

Hydrogen Sulfide at Landfills



What is hydrogen sulfide?

Hydrogen sulfide (H₂S) is a colorless gas with a “rotten egg” smell. It occurs naturally and can be produced by the breakdown of organics (e.g., yard trimmings, food waste) and human/animal waste (e.g., sewage). It is heavier than air and can collect in low-lying or poorly ventilated areas.

Hydrogen sulfide can be produced at landfills in two primary ways: 1) from the breakdown of organic matter; and 2) from the breakdown of gypsum-containing materials such as wallboard/sheetrock. The production of hydrogen sulfide can increase when materials are crushed, compacted or come in contact with rainwater – all of which commonly occur at landfills.

Hydrogen sulfide levels near landfills change throughout the day. Levels are usually highest at night or early in the morning when there is less wind. Periods of high rainfall also increase levels of hydrogen sulfide. This effect does not occur immediately. There is typically a lag of several days or weeks between significant rainfall and an increase in odors.

How does hydrogen sulfide leave a landfill?

Since hydrogen sulfide is heavier than air, it will move along the ground surface. Weather plays a major factor in its movement. Wind speed, wind direction and humidity can cause hydrogen sulfide to move more readily or become stagnant. Hydrogen sulfide tends to become more diluted as it moves offsite of a landfill and mixes with clean air.

How can odors be reduced?

Landfill operators can reduce hydrogen sulfide odors by applying proper cover. Placing clean soil on waste material that has the potential to produce hydrogen sulfide helps to reduce the smell. Since contact with water accelerates the reaction that causes the odors, waste should be placed in such a way that it drains properly and has minimal contact with water. Reducing the size of the landfill’s daily working face also can help reduce odors.

Other methods that can be used to prevent and control odors are: moisture control; cover soil

amendments; capping systems; odor neutralizers; gas collection and treatment systems.

What are the health risks of hydrogen sulfide?

The most common way to be exposed to hydrogen sulfide is by breathing it. Some people are able to smell hydrogen sulfide at levels as low as 0.6 parts per billion. Exposure to low levels can cause irritability, watery eyes, asthmatic symptoms and headaches.

It is rare for landfills to produce hydrogen sulfide at high concentrations. It is rarer still for hydrogen sulfide to move offsite at higher concentrations since mixing with clean air tends to dilute it.

What should I do if I smell hydrogen sulfide from a landfill?

A mild, occasional smell of hydrogen sulfide coming from a landfill is not uncommon. If the smell is strong and persistent, you should contact the landfill manager or operator. Complaints can also be directed to the S.C. Department of Health and Environmental Control (DHEC) Regional Offices. (To find one in your area, visit www.scdhec.gov/ea-regional-offices.) DHEC staff regularly work with landfill operators to help reduce hydrogen sulfide odors at their sites.

Other Landfill Gases ...

As waste material decays in landfills it may produce many different gases. See the DHEC’s “Landfill Gases Fact Sheet” (www.scdhec.gov/sites/default/files/Library/OR-1197.pdf) for more information about other landfill gases.

Want to learn more about landfills?

For more information about landfills and how they work, visit www.scdhec.gov/landfills.

The U.S. Environmental Protection Agency provides additional information about Hydrogen Sulfide at <https://nepis.epa.gov/Adobe/PDF/P100NG53.pdf>.

About this Fact Sheet ...

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