

KINDERMORGAN

Kinder Morgan CO2 Company, LP.

H2S CONTINGENCY PLAN

INTRODUCTION H₂S is a toxic, poisonous gas that could cause death injury. The objective of this contingency plan is to provide an original plan of action for alerting and protecting the public from H₂S exposure in the event a potential hazardous volume is accidentally released to the atmosphere. This plan should be activated immediately if any such release occurs. The Drilling Superintendent is responsible for initiating and carrying out the plan.

II. INDIVIDUAL RESPONSIBILITIES It is the responsibility of all personnel on location to familiarize themselves with the procedures outlined in this contingency plan.

A. All Personnel:

1. Responsible for his assigned safety equipment.
2. Responsible for familiarizing himself with the location of all safety equipment.
3. Responsible for reporting any indications of H₂S to those in the area and to a supervisor.

B. Drilling Superintendent

1. Responsible for thoroughly understanding and seeing that all aspects of this contingency plan are enforced.
2. Responsible for implementing all phases of this contingency plan.
3. Responsible for keeping a minimum of personnel on the location during expected hazardous operations.
4. Responsible for coordinating all well site operations and communication in the event that an emergency develops.
5. Responsible for ensuring that all visitors receive an H₂S Safety Orientation. A visitors log will be maintained as well as a list of personnel on the location after drilling has progress to the suspected H₂S formation.

III. LOCATION LAYOUT

- A. The location of a least two pre-determined safe areas to assemble at in the event of an emergency. These locations should be located 180 degrees to one another, and in the direction of the prevailing winds.
- B. H₂S rig monitor with three (3) heads. One located at the bell nipple, one located at the shale shaker, and a third one on the rig floor. Indicate here any other additional H₂S detector locations for this well:

Type:

Location:

Type:

Location:

- C. The location and type of all air masks. Self-contained breathing apparatus for use by rig personnel for this well will be kept in the following location(s):

Type: 1-30 Min. Rescue Unit	Location: Company Man's Trailer
Type: 1-30 Min. Rescue Unit	Location: Tool Pusher's Trailer
Type: 2-30 Min. Rescue Unit	Location: Briefing Area # 1
Type: 2-30 Min. Rescue Unit	Location: Briefing Area #2
Type: 5-5 Min. Escape Unit	Location: Rig Floor

If a cascade system is utilized, indicate the location(s):

- D. The location of windsocks or streamers. The wind direction indicators for this well will be located at:

Type: Windsock	Location: Briefing Area # 1
Type: Windsock	Location: Briefing Area #2
Type: Windsock	Location: Pits
Type: Windsock	Location: Rig Floor

- E. The location of any other safety equipment used, such as flare guns or bug blowers:

Type: Hand Held Detector & Tubes	Location: Rig Floor
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- F. The location of all telephones and/or means of communication are as follows:

Type: Unknown at this time	Location:
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- G. Warning Signs:

1. "NO SMOKING" signs should be strategically located around the rig and rig location. The following locations are appropriate:

- a. Doghouse
- b. Rig Floor
- c. Substructure
- d. Lower landing of all stairs leading to rig floor
- e. Mud pits
- f. Shale shaker

2. "POISON GAS" signs should also be strategically located round the rig and rig location. The following locations are appropriate:

- a. All entrances leading to the location
- b. Lower landing of all stairs leading to rig floor
- c. All areas around substructure, including mud pits and shale shaker
- d. Various points along the perimeter of the radius of exposure.

NOTE: All warning signs should be black and yellow in color and of readable size at a reasonable distance.

IV. OPERATING PROCEDURES The following operating procedures will be utilized in areas with H₂S

- A. Plan of operating for handling gas locks and other drilling problems. Any gas kick will be controlled by using approved well control techniques. Upon evidence that ambient H₂S concentrations have reached 10 PPM, all non-essential personnel will be evacuated to pre-determined safe areas. Personnel remaining on the rig floor will continue to control the well until the situation indicated the area is safe to re-enter.
- B. Special Operations
 - 1. Drill Stem Tests. All drill stem tests must be closed chamber and conducted during daylight hours.
 - 2. Coring. After a core has been cut, circulate bottoms up and monitor for H₂S. If hole conditions (and/or detectors) indicate potentially hazardous conditions, put breathing equipment on 10 stands before core barrel reaches the surface. Breathing equipment will be worn by all personnel while core barrel is pulled, broken out and opened up, and until a safe atmosphere is indicated.

V. OPERATING CONDITIONS Operating conditions are defined in three categories. A description of each of these conditions and the required action to take are given below.

A. CONDITION I — Normal Operating Conditions, Potential Danger, Operations

Under Control

Characterized by:	Normal drilling operations and test operations in zones which contains or may contain H ₂ S.
Warning Flag:	Yellow
Alarm:	None
Probable Occurrence:	No detectable gas present at surface
General Action:	(1) Know location of safety equip (2) Check safety equipment for proper function. Keep it available. (3) Be alert for a condition change (4) Follow instructions of supervisor

B. CONDITION II — Potential to Moderate Danger to Life

Characterized by:	H ₂ S gas present. Concentration less than 10 PPM.
Warning Flag:	Orange

Alarm:	Flashing light at 10 PPM H2S. Intermittent blasts on horn at 10 PPM H2S
Probable Occurrence:	<ul style="list-style-type: none"> (1) As drill gas (2) As trip gas when circulating bottoms up (3) When core barrel is pulled (4) When a well kick is circulated out (5) Surface pressure, well flow or lost operations (6) Equipment failure during testing operations
General Actions:	<ul style="list-style-type: none"> (1) Follow instructions of supervisor (2) Put on breathing equipment if directed, or if conditions warrant it (3) Stay in "SAFE BREATHING AREA" if instructed and not working to correct the problem. (4) The Drilling Superintendent will initiate action to reduce the H2S concentration to zero

C. CONDITION III - Moderate to Extreme Danger to Life

Characterized by:	H2S present in concentrations at or above 10 PPM. Critical well operations or well control problems. In the extreme, loss of well control.
Warning Flag:	Red
Alarm:	Flashing light and continuous blast on horn at 10 PPM H2S
Probable Occurrence:	<ul style="list-style-type: none"> (1) As drill gas (2) As trip gas when circulating bottoms up (3) When core barrel is pulled (4) When a well kick is circulated out (5) Surface pressure, well flow or lost returns problems (6) Equipment failure during testing operations

VI. EMERGENCY PROCEDURES The procedures listed below apply to drilling and testing operations.

A. If at any time during Condition I, the mud logger, mud engineer, or any other person detects H₂S, he will notify the Drilling Superintendent. All personnel should keep alert to the Drilling Superintendent's orders. He will:

- 1 Immediately begin to ascertain the cause or the source of the H₂S and take steps to reduce the H₂S concentration to zero. This should include having the mud engineer run a sulfide and pH determination on the flowline mud if waster-base mud is in use. If an oil-base mud is in use, the mud engineer should check the lime content of the mud.
2. Order non-essential personnel out of the potential danger area.
3. Order all personnel to check their safety equipment to see that it is working properly and in the proper location. Persons without breathing equipment will not be allowed to work in a hazard area.
4. Notify the Contract Supervisor of condition and action taken.
5. Increase gas monitoring activities with portable H₂S detectors and continue operations with caution.
6. Display the orange warning flag.

B. If the H₂S concentrations exceed 10 PPM the following steps will be taken:

1. Put on breathing equipment
2. Display red flag
3. Driller — prepare to shut the well in
 - a. Pick up pipe to get Kelly out of BOP's
 - b. Close BOP's if necessary
4. If testing operations are in progress, the well will be shut it
5. Help anyone who may be affected by gas.
6. Evacuate quickly to the "SAFE BRIEFING AREA" if instructed or conditions warrant.

C. In the event a potentially hazardous volume of H₂S is released into the atmosphere, the following steps must be taken to alert the public:

1. Remove all rig personnel from the danger are and assemble at a pre-determined safe area, preferable upwind from the well site.
2. Alert the drilling office, public safety personnel, regulatory agencies, and the general public of the existence and location of an H₂S release. See List of Emergency Telephone Numbers.

3. Assign personnel to block any public road (and access road to location) at the boundary of the area of exposure. Any unauthorized people within the area should be informed that an emergency exists and be ordered to leave immediately.
4. Request assistance from public safety personnel to control traffic and/or evacuate people from the threatened area.

VII. TRAINING PROGRAM All personnel associated with the drilling operations will receive training to insure efficient and correct action in all situations. This training will be in the general areas of: (1) personnel safety, (2) rig operations, and (3) well control procedures.

A. Personnel Training — All personnel shall have received H2S training in the following areas:

- I. Hazardous and characteristics of H2S
2. Effect on metal components of the system
3. Safety precautions
4. Operation of safety equipment and life support systems
- S. Corrective action and shutdown procedures

B. Rig Operations — All rig personnel should have received training in the following areas:

1. Well control procedures
 2. Layout and operations of the well control equipment
- NOTE: Proficiency will be developed through BOP drills which will be documented by the Drilling Superintendent.

C. Service Company Personnel — All service personnel shall have been trained by their employers in the hazards and characteristics of H2S and the operation of safety equipment and life support systems.

D. Visitors — All first time visitors to the location will be required to attend a safety orientation. The Drilling Superintendent shall be responsible for this orientation and he shall see that every visitor is logged in correctly.

E. Public — The public within the area of the exposure shall be given an advance briefing by the Drilling Superintendent. The briefing must include the following elements:

1. Hazards and characteristics of hydrogen sulfide. It is an extremely dangerous gas. It is normally detectable by its "rotten egg" odor, but odor is not a reliable means of detection because the sense of smell may be dulled or lost due to intake of the gas. It is colorless, transparent, and flammable. It is heavier than air and may accumulate in low places.

2. The necessity of an emergency action plan. Due to the danger of persons exposed to hydrogen sulfide and the need for expeditious action should an emergency occur, this action plan will be put into effect if and when a leak occurs.
3. The location of hydrogen sulfide within the area of exposure. At the drilling location.
4. The manner in which the public will be notified of an emergency. By telephone or personal contact.
5. Steps to be taken in case of emergency:
 - a. Abandon danger area.
 - b. Notify necessary agencies and request assistance for controlling traffic and evacuating people.