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MEMORANDUM

TO: All Fire and Emergency Services Responders

FROM: Ron Dunn

DATE: November 6, 2009

SUBJECT: Chemical Suicides

The Office of Fire Prevention and Control has recently assisted local authorities in two communities with suicides involving chemicals. This method of suicide, sometimes called detergent suicide, if frequently used in Japan and is being seen more frequently in this country. The process involves mixing common household chemicals to create hydrogen sulfide in a small space. Instructions to do this are readily available on the internet and most encourage anyone planning to use this method to provide appropriate warnings to people who might encounter or respond to their situation about the presence of the deadly gas. One incident in Japan took place in the bathroom of an apartment. Over seventy people in neighboring apartments were sickened by the fumes. In Arizona one individual manufactured hydrogen cyanide instead of hydrogen sulfide. This is the only instance of hydrogen cyanide I've been able to discover and suspect it's rare because the chemicals needed for the reaction are not as readily available as those used to make hydrogen sulfide.

Our concern is that anyone who enters the space without proper protection may quickly become a victim themselves. Both recent incidents in New York involved suicides inside a vehicle. One vehicle had very clear and obvious warning signs taped to the window (as in Fig. 1 and 2), the other had signs that were less noticeable laid on the dashboard. In both instances responders were able to recognize the situation and take appropriate protective actions.

It is anticipated that the number of these incidents will rise as more people become aware of the process. The Office of Fire Prevention and Control has developed guidelines to deal with these incidents that I believe local responders will find useful in the event of a chemical suicide in their community.

The attached information is intended to serve as a model protocol. Local agencies may choose to alter these, or implement different policies, based on local training, resources and policies. The important point is that we should be prepared to respond safely to events of this nature. Please distribute this information to the responders in your community.

Fig. 1

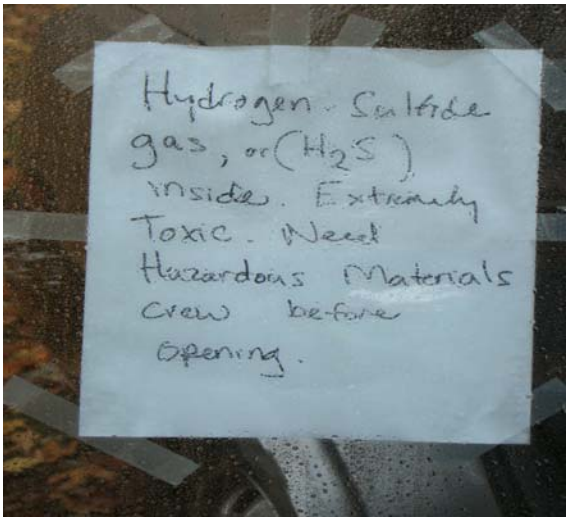

Fig. 2

Fig. 3 (chemical containers and pail used for mixing)

Responding to Chemical Suicides

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. Dispatchers and call takers should warn callers not to approach, or enter, vehicles, rooms or apartments where unresponsive people may have attempted chemical suicide.

Careful size up of any situation involving an unresponsive person in an enclosed space is critical for responder safety. Responders should wear SCBA and turn out gear 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.

If there is a possibility that the individual may be sleeping, attempt to wake them with a vehicle public address system, bullhorns or sirens.

If individuals 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 indicate the presence of deadly gas inside the space.

> Signs may not be easily detected, or understood, by other people – including responders!
>
> Signs may be hidden or obscured by condensation, frost, snow or vapors produced by the reaction.
>
> 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 that 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. There is a possibility that improvised "containers", such as a sink or the glove box of an automobile, could be used to mix the chemicals.

> If you can clearly see that there are no chemical containers and mixing containers present anywhere in the space it is probably not a chemical suicide.
>
> If chemical containers are present attempt to identify the chemicals from labels on the containers, or a sales receipt. The reaction utilizes an acid, such as muriatic or hydrochloric which is found in many common cleaning compounds and a sulfide that would be 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 (VD = 1.19), but hydrogen cyanide is slightly lighter (VD = 0.94)

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 (level A). 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 (LEL) of hydrogen sulfide is 4% (40,000 ppm) and the LEL of hydrogen cyanide is 5.6% (56,000 ppm). There have been no incidents of fire reported with these incidents and it is believed that concentrations do not typically reach the LEL except at close proximity to the mixing container. Responders should eliminate ignition sources when ever possible.

The vapors inside the space should be ventilated to the outside. Ensure that 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. 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.

Expenses related to the clean up may be reimbursed through the State Super Fund or the Environmental Protection Agency. New York State Environmental Conservation employees can assist with this, contact DEC early in the incident. DEC can hire contractors to carry out the clean up; they can not reimburse local responders for their costs associated with incidents.

Hydrogen Cyanide

Hydrogen Cyanide is a colorless gas, or a bluish – white liquid with a bitter almond odor. The IDLH is 50ppm.

The chemical formula for Hydrogen Cyanide is HCN.

HCN is extremely toxic by inhalation and/or skin contact.

HCN can be made by mixing cyanide containing compounds with acids.

HCN is lighter than air (VD 0.94) and miscible with water. Vapors may be knocked down by using a water spray. Runoff should be contained if possible.

Brief exposure to high concentrations (>500ppm) can cause loss of consciousness and/or death. Effects can occur with a few breaths, and possibly as few as a single breath. Concentrations as low as 270ppm have been known to cause death within 6 to 8 minutes

Cutaneous absorption must be avoided. Hydrogen cyanide is readily absorbed through intact skin and may cause systemic poisoning with little or no irritation to the skin itself.

Expose to HCN gas will require decontamination. For victim decon, remove clothing and shower with water for 3-5 minutes. Victim's clothing and belongings should be double bagged.

The use of body bags is not recommended.

Emergency personnel entering areas where they will be exposed to HCN should wear totally encapsulated chemical protective clothing with self contained breathing apparatus (SCBA).

Hydrogen Cyanide is a flammable gas with a LEL of 5.6% and a UEL of 40%. Vapors may find a source of ignition and travel back. As such, the use of flash protection over chemical protective clothing should be considered.

Hydrogen Sulfide

Hydrogen Sulfide is a colorless gas with a strong odor of rotten eggs. The chemical formula for Hydrogen Sulfide is H_2S.

H_2S is extremely toxic by inhalation and will rapidly fatigue the sense of smell.

H_2S is made by mixing ZnS and HCl, both easily obtainable from any hardware store.

H_2S is heavier than air (VD 1.19) and slightly water soluble (.4%). Vapors may be knocked down by using a water spray. Runoff is corrosive and toxic.

Brief exposure to high concentrations (>500ppm) can cause loss of consciousness and/or death. Effects can occur with a few breaths, and possibly as few as a single breath.

Cutaneous absorption is minimal. Victims exposed to H_2S gas do not pose a substantial risk of secondary contamination to personnel outside the Hot Zone.

Acute expose to H_2S gas may require decontamination. For victim decon, remove clothing and shower with water for 3-5 minutes. Victim's clothing and belongings should be double bagged.

The use of body bags is not recommended.

Emergency personnel should wear protective clothing, appropriate to the type and degree of contamination. The use of self contained breathing apparatus (SCBA) is recommended, as the IDLH is 100ppm.

Chemical protective clothing is not generally recommended because H_2S gas is not readily absorbed through the skin.

Hydrogen Sulfide is a flammable gas with a LEL of 4.3% and a UEL of 45%. Vapors may find a source of ignition and travel back. As such, it is recommended the use of structural firefighting turnout gear be used. In some cases, the use of Tyvek suits with SCBA may be appropriate.