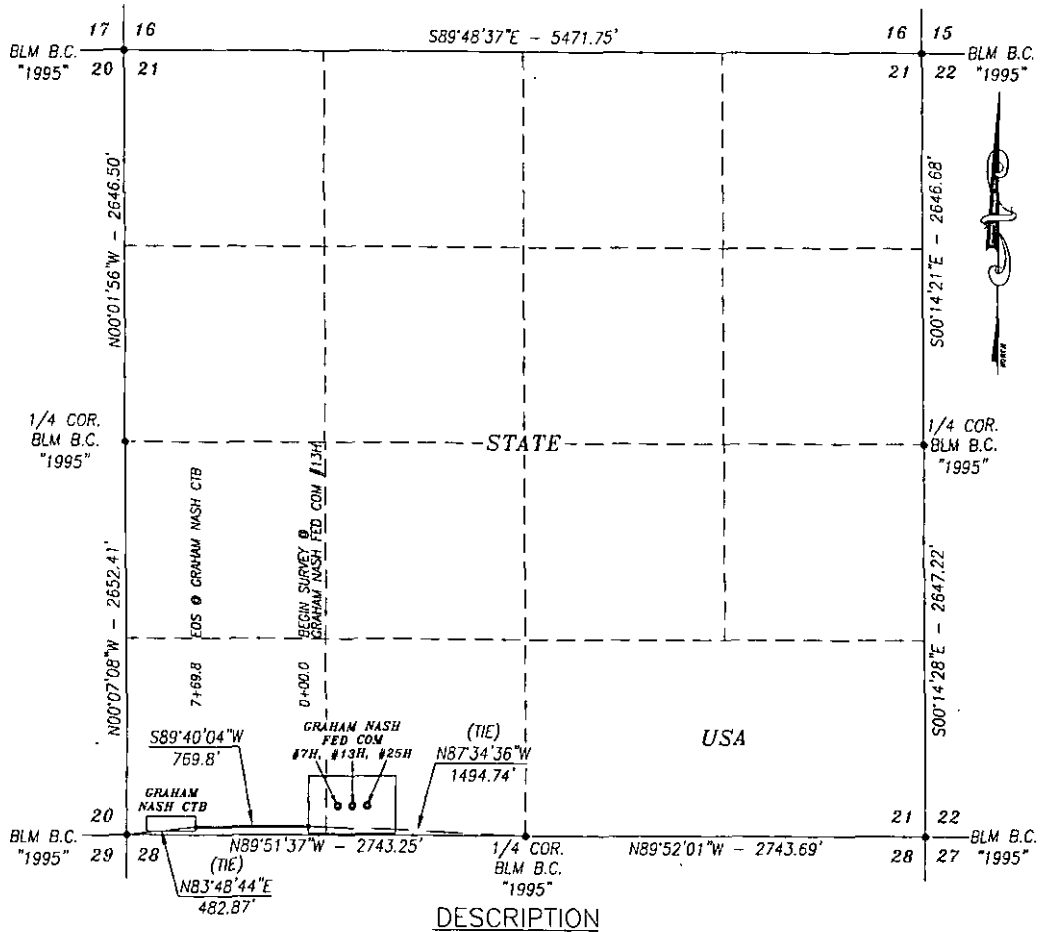
FID	Shape *	OPERATOR	WELL_NAME	LATITUDE	LONGITUD	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	Point	GLENN BENNETT	HUMBLE STATE 001	32.02152	-104.0847	3E+09	21	26.0S	28E	330	S	330	E	0	Plugged
1	Point	CHAPMAN FORD	SUN ST 27 001	32.00682	-104.0824	3E+09	27	26.0S	28E	330	S	330	W	0	Plugged
2	Point	CHAPMAN FORD	STATE 34 001	32.00412	-104.0812	3E+09	34	26.0S	28E	660	N	660	W	0	Plugged
3	Point	SLEDGE OIL & GAS INC	POGO ST 001	32.00318	-104.0844	3E+09	33	26.0S	28E	990	N	330	E	0	Plugged
4	Point	RAY H HASKINS	GETTY STATE 001	32.02578	-104.0858	3E+09	21	26.0S	28E	1880	S	660	E	0	Plugged
5	Point	COG OPERATING LLC	GRAHAM NASH STATE COM 001H	32.01871	-104.1	3E+09	28	26.0S	28E	660	N	330	W	6704	Active
6	Point	COG OPERATING LLC	GRAHAM NASH STATE COM 002E	32.01122	-104.1	3E+09	28	26.0S	28E	1980	S	330	W	0	Active
7	Point	CHESAPEAKE OPERATING, INC.	SKEEN 21 STATE 001H	32.0344	-104.0936	3E+09	21	26.0S	28E	250	N	2310	W	0	New (Not drilled or compl)
8	Point	COG OPERATING LLC	HONEY GRAHAM STATE COM 006H	32.01962	-104.1106	3E+09	29	26.0S	28E	330	N	2310	W	6627	New (Not drilled or compl)
9	Point	COG OPERATING LLC	HONEY GRAHAM STATE COM 007H	32.01871	-104.1127	3E+09	29	26.0S	28E	660	N	1650	W	6615	New (Not drilled or compl)
10	Point	MEWBOURNE OIL CO	SKEEN 21 STATE COM 002H	32.03418	-104.0897	3E+09	21	26.0S	28E	330	N	1980	E	6816	New (Not drilled or compl)
11	Point	MEWBOURNE OIL CO	SKEEN 21 DM STATE 001	32.03467	-104.0994	3E+09	21	26.0S	28E	150	N	500	W	7957	New (Not drilled or compl)
12	Point	COG OPERATING LLC	HONEY GRAHAM STATE COM 002H	32.02016	-104.1116	3E+09	29	26.0S	28E	130	N	1980	W	7789	New (Not drilled or compl)
13	Point	COG OPERATING LLC	HONEY GRAHAM STATE COM 004H	32.01962	-104.1075	3E+09	29	26.0S	28E	330	N	1980	E	7854	New (Not drilled or compl)
14	Point	COG OPERATING LLC	HONEY GRAHAM STATE COM 005H	32.01001	-104.1037	3E+09	19	26.0S	28E	190	N	820	E	7833	New (Not drilled or compl)
15	Point	COG OPERATING LLC	GRAHAM NASH STATE COM 008H	32.01998	-104.0986	3E+09	28	26.0S	28E	190	N	760	W	0	New (Not drilled or compl)
16	Point	COG OPERATING LLC	GRAHAM NASH STATE COM 005H	32.00091	-104.0862	3E+09	33	26.0S	28E	280	S	760	E	0	New (Not drilled or compl)
17	Point	COG OPERATING LLC	GRAHAM NASH STATE COM 006H	32.00168	-104.0909	3E+09	33	26.0S	28E	560	S	2200	E	0	New (Not drilled or compl)
18	Point	MEWBOURNE OIL CO	SKEEN 21 D3BO STATE COM 003H	32.03458	-104.0894	3E+09	21	26.0S	28E	185	N	1900	E	0	New (Not drilled or compl)
19	Point	MEWBOURNE OIL CO	SKEEN 21 D3DM STATE COM 003H	32.03457	-104.0989	3E+09	21	26.0S	28E	185	N	660	W	0	New (Not drilled or compl)
20	Point	MEWBOURNE OIL CO	SKEEN 21 B3CN STATE COM 001H	32.03458	-104.0951	3E+09	21	26.0S	28E	185	N	1850	W	0	New (Not drilled or compl)
21	Point	MEWBOURNE OIL CO	SKEEN 21 B3DM STATE COM 002H	32.03457	-104.0991	3E+09	21	26.0S	28E	185	N	610	W	0	New (Not drilled or compl)
22	Point	MEWBOURNE OIL CO	SKEEN 21 D3CN STATE COM 002H	32.03458	-104.0952	3E+09	21	26.0S	28E	185	N	1800	W	0	New (Not drilled or compl)
23	Point	MEWBOURNE OIL CO	SKEEN 21 B2CN STATE 001H	32.03435	-104.0936	3E+09	21	26.0S	28E	266	N	2310	W	0	New (Not drilled or compl)
24	Point	MEWBOURNE OIL CO	SKEEN 21 B2BO STATE COM 001H	32.03458	-104.0903	3E+09	21	26.0S	28E	185	N	2180	E	0	New (Not drilled or compl)

PIPELINE PLAT
COG OPERATING, LLC.

A 2-7/8" SURFACE POLY OIL, GAS, & WATER LINE FROM THE GRAHAM NASH FED COM #13H TO THE GRAHAM NASH CTB IN

SECTION 21, TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 21, TOWNSHIP 26 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT IN THE SW/4 SW/4 OF SAID SECTION, WHICH LIES N87°34'36"W 1494.74 FEET FROM THE SOUTH QUARTER CORNER; THEN S89°40'04"W 769.8 FEET; TO A POINT IN THE SW/4 SW/4OF SAID SECTION, WHICH LIES N83°48'44"E 482.87 FEET FROM THE SOUTHWEST CORNER.

SAID STRIP OF LAND BEING 769.8 FEET OR 46.65 RODS IN LENGTH, CONTAINING 0.530 ACRES MORE OR LESS AND BEING ENTIRELY LOCATED IN THE SW/4 SW/4 OF SAID SECTION.

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 GRID VALUES.

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

CHAD L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 1/27/16
CHAD HARCROW N.M.P.S. NO. 17777 DATE

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

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

COG OPERATING, LLC

SURVEY OF A PROPOSED PIPELINE LOCATED IN SECTION 21, TOWNSHIP 26 SOUTH, RANGE 28 EAST, EDDY COUNTY, NMPM, NEW MEXICO

SURVEY DATE: JANUARY 25, 2016		
DRAFTING DATE: JANUARY 27, 2016		PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: SP	FILE: 16-46

LEGEND

- WELL
- WELLPAD
- PIPELINE
- TANK BATTERY

GRAHAM NASH FED COM #13H PIPELINE

SECTION: 21 TOWNSHIP: 26 S. RANGE: 28 E.

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

W.O. # 16-46 LEASE: GRAHAM NASH FED COM

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

PIPELINE OVERVIEW IMAGERY 01/27/2016 S.P.

CONCHO

COG OPERATING, LLC

N

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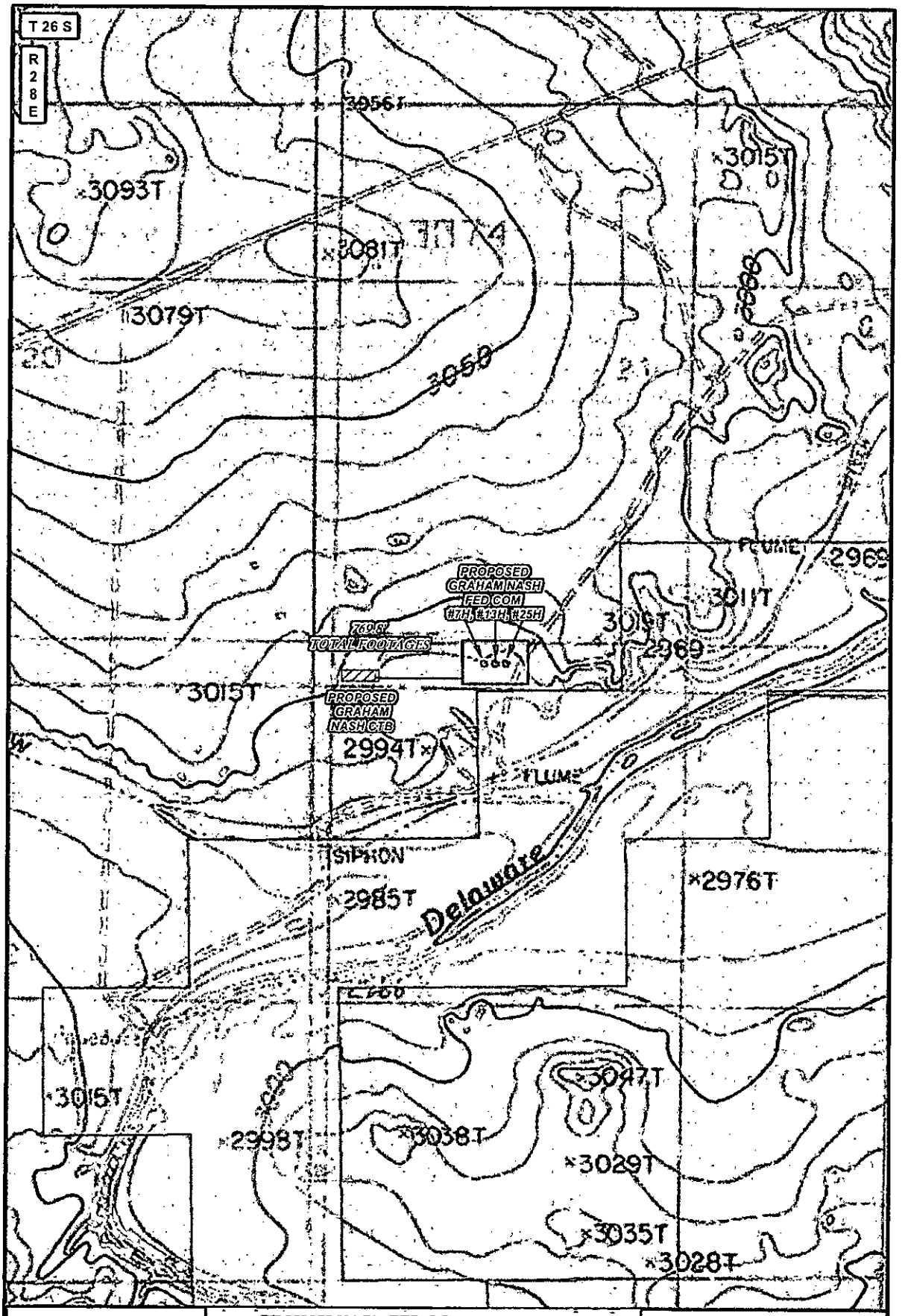

LEGEND

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

GRAHAM NASH FED COM #13H PIPELINE

SECTION: 21	TOWNSHIP: 26 S.	RANGE: 28 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 16-46	LEASE: GRAHAM NASH FED COM	

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

PIPELINE OVERVIEW | LAND STATUS | 01/27/2016 | S.R.

CONCHO

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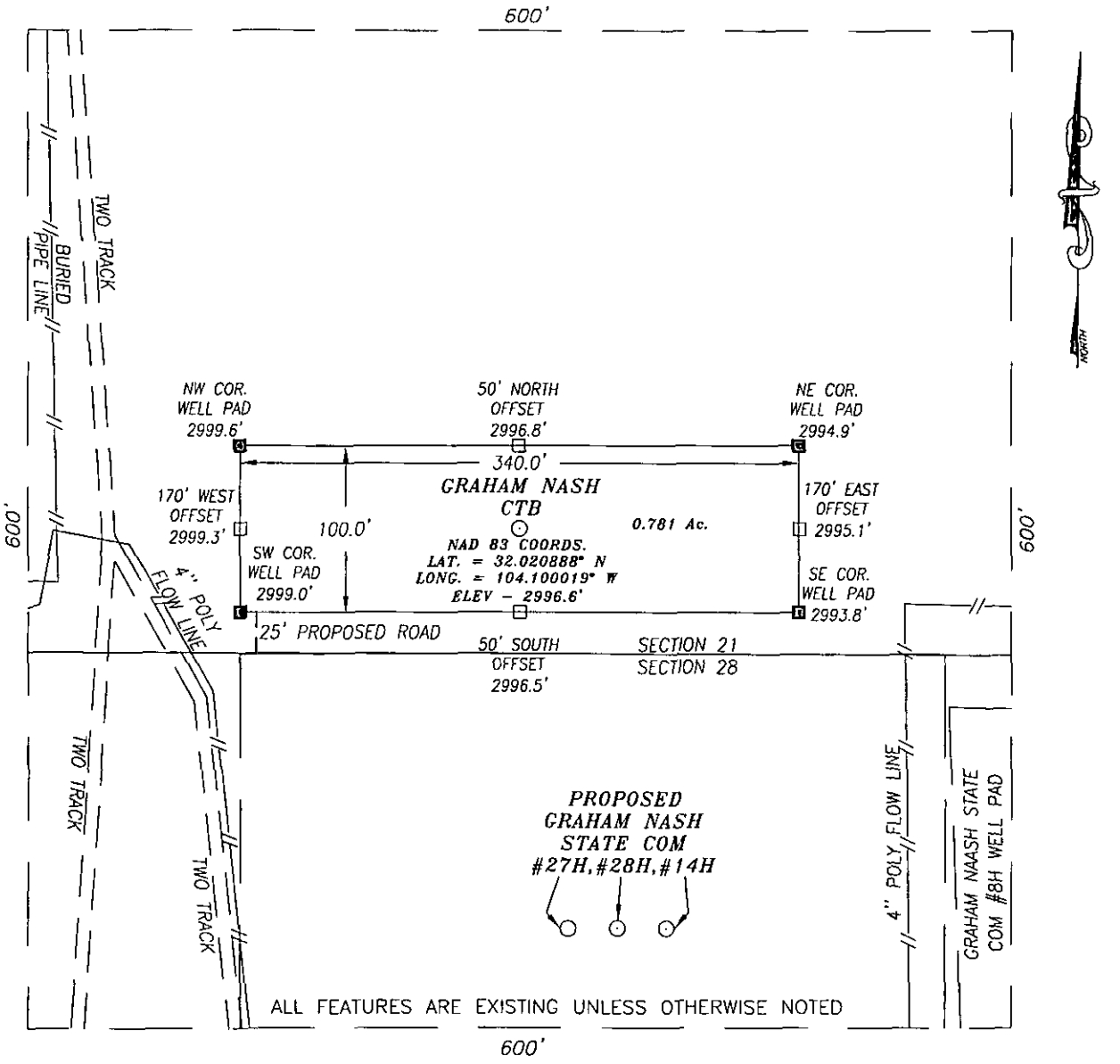
SECTION 21, TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTON OF WHITE CITY RD (CR-724) AND HIGHWAY 285 GO WEST ON WHITE CITY RD. APPROX. 3.0 MILES; THEN TURN LEFT (SOUTH) AND GO APPROX. 3.1 MILES AND TURN LEFT (EAST) THEN GO APPROX. 1.1 MILES TO THE EXISTING GRAHAM NASH ST COM #8H PAD; THEN FROM THE NORTWEST CORNER OF THE #8H PAD PROPOSED CTB IS APPROX. 280 FEET WESTNORTHWEST.

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100 0 100 200 Feet

Scale: 1"=100'

CERTIFICATION

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CHAD L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow

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

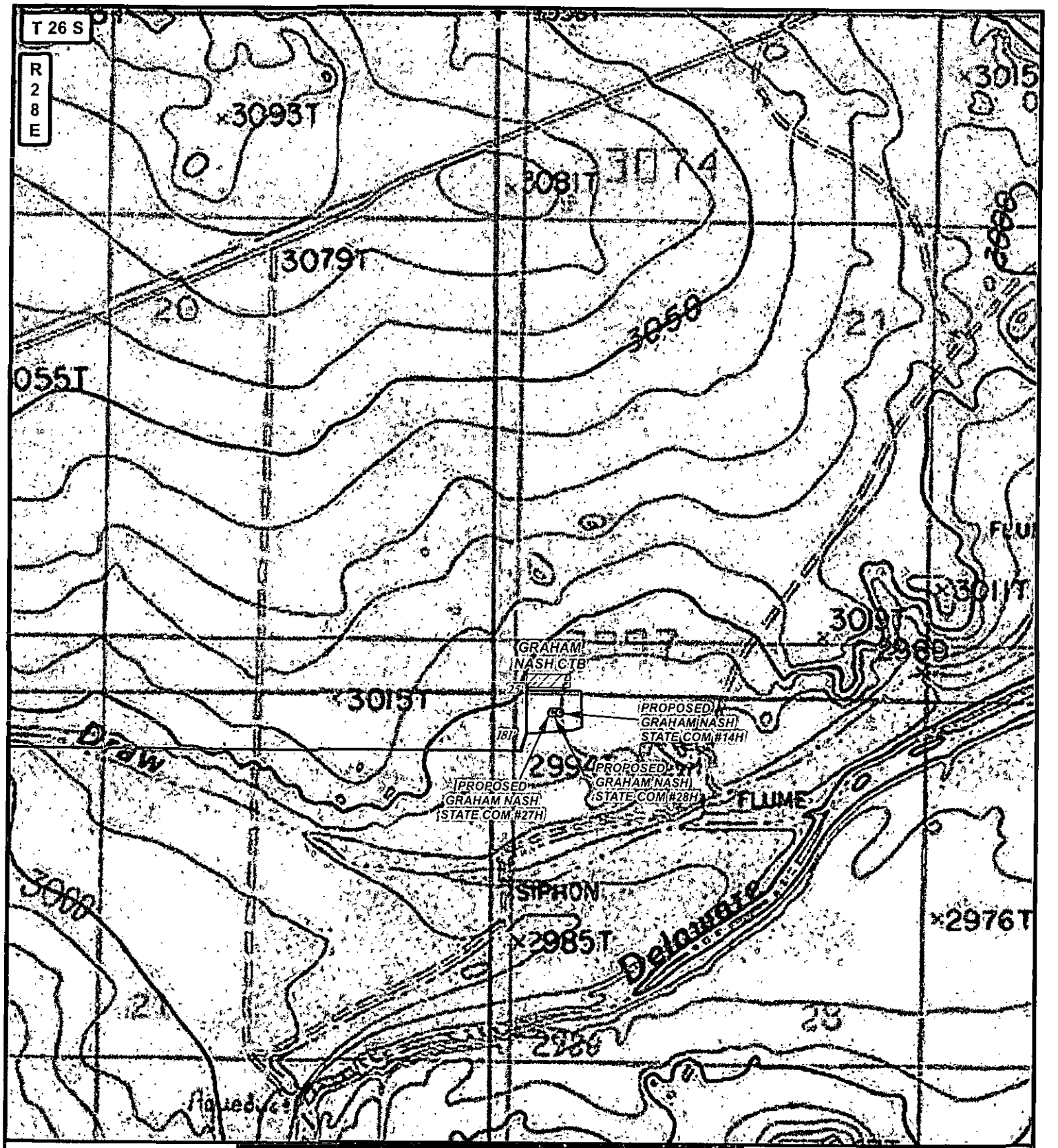
2/3/16

DATE

COG OPERATING, LLC

GRAHAM NASH CENTRAL TANK BATTERY
LOCATED 75 FEET FROM THE SOUTH LINE
AND 311 FEET FROM THE WEST LINE OF SECTION 21,
TOWNSHIP 26 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: JAN. 22, 2016		PAGE: 1 OF 1
DRAFTING DATE: JAN 26, 2016		
APPROVED BY: CH	DRAWN BY: AF	FILE: 16-44



LEGEND

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

GRAHAM NASH CENTRAL TANK BATTERY

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2996.6'
STATE: NEW MEXICO		COUNTY: EDDY	75' FSL & 311' FWL
W.O. #16-44	LEASE: GRAHAM NASH CTB		SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP TOPO 01/27/2016 A.F.

N

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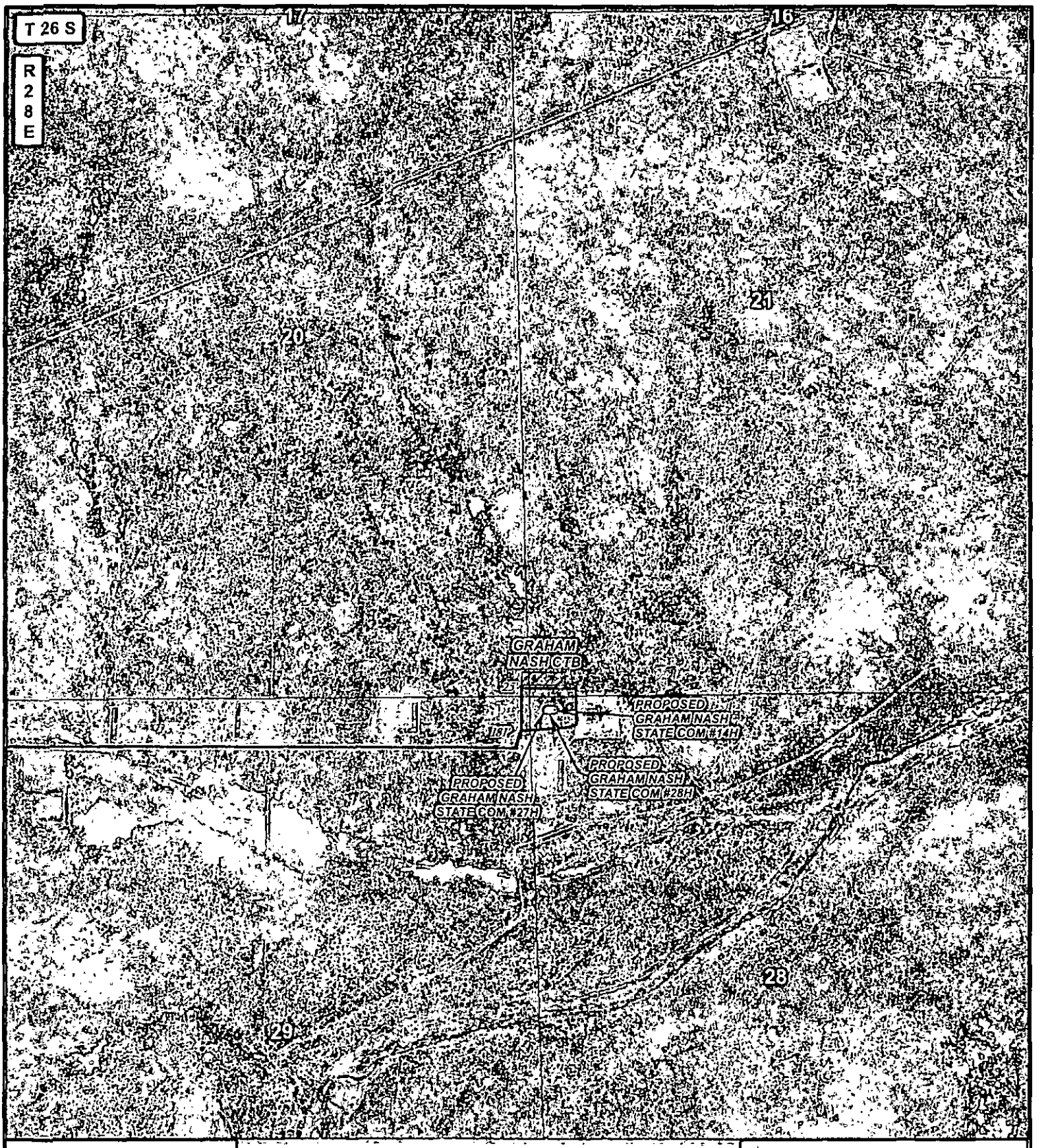

LEGEND

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

GRAHAM NASH CENTRAL TANK BATTERY

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2996.6'
STATE: NEW MEXICO	COUNTY: EDDY		75' FSL & 311' FWL
W.O. #16-44	LEASE: GRAHAM NASH CTB		SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP IMAGERY 01/27/2016 A.P.

N

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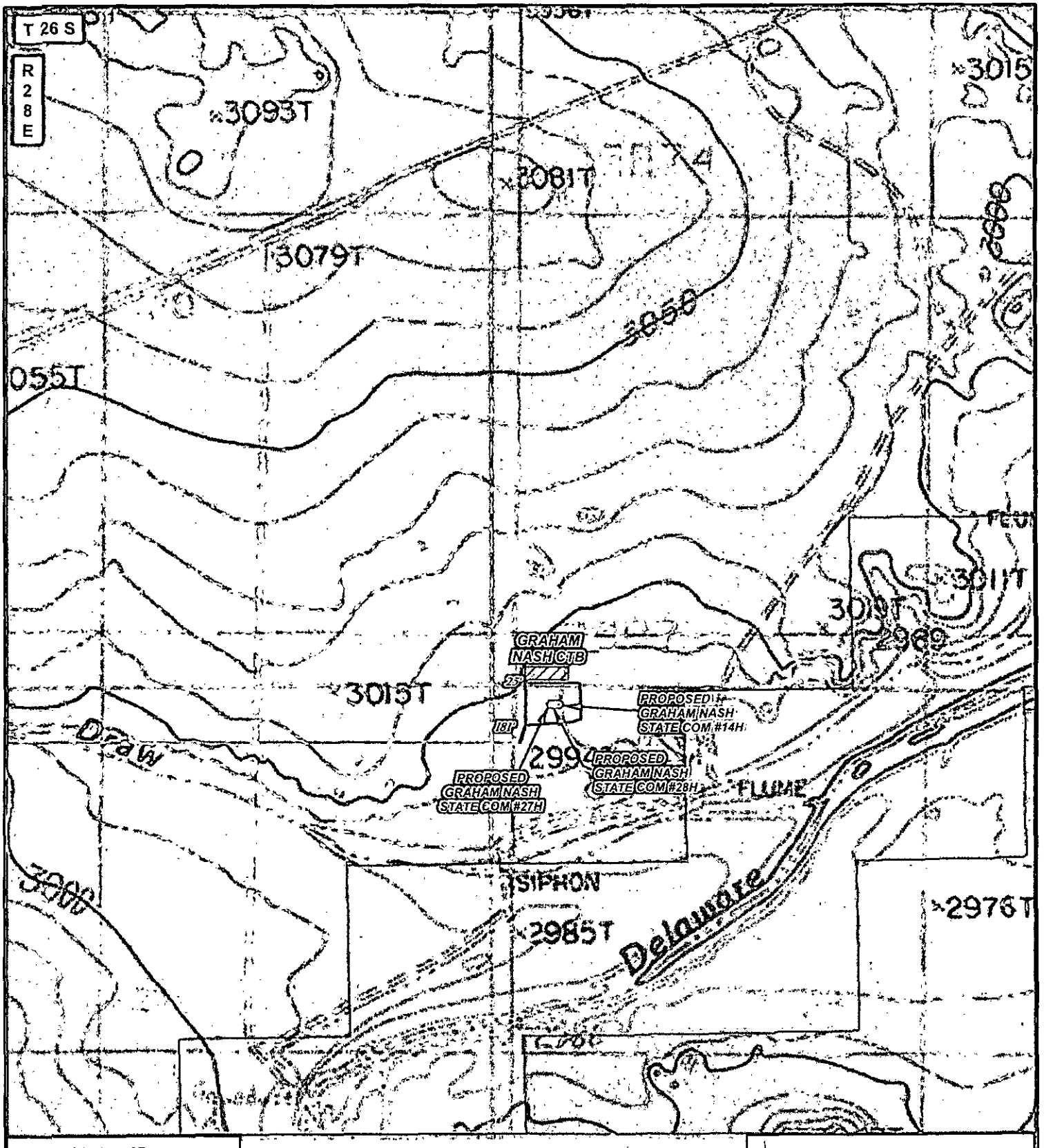

LEGEND

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

GRAHAM NASH CENTRAL TANK BATTERY

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2996.6'
STATE: NEW MEXICO		COUNTY: EDDY	75' FSL & 311' FWL
W.O. #16-44	LEASE: GRAHAM NASH CTB		SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP | LAND STATUS | 01/27/2016 | A.F.

N

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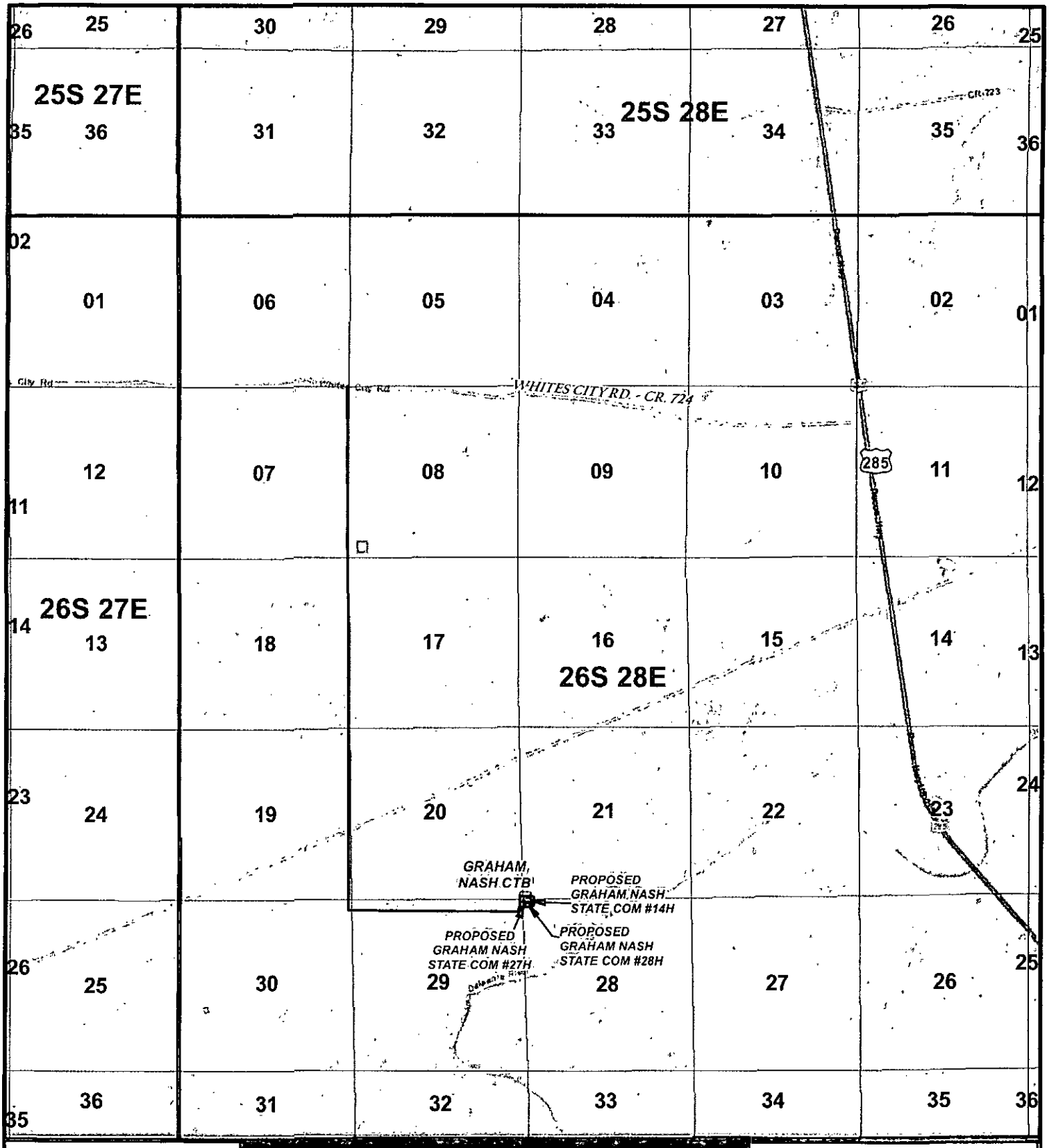

LEGEND

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

GRAHAM NASH CENTRAL TANK BATTERY

SEC: 21	TWP:26 S.	RGE:28 E.	ELEVATION:2996.6'
STATE: NEW MEXICO	COUNTY: EDDY	75' FSL & 311' FWL	
W.O. #16-44	LEASE: GRAHAM NASH CTB	SURVEY: N.M.P.M	

0 2,500 5,000 7,500 10,000 FEET

0 0.275 0.55 1.1 Miles

1 IN = 4,000 FT

VICINITY MAP 01/27/2016 A.F.

N

CONCHO

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COG Operating LLC, Graham Nash Federal Com 13H

1. Geologic Formations

TVD of target	9,100'	Pilot hole depth	-
MD at TD:	16,336'	Deepest expected fresh water:	118'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	270	Water	
Top of Salt	563	Salt	
Fletcher Anhydrite	2194	Barren	
Lamar	2378	Barren	
Delaware Group	2424	Oil/Gas	
Bone Spring	6130	Oil/Gas	
2nd Bone Spring Lime	7667	Oil/Gas	
3rd Bone Spring Lime	8787	Oil/Gas – Target Zone	
Wolfcamp	9139	Oil/Gas	

2. Casing Program See COA

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	350'	13.375"	48	H40	STC	4.70	1.38	19.17
12.25"	0	~~2410~~ 2370	9.625"	36	J55	LTC	1.61	0.80	5.22
8.75"	0	16,336'	5.5"	17	P110	BTC	1.71	2.44	1.60
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

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

- 9-5/8" 36# J-55: Pi = 3520; Pi/D = 3520 psi/2410ft = 1.46, above the fracture gradient of 0.7 psi/ft at the shoe.

Must have table for contingency casing

	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). (Assumption bulleted above)	N
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	

Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	Y
If yes, are there two strings cemented to surface?	Y
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	300	14.8	1.34	6.4	8	Tail: Class C + 2% CaCl2
Inter.	500	13.5	1.75	9.4	8	Lead: Class C + 4% Gel + 2% CaCl2
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Prod.	925	11.9	2.5	13.9	12	Lead: 50:50:10 H Blend
	2150	14.4	1.25	6.34	10	Tail: 50:50:2 Class H + 1% Salt + 0.5% Halad-9 + 0.05% SA-1015

Casing String	TOC	% Excess
Surface	0'	50%
Intermediate	0'	50%
Production	1910'	35%

Include Pilot Hole Cementing specs:

Pilot hole depth NA'

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type

4. Pressure Control Equipment

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

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	50% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	11"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			Other*		

*Specify if additional ram is utilized.

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.

N	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.
N	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.

	See attached schematic.

5. Mud Program See COA

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6-8.8	28-34	N/C
Surf shoe	Int shoe	Saturated Brine	9.9-10.2	28-34	N/C
Int shoe	TD	Cut Brine	8.5-9.3	28-34	N/C

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

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

6. Logging and Testing Procedures See COA

Logging, Coring and Testing.	
x	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.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain –

Additional logs planned		Interval
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
	CBL	Production casing
x	Mud log	Intermediate shoe to TD
	PEX	Intermediate shoe to TD

7. Drilling Conditions See COA

Condition	Specify what type and where?
BH Pressure at deepest TVD	4400 psi
Abnormal Temperature	No

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

Is this a walking operation? N - If yes, describe.
Will be pre-setting casing? N - If yes, describe.

Attachments

- Directional Plan
- BOP & Choke Schematics
- C102 and supporting maps
- Rig plat
- H2S schematic
- H2S contingency plan
- Interim reclamation plat

COG Operating LLC

Eddy County, NM (NAD27 NME)
Graham Nash Federal Com
#13H

OH

Plan: Design #1

Standard Planning Report

01 February, 2016

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #13H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Site:	Graham Nash Federal Com	**North Reference:**	Grid
Well:	#13H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project Eddy County, NM (NAD27 NME)

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site Graham Nash Federal Com

Site Position:		**Northing:**	371,481.00 usft	**Latitude:**	32° 1' 15.933 N
From:	Map	**Easting:**	573,699.60 usft	**Longitude:**	104° 5' 43.924 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.13 °

Well #13H

Well Position	**+N/-S**	0.0 usft	**Northing:**	371,481.00 usft	**Latitude:**	32° 1' 15.933 N
	+E/-W	0.0 usft	**Easting:**	573,699.60 usft	**Longitude:**	104° 5' 43.924 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	2,988.8 usft

Wellbore OH

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	2/1/2016	7.33	59.81	47,904

Design Design #1

Audit Notes:

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

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	175.65

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
8,622.5	0.00	0.00	8,622.5	0.0	0.0	0.00	0.00	0.00	0.00	
9,375.0	90.29	162.00	9,100.0	-456.4	148.3	12.00	12.00	0.00	162.00	
10,146.5	90.29	177.43	9,096.1	-1,213.3	285.6	2.00	0.00	2.00	89.97	
16,335.8	90.29	177.43	9,065.0	-7,396.3	563.1	0.00	0.00	0.00	0.00	PBHL(GNF#13H)

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #13H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Site:	Graham Nash Federal Com	**North Reference:**	Grid
Well:	#13H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #13H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Site:	Graham Nash Federal Com	**North Reference:**	Grid
Well:	#13H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,622.5	0.00	0.00	8,622.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 8622.5 'MD, 0.00° INC, 0.00° AZI									
8,625.0	0.30	162.00	8,625.0	0.0	0.0	0.0	12.00	12.00	0.00
8,650.0	3.30	162.00	8,650.0	-0.8	0.2	0.8	12.00	12.00	0.00
8,675.0	6.30	162.00	8,674.9	-2.7	0.9	2.8	12.00	12.00	0.00
8,700.0	9.30	162.00	8,699.7	-6.0	1.9	6.1	12.00	12.00	0.00
8,725.0	12.30	162.00	8,724.2	-10.4	3.4	10.6	12.00	12.00	0.00
8,750.0	15.30	162.00	8,748.5	-16.1	5.2	16.4	12.00	12.00	0.00
8,775.0	18.30	162.00	8,772.4	-23.0	7.5	23.5	12.00	12.00	0.00
8,800.0	21.30	162.00	8,795.9	-31.0	10.1	31.7	12.00	12.00	0.00
8,825.0	24.30	162.00	8,819.0	-40.2	13.1	41.1	12.00	12.00	0.00
8,850.0	27.30	162.00	8,841.5	-50.6	16.4	51.7	12.00	12.00	0.00
8,875.0	30.30	162.00	8,863.4	-62.0	20.2	63.4	12.00	12.00	0.00
8,900.0	33.30	162.00	8,884.6	-74.6	24.2	76.2	12.00	12.00	0.00
8,925.0	36.30	162.00	8,905.2	-88.1	28.6	90.0	12.00	12.00	0.00
8,950.0	39.30	162.00	8,924.9	-102.7	33.4	104.9	12.00	12.00	0.00
8,975.0	42.30	162.00	8,943.8	-118.2	38.4	120.8	12.00	12.00	0.00
9,000.0	45.30	162.00	8,961.9	-134.7	43.8	137.6	12.00	12.00	0.00
9,025.0	48.30	162.00	8,979.0	-152.0	49.4	155.3	12.00	12.00	0.00
9,050.0	51.30	162.00	8,995.1	-170.2	55.3	173.9	12.00	12.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #13H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Site:	Graham Nash Federal Com	**North Reference:**	Grid
Well:	#13H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,075.0	54.30	162.00	9,010.3	-189.1	61.4	193.2	12.00	12.00	0.00
9,100.0	57.30	162.00	9,024.3	-208.8	67.8	213.3	12.00	12.00	0.00
9,125.0	60.29	162.00	9,037.3	-229.1	74.4	234.1	12.00	12.00	0.00
9,150.0	63.29	162.00	9,049.1	-250.0	81.2	255.5	12.00	12.00	0.00
9,175.0	66.29	162.00	9,059.7	-271.6	88.2	277.5	12.00	12.00	0.00
9,200.0	69.29	162.00	9,069.2	-293.6	95.4	300.0	12.00	12.00	0.00
9,225.0	72.29	162.00	9,077.4	-316.0	102.7	322.9	12.00	12.00	0.00
9,250.0	75.29	162.00	9,084.4	-338.8	110.1	346.2	12.00	12.00	0.00
9,275.0	78.29	162.00	9,090.1	-362.0	117.6	369.9	12.00	12.00	0.00
9,300.0	81.29	162.00	9,094.5	-385.4	125.2	393.8	12.00	12.00	0.00
9,325.0	84.29	162.00	9,097.6	-409.0	132.9	417.9	12.00	12.00	0.00
9,350.0	87.29	162.00	9,099.5	-432.7	140.6	442.1	12.00	12.00	0.00
9,375.0	90.29	162.00	9,100.0	-456.4	148.3	466.4	12.00	12.00	0.00
EOC- 9375.0 MD, 90.29° INC, 162.00° AZI									
9,400.0	90.29	162.50	9,099.9	-480.3	155.9	490.7	2.00	0.00	2.00
9,500.0	90.29	164.50	9,099.4	-576.1	184.3	588.5	2.00	0.00	2.00
9,600.0	90.29	166.50	9,098.9	-672.9	209.4	686.9	2.00	0.00	2.00
9,700.0	90.29	168.50	9,098.3	-770.6	231.0	785.9	2.00	0.00	2.00
9,800.0	90.29	170.50	9,097.8	-868.9	249.2	885.3	2.00	0.00	2.00
9,900.0	90.29	172.50	9,097.3	-967.8	264.0	985.0	2.00	0.00	2.00
10,000.0	90.29	174.50	9,096.8	-1,067.1	275.3	1,085.0	2.00	0.00	2.00
10,100.0	90.29	176.50	9,096.3	-1,166.8	283.2	1,184.9	2.00	0.00	2.00
10,146.5	90.29	177.43	9,096.1	-1,213.3	285.6	1,231.4	2.00	0.00	2.00
10,200.0	90.29	177.43	9,095.8	-1,266.7	288.0	1,284.9	0.00	0.00	0.00
10,300.0	90.29	177.43	9,095.3	-1,366.6	292.5	1,384.9	0.00	0.00	0.00
10,400.0	90.29	177.43	9,094.8	-1,466.5	297.0	1,484.8	0.00	0.00	0.00
10,500.0	90.29	177.43	9,094.3	-1,566.4	301.5	1,584.8	0.00	0.00	0.00
10,600.0	90.29	177.43	9,093.8	-1,666.3	306.0	1,684.7	0.00	0.00	0.00
10,700.0	90.29	177.43	9,093.3	-1,766.2	310.4	1,784.7	0.00	0.00	0.00
10,800.0	90.29	177.43	9,092.8	-1,866.1	314.9	1,884.6	0.00	0.00	0.00
10,900.0	90.29	177.43	9,092.3	-1,966.0	319.4	1,984.6	0.00	0.00	0.00
11,000.0	90.29	177.43	9,091.8	-2,065.9	323.9	2,084.5	0.00	0.00	0.00
11,100.0	90.29	177.43	9,091.3	-2,165.8	328.4	2,184.5	0.00	0.00	0.00
11,200.0	90.29	177.43	9,090.8	-2,265.7	332.9	2,284.4	0.00	0.00	0.00
11,300.0	90.29	177.43	9,090.3	-2,365.6	337.3	2,384.4	0.00	0.00	0.00
11,400.0	90.29	177.43	9,089.8	-2,465.5	341.8	2,484.3	0.00	0.00	0.00
11,500.0	90.29	177.43	9,089.3	-2,565.4	346.3	2,584.3	0.00	0.00	0.00
11,600.0	90.29	177.43	9,088.8	-2,665.3	350.8	2,684.2	0.00	0.00	0.00
11,700.0	90.29	177.43	9,088.3	-2,765.2	355.3	2,784.2	0.00	0.00	0.00
11,800.0	90.29	177.43	9,087.8	-2,865.1	359.8	2,884.1	0.00	0.00	0.00
11,900.0	90.29	177.43	9,087.3	-2,965.0	364.2	2,984.1	0.00	0.00	0.00
12,000.0	90.29	177.43	9,086.8	-3,064.9	368.7	3,084.0	0.00	0.00	0.00
12,100.0	90.29	177.43	9,086.3	-3,164.8	373.2	3,184.0	0.00	0.00	0.00
12,200.0	90.29	177.43	9,085.8	-3,264.7	377.7	3,283.9	0.00	0.00	0.00
12,300.0	90.29	177.43	9,085.3	-3,364.6	382.2	3,383.9	0.00	0.00	0.00
12,400.0	90.29	177.43	9,084.8	-3,464.5	386.7	3,483.8	0.00	0.00	0.00
12,500.0	90.29	177.43	9,084.3	-3,564.4	391.1	3,583.8	0.00	0.00	0.00
12,600.0	90.29	177.43	9,083.8	-3,664.3	395.6	3,683.7	0.00	0.00	0.00
12,700.0	90.29	177.43	9,083.3	-3,764.2	400.1	3,783.7	0.00	0.00	0.00
12,800.0	90.29	177.43	9,082.8	-3,864.1	404.6	3,883.6	0.00	0.00	0.00
12,900.0	90.29	177.43	9,082.3	-3,964.0	409.1	3,983.6	0.00	0.00	0.00
13,000.0	90.29	177.43	9,081.8	-4,063.8	413.6	4,083.5	0.00	0.00	0.00
13,100.0	90.29	177.43	9,081.3	-4,163.7	418.0	4,183.5	0.00	0.00	0.00
13,200.0	90.29	177.43	9,080.7	-4,263.6	422.5	4,283.4	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #13H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	WELL @ 3014.8usft (Original Well Elev)
Site:	Graham Nash Federal Com	**North Reference:**	Grid
Well:	#13H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,300.0	90.29	177.43	9,080.2	-4,363.5	427.0	4,383.4	0.00	0.00	0.00
13,400.0	90.29	177.43	9,079.7	-4,463.4	431.5	4,483.3	0.00	0.00	0.00
13,500.0	90.29	177.43	9,079.2	-4,563.3	436.0	4,583.3	0.00	0.00	0.00
13,600.0	90.29	177.43	9,078.7	-4,663.2	440.5	4,683.2	0.00	0.00	0.00
13,700.0	90.29	177.43	9,078.2	-4,763.1	444.9	4,783.2	0.00	0.00	0.00
13,800.0	90.29	177.43	9,077.7	-4,863.0	449.4	4,883.1	0.00	0.00	0.00
13,900.0	90.29	177.43	9,077.2	-4,962.9	453.9	4,983.1	0.00	0.00	0.00
14,000.0	90.29	177.43	9,076.7	-5,062.8	458.4	5,083.0	0.00	0.00	0.00
14,100.0	90.29	177.43	9,076.2	-5,162.7	462.9	5,183.0	0.00	0.00	0.00
14,200.0	90.29	177.43	9,075.7	-5,262.6	467.4	5,282.9	0.00	0.00	0.00
14,300.0	90.29	177.43	9,075.2	-5,362.5	471.8	5,382.9	0.00	0.00	0.00
14,400.0	90.29	177.43	9,074.7	-5,462.4	476.3	5,482.8	0.00	0.00	0.00
14,500.0	90.29	177.43	9,074.2	-5,562.3	480.8	5,582.8	0.00	0.00	0.00
14,600.0	90.29	177.43	9,073.7	-5,662.2	485.3	5,682.7	0.00	0.00	0.00
14,700.0	90.29	177.43	9,073.2	-5,762.1	489.8	5,782.7	0.00	0.00	0.00
14,800.0	90.29	177.43	9,072.7	-5,862.0	494.2	5,882.6	0.00	0.00	0.00
14,900.0	90.29	177.43	9,072.2	-5,961.9	498.7	5,982.6	0.00	0.00	0.00
15,000.0	90.29	177.43	9,071.7	-6,061.8	503.2	6,082.5	0.00	0.00	0.00
15,100.0	90.29	177.43	9,071.2	-6,161.7	507.7	6,182.5	0.00	0.00	0.00
15,200.0	90.29	177.43	9,070.7	-6,261.6	512.2	6,282.4	0.00	0.00	0.00
15,300.0	90.29	177.43	9,070.2	-6,361.5	516.7	6,382.4	0.00	0.00	0.00
15,400.0	90.29	177.43	9,069.7	-6,461.4	521.1	6,482.3	0.00	0.00	0.00
15,500.0	90.29	177.43	9,069.2	-6,561.3	525.6	6,582.3	0.00	0.00	0.00
15,600.0	90.29	177.43	9,068.7	-6,661.2	530.1	6,682.2	0.00	0.00	0.00
15,700.0	90.29	177.43	9,068.2	-6,761.1	534.6	6,782.2	0.00	0.00	0.00
15,800.0	90.29	177.43	9,067.7	-6,861.0	539.1	6,882.1	0.00	0.00	0.00
15,900.0	90.29	177.43	9,067.2	-6,960.9	543.6	6,982.1	0.00	0.00	0.00
16,000.0	90.29	177.43	9,066.7	-7,060.8	548.0	7,082.0	0.00	0.00	0.00
16,100.0	90.29	177.43	9,066.2	-7,160.7	552.5	7,182.0	0.00	0.00	0.00
16,200.0	90.29	177.43	9,065.7	-7,260.6	557.0	7,281.9	0.00	0.00	0.00
16,300.0	90.29	177.43	9,065.2	-7,360.5	561.5	7,381.9	0.00	0.00	0.00
16,335.8	90.29	177.43	9,065.0	-7,396.3	563.1	7,417.7	0.00	0.00	0.00
TD at 16335.8 - PBHL(GNF#13H)									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL(GNF#13H) - plan hits target center - Point	0.00	0.00	9,065.0	-7,396.3	563.1	364,084.70	574,262.70	32° 0' 2.722 N	104° 5' 37.574 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
8,622.5	8,622.5	0.0	0.0	KOP - 8622.5 'MD, 0.00° INC, 0.00° AZI
9,375.0	9,100.0	-456.4	148.3	EOC- 9375.0 'MD, 90.29° INC, 162.00° AZI
16,335.8	9,065.0	-1,213.3	285.6	TD at 16335.8

CONCHO

COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Site: Graham Nash Federal Com
Well: #13H
Wellbore: OH
Plan: Design #1 (#13H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	8622.5	0.00	0.00	8622.5	0.0	0.0	0.00	0.00	0.0	
3	9375.0	90.29	162.00	9100.0	-456.4	148.3	12.00	162.00	466.4	
4	10146.5	90.29	177.43	9096.1	-1213.3	285.6	2.00	89.97	1231.4	
5	16335.8	90.29	177.43	9065.0	-7396.3	563.1	0.00	0.00	7417.7	PBHL(GNF#13H)

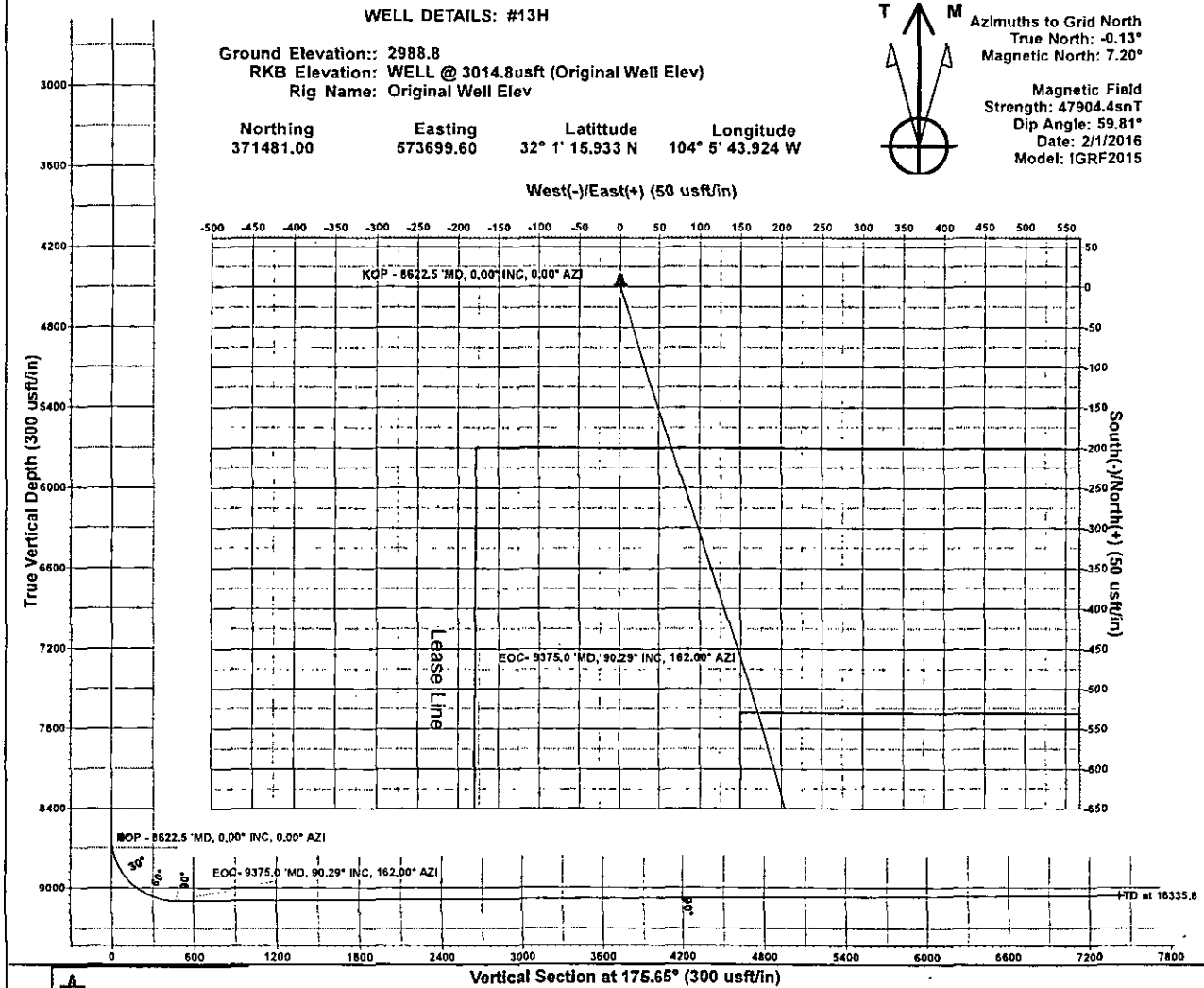
WELL DETAILS: #13H

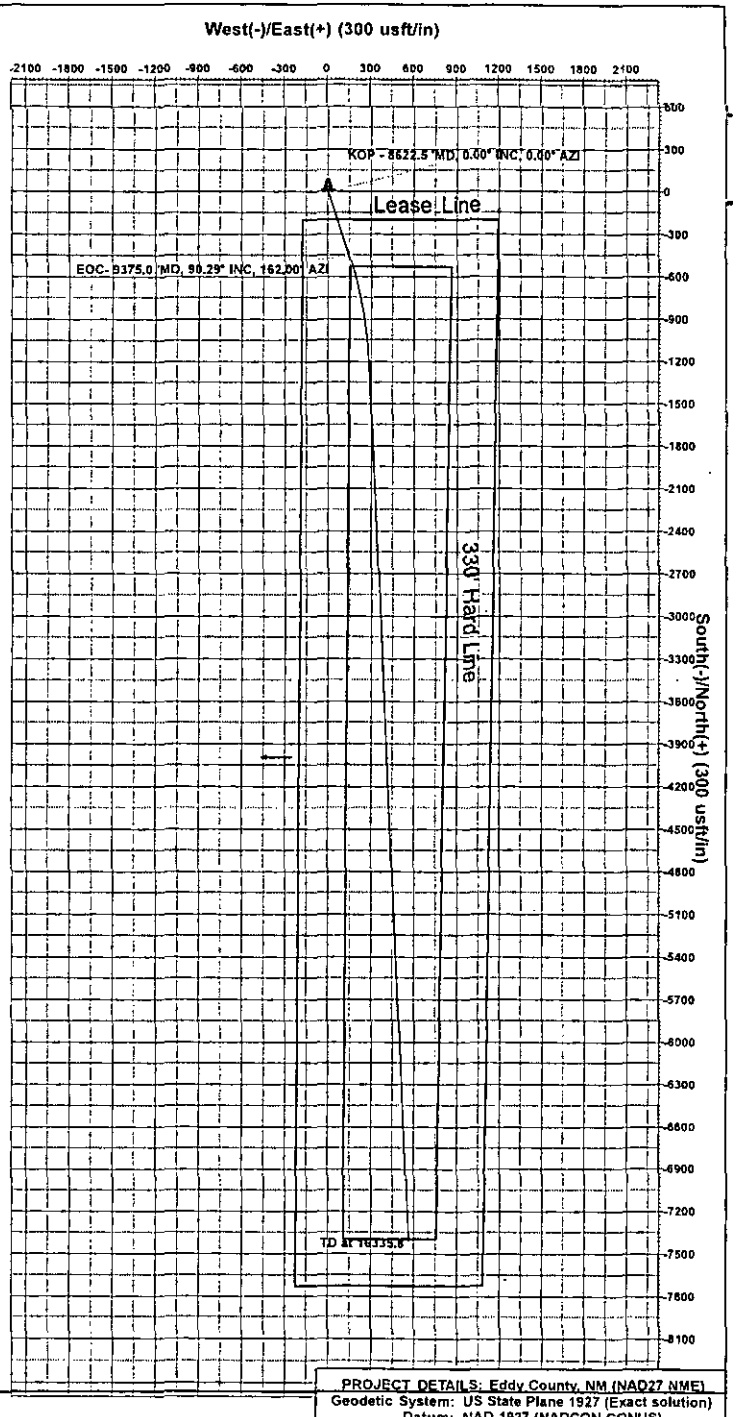
Ground Elevation:: 2988.8
RKB Elevation: WELL @ 3014.8usft (Original Well Elev)
Rig Name: Original Well Elev

Northing	Easting	Latittude	Longitude
371481.00	573699.60	32° 1' 15.933 N	104° 5' 43.924 W

Azimuths to Grid North
True North: -0.13°
Magnetic North: 7.20°

Magnetic Field
Strength: 47904.4snT
Dip Angle: 59.81°
Date: 2/1/2016
Model: IGRF2015





Integrity Directional Services

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

LLD ACREAGE REPORT

Admin State: NM

Geo State: NM

MTR: 23 0260S 0280E

Section: 033

Sur Type	Sur No	Lld Suff	NE NNSS EWWE	NW NNSS EWWE	SW NNSS EWWE	SE NNSS EWWE	Sur Note	Dup Flg	Sub Surf	Acreage
A			XX--	X---	----	----				120.000
L	1		----	--X-	----	----	R			23.790
L	2		----	---X	----	----				23.770
L	3		--X-	----	----	----				23.750
L	4		---X	----	----	----				23.730
L	5		----	--X-	----	----				25.240
L	6		----	-X--	----	----				42.390
V			----	----	XXXX	XXXX				

Section 033 Total: 258.880

MTR Total Exluding Survey Notes C/D/R and Sub Surf = Y 258.880

Grand Total Excluding Survey Notes C/D/R and Sub Surf = Y: 258.880

NO WARRANTY IS MADE BY BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 21 **Township:** 26S **Range:** 28E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 28 **Township:** 26S **Range:** 28E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 33 **Township:** 26S **Range:** 28E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 01668		ED		3	3	12	26S	28E	589957	3546554*	250	100	150
C 02160		ED	4	1	2	14	26S	28E	589243	3546044*	300	120	180
C 02160 S		ED	1	1	2	14	26S	28E	589043	3546244*	300	120	180
C 02160 S2		ED	1	1	2	14	26S	28E	589043	3546244*	300	120	180
C 02160 S3		ED	2	2	1	14	26S	28E	588834	3546241*	300	120	180
C 02160 S4		ED	2	2	1	14	26S	28E	588834	3546241*	300	120	180
C 02160 S5		ED	1	1	1	14	26S	28E	588225	3546237*	300	120	180
C 02160 S6		ED	3	3	1	14	26S	28E	588232	3545635*	300	120	180
C 02160 S7		ED	3	3	1	22	26S	28E	586638	3543998*	300	120	180
C 02160 S8		ED	2	3	3	12	26S	28E	590056	3546653*	200	120	80
C 02160 S9		ED	3	3	2	02	26S	28E	589020	3548868*	300	120	180
C 02477	CUB	ED		1	1	03	26S	28E	586687	3549347*	150		
C 02478	CUB	ED		2	1	05	26S	28E	583848	3549325*	100		
C 02479	CUB	ED		4	4	10	26S	28E	587909	3546534*	200		
C 02480	CUB	ED		4	4	10	26S	28E	587909	3546534*	150		
C 02481	CUB	ED		1	1	14	26S	28E	588326	3546138*	200		
C 02894	C	ED	2	2	3	12	26S	28E	590458	3547061*	240		
C 02924	C	ED	1	3	2	11	26S	28E	589032	3547451*			

Average Depth to Water: **118 feet**

Minimum Depth: **100 feet**

Maximum Depth: **120 feet**

Record Count: 18

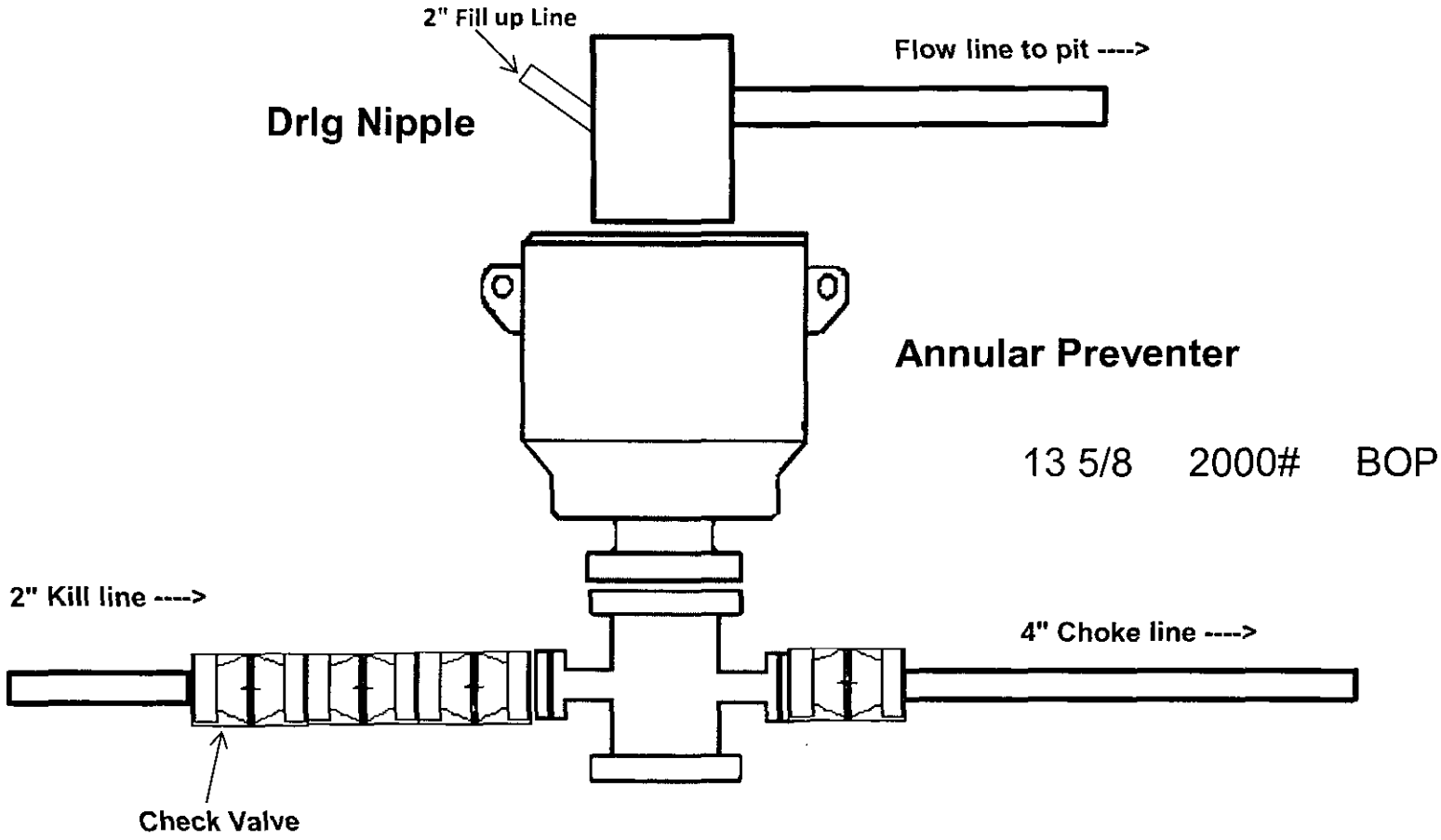
PLSS Search:

Township: 26S **Range:** 28E

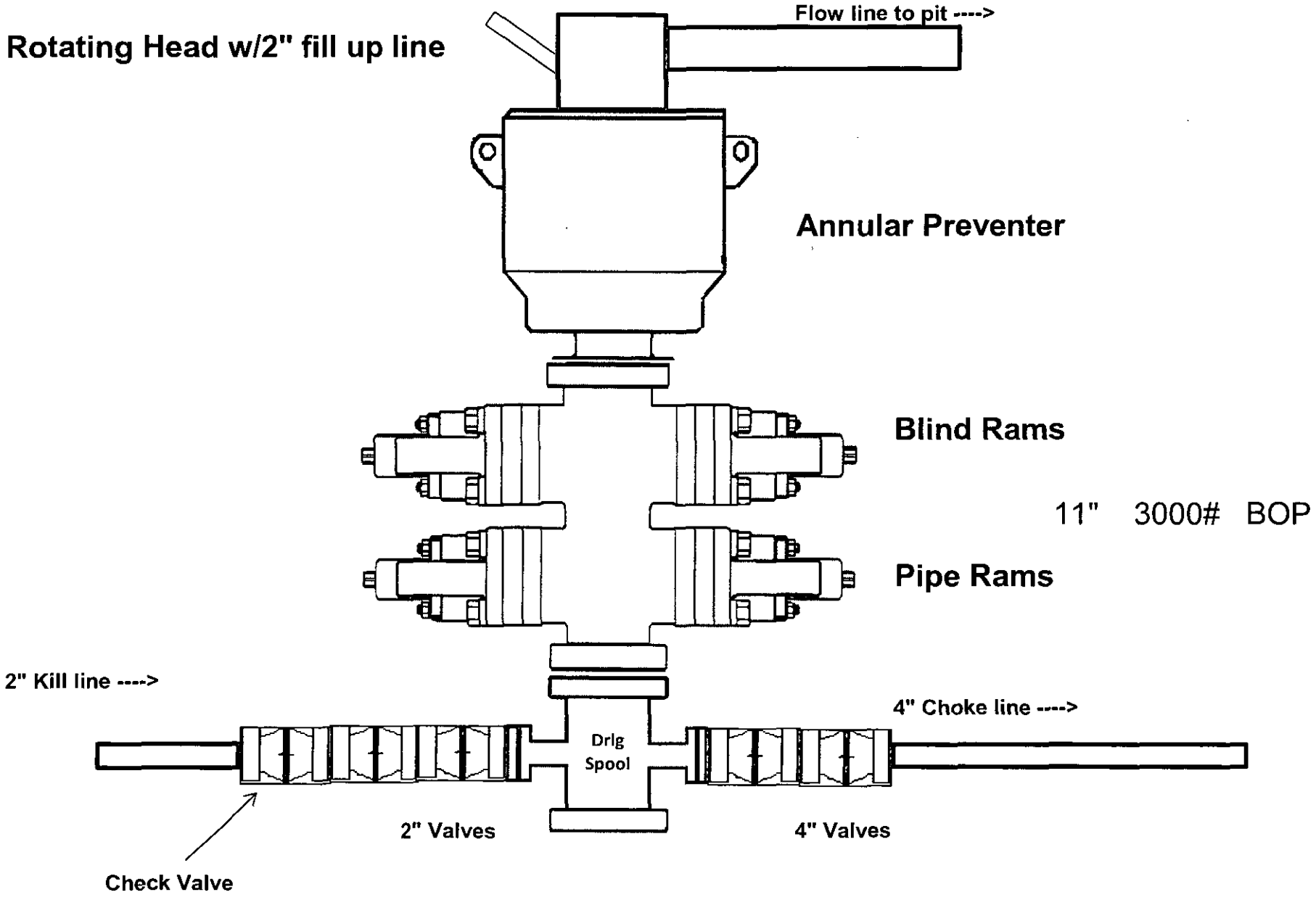
***UTM location was derived from PLSS - see Help**

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

2,000 psi BOP Schematic

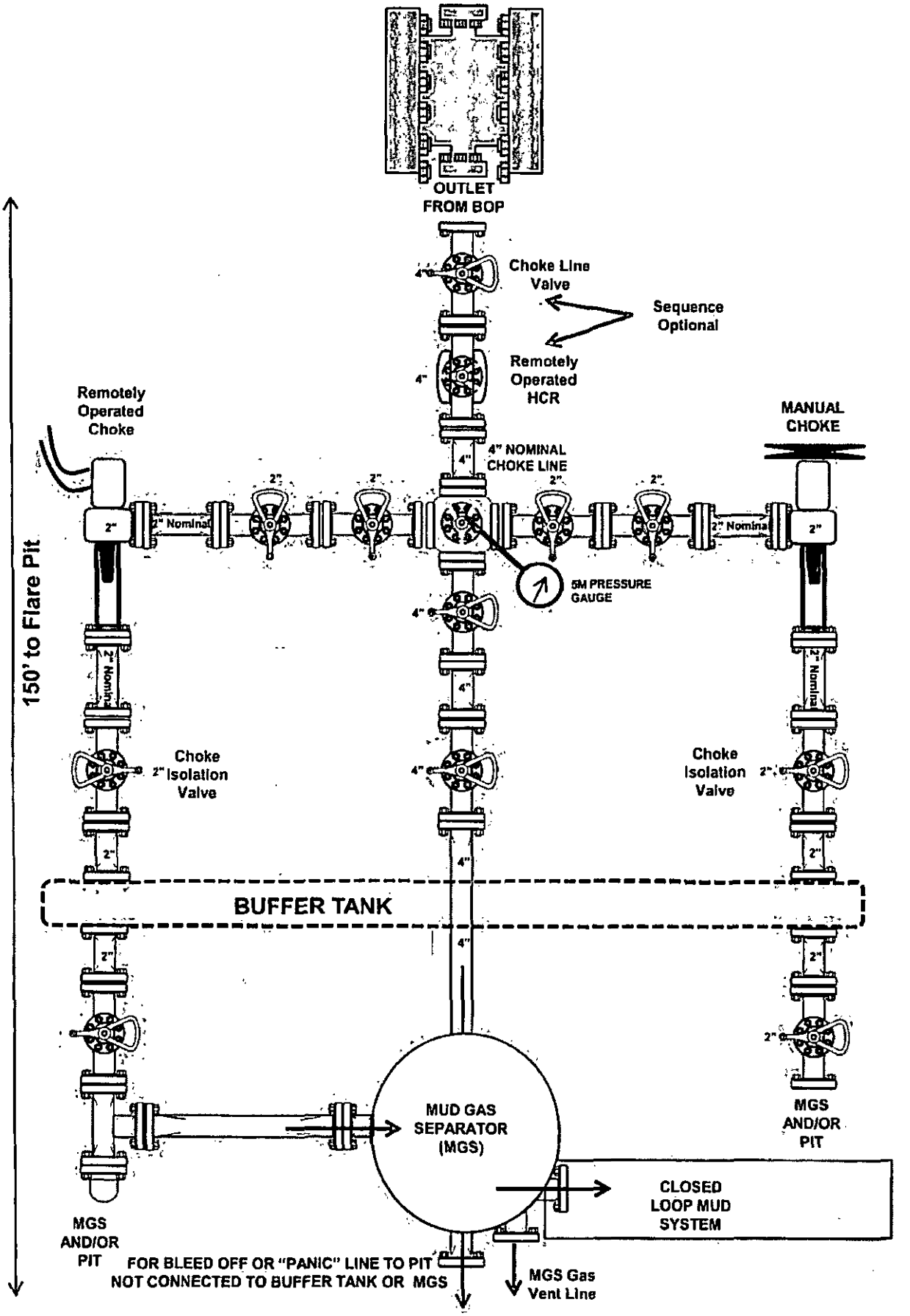


3,000 psi BOP Schematic

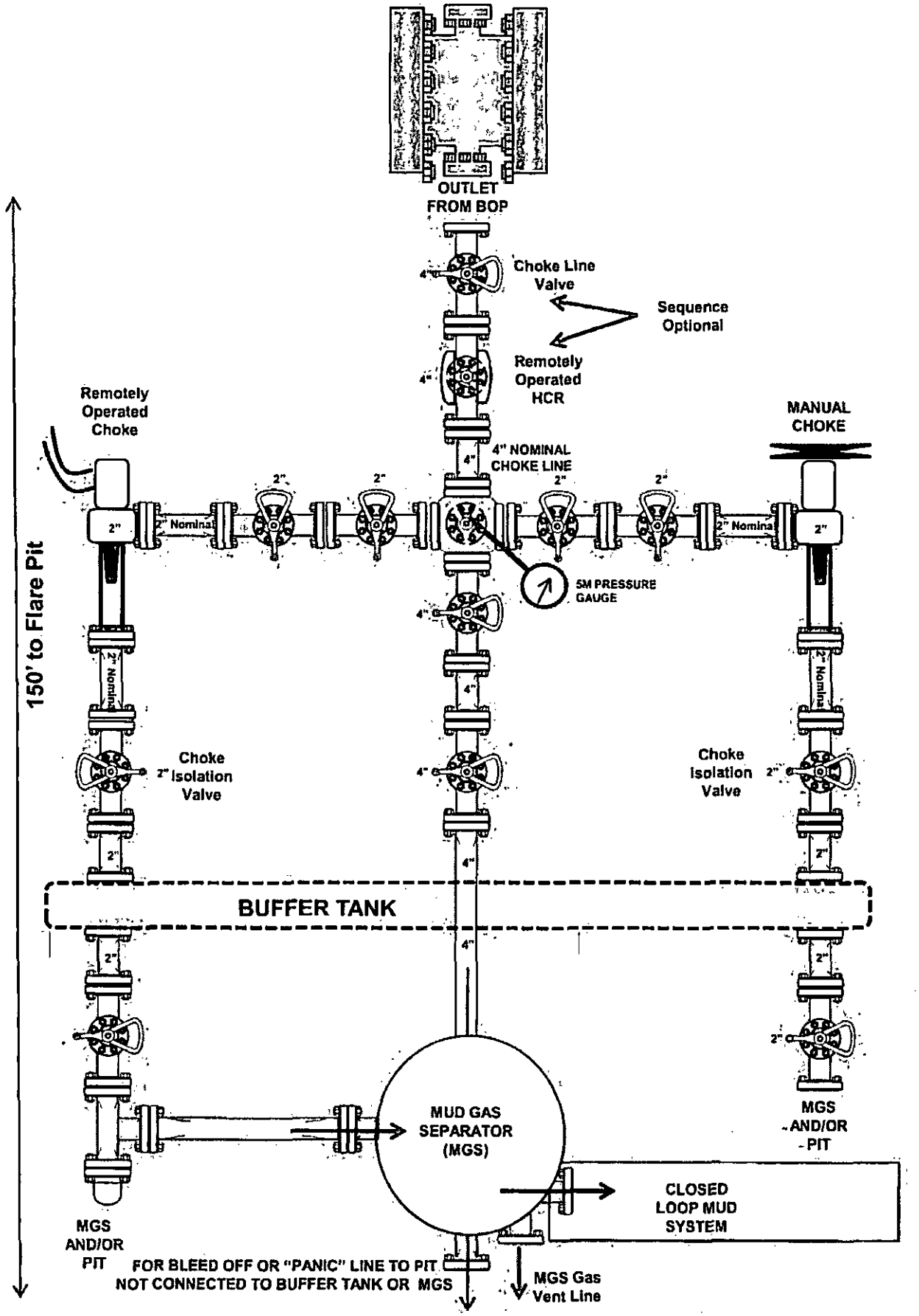


EXTRA COPY

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



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



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

Flare Lines will be from both Choke Manifold & Separator to edge of location.

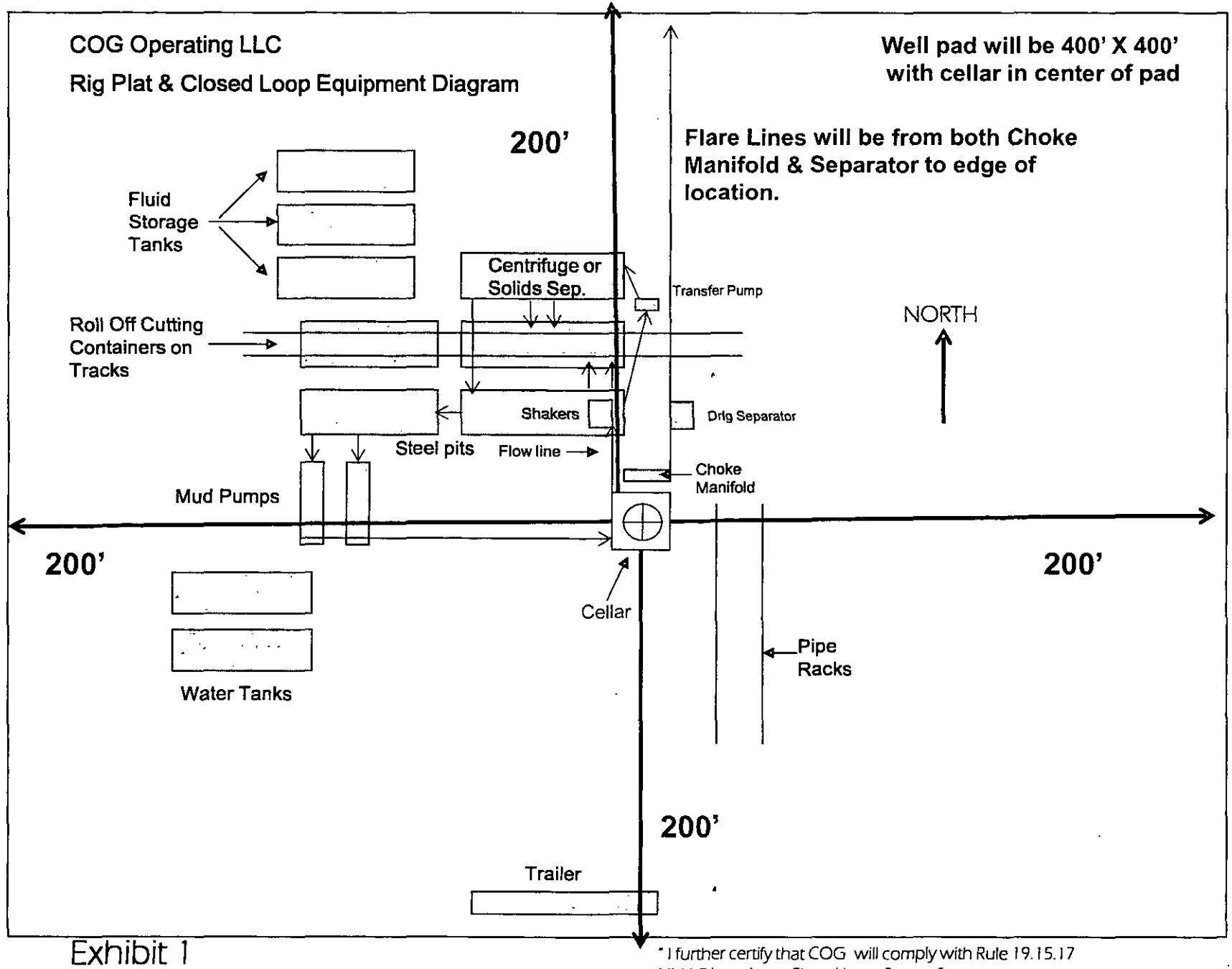
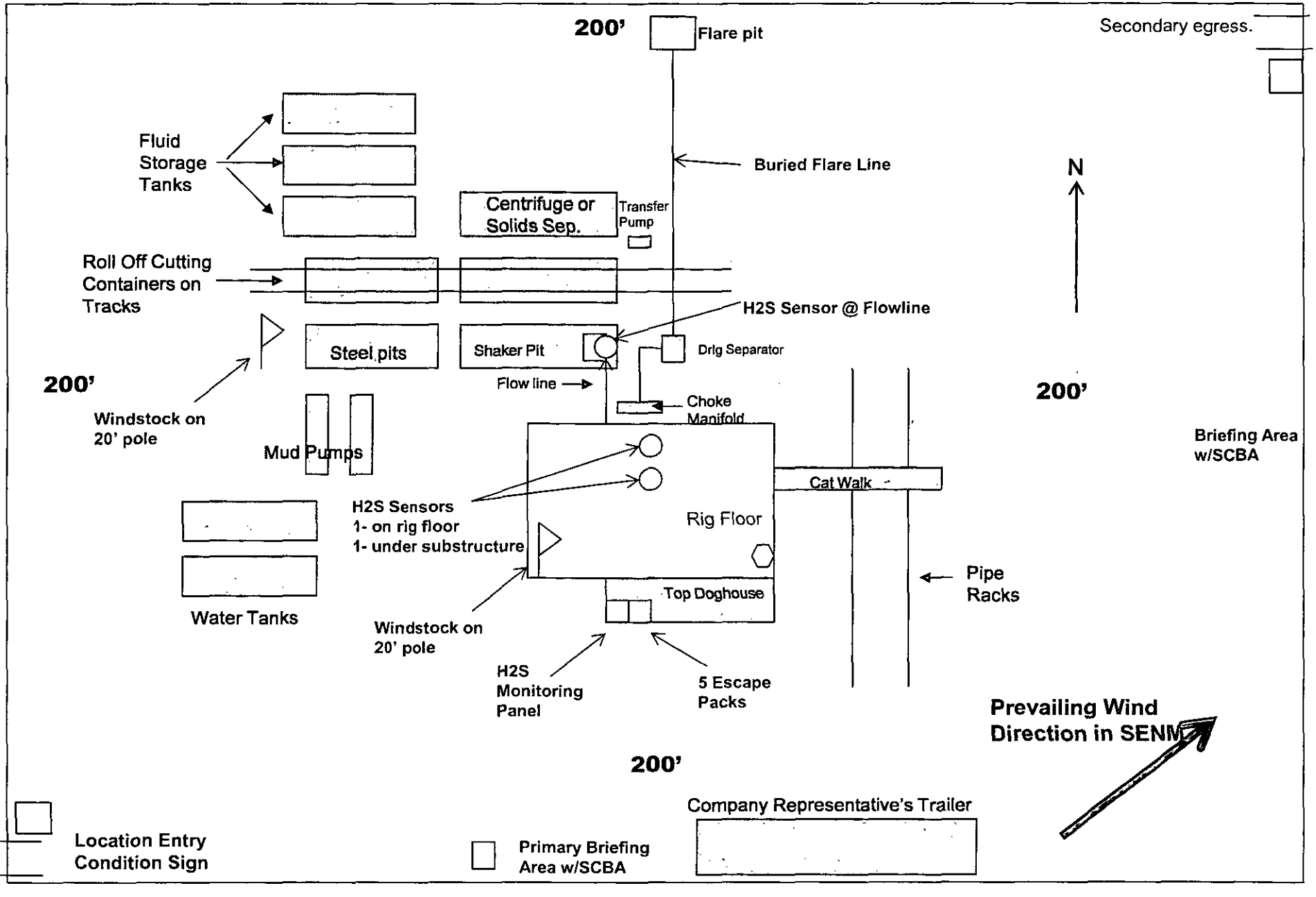


Exhibit 1

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

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

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



COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

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

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

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

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

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

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

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

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

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

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

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

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

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

g. Communication:
Company vehicles equipped with cellular telephone.

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

WARNING

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

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

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG OPERATING LLC OFFICE	575-748-6940	
SHERYL BAKER	575-748-6940	432-934-1873
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

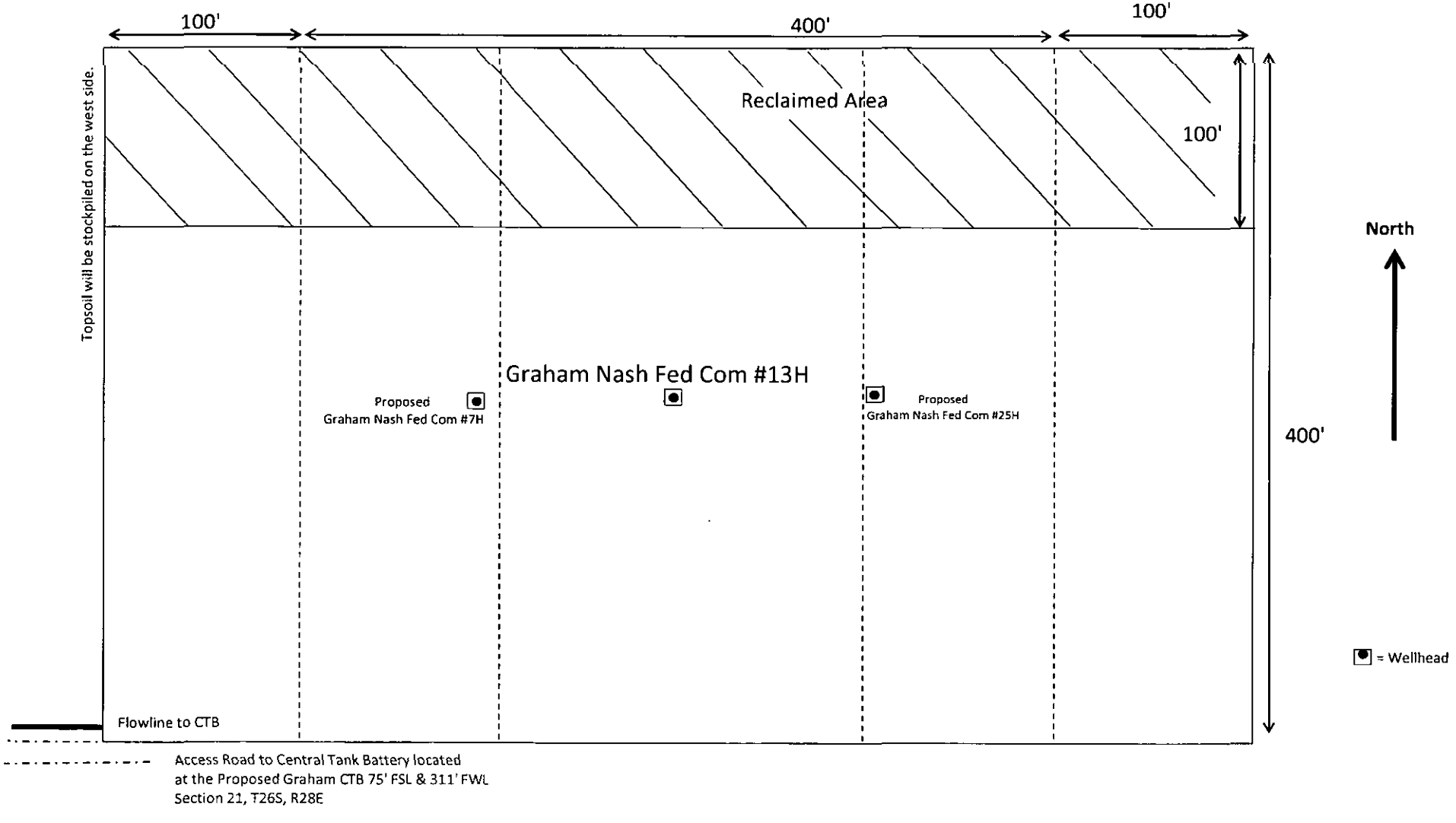
	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT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

COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well Site Layout
Production Facility Layout

Graham Nash Federal Com #13H
Section 21 - T26S - R28E

Exhibit 3



COG Operating LLC
2208 West Main Street
Artesia, NM 88210

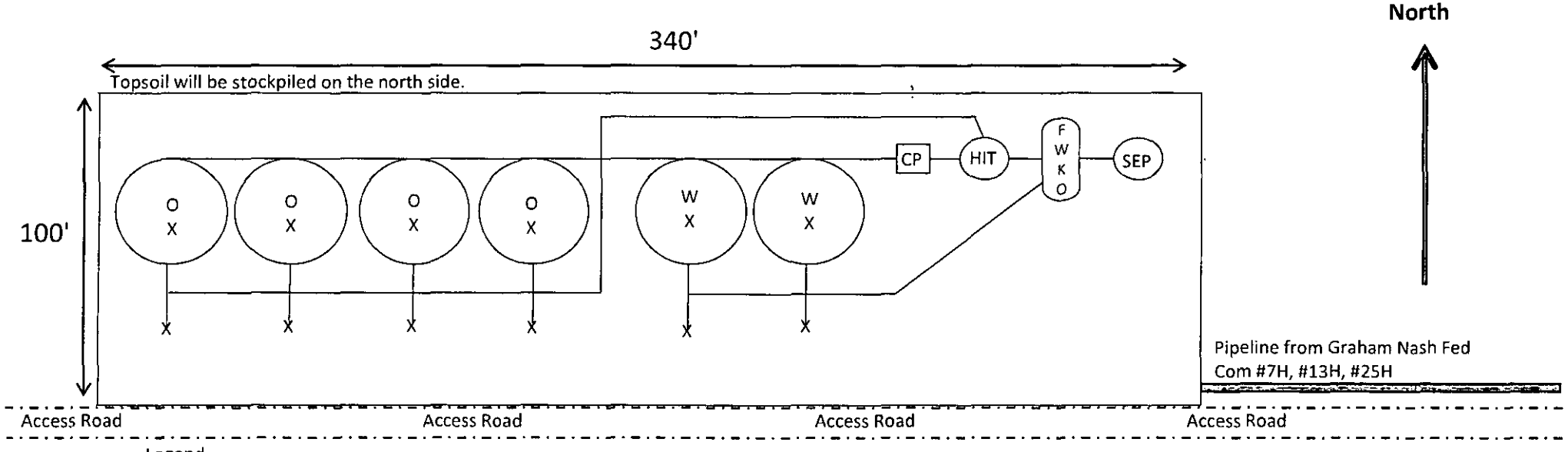
Well Site Layout

Production Facility Layout

Graham Nash CTB

Section 21 - T26S - R28E

Exhibit 3A



Legend

O = 500 BBL Steel Oil Tank
W = 500 BBL Steel Water Tank
H = 6' x 20' Heater
X = Valve
SEP = Separator
FWKO = Fresh Water Knockout
HIT = Heater
CP = Control Panel

Surface Use & Operating Plan

Graham Nash Federal Com #13H

- Surface Owner: State of New Mexico
- New Road: 1680.8'
- An additional 25' of new road will be required for the proposed Graham Nash Central Tank Battery
- Flow Line: Will follow road to the proposed Graham Nash Central Tank Battery
- Facilities: Requesting permission to construct a Graham Nash Central Tank Battery located at 75' FSL & 311' FWL of Section 21, T26S, R28E, as shown on Exhibit 3A

- **Well Site Information**
  V Door: East
  Topsoil: West
  Interim Reclamation: North

Notes

Onsite: On-site was done by Chad Young (BLM); Gerald Herrera (COG); Rand French (COG); Parker Holt (COG) on January 6, 2016.

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 Location Verification Map Exhibit 2. 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 Exhibit #2. The road shown in Exhibit #2 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 1680.8' of new access road will be required for this location. An additional 25' of new road will be required for the proposed Graham Nash Central Tank Battery. If any road is required it will be constructed as follows:

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

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

B. No turnouts are planned.

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

D. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from from approved SRO #2 Caliche Pit HA-0255, SE/4SE/4 Section 18, T26S, R28E.

3. Location of Existing Well:

The One-Mile Radius Map Exhibit 4 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.

B. If the well is productive, contemplated facilities will be as follows:

1) Will utilize tank battery and facilities at the proposed Graham Nash Central Tank Battery location.

2) Production will be sent to the proposed Graham Nash Central Tank Battery facility. A surface flow line of approximately 769.8' of 3" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the road to the proposed facility at the Graham Nash Central Tank Battery location. We plan to install a 4" surface polyethylene pipe transporting Gas Lift Gas from the Graham Nash Central Tank Battery to the Graham Nash Federal Com #13H which shares a pad with the Graham Nash Federal Com #7H and #25H. The surface Gas Lift Gas pipe of approximately 769.8" under a maximum pressure of 125 psi will be installed no farther than 10 feet from the edge of the road.

C. Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from approved SRO #2 Caliche Pit HA-0255, SE/4SE/4 Section 18, T26S, R28E. Any additional construction materials will be purchased from contractors.

3) 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.

4) 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. The water will be obtained from Glenn's Water Well Service P O Box 696, Tatum, NM 88267. (575) 398-2424 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 Exhibit #2. 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. Equipment that is needed to construct the proposed location will be as follows: Two dozers, one blade, one morograder, one backhoe, one water truck and two dump trucks.

B. The time line to complete construction will be approximately 10 days.

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

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

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

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

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

H. 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.

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

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved from approved SRO #2 Caliche Pit HA-0255, SE/4SE/4 Section 18, T26S, R28E.

7. Methods of Handling Water Disposal:

A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud box commerciales and taken to R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240. .

B. Drilling fluids will be contained in steel mud pits and taken to R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.

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 R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.

D. It is anticipated that the disposal of produced water will be trucked to the SRO/Myox Water Gathering System composed of: Willow 17 State SWD 1 (17-25S-28E), Myox 21 State 1 (21-25S-28E), Apple 5 State SWD 1 (5-25S-28E), SRO 101 SWD (5-26S-28E), SRO 102 SWD (16-26S-28E), SRO 103 SWD (17-26S-28E), SRO 104 SWD (10-26S-28E), Aminoil State 1 SWD (22-26S-28E).

E. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill-Lea Landfill LLC located at Mile Marker 64, Highway 62-180 East, P O Box 3247, Carlsbad, NM 88221. No toxic waste or hazardous chemicals will be produced by this operation.

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

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

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

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.

10. Sedimentation and Erosion Control

Immediately following pad construction approximately 800' of straw waddles will be placed on the top edge of the North side and 200' running Northwest and 100' on the Northeast corner of the location running Southeast to allow runoff to break to the Northeast corner and flow South into the Delaware River. This will reduce sedimentation on the well pad and protect the road and the pads to the Southwest.

11. Surface Ownership:

A. The surface is owned by the State of New Mexico. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.

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 # 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.**

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:

Sheryl Baker
Drilling Superintendent
COG Operating LLC
2208 West Main Street
Artesia, NM 88210
Phone (575) 748-6940 (office)
(432) 934-1873 (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
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating, LLC
LEASE NO.:	NMNM126965
WELL NAME & NO.:	13H-Graham Nash Federal Com
SURFACE HOLE FOOTAGE:	200'/S & 1550'/W
BOTTOM HOLE FOOTAGE	330'/S & 2100'/W
LOCATION:	Section 21, T.26 S., R.28 E., NMPM
COUNTY:	*Eddy 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.

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)

Communitization Agreement:

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. If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.

3. In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

Straw Wattles:
Straw wattles will be placed immediately outside the disturbed are of the entire pad to prevent erosion and runoff to the Delaware river.

Care will be taken to avoid damaging the pasture fence to the south of the pad. If the fence is damaged (poles bend or knocked over, wires cut, etc.), construction will cease under the fence is repaired to its pre-damaged condition.

Cave and Karst Conditions of Approval:

** Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

Cave/Karst Surface Mitigation
The following stipulations will be applied to minimize impacts during construction, drilling and production.

Construction:
In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

No Blasting:
No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

Pad Berming:
The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

Tank Battery Liners and Berms:
Tank battery locations and all facilities will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

Leak Detection System:
A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating values and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

Automatic Shut-off Systems:
Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation
The following stipulations will be applied to protect cave/karst and ground water concerns:

Rotary Drilling with Fresh Water:
Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

Directional Drilling:
Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

Lost Circulation:
ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

Abandonment Cementing:
Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:
Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

Powerlines:
Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Larger powerlines will adjust their pole spacing to avoid cave and karst features. The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

VI. CONSTRUCTION

A. NOTIFICATION

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

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

B. *TOPSOIL*

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

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

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

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

F. EXCLOSURE FENCING (CELLARS & PITS)

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

G. ON LEASE ACCESS ROADS

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

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

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

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

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

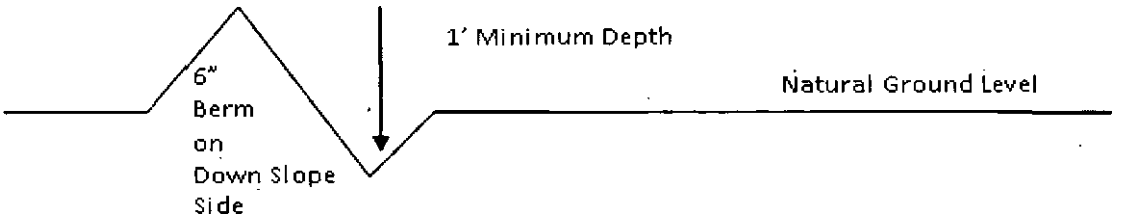
Ditching
Ditching shall be required on both sides of the road.

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

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

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

Cattleguards
An appropriately sized cattleguard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattleguards 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 cattleguards 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

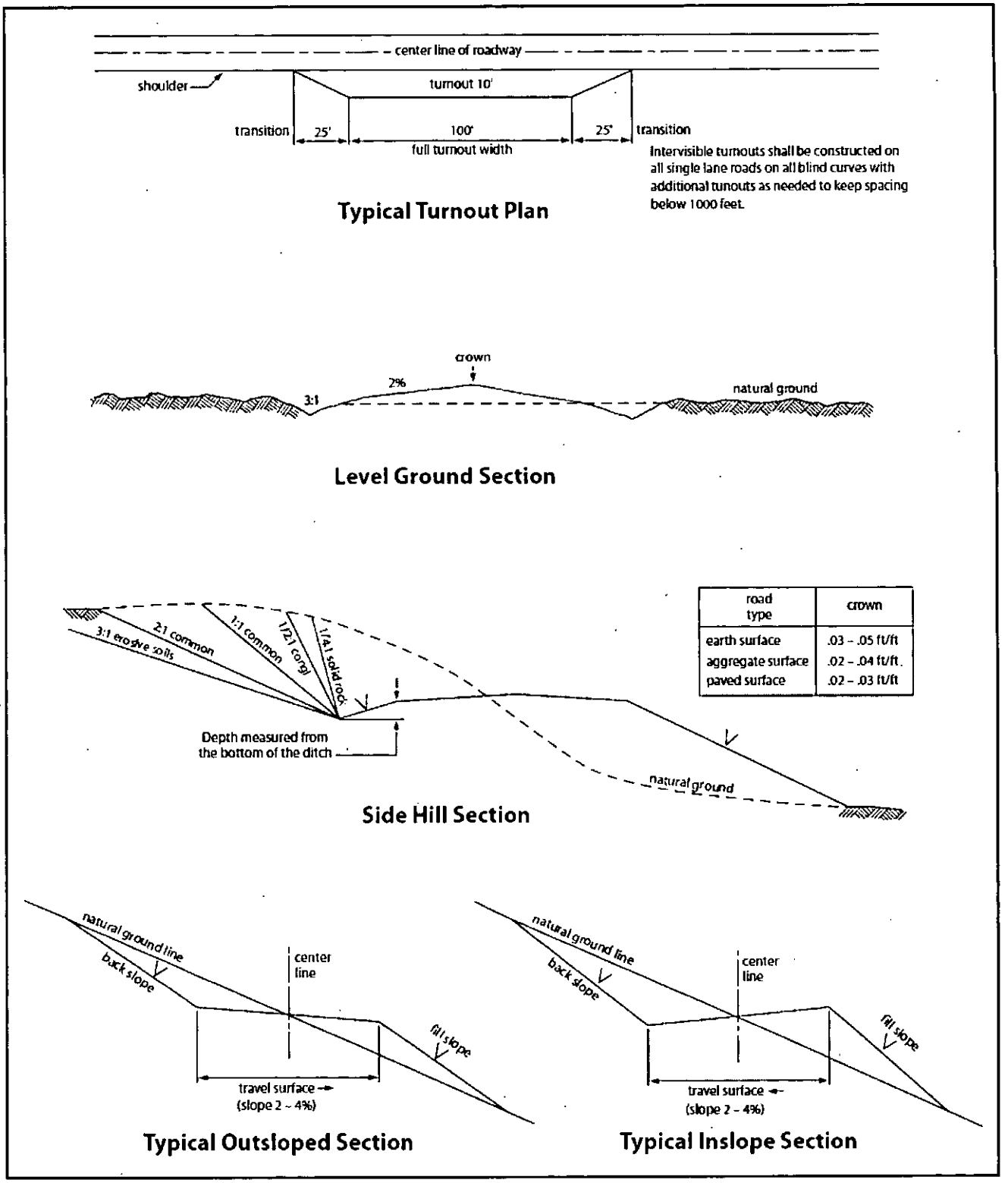


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

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

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

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

1. **Although Hydrogen Sulfide has not been reported in the area, it is always a potential hazard. It is recommended that monitoring equipment be onsite for potential Hydrogen Sulfide. 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, report measured amounts and formations to the BLM.**

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. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

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 is 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 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. Ensure that well log be run since data density is low for this area. This will assist in future development.**

B. CASING

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.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

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. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE.

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.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

HIGH CAVE/ KARST:
A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH.

ON A THREE STRING DESIGN; IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

Risks:
Possibility of water flows in the Salado and in the Castile.
Possibility of lost circulation in the Rustler and in the Delaware.
Abnormal pressures may be encountered when penetrating the Third (3rd) Bone Spring Sandstone and subsequent formations.

Fresh water mud to be used to the setting depth of the surface casing.

1. The **13 3/8** inch surface casing shall be set at approximately **350** feet **(below usable water and cave zones, and if salt is encountered, set casing at least 25 feet above the salt)** and cemented to the surface.
    a. *If cement does not circulate to the surface, the appropriate BLM office shall* be notified and a temperature survey utilizing an electronic type temperature

survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

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

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

2. The minimum required fill of cement behind the **9 5/8** inch intermediate casing which shall be set at approximately **2370** feet **(in the top of the competent Lamar Limestone or basal anhydrite of the Castile Formation)** is:

   ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

If cement does not circulate to surface on the intermediate casing, the cement on the production casing must come to surface.

3. The minimum required fill of cement behind the **5 1/2** inch production casing is:

   ☒ Cement tie-back is appropriate as proposed. Operator shall provide method of verification.

4. 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.

C. 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 53.
2. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.
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. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.
c. 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.
d. The results of the test shall be reported to the appropriate BLM office.
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 if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
g. BOP/BOPE must be tested by an independent service company within **500** feet of the top of the **Third (3rd) Bone Spring Sandstone** 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.

D. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Third (3rd) Bone Spring Sandstone** and **Wolfcamp formation**, and shall be used until production casing is run and cemented.

Proposed mud weight may not be adequate for drilling through **Third (3rd) Bone Spring Sandstone** and **Wolfcamp formation**.

E. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

F. WASTE MATERIAL AND FLUIDS

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

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

KGR 05292016

VIII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

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

Exclosure Netting (Open-top Tanks)

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

Chemical and Fuel Secondary Containment and Exclosure Screening

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

Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage

perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

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

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

B. PIPELINES
STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES

A copy of the Grant and attachments, including stipulations, survey plat(s) and/or map(s), shall be on location during construction. BLM personnel may request to review a copy of your permit during construction to ensure compliance with all stipulations.

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

1. Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.

2. Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, Holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC § 2601 *et seq.* (1982) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant (*see* 40 CFR, Part 702-799 and in particular, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. Holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the

Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601, *et seq.* or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, *et seq.*) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way Holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way Holder on the Right-of-Way. This provision applies without regard to whether a release is caused by Holder, its agent, or unrelated third parties.

4. Holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. Holder shall be held to a standard of strict liability for damage or injury to the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

a. Activities of Holder including, but not limited to: construction, operation, maintenance, and termination of the facility;

b. Activities of other parties including, but not limited to:
   (1) Land clearing
   (2) Earth-disturbing and earth-moving work
   (3) Blasting
   (4) Vandalism and sabotage;

c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

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

6. All construction and maintenance activity shall be confined to the authorized right-of-way width of **20** feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline shall be installed no farther than 10 feet from

the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline shall be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity shall be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

8. Holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky of duney areas, the pipeline shall be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of **24** inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

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

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

12. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

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

14. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

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

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

17. Surface pipelines shall be less than or equal to 4 inches and a working pressure below 125 psi.

IX. 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).

X. FINAL ABANDONMENT & RECLAMATION

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

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

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

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

Seed Mixture 1 for Loamy Sites

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

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

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

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

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