

Methyl Mercaptan Q&A with Dr. Christopher Teaf

President & Director of Toxicology, Hazardous Substance & Waste Management Research, Inc.

1. What is methyl mercaptan?

Methyl mercaptan (also called methanethiol) occurs naturally in human and other animal tissues, as well as in certain foods such as nuts, cheeses, and wines. It may be released from decaying organic matter in swampy areas and is added to natural gas to help people detect gas leaks.

2. Does New-Indy Catawba put the community at risk of exposure to methyl mercaptan?

No. Based on recent studies conducted at New-Indy Catawba, methyl mercaptan was not detected in air sampling data collected over four consecutive weeks in April of 2022. This data was collected from three air monitoring locations along the fence line at the facility. Samples were collected and provided them to state and federal regulators. They contained no indication that operations at New-Indy Catawba produce methyl mercaptan emissions that would pose any health risk to the surrounding community.

3. How easy is it to smell methyl mercaptan compared to other odors?

Easy. Methyl mercaptan has a low odor threshold of 0.002 parts per million (ppm) in air, which is 250 times lower than the 0.5 ppm NIOSH Recommended Exposure Limit and 5,000 times lower than the 10 ppm OSHA Permissible Exposure Limit. Methyl mercaptan has an unpleasant odor that resembles rotten cabbage or garlic.

4. Can methyl mercaptan be harmful if you cannot smell it? Is it similar to carbon monoxide (CO)?

Methyl mercaptan is not similar to CO, which is a completely odorless gas. Generally, it is not possible to be harmed by methyl mercaptan if you do not smell it. For most people, the methyl mercaptan odor threshold is low enough that it provides a good warning to avoid possible harmful exposures. Even if you do smell methyl mercaptan, it does not mean that it is harmful.

5. Is methyl mercaptan always a gas? Does it exist in household water?

Methyl mercaptan is a gas under normal circumstances. It occurs in outdoor air in mostly low concentrations. It has not been reported as a drinking water contaminant.

There are no federal or state drinking water standards for methyl mercaptan, and it is of health interest only in rare airborne situations.

6. Does methyl mercaptan have any beneficial uses?

Yes. Methyl mercaptan is used in preparing animal feed and as a chemical used in pesticides, fungicides, and plastics. It is used as an odorant in natural gas supplies, although other mercaptans and sulfide compounds are also commonly used for this application.

7. At what level is methyl mercaptan dangerous to humans and pets? Does prolonged exposure to low concentrations cause health issues for humans and pets? Is intermittent or occasional exposure to small to intermediate levels of methyl mercaptan unhealthy? Are the elderly, the young, and people with compromised immune systems more likely to suffer adverse health effects from either prolonged or intermittent exposure to methyl mercaptan?

Occupational guidelines are available for methyl mercaptan in worker air space (REL and PEL), and the National Advisory Committee has established emergency response guidelines for methyl mercaptan for the public during, for example, chemical spills (Acute Exposure Guideline Levels or AEGLs), but methyl mercaptan generally is of interest with respect to odor control rather than health considerations. No information was found regarding potential adverse effects specifically to pets, children, or the elderly. Animal studies show adverse health effects starting at concentrations in the low ppm range. Occupational studies report central nervous system effects, such as headache, at long term daily exposures in the 15-ppm range.

8. What are the health effects associated with methyl mercaptan exposure? Do the health effects end after exposure ceases?

Due to the low odor threshold acting as a warning, human exposures to harmful levels of methyl mercaptan are rare. It is only through occupational exposures that health effects are reported. Worker exposures to unspecified "lower levels" of methyl mercaptan have resulted in reported respiratory, eye, and mucous membrane irritation, dizziness, nausea, and vomiting. The irritant effects cease when exposure ends. A few reports of death were found from exposure to greater than 10,000 ppm.

9. Does the federal or state government regulate methyl mercaptan? Is methyl mercaptan a pollutant under state or federal law? Other than workplace limits from OSHA, has the

state or federal government-imposed exposure limits for methyl mercaptan? What are the exposure guidelines for methyl mercaptan?

South Carolina regulates methyl mercaptan under SC Reg. 61-62.5 Standard No. 8. Certain air emission sources that are regulated under Standard No. 8 are required to complete ambient air dispersion modeling to demonstrate that their air emissions do not exceed the maximum allowable 24-hour average concentrations (MAAC) identified in Standard No. 8, including for methyl mercaptan.

Exposure guidelines for the public (Acute Exposure Guideline Levels or AEGs) are available for use under emergency response situations like chemical spills. The one-hour and eight-hour AEGs are 23 ppm and 7.3 ppm, respectively.

10. Is methyl mercaptan considered a toxic substance under federal law?

No. But it is regulated by OSHA and NIOSH for workplace exposures. The workplace Permissible Exposure Limit (PEL) enforced by OSHA is 10 ppm, and the NIOSH Recommended Exposure Limit (REL) is 0.5 ppm.

11. What are some source materials with technical information about methyl mercaptan?

ATSDR (Agency for Toxic Substances & Disease Registry). 1992. Public Health Statement: Methyl Mercaptan. DHHS. Atlanta, GA.

ATSDR (Agency for Toxic Substances & Disease Registry). 1992. Toxicological Profile for Methyl Mercaptan. U.S. DHHS. Atlanta, GA. September 1992.

ATSDR (Agency for Toxic Substances & Disease Registry). 2014. Addendum to the Toxicological Profile for Methyl Mercaptan. U.S. DHHS. Atlanta, GA. October 2014.

NRC (National Research Council). 2013. Methyl Mercaptan Acute Exposure Guideline Levels. Acute Exposure Guideline Levels for Selected Airborne Chemicals: Volume 15. Washington DC. September 26, 2013.

SCDHEC (South Carolina Department of Health and Environmental Control). 2019. Regulation 61-62 Air Pollution Control Regulations and Standards. January 25, 2019.

USEPA (U.S. Environmental Protection Agency). 2004. Provisional Peer Reviewed Toxicity Values for Methyl Mercaptan. USEPA National Center for Environmental Assessment Office of Research and Development. Cincinnati, OH. December 20, 2004.