

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Avenue, Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural Resources

Form C-101  
March 4, 2004

Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

RECEIVED

Submit to appropriate District Office  
State Lease - 6 Copies  
Fee Lease - 5 Copies

☐ AMENDED REPORT

**APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE**

|   |  |   |
|---|--|---|
| <sup>1</sup> Operator Name and Address<br>Yates Petroleum Corporation<br>105 South Fourth Street<br>Artesia, NM 88210 |  | <sup>2</sup> OGRID Number<br>025575       |
| <sup>3</sup> Property Code  |  | <sup>4</sup> API Number<br>30 - 015-34015 |
| <sup>5</sup> Property Name<br>Artesia Airport CE Com.   |  | <sup>6</sup> Well No.<br>3                |

**7 Surface Location**

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| E             | 10      | 17S      | 25E   |         | 1940'         | North            | 660'          | West           | Eddy   |

**8 Proposed 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 |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| H             | 10      | 17S      | 25E   |         | 1980'         | North            | 660'          | East           | Eddy   |

<sup>9</sup> Proposed Pool 1  
Chester

<sup>10</sup> Proposed Pool 2

**Drilling Pit Location and Other Information**

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| E             | 10      | 17S      | 25E   |         | 1940'         | North            | 660'          | West           | Eddy   |

Depth to ground water  
125'

Distance from nearest fresh water well  
.4 of a mile

Distance from nearest surface water  
1100'

|                                   |  |                                     |  |   |
|-----------------------------------|--|-------------------------------------|--|---|
| <sup>11</sup> Work Type Code<br>N | <sup>12</sup> Well Type Code<br>G                    | <sup>13</sup> Cable/Rotary<br>R     | <sup>14</sup> Lease Type Code<br>P         | <sup>15</sup> Ground Level Elevation<br>3559' |
| <sup>16</sup> Multiple<br>N       | <sup>17</sup> Proposed Depth<br>TVD 5150' - MD 8983' | <sup>18</sup> Formation<br>Wolfcamp | <sup>19</sup> Contractor<br>Not Determined | <sup>20</sup> Spud Date<br>ASAP               |

**21 Proposed Casing and Cement Program**

| Hole Size | Casing Size  | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|-----------|--------------|--------------------|---------------|-----------------|---------------|
| 17 1/2"   | 13 3/8"      | 48#                | 350'          | 450 sx          | Surface       |
| 12 1/4"   | 9 5/8"       | 36#                | 1100'         | 525 sx          | Surface       |
| 8 3/4"    | Pilot Hole   | -----              | 5400' MVD     | -----           | -----         |
| 8 3/4"    | 7"           | 23#+26#            | 5250' MD      | 875 sx          | TOC- 600'     |
| 6 1/4"    | 4 1/2" Liner | 11.6#              | 8983' MD      | 550 sx          | TOC-4800'     |

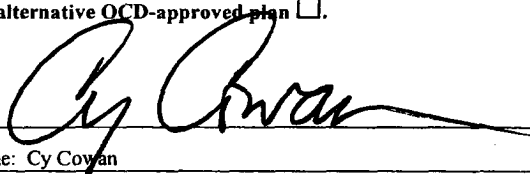
22 Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.  
Yates Petroleum Corporation proposes to drill and test the Wolfcamp and intermediate formations. Approximately 350' of surface casing will be set and cement circulated to shut off gravel and cavings. If commercial, production casing will be run and cemented, will perforate and stimulate as needed for production..  
MUD PROGRAM: 0-350' FW/Spud Mud; 350'-1100' FW Gel/Air Mist; 1100'-TD Cut Brine.  
BOPE PROGRAM: A 3000# BOPE will be installed on the 9 5/8" casing and tested daily.

23 I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that the drilling pit will be constructed according to NMOCD guidelines ☐, a general permit X or an (attached) alternative OCD-approved plan ☐.

Approved by:

OIL CONSERVATION DIVISION

Signature:



TIM W. GUM  
DISTRICT II SUPERVISOR

Printed name: Cy Cowan

Title:

Title: Regulatory Agent

Approval Date: MAR 21 2005

Expiration Date:

MAR 21 2006

E-mail Address: debbiec@ypcn.com

Date:

Phone: (505) 748-4372

Conditions of Appr  
Attached ☐

NOTIFY OCD OF SPUD & TIME TO  
WITNESS CEMENTING OF  
SURFACE & INTERMEDIATE  
CASING

**P.O. Box 2088**  
**Santa Fe, New Mexico 87504-2088**

**☐ AMENDED REPORT**

## WELL LOCATION AND ACREAGE DEDICATION PLAT

|                     |  |           |                              |
|---------------------|--|-----------|------------------------------|
| API Number          |  | Pool Code | Pool Name<br>Widcat Wolfcamp |
| Property Code       | Property Name<br>ARTESIA AIRPORT "CF" COM.   |           | Well Number<br>3             |
| OGRID No.<br>025575 | Operator Name<br>YATES PETROLEUM CORPORATION |           | Elevation<br>3559            |

### Surface Location

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| E             | 10      | 17S      | 25E   |         | 1940          | NORTH            | 660           | 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 |
| H             | 10      | 17S      | 25E   |         | 1980          | NORTH            | 660           | EAST           | EDDY   |

| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |
|-----------------|-----------------|--------------------|-----------|
| 320             |                 |                    |           |

**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**

|   |                  |                  |                  |
|---|------------------|------------------|------------------|
| NM-100834<br><br>1940'<br><br>FEE                                       | 1980'<br><br>FEE | 1980'<br><br>FEE | 1980'<br><br>FEE |
| 660'<br><br>FEE   | 660'<br><br>FEE  | 660'<br><br>FEE  | 660'<br><br>FEE  |
| N.32°51'07.2"<br>W.104°28'45.9"<br>N.673654.7<br>E.455294.6<br>(NAD-27) |                  |                  |                  |
| BOTTOM HOLE   |                  |                  |                  |

### OPERATOR CERTIFICATION

I hereby certify the the information contained herein is true and complete to the best of my knowledge and belief.

*Cy Cowan*

Signature \_\_\_\_\_

Cy Cowan

Printed Name \_\_\_\_\_

Regulatory Agent

Title \_\_\_\_\_

January 31, 2005

Date \_\_\_\_\_

### SURVEYOR CERTIFICATION

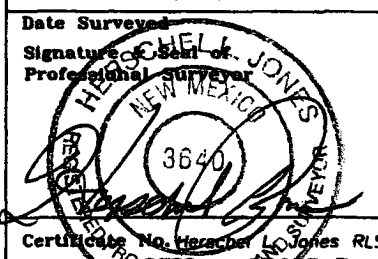
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

11/19/2004

Date Surveyed \_\_\_\_\_

Signature of \_\_\_\_\_

Professional Surveyor



Certificate No. H-100834 Jones RLS 3640  
 PORTIA AIRPORT 3  
 GENERAL SURVEYING COMPANY

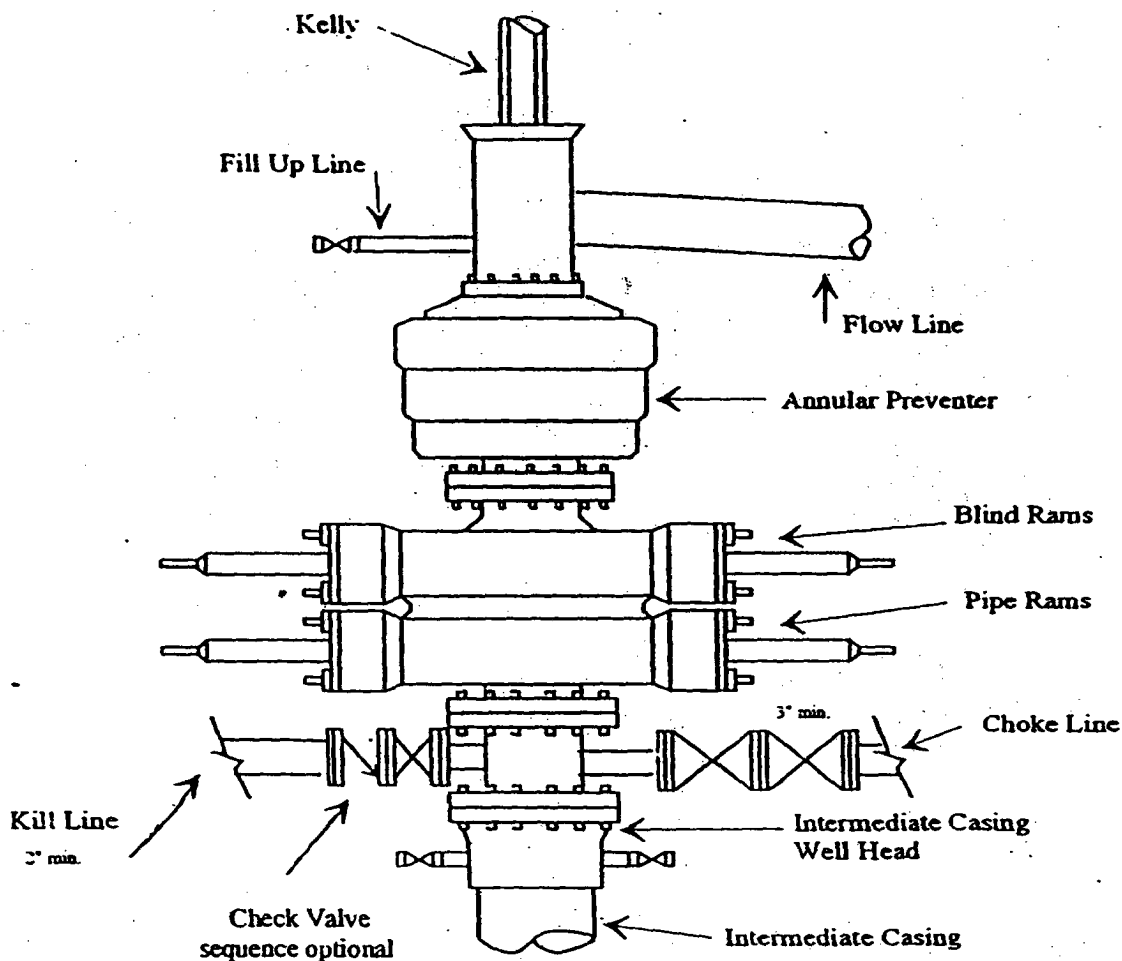
0 330' 660' 990' 1650' 1980' 2310' 2310' 1980' 1650' 990' 660' 330' 0



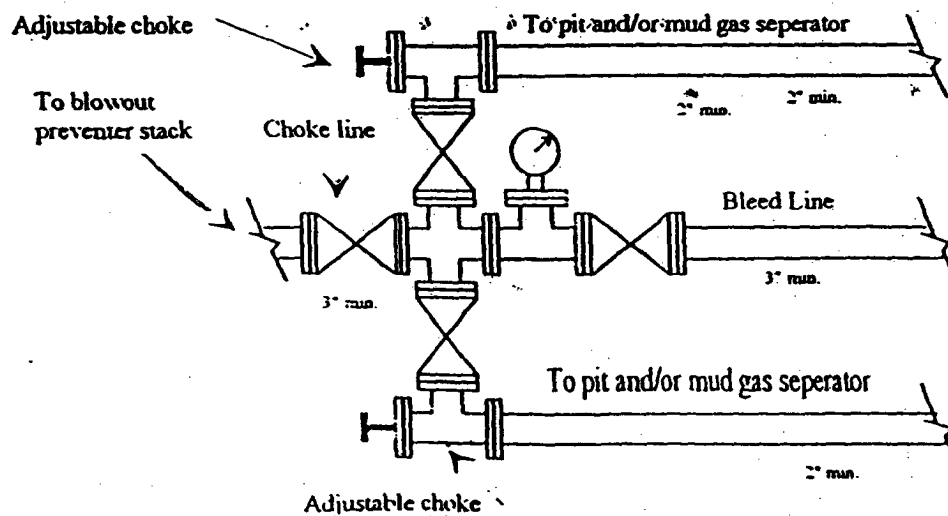
# Yates Petroleum Corporation

BOP-3

## Typical 3,000 psi Pressure System Schematic Annular with Double Ram Preventer Stack

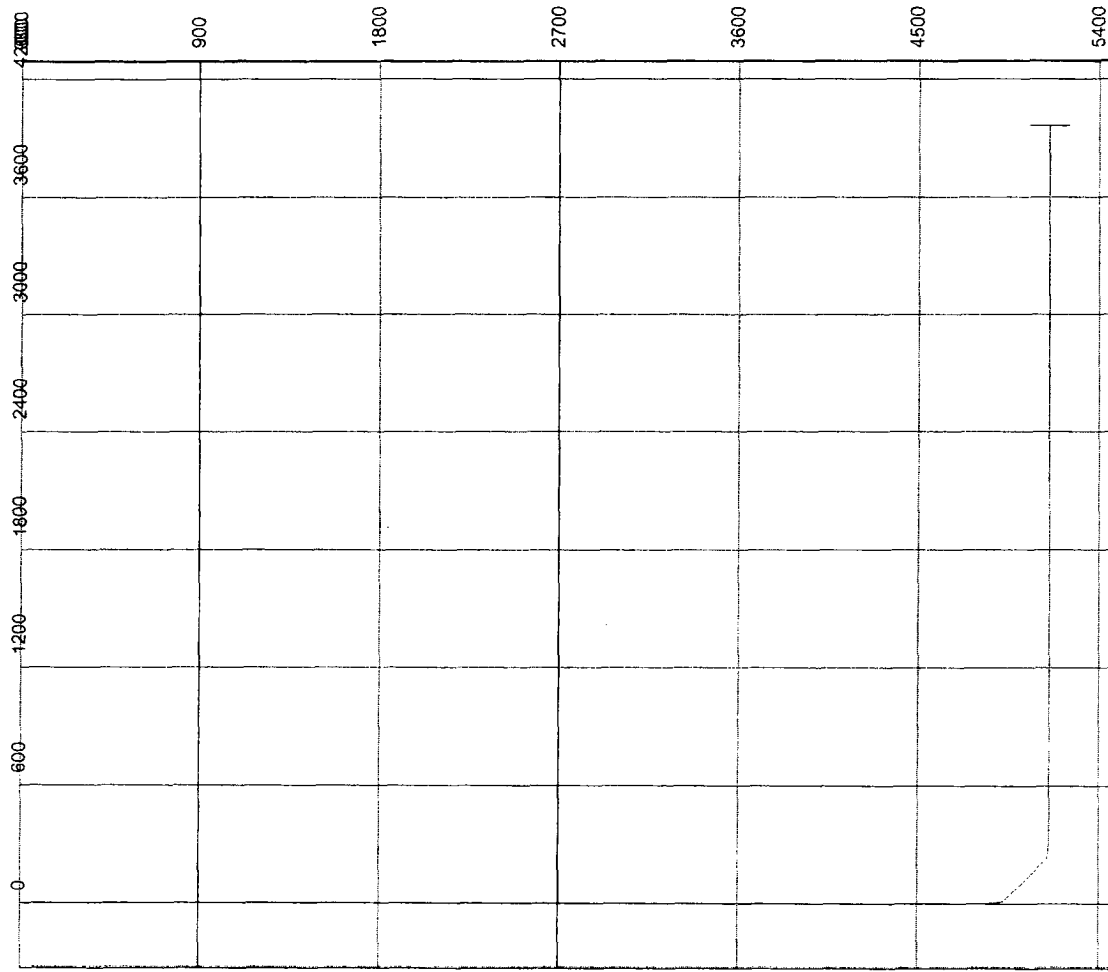


## Typical 3,000 psi choke manifold assembly with at least these minimum features



|   | M.D. [ft] | Inclination<br>[°] | Azimuth [°] | T.V.D. [ft] | N+/S- [ft] | E+/W- [ft] | D.L.S.<br>[°/100ft] | ToolFace<br>[°] | T.F. Ref.<br>[HS/GN] |
|---|-----------|--------------------|-------------|-------------|------------|------------|---------------------|-----------------|----------------------|
| 1 | 0.00      | 0.00               | 0.00        | 0.00        | 0.00       | 0.00       | 0.00                |                 |                      |
| 2 | 4850.00   | 0.00               | 0.00        | 4850.00     | 0.00       | 0.00       | 19.00               | 91              | GN                   |
| 3 | 4921.26   | 13.54              | 90.58       | 4920.60     | -0.08      | 8.38       | 19.00               | 0               | HS                   |
| 4 | 5249.34   | 75.88              | 90.58       | 5142.44     | -2.30      | 227.96     | 19.00               | 360             | HS                   |
| 5 | 5323.81   | 90.02              | 90.58       | 5151.56     | -3.05      | 301.67     | 0.00                |                 |                      |
| 6 | 8982.33   | 90.02              | 90.58       | 5150.00     | -40.00     | 3960.00    | 0.00                |                 |                      |

### 3D<sup>s</sup> Directional Drilling Planner - 3D View

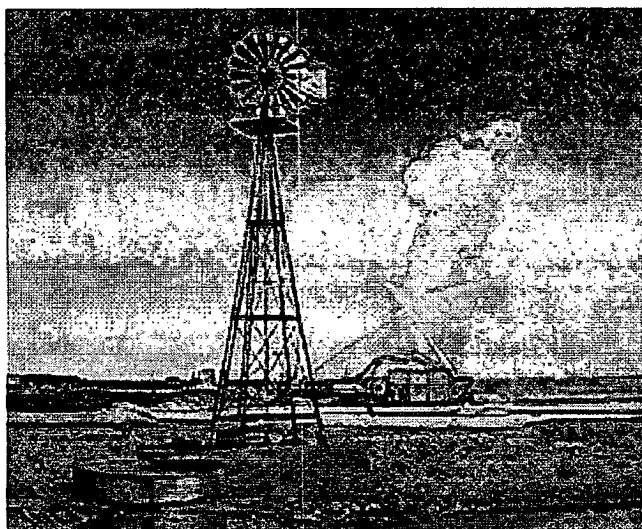


# **YATES PETROLEUM**

Legals:

**ARTESIA AIRPORT CF COM. #3  
8,600' WOLFCAMP WELL  
SECTION 10, T-17-S, R-25-E  
1980' FNL 660' FEL  
EDDY COUNTY, NEW MEXICO**

## **"CONTINGENCY PLAN"**

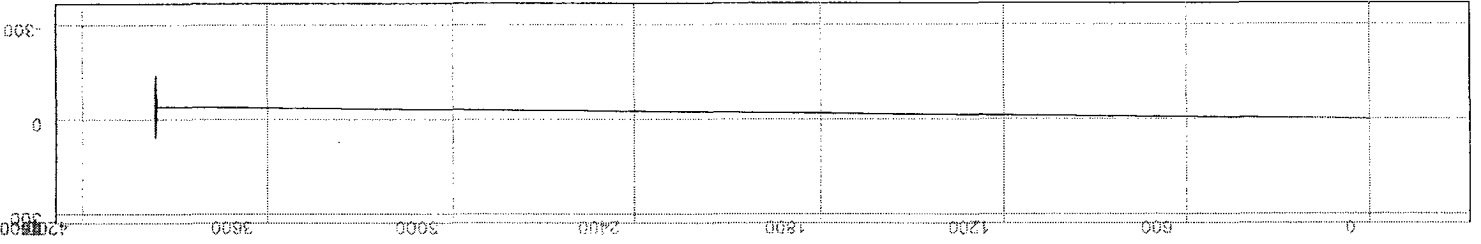


**CALAWAY SAFETY EQUIPMENT CO., INC.  
3229 N. INDUSTRIAL DR.  
HOBBS, NEW MEXICO 88240  
(505) 392-2973**

|   | M.D. [ft] | Inclination<br>[°] | Azimuth [°] | T.V.D. [ft] | N+/S- [ft] | E+/W- [ft] | D.L.S.<br>[°/100ft] | ToolFace<br>[°] | T.F. Ref.<br>[HS/GN] |
|---|-----------|--------------------|-------------|-------------|------------|------------|---------------------|-----------------|----------------------|
| 1 | 0.00      | 0.00               | 0.00        | 0.00        | 0.00       | 0.00       | 0.00                |                 |                      |
| 2 | 4760.00   | 0.00               | 0.00        | 4760.00     | 0.00       | 0.00       | 15.00               | 91              | GN                   |
| 3 | 4921.26   | 24.19              | 90.58       | 4916.51     | -0.34      | 33.54      | 15.00               | 360             | HS                   |
| 4 | 5249.34   | 73.40              | 90.58       | 5126.06     | -2.76      | 272.84     | 15.00               | 0               | HS                   |
| 5 | 5346.68   | 88.00              | 90.58       | 5141.74     | -3.72      | 368.64     | 0.00                |                 |                      |
| 6 | 8940.41   | 88.00              | 90.58       | 5267.00     | -40.00     | 3960.00    | 0.00                |                 |                      |

# 3D<sup>3</sup> Directional Drilling Planner - 3D View

Company: Technical Toolboxes Inc.  
Well: Artesia Airport CF Com. #3

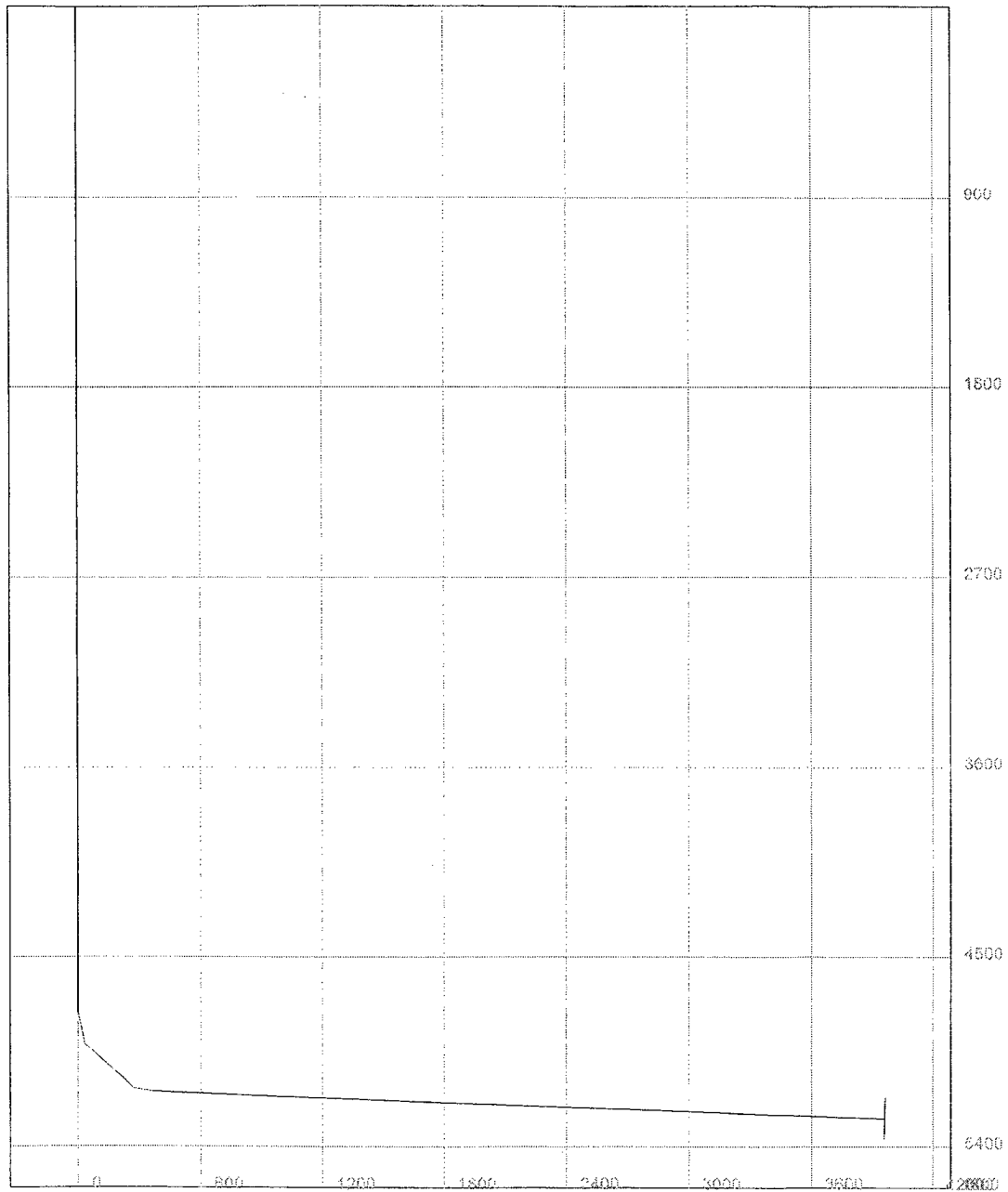




### 3D<sup>3</sup> Directional Drilling Planner - 3D View

Company: Technical Toolboxes Inc.

Well: Artesia Airport CF Com. #3



## Table of Contents

- I. H2S Contingency Plan Section
  - A. Scope
  - B. Objective
  - C. Discussion of Plan
- II. Emergency Procedures Section
  - A. Emergency Procedures
  - B. Emergency Reaction Steps
  - C. Simulated Blowout Control Drills
- III. Ignition Procedures Section
  - A. Responsibility
  - B. Instructions
- IV. Training Program Section
  - A. Training Requirements
- V. Emergency Equipment Section
  - A. Emergency Equipment Requirements
- VI. Check Lists Section
  - A. Status Check List
  - B. Procedural Check List
- VII. Briefing Procedure Section
  - A. Briefing Procedures
- VIII. Evacuation Plan Section
  - A. General Plan
  - B. Emergency Assistance Telephone List
- IX. Maps and Plats Section
  - A. Map showing Well site
  - B. Map showing Public within Radius of Exposure and Evacuation Routes
  - B. Emergency Call List of Residents and Businesses

X. General Information Section

- A. Drilling / Re-entry Permits
- B. 100 ppm Exposure Radius Chart
- C. 500 ppm Exposure Radius Chart
- D. Toxic Effects of Hydrogen Sulfide Poisoning
- E. Use of Self Contained Breathing Apparatus
- F. Rescue-First Aid for Hydrogen Sulfide Poisoning

## I. H2S CONTINGENCY PLAN SECTION

### Scope

This contingency plan establishes guidelines for all company employees and contract employees whose work activities may involve exposure to Hydrogen Sulfide gas (H2S).

### Objective

1. Prevent any and all accidents and prevent the uncontrolled release of H2S into the atmosphere.
2. Provide proper evacuation procedures to cope with emergencies.
3. Provide immediate and adequate medical attention should an injury occur.

### Discussion of Plan

Implementation: This plan, with all details, is to be fully implemented prior to drilling below 1000'.

Emergency Response Procedure: This section outlines the conditions and denotes steps to be taken in the event of an emergency.

Emergency Equipment and Procedure: This section outlines the safety and emergency equipment that will be required for the drilling of this well.

Training Provisions: This section outlines the training provisions that must be adhered to prior to drilling below 1000'.

Emergency Call Lists: Included are the telephone numbers of all persons that would need to be contacted should an emergency occur.

Briefing: This section deals with the briefing of all people involved in the drilling operation.

Public Safety: Public Safety Personnel will be made aware of the drilling of this well.

Check Lists: Status Check Lists and Procedural Check Lists have been included to insure adherence to the plan.

General Information: A general information section has been included to supply support information.

## II. EMERGENCY PROCEDURES SECTION

### Emergency Procedures

- I. In the event of any evidence of H<sub>2</sub>S level above 10 ppm, take the following steps immediately:
  - A. Secure breathing apparatus.
  - B. Order non-essential personnel out of the danger zone.
  - C. Take steps to determine if the H<sub>2</sub>S level can be corrected or suppressed and if so, proceed with normal operations.
- II. If uncontrollable conditions occur, proceed with the following:
  - A. Take steps to protect and / or remove any public downwind of the rig including partial evacuation or isolation. Notify necessary public Safety personnel and Yates Petroleum Corporation, Drilling Superintendent, Jim Krogman of the situation.
  - B. Remove all personnel to the Safe Briefing Area.
  - C. Notify public safety personnel for help with maintaining roadblocks and implementing evacuation.
  - D. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety procedures.
- III. Responsibility
  - A. The Company Approved Supervisor shall be responsible for the total implementation of the plan.
  - B. The Company Approved Supervisor shall be in complete command during any emergency.
  - C. The Company Approved Supervisor shall designate a back up Supervisor in the event that he / she is not available.

## **Emergency Reaction Steps**

### **I. Drilling or Tripping**

#### **A. All Personnel**

1. When alarm sounds, don escape unit and report to upwind Safe Briefing Area
2. Check status of other personnel (Buddy System).
3. Secure breathing apparatus.
4. Await order from Supervisor

#### **B. Drilling Foreman**

1. Report to the upwind Safe Briefing Area.
2. Don breathing apparatus and return to the point of release with the Tool Pusher or Driller (Buddy System).
3. Determine the concentration of H<sub>2</sub>S.
4. Assess the situation and take appropriate control measures.

#### **C. Tool Pusher**

1. Report to the upwind Safe Briefing Area.
2. Don breathing apparatus and return to the point of release with the Drilling Foreman or Driller (Buddy System).
3. Determine the concentration of H<sub>2</sub>S.
4. Assess the situation and take appropriate control measures.

#### **D. Driller**

1. Don escape unit.
2. Check monitor for point of release.
3. Report to the Safe Briefing Area.
4. Check the status of other personnel (in a rescue attempt, always use the buddy system).
5. Assign the least essential person to notify the Drilling Foreman and Tool Pusher, in the event of their absence.
6. Assume the responsibility of the Drilling Foreman and Tool Pusher until they arrive, in the event of their absence.

E. Derrick Man

1. Remain in the Safe Briefing Area until otherwise instructed by Supervisor.

F. Mud Engineer

1. Report to Safe Briefing Area.
2. When instructed, begin check of mud for pH level and H<sub>2</sub>S level.

G. Safety Personnel

1. Don appropriate breathing apparatus.
2. Check status of all personnel.
3. Await instructions from Drilling Foreman

II. Taking a Kick

- A. All personnel report to Safe Briefing Area.
- B. Follow standard BOP procedures.

III. Open Hole Logging

- A. All unnecessary personnel should leave the rig floor.
- B. Drilling Foreman and Safety personnel should monitor the conditions and make necessary safety equipment recommendations.

IV. Running Casing or Plugging

- A. Follow "Drilling or Tripping" procedures.
- B. Assure that all personnel have access to protective equipment.

## Simulated Blowout Control Drills

All drills will be initiated by activating alarm devices (air horn). One long blast, on air horn, for Actual and Simulated Blowout Control Drills. The Drilling Foreman or Tool Pusher will perform this operation at least one time per week for each of the following conditions, with each crew:

- |         |                     |
|---------|---------------------|
| Drill 1 | Bottom Drilling     |
| Drill 2 | Tripping Drill Pipe |

In each of these drills, the initial reaction time to shutting in the well shall be timed as well as the total time for the crew to complete its entire pit drill assignment. The times must be recorded on the IADC Driller's Log as "Blowout Control Drill".

Drill No.: \_\_\_\_\_

Reaction time to shut-in: \_\_\_\_\_ minutes, \_\_\_\_\_ seconds.

Total time to complete assignment: \_\_\_\_\_ minutes, \_\_\_\_\_ seconds.

### I. Drill Overviews

#### A. Drill No. 1--Bottom Drilling

1. Sound the alarm immediately
2. Stop the rotary and hoist the kelly joint above the rotary table.
3. Stop the circulatory pump.
4. Close drill pipe rams.
5. Record casing and drill pipe shut-in pressures and pit volume increases.

#### B. Drill No. 2--Tripping Drill Pipe

1. Sound the alarm immediately
2. Position the upper tool joint just above the rotary table and set slips.
3. Install a full opening valve or inside blowout preventer tool in order to close the drill pipe.
4. Close the drill pipe rams.
5. Record the shut-in annular pressure.



## II. Crew Assignments

### A. Drill No. 1-Bottom Drilling

#### 1. Driller

- a. Stop the rotary and hoist Kelly joint above the rotary table.
- b. Stop the circulatory pump.
- c. Check flow.
- d. If flowing, sound the alarm immediately.
- e. Record the shut-in drill pipe pressure.
- f. Record all data reported by the crew.
- g. Determine the mud weight increase needed or other courses of action.

#### 2. Derrickman

- a. Open choke line valve at BOP.
- b. Signal Floor Man #1 at accumulator, that choke line is open.
- c. Close choke and upstream valve after pipe tams have been closed.
- d. Read the shut-in annular pressure and report readings to Driller.

#### 3. Floor Man #1

- a. Close the pipe tams after receiving the signal from the Derrickman.
- b. Report to Driller for further instructions.

#### 4. Floor Man #2

- a. Notify the Tool Pusher and Operator Representative of the H<sub>2</sub>S alarms.
- b. Check for open fires and if safe to do so, extinguish them.
- c. Stop all welding operations.
- d. Turn off all non-explosion proof lights and instruments.
- e. Report to Driller for further instructions.

5. Tool Pusher
  - a. Report to the rig floor.
  - b. Have a meeting with all crews.
  - c. Compile and summarize all information.
  - d. Calculate the proper kill weight.
  - e. Ensure that proper well procedures are put into action.

6. Operator Representative
  - a. Notify the Drilling Superintendent.
  - b. Determine if an emergency exists and if so, activate the contingency plan.

B. Drill No. 2-Tripping Pipe

1. Driller
  - a. Sound the alarm immediately when mud volume increase has been detected.
  - b. Position the upper tool joint just above the rotary table and set slips.
  - c. Install a full opening valve or inside blowout preventor tool to close the drill pipe.
  - d. Check flow.
  - e. Record all data reported by the crew.
  - f. Determine the course of action.

2. Derrickman
  - a. Come down out of derrick.
  - b. Notify Tool Pusher and Operator Representative.
  - c. Check for open fires and, if safe to do so, extinguish them.
  - d. Stop all wellhead operations.

3. Floor Man #1
  - a. Pick up full opening valve or inside blowout preventers and stab into tool joint above rotary table (with Floor Man #2).
  - b. Tighten valve with back-up tongs.
  - c. Close pipe rams after signal from Floor Man #2.
  - d. Read accumulator pressure and check for possible high-pressure fluid leaks in valves or piping.
  - e. Report to Driller for further instructions.
4. Floor Man #2
  - a. Pick-up full opening valve or inside blowout preventers and stab into tool joint above rotary table (with Floor Man #1).
  - b. Position back-up tongs on drill pipe.
  - c. Open choke line valve at BOP.
  - d. Signal Floor Man #1, at accumulator, that choke line is open.
  - e. Close choke and upstream valve after pipe rams have been closed.
  - f. Check for leaks on BOP stack and choke manifold.
  - g. Read annular pressure.
  - h. Report readings to the Driller.
5. Tool Pusher
  - a. Report to rig floor.
  - b. Have a meeting with all crews.
  - c. Compile and summarize all information.
  - d. Calculate proper kill weight.
  - e. See that proper well kill procedures are put into action.
6. Operator Representative
  - a. Notify Drilling Superintendent.
  - b. Determine if an emergency exists, and if so, activate the contingency plan.

### III. IGNITION PROCEDURES SECTION

#### Responsibility

The decision to ignite the well is the responsibility of the **DRILLING FOREMAN** in concurrence with the **STATE POLICE**. In the event the Drilling Foreman is incapacitated, it becomes the responsibility of the **RIG TOOL PUSHER**. This decision should be made only as a last resort and in a situation where it is clear that:

1. Human life and property are endangered.
2. There is no hope of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

#### Instructions for Igniting the Well

1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and attach a safety rope. One man must monitor the atmosphere for explosive gases with the Explosimeter, while the Drilling Foreman is responsible for igniting the well.
2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.
3. Ignite from upwind and do not approach any closer than is warranted.
4. Select the ignition site best suited for protection and which offers an easy escape route.
5. Before igniting, check for the presence of combustible gases.
6. After igniting, continue emergency actions and procedures as before.
7. All unassigned personnel will limit their actions to those directed by the Drilling Foreman.

**NOTE:** After the well is ignited, burning Hydrogen Sulfide will convert to Sulfur Dioxide, which is also highly toxic. Do not assume the area is safe after the well is ignited.

#### IV. TRAINING PROGRAM SECTION

##### Training Requirements

When working in an area where Hydrogen Sulfide gas (H<sub>2</sub>S) might be encountered, definite training requirements must be carried out. The Company Supervisor will insure that all personnel, at the well site, have had adequate training in the following:

1. Hazards and characteristics of H<sub>2</sub>S.
2. Physical effects of Hydrogen Sulfide on the human body.
3. Toxicity of Hydrogen Sulfide and Sulfur Dioxide.
4. H<sub>2</sub>S detection.
5. Emergency rescue.
6. Resuscitators.
7. First aid and artificial resuscitation.
8. The effects of H<sub>2</sub>S on metals.
9. Location Safety.

Service company personnel and visiting personnel must be notified in the zone contains H<sub>2</sub>S. Each service company must provide adequate training and equipment for their employees before they arrive at the well site.

## **V. EMERGENCY EQUIPMENT SECTION**

### **Emergency Equipment Requirements**

#### **I. Signs**

- A. Located at the location entrance with the following information:

**CAUTION - POTENTIAL POISON GAS  
HYDROGEN SULFIDE  
NO ADMITTANCE WITHOUT AUTHORIZATION**

#### **II.\* Fresh air breathing equipment**

- A. Air line units for all rig personnel on location.  
B. Cascade system with hose lines to rig floor and one to the derrickman and other operation areas. Spare cascade (trailer) on location.

#### **III. Wind Socks or Wind Streamers**

- A. Two 10" windsocks located at strategic locations at a height visible from the rig floor.  
B. Wind streamers (if preferred) to be placed at various locations on the well site to insure wind consciousness at all times. (Corners of location).

#### **IV. Hydrogen Sulfide detector and alarms.**

- A. 1 - four channel H2S monitor with alarms.  
B. 4 - Sensors, located at floor, bell nipple, shale shaker and pits.  
\* C. Hand operated detectors with tubes.  
\* D. H2S monitor tester.

#### **V. Condition sign and flags**

- A. One each of green, yellow and red condition flags to be displayed to denote conditions:

|               |                            |
|---------------|----------------------------|
| <b>GREEN</b>  | <b>Normal Conditions</b>   |
| <b>YELLOW</b> | <b>Potential Danger</b>    |
| <b>RED</b>    | <b>Danger, H2S Present</b> |

- B. The condition flag shall be posted at the location entrance.

#### **VI.\* Auxiliary rescue equipment**

- A. Stretcher  
B. Two 100' lengths of 5/8" nylon rope.

#### **VII.\* Mud Inspection devices**

- A. Garrett Gas Train or Hach Tester for inspection of Hydrogen Sulfide concentration in the mud system.

#### **VIII. Fire Extinguishers**

- A. Adequate fire extinguishers shall be located at strategic locations.

#### **IX. Blowout prevention equipment**

- A. The well shall have hydraulic BOP equipment for the anticipated BHP.  
B. Equipment must be tested upon installation.

#### **X.\* Combustible gas detectors**

- A. There shall be one combustible gas detector on location at all times.

- XI. BOP Testing
  - A. BOP, Choke Line and Kill Line will be tested as specified by operator
- XII. Audio System
  - A. Radio communications shall be available at the rig.
  - B. Radio communications shall be available at the rig floor or trailer.
  - C. Radio communications shall be available on vehicles.
- XIII. Special control equipment
  - A. Hydraulic BOP equipment with remote control on ground.
  - B. Rotating head at surface casing point.
- XIV. Evacuation Plan
  - A. Evacuation routes should be established prior to spudding each well.
  - B. Should be discussed with all rig personnel.
- XV. Designated Areas
  - A. Parking and visitor area.
    - 1. All vehicles are to be parked at a pre-determined safe distance from the wellhead.
    - 2. Designated smoking area.
  - B. Safe Briefing Area
    - 1. Two Safe Briefing Areas shall be designated on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds or they are at a 180 degree angle if wind directions tend to shift in the area.
    - 2. Personal protective equipment should be stored in both protection centers or if a moveable trailer is used, it should be kept upwind of existing winds. When wind is from the prevailing direction, both protection centers should be accessible.

- \*Additional equipment will be available at Callaway Safety Equipment Co., Inc., 3229 N. Industrial, Hobbs, New Mexico (505) 392-2973
- Additional personal Hydrogen Sulfide monitors on location for all hands.
- Automatic Flare igniter installed on rig.

## VI. CHECK LIST SECTION

### Status Check List

**NOTE:** Date each item as they are implemented.

- |     |  |       |
|-----|--|-------|
| 1.  | Sign at location entrance  | _____ |
| 2.  | Two (2) windsocks (in required locations)  | _____ |
| 3.  | Wind streamers (if required)   | _____ |
| 4.  | 30 minute pressure demand air packs on location for all rig personnel and mud loggers. | _____ |
| 5.  | Air packs, inspected and ready for use.  | _____ |
| 6.  | Spare bottles for each air pack (if required)  | _____ |
| 7.  | Cascade system and hose line hook up   | _____ |
| 8.  | Cascade system for refilling air bottles   | _____ |
| 9.  | Choke manifold hooked up and tested (Before drilling out surface casing)               | _____ |
| 10. | Remote Hydraulic BOP control (hooked up and tested before drilling out surface casing) | _____ |
| 11. | BOP Preventer tested (before drilling out surface casing)                              | _____ |
| 12. | Mud engineer on location with equipment to test mud for Hydrogen Sulfide               | _____ |
| 13. | Safe Briefing Areas set up   | _____ |
| 14. | Condition sign and flags on location and ready   | _____ |
| 15. | Hydrogen Sulfide detection system hooked up  | _____ |
| 16. | Hydrogen Sulfide alarm system hooked up  | _____ |
| 17. | Stretcher on location at Safe Briefing Area  | _____ |
| 18. | 1 - 100' length of 5/8" nylon rope on location   | _____ |
| 19. | 1 - 20 # or 30 # ABC fire extinguisher in safety trailer in addition to those on rig   | _____ |
| 20. | Combustible gas detector on location and tested  | _____ |



- 21. All rig crews and supervisors trained (as required) \_\_\_\_\_
- 22. Access restricted for unauthorized personnel \_\_\_\_\_
- 23. Drills on H2S and well control procedures \_\_\_\_\_
- 24. All outside service contractors advised of potential  
Hydrogen Sulfide on well \_\_\_\_\_
- 25. **NO SMOKING** sign posted \_\_\_\_\_
- 26. Hand operated H2S detector with tubes on location \_\_\_\_\_
- 27. 25 mm flare gun with flares \_\_\_\_\_
- 28. Automatic Flare igniter installed on rig \_\_\_\_\_

### **Procedural Check List**

#### **Perform the following on each tour:**

1. Check fire extinguishers to see that they have the proper charge.
2. Check breathing equipment to insure that it has not been tampered with.
3. Check pressure on supply air bottles to see that they are capable of recharging.
4. Make sure all of the Hydrogen Sulfide detection systems are operative.

#### **Perform the following each week:**

1. Check each piece of breathing equipment to make sure that the demand regulator is working. This requires that the bottle be opened and the mask assembly be put on tight enough so that when you inhale, you get air.
2. Blowout preventer skills.
3. Check supply pressure on BOP accumulator stand-by source.
4. Check all work/escape units for operation: demand regulator, escape bottle air volumes, and supply bottle air volume.
5. Check breathing equipment mask assembly to see that straps are loosened and turned back.
6. Check pressure on breathing equipment air bottles to make sure they are charged to full volume.
7. Check breathing equipment air bottles to make sure all demand regulators are working. This requires that the bottles be opened and the mask assembly be put on tight enough so that when you inhale, you get air.
8. Confirm pressure on all supply air bottles.
9. Perform breathing equipment drills with on-site personnel.

#### **Check the following supplies for availability:**

- a. Stretcher
  - b. Safety belts and ropes
  - c. Emergency telephone lists
  - d. Spare air bottle
  - e. Spare oxygen bottles (if resuscitator required)
  - f. Hand operated H<sub>2</sub>S detectors and tubes
10. Test the Explosimeter to verify batteries are good.

## **VII. BRIEFING PROCEDURE SECTION**

### **Briefing Procedures**

The following scheduled briefings will be held to insure the effective drilling and operation of this project:

#### **Pre-Spud Meeting**

**Date:** Prior to spudding the well

**Attendance:** Drilling Supervisor  
Drilling Engineer  
Drilling Foreman  
Rig Pushers  
Rig Driller  
Mud Engineer  
All Safety Personnel  
Service Companies

**Purpose:** Review and discuss the well program, step by step, to insure complete understanding of assignments and responsibilities.

## VIII. EVACUATION PLAN SECTION

### General Plan

The direct lines of action prepared by CALLAWAY SAFETY EQUIPMENT CO., INC. to protect the public from hazardous gas situations are as follows:

1. When the company approved supervisor (Drilling Foreman, Tool Pusher, Driller) determine Hydrogen Sulfide gas cannot be limited to the well location and the public will be involved, he will activate the evacuation plan. Escape routes are noted on the Area map.
2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists and evacuation needs to be implemented.
3. Company approved safety personnel that have been trained in the use of Hydrogen Sulfide detection equipment and self-contained breathing equipment will be utilized.
4. Law Enforcement personnel (State Police, Sheriff's Department, local Police Department and local Fire Department) will be called to aid in setting up and maintaining roadblocks. Also, they will aid in evacuation of the public if necessary.

**NOTE:** Law enforcement personnel will not be asked to come into a contaminated area. Their assistance will be limited to uncontaminated areas. Constant radio contact will be maintained with them.

5. After the discharge of gas has been controlled, "Company" safety personnel will determine when the area is safe for re-entry.

**See Emergency Reaction Plan**

## EMERGENCY ASSISTANCE TELEPHONE LIST

### PUBLIC SAFETY

---

|                                  |                       |
|----------------------------------|-----------------------|
| Artesia P.D.                     | (505) 746-5000 or 911 |
| Eddy County Sheriff's Department | (505) 746-9888 or 911 |
| New Mexico State Police          | (505) 748-9718 or 911 |
| Artesia Fire Department          | (505) 885-5050 or 911 |
| New Mexico OCD (Tim Gum)         | (505) 748-1283        |
| New Mexico D.O.T.                | (505) 827-5100        |
| U.S. Dept. of Labor              | (505) 248-5302        |

### YATES PETROLEUM CORPORATION

---

|             |                         |                         |
|-------------|-------------------------|-------------------------|
| Jim Krogman | Drilling Superintendent | (505) 748-4215 (office) |
|             |                         | (505) 365-8340 (mobile) |
|             |                         | (505) 746-2674 (home)   |
| Tim Bussell | Assistant Drilling Sup. | (505) 748-4221 (office) |
|             |                         | (505) 365-5695 (mobile) |
|             |                         | (505) 746-2121 (home)   |

### POTENTIALLY AFFECTED AREAS

---

|                           |                |                           |
|---------------------------|----------------|---------------------------|
| Artesia Municipal Airport | (505) 746-3206 |                           |
| FLETC (Gloria Vaught)     | Safety Chief   | (505) 748-8056 (work)     |
|                           |                | (505) 318-1113 (cellular) |
|                           |                | (505) 748-8136 (security) |

### SAFETY CONTRACTOR

---

|                           |                         |
|---------------------------|-------------------------|
| Callaway Safety Equipment | (505) 392-2973 (Hobbs)  |
|                           | (432) 561-5049 (Odessa) |

**Affected Public Notification List**  
(within a 65' radius of exposure @ 100 ppm)

The geologic zones that will be encountered during drilling are known to contain hazardous quantities of H<sub>2</sub>S. The accompanying map illustrates the affected areas of the community. The residents within this radius will be notified via a hand delivered written notice describing the activities, potential hazards, and conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

**Evacuee Description:** Residents

**Notification Process:** A continuous siren audible to all residents will be activated; signaling evacuation of previously notified and informed residents.

**Evacuation Plan:** All evacuees will migrate lateral to the wind direction.

The Oil Company will identify all homebound or highly susceptible individuals and make special evacuation preparations, interfacing with the local fire and emergency medical services as necessary.

IX. MAPS AND PLATS SECTION

**Callaway Safety Equipment Co., Inc.****3229 INDUSTRIAL DR.  
HOBBS, NEW MEXICO 88240****SAM D. CALLAWAY  
PRESIDENT****505 392-2973****AIRPORT CF COM. #3**

To whom it may concern,

Based on information from prior wells drilled in this area, there were no reportable quantities of Hydrogen Sulfide (H<sub>2</sub>S) associated with these wells.

However, as a precautionary measure, a mock survey of the well to be drilled was done utilizing 100 ppm and 500 ppm readings at the wellhead with a 2100 mcf/day back pressure flow rate. The results of these mock surveys showed the radius of exposure was significantly less than the 3000' utilized under NM OCD Rule 118 for a wildcat well or a well with no other comparable data to utilize for a survey purposes.





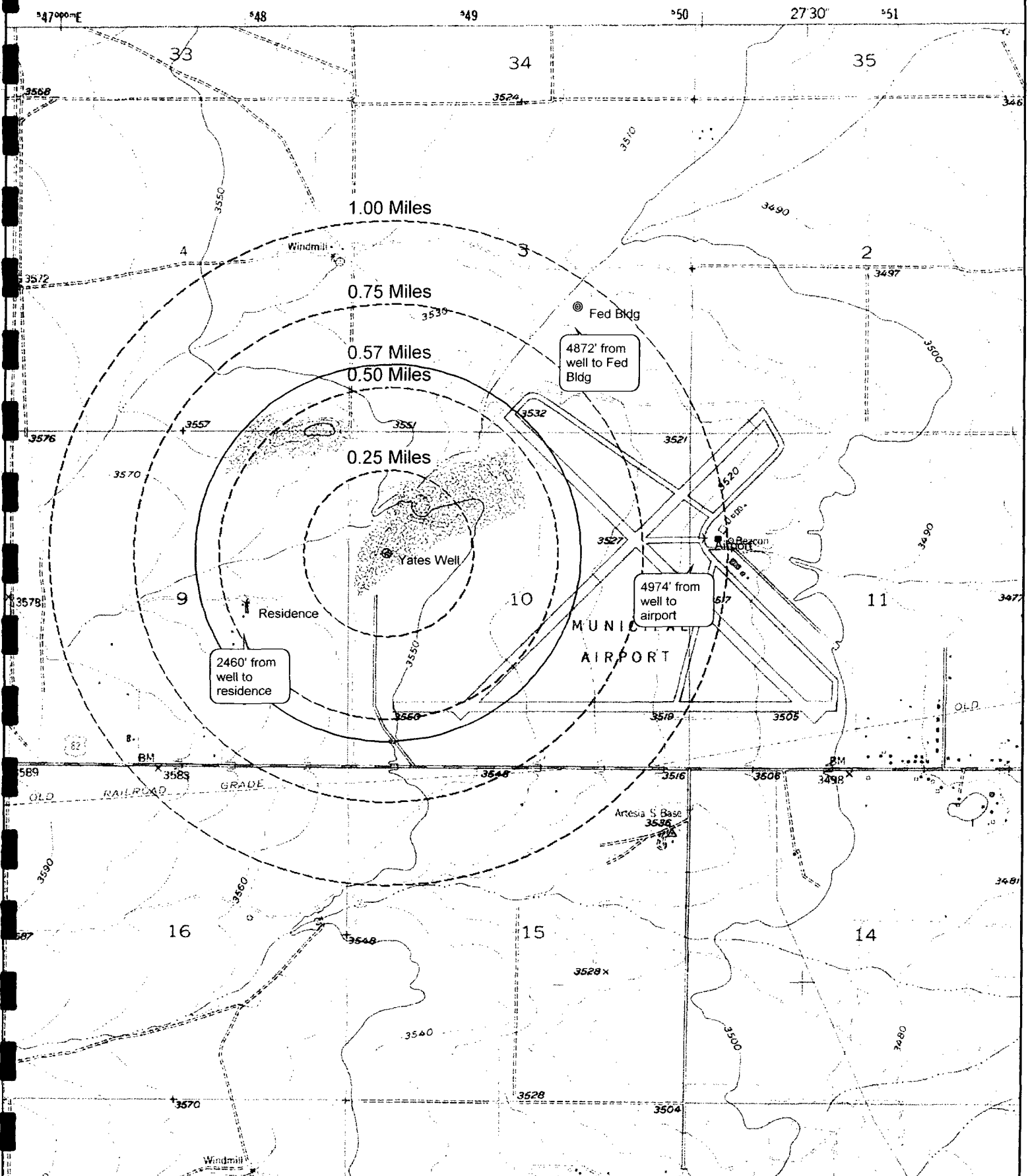
## Callaway Safety Equipment

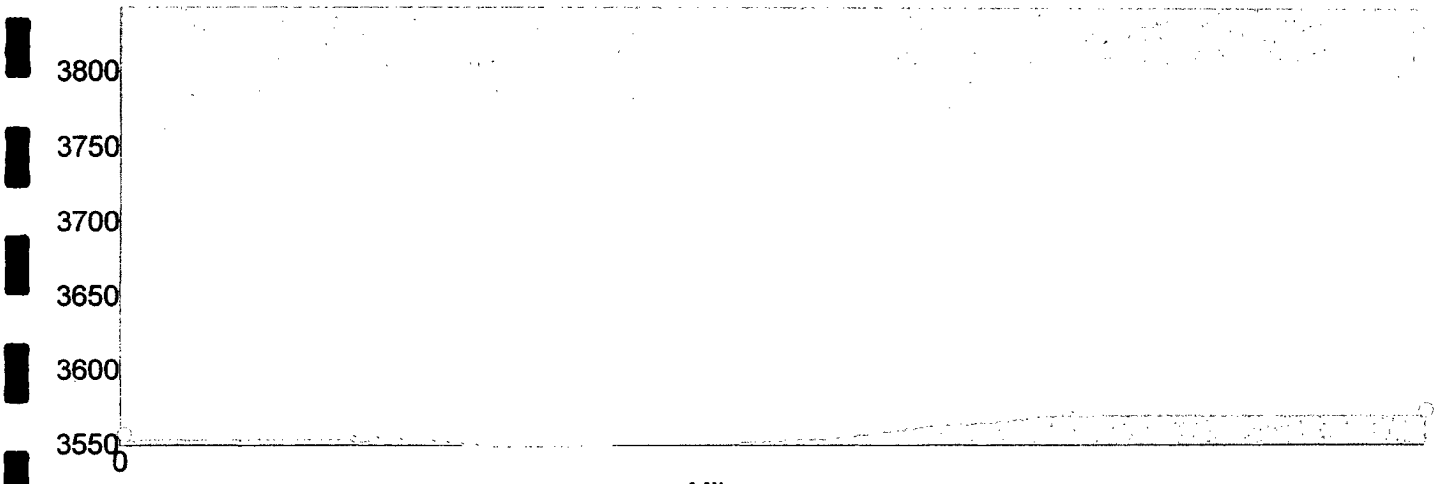
[illegible]

**3229 Industrial Drive  
Hobbs, NM 88240  
505-392-2973**

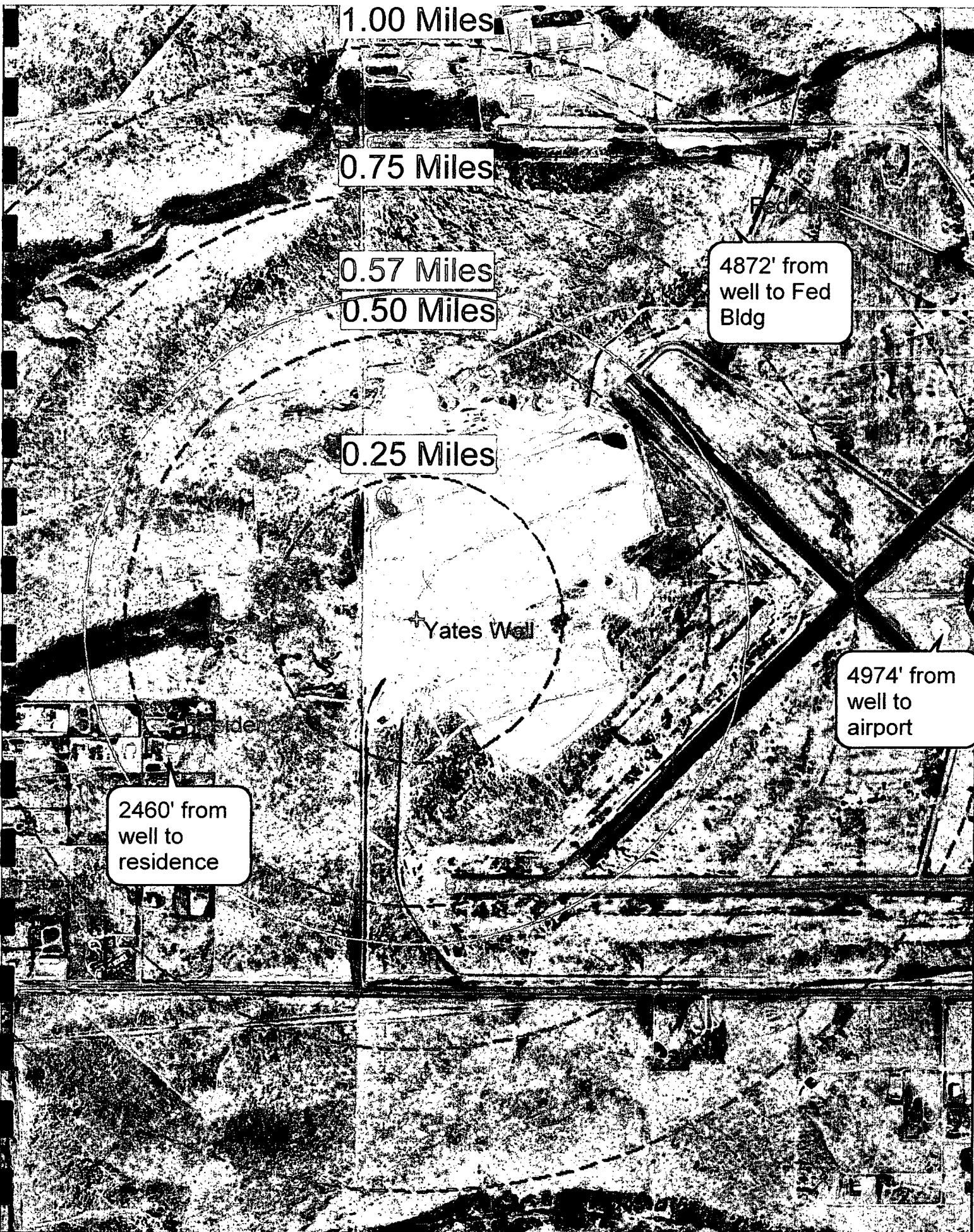
**Callaway Safety Technician**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY





|                  |           |                   |           |            |                   |
|------------------|-----------|-------------------|-----------|------------|-------------------|
|                  |           | Miles             |           |            |                   |
| Total distance:  | 2460 feet | Climbing:         | 23 feet   | Latitude:  | 032° 51' 7.96" N  |
|                  |           | Descending:       | -7 feet   | Longitude: | 104° 28' 48.02" W |
| Ground distance: | 2461 feet | Elevation change: | 16 feet   | Elevation: | 3556 feet         |
|                  |           | Min/Max:          | 3549/3572 | Grade:     | 0%                |



1.00 Miles

0.75 Miles

0.57 Miles

0.50 Miles

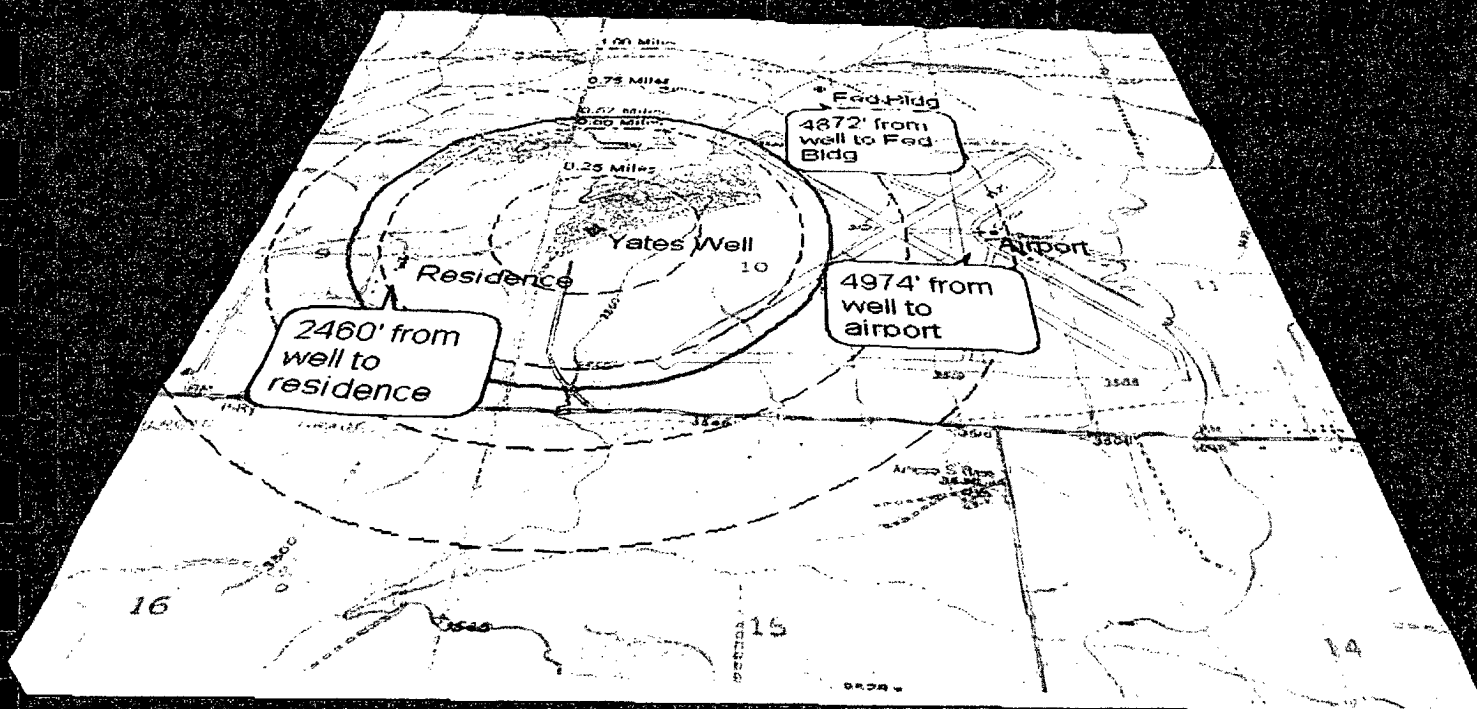
0.25 Miles

Yates Well

2460' from  
well to  
residence

4872' from  
well to Fed  
Bldg

4974' from  
well to  
airport





12

11

10

9

EMPTY

Y  
E  
R  
K  
E  
Y  
T  
R  
A  
I  
L

8

MR. & MRS. RICHARD PEDDE  
746-2842

7

VACANT

6

MARTY KING : 3 KIDS  
746-2836

5

MR. & MRS. FRANK HAMMON  
746-9477

4

RAY G. RUZ  
746-4056

3

DAVID HIGGINS - 1 SON  
746-4601

2

MR. & MRS. LARRY SMITH  
746-6037

1

BILL & LELINA CHASE  
748-3770

HOPE HIGHWAY

EMPTY  
9.  
10.  
11.  
12.

OUTSIDE OF R.O.E.

X. GENERAL INFORMATION SECTION



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

RECEIVED

MAY 27 2004

FORM APPROVED  
OMB NO. 1004-0135  
Expires January 31, 2004

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

1a. Type of Well ☐ Oil Well ☒ Gas Well ☐ Dry ☐ Other

b. Type of Completion: ☒ New Well ☐ Work Over ☐ Deepen ☐ Plug Back ☐ Diff. Resvr., Other

2. Name of Operator  
**Perenco LLC**

3. Address  
**6 Desta Drive, Suite 6800 Midland, TX 79705**

3a. Phone No. (include area code)  
**432 682-8553**

4. Location of Well (Report location clearly and in accordance with Federal requirements)\*  
At surface **760' FSL and 760' FEL (UL P)**  
At top prod. interval reported below **972' FSL and 760' FEL**  
At total depth **985' FNL and 804' FEL (UL A)**

5. Lease Serial No.  
**93196-23342**

6. If Indian, Allottee or Tribe Name

7. Unit or CA Agreement Name and No.  
**Thames 31 Federal #1**

8. Lease Name and Well No.  
**30-015-33139**

9. API Well No.  
**30-015-33139**

10. Field and Pool, or Exploratory  
**Williston**

11. Sec., T., R., M., or Block and Survey or Area  
**Sec. 31, T16S, R25E**

12. County or Parish  
**Eddy**

13. State  
**NM**

14. Date Spudded  
**01/26/04**

15. Date T.D. Reached  
**2/24/04**

16. Date Completed  
☐ D & A ☒ Ready to Prod.  
**3/07/04**

17. Elevations (DF, RKB, RT, GL)\*  
**3600' GL**

18. Total Depth: MD **8345** TVD **5090**

19. Plug Back T.D.: MD **8345** TVD **5090**

20. Depth Bridge Plug Set: MD **4656** TVD **4656**

21. Type Electric & Other Mechanical Logs Run (Submit copy of each)  
**Mudlog, Platform Express, Microlog/HNGS**

22. Was well cored? ☐ No ☒ Yes (Submit analysis)  
Was DST run ☒ No ☐ Yes (Submit report)  
Directional Survey? ☐ No ☒ Yes (Submit copy)

23. Casing and Liner Record (Report all strings set in well)

| Hole Size | Size/Grade | Wt. (#ft.) | Top (MD) | Bottom (MD) | Stage Cementer Depth | No. of Sks. & Type of Cement | Slurry Vol. (BBL) | Cement Top* | Amount Pulled |
|-----------|------------|------------|----------|-------------|----------------------|------------------------------|-------------------|-------------|---------------|
| 17-1/2"   | 13-3/8"    | 48#        | 0        | 359'        |                      | 448 Class C                  | 108               | Surface     | Circ. 212 sx  |
| 12-1/4"   | 9-5/8"     | 40#        | 0        | 1103'       |                      | 475 Class C                  | 164               | Surface     | Circ. 26 sx   |
| 8-3/4"    | 7"         | 26#        | 0        | 5090'       |                      | 487 Class C                  | 175               | 2010'       | CBL           |

24. Tubing Record

| Size   | Depth Set (MD) | Packer Depth (MD) | Size | Depth Set (MD) | Packer Depth (MD) | Size | Depth Set (MD) | Packer Depth (MD) |
|--------|----------------|-------------------|------|----------------|-------------------|------|----------------|-------------------|
| 2-3/8" | 4488'          | 4488'             |      |                |                   |      |                |                   |

25. Producing Intervals

| Formation     | Top         | Bottom      | Perforated Interval  | Size | No. Holes | Perf. Status            |
|---------------|-------------|-------------|----------------------|------|-----------|-------------------------|
| A) <b>Abo</b> | <b>4904</b> | <b>4950</b> | <b>5091-8257' MD</b> |      |           | <b>Perforated liner</b> |
| B)            |             |             |                      |      |           |                         |
| C)            |             |             |                      |      |           |                         |
| D)            |             |             |                      |      |           |                         |

27. Acid, Fracture, Treatment, Cement Squeeze, Etc.

| Depth Interval       | Amount and Type of Material         |
|----------------------|-------------------------------------|
| <b>5091-8257' MD</b> | <b>65000 gals 15% NEFE HCl acid</b> |

28. Production - Interval A

| Date First Produced | Test Date            | Hours Tested | Test Production | Oil BBL  | Gas MCF     | Water BBL | Oil Gravity    | Gas Gravity                   | Production Method |
|---------------------|----------------------|--------------|-----------------|----------|-------------|-----------|----------------|-------------------------------|-------------------|
| <b>03/07/04</b>     | <b>03/10/04</b>      | <b>4</b>     | <b>→</b>        | <b>0</b> | <b>350</b>  | <b>2</b>  | <b>N/A</b>     | <b>.681</b>                   | <b>Flowing</b>    |
| Choke Size          | Tbg. Press. Flwg. SI | Csg. Press.  | 24 Hr. →        | Oil BBL  | Gas MCF     | Water BBL | Gas: Oil Ratio | Well Status                   |                   |
| <b>16/64</b>        | <b>1650</b>          |              | <b>→</b>        | <b>0</b> | <b>2100</b> | <b>0</b>  | <b>0</b>       | <b>SI Waiting on Pipeline</b> |                   |

28a. Production-Interval B

| Date First Produced | Test Date            | Hours Tested | Test Production | Oil BBL | Gas MCF | Water BBL | Oil Gravity    | Gas Gravity | Production Method |
|---------------------|----------------------|--------------|-----------------|---------|---------|-----------|----------------|-------------|-------------------|
|                     |                      |              | <b>→</b>        |         |         |           |                |             |                   |
| Choke Size          | Tbg. Press. Flwg. SI | Csg. Press.  | 24 Hr. →        | Oil BBL | Gas MCF | Water BBL | Gas: Oil Ratio | Well Status |                   |
|                     |                      |              | <b>→</b>        |         |         |           |                |             |                   |

(See instructions and spaces for additional data on reverse side)

**Laboratory Services, Inc.**4016 Fiesta Drive  
Hobbs, New Mexico 88240

Telephone: (505) 397-3713

FOR: Metering & Testing Services Inc.  
Attention: Mr. Tom Duncan  
2807 West County Road  
Hobbs, New Mexico 88240

SAMPLE: IDENTIFICATION: Thames Federal 31 #1  
COMPANY: Perenco LLC  
LEASE:  
PLANT:

SAMPLE DATA: DATE SAMPLED: 3/10/04 12:00 pm  
ANALYSIS DATE: 3/11/04  
PRESSURE - PSIG 100  
SAMPLE TEMP. °F 70  
ATMOS. TEMP. °F

GAS (XX) LIQUID ( )  
SAMPLED BY: Al Lewis  
ANALYSIS BY: Vickie Biggs

REMARKS:

**COMPONENT ANALYSIS**

| COMPONENT              | MOL<br>PERCENT | GPM   |
|------------------------|----------------|-------|
| Hydrogen Sulfide (H2S) | 0.000          |       |
| Nitrogen (N2)          | 0.650          |       |
| Carbon Dioxide (CO2)   | 4.009          |       |
| Methane (C1)           | 85.676         |       |
| Ethane (C2)            | 5.563          | 1.484 |
| Propane (C3)           | 2.084          | 0.578 |
| I-Butane (IC4)         | 0.306          | 0.100 |
| N-Butane (NC4)         | 0.582          | 0.183 |
| I-Pentane (IC5)        | 0.185          | 0.068 |
| N-Pentane (NC5)        | 0.164          | 0.059 |
| Hexane Plus (C6+)      | 0.781          | 0.339 |
|                        | 100.000        | 2.806 |

|                  |      |                       |
|------------------|------|-----------------------|
| BTU/CU.FT. - DRY | 1096 | MOLECULAR WT. 19.7710 |
| AT 14.650 DRY    | 1093 |                       |
| AT 14.650 WET    | 1074 |                       |
| AT 14.73 DRY     | 1099 |                       |
| AT 14.73 WET     | 1080 |                       |

|                    |       |
|--------------------|-------|
| SPECIFIC GRAVITY - |       |
| CALCULATED         | 0.681 |
| MEASURED           |       |

### Toxic Effects of Hydrogen Sulfide Poisoning

Hydrogen Sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 20 ppm, which is .002% by volume. Hydrogen Sulfide is heavier than air (specific gravity - 1.192) and colorless. It forms an explosive mixture with air between 4.3 and 46.0 percent by volume. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is between five and six times more toxic than Carbon Monoxide. Toxicity data for Hydrogen Sulfide and various other gases are compared below in Table I. Physical effects at various Hydrogen Sulfide levels are shown in Table II.

**Table I**  
Toxicity of Various Gases

| Common Name      | Chemical Formula | Specific Gravity | Threshold Limit (A)      | Hazardous Limit (B) | Lethal Concentration (C)       |
|------------------|------------------|------------------|--------------------------|---------------------|--------------------------------|
| Hydrogen Cyanide | HCN              | 0.94             | 10 ppm                   | 150 ppm/hr          | 300 ppm                        |
| Hydrogen Sulfide | H <sub>2</sub> S | 1.18             | 10 ppm (D)<br>20 ppm (E) | 250 ppm/hr          | 600 ppm                        |
| Sulfur Dioxide   | SO <sub>2</sub>  | 2.21             | 5 ppm                    |                     | 1000 ppm                       |
| Chlorine         | CL <sub>2</sub>  | 2.45             | 1 ppm                    | 4 ppm/hr            | 1000 ppm                       |
| Carbon Monoxide  | CO               | 0.97             | 50 ppm                   | 400 ppm/hr          | 1000 ppm                       |
| Carbon Dioxide   | CO <sub>2</sub>  | 1.52             | 5000 ppm                 | (5 %)               | (10 %)                         |
| Methane          | CH <sub>4</sub>  | 0.55             | 90,000 ppm               | (9 %)               | Combustible<br>Above 5% in air |

- A. **Threshold Limit** - Concentration at which it is believed that all workers may be repeatedly exposed day after day without adverse effects.
- B. **Hazardous Limit** - Concentration that may cause death.

- C. **Lethal Concentration** - Concentration that will cause death with short-term exposure.
- D. **Threshold Limit (10 ppm)** - 1972 ACGIH (American Conference of Governmental Industrial Hygienists).
- E. **Threshold Limit (20 ppm)** - 1966 ANSI acceptable ceiling concentration for eight-hour exposure (based on 40 hour week) is 20 ppm. OSHA Rules and Regulations (Federal Register, Volume 37, No. 202, Part II, dated 10/18/72)

**Table II**  
Physical Effects of Hydrogen Sulfide

| Percent (%) | ppm  | Physical Effects                                      |
|-------------|------|---|
| 0.001       | 10   | Obvious and unpleasant odor                           |
| 0.002       | 20   | Safe for 8 hrs. exposure                              |
| 0.01        | 100  | Kills smell in 3-5 minutes; may sting eyes & throat   |
| 0.02        | 200  | Kills smell shortly; stings eyes and throat           |
| 0.03        | 300  | IDLH (Immediate Danger to Life and Health) Level      |
| 0.05        | 500  | Dizziness; breathing ceases in a few minutes          |
| 0.07        | 700  | Unconscious quickly; death will result if not rescued |
| 0.10        | 1000 | Unconscious at once; followed by death within minutes |

**\* CAUTION:** Hydrogen Sulfide is a colorless and transparent gas and is highly flammable. It is heavier than air and may accumulate in low places.

- E. At any time there is a doubt as to the H<sub>2</sub>S level in the area to be entered.

### **Rescue-First Aid for Hydrogen Sulfide Poisoning**

**DO NOT PANIC !!!!**

**Remain Calm -- THINK**

1. Hold your breath (Do not inhale; stop breathing) and go to Briefing Area.
2. Put on breathing apparatus.
3. Remove victim(s) to fresh air as quickly as possible. (Go upwind from the source or at right angles to the wind; **NOT** downwind).
4. Briefly apply chest pressure-arm lift method of artificial respiration to clear the victim's lungs and to avoid inhaling any toxic gas directly from the victim's lungs.
5. Provide for prompt transportation to the hospital and continue giving artificial respiration if needed.
6. Hospital(s) or medical facilities need to be informed, beforehand, of the possibility of H<sub>2</sub>S gas poisoning, no matter how remote the possibility.
7. Notify emergency room personnel that the victim(s) have been exposed to H<sub>2</sub>S gas.

Besides basic first aid, everyone on location should have a good working knowledge of artificial respiration, as well as first aid for eyes and skin contact with liquid H<sub>2</sub>S. Everyone needs to master these necessary skills.

**Use of Self-Contained Breathing Apparatus**  
(SCBA)

- I. Written procedures shall be prepared covering safe use of respirators in dangerous atmospheric situations, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.
- II. Respirators shall be inspected frequently, at random, to insure that they are properly used, cleaned and maintained.
- III. Anyone who may use respirators shall be trained in how to properly seal the face piece. They shall wear respirators in normal air and then in a test atmosphere. **(NOTE: Such items as facial hair (beard or sideburns) and eyeglass temple pieces will not allow a proper seal).** Anyone that may be expected to wear respirators should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses. Contact lenses should not be allowed.
- IV. Maintenance and care of Respirators
  - A. A program of maintenance and care of respirators shall include the following:
    - 1. Inspection for defects, including leak checks.
    - 2. Cleaning and disinfecting.
    - 3. Repair
    - 4. Storage
  - B. Inspection: Self Contained Breathing Apparatus (SCBA) for emergency use shall be inspected monthly and records maintained for the following:
    - 1. Fully charged cylinders.
    - 2. Regulator and warning device operation.
    - 3. Condition of face piece and connection.
    - 4. Elastomer or rubber parts shall be stretched or massaged to keep them pliable and prevent deterioration.
  - C. Routinely used respirators shall be collected, cleaned and disinfected as frequently as necessary to insure proper protection is provided.
- V. Persons assigned tasks that require the use of Self Contained Breathing Equipment shall be certified physically fit for breathing equipment usage by the local company physician at least annually.
- VI. Respirators should be worn during the following conditions:
  - A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H<sub>2</sub>S,
  - B. When breaking out any line where H<sub>2</sub>S can reasonably be expected,
  - C. When sampling air in areas to determine if toxic concentrations of H<sub>2</sub>S exist,
  - D. When working in areas where over 20 ppm H<sub>2</sub>S has been detected.

