

DRAFT PROPOSED REGULATION ORDER

METHANE EMISSIONS FROM MUNICIPAL SOLID WASTE LANDFILLS

Adopt new section *[to be inserted]*, title *[to be inserted]*, California Code of Regulations, to read as follows: (Note: The entire text of section *[to be inserted]* set forth below is new language proposed to be added to the California Code of Regulations.)

Section *[to be inserted]*. Methane Emissions from Municipal Solid Waste Landfills

(a) Purpose

The purpose of this control measure is to minimize methane emissions from municipal solid waste landfills pursuant to the California Global Warming Solutions Act of 2006 (Health & Safety Code, Sections 38500 et. seq.).

(b) Applicability

This section applies to all municipal solid waste landfills.

(c) Limited Exemptions

- (1) *Landfills Greater than or Equal to 450,000 Tons of Waste-in-Place:* The requirements of subsections (e)(1) through (e)(9) and subsection (f), shall not apply to municipal solid waste landfills greater than or equal to 450,000 tons of waste-in-place (WIP), provided the conditions in either subsections (c)(1)(A) or (c)(1)(B) and (c)(1)(C) and (c)(1)(D), are satisfied:
- (A) The owner or operator can demonstrate to the satisfaction of the Enforcement Agency that there is no surface leak at any location of the landfill that exceeds a methane concentration of 200 parts per million by volume (ppmv), other than non-repeatable, momentary readings, after 4 consecutive quarterly monitoring periods using the procedures specified in subsection (h)(3); or
 - (B) The landfill gas heat input capacity is less than 3.0 million British thermal units per hour (MMBTU/hr) recovered as determined using the procedures specified in subsection (h)(2); and
 - (C) The owner or operator submits an Exemption Request to the Enforcement Agency pursuant to subsection (c)(3); and

- (D) Any owner or operator granted an exemption pursuant to this subsection shall report the information required in subsection (g)(2)(D) according to the following schedule:
 - 1. *Active Landfills:* The report shall be prepared for the period of January 1 through December 31 and submitted to the Enforcement Agency by March 15 of the following year.
 - 2. *Closed or Inactive Landfills:* The information required in subsection (g)(2)(D) shall be reported on a one-time basis within 30 days of receiving the exemption.
- (2) *Landfills Having Less than 450,000 Tons of Waste-in-Place:* The requirements of subsections (e)(1) through (e)(9) and subsection (f), shall not apply to municipal solid waste landfills having less than 450,000 tons of WIP, provided the following conditions are satisfied:
 - (A) *All landfills:* The owner or operator shall submit an Exemption Request to the Enforcement Agency pursuant to subsection (c)(3).
 - (B) *Active Landfills:* The owner or operator shall report the information required in subsection (g)(2)(D).
 - 1. The report shall be prepared for the period of January 1 through December 31 and submitted to the Enforcement Agency by March 15 of the following year.
 - (C) *Closed or Inactive Landfills:* The owner or operator shall submit the information required in subsection (g)(2)(D) on a one-time only basis within 30 days of receiving the exemption.
- (3) *Exemption Request:* Any owner or operator seeking an exemption pursuant to subsection (c)(1) or (c)(2) shall comply with the following requirements:
 - (A) A written request for an exemption shall be submitted to the Enforcement Agency within 9 months of the effective date of this section. After the 9-month period, the owner or operator shall comply with the requirements of this section until an exemption is obtained from the Enforcement Agency.
 - (B) The written request for an exemption shall include copies of all applicable documentation demonstrating that the criteria in either subsection (c)(1)(A) or (c)(1)(B) has been met and any other data or information requested by the Enforcement Agency necessary to determine whether an exemption should be granted. Examples of

applicable documentation include, but are not limited to: surface emissions testing data, landfill gas heat input capacity calculations, permits, or WIP information.

(C) If the landfill is active, the exemption granted under subsections (c)(1) or (c)(2) shall be reevaluated after a period of 12 months.

1. A renewal request shall be submitted every year to the Enforcement Agency until the owner or operator completes all closure requirements in accordance with the California Code of Regulations Title 27, Sections 20950 through 21200.

(D) If the landfill is closed or inactive, annual renewal of the exemption is not required.

(4) *Expiration of Limited Exemption:* If a MSW landfill should have its exemption terminated, the owner or operator shall comply with the requirements of this section.

(5) *Hazardous Waste Landfills:* Landfills that received only hazardous waste (Class I landfills) or are subject to U.S. Code Title 42, Chapter 103 – The Comprehensive Environmental Response, Compensation and Liability Act [insert effective date] shall be exempt from the requirements of this section.

(d) Definitions

For purposes of this section, the following definitions apply:

(1) “Active Municipal Solid Waste Landfill” means a landfill that is accepting municipal solid waste for disposal.

(2) “Component Leak” means the concentration of methane measured one half of an inch or less from the component source. Measurements from any vault shall be taken 2 inches above the surface of the vault exposed to the atmosphere.

(3) “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. Vaults containing gas collection system equipment, where the top of the vault is located at or near the surface of the landfill, are also considered as components.

- (4) “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.
- (5) “Closed Landfill” means that a landfill is no longer accepting municipal 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, or can document that the landfill is no longer receiving municipal solid waste.
- (6) “District” means any air quality management district or air pollution control district.
- (7) “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.
- (8) “Energy Recovery Device” means any combustion device which 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.
- (9) “Enforcement Agency” means the Air Resources Board and any air quality management district or air pollution control district that the California Air Resources Board has entered into an Enforcement Agreement to enforce the requirements of this section.
- (10) “Gas Control Device” means any device used to dispose of collected landfill gas, including, but not limited to, enclosed ground type flares, internal combustion engines, boilers and boiler-to-steam turbine systems, and gas turbines.
- (11) “Gas Collection System” means any system which employs various gas collection wells and connected piping, and mechanical blowers, fans, pumps, or compressors to create a pressure gradient and actively extract landfill gas.
- (12) “Gas Control System” means any system which disposes of collected landfill gas by one or more of the following means: combustion, gas treatment for subsequent sale, or sale for processing offsite.
- (13) “Inactive Municipal Solid Waste Landfill” means a landfill that is no longer accepting municipal solid waste for disposal.

- (14) "Landfill Surface" means the area of the landfill under which decomposable solid waste has been placed, excluding the working face.
- (15) "Municipal Solid Waste Landfill or MSW Landfill" means an entire disposal facility in a contiguous geographical space where municipal solid waste (MSW) is placed in or on land.
- (16) "Non-repeatable, Momentary Readings" means indications of the presence of methane, which persist for less than five seconds and do not recur when the sampling probe of a portable gas detector is placed in the same location.
- (17) "Owner or operator" means the landowner of a MSW landfill, the person holding Title to the property, or any person who through a lease, franchise agreement, or other arrangement with the owner manages the day-to-day activities of the landfill.
- (18) "Professional Engineer" means an engineer holding a valid certificate issued by the State of California Board of Registration for Professional Engineers and Land Surveyors or a state offering reciprocity with California.
- (19) "Surface Leak" means the concentration of methane measured within 2 inches above the landfill surface that exceeds 200 ppmv, other than non-repeatable, momentary readings.
- (20) "Well Raising" means a landfill activity where an existing gas collection well is temporarily disconnected from a vacuum source, and the non-perforated 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 re-connected in order to continue collecting gas from that well.
- (21) "Working Face" means the open area where daily waste is deposited and compacted with landfill equipment.

(e) Requirements

- (1) *Installation of the Gas Collection and Control System.*
 - (A) *Design Plan:* If a gas collection and control system which meets the requirements of subsection (e)(2)(A) and either subsections (e)(2)(B) or (e)(2)(C) has not been installed, the owner or operator of an active landfill shall submit a Design Plan to the Enforcement Agency within one year after the effective date of this

section. The Enforcement Agency shall review and either approve or disapprove the Design Plan, or request additional information be submitted. The Design Plan shall meet the following requirements:

1. The Design Plan shall be prepared and certified by a professional engineer.
2. The Design Plan shall provide for the control of the collected gas through the use of a gas collection and control system meeting the requirements in subsections (e)(2)(A) and either (e)(2)(B) or (e)(2)(C).
3. The Design Plan shall include a schedule of inspection and maintenance intervals including dates and durations of expected system shutdowns.
4. The owner or operator of a MSW landfill shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.
5. The Design Plan shall include any alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to (e)(9).
6. As operating experience is gained and as site conditions change, the Design Plan may be revised, subject to the approval of the Enforcement Agency.

(B) If an owner or operator is upgrading an existing gas collection and control system to meet the requirements of this section, the existing Design Plan shall be amended to include any necessary updates or addenda, and shall be certified by a professional engineer. Areas of an active landfill that are closed or inactive shall also be included in the amended Design Plan.

(C) Any owner or operator of a MSW landfill subject to the requirements of subsection (e)(1) shall install and operate a gas collection and control system within 18 months after approval of the Design Plan.

(2) *Gas Collection and Control System Requirements.*

(A) *General Requirements.* The owner or operator shall satisfy the following requirements for the operation of a gas collection and control system:

1. Route the collected gas to a gas control device(s) and operate the gas collection and control system continuously except as provided in subsections (e)(4) through (e)(7).
2. Operate the gas collection and control system so that there is no component leak that exceeds 200 ppmv, measured as methane, at any component that contains landfill gas.
 - a. The gas collection and control system shall be monitored pursuant to subsection (f)(2)(C).
 - b. Any component leak shall be tagged and recorded pursuant to subsection (g)(1)(A)6 and repaired within 7 days.
3. Design the gas collection and control system to handle the maximum expected gas generation rate from the entire area of the landfill that requires control to prevent subsurface gas migration and to collect gas at an extraction rate to comply with the landfill methane surface emission limit and component leak standard. The maximum expected gas flow rate from the landfill shall be calculated pursuant to subsection (h)(6).
4. The gas collection system shall be designed and operated to draw gas toward the gas collection device or devices without overdraw that could cause fires or damage to the gas collection and control system.
5. Whenever landfill material is to be brought to the surface during the installation or preparation of wells, piping, or other equipment, or when landfill waste is to be excavated and moved, the owner or operator shall provide a description of the mitigation measures planned or taken to prevent the release of methane or other emissions into the atmosphere.

(B) *Requirements for Flares.*

1. Route the collected gas to an enclosed ground type flare that achieves a methane destruction efficiency of at least 99 percent by weight.
 - a. Enclosed flares shall be equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.

- b. During restart or startup there shall be a sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the atmosphere.
2. Route the collected gas to an open flare that achieves a methane destruction efficiency of at least 98 percent by weight and meets the requirements of 40 CFR 60.18 *[insert effective date]*. The operation of an open flare shall not be allowed except under the following conditions:
- a. Until January 1, 2015, the provisions of subsection (e)(2)(B)1 shall not apply to any open flare installed and operating prior to June 1, 2008, or
 - b. 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 the gas control system, or to remedy a situation (e.g., offsite gas migration) where there is an imminent, life endangering threat to humans requiring immediate action.
 - i. Any owner seeking to temporarily operate an open flare shall submit a written request to the Enforcement Agency pursuant to subsection (e)(9).

(C) *Requirements for Gas Control Devices other than Flares.*

1. Route the collected gas to an energy recovery device, or series of devices that achieve a methane destruction efficiency of at least 99 percent by weight. Lean burn internal combustion engines shall reduce the outlet methane concentration to less than *[to be inserted]* ppmv, dry basis, corrected to 15 percent oxygen.
- a. If a boiler or a process heater is used as the gas control device, the landfill gas stream shall be introduced into the flame zone. Where the landfill gas is the primary fuel for the boiler or process heater, introduction of the landfill gas stream into the flame zone is not required.

- b. The gas control device shall be operated within the parameter ranges established during the initial or most recent source test and monitored for the operating parameters specified in subsection (f)(2).
2. Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of subsections (e)(2)(B) or (e)(2)(C).
- (D) *Source Test Requirements:* The owner or operator shall conduct an annual source test for any gas control device(s) subject to the requirements of subsections (e)(2)(B) or (e)(2)(C) using the test methods identified in (h)(8). An initial source test shall be conducted within 180 days of initial start up of the gas collection and control system. Each succeeding complete annual source test shall be conducted no later than 45 days after the anniversary date of the initial source test.
- (3) *Landfill Methane Surface Emission Limit:* Except as provided in subsections (e)(6) and (e)(8), no location of the landfill surface shall exceed a methane concentration of 200 ppmv, other than non-repeatable, momentary readings. Surface monitoring shall be conducted pursuant to the procedure in subsection (h)(3). If a surface leak is discovered that exceeds 200 ppmv methane, the owner or operator shall comply with the requirements of subsection (f)(1)(A).
- (4) *Well Raising:* The requirements of sections (e)(2)(A)1, (e)(2)(A)2, and (e)(3), shall 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.
 - (B) Once installed, a gas collection well extension is sealed or capped until the raised well is reconnected to a vacuum source.
 - (C) Well disconnection times are recorded pursuant to subsection (g)(1)(A).
- (5) *Gas Collection and Control System Inspection, Maintenance, and Repair:* The requirements of subsections (e)(2)(A) through (e)(2)(C) and (e)(3), shall not apply to specific portions of a MSW landfill undergoing inspection, maintenance, or repair of the gas collection and control system provided the following conditions are met:

- (A) The owner or operator has provided a schedule of the inspection and maintenance intervals, including dates and durations of expected system shutdowns, as required in subsection (e)(1)(A)3.
 - (B) Methane emissions are minimized during shutdown.
 - (C) The requirements of subsection (g)(1)(A)1 and (g)(1)(A)2 are satisfied.
- (6) *Temporary Shutdown of Gas Collection System Components:* The requirements of subsections (e)(2)(A)1, (e)(2)(A)2, and (e)(3), shall not apply to individual landfill gas collection system components that must be temporarily shut down in order to repair the components, to connect new landfill gas collection system components to the existing system, to prevent or extinguish fires, or to perform construction activities meeting the requirements of subsection (e)(8), provided the following requirements are met:
- (A) Existing gas collection system components are being repaired or are being shut down to prevent or extinguish fires.
 - (B) New gas collection system components are required to maintain compliance with this section and are included in the most recent Design Plan as specified in subsection (e)(1)(B).
 - (C) The requirements of subsection (g)(1)(A)1 are satisfied.
- (7) *Construction Activities:* The requirements of subsection (e)(3) shall 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, provided the following requirements are met:
- (A) The owner or operator shall maintain records of any construction activities for a period of 5 years. Records shall be available for inspection by the Enforcement Agency upon request. The records shall contain the following:
 - 1. A description of the action(s) being taken, the areas of the landfill that will be affected by these actions and any landfill gas collection system components that will be affected by these actions.
 - 2. The reason the action is required.

3. Construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.
 4. A description of the mitigation measures planned or taken to minimize methane and other potential air quality impacts.
- (B) Any new gas collection system components must be included in the most recent Design Plan.
- (8) *Permanent Shutdown and Removal of the Gas Collection and Control System:* The gas collection and control system at any closed MSW landfill can be capped or removed provided 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 the Enforcement Agency that due to declining methane rates the landfill will have a difficult time operating a gas collection and control system for a 15-year period.
 - (B) Surface methane concentration measurements do not exceed 200 ppmv at any point of the landfill surface, other than non-repeatable, momentary readings, as determined using the procedures in subsection (h)(3).
 - (C) The owner or operator can demonstrate that methane concentration measurements in any existing subsurface boundary probes do not exceed five percent by volume based on quarterly perimeter well testing performed pursuant to requirements listed in Title 27, section 20921.
 - (D) The owner or operator submits an Equipment Removal Report to the Enforcement Agency pursuant to subsection (g)(2)(B).
- (9) *Alternative Compliance Options.*
- (A) Any alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements requested by the owner or operator shall be submitted in writing to the Enforcement Agency.
 1. The Enforcement Agency shall review the alternatives and either approve, disapprove, or request that additional information be submitted.

2. The Enforcement Agency shall deny the approval of any alternatives not providing equivalent levels of enforceability and methane emission control.

(f) Monitoring Requirements

- (1) *Instantaneous Landfill Methane Surface Monitoring Requirements:* Any owner or operator of a MSW landfill with a gas collection and control system shall conduct monitoring of the landfill surface on a quarterly basis using the procedure specified in subsection (h)(3).
 - (A) Any reading equal to or exceeding the limit specified in subsection (e)(3) shall be recorded as an exceedance and the following actions shall be taken:
 1. The owner or operator shall record the date, location, and value of each exceedance. The location of each exceedance shall be clearly marked and recorded on a topographic map of the landfill, drawn to scale with the location of the gas collection system clearly identified.
 2. The owner or operator shall initiate corrective action, such as cover maintenance or repair, or well vacuum adjustments, to correct the exceedance within 5 calendar days of discovery.
 3. The location of the exceedance shall be re-monitored within 10 calendar days of the date that the exceedance was first discovered.
 - a. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be re-monitored again no later than 10 days after the second exceedance.
 - (B) If the re-monitoring shows a third exceedance, the owner or owner or operator shall take the necessary corrective action, such as, but not limited to installing a new or replacement gas collection well, or other corrective action to achieve compliance. The owner or operator must achieve compliance no later than 120 days after detecting the third exceedance or it shall be a violation.
 - (C) Any closed or inactive MSW landfill, or any closed or inactive areas on an active landfill that has no monitored exceedances of the limit specified in subsection (e)(3) after 4 consecutive quarterly monitoring periods may monitor annually. Any reading of 200 ppmv or more of methane other than non-repeatable, momentary

readings detected during the annual monitoring or any compliance inspections by the Enforcement Agency shall result in a return to quarterly monitoring of the landfill surface.

- (2) *Gas Control System Equipment Monitoring:* The owner or operator shall monitor the gas control system using the following procedures:
- (A) For an enclosed combustor the following equipment shall be installed, calibrated, maintained, and operated according to the manufacturer's specifications:
1. A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (\pm) one 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 greater than 44 megawatts.
 2. At least one gas flow rate measuring device which shall record the flow to the control device(s) at least every 15 minutes.
- (B) For a gas control device other than an enclosed combustor, demonstrate compliance by providing information satisfactory to the Enforcement Agency describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. Alternatives to this subsection shall be submitted as specified in subsection (e)(9). The Enforcement Agency may specify additional appropriate monitoring procedures.
- (C) Components containing landfill gas and under positive pressure shall be monitored quarterly for leaks. Any exceedances of the limit specified in subsection (e)(2)(A)2 shall be recorded pursuant to subsection (g)(1)(A)5.
- (3) *Cover Integrity Monitoring:* The owner or operator shall monitor the landfill surface for cover integrity monthly and implement cover repairs as necessary.

(g) Recordkeeping and Reporting Requirements.

- (1) *Recordkeeping Requirements.*
- (A) The owner or operator shall maintain the following records for at least five years:

1. All gas collection system downtime exceeding 5 days, including individual well shutdown times, and the reason for the downtime.
2. All gas control system downtime in excess of 1-hour, the reason for the downtime, and the length of time the gas control system was shutdown.
3. Continuous gas flow rate records and temperature for all operating flares and enclosed combustors.
4. Maximum expected gas generation flow rate as calculated in subsection (h)(6).
5. Records of all component leak testing and landfill surface monitoring, tagged leaks in exceedance of the limits in subsections (e)(2)(A)2 or (e)(3), including the location of the leak, leak concentration in ppmv, date and time of discovery, the action taken to repair the leak, date of repair, any required re-monitoring, and the re-monitored concentration in ppmv, and the installation date and location of each well for gas collection system expansion.
6. Annual waste acceptance rate and the current amount of waste-in-place.
7. Records of the nature, location, amount, and date of deposition of non-degradable wastes for any landfill areas excluded from the collection system requirement as documented in the Design Plan.
8. Records for periods of operation during which the parameter boundaries established during the most recent source test are exceeded. The following constitute exceedances that shall be recorded:
 - a. For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 MMBtu/hr) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 degrees Celsius (82 degrees Fahrenheit) below the average combustion temperature during the most recent source test at which compliance with subsections (e)(2)(B) or (e)(2)(C) was determined.

- b. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under subsection (e)(2)(C)1.a.
- c. Any owner or operator who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with subsection (e)(2)(C) shall keep records of all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other State, local, Tribal, or Federal regulatory requirements).

(B) The owner or operator shall maintain the following records for the life of the gas control device:

- 1. The control device vendor specifications.
- 2. The maximum expected gas generation flow rate as calculated in subsection (h)(6).
- 3. For enclosed combustors (except boilers and process heaters greater than 44 megawatts), the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test.
- 4. Results of the source test conducted pursuant to subsection (e)(2)(D).
- 5. The percent reduction of methane.
- 6. For a boiler or process heater of any size, 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.

(2) Reporting Requirements.

(A) *Closure Report:* Any owner or operator of a MSW landfill which has ceased accepting waste shall submit a Closure Report to the Enforcement Agency within 30 days of waste acceptance cessation. The Enforcement Agency may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable

State, Federal, or local statutes, regulations, and ordinances in effect at the time of closure.

(B) *Equipment Removal Report:* A gas collection and control system Equipment Removal Report shall be submitted to the Enforcement Agency 30 days prior to well capping, removal or cessation of operation of the gas collection, treatment, or control system equipment. The report shall contain all of the following information:

1. A copy of the Closure Report submitted pursuant to subsection (g)(2)(A).
2. A copy of the initial Source Test Report or other documentation demonstrating that the gas collection and control system has been installed and operated for a minimum of 15 years, unless the owner or operator can demonstrate to the satisfaction of the Enforcement Agency that due to declining methane rates the landfill will have a difficult time operating a gas collection and control system for a 15-year period.
3. All records needed to verify that landfill methane surface concentration measurements do not exceed 200 ppmv at any point of the landfill surface pursuant to subsection (e)(3).

(C) *Annual Report:* Any operator or owner subject to the requirements of subsection (e)(2) shall prepare an annual report for the period of January 1 through December 31 of each year. The annual report shall be submitted to the Enforcement Agency by March 15 of the following year. The initial annual report shall be submitted within 180 days of installation and start-up of the gas collection and control system. The annual report shall contain the following information:

1. Landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.
2. Total volume of landfill gas collected (reported in standard cubic feet).
3. Composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume).
4. Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.

5. The date gas collection and control system was installed and in full operation.
6. The percent methane destruction efficiency of each gas control device(s).
7. Type and amount of supplemental fuels burned with the landfill gas in each device.
8. Total volume of landfill gas shipped off-site for combustion, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.
9. Percentage of area with final cover and a geomembrane.
10. Percentage of area with final cover but without a geomembrane.
11. The information required by subsections (g)(1)(A)1, (g)(1)(A)2, (g)(1)(A)5, (g)(1)(A)6, and (g)(1)(B)4.

(D) *Reporting Requirements for Landfills Exempted Pursuant to Subsections (c)(1) and (c)(2):* Any owner or operator granted an exemption under subsections (c)(1) and (c)(2) shall report the following information:

1. Landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.
2. The landfill's estimated waste-in-place, in tons.
3. Percentage of area with final cover and a geomembrane.
4. Percentage of area with final cover but without a geomembrane.

(h) Test Methods and Procedures

- (1) Hydrocarbon Detector Specifications: Any instrument used for the measurement of methane shall be a gas detector that meets the calibration, specifications, and performance criteria of EPA Reference Method 21 (40 CFR 60, Appendix A) [*insert effective date*], except for the following:

- (A) "Methane" shall replace all references to volatile organic compounds (VOC).
 - (B) The calibration gas shall be methane.
 - (C) The hydrocarbon detector shall be equipped with a data logger.
- (2) *Determination of Rated Heat Capacity:* The landfill gas heat input capacity shall be determined using the following procedure:
- (A) The heat input capacity shall be calculated using good engineering practices and site-specific data when available. The methane generation potential for a landfill shall be calculated using the methods provided in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3 [*insert effective date*] and using a recovery rate of 75 percent. The calculation along with relevant parameters shall be provided as part of the report. The Enforcement Agency may request other reasonable information as may be necessary to verify the heat input capacity from the landfill. Heat input capacity shall be calculated using the following equation:

$$\text{HIC (MMBtu/hr)} = \text{CH}_4\text{Gen (scfm)} \times \text{CE (\%)} \times \text{GHV (Btu/scf)} \times 60 \text{ (min/hr)} \times (1 \text{ MMBtu}/1,000,000 \text{ Btu})$$

Where:

HIC = Heat Input Capacity in units of million British Thermal Units per hour (MMBtu/hr)

CH₄Gen = Total Methane Generated in units of standard cubic feet per minute (scfm). CH₄Gen may be calculated using the IPCC First Order Decay Model, actual field data, or approved equivalent.

CE = Landfill Gas Collection and Control System (GCCS) capture efficiency in percent (%). CE shall be 75 percent.

GHV (Gross Heating Value) = percent (%) methane content x gross heating value of methane (assumed to be 1,000 Btu/scf), in units of British Thermal Units per standard cubic feet (Btu/scf). Actual field data for the percent (%) methane may be used by the owner or operator to determine the GHV.

- (3) *Instantaneous Landfill Methane Surface Monitoring Procedures:* The owner or operator shall measure the landfill surface concentration of methane using a hydrocarbon detector meeting the requirements of

subsection (h)(1). The landfill surface shall be inspected using the following procedures:

- (A) Testing shall be performed by holding the probe 2 inches above the ground along a walking pattern that traverses the landfill.
 - 1. The walking pattern shall be no more than a 25-foot spacing interval.
 - 2. If the owner or operator has no exceedances of the limit specified in subsection (e)(3) after 4 consecutive quarterly monitoring periods, the walking pattern spacing may be increased to 100-foot intervals. The owner or operator shall return to a 25-foot spacing interval upon any exceedances of the limit specified in subsection (e)(3), other than non-repeatable, momentary readings.
 - (B) Any landfill surface areas with cover penetrations, distressed vegetation, cracks or seeps shall also be inspected visually and with a hydrocarbon detector.
 - (C) Steep slopes, wet or icy surfaces, construction areas, and other dangerous areas may be excluded from landfill surface inspection.
 - (D) Surface testing shall be terminated when the average wind speed exceeds 5 miles per hour or the instantaneous wind speed exceeds 10 miles per hour. The Enforcement Agency may approve exceptions to the wind speed requirement for MSW landfills consistently having measured winds in excess of these specified limits. Average wind speed shall be determined on a 10-minute average using an on-site anemometer with a continuous recorder.
 - (E) Surface testing shall be conducted when there has been no measurable precipitation in the preceding 72 hours prior to sampling.
- (4) *Gas Collection and Control System Leak Inspection Procedures.* Leaks shall be measured using a portable gas detector as prescribed in EPA Reference Method 21 (40 CFR 60, Appendix A) [insert effective date].
- (5) *Determination of Concentration.* The percentage concentration of methane and oxygen in the landfill gas shall be determined as prescribed in EPA Reference Method 3C (40 CFR 60, Appendix A) [insert effective date].

- (6) *Determination of Maximum Expected Gas Generation Rate.* The maximum expected gas generation rate shall be determined as prescribed in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 3 *[insert effective date]* using a recovery rate of 75 percent.
 - (7) *Determination of Gauge Pressure.* The gauge pressure shall be determined using a hand-held manometer, magnahelic gauge, or other pressure measuring device approved by the Enforcement Agency. The device shall be calibrated and operated in accordance with manufacture's specifications.
 - (8) *Control Device Efficiency Determination.* Either EPA Reference Methods *[to be inserted]* shall 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 to less than *[to be inserted]* ppmv, dry basis, corrected to 15 percent oxygen.
- (i) **Penalties** *[to be inserted]*
 - (j) **Severability.** Each part of this section shall be deemed severable, and in the event that any part of this section is held to be invalid, the remainder of this section shall continue in full force and effect.

NOTE: Authority cited: sections *[to be inserted]*