

Chapter 173-408 WAC
Landfill Methane Emissions

GENERAL REQUIREMENTS

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WAC 173-408-020 Applicability

Except as exempted in Chapter 173-408-030 WAC, this chapter applies to:

- (a) All municipal solid waste (MSW) landfills that received solid waste after January 1, 1992.

WAC 173-408-030 Exemptions

- (1) This chapter does not apply to the following landfills:
 - (a) Landfills that receive only hazardous waste(s)
 - (b) “CERCLA regulated landfill” as defined in section 173-408-040, if it meets the criteria for exemption set forth in subsection (3) of this section
 - (c) Landfills that receive only “inert waste or non-decomposable waste(s)” as defined in section 173-408-040
- (2) CERCLA exemption process:

This subsection establishes the process for an owner or operator of a “CERCLA regulated landfill”, as defined in Chapter 173-408-040 WAC, to claim an exemption from the requirements of this chapter.

To claim exemption from the requirements of this chapter, the owner or operator of a CERCLA regulated landfill shall submit the following information to the department:

- (a) The applicable CERCLA removal action memorandum or remedial action record of decision, including any amendments.
 - (b) A map of the portion of the landfill that has been designated as on-site for purposes of the CERCLA response action.
 - (c) Additional information as needed to establish that the CERCLA regulated landfill meets the criteria for exemption set forth in subsection (3) of this section.
- (3) (a) The department will review the submitted information and determine whether the CERCLA regulated landfill meets the following criteria for exemption from the requirements of this chapter:
 - (i) The CERCLA response action(s) must be currently under way at the CERCLA regulated landfill;

- (ii) The owner or operator must demonstrate that complying with the requirements of this chapter would compromise the efficacy of the ongoing CERCLA response action(s);
 - (iii) The CERCLA response action(s) must require the installation or modification of a landfill gas collection and control system (GCCS); and
 - (iv) The owner or operator must demonstrate that the GCCS influences methane capture in the landfill.
- (c) The department may consult with the U.S. Environmental Protection Agency in the course of determining whether the CERCLA regulated landfill meets the above criteria for exemption from the requirements of this chapter.
- (d) For zones or areas of a municipal solid waste landfill that are adjacent to but outside the area designated as on-site for purposes of the CERCLA response action(s), the substantive requirements of this chapter shall be considered as applicable or relevant and appropriate requirements (ARARs) in the selection of a removal or remedial action, and in evaluations of a removal or remedial action's compliance with ARARs during any subsequent five-year reviews required by CERCLA.

WAC 173-408-040 Definitions

When used in this chapter, the following terms have the meanings given below. These definitions should not be interpreted to apply to any other chapter unless expressly provided for therein.

Ecology will pull definitions from the statute and add new definitions as needed.

"Active municipal solid waste (MSW) landfill" means a municipal solid waste landfill that has accepted or is accepting solid waste for disposal and has not been closed in accordance with the requirements set forth in WAC 173-351-500 as it existed on January 10, 2022.

"Air pollution" is presence in the outdoor atmosphere of one or more air contaminants in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interfere with enjoyment of life and property. For the purpose of this chapter, air pollution does not include air contaminants emitted in compliance with Chapter 17.21 RCW.

"Ambient air" means the surrounding outside air.

"CERCLA regulated landfill" means the portion of a municipal solid waste landfill that has been designated as on-site for purposes of a CERCLA response action(s).

"CERCLA response action" means a removal or remedial action conducted pursuant to 42 U.S.C. Sections 9604, 9606, 9620, 9621, or 9622.

“Closed municipal solid waste landfill” means a municipal solid waste landfill that is no longer accepting solid waste for disposal and has been closed in accordance with the requirements set forth in [WAC 173-351-500](#) as it existed on January 10, 2022.

“Component” means any equipment that is part of the gas collection and control system and that contains landfill gas including, but not limited to, wells, pipes, flanges, fittings, valves, flame arrestors, knock-out drums, sampling ports, blowers, compressors, or connectors.

“Component leak” means the concentration of methane measured one half of an inch or less from a component source that exceeds 500 parts per million by volume (ppmv), other than non-repeatable, momentary readings. Measurements from any vault must be taken within 3 inches above the surface of the vault exposed to the atmosphere.

“Continuous operation” means that the gas collection and control system is operated continuously, the existing gas collection wells are operating under vacuum while maintaining landfill gas flow, and the collected landfill gas is processed by a gas control system 24 hours per day.

"Department" means the department of ecology.

“Destruction efficiency” means a measure of the ability of a gas control device to combust, transform, or otherwise prevent emissions of methane from entering the atmosphere.

“Emission” means a release of air contaminants into the ambient air.

“Energy recovery device” means any combustion device that uses landfill gas to recover energy in the form of steam or electricity, including, but not limited to, gas turbines, internal combustion engines, boilers, and boiler-to-steam turbine systems.

“Exceedance” means the concentration of methane measured within 3 inches above the landfill surface that exceeds 500 ppmv, other than non-repeatable, momentary readings, as determined by instantaneous surface emissions monitoring; or the average methane concentration measurements that exceed 25 ppmv, as determined by integrated surface emissions monitoring.

“Facility” means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

“Facility boundary” means the boundary surrounding the entire area on which MSW landfill activities occur and are permitted.

"Gas collection system" means any system that employs various gas collection wells and connected piping, and mechanical blowers, fans, pumps, or compressors to create a pressure gradient and actively extract landfill gas.

"Gas control device" means any device used to dispose of or treat collected landfill gas including, but not limited to, enclosed flares, internal combustion engines, boilers and boiler-to-steam turbine systems, fuel cells, and gas turbines.

"Gas control system" means any system that disposes of or treats collected landfill gas by one or more of the following means: Combustion; gas treatment for subsequent sale, or sale for processing offsite, including for transportation fuel and injection into a natural gas pipeline.

"Heat input capacity (HIC)" means the hourly heat content available on a steady state basis in the form of landfill gas generated from a landfill's waste source material.

"Inert waste or non-decomposable waste(s)" has the same meaning as "inert waste" in WAC 173-350-100.

"Landfill" means a disposal facility or part of a facility at which solid waste is permanently placed in or on land including facilities that use solid waste as a component of fill.

"Landfill gas" means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in a MSW landfill, from the evolution of volatile species in the waste, or from chemical reactions of substances in the waste.

"Landfill surface" means the area of the landfill under which decomposable solid waste has been placed, excluding the working face.

"Municipal solid waste (MSW)" means a subset of solid waste which includes unsegregated garbage, refuse and similar solid waste material discarded from residential, commercial, institutional, and industrial sources and community activities, including residue after recyclables have been separated. Solid waste that has been segregated by source and characteristic may qualify for management as a non-MSW solid waste, at a facility designed and operated to address the waste's characteristics and potential environmental impacts. The term MSW does not include:

(a) Dangerous wastes other than wastes excluded from the requirements of chapter 173-303 WAC, Dangerous waste regulations, in WAC 173-303-071 such as household hazardous wastes;

(b) Any solid waste, including contaminated soil and debris, resulting from response action taken under section 104 or 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. 9601), chapter 70.105D RCW, Hazardous waste cleanup—Model Toxics Control Act, chapter 173-340 WAC, Model Toxics Control Act—Cleanup, or a remedial action taken under those statutes and rules; nor

(c) Mixed or segregated recyclable material that has been source-separated from garbage, refuse and similar solid waste. The residual from source separated recyclables is MSW.

“Municipal solid waste landfill” means a discrete area of land or an excavation that receives household waste and that is not a land application site, surface impoundment, injection well, or pile.

“Non-repeatable, momentary readings” means indications of the presence of methane, which persist for less than five seconds and do not recur when the sampling probe of a portable gas detector is placed in the same location.

“On-site” has the same meaning as set forth in 40 C.F.R. 300.400(e)(1).

"Person" means an individual, firm, public or private corporation, association, partnership, political subdivision of the state, municipality, or governmental agency.

“Solid waste” means all putrescible and non-putrescible solid and semisolid wastes including, but not limited to garbage, rubbish, ashes, industrial wastes, commercial waste, swill, sewage sludge, demolition, and construction wastes, abandoned vehicles or parts thereof, discarded commodities and recyclable materials.

“Working face” means the open area where solid waste is deposited daily and compacted with landfill equipment.

WAC 173-408-050 Waste in place reporting

- (1) Each owner or operator of an active MSW landfill having fewer than 450,000 tons of waste in place must submit an annual waste in place report pursuant to Chapter 173-408-110(2)(b) WAC until either;
 - (a) The active MSW landfill reaches a size of greater than or equal to 450,000 tons.
 - (b) The owner/operator submits a closure notification pursuant to Chapter 173-408-110(2)(f) WAC.

WAC 173-408-060 Landfill gas heat input capacity (HIC)

- (1) Each owner or operator of an active MSW landfill having greater or equal than 450,000 tons of waste in place or a closed MSW landfill having greater than or equal to 750,000 tons of waste in place must submit an annual landfill gas heat input capacity (HIC) report pursuant to Chapter 173-408-110(2)(c) WAC until either;
 - (a) The MSW landfill reaches a HIC of greater than or equal to 3,000,000 British thermal units per hour recovered.
 - (b) The owner/operator submits a closure notification pursuant to Chapter 173-408-110(2)(f) WAC.
- (2) MSW landfills that have reached a HIC of greater than or equal to 3,000,000 British thermal units per hour recovered must either;
 - (a) Meet the requirements of _____, or;
 - (b) Demonstrate that after four consecutive quarterly monitoring periods there is no measured concentration of 200 parts per million by volume or greater of methane using the instantaneous surface monitoring procedures specified in

_____. If there is no measured concentration of 200 parts per million by volume or greater of methane, then the following apply;

- (i) The owner or operator of an active MSW landfill must recalculate the HIC annually as required in (b) of this subsection, until such time that the owner or operator submits a closure notification pursuant to section Chapter 173-408-100(2)(f) WAC.
 - (ii) The owner or operator of a closed MSW landfill no longer has to comply with the requirements of this chapter, provided that the following information is submitted and approved;
 - (A) A waste in place report pursuant to Chapter 173-408-110(2)(b) WAC.
 - (B) All instantaneous surface monitoring records.
- (3) *Determination of Landfill HIC:* The landfill gas heat input capacity must be determined pursuant to sections 173-408-060(a), 173-408-060(b), or 173-408-060(c), as applicable:
- (a) *MSW Landfills without Carbon Adsorption or Passive Venting Systems:* The heat input capacity must be calculated using the procedure as specified in _____. Additional information may be requested as necessary to verify the heat input capacity from the MSW landfill. Site-specific data may be substituted when available.
 - (b) *MSW Landfills with Carbon Adsorption Systems:* The landfill gas heat capacity must be determined by measuring the actual total landfill gas flow rate, in standard cubic feet per minute (scfm), using a flow meter or other flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of _____. The total landfill gas flow rate must be multiplied by the methane concentration and then multiplied by the gross heating value (GHV) of methane of 1,012 Btu/scf to determine the landfill gas heat input capacity.
 - (c) *MSW Landfills with Passive Venting Systems:* The landfill gas heat input capacity must be determined pursuant to both of the following and is the higher of those determined values:
 - (i) Section 173-408-060(3)(a); and
 - (ii) The owner or operator must measure actual landfill gas flow rates (in units of scfm) by using a flow measuring device such as a standard pilot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of _____ from each venting pipe that is within the waste mass. Each gas flow rate must then be multiplied by its corresponding methane concentration to obtain the individual methane flow rate. The individual methane flow rates must be added together

and then multiplied by the GHV of methane of 1,012 Btu/scf to determine the landfill gas heat input capacity.

WAC 173-408-110 Recordkeeping and reporting requirements.

(1) *Recordkeeping requirements:* The owner or operator of a municipal solid waste landfill must maintain records as prescribed in this section. The records must be provided by the owner or operator within five business days of a request. Records must be kept at a location within the State of Washington.

- (a) An owner or operator must maintain the following records for at least five years:
 - (i) All gas collection system downtime exceeding five calendar days, including individual well shutdown and disconnection times, and the reason for the downtime.
 - (ii) All gas control system downtime in excess of one hour, the reason for the downtime, and the length of time the gas control system was shutdown.
 - (iii) Expected gas generation flow rate calculated pursuant to section _____.
 - (iv) Records of all instantaneous surface readings of 200 ppmv or greater; all exceedances of the limits in section _____, including the location of the leak (or affected grid), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitored concentration in ppmv, and wind speed during surface sampling; and the installation date and location of each well installed as part of a gas collection system expansion.
 - (v) Records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken.
 - (vi) Annual solid waste acceptance rate and the current amount of waste-in-place.
 - (vii) Records of the nature, location, amount, and date of deposition of non-decomposable waste for any landfill areas excluded from the collection system.
 - (viii) Results of any source tests conducted pursuant to section _____.
 - (ix) Records describing the mitigation measures taken to prevent the release of methane or other emissions into the atmosphere:
 - (A) When solid waste was brought to the surface during the installation or preparation of wells, piping, or other equipment;
 - (B) During repairs or the temporary shutdown of gas collection system components; or,
 - (C) When solid waste was excavated and moved.
 - (x) Records of the equipment operating parameters specified to be monitored under sections _____ and _____ as well as records for periods of operation during which the parameter boundaries established during the most recent source test are exceeded. The records must

include the following information:

- (A) For enclosed flares, all 3-hour periods of operation during which the average temperature difference was more than 28 degrees Celsius (or 50 degrees Fahrenheit) below the average combustion temperature during the most recent source test at which compliance with sections _____ and _____ was determined.
 - (B) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone pursuant to section _____.
 - (C) For any owner or operator who uses a boiler or process heater with a design heat input capacity of 44 megawatts (150 MMBtu/hr) or greater to comply with section _____, all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other federal, State, local, or tribal regulatory requirements).
- (xi) Records of any disturbance or removal of areas of the landfill surface where the landfill cover material has been removed for the purpose of installing, expanding, replacing, or repairing components of the landfill cover system, the landfill gas collection and control system, the leachate collection and removal system, or a landfill gas condensate collection and removal system. The records must contain the following information:
- (A) A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.
 - (B) Disturbance or removal start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.
 - (C) A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.
- (xii) Records of any construction activities pursuant to section _____. The records must contain the following information:
- (A) A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.
 - (B) Construction start and finish dates, and projected shut down times for individual gas collection system components.

- (C) A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.
- (xiii) Records of any active mining activities as defined in section _____. The records must contain the following information:
 - (A) A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.
 - (B) Active mining start and finish dates, and projected shut down times for individual gas collection system components.
 - (C) A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.
- (xiv) Records of any law enforcement activities as defined in section _____. The records must contain the following information:
 - (A) A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.
 - (B) Law enforcement activity start and finish dates, and projected shut down times for individual gas collection system components.
 - (C) A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.
- (b) The owner or operator must maintain the following records for the life of each gas control device, as measured during the initial source test or compliance determination:
 - (i) The control device vendor specifications
 - (ii) The expected gas generation flow rate as calculated pursuant to section _____.
 - (iii) The percent reduction of methane achieved by the control device determined pursuant to section _____.
 - (iv) For a boiler or process heater, the description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time-period of the performance test.
 - (v) For an open flare: the flare type (i.e., steam-assisted, air-assisted, or non-assisted); all visible emission readings, heat content determination, flow

rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in 40 CFR § 60.18 (as last amended 73 Fed.Reg. 78209 (December 22, 2008), which is incorporated by reference herein; and records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame or the flare flame is absent.

- (2) *Reporting Requirements:* The owner or operator of a municipal solid waste landfill must prepare reports as prescribed in this section. Reports must be kept at a location within the State of Washington.
- (a) *Annual Report:* The owner or operator of a municipal solid waste landfill must prepare the following reports as required pursuant to subsections (a) through (e) of this section. The reports must be prepared for the period of January 1st through December 31st of each year and be submitted as part of an annual report on April 1st of the subsequent year. In each report the following information must be included:
- (i) MSW landfill name, owner and operator, address, and Facility/Site ID (FS ID) number.
 - (ii) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.
- (b) *Waste in Place Report:* Any owner or operator of a MSW landfill subject to the requirements of Chapter 173-408-050 WAC must report the following information:
- (i) The landfill's status (active or closed), and the estimated waste-in-place, in tons.
- (c) *Landfill Gas Heat Input Capacity Calculation:* Any owner or operator subject to the requirements of Chapter 173-408-060(1) WAC must calculate the landfill gas heat input capacity using the procedures specified in _____. The report must be submitted within 90 days of the effective date of this chapter or upon reaching 450,000 tons of waste-in-place for active MSW landfills.
- (d) *Quarterly Instantaneous surface monitoring:* Any owner or operator who conducts instantaneous surface emissions monitoring pursuant to _____ must provide the following information:
- (i) Date of monitoring.
 - (ii) Location of monitoring.
 - (iii) Measured concentration of methane in ppmv.

- (e) *GCCS operations:* Any owner or operator of a MSW landfill that has a gas collection and control system must report following:
 - (i) Total volume of landfill gas collected (reported in standard cubic feet).
 - (ii) Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).
 - (iii) Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.
 - (iv) The date that the gas collection and control system was installed and in full operation.
 - (v) The percent methane destruction efficiency of each gas control device(s).
 - (vi) Type and amount of supplemental fuels burned with the landfill gas in each device.
 - (vii) Total volume of landfill gas shipped off-site, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.
- (f) *Closure Notification Report:* The owner or operator of a municipal solid waste landfill that ceases to accept waste must submit a closure notification within 30 days of ceasing to accept waste.
 - (i) The closure notification must include the last day solid waste was accepted, the anticipated closure date of the MSW landfill, and the estimated waste-in-place.
 - (ii) If a MSW landfill with greater than or equal to 450,000 tons of waste in place submits a closure notification pursuant to this section, the owner or operator of the landfill must submit a 30-year projection of their estimated heat input capacity calculation as part of this report.
 - (iii) Additional information may be requested as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable federal, State, local, or tribal statutes, regulations, and ordinances in effect at the time of closure.
 - (iv) If a closure report has been submitted, no additional wastes may be placed into the landfill without filing a notification.
- (g) *Equipment Removal Report:* The owner or operator of a municipal solid waste landfill must submit a gas collection and control system equipment removal report within 30 days of well capping or the removal or cessation of operation of the gas collection, treatment, or control system equipment. The report must contain the following information:
 - (i) A copy of the Closure Notification Report submitted pursuant to Chapter 173-408-110(2)(f) WAC.

- (ii) A copy of the initial source test report, pursuant to section _____, or other documentation demonstrating that the gas collection and control system has been installed and operated for a minimum of 15 years, unless the owner or operator can demonstrate that due to declining methane rates the landfill is unable to operate the gas collection and control system for a 15-year period.
 - (iii) Instantaneous or integrated emissions monitoring results needed to verify that landfill surface methane concentration measurements do not exceed the limits specified in section _____ after equipment removal.
- (h) Any report, or information submitted pursuant to this subsection must contain certification by a responsible official of truth, accuracy, and completeness. This certification, and any other certification required under this section, must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.