

BACKGROUND

On the night of February 18, 2022, a sulfur odor was reported coming from the United Refinery in Warren, Warren County. Due to heavy rain and prior snow cover, the floating lid for one of the refinery tanks containing naphtha was damaged, causing the lid to partially submerge. Naphtha is a generic term referring to a refined or partially refined petroleum product. Naphtha contains many chemicals, including benzene and hydrogen sulfide. Odors detected in the area include those similar to gasoline or kerosene, and also a sulfuric, rotten egg smell. There are residential areas toward the northeast and east side of the site (Figure 1).

WHAT IS HAPPENING AT THE SITE NOW?

United Refinery Company is working to remove all the of the naphtha from the tank. While that work continues, they are placing a layer of foam on top of the liquid to prevent prolonged odors. When these layers are re-applied (approximately every 2-5 hours), there may be additional odors emitted from the refinery site. The United Refinery Company is conducting air monitoring on and at the fence line of the site, and Pennsylvania Department of Environmental Protection (DEP) has conducted initial air monitoring in the surrounding community. DEP has deployed additional equipment which will help develop a more complete list of chemicals in the community air, and concentrations of those chemicals. DEP is also working with United Refinery to conduct more comprehensive air monitoring in the community. This air monitoring is expected to continue for several weeks.

IS THE COMMUNITY AT RISK?

Following several days of complaints from residents, on February 20, a DEP representative observed a sulfur odor and conducted air monitoring throughout the community with a hand-held device. Hand-held monitors provide immediate results but can only detect higher concentrations of chemicals. DEP detected total volatile organic compounds (VOCs) at a concentration range of 0-7 parts per million (ppm) around the site. DEP found that the meter readings for oxygen (O₂), carbon monoxide (CO) and hydrogen sulfide (H₂S) were normal or non-detectable.

We do not know enough about which specific chemicals are in the air of the community and at what levels to make a determination about the potential for harmful health effects from exposures at this time. However, even without more specific information, we do know that strong odors can cause symptoms for some people. Therefore, the community in the nearby residential areas may experience odor-related symptoms such as shortness of breath, headaches, nausea, and irritation of the eyes, nose and/or respiratory tract. These symptoms usually resolve when the odor goes away. In sensitive people, such as those with asthma, the very young, or the very old, odors and contaminant exposures can result in symptoms that are not observed in the general population and those symptoms may last longer and can aggravate existing medical conditions.

General information about the chemicals found in the tank and their health effects are described below.

WHAT IS NAPHTHA?

- Naphtha is a complex hydrocarbon mixture produced by the distillation of petroleum or coal-tar. Naphtha can be reddish-brown (Coal-Tar) or colorless pale yellow (petroleum) with a gasoline-like odor. Naphtha is used as a solvent, in making varnish, adhesives, coatings, and many other chemicals.

IS NAPHTHA HARMFUL?

- Breathing naphtha can irritate the nose and throat, and exposures can also cause headache, dizziness, nausea and /or vomiting. High exposure can cause fatigue, lightheadedness and passing out. Long-term exposure can cause drying and cracking of the skin. Repeated exposure may damage the nervous system and may affect the kidneys.

- Naphtha has a gasoline-like odor that can be smelled at 10 ppm in the air.
- Two of the most toxic chemicals in naphtha are benzene and hydrogen sulfide. While further assessments are underway to understand what is in the community air, determining the airborne concentrations of these two chemicals in community air is a primary focus of the ongoing air quality monitoring.

WHAT IS BENZENE?

- Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.
- Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

IS BENZENE HARMFUL?

- Most people can begin to smell benzene in air at approximately 60 ppm and recognize the odor as benzene at 100 ppm. Breathing levels of benzene at 700-3,000 ppm can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. In most cases, people will stop feeling these effects when they are no longer exposed and begin to breathe fresh air.
- The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection. The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that benzene is carcinogenic to humans.

WHAT IS HYDROGEN SULFIDE?

- Hydrogen sulfide is a flammable, colorless gas that smells like rotten eggs. People usually can smell hydrogen sulfide at low concentrations in air ranging from 0.0005 to 0.3 ppm.
- Hydrogen sulfide occurs naturally in crude petroleum, natural gas, volcanic gases, and hot springs. It can also result from bacterial breakdown of organic matter. It is also produced by human and animal wastes. Bacteria found in your mouth and digestive tract produce hydrogen sulfide during the digestion of food containing vegetable or animal proteins. Industrial sources of hydrogen sulfide include petroleum refineries, natural gas plants, petrochemical plants, coke oven plants, food processing plants, and tanneries.

IS HYDROGEN SULFIDE HARMFUL?

- Hydrogen sulfide ambient air concentrations from natural sources have been estimated to be between 0.00011 and 0.00033 ppm. Exposure to hydrogen sulfide at levels typically found in the environment are not likely to result in health effects. Levels likely to result in health effects are those at 1 ppm and above.
- Exposure to concentrations at least 100 times higher than typical environmental levels may result in eye, nose, or throat irritation, and/or headaches, poor memory, tiredness, or balance problems. It may also cause difficulty in breathing for some asthmatics. Exposures to hydrogen sulfide concentrations at more than 1 million times typically found in the environment could result in loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in some individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function.

If you are concerned about health effects related to potential exposure to these chemicals, please contact your primary care physician.

RESOURCES FOR MORE INFORMATION

To learn more about environmental odors, visit:

https://www.atsdr.cdc.gov/odors/docs/Are_Environmental_Odors_Toxic_508.pdf

Additional information on benzene and your health can be found online:

- <https://www.atsdr.cdc.gov/toxfaqs/tfacts3.pdf>
- <https://emergency.cdc.gov/agent/benzene/basics/facts.asp>

Additional information on hydrogen sulfide and your health can be found online:

- <https://www.atsdr.cdc.gov/toxfaqs/tfacts114.pdf>

Additional information on Naphtha and your health can be found online:

- <https://nj.gov/health/eoh/rtkweb/documents/fs/0518.pdf>

If you have any questions, contact us at env.health.concern@pa.gov.

