



State of Oregon Department of Environmental Quality

# Draft Rules

Landfill Gas Emissions 2021 Rulemaking Advisory Committee Meeting #2

## Oregon Department of Environmental Quality Division 239 (new)

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### **340-239-0010 Applicability**

(1) This division applies in all areas of the state and to all landfills that have received, or will receive, solid waste after January 1, 1977, excluding those sources located on either tribal or federal lands that are not subject to regulation by DEQ and except as provided in section (3), below.

(2) Subject to the requirements in this division and OAR 340-200-0010(3), LRAPA is designated by the EQC to implement the rules in this division within its area of jurisdiction.

#### **(3) Exemptions**

(a) This division does not apply to landfills that are regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C or the Comprehensive Environmental Response, Compensation and Liability Act 42 U.S.C, Chapter 103 (Promulgated 12/11/80; Amended 10/17/86).

(b) This division does not apply to landfills that receive only nondecomposable wastes.

(c) This division does not apply to closed or inactive landfills with less than 450,000 tons of waste-in-place.

**Statutory/Other Authority:** ORS 468.020, 468A.025 & 468A.135

**Statutes/Other Implemented:** ORS 468A.025 & 468A.135

### **340-239-0015 Definitions**

The definitions in OAR 340-200-0020, 340-218-0030 and this rule apply to this division. If the same term is defined in this rule and 340-200-0020 or 340-218-0030, the definition in this rule applies to this division.

(1) “Active Landfill” means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

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

(3) “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. Measurements from any vault must be taken within 3 inches above the surface of the vault exposed to the atmosphere.

- (4) “Closed Landfill” means that a landfill is no longer accepting solid waste for disposal and has documentation that the closure was conducted in accordance with the applicable statutes, regulations, and local ordinances in effect at the time of closure.
- (5) “Continuous Operation” means that the gas collection and control system is operated continuously, the existing gas collection wells are operating under vacuum while maintaining landfill gas flow, and the collected landfill gas is processed by a gas control system 24 hours per day.
- (6) “Controlled Landfill” means any landfill at which collection and control systems are required under this division. The landfill is considered controlled at the time a collection and control system design plan is required to comply with OAR 340-239-105(4) or OAR 340-239-105(5).
- (7) “Corrective action analysis” means a description of all reasonable interim and long-term measures, if any, that are available, and an explanation of why the selected corrective action(s) is/are the best alternative(s), including, but not limited to, considerations of cost effectiveness, technical feasibility, safety, and secondary impacts.
- (8) “Destruction Efficiency” means a measure of the ability of a gas control device to combust, transform, or otherwise prevent emissions of methane from entering the atmosphere.
- (9) “Enclosed Combustor” means an enclosed flare, steam generating boiler, internal combustion engine, or gas turbine.
- (10) “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.
- (11) “Open Flare” means an open combustor without enclosure or shroud.
- (12) “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.
- (13) “Gas Collection System” means any system that employs various gas collection wells and connected piping, and gas mover equipment.
- (14) “Gas Control System” means any system that disposes of or treats collected landfill gas by one or more of the following means: combustion, gas treatment for subsequent sale, or sale for processing offsite, including for transportation fuel and injection into the natural gas pipeline.
- (15) “Gas mover equipment” means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.
- (16) “Gas Mover System” includes all of the gas mover equipment
- (17) “Gas Collection and Control System” means any system consisting of a Gas Collection System and a Gas Control System.

(18) “Inactive area” means a separate area of a landfill in which solid waste is no longer being placed. The area must be separated from other areas of the landfill to ensure that the landfill gas does not migrate between active and inactive areas.

(19) “Inactive Landfill” means a landfill that is no longer accepting solid waste for disposal, or can document that the landfill is no longer receiving solid waste.

(20) “Landfill” means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under 40 CFR § 257.2.

(21) “Landfill Gas” means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in a landfill, from the evolution of volatile species in the waste, or from chemical reactions of substances in the waste.

(22) “Landfill Surface” means the area of the landfill under which decomposable solid waste has been placed, excluding the working face.

(23) “Leachate recirculation” means the practice of taking the leachate collected from the landfill and reapplying it to the landfill by any of one of a variety of methods, including pre-wetting of the waste, direct discharge into the working face, spraying, infiltration ponds, vertical injection wells, horizontal gravity distribution systems, and pressure distribution systems.

(24) “Nondecomposable Solid Waste” constituents that are biologically and chemically inactive and do not form landfill gas.

(25) Examples include, but are not limited to, earth, rock, concrete asphalt paving fragments, uncontaminated concrete (including fiberglass or steel reinforcing rods embedded in the concrete), brick, glass, ceramics, clay products, inert slag, asbestos-containing waste, waste tire chips, and demolition materials containing minor amounts (less than 10 percent by volume) of wood and metals. Materials that do not meet this definition are considered decomposable solid waste.

(26) “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.

(27) “Operator” means any person or entity, including but not limited to any government entity, corporation, partnership, trustee, other legal entity, or individual that:

(a) Operates the landfill;

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

(c) Operates any stationary equipment for the collection of landfill gas;

(d) Purchases landfill gas from an owner or operator of a landfill and operates any stationary equipment for the treatment of landfill gas; or

(e) Purchases untreated landfill gas from an owner or operator of a landfill and operates any stationary equipment for the combustion of landfill gas.

(28) “Owner” means any person or entity, including but not limited to any government entity, corporation, partnership, trustee, other legal entity, or individual that:

(a) Holds title to the real property on which the landfill 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 real property used for landfill purposes and subject to this rule.

(c) Owns any stationary equipment for the collection of landfill gas;

(d) Purchases the landfill gas from an owner or operator of a landfill and owns any stationary equipment for the treatment of landfill gas; or

(e) Purchases untreated landfill gas from an owner or operator of a landfill and owns any stationary equipment for the combustion of landfill gas.

(29) “ppmv” means parts per million by volume

(30) “Professional Engineer” means an individual who is registered in Oregon and holds a valid certificate to practice engineering in Oregon as provided under ORS 672.002 to 672.325.

(31) “Root cause analysis” means an assessment conducted through a process of investigation to determine the primary cause, and any other contributing causes, of positive pressure at a wellhead.

(32) “scfm” means standard cubic feet per minute

(33) “SEM” means Surface Emission Monitoring

(34) “Solid Waste” means all decomposable and nondecomposable solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial waste, manure, vegetable or animal solid and semisolid wastes, sludge, and other discarded solid and semisolid wastes.

Solid waste also includes any material meeting the definition of Solid Waste in 40 CFR § 60.751.

(35) “Treatment system” means a system that filters, de-waters, and compresses landfill gas.

(36) “Waste-in-Place” means the total amount of solid waste placed in the landfill in tons. The refuse density is assumed to be 1,300 pounds per cubic yard and the decomposable fraction is assumed to be 70 percent by weight unless DEQ approves alternative values.

(37) “Well Raising” means a landfill activity where an existing gas collection well is temporarily disconnected from a vacuum source, and the nonperforated pipe attached to the well is extended vertically to allow the addition of a new layer of solid waste or the final cover; or is extended horizontally to allow the horizontal extension of an existing layer of solid waste or cover material. The extended pipe (well extension) is then reconnected in order to continue collecting gas from that well.

(38) “Working Face” means the open area where solid waste is deposited daily and compacted with landfill equipment.

**Statutory/Other Authority:** ORS 468.020 & 468A.025

**Statutes/Other Implemented:** ORS 468A.025

### **340-239-0100 Landfills Less Than 450,000 Tons of Waste-in-Place**

(1) By July 1, 2022 each owner or operator of a landfill listed in Table 1, Part A of OAR 340-216, having less than 450,000 tons (408,000 metric tons) of waste-in-place, must submit an administratively complete permit application and an initial Waste-in-Place report including calendar year 2021 to DEQ pursuant to OAR 340-239-0700(3)(e).

(2) Each owner or operator of a new landfill that is designed to receive less than 450,000 tons in the first year must comply with applicable provisions of the Notice of Construction requirements in OAR chapter 340 division 210, and submit an administratively complete permit application at least 60 days prior to initial waste acceptance. Each owner or operator of a new landfill must submit an initial Waste-in-Place report 30 days after the end of calendar year pursuant to OAR 340-0700(3)(e).

(3) Following the initial Waste-In-Place report submitted according to OAR 340-239-0100(1) or OAR 340-239-0100 (2), each owner or operator of a landfill having less than 450,000 tons of waste-in-place must submit an annual Waste-in-Place report to DEQ pursuant to OAR 340-239-0700(3)(e), until either:

(a) The landfill reaches a size greater than or equal to 450,000 tons of waste-in-place. Once a landfill reaches a size greater than or equal to 450,000 tons of waste-in-place, the owner or operator is subject to OAR 340-0105; or

(b) The owner or operator submits a Closure Notification pursuant to OAR 340-239-0700(3)(a).

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0105 Landfills Greater Than or Equal to 450,000 Tons of Waste-in-Place**

(1) By July 1, 2022 each owner or operator of a landfill listed in Table 1 Part A of OAR 340-216, having greater than 450,000 tons (408,000 metric tons) of waste-in-place, must submit an administratively complete permit application and an initial Waste-in-Place report to DEQ pursuant to OAR 340-239-0700(3)(e) and methane generation report to DEQ pursuant to OAR 340-239-0700(3)(f).

(2) Each owner or operator of a new landfill that is designed to receive over 450,000 tons in the first year must comply with applicable provisions of the Notice of Construction requirements in OAR chapter 340 division 210, and submit an administratively complete permit application at least 60 days prior to initial waste acceptance. Each owner or operator of a new landfill must submit an initial Waste-in-Place report to DEQ pursuant to OAR 340-239-0700(3)(e) and a methane generation report pursuant to OAR 340-239-0700(3)(f).

(3) Each owner or operator of a landfill must notify DEQ 60 days prior to reaching 450,000 tons waste-in-place, based on anticipated acceptance rates. Each owner or operator of a landfill must submit a methane generation report pursuant to OAR 340-239-0700(3)(f) within 30 days of reaching 450,000 tons waste-in-place.

(4) If the calculated methane generation rate reported according to OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) is less than 664 metric tons (732 tons) per year, the owner or operator must:

(a) If the landfill is active:

(A) Recalculate the methane generation rate annually using the procedures specified in OAR 340-239-0800(2); and

(B) If the landfill is active, submit an annual Methane Generation Rate Report to DEQ pursuant to OAR 340-239-0700(3)(f) until either of the following conditions is met:

(i) The calculated methane generation rate is greater than or equal to 664 metric tons per year, or

(ii) The owner or operator submits a Closure Notification pursuant to OAR 340-239-0700(3)(a).

(b) If the landfill is closed or inactive during the entire reporting period, no reporting is required for that reporting period.

(5) If the methane generation rate reported according to OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) is greater than or equal to 664 metric tons per year but less than 7,755 metric tons per year the owner or operator must either:

(a) Comply with the requirements of OAR 340-239-0110 through OAR 340-239-0800; or

(b) Demonstrate to the satisfaction of DEQ that after four consecutive quarterly monitoring periods there is no measured concentration of methane of 200 parts per million by volume (ppmv) or greater using the instantaneous surface monitoring procedures specified in OAR 340-

239-0800(3). Quarterly monitoring must begin within 90 days after the methane generation rate calculation required under OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) is greater or equal to 664 metric tons per year, as reported using an Instantaneous Surface Monitoring Report prepared and submitted according to OAR 340-239-0070(3)(l). Based on the monitoring results, the owner or operator must do one of the following:

(A) If there is any measured concentration of methane of 200 ppmv or greater from the surface of an active, inactive, or closed landfill, comply with OAR 340-239-0110 through OAR 340-239-0800;

(B) If there is no measured concentration of methane of 200 ppmv or greater from the surface of an active landfill, recalculate the methane generation rate annually using the procedures specified in OAR 340-239-0800(2) and submit a Methane Generation Report annually to DEQ pursuant to OAR 340-239-0700(3)(f); or

(C) If there is no measured concentration of methane of 200 ppmv or greater from the surface of a closed or inactive landfill, the requirements of OAR 340-239-0110 through OAR 340-239-0800 no longer apply provided that a Waste-in-Place Report pursuant to OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) and all required Instantaneous Surface Monitoring Reports have been submitted to DEQ according to OAR 340-239-0105(4)(b).

(6) If the methane generation rate reported according to OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) is greater than or equal to 7,755 metric tons per year the owner or operator must comply with the requirements of OAR 340-239-0110 through OAR 340-239-0800.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0110 Gas Collection and Control System Requirements**

When required as provided in OAR 340-239-0105 through 340-239-0800, the owner or operator of a landfill must comply with the gas collection and control system requirements, system operational standards and well head sampling requirements in this rule.

#### **(1) Design Plan and Installation .**

(a) If a gas collection and control system which meets the requirements of OAR 340-239-0110(2) has not been installed, the owner or operator of a landfill subject to OAR 340-239-0110 must submit a Design Plan to DEQ within one year after the effective date of this division, or within one year of the landfill being subject to OAR 340-239-0110. At a minimum, the Design Plan must meet all of the following requirements:

(A) The Design Plan must be prepared and certified by a professional engineer. The following issues must be addressed in the design: Depths of refuse, refuse 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 refuse decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.

(B) 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 OAR 340-239-0110(2) or an alternative method approved pursuant to OAR 340-239-0500.

(C) The gas collection and control system must be designed to handle the maximum expected gas generation flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment. The maximum expected gas generation flow rate must be calculated using the method in OAR 340-239-0800(5) or an alternative method approved pursuant to OAR 340-239-0500.

(D) The Design Plan must include any proposed alternatives to the requirements, justification for the need for any proposed alternatives, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to OAR 340-239-0500.

(E) The Design Plan must include a description of potential mitigation measures to be used to prevent the release of methane or other pollutants into the atmosphere during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; or, when solid waste is to be excavated and moved.

(F) For active landfills, the design plan must identify areas of the landfill that are closed or inactive.

(G) The gas collection and control system must be designed to collect gas at an extraction rate to comply with the surface methane emission limits in OAR 340-239-0200, component leak standard in OAR 340-239-0600(2)(c), and be sufficient to meet all operational and performance standards in this division. The expected gas generation flow rate from the landfill must be calculated pursuant to OAR 340-239-0800(5).

(H) The gas collection and control system must be designed to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions.

(I) Any areas of the landfill that contain only asbestos-containing waste, or nondecomposable solid waste may be excluded from collection provided that the owner or operator submits documentation to DEQ containing the nature, date of deposition, location and amount of asbestos or non-decomposable solid waste deposited in the area. This documentation may be included as part of the Design Plan.

(b) Any owner or operator of an active landfill must install and operate a gas collection and control system within 18 months after becoming subject to the requirements of OAR 340-239-0110 through OAR 340-239-0800.

(c) Any owner or operator of a closed or inactive landfill must install and operate a gas collection and control system within 30 months after becoming subject to the requirements of OAR 340-239-0110 through OAR 340-239-0800.

(d) If an owner or operator of a landfill is modifying an existing gas collection and control system to meet the requirements of this division, the owner or operator must submit an Amended Design Plan to DEQ that includes any necessary updates or addenda, in accordance with OAR 340-239-0700(3)(j), and certified by a professional engineer.

(e) Each owner or operator of a controlled landfill 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 area controlled by the well is subject to this division.

(f) The owner or operator of a landfill must operate, maintain and expand the gas collection system in accordance with the procedures and schedules in the approved Design Plan.

## (2) Gas Collection and Control System Operational Standards

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

(A) Route all collected gas to a gas control device or devices, and operate the gas collection and control system continuously except as provided in OAR 340-239-0110(4) and OAR 340-239-0110(5).

(B) Operate the gas collection and control system to comply with OAR 340-239-0110(1)(a)(G).

(C) Design and operate the gas collection system to draw all the gas toward the gas control device or devices.

(D) Design and operate the gas collection system to minimize off-site and on-site migration of subsurface gas in compliance with OAR 340-093, OAR 340-094, and OAR 340-095.

(E) 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.

(F) 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.

(G) Install all passive collection systems with liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under 40 CFR § 258.40.

(H) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than one percent (1%) of the total amount

of methane emissions from the landfill. The amount, location, and age of the material must be documented and provided to DEQ upon request. A separate methane emissions estimate must be made for each section proposed for exclusion, and the sum of all such sections must be compared to the methane emissions estimate for the entire landfill. The methane emissions from each section proposed for exclusion must be computed using the methods provided in OAR 340-239-0800(5).

(I) 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.

(J) 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 or refuse, 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.

(K) 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.

(L) Landfill gas must be conveyed to a control system in compliance with OAR 340-239-0110(2) 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 paragraph (L)(ii) of this section must be used; or

(ii) For new collection systems, the maximum flow rate must be in accordance with OAR 340-239-0800(5).

(b) Requirements for Enclosed Flares. A landfill owner or operator who operates a flare must route the collected gas to an enclosed flare that meets all of the following requirements:

(A) Achieves a methane destruction efficiency of at least 99 percent by weight.

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

(C) During restart or startup there must be a sufficient flow of propane, commercial natural gas, or other approved fuel source, to the pilot light to prevent unburned collected methane from being emitted to the atmosphere.

(D) The gas control device must be operated within the parameter ranges established during the initial or most recent performance test or in an issued Air Contaminant Discharge Permit or Oregon Title V Operating Permit.

(c) Requirements for open flares: A landfill owner or operator who operates an open flare must route the collected gas to an open flare that meets the requirements of 40 CFR § 60.18. The owner or operator of an open flare must install, calibrate, maintain, and operate the following equipment according to the manufacturer's specifications:

(A) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(B) A device that records flow to the flare and bypass of the flare (if applicable). The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the control device at least every 15 minutes; and

(ii) 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.

(C) An open flare installed and operating prior to August 1, 2021, may operate until January 1, 2024.

(D) Operation of an open flare on or after August 1, 2021, may be allowed if the owner or operator can demonstrate to the satisfaction of DEQ that one of the following conditions apply:

(i) The methane generation rate is less than 664 metric tons per year pursuant to OAR 340-239-800(2) and is insufficient to support the continuous operation of an enclosed flare or other gas control device.

(ii) The owner or operator is seeking to 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 seeking to temporarily operate an open flare must submit a written request to DEQ pursuant to OAR 340-239-0500.

(iii) The owner or operator has landfill gas emissions that are unable to be controlled using non-open flare gas control devices in the gas control system. These emissions being controlled using

an open flare may not exceed 664 metric tons per year of methane. Any owner seeking to operate an open flare in this manner must submit a written request to DEQ pursuant to OAR 340-239-0500. The request must include an analysis verifying that there is no feasible alternative control device configuration that would use the landfill gas emissions without use of an open flare.

(d) Requirements for Gas Control Devices other than Flares. A landfill owner or operator who operates a gas control device other than a flare must satisfy one of the following requirements:

(A) Route the collected gas to an energy recovery device, or series of devices that meets all of the following requirements:

(i) Achieves a methane destruction efficiency of at least 99 percent by weight pursuant to OAR 340-239-0800(6). Lean burn internal combustion engines must reduce the outlet methane concentration to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen. The reduction efficiency or parts per million by volume 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 OAR 340-239-0800(6). The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(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.

(iii) Operate the gas control device within the parameter ranges established during the initial or most recent performance test.

(B) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. 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 controlled according to either OAR 340-0110(2)(b), OAR 340-0110(2)(c) or OAR 340-0110(2)(d). All emissions vented to the atmosphere from the gas treatment system are subject to the requirements of OAR 340-239-0110(2)(b) or OAR 340-239-0110(2)(c). The owner or operator must prepare a site-specific treatment monitoring plan to include all of the following:

(i) Monitoring records of parameters that are identified in the treatment system monitoring plan and that ensure the treatment system is operating properly for each intended end use of the treated landfill gas. At a minimum, records should include records of filtration, de-watering, and compression parameters.

(ii) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas;

(iii) Documentation of the monitoring methods and ranges, along with justification for their use;

(iv) List of responsible staff (by job title) for data collection;

(v) Processes and methods used to collect the necessary data; and

(vi) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems (CMS).

(C) Each owner or operator complying with OAR 340-239-0110(2)(d) by using a landfill gas treatment system must calibrate, maintain, and operate according to the manufacturer's specifications a device that records flow to the treatment system and bypass of the treatment system (if applicable). Each owner or operator must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required in OAR 340-239-0110(2)(d)(B). The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the treatment system at least every 15 minutes;

(ii) Install liners or equivalent non-permeable materials on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under 40 CFR 258.40; and

(iii) 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.

(e) Performance Test Requirements. The owner or operator must conduct annual performance tests for any gas control device(s) subject to the requirements of OAR 340-239-0110(2) using the test methods identified in OAR 340-239-0800(6). Following an initial performance test, the owner or operator must conduct a complete annual performance test each calendar year, no later than 45 days after the anniversary date of the initial performance test. Performance tests must be conducted in compliance with all of the following requirements:

(A) An initial performance test must be conducted within 180 days of initial start up of the gas collection and control system.

(B) If a gas control device remains in compliance with standards in OAR 340-239-0110(2) after three consecutive performance tests, the owner or operator may conduct the performance test every three years. If a subsequent performance test shows the gas collection and control system does not demonstrate compliance with the standard(s) in (applicable standard), the performance testing frequency must return to annual.

(C) The performance tests must be conducted under such conditions as DEQ specifies to the owner or operator based on representative performance of the affected source for the period being tested. Representative conditions exclude periods of startup and shutdown unless specified by DEQ. The owner or operator may not conduct performance tests during periods of malfunction. The owner or operator must record the process information that is necessary to document operating conditions during the test and include in such record an explanation to support that such conditions represent normal operation. Upon request, the owner or operator

shall make available to DEQ such records as may be necessary to determine the conditions of performance tests.

(3) Wellhead sampling. Each landfill owner or operator required to comply with OAR 340-239-0110(2) for an active gas collection system must install a sampling port and measuring devices, or an access port for measuring devices at each wellhead and comply with the following:

(a) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in OAR 340-239-0600(3);

(b) Monitor temperature of the landfill gas on a monthly basis as provided in OAR 340-239-0600(3); and

(c) Measure the gauge pressure in the gas collection header on a monthly basis as provided in OAR 340-239-0600(2)(d).

(4) Well Raising. The requirements of OAR 340-239-0110(2)(a)(A), OAR 340-239-0110(2)(a)(B), and OAR 340-239-0110(3), do not apply to individual wells involved in well raising provided the following conditions 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 or capped until the raised well is reconnected to a vacuum source.

(5) Repairs and Temporary Shutdown of Gas Collection System Components: The requirements of OAR 340-239-0110(2)(a)(A) and OAR 340-239-0110(2)(a)(B), do not apply to individual landfill gas collection system components that must be temporarily shut down in order to repair the components due to emergencies, catastrophic events such as earthquakes, to extinguish landfill fires, to prevent landfill fires, to connect new landfill gas collection system components to the existing system, to perform construction activities pursuant to OAR 340-239-0300, or to conduct performance testing, provided the following requirements are met:

(a) Any new gas collection system components required to maintain compliance with this division must be included in the most recent Design Plan pursuant to OAR 340-239-0110 (1). The owner or operator must comply with applicable provisions of the Notice of Construction requirements in OAR chapter 340 division 210 and permit modification requirements of OAR chapter 340 division 216 or 218 prior to the construction, installation and operation of new landfill gas collection system components;

(b) Methane emissions are minimized during shutdown pursuant to OAR 340-239-0110(1)(a)(E); and

(c) The owner or operator must submit a notification to DEQ after any temporary shutdown due to a catastrophic event or landfill fires in accordance with OAR 340-239-0700(3)(n).

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0200 Compliance Standards**

When required as provided in OAR 340-239-0105 through 340-239-0800, the owner or operator of a landfill must comply with the compliance standards in this rule.

(1) Surface Emission Methane Concentration Limits. Except as provided in OAR 340-239-0110(4), OAR 340-239-0110(5), and OAR 340-239-0300, beginning August 1, 2022, or upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to OAR 340-239-0110(1), whichever is later, no location on the landfill surface may exceed either of the following methane concentration limits:

(a) 500 ppmv, other than nonrepeatable, momentary readings, as determined by instantaneous surface emissions monitoring conducted in accordance with OAR 340-239-0800(3)(b); or

(b) An average methane concentration limit of 25 ppmv as determined by integrated surface emissions monitoring conducted in accordance with OAR 340-239-800(3)(c).

(2) Wellhead Gauge Pressure Requirement: Each landfill gas collection and control system wellhead must be operated under a negative pressure without causing air infiltration, except as provided in OAR 340-239-0110(4) and OAR 340-239-110(5), or under any of the following conditions:

(a) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits for the wellheads and include them in the Design Plan;

(b) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows; or

(c) A fire or increased well temperature. The owner or operator must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the semi-annual reports as provided in OAR 340-239-700(3)(c).

(3) Wellhead Temperature Requirement:

(a) Each landfill gas collection and control system interior wellhead in the collection system must be operated with a landfill gas temperature less than 62.8 degrees Celsius (145 degrees Fahrenheit).

(b) The landfill owner or operator may request a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to DEQ for approval and must include supporting data demonstrating that the elevated parameter neither causes fires

nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (i.e., it is only acceptable if it neither causes fires nor kills methanogens).

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0300 Construction Activities**

The requirements of OAR 340-239-0200 do not apply to the working face of the landfill or to areas of the landfill surface where the landfill cover material has been removed and refuse has been exposed for the purpose of installing, expanding, replacing, or repairing components of the landfill gas, leachate, or gas condensate collection and removal system, or for law enforcement activities requiring excavation; as long as these areas are kept to the minimum size and time duration as possible.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0400 Permanent Shutdown and Removal of the Gas Collection and Control System**

When required as provided in OAR 340-239-0105 through 340-239-0800, the owner or operator of a landfill must comply with the criteria in this rule prior to the permanent shutdown and removal of a landfill gas collection and control system.

(1) The gas collection and control system at a closed landfill may be capped or removed provided all of the following requirements are met:

(a) The gas collection and control system was in operation for at least 15 years, unless the owner or operator can demonstrate to the satisfaction of DEQ that due to declining methane rates the landfill will be unable to operate the gas collection and control system for a 15-year period.

(b) The calculated or measured methane generation rate at the landfill is less than 664 metric tons per year on three successive test dates. For measured methane generation rates, the test dates must be no less than 90 days apart, no more than 180 days apart. The calculated methane generation rate must be calculated pursuant to OAR 340-239-0800(2).

(c) Surface methane concentration measurements do not exceed the limits specified in OAR 340-239-0200.

(d) The owner or operator submits an Equipment Removal Report to DEQ pursuant to OAR 340-239-0700(3)(b).

(e) DEQ has not received complaints about nuisance odors within the previous 3 years.

(f) Subsurface methane migration does not exceed compliance limits.

(2) The owner or operator of the landfill that has capped or removed the gas collection and control system must conduct surface methane concentration measurements over the portion of the landfill with the capped or removed gas collection and control system pursuant to OAR 340-239-0800(3) for at least eight consecutive quarters after the gas collection and control system is capped or removed, and:

(a) If there is no measured concentration of methane of 200 ppmv or greater from the surface of the closed landfill, the owner or operator must submit a final gas collection and control system Closure Report to DEQ pursuant to OAR 340-239-0700(3)(a); or

(b) If there is any measured concentration of methane of 200 ppmv or greater, other than nonrepeatable, momentary readings, as determined by instantaneous surface emissions monitoring, from the surface of the closed landfill with capped or removed gas collection and control system, the owner or operator must comply with OAR 340-239-0110 through OAR 340-239-0800.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0500 Alternative Compliance Options**

(1) The owner or operator of a landfill may request alternatives to the compliance measures, monitoring requirements, test methods and procedures of OAR 340-239-0110, OAR 340-239-0600, and OAR 340-239-0800. Any alternatives requested by the owner or operator of a landfill must be submitted in writing to DEQ and receive written approval from DEQ before they may be implemented. Alternative compliance option requests may include, but are not limited to, the following:

(a) Semi-continuous (batch) operation of the gas collection and control system due to insufficient landfill gas flow rates;

(b) Alternative wind speed requirements for landfills consistently having winds in excess of the limits specified in this division;

(c) Alternative walking patterns to address potential safety and other issues, such as: Steep or slippery slopes, monitoring instrument obstructions, and physical obstructions;

(d) Exclusion of construction areas and other dangerous areas from landfill surface inspection; and

(e) Exclusion of paved roads that do not have any cracks, pot holes, or other penetrations from landfill surface inspection.

(2) The owner or operator seeking to use an alternative compliance option must provide information satisfactory to DEQ demonstrating that off-site migration is being, and will be, effectively controlled.

(3) The owner or operator seeking to use an alternative compliance option must provide information satisfactory to DEQ demonstrating that the proposed alternatives provide an equivalent level of methane emission control, as compared with the methane controls that would have been required of the owner or operator of the landfill under OAR 340-239-0110, OAR 340-239-0600 and OAR 340-239-0800, as applicable. DEQ may not approve use of an alternative compliance option unless it determines the proposed alternative will provide an equivalent level of methane emission control.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0600 Monitoring Requirements**

When required as provided in OAR 340-239-0105 through 340-239-0800, the owner or operator of a landfill must comply with the monitoring requirements in this rule.

(1) Surface Emissions Monitoring Requirements. Any owner or operator of a landfill with a gas collection and control system must conduct quarterly instantaneous and integrated surface monitoring of the landfill surface using the procedures specified in OAR 340-239-0800(3). All of the following requirements apply to such monitoring:

(a) Instantaneous Surface Monitoring. Any reading exceeding the limit specified in OAR 340-239-0200(1)(a) must be recorded as an exceedance and all of 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 of the landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.

(B) Corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, or well vacuum adjustments and the location must be re-monitored within ten days of a measured exceedance. The owner or operator must comply with all of the following requirements:

(i) If the re-monitoring of the location shows a second exceedance, the owner or operator must take additional corrective action and the location must be re-monitored again no later than 10 days after the second exceedance.

(ii) If the remonitoring shows a third exceedance, the owner or owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 days after detecting the third exceedance.

(iii) Any location that initially showed an exceedance but has a methane concentration less than 500 ppmv methane, or 200 ppmv methane if this is to determine compliance with OAR 340-239-0100(3)(c)(B), at the 10-day re-monitoring must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 ppmv methane, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the owner or owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 days after detecting the third exceedance.

(iv) For any location where monitored methane concentration equals or exceeds 500 ppmv, or 200 ppmv methane if this is to determine compliance with OAR 340-239-0100(3)(c)(B), three times within a quarterly period, a new well or other collection device must be installed within 120 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 DEQ for approval.

(C) The owner or operator of a closed or inactive landfill, or of any closed or inactive areas on an active landfill that has no monitored exceedances of the limits specified in OAR 340-239-0200(1)(a) after four consecutive quarterly monitoring periods, may shift to monitor annually.

(D) The owner or operator must return to quarterly monitoring upon any exceedances of the limits specified in OAR 340-239-0200(1)(a) that cannot be remediated within 10 days or upon any exceedances detected during a DEQ inspection.

(b) Integrated Surface Monitoring. Any reading exceeding the limit specified in OAR 340-239-0200(2)(b) must be recorded as an exceedance and all of the following actions must be taken:

(A) The owner or operator must record the average surface concentration measured as methane 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 of the landfill drawn to scale.

(B) Within 10 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, or well vacuum adjustments and the grid must be re-monitored. The owner or operator must comply with all of the following requirements:

(i) If the remonitoring of the grid shows a second exceedance, additional corrective action must be taken and the location must be re-monitored again no later than 10 days after the second exceedance.

(ii) If the remonitoring in OAR 340-239-0600(1)(b)(B)(i) shows a third exceedance, the owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 days after detecting the third exceedance.

(C) Any exceedances of the limits specified in OAR 340-239-0200(1)(b) detected during any DEQ inspections will result in a return to quarterly monitoring of the landfill.

(2) Gas Control System Equipment Monitoring. The landfill owner or operator must monitor the gas control system using the following procedures:

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

(A) A temperature monitoring device equipped with a continuous recorder that has an accuracy of plus or minus ( $\pm$ ) 1 percent of the temperature being measured expressed in degrees Celsius or Fahrenheit. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.

(B) A device that records flow to the control device and bypass of the control device (if applicable). The owner or operator must:

(i) 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

(ii) 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.

(b) For a gas control device other than an enclosed flare, the owner or operator must provide 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 must maintain, operate, and monitor the device according to the information provided. Alternative compliance requests to this section must be submitted to DEQ as specified in OAR 340-239-0500. DEQ may specify additional monitoring procedures.

(c) Components containing landfill gas and under positive pressure must be monitored quarterly for leaks. Any component leak over 500 ppmv methane must be tagged and repaired within 10 days. Quarterly component leak testing at landfills having landfill gas-to-energy facilities may be conducted prior to scheduled maintenance or planned outage periods.

(d) The owner or operator must measure gauge pressure in the gas collection header applied to each individual well, monthly. If a positive pressure exists, other than as provided in OAR 340-239-0200(2), action must be initiated to correct the exceedance within 5 days. Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(d) The monitoring requirements of this section apply at all times the affected source is operating, except for periods of monitoring system malfunctions, repairs associated with monitoring system malfunctions, and required monitoring system quality assurance or quality control activities. A monitoring system malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring system failures that are caused in part by poor maintenance or careless operation are not malfunctions. Monitoring system repairs completed in response to monitoring system malfunctions to return the monitoring system to operation must be completed as expeditiously as practicable.

(3) Wellhead Monitoring. The landfill owner or operator must monitor each individual wellhead monthly to determine the gauge pressure, temperature, and nitrogen or oxygen, and comply with all of the following requirements:

(a) If there is any positive pressure reading other than as provided in OAR 340-239-0110(3), the owner or operator must take the following actions. Any attempted corrective measure must not cause exceedances of other operational or performance standards:

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

(B) If negative pressure cannot be achieved without excess air infiltration within 15 days of the date the positive pressure was first measured, must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after positive pressure was first measured. The owner or operator must submit a corrective action report to DEQ pursuant to OAR 340-239-0700(3)(k);

(C) If corrective actions cannot be fully implemented within 60 days following the positive pressure measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the positive pressure measurement; and

(D) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to DEQ.

(b) If a well exceeds the operating parameter for temperature, action must be initiated to correct the exceedance within 5 days. Any attempted corrective measure must not cause exceedances of other operational or performance standards, and the owner or operator must comply with all of the following requirements:

(A) If a landfill gas temperature less than 62.8 degrees Celsius (145 degrees Fahrenheit), or as established in OAR 340-239-600(3), cannot be achieved within 15 days of the first measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit), the owner or operator must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after a landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit) was first measured. The owner or operator must keep records according to OAR 340-239-0700(2).

(B) If corrective actions cannot be fully implemented within 60 days following the temperature measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit). The owner or operator must submit the items listed in OAR 340-239-0700(3)(c)(A) as part of the next semi-annual report. The owner or operator must keep records according to OAR 340-239-0700(2).

(C) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to DEQ, according to OAR 340-239-0700(3)(c)(A) and OAR 340-239-600(3)(a)(C). The owner or operator must keep records according to OAR 340-239-0700(2).

(D) If a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured, according to the procedures in OAR 340-239-0800(7) is greater than or equal to 1,000 ppmv the corrective action(s) for the wellhead temperature standard (62.8 degrees Celsius or 145 degrees Fahrenheit) must be completed within 15 days.

(E) If a higher operating temperature has not been approved by DEQ, the enhanced monitoring specified in OAR 340-239-0800(8) is required at each well with a measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit).

(4) Cover integrity. The landfill owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis. The cover shall conform with requirements in OAR 340-094 and OAR 340-095.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### **340-239-0700 Recordkeeping and Reporting Requirements.**

When required as provided in OAR 340-239-0100 through 340-239-0800, the owner or operator of a landfill must comply with the recordkeeping and reporting requirements in this rule.

(1) Owners or operators of landfills that are subject to 40 CFR § 60.31f, 40 CFR § 60.760, or 40 CFR § 60.1935 must conduct electronic reporting pursuant to 40 CFR § 60.38f(j), 40 CFR § 60.767(i), or CFR § 63.1981(i), respectively and as applicable.

(2) Recordkeeping Requirements.

(a) A landfill owner or operator subject to this division must maintain the following records for at least five years pursuant to OAR 340-214-0114:

(A) All gas collection system downtime exceeding five days, including individual well shutdown and disconnection times, the reason for the downtime, and any corrective actions conducted in response to the downtime;

(B) All gas control system downtime in excess of one consecutive hour, the reason for the downtime, the length of time the gas control system was shutdown, and any corrective actions conducted in response to the downtime;

(D) All instantaneous surface readings of 200 ppmv or greater. All exceedances of the limits in OAR 340-239-0100(4)(c)(B) and OAR 340-239-0200, 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 remonitoring and the remonitored concentration in ppmv, wind speed during surface sampling, and the installation date and location of each well installed as part of a gas collection system expansion;

(E) Any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken;

(F) Each wellhead temperature monitoring value of 62.8 degrees Celsius (145 degrees Fahrenheit) or above, each wellhead nitrogen level at or above 20 percent, and each wellhead oxygen level at or above 5 percent;

(G) Monthly solid waste acceptance rate, for active landfills or landfills that have accepted waste within the last five years;

(H) The current amount of waste-in-place;

(I) The nature, location, amount, and date of deposition of nondegradable waste for any landfill areas excluded from the collection system;

(J) Results of any performance tests conducted pursuant to OAR 340-239-0110(2)(e);

(K) Descriptions of mitigation measures taken to prevent the release of methane or other emissions into the atmosphere:

(i) When solid waste was brought to the surface during the installation or preparation of wells, piping, or other equipment;

(ii) During repairs or the temporary shutdown of gas collection system components; and

(iii) When solid waste was excavated and moved;

(L) Any construction activities pursuant to OAR 340-239-0300 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 impacts;

(M) For any root cause analysis for which corrective actions are required, records of the root cause analysis conducted, the corrective action analysis, the date for corrective action(s) already completed following the positive pressure reading or high temperature reading, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates, and a copy of any comments or final approval on the corrective action analysis or schedule from DEQ;

(N) The equipment operating parameters specified to be monitored under OAR 340-239-0600(2) as well as records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The records must include the following information:

(i) For enclosed flares, all 3-hour periods of operation during which the average temperature difference was more than 28 degrees Celsius (or 50 degrees Fahrenheit) below the average combustion temperature during the most recent performance test at which compliance with OAR 340-239-0110(2)(b) and OAR 340-239-0110(2)(c) was determined;

(ii) 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 OAR 340-239-0110(2)(c), all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other federal, State, local, or tribal regulatory requirements), readily accessible continuous records of the equipment operating parameters specified to be monitored in OAR 340-239-0600(2) and up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded;

(iii) For non-enclosed 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

(iv) 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;

(O) 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;

(P) Landfill owners or operators who convert waste-in-place from volume to mass to demonstrate that waste-in-place is less than 450,000 tons, must keep readily accessible, records of the annual recalculation of site-specific density, design capacity, and the supporting documentation;

(Q) Landfill owners or operators demonstrating that site-specific surface methane emissions are below 200 parts per million by conducting surface emission monitoring under OAR 340-0100(4)(c)(B) must keep for at least 5 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 CFR part 60, including all of the following items:

(i) Calibration records:

Date of calibration and initials of operator performing the calibration;

Calibration gas cylinder identification, certification date, and certified concentration;

Instrument scale(s) used;

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

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 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, for the duration of the Tier 4 monitoring demonstration;

(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 4 meters. Coordinates must be in decimal degrees with at least five decimal places;

(v) Monitored methane concentration (parts per million) of each reading;

(vi) Background methane concentration (parts per million) after each instrument calibration test;

(vii) Adjusted methane concentration using most recent calibration (parts per million);

(viii) For readings taken at each surface penetration, the unique identification location label matching the label specified in paragraph (iv) of this section; and

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

(R) For each owner or operator reporting leachate or other liquids addition under OAR 340-239-0700(3)(g), keep records of any engineering calculations or company records used to estimate the quantities of leachate or liquids added, the surface areas for which the leachate or liquids

were applied, and the estimates of annual waste acceptance or total waste in place in the areas where leachate or liquids were applied; and

(S) Date of initial placement of waste in newly constructed landfill cells.

(T) Any component leaks above 250 ppmv methane detected pursuant to OAR 340-239-0600(2)(c) and all repairs performed in response to the leak.

(b) The landfill owner or operator must maintain the following records for the life of the control system equipment, as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring must be maintained for a minimum of 5 years. Records of the control device vendor specifications must be maintained until removal:

(A) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in OAR 340-239-0110(1)(a);

(B) The expected gas generation flow rate as calculated pursuant to OAR 340-239-0800(5);

(C) The percent reduction of methane achieved by the control device determined pursuant to OAR 340-239-0800(6);

(D) 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;

(E) Where an owner or operator subject to the provisions of this subpart is demonstrating compliance with OAR 340-239-0110(2) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts:

(i) The average temperature measured at least every 15 minutes and averaged over the same time period of the performance test; and

(ii) The percent reduction of methane determined as specified in OAR 340-239-0800(6) achieved by the control device;

(F) For an open flare, the flare type (i.e., steam-assisted, air-assisted, or non-assisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in 40 CFR § 60.18, 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;

(G) An up to date map showing each existing and planned collector in the system;

(H) Where an owner or operator subject to the provisions of this subpart is demonstrating compliance with OAR 340-239-0110(2) through use of a landfill gas treatment system:

(i) Bypass records. Records of the flow of landfill gas to, and bypass of, the treatment system; and

(ii) Site-specific treatment monitoring plan meeting the requirements of OAR 340-239-0110(2)(d)(B); and

(I) 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.

(c) Record Storage: The landfill owner or operator must maintain copies of the records and reports required by this division and provide them to DEQ within five business days upon request.

### (3) Reporting Requirements.

(a) Closure Notification. Any owner or operator of a landfill that has ceased accepting waste must submit a Closure Notification to DEQ within 30 days of waste acceptance cessation, and:

(A) The Closure Notification must include the last day solid waste was accepted, the anticipated closure date of the landfill, and the estimated waste-in-place; and

(B) DEQ may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable regulations, requirements, or ordinances in effect at the time of closure.

(b) Equipment Removal Report. The landfill owner or operator must submit a gas collection and control system Equipment Removal Report to DEQ 30 days prior to well capping, 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 submitted pursuant to OAR 340-239-0700(3)(a);

(B) A copy of the initial performance 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 to the satisfaction of DEQ 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) Surface emissions monitoring results needed to verify that landfill surface methane concentration measurements do not exceed the limits specified in OAR 340-239-0200.

(c) Semi-Annual Report. Any landfill owner or operator subject to the requirements of this division, except OAR 340-239-0100, must prepare a semi-annual report for the periods of January 1 through June 30 and July 1 through December 31 of each year, unless otherwise approved in writing by DEQ. The reports required by this rule must be submitted within 30 days after the end of each reporting period, unless otherwise approved in writing by DEQ. The semi-annual report will be due on July 30, unless otherwise approved in writing by DEQ. The annual

report will be due on February 15, unless otherwise approved in writing by DEQ, but may not be due later than March 15, and must consist of the semi-annual and annual reporting requirements. The initial annual report must be submitted within 180 days of installation and startup of the collection and control system and must include the initial performance test report. The semi-annual report must contain the following information:

(A) For any corrective action analysis for which corrective actions are required in OAR 340-239-0600(3)(a) and OAR 340-239-0600(3)(b) and that take more than 60 days to correct the exceedance, the root cause analysis conducted, including a description of the recommended corrective action(s), the date for corrective action(s) already completed following the positive pressure or elevated temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates;

(B) All known, prevented, or suspected subsurface landfill fire(s) along with potential causes and any efforts conducted to avoid or put out the fire(s). Any positive pressure readings that may have contributed to the known, prevented, or suspected fire;

(C) All instantaneous surface readings of 200 ppmv or greater. All exceedances of the limits in OAR 340-239-0110(2)(a)(B) and OAR 340-239-0200, 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 remonitoring and the remonitored concentration in ppmv, wind speed during surface sampling, the concentration recorded at each location for which an exceedance was recorded in the previous month, and the installation date and location of each well installed as part of a gas collection system expansion;

(D) The number of times that applicable parameters monitored under OAR 340-239-0110(3), OAR 340-239-0110(4)(a), OAR 340-239-0110(4)(b) were exceeded and when the gas collection and control system was not operating under OAR 340-0110(2)(a) including periods of startup, shutdown, and malfunction (SSM). For each instance, report the date, time, and duration of each exceedance. Where an owner or operator subject to the requirements of this division is demonstrating compliance with the operational standard for temperature OAR 340-239-0600(3)(b), the owner or operator must provide a statement of the wellhead operational standard for temperature and oxygen the landfill is complying with for the period covered by the report. The report must indicate:

(i) The number of times each of those parameters monitored under OAR 340-239-0600(3)(b), were exceeded. For each instance, report the date, time, and duration of each exceedance; and

(iii) The number of times the parameters for the site-specific treatment system in OAR 340-239-0110(2)(d)(B) were exceeded;

(E) Description and duration of all periods when the gas stream was diverted from the control device or treatment system through a bypass line or the indication of bypass flow as specified OAR 340-239-0110(2)(c);

(F) Description and duration of all periods when the control device or treatment system was not operating and length of time the control device or treatment system was not operating;

- (G) All periods when the collection system was not operating;
  - (H) The date of installation and the location of each well or collection system expansion;
  - (I) Each owner or operator required to conduct enhanced monitoring in for temperatures exceeding 62.8 degrees Celsius (145 degrees Fahrenheit) must include the results of all monitoring activities conducted during the period;
  - (J) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal units per hour) or greater, all 3-hour periods of operation during which the average temperature was more than 28 degrees Celsius (82 degrees Fahrenheit) below the average combustion temperature during the most recent performance test; and
  - (K) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone.
- (d) Annual Report. Any owner or operator subject to the requirements of this division, except OAR 340-239-0100, must prepare an annual report for the period of January 1 through December 31 of each year. Each annual report must be submitted to DEQ by February 15 of the following year, unless otherwise specified by DEQ. The annual report must contain the following information:
- (A) Landfill name, owner and operator, address, and permit number as issued according to division 216 or 218;
  - (B) Total volume of landfill gas collected (reported in standard cubic feet);
  - (C) Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume);
  - (D) Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device;
  - (E) The date that the gas collection and control system was installed and in full operation;
  - (F) The percent methane destruction efficiency of each gas control device(s);
  - (G) Type and amount of supplemental fuels burned with the landfill gas in each device;
  - (H) 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;
  - (I) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface;

(J) The information required by OAR 340-239-0700(2)(a)(A) through OAR 340-239-0700(2)(a)(F), OAR 340-239-0700(2)(a)(H), and OAR 340-239-0700(2)(a)(K) through OAR 340-239-0700(2)(a)(M); and

(K) Instrument specifications for all instruments used for monitoring compliance with this division.

(e) Waste-in-Place Report. Any owner or operator subject to the requirements of OAR 340-239-0100(1), OAR 340-239-0100(2), OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) must prepare an initial Waste-in-Place Report and annual Waste-in-Place reports each following year. Each annual report must be prepared for the period of January 1 through December 31 of each year and submitted to DEQ by January 31 of the following year. DEQ may extend this deadline through March 1 in the form of a permit condition. The report also must include:

(A) Landfill name, owner and operator, address, and the permit number as issued according to division 216 or 218;

(B) The landfill's status (active, closed, or inactive) and the estimated waste-in-place, as of December 31 of the prior year, in tons; and

(C) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

(f) Methane Generation Rate Report. Any owner or operator subject to the requirements of OAR 340-239-0105(1), OAR 340-23-0105(2), or OAR 340-23-0105(3) must calculate the methane generation rate using the calculation procedures specified in OAR 340-239-0800(2) and report the results to DEQ:

(A) By July 1, 2022 for landfills with greater than 450,000 tons waste-in-place;

(B) Within 90 days of reaching 450,000 tons of waste-in-place; and

(C) By March 15 of each subsequent year while waste-in-place is greater than 450,000 tons and methane generation rate is less than 664 metric tons per year. The calculation, along with relevant parameters, must be provided as part of the report.

(g) Liquids Addition Report. Any owner or operator subject to the requirements of OAR 340-239-0110 that has employed leachate recirculation or added liquids based on a Research, Development, and Demonstration permit (issued through Resource Conservation and Recovery Act, subtitle D, part 258) within the last 10 years must submit to DEQ, annually, the following information:

(A) Volume of leachate recirculated (gallons per year) and the reported basis of those estimates (records or engineering estimates);

(B) Total volume of all other liquids added (gallons per year) and the reported basis of those estimates (records or engineering estimates);

(C) Surface area (acres) over which the leachate is recirculated (or otherwise applied);

(D) Surface area (acres) over which any other liquids are applied;

(E) The total waste disposed (megagrams) in the areas with recirculated leachate and/or added liquids based on on-site records to the extent data are available, or engineering estimates and the reported basis of those estimates;

(F) The annual waste acceptance rates (megagrams per year) in the areas with recirculated leachate and/or added liquids, based on on-site records to the extent data are available, or engineering estimates;

(G) The initial report must contain items in paragraph (g)(A) through (F) of this section per year for the initial annual reporting period as well as for each of the previous 10 years, to the extent historical data are available in on-site records, and the report must be submitted no later than thirteen months after the date of commenced construction, modification, or reconstruction;

(H) Subsequent annual reports must contain items in paragraph (g)(A) through (F) of this section for the 365-day period following the 365-day period included in the previous annual report, and the report must be submitted no later than 365 days after the date the previous report was submitted; and

(I) Landfills may cease annual reporting of items in paragraphs (g)(A) through (F) of this section once they have submitted the closure report in paragraph (a) of this section.

(h) Initial Performance test. For a control system designed and operated to meet the requirements of this division, the owner or operator must submit an initial performance test report that establishes the reduction efficiency or parts per million by volume no later than 180 days after the initial startup of the approved control system using EPA Method 25 or 25C, 40 CFR 60, Appendix A. The test must meet the following requirements:

(A) The initial performance test report must include the following information:

(i) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(ii) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(iii) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(iv) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;

(v) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(vi) The provisions for the control of off-site migration.

(B) The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this division;

(C) If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone;

(D) The control device must be operated within the parameter ranges established during the initial or most recent performance test or in the most recent permit. The operating parameters to be monitored are specified in OAR 340-239-0600; and

(E) Within 60 days after the date of completing each performance test, the owner or operator must submit the results of the performance test, including any associated fuel analyses.

(i) Collection and Control System Design Plan. Each owner or operator subject to the provisions of OAR 340-239-0110 must submit a collection and control system design plan to DEQ for approval. The collection and control system design plan must be prepared and approved by a professional engineer and must meet the following requirements:

(A) The collection and control system as described in the design plan must meet the design requirements in OAR 340-0110(1);

(B) The collection and control system design plan must include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions proposed by the owner or operator;

(C) The collection and control system design plan must either conform with specifications for gas collection systems in OAR 340-239-0110 or include a demonstration to DEQ's satisfaction of the sufficiency of the alternative provisions to OAR 340-239-0500;

(D) If DEQ does not approve or disapprove the design plan, or does not request that additional information be submitted within 90 days of receipt, then the owner or operator may continue with implementation of the design plan with the recognition that the owner or operator is proceeding at their own risk. In the event that the design plan is required to be modified to obtain approval, the owner or operator must take any steps necessary to conform any prior actions to the approved design plan and any failure to do so could result in an enforcement action; and

(E) If the owner or operator chooses to demonstrate compliance with the emission control requirements of this division using a treatment system as defined in this division, then the owner or operator must prepare a site-specific treatment system monitoring plan as specified in OAR 340-0110(2)(d)(B).

(j) Amended design plan. The owner or operator who has already been required to submit a design plan under OAR 340-239-0110(2) must submit an amended design plan to DEQ within 90 days of any event that requires a change to the Design Plan as follows:

(A) At least 90 days before expanding operations to an area not covered by the previously approved design plan; and

(B) Prior to installing, repairing, or expanding the gas collection system in a way that is not consistent with the design plan previously submitted to DEQ.

(k) Corrective Action reports:

(A) For corrective action that is required according to OAR 340-239-0600(3) and is expected to take longer than 120 days after the initial exceedance to complete, the landfill owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to DEQ as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 55 degrees Celsius (131 degrees Fahrenheit). The owner or operator must receive DEQ approval regarding the plan for corrective action and the corresponding timeline.

(B) For corrective action that is required according to OAR 340-239-0600(3) and is not completed within 60 days after the initial exceedance, the landfill owner or operator must submit a notification to DEQ as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance.

(C) If a landfill owner or operator cannot fully implement a corrective action described in paragraph (A) or (B) within 60 days following the positive pressure or excess temperature measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the positive pressure measurement.

(l) Instantaneous Surface Emission Monitoring Report. A landfill owner or operator complying with OAR 340-239-0105(5)(b) 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. The Instantaneous Surface Emissions Monitoring Report must include any corrective actions taken as a result of the surface emissions monitoring and clearly identify the location, date and time (to nearest second), average wind speeds including wind gusts, and reading (in parts per million) of any detectable concentrations of methane, other than non-repeatable, momentary readings. For location, the landfill owner or operator must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal

degrees with at least five decimal places. The Instantaneous Surface Emissions Monitoring Report must also include the results of the most recent methane generation rate calculation in order to verify that the landfill does not exceed 664 metric tons per year of methane.

(m) 24-hour high temperature report. Where a landfill owner or operator subject to the provisions of this division is demonstrating compliance with the operational standard for temperature in OAR 340-239-0600(3)(b) and a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured is greater than or equal to 1,000 ppmv, the owner or operator must report the date, time, well identifier, temperature and carbon monoxide reading via email to DEQ within 24 hours of the measurement unless a higher operating temperature value has been approved by DEQ for the well.

(n) Repairs and Temporary Shutdown Notification. At least 30 days prior to a scheduled shutdown, any landfill owner or operator that temporarily shuts down a gas collection and control system per OAR 340-239-0110(5) must submit a notification of the shutdown include a justification for the shutdown, the system component(s) that will require shutdown, and the approximate timeline for the shutdown. If these shutdown occurred due to catastrophic or other unplanned events as stipulated in OAR 340-239-0110(5), the notification must be submitted within 10 days after the shutdown.

(o) Root Cause Analysis Report. If a landfill owner or operator cannot fully implement a corrective action required according to OAR 340-239-0600(3) within 120 days after the initial exceedance, the landfill owner or operator must submit the root cause analysis and additional analysis and reporting according to OAR 340-239-0700(k) as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 55 degrees Celsius (131 degrees Fahrenheit). The root cause analysis must include a thorough investigation of the landfill gas collection and control system to determine the primary cause, and any other contributing causes, of positive pressure or high temperature at a wellhead. The report must include all factors investigated, methods used, and alternative causes that were analysed.

(p) Any report, or information submitted by a landfill owner or operator pursuant to this division must contain certification by a responsible official of truth, accuracy, and completeness. This certification, and any other certification required under this division, must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050

### 340-239-0800 Test Methods and Procedures

When required as provided in OAR 340-239-0105 through 340-239-0700, the owner or operator of a landfill must comply with the test methods and procedures for monitoring and measurements in this rule.

(1) Hydrocarbon Detector Specifications. Any instrument used for the measurement of methane must be a gas detector, or other equivalent instrument approved by DEQ, that meets the calibration, specifications, and performance criteria of EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 CFR Part 60, Appendix A, except for the following:

(a) "Methane" replaces all references to volatile organic compounds (VOC);

(b) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air;

(c) To meet the performance evaluation requirements in section 8.1 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 8.1 of Method 21 of appendix A of this part must be used; and

(d) The calibration procedures provided in sections 8 and 10 of Method 21 of appendix A of this part must be followed immediately before commencing a surface monitoring survey.

(2) Determination of methane generation rate. The methane generation rate must include wastes received up to December 31 of the previous year. The methane generation rate must be determined as follows, as applicable:

(a) For Landfills without Carbon Adsorption or Passive Venting Systems, the methane generation rate must be calculated using the procedures specified in 40 CFR part 98, subpart HH or TT. DEQ may request additional information as may be necessary to verify the methane generation rate from the landfill. Site-specific data may be substituted when available.

(b) For Landfills with Carbon Adsorption Systems, the methane generation rate must be determined by measuring the actual total landfill gas flow rate, in standard cubic feet per minute (scfm), using a flow meter or other flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of OAR 340-239-0800(1). The total landfill gas flow rate must be multiplied by the methane concentration to determine the methane generation rate.

(c) For Landfills with Passive Venting Systems, the methane generation rate must be determined pursuant to both of the following and is the higher of these determined values:

(A) OAR 340-239-0800(2)(a); and

(B) The owner or operator must measure actual landfill gas flow rates (in units of scfm) by using a flow measuring device such as a standard pitot tube and methane concentration (percent by

volume) using a hydrocarbon detector meeting the requirements of OAR 340-239-0800(1) 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 to determine the methane generation rate.

(3) Surface Emissions Monitoring Procedures. The landfill owner or operator must measure the landfill surface concentration of methane using a hydrocarbon detector meeting the requirements of OAR 340-239-0800(1). The landfill surface must be inspected and monitored quarterly using all of the following procedures:

(a) Monitoring Area. The entire landfill surface must be divided into individually identified 50,000 square foot grids and include the entire perimeter of the collection area. The grids must be used for both instantaneous and integrated surface emissions monitoring. The monitoring must comply with all of the following requirements:

(A) Surface monitoring must be performed in accordance with section 8.3.1 of EPA Method 21 of appendix A of 40 CFR subpart 60, except that the probe inlet must be placed within 3 inches of the landfill surface while traversing the grid. Each owner or operator required comply with OAR 340-0100(4)(c)(B), must place the hydrocarbon detector's probe within 2 inches of the landfill surface while traversing the grid.

(B) The walking pattern must be no more than a 25-foot spacing interval and must traverse each monitoring grid and:

(i) If the owner or operator has no exceedances of the limits specified in OAR 340-239-0200 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 any exceedances of the limits specified in OAR 340-239-0200 that cannot be remediated within 10 days or upon any exceedances detected during a DEQ inspection; and

(ii) If an owner or operator of a landfill can demonstrate that in the past three years before the effective date of this division that there were no measured exceedances of the limit specified in OAR 340-239-0200(1)(a) by annual or quarterly 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 any exceedances of the limits specified in OAR 340-239-0200 that cannot be remediated within 10 days or upon any exceedances detected during a DEQ inspection.

(C) Surface testing must be terminated when the average wind speed exceeds four miles per hour or the instantaneous wind speed exceeds 10 miles per hour. DEQ may approve alternatives to this wind speed surface testing termination for landfills consistently having measured winds in excess of these specified limits. Average wind speed must be determined on a 5-minute average using an on-site anemometer placed in an open area with a continuous recorder and data logger for the entire duration of the monitoring event. The owner or operator must use a wind barrier, similar to a funnel, when onsite average wind speed exceeds 4 miles per hour or 2 meters per second or gust exceeding 10 miles per hour. The wind barrier must surround the SEM monitor, and must be placed on the ground, to ensure wind turbulence is blocked. SEM cannot be conducted if average wind speed exceeds 25 miles per hour.

(D) Monitoring must be performed during typical meteorological conditions.

(b) Instantaneous Surface Emissions Monitoring Procedures must comply with the following:

(A) The landfill owner or operator must record any instantaneous surface readings of methane 200 ppmv or greater, other than nonrepeatable, momentary readings;

(B) Surface areas of the landfill that exceed a methane concentration limit of 500 ppmv, or 200 ppmv if this is to determine compliance with OAR 340-239-0100(4)(c)(B), must be marked and remediated pursuant to OAR 340-239-0600(1)(a)(B);

(C) Surface areas of the landfill that exceed a methane concentration limit of 250 ppmv, or 100 ppmv if this is to determine compliance with OAR 340-239-0100(4)(c)(B), must be monitored in a 5 foot grid around the location to determine the extents of the methane leak.

(D) The wind speed must be recorded during the sampling period;

(E) The landfill surface areas with cover penetrations, distressed vegetation, cracks or seeps must also be inspected visually and with a hydrocarbon detector; and

(F) 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 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(c) Integrated Surface Emissions Monitoring Procedures must comply with the following:

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

(B) Individual monitoring grids that exceed an average methane concentration of 25 ppmv must be identified and remediated pursuant to OAR 340-239-0600(1)(b); and

(C) The wind speed must be recorded during the sampling period.

(4) Gas Collection and Control System Leak Inspection Procedures. Landfill owners and operators must measure leaks using a hydrocarbon detector meeting the requirements of OAR 340-239-0800(1).

(5) Determination of Expected Gas Generation Flow Rate. Landfill owners and operators must determine the expected gas generation flow rate as prescribed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, using a recovery rate of 75 percent or 40 CFR 63.1960(a)(1).

(6) Control Device Destruction Efficiency Determination. Landfill owners and operators must use the following methods of analysis to determine the efficiency of the control device in reducing methane:

(a) For Enclosed Combustors, one of the following test methods, all of which are incorporated by reference herein (and all as promulgated in 40 CFR, Part 60, Appendix A) at the pages cited

below, must be used to determine the efficiency of the control device in reducing methane by at least 99 percent, or in reducing the outlet methane concentration for lean burn engines to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen:

(A) U.S. EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions By Gas Chromatography;

(B) U.S. 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; or

(C) U.S. EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases;

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

$$\text{Destruction Efficiency} = [1 - ((\text{Mass of Methane} - \text{Outlet}) / (\text{Mass of Methane} - \text{Inlet}))] \times 100\%$$

Open Flares: Open flares must meet the requirements of 40 CFR § 60.18; and

The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(7) Wellhead monitoring.

(a) Landfill owners and operators must determine the nitrogen level using EPA Reference Method 3C, Determination of Volatile Organic Compound Leaks, 40 CFR Part 60, Appendix A, unless an alternative test method is approved by DEQ.

(b) Unless an alternative test method is established and approved by DEQ, landfill owners and operators must determine the oxygen level by an oxygen meter using EPA Reference Method 3A or 3C, 40 CFR 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  $\pm 10$  percent.

(c) Landfill owners and operators may use a portable gas composition analyzer to monitor the oxygen levels provided that the analyzer is calibrated and the analyzer meets all quality

assurance and quality control requirements for 40 CFR part 60, Appendix A-1, Method 3A or ASTM D6522-11.

(d) Determination of Gauge Pressure. Landfill owners and operators must determine gauge pressure using a hand-held manometer, magnahelic gauge, or other pressure measuring device approved by DEQ. The device must be calibrated and operated in accordance with the manufacturer's specifications.

(e) Landfill owners and operators must calibrate the temperature measuring device annually using the procedure in 40 CFR 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.

(8) 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 concentration as provided in OAR 340-239-0110(3)(a);

(c) Monitor temperature of the landfill gas at the wellhead as provided in OAR 340-239-0600(3);

(d) Monitor temperature of the landfill gas every 10 vertical feet of the well as provided in OAR 340-239-0600(3);

(e) Monitor the methane concentration with a methane meter using EPA Method 3C of appendix A-6 to 40 CFR part 60, EPA Method 18 of Appendix A-6 to 40 CFR 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 CFR 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 CFR 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); and

(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.

(9) Alternative Test Methods. Landfill owners and operators may use alternative test methods provided that they are approved in writing by DEQ pursuant to OAR 340-239-0500.

**Statutory/Other Authority:** ORS 468.020, 468A.025, 468A.040 & 468A.050

**Statutes/Other Implemented:** ORS 468A.025, 468A.040 & 468A.050