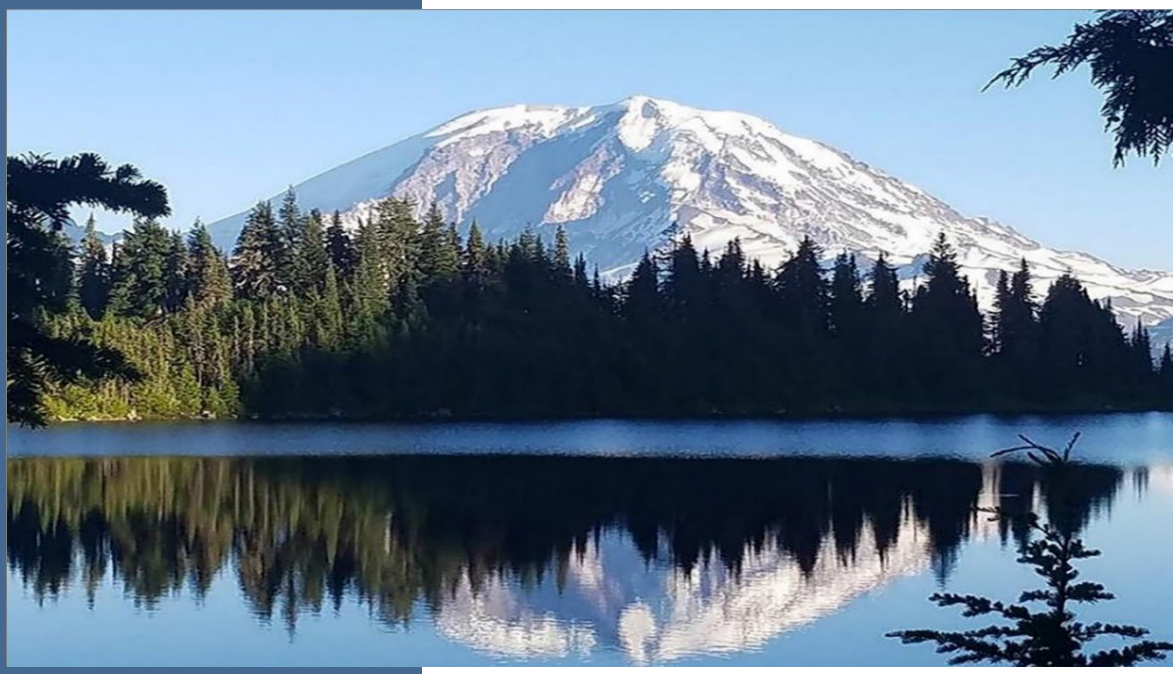

Draft Implementation Guidance Document

Chapter 173-408 WAC, Landfill Methane Emissions

Air Quality Program
Washington State Department of Ecology
Olympia, Washington

April 2025

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Website[1]: Washington State Department of Ecology

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[1] www.ecology.wa.gov/contact

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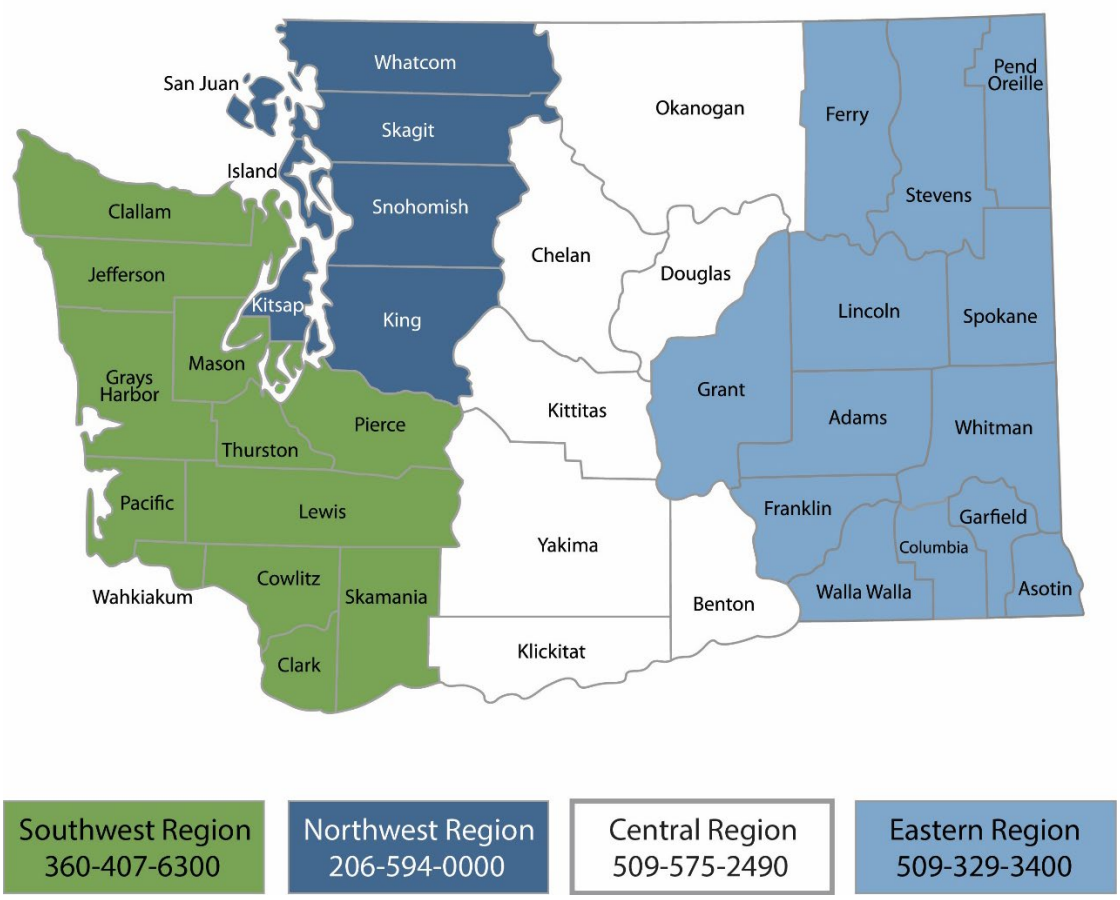
Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

Draft Implementation Guidance Document: Landfill Methane Emissions Rule

Chapter 173-408 WAC
Landfill Methane Emissions

Air Quality Program
Washington State Department of Ecology
Olympia, WA

April 2025

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Acronyms

Btu/hr:	British Thermal Units per hour
CFR:	Code of Federal Regulations
CO_2:	Carbon Dioxide
EG:	Emission Guidelines
GCCS:	Gas Collection and Control System
HIC:	Heat Input Capacity
m^3:	Cubic Meters
Mg:	Megagrams
MSW:	Municipal Solid Waste
NMOC:	Non-Methane Organic Compound
NSPS:	New Source Performance Standards
O/Os:	Owners or Operators
Ppm:	Parts Per Million
Ppmv:	Parts Per Million Volume
SEM:	Surface Emissions Monitoring
SMDP:	Surface Monitoring Design Plan
VOC:	Volatile Organic Compounds
WAC:	Washington Administrative Code
WIP:	Waste in Place

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Organization of this document

This document is organized into three parts and one appendix. Part 1 (Introduction) states the purpose of developing this document; provides background information on methane generation from MSW landfills; and provides a summary of the benefits of the adopted rule.

Part 2 (Comparison of Requirements) compares the landfill methane rule's requirements with existing federal requirements. This comparison can be found in Table 1. It is important to note that MSW landfills impacted by this rule should work with their local clean air agency[2] to ensure compliance with all permitting requirements enacted by the jurisdictional authority. This guidance document is only meant to assist with this in the context of the new state rule and is not meant to provide guidance on how MSW landfills should comply with their jurisdictional air authority's requirements.

Part 3 (Regulatory Requirements) provides guidance on certain requirements of the rule. This part is intended to provide clarification on any requirements of the rule that are not explicitly written into it. Each section is followed up with questions and answers specific to the section of the rule. Some of these questions have already been directed to Ecology, and others are questions that Ecology anticipates having to clarify in the future as we implement the authorizing law and this rule.

Lastly, Appendix A provides a copy of the rule.

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[2] https://ecology.wa.gov/About-us/Accountability-transparency/Partnerships-committees/Clean-air-agencies

Part 1: Introduction

Purpose of this document

The purpose of this document is to assist owners or operators of municipal solid waste (MSW) landfills in complying with the requirements of Chapter 173–408 WAC – Landfill Methane Emissions[3] (this rule). This document may also benefit local clean air agencies that will implement and enforce requirements of this rule. This rule was developed to reduce methane emissions from MSW landfills. The Washington Department of Ecology (Ecology) adopted this rule on May 13, 2024, and the rule became effective on June 13, 2024.

It is important to note that the guidance offered in this document is to assist in compliance of the rule, however this document is not a part of the authorizing law, codified as Chapter 70A.540[4], or a part of the rule, Chapter 173-408 WAC[5]. Appendix A, starting on page 78, provides a full copy of the rule.

Background

Methane gas is generated at municipal solid waste (MSW) landfills when organic material is broken down in the absence of oxygen – a process called anaerobic decomposition. MSW landfills accept many different types of organic materials that generate methane when they decompose, including food waste, yard waste and paper products. Methane typically represents about 50% of a landfill gas stream, with CO_2 making up around the other 50%, and many other types of gases being present in small quantities.

Landfill gas contributes to climate change when it escapes the landfill and enters the atmosphere. Methane is a potent greenhouse gas that has more than 80 times the global warming potential of CO_2 over a 20-year period.[6] Methane is also short-lived atmospheric gas, because of this, as well as its potency as a greenhouse gas, the Intergovernmental Panel on Climate Change has noted that reducing methane emissions is one of the best strategies for mitigating the impacts of climate change in the near term.

According to the EPA, MSW landfills are the third-largest source of human-related methane emissions in the United States, accounting for approximately 14.4 percent of these emissions in 2022.[7] MSW landfills are also one of the largest sources of methane in Washington State. This rule implements more protective standards for methane emissions than are currently required under the federal Clean Air Act, resulting in the capture of more methane from MSW landfills across the state.

The rulemaking created a new chapter in the Washington Administrative Code (WAC), Chapter 173-408 WAC – Landfill Methane Emissions[8]. This new chapter implements Reducing Methane Emissions from Landfills (Engrossed Second Substitute House Bill 1663, Chapter 179, Laws of 2022, codified as Chapter 70A.540 RCW).

[3] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408
[4] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.540&full=true
[5] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408
[6] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07_SM.pdf
[7] https://www.epa.gov/lmop/basic-information-about-landfill-gas
[8] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408

It covers closed, inactive[9], and active municipal solid waste (MSW) landfills that have received solid waste after January 1, 1992.

As a result of this rulemaking, Washington State has joined California, Oregon, Maryland and Michigan in adopting more protective standards than federal law for reducing methane emissions from MSW landfills.

Benefits of adopted rule

This rule provides benefits in the form of decreased emissions of methane. The economic analyses[10] accompanying the rulemaking referenced California's Landfill Methane control regulation, where collection and beneficial use of landfill methane as energy increased by 5%, and collection and conversion to less potent greenhouse gases by flaring increased by 33%. Following these percentages and based on the past five years of data for methane captured in Washington, Ecology estimates an increase of roughly 20,000 metric tons (560,000 metric tons of CO2 equivalent) of methane will be controlled annually as this rule is implemented.

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[9] See definition of "inactive municipal solid waste landfill" here: https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-020
[10] https://apps.ecology.wa.gov/publications/SummaryPages/2402010.html

Part 2: Comparison of Requirements

Below is a side-by-side comparison table of some existing federal New Source Performance Standards and Emissions Guidelines (NSPS/EG) requirements for MSW landfills to this rule's requirements.

This table serves to provide local clean air agencies that administer these regulations (through permitting or other avenues), and MSW landfills that currently comply with these requirements, information on how the new rule's requirements differ from existing federal regulations. Any row on the table that notes "no similar requirement" means that there is no specific requirement in one of the regulations that is like the other.

This table does not provide an exhaustive list of each requirement, and the information herein should not be used to meet compliance with the rule.

Table 1. Comparison of Existing Federal Requirements and the Landfill Methane Rule

Requirements	NSPS/EG[11]	Landfill Methane Rule
Baseline Applicability	Landfill accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition; and Landfill commenced construction, reconstruction, or modification on or after May 30, 1991, but before July 17, 2014.	All MSW landfills that received solid waste after January 1, 1992.
Initial Design Capacity/ Waste in Place Reporting	MSW landfills with < 2.5 million megagrams (Mg) (2.75 million tons) by mass or < 2.5 million cubic meters (m^3) by volume design capacity must submit initial design capacity report.	All MSW landfills that received solid waste after January 1, 1992, must submit initial waste in place report.
Exempt from further rule requirements	MSW landfills that submitted < 2.5 million Mg (2.75 million tons) by mass or <2.5 million m^3 by volume design capacity report.	Closed MSW landfills that reported <750,000 tons of waste in place (WIP).
Exempt from initial NMOC emission rate /Heat Input Capacity Reporting	MSW landfills that submitted < 2.5 million Mg (2.75 million tons) by mass or <2.5 million m^3 by volume design capacity report.	Active MSW landfills that reported < 450,000 tons of WIP.

[11] https://www.epa.gov/stationary-sources-air-pollution/municipal-solid-waste-landfills-new-source-performance-standards

Initial NMOC emission rate /Heat Input Capacity Reporting	MSW landfills that submitted ≥ 2.5 million Mg (2.75 million tons) by mass or ≥ 2.5 million m^3 by volume design capacity report.	Active MSW landfills that reported ≥ 450,000 tons of WIP. Closed landfills that reported ≥ 750,000 tons of WIP.
Installation of a Gas Collection and Control System (GCCS)	Active landfills with reported NMOC emission rate of ≥ 34 Mg per year, or closed landfills with reported NMOC emissions rate of ≥ 50 Mg per year, or Tier 4 surface emissions monitoring shows surface emission concentration of 500 parts per million (ppm) methane or greater.	Active and closed MSW landfills with reported heat input capacity of 3.0 million British thermal units per hour (btu/hr) recovered; or Surface emissions monitoring (SEM) shows any leak of ≥ 200 parts per million by volume (ppmv) methane.
Demonstration to preclude installation of a GCCS	Tier 1 – 3 emissions calculations demonstrating < 34 Mg per year. Tier 4 monitoring (only if Tiers 1 and 2 indicate NMOC emissions of < 50 Mg per year) that demonstrates < 500 ppm of methane from the surface of the landfill.	Installation of GCCS is not required if active and closed MSW landfills can demonstrate <200 ppmv of methane from surface of the landfill, over four consecutive quarterly instantaneous SEM periods.
Design plan submittal[12]	Submit a GCCS design plan within 1 year of submitting a NMOC emission rate of ≥ 34 Mg per year for active landfills, and ≥ 50 Mg per year for closed landfills (unless landfill decides to demonstrate via Tier 1 – 4 that emission rate is lower).	Submit a GCCS design plan within one year of the effective date of the rule (by 6/13/2025), or within one year of detecting any leak on the landfill surface of > 200 ppmv of methane via SEM.
Timeline for installation of a GCCS	Install and startup a GCCS within 30 months after the first NMOC emission rate report shows ≥ 34 Mg per year, for active landfills, and ≥ 50 Mg per year for closed landfills, unless Tier 2 or 3	Active MSW landfills must install and operate a GCCS not later than 18 months after date of compliance of rule (by 12/13/2025).[13]

[12] For landfills without an active collection and control system already installed.

[13] Date of compliance in this case is the effective date of the rule (6/13/2024), unless a landfill decides to demonstrate low surface methane concentration (< 200 ppmv) via SEM or is approved for an alternative compliance measure. This is discussed in more detail on page 45 in the answer to question 3.

	sampling shows emission rate < 34 Mg or < 50 Mg, respectively.	Closed MSW landfills must install and operate a GCCS not later than 30 months after date of compliance of rule (12/13/2026).[14]
Amending a design capacity report/ plan	An amended design capacity report must be submitted providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to meet or exceed 2.5 million Mg and 2.5 million m^3.	An amended design plan must be submitted to the department or local clean air agency within 90 days of any event that warrants a change to the design plan.
Active gas collection	Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade.	Demonstrate how the GCCS will handle the expected gas generation flow rate[15] from the entire area of the MSW landfill and collect gas at an extraction rate to comply with the surface methane emission limits.[16] The GCCS must be operated, maintained, and expanded in accordance with the procedures and schedules in the approved design plan.
Open flares	A non-enclosed flare designed and operated in accordance with the parameters established in § 60.18[17], and reduction of NMOC by 98 weight %.	The open flare must meet the requirements of 40 C.F.R. 60.18 and achieve a methane destruction efficiency of at least 99 % by weight. An open flare installed and operating prior to December 31, 2022, may operate until January 1, 2032.[18]
Enclosed flares	Reduce NMOC by 98 weight % or reduce the outlet NMOC concentration to less than 20 ppmv, dry basis as hexane at 3 percent oxygen or less.	Achieve a methane destruction efficiency of at least 99 % by weight.

[14] Same conditions apply for closed MSW landfills.
[15] The expected gas generation flow rate must be determined using the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, using a recovery rate of 75 percent.
[16] < 500 ppmv as determined by instantaneous SEM, or an average of 25 ppmv as determined by integrated SEM.
[17] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-A/section-60.18
[18] Unless landfill can demonstrate that heat input capacity is < 3.0 million btu/hr recovered.

		Must be equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors. During restart or startup there must be sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the ambient air.
Gas control temperature monitoring	A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater.	A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) one percent of the temperature being measured expressed in degrees Celsius or Fahrenheit, which may be recorded in 15-minute average increments.
Gas control flow monitoring	Install, calibrate, and maintain a gas flow rate measuring device that must record the flow to the control device at least every 15 minutes; and Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.	At least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes. No similar requirement
Energy recovery devices	No similar requirement	The device must achieve a methane destruction efficiency of at least 97 % by weight, except for lean-burn internal combustion engines that were installed and operating prior to January 1, 2022, which must reduce the outlet methane concentration to

		less than 3,000 ppmv, dry basis corrected to 15 % oxygen; and
	If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone.	If a boiler or a process heater is used as the gas control device, the landfill gas stream must be introduced into the flame zone, except that where the landfill gas is not the primary fuel for the boiler or process heater, introduction of the landfill gas stream into the flame zone is not required.
Treatment and processing systems	Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be flared.	If a GCCS routes the collected gas to a treatment system that processes the collected gas for subsequent sale or use, the owner or operator of the treatment system must ensure the system achieves a methane leak rate of 3 % or less by weight. Venting of processed landfill gas to the ambient air is not allowed. If the processed landfill gas cannot be routed for subsequent sale or use, then the treated landfill gas must be flared.
Performance and source testing for control devices	The reduction efficiency or concentration in ppmv must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.35f(d)[19]	An initial source test must be conducted within 180 days of initial start-up of the gas collection and control system; and If a gas control device was in compliance with source testing requirements as of June 9, 2022[21], the landfill must conduct the source test no less frequently than once every five years; and
	The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating	If a gas control device was not in compliance with source testing requirements as of June 9, 2022, or if a subsequent source test shows the gas control device is out of

[19] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-Cf/section-60.35f#p-60.35f(d)
[21] Additional guidance on this requirement can be found in Table 5.

	parameters to be monitored are specified in § 60.37f.[20]	compliance, the landfill must conduct the source test no less frequently than once per year until two subsequent consecutive tests both show compliance. Upon two subsequent consecutive compliant tests, the landfill may return to conducting the source test no less frequently than once every five years.
Wellhead operations	Operate collection system with negative pressure at each wellhead, except for instances of increased temperature, fires, use of a geomembrane or synthetic cover and when a well is decommissioned	Each wellhead must be operated under a vacuum (negative pressure), except for use of a geomembrane cover, a decommissioned well(s), well casing extension(s)[22]; and Repairs and temporary shutdown to repair or modify components, connect new components to existing system, prevent or extinguish landfill fires, or for construction, active mining, or law enforcement activities that affect operation of wellhead.[23]
	Operate each interior wellhead in the collection system with a landfill gas temperature less than 55° Celsius (131° Fahrenheit).	No similar requirement
Permanent shutdown and removal of the GCCS	The landfill is a closed landfill, and a closure report has been submitted. The collection and control system has been in operation a minimum of 15 years, or the landfill owner or operator demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flow	The landfill is a closed landfill, and a closure report has been submitted. The gas collection and control system has been in operation for at least 15 years, or the owner or operator demonstrates that, due to declining gas flow, the MSW landfill will be unable to operate the gas collection and control system for a 15-year period after closure.

[20] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-Cf/section-60.37f

[22] If new fill is being added or compacted in immediate vicinity of well, and the extension is sealed and capped until the raised well is connected to a vacuum source.

[23] If methane emissions are minimized during shutdown, and the system can be shut down within an hour of event that makes the system inoperable, to minimize venting of gas into the atmosphere.

	The calculated NMOC emission rate at the landfill is less than 34 megagrams per year on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.	The landfill has had no exceedance of the methane concentration limits[24] on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.
	No similar requirement	A provisional shutdown prior to permanent shutdown, where the GCCS is shutdown, and eight consecutive quarters of SEM takes place over the portion of landfill served by the shutdown GCCS.[25]
	No similar requirement	If SEM shows exceedances[26] during the provisional shutdown, shutdown portion of GCCS must be restarted. If no exceedances, permanent shutdown of GCCS may proceed following approval by Ecology or local clean air agency.
Methane concentration limits	After installation of the collection system:	Beginning January 1, 2025; or Upon commencing operation of a new GCCS or modification of existing GCCS; or
	No similar requirement	Date established by Ecology to accommodate significant technological improvements (not to exceed May 13, 2026); No location on a MSW landfill surface may exceed:

[24] ≥ 500 ppmv via instantaneous SEM, or an average of ≥ 25 ppmv as determined by integrated SEM

[25] SEM may be increased to 100-ft spacing, if grid is offset 25-ft each quarter to cover entire area at 25-ft spacing by the end of each year.

[26] ≥ 500 ppmv via instantaneous SEM, or average of ≥ 25 ppmv for integrated SEM

	≥ 500 ppm above background (methane) on landfill surface	≥ 500 ppmv, other than "nonrepeatable, momentary readings"[27], as determined by instantaneous SEM; or
	No similar requirement	An average of ≥ 25 ppmv as determined by integrated SEM
Surface Monitoring Requirements	After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.	Quarterly instantaneous or integrated SEM of the entire "landfill" surface"[28]
	Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.	Closed MSW landfills with no recorded exceedances after four consecutive quarters of SEM, or able to demonstrate no exceedances in the three years prior to effective date of rule (June 13, 2024), may move to annual monitoring. If exceedance found during annual monitoring, must return to quarterly.
	A surface monitoring design plan (SMDP) shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.	A surface monitoring design plan (SMDP) must be developed that includes a topographical map that, clearly identifies the monitoring traverse and the working face, and describes the rationale for any site-specific deviations. Plan must be updated quarterly if changes are made to monitoring traverse or working face and be provided to Ecology or the local clean air agency upon request.

[27] Defined in WAC 173-408-020
[28] Defined in WAC 173-408-020

	No similar requirement	Monitoring area must be divided into individually identified 50,000 square foot grids.
	Owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover.	Walking pattern (traverse) must be no more than 25-ft spacing and must traverse each monitoring grid. The entirety of landfill surface areas with cover penetrations, distressed vegetation, cracks, or seeps must also be inspected visually and with a hydrocarbon detector.
	No similar requirement	Active and closed MSW landfills with no exceedances after four consecutive quarters of SEM, or able to demonstrate no exceedances in the three years prior to effective date of rule (June 13, 2024), may increase walking pattern (traverse) to 100-ft intervals. If exceedance found during annual monitoring, must return to 25-ft spacing intervals.
	Monitoring shall be performed during typical meteorological conditions.	Monitoring should be conducted during average barometric conditions.
	The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.	The wind speed and barometric pressure must be recorded during the sampling period. Average wind speed must be determined on a 15-minute average using an on-site anemometer with a continuous recorder for the entire duration of the monitoring event.
	No similar requirement	Surface testing must be terminated when average wind speed exceeds five miles per hour, or the instantaneous wind speed exceeds 10 miles per hour.
	No similar requirement	

		Surface emissions testing must be conducted only when there has been no measurable precipitation in the preceding 72 hours.
Surface Monitoring Exceedances	Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance, and the location of each monitored exceedance shall be marked and the location recorded.	The owner or operator must record the date, location, and value of each exceedance, along with retest dates and results. The location of each exceedance must be clearly marked and identified on a topographic map, at a minimum, of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.
	No similar requirement	The owner or operator of a MSW landfill must notify the department or local clean air agency within two working days after all corrective actions and remonitoring taken to address SEM exceedances
	Upon the first exceedance, cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance	Upon the first exceedance, corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, and well vacuum adjustments, and the location must be remonitored within 10 calendar days of a measured exceedance.
	If the re-monitoring of the location shows a second exceedance (within the same quarterly period), additional corrective action shall be taken, and the location shall be monitored again within 10 days of the second exceedance.	If the remonitoring of the location shows a second exceedance (within the same quarterly period), additional corrective action must be taken, and the location must be remonitored again within 10 calendar days of the second exceedance.
	If the re-monitoring shows a third exceedance for the same location within a quarterly period, a new well or other	If the remonitoring shows a third exceedance (within the same

	collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval. No further monitoring of that location is required until these action(s) have been taken Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the same actions as if remonitoring of a location shows a third exceedance shall be taken. The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.	quarterly period), the owner or operator must install a new or replacement well, or an alternative active methane control approved by the department or local clean air agency, as needed to achieve compliance no later than 120 calendar days after detecting the third exceedance. No similar requirement No similar requirement
GCCS Monitoring (excluding wellhead monitoring, which is detailed in the next row of this table)	Each owner or operator with an enclosed combustor shall: calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment.	The owner or operator, or third-party owner or operator[29], of a MSW landfill with a gas collection and control system must monitor the GCCS accordingly: Enclosed flares must be installed, calibrated, maintained, and operated

[29] Defined in WAC 173-408-020. Please see the "Definitions" section in Part 3 of this document for a discussion on "third-party owners or operators"

		according to manufacturer's specifications.
	An enclosed shall be equipped with a temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.	Enclosed flares must have a temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) one percent of the temperature being measured expressed in degrees Celsius or Fahrenheit, which may be recorded in 15-minute average increments.
	A device that records flow to or bypass of the control device. The owner or operator shall either: Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or	Enclosed flares must be equipped with at least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes.
	Each owner or operator with an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:	Open flares must meet the requirements of 40 C.F.R. 60.18 (in effect on the date in WAC 173-400-025[30]).
	Each owner or operator using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the Administrator describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator shall review the information and either approve it, or request that additional information be	For a gas control device other than an enclosed flare, the owner or operator must demonstrate compliance by providing information describing the operation of the gas control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The owner or operator, or third-party owner or operator, may request alternative compliance measures to

[30] https://app.leg.wa.gov/WAC/default.aspx?cite=173-400-025

	submitted. The Administrator may specify additional appropriate monitoring procedures.	replace the requirements of this subsection in accordance with WAC 173-408-130. The department may specify additional monitoring procedures as a condition of approving alternative compliance measures.
	No similar requirement	Components[31] containing landfill gas must be monitored quarterly for leaks. Any component leak must be tagged, repaired, and remonitored within 10 calendar days, and the department or local clean air agency must be notified within two working days after all corrective actions and remonitoring taken to address. At facilities which combust landfill gas for energy production, or which treat landfill gas for other beneficial uses, and which are located at MSW landfills subject to the rule, component leak testing may be conducted prior to scheduled maintenance or planned outage periods, if the maintenance or planned outage periods would conflict with the quarterly monitoring schedule.
Wellhead Monitoring	Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A)[32] for an active gas collection system shall install a	The owner or operator of a MSW landfill with a gas collection and control system must monitor each

[31] Defined in WAC 173-408-020

[32] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.752(b)(2)(ii)(A)

	sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and: Measure the gauge pressure in the gas collection header at each individual well on a monthly basis. If positive pressure exists, except as for provided in "Wellhead operations"[33], then: Action shall be initiated to correct the exceedance within 5 calendar days If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval. And monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5)[34].	individual wellhead monthly to determine the gauge pressure. If there is any positive pressure reading other than as provided in the "Wellhead operations"[35] row of this table on page 17, the owner or operator must take the following actions: Initiate corrective action within five calendar days of the positive pressure measurement; If the problem is not corrected within 15 days of the date the positive pressure was first measured, the owner or operator must initiate further corrective action including, but not limited to, any necessary expansion of the gas collection system, to mitigate any positive pressure readings; and Corrective actions, including any expansion of the gas collection and control system, must be completed and any new wells must be operating within 120 days of the date the positive pressure was first measured. No similar requirement
Test methods and procedures	Calculate NMOC emission rate using equations in § 60.754(a)(1)(i)[36] or § 60.754(a)(1)(ii)[37].	Calculate landfill gas heat input capacity using appropriate method in

[33] https://www.ecfr.gov/current/title-40/section-60.757#p-60.757(f)(1) for exceptions on positive pressure at wellheads
[34] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.755(a)(5)
[35] See WAC 173-408-080(7) for exceptions to wellhead gauge pressure requirement
[36] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.754(a)(1)(i)
[37] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.754(a)(1)(ii)

	Surface emission monitoring shall be performed in accordance with Method 21 except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. "Methane" shall replace all references to VOC. The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.	accordance with WAC 173-408-120(2)[42]. Measure methane using a hydrocarbon detector, or other equivalent instrument approved by Ecology or the local clean air agency, meeting the following: EPA Reference Method 21[43] (" methane" replaces all references to VOCs) EPA Other Test Method 51 (OTM-51)[44] Other approved EPA test methods with concurrent department or local authority approval
	For the purposes of calculating the maximum expected gas generation flow, one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42), or other site-specific values demonstrated to be appropriate and approved by the Administrator: 40 CFR 60.755(a)(1)(i)[38] 40 CFR 60.755(a)(1)(ii) 40 CFR 60.755(a)(1)(iii)	The expected gas generation flow rate must be determined as prescribed by the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, which is incorporated by reference herein, using a recovery rate of 75 percent.
	EPA Method 25, 25C, or Method 18 must be used to determine compliance with the 98 weight-percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate	The control device destruction efficiency must be determined according to the following methods:

[38] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.755(a)(1)(i
[42] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[43] https://www.epa.gov/sites/default/files/2017-08/documents/method_21.pdf
[44] https://www.epa.gov/system/files/documents/2022-12/OTM%2051-%20UAS%20Application%20of%20Method%2021%20for%20Surface%20Emission%20Monitoring%20of%20Landfills.pdf

	compliance has been approved by the Administrator. Method 3 or 3A shall be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. The equation in 40 CFR 60.754(d)[39] shall be used to calculate destruction efficiency. Open flare designed and operated in accordance with § 60.18[40] except as noted in § 60.754(e)[41] No equivalent	EPA Reference Method 18[45] EPA Reference Method 25[46] EPA Reference Method 25A[47] EPA Reference Method 25C[48] The equation in WAC 173-408-120(6)(a)(v)[49] must be used to calculate destruction efficiency. Open flares must meet the requirements of 40 CFR 60.18. Gauge pressure must be determined using a hand-held manometer, magnehelic gauge, or other pressure measuring device approved by the department or local clean air agency. The device must be calibrated and operated in accordance with the manufacturer's specifications.
Alternative compliance	The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§60.753 through 60.758 proposed by the owner or operator.	The owner or operator of a MSW landfill, or third-party owner or operator, may request alternatives to the compliance measures, monitoring requirements, and test methods and procedures set forth in WAC 173-408-080[50], WAC 173-408-110[51], and WAC

[39] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.754(d)
[40] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-A/section-60.18
[41] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.754(e)
[45] https://www.epa.gov/emc/method-18-volatile-organic-compounds-gas-chromatography
[46] https://www.epa.gov/emc/method-25-gaseous-nonmethane-organic-emissions
[47] https://www.epa.gov/emc/method-25a-gaseous-organic-concentration-flame-ionization
[48] https://www.epa.gov/emc/method-25c-nonmethane-organic-compounds-landfill-gases
[49] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-120
[50] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-080
[51] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-110

	The Administrator shall review the information submitted under the collection and control system design plan, as well as alternatives, and either approve it, disapprove it, or request that additional information be submitted. The owner or operator may establish an alternative traversing pattern for the required surface monitoring traverse that ensures equivalent coverage. Alternative timelines for correcting exceedances of wellhead gauge pressure and temperature may be submitted to the Administrator for approval.	173-408-120[52]. Any alternatives requested by the owner or operator must be submitted in writing to Ecology.
Recordkeeping	Except as provided by approved alternatives, owners or operators subject to the provisions of § 60.752(b)[53] shall keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable. Except as provided by approved alternatives, owners or operators shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in 40 CFR 60.758(b)(1) through (b)(4)[54] as measured during the initial performance test or compliance determination.	The owner or operator of a MSW landfill, or a third-party owner or operator, must maintain records as prescribed in WAC 173-408-160[57]. The records must be provided by the owner or operator to the department or local authority within five business days of a request. Owners or operators must maintain the records prescribed in WAC 173-408-160(1)(a)(i) through (xvi) for at least five years. Owners or operators must maintain the records prescribed in WAC 173-408-160(1)(b)(1) through (v) for the life of each gas control device, as measured during the initial source test or compliance determination.

[52] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-120
[53] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.752(b)
[54] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.758(b)
[57] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-160

	Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.	
	Except as provided by approved alternatives, owners or operators shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756[55] as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.	WAC 173-408-160(1)(a)(viii) requires Records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken. WAC 173-408-160(1)(a)(xiii) through (xiii)(C) requires records of the equipment operating parameters specified to be monitored, as well as records for periods of operation during which the parameter boundaries established during the most recent source test are exceeded
	Except as provided by approved alternatives, owners or operators shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.	WAC 173-408-160(1)(a)(vi) requires records of the installation date and location of each well installed as part of a gas collection system expansion
	Except as provided by approved alternatives, owners or operators shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753[56], the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.	WAC 173-408-160(1)(a)(i) through (viii) requires recordkeeping for all surface emissions monitoring plans and monitoring records; GCCS downtime; expected gas generation flow rate; SEM exceedances, component monitoring exceedances, and wellhead gauge pressure exceedances.

[55] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW/section-60.756
[56] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW/section-60.753

	Owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million m^3 shall keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.	WAC 173-408-160(1)(a)(ix) requires recordkeeping on the annual solid waste acceptance rate and the current amount of waste in place
Annual Reporting	No equivalent, initial design capacity report and amended design capacity report required for some MSW landfills, per § 60.757(a)[58] Annual NMOC emission rate report (for landfills that initially report ≥ 50 megagrams per year and do not have a GCCS installed), per § 60.757(b)[59] § 60.757(f)(5)[60] requires annual reporting on the location of each SEM exceedance of the 500 parts per million methane concentration, and the concentration recorded at each location for which an exceedance was recorded in the previous month.	WAC 173-408-060(2)[63] requires annual WIP reporting for active MSW landfills that reported < 450,000 tons of WIP during initial reporting WAC 173-408-070(3)[64] requires an annual heat input capacity report (for MSW landfills that reported WIP over the threshold[65] and report < 3 million btu/hr recovered heat input capacity during initial reporting WAC 173-408-170(6)[66] requires an annual surface emissions monitoring reporting on: • Date(s) of all monitoring; • Location of the monitoring grid coordinates on a topographic map; and • Measured concentration of methane in ppmv,

[58] https://www.ecfr.gov/current/title-40/section-60.757
[59] https://www.ecfr.gov/current/title-40/section-60.757
[60] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.757(f)
[63] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-060
[64] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-070
[65] The threshold is ≥ 450,000 tons of WIP for active and inactive MSW landfills, and ≥ 750,000 tons of WIP for closed MSW landfills
[66] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170

		exceedances, and all corrective actions taken.
	No equivalent	WAC 173-408-170(7)[67] requires MSW landfills with a GCCS to report on different elements of operation of the system(s).
	Each owner or operator of a landfill with a calculated NMOC emissions rate of ≥ 50 megagrams per year using an active collection system designed in accordance with § 60.752(b)(2)(ii)[61] shall submit to the Administrator annual reports on the following:	
	• Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d)[62].	Recordkeeping requirement in rule: WAC 173-408-160(1)(a)(xiii)[68]
	• Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow	Recordkeeping requirement in rule: WAC 173-408-160(1)(b)((v)
	• Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.	Recordkeeping requirement in rule: WAC 173-408-160(1)(a)(iii)
	• All periods when the collection system was not operating in excess	Recordkeeping requirement in rule: WAC 173-408-160(1)(a)(ii)

[61] https://www.ecfr.gov/current/title-40/part-60/subpart-WWW#p-60.752(b)(2)(ii)
[62] https://www.ecfr.gov/current/title-40/section-60.756
[67] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170
[68] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-160

	of 5 days. • The date of installation and the location of each well or collection system expansion added	Recordkeeping requirement in rule: WAC 173-408-160(1)(a)(vi)
Closure Report/Notification	Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60[69]. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4)[70]. No similar requirement	WAC 173-408-170(8)[71] requires landfills that cease to accept waste to submit a closure notification to the department or local authority. Except as provided in (e), the closure notification must be submitted within 30 days of ceasing to accept waste. (a) 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. (b) 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 HIC calculation. (c) 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, or local statutes, regulations, and ordinances in effect at the time of closure. (d) If a closure report has been submitted, no additional wastes may be placed into the landfill without

[69] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-258/subpart-F/section-258.60
[70] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-A/section-60.7#p-60.7(a)(4)
[71] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170

	No similar requirement	filing a notification with the department or local authority. (e) In lieu of submitting the closure notification report within 30 days of ceasing to accept waste, the owner or operator of an inactive municipal solid waste landfill may submit documentation to the department or local authority demonstrating that all the following occurred prior to the effective date of this chapter.
Equipment Removal Report	Each owner or operator of a controlled landfill shall submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment, per §60.757(e)[72] The equipment removal report shall contain all of the following items: • A copy of the closure report • A copy of the initial performance test report demonstrating that the 15- year minimum control period has expired; and	WAC 173-408-170(9)[73] requires that landfills must submit a GCCS equipment removal report to the department or local authority 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: • A copy of the closure notification report • A copy of the initial source test report 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;

[72] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-WWW#p-60.757(e)
[73] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170

	• Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year	and • Eight consecutive quarterly instantaneous or integrated emissions monitoring results as needed to verify that landfill surface methane concentration measurements are not exceeded

For MSW landfills that commenced construction, reconstruction, or modification after July 17, 2014, please see requirements here:

eCFR :: 40 CFR Part 60 Subpart XXX -- Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014[74]

National Emission Standards for Hazardous Air Pollutants (NESHAP)

U.S. EPA promulgated NESHAP for MSW landfills (40 Code of Federal Regulations Part 63 Subpart AAAA) on January 16, 2003. The NESHAP has the same requirements as the NSPS but also contains provisions for start-up, shut-down, and additional recordkeeping and reporting requirements. This rule differs from federal NSPS and NESHAP requirements in that it applies to smaller landfills (450,000 versus 2,750,000 tons of waste-in-place) and has more stringent requirements for methane collection and control, component leak testing and surface emissions monitoring, and compliance schedules. The more stringent requirements in the state landfill methane emissions rule are needed to maximize greenhouse gas emission reductions. Since the requirements of this rule are more stringent, they do not conflict with or impede compliance with the existing federal requirements. Please see NESHAP requirements here:

eCFR :: 40 CFR Part 63 Subpart AAAA -- National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills[75]

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[74] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-XXX
[75] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-63/subpart-AAAA

Part 3: Regulatory Requirements

This part of the document serves as supplemental guidance to the requirements of the rule.[76] This guidance is intended to aid MSW landfill and third-party owners or operators in complying with the rule, as well as aid local clean air agencies in administering the rule in their jurisdictions.

This guidance covers many of the rule's requirements, however not all of them. Ecology anticipates publishing more guidance on annual reporting and use of the Methane Emissions Monitoring & Reporting system later this year. Each section header is followed by a link to the relevant section of the rule.

Definitions (WAC 173-408-020[77])

This section covers definitions from the rule that Ecology has already received questions or anticipates receiving questions on in the future. For a full list of the rule's definitions, please click on the link above next to "Definitions".

Question and answer

1.) How do I know if my MSW landfill is considered "active" or "closed" under this rule?

The authorizing statute and rule defines an "Active municipal solid waste landfill" as 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[78] as it existed on January 10, 2022.

The authorizing statute and rule define a "Closed municipal solid waste landfill" as a MSW 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.

2.) How do I find out how my facility as permitted?

Local jurisdictional health departments[79] have primary oversight of solid waste facilities and issue permits for facilities, including MSW landfills. For questions on which type of permit your facility operates under, please contact your local health jurisdiction.[80]

3.) My landfill closed in accordance with the requirements set forth in Chapter 173-304 WAC: is it subject to requirements of the rule?

That depends on when the landfill stopped receiving solid waste. Because the closure and post-closure requirements of WAC 173-351-500 do not apply to MSW landfills that do not receive waste on or after

[76] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408
[77] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-020
[78] https://app.leg.wa.gov/WAC/default.aspx?cite=173-351-500
[79] https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Solid-waste-permits
[80] https://doh.wa.gov/about-us/washingtons-public-health-system/washington-state-local-health-jurisdictions

November 26, 1993[81], MSW landfills that received solid waste after January 1, 1992[82], and closed before November 26, 1993, are potentially impacted by the rule.

The MSW landfills that fall within this timeframe, that is, they received solid waste after January 1, 1992, and closed under Chapter 173-304 WAC, before Chapter 173-351 WAC was in effect, are defined as an "Inactive municipal solid waste landfill" under the rule:

"Inactive 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 Chapter 173-304 WAC[83]. For purposes of this rule, an inactive municipal solid waste landfill is subject to all requirements applicable to an active municipal solid waste landfill unless and until (a) the department or local authority determines the landfill is exempt in accordance with WAC 173-408-070(4)(b)(ii)[84]; or (b) the owner or operator submits a closure notification in accordance with WAC 173-408-170(8)[85].

As stated in the definition above, "inactive" MSW landfills are subject to all the applicable requirements of an "active" MSW landfill under the rule. This is because they did not close in accordance with the requirements of WAC 173-351-500 and are therefore not defined as a closed MSW landfill in the authorizing law and rule.

Ecology has built a pathway for "inactive" MSW landfills to be considered closed under this rule and therefore not subject to the same requirements as MSW landfills defined as "active" in the rule. More details on this can be found in Table 2.

If you have any questions or concerns on this process, please do not hesitate to reach out to either Catherine Lucke at catherine.lucke@ecy.wa.gov or Bill Flagg at bill.flagg@ecy.wa.gov.

4.) I own or operate a facility that receives landfill gas that is routed from a MSW landfill for treatment, processing, and then subsequent sale or use: is my facility subject to the requirements of the rule?

If your facility meets the rule's definition of "third-party owner or operator", it may be subject to various requirements of the rule.

Under the rule, a "third-party owner or operator" means any "person" that:

(a) Owns any stationary equipment for the collection of landfill gas from a MSW landfill subject to the rule; or
(b) Purchases or otherwise obtains untreated landfill gas from an owner or operator of a MSW landfill subject to this chapter and owns any stationary equipment for the treatment and/or combustion of the landfill gas.

A "person", as defined in the rule, means "an individual, firm, public or private corporation, association, partnership, political subdivision of the state, municipality, or governmental agency."

[81] https://app.leg.wa.gov/WAC/default.aspx?cite=173-351-010
[82] Applicability to the rule constitutes all MSW landfills that have received solid waste after January 1, 1992.
[83] https://app.leg.wa.gov/WAC/default.aspx?cite=173-304
[84] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-070
[85] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-170

Under the rule, "landfill gas" means "any 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."

Given these definitions, there are two scenarios where your facility could be defined as a third-party owner or operator under the rule: the first being if your facility owns equipment for the purposes of collecting landfill gas from an adjacent MSW landfill, and the second being if your facility purchases or obtains untreated landfill gas for treatment and/or combustion.

6.) My facility only receives treated landfill gas from a MSW landfill: would it still be subject to the requirements of the rule?

Your facility would not be considered a "third-party owner or operator", as defined above, if it only receives treated "landfill gas" (also defined above). However, Ecology may request a demonstration to verify the extent of treatment of landfill gas that a facility receives from a MSW landfill.

And, as stated above, a facility would still be defined as a third-party owner or operator under the rule if it owns any stationary equipment for the collection of landfill gas from a MSW landfill subject to the rule.

7.) My facility is considered a "third-party owner or operator" under the rule: what requirements am I subject to?

As stated in WAC 173-408-080(1)(b)[86], "if a MSW landfill partners with a third-party owner or operator … to operate all or a portion of the gas collection and control system [GCCS] or energy recovery device, the owner or operator of the relevant portion of the [GCCS] or energy recovery device is the responsible party obligated to comply with the requirements of this chapter [the rule]".

A "gas collection system", as defined under the rule, means "any portion of a gas collection and control system that employs various gas collection wells and connected piping, and mechanical blowers, fans, pumps, or compressors to create a pressure gradient, actively extract landfill gas, and convey the gas to the gas control system."

A "gas control system", as defined under the rule, means "any portion of a gas collection and control 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."

Lastly, an "energy recovery device", as defined under the rule, 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."

The specific requirements for a "third-party owner or operator" are as follows:

[86] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080

WAC 173-408-110(2)[87]: "The … or third-party owner or operator … with a gas collection and control system must monitor the system according to the following procedures:

> (a) For enclosed flares, the following equipment must be installed, calibrated, maintained, and operated according to the manufacturer's specifications:
>
> (i) A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) one percent of the temperature being measured expressed in degrees Celsius or Fahrenheit, which may be recorded in 15-minute average increments.
>
> (ii) At least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes."

WAC 173-408-110(2)(b): "For a gas control device other than an enclosed flare, the owner or operator must demonstrate compliance by providing information describing the operation of the gas control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The owner or operator, or third-party owner or operator, may request alternative compliance measures to replace the requirements of this subsection in accordance with WAC 173-408-130[88]. The department may specify additional monitoring procedures as a condition of approving alternative compliance measures."

WAC 173-408-120(4)[89]: "The … or third-party owner or operator of a landfill gas control system, must measure leaks using a hydrocarbon detector meeting the requirements of subsection (1) of this section.

WAC 173-408-160(1)[90]: "The … or a third-party owner or operator, must maintain records as prescribed in this subsection. The records must be provided by the owner or operator to the department or local authority within five business days of a request. Records described in this subsection must be retained in the operating record required by WAC 173-351-200(10)(a)[91]."

For more information on how these rules may affect your facility, please reach out to catherine.lucke@ecy.wa.gov or bill.flagg@ecy.wa.gov.

Applicability (WAC 173-408-030[92]) and Initial Reporting Determinations

Chapter 173-408 WAC applies to all MSW landfills that have received solid waste after January 1, 1992, except the following types of landfills:

- Landfills that receive or received only "hazardous waste(s)" as defined in WAC 173-408-020[93];

[87] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[88] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130
[89] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[90] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-160
[91] https://app.leg.wa.gov/WAC/default.aspx?cite=173-351-200
[92] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-030
[93] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-020

- "CERCLA regulated landfill" as defined in WAC 173-408-020, if it meets the criteria for exemption set forth in WAC 173-408-040[94];
- Landfills that receive or received only "inert waste or nondecomposable waste(s)" as defined in WAC 173-408-020; or
- A "limited purpose landfill" as defined in WAC 173-408-020.

In accordance with WAC 173-408-060(1)[95] and WAC 173-408-170(1)[96], all MSW landfills that received solid waste after January 1, 1992, must submit an initial waste in place report: these reports were due on September 11, 2024.

Additionally, active and inactive MSW landfills that reported waste in place of 450,000 tons or greater, and closed MSW landfills that reported waste in place of 750,000 tons of waste in place or greater, must also submit an initial heat input capacity report, in accordance with WAC 173-408-070(2)[97] and WAC 173-408-170(2)[98]. These reports were also due on September 11, 2024.

Guidance on initial reporting was released on July 18, 2024 and August 21, 2024, and can be found on our implementation guidance webpage[99] under the "Documents" section at the bottom of the page.

Question and answer

- I own or operate an active (open) MSW landfill[100] and have reported fewer than 450,000 tons of waste in place: what further requirements is my landfill subject to?

Active (open) MSW landfills that have initially reported fewer than 450,000 tons of waste in place must submit an annual waste in place report to Ecology and the local clean air agency, as required by WAC 173-408-170(3) and (4)[101]. The waste in place report is due on April 1st of each year, starting on April 1, 2026. Landfills are required to submit this report annually until either:

- The active MSW landfill reaches a size of greater than or equal to 450,000 tons of waste in place; or
- The owner or operator submits a closure notification.

Ecology anticipates issuing further guidance on annual reporting and using our Methane Emissions Monitoring & Reporting platform later this year.

1.) What happens if my active landfill reports 450,000 tons of waste in place or greater in a future reporting year?

[94] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-040
[95] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-060
[96] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-170
[97] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-070
[98] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-170
[99] https://www.ezview.wa.gov/site/alias__1962/41956/landfill_methane_emissions_guidance.aspx
[100] For the rule's definition of an active MSW landfill, please see page 35 under the definitions section.
[101] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170

If your active landfill submits an annual report showing 450,000 tons of waste in place or greater in a future reporting year, then your landfill is also required to submit a heat input capacity report that same reporting year, as required by WAC 173-408-070(3)[102] and WAC 173-408-170(3) and (5)[103].

As an example, if your active landfill initially reported 400,000 tons of waste in 2024, an annual waste in place report will be required by April 1, 2026. If your active landfill reports 475,000 tons of waste in place in 2026, you will also be required to submit a heat input capacity report by April 1, 2026, along with your annual waste in place report.

2.) I own or operate a closed MSW landfill and have reported fewer than 750,000 tons of waste in place: what further requirements is my landfill subject to?

Closed MSW landfills that have reported fewer than 750,000 tons of waste in place are no longer subject to requirements of the rule, if these landfills meet the definition of a "closed municipal solid waste landfill" and closed in accordance with WAC 173-351-500[104]. The definition for this type of landfill is discussed under the "Definitions" section on page 35.

3.) The landfill I own or operate is closed, but it closed in accordance with the requirements set forth in Chapter 173-304 WAC[105]: if I reported fewer than 750,000 tons of waste in place on my initial report, does my landfill no longer need to meet further requirements of the rule?

MSW landfills that closed under Chapter 173-304 WAC are defined as an "inactive municipal solid waste landfill" under the rule. These types of landfills are subject to all the same requirements as an active (open) MSW landfill under the rule, however, Ecology has created a process for these landfills to close under the rule, and once they do, they will no longer be subject to the same requirements as active (open) MSW landfills.

Please see WAC 173-408-170(8)[106] for closure notification requirements for inactive MSW landfills.

4.) I reported 450,000 tons of waste in place or greater for the "inactive municipal solid waste landfill" that I own or operate: do I also need to submit an initial heat input capacity report?

Yes. As explained above, an "inactive municipal solid waste landfill" must meet all the same requirements as an "active [open] municipal solid waste landfill" until the landfill submits a closure notification in accordance with WAC 173-408-170(8).

5.) I own or operate an "inactive municipal solid waste landfill". I have submitted my initial reports, and once I have submitted my closure notification, as outlined above, is my landfill no longer subject to the requirements of the rule?

[102] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-070
[103] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170
[104] https://app.leg.wa.gov/WAC/default.aspx?cite=173-351-500
[105] https://app.leg.wa.gov/WAC/default.aspx?cite=173-304
[106] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170

That depends on what your landfill initially reported for waste and place and (if applicable) heat input capacity. The table on the following page breaks down the requirements for inactive MSW landfills.

Table 2: Requirements for inactive MSW landfills based on initial reports submitted

Size (in tons)[107]	Exemption	Further requirements
< 450,000 tons	Exempt if able to submit closure notification	If no closure notification submitted, then must submit WIP annually[108]
≥ 450,000 tons but < 750,000 tons and reported heat input capacity (HIC)[109] is < 3 million btu/hr recovered	Exempt if able to submit closure notification	If no closure notification submitted, then must recalculate/report HIC annually[110]
≥ 450,000 tons but < 750,000 tons and reported heat input capacity (HIC) is > 3 million btu/hr recovered	Exempt if landfill can demonstrate no detections of ≥ 200 parts per million by volume (ppmv) of methane over four consecutive quarterly monitoring periods[111]	If there are any detections of ≥ 200 ppmv of methane during the four quarters of monitoring, then landfill must install a GCCS and perform quarterly surface emissions monitoring[112]
≥ 750,000 tons and reported HIC is < 3 million btu/hr recovered	Exempt if able to submit closure notification	If no closure notification submitted, then must recalculate/report HIC annually
≥ 750,000 tons and reported HIC is < 3 million btu/hr recovered	Exempt if landfill can demonstrate no detections of ≥ 200 parts per million by volume (ppmv) of methane over four consecutive quarterly monitoring periods	If there are any detections of ≥ 200 ppmv of methane during the four quarters of monitoring, then landfill must install a GCCS and perform quarterly surface emissions monitoring

If you own or operate an inactive MSW landfill and have further inquiries on how the rule may impact your landfill, please reach out to catherine.lucke@ecy.wa.gov and bill.flagg@ecy.wa.gov.

6.) I own or operate an active (open) MSW landfill and have reported greater than or equal to 450,000 tons of waste in place and a heat input capacity of ≥ 3 million British thermal units per hour (btu/hr) recovered: what further requirements is my landfill subject to?

[107] As reported during the initial reporting period
[108] First annual WIP report due by April 1, 2026
[109] As reported during initial reporting period
[110] First annual HIC report due by April 1, 2026
[111] Please see https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-070 for this requirement
[112] More guidance is given on this in the "Monitoring" section of this document.

This depends on a couple of factors. If your landfill does not already have an active gas collection and control system in place, then you will either need to:

- Install a gas collection and control system (GCCS) that meets the requirements of WAC 173-408-080[113]; or
- Demonstrate to the satisfaction of Ecology or your local clean air agency that after four consecutive quarterly monitoring periods there is no measured concentration of ≥ 200 ppmv of methane via the instantaneous monitoring procedures specified in WAC 173-408-120(3)(b).[114]

If you decide to conduct four quarters of surface emissions monitoring and there are no exceedances of ≥ 200 ppmv of methane, then you will need to recalculate your heat input capacity and report it annually[115] until the landfill ceases to accept waste and a closure notification is submitted in accordance with WAC 173-408-080(8)[116]. If there are any exceedances of 200 ppmv of methane during any of the four consecutive quarters of monitoring, then the owner or operator of the active MSW landfill will need to install a gas collection and control system.

7.) What if my active MSW landfill already has a gas collection and control system in place?

If the active MSW landfill already has a gas collection and control system in place, then the owner or operator must begin surface emissions monitoring in the first quarter of 2025. The only exception to this is if the owner or operator needs to modify their existing system to meet the requirements of WAC 173-408-080.

Please see Table 6 for more guidance on modifications to existing systems.

8.) I own or operate a closed MSW landfill and have reported greater than or equal to 450,000 tons of waste in place[117] and a heat input capacity of ≥ 3 million British thermal units per hour (btu/hr) recovered: what further requirements is my landfill subject to?

Like active MSW landfills, this depends on a couple of factors. If your landfill does not already have an active gas collection and control system in place, then you will either need to:

- Install a gas collection and control system that meets the requirements of WAC 173-408-080[118]; or
- Demonstrate to the satisfaction of Ecology or your local clean air agency that after four consecutive quarterly monitoring periods there is no measured concentration of ≥ 200 ppmv of methane via the instantaneous monitoring procedures specified in WAC 173-408-120(3)(b)[119]

The key difference regarding further requirements of active MSW landfills versus closed MSW landfills is that if the owner or operator of a closed MSW landfill, or inactive MSW landfill, decides to conduct four quarters of surface emissions monitoring and there are no exceedances of ≥ 200 ppmv of methane then the owner or

[113] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[114] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[115] The first annual HIC report is due by April 1, 2026
[116] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170
[117] As required by WAC 173-408-060(1)
[118] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[119] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120

operator of the landfill no longer has to comply with any other requirements of the rule, provided the following are submitted to Ecology or the local clean air agency:

- A waste in place report
- All instantaneous surface monitoring records demonstrating no exceedances of 200 ppmv of methane

If there are any exceedances of 200 ppmv of methane during this demonstration, then the closed MSW landfill will need to install a gas collection and control system.

9.) What if my closed MSW landfill already has a gas collection and control system in place?

As is the case with active MSW landfills, If the closed MSW landfill already has a gas collection and control system in place, then the owner or operator must begin surface emissions monitoring in the first quarter of 2025. The only exception to this is if the owner or operator needs to modify their existing system to meet the requirements of WAC 173-408-080.

Please see Table 6 for more guidance on modifications to existing systems.

CERCLA exemption process (WAC 173-408-040[120])

MSW landfills that have CERCLA response actions currently under way may claim exemption from the rule's requirements.

Three definitions in the rule apply to these types of landfills:

"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.

"On-site" has the same meaning as set forth in 40 C.F.R. 300.400(e)(1)[121] (in effect on the date in WAC 173-400-025[122]).

Question and answer

1.) The MSW landfill I own or operate is listed as a CERCLA (Superfund) site: is the entire landfill exempt from the rule?

The rule only exempts portions of a MSW landfill from the requirements of the rule, if these portions are designated as "onsite" for purposes of a "CERCLA response action" (see definitions above).

[120] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-040
[121] https://www.ecfr.gov/current/title-40/part-300/section-300.400#p-300.400(e)
[122] https://app.leg.wa.gov/WAC/default.aspx?cite=173-400-025

2.) How do I claim exemption for CERCLA response actions on-site at the MSW landfill I own or operate?

WAC 173-408-040[123] establishes the process for owners of operators of CERCLA regulated landfills to claim exemption from the rule's requirements.

If you have any questions on this process, please reach out to catherine.lucke@ecy.wa.gov and bill.flagg@ecy.wa.gov.

Design Plan and Installation of a GCCS (WAC 173-408-080(2)[124])

This section offers guidance for MSW landfills that must install a gas collection and control system (GCCS) based on exceeding initial reporting thresholds for waste in place and heat input capacity (see the "Applicability and Initial Reporting Determinations" section beginning on page 38 for more information on these thresholds). The table below outlines requirements and includes timelines for when the requirements must be met:

Table 3: Timeline requirements for MSW landfills that must install a GCCS

Requirements	Active MSW landfills	Closed MSW landfills	Inactive MSW landfills[125]	Exceptions
Design plan submittal	Submit by June 13, 2025[126]	Same	Same	Due within one year of detecting a leak of ≥ 200 ppmv of methane on landfill surface[127]
Design plan requirements	Please see WAC 173-408-080(2)(a)(i) through (xvi)[128]			
GCCS installation and operation	By December 13, 2025[129]	By December 13, 2026[130]	Same as active MSW landfills	Within 18 months (active & inactive MSW landfills), or 30 months (closed MSW landfills) after detecting a leak of ≥ 200 ppmv of methane on landfill surface

[123] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-040
[124] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[125] An "inactive municipal solid waste landfill" must meet all the same requirements as an "active municipal solid waste landfill" until they submit a closure notification in accordance with WAC 173-408-170(8).
[126] Within one year of the effective date of the rule, which was June 13, 2024.
[127] WAC 173-408-070(3)(b)
[128] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[129] Not later than 18 months after landfill is required to comply with the rule, which was June 13, 2024.
[130] Not later than 30 months after landfill is required to comply with the rule, which was June 13, 2024.

As required by WAC 173-408-080(2), the design plan must be submitted to either Ecology or the local clean air agency.

Question and answer

1.) Why are there two different timelines for submittal of the design plan?

WAC 173-408-080(2)[131] states that a MSW landfill "must submit a design plan … within one year after the effective date of the chapter [rule], or within one year of detecting any leak on the landfill surface exceeding a methane concentration of 200 ppmv, in accordance with WAC 173-408-070(4)(b)".[132] [133]

As shown in Table 2, for inactive MSW landfills, and discussed on pages 42 and 43 for both active and closed MSW landfills, owners or operators of a MSW landfill without a GCCS in place, and those that exceed the 3 million btu/hr recovered heat input capacity threshold, as determined by initial reporting, can choose to provide a demonstration to Ecology or the local clean air agency that the landfills surface methane concentration is $<$ 200 ppmv over four consecutive quarters of instantaneous[134] surface emissions monitoring (SEM).

If an owner or operator finds an exceedance of $\geq$ 200 ppmv of surface methane in any one of these quarters they will have to install a GCCS, and the timeline for submitting a design plan will also begin at this time.

For example, if an owner or operator decides to provide the SEM demonstration and finds a leak of $\geq$ 200 ppmv of surface methane on May 1, 2025, then they must submit a design plan to the local clean air agency or Ecology by May 1, 2026.

2.) Is this why there are two different timelines for GCCS installation and operation as well?

Yes. Using the example in the answer above, if an owner or operator of an active or inactive MSW landfill finds a leak of $\geq$ 200 ppmv of surface methane on May 1, 2025, they must have a GCCS installed and operational by November 1, 2026, or 18 months after exceeding the 200 ppmv methane concentration via the monitoring demonstration.

Owners or operators of closed MSW landfills must have a GCCS installed and operational by November 1, 2027, or 30 months after exceeding the 200 ppmv methane concentration via the monitoring demonstration.

3.) If I decide to provide the demonstration of four consecutive quarters of SEM, when do I need to begin this demonstration?

If an owner or operator decides to provide a demonstration then they need to schedule this demonstration with Ecology or the local clean air agency by June 13, 2025. This does not mean that they must have the demonstration done by this date, rather they must inform Ecology or the local clean air agency that they intend to go this route by June 13, 2025.

If an owner or operator can demonstrate no exceedances of $\geq$ 200 ppmv through all four consecutive quarters throughout 2025, then they will not have to submit a design plan and install a GCCS.

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[131] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[132] Note: The reference in the WAC should read in accordance with WAC 173-408-070(4)(b), not (3)(b)
[133] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-070
[134] Guidance on this method is covered in the "Monitoring Methods" section of this document.

If an owner or operator finds an exceedance during this demonstration, as provided in the example above, the timeline for submittal of a design plan, as well as installation and operation of a GCCS begins, and they will no longer have to continue to meet the monitoring requirements of the demonstration.

4.) Are there exceptions to the above timelines for submitting a design plan and installation and operation of a GCCS?

Yes. WAC 173-408-130[135] states that owners or operators of MSW landfills, as well as third-party owners or operators[136], "may request alternatives to the compliance measures, monitoring requirements, and test methods and procedures" sections of the rule, which includes requirements set forth in WAC 173-408-080. Alternative compliance measure requests are discussed in more detail on page 75.

5.) My landfill already has a design plan for the current GCCS in place; can we use the current design plan to satisfy the rule's requirements?

That depends. If an owner or operator already has a design plan for a GCCS that is currently in operation, and that meets the requirements of WAC 173-408-080(2)(a)(i) through (xvi)[137], then this design plan satisfies the rule's requirements.

However, if an owner or operator must modify an existing GCCS to meet the rule's requirements, then the "existing design plan must be amended to include any necessary updates or addenda and must be certified by a professional engineer", as required by WAC 173-408-080(2)(a)(xiv)[138]. If an owner or operator needs to amend an existing design plan, based on modifications to the current GCCS, then the amended design plan must be submitted to Ecology or the local clean air agency within 90 days of any event that warrants changes to the design plan.

For example, if an existing design plan cannot "demonstrate how the gas collection and control system will handle the expected gas generation flow rate from the entire area of the MSW landfill[139] …", as required by WAC 173-408-080(2)(a)(ix)[140], then the GCCS will likely have to be expanded and an amended design plan will need to be submitted to reflect these changes.

6.) My current GCCS needs to be modified to meet the requirements of the rule: when does the timeline begin for modifications of the existing GCCS and amended design plan submittal?

Owners or operators should reach out to Ecology or their local clean air agency once they determine that a modification to the system is needed (e.g., installation of new wells, new horizontal and/or vertical collectors, etc.), which will begin the timeline for amending a design plan to reflect modifications to the system.

As stated above, an amended design plan must be submitted within 90 days of any event that warrants a change to the design plan.

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[135] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130
[136] Please see the "Definitions" section of this document for a more detailed discussion on third-party owners or operators
[137] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[138] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[139] Except for areas that contain only "inert or nondecomposable waste(s)". Please see answer to question 1 under the "Monitoring" section for more information on this.
[140] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080

7.) Are there any exceptions to this timeline? What if significant modifications to the system must be made to meet the requirements of the rule?

Yes. owners or operators may request alternative compliance measures to meet the requirements of WAC 173-408-080. Additionally, the rule's methane concentration limits[141] requirements allow for timeline exceptions for owners or operators who must make "significant technological improvements" to meet the requirements of the rule. Any owner or operator who submits an alternative compliance measure request will have to comply with a date established by Ecology to accommodate the significant technological improvement(s).

The maximum amount of time allotted to accommodate these improvements cannot "exceed 24 months after the department adopts rules to implement this chapter"[142], which is May 13, 2026. For this reason, any alternative compliance measure requests to accommodate for significant technological improvements should be submitted as soon as feasibly possible.

This is discussed in detail in the answer to question 3 in the "Monitoring" section of this document. Alternative compliance measure requests are discussed in more detail beginning on page 75.

Gas Collection and Control System Requirements (WAC 173-408-080(3) through (7)[143])

This section provides guidance on GCCS operational requirements. Click the link above to view all the rule's requirements for a GCCS. The table below outlines methane destruction efficiency requirements for control devices.

Table 4: Destruction efficiency requirements for control devices

Control Device	Required Methane Destruction Efficiency	Additional Information
Open Flares	At least 99% by weight[144]	• Must meet requirements of 40 CFR 60.18[145] • Open flares installed prior to Dec. 31, 2022, may operate for 10 years[146]

[141] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100
[142] WAC 173-408-100(1)(c)
[143] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[144] Required by WAC 173-408-080(4)
[145] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-A/section-60.18
[146] WAC 173-408-080(4)(b)(ii)

		• Open flares may be temporarily operated in certain circumstances[147]
Enclosed Flares	At least 99% by weight	• Must be equipped with automatic dampers, a flame arrester, and continuous recording temperature sensors[148] • Must provide flow of propane or natural gas during restart or startup[149] • Must be operated within parameter ranges established during initial or most recent source test[150]
Energy Recovery Devices (gas turbines, internal combustion engines, boilers, etc.)	At least 97% by weight[151]	• Boilers or process heaters must route landfill gas (LFG) stream into the flame zone (except where LFG is not the primary fuel[152] • Must be operated within parameter ranges established during initial or most recent source test[153]
Lean burn internal combustion engines	Reduce outlet methane concentration to less than 3,000 ppmv, dry basis corrected to 15% oxygen	
Treatment and processing systems	Methane leak rate of 3% or less by weight	• Venting of processed LFG to ambient air not allowed[154] • If processed LFG cannot be routed for sale or use, then must be flared

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[147] WAC 173-408-080(4)(b)(iii)
[148] WAC 173-408-080(4)(a)(i)
[149] To prevent unburned methane from being emitted, WAC 173-408-080(4)(a)(ii)
[150] WAC 173-408-080(4)(a)(iii)
[151] WAC 173-408-080(5)(a)(i)
[152] WAC 173-408-080(5)(ii)
[153] WAC 173-408-080(5)(a)(iii)
[154] WAC 173-408-080(5)(b)

The table below outlines source testing requirements for control devices.

Table 5: Source testing requirements for enclosed flares and energy recovery devices[155]

Device timeline	Existing devices	Devices installed as required by rule
Devices in compliance with source testing requirements as of June 9, 2022	Must conduct a source test no less frequently than once every 5 years[156] (within 5 years of last compliant test date)	Initial source test must be conducted within 180 days of initial start-up of the GCCS If initial source test shows compliance, then 5-year source testing schedule, if out of compliance, then once per year until two subsequent source tests show compliance
Devices not in compliance with source testing requirements as of June 9, 2022	Must conduct a source test once per year until two subsequent source tests both show compliance, then can move to 5-year source testing schedule[157]	
Devices previously not required to conduct source testing	Must conduct a source test once per year until two subsequent source tests both show compliance, then can move to 5-year source testing schedule (first source test due within one year of issuance of this guidance)	

Question and answer

1.) My existing open flare complies with the current federal destruction efficiency requirements: does it meet the rule's destruction efficiency requirements?

That depends. Federal regulations require a 98% destruction efficiency rate for non-methane organic compounds (NMOCs): As shown in table 4, the rule requires both open and enclosed flares to achieve a methane destruction efficiency rate of 99% by weight.

Ecology will consider source tests that precluded the effective date of the rule (June 13, 2024), if they were in compliance with source testing requirements as of June 9, 2022, and demonstrate that the testing covered methane destruction.

Landfills located in another clean air jurisdiction should work with their local clean air agency[158] on requirements for source testing schedules.

2.) My open flare was installed and operating after December 31, 2022, am I able to still operate the open flare until January 1, 2032?

[155] WAC 173-408-080(6)
[156] WAC 173-408-080(6)(b)
[157] WAC 173-408-080(6)(c)
[158] https://ecology.wa.gov/About-us/Accountability-transparency/Partnerships-committees/Clean-air-agencies

If an owner or operator installed and operated an open flare after the date established by rule (Dec. 31, 2022), but plans to still operate the flare, then they will have to submit an alternative compliance measure request to Ecology in accordance with WAC 173-408-130[159].

Alternative compliance measure requests are discussed in more detail beginning on page 75.

3.) My landfill has an existing open flare onsite, installed and operating prior to December 31, 2022, and we would like to operate it beyond January 1, 2032: is this possible?

Yes, if the owner or operator can demonstrate low methane generation at the MSW landfill, as required by WAC 173-408-080(4)(b)(ii): "An open flare installed and operating prior to December 31, 2022, may operate until January 1, 2032, unless the owner or operator demonstrates to the satisfaction of the department or local authority that the landfill gas HIC is less than 3,000,000 British thermal units per hour… and is insufficient to support the continuous operation of an enclosed flare or other gas control device."

4.) I own and operate a treatment and processing system: how do I ensure I achieve a methane leak rate of 3% or less by weight?

The first consideration is to determine whether you are a "third-party owner or operator" as defined in the rule. This is discussed in detail in the "Definitions" section of this document.

If you are considered a third-party owner or operator under the rule, then the requirement to achieve a methane leak rate of 3% or less by weight applies to you. WAC 173-408-120(4)[160] requires that gas collection and control system leaks be measured using a hydrocarbon detector, or other equivalent instrument approved by Ecology or the local clean air agency, that meets the following calibration, specifications, and performance criteria (WAC 173-408-120(1))[161]:

- EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A[162]
- EPA Other Test Method 51 (OTM-51)[163]
- Other approved EPA test methods with concurrent Ecology or local clean air agency approval

5.) How do I know if my gas control device was in compliance with source testing requirements as of June 8, 2022?

As long the current gas control device is in compliance with the approval order issued by the local air agency who has jurisdiction over your landfill, then the gas control device is in compliance, and the next source test needs to be conducted within 5 years of the compliant test.

6.) I was not previously required to source test the control device at my landfill: how do I go about this process?

[159] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130
[160] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[161] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[162] https://www.epa.gov/emc/method-21-volatile-organic-compound-leaks
[163] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-990

WAC 173-408-120(6)[164] (Control device destruction efficiency determination) states the process for enclosed flares and energy recovery devices. The following test methods are acceptable:

- EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
- EPA Reference Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon
- EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
- EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases

Additionally, the following equation must be used to calculate destruction efficiency:

$$Destruction\ Efficiency = \left[1 - \left(\frac{Mass\ of\ Methane - Outlet}{Mass\ of\ Methane - Inlet}\right)\right] x\ 100\%$$

As noted in Table 5, an initial source test must be conducted within 180 days of startup of the gas collection and control system.

7.) Do results of source tests need to be submitted to Ecology or the local clean air agency?

Owners or operators must submit a copy of the most recent source test for each gas control device[165] annually, in accordance with WAC 173-408-170(7)(h)[166], and this report must go to both Ecology and the local clean air agency.

Additionally, owners or operators must keep records on source testing, which may be requested by Ecology or the local clean air agency. WAC 173-408-160[167] provides all the rule's recordkeeping requirements.

Ecology intends to issue further guidance on annual reporting later this year.

For any additional questions on source testing, please reach out to catherine.lucke@ecy.wa.gov or bill.flagg@ecy.wa.gov.

Methane Concentration Limits (WAC 173-408-100[168])

This section provides guidance on the rule's methane concentration limits: these limits pertain to the methane concentration at the surface of a MSW landfill.

MSW landfills must comply with the methane concentration limits on whichever of the following dates is later:

- January 1, 2025

[164] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[165] Gas control devices subject to WAC 173-408-080(4)(a) and (5)(a)
[166] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-170
[167] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-160
[168] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100

- Upon commencing operation of a newly installed GCCS or modification of an existing GCCS in accordance with WAC 173-408-080[169]; or
- A date established by Ecology to accommodate significant technological improvements, not to exceed beyond May 13, 2026[170]

The methane concentration limits at the surface of a MSW landfill are as follows:

- 500 ppmv of methane as determined by instantaneous surface emissions monitoring, other than when measured by nonrepeatable, momentary readings; or
- An average concentration limit of 25 ppmv of methane as determined by integrated surface emissions monitoring.

Lastly, these requirements do not apply to certain areas of a MSW landfill, if the owner or operator of the landfill ensures these areas are no longer in size and no longer in duration than is necessary for the specified activity. These areas are as follows:

- The "working face"[171] of the landfill;
- 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;
- Areas of the landfill in which the owner or operator, or a designee, which is a person or entity that has express, written permission from the owner or operator, is engaged in active mining for minerals or metals; or
- Areas of the landfill surface where the landfill cover material has been removed for law enforcement activities requiring excavation.

Question and answer

1.) How do I know if the above methane concentration limits apply to my landfill, starting on January 1, 2025?

MSW landfills that already have a gas collection and control system (GCCS) that meets the requirements of WAC 173-408-080[172] must comply with the above methane concentration limits.

Further, these MSW landfills should have begun quarterly surface emissions monitoring starting on January 1, 2025. Quarterly surface emissions monitoring results will determine whether a MSW landfill has exceeded the rule's methane concentration limits. Guidance on monitoring is covered in the next section of this document.

[169] Please see the "Design Plan and Installation of a GCCS" section for more information on this
[170] The rule allows for 24 months after Ecology adopts rules to implement Chapter 173-408 WAC, and the rule was adopted on May 13, 2024.
[171] The "working face" is defined in the rule as the "open area of a MSW landfill where solid waste is deposited daily and compacted with landfill equipment."
[172] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080

2.) If I need to install a new GCCS, or make modifications to an existing GCCS, to comply with the rule, when do the methane concentration limits of the rule apply to my landfill?

a.) Installation of a new system:

Owners or operators of MSW landfills that must install a new GCCS to comply with the rule will have to comply with the methane concentration limits once the new system is installed and operational. Table 3 shows timeline requirements for owners or operators of MSW landfills who must install a new GCCS to comply with the rule.

This also coincides with the timeline for when owners or operators must begin quarterly surface emissions monitoring.

b.) Modification of an existing system:

Owners and operators who have an existing system, but must make modifications to the system to meet the requirements of WAC 173-408-080[173], should have already started the process of making these modifications, and will need to submit an amended design plan to Ecology or the local clean air agency within 90 days of any event that warrants a change to the design plan. As discussed in the "Design plan and installation of a GCCS" section of this document, owners or operators should notify Ecology or their local clean air agency if modification of an existing system must be made.

Once the amended design plan is approved, the owner or operator will need to comply with the rule's methane concentration limits, and quarterly SEM must begin.

3.) I need to make significant technological improvements to my existing GCCS: how do I go about this process?

If an owner or operator is making significant improvements to an existing system, the first step is to reach out to Ecology with an alternative compliance measures request letter in accordance with WAC 173-408-130[174]. In the letter, the owner or operator should provide details on the proposed improvements to the existing system, any new components being added, and a comprehensive timeline that includes construction start and end dates. The owner or operator must also submit a plan detailing proposed actions on methane emissions control in the interim, while improvements are being made.

If approved, Ecology will establish a date to accommodate the technological improvements, not to exceed May 13, 2026, in accordance with WAC 173-408-100(1)(c).[175]

Throughout this process, Ecology may request recommendations from the local clean air agency who has jurisdiction over the county the MSW landfill is operating in.

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[173] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-080
[174] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-130
[175] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-100

Monitoring (WAC 173-408-110[176])

This section of guidance covers a wide range of the rule's monitoring requirements.

WAC 173-408-110(1)[177] states that the "owner or operator of a MSW landfill with a gas collection and control system must conduct quarterly instantaneous or integrated surface monitoring of the entire landfill surface according to this subsection and the procedures in WAC 173-408-120(3)."[178]

WAC 173-408-110(1)(a) requires any MSW landfill that conducts surface emissions monitoring (SEM) to develop a surface monitoring design plan (SMDP). The requirements for the SMDP are as follows:

- Includes a topographical map, or maps[179], that clearly identifies the monitoring grids, monitoring traverse, and the working face of the landfill;
- Describes the rationale for any site-specific deviations (e.g., approved alternative compliance measures;
- Must be updated on a quarterly basis if changes are made to the monitoring traverse or working face area of the landfill; and
- Must be provided to Ecology or the local clean air agency within 5 business days of a request[180]

Table 6 below provides an overview of the quarterly SEM timeline requirements. The timeline for when MSW landfills subject to the rule need to start monitoring is informed by the rule's methane concentration limits section, WAC 173-408-100[181], which sets enforceable limits on surface methane concentrations, as determined by either instantaneous or integrated surface monitoring. These limits are discussed more in the previous section of this document.

Table 6: Monitoring timelines and requirements for MSW landfills

Timeline for quarterly surface emissions monitoring (SEM) and component monitoring	Active MSW landfills	Closed MSW landfills	Inactive MSW landfills
MSW landfills with an existing GCCS that meets the requirements of WAC 173-408-080[182]	Beginning on the first quarter of 2025	Same	Same

[176] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[177] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[178] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[179] Multiple maps can be developed if it helps larger landfills capture the monitoring grids and traverse in better resolution.
[180] Please see WAC 173-408-160(1) for the rule's recordkeeping requirements
[181] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100
[182] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080

MSW landfills with an existing GCCS that needs modifications	Starting the first quarter after modifications are made, and an amended design plan is submitted and approved	Same	Same
MSW landfills installing a GCCS[183]	Starting the first quarter after installation and operation of a GCCS	Same	Same
MSW landfills making significant technological improvements	Date established by Ecology, not to exceed May 13, 2026	Same	Same

The methane concentration limit requirements of the rule set exceedance limits, as discussed in the previous section of this document, as well as actions that must be taken when an exceedance is found during a monitoring event. WAC 173-408-110(1)(b) through (e) and (2)(c)[184] requires steps to be taken when an exceedance is found during quarterly SEM and component monitoring, which is described below in Table 7.

Table 7: Quarterly SEM and component monitoring exceedances timeline

Exceedance	Corrective action(s) and remonitoring	Notification[185]	Additional requirements
1st exceedance[186]	Within 10 calendar days	To Ecology or the local clean air agency within two working days after corrective action(s) and remonitoring.	Must record date, location, and value[187] for each exceedance, and for remonitoring and report annually[188]. Exceedance location must be marked on a topographic map displaying both the monitoring grids and gas collection system.

[183] The timeline for installation and operation of a new GCCS is described in the "Design plan and installation of a GCCS" section.
[184] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-110
[185] WAC 173-408-110(1)(b)
[186] WAC 173-408-110(1)(c)(ii) and (1)(d)(ii)
[187] For instantaneous SEM this the value for each exceedance, for integrated SEM this is the average surface methane concentration for each grid.
[188] As required by WAC 173-408-170(6). Ecology anticipates publishing additional guidance on annual reporting.

2nd exceedance[189]	Within 10 calendar days	Same	Same
3rd exceedance[190]	Install a new or replacement well, or alternative active methane control within 120 days	Same	Same

The corrective action(s), remonitoring and notification timelines above in Table 7 apply to active, inactive and closed MSW landfills, however closed MSW landfills may move from a quarterly monitoring schedule to an annual monitoring schedule under the following conditions:

- Any closed MSW landfill that has no monitored exceedances, either through instantaneous or integrated SEM, after four consecutive quarterly monitoring periods may move to annual monitoring[191].
- Any closed MSW landfill that can demonstrate no quarterly or annual monitoring exceedances, either through instantaneous or integrated SEM, in the three years before the effective date of the rule, June 13, 2024, may monitor annually[192].

If a closed MSW landfill moves to annual monitoring due to the above conditions, and measures an exceedance during an annual monitoring event, then it must move back to a quarterly monitoring schedule.

In addition to quarterly SEM requirements for the landfill surface and GCCS components containing landfill gas, the rule also requires monthly wellhead monitoring for all MSW landfills impacted by the rule. Guidance on wellhead monitoring requirements is found in the table below.

Table 8: Monthly wellhead monitoring exceedance timeline

Monthly Requirement	Exceedance	Corrective action(s) and remonitoring	Exceptions
Monitor each wellhead to	Within 5 calendars days of positive pressure reading	Initiate corrective action(s)	Please see WAC 173-408-080(7)[193] for exceptions to the

[189] WAC 173-408-110(1)(c)(ii)(A) and (1)(d)(ii)(A)
[190] WAC 173-408-110(1)(c)(ii)(B) and (1)(d)(ii)(B)
[191] WAC 173-408-110(1)(c)(iii) and (1)(d)(iii)
[192] WAC 173-408-110(1)(e)
[193] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080

determine gauge pressure	Within 15 calendar days of positive pressure reading	If issue is not fixed, must initiate further corrective action(s) (e.g., initiate expansion of collection system)	wellhead gauge pressure requirements.
	Within 120 days of positive pressure reading	New wells must be installed and operating	

The rule also contains gas control system equipment and component monitoring requirements for both MSW landfills and third-party owners and operators[194] subject to the rule, which can be found in WAC 173-408-110(2)(a), (b), and (c)[195].

Question and answer

1.) What does the entire landfill surface mean regarding quarterly surface emissions monitoring (SEM)?

Under WAC 173-408-020[196], "landfill surface" is defined as "the area of the landfill under which decomposable solid waste has been placed, excluding the working face."

Any area of an MSW landfill that falls under this definition must be monitored on a quarterly basis. Areas that contain only "inert or nondecomposable waste(s)", as defined in WAC 173-408-020[197], may be excluded from monitoring, as well as gas collection. However, as required by WAC 173-408-080(2)(a)(ix)[198], an owner or operator must submit documentation to Ecology or the local clean air agency containing the nature, date of deposition, location and amount of inert waste or nondecomposable waste(s) deposited in the area before these areas can be excluded from gas collection and quarterly SEM. This documentation may be included as part of the design plan and these areas must also be marked on the SMDP (please see answer to question 6 of this section for more details on this).

2.) What about areas of the landfill that have steep slopes or other hazardous conditions that make it them unsafe to monitor?

If these areas of the landfill fall under the definition of "landfill surface" then they must be monitored on a quarterly basis. Ecology has adopted EPA Other Test Method (OTM) 51[199] (unmanned aerial system) as an alternative to Method 21, which provides a safer alternative to monitoring areas that contain hazards. Guidance on these methods will be provided in the next section ("Monitoring Methods") of this document.

[194] Please see the "Definitions" section for guidance on third-party owners or operators
[195] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[196] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-020
[197] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-020
[198] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[199] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120

If an owner or operator still has concerns with monitoring certain areas of the landfill, they can submit an alternative compliance measures request (WAC 173-408-130[200]). Guidance on these requests is discussed on page 75.

3.) Page 52 of this guidance document notes that certain areas of the landfill are excluded from the rule's methane concentration limits requirements based on certain activities. In the event these activities take place, are the impacted areas of the landfill excluded from quarterly SEM?

Yes, WAC 173-408-100(4)[201] excludes certain areas from the rule's methane concentration limits[202], which temporarily excludes them from quarterly SEM. It should be noted that WAC 173-408-100(4) requires that an "owner or operator ensures these areas are no larger in size and no longer in duration than is necessary for the specified activity" as a condition for exclusion from the rule's methane concentration limits (and quarterly SEM).

The SMDP must be updated on a quarterly basis to provide a description of these areas and activities in question, which are listed in WAC 173-408-100(4)(b) through (d)[203]. These areas/activities are considered "site specific deviations" to the monitoring traverse.

4.) I need to install and operate a GCCS to meet the requirements of the rule: when do I need to begin quarterly SEM and component monitoring?

As shown in table 6, owner or operators that install new systems must begin quarterly SEM and component monitoring the first quarter following installation and start-up of the system.

The timeline requirements for installation and operation of a GCCS for MSW landfills is shown in table 3 of this guidance document.

5.) I own or operate a landfill with an existing GCCS, but the GCCS needs to be modified to meet the requirements of WAC 173-408-080: do I need to begin quarterly SEM and component monitoring beginning on January 1, 2025?

No. As shown in Table 6, owners or operators that must modify their GCCS to meet the requirements of WAC 173-408-080[204] must begin monitoring the first quarter after modifications have been made, and an amended design plan has been submitted and approved by Ecology or the local clean air agency.

6.) I need to make significant technological improvements at my landfill, as referenced in Table 6: when does Ecology establish a date for when these improvements must be made and for when monitoring begins?

Owners or operators who must make significant technological improvements to the system must submit an alternative compliance measure request to Ecology for review and approval. Once submitted, and if approved, Ecology will specify a date for when the rule's methane concentration limits begin, which coincides with when quarterly SEM must begin.

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[200] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-130
[201] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100
[202] 500 ppmv via instantaneous SEM, or an average of 25 ppmv via integrated SEM
[203] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100
[204] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-080

7.) WAC 173-408-110(1)(a)[205] states that the "rationale for any site-specific deviations" must be included in the surface monitoring design plan: what are considered site-specific deviations?

Site-specific deviations are any areas of the MSW landfill surface and gas collection and control system components that are not being monitored due to allowable exclusions granted by the rule. For example, areas that contain only "inert or nondecomposable waste(s)", as defined under WAC 173-408-020[206] would fall under this category. Please see the answers to questions 1 and 3 of this section for examples of site-specific deviations.

It should be noted that if site-specific deviations are only temporary, then the SMDP must be updated for the next quarter of monitoring to reflect the changes to the monitoring traverse and/or monitoring grids.

8.) If Ecology or the local clean air agency requests my surface monitoring design plan, how should this be submitted?

WAC 173-408-140[207] covers requirements for communications, submittals or requests. Unless expressly stated otherwise in the rule, submittals to Ecology or the local clean air agency need to be in a format acceptable to the relevant agency upon request.

Ecology will accept the SMDP in pdf format. Owners or operators of landfills located in jurisdiction overseen by a local clean air agency should work with their applicable agency on acceptable formats for submittals.

9.) What is considered an exceedance during a monitoring event?

Under WAC 173-408-020[208], an "exceedance" is defined as "the concentration of methane measured within three inches above the landfill surface that exceeds 500 ppmv, other than 'nonrepeatable, momentary readings', as defined in this section, as determined by instantaneous surface emissions monitoring; or the average methane concentration measurements that exceed 25 ppmv, as determined by integrated surface emissions monitoring."

"Nonrepeatable, momentary readings" are defined by rule as "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."

Table 7 gives guidance on requirements for when exceedances are found during monitoring.

10.) What are components and how do I monitor them?

Under WAC 173-408-020, a "component" is defined as "any equipment that is part of a 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."

WAC 173-408-110(2)(c)[209] requires quarterly monitoring of all components containing landfill gas. When a "component leak" is found during a monitoring event, an owner or operator must follow the same corrective

[205] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[206] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-020
[207] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-140
[208] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-020
[209] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110

action(s), remonitoring and notification requirements as they would for finding exceedances during SEM. The timeline for these actions is displayed in table 7.

The rule defines a "component leak" as "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 'nonrepeatable, momentary readings' …. Measurements from any vault must be taken within three inches above the surface of the vault exposed to the ambient air."

11.) How do I make a notification to Ecology or the local clean air agency following corrective action(s) and remonitoring of a found exceedance?

In accordance with WAC 173-408-110(1)(b)[210], (1)(c)(i) and (d)(i), a notification must include the following:

- Date, location[211], and value[212] of initial monitoring exceedance;
- Date of corrective action(s) taken and a description of the corrective action(s); and
- Date, location[213], and value of remonitoring

Regarding location, latitude and longitude coordinates of the exceedance location must be provided.

Ecology also recommends that the following details are provided in the notification:

- Wind speed and barometric pressure during sampling;
- Pictures of exceedance location (e.g., landfill surface, equipment leak location, etc.), as part of the description of corrective action(s) taken; and
- Installation date and location of each well installed as part of a gas collection system expansion following a third exceedance.

Regarding details on wind speed and barometric pressure, owners or operators are required to keep records of this data during monitoring events, as required by WAC 173-408-160(1)(vi)[214], and if they add this information to their notification it will be considered an acceptable record.

Regarding installation date and location of each well installed as part of an expansion, this only applies to owners or operators who record a third exceedance during monitoring and may have to "install a new or replacement well", as required by WAC 173-408-110(1)(c)(ii)(B) and (1)(d)(ii)(B) to fix the repeated exceedance.[215] WAC 173-408-160(1)(vi) also requires a record of "the installation date and location of each well installed as part of a gas collection system expansion", and if this is included in the notification it will be considered an acceptable record.

Pictures are not required, however are considered a good operational practice as owners or operators will have a visual record of exceedance areas that they can refer to later.

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[210] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-110

[211] From WAC 173-408-110(1)(c)(i) and (d)(i): "clearly marked and identified on a topographic map, at a minimum, of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified"

[212] In ppmv

[213] This should be the same location as the initial exceedance

[214] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-160

[215] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-110

Lastly, it is important to note that MSW landfills that are located in a geographic area of a local clean air agency[216], should work with their clean air agency on this notification process to ensure the format of the notification is acceptable to the applicable agency, as required by WAC 173-408-140.[217]

12.) How do I measure gauge pressure to satisfy the rule's monthly wellhead monitoring requirements?

WAC 173-408-120(7)[218] establishes the requirement for determination of gauge pressure: "Gauge pressure must be determined using a hand-held manometer, magnehelic gauge, or other pressure measuring device approved by the department [Ecology] or local authority. The device must be calibrated and operated in accordance with the manufacturer's specifications."

Monitoring Methods (WAC 173-408-120(3)[219])

This section provides guidance on instantaneous and integrated surface emissions monitoring (SEM), including equipment, methodology, monitoring traverse, and precipitation and windspeed requirements.

As noted in the previous section, and as required by WAC 173-408-110(1)[220] "The owner or operator of a MSW landfill with a gas collection and control system must conduct quarterly instantaneous or integrated surface monitoring of the entire landfill surface …".

Monitoring Equipment: the following equipment is needed during SEM.

- A hydrocarbon detector or other equivalent instrument approved by Ecology or the local clean air agency;
    - The rule defines a "hydrocarbon detector" as an instrument used for the measurement of methane that meets the calibration, specifications, and performance criteria of EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A (in effect on the date in WAC 173-400-025[221]).
- Onsite anemometer to measure windspeed during sampling[222]
- Barometer to measure barometric pressure during sampling

Approved Monitoring Methods: the following methods are approved for use for SEM.

- EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A (incorporated by reference)[223]
- EPA Other Test Method 51 (OTM-51)[224]

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[216] https://ecology.wa.gov/About-us/Accountability-transparency/Partnerships-committees/Clean-air-agencies
[217] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408-140
[218] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[219] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[220] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[221] https://app.leg.wa.gov/WAC/default.aspx?cite=173-400-025
[222] As required by WAC 173-408-120(3)(b)(v) and (3)(c)(iii)
[223] WAC 173-408-120(1)(a)
[224] WAC 173-408-120(1)(b)

- Other approved EPA test methods with Ecology and local clean air agency approval[225]

Monitoring Methodology:

The rule allows owners or operators to conduct monitoring either using the instantaneous or integrated method[226], but owners and operators can choose to perform both methods each quarter if they choose to do so. However, if an owner or operator wishes to change methods from one quarter to the next, they must seek Ecology or local clean air agency approval before doing so.

Similarly, an owner or operator must seek approval from Ecology or the local clean air agency to use any EPA approved test method other than described in WAC 173-408-110(1)(a) and (b)[227]. If an owner or operator chooses to use an alternative to Method 21, such as OTM-51 (unmanned aerial systems), they must seek approval from Ecology or the local clean air agency before returning to Method 21[228]. Table 9 below outlines key requirements for quarterly or annual SEM for both the instantaneous and integrated methods.

Table 9: Overview of monitoring requirements for owners or operators (O/Os) of MSW landfills

Requirement	Area or duration	Methods impacted	Exceptions
50,000 square foot (sq ft) grids[229]	Entire landfill surface	Both instantaneous and integrated SEM	None
25-foot (ft) (7.6 meter) walking path spacing (traverse)[230]	In each monitoring grid, covering entire landfill surface	Both instantaneous and integrated SEM	100-ft traverse after 4 consecutive quarters with no exceedances[231]
			100-ft traverse if O/O's can demonstrate no exceedances in 3 years before June 13, 2024[232]
Terminate sampling when average (avg.) wind speed exceeds 5 mph, or gusts exceed 10 mph[233]	Until wind speed drops below exceedance thresholds	Both instantaneous and integrated SEM	Wind speed alternatives for MSW landfills regularly facing high wind speeds
Sampling only can be done within 72 hours of	72 hours	Both instantaneous and integrated SEM	Precipitation alternatives for landfills regularly receiving high precipitation

[225] WAC 173-408-120(1)(c)
[226] WAC 173-408-110(1)
[227] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[228] WAC 173-408-990(11.0) (e)
[229] WAC 173-408-120(3)(a)
[230] WAC 173-408-120(3)(a)(ii)
[231] WAC 173-408-120(3)(a)(ii)(A)
[232] WAC 173-408-120(3)(a)(ii)(B)
[233] WAC 173-408-120(3)(a)(iii)

no measurable precipitation[234]			
< 500 ppmv methane, other than "nonrepeatable, momentary readings"[235]	Each monitoring point in the grid	Instantaneous SEM	None
< Avg. of 25 ppmv methane	Avg. of all samples in each grid	Integrated SEM	None

Instantaneous SEM overview:

Instantaneous SEM is a point-source monitoring method, where a grid is traversed by either an individual holding a portable hydrocarbon detector or by an unmanned aerial system (UAS) with an attached hydrocarbon detector (methane detection payload). When performing instantaneous SEM, the detector is measuring emissions of methane on the landfill surface at a given time and location and recording the data. Exceedances (≥ 500 ppmv surface methane) are determined by the surface methane concentration of each reading at the time it is taken, and the location of the exceedance(s) must be remonitored after corrective action(s) have been taken.

Requirements for instantaneous SEM:

- For Method 21, hold the hydrocarbon detector's probe within three inches (7.62 cm) of the landfill surface while traversing the grid
- For OTM-51, the methane detector payload's nozzle inlet should be within ~ 2 – 3.9 inches (5-10 cm) of the landfill surface while traversing the grid
- Grids must be 50,000 sq ft (Table 9)
- Walking pattern (traverse) or UAS flight path must be no more than 25-ft (7.6 meters) spacing (Table 9)
- Owner or operator must record any surface readings of 200 ppmv of methane or greater (other than nonrepeatable, momentary readings)
- Any readings of ≥ 500 ppmv must be marked and remediated, and the location of the exceedance must be remonitored as required by WAC 173-408-120(3)(b)(ii)[236]
- Location of each monitored exceedance must be marked with the concentration of the exceedance recorded. The location of the exceedance must be recorded using an instrument with an accuracy of at least 14 feet[237]

[234] WAC 173-408-120(3)(a)(iv)
[235] Nonrepeatable, 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."
[236] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[237] WAC 173-408-120(3)(b)(iv)

- All cover penetrations, distressed vegetation, cracks, or seeps must be visually inspected during and monitored using a hydrocarbon detector (Method 21 or OTM-51) during the monitoring event
- Wind speed and barometric pressure must be recorded during monitoring
    - Average wind speed must be determined using an onsite anemometer with a continuous recorded, measuring 15-minute averages.[238]

Integrated SEM overview:

Integrated SEM is an average of all readings taken inside of a particular grid. Both Method 21 and OTM-51 can be used with the integrated method. With integrated SEM, exceedances (≥ average of 25 ppmv surface methane) are determined by averaging all the point-source surface methane readings inside of a grid after the entire grid is monitored. When the average of all readings in a grid show that the grid is in exceedance the whole grid must be remonitored after corrective action(s) have been taken.

Requirements for integrated SEM:

- For Method 21, hold the hydrocarbon detector's probe within three inches (7.62 cm) of the landfill surface while traversing the grid
- For OTM-51, the methane detector payload's nozzle inlet should be within ~ 2 – 3.9 inches (5-10 cm) of the landfill surface while traversing the grid
- Grids must be 50,000 sq ft (Table 9)
- Walking pattern (traverse) or UAS flight path must be no more than 25-ft spacing (7.6 meters) (Table 9)
- All readings taken inside of a grid (50,000 sq ft grid at 25-ft spacing) must be recorded and averaged for each grid
- Any grids reading an average of ≥ 25 ppmv must be identified and remediated, and the grid must be remonitored[239]
- All cover penetrations, distressed vegetation, cracks, or seeps must be visually inspected during and monitored using a hydrocarbon detector (Method 21 or OTM-51) during the monitoring event
- Wind speed and barometric pressure must be recorded during monitoring
    - Average wind speed must be determined using an onsite anemometer with a continuous recorded, measuring 15-minute averages[240]

Planning and Preparation for Monitoring:

This subsection covers guidance on planning, preparation and performing quarterly surface[241] emissions monitoring. Not all the following activities are required but are suggestions for owners or operators who are

[238] WAC-173-408-120(3)(a)(iii)
[239] WAC 173-408-120(3)(c)(ii)
[240] WAC-173-408-120(3)(a)(iii)
[241] Or annual, as allowed by WAC 173-408-110(1)(c)(iii) and WAC 173-408-110(1)(d)(iii) and (e).

preparing to conduct instantaneous or integrated SEM.

Table 10: Planning and Preparation for Monitoring Guidance, Instantaneous or Integrated SEM

Task	Timing	Comments
Manage grid map	Weekly	WAC 173-408-110(1)(a)[242] requires a SMDP, including a topographical map. The plan must be updated quarterly if changes are made to the monitoring traverse or working face.
Select grids and monitoring routes	Quarterly	A walking pattern with a 25-ft spacing interval in a 50,000-ft grid[243]. A route of approximately 2,450 linear ft in a 50,000 ft grid to be walked in 20 minutes is recommended.
Identify excluded areas on map	Quarterly	The SMDP map must include "site-specific deviations", and the rationale for them, as required by WAC 173-408-110(1)(a)[244]
Inspect grid for accessibility	Prior to monitoring	Identify any items requiring attention before monitoring. As necessary, arrange to have brush or weeds removed from monitoring path.
Ensure area will be dry	3-5 days ahead of sampling	As necessary and to the extent possible, have irrigation shut off several days before testing.
Confirm weather conditions	Day of sampling	No rain in previous 72 hours (WAC 173-408-120(3)(a)(iv)[245]); wind speed less than 5 mph for 15-min average or 10 mph instantaneous, based on hand-held anemometer (WAC 173-408-120(3)(a)(iii)[246]).
Prepare and calibrate equipment	3-5 days ahead of sampling	Prepare according to calibration, specifications, and performance criteria, as required by WAC 173-408-120(1)[247]
Confirm safe conditions	Ongoing basis	Confirm conditions are safe for monitoring. Use additional safety precautions as necessary so that all required areas are monitored.[248]

Scheduling: Key factors to consider when scheduling surface grid monitoring are as follows.

[242] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[243] WAC 173-408-120(3)(a) and (3)(a)(ii)
[244] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[245] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[246] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[247] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[248] Please see answers to questions 1 and 2 under the "Monitoring" section of this document for guidance on this.

- Monitoring should always be started as early as possible in a quarter to assure that all monitoring is completed before the end of the quarter.
- Grids to be monitored are selected daily and selection often depends on weather conditions, keeping in mind wind speed and precipitation requirements.
- Re-monitoring and remediation activities should be incorporated into the quarterly schedule and typically take priority over routine monitoring.

Route Selection:

This section describes methods for selecting sampling routes when excluding full or partial grids from monitoring. The entire "landfill surface" (excluding the working face), as defined in WAC 173-408-020[249] must be monitored each quarter.

Ideal grid example

The monitoring path for an ideal grid (a 50,000 ft^2 rectangle) may resemble that shown in Figure 1. Figure 1 is an illustrative example for landfill owners and operators to refer to in the development of appropriate walking patterns, or flight path[250], to comply with the rule. Because of the variability of landscapes and operational practices it is not expected for landfill owners or operators to follow the exact walking pattern depicted in Figure 1.

The rule requires that the walking pattern must be no more than a 25-foot (7.6 meter) spacing interval and must traverse each grid[251]; unless the spacing interval is increased to a 100-foot spacing interval pursuant to WAC 173-408-120(3)(a)(ii)(A) and (B).[252] The sampling path resembles a serpentine[253] pattern. A route of approximately 2,450 feet long in a 50,000 ft^2 grid to be walked in about 20 minutes while using a 4-second sampling frequency is recommended. The walking pace should be approximately 100 feet per minute, except when limited by terrain or vegetation. This would yield about 300 data points per 50,000 ft2 grid.

For owners or operators utilizing EPA Other Test Method 51 (OTM-51), the monitoring grid (50,000 sq ft) and traverse spacing intervals (25 ft) requirements are the same, however the method is different than Method 21. Please refer to WAC 173-408-990 (Appendix II)[254] for requirements on the use of OTM-51 for monitoring.

Irregular grid example

Different routes need to be used for grids with excluded areas or irregular shapes. Guidelines for selecting routes and sampling times for irregular grids are presented in Table 11. In these cases, both the length of the traverse and the time taken to complete the traverse should be prorated to the percent of the total grid that can be sampled. For example, if only 70% (35,000 ft^2) of the area is sampled, the traverse length and sampling time are calculated as shown below:

[249] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-020
[250] When using an approved UAS monitoring method, such as OTM-51
[251] WAC 173-408-120(3)(a) and (3)(a)(ii)
[252] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[253] See Figure 1.
[254] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-990

Adjusted route length = 0.7 x 2,450 ft = 1,715 ft

Adjusted sample time = 0.7 x 20 minutes = 14 minutes

Note that since the proportion reduces both the distance and sample time, the speed at which the route is walked will remain the constant.

Grids with excluded areas

Grids with excluded areas will have less than 50,000 ft^2 of area available for traversing. In these cases, both the length of the traverse and the time taken to complete the traverse should be applied to the percent of the total grid that can be sampled. Areas that are not required to be monitored do not need to be split into 50,000 ft^2 grids.

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Figure 1. Typical 50,000 Square Foot Grid and Walk Pattern

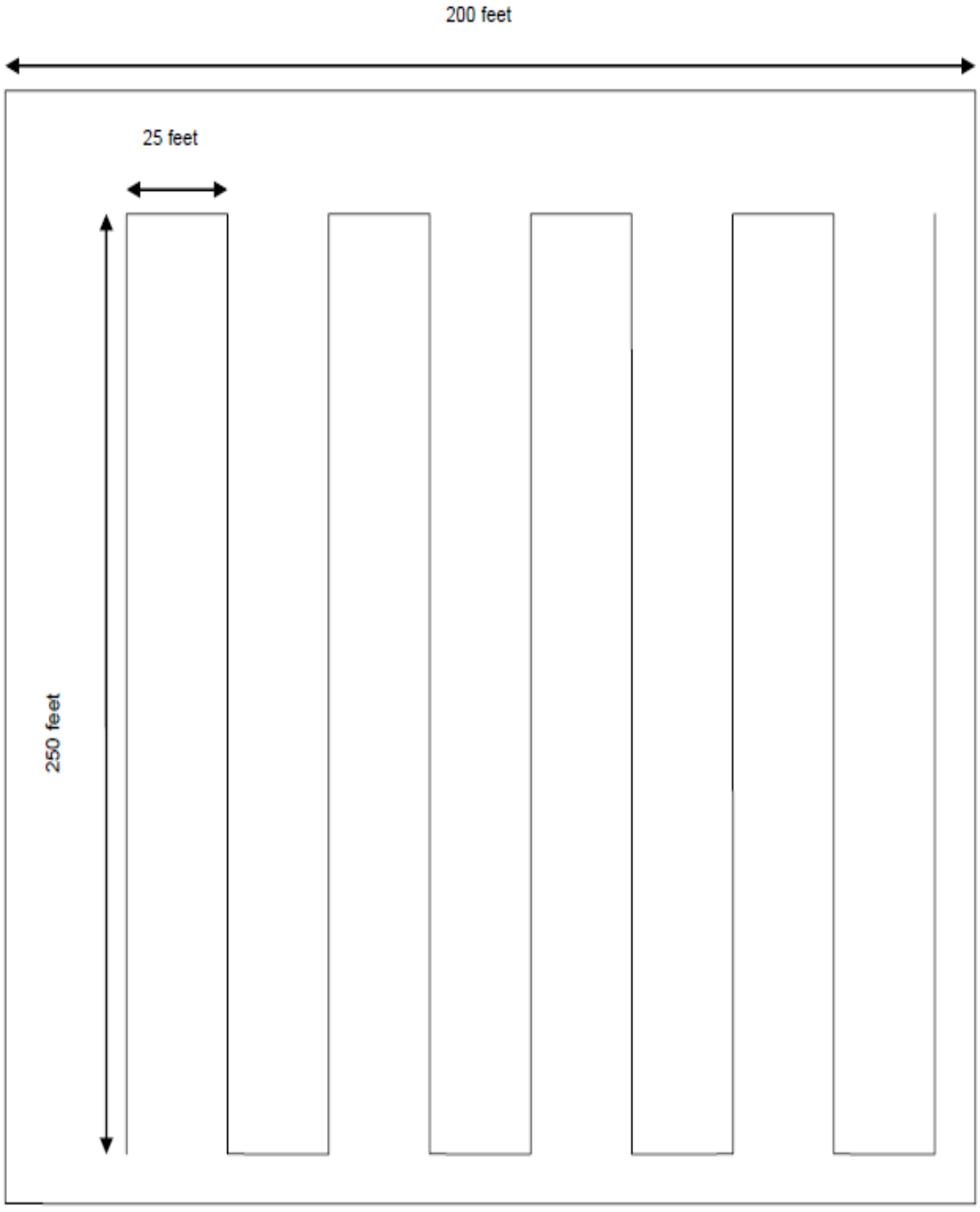

Figure 1: Landfill Walk Pattern for an Ideal 50,000 Square Foot Grid

Table 11: Guidance for Route Selection on Irregular Grids

Issue	Recommended Action
Grid has excluded area	• Choose a representative route over remaining area • Prorate length of route to fraction of grid sampled • Prorate sampling time to fraction of grid sampled
Grid has irregular shape and/or terrain	Adjust shape of route to provide complete, safe coverage

Some grids will have irregular shapes or terrain that will make walking a standard serpentine route impossible. In these cases, an alternate route should be developed that provides representative coverage of the grid.

Excluded areas from monitoring:

WAC 173-408-110(1)[255] requires instantaneous or integrated monitoring of the "entire landfill surface"[256], which excludes the working face of the landfill. There are other areas that potentially may be excluded from monitoring. Table 12 presents guidelines for determining if an area can or should be excluded from monitoring.

Table 12: Guidelines for Excluding Areas from Monitoring

Reason for Exclusion	WAC Reference	Comments
Active working face	WAC 173-408-110(1) WAC 173-408-100(4)(a)	• Area should be "no larger in size and no longer in duration as necessary"[257] • "Landfill surface" excludes the "working face"[258] • "Working face" excluded from the rule's methane concentration limits.
Landfill surface cover material removal for certain activities	WAC 173-408-100(4)(b)	• Area should be "no larger in size and no longer in duration than is necessary" • Area(s) should be checked again later in the quarter and monitored if it is accessible
Active mining for minerals or metals requiring	WAC 173-408-100(4)(c)	• Area should be "no larger in size and no longer in duration than is necessary"

[255] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[256] Please see the answer to question 1 under the "Monitoring" section of this guidance document for more details on this.
[257] WAC 173-408-100(4)
[258] Please see WAC 173-408-020 for definitions of both terms

excavation of cover materials		• Area(s) should be checked again later in the quarter and monitored if it is accessible
Law enforcement activities requiring excavation of cover materials	WAC 173-408-100(4)(d)	• Area should be "no larger in size and no longer in duration than is necessary" • Area(s) should be checked again later in the quarter and monitored if it is accessible
"Inert waste or nondecomposable waste(s)"[259]	WAC 173-408-110(1)	"Landfill surface" does not include nondecomposable waste(s)
Alternative compliance measures	WAC 173-408-130	Must be approved by Ecology before any areas in question are excluded from monitoring

It is important to note that if an area is inaccessible due to temporary conditions, such as those stated in WAC 173-408-100(b) through (d)[260], the area(s) should be checked again later in the quarter and monitored if accessible, as noted in Table 12. Additionally, documentation of excluded areas meeting the criteria listed above should be noted on the SMDP, and on a topographical map, as required by WAC 173-408-110(1)(a).[261]

Grid Preparation:

It is necessary to ensure ahead of time that the grid surface will be dry and accessible for monitoring. Steps taken to satisfy this requirement include:

- Irrigation: Plan to shut off the irrigation a few days before monitoring if normal irrigation would render the grid unsafe to monitor. Monitoring should be planned around the irrigation schedule.
- Vegetation: Some types of vegetation are either unsafe to walk on or impractical to walk through. As necessary, and within the limits of the rule or other restrictions, modifications to the landscape and vegetation should be considered to allow for safe monitoring of the grid. These modifications may include removal of vegetation or construction of a path to reach areas that are difficult to access.

Weather Conditions:

The rule includes several weather restrictions to ensure representative monitoring, some of which are already covered in Table 9.

[259] Please see definition in WAC 173-408-020
[260] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100
[261] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110

- Average wind speed less than 5 mph, or instantaneous wind speed less than 10 mph, based on a 15-minute average
- No measurable precipitation within the past 72 hours

Weather checks are performed as part of monitoring as follows:

- (Best practice) At the beginning and end of each day, check and record wind speed and wind direction using the site weather station or other instrumentation. Relative humidity and barometric pressure can also be recorded.
- (Best practice) Before and after monitoring each grid, measure and record wind speed using a hand-held anemometer.
- (Requirement) The wind speed and barometric pressure must be recorded during the sampling period (WAC 173-408-120(3)(b)(v))[262]

Sampling Equipment Preparation:

Any instrument used for the measurement of methane during a required monitoring event must be a hydrocarbon detector or other equivalent instrument approved by the department or local clean air agency that meets the following calibration, specifications, and performance criteria in the bulleted points below. It is a best practice to test instrumentation outside of monitoring events to ensure they meet performance criteria as well as manufacturer's guidelines for proper use of the instrumentation. Table 13 contains additional guidance for calibration parameters for Method 21.

- EPA Method 21[263]: Incorporated by reference in accordance with WAC 173-408-120(1)(a)[264]
- EPA Other Test Method 51 (OTM-51)[265]: As specified in WAC 173-408-990[266]
- Other approved EPA test methods: With Ecology and local clean air agency approval in accordance with WAC 173-408-130[267]

Table 13: Recommended Calibration Parameters for SEM with Method 21

Parameter	Specification	Comments
Span calibration gas concentration	Not less than 25 ppm; or more than 500 ppm	When a single calibration gas is used, 250 ppm and below is the preferred range

[262] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[263] https://www.epa.gov/emc/method-21-volatile-organic-compound-leaks
[264] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[265] https://www.epa.gov/system/files/documents/2022-12/OTM%2051-%20UAS%20Application%20of%20Method%2021%20for%20Surface%20Emission%20Monitoring%20of%20Landfills.pdf
[266] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-990
[267] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130

Calibration precision	≤ 3 percent of the calibration gas value	None
Instrument response on span gas	Gas value ± 3 percent	None

Question and answer

1.) Do I have to perform both instantaneous and integrated surface monitoring each quarter?

No. WAC 173-408-110(1)[268] requires owners or operators to conduct either instantaneous or integrated surface monitoring on a quarterly basis, so an owner or operator can choose which method works best for them. However, once an owner or operator establishes the method they choose to use, they will need approval from Ecology or the local clean air agency before switching to another method.

2.) Do I need approval prior to using the EPA OTM-51 (UAS) method?

Yes. WAC 173-408-990(11.0)(c)(Appendix II)[269] requires that owners or operators notify Ecology or their local clean air agency before use of this method. The notification must include a copy of Appendix II.

Additionally, if an owner or operator utilizes OTM-51 for monitoring, they must receive approval from Ecology or their local clean air agency before returning to Method 21 or another approved alternative method for monitoring.[270]

3.) What are the differences between instantaneous and integrated surface monitoring regarding observing exceedances, taking corrective action(s) and remonitoring?

The main differences are the methane concentration limits based on the method used, which determines if there is an exceedance or not, as well as what area needs to be remonitored after an exceedance is found and corrective action(s) have been taken. WAC 173-408-100(2)[271] sets exceedance limits for these two types of monitoring: this is discussed in more detail under the "Methane Concentration Limits" section of this document.

Regarding differences in remonitoring, under the instantaneous method the point where the exceedance (≥ 500 ppmv of methane) has been found (e.g., a crack in cover material) needs to be remediated and remonitored, whereas under the integrated method the whole grid will need to be remonitored, after corrective action is taken, if the grid is in exceedance (an average methane concentration of ≥ 25 ppmv).

Table 7 details timeline requirements for taking corrective action(s) and remonitoring, and pages 63 and 64 break down the requirements for conducting both instantaneous and integrated monitoring in more detail.

4.) When using the integrated method, do I need to visually inspect and monitor all cover penetrations, distressed vegetation, cracks, or seeps on the landfill surface?

[268] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[269] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-990
[270] As required by WAC 173-408-990(11.0)(e)
[271] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-100

Yes, this practice is required for both methods (instantaneous and integrated).

5.) If I decide to use both the instantaneous and integrated monitoring methods what is the process and how do I report exceedances?

If an owner or operator decides to use both methods, the methods for each method are the same. For example, while conducting instantaneous SEM an owner or operator would record all readings in a particular grid (50,000 sq ft) at 25-ft spacing and at a recommended 4 second sampling frequency and then average all the readings at the end of sampling the grid to get the integrated sampling results.

If an exceedance is found while using the instantaneous method (point-source exceedance) then remonitoring should be conducted using the instantaneous method. Similarly, integrated sampling should be used to remonitor an exceedance of the grid found during integrated sampling. If the grid shows point-source exceedances and exceedances of the average methane concentration in the grid, then both methods must be used to remonitor the grid.

6.) The "Requirements of instantaneous SEM" subsection of this section notes that an owner or operator must record any surface readings of 200 ppmv of methane or greater (other than "nonrepeatable, momentary readings): isn't the exceedance limit ≥ 500 ppmv of methane for instantaneous SEM? Also, do readings of 200 ppmv or greater have to be recorded while using the integrated method?

WAC 173-408-120(3)(b)(i)[272] requires all instantaneous SEM readings of ≥ 200 ppmv, other than "nonrepeatable, momentary readings"[273], to be recorded but this does not equate to an "exceedance"[274]. These readings are constituted as elevated readings that must be recorded during instantaneous SEM. Additionally, WAC 173-408-160(1)(a)(v)[275] requires recordkeeping of all instantaneous surface readings of 200 ppmv or greater.

7.) I own or operate a landfill located in an area that receive high winds and/or heavy precipitation, and it may be unfeasible to schedule monitoring around the wind/precipitation requirements in the rule: what are my options here?

Ecology understands that some MSW landfills are in areas of the state that receive heavy amounts of rain, or face high windspeeds, or both. This is why Ecology, or the local clean air agency, may approve alternatives to this procedure for MSW landfills that cannot meet the windspeed or precipitation requirements in WAC 173-408-120(3)(a)(iii) and (iv)[276], respectively.

Owners or operators that face challenges in being able to conduct monitoring while meeting these requirements should first reach out to their local clean air agency to discuss alternatives for these requirements.

8.) Does the working face of the landfill need to be monitored?

[272] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[273] Defined in WAC 173-408-020
[274] Defined in WAC 173-408-020
[275] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-160
[276] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120

No. WAC 173-408-110(1) requires monitoring of the entire "landfill surface", however the "working face" of the landfill is excluded from this definition.[277]

9.) Are there other areas of the landfill that may be excluded from SEM?

Table 12 provides information on other potential areas of exclusion from SEM.

10.) If it is unfeasible to divide up my landfill into ideal grids (50,000 sq ft), does Ecology or my local clean air agency need to be notified?

Ecology does not need to be notified on this, however the required SMDP[278] must clearly identify the grids and monitoring traverse on a topographical map. The SMDP must be provided upon request from Ecology or the local clean air agency.

Owners or operators of MSW landfills should work with their local clean air agency to determine whether the authorizing agency wants to review the SMDP prior to conducting monitoring.

Please see the guidance under the "route selection" on page 66 for more details on grid selection for monitoring.

11.) If I'd like to utilize a monitoring method that is different than EPA Method 21 or EPA OTM-51, what is the process?

WAC 173-408-120(1)(c) [279] allows for "other approved EPA test methods", provided an owner or operator receives concurrent Ecology or local clean air agency approval. Owners or operators should coordinate submittal of another EPA approved method to Ecology or their local clean air agency on a timely basis to ensure there is no disruption to required quarterly monitoring.

12.) Will I be able to adjust my monitoring traverse to 100-ft spacing upon finding no exceedances after monitoring at the required 25-ft spacing traverse?

Yes, under certain circumstances. As stated in WAC 173-408-120(3)(a)(ii)(A) and (B)[280]:

(A): "If the owner or operator measures no exceedances of the limits[281] ... after any four consecutive quarterly monitoring periods, the walking pattern spacing may be increased to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon detection of any exceedances of the limits ... that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection."

(B): "If an owner or operator of a MSW landfill can demonstrate that in the three years before the effective date of this chapter that there were no measured exceedances of the limits... by annual or quarterly instantaneous surface emissions monitoring, the owner or operator may increase the walking pattern spacing to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon detection of any exceedances of the limits... that cannot be remediated within 10 calendar days, or upon any exceedances detected during a compliance inspection. The demonstration must prove to the satisfaction of the department

[277] Please see WAC 173-408-020 for definitions of "landfill surface" and "working face".
[278] WAC 173-408-110(1)(a)
[279] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[280] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[281] Please see WAC 173-408-100(2) for the rule's methane concentration limits

or local authority that any instrument used for methane detection meets the requirements [WAC 173-408-120(1)]."

13.) Do the requirements in WAC 173-408-120(3)(a)(ii)(A) and (B)[282] apply to specific areas of the landfill or the whole landfill?

An owner or operator must demonstrate that there are, or the in the case of (B), were, no exceedances of the methane concentration limits for the entire landfill to be approved to move to 100-ft spacing.

14.) If I am approved to move to a 100-ft monitoring traverse, would this requirement meet any federal monitoring requirements?

Ecology cannot dictate whether MSW landfills performing a 100-ft monitoring traverse meets any pertinent federal requirements, however if a MSW landfill conducts surface monitoring to meet existing federal requirements, the required 30-meter spacing intervals also satisfy the 100-ft spacing interval requirements of the rule (if the landfill is approved to conduct monitoring at 100-ft spacing in accordance with the rule).

Alternative Compliance Measures (WAC 173-408-130[283])

This section provides guidance on submitting alternative compliance measures. As stated in WAC 173-408-130(1), "the owner or operator of a MSW landfill, or third-party owner or operator, may request alternatives to the compliance measures, monitoring requirements, and test methods and procedures set forth in WAC 173-408-080, 173-408-110, and 173-408-120. Any alternatives requested by the owner or operator must be submitted in writing [to Ecology]".

Upon receipt, Ecology may evaluate the criteria listed in WAC 173-408-130(2)(a) through (h),[284] as well as other possible criteria, and either approve or disapprove the requested alternatives within 120 days of receipt.

Ecology may also request additional information as part of a review of a requested alternative, and until the additional information is submitted the request will be determined as incomplete. For example, if an owner or operator requests alternative compliance measures for certain monitoring requirements, without supporting data that shows the alternative measures "provide levels of performance, enforceability, or methane emissions control equivalent to those set forth in this chapter [rule]", Ecology may request further information to support the evaluation of the requested alternatives.

Unless explicitly written in the rule, alternative compliance measure requests will only be evaluated for WAC sections -080[285], -110[286], and –120[287].

[282] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[283] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130
[284] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-130
[285] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-080
[286] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-110
[287] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120

Question and answer

1.) Can more than one request be submitted at a time?

Yes. An owner or operator can submit more than one alternative compliance measure as part of one request. However, each single request may be approved/disapproved on a different timeline based on information submitted as part of the request.

2.) How do I determine what information or data Ecology needs as criteria to support a determination on an alternative request?

An owner or operator can reach out to Ecology before submitting a request to determine what supporting evidence should be submitted to assist in evaluating a request. However, Ecology may reach out for additional information while evaluating a request if it is necessary for the evaluation process.

3.) Can I submit an alternative compliance request to my local clean air agency instead of Ecology?

No. The authorizing law requires any requested alternatives to be sent to Ecology, however Ecology may ask for a recommendation from a local clean air agency in its evaluation of a request.

Local clean air agencies can evaluate and approve (or disapprove) wind speed and precipitation requirements in accordance with WAC 173-408-120(3)(a)(iii) and (iv)[288]

4.) Can I submit an alternative compliance request electronically?

Yes, Ecology will accept a request by mail or electronically. The submittal must be signed by an authorized "person"[289] with the certification language provided in WAC 173-408-150[290].

5.) When can I expect a decision to be made on a submitted request?

WAC 173-408-130(3) requires Ecology to either approve or disapprove a submitted alternative compliance measure within 120 days of receipt. If additional information is requested, the original request will be considered incomplete until the additional information is submitted to Ecology.

Civil Penalty (WAC 173-408-180[291])

Please see WAC 173-408-180 for requirements on civil penalties.

Question and answer

1.) Does an exceedance equal a violation under the rule?

No. As stated in WAC 173-408-180(2) "The department will waive penalties under RCW 70A.15.3160[292], in

[288] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-120
[289] Defined in WAC 173-408-020
[290] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-150
[291] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408&full=true#173-408-180
[292] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.15.3160

accordance with this subsection, in the event the owner or operator of the landfill is actively taking corrective actions to control any methane exceedances."

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Appendix A

This appendix provides a copy of the rule. To view the official rule, please follow this link: Chapter 173-408 WAC[293].

Chapter 173-408 WAC
LANDFILL METHANE EMISSIONS

WAC 173-408-010

Policy and purpose.

(1) Ecology's policy under chapter **70A.540** RCW is to reduce methane emissions from municipal solid waste (MSW) landfills.

(2) This rule establishes requirements to reduce methane emissions from both active and closed MSW landfills that have received solid waste after January 1, 1992.

(3) These rules are informed by landfill methane regulations adopted by the California Air Resources Board, the Oregon Environmental Quality Commission, and the United States Environmental Protection Agency.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-010, filed 5/13/24, effective 6/13/24.]

WAC 173-408-020

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.

"Active mining" means actively excavating a landfill or a portion thereof using conventional mining technology to recover and reuse minerals and/or metals until such a time that the landfill cover is replaced.

"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 contaminant" has the same meaning as set forth in WAC **173-400-030**.

[293] https://app.leg.wa.gov/WAC/default.aspx?cite=173-408

"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.

"Authority" or "local authority" means any air pollution control agency whose jurisdictional boundaries are coextensive with the boundaries of one or more counties.

"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 a 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 "nonrepeatable, momentary readings," as defined in this section. Measurements from any vault must be taken within three inches above the surface of the vault exposed to the ambient air.

"Continuous operation" means that a 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 into the ambient air.

"Emission" means a release of air contaminants into the ambient air.

"Enclosed combustor" means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

"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 three inches above the landfill surface that exceeds 500 ppmv, other than "nonrepeatable, momentary readings," as defined in this section, as determined by instantaneous surface emissions monitoring; or the

average methane concentration measurements that exceed 25 ppmv, as determined by integrated surface emissions monitoring.

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

"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. A gas control device is a component used in a gas control system.

"Gas control system" means any portion of a gas collection and control 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.

"Hazardous waste" has the same meaning as set forth in RCW **70A.300.010**.

"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.

"Hydrocarbon detector" means an instrument used for the measurement of methane that meets the calibration, specifications, and performance criteria of EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A (in effect on the date in WAC **173-400-025**).

"Inactive 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 chapter **173-304** WAC. For purposes of this rule, an inactive municipal solid waste landfill is subject to all requirements applicable to an active municipal solid waste landfill unless and until (a) the department or local authority determines the landfill is exempt in accordance with WAC **173-408-070** (4)(b)(ii); or (b) the owner or operator submits a closure notification in accordance with WAC **173-408-170**(8).

"Increased meter reading" means a single or series of meter reading(s) above 200 ppm of methane.

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

"Landfill" has the same meaning as set forth in RCW **70A.205.015**.

"Landfill gas" means any 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.

"Limited purpose landfill" has the same meaning as set forth in WAC **173-350-100**.

"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," as defined in RCW **70A.300.010**, other than wastes expressly excluded from the requirements of chapter **173-303** WAC, Dangerous waste regulations, as set forth in WAC **173-303-071**, such as household hazardous wastes;

(b) Any solid waste, including contaminated soil and debris, generated by a "CERCLA response action," as defined in this section, or by a remedial action taken under the Model Toxics Control Act, chapters **70A.305** RCW and **173-340** WAC; nor

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

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

"Nonrepeatable, 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.

"Nozzle offset distance" means the horizontal distance between the "unmanned aerial system," as defined in this section, and the distal end of the nozzle when flown as a fixed above ground level (AGL) and a known nozzle tube length.

"On-site" has the same meaning as set forth in 40 C.F.R. 300.400(e)(1) (in effect on the date in WAC **173-400-025**).

"Operator" means any "person," as defined in this section, that:

(a) Operates a MSW landfill;

(b) Is responsible for complying with any federal, state, or local requirements relating to methane emissions from a source located on real property used for MSW landfill purposes and subject to this chapter; or

(c) Operates any stationary equipment for the collection of landfill gas from a MSW landfill subject to this chapter.

"Owner" means any "person," as defined in this section, that:

(a) Holds title to any portion of the real property on which a MSW landfill subject to this chapter is located including, but not limited to, title held by joint tenancy, tenancy in common, community property, life estate, estate for years, lease, sublease, or assignment, except title held solely as security for a debt such as mortgage;

(b) Is responsible for complying with any federal, state, or local requirements relating to methane emissions from a source located on real property used for MSW landfill purposes and subject to this chapter; or

(c) Owns any stationary equipment for the collection of landfill gas from a MSW landfill subject to this chapter.

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

"Professional engineer" means an individual who is registered in Washington and holds a valid certificate to practice engineering in Washington as provided under chapter **18.43** RCW.

"Putrescible waste" means solid waste which contains material capable of being readily decomposed by microorganisms and which is likely to produce offensive odors.

"Solid waste" means all putrescible and nonputrescible 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.

"Third-party owner or operator" means any "person," as defined in this section, that:

(a) Owns any stationary equipment for the collection of landfill gas from a MSW landfill subject to this chapter; or

(b) Purchases or otherwise obtains untreated landfill gas from an owner or operator of a MSW landfill subject to this chapter and owns any stationary equipment for the treatment and/or combustion of the landfill gas.

"Unmanned aerial system (UAS)," commonly known as a drone, means an aircraft without any human pilot, crew, or passengers on board. In this context, a UAS includes multiple rotors such that the minimum speed is not limited by stall and can be reduced all the way to zero (hover).

"Waste in place" means the total amount of solid waste placed in the MSW landfill estimated in tons. The solid waste density is assumed to be 1,300 pounds per cubic yard, and the decomposable fraction is assumed to be 70 percent by weight, unless the department or local authority approves alternative values.

"Working face" means the open area of a MSW landfill where solid waste is deposited daily and compacted with landfill equipment.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-020, filed 5/13/24, effective 6/13/24.]

WAC 173-408-030

Applicability.

Except as provided in subsection (1) of this section, this chapter applies to all MSW landfills that received solid waste after January 1, 1992.

(1) This chapter does not apply to the following landfills:

(a) Landfills that receive or received only "hazardous waste(s)" as defined in WAC **173-408-020**;

(b) "CERCLA regulated landfill" as defined in WAC **173-408-020**, if it meets the criteria for exemption set forth in WAC **173-408-040**;

(c) Landfills that receive or received only "inert waste or nondecomposable waste(s)" as defined in WAC **173-408-020**; or

(d) A "limited purpose landfill" as defined in WAC- **173-408-020**.

(2) Jurisdiction.

(a) The owner or operator of a landfill that is located within the jurisdiction of a local authority activated in accordance with chapter **70A.15** RCW must submit all reports and other information required by this chapter to the local authority unless otherwise stated in this chapter.

(b) The owner or operator of a landfill that is not located within any jurisdiction of a local authority activated in accordance with chapter **70A.15** RCW must submit all reports and other information required by this chapter to the department unless otherwise stated in this chapter.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-030, filed 5/13/24, effective 6/13/24.]

WAC 173-408-040

CERCLA exemption.

(1) CERCLA exemption process: This subsection establishes the process for an owner or operator of a CERCLA regulated landfill 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; and

(c) Additional information as needed to establish that the CERCLA regulated landfill meets the criteria for exemption set forth in subsection (2) of this section.

(2)(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.

(b) The department may consult with the U.S. Environmental Protection Agency while determining whether the CERCLA regulated landfill meets the above criteria for exemption from the requirements of this chapter.

(c) For zones or areas of a MSW 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.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-040, filed 5/13/24, effective 6/13/24.]

WAC 173-408-050

Request for demonstration.

The department or local authority may request that any owner or operator of a MSW landfill demonstrate that the landfill does not meet the applicability criteria in WAC **173-408-030**. Such a demonstration must be submitted to the department or local authority, as applicable, within 90 days of a written request received from the department or local authority.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-050, filed 5/13/24, effective 6/13/24.]

WAC 173-408-060

Waste in place reporting.

(1) Each owner or operator of a MSW landfill that received solid waste after January 1, 1992, must submit an initial waste in place report to the department in accordance with WAC **173-408-170**(1).

(2) 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 to the department and local authority in accordance with WAC **173-408-170** (3) and (4) until either:

(a) The active MSW landfill reaches a size of greater than or equal to 450,000 tons of waste in place; or

(b) The owner or operator submits a closure notification under WAC **173-408-170**(8).

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-060, filed 5/13/24, effective 6/13/24.]

WAC 173-408-070

Landfill gas heat input capacity (HIC).

(1) This section applies to each owner or operator of:

(a) An active MSW landfill having waste in place of 450,000 tons or greater; or

(b) A closed MSW landfill having waste in place of 750,000 tons or greater.

(2) Each owner or operator subject to this section must submit an initial landfill gas HIC report to the department in accordance with WAC **173-408-170**(2).

(3) Each owner or operator subject to this section must submit an annual landfill gas HIC report to the department and local authority in accordance with WAC **173-408-170** (3) and (5) until either:

(a) The MSW landfill reaches a HIC of 3,000,000 British thermal units per hour recovered or greater; or

(b) The owner or operator submits a closure notification under WAC **173-408-170**(8).

(4) Each owner or operator of a MSW landfill that has a HIC of 3,000,000 British thermal units per hour recovered or greater must either:

(a) Meet the requirements of WAC **173-408-080**; or

(b) Demonstrate to the satisfaction of the department or local authority 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 WAC **173-408-120** (3)(b). 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 and submit an annual landfill gas HIC report in accordance with subsection (3) of this section, until such time that the owner or operator submits a closure notification under WAC **173-408-170**(8).

(ii) The owner or operator of a closed or inactive MSW landfill that meets the requirements of this subsection no longer has to comply with any other requirements of this chapter, provided that the following information is submitted to and approved by the department or local authority:

(A) A waste in place report prepared in accordance with WAC **173-408-170** (3) and (4); and

(B) All instantaneous surface monitoring records.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-070, filed 5/13/24, effective 6/13/24.]

WAC 173-408-080

Gas collection and control systems.

(1) General requirements: Except as provided by (a) of this subsection, any owner or operator of a MSW landfill that exceeds the HIC threshold specified in WAC **173-408-070**(4) must install a gas collection and control system that meets the requirements of this section.

(a) This section does not apply if, in accordance with WAC **173-408-070** (4)(b), the owner or operator has demonstrated to the satisfaction of the department or local authority 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 WAC **173-408-120** (3)(b).

(b) If a MSW landfill partners with a "third-party owner or operator," as defined in WAC **173-408-020**, to operate all or a portion of the gas collection and control system or energy recovery device, the owner or operator of the relevant portion of the gas collection and control system or energy recovery device is the responsible party obligated to comply with the requirements of this chapter.

(2) Design plan and installation: If a gas collection and control system that meets the requirements of either subsection (3), (4), or (5) of this section has not been installed, the owner or operator of a MSW landfill must submit a design plan to the department or local authority within one year after the effective date of this chapter, or within one year of detecting any leak on the landfill surface exceeding a methane concentration of 200 ppmv, in accordance with WAC **173-408-070** (3)(b). The department or local authority must review and either approve or disapprove the design plan within 120 days of receipt. The department or local authority may request that the owner or operator submit additional information as part of the review of the design plan.

(a) The design plan must meet the following requirements:

(i) The design plan must be prepared and certified by a "professional engineer," as defined in WAC **173-408-020**;

(ii) The following issues must be addressed in the design plan: Depths of solid waste; solid waste gas generation rates and flow characteristics; cover properties; gas system expandability; leachate and condensate management; accessibility; compatibility with filling operations; integration with closure end use; air intrusion control; corrosion resistance; fill settlement; resistance to the solid waste decomposition heat; and ability to isolate individual components or sections for repair or troubleshooting without shutting down the entire collection system;

(iii) A description of the density of wells, horizontal collectors, surface collectors, or other gas extraction devices necessary to achieve compliance with the concentration limits set forth in WAC **173-408-100**(2);

(iv) The design plan must include approved equipment maintenance, calibrations, and schedules according to 40 C.F.R. Part 60, Appendix A (in effect on the date in WAC **173-400-025**), as well as vendor specifications;

(v) The design plan must provide for the control of the collected gas through the use of a gas collection and control system meeting the requirements of either subsection (3), (4), or (5) of this section;

(vi) The design plan must include any proposed alternatives to the applicable test methods, procedures, compliance measures, or monitoring requirements, under WAC **173-408-130**;

(vii) The design plan must include a description of potential mitigation measures to be used to prevent the release of methane or other air pollutants into the ambient air from the working face; during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; when solid waste is to be excavated and moved; during active mining activities; to prevent or extinguish landfill fires; or, during law enforcement activities requiring excavation;

(viii) For active MSW landfills, the design plan must identify areas of the landfill that are closed;

(ix) The design plan must demonstrate how the gas collection and control system will handle the expected gas generation flow rate from the entire area of the MSW landfill and collect gas at an extraction rate to comply with the surface methane emission limits in WAC **173-408-100**(2) and the component leak standard in subsection (3)(b) of this section. The expected gas generation flow rate from the MSW landfill must be calculated in accordance with WAC **173-408-120**(5).

Any areas of the landfill that contain only "inert waste or nondecomposable waste(s)," as defined in WAC **173-408-020**, may be excluded from gas collection provided that the owner or operator submits documentation to the department or local authority containing the nature,

date of deposition, location and amount of inert waste or nondecomposable waste(s) deposited in the area. This documentation may be included as part of the design plan;

(x) The owner or operator must develop acceptable pressure limits for the wellheads and include them in the design plan;

(xi) The owner or operator must place each well or design component as specified in the approved design plan. Following initial construction, each new component must be installed no later than 60 days after the date on which the area controlled by the well is required to be controlled pursuant to this chapter;

(xii) Any owner or operator of an active MSW landfill must install and operate a gas collection and control system not later than 18 months after the date that the landfill is required to comply with this rule, and in accordance with the approved design plan;

(xiii) Any owner or operator of a closed MSW landfill must install and operate a gas collection and control system not later than 30 months after the date that the landfill is required to comply with this rule, and in accordance with the approved design plan;

(xiv) If an owner or operator is modifying an existing gas collection and control system to meet the requirements of this chapter, the existing design plan must be amended to include any necessary updates or addenda and must be certified by a professional engineer;

(xv) An amended design plan must be submitted to the department or local authority within 90 days of any event that warrants a change to the design plan; and

(xvi) The gas collection and control system must be operated, maintained, and expanded in accordance with the procedures and schedules in the approved design plan.

(3) Gas collection and control system requirements: The owner or operator must satisfy the following requirements when operating a gas collection and control system:

(a) Route the collected gas to a gas control device or devices and operate the gas collection and control system continuously except as provided in subsections (7), (8), and (9) of this section, and WAC **173-408-090**.

(b) Operate the gas collection and control system so that there is no landfill gas leak that exceeds 500 ppmv, measured as methane, at any component under positive pressure.

(c) The gas collection system must be designed and operated to draw all the gas toward the gas control device or devices.

(d) The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.

(e) Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover, into the solid waste, into the collection system, or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(f) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(4) Requirements for flares: An MSW landfill owner or operator who operates a flare must ensure the gas collection and control system achieves a methane destruction efficiency of at least 99 percent by weight. The owner or operator must satisfy the following requirements:

(a) Route the collected gas to an enclosed flare that meets the following requirements:

(i) Is equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.

(ii) During restart or startup there must be sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the ambient air.

(iii) The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

(b) Route the collected gas to an open flare that meets the following requirements:

(i) The open flare must meet the requirements of 40 C.F.R. 60.18 (in effect on the date in WAC **173-400-025**);

(ii) An open flare installed and operating prior to December 31, 2022, may operate until January 1, 2032, unless the owner or operator demonstrates to the satisfaction of the department or local authority that the landfill gas HIC is less than 3,000,000 British thermal units per hour in accordance with WAC **173-408-120**(2), and is insufficient to support the continuous operation of an enclosed flare or other gas control device; and

(iii) The owner or operator may temporarily operate an open flare during the repair or maintenance of the gas control system, or while awaiting the installation of an enclosed flare, or to address offsite gas migration issues. Any owner or operator seeking to temporarily operate an open flare must submit a written request to the department or local authority in accordance with WAC **173-408-130**.

(5) Requirements of gas control devices other than flares: An MSW landfill owner or operator who operates a gas control device other than a flare must satisfy one of the following requirements:

(a) If a gas collection and control system routes the collected gas to an energy recovery device or devices, the owner or operator of the energy recovery device or devices must comply with the following requirements:

(i) The device or devices must achieve a methane destruction efficiency of at least 97 percent by weight, except for lean-burn internal combustion engines that were installed and operating prior to January 1, 2022, which must reduce the outlet methane concentration to less than 3,000 parts per million by volume, dry basis corrected to 15 percent oxygen; and

(ii) If a boiler or a process heater is used as the gas control device, the landfill gas stream must be introduced into the flame zone, except that where the landfill gas is not the primary fuel for the boiler or process heater, introduction of the landfill gas stream into the flame zone is not required.

(iii) The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

(b) If a gas collection and control system routes the collected gas to a treatment system that processes the collected gas for subsequent sale or use, the owner or operator of the treatment system must ensure the system achieves a methane leak rate of three percent or less by weight. Venting of processed landfill gas to the ambient air is not allowed. If the processed landfill gas cannot be routed for subsequent sale or use, then the treated landfill gas must be controlled according to this subsection (5).

(6) Source test requirements: The owner or operator of a MSW landfill must conduct a source test for any gas control device or devices subject to subsection (4)(a) or (5)(a) of this section using the test methods identified in WAC **173-408-120**(6). The gas control device or devices must meet the following requirements:

(a) An initial source test must be conducted within 180 days of initial start-up of the gas collection and control system;

(b) If a gas control device was in compliance with source testing requirements as of June 9, 2022, the owner or operator must conduct the source test no less frequently than once every five years; and

(c) If a gas control device was not in compliance with source testing requirements as of June 9, 2022, or if a subsequent source test shows the gas control device is out of compliance, the owner or operator must conduct the source test no less frequently than once per year until two subsequent consecutive tests both show compliance. Upon two subsequent consecutive compliant tests, the owner or operator may return to conducting the source test no less frequently than once every five years.

(7) Wellhead gauge pressure requirement: Each wellhead must be operated under a vacuum (negative pressure), except as provided in subsections (8) and (9) of this section, WAC **173-408-090**, or under any of the following conditions:

(a) Use of a geomembrane or synthetic cover; or

(b) A decommissioned well.

(8) Gas collection well casing extension: The requirements of subsections (3)(a) and (b) and (7) of this section do not apply to individual wells involved in well raising, provided the following requirements are met:

(a) New fill is being added or compacted in the immediate vicinity around the well; and

(b) Once installed, a gas collection well extension is sealed and capped until the raised well is reconnected to a vacuum source.

(9) Repairs and temporary shutdown of gas collection system components: The requirements of subsections (3)(a) and (b) and (7) of this section do not apply to individual landfill gas collection system components that must be temporarily shut down to repair or modify components of the gas collection system, to connect new landfill gas collection system components to the existing system, to prevent or extinguish landfill fires, or if the MSW landfill engages in construction, active mining, or law enforcement activities, provided the following requirements are met:

(a) Methane emissions are minimized during shutdown under subsection (2)(a)(vii) of this section;

(b) In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour of the collection or control system not operating.

Efforts to repair the collection or control system must be initiated and completed to minimize downtime, and the collection and control system must be returned to operation no more than five calendar days following initial shutdown. In the event the collection and control system cannot be returned to operation in five calendar days following initial shutdown, the owner or operator must submit a notification to the department or local authority in accordance with WAC **173-408-140**; and

(c) Records are kept on the actions being taken, in accordance with WAC **173-408-160** (1)(a)(xiv), (xv), and (xvi).

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-080, filed 5/13/24, effective 6/13/24.]

WAC 173-408-090

Permanent shutdown and removal of the gas collection and control system.

The owner or operator of a closed MSW landfill may propose to the department or local authority that a gas collection and control system be decommissioned and removed provided the following requirements are met:

(1)(a) The gas collection and control system has been in operation for at least 15 years after an owner or operator has submitted a closure notification that has been approved, pursuant to WAC **173-408-170**(8), or the owner or operator demonstrates to the satisfaction of the department or local authority that, due to declining gas flow, the MSW landfill will be unable to operate the gas collection and control system for a 15-year period after closure; and

(b) The landfill has had no exceedance of the methane concentration limits, as determined by surface emissions monitoring conducted in accordance with WAC **173-408-100**(2), on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.

(2) The owner or operator conducts a provisional shutdown of the gas collection and control system meeting the following conditions:

(a) The owner or operator of the landfill shuts down the collection and control system and conducts surface emissions monitoring over the portion of the landfill served by the shut-down gas collection and control system, in accordance with WAC **173-408-120**(3) and (b) of this subsection, for at least eight consecutive calendar quarters;

(b) During the provisional shutdown period, the surface emissions monitoring walking grid described in WAC **173-408-120** (3)(a)(ii) may be increased to 100-foot spacing so long as the walking grid is offset by 25 feet each quarter so that by the end of one year of monitoring, the entire surface area has been monitored every 25 feet; and

(c) During the provisional shutdown period, if any measured concentration of methane from the surface of the closed landfill exceeds the applicable limit specified in WAC **173-408-100**(2), the owner or operator must restart the shut-down portion of the gas collection and control system.

(3) If no surface emissions monitoring result exceeds the applicable limit specified in WAC **173-408-100**(2) during the provisional shutdown period, and with the approval of the department or local authority, the owner or operator may proceed with permanent shutdown and removal of the gas collection and control system.

(4) Following approval by the department or local authority for a permanent shutdown of the gas collection and control system, the owner or operator may decommission and remove the gas collection and control system and must submit an equipment removal report to the department or local authority in accordance with WAC **173-408-170**(9).

(5) Subsequent to permanent shutdown of the gas collection and control system, any exceedance of the surface methane concentration limits may be cause for the department or local authority to require an owner or operator to control surface methane emissions. The required actions may include reestablishing a gas collection and control system.

(6) Nothing in this subsection may be interpreted to modify or supersede requirements related to the capping or removal of gas collection and control systems that may exist under the state Clean Air Act, the Federal Clean Air Act, or rules adopted pursuant to either the state Clean Air Act or the Federal Clean Air Act.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-090, filed 5/13/24, effective 6/13/24.]

WAC 173-408-100

Methane concentration limits.

(1) Except as provided in WAC **173-408-080**, the methane concentration limits set forth in subsection (2) of this section apply to a MSW landfill subject to this chapter beginning on whichever of the following dates is later:

(a) January 1, 2025;

(b) Upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to WAC **173-408-080**; or

(c) A date established by the department to accommodate significant technological improvements, which may include the installation of an energy recovery device or devices, which does not exceed 24 months after the department adopts rules to implement this chapter.

(2) No location on a MSW landfill surface may exceed the following methane concentration limits, dependent upon whether the owner or operator of the MSW landfill conducts instantaneous surface emissions monitoring or integrated surface emissions monitoring in accordance with WAC **173-408-110**(1):

(a) Five hundred parts per million by volume, other than when measured by nonrepeatable, momentary readings, as determined by instantaneous surface emissions monitoring; or

(b) An average methane concentration limit of 25 parts per million by volume as determined by integrated surface emissions monitoring.

(3) Any reading exceeding the applicable limit set forth in subsection (2) of this section must be recorded as an exceedance and the following actions must be taken:

(a) The owner or operator must record the date, location, and value of each exceedance, along with retest dates and results. The location of each exceedance must be clearly marked and identified on a topographic map, at a minimum, of the MSW landfill, drawn to scale, with the location of both the monitoring grids and the gas collection system clearly identified;

(b) The owner or operator must take corrective action, which may include, but not be limited to, maintenance or repair of the cover, and well vacuum adjustments. The location or locations of any exceedance must be remonitored within 10 calendar days of a measured exceedance; and

(c) The owner or operator must notify the department or local authority in accordance with WAC **173-408-110** (1)(b).

(4) The requirements of this section do not apply to the following areas, provided that the owner or operator ensures these areas are no larger in size and no longer in duration than is necessary for the specified activity:

(a) The "working face" of the landfill, as defined in WAC **173-408-020**;

(b) 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;

(c) Areas of the landfill in which the owner or operator, or a designee, which is a person or entity that has express, written permission from the owner or operator, is engaged in active mining for minerals or metals; or

(d) Areas of the landfill surface where the landfill cover material has been removed for law enforcement activities requiring excavation.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-100, filed 5/13/24, effective 6/13/24.]

WAC 173-408-110

Monitoring.

(1) Surface emissions monitoring: The owner or operator of a MSW landfill with a gas collection and control system must conduct quarterly instantaneous or integrated surface monitoring of the entire landfill surface according to this subsection and the procedures in WAC **173-408-120**(3).

(a) A surface monitoring design plan must be developed that includes a topographical map that, at a minimum, clearly identifies the monitoring traverse and the working face, and describes the rationale for any site-specific deviations. The plan must be updated quarterly if changes are made to the monitoring traverse or working face, and the surface monitoring design plan must be provided upon request by the department or local authority.

(b) The owner or operator of a MSW landfill must notify the department or local authority within two working days after all corrective actions and remonitoring taken to address exceedances detected under (c) or (d) of this subsection, and subsection (2)(c) of this section. The notification must include a description of the corrective actions taken. The owner or operator of a MSW landfill may request alternative compliance measures to replace the requirements of this subsection in accordance with WAC **173-408-130**.

(c) Instantaneous surface monitoring: Any reading exceeding the limit in WAC **173-408-100** (2)(a) must be recorded and reported as an exceedance and the following actions must be taken:

(i) The owner or operator must record the date, location, and value of each exceedance, along with retest dates and results. The location of each exceedance must be clearly marked and identified on a topographic map, at a minimum, of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.

(ii) Corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, and well vacuum adjustments, and the location must be remonitored within 10 calendar days of a measured exceedance.

(A) If the remonitoring of the location shows a second exceedance, additional corrective action must be taken, and the location must be remonitored again within 10 calendar days of the second exceedance.

(B) If the remonitoring required by (c)(ii)(A) of this subsection shows a third exceedance, the owner or operator must install a new or replacement well, or an alternative active methane control approved by the department or local authority, as needed to achieve compliance no later than 120 calendar days after detecting the third exceedance.

(iii) Any closed MSW landfill that has no monitored exceedances of the limit in WAC **173-408-100** (2)(a) after four consecutive quarterly monitoring periods may monitor annually. Any exceedances of the limit in WAC **173-408-100** (2)(a) detected during the annual monitoring will result in a return to quarterly monitoring of the landfill.

(iv) Any exceedances of the limit in WAC **173-408-100** (2)(a) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill.

(d) Integrated surface monitoring: Any reading exceeding the limit in WAC **173-408-100** (2)(b) must be recorded and reported as an exceedance and the following actions must be taken:

(i) The owner or operator must record the average surface methane concentration measured for each grid along with retest dates and results. The location of the grids and the gas collection system must be clearly marked and identified on a topographic map, at a minimum, of the MSW landfill drawn to scale.

(ii) Within 10 calendar days of a measured exceedance, corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, and well vacuum adjustments, and the grid must be remonitored.

(A) If the remonitoring of the grid shows a second exceedance, additional corrective action must be taken, and the location must be remonitored again within 10 calendar days after the second exceedance.

(B) If the remonitoring required by (d)(ii)(A) of this subsection shows a third exceedance, the owner or operator must install a new or replacement well, or an alternative active methane control approved by the department or local authority, as needed to achieve compliance no later than 120 calendar days after detecting the third exceedance.

(iii) Any closed MSW landfill that has no monitored exceedances of the limit in WAC **173-408-100** (2)(b) after four consecutive quarterly monitoring periods may monitor annually. Any

exceedances of the limit in WAC **173-408-100** (2)(b) detected during the annual monitoring event will result in a return to quarterly monitoring of the landfill.

(iv) Any exceedances of the limit in WAC **173-408-100** (2)(b) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill.

(e) An owner or operator of a closed MSW landfill that can demonstrate that, in the three years before the effective date of this chapter, there were no exceedances of the limit in WAC **173-408-100**(2), as measured by annual or quarterly monitoring, may monitor annually. Any exceedances of the limit in WAC **173-408-100**(2) detected during the annual monitoring event will result in a return to quarterly monitoring of the landfill.

(2) Gas control system equipment monitoring: The owner or operator, or third-party owner or operator, of a MSW landfill with a gas collection and control system must monitor the system according to the following procedures:

(a) For enclosed flares, the following equipment must be installed, calibrated, maintained, and operated according to the manufacturer's specifications:

(i) A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) one percent of the temperature being measured expressed in degrees Celsius or Fahrenheit, which may be recorded in 15-minute average increments.

(ii) At least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes.

(b) For a gas control device other than an enclosed flare, the owner or operator must demonstrate compliance by providing information describing the operation of the gas control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The owner or operator, or third-party owner or operator, may request alternative compliance measures to replace the requirements of this subsection in accordance with WAC **173-408-130**. The department may specify additional monitoring procedures as a condition of approving alternative compliance measures.

(c) Components containing landfill gas must be monitored quarterly for leaks. Any component leak must be tagged, repaired, and remonitored within 10 calendar days, and the department or local authority must be notified in accordance with subsection (1)(b) of this section.

At facilities which combust landfill gas for energy production, or which treat landfill gas for other beneficial uses, and which are located at MSW landfills subject to this chapter, component leak testing may be conducted prior to scheduled maintenance or planned outage periods, if the maintenance or planned outage periods would conflict with the quarterly monitoring schedule.

(3) Wellhead monitoring: The owner or operator of a MSW landfill with a gas collection and control system must monitor each individual wellhead monthly to determine the gauge pressure. If there is any positive pressure reading other than as provided in WAC **173-408-080**(7), the owner or operator must take the following actions:

(a) Initiate corrective action within five calendar days of the positive pressure measurement;

(b) If the problem is not corrected within 15 days of the date the positive pressure was first measured, the owner or operator must initiate further corrective action including, but not limited to, any necessary expansion of the gas collection system, to mitigate any positive pressure readings; and

(c) Corrective actions, including any expansion of the gas collection and control system, must be completed and any new wells must be operating within 120 days of the date the positive pressure was first measured.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-110, filed 5/13/24, effective 6/13/24.]

WAC 173-408-120

Test methods and procedures.

(1) Hydrocarbon detector specifications: Any instrument used for the measurement of methane must be a hydrocarbon detector or other equivalent instrument approved by the department or local authority that meets the following calibration, specifications, and performance criteria, as applicable:

(a) EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A (in effect on the date in WAC **173-400-025**), which is incorporated by reference herein, except as follows:

(i) "Methane" replaces all references to volatile organic compounds (VOC).

(ii) The calibration gas shall be methane.

(b) EPA Other Test Method 51 (OTM-51) as specified in WAC **173-408-990** (Appendix II) of this chapter.

(c) Other approved EPA test methods with concurrent department or local authority approval.

(2) Determination of landfill gas heat input capacity: The landfill gas HIC must be determined in accordance with this subsection:

(a) MSW landfills without carbon adsorption or passive venting systems: The HIC must be calculated using the procedure as specified in WAC **173-408-980** (Appendix I). Additional information may be requested by the department or local authority as necessary to verify the HIC from the MSW landfill. Site-specific data may be substituted when available.

(b) MSW landfills with carbon adsorption systems: The landfill gas HIC at a MSW landfill with a carbon adsorption system must be determined by measuring:

(i) 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

(ii) The methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of subsection (1) of this section. 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 HIC.

(c) MSW landfills with passive venting systems: The landfill gas HIC at a MSW landfill with a passive venting system must be determined using both of the following, and is the higher of those determined values:

(i) The calculation described in (a) of this subsection; and

(ii) The owner or operator must measure:

(A) The actual landfill gas flow rates (in units of scfm), using a flow meter or other flow measuring device such as a standard pitot tube; and

(B) The methane concentration (percent by volume), using a hydrocarbon detector meeting the requirements of subsection (1) of this section, 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 HIC.

(3) Surface emissions monitoring procedures: The owner or operator of a MSW landfill must measure the landfill surface concentration of methane using a hydrocarbon detector meeting the requirements of subsection (1) of this section. The landfill surface must be inspected using the following procedures:

(a) Monitoring area: The entire landfill surface must be divided into individually identified 50,000 square foot grids. The grids must be used for both instantaneous and integrated surface emissions monitoring.

(i) Testing must be performed by holding the hydrocarbon detector's probe within three inches of the landfill surface while traversing the grid, except where alternatives to EPA Reference Method 21 are used.

(ii) The walking pattern must be no more than 25-foot spacing intervals and must traverse each monitoring grid.

(A) If the owner or operator measures no exceedances of the limits in WAC **173-408-100**(2), after any four consecutive quarterly monitoring periods, the walking pattern spacing may be increased to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon detection of any exceedances of the limits in WAC **173-408-100**(2) that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection.

(B) If an owner or operator of a MSW landfill can demonstrate that in the three years before the effective date of this chapter that there were no measured exceedances of the limits

in WAC **173-408-100**(2), by annual or quarterly instantaneous surface emissions monitoring, the owner or operator may increase the walking pattern spacing to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon detection of any exceedances of the limits in WAC **173-408-100**(2) that cannot be remediated within 10 calendar days, or upon any exceedances detected during a compliance inspection. The demonstration must prove to the satisfaction of the department or local authority that any instrument used for methane detection meets the requirements of subsection (1) of this section.

(iii) Surface testing must be terminated when the average wind speed exceeds five miles per hour, or the instantaneous wind speed exceeds 10 miles per hour. Surface testing can continue when the average wind speed is five miles per hour or less. The department or local authority may approve alternatives to this wind speed surface testing termination for MSW landfills consistently having measured winds in excess of these specified limits. Average wind speed must be determined on a 15-minute average using an on-site anemometer with a continuous recorder for the entire duration of the monitoring event.

(iv) Surface emissions testing must be conducted only when there has been no measurable precipitation in the preceding 72 hours. The department or local authority may approve alternatives to this procedure for MSW landfills that cannot meet the requirements of this subsection.

(v) Monitoring should be conducted during average barometric pressure conditions to the extent possible.

(b) Instantaneous surface emissions monitoring procedures:

(i) The owner or operator must record any instantaneous surface readings of methane 200 ppmv or greater, other than those measured by "nonrepeatable, momentary readings," as defined in WAC **173-408-020**;

(ii) Surface areas of the MSW landfill that exceed a methane concentration limit of 500 ppmv must be marked and remediated in accordance with WAC **173-408-110** (1)(b) and (c);

(iii) The entirety of landfill surface areas with cover penetrations, distressed vegetation, cracks, or seeps must also be inspected visually and with a hydrocarbon detector that meets the requirements of subsection (1) of this section. Exceedances of a methane concentration limit of 500 ppmv must be marked and remediated in accordance with WAC **173-408-110** (1)(b) and (c);

(iv) The location of each monitored exceedance must be marked, and the location and concentration recorded. The location must be recorded using an instrument with an accuracy of at least 14 feet. The coordinated must be in decimal degrees with at least five decimal places; and

(v) The wind speed and barometric pressure must be recorded during the sampling period.

(c) Integrated surface emissions monitoring procedures:

(i) Integrated surface readings must be recorded and then averaged for each grid;

(ii) Individual monitoring grids that exceed an average methane concentration of 25 ppmv must be identified and remediated in accordance with WAC **173-408-110** (1)(b) and (d); and

(iii) The wind speed and barometric pressure must be recorded during the sampling period.

(4) Gas collection and control system leak procedures: The owner or operator of a MSW landfill, or third-party owner or operator of a landfill gas control system, must measure leaks using a hydrocarbon detector meeting the requirements of subsection (1) of this section.

(5) Determination of expected gas generation flow rate: The expected gas generation flow rate must be determined as prescribed by the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, which is incorporated by reference herein, using a recovery rate of 75 percent.

(6) Control device destruction efficiency determination: The control device destruction efficiency must be determined according to the following methods:

(a) Enclosed combustors: One of the following test methods in 40 C.F.R., Part 60, Appendix A (in effect on the date in WAC **173-400-025**), must be used to determine the efficiency of the control device:

(i) U.S. EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography (in effect on the date in WAC **173-400-025**);

(ii) U.S. EPA Reference Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon (in effect on the date in WAC **173-400-025**);

(iii) U.S. EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer (in effect on the date in WAC **173-400-025**); or

(iv) U.S. EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases (in effect on the date in WAC **173-400-025**).

(v) The following equation must be used to calculate destruction efficiency:

$$Destruction\ Efficiency = \left[1 - \left(\frac{Mass\ of\ Methane\ -\ Outlet}{Mass\ of\ Methane - Inlet}\right)\right] x\ 100\%$$

(b) Open flares: Open flares must meet the requirements of 40 C.F.R. 60.18 (in effect on the date in WAC **173-400-025**).

(7) Determination of gauge pressure: Gauge pressure must be determined using a hand-held manometer, magnehelic gauge, or other pressure measuring device approved by the department or local authority. The device must be calibrated and operated in accordance with the manufacturer's specifications.

(8) Alternative test methods: Alternative test methods may be used if they are approved in writing by the department or local authority.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-120, filed 5/13/24, effective 6/13/24.]

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 173-408-130

Alternative compliance measures.

(1) The owner or operator of a MSW landfill, or third-party owner or operator, may request alternatives to the compliance measures, monitoring requirements, and test methods and procedures set forth in WAC **173-408-080**, **173-408-110**, and **173-408-120**. Any alternatives requested by the owner or operator must be submitted in writing to the department.

(2) The criteria that the department may use to evaluate alternative compliance measure requests include, but are not limited to:

(a) Compliance history;

(b) Documentation containing the landfill gas flow rate and measured methane concentrations for individual gas collection wells or components;

(c) Permits;

(d) Component testing and surface monitoring results;

(e) Gas collection and control system operation, maintenance, and inspection records;

(f) Historical meteorological data;

(g) Consistency with EPA-approved test methods and procedures; and

(h) Recommendation of the local authority, if applicable.

(3) The department will review the requested alternatives and either approve or disapprove the alternatives within 120 days of receipt of a complete request.

(a) The department may request that additional information be submitted as part of the review of the requested alternatives, including additional information requested by a local authority for purposes of providing a recommendation for the department's consideration under subsection (2)(h) of this section. Until the requested information is submitted, the request will be determined as incomplete, and no department actions will be taken to approve or deny the request.

(b) If the department denies a request for an alternative compliance option, the department will provide written reasons for the denial.

(c) The department must deny a request for alternative compliance measures if the request does not provide levels of performance, enforceability, or methane emissions control that are equivalent to those set forth in this chapter.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-130, filed 5/13/24, effective 6/13/24.]

WAC 173-408-140

Communications and submittals format.

Any communications, submittals, or requests required by this chapter must be in a format acceptable to the department or the local authority, as applicable.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-140, filed 5/13/24, effective 6/13/24.]

WAC 173-408-150

Certification.

Any application form, report, compliance certification, or other information submitted pursuant to this chapter shall contain the following written certifications made and signed by the person making the submission:

(1) "I certify under penalty of perjury under the laws of the state of Washington that I am duly authorized to make this submission on behalf of the party that is required to provide the information contained therein pursuant to Chapter **173-408** WAC."

(2) "I certify under penalty of perjury under the laws of the state of Washington that, based on information and belief formed after reasonable inquiry, all statements and information contained in the submitted document are true, accurate, and complete."

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-150, filed 5/13/24, effective 6/13/24.]

WAC 173-408-160

Recordkeeping requirements.

(1) The owner or operator of a MSW landfill, or a third-party owner or operator, must maintain records as prescribed in this subsection. The records must be provided by the owner or operator to the department or local authority within five business days of a request. Records described in this subsection must be retained in the operating record required by WAC **173-351-200** (10)(a).

(a) An owner or operator must maintain the following records for at least five years:

(i) All surface emission monitoring plans and monitoring records.

(ii) All records of gas collection system downtime exceeding five calendar days, including individual well shutdown and disconnection times, and the reason for the downtime.

(iii) All records of 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.

(iv) Expected gas generation flow rate calculated in accordance with WAC **173-408-120**(5).

(v) Records of all instantaneous surface readings of 200 ppmv or greater, in accordance with WAC **173-408-120** (3)(b)(i).

(vi) All exceedances of the limits set forth in WAC **173-408-100**(2), including the location of the leak (or affected grid), leak concentration in ppmv, date and time of measurement, the action(s) taken to repair the leak, date of repair, any required remonitoring and the remonitored concentration in ppmv, wind speed and barometric pressure during surface sampling; and the installation date and location of each well installed as part of a gas collection system expansion.

(vii) Records of any component leak exceedances and corrective actions taken, in accordance with WAC **173-408-110** (2)(c).

(viii) Records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken, in accordance with WAC **173-408-110**(3).

(ix) Annual solid waste acceptance rate and the current amount of waste in place.

(x) Records of the nature, location, amount, and date of deposition of nondecomposable waste for any landfill areas excluded from the collection system.

(xi) Results of any source tests conducted pursuant to WAC **173-408-120**(6).

(xii) Records describing the mitigation measures taken to prevent the release of methane or other emissions into the ambient air:

(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.

(xiii) Records of the equipment operating parameters specified to be monitored under WAC **173-408-110** (2)(a) and (b), 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 three-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 WAC **173-408-080** (4) and (5) 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 WAC **173-408-080** (5)(a)(ii).

(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 WAC **173-408-080**(5), 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, or local regulatory requirements).

(xiv) Records of any actions involving 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.

(xv) Records of any active mining activities, as defined in WAC **173-408-020**. 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.

(xvi) Records of any law enforcement activities requiring excavation. 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 WAC **173-408-120**(5).

(iii) The percent reduction of methane achieved by the control device determined pursuant to WAC **173-408-120**(6).

(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 nonassisted); 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 C.F.R. 60.18 (in effect on the date in WAC **173-400-025**), 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.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-160, filed 5/13/24, effective 6/13/24.]

WAC 173-408-170

Reporting requirements.

The owner or operator of a MSW landfill must prepare and submit reports as prescribed in this section. Reports required by this subsection must be retained in the operating record required by WAC **173-351-200** (10)(a).

(1) Initial waste in place report: Each owner or operator of a MSW landfill that meets the requirements of WAC **173-408-060**(1) must submit an initial waste in place report to the department. The report must be submitted within 90 days of the effective date of this chapter and include the following information:

(a) The landfill information set forth in subsection (3)(b)(i) of this section.

(b) The estimated waste in place, in tons, as of December 31st of the previous year.

(2) Initial landfill gas heat input capacity report: Any owner or operator of a MSW landfill subject to the requirements of WAC **173-408-070**(2) must calculate the landfill gas HIC, using the

procedures in WAC **173-408-120**(2), and submit the calculation to the department. The calculation must be submitted within 90 days of the effective date of this chapter.

(3) Annual reports: The owner or operator of a MSW landfill must prepare an annual report containing the information set forth in subsections (3) through (7) of this section, as applicable.

(a) The annual report must be prepared for the period of January 1st through December 31st of each year and be submitted to the department and local authority by April 1st of the subsequent year.

(b) In each annual report, the following information must be included:

(i) MSW landfill name, owner and operator, address, and facility/site ID (FS ID) number; and

(ii) Most recent topographic map, at a minimum, of the site showing all types of cover (e.g., final, interim, daily) with corresponding percentages over the landfill surface.

(4) Annual waste in place report: Any owner or operator of a MSW landfill subject to the requirements of WAC **173-408-060**(2) must include the following information in the annual report required by subsection (3) of this section. The estimated waste in place, in tons, as of December 31st of the previous year.

(5) Annual landfill gas heat input capacity report: Any owner or operator subject to the requirements of WAC **173-408-070**(3) must calculate the landfill gas HIC, using the procedures in WAC **173-408-120**(2), and include the calculation in the annual report required by subsection (3) of this section.

(6) Surface emissions monitoring report: Any owner or operator who conducts surface emissions monitoring pursuant to WAC **173-408-110**(1), and component monitoring pursuant to WAC **173-408-110** (2)(c), must include the following information in the annual report required by subsection (3) of this section:

(a) Date(s) of all monitoring;

(b) Location of the monitoring grid coordinates on a topographic map; and

(c) Measured concentration of methane in ppmv, exceedances, and all corrective actions taken.

(7) Gas collection and control system operations: Any owner or operator of a MSW landfill that has a gas collection and control system must include the following in the annual report required by subsection (3) of this section:

(a) Total volume of landfill gas collected (reported in standard cubic feet);

(b) Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume);

(c) Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device;

(d) The date that the gas collection and control system was installed and in full operation;

(e) The percent methane destruction efficiency of each gas control device(s);

(f) Type and amount of supplemental fuels burned with the landfill gas in each device;

(g) 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; and

(h) A copy of the most recent source test for each gas control device.

(8) Closure notification report: The owner or operator of a MSW landfill that ceases to accept waste must submit a closure notification to the department or local authority in accordance with this subsection. Except as provided in (e) of this subsection, the closure notification must be submitted within 30 days of ceasing to accept waste.

(a) 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.

(b) 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 HIC calculation, according to the procedures in WAC **173-408-980** (Appendix I), as part of this report.

(c) 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, or local statutes, regulations, and ordinances in effect at the time of closure.

(d) If a closure report has been submitted, no additional wastes may be placed into the landfill without filing a notification with the department or local authority.

(e) In lieu of submitting the closure notification report within 30 days of ceasing to accept waste, the owner or operator of an inactive municipal solid waste landfill, as defined in WAC **173-408-020**, may submit documentation to the department or local authority demonstrating that all of the following occurred prior to the effective date of this chapter.

(i) The owner or operator notified the jurisdictional health department of the intent to implement an approved closure plan, in compliance with WAC **173-304-407** (5)(a);

(ii) The owner or operator commenced implementation of an approved closure plan within 30 days of ceasing to accept waste, in compliance with WAC **173-304-407** (5)(b); and

(iii) The owner or operator submitted all facility closure plan sheets and certification of closure, in compliance with WAC **173-304-407** (5)(d).

(9) Equipment removal report: The owner or operator of a MSW landfill must submit a gas collection and control system equipment removal report to the department or local authority 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:

(a) A copy of the closure notification report submitted pursuant to subsection (8) of this section;

(b) A copy of the initial source test report, prepared pursuant to WAC **173-408-080** (6)(a), 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; and

(c) Eight consecutive quarterly instantaneous or integrated emissions monitoring results, collected pursuant to WAC **173-408-090**(2), as needed to verify that landfill surface methane concentration measurements do not exceed the limits in WAC **173-408-100**(2).

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-170, filed 5/13/24, effective 6/13/24.]

WAC 173-408-180

Civil penalty.

(1) Any person who violates any requirement of chapter **70A.540** RCW or this chapter may incur a civil penalty of up to $10,000 per day for each violation, pursuant to RCW 70A.15.3160.

(2) The department will waive penalties under RCW **70A.15.3160**, in accordance with this subsection, in the event the owner or operator of the landfill is actively taking corrective actions to control any methane exceedances.

(a) At least 30 calendar days prior to the department's issuance of a civil penalty, the department will send the owner or operator of the landfill a notice of violation, in accordance with RCW **70A.15.3010**.

(b) To demonstrate eligibility for waiver of a civil penalty under this subsection, the owner or operator of the landfill must provide the following information to the department within 30 calendar days of issuance of the notice of violation:

(i) A description of all corrective action(s) that have been initiated to control methane exceedances;

(ii) A description of all corrective action(s) that are being planned to control methane exceedances, including an implementation schedule of the actions;

(iii) Any supporting documentation associated with the corrective actions; and

(iv) A written certification meeting the requirements of WAC **173-408-150**.

(c) If the owner or operator does not provide the information required by (b) of this subsection within 30 calendar days of issuance of the notice of violation, and has not received a written extension by the department, the department may proceed with issuance of a civil penalty as appropriate.

(d) The department will determine whether the owner or operator is eligible for waiver of a civil penalty on the basis of the information submitted pursuant to (b) of this subsection.

(i) The department may request additional information from the owner or operator before making a final determination. If the owner or operator does not respond to the

department's request for additional information within 30 calendar days, the department may proceed with issuance of a civil penalty as appropriate.

(ii) The department will waive issuance of a civil penalty for the violation(s) identified in the notice of violation if the owner or operator demonstrates to the department's satisfaction that the corrective actions that have been initiated, or that are being planned, resolve the violation(s).

(iii) The department may condition its waiver of a civil penalty under this subsection on the owner or operator's continued implementation and/or completion of the identified corrective action(s). If the owner or operator does not comply with any such condition(s), the department may reconsider its prior determination of eligibility for waiver.

(e) If the department waives issuance of a civil penalty under this subsection, the department may subsequently request submission of documentation regarding the implementation status of the identified corrective action(s). If the owner or operator does not respond to the department's subsequent request(s) within 30 calendar days, the department may reconsider its prior determination of eligibility for waiver.

(3) A "local authority," as defined in WAC **173-408-020**, may waive penalties under RCW **70A.15.3160**, in accordance with subsection (2) of this section, in the event the owner or operator of the landfill is actively taking corrective actions to control any methane exceedances.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-180, filed 5/13/24, effective 6/13/24.]

WAC 173-408-190

Severability.

If any provision of this chapter or its application is held invalid, the remainder of the chapter or application of the provision is not affected.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-190, filed 5/13/24, effective 6/13/24.]

WAC 173-408-980

Appendix I.

1.0 Calculate Heat Input Capacity

Equation 1

$$Heat\ Input\ Capacity\ \left(\frac{MMBtu}{hr}\right) = Methane\ Gas\ Generation\ (scfm) \times \frac{60\ minutes}{1\ hour} \times Collection\ Efficient \times GHV_{Methane} \times \frac{1MMBtu}{1{,}000{,}000Btu}$$

Where:

Collection Efficiency	=	The landfill gas collection efficiency in percent (%), which is 75 percent.
GHV (Gross Heating Value)	=	Gross heating value of methane, which is 1,012[1] in units of British thermal units per standard cubic feet, or Btu/scf.

[1] Landfill Methane Outreach Program (LMOP) Interactive Conversion Tool

2.0 Methane Gas Generation

CH_4 Generation is calculated using the following equation:

Equation 2

$$CH_4\ Generation\ (Mg) = \left\{ ANDOC_{year-start} \times [1 - e^{-k}] - ANDOC_{deposited-last\ year} \times \left[\frac{1}{k} \times \left(e^{-k\times\left(1-\frac{M}{12}\right)} - e^{-k}\right) - \frac{M}{12} \times e^{-k}\right] + ANDOC_{deposited-same\ year} \times \left[1 - \left(\frac{1}{k} \times \left(1 - e^{-k\times\left(1-\frac{M}{12}\right)} + \frac{M}{12}\right)\right)\right]\right\} \times FCH_4$$

Where:

CH4 Generation = CH4 generated in the inventory year (Mg of CH4).

FCH4 = Fraction of decomposing carbon converted into CH4 (Default = 0.5)[2]

ANDOCyear-start = ANDOC in place at the beginning of the inventory year.

ANDOCdeposited-last year = ANDOC deposited during the previous inventory year.

ANDOCdeposited-same year = ANDOC deposited during the inventory year.

2 2006 IPCC Guidelines for National Greenhouse Gas Inventories

3.0 To Convert Methane Generated from Mg of CH_4 to SCFM

Equation 3

$$CH_4\ Gas\ Generated\ (scfm) = \frac{CH_4\ Generation\ (Mg)}{(year)} \times \frac{1\ (year)}{525{,}600\ (minutes)} \times \frac{1{,}000{,}000\ (g)}{1\ (Mg)} \times \frac{1\ (mole\ CH_4)}{16.0426\ (g\ CH_4)} \times \frac{0.83662\ (scf)}{1\ (mole\ landfill\ gas)}$$

4.0 Define ANDOC%

Equation 4

$$ANDOC\% = \sum WIPFRAC_j \times TDOC_j \times DANF_j$$

Where:

WIPFRACi = Fraction of the ith component in the waste in place.

TDOCi = Total Degradable Organic Carbon fraction of the ith waste component (Mg of that component/Mg of Total waste in

place).

DANFi = Decomposable Anaerobic Fraction of the ith waste component, that fraction capable of decomposition in anaerobic conditions (Mg of decomposable carbon for that component/Mg TDOCi for that component).

5.0 Define ANDOC

Equation 5

$$ANDOC = WIP\ (tons) \times \frac{0.9072\ (Mg)}{(ton)} \times\ ANDOC\%$$

Where:

ANDOC = Anaerobically Degradable Organic Carbon, carbon that is capable of decomposition in an anaerobic environment (Mg of carbon).

WIP = Waste in place estimate of all the landfilled waste (wet weight) as reported to Ecology's Solid Waste Management Program (tons).

6.0 Calculate $ANDOC_{year\text{-}end}$

Equation 6

$$\begin{aligned} ANDOC_{year-end} &= ANDOC_{year-start} \times e^{-k} \\ &+ ANDOC_{deposited-last\ year} \\ &\times \left[\frac{1}{k} \times \left(e^{-k\times\left(1-\frac{M}{12}\right)} - e^{-k}\right) - \frac{M}{12} \times e^{-k}\right] \\ &+ ANDOC_{desposited-same\ year} \times \left[\frac{1}{k} \times \left(1 - e^{-k\times\left(1-\frac{M}{12}\right)} + \frac{M}{12}\right)\right] \end{aligned}$$

Where:

$ANDOC_{year\text{-}end}$	=	ANDOC remaining undecomposed at the end of the inventory year.
$ANDOC_{year\text{-}start}$	=	ANDOC in place at the beginning of the inventory year.
$ANDOC_{deposited\text{-}last\ year}$	=	ANDOC deposited during the previous inventory year.
$ANDOC_{deposited\text{-}same\ year}$	=	ANDOC deposited during the inventory year.
M	=	Assumed delay before newly deposited waste begins to undergo anaerobic decomposition (Months, Default = 6).
k	=	Assumed rate constant for anaerobic decomposition; k = ln2/half-life (years); half-life is the number of years required for half of the original mass of carbon to degrade.

Table 1 lists the accepted constant values for the anaerobic decomposition rate ("k").

Table 1: K Values

K for Average Rainfall (Inches/Year)			
Inches Rain	<20	20-40	>40
K Value	0.02	0.038	0.057

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-980, filed 5/13/24, effective 6/13/24.]

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 173-408-990

Appendix II.

OTM-51 – UAS Application of Method 21 for Surface Emission Monitoring of Landfills.

This method provides procedures for use of unmanned aerial systems (UAS) to perform surface emissions monitoring for MSW landfills. This method was submitted by Sniffer Robotics, LLC to EPA's Office of Air Quality Planning and Standards Measurement Technology group and

was included into the Other Test Method (OTM) category on EPA's Air Emission Measurement Center website on 12/15/2022.

OTM-51 is approved for use at MSW landfills for several federal regulations and is approved for use under this chapter, subject to the caveats and additional information specified in section 11.0 of this appendix.

The following application of OTM-51 is only approved for the purpose of compliance with the surface emission monitoring requirements of this chapter, and does not supersede any approved methods, requirements, or regulations regarding the use of OTM-51 for other federal, state, and local laws or regulations.

2.0 Scope and Application

Scope: This method is an alternative test method for determining compliance with the surface methane operational standard for landfills in lieu of procedures set forth pursuant to WAC **173-408-120** (1)(a).

Analytes

Analyte	CAS Number
Methane (CH_4)	74-82-8

3.0 Summary of Method

This alternative test method seeks to replicate, to the greatest extent possible, EPA Method 21, but automates surface emission monitoring by utilizing a methane detection payload on an "unmanned aerial system (UAS)," as defined in WAC **173-408-020**, coupled with a ground level to UAS sampling system. The methane detector payload includes a hose and custom nozzle design that, when carried by the UAS, places the nozzle inlet within 5-10 cm of the ground. The UAS transmits the geolocated methane readings to the operator via a wireless communication system. The UAS is used to sample large areas for "increased meter readings," as defined in WAC **173-408-020**, each of which are then inspected using EPA Reference Method 21.

4.0 Equipment and Supplies

(a) The methane detection payload shall have the following specifications:

(i) The methane detection payload shall collect and respond to methane in the air samples; standoff or remote detection technologies are not applicable. Detector types that may meet this requirement include, but are not limited to, flame ionization, nondispersive infrared absorption (NDIR) and tunable diode laser absorption spectroscopy (TDLAS).

(ii) The methane detection payload shall be capable of measuring methane in the range from zero through the increased meter reading up to and above the exceedance limit of 500 ppm specified in this chapter.

(iii) The scale of the methane detection payload shall be readable to ±2.5 percent of the increased meter reading level of 200 ppm methane.

(iv) The methane detection payload shall be equipped with a pump that provides the detector a constant sample flow rate. The nominal sample flow rate, as measured at the sample probe nozzle, shall be at least 0.5 l/min when the probe is fitted with the full impedance stack of tubing, filters, and nozzle.

(v) The methane detection payload shall have a known instrument-only response time. Instrument-only response time shall be measured for the methane detection instrument prior to being placed into service but does not have to be repeated at subsequent intervals. Instrument-only response time shall be measured by measuring the T90 response time for a minimum of five unique tube lengths less than 10m, fitting a linear regression to the measured T90 response times and recording the y-intercept as the instrument only response time if the r^2 of the linear regression is greater than 0.95.

(b) The ground level sampling system shall have the following specifications:

(i) The ground level sampling system shall be equipped with a single nozzle with inside diameter such that the air speed into the nozzle (per the nominal sample flow rate defined in section 4.0(a)(iv) of this appendix) is at least 0.3 m/s.

(ii) The ground level sampling system shall include a hose of sufficient length to drag the nozzle on the ground such that the nozzle is in fluid communication with the methane detection payload.

(iii) Before putting the ground level sampling system into service, determine the "nozzle offset distance," as defined in WAC **173-408-020**. If the tube length of the ground sampling density changes or the planned AGL for the ground level sampling system changes, repeat measurements to determine the nozzle offset distance.

(c) The UAS shall have the following specifications:

(i) The UAS shall carry the methane detection payload and the ground level sampling system and use an automated, real-time measurement and control system to fly at a constant AGL of ±1 meter.

(ii) The UAS shall include a data acquisition system to record both timestamped drone position (GPS coordinates with an accuracy of no worse than ±2 meters) and methane concentration. The data shall be logged at a frequency of at least the instrument-only response time per section 4.0(a)(v) of this appendix.

(iii) The UAS shall have a gimbaled camera that is remotely viewable and controllable by a remote operator in near real-time. The camera and display shall have high enough resolution for the operator to discern indicators of elevated concentrations of landfill gas, including distressed vegetation, cracks or seeps in the cover and cover penetrations from the defined flight AGL. Pictures taken shall be georeferenced via metadata or similar to the GPS accuracy of ±2 meters.

(iv) The UAS shall be in communication with an operator display that shows the methane concentration, as measured by the methane detection payload.

(v) If automated flight plans are used to control the path of the UAS, the UAS shall be controllable by the remote operator to deviate from said flight plans to inspect areas where visual observations indicate potential elevated concentrations of landfill gas, such as distressed vegetation, cracks, or seeps in the cover and cover penetrations.

(vi) The UAS shall be equipped with a method to control the forward speed to the value determined to meet the limit under section 7.0 of this appendix.

5.0 Reagents and Standards

(a) Two gas mixtures are required for methane detection payload calibration and performance evaluation:

(i) Zero gas. Air, less than 10 parts per million by volume (ppmv) methane.

(ii) Methane calibration gas. Obtain a known standard in air at a concentration approximately equal to the 500 ppm above background operational limit specified in the regulation.

(b) Cylinder gases: If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within two percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life.

6.0 Sample Collection, Preservation, Storage, and Transport

(a) Methane detection payload performance evaluation: Assemble and start up the methane detection payload according to the manufacturer's instructions for recommended warm-up period and preliminary adjustments.

(b) Calibration precision: The calibration precision test shall be completed prior to placing the methane detection payload into service and at subsequent three-month intervals or at the next use, whichever is first.

(i) Make a total of three measurements of both the zero and the methane calibration gas by alternately introducing them where the measurement is collected via the ground level sampling system with all filters, the full tube length, and nozzle present. The introduction of the gas must be done such to not change the flow rate of the system or to pressurize the measurement cell. Record the meter readings.

(ii) Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage.

(iii) The calibration precision shall be equal to or less than 10.0 percent of the calibration gas value.

(c) Response time: The response time test shall be completed prior to placing the methane detection payload and ground level sampling system into service and at subsequent three-month intervals or at the next use, whichever is first. If a modification to the sample

pumping system or flow configuration is made that would change the response time, a new test is required before further use.

(i) Introduce zero gas into the nozzle of the ground level sampling system. When the meter reading has stabilized, switch quickly to the specified calibration gas. After switching, measure the time required to attain 90 percent of the final stable reading. Perform this test sequence three times and record the results. Calculate the average response time.

(ii) The response time shall be equal to or less than 30 seconds. The instrument pump, ground level sampling system with all filters, tubing, and nozzle lengths, which will be used during testing shall all be in place during the response time determination.

(d) Nozzle offset distance: The nozzle offset distance shall be measured prior to placing the methane detection payload into service by recording the time between the UAS passing a known point in space and the nozzle passing the same point in space at a known, consistent speed, hose length and AGL. The horizontal offset distance is the measured temporal offset of the UAS to the nozzle, multiplied by the known, consistent speed.

(e) Offset calculation: Derive the temporal offset from UAS GPS measurement to receipt of quantified methane measurement for each combination of AGL and methane detection payload configuration by adding the response time to the nozzle offset distance divided by speed. Record this time offset for input to the data acquisition system and offset the reported location of all methane measurements along the actual traversed path by this offset (i.e., if the offset is "X" seconds, the location of the measurement shall be reported as the location of the UAS "X" seconds in the past).

(f) Flow rate: The flow rate test shall be completed prior to placing the methane detection payload and ground level sampling system into service and at subsequent three-month intervals or at the next use, whichever is first. If a modification to the sample pumping system or flow configuration is made that would change the flow rate, a new test is required before further use. Measure the flow rate at the distal end of the collection nozzle with a flow meter readable to at least 0.1 l/min per the flow meter manufacturer's specification. Record the flow rate; the flow rate shall be greater than 0.5 l/min.

(g) Instrument calibration: Calibrate the methane detection payload according to section 10.0 of this appendix.

7.0 Surface Emissions Monitoring via UAS and Follow-up Ground-based Surveys

(a) Set the UAS terrain following system to fly at the constant AGL for the ground level sampling system characterized in section 4.0(b)(ii) of this appendix. Ensure the remote operator can control the gimbaled camera on the UAS and that the resolution is adequate to make visual observations that indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and cover penetrations.

(b) Take off and fly the UAS (at the predefined constant AGL) at a speed such that the instrument-only response time multiplied by the forward flight speed does not exceed four

meters along a pattern that traverses the landfill at 25-ft intervals. The aggregation of all the surface sampling traverses shall include the perimeter of the collection area, and all locations where visual observations from the gimbaled camera or aerial imagery taken within 120 days indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover.

(i) Surface sampling traverses in accordance with this test method shall only occur during average barometric pressure conditions to the extent possible.

(ii) Surface sampling traverses in accordance with this test method must be terminated when the average wind speed exceeds five miles per hour, or the instantaneous wind speed exceeds 10 miles per hour. Surface testing can continue when the average wind speed is five miles per hour or less. The department or local authority may approve alternatives to this wind speed surface testing termination for MSW landfills consistently having measured winds in excess of these specified limits.

(iii) Surface sampling traverses in accordance with this test method must be conducted only when there has been no measurable precipitation in the preceding 72 hours. The department or local authority may approve alternatives to this procedure for MSW landfills that cannot meet the requirements of this subsection.

(c) During flight, take georeferenced pictures from the UAS gimbaled camera of features that indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and cover penetrations. Inspect these locations per section 7.0(d) of this appendix.

(d) Increased meter readings: If an increased meter reading is observed or recorded by the UAS data acquisition system, refer to Section 8.3.1 of Method 21 to survey the area of the GPS coordinate of the increased meter reading and the area within a radius of at least 15 meters. While inspecting the increased meter readings and traversing the landfill between said increased meter readings, make visual observations to identify areas that indicate elevated concentrations of landfill gas, such as distressed vegetation, cracks or seeps in the cover and cover penetrations and inspect said areas as increased meter readings.

(e) Cover penetrations: In addition to conducting ground-based surveys where increased meter readings were detected, refer to Section 8.3.1 of Method 21 to survey applicable cover penetrations or openings within the landfill area.

(f) Monitoring route: All measurement points compliant with the specifications of this alternative method shall be plotted on a map that encompasses and includes the perimeter of waste. Any points that deviate from this test method including, but not limited to, manual deviations to the AGL that exceed ±1 meter, GPS accuracy worse than ±2 meters, presumed or measured flow rate less than 0.5 l/min, ground sampling density worse than 25-ft intervals, etc. shall not be plotted. Any location on the map greater than 15m from a measurement point shall be noted and justified (e.g., noted as an active area, noted hazards that prevent inspection detail, etc.).

(g) Remonitoring: Refer to EPA Reference Method 21 for remonitoring of previously identified exceedances.

8.0 Exceedances

(a) The owner or operator of a MSW landfill must notify the department or local authority within two working days after all corrective actions and remonitoring taken to address exceedances detected using this method. The notification must include a description of the corrective actions taken. The owner or operator of a MSW landfill may request alternative compliance measures to replace the requirements of this subsection pursuant to WAC **173-408-130**.

(b) The owner or operator must record the date, location, and value of each exceedance, along with retest dates and results. The location of each exceedance must be clearly marked and identified on a topographic map, at a minimum, of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.

(c) Corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, and well vacuum adjustments, and the location must be remonitored within 10 calendar days of a measured exceedance.

(i) If the remonitoring of the location shows a second exceedance, additional corrective action must be taken, and the location must be remonitored again within 10 calendar days of the second exceedance.

(ii) If the remonitoring required by section 8.0(c)(i) of this appendix shows a third exceedance, the owner or operator must install a new or replacement well, or an alternative active methane control approved by the department or local authority, as needed to achieve compliance no later than 120 calendar days after detecting the third exceedance.

9.0 Quality Control

Section	Quality Control Measure	Effect
6.0 (Calibration Precision)	Instrument calibration precision check	Ensure precision and accuracy, respectively, of instrument response to standard.
10.0	Instrument calibration	

10.0 Calibration and Standardization

(a) Calibrate the methane detection payload as follows: After the appropriate warm-up period and any internal zero calibration procedure, introduce the calibration gas at the inlet of the ground level sampling system to include all filter, tubing, and the nozzle. Per the manufacturer's guidelines ensure the instrument readout corresponds to the calibration gas value within 10.0 percent.

Note: If the meter readout cannot be calibrated to the proper value and/or a malfunction of the methane detection payload is indicated, corrective actions are necessary before use.

11.0 ALT–150 Compliance Letter

The use of OTM-51 for purposes of compliance with this chapter is subject to the following limitations/caveats, as specified in the EPA's ALT-150 letter (dated 12/15/2022):

(a) Entities other than Sniffer Robotics, LLC must submit data comparing OTM-51 and EPA Reference Method 21 to the department or local authority before this alternative test method may be used in lieu of SEM test procedures specified by WAC **173-408-120** (1)(a).

(b) Increased meter readings must be documented as prescribed by OTM-51. When an exceedance of the operational standard is identified, the location of the monitored exceedance must be marked, and the location and concentration recorded as specified in section 8.0 of this appendix. When an increased meter reading is not identified as an exceedance of the operational standard, there must be at a minimum a traditional surface monitoring pattern either in a spiral or serpentine pattern with three-meter intervals that covers a 30-meter radius from the increased meter readings to confirm no exceedance of the operational standard.

(c) Affected landfills using OTM-51 must notify the department or local authority before use of this alternative method and notification must include a copy of this appendix.

(d) Landfills must include a copy of this appendix and method with each report presenting SEM results using OTM-51.

(e) Once an owner or operator of a landfill chooses to use OTM-51, the landfill must continue to use the alternative method in meeting the requirements of this chapter until the owner or operator receives approval from the department or local authority to return to the existing Method 21 or use of a new EPA-test method.

[Statutory Authority: Chapter **70A.540** RCW. WSR 24-11-052 (Order 22-15), § 173-408-990, filed 5/13/24, effective 6/13/24.]

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