

Landfill Gas Emissions Reporting Methane Generation Rate



State of Oregon
Department of
Environmental
Quality

On Oct. 1, 2021, the Environmental Quality Commission approved new Landfill Gas Emission rules as Oregon Administrative Rule 340 Division 239 (OAR 340-239). Owners or operators of landfills with greater than or equal to 200,000 tons of waste-in-place are required to submit annual Waste-in-Place (in tons) and Methane Generation Rate (in metric tons methane per year) reports to DEQ.

This guidance document provides additional information and resources for calculating the Methane Generation Rate.

Equations

OAR 340-239-0800 requires some landfills to calculate their methane generation rate. This will usually be completed using the equations provided in 40 CFR 98.343 or 98.463 (Equations HH-1 and TT-1). This equation is as follows:

$$G_{CH_4} = \left[\sum_{x=S}^{T-1} \left\{ W_x \times DOC_x \times MCF \times DOC_F \times F \times \frac{16}{12} \times \left(e^{-k(T-x-1)} - e^{-5(T-x)} \right) \right\} \right]$$

where:

G_{CH_4} = Modeled methane generation rate in reporting year T (metric tons CH_4).

x = Year in which waste was disposed.

S = Start year of calculation. Use the year 1960 or the opening year of the landfill, whichever is more recent.

T = Reporting year for which emissions are calculated.

W_x = Quantity of waste disposed in the landfill in year x from measurement data, tipping fee receipts, or other company records (metric tons, as received (wet weight)).

MCF = Methane correction factor (fraction). Use the default value of 1 unless there is active aeration of waste within the landfill during the reporting year. If there is active aeration of waste within the landfill during the reporting year, use either the default value of 1 or select an alternative value no less than 0.5 based on site-specific aeration parameters.

DOC = Degradable organic carbon from Table HH-1 of this subpart [fraction (metric tons carbon/metric ton waste)].

DOC_F = Fraction of DOC dissimilated (fraction). Use the default value of 0.5.

F = Fraction by volume of CH_4 in landfill gas from measurement data for the current reporting year, if available (fraction, dry basis, corrected to 0% oxygen); otherwise, use the default of 0.5.

k = Rate constant from Table HH-1 to this subpart (yr^{-1}). Select the most applicable k value for the majority of the past 10 years (or operating life, whichever is shorter).

Table HH-1 or TT-1 can be found at the links below:

Table HH-1: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-HH/appendix-Table%20HH-1%20to%20Subpart%20HH%20of%20Part%2098>

Table TT-1: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-TT/appendix-Table%20TT-1%20to%20Subpart%20TT%20of%20Part%2098>

Using Spreadsheets

EPA provides spreadsheets to help calculate the greenhouse gas emissions for equations HH-1 or TT-1. These spreadsheets are available at the link below and may be used to complete the Methane Generation Rate calculation. Scroll down to HH-1 for Municipal Solid Waste Landfills and TT-1 for Industrial Waste Landfills.

<https://ccdsupport.com/confluence/display/help/Optional+Calculation+Spreadsheet+Instructions>

Alternative formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

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