Hydrogen Sulfide (H2S) Factsheet

What is hydrogen sulfide?

- Hydrogen sulfide is a heavier-than-air, flammable gas with a characteristic rotten egg odor. Individuals can detect this odor when hydrogen sulfide gas is present at very low levels. Everyone has a different sensitivity to the odor.
- Hydrogen sulfide occurs both naturally and from industrial processes. Natural sources include crude oil, natural gas, salt marshes, sulfur springs, and swamps. Industrial sources include manure handling operations, oil refineries, pulp and paper mills, tanneries, wastewater treatment plants, and solid waste landfills.
- Hydrogen sulfide may account for up to 1 percent by volume of landfill gas emissions, although typically the percentage is much less. The formation of hydrogen sulfide within a landfill depends on certain conditions including moisture content, temperature, and pH; anaerobic conditions (lacking oxygen); and a sulfate source.

What types of wastes contribute to hydrogen sulfide formation in landfills?

- Gypsum wallboard, a component of Construction and Demolition Debris (CDD), is a major contributor to hydrogen sulfide formation in landfills.
- CDD and crushed CDD (fines), containing gypsum, are a significant source of sulfate. Other types of waste streams that may contain sulfate include wastes from pulp and paper mill bleaching and coating operations and sludges from wastewater treatment plants.

How do landfills check for hydrogen sulfide?

- Different methods can be used to check for hydrogen sulfide and are selected based on site-specific needs. Hydrogen sulfide can be detected and measured with portable or stationary continuous air monitors. Air sampling and subsequent laboratory analysis can also be conducted.

How can hydrogen sulfide be controlled in the landfill environment?

- Hydrogen sulfide and other landfill gases can be controlled by installing an active gas management system that pulls out and burns the landfill gas. Also, hydrogen sulfide emissions can be reduced by decreasing the amount of sulfate containing wastes entering the landfill, and by applying certain cover materials such as soil amended with lime and fine concrete.

Does the federal government have guidelines to protect human health from Hydrogen Sulfide exposure?

- OSHA and NIOSH have established workplace limits for hydrogen sulfide. OSHA established an eight-hour permissible exposure limit-time weighted average (PEL-TWA) of 10 ppm and a 15-minute short-term exposure limit (PEL-STEL) of 15 ppm for exposed workers. NIOSH established a limit of 300 ppm as the immediately dangerous to life and health concentration.
- EPA health scientists unanimously recommend a weighted average of no more than 15 ppb at the residence or 70 ppb at the property line. EPA set the safe exposure level at 0.00014 ppm to protect sensitive people such as children and the elderly.

https://ohsonline.com/Articles/2007/10/Human-Health-Effects-from-Exposure-to-LowLevel-Concentrations-of-Hydrogen-Sulfide.aspx?Page=1