

Municipal Solid Waste Landfills



Final Rule: Mandatory Reporting of Greenhouse Gases

Under the Mandatory Reporting of Greenhouse Gases (GHGs) rule, owners or operators of municipal solid waste (MSW) landfills (as defined below) must report emissions from MSW landfills and all other source categories located at the landfill for which methods are defined in the rule. Owners or operators are required to collect emission data; calculate GHG emissions; and follow the specified procedures for quality assurance, missing data, recordkeeping, and reporting.

How Is This Source Category Defined?

The landfill source category consists of MSW landfills that accepted waste on or after January 1, 1980 and generate methane (CH₄) in amounts equivalent to 25,000 metric tons of carbon dioxide equivalent (CO₂e) or more per year. This definition is based on the amount of CH₄ *generated* (adjusted for soil oxidation, but not considering whether any gas is collected and destroyed) and not the amount of CH₄ actually emitted. The MSW landfill consists of the landfill, landfill gas collection systems, and landfill gas destruction devices (including flares).

This source category does not include industrial, hazardous waste, or construction and demolition landfills.

What GHGs Must Be Reported?

MSW landfill owners and operators must report:

- Annual modeled CH₄ generation and CH₄ emissions from the landfill.
- Annual CH₄ destruction (for landfills with gas collection and control systems).
- Annual CO₂, CH₄, and nitrous oxide (N₂O) emissions from stationary fuel combustion devices using the calculation methods specified in 40 CFR part 98, subpart C (General Stationary Combustion Sources). The information sheet on general stationary fuel combustion sources summarizes calculating and reporting emissions from these units.

How Must GHG Emissions Be Calculated?

MSW landfills must calculate modeled annual CH₄ generation based on:

- Measured or estimated values of historic annual waste disposal quantities; and
- Appropriate values for model inputs (i.e., degradable organic carbon fraction in the waste, CH₄ generation rate constant). Default parameter values are specified for bulk municipal waste and individual waste materials.

Landfills that do not collect and destroy landfill gas must adjust the modeled annual CH₄ generation to account for soil oxidation (CH₄ that is converted to CO₂ as it passes through the landfill cover before being emitted) using a default soil oxidation factor. The resulting value represents both CH₄ generation (adjusted for oxidation) and CH₄ emissions.

Facilities that collect and control landfill gas must calculate the annual quantity of CH₄ recovered and destroyed based on continuous monitoring of gas flow rate and continuous or weekly monitoring of CH₄ concentration, temperature, pressure, and moisture content of the collected gas prior to the destruction

device. CH₄ destruction efficiency must be based on the manufacturer's specified efficiency or 99 percent, whichever is less.

Those facilities that collect and control landfill gas must then calculate CH₄ emissions in two ways and report *both* results. Emissions must be calculated by:

1. Subtracting the measured amount of CH₄ recovered from the modeled annual CH₄ generation (with adjustments for soil oxidation and destruction efficiency of the destruction device).
2. Applying a gas collection efficiency to the measured amount of CH₄ recovered to account for CH₄ that is emitted through the landfill surface (adjusted for soil oxidation). Default collection efficiencies are specified that take into account collection system coverage and landfill cover materials.

A checklist for data that must be monitored is available at:

<http://www.epa.gov/climatechange/emissions/downloads/checklists/mswlandfills.pdf>

What Information Must Be Reported?

In addition to the information required by the General Provisions at 40 CFR 98.3(c), each facility must report the following landfill information:

- Information on the landfill's operating status, first and last year the landfill accepted waste, anticipated closure date, capacity, and whether leachate recirculation is used.
- Waste disposal quantity for each year of landfilling and description of how it was estimated.
- Waste composition data, if available, and how these data were estimated.
- Values of all parameters used in the methane generation calculations, including degradable organic carbon (DOC) and rate constant (k).
- Fraction of CH₄ in landfill gas and how this fraction was determined (measured or default values).
- Surface area of the landfill containing waste, cover type, and surface area and oxidation factor for each cover type used to calculate the average oxidation fraction, and the average oxidation fraction used.
- Annual CH₄ generation modeled.
- Annual CH₄ emissions adjusted for oxidation (for landfills without gas collection).
- Annual CH₄ emissions. (Facilities with landfill gas collection and control systems must report emissions using both of two estimation methodologies described above and must also report annual CH₄ destruction by the destruction device).

For landfills with gas collection systems, report:

- Total volumetric flow of landfill gas collected for destruction, measured CH₄ concentration, monthly average measured temperature and pressure, and annual quantity of CH₄ recovered.
- For landfill gas destruction devices, the destruction efficiency or whether gas was sent off-site for destruction. Indicate if a back-up destruction device is available, its associated destruction efficiency and the annual operating hours for primary destruction and back-up destruction devices.
- The gas collection efficiency used in emissions calculations.
- Descriptions of the gas collection system (manufacture, capacity, number of wells, etc.), surface area, waste depth and cover type for areas within the landfill.
- Annual operating hours of gas collection system.

For More Information

This document is provided solely for informational purposes. It does not provide legal advice, have legally binding effect, or expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits in regard to any person. The series of information sheets is intended to assist reporting facilities/owners in understanding key provisions of the final rule.

Visit EPA's Web site (www.epa.gov/climatechange/emissions/ghgrulemaking.html) for more information, including the final preamble and rule, additional information sheets on specific industries, the schedule for training sessions, and other documents and tools. For questions that cannot be answered through the Web site, please contact us at: ghgmrr@epa.gov.