

## The Nose Does Not Always Know

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▲ A natural gas explosion at a meat processing plant caused a structural collapse and an ammonia release. Image courtesy of the U.S. Chemical Safety and Hazard Investigation Board.

On June 9, 2009, a natural gas explosion occurred at a meat processing plant in Garner, NC, causing a release of 18,000 lb (8,165 kg) of ammonia and a section of the building to collapse. Three workers were killed, four workers were critically burned, and 71 people were sent to the hospital. Three firefighters were exposed to toxic anhydrous ammonia leaking from the plant's refrigeration system.

While installing a new gas-fired water heater in the meat processing plant's utility room, workers from the water heater manufacturer used natural gas to displace the air in the new gas line. The purge gas vented into the utility room, and an exhaust fan provided some ventilation. However, the employees did not use a combustible gas detector to monitor the area. Instead, they relied on smell to determine when the piping had been effectively purged of air and whether or not an unsafe release of natural gas occurred.

While some nearby employees smelled gas, others did not report the odor. Personnel who did notice the gas odor were not concerned. They assumed that the presence of the smell was a normal part of starting the water heater. Employees from both the manufacturer and site were unaware that the purging had created a dangerous accumulation of natural gas in the utility room that exceeded the lower explosive limit (LEL). The utility room contained several potential ignition sources, including unclassified electrical devices, that may have ignited the gas. Read the U.S. Chemical Safety and Hazard Investigation Board (CSB) Report No. 2010-12-1-NC-1 for more information on this incident.

### Did You Know?

- Workers repeatedly exposed to an odor can experience a loss in odor detection ability due to odor adaptability and olfactory fatigue. This is true of hydrogen sulfide (H<sub>2</sub>S) and the mercaptans used to odorize natural gas.
- An individual's natural ability to detect certain odors varies widely and is affected by respiratory factors, such as infection with a cold, the flu, or COVID-19.
- Flammable vapors or gases vented into a confined or congested area can accumulate and form a flammable gas cloud above the LEL (*i.e.*, the minimum concentration of vapor in air needed for propagation of a flame in the presence of an ignition source).
- Intermittent gas testing can detect a gas leak. However, continuous gas testing is the best way to monitor an area for hazardous gases.

### What Can You Do?

- Never rely on sense of smell to detect hazardous gases, because it is unreliable. If you do smell a hazardous gas, immediately leave the area and notify your supervisor.
- Read the U.S. National Institute of Occupational Safety & Health (NIOSH) bulletin about odorant fade ([www.cdc.gov/niosh/docs/2021-106](http://www.cdc.gov/niosh/docs/2021-106)).
- If hazardous gas purging is required, carefully follow the purging procedure. Verify that the hazardous gases are vented to a well-ventilated area.
- Before breaking or opening a hazardous gas line, conduct a hazard review or use the proper permit to ensure that all of the required safety systems are used.
- Portable gas meters are the best method to detect and monitor the level of hazardous gases. Use the correct meter for the gas present in the area and calibrate gas meters before each use.
- Before using a gas meter, verify that it has been calibrated correctly for the gas of interest, and confirm that it is used according to the manufacturer's instructions.

**Do not rely on your sense of smell to detect hazardous gases!**