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Bulletin

Kansas City Regional TEW - Inter-Agency Analysis Center

SPECIAL BULLETIN COVERSHEET

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Wednesday, March 17, 2010

SPECIAL BULLETIN

The information contained within the attachments to this bulletin pertains exclusively to HYDROGEN SULPHIDE suicide deaths. This document is based on information provided by the Colorado Fire Chiefs Association.

Reported suicides using this method go back to 2008 and are not confined to the United States.

There is also information about the various chemicals used and the chemical makeup of these materials.

FIREFIGHTER SAFETY & SURVIVAL MESSAGE

Responder Safety: Hydrogen Sulfide Gas (H₂S) Suicides on the Rise



The number of chemical suicide deaths appears to be on the rise here in the United States and across the globe. This bulletin contains information on the toxicity of this chemical and gives suggestions on how to respond to a possible chemical suicide.

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Toxicity

Hydrogen sulfide is considered a broad-spectrum poison, meaning that it can poison several different systems in the body, although the nervous system is most affected. The toxicity of H₂S is comparable with that of hydrogen cyanide. It forms a complex bond with iron in the mitochondrial cytochrome enzymes, thereby blocking oxygen from binding and stopping cellular respiration.

- 0.0047 ppm is the recognition threshold, the concentration at which 50% of humans can detect the characteristic odor of hydrogen sulfide, normally described as resembling "a rotten egg".
- Less than 10 ppm has an exposure limit of 8 hours per day.
- 10–20 ppm is the borderline concentration for eye irritation.
- 50–100 ppm leads to eye damage.
- At 150–250 ppm the olfactory nerve is paralyzed after a few inhalations, and the sense of smell disappears, often together with awareness of danger,
- 320–530 ppm leads to pulmonary edema with the possibility of death.
- 530–1000 ppm causes strong stimulation of the central nervous system and rapid breathing, leading to loss of breathing;
- 800 ppm is the lethal concentration for 50% of humans for 5 minutes exposure (LC50).
- Concentrations over 1000 ppm cause immediate collapse with loss of breathing, even after inhalation of a single breath.

Responding to Chemical Suicides

- Dispatchers and call takers should be alert for this type of call.
- Dispatchers and call takers should warn callers not to approach, or enter, vehicles, rooms or apartments where unresponsive people may have attempted chemical suicide.
- The caller may say there are warning signs on the vehicle but may not volunteer this information.
- The caller may not say anything about a strange smell (like rotten eggs or almonds) unless prompted when they call 9-1-1.
- Proper initial questioning may yield information vital to the safety of the first responders.
- The information must be immediately passed on to the first responders by the 9-1-1 personnel.
- Responders should be aware that these situations commonly occur in vehicles, residential bathrooms and other small spaces where a small amount of gas can quickly reach lethal concentrations.
- carefully size up any situation involving an unresponsive person in an enclosed space.
- If a chemical substance is suspected, responders should follow their agencies' hazardous materials operational protocol and procedures, including requesting assistance from the appropriate Haz-Mat team.
- Responders should wear appropriate PPE, including positive pressure self-contained breathing apparatus, whenever they are dealing with a suspected chemical suicide.
- Consider wind speed and direction when determining the need to evacuate nearby structures.
- In an apartment building, consideration should be given to evacuating the entire building.
- IC will need to make an immediate decision for "life rescue" or "wait and hold". If believed to be an "unconscious victim" rescue responders should don appropriate PPE and SCBA to breach window or door to affect a quick rescue.
- If there's a possibility the victim is sleeping, attempt to wake them with a vehicle public address system, bullhorn or siren.
- If they cannot be awakened, responders should perform a thorough recon before entering the space to assist the victim.

- Individuals who initiate chemical suicide may, or may not, place warning signs on doors or windows to

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indicate the presence of deadly gas inside the space.

- Warning signs may not be easily detected or understood by other people –including responders!
- Warning signs may be hidden or obscured by condensation, frost, snow, or vapors produced by the reaction.
- Warning signs may be removed, become detached or dislodged, or blow away before emergency personnel arrive.
- Interview anyone who may have approached the scene to learn what they saw or smelled.
- A “rotten egg” smell would indicate hydrogen sulfide.
- An almond odor is typical of cyanide compounds.
- Look for indications a chemical reaction has been initiated.
- Typically you will find containers of household chemicals and pails, buckets, pots or other containers where the chemicals have been mixed.
- Improvised “containers”, such as a sink or the glove box of an automobile, could be used to mix the chemicals.
- If chemical containers are present, attempt to identify the chemicals from labels or a sales receipt.
- The reaction utilizes an acid, such as muriatic or hydrochloric found in many common cleaning compounds, and a sulfide present in many fungicides, paints, insecticides, and shampoo to produce Hydrogen Sulfide.
- The presence of containers of potassium cyanide, or cyanide compounds would indicate a reaction that produces hydrogen cyanide.
- This is less common than the hydrogen sulfide reaction as the cyanides are not as easily obtained.
- Air sampling equipment can be used to determine the presence or absence of hydrogen sulfide or hydrogen cyanide.
- A small hole may be punched in a car or home window, or a probe, or colorimetric tube inserted in the gap between a door to the room and the floor.
- A hydrocyanic acid tube will detect hydrogen cyanide.
- Hydrogen sulfide is heavier than air, but hydrogen cyanide is slightly lighter.
- If the vapor in the space cannot be identified, or the presence of hydrogen cyanide is confirmed entry should only be made by individuals protected by fully encapsulated chemical protective clothing.
- Hydrogen cyanide is immediately dangerous to life and health at concentrations above 50 parts per million.
- Both hydrogen sulfide and hydrogen cyanide are flammable.
- The Lower Explosive Level of hydrogen sulfide is 4% and the LEL of hydrogen cyanide is 5.6%.
- There have been no incidents of fire reported with the chemical suicide incidents reported to date.
- It is believed that concentrations do not typically reach the LEL except at close proximity to the mixing container.
- Responders should eliminate ignition sources whenever possible.
- Vapors inside the space should be ventilated to the outside.
- Ensure no one will be endangered by the vapors before using natural or forced ventilation to air the space out.
- Anyone who has been exposed to the vapors should be decontaminated with soap and water.
- Clothing should be removed and double-bagged.
- Contaminated clothing and PPE should be laundered before being re-used.
- If alive, the victim should be stripped and decontaminated with soap and water before being transported from the scene.
 - Deceased victims should be covered by a sheet, body bags are not recommended.

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Responders Who Fail to Take Proper Precautions Can Quickly Become Victims Themselves

Resources

Advisory - New York State Office of Homeland Security, Emergency Managers Advisory, Subject: (U)

Hydrogen Sulfide: A Potential First Responder Hazard (September 26, 2008). See:

<http://cryptome.org/dhs-hyd-sul.pdf>.

Chemical Suicide Memo, New York State Office of Fire Prevention & Control Hazardous

Materials/Homeland Security Bureau (November 6, 2009). See:

<http://www.colofirechiefs.org/ffsafety/chemicalsuicidememo.pdf>.

Responder Safety Information - Hydrogen Sulfide Suicide, Wake County, NC EMS Division (February 22, 2010). See: http://www.colofirechiefs.org/ffsafety/H2S_Suicide_Warning.pdf.

Ada County Sheriff's Office (Idaho) Officer/Emergency Responder Safety Bulletin (May 14, 2009). See:

<http://www.vleoa.org/Content/Documents/Document.ashx?DocId=86676>.

Medical Management Guidelines for Hydrogen Sulfide, Agency for Toxic Substances and Disease

Registry (ATSDR), Department of Health and Human Services. See:

<http://www.atsdr.cdc.gov/Mhmi/mmg114.html>.

NIOSH Pocket Guide to Chemical Hazards - Hydrogen Sulfide, National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention. See:

<http://www.cdc.gov/niosh/npg/npgd0337.html>.

Chemical Suicides - First Responder Safety (PPT), Saline County Sheriff's Department, Missouri. See:

http://www.colofirechiefs.org/ffsafety/Chemical_Suicides.pdf.

Hydrogen Sulfide (PPT) Shelby County EMS Training Division. See:

http://www.colofirechiefs.org/ffsafety/Hydrogen_Sulfide_PPT.pdf.

These and other resources are posted on the CSFCA's Responder Safety: Chemical Suicide webpage, at:

http://www.colofirechiefs.org/chemical_suicides.htm.

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