



## Black Hills Gas Resources

# Hydrogen Sulfide Drilling Operations Plan

## I. Hydrogen Sulfide Training

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

1. The hazards and characteristics of hydrogen sulfide ( $H_2S$ ).
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of  $H_2S$  detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

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

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

A training session will be held prior to encountering a known or probable  $H_2S$  zone (within 3 days or 500 feet) and weekly  $H_2S$  well control drills for all personnel in each crew. The initial training sessions shall include a review of the site specific  $H_2S$  Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

## II. $H_2S$ safety equipment and Systems

Note: All  $H_2S$  safety equipment and systems (if necessary) will be installed, tested, and operational when drilling reaches a depth of 500 feet above or three days prior to penetrating the first zone containing or reasonably expected to contain  $H_2S$ .

### A. Well control equipment:

1. Choke manifold with a minimum of one remote choke.
2. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.

### B. Protective equipment for essential personnel

1. Self-Contained Breathing Apparatus (SCBA) (30 min) will be located in the doghouse, on mud tanks, in the cellar and at briefing areas, as indicated on well site diagram.

### C. $H_2S$ detection and monitoring equipment:

1. Two portable H<sub>2</sub>S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H<sub>2</sub>S levels reach 10ppm.
- D. Visual warning systems:
1. Wind direction indicators as shown on well site diagram.
  2. Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used when appropriate. See example attached.
- E. Mud program:
1. The mud program has been designed to minimize the volume of H<sub>2</sub>S circulated to the surface. Proper mud weight, safe drilling practices and the use of H<sub>2</sub>S scavengers will minimize hazards when penetrating H<sub>2</sub>S bearing zones.
- F. Metallurgy:
1. All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H<sub>2</sub>S service.
  2. All elastomers used for packing and seals shall be H<sub>2</sub>S trim.
- G. Communication:
- Satellite phones shall be available at well site.  
Black Hills company vehicles are outfitted with two way radios and cellular phones.
1. A list of nearest tribal, county, and state emergency department numbers shall be available at well site. (See attachment)
  2. Black Hills 24hrs general emergency contact
    - a 1-877-554-6349
  3. Black Hills emergency contact personnel
    - a Allen Parrent, Drilling Superintendent
      - o Office: 1-720-210-1310 (Day Time)
      - o Mobile: 1-505-486-0323
      - o Email: [Allen.Parrent@blackhillscorp.com](mailto:Allen.Parrent@blackhillscorp.com)
    - b Lance Nelson, Drilling Engineer
      - o Office: 1-303-566-3502 (Day Time)
      - o Mobile: 1-303-550-8849
      - o Email: [Lance.Nelson@blackhillscorp.com](mailto:Lance.Nelson@blackhillscorp.com)
    - c Art Childers, Engineer Manager
      - o Office: 1-303-566-3413 (Day Time)
      - o Mobile: 1-303-453-9083
      - o Email: [Art.Childers@blackhillscorp.com](mailto:Art.Childers@blackhillscorp.com)
    - d Doran Newlin, Production Manager
      - o Office: 1-303-568-5983 (Day Time)
      - o Mobile: 1-303-317-4805
      - o Email: [Doran.Newlin@blackhillscorp.com](mailto:Doran.Newlin@blackhillscorp.com)
- H. Well testing:
1. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill stem testing operations conducted in an H<sub>2</sub>S environment will use the closed chamber method of testing.

# **EMERGENCY CONTACT NUMBERS**

## **HOSPITAL**

**DULCE  
SAN JUAN**

**911 / 505-334-6622  
575-759-3291  
505-334-6622**

## **AMBULANCE**

**DULCE  
SAN JUAN**

**911 / 505-334-6622  
575-759-3778  
505-334-6622**

## **EMERGENCY HELICOPTER**

**911 / 505-334-6622**

## **FIRE/RESCUE**

**JICARILLA FIRE/SFTY  
FOREST SERVICE FIRE/SFTY  
NON-EMERGENCY**

**911 / 505-334-6622  
505-759-3254  
505-632-1963  
505-334-6622**

## **POLICE**

**JICARILLA PD  
RIO ARRIBA SHERIFF  
OFFICE  
DISPATCH  
NEW MEXICO STATE POLICE  
SAN JUAN SHERIFF  
NON-EMERGENCY**

**911 / 505-334-6622  
575-759-3222  
  
575-588-7522  
505-753-3320  
505-325-7547  
505-334-6622  
505-334-6622**

## **POISON CONTROL**

**1-800-222-1222**