

ATS-07-269

OCD - ARTESIA

Form 3160-3
(February 2005)

FORM APPROVED
OMB No. 1004-0137
Expires March 31, 2007

Month - Year
APR 16 2007
OCD - ARTESIA, NM

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

| | | |
|--|---|--|
| 1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER | | 5. Lease Serial No. NMLC 069033 |
| 1b. Type of Well: <input type="checkbox"/> Oil Well <input checked="" type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone | | 6. If Indian, Allottee or Tribe Name N/A |
| 2. Name of Operator C.O.G. Operating, L.L.C. 229137 | | 7. If Unit or CA Agreement, Name and No. N/A |
| 3a. Address 550 W. Texas Avenue, Suite 1300 Midland, Texas 79701 | 3b. Phone No. (include area code) 432-683-7443 | 8. Lease Name and Well No. Blue Thunder 5 Federal Com #2 35819 |
| 4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 1200' FNL & 1980' FWL, Unit C At proposed prod. zone Same | | 9. API Well No. 30-OW-35550 |
| 14. Distance in miles and direction from nearest town or post office* Approximately 11 miles Southeast from Loco Hills, NM | | 10. Field and Pool, or Exploratory Lusk Morrow, West |
| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 1200' | | 11. Sec., T. R. M. or Blk. and Survey or Area Sec 5, T19S, R31E |
| 16. No. of acres in lease 639.22 | 17. Spacing Unit dedicated to this well 320 | 12. County or Parish Eddy |
| 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. Approx. 2700' to #1 | 19. Proposed Depth 12,500' | 13. State NM |
| 20. BLM/BIA Bond No. on file NMB 000215 | 21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3557' GL | 22. Approximate date work will start* 04/09/2007 |
| 23. Estimated duration 45 days | | |

24. Attachments

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

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

| | | |
|---|---------------------------------------|--------------------|
| 25. Signature <i>Denise Menoud</i> | Name (Printed/Typed) Denise Menoud | Date 02/13/2007 |
| Title Agent for C.O.G. Operating, L.L.C. | | |

| | | |
|---|---------------------------------------|---------------------------------|
| Approved by (Signature) <i>/s/ James Stovall</i> | Name (Printed/Typed) James Stovall | Date APR - 6 2007 |
| Title ACTING FIELD MANAGER | | Office CARLSBAD FIELD OFFICE |

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

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

*(Instructions on page 2)

CAPITAN CONTROLLED WATER BASIN

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO
GENERAL REQUIREMENTS AND
SPECIAL STIPULATIONS
ATTACHED

If earthen pits are used in association with the drilling of this well, an OCD pit permit must be obtained prior to pit construction.

EXHIBIT "A"

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240

DISTRICT II
1301 W. Grand Avenue, Artesia, NM 88210

DISTRICT III
1000 Rio Bravos Rd., Aztec, NM 87410

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-102
Revised October 12, 2005

Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

| | | |
|--------------------|---|--------------------------------|
| API Number | Pool Code 80844 | Pool Name Lusk Morrow, West |
| Property Code | Property Name BLUE THUNDER "5" FEDERAL | Well Number 2 |
| OGRD No. 229137 | Operator Name C.O.G. OPERATING L.L.C. | Elevation 3557' |

Surface Location

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| C | 5 | 19 S | 31 E | | 1200 | NORTH | 1980 | WEST | EDDY |

Bottom Hole Location If Different From Surface

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|------------------------|----------------------|--------------------|-----------|---------|---------------|------------------|---------------|----------------|--------|
| | | | | | | | | | |
| Dedicated Acres 320 | Joint or Infill I | Consolidation Code | Order No. | | | | | | |

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

| | |
|--|---|
| | <p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information contained 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 pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Denise Menoud</i> 2/9/07 Signature Date Denise Menoud, Agent for C.O.G. operating, L.L.C. Printed Name</p> |
| | <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>JANUARY 26, 2007 Date Surveyed Signature & Seal of Surveyor Professional Surveyor W.O. Jones Certificate No. Gary L. Jones 7977</p> <p>BASIN SURVEYS</p> |

ATTACHMENT TO FORM 3160-3
COG Operating
Blue Thunder 5 Federal Com #2
SL: 1200' FNL & 1980' FWL, Unit C
Sec 5, T19S, R31E
Eddy County, NM

1. Proration Unit Spacing: N/2, 320 acres

2. Ground Elevation: 3557'

3. Proposed Drilling Depth: 12,500'

4. Estimated tops of geological markers:

| | |
|-------------------|--------|
| Rustler anhydrite | 600' |
| Yates | 2700' |
| Queen | 3350' |
| Delaware | 4920' |
| Bone Spring | 6500' |
| Wolfcamp | 9850' |
| Strawn | 10850' |
| Atoka | 11150' |
| Morrow Lime | 11350' |
| Morrow Clastics | 11730' |

5. Possible mineral bearing formations:

| | |
|-------------|-----|
| Bone Spring | Oil |
| Atoka | Gas |
| Morrow | Gas |

6. Hole Size & Casing Program

| <u>Hole size</u> | <u>Interval</u> | <u>OD of Casing</u> | <u>Weight</u> | <u>Thread</u> | <u>Collar</u> | <u>Grade</u> |
|------------------|--------------------|---------------------|---------------|---------------|---------------|--------------|
| 17-1/2" | 0' - +/-600' | 13-3/8" | 48# | 8rd | STC | H40 |
| 12 1/4" | +/-600' - +/-3500' | 8-5/8" | 32# | 8rd | STC | J-55 |
| 7-7/8" | +/-3500' - 12500' | 5-1/2" | 17# | 8rd | LTC | P110 |

7. Cementing and Setting Depth

| | | | |
|---------|--------------|------------|---|
| 13 3/8" | surface | +/- 600' | Set +/- 600' of 13 3/8" 48# STC casing. Cement w/ 200 sx 35:65 Poz: "C" + additives followed by 200 sx + 2% Class "C" + 2% CaCl2. Circulate cement. |
| 8 5/8" | Intermediate | +/- 3500' | Set +/- 3500' of 8 5/8" 32# J-55 STC casing. Cement w/ 800 sx 50:50 Poz "C" light cement + additives followed by 200 sx Class "C" cement. Circulate cement. |
| 5 1/2" | Production | +/- 12500' | Set +/- 12500' of 5 1/2" 17# P110 LTC casing. Cement w/ 600 sx Class "H" + additives. Est TOC @ +/- 9000'. |

ATTACHMENT TO FORM 3160-3
COG Operating LLC
Blue Thunder 5 Federal Com #2
Page 2 of 2

8. Pressure Control Equipment

After setting 13-3/8" casing and installing 3000 psi casing head, NU 13-5/8" 3000 psi annular BOP. Test annular BOP, casing and manifold with clear fluid to 1350 psi w/ rig pump.

After setting 8-5/8" casing and installing 5000 psi casing spool, NU 5000 psi double ram BOP and 5000 psi annular BOP. Test double ram BOP and manifold to 4000# with clear fluid and annular to 2500 psi using an independent tester.

9. Proposed Mud Circulating System

| <u>Interval</u> | <u>Mud Wt.</u> | <u>Visc.</u> | <u>FL</u> | <u>Type Mud System</u> |
|-------------------|----------------|--------------|-----------|---|
| 0' - 600' | 8.4 - 9.2 | 28 - 35 | NC | Fresh water native mud w/ paper for seepage and sweeps. Lime for pH. |
| 600' - 3,500' | 10.0 - 10.2 | 28 - 29 | NC | Brine mud, lime for pH and paper for seepage and sweeps. |
| 3500' - 10,800' | 10.0 - 10.2 | NC | NC | Drill section with fresh water/cut brine circulating the reserve utilizing periodic sweeps of paper as needed for seepage control and solids removal. |
| 10,800' - 11,150' | 9.2 - 9.6 | 31 - 32 | 20 | Increase weight with brine additions and reduce fluid loss w/ starch. |
| 11,150' - 11,730' | 9.6 - 9.8 | 36 - 42 | <15 | Reduce fluid loss w/ starch and XCD Polymer |
| 11,730' - 12,500' | 9.8 - 9.9 | 36 - 42 | < 8 | Reduce fluid loss w/ starch and XCD Polymer. Maintain properties to TD. Spot a high vis pill on bottom for logs. |

10. Anticipated Starting Date

Drilling operations will commence on approximately April 6, 2007 with drilling and completion operations lasting approximately 45 days.

11. Logging, Coring, and Testing Program

- A. Open hole logs: Litho Density Comp. Neutron, High Res. Laterlog, BHC Sonic. Caliper from TD back to 8-5/8" casing shoe.
- B. Spectral Gamma Ray, Neutron from 8-5/8" casing shoe back to surface.
- C. Mud logger on hole from 2400' to TD.
- D. Sidewall cores on stand by if sufficient shows are encountered.

12. Potential Hazards

No abnormal pressures or temperatures are expected. There is no known presence of H2S in this area. If H2S is encountered, the operator will comply with the provisions of Onshore Oil and Gas Order No. 6. No lost circulation is expected to occur. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Estimated BHP 5000 psi, and estimated BHT 170°.

SURFACE USE AND OPERATIONS PLAN
FOR DRILLING, COMPLETION, AND PRODUCING

C.O.G. Operating, LLC
Blue Thunder 5 Federal Com #2
1200' FNL & 1980' FWL, Unit C
Sec 5, T19S, R31E
Eddy County, New Mexico

LOCATED

Approximately 11 miles Southeast of Loco Hills, New Mexico

OIL & GAS LEASE

NMLC 0069033

RECORD TITLE LESSEE

Paul Slayton, Box 2035, Roswell, NM 88202-2035

BOND COVERAGE

\$25,000 statewide bond of C.O.G. Operating, L.L.C.

SURFACE OWNER

Bureau of Land Management

MINERAL OWNER

Bureau of Land Management

GRAZING TENANT

Roy Creamer, 2194 S – RR39, Milnesand, NM 88125

POOL

Lusk; Morrow West (Gas) - #80840

PROPOSED TOTAL DEPTH

This well will be drilled to a depth of approximately 12,500'.

EXHIBITS

- A. & A-1. Well Location & Acreage Dedication Maps
- B. Area Road Map
- C. & C-1. Vicinity Oil & Gas Maps
- D. Topographic & Location Verification Map
- E. & E-1. Proposed Lease Roads Maps
- F. & F-1. Proposed Electric Line Maps
- G. Drilling Rig Layout
- H. BOPE Schematic
- I. Choke Manifold Schematic

EXISTING ROADS

- A. Exhibit A is a portion of a section map showing the location of the proposed well as staked.
- B. Exhibit B is a map showing existing roads in the vicinity of the proposed well site.
- C. Directions to well location:
From the junction of US Hwy 82 and County Road 222 (Shugart), proceed South 8.2 miles on County Road 222 to lease road. On lease road go West winding Westerly 1.1 miles to lease road and proposed lease road.

ACCESS ROADS

- A. Length and Width: 854.0' long and 30' wide. The access road will be built and is shown on Exhibit A-1.
- B. Surface Material: Existing
- C. Maximum Grad: Less than five percent
- D. Turnouts: None necessary
- E. Drainage Design: Existing
- F. Culverts: None necessary
- G. Gates and Cattle Guards: None needed

LOCATION OF EXISITING WELLS

Existing wells in the immediate area are shown in Exhibits C & C-1 .

LOCATION OF EXISTING AND/OR PROPOSED FACILITIES

Necessary production facilities for this well will be located on the well pad.

LOCATION AND TYPE OF WATER SUPPLY

It is not contemplated that a water well will be drilled. Water necessary for drilling will be purchased and hauled to the site over existing roads shown on Exhibit B.

METHODS OF HANDLING WASTE DISPOSAL

- A. Drilling fluids will be allowed to evaporate in the drilling pits until the pits are dry.
- B. Water produced during tests will be disposed of in the drilling pits.
- C. Oil produced during tests will be stored in test tanks.
- D. Trash will be contained in a trash trailer and removed from well site.
- E. All trash and debris will be removed from the well site within 30 days after finishing drilling and/or completion operations.

ANCILLARY FACILITIES

None required.

WELL SITE LAYOUT

Exhibit E shows the relative location and dimensions of the well pad, mud pits, reserve pit, and trash pit, and the location of major rig components.

PLANS FOR RESTORATION OF THE SURFACE

- A. After completion of drilling and/or completion operations, all equipment and other material not needed for operations will be removed. The well site will be cleaned of all trash and junk to leave the site in an as aesthetically pleasing condition as possible.
- B. After abandonment, all equipment, trash, and junk will be removed and the site will be clean.

OTHER INFORMATION

- A. **Topography:**
The topography consists of sandy soil with native grasses. No wildlife was observed, but the usual inhabitants of this region are Jackrabbits, Reptiles, Coyotes, etc.
- B. **Soil:** Topsoil at the well site is sandy soil.
- C. **Flora and Fauna:** The location is in an area sparsely covered with mesquite and range grasses.
- D. **Ponds and Streams:** There are no rivers, lakes, ponds, or streams in the area.
- E. **Residences and Other Structures:** There are no residences within a mile of the proposed well site.
- F. **Archaeological, Historical, and Cultural sites:** An Archaeological Survey has been ordered and a copy to be sent to the BLM Office.
- G. **Land Use:** Grazing

ONLEASE RIGHT OF WAY REQUEST

Requesting Right of Way for all onlease appurtenances, including proposed lease roads and electric lines.

- A. **Roads:** Building of a proposed lease road 854.0' in length. (See Exhibit A-1).
- B. **Electric Lines:** Constructing of proposed Electric Lines 731.7' in length. (See Exhibit F-1).

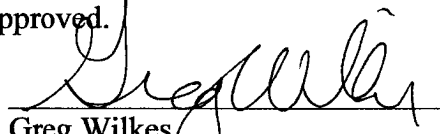
OPERATOR'S REPRESENTATIVE

Greg Wilkes
C.O.G. Operating, LLC
550 W. Texas Ave, Suite 1300
Midland, TX 79701
(432) 683-7443

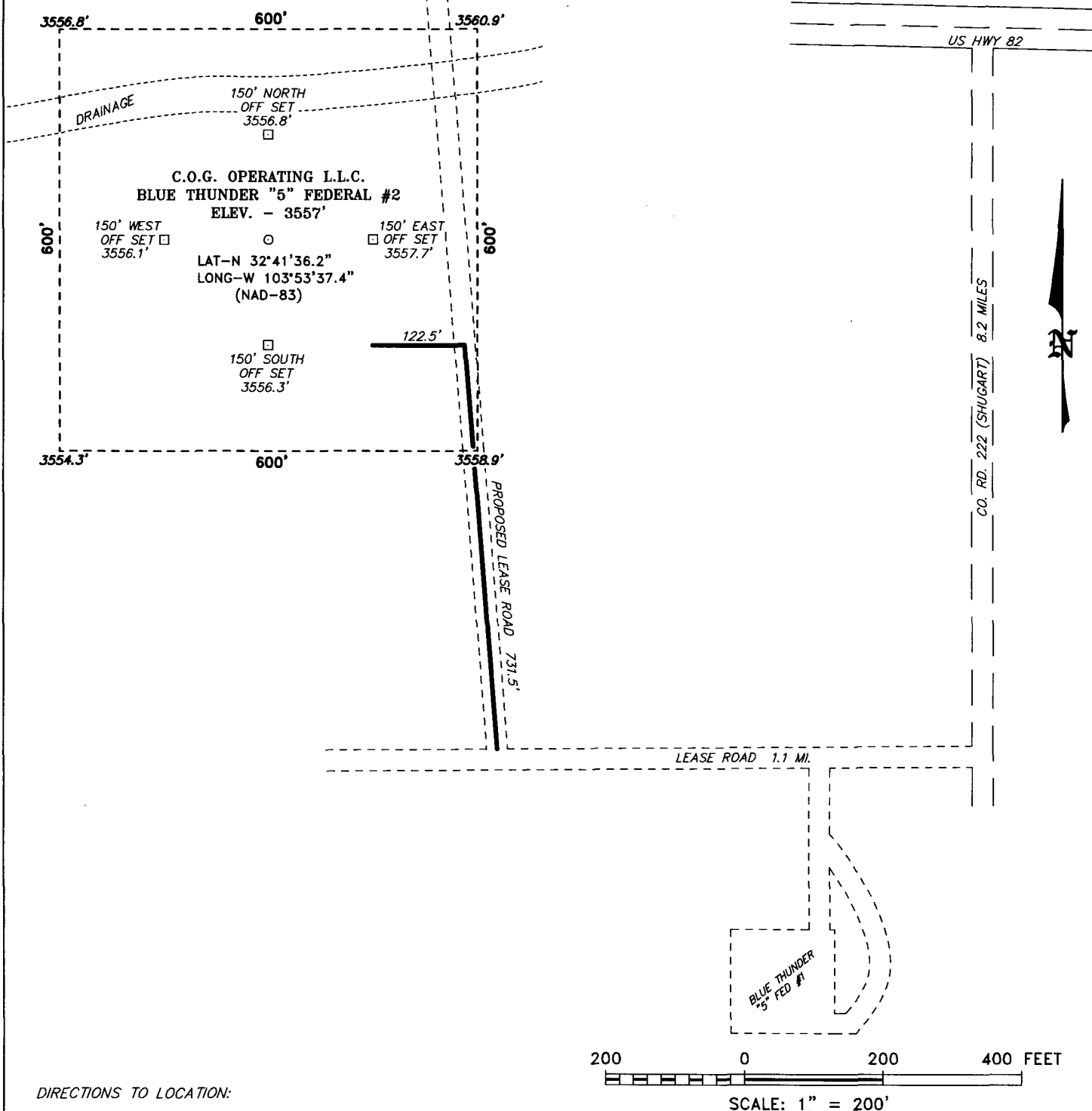
CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed herein will be preformed by the C.O.G. Operating, LLC Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

2/19/07
Date

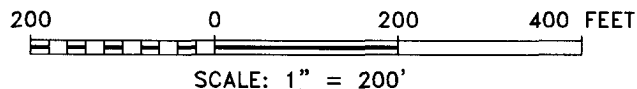

Greg Wilkes
C.O.G. Operating, LLC

**SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY,
NEW MEXICO.**



DIRECTIONS TO LOCATION:

FROM THE JUNCTION OF US. HWY 82 AND CO RD. 222 (SHUGART), PROCEED SOUTH 8.2 MILES ON CO. RD. 222 TO LEASE ROAD, ON LEASE ROAD GO WEST WINDING WESTERLY 1.1 MILES TO LEASE ROAD AND PROPOSED LEASE ROAD.



C.O.G. OPERATING L.L.C.

REF: BLUE THUNDER "5" FEDERAL #2 / Well Pad Topo
THE BLUE THUNDER "5" FEDERAL No. 2 LOCATED 1200' FROM
THE NORTH LINE AND 1980' FROM THE WEST LINE OF
SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO.

BASIN SURVEYS P.O. BOX 1786-HOBBS, NEW MEXICO

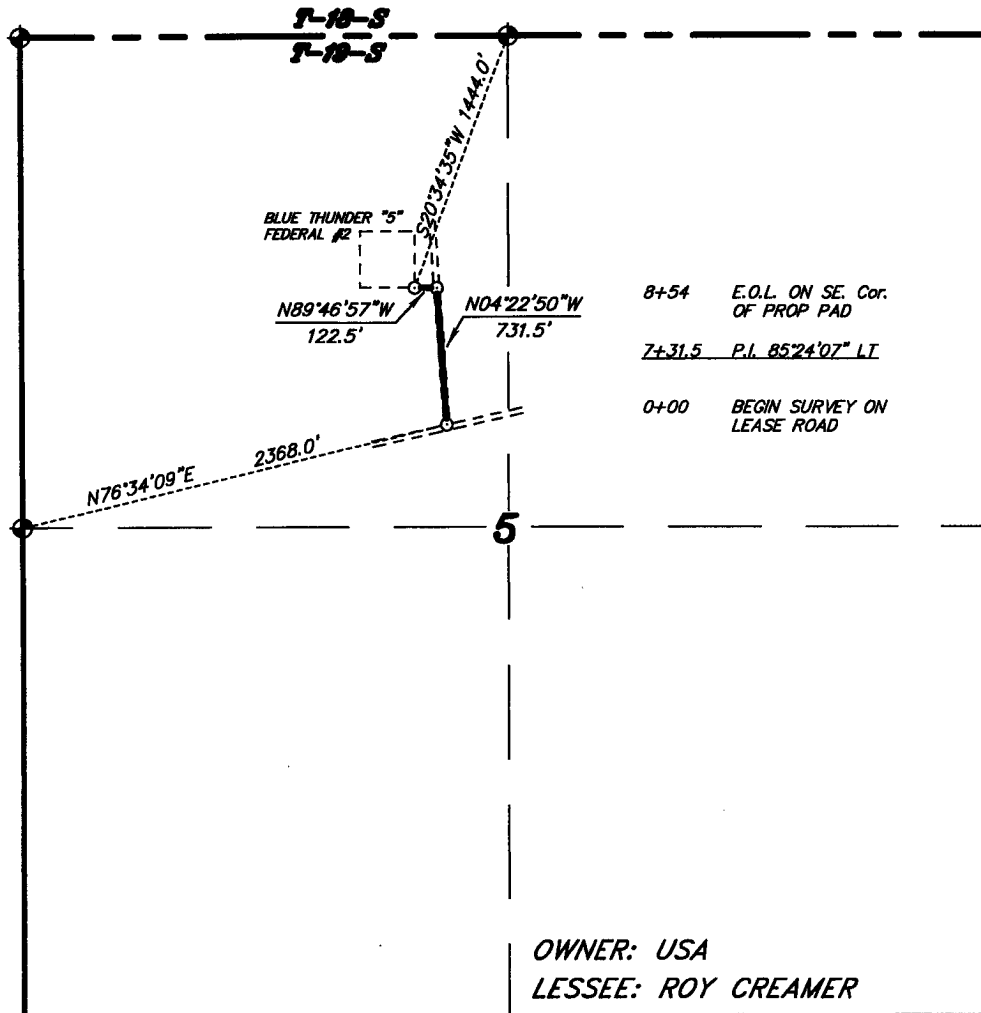
W.O. Number: 17687 Drawn By: **J. M. SMALL**

Date: 01-30-2007 Disk: JMS 17687W

Survey Date: 01-26-2007 Sheet 1 of 1 Sheets

EXHIBIT "E-1"

SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.

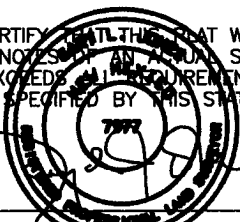


LEGAL DESCRIPTION

A STRIP OF LAND 20.0 FEET WIDE, LOCATED IN SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING 10.0 FEET LEFT AND RIGHT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY.

SECTION 5 = 854.0 FEET = 0.16 MILES = 51.76 RODS = 0.39 ACRES

I HEREBY CERTIFY THAT THIS MAP WAS PREPARED FROM FIELD NOTES, AN AERIAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.



GARY L. JONES No. 7977
TEXAS P.L.S. No. 5074

BASIN SURVEYS P.O. BOX 1786-HOBBS, NEW MEXICO

W.O. Number: 17687 Drawn By: J. M. SMALL

Date: 01-30-2007 Disk: JMS 17687R.E.P.

1000 0 1000 2000 FEET

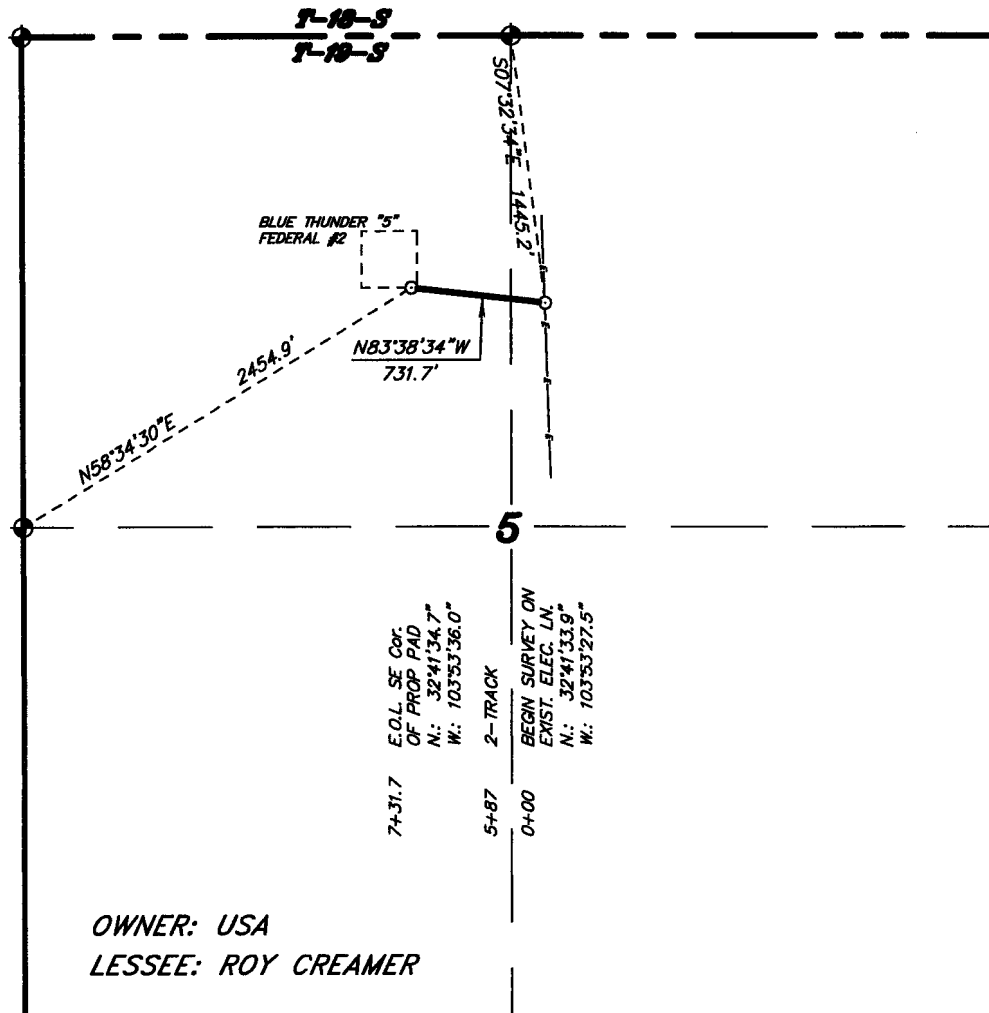
C.O.G. OPERATING L.L.C.

REF: PROP. LEASE ROAD TO THE BLUE THUNDER "5" FEDERAL #2

A ROAD CROSSING USA LAND IN
SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO.

Survey Date: 01-26-2007 Sheet 1 of 1 Sheets

**SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.**

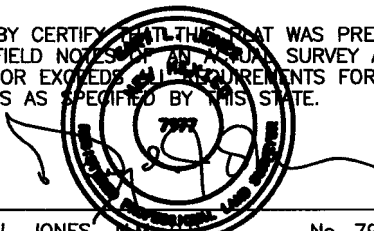


LEGAL DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE, LOCATED IN SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND RIGHT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY.

SECTION 5 = 731.7 FEET = 0.14 MILES = 44.35 RODS = 0.50 ACRES

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF A SURVEY AND MEETS OR EXCEEDS THE REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.



GARY L. JONES N.M.P.S. No. 7977
TEXAS P.L.S. No. 5074

BASIN SURVEYS P.O. BOX 1786—HOBBS, NEW MEXICO

W.O. Number: 17687 Drawn By: J. M. SMALL

Date: 01-30-2007 Disk: JMS 17687R.E.P.

1000 0 1000 2000 FEET

C.O.G. OPERATING L.L.C.

REF: PROP. ELECTRIC LINE TO THE BLUE THUNDER "5" FEDERAL #2

A ELECTRIC CROSSING USA LAND IN
SECTION 5, TOWNSHIP 19 SOUTH, RANGE 31 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO.

Survey Date: 01-26-2007 Sheet 1 of 1 Sheets

EXHIBIT "H"

BOPE SCHEMATIC

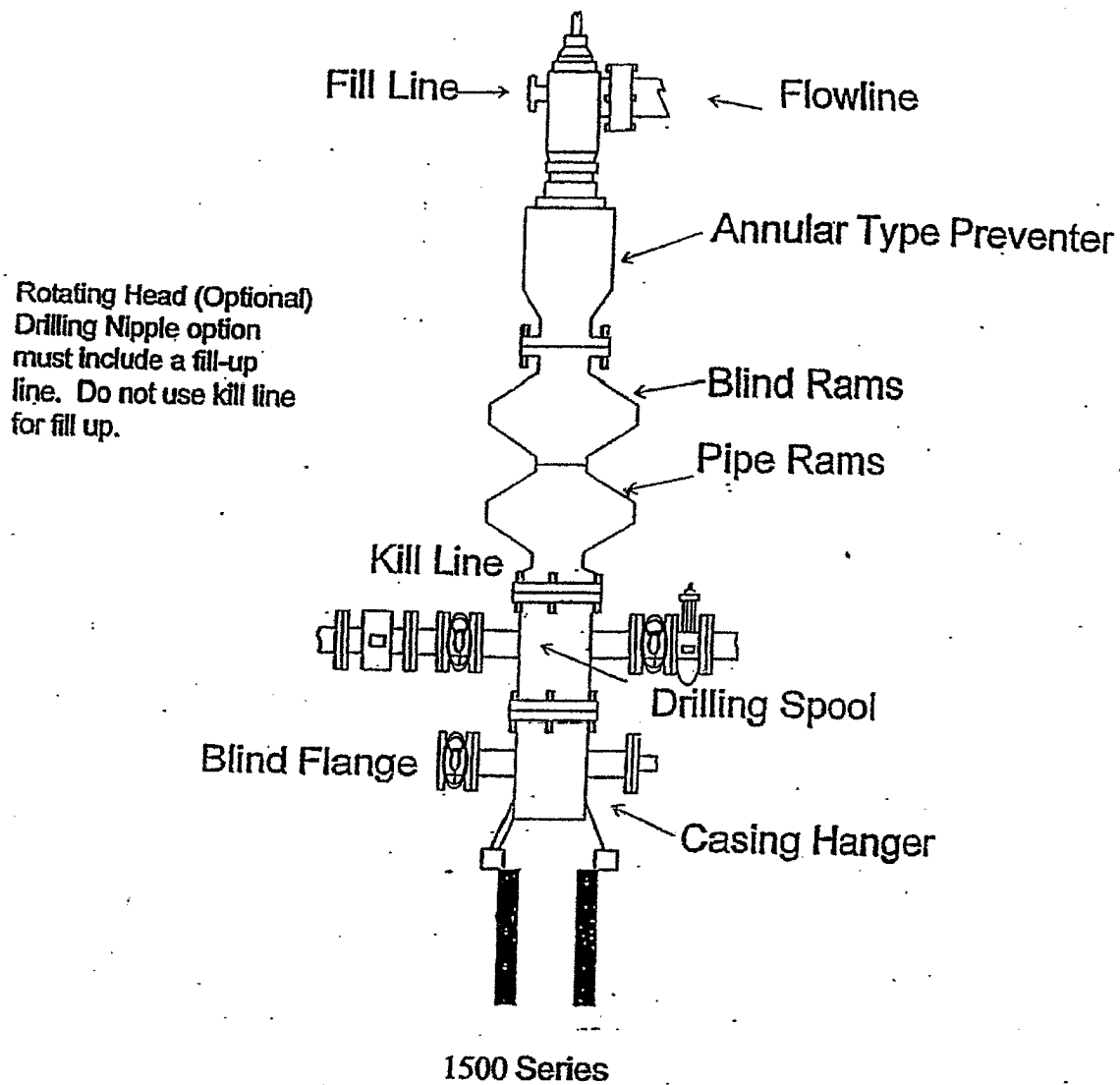
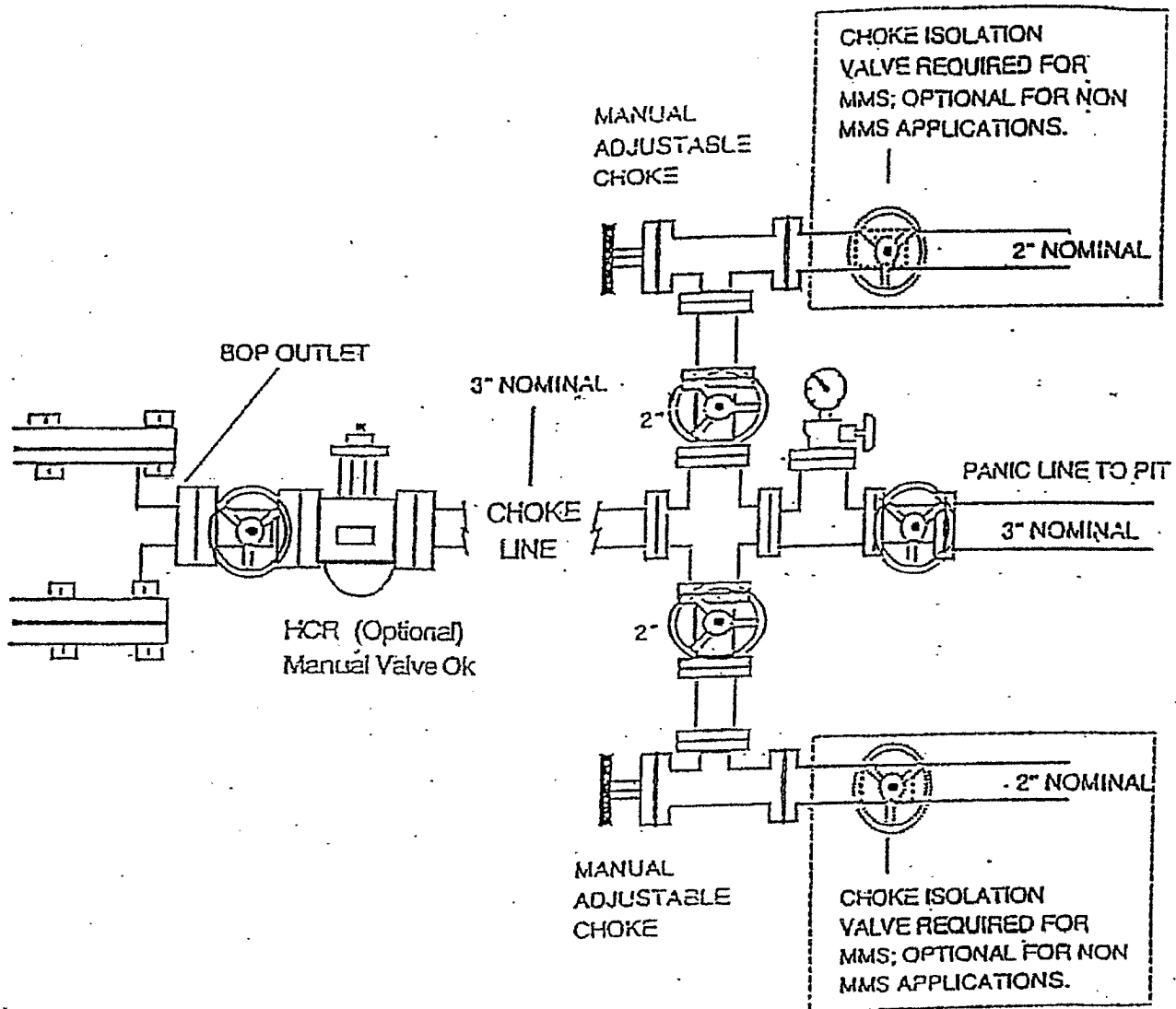


EXHIBIT "I"

CHOKE MANIFOLD
5M SERVICE



COG OPERATING, LLC

**HYDROGEN SULFIDE (H₂S) CONTINGENCY PLAN
FOR DRILLING / COMPLETING / WORKOVER / FACILITY
WITH THE EXPECTATION OF H₂S IN EXCESS OF 100 PPM**

**BLUE THUNDER 5 FEDERAL COM #2
NEW DRILL WELL
1200' FNL & 1980' FWL, UNIT C
SECTION 5, T19S, R31E
EDDY COUNTY, NEW MEXICO**

This well / facility is not expected to have H₂S, but the following is submitted as requested.

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| XII. | Location Map | Page 15 |
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GENERAL H2S EMERGENCY ACTIONS

In the event of any evidence of H2S emergency, the following plan will be initiated:

1. All personnel will immediately evacuate to an up-wind and if possible up-hill "safe area".
2. If for any reason a person must enter the hazardous area, they must wear a SCBA (self-contained breathing apparatus).
3. Always use the "buddy system".
4. Isolate the well / problem if possible.
5. Account for all personnel.
6. Display the proper colors warning all unsuspecting personnel of the danger at hand.
7. Contact the company representative as soon as possible if not at the location (use the enclosed call list as instructed).

At this point the company representative will evaluate the situation and coordinate the necessary duties to bring the situation under control, and if necessary, the notification of emergency response agencies and residents.

EMERGENCY PROCEDURES FOR AN UNCONTROLLABLE RELEASE OF H2S

1. All personnel will don the self-contained breathing apparatus.
2. Remove all personnel to the "safe area: (always use the "buddy system").
3. Contact company representative if not on location.
4. Set in motion the steps to protect and / or remove the general public to any upwind "safe are". Maintain strict security and safety procedures while dealing with the source.
5. No entry to any unauthorized personnel.
6. Notify the appropriate agencies:
City Police - City streets
State Police - State Roads
County Sheriff - County Roads
7. Call the NMOCD.

If at this time the supervising person determines the release of H2S cannot be contained to the site location and the general public is in harms way, he will immediately notify public safety personnel.

EMERGENCY CALL LIST

| | <u>Office</u> | <u>Cell</u> | <u>Home</u> |
|--------------|---------------|--------------|--------------|
| Greg Wilkes | 432-683-7443 | 432-631-6795 | 432-697-9745 |
| John Coffman | 432-683-7443 | 432-631-9762 | 432-699-5552 |

EMERGENCY RESPONSE NUMBERS

Eddy County, New Mexico

| | |
|---|----------------------------|
| State Police | 505-748-9718 |
| Eddy County Sheriff | 505-746-2701 |
| Emergency Medical Services (Ambulance) | 911 or 505-746-2701 |
| Eddy County Emergency Management (Harry Burgess) | 505-887-9511 |
| State Emergency Response Center (SERC) | 505-476-9620 |
| Carlsbad Police Department | 505-885-2111 |
| Carlsbad Fire Department | 505-885-3125 |
| New Mexico Oil Conservation Division | 505-748-1283 |
| Callaway Safety Equipment, Inc. | 505-392-2973 |

PROTECTION OF THE GENERAL (ROE) RADIUS OF EXPOSURE

In the event greater than 100 ppg H2S is present, the ROE calculations will be done to determine if the following is warranted:

- * 100 ppm at any public area (any place not associated with this site)
- * 500 ppm at any public road (any road which the general public may travel).
- * 100 ppm radius of 3000' will be assumed if there is insufficient data to do the calculations, and there is a reasonable expectation that H2S could be present in concentrations greater than 100 ppm in the gas mixture.

Calculation for the 100 ppm ROE: (H2S concentrations in decimal form)

$$X = [(1.589)(\text{concentration})(Q)] (0.6258)$$

10,000 ppm + = .01
1,000 ppm + = .001

Calculation for the 500 ppm ROE:

100 ppm + = .0001
10 ppm + = .00001

$$X = [(0.4546)(\text{concentration})(Q)] (.06258)$$

EXAMPLE: If a well / facility has been determined to have 150 ppm H2S in the gas mixture and the well / facility is producing at a gas rate of 200 MCFD then:

ROE for 100 ppm $X = [(1.589)(.00010)(200,000)] (0.6258)$
 $X = 8.8'$

ROE for 500 ppm $X = [(0.4546)(.00050)(200,000)] (0.6258)$
 $X = 10.9'$

These calculations will be forwarded to the appropriate NMOCD district office when applicable.

PUBLIC EVACUATION PLAN

When the supervisor has determined that the general public will be involved, the following plan will be implemented.

1. Notification of the emergency response agencies of the hazardous condition and implement evacuation procedures.
2. A trained person in H₂S safety shall monitor with detection equipment the H₂S concentration, wind and area of exposure. This person will determine the outer perimeter of the hazardous area. The extent of the evacuation area will be determined from the data being collected. Monitoring shall continue until the situation has been resolved. All monitoring equipment shall be UL approved for use in Class I Groups A, B, C & D, Division I hazardous locations. All monitors will have a minimum capability of measuring H₂S, oxygen, and flammable values.
3. Law enforcement shall be notified to set up necessary barriers and maintain such for the duration of the situation as well as aid in the evacuation procedure.
4. The company representative shall stay in communication with all agencies throughout the duration of the situation and inform such agencies when the situation has been contained and the effected area is safe to enter.

PROCEDURE FOR IGNITING AN UNCONTROLLABLE CONDITION

The decision to ignite a well should be a last resort and one, if not both, of the following pertain:

1. Human life and / or property are endangered.
2. There is no hope of bringing the situation under control with the prevailing conditions at the site.

Instructions for Igniting the Well:

1. Two people are required. They must be equipped with positive pressure, self-contained breathing apparatus and "D"-ring style, full body, OSHA approved safety harness. Non-flammable rope will be attached.
2. One of the people will be a qualified safety person who will test the atmosphere for H₂S, oxygen and LFL. The other person will be the company representative.
3. Ignite upwind from a distance no closer than necessary. Make sure that where you ignite from has the maximum escape avenue available. A 25mm flare gun with a range of approximately +/- 500 feet shall be used to ignite the gas.
4. Before igniting, check for the presence of combustible gases.
5. After igniting, continue emergency actions and procedures as before.

REQUIRED EMERGENCY EQUIPMENT

1. Breathing Apparatus

- * Rescue Packs (SCBA) – 1 unit shall be placed at each breathing area, 2 shall be stored in the safety trailer.
- * Work / Escape Packs – 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
- * Emergency Escape Packs – 4 packs shall be stored in the doghouse for emergency evacuation.

2. Signage and Flagging

- * One Color Code Condition Sign will be placed at the entrance to the site reflecting the possible conditions at the site.
- * A Colored Condition flag will be on display reflecting the condition at the site at that time.

3. Briefing Area

- * Two perpendicular areas will be designated by signs and readily accessible.

4. Windsocks

- * Two windsocks will be placed in strategic locations, visible from all angles.

5. H2S Detectors and Alarms

* The stationary detector with three (3) sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible alarm @ 15 ppm. Calibrate a minimum of every 30 days or as needed. The three sensors will be placed in the following places: (Gas sample tubes will be stored in the safety trailer):

- * Rig Floor
- * Bell Nipple
- * End of flow line or where well bore fluid is being discharged

6. Auxiliary Rescue Equipment

- * Stretcher
- * Two OSHA full body harnesses
- * 100' of 5/8" OSHA approved rope
- * One 20 lb. Class ABC fire extinguisher
- * Communication via cell phones on location and vehicles on location

USING SELF-CONTAINED BREATHING AIR EQUIPMENT (SCBA)

1. SCBA should be worn when any of the following are performed:
 - * Working near the top or on top of a tank
 - * Disconnecting any line where H₂S can reasonably be expected.
 - * Sampling air in the area to determine if toxic concentrations of H₂S exist.
 - * Working in areas where over 10 ppm of H₂S has been detected.
 - * At any time there is a doubt of the level of H₂S in the area.
2. All personnel shall be trained in the use of SCBA prior to working in a potentially hazardous location.
3. Facial hair and standard eyeglasses are not allowed with SCBA.
4. Contact lenses are never allowed with SCBA.
5. When breaking out any line where H₂S can reasonably be expected.
6. After each use, the SCBA unit shall be cleaned, disinfected, serviced and inspected.
7. All SCBA shall be inspected monthly.

RESCUE & FIRST AID FOR VICTIMS OF H₂S POISONING

- * Do not panic.
- * Remain calm and think.
- * Get on the breathing apparatus.
- * Remove the victim to the safe breathing area as quickly as possible, upwind and uphill from source or crosswind to achieve upwind.
- * Notify emergency response personnel.
- * Provide artificial respiration and / or CPR as necessary.
- * Remove all contaminated clothing to avoid further exposure.
- * A minimum of two (2) personnel on location shall be trained in CPR and First Aid.

Toxic Effects of H2S Poisoning

Hydrogen Sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 10 PPM, which is .001% by volume. Hydrogen Sulfide is heavier than air (specific gravity-1.192) and is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen sulfide and other gasses are compared below in Table 1. toxicity table for H2S and physical effects are shown in Table II.

Table 1
Permissible Exposure Limits of Various Gasses

| Common Name | Symbol | Sp. Gravity | TLV | STEL | IDLH |
|------------------|--------|-------------|----------|------------|---------|
| Hydrogen Cyanide | HCN | .94 | 4.7 ppm | C | |
| Hydrogen Sulfide | H2S | 1.192 | 10 ppm | 15 ppm | 100 ppm |
| Sulfide Dioxide | SO2 | 2.21 | 2 ppm | 5 ppm | |
| Chlorine | CL | 2.45 | .5 ppm | 1 ppm | |
| Carbon Monoxide | CO | .97 | 25 ppm | 200 ppm | |
| Carbon Dioxide | CO2 | 1.52 | 5000 ppm | 30,000 ppm | |
| Methane | CH4 | .55 | 4.7% LEL | 14% UEL | |

Definitions

- A. TLV – Threshold Limit Value is the concentration employees may be exposed to based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists and regulated by OSHA.
- B. STEL – Short Term Exposure Limit is the 15 minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H2S is 19 PPM.
- C. IDLH – Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H2S is 100 PPM.
- D. TWA – Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed to based on an TWA.

TABLE II
Toxicity Table of H₂S

| Percent % | PPM | Physical Effects |
|-----------|------|---|
| .0001 | 1 | Can smell less than 1 ppm. |
| .001 | 10 | TLV for 8 hours of exposure |
| .0015 | 15 | STEL for 15 minutes of exposure |
| .01 | 100 | Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes. |
| .02 | 200 | Kills sense of smell quickly, may burn eyes and throat. |
| .05 | 500 | Dizziness, cessation of breathing begins in a few minutes. |
| .07 | 700 | Unconscious quickly, death will result if not rescued promptly. |
| .10 | 1000 | Death will result unless rescued promptly. Artificial resuscitation may be necessary. |

PHYSICAL PROPERTIES OF H₂S

The properties of all gasses are usually described in the context of seven major categories:

COLOR
ODOR
VAPOR DENSITY
EXPLOSIVE LIMITS
FLAMMABILITY
SOLUBILITY (IN WATER)
BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

COLOR – TRANSPARENT

Hydrogen Sulfide is colorless so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence, a fact that makes the gas extremely dangerous to be around.

ODOR – ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs". For this reason it earned its common name "sour gas". However, H₂S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H₂S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS – 4.3% TO 46%

Mixed with the right proportion of air or oxygen, H₂S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO₂), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY – 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H₂S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H₂S may release the gas into the air.

BOILING POINT – (-76 degrees Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.

CONDITIONS OF APPROVAL - DRILLING

Operator's Name: COG Operating, LLC
Well Name & No.: 2-Blue Thunder 5 Federal Com
Location: 1200FNL, 1980FWL, Section 5, T-19-S, R-31-E
Lease: NMLC 069033

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I. DRILLING OPERATIONS REQUIREMENTS:

- A. The Bureau of Land Management (BLM) is to be notified a minimum of 4 hours in advance for a representative to witness:
1. Spudding well
 2. Setting and/or Cementing of all casing strings
 3. BOPE tests
- Eddy County call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (505) 361-2822
- B. A Hydrogen Sulfide (H₂S) Drilling Plan is attached to the APD. **Although not detected in this section, H₂S has been measured in Sections 19, 21, 24, T-19-S and R-32-E between 200-3000 ppm in gas streams and 200-3000 ppm in STVs.**
- C. 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.
- D. If floor controls are required, (3M or Greater) controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

II. CASING:

- A. The 13-3/8 inch surface casing shall be set **a minimum of 25 feet into the Rustler Anhydrite at approximately 600 feet** and cemented to the surface.
1. 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 a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.
 2. Wait on cement (WOC) time for a primary cement job will be a minimum of 12 hours for a non-water basin, 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compression strength, whichever is greater. (This is to include the lead cement)
 3. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compression strength, whichever is greater.
 4. If cement falls back, remedial action will be done prior to drilling out that string.

Possible lost circulation in Capitan Reef and Artesia Groups.

Possible water flows in the Artesia and Salado Groups.

Possible high pressure in Wolfcamp and over pressured in Strawn, Atoka, and Morrow.

- B. The minimum required fill of cement behind the 8-5/8 inch intermediate casing is **cement to surface**. If cement does not circulate see A.1 thru 4.
- C. The minimum required fill of cement behind the 5-1/2 inch production casing is **cement to extend a minimum of 200 feet inside the intermediate casing**.
- D. 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.

III. PRESSURE CONTROL:

- A. 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.
- B. 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**.
- C. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 8-5/8 inch intermediate casing shoe shall be **5000 (5M) PSI**. **Manifold to have one remotely operated choke**.
- D. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - 1. The tests shall be done by an independent service company.
 - 2. The results of the test shall be reported to the appropriate BLM office.
 - 3. 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.
 - 4. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi in accordance with API RP 53. 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.
 - 5. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp (formation). This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.
 - 6. A variance to test the surface casing and BOP/BOPE to the reduced pressure of 70% of internal yield pressure of casing-approximately 1200 psi with the rig pumps is approved.

IV. DRILLING MUD:

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

Engineer on call phone: 505-706-2779
WWI 022707