

Chemically Speaking LLC

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Arsine Incident?

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The incident at the Technical University of Dresden described below on Jan 19, 2012, is everyone's EHS and ER worst case nightmare. It is an unfortunate reminder of the value of training and being prepared for an emergency for the materials being handled. This aspect is missing at most sites for hazardous chemicals.

Arsine Poisoning, Jan 19, 2012, Technical University of Dresden

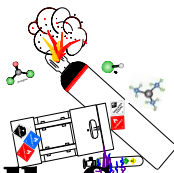


At 5 PM during a demonstration for a freshman chemistry class an accident occurred. Some reported smelling a garlic like odor. People became concerned that it was arsine. 97 people (mostly students) were transported by 30 buses and ambulances to area hospitals for observation, many staying overnight. Over 100 firefighters and 70 other government agencies responded. No evidence of a leak or arsine was found.

Needless to say, this incident caused significant news coverage and public concern over potentially a "non" incident. There is also a doubt that there was any arsine involved.

This incident reminded me of another "non" incident in 1993 that resulted in bad news coverage and public perception. A university in the US was starting up a new gas supply system. While they were trying to install a arsine cylinder, the gas detection system went into alarm at the TLV level of 50 ppb. The ER team responded but could not find a leak. Some graduate students thought they smelled something. A few hours after the alarm they contacted the hospital about being "exposed" to arsine and 7 drove themselves to the emergency room. The hospital went into a panic, thinking they had "contaminated" victims. They quarantined the victims, proceeded to evacuate the wing of the hospital and called in additional workers to deal with the crisis. Hours later, no one checked on the "victims" due to the chaos, so they simply walked out of the emergency room. They never found any evidence of arsine exposure or a leak.

Both incidents highlight the psychological fear many people have with arsine. While many other gases in common use (hydrogen selenide, diborane) have acute exposure levels well below that of arsine, most people treat arsine s



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being more dangerous. People associate it as a chemical warfare gas that was used in World War I (very little) or arsenic which is used to murder people, so they assume it must be really bad.

Arsine is most commonly described as having a garlic like odor. This is true for certain concentrations. The odor is not unpleasant, it has a distinctive non garlic like odor at low concentrations that I cannot fully describe. The symptoms of acute exposure are also not immediately apparent, as a result one can easily be acutely exposed and not be aware. This probably adds to the fear.

It is also relatively easy to make arsine. Any arsenic compound in the presence of a reducing environment (eg halogen acid and zinc) will react to form arsine. As Steve Roberge described in a 2009 article, arsine can be generated in the reducing environment of a electric wet battery while it is being charged (forklift). He highlighted a paper from Varma et al dated May 1988 "Stibine and arsine generation from a lead acid cell during charging modes under a utility load leveling duty cycle.

I have been making arsine since 1972 and have dealt with many incidents and actual exposures. It is hard for many to believe that the basic method (arsenic, zinc, sulfuric acid) to manufacture arsine is still in use today. During this time, I have also dealt with many "non" events like the 2 described above.

If you handle arsine, I would strongly recommend that you not only have the safety and ER equipment available but that you train your employees on the symptoms of exposure. Proper medical treatment of the local health and ER services is absolutely critical to a timely and orderly response. I have found the US Health Dept Medical Management Guidelines to be the best resource for this.

<http://www.atsdr.cdc.gov/MMG/MMG.asp?id=1199&tid=278>. They have been invaluable, and I have had them translated into Chinese, Korean and Japanese for ease of training.



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