# Municipal Solid Waste Landfills

**Subpart HH, Greenhouse Gas Reporting Program**

*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 per the requirements of 40 CFR Part 98 Subpart HH – Municipal Solid Waste Landfills.*

## 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 ($CH_4$) in amounts equivalent to 25,000 metric tons of carbon dioxide equivalent ($CO_2e$) or more per year. This definition is based on the amount of $CH_4$ *generated* (adjusted for soil oxidation, but not considering whether any gas is collected and destroyed) and not the amount of $CH_4$ 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, Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste, Toxic Substances Control Act (TSCA) hazardous waste, or construction and demolition landfills.

## What Greenhouse Gases Must Be Reported?

MSW landfill owners and operators must report:

- Annual modeled $CH_4$ generation and $CH_4$ emissions from the landfill.
- Annual $CH_4$ destruction resulting from landfill gas collection and combustion systems (for landfills which have these systems).
- Annual $CO_2$, $CH_4$, and nitrous oxide ($N_2O$) 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 Greenhouse Gas Emissions Be Calculated?

All MSW landfills must calculate modeled annual $CH_4$ generation based on:

- Measured or estimated values of historic annual waste disposal quantities; and
- Appropriate values for model inputs (i.e., degradable organic carbon (DOC) for each waste stream reported, DOC fraction in the landfill of each waste stream, $CH_4$ 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 $CH_4$ generation to account for soil oxidation ($CH_4$ that is converted to $CO_2$ as it passes through the landfill cover before being emitted) using one of the default soil oxidation factors. The resulting value represents both $CH_4$ generation (adjusted for oxidation) and $CH_4$ emissions.

Facilities that collect and control landfill gas must calculate the annual quantity of $CH_4$ recovered and destroyed based on continuous monitoring of gas flow rate and continuous or weekly monitoring of $CH_4$

concentration, temperature, pressure, and moisture content of the collected gas prior to the destruction device. $CH_4$ destruction efficiency must be based on the manufacturer's specified efficiency or 99 percent, whichever is less.

These facilities that collect and control landfill gas must then calculate $CH_4$ emissions in two ways and report *both* results. Emissions must be calculated by:

(1) Subtracting the measured amount of $CH_4$ recovered from the modeled annual $CH_4$ generation (with adjustments for soil oxidation and destruction efficiency of the destruction device).
(2) Applying a gas collection efficiency to the measured amount of $CH_4$ recovered to account for $CH_4$ 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: https://www.epa.gov/ghgreporting/subpart-hh-checklist.

## 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 the method used to estimate it.
- Waste composition for each year of landfilling in percent by weight.
- Values of all parameters used in the methane generation calculations, including degradable organic carbon (DOC) and decay rate constant (k).
- Fraction of $CH_4$ in landfill gas and how this fraction was determined (measured or default values).
- Surface area of the landfill containing waste and cover types used.
- Annual modeled $CH_4$ generation.
- Annual $CH_4$ generation adjusted for oxidation (which equated to $CH_4$ emissions for landfills without gas collection), the oxidation fraction used in the calculation and whether passive vents or passive flares are present at the landfill.

For landfills with gas collection systems, report:

- Total volumetric flow of landfill gas collected for destruction, annual average $CH_4$ concentration, monthly average temperature, pressure and moisture content, if required.
- An indication if destruction occurs at the facility, off-site, or both. If destruction occurs at the facility, the number of destruction devices associated with each measurement location and the annual operating hours of the gas collection system associated with that measurement location. For each destruction device associated with a measurement location, the destruction efficiency and the annual operating hours where active gas flow was sent to the destruction device.
- Annual quantity of $CH_4$ recovered.
- Description of the gas collection system (manufacture, capacity, number of wells, etc.), surface area, waste depth and cover type for areas within the landfill.
- The gas collection efficiency used in emissions calculations.

- Annual $CH_4$ generation adjusted for oxidation and the oxidation fraction used in the calculation.
- $CH_4$ emissions calculated using each of the two estimation methods described above and the oxidation fractions used with each method.
- Annual facility $CH_4$ emissions for the subpart. (Facilities with landfill gas collection systems must choose which of the $CH_4$ emissions from the two estimation methods best represents emissions from the landfill.)

## When and How Must Reports Be Submitted?

Annual reports must be submitted by March 31 of each year, unless the 31st is a Saturday, Sunday, or federal holiday, in which case the reports are due on the next business day. Annual reports must be submitted electronically using the electronic Greenhouse Gas Reporting Tool (e-GGRT), the GHGRP's online reporting system. Additional information on setting up user accounts, registering a facility and submitting annual reports is available at https://ccdsupport.com/confluence/.

## When Can a Facility Stop Reporting?

There are several scenarios under which a facility may discontinue reporting. These scenarios are summarized in the Subpart A Information Sheet as well as in an FAQ.

## For More Information

For additional information on Subpart HH, visit the Subpart HH Resources webpage. For additional information on the Greenhouse Gas Reporting Program, visit the Greenhouse Gas Reporting Program Website, which includes information sheets on other rule subparts, data previously reported to the Greenhouse Gas Reporting Program, training materials, and links to frequently asked questions.

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 Greenhouse Gas Reporting Program.