

July 21, 2023



Director Laura Watson
Department of Ecology
300 Desmond Drive SE
Lacey, WA 98503

RE: Rulemaking - Informal Comment for Chapter 173-408 WAC, Landfill Methane Emissions

Dear Director Watson,

Zero Waste Washington is pleased to submit these follow-up comments in response to the informal comment period for Chapter 173-408 WAC, Landfill Methane Emissions, and Ecology's expanded draft rules. These comments do not repeat verbatim the information and recommendations provided in our comments submitted on June 13, 2023, and we respectfully request consideration of our initial comments as well.

As stated in the draft rules and in the originating statute, "Ecology's policy under Chapter 70A.540 RCW is to reduce methane emissions from municipal solid waste (MSW) landfills." In order to fulfill this mandate, Ecology must, in part, apply its considerable capacities and unique access to information provided by landfill operators on methane leaks and gas control system issues, examine EPA, Oregon, California and Maryland's rules, review research on drivers of emissions from landfills and the latest best practices in methane monitoring and control to determine what feasible parameters and requirements will achieve meaningful methane emissions reductions.

The current draft rule, unfortunately, falls short on some issues. While it does incorporate several key improvements - for example, a tighter monitoring grid at 25-feet and monitoring post-removal of the gas collection and control system - the rule misses multiple key opportunities to meaningfully reduce methane emissions from Washington's landfills. We respectfully urge Ecology to clarify and strengthen the draft rules in the following specific ways:

Surface emissions monitoring and reporting:

- **The draft rule is keyed to old methane sensing technology and locks out newer and available technology, weakening a bedrock goal, which is to find and mitigate all large methane leaks. The rule should instead ensure monitoring definitions and requirements are "evergreen," and proactively ensure the use of available, most effective methane sensing technologies, such as drones, so that significant methane emissions are detected and remediated.** Landfills can have significant surface area and the draft rule does not require the surface area of the landfill to be comprehensively monitored. Instead, it allows a walking grid pattern where a portion of the surface area is monitored. That is because of the reliance on human beings to walk while holding a hydrocarbon detector several inches from the ground in order to find the methane leak. Today, there are available remote sensing technologies that can importantly complement this labor-intensive method including drones, flights and satellites (EPA has already given Method 21 approval for a specific type of drone technology). We expect these technologies to continue to expand in use. Unfortunately, the draft rule includes language in both the definitions and throughout the document that do not enable these other available technologies in use today. Some examples include:
 - The exceedance definition reads, in part, "Exceedance" means the concentration of methane measured within 3 inches above the landfill surface that exceeds 500 ppmv, other than non-repeatable, momentary readings"

- WAC 173-408-090 Test methods and procedures (Page 16) states, in part: “Testing must be performed by holding the hydrocarbon detector’s probe within 3 inches of the landfill surface while traversing the grid.”

Instead of this fixed approach, or waiting for the EPA to act, Ecology should follow [California Air Resource Board’s proposal](#) to create a process to “evaluate and approve the use of new technologies such as drones to supplement surface emissions monitoring.”

- **It is important to close the unnecessarily large loophole created by including an allowance for an “inactive area.” EPA, California and Oregon do not allow this, and creating a “division” of the landfill allows for large cutbacks in monitoring for methane emissions.** The draft rule includes an untested, expansive and vague definition for “inactive area,” which then is applied to allow landfill operators to significantly cut back on monitoring for methane emissions. Specifically, the draft rule allows “any closed or inactive areas on an active MSW landfill that has no monitored exceedances of the limit specified in WAC 173-408-100(1)(a) after four consecutive quarterly monitoring periods may monitor annually.” Landfills are not static entities, and we can expect shifts and changes over time due to rainfall, earthquakes (including many small ones), waste decomposition, eroding cover, etc. Furthermore, the gas collection system will have malfunctions. In other words, methane (and methane sources) will shift around over time. And methane leaks are not found without regular monitoring. The rule’s definition for inactive area (“inactive area means an area of an active MSW landfill where waste has been placed and a temporary cover system has been installed, but where additional waste is planned to be placed in the future as the facility’s waste filling sequence proceeds”) is extremely expansive. California, Oregon and EPA allow reducing monitoring frequency only for landfills/areas that are no longer accepting solid waste. This inactive area definition and any reference to it, therefore, should be deleted.
- **The rule should incorporate language to ensure that landfill operators submit monitoring reports in a timely manner and demonstrate their complete monitoring:** We believe that the rule should adopt Oregon’s rule language, to ensure surface emission monitoring is provided to the relevant authority without delay, which would then read as follows: “(A) A landfill owner or operator conducting surface emission monitoring pursuant to WAC 173-408-070 must submit an Instantaneous Surface Monitoring Report within 30 days after the fourth consecutive quarter or monitoring if no exceedances are detected, or 30 days after a measured concentration of methane of 200 ppmv or greater, whichever is first.”
- **To address the most [significant operational factor](#) affecting surface methane emissions, the rule should include requirements to limit the landfill working face, limit the concentration of wet waste, and speed up installation of intermediate cover.** The draft rule is silent on one the most critical drivers of methane emissions - the amount of active face and final cover. The California Air Resources Board has proactively identified minimizing the area and duration of daily cover, in a [rule](#) improvement. We believe Washington’s rule should follow suit, incorporating the specific additions to its draft rule language that are outlined in our June 13, 2023, comments.
- Finally, monitoring should be conducted only when barometric pressure is normal.

Gas Collection and Control System Equipment parameters, monitoring and leak detection:

- **The draft rule should strengthen the gas component design and monitoring language, aligning with Oregon’s rules.** Just as important as effective monitoring for methane exceedances is the effective design, equipment type, installation, operation and robust monitoring of gas collection and control systems. For example, Canada’s draft Regulatory Framework includes monthly monitoring of wellheads and components under positive pressure, with either a portable detector or installation of a continuous monitoring system. Oregon’s rule details key design, installation, monitoring and Leak Detection and Repair (LDAR) requirements, including wellhead monitoring key parameters - temperature, pressure and nitrogen. The draft rule language misses several important aspects from Oregon’s rule, which should be incorporated (below is specific missing language to incorporate):
 - Gas Collection and Control System Operational Standards:
 - i) “Design and operate the gas collection system to minimize off-site and on-site migration of subsurface gas”
 - ii) “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.
 - iii) “Efforts to repair the collection or control system must be initiated and completed in a manner such that downtime is kept to a minimum, and the collection and control system must be returned to operation.”
 - iv) “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.”
 - v) “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 so as 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. 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. Landfill gas must be conveyed to a control system in compliance with this rule through the collection header pipe(s). The gas mover equipment must be sized to handle the maximum gas

generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(i) For existing collection systems, the flow data must be used to project the maximum flow rate. If no flow data exists, the procedures in subparagraph (2)(a)(L)(ii) of this rule must be used; or

(ii) For new collection systems, the maximum flow rate must be determined in accordance with WAC 173-408-100(1).”

- Wellhead monitoring:

- i) “(a) Landfill owners and operators must determine wellhead nitrogen levels using EPA Reference Method 3C, Determination of Volatile Organic Compound Leaks, 40 C.F.R. Part 60, Appendix A, unless an alternative test method is approved by Ecology.”
- ii) “(b) Unless an alternative test method is established and approved by DEQ, landfill owners and operators must determine wellhead oxygen levels by an oxygen meter using EPA Reference Method 3A or 3C, 40 C.F.R. Part 60, Appendix A, or ASTM D6522-20, except that, if sample location is prior to combustion:
 - (A) The span must be set between 10 and 12 percent oxygen;
 - (B) A data recorder is not required;
 - (C) Only two calibration gases are required, a zero and span;
 - (D) A calibration error check is not required; and
 - (E) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.”
- iii) “Landfill owners and operators may use a portable gas composition analyzer to monitor wellhead oxygen levels provided that the analyzer is calibrated, and the analyzer meets all quality assurance and quality control requirements for 40 C.F.R. Part 60, Appendix A-1, Method 3A or ASTM D6522-11.”
- iv) “Determination of Gauge Pressure. Landfill owners and operators must determine wellhead gauge pressure using a hand-held manometer, magnahelic gauge, or other pressure measuring device approved by Ecology. The device must be calibrated and operated in accordance with the manufacturer’s specifications.”
- v) “Landfill owners and operators must calibrate wellhead temperature measuring devices annually using the procedure in 40 C.F.R. Part 60, Appendix A-1, Method 2, Section 10.3 except that a minimum of two temperature points, bracket within 10 percent of all landfill absolute temperature measurements or two fixed points of ice bath and boiling water, corrected for barometric pressure, are used.”
- vi) “Enhanced monitoring. The landfill owner or operator must initiate enhanced monitoring at each well with a measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit) as follows:
 - (a) Visual observations for subsurface oxidation events (smoke, smoldering ash, damage to well) within the radius of influence of the well;
 - (b) Monitor oxygen or nitrogen concentration as provided in WAC 173-408-090;
 - (c) Monitor temperature of the landfill gas at the wellhead as provided in WAC (insert chapter)
 - (d) Monitor temperature of the landfill gas every 10 vertical feet of the well as provided in WAC (insert chapter)

(e) Monitor the methane concentration with a methane meter using EPA Method 3C of Appendix A-6 to 40 C.F.R. Part 60, EPA Method 18 of Appendix A-6 to 40 C.F.R. part 60, or a portable gas composition analyzer to monitor the methane levels provided that the analyzer is calibrated and the analyzer meets all quality assurance and quality control requirements for EPA Method 3C or EPA Method 18;”

“(f) Monitor carbon monoxide concentrations, as follows:

(A) Collect the sample from the wellhead sampling port in a passivated canister or multi-layer foil gas sampling bag (such as the Cali-5-Bond Bag) and analyze that sample using EPA Method 10, 40 C.F.R. Part 60, Appendix A-4, or an equivalent method with a detection limit of at least 100 ppmv of carbon monoxide in high concentrations of methane; and

(B) Collect and analyze the sample from the wellhead using EPA Method 10, 40 C.F.R. Part 60, Appendix A-4 to measure carbon monoxide concentrations;”

“(g) The enhanced monitoring must begin 7 days after the first measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit);”

“(h) The enhanced monitoring must be conducted on a weekly basis. If four consecutive weekly carbon monoxide readings are under 100 ppmv, then enhanced monitoring may be decreased to monthly. If monthly carbon monoxide readings exceed 100 ppmv, the landfill must return to weekly monitoring;”

“(i) The enhanced monitoring can be stopped once a higher operating value is approved, at which time the monitoring provisions issued with the higher operating value must be followed, or once the measurement of landfill gas temperature at the wellhead is less than or equal to 62.8 degrees Celsius (145 degrees Fahrenheit)”

“(j) For each wellhead with a measurement of landfill gas temperature greater than or equal to 73.9 degrees Celsius (165 degrees Fahrenheit), annually monitor temperature of the landfill gas every 10 vertical feet of the well. This temperature can be monitored either with a removable thermometer, or using temporary or permanent thermocouples installed in the well.”

- Gas equipment monitoring: The rule omits recording gas component leaks. (2) c) Gas equipment monitoring should instead read as follows:

“Components containing landfill gas must be monitored quarterly for leaks. Any component leak must be tagged and repaired within 10 calendar days. Any component leak over 250 ppmv must be recorded pursuant to WAC 173-408-110.”

Record Keeping and Reporting requirements:

- **The rule’s recordkeeping and reporting requirements should include key record keeping requirements to align with Oregon’s Landfill Emissions rule, in order to provide a record that landfill operators are conducting the operational requirements set out by the rule.** Since Ecology and the local air districts do not conduct their own emissions monitoring and gas component leak monitoring at landfills to ensure compliance, we are dependent on landfill operators fulfilling the rule without this level of oversight. Thus, robust record keeping is the principal way to track compliance, and the rule record keeping requirements reflect the best practice to achieve the rule’s

requirements. Therefore, we believe the rule language should be strengthened by including the following language (per Oregon's rule, Landfill Gas Emissions section [340-239-070](#))

- (1) (v) should be changed to:

“Records of all instantaneous surface readings of 100 ppmv or greater; all exceedances of the limits in WAC 173-408-100(1), including the location of the leak (or affected grid), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitored concentration in ppmv, and wind speed during surface sampling; and the installation date and location of each well installed as part of a gas collection system expansion.”
- (1) (vii) should be changed to the following:

“Monthly solid waste acceptance rate, for active landfills or landfills that have accepted waste within the last five years and the current amount of waste-in-place including waste composition.”
- (1) (xiii): This section requires reporting on “non routine maintenance construction activity” - a term that is not defined and is not comprehensive. Instead, Ecology should incorporate Oregon's reporting language in their rule: “Any construction activities pursuant to XXX. Records must contain the following information:
 - (i) A description of the actions being taken, the areas of the 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;
 - (ii) Construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components; and
 - (iii) A description of the mitigation measures taken to minimize methane emissions and other potential air quality impact.”
- The draft rule omits open flares from the “Records of the equipment operating parameters” section, or (1) (xi), instead including it in a different section that requires reporting “as measured during the initial source test or compliance determination.” Ecology should clearly require comprehensive record keeping for open flares, by incorporating Oregon's language in the (1) (xi) section, as follows:

“(D) For open flares, continuous records of the flame or flare pilot flame monitoring, and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent; and
(E) The indication of flow to the control system and the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.”
- The draft rule language omits record keeping of exceedances by gas collection and control systems. It should correct this omission by including Oregon's language:

“All collection and control system exceedances of the operational standards; the reading in the subsequent month, whether or not the second reading is an exceedance; and the location of each exceedance.”
- The draft rule omits record keeping requirements from Oregon's rules that are to document that the landfill operator is fulfilling the surface emissions requirements and gas control parameters it is attesting to. This record keeping should not be a hardship if the operator is in compliance, as they are necessary information to collect if they are in compliance. The draft language should therefore include the following language from Oregon's rules:
 - “(1)(c) Landfill owners or operators demonstrating that site-specific surface methane emissions are below 200 ppmv by conducting surface emission monitoring under WAC 173-408-070 must keep for

at least five years up-to-date, readily accessible records of all surface emissions monitoring and information related to monitoring instrument calibrations conducted according to sections 8 and 10 of Method 21 of appendix A of 40 C.F.R. Part 60, including all of the following items”:

“(i) Calibration records, including:

(I) Date of calibration and initials of operator performing the calibration;

(II) Calibration gas cylinder identification, certification date, and certified concentration;

(III) Instrument scale(s) used;”

“(IV) A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value; and”

“(V) If an owner or operator makes their own calibration gas, a description of the procedure(s) used;”

“(ii) Digital photographs of the instrument setup, including the wind barrier. The photographs must be accurately time and date-stamped and taken at the first sampling location prior to sampling and at the last sampling location after sampling at the end of each sampling day;

(iii) Timestamp of each surface scan reading which must be detailed to the nearest second, based on when the sample collection begins and log for the length of time each sample was taken using a stopwatch (e.g., the time the probe was held over the area);

(iv) Location of each surface scan reading. The owner or operator must determine the coordinates using an instrument with an accuracy of at least four meters. Coordinates must be in decimal degrees with at least five decimal places;

(v) Monitored methane concentration (ppmv) of each reading;

(vi) Background methane concentration (ppmv) after each instrument calibration test;

(vii) For readings taken at each surface penetration, the unique identification location label matching the label specified in subparagraph XXX; and

(viii) Records of the operating hours of the gas collection system for each destruction device;”

“(E) The date of initial placement of waste in newly constructed landfill cells; and”

“(F) Documentation of any component leaks above 250 ppmv methane detected pursuant to WAC 173-408-070 and all repairs performed in response to any component leaks above 500 ppmv.”

(G) “The maximum design capacity of the landfill.”

Finally, during the rulemaking process, we request that Ecology provide an estimated amount of landfill methane emissions that the proposed rules would reduce, with an accompanying methodology. For example, the State of Maryland Department of Environment provided an estimate during their rulemaking that there would be a 25-50 percent reduction in emissions from the landfills that fall under the rule, once it's in full effect. Such information would provide transparency and valuable information for the public, as the rulemaking process proceeds.

Thank you for consideration of our comments. I can be reached at heather@zerowastewashington.org or (206) 441-1790.

Sincerely,

A handwritten signature in black ink, appearing to read "Heather Trim", with a long, sweeping underline.

Heather Trim
Executive Director