

## Sulfide Suicide Method Poses Officer Safety Hazard



Excerpt from a 2008 Las Vegas Metropolitan Police Department Training Alert

### Responding to a Routine Call - How Would You React?

**I**t's Sunday morning 0730 hours, you respond to a person down in auto.

You locate a car in the empty parking lot of a business. The fire and medical unit pull up near the vehicle, and personnel see a person inside who appears to be asleep or unconscious. Wearing safety glasses and medical gloves, you walk up to the car and knock on the window.

The motorist does not respond to your knock on the window, and the doors are locked.

What action do you take? Will you hurry to make access? Will you use a lockout tool, center punch, or halligan to make entry?

You make access, a rush of warm air comes out of the vehicle and you smell a sharp odor. **You have just become a victim**, and have been exposed to hydrogen sulfide, a possibly fatal gas.

What started as a routine person-down call has easily expanded into a full-blown hazardous materials incident with a multijurisdictional response.

What should you have done differently? You are the first-in unit. How should you respond to this type of incident?

1. Do not become complacent! Your response should be similar on every call.
2. Be well trained, know your job, do your job.
3. Start your size-up from the time a call is dispatched.
4. Establish a strong command and control the scene.
5. Do not go rushing in.
6. Survey the scene. Does the scene look routine? Do you see anything unusual? (Example: a note on the window, containers inside the vehicle, taped vents)
7. Wear the appropriate PPE.
8. Establish a Hot Zone.
9. Develop a plan of action and coordinate activities.
10. Call for additional resources, such as a Hazmat team or a first aid unit.

**T**here is a new suicide technique being publicized on the Internet that can become a deadly hazard to law enforcement officers and others who come upon the scene.

The suicide technique uses hydrogen sulfide, a gas that smells like rotten eggs. Law enforcement and first responders will need to know how to identify such suicide scenes and protect themselves and the public from hazards associated with this chemical process.

The victim can retrieve the recipe off the Internet, combining a toilet bowl cleanser and a pesticide, to create a high concentration of the gas. The gas will then cause respiratory paralysis and death in less than six minutes. Inhalation of hydrogen sulfide is a common suicide technique in Japan and may likely gain acceptance throughout the U.S.

Hydrogen sulfide suicide, also known as detergent suicide, was first reported in the United States in 2008 in Pasadena, Calif., and has since moved east, with cases reported in Georgia, Texas, North Carolina, South Carolina, Connecticut, Idaho, and Utah.

Most of the cases in the United States have involved young adults creating hydrogen sulfide in their cars, so citizens usually have not been exposed to the gas. However, this creates a major hazard to first responders on the scene if they are unaware of the danger or unable to identify hydrogen sulfide.

In March 2010, officers from St. Petersburg, Fla. responded to a suicide call in a residential area that pertained to an unconscious man in a car. The officers noticed five signs on the car windows warning them to stay away. They donned full protective clothing and breathing devices. However, one officer inhaled a lungful of hydrogen sulfide gas and had to be transported to a hospital for treatment. This call illustrates the new problem that faces officers. Responding to these unknown situations to help people could endanger their own lives.

### **What is Hydrogen Sulfide?**

Hydrogen sulfide is considered a poison that affects several systems of the body, mostly the nervous system. It is a colorless, flammable, and extremely hazardous gas with a rotten egg smell.

Hydrogen sulfide is similar to cyanide, and it is five times more toxic than carbon monoxide. Natural hydrogen sulfide is found mostly in swamps and sewers due to the breakdown of organic matter and a lack of oxygen.

The gas is heavier than air, so it travels along the ground. It collects in enclosed, poorly ventilated areas such as basements, manholes, sewer lines, underground telephone vaults, and manure pits. The more enclosed the space, the higher the concentration of hydrogen sulfide will be present. For instance, a car will contain a higher concentration of hydrogen sulfide than a bedroom.

- Exposure to low concentrations can also cause eye irritation, sore throat, cough, nausea, shortness of breath, and fluid in the lungs.
- Exposure to moderate concentrations can cause fatigue, loss of appetite, vomiting, staggering, headaches, and irritability.
- Exposure to high concentrations can cause convulsions, amnesia, miscarriage, coma, and death.

The primary route of exposure is inhalation. The gas is rapidly absorbed by the lungs. However, contact with liquid hydrogen sulfide causes frostbite. Labored breathing occurs shortly after the gas is inhaled and respiratory paralysis soon follows. Death will occur by asphyxiation unless the person is removed immediately to fresh air and resuscitated.

In addition, hydrogen sulfide has an auto-ignition point of 500 degrees Fahrenheit. (Cigarettes burn at 1,400 degrees Fahrenheit.) It burns with a blue flame, and can cause chemical pneumonia within hours.

### **Secondary Exposure: Hazards to First Responders**

In Sept. 2008, the New York State Office of Homeland Security sent out an advisory to all emergency medical workers, warning them that they could become innocent casualties of the suicide technique if they are not careful.

When responding to incidents, especially possible suicides, first responders should be aware of the possibility of encountering hydrogen sulfide gas.

First responders should exercise caution if they suspect the presence of hydrogen sulfide and they should follow their agency's Hazmat protocols. Consult the Hydrogen Sulfide Material Safety Data Sheet (excerpt on page 9.)

Protection against hydrogen sulfide exposure:

- Air must be tested for the presence and concentration of hydrogen sulfide by a qualified person using air monitoring equipment. Testing should also determine if fire/explosion precautions are necessary.
- If the gas is present, the area must be ventilated continually to remove the gas.
- If the gas cannot be removed, the person entering the area must use appropriate respiratory protection and any other necessary personal protective equipment, rescue and communication equipment.

Entry into a dangerous hydrogen sulfide atmosphere should only be made using:

- a full facepiece pressure demand self-contained breathing apparatus with a minimum service life of 30 minutes, or
- a combination full facepiece pressure demand supplied-air respirator with an auxiliary self-contained air supply.

If hydrogen sulfide levels are below 100 ppm, an air-purifying respirator may be used.

### **Three categories of breathing equipment:**

- Escape Unit (an air capsule)
- Work Unit (air-line with an escape bottle; allows you to work for an extended period of time)
- Rescue Unit (self-contained 30-min. supply of air carried on your back.)

Most importantly, investigators should NOT rely on their sense of smell to detect hydrogen sulfide. The sense of smell is paralyzed within three to 15 minutes of exposure to the gas.

**Therefore, knowing the limitations of your detection devices can save your life.** First responders should always be prepared for a high concentration of the gas. The maximum exposure limit for a low concentration of hydrogen sulfide is eight hours without respiratory equipment. An exposure to a high concentration of hydrogen sulfide could cause coma and death within minutes.

### **Common Detection Devices**

For lower concentrations:

- lead acetate, ampules, or coated strips change colors in the presence of hydrogen sulfide. The color change indicates the concentration.



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For higher concentrations:

- Hand-operated tube detectors: shows concentration on scale; should be used frequently
- Personal electronic monitors: gives a continuous, audible readout of concentration levels
- Fixed monitor systems: continuous readout; alarm sounds when reaches set levels
- Tutwiler method: chemical analysis to determine concentrations

<b>L O W</b>	0 - 10 ppm	Irritation of the eyes, nose, and throat
<b>M O D</b>	10 - 50 ppm	Headache Dizziness Nausea and vomiting Coughing and breathing difficulty
<b>H I G H</b>	50 - 200 ppm	Severe respiratory tract irritation Eye irritation / acute conjunctivitis Shock and convulsions Coma Death in severe cases

When hydrogen sulfide reaches a high concentration, investigators should work in pairs. If the distance between investigators extends more than an arm's length, a lifeline should be secured between them. Never attempt a rescue in an area that may contain hydrogen sulfide without being trained to perform such a rescue.

In addition, a briefing area should be established upwind. Wind can disperse hydrogen sulfide rapidly. Windssocks or streamers could be installed in the location to determine the present wind direction. Also, large blowers or fans can be used to disperse the vapors. However, the blowers should be non-spark type. Do not smoke near the scene.

### Exposure Treatment

After putting on proper respiratory equipment, move the victim into fresh air immediately. Apply mouth-to-mouth ventilation if the victim is unconscious and breathing has stopped. After reviving the victim, do not leave him alone. Make sure the victim is seen by a physician for possible underlying conditions.

Other treatment involves immediate inhalation of amyl nitrate, injections of sodium nitrite, inhalation of pure oxygen, administration of bronchodilators to overcome eventual bronchospasm, and in some cases hyperbaric oxygen therapy.



**Sulfide Suicide and the Web**

Hydrogen sulfide suicide, also known as detergent suicide, is surfacing based on a “how to” manual circulating on the Internet.

Originally when hydrogen sulfide appeared on American blog sites, it was described as similar to stink bombs, “great for pranks,” and “toxic, but not that toxic.” Later, it was described as “a quicker, less complicated method of suicide.”

Hydrogen sulfide gained popularity as a method of suicide when Bloomberg.com (a news site) published the Japanese recipe for hydrogen sulfide after more than 500 Japanese men, women, and children committed suicide using Internet instructions in the first half of 2008.

The sites described how to mix bath sulfur (similar to bath salts) with toilet bowl cleanser to produce the gas. The American version replaces bath sulfur (which is not available here) with pesticides.

In December 2009, 88 percent of search terms on *A Typical Life* blog were a variation of “detergent suicide recipe,” and “how to make hydrogen sulfide.”

Some sites that provide the instructions for hydrogen sulfide also include a downloadable PDF sign to warn emergency workers arriving on the scene.



**U.S. Blogs: Hydrogen Sulfide Recipes**

Interestingly, some blog sites point to a government Web site ([www.householdproducts.nlm.nih.gov](http://www.householdproducts.nlm.nih.gov)) to help identify the household chemicals to make hydrogen sulfide. Other sites tell readers to simply mix dishwashing detergent with a bleach-containing cleanser, such as Comet.

However, the most basic formula is a strong acid (toilet bowl cleaner) + calcium polysulfides solution (pesticides) = hydrogen sulfide.

<b>Hydrogen Sulfide Ingredients</b>			
<i>Acid Sources</i>		<i>Sulfide Sources</i>	
Lysol Ready to Use Disinfectant	Blu-Lite Germicidal Acid Bowl Cleaner	Artist oil paints	Spackling paste
Lysol Toilet Bowl Cleaner	Kaboom Shower, Tub, and Tile Cleaner	Dandruff shampoos	Some latex paints
Sno Bol Toilet Cleaner		Pesticides	Garden fungicides
The Works Toilet Bowl Cleaner	Tile, stone cleaners		

## **Sulfide Suicide: U.S. Cases**

### **Pasadena, California**

In August 2008, law enforcement and fire units responded to a suicide involving hydrogen sulfide in Pasadena, Calif.

The victim, found dead in his car behind a shopping center, had mixed a fungicide and a toilet bowl cleaner in a plastic tray. First responders saw the tray with a bright-blue liquid in the back seat of the vehicle. The man had placed a note on the car to warn first responders.

The police and firefighters evacuated the shopping center before a Hazmat crew in chemical suits extracted the body and began cleanup.

Investigation indicated the victim may have visited one or more of the numerous Japanese Web sites that provide information on how to commit suicide using hydrogen sulfide.

### **Bartow County, Georgia**

In December 2008, emergency medical workers arrived at Lake Allatoona in Bartow County, Ga. and found a similar scene. Along with the 20-year-old victim inside the car, workers found two buckets containing a yellow substance. A note on the window said “caution” and identified the compound as hydrogen sulfide.

### **Chapel Hill, North Carolina**

In 2005, the University of North Carolina at Chapel Hill conducted a study that linked suicide rates in North Carolina with hydrogen sulfide exposures from a nearby paper mill.

In one instance, the Haywood County mill reported a release of 93,000 pounds of hydrogen sulfide. The study showed that exposure to occupational levels of hydrogen sulfide can result in nervousness, mania, dementia, and violence - which could result in suicidal thoughts or acts.

## **Potential Use by Terrorists**

Terrorist training manuals have discussed using hydrogen sulfide gas in an attack; however, it would be difficult for terrorists to create fatal concentrations of hydrogen sulfide in large open areas because the gas would dissipate.

Terrorists could fill enclosed spaces with the gas to cause disruption and panic, but there is no information that indicates an imminent terrorist attack using hydrogen sulfide, according to the New York State Office of Homeland Security.

Law enforcement should be aware that terrorists could use hydrogen sulfide as a weapon of mass destruction because it is inexpensive and easy to produce. Also, anyone can purchase the necessary materials to create the gas at retail stores or on the Internet.

The discovery of the victim in Pasadena led to the evacuation of several businesses in the immediate area and left bystanders stranded for up to five hours while responders assessed the scene.

In Japan, 90 people in an apartment building were sickened when a 14-year-old girl killed herself in her bathroom using hydrogen sulfide. Also in Japan, a man vomited in a hospital emergency room after poisoning himself with the gas, causing 50 people to be sickened by the fumes.

Most countries have legal limits that govern the maximum allowable levels of exposure to hydrogen sulfide in the working environment. A typical permissible exposure limit is 10 ppm. (Hydrogen Sulfide Safety Factsheet, 2004.)

The Atlanta Division’s Joint Terrorism Task Force requests officers with questions or information pertaining to large or suspicious purchases of acid or sulfur-based cleaning supplies to contact them at (404) 679-9000. (FBI Situational Information Report, 2010.)

### **Suicide Investigation and Prevention**

Suicide is the eleventh most common cause of death. Almost four times as many males die by suicide compared to females. Approximately 13 percent of men and 40 percent of women who commit suicide choose poison (such as hydrogen sulfide) as their method.

Risk factors for suicide:

- depression and other mental disorders, or a substance-abuse disorder (often in combination with other mental disorders). More than 90 percent of people who die by suicide have these risk factors.
- prior suicide attempt
- family history of mental disorder, substance abuse, or suicide
- family violence (physical or sexual abuse)
- firearms in the home; firearms are used in more than half of suicides
- incarceration
- exposure to the suicidal behavior of others, such as family members, peers, or media figures.

Questions to ask before determining if a death is a suicide:

- Who found the body or called the police?
- When was the victim last seen alive?
- What was the psychological state of the victim before death?
- Did the victim leave a suicide note?
- Where/what is the method used to cause death?
- Is anything missing from the house?
- Are there any signs of a struggle?
- Is there more than one cause of death?
- Was the deceased on any medication?
- Was the deceased a heavy drinker/drug abuser?
- Were there any prior suicide attempts or history of a mental illness?

The key to suicide prevention is education. Law enforcement can utilize knowledge gained about suicide in the communities they serve by offering information, letting people know where they can seek help, or partnering with prevention programs.

Suicide prevention programs:

- American Association of Suicidology (AAS)
- American Foundation for Suicide Prevention (AFSP)
- Children's Safety Network (CSN)
- Council of Juvenile Correctional Administrators (CJCA)
- Critical Illness and Trauma Foundation (CIT)
- First Nations Behavioral Health Association (FNBHA)
- NAMI (formerly National Alliance for the Mentally Ill)
- National Association of School Personnel Administrators (NASPA)
- National Association of State Mental Health Program Directors (NASMHPD)
- National Council for Community Behavioral Healthcare
- National Organization for People of Color Against Suicide (NOPCAS)
- Pacific Institute for Research and Evaluation (PIRE)
- Screening for Mental Health, Inc. (SMH)
- Suicide Prevention Action Network (SPAN USA)
- Suicide Prevention Partnership

For more information on partnering with suicide prevention programs, check out the Suicide Prevention Resource Center Web site at [www.sprc.org](http://www.sprc.org).

## MATERIAL SAFETY DATA SHEET

### SECTION 1. PRODUCT IDENTIFICATION

**PRODUCT NAME:** Hydrogen Sulfide  
**CHEMICAL NAME:** Sulfides **FORMULA:**  
H<sub>2</sub>S  
**SYNONYMS:** Sulfuretted Hydrogen; Hydrogen Sulphide;  
Hydrosulfuric Acid; Sulfur Hydride; Sewer Gas; Sour Gas

**MANUFACTURER:** Air Products and Chemicals, Inc.  
**ADDRESS:** 7201 Hamilton Boulevard  
Allentown, PA 18195-1501

**PRODUCT INFORMATION:** (800) 752-1597

**MSDS NUMBER:** 1010 **REVISION:** 5  
**REVIEW DATE:** October 1998 **REVISION DATE:** October 1998

### SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hydrogen Sulfide is sold as pure product (> 99%).

**CAS NUMBER:** 7783-06-4

**EXPOSURE LIMITS:**

**OSHA:** PEL = 20 ppm (Ceiling) **ACGIH:** TWA = 10 ppm  
(10 minutes)

**NIOSH:** REL = 10 ppm Ceiling

STEL = 15 ppm

IDLH = 100 ppm

### SECTION 3. HAZARD IDENTIFICATION

#### EMERGENCY OVERVIEW

Hydrogen Sulfide is a toxic, flammable, colorless, liquefied gas. Hydrogen Sulfide has a distinct "rotten-egg" smell. The odor cannot be relied on as an adequate warning of the presence of Hydrogen Sulfide because at high concentrations olfactory fatigue occurs. Inhalation of high concentrations of this gas can result in unconsciousness, coma, and death. Direct contact with liquid Hydrogen Sulfide can cause frostbite. Hydrogen Sulfide poses an immediate fire hazard when mixed with air. The gas is heavier than air, and may spread long distances. Distant ignition and flashback are possible. Flame or high temperature impinging on a localized area of a cylinder of Hydrogen Sulfide can cause the cylinder to explode without activating the cylinder's relief devices. Provide adequate fire protection during emergency response situations. Contact with the liquid (or, contact with rapidly expanding gases) may cause frostbite.

#### **EMERGENCY TELEPHONE NUMBERS**

(800) 523-9374  
(610)481-7711

Continental U.S., Canada, and Puerto Rico  
Other locations

#### **ACUTE POTENTIAL HEALTH EFFECTS:**

##### **ROUTES OF EXPOSURE:**

**EYE CONTACT:** Inflammation and irritation of the eyes can occur at very low airborne concentration (less than 10 ppm). Exposure over several hours may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm, there is an intense tearing, blurring of vision, and pain when looking at light. Exposed individuals may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases, the eye can be permanently damaged. In addition to irritation, contact of the eyes with the liquid can cause frostbite.

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**INGESTION:** Ingestion of Hydrogen Sulfide is not a likely route of industrial exposure.

**INHALATION:** Inhalation of high concentrations of Hydrogen Sulfide can cause dizziness, headache, and nausea. Exposure to higher concentrations can result in respiratory arrest, coma, or unconsciousness. Exposure for more than 30 minutes at concentrations of greater than 600 ppm have been fatal. Continuous inhalation of low concentrations may cause olfactory fatigue, so that the odor is no longer an effective warning of the presence of Hydrogen Sulfide. Severe exposures which do not result in death may cause long-term symptoms such as memory loss, paralysis of facial muscles, or nerve tissue damage.

**SKIN CONTACT:** The gas may be irritating to the skin. Direct contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

**POTENTIAL HEALTH EFFECTS OF REPEATED EXPOSURE:**

**ROUTE OF ENTRY:** Inhalation, skin contact

**TARGET ORGANS:** Respiratory system, skin, central nervous system.

**SYMPTOMS:** The most significant symptoms of chronic, low level exposure are related to the central nervous system, with potential nerve tissue damage. Repeated low level skin exposure may cause dermatitis.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Acute or chronic respiratory conditions or eye disorders may be aggravated by over-exposure to Hydrogen Sulfide.

**CARCINOGENICITY:** Hydrogen Sulfide is not found on the FEDERAL OSHA Z LIST, NTP, CAL/OSHA, or IARC Carcinogenicity lists.

**SECTION 4. FIRST AID MEASURES**

**EYE CONTACT:** If liquid is splashed into eyes, or if irritation of the eye develops after exposure to Hydrogen Sulfide, open victim's eyes while under gentle, lukewarm, running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention from an ophthalmologist.

**INGESTION:** Ingestion is an unlikely route of exposure for Hydrogen Sulfide.

**INHALATION:** Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

**SKIN CONTACT:** If liquid is spilled on skin, or if irritation of the skin develops after exposure to liquid or gas, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention. In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

**NOTES TO PHYSICIANS:** Administer oxygen, if necessary and treat symptoms. Be observant for initial signs of pulmonary edema.

**SECTION 5. FIRE FIGHTING MEASURES**

**FLASH POINT:**  
Flammable gas

**AUTOIGNITION:**  
500 °F (260 °C)

**FLAMMABLE RANGE:**  
(LEL): 4.0% (UEL): 44.0%

**EXTINGUISHING MEDIA:** Extinguish Hydrogen Sulfide fires by shutting-off the source of the gas. Use water spray to cool fire-exposed containers, structures, and equipment. Other appropriate extinguishing media are dry chemical, foam, and carbon dioxide.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Evacuate all personnel from area. If possible without risk, shut off source of gas, then fight fire according to types of materials burning. Extinguish fire only if gas flow can be stopped. This will avoid possible accumulation and reignition of a flammable gas mixture. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out. For small releases, if it is not possible to stop the leak, and it does not endanger personnel, let the fire burn itself out. Incipient fire responders should wear eye protection. Structural fire fighters