

# LEGACY RESERVES OPERATING, L. P.

## HYDROGEN SULFIDE (H<sub>2</sub>S) CONTINGENCY PLAN LEA UNIT 54H

Assumed 100 ppm ROE = 3000'

100 ppm H<sub>2</sub>S concentration shall trigger activation of this plan.

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This is an open drilling site. H<sub>2</sub>S monitoring equipment and emergency response equipment will be rigged up and in use when the company drills out from under surface casing. H<sub>2</sub>S nonitors, warning signs, wind indicators and flags will be in use.

A. All personnel shall receive proper H<sub>2</sub>S training in accordance with Onshore Order 6 III.C.3.a

B. Briefing Area: Two perpendicular areas will be designated by signs and readily accessible.

C. Required Emergency Equipment:

- Well control equipment
  - a. Flare line 150' from wellhead to be ignited by flare gun.
  - b. Choke manifold with a remotely operated choke.
  - c. Mud/Gas Separator.
- Protective Equipment for essential personnel.  
Breathing apparatus:
  - a. Rescue Packs (SCBA) – 1 unit shall be placed at each briefing area. 2 units shall be stored in the safety trailer.
  - b. Work/Escape packs – 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
  - c. Emergency Escape Packs – 4 packs shall be stored in the doghouse for emergency evacuation.

Auxiliary Rescue Equipment:

- a. Stretcher
  - b. Two OSHA full body harness
  - c. 100 ft. 5/8" OSHA approved rope
  - d. One 20# class ABC fire extinguisher
- H<sub>2</sub>S detection and monitoring Equipment:  
The stationary detector with three sensors will be placed in the upper doghouse, set to visually alarm @ 10 ppm and audible @ 14 ppm. Calibrate a minimum of every 30 days or as needed. The sensors will be placed in the following places: Rig floor, Bell nipple, end of flare line or where well bore fluid is being discharged (Gas sample tubes will be stored in the safety trailer).
  - Visual warning systems.
    - a. One color code condition sign will be placed at the entrance to the site reflecting the possible conditions at the site.
    - b. A colored condition flag will be on display, reflecting the current condition, at the drilling site.
    - c. Two wind socks will be placed in strategic locations being visible from all angles.
  - Mud Program:  
The mud program has been designated to minimize the volume of H<sub>2</sub>S circulated to surface. The operator will have the necessary mud products to minimize hazards while drilling in H<sub>2</sub>S bearing zones.

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- Metallurgy:
  - a. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, shall be suitable for H<sub>2</sub>S service.
  - b. All elastomers used for packing and seals shall be H<sub>2</sub>S trim.
- Communication:
 

Communication will be via two way radio in emergency and company vehicles. Cell phones and land lines where available.

## H<sub>2</sub>S Operations

Though no H<sub>2</sub>S is anticipated during the drilling operation, this contingency plan will provide for methods to ensure the well is kept under control in the event an H<sub>2</sub>S reading of 100 ppm or more are encountered. Once personnel are safe and the proper protective gear is in place and on personnel, the operator and rig crew essential personnel will ensure the well is under control, suspend drilling operations and shut-in the well (unless pressure build up or other operational situations dictate suspending operations will prevent well control), increase the mud weight and circulate all gas from the hole utilizing the mud/gas separator downstream of the choke, the choke manifold and the emergency flare system located 150' from the well. Bring the mud system into compliance and the H<sub>2</sub>S level below 10 ppm, then notify all emergency officers that drilling ahead is practical and safe.

Proceed with drilling ahead only after all provisions of Onshore Order 6, Section III.C. have been satisfied.

## Ignition of Gas source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to sulfur dioxide (SO<sub>2</sub>). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever this is an ignition of the gas.

## Characteristics of H<sub>2</sub>S and SO<sub>2</sub>

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H <sub>2</sub> S	1.189 Air = 1	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO <sub>2</sub>	2.21 Air = 1	2 ppm	N/A	1000 ppm

## **Contacting Authorities**

Legacy Reserves Operating's personnel must liaison with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including directions to site. The following call list of essential and potential responders has been prepared for use during a release. (Operator Name)'s response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER).

## Emergency Assistance Telephone List

### PUBLIC SAFETY:

	<b>911 or</b>
Lea County Sheriff or Police	(575) 396-3611
Fire Department	(575) 397-9308
Hospital	(575) 492-5000
Ambulance	911
Department of Public Safety	(392) 392-5588
Oil Conservation Division	(575) 748-1823
New Mexico Energy, Minerals & Natural Resources Department	(575) 748-1283

### LEGACY RESERVES OPERATING LP

Legacy Reserves Operating LP	Office (432) 689-5200
Drilling Manager: Mike Parrish	Office (432) 689-5200 Cell (432) 664-2150
Senior Engineer: Blain Lewis	Office (432) 689-5200 Cell (432) 230-7450
Operations Manager: Ernie Hanson	Office (432) 689-5200 Cell (432) 230-9009
Executive Vice President of Operations Paul Horne	Office (432) 689-5200
Safety Coordinator Randy Williams	Office (432) 689-5200 Cell (432) 260-5566

### Drilling Contractor – Patriot Drilling rig #5

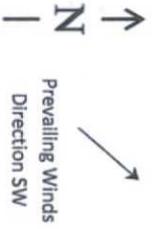
Tool Pusher: Donny Boatright	Cell (575) 390-3721
Relief Tool Pusher: Kenny Hayes	Cell (575) 631-4554
Drilling Manager: Leroy Peterson	Office (432) 686-2780 Cell (432) 889-8884

### LEGACY SAFETY

**Hobbs (575) 393-7233**

Field Operations Manager: Buddy Boydston	Cell (575) 631-0820
Operations Manager: Danny Owens	Cell (575) 605-6715

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esidents: THERE ARE NO RESIDENTS WITHIN 3000' ROE.



# H2S Briefing Areas and Alarm Locations



**Legend**

	Wellhead		Self-Contained Breathing Apparatus (SCBA)
	Wind Indicator		H <sub>2</sub> S Sensors
	Safe Briefing Area		H <sub>2</sub> S Alarm