13-984

Form 3160-3
(March 2012)

UNORTHODOX LOCATION

OCD Artesia

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

1a. Type of Work: ☑ DRILL ☐ REENTER	5. Lease Serial No. NMNM114349
1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone	6. If Indian, Allotee or Tribe Name
2. Name of Operator COG Operating LLC. <229137>	7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. *(include area code)* 575-748-6940
4. Location of Well *(Report location clearly and in accordance with any State requirements.*)* At surface 190' FNL & 500' FEL Unit Letter A (NENE) SHL Sec. 31 - T25S - R27E; At proposed prod. Zone 330' FSL & 380' FEL Unit Letter P (SESE) BHL Sec. 31 - T25S - R27E	8. Lease Name and Well No. Jack Federal #5H <38565>
	9. API Well No. 30-015-42135
	10. Field and Pool, or Exploratory WILDCAT G-03 S262631M; BS ~~Wildcat, Bone Spring~~ <97818>
	11. Sec., T.R.M. or Blk and Survey or Area Sec. 31 - T25S - R27E
14. Distance in miles and direction from nearest town or post office* Approximately 9 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) 190'	16. No. of acres in lease 638.40; 17. Spacing Unit dedicated to this well 160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1810' (Jack Fed #4H) BHL:791'	19. Proposed Depth TVD: 7,560' MD: 12,101'; 20. BLM/BIA Bond No. on file NMB000740 & NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3248.8' GL	22. Approximate date work will start* 2/1/2014; 23. Estimated duration 30 days

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 11/21/2013
Title Regulatory Analyst		
Approved by *(Signature)*. /S/ STEPHEN J. CAFFEY	Name *(Printed/Typed)*	Date MAR 4 2014
Title FIELD MANAGER	Office CARLSBAD FIELD OFFICE	

RECEIVED
MAR 06 2014
NMOCD ARTESIA

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.
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

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)

Carlsbad Controlled Water Basin

(Instructions on page 2)

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

The undersigned accepts all applicable terms, conditions, stipulations, and restrictions concerning operations conducted on the leased land or portion thereof, as described below:

Date: November _____, 2013

Lease #: NMNM114349
Jack Federal #5H

Legal Description: Sec. 31 – T25S – R27E
Eddy County, New Mexico

Formation(s): Bone Spring

Bond Coverage: Statewide

BLM Bond File #: NMB000740 & NMB000215

COG OPERATING LLC

_____
Mayte Reyes
Regulatory Analyst

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

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

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

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

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015- 42135	97818	~~Wildcat; Bone Spring~~ WILDCAT G-03 S262631M;BS.

Property Code	Property Name	Well Number
38565	JACK FEDERAL	5H

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	3248.8'

Surface Location

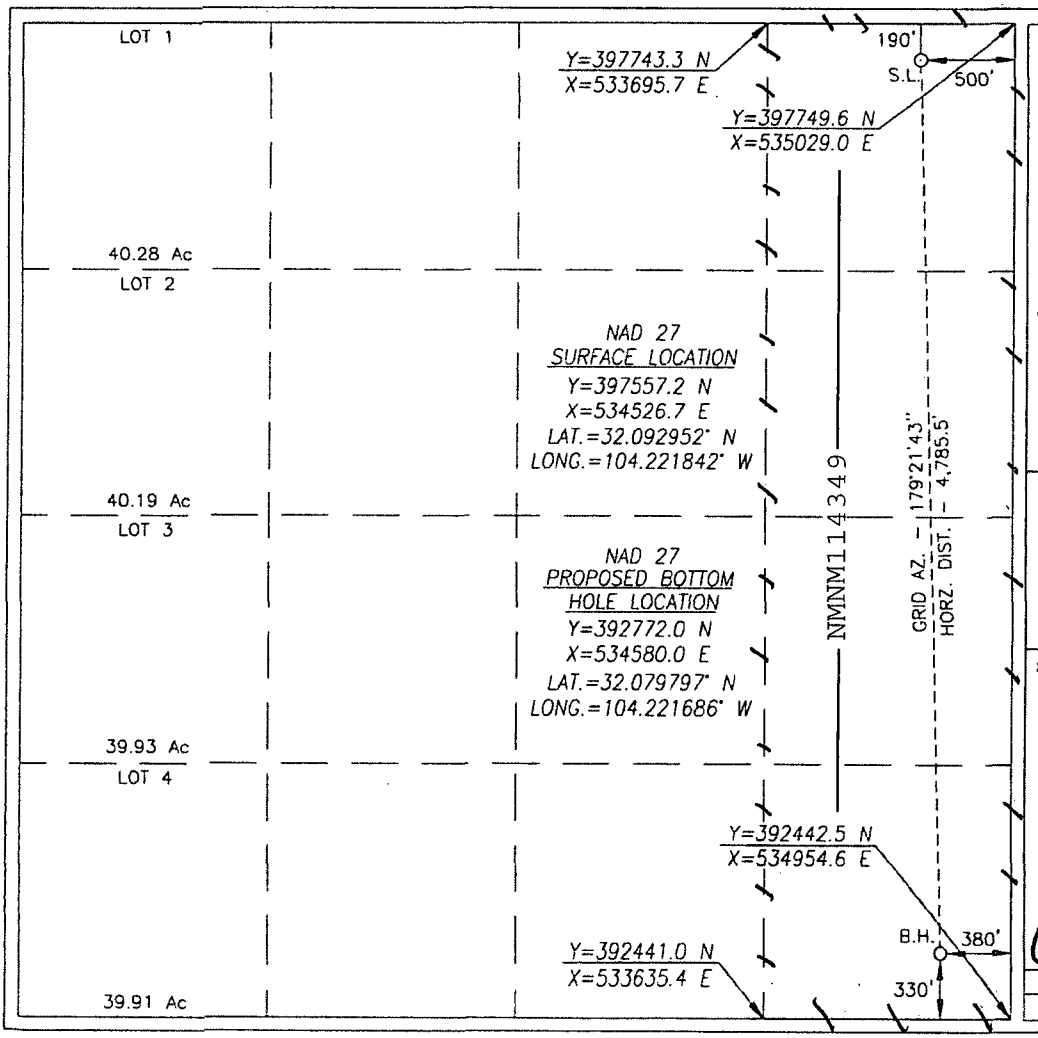
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	31	25-S	27-E		190	NORTH	500	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	31	25-S	27-E		330	SOUTH	380	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			12101 3-4

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



OPERATOR CERTIFICATION

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

Melanie Parker 11/21/13
Signature Date

Melanie J. Parker
Printed Name

mparker@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.

AUGUST 27, 2013
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

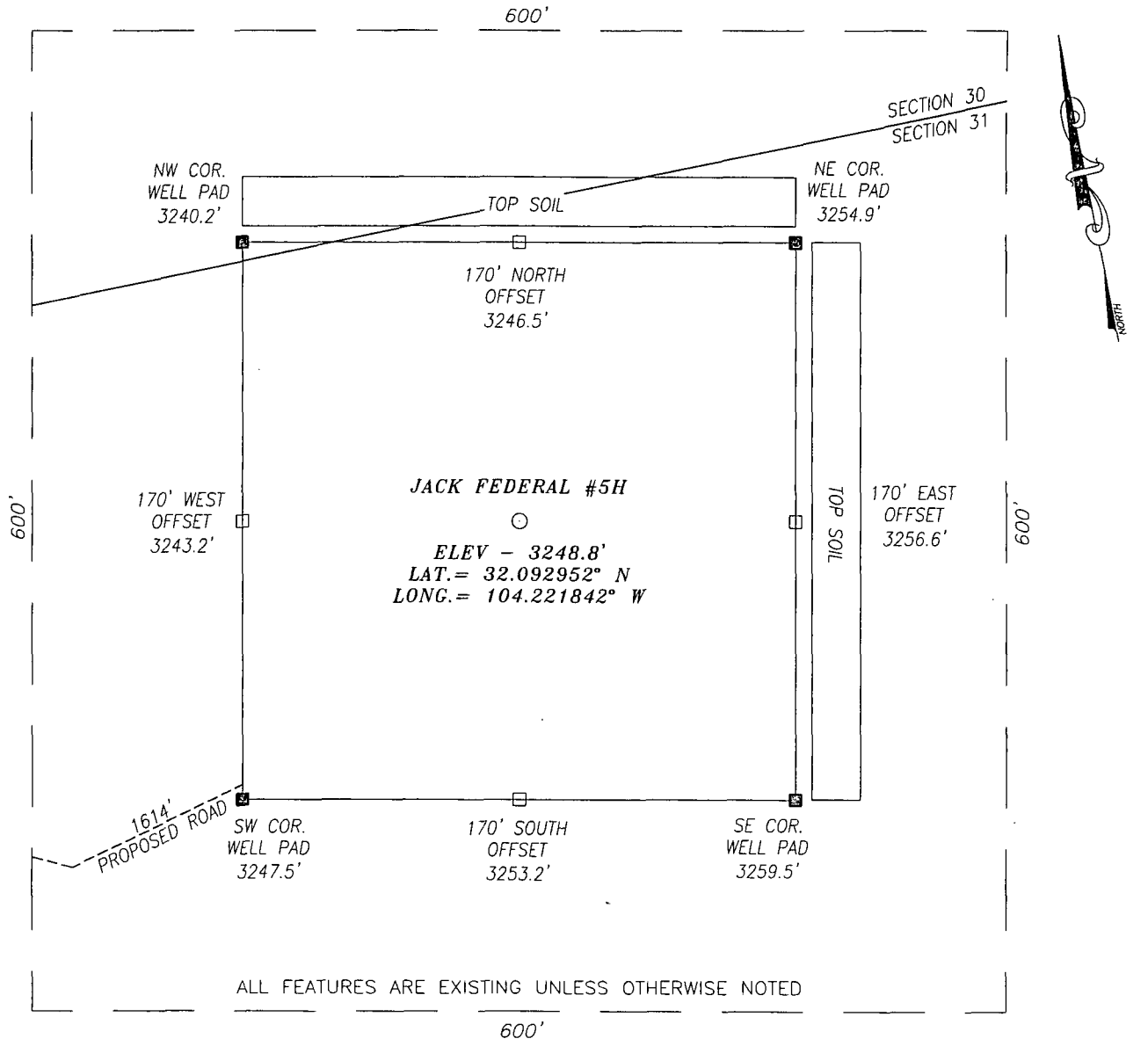
Chad Harcrow 9/16/13

Certificate No. CHAD HARCROW 17777

W.O. # 13-605 DRAWN BY: TL

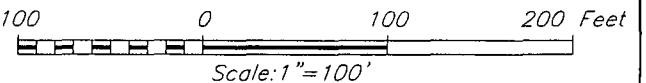
SECTION 31, TOWNSHIP 25 SOUTH, RANGE 27 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF WHITE CITY RD. AND CR #742 (JOHN D FOREHAND RD) GO NORTH ON CR #742 FOR APPROX. 1.9 MILES; THEN TURN RIGHT (EAST) AND GO APPROX. 0.5 MILES TO EXISTING JACK FED #1H WELL PAD; THEN FROM SOUTHEAST CORNER OF PAD PROPOSED WELL IS APPROX. 4312 FEET EAST.



Scale: 1"=100'

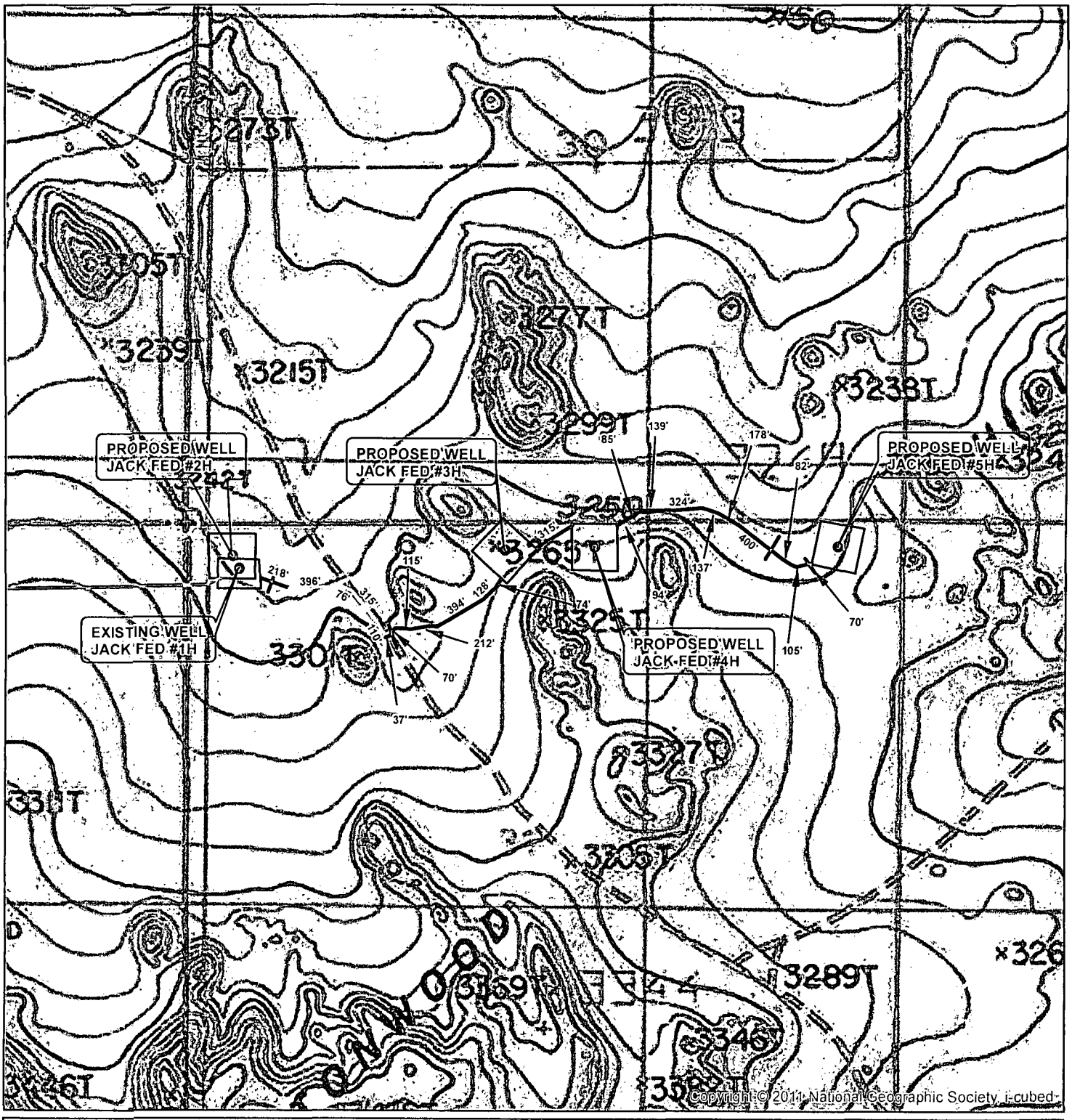
HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

COG OPERATING, LLC

JACK FEDERAL #5H WELL
LOCATED 190 FEET FROM THE NORTH LINE
AND 500 FEET FROM THE EAST LINE OF SECTION 31,
TOWNSHIP 25 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: 08/27/2013		PAGE: 1 OF 1
DRAFTING DATE: 08/30/2013		
APPROVED BY: CH	DRAWN BY: TL	FILE: 13-605

ACCESS ROAD MAP



SEC 30, 31, TWP. 25S, RGE. 27E
SURVEY: N.M.P.M
COUNTY: EDDY STATE: NEW MEXICO
DESCRIPTION: JACK FED #2H, 3H, 4H, & 5H

OPERATOR: COG OPERATING LLC
LEASE: JACK FED

W.O. # 13-602, 603, 604, 605

- WELL
- WELL PAD
- MAIN ROAD
- PROPOSED LOW WATER CROSSINGS
- PROPOSED ROAD
- TWO TRACK ROAD TO BE UPGRADED

1 IN = 1,000 FT

N

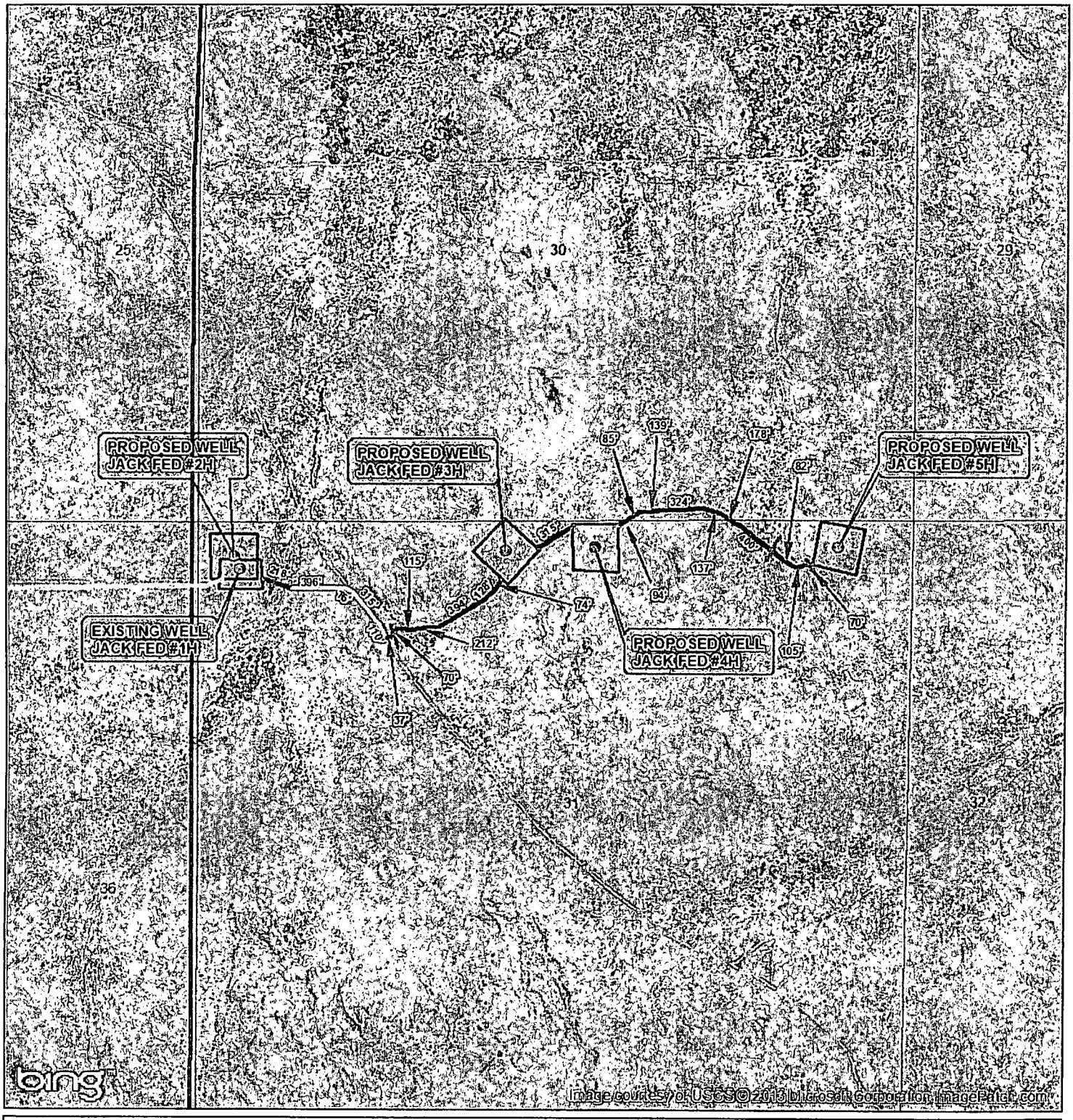
0 2,000 FEET

0 0.125 0.25 0.5 Miles

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

MAP DATE: 8/30/2013

ACCESS ROAD MAP



SEC 30, 31, TWP. 25S, RGE. 27E
SURVEY: N.M.P.M
COUNTY: EDDY STATE: NEW MEXICO
DESCRIPTION: JACK FED #2H, 3H, 4H, & 5H

OPERATOR: COG OPERATING LLC
LEASE: JACK FED

W.O. # 13-602, 603, 604, 605

WELL
WELL PAD
MAIN ROAD
PROPOSED LOW WATER CROSSINGS
PROPOSED ROAD
TWO TRACK ROAD TO BE UPGRADED

1 IN = 1,000 FT

N

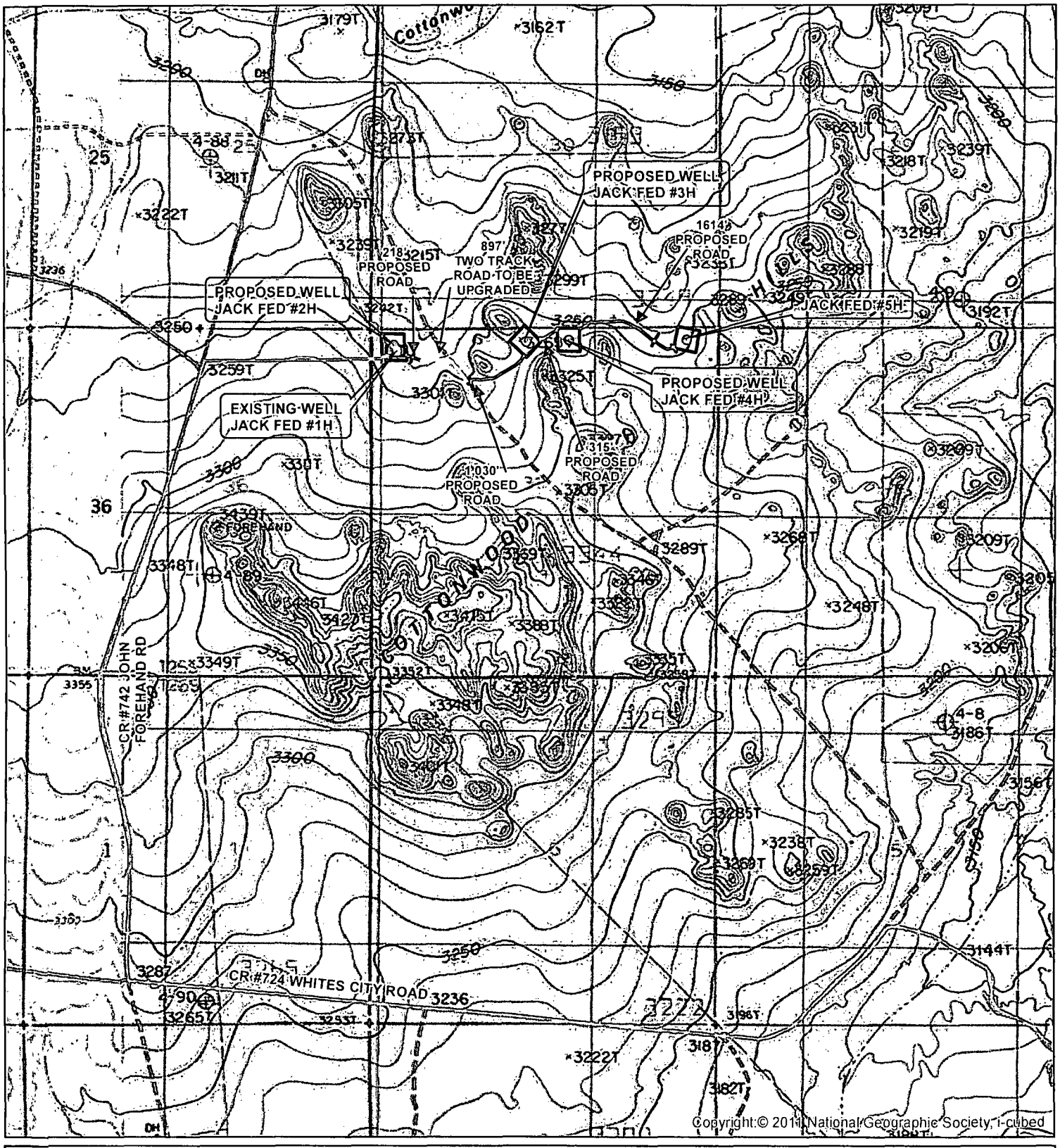
0 2,000 FEET

0 0.125 0.25 0.5 Miles

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

MAP DATE: 8/30/2013

EXHIBIT 2 LOCATION VERIFICATION



SEC. 31, TWP. 25 S, RGE. 27 E
SURVEY: N.M.P.M
COUNTY: EDDY STATE: NEW MEXICO
DESCRIPTION: JACK FED #5H
190' FNL & 500' FEL

ELEVATION: 3248.8'
OPERATOR: COG OPERATING LLC
LEASE: JACK FED

W.O. # 13-605

N

1 IN = 2,000 FT

0 0.175 0.35 0.7 Miles

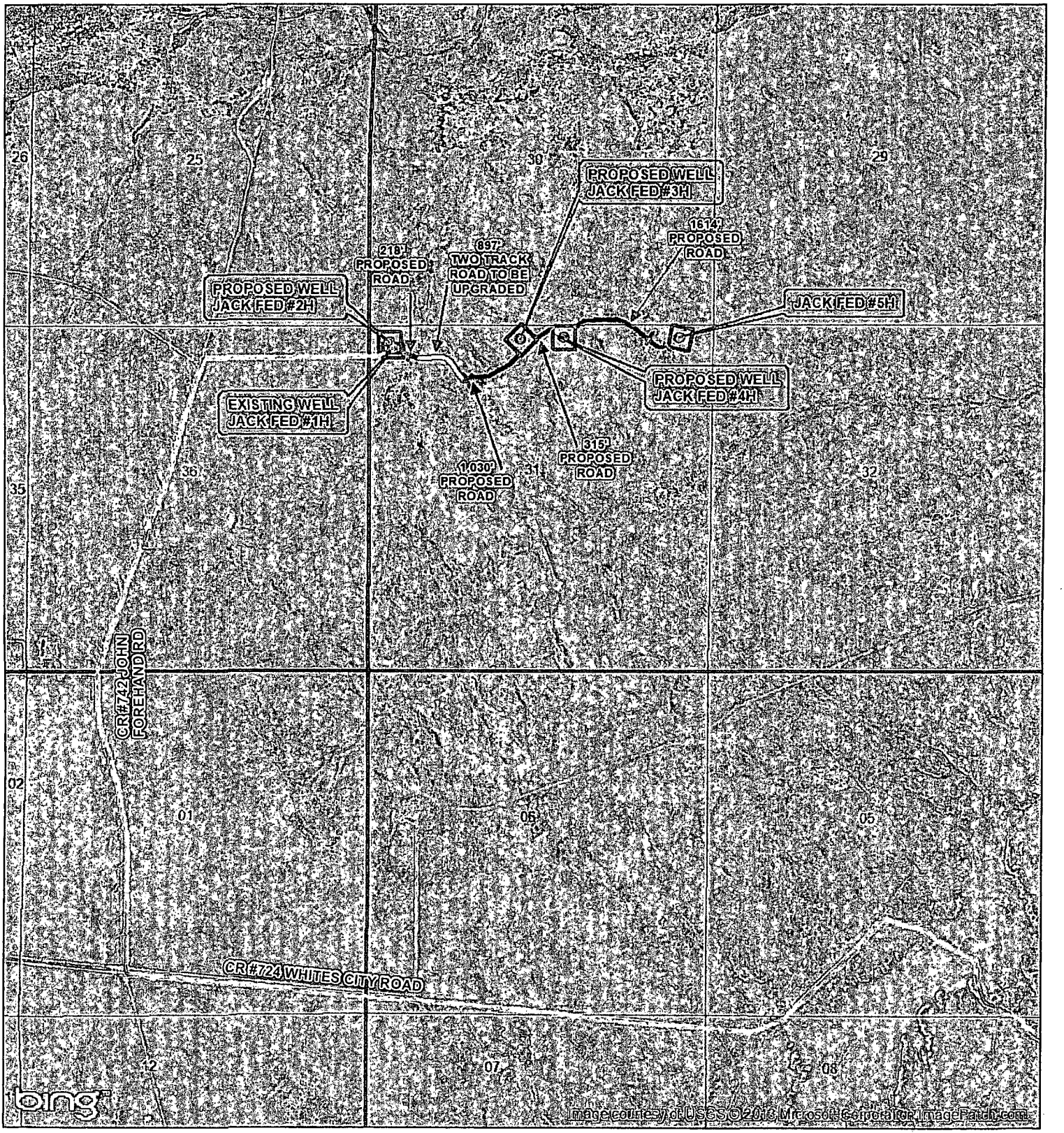
0 900 1,800 3,600 Feet

- WELL
- WELLPAD
- MAIN ROAD
- PROPOSED LOW WATER CROSSINGS
- PROPOSED ROAD
- TWO TRACK ROAD TO BE UPGRADED

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

MAP DATE: 8/30/2013

LOCATION VERIFICATION



SEC. 31, TWP. 25 S, RGE. 27 E
SURVEY: N.M.P.M
COUNTY: EDDY STATE: NEW MEXICO
DESCRIPTION: JACK FED #5H
190' FNL & 500' FEL

ELEVATION: 3248.8'
OPERATOR: COG OPERATING LLC
LEASE: JACK FED

W.O. # 13-605

N

1 IN = 2,000 FT

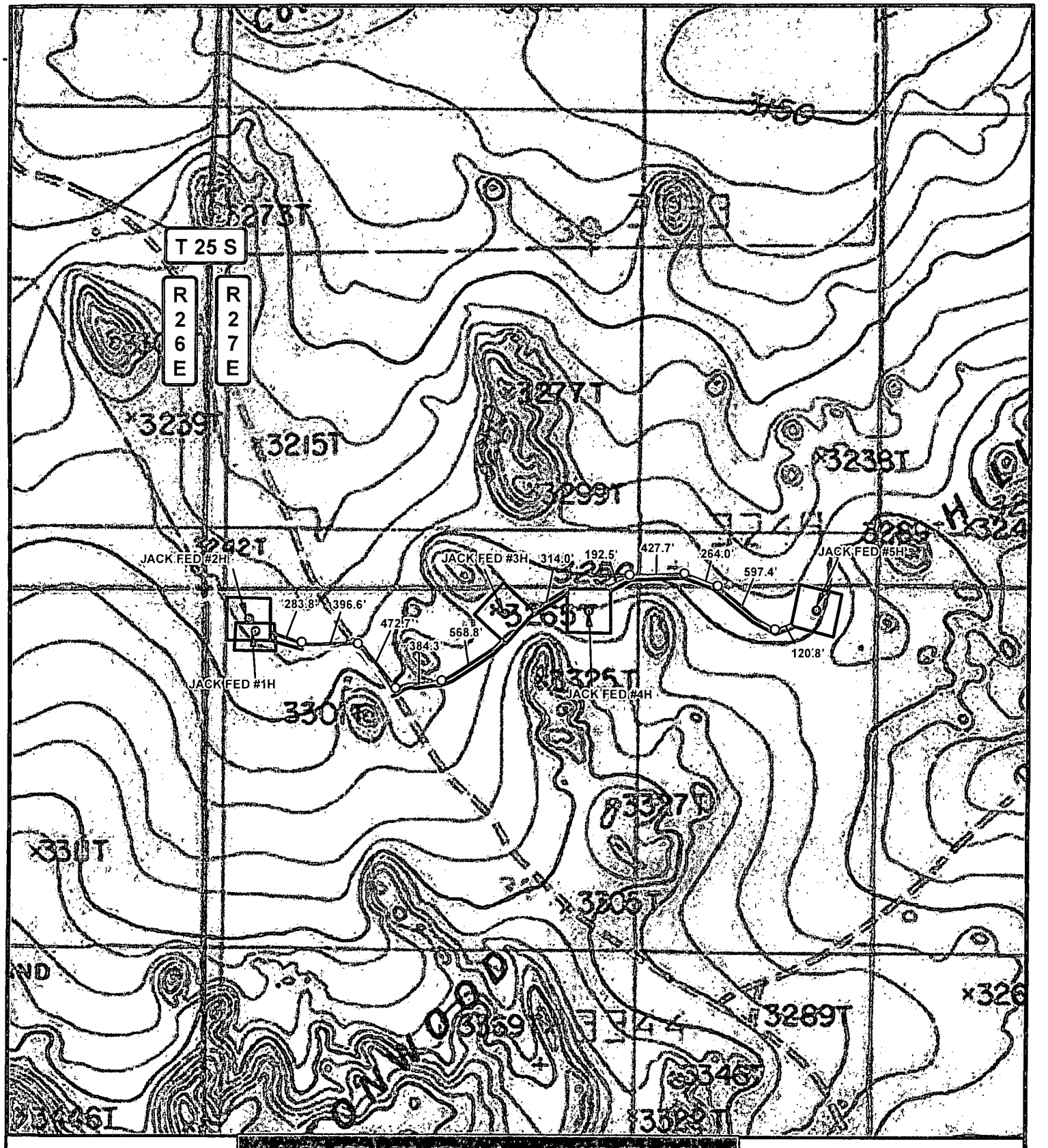
0 0.175 0.35 0.7 Miles

0 900 1,800 3,600 Feet

- WELL
- WELLPAD
- MAIN ROAD
- PROPOSED LOW WATER CROSSINGS
- PROPOSED ROAD
- TWO TRACK ROAD TO BE UPGRADED

HARCROW SURVEYING, LLC
110' WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

MAP DATE: 8/30/2013



LEGEND

- BEND
- WELL
- WELL PAD
- FLOWLINE
- PROPOSED ROAD
- TWO TRACK ROAD

JACK FED #2H, #3H, #4H, & #5H FLOWLINE

SECTION: 30, 31	TOWNSHIP: 25 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	LENGTH: 4022.6'
W.O. # 13-855	LEASE: JACK FED	SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

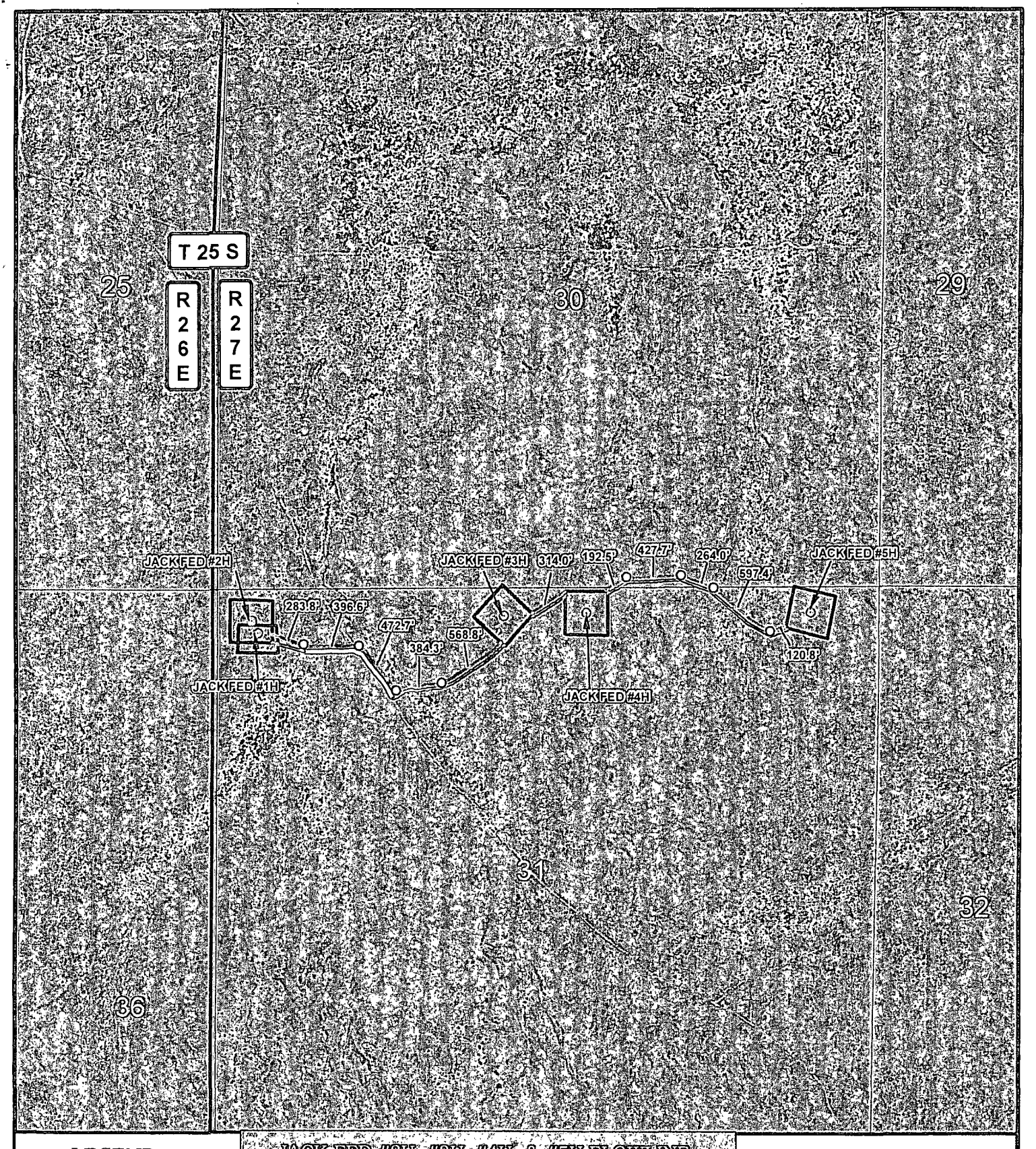
FLOWLINE MAP | TOPO | 11/20/2013 | S.P.

CONCHO

COG OPERATING, LLC

N

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com



LEGEND

- BEND
- WELL
- WELL PAD
- FLOWLINE
- PROPOSED ROAD
- TWO TRACK ROAD

JACK FED #2H, #3H, #4H, & #5H FLOWLINE

SECTION: 30, 31	TOWNSHIP: 25 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	LENGTH: 4022.6'
W.O. # 13-855	LEASE: JACK FED	SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

FLOWLINE MAP IMAGERY 11/20/2013 S.P.

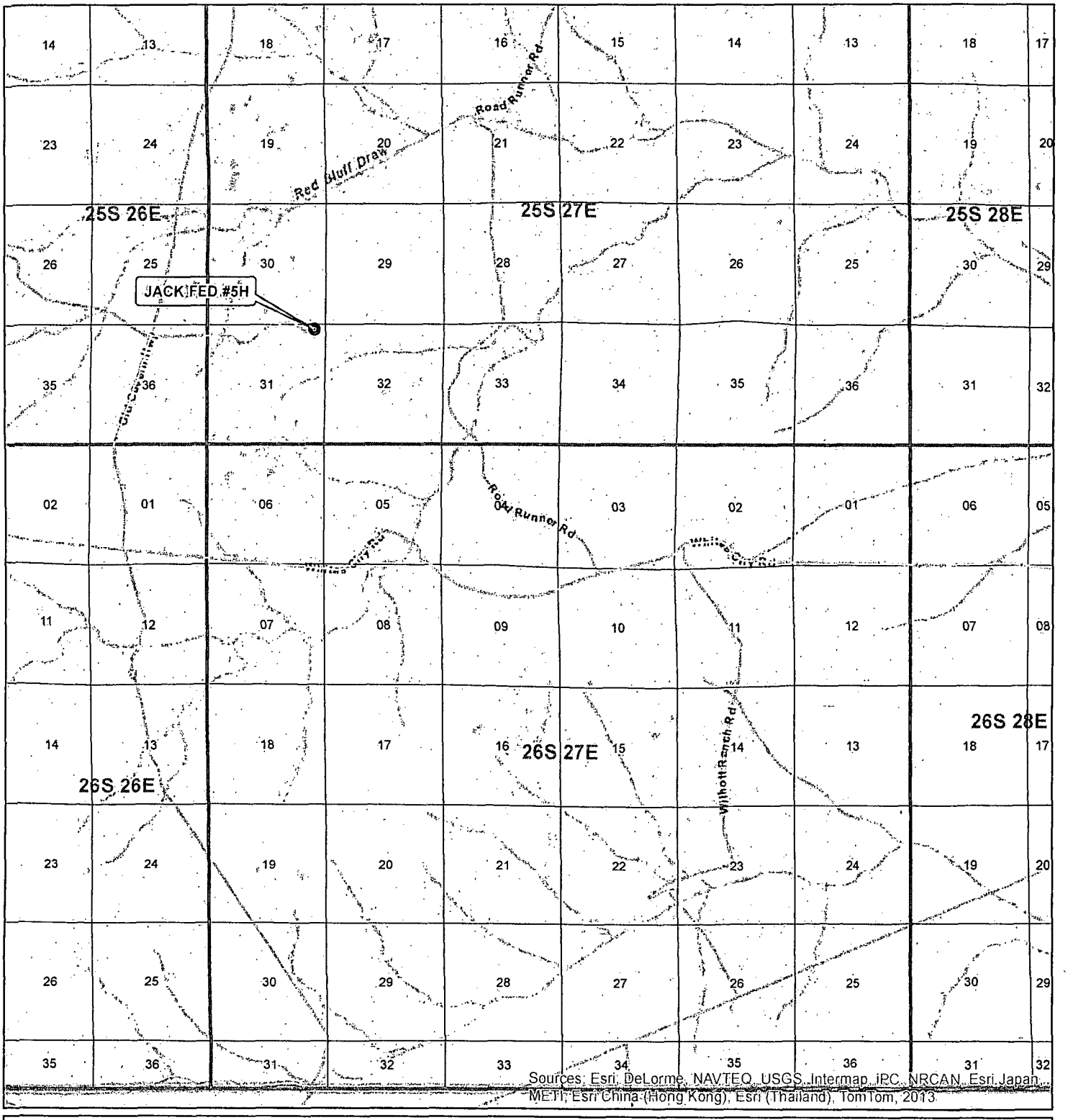
CONCHO

COG OPERATING, LLC

N

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

VICINITY MAP



SEC. 31, TWP. 25 S, RGE. 27 E
SURVEY: N.M.P.M
COUNTY: EDDY STATE: NEW MEXICO
DESCRIPTION: JACK FED #5H
190' FNL & 500' FEL

ELEVATION: 3248.8'
OPERATOR: COG OPERATING LLC
LEASE: JACK FED

W.O. # 13-605

1 IN = 6,000 FT

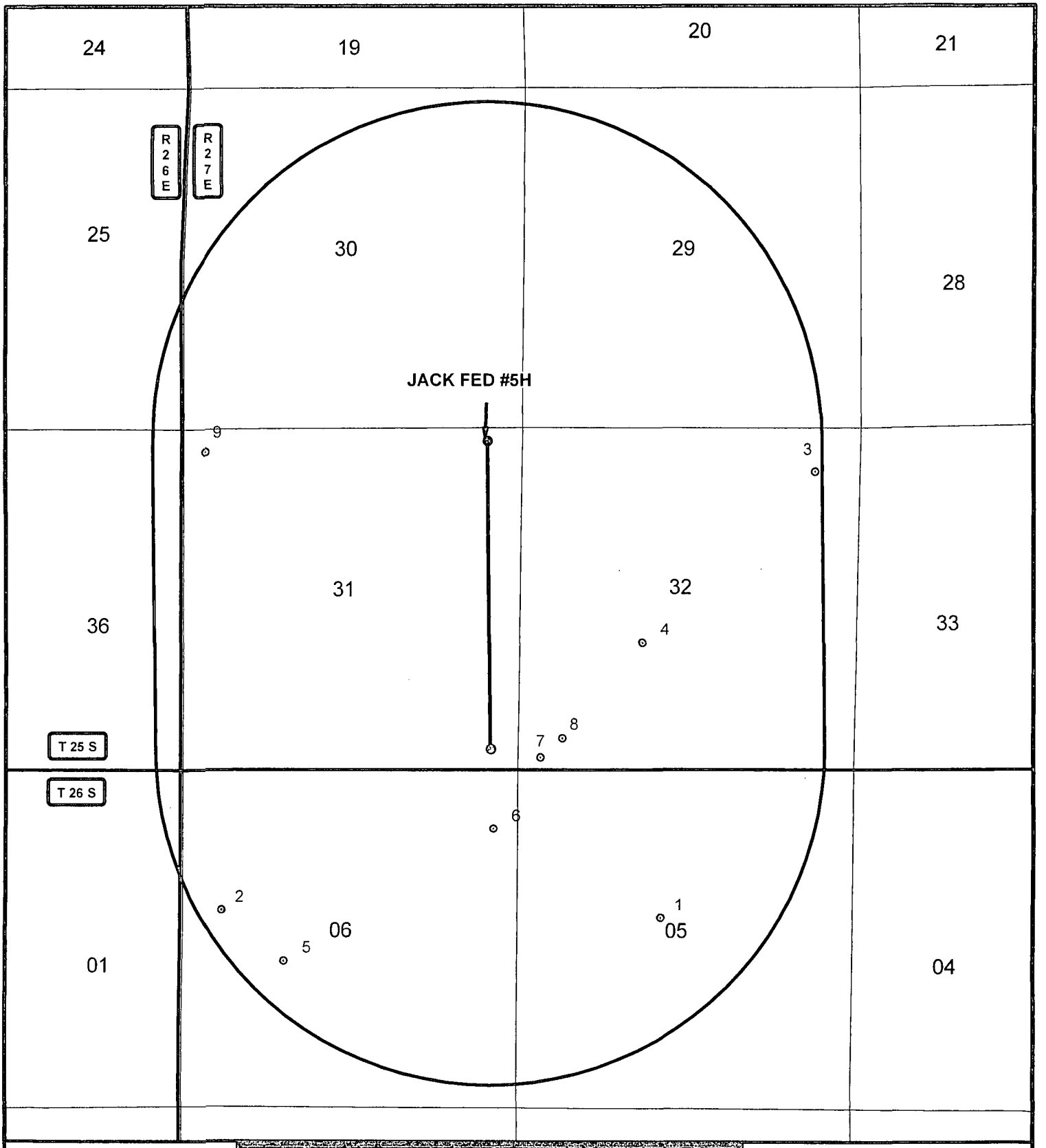
N

0 0.5 MILES

WELL
TOWNSHIP
SECTION

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

MAP DATE: 8/30/2013



LEGEND

- Wells within 1 mi.
- Well
- Bottomhole
- 1 mi. Buffer

WELL NAME: JACK FED #5H

SECTION: 31	TOWNSHIP: 25 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	190' FNL, 500' FEL
W.O. # 13-847	LEASE: JACK FED	SURVEY: N.M.P.M

0 2,500 5,000 FEET

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

1 MILE BUFFER MAP 11/15/2013 S.P.

N

CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC
1107 WATSON, ARTESIA N.M. 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
JACK FEDERAL # 5H
SHL: 190' FNL & 500' FEL, Unit A
Sec. 31 T25S R27E
BHL: 330' FSL & 380' FEL, Unit P
Sec 31, T25S, R27E
Eddy County, NM

1. **Proration Unit Spacing:** 160 Acres

2. **Ground Elevation:** 3248.8'

3. **Proposed Depths:** Horizontal: **EOC (end of curve) TVD =7520' MD = 7788'**
Toe (end of lateral) TVD = 7560' MD= 12101'

4. **Estimated tops of geological markers: (TVD)**

Fresh Water	142'
Rustler	287'
Top of Salt	557'
BOS/Fletcher Anhydrite	**1857'**
Delaware/Lamar	**2049'**
Bell Canyon	**2096'**
Cherry Canyon	**2952'**
Brushy Canyon	**4039'**
Bone Spring	5615'
Upper Avalon	5915'
Lower Avalon	6141'
1st Bone Spring Sand	6572'
2nd Bone Spring Sand	7294'
3rd Bone Spring Sand	8403'
Wolfcamp	8757'

5. **Possible mineral bearing formations:**

Delaware/Lamar	**2049'**	**Oil/Gas**
Bell Canyon	**2096'**	**Oil/Gas**
Cherry Canyon	**2952'**	**Oil/Gas**
Brushy Canyon	**4039'**	**Oil/Gas**
Bone Spring	5615'	Oil/Gas
Upper Avalon	5915'	Oil/Gas
Lower Avalon	6141'	Oil/Gas
1st Bone Spring Sand	6572'	Oil/Gas
2nd Bone Spring Sand	7294'	Oil/Gas
3rd Bone Spring Sand	8403'	Oil/Gas
Wolfcamp	8757'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to ~~310'~~ 390' and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be protected by setting 9 5/8" casing to ~~2070'~~ 2030' and circulating cement back to surface. Any zones between 9 5/8" casing shoe and TD, which contain commercial quantities of oil and/or gas will have cement circulated across them. This will be achieved by cementing 5 ½" production casing from the TD to surface.

6. Proposed Mud System

The well will be drilled to TD with a combination of fresh water, brine, **cut brine mud systems.** The applicable depths and properties of these systems are as follows:

See COA

DEPTH (MD)	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-~~310~~ 390 / 2030	Fresh Water	8.5	29	N.C.
~~310~~'-~~2070~~'	Brine	10	29	N.C.
~~2070~~'-12101'	Cut Brine	8.9-9.2	29	N.C.

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

Visual or electronic mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume.

The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weights, safe drilling practices and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

7. Proposed Casing Program

See COA

Hole Size	Interval MD	OD Casing	Weight	Grade	Condition	Jt.	brst/clps/ten
17 ½"	0-~~310~~ 390'	13 3/8" 0-~~310~~'	54.5#	J-55	New	ST&C	2.80/2.62/11.12
12 ¼"	~~310~~'-~~2070~~' 2030'	9 5/8" 0'-~~2070~~'	40#	J-55	New	LT&C	1.91/2.39/7.41
7 7/8"	~~2070~~'-12101'	5 1/2" 0-12101'	17#	P-110	New	LT&C	1.33/2.07/4.03

8. Proposed Cement Program

13 3/8" SURFACE: **(Circulate to Surface)**

		Description	Yield	Density	Water Requirements
Tail: 0'-310' Excess 84%	350 sks	Class C w/2% $CaCl_2$	1.32 cf/sk	14.8 ppg	6.3 gal/sk

9 5/8" INTERMEDIATE CASING:

Single Stage: (Circulate to Surface)

1st Lead: 0'-310' Excess 71%	100 sks	EconoCem-HLC + 5% Salt +5 pps Kol-Seal	2.00 cf/sk	12.7 ppg	10.6 gal/sk
2nd Lead:* 310'-1500' Excess 88%	350 sks	EconoCem-HLC + 5% Salt +5 pps Kol-Seal	2.00 cf/sk	12.7 ppg	10.6 gal./sk.
Tail:* 1500'-2070' Excess 69%	250 sks	Class C w/2% $CaCl_2$	1.32 cf/sk	14.8 ppg	6.3 gal./sk.

* open hole
Combined OH excess 81%

5 ½" PRODUCTION CASING:

Single Stage: (Cement calculated to surface. Minimum tie back 200' above 9 5/8" intermediate casing)

Lead: 0'-2070' (min. tie-back 200' above 9 5/8" shoe) Excess 16%	250 sks	EconoCem-H +0.5 % Halad-322+ 5 pps Kol-Seal+ 0.25 pps D-Air 7000 + 0.2% HR-601	2.51 cf/sk	11.9 ppg	14.2 gal/sk.
Lead:* 2070'-7043'(KOP) Excess 32%	450 sks	EconoCem-H +0.5% Halad-322+ 5 pps Kol-Seal+ 0.25 pps D-Air 7000 + 0.2% HR 601	2.51 cf/sk	11.9 ppg	14.2 gal/sk

		Description	Yield	Density	Water Requirements
Tail:*					
7043'(KOP) - 12101'	1000 sks	VersaCem + 0.4% GasStop + 0.3% CFR-3 + 1 % Salt + 1% HR-601	1.24 cf/sk	14.4 ppg	5.7 gal/sk
Excess 41%					

*open hole
Combined OH Excess 36%

9. Pressure Control Equipment:

A 13 5/8" 2000 psi Hydril type annular preventer with mud cross, choke manifold, chokes, kill line, Kelly cock, safety valve and subs to fit all drill strings in use as provided for in Onshore Order #2 will be nippled up on the 13 3/8" x 2000 psi SOW X 13 5/8" x 2000 psi casing head (see attached BOPE drawings). This unit will be hydraulically operated and will be tested by independent tester using test plug to 250 psig/300 psig low and 1000 psig high. Choke line valve, chokes, upper Kelly cock valve , safety valve shall also be tested to 250 psig/300 psig low and **2000** psig high by independent tester.

After setting the 9 5/8" intermediate casing the following BOPE as provided for in Onshore Order #2 will be rigged up on the 9 5/8" intermediate casing spool **(11" 2000 psi x 11" 3000 psi): 11" X 3000 psi annular, 11" X 3000 psi** double ram type preventer with blind rams on top and 4 1/2" drill pipe rams on the bottom, choke, mud cross, choke manifold, 4" diameter choke line, 2" kill line, kelly cock, safety valve with proper subs for all drill string connections in use (see attached BOPE drawings). The BOPE including auxiliary equipment (chokes, choke manifold etc.) will be tested by independent tester..

A test plug will be used and all BOPE tested to 250 psig/ 300 psig low pressure and **3000** psig high pressure for 10 minutes. Annular preventer will be tested to 1500 psig. BOP stack will be used continuously until total depth is reached. 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. Any time a component of the BOP stack or choke manifold is changed or installed BOPE will be re-tested as required.

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string depth or 1500 psig, whichever is greater, but not to exceed 70 percent of casing's minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action will be taken.

10. Production Hole Drilling Summary:

Drill 7 7/8" hole to 7043'. Kick off at +/- 7043', building curve at 12°/100' to 89.47° inclination at 7788'MD/7520' TVD az 179.36°. Continue lateral section at 89.47° inc., az 179.36° for +/-4313' lateral to TD at +/-12101' MD/ 7560' TVD. Run 5-1/2" production casing. 5 ½" casing will be isolated by a single stage cement job. Cement will be calculated to surface (min tie back is 200' above 9 5/8" csg shoe).

11. Auxiliary Well Control and Monitoring Equipment

A. Kelly cock will be kept in the drill string at all times.

B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

12. Logging, Testing and Coring Program:

A. **Open hole logs: GR/NL TD to surface**

B. The mud logging program will consist of lagged 20' samples from intermediate casing shoe to KOP and thru curve and lateral to TD.

C. Drill Stem test is not anticipated

D. No conventional coring is anticipated.

E. Further testing procedures will be determined after the 5 ½" production casing has been cemented at TD based on drill shows and log evaluation.

13. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:

No abnormal pressures or temperatures are anticipated. The estimated bottom hole temperature is112° Fahrenheit and estimated maximum bottom hole pressure is 3215 psi.. Wells in this area will penetrate formations that are known or could reasonably be expected to contain hydrogen sulfide. Therefore, a H_2S drilling operations plan is included with this APD. Hydrogen Sulfide detection equipment will be operational and breathing equipment will be on location after drilling out the 13 3/8" casing shoe and until the 5 ½" casing is cemented. **If while drilling the intermediate hole section H_2S concentrations exceed 100 ppm the well will be shut-in and a remote operated choke installed. A remote operated choke will be installed as part of the 3000 psi BOP equipment rigged up after setting 9 5/8" casing and before drilling 9 5/8" casing shoe.** COG will comply with Onshore Order #6. All BOPE testing companies used by COG have H2S certified employees and will work on H2S locations. No major loss circulation zones have been reported in offsetting wells.

14. Anticipated Starting Date

Drilling operations will commence on approximately **February 28, 2014** with drilling and completion operations lasting approximately ***90*** days.

GEG/12.19.13

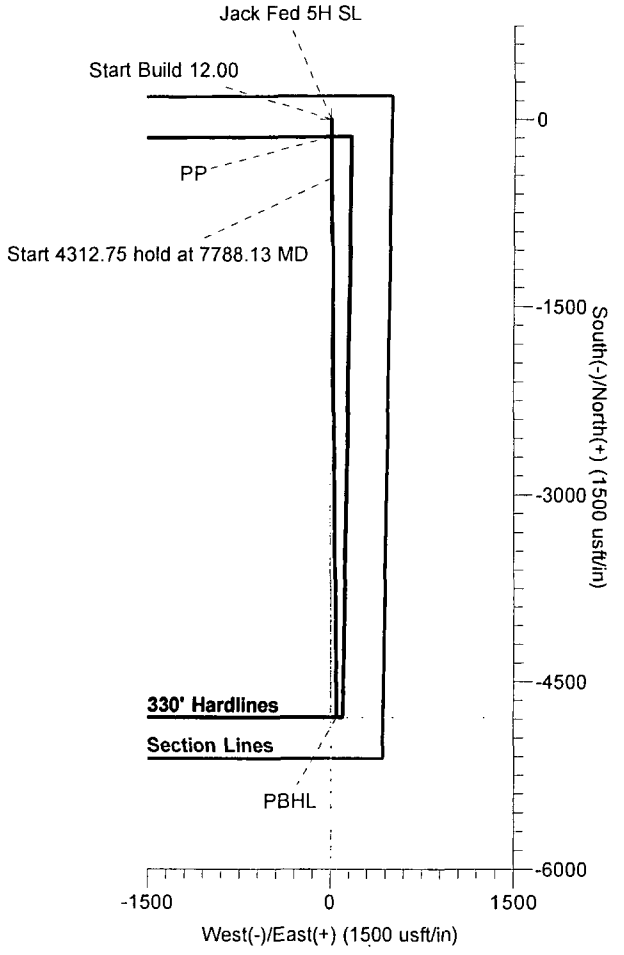
COG OPERATING, LLC

Field: Eddy County, NM
Site: Jack Federal Pad
Well: 5H
Wellbore: Lateral
Plan: Plan #1

CONCHO

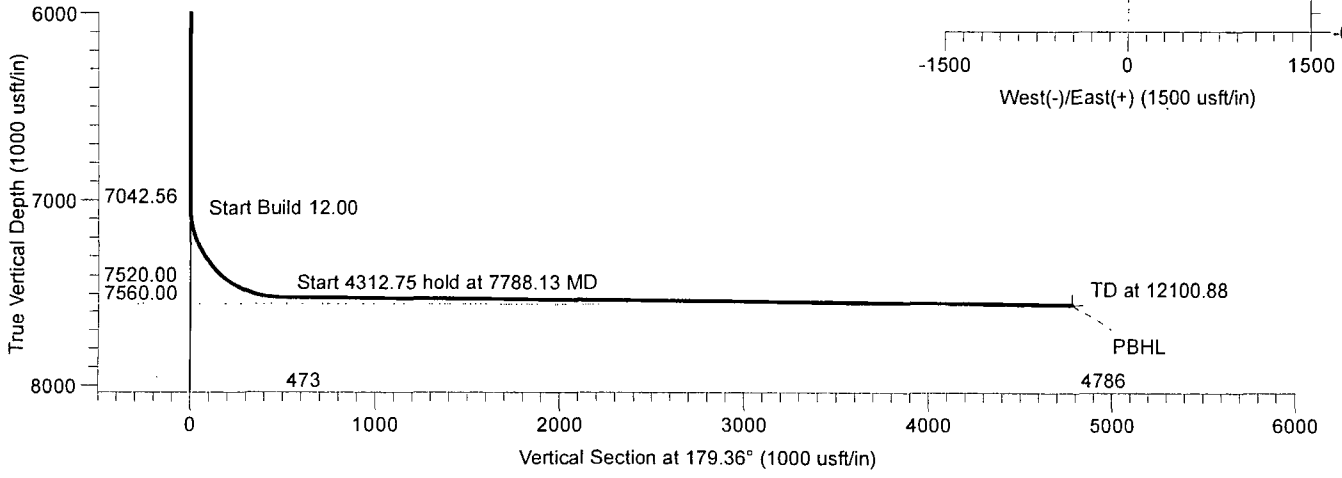
Azimuths to Grid North
True North: -0.06°
Magnetic North: 7.52°

Magnetic Field
Strength: 48229.8snT
Dip Angle: 59.90°
Date: 10/29/2013
Model: IGRF2010



Sec31,T25S,R27E
Distances

SHL - Unit A
190.0'FNL, 500.1'FEL
PP
330.0'FNL, 496.9'FEL
PBHL - Unit P
329.9'FSL, 380.2'FEL



TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Jack Fed 5H PP	0.00	-139.96	1.56	397417.35	534528.31	32° 5' 33.24 N	104° 13' 18.62 W	Point
Jack Fed 5H SL	0.00	0.00	0.00	397557.31	534526.75	32° 5' 34.63 N	104° 13' 18.63 W	Point
Jack Fed 5H PBHL	7560.00	-4785.31	53.25	392772.00	534580.00	32° 4' 47.27 N	104° 13' 18.07 W	Point

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	7042.56	0.00	0.00	7042.56	0.00	0.00	0.00	0.00	0.00	
3	7788.13	89.47	179.36	7520.00	-473.01	5.26	12.00	179.36	473.04	
4	12100.88	89.47	179.36	7560.00	-4785.31	53.25	0.00	0.00	4785.60	Jack Fed 5H PBHL

Archer

ARCHER DIRECTIONAL DRILLING SERVICES
12101 Cutten Rd. Houston, Texas 77066
Phone: 281-301-2600 Fax: 281-301-2795

Design: Plan #1 (5H/Lateral)
Created By: Ivonne Gonzalez
Date: 13:11, October 29 2013

Archer

Planning Report

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 5H - Slot 5H
Company:	COG OPERATING, LLC	**TVD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Project:	Eddy County, NM	**MD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Site:	Jack Federal Pad	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

Project Eddy County, NM

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 Jack Federal Pad

Site Position:		**Northing:**	397,477.50 usft	**Latitude:**	32° 5' 33.88 N
From:	Map	**Easting:**	530,015.50 usft	**Longitude:**	104° 14' 11.08 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.05 °

Well 5H - Slot 5H

Well Position	**+N/-S**	79.81 usft	**Northing:**	397,557.30 usft	**Latitude:**	32° 5' 34.63 N
	+E/-W	4,511.25 usft	**Easting:**	534,526.75 usft	**Longitude:**	104° 13' 18.63 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,249.00 usft

Wellbore Lateral

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/29/2013	7.58	59.90	48,230

Design Plan #1

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	179.36

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,042.56	0.00	0.00	7,042.56	0.00	0.00	0.00	0.00	0.00	0.00	
7,788.13	89.47	179.36	7,520.00	-473.01	5.26	12.00	12.00	0.00	179.36	
12,100.88	89.47	179.36	7,560.00	-4,785.31	53.25	0.00	0.00	0.00	0.00	Jack Fed 5H PBHL

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 5H - Slot 5H
Company:	COG OPERATING, LLC	**TVD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Project:	Eddy County, NM	**MD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Site:	Jack Federal Pad	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 5H - Slot 5H
Company:	COG OPERATING, LLC	**TVD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Project:	Eddy County, NM	**MD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Site:	Jack Federal Pad	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,042.56	0.00	0.00	7,042.56	0.00	0.00	0.00	0.00	0.00	0.00
7,050.00	0.89	179.36	7,050.00	-0.06	0.00	0.06	12.00	12.00	0.00
7,075.00	3.89	179.36	7,074.98	-1.10	0.01	1.10	12.00	12.00	0.00
7,100.00	6.89	179.36	7,099.86	-3.45	0.04	3.45	12.00	12.00	0.00
7,125.00	9.89	179.36	7,124.59	-7.10	0.08	7.10	12.00	12.00	0.00
7,150.00	12.89	179.36	7,149.10	-12.04	0.13	12.04	12.00	12.00	0.00
7,175.00	15.89	179.36	7,173.31	-18.25	0.20	18.25	12.00	12.00	0.00
7,200.00	18.89	179.36	7,197.16	-25.72	0.29	25.72	12.00	12.00	0.00
7,225.00	21.89	179.36	7,220.59	-34.43	0.38	34.43	12.00	12.00	0.00
7,250.00	24.89	179.36	7,243.54	-44.36	0.49	44.36	12.00	12.00	0.00
7,275.00	27.89	179.36	7,265.93	-55.47	0.62	55.47	12.00	12.00	0.00
7,300.00	30.89	179.36	7,287.71	-67.74	0.75	67.74	12.00	12.00	0.00
7,325.00	33.89	179.36	7,308.81	-81.13	0.90	81.13	12.00	12.00	0.00
7,350.00	36.89	179.36	7,329.19	-95.60	1.06	95.61	12.00	12.00	0.00
7,375.00	39.89	179.36	7,348.78	-111.13	1.24	111.13	12.00	12.00	0.00
7,400.00	42.89	179.36	7,367.54	-127.65	1.42	127.66	12.00	12.00	0.00
7,425.00	45.89	179.36	7,385.40	-145.14	1.62	145.15	12.00	12.00	0.00
7,450.00	48.89	179.36	7,402.32	-163.54	1.82	163.55	12.00	12.00	0.00
7,475.00	51.89	179.36	7,418.26	-182.80	2.03	182.81	12.00	12.00	0.00
7,500.00	54.89	179.36	7,433.16	-202.86	2.26	202.87	12.00	12.00	0.00
7,525.00	57.89	179.36	7,447.00	-223.68	2.49	223.69	12.00	12.00	0.00
7,550.00	60.89	179.36	7,459.72	-245.19	2.73	245.21	12.00	12.00	0.00
7,575.00	63.89	179.36	7,471.31	-267.34	2.97	267.36	12.00	12.00	0.00
7,600.00	66.89	179.36	7,481.72	-290.07	3.23	290.09	12.00	12.00	0.00
7,625.00	69.89	179.36	7,490.92	-313.31	3.49	313.33	12.00	12.00	0.00
7,650.00	72.89	179.36	7,498.90	-337.00	3.75	337.02	12.00	12.00	0.00
7,675.00	75.89	179.36	7,505.62	-361.07	4.02	361.09	12.00	12.00	0.00
7,700.00	78.89	179.36	7,511.08	-385.46	4.29	385.49	12.00	12.00	0.00
7,725.00	81.89	179.36	7,515.25	-410.11	4.56	410.13	12.00	12.00	0.00
7,750.00	84.89	179.36	7,518.13	-434.94	4.84	434.96	12.00	12.00	0.00
7,775.00	87.89	179.36	7,519.70	-459.88	5.12	459.91	12.00	12.00	0.00
7,788.13	89.47	179.36	7,520.00	-473.01	5.26	473.04	12.00	12.00	0.00
7,800.00	89.47	179.36	7,520.11	-484.88	5.40	484.91	0.00	0.00	0.00
7,900.00	89.47	179.36	7,521.04	-584.87	6.51	584.90	0.00	0.00	0.00
8,000.00	89.47	179.36	7,521.97	-684.86	7.62	684.90	0.00	0.00	0.00
8,100.00	89.47	179.36	7,522.89	-784.85	8.73	784.89	0.00	0.00	0.00
8,200.00	89.47	179.36	7,523.82	-884.84	9.85	884.89	0.00	0.00	0.00

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 5H - Slot 5H
Company:	COG OPERATING, LLC	**TVD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Project:	Eddy County, NM	**MD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Site:	Jack Federal Pad	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

Planned Survey

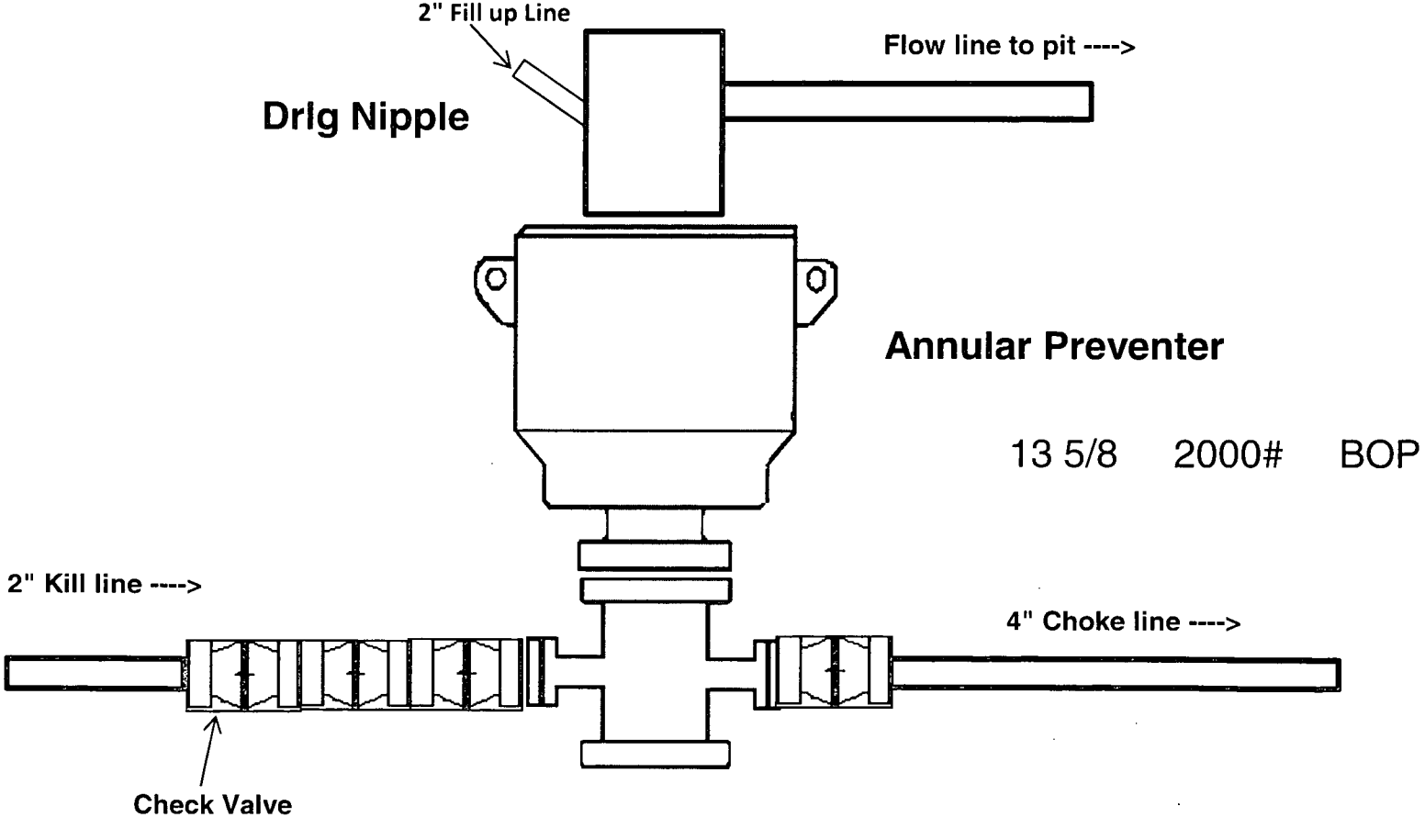
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,300.00	89.47	179.36	7,524.75	-984.83	10.96	984.89	0.00	0.00	0.00
8,400.00	89.47	179.36	7,525.68	-1,084.81	12.07	1,084.88	0.00	0.00	0.00
8,500.00	89.47	179.36	7,526.60	-1,184.80	13.18	1,184.88	0.00	0.00	0.00
8,600.00	89.47	179.36	7,527.53	-1,284.79	14.30	1,284.87	0.00	0.00	0.00
8,700.00	89.47	179.36	7,528.46	-1,384.78	15.41	1,384.87	0.00	0.00	0.00
8,800.00	89.47	179.36	7,529.39	-1,484.77	16.52	1,484.86	0.00	0.00	0.00
8,900.00	89.47	179.36	7,530.31	-1,584.76	17.63	1,584.86	0.00	0.00	0.00
9,000.00	89.47	179.36	7,531.24	-1,684.75	18.75	1,684.86	0.00	0.00	0.00
9,100.00	89.47	179.36	7,532.17	-1,784.74	19.86	1,784.85	0.00	0.00	0.00
9,200.00	89.47	179.36	7,533.10	-1,884.73	20.97	1,884.85	0.00	0.00	0.00
9,300.00	89.47	179.36	7,534.02	-1,984.72	22.09	1,984.84	0.00	0.00	0.00
9,400.00	89.47	179.36	7,534.95	-2,084.71	23.20	2,084.84	0.00	0.00	0.00
9,500.00	89.47	179.36	7,535.88	-2,184.70	24.31	2,184.83	0.00	0.00	0.00
9,600.00	89.47	179.36	7,536.81	-2,284.69	25.42	2,284.83	0.00	0.00	0.00
9,700.00	89.47	179.36	7,537.73	-2,384.68	26.54	2,384.83	0.00	0.00	0.00
9,800.00	89.47	179.36	7,538.66	-2,484.67	27.65	2,484.82	0.00	0.00	0.00
9,900.00	89.47	179.36	7,539.59	-2,584.66	28.76	2,584.82	0.00	0.00	0.00
10,000.00	89.47	179.36	7,540.52	-2,684.65	29.87	2,684.81	0.00	0.00	0.00
10,100.00	89.47	179.36	7,541.44	-2,784.64	30.99	2,784.81	0.00	0.00	0.00
10,200.00	89.47	179.36	7,542.37	-2,884.63	32.10	2,884.80	0.00	0.00	0.00
10,300.00	89.47	179.36	7,543.30	-2,984.62	33.21	2,984.80	0.00	0.00	0.00
10,400.00	89.47	179.36	7,544.23	-3,084.60	34.32	3,084.80	0.00	0.00	0.00
10,500.00	89.47	179.36	7,545.15	-3,184.59	35.44	3,184.79	0.00	0.00	0.00
10,600.00	89.47	179.36	7,546.08	-3,284.58	36.55	3,284.79	0.00	0.00	0.00
10,700.00	89.47	179.36	7,547.01	-3,384.57	37.66	3,384.78	0.00	0.00	0.00
10,800.00	89.47	179.36	7,547.94	-3,484.56	38.77	3,484.78	0.00	0.00	0.00
10,900.00	89.47	179.36	7,548.86	-3,584.55	39.89	3,584.77	0.00	0.00	0.00
11,000.00	89.47	179.36	7,549.79	-3,684.54	41.00	3,684.77	0.00	0.00	0.00
11,100.00	89.47	179.36	7,550.72	-3,784.53	42.11	3,784.77	0.00	0.00	0.00
11,200.00	89.47	179.36	7,551.64	-3,884.52	43.23	3,884.76	0.00	0.00	0.00
11,300.00	89.47	179.36	7,552.57	-3,984.51	44.34	3,984.76	0.00	0.00	0.00
11,400.00	89.47	179.36	7,553.50	-4,084.50	45.45	4,084.75	0.00	0.00	0.00
11,500.00	89.47	179.36	7,554.43	-4,184.49	46.56	4,184.75	0.00	0.00	0.00
11,600.00	89.47	179.36	7,555.35	-4,284.48	47.68	4,284.74	0.00	0.00	0.00
11,700.00	89.47	179.36	7,556.28	-4,384.47	48.79	4,384.74	0.00	0.00	0.00
11,800.00	89.47	179.36	7,557.21	-4,484.46	49.90	4,484.74	0.00	0.00	0.00
11,900.00	89.47	179.36	7,558.14	-4,584.45	51.01	4,584.73	0.00	0.00	0.00
12,000.00	89.47	179.36	7,559.06	-4,684.44	52.13	4,684.73	0.00	0.00	0.00
12,100.88	89.47	179.36	7,560.00	-4,785.31	53.25	4,785.60	0.00	0.00	0.00

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 5H - Slot 5H
Company:	COG OPERATING, LLC	**TVD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Project:	Eddy County, NM	**MD Reference:**	3249'GL+18'KB @ 3267.00usft (Planning)
Site:	Jack Federal Pad	**North Reference:**	Grid
Well:	5H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

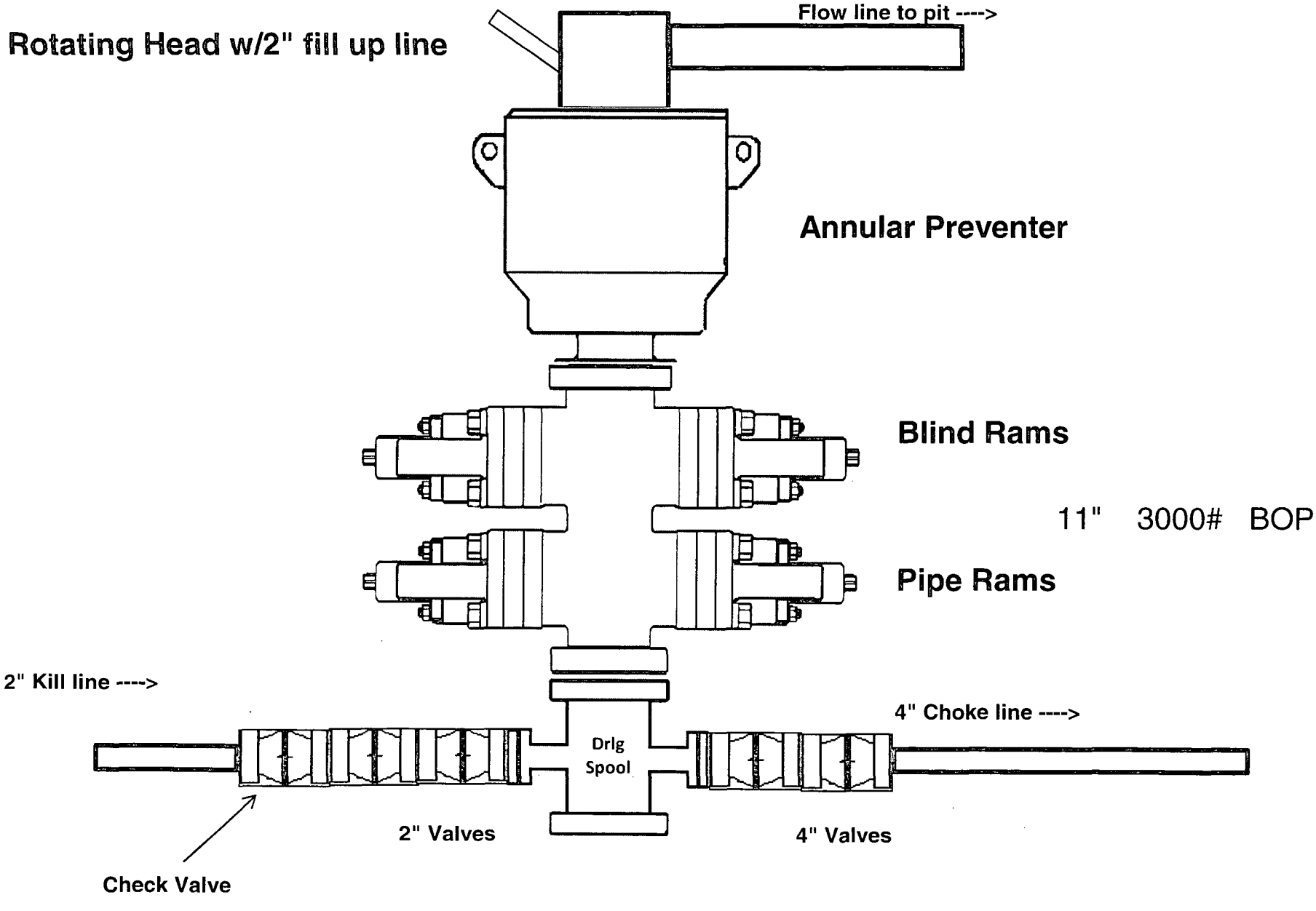
Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Jack Fed 5H SL - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	397,557.30	534,526.75	32° 5' 34.63 N	104° 13' 18.63 W
Jack Fed 5H PP - plan misses target center by 139.97usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	-139.96	1.56	397,417.35	534,528.31	32° 5' 33.24 N	104° 13' 18.62 W
Jack Fed 5H PBHL - plan hits target center - Point	0.00	0.00	7,560.00	-4,785.31	53.25	392,772.00	534,580.00	32° 4' 47.27 N	104° 13' 18.07 W

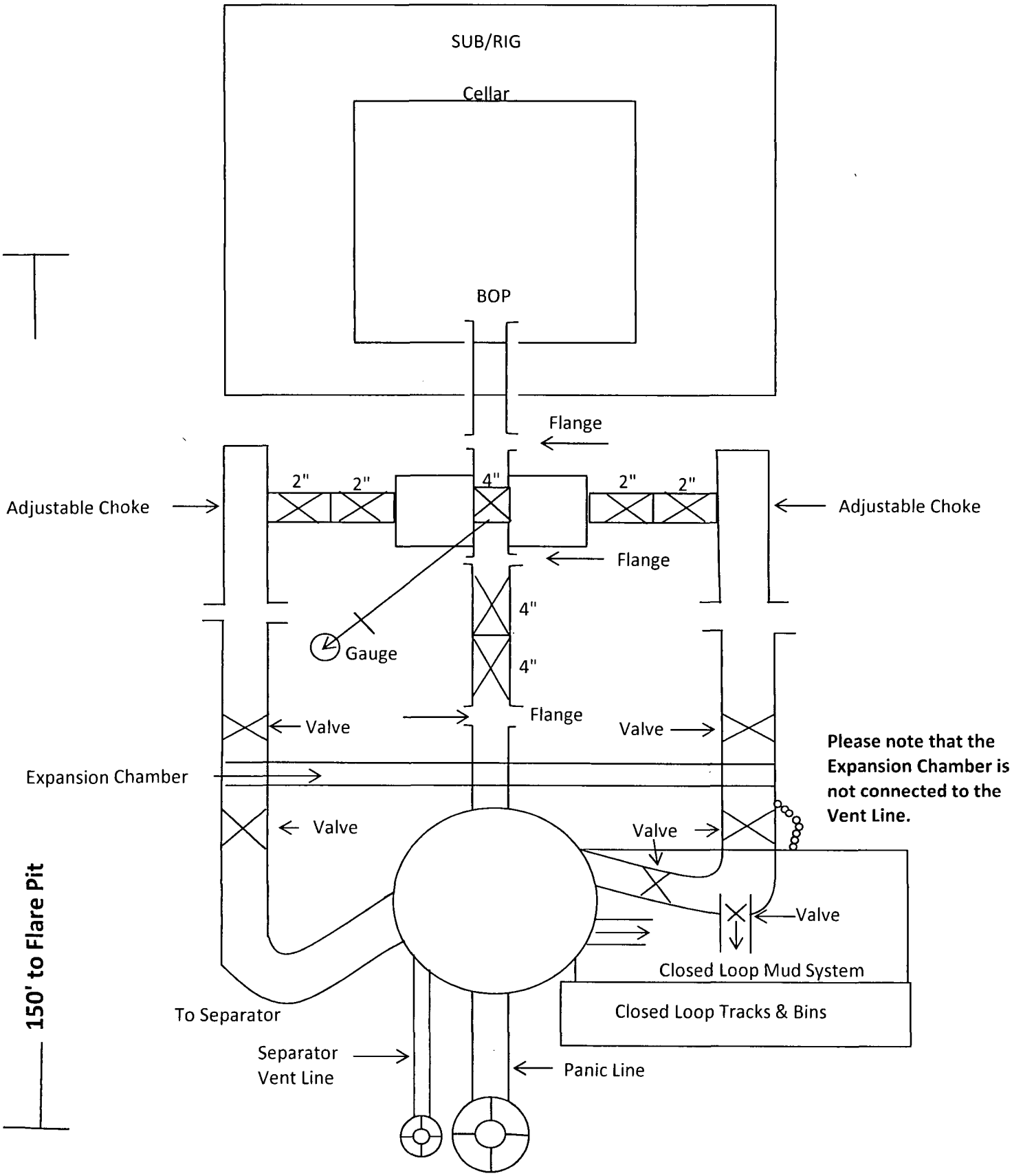
2,000 psi BOP Schematic



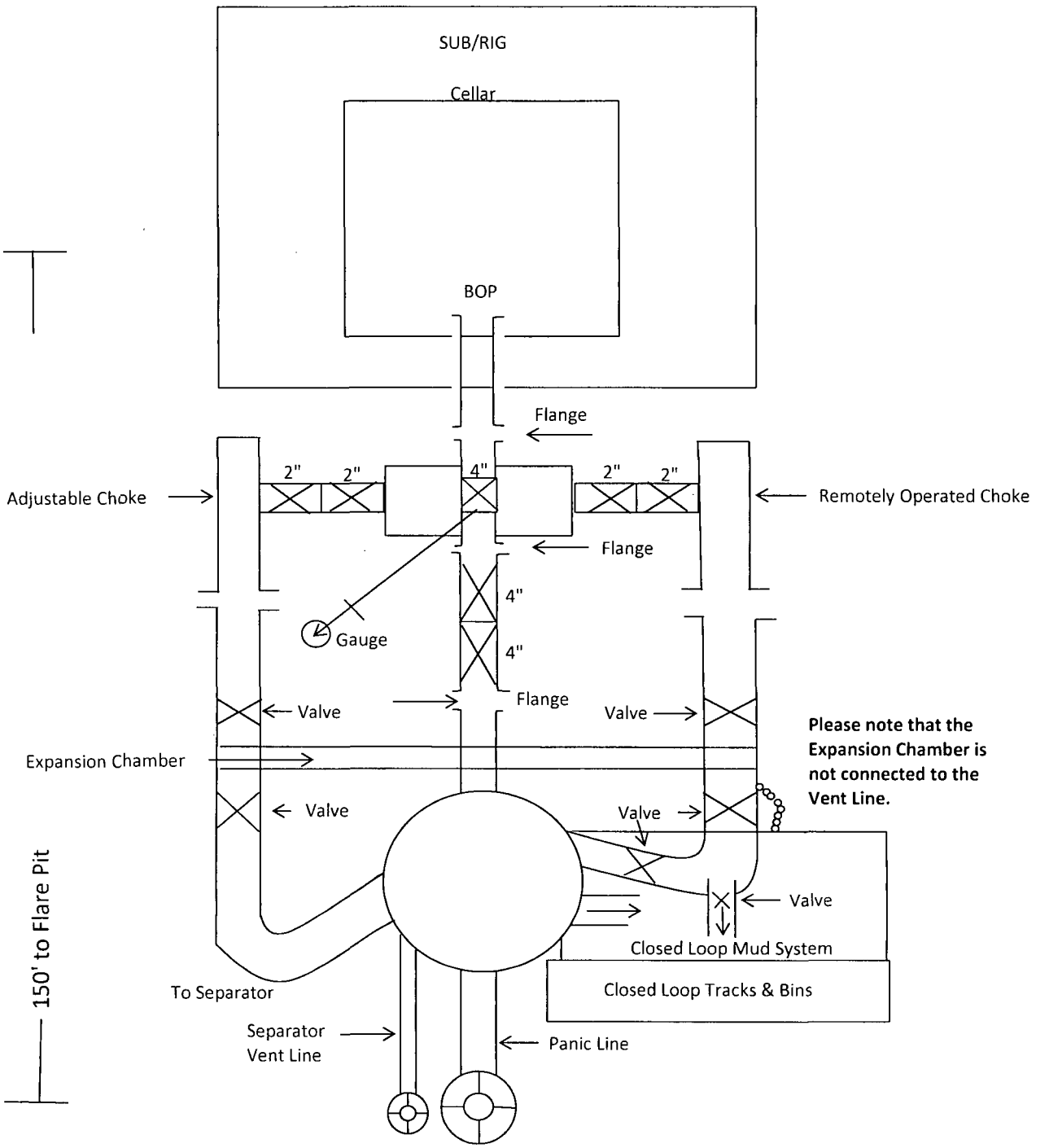
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

Well pad will be 340' X 340' with cellar in center of pad

Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'

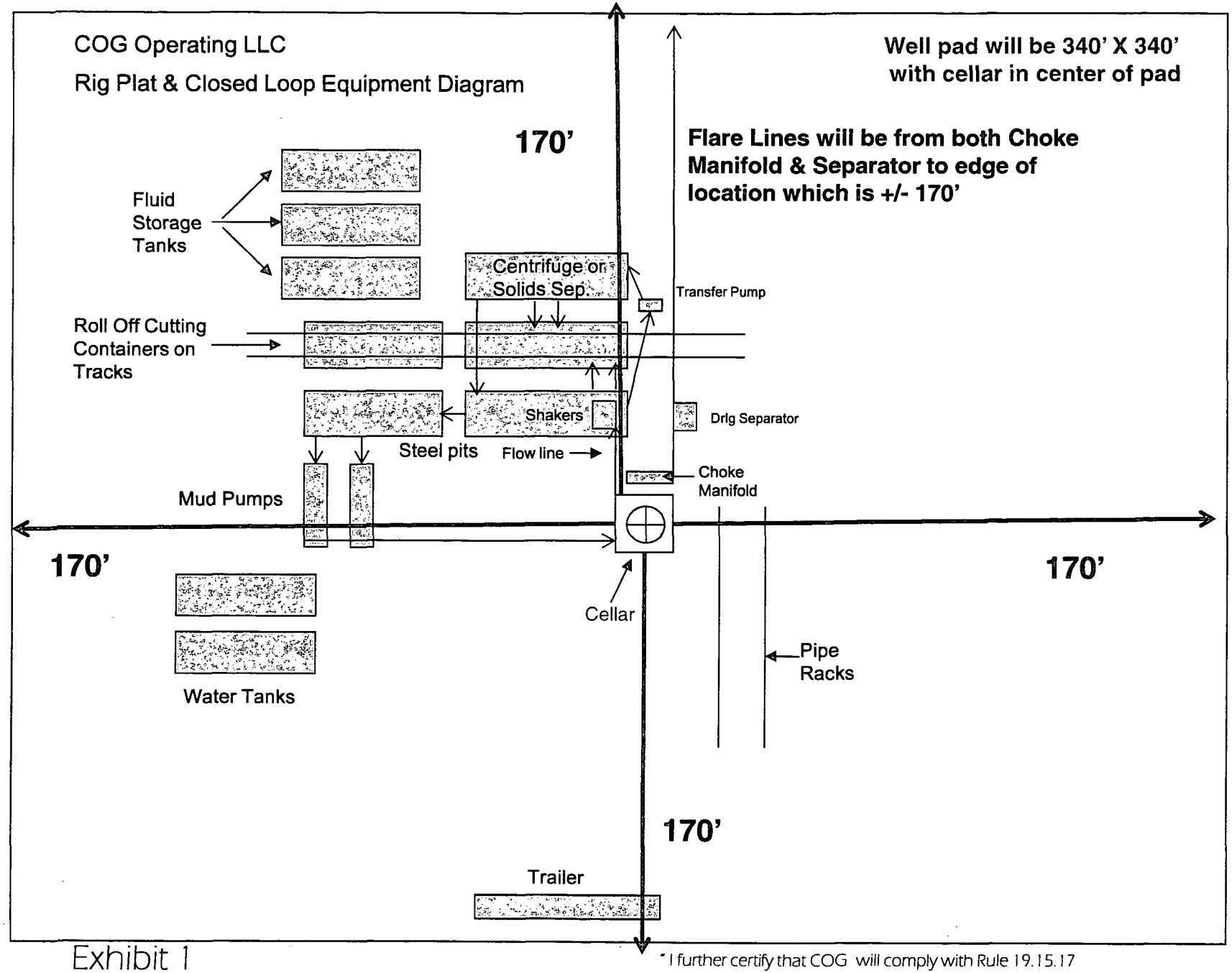


Exhibit 1

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

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
KENT GREENWAY	575-746-2010	432-557-1694
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

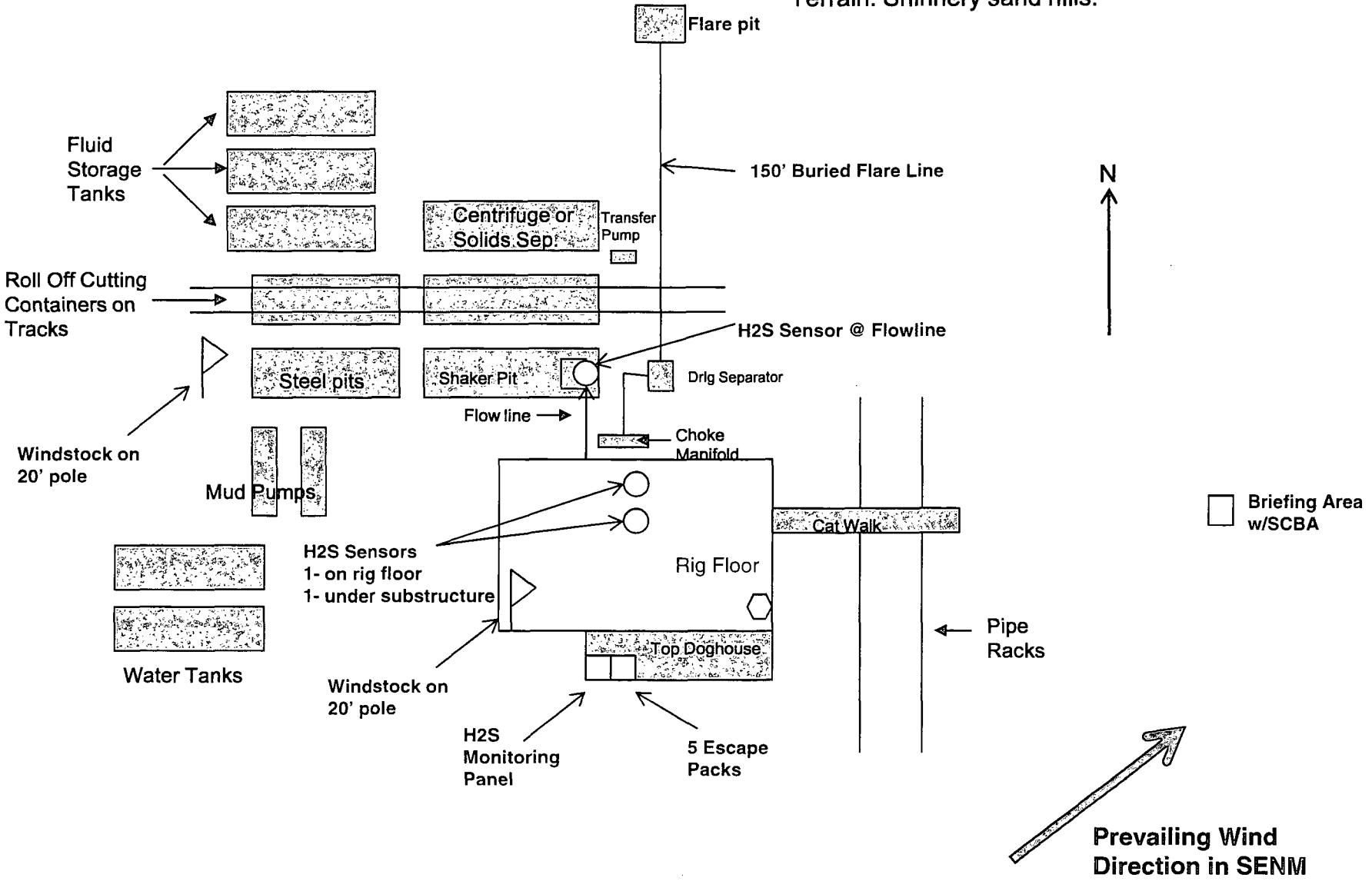
EMERGENCY RESPONSE NUMBERS

	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

Well pad will be 340' X 340' with cellar in center of pad

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

Secondary egress.



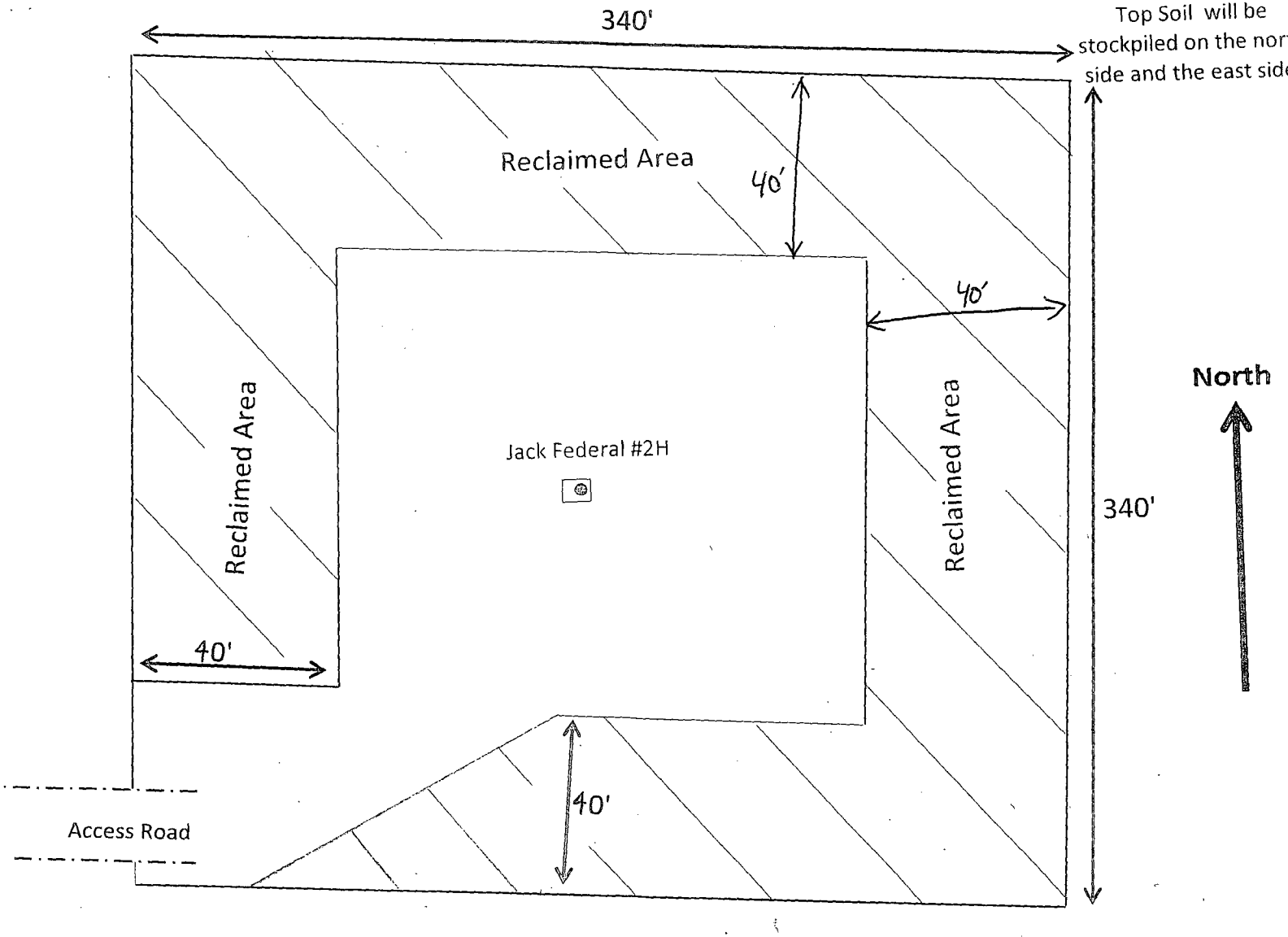
CONCHO

COG Operating LLC
2208 West Main
Artesia, NM 88210

Production Facility Layout

Jack Federal #5H
Section 31-T25S-R27E

EXHIBIT 3



Surface Use & Operating Plan

Jack Federal #5H

- Surface Tenant: Forehand Ranches, Inc., P O Box 5373, Carlsbad, NM 88221
- New Road: 4074'
- Flow Line: Will follow road to proposed facility at the Jack Federal #4H.
- Facilities: Will utilize facilities at the Jack Federal #4H well location.

Well Site Information

V Door: East
Topsoil: North & East
Interim Reclamation: North, South, East & West

Notes

Onsite: On-site was done by Tanner Nygren (BLM); Rand French (COG) on August 27, 2013.

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. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in section 2A of this Surface Use and Operating Plan.

2. Proposed Access Road:

The Location Verification Map shows that 4074' of new access road will be required for this location. If any road is required it will be constructed as follows:

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

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

B. No turnouts are planned.

C. Two low water crossings are proposed as indicated on the Access Road Map. No culverts, gates, or cattleguards 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 the nearest BLM approved caliche pit.

3. Location of Existing Well:

The One-Mile Radius Map shows existing wells within a one-mile radius of surface hole location and the bottom hole location.

4. Location of Existing and/or Proposed Facilities:

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

1) A tank battery and facilities are proposed at the Jack Federal #4H location.

2) Production will be sent to the Jack Federal #4H facility. A surface flow line of approximately 1603' of 2 7/8" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Jack Federal #4H. The flow line is be layed a safe distance, estimated at 5-10' from the road.

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

4) 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 a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.

5) 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.

6) 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 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. However to avoid boring Marathon Road, a production facility will be installed on this well pad.

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. A caliche permit will be obtained from BLM prior to obtaining caliche. 2400 cubic yards is the maximum amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

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

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

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

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

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

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

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

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit or other established mineral pit. A BLM mineral material permit will be acquired prior to obtaining any mineral material from BLM pits or land.

7. Methods of Handling Water Disposal:

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

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

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

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

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

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

8. Ancillary Facilities:

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

9. Well Site Layout:

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

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

10. Plans for Restoration of the Surface:

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

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.

11. Surface Ownership:

A. The surface is owned by owned by the U.S. Government and is administered by the Bureau of Land Management. 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 surface tenant is Forehand Ranches, Inc., P O Box 5373, Carlsbad, NM 88221.

C. 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 # NMB000215 and NMB000740

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.:	**NMNM-114349**
WELL NAME & NO.:	**Jack Federal 5H**
SURFACE HOLE FOOTAGE:	**0190' FNL & 0550' FEL**
BOTTOM HOLE FOOTAGE	**0330' FSL & 0380' FEL**
LOCATION:	**Section 31, T. 25 S., R 27 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

TABLE OF CONTENTS

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

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)

Survey Requirement:

Due to the fact that the access road has many turns and survey stakes have been knocked over by weather or animals, the access road and well pad must be re-staked by professional surveyors prior to construction.

Road Construction Requirement:

As depicted in the "Access Road Map" in the APD, a low water crossing shall be constructed on the access road where drainages/arroyos cross the road. The low water crossing shall be accomplished by dipping the road down to the bed of the drainage. The road bed cannot be higher than the grade of the drainage. Material moved from the banks of the crossing shall be stockpiled near the road edge. Gravel or cobble shall be used as the primary material for the road bed in the low water crossing.

Berming of the Well Pad

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

- The 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.)

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.

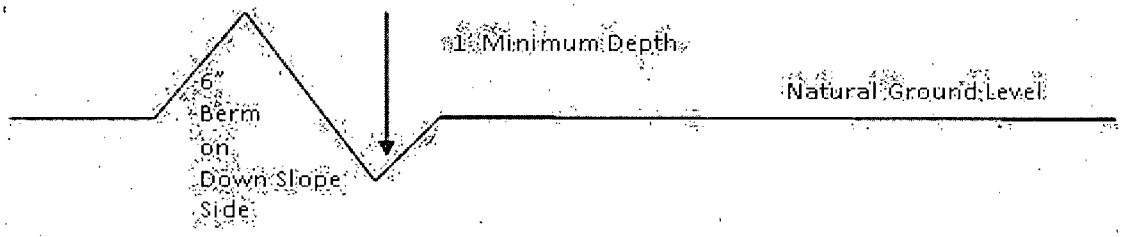
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

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.

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

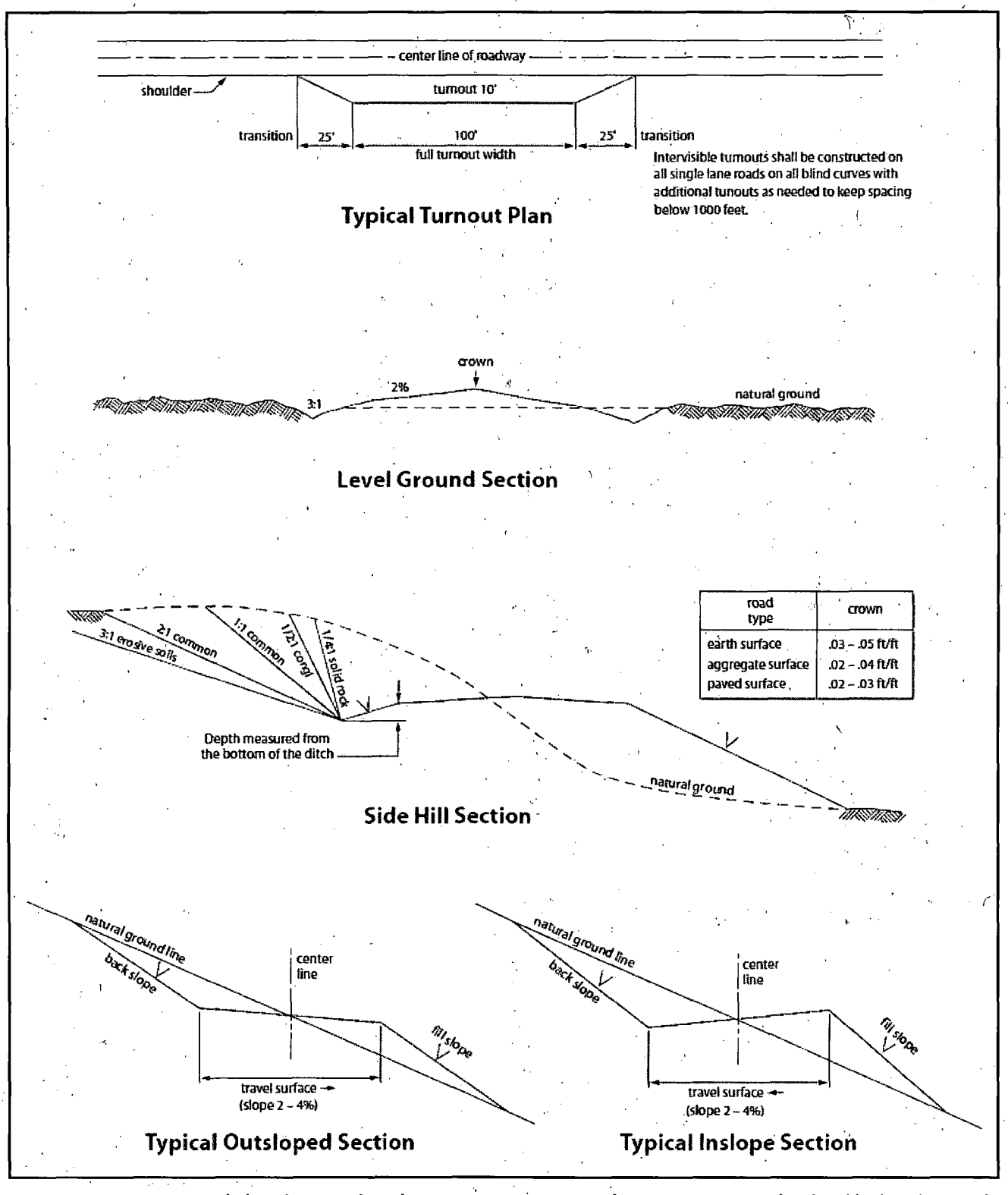


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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. **Operator has stated that 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 Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.**

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 top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. 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.).

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

Wait on cement (WOC) time prior to drilling out for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. 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. IF OPERATOR DOES NOT HAVE THE WELL SPECIFIC CEMENT DETAILS ONSITE PRIOR TO PUMPING THE CEMENT FOR EACH CASING STRING, THE WOC WILL BE 30 HOURS. See individual casing strings for details regarding lead cement slurry requirements.

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

Medium Cave/Karst
Possible water flows in the Castile and Delaware.
Possible lost circulation in the Salado and Delaware.

1. The **13-3/8** inch surface casing shall be set at approximately **390** feet and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

    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 **2030** feet, 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 75% or greater lost circulation occurs while drilling the intermediate casing hole, the cement on the production casing must come to surface.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

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

   ☒ Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.

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 RP 53 Sec. 17.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

   a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **3000 (3M)** psi.

4. 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**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (18 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

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.

D. DRILL STEM TEST

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

E. 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.

JAM 021214

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

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

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

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

3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to 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 agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. The holder shall be liable for damage or injury to the United States to the extent

provided by 43 CFR Sec. 2883.1-4. The 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 the 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 the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any responsibility as provided herein.

6. All construction and maintenance activity will 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 must 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 must be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity will be confined to existing roads or right-of-ways.

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

8. The 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 will be "snaked" around hummocks and dunes rather then 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 must 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

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

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will 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). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will 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