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## Methane and Hydrogen Sulfide Gases at C&DD Landfills

Two gases found at construction and demolition debris landfills are methane (CH<sub>4</sub>) and hydrogen sulfide (H<sub>2</sub>S). Both gases are produced to some extent in most landfills.

Compared to municipal solid waste landfills, construction & demolition debris (C&DD) landfills are expected to generate less methane (due to low amounts of organic material) and more hydrogen sulfide (due to the large proportion of wallboard).

The purpose of this document is to alert C&DD operators of dangers associated with these gases and conditions that promote their generation, so operators can control those conditions and monitor for their presence.

For more detailed information about these gases and how to protect workers from exposure, contact OSHA, NIOSH, and other health and safety organizations.

### Methane

Methane is an odorless, colorless gas that is explosive when the concentration in air is between 5 percent and 15 percent.

Methane is a product of anaerobic decomposition of organic matter such as wood and paper.

To generate methane, the bacteria breaking down the organic matter must have an anaerobic environment (no oxygen) and moisture. Food and yard waste, which are prohibited at a C&DD landfill, are especially good food sources for the bacteria.

### Hydrogen Sulfide

Hydrogen sulfide is heavier than air, and explosive when the concentration in air is between 4.3 percent and 45.5 percent. At very low concentrations, hydrogen sulfide can be detected by its rotten egg smell. But it quickly paralyzes the olfactory senses so it can no longer be detected by smell. Exposure to hydrogen sulfide can cause long lasting health effects, and can kill at high concentrations.

Hydrogen sulfide gas is a product of anaerobic decomposition of gypsum (commonly used in wall board).

To generate hydrogen sulfide gas, the bacteria breaking down the gypsum must have an anaerobic

environment, moisture, and a carbon source (the paper and glue in wallboard is sufficient). Approximately four tons of gypsum will produce one ton of hydrogen sulfide. Hydrogen sulfide is generated faster than methane, especially if wallboard is pulverized (more surface area available to the bacteria).

### Steps to Take

The most effective measure the owner or operator can take to prevent the generation of methane and hydrogen sulfide gas is to keep the debris from getting wet. This includes diverting and removing surface water, avoiding areas with a high ground water table, and possibly stopping leachate recirculation. The addition of lime could be effective to inhibit the growth of anaerobic bacteria, but this approach is not yet proven.

According to Ohio Revised Code 3714.12(B), if methane or hydrogen sulfide gas is generated at levels where there is a substantial threat to public health, safety or the environment or an imminent and substantial risk of fire, the owner or operator may be issued emergency orders to monitor the gas and possibly

undertake other more aggressive measures to control the gas. These measures include destroying the gas through a flare or combustor, purifying or reacting the gas (to remove hydrogen sulfide), or installing vents and/or barriers (methane migration).

### Contacts

If methane or hydrogen sulfide become a problem, the owner or operator should contact the local health department, the local fire department (if there is a risk of fire or explosion), and the appropriate Ohio EPA district office:

Central District Office  
(614) 728-3778  
1-800-686-2330

Northeast District Office  
(330) 963-1200  
1-800-686-6330

Northwest District Office  
(419) 352-8461  
1-800-686-6930

Southeast District Office  
(740) 385-8501  
1-800-686-7330

Southwest District Office  
(937) 285-6357  
1-800-686-8930