

## **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 400,000 Tons of Waste-in-Place:* The requirements of subsections (e)(1) and (2) shall not apply to municipal solid waste landfills greater than or equal to 400,000 tons of waste-in-place (WIP), provided the following conditions are satisfied:
  - (A) The owner or operator can demonstrate to the satisfaction of the Enforcement Agency that there is no leak at any location of the landfill surface that exceeds a methane concentration of 200 ppmv after 6 consecutive calendar months of monitoring the landfill surface using the procedures specified in subsection (h)(3).
  - (B) The landfill gas heat input capacity is less than 2.5 million British thermal units per hour (MMBTU/hr) as determined using the procedure in subsection (h)(2).
  - (C) The owner or operator submits an Exemption Request to the Enforcement Agency pursuant to subsection (c)(3).
  - (D) Any owner or operator granted an exemption pursuant to this subsection shall report the information required in subsection

(g)(2)(D) on an annual basis, unless the landfill is closed and has no design capacity for future waste deposition.

1. The annual report shall be prepared 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.

(2) *Landfills Having Less than 400,000 Tons of Waste-in-Place:* The requirements of subsections (e)(1) and (2) shall not apply to municipal solid waste landfills having less than 400,000 tons of WIP, provided the following conditions are satisfied:

- (A) If the landfill is closed and has no design capacity available for future waste deposition, the owner or operator shall submit the information required in subsection (g)(2)(D) within 30 days of receiving the exemption.
- (B) If the landfill is active and has a design capacity available for future waste deposition, the owner or operator shall report the information required in subsection (g)(2)(D) on an annual basis.

1. The annual report shall be prepared 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.

- (C) The owner or operator submits an Exemption Request to the Enforcement Agency pursuant to subsection (c)(3).

(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.
- (B) The written request for an exemption shall include copies of all permits, site disposal records, design capacity, waste-in-place, documentation demonstrating the criteria in subsection (c)(1)(A) and (c)(1)(B) has been met (if applicable), and any other data or information requested by the Enforcement Agency necessary to determine whether an exemption should be granted.

- (C) If the landfill is either an active landfill or an inactive landfill with design capacity available for future waste deposition, the exemption granted under subsections (c)(1) or (c)(2) shall be for a period of 12 months.

1. A renewal request shall be submitted annually 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.

- (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.

**(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.
- (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.
- (6) "District" means any air quality management district or air pollution control district.

- (7) "Destruction Efficiency" means a measure of the ability of the 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 the California Integrated Waste Management Board, any air quality management district or air pollution control district, or a designated local enforcement agency 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 0 to 3 inches above the landfill surface.
- (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) *Gas Collection Control System Design Plan:* If a gas collection and control system which meets the requirements of subsections (e)(2)(A) and either subsections (e)(2)(B) or (e)(2)(C) has not been installed, the owner or operator shall submit a Gas Collection and Control System 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 Gas Collection and Control System Design Plan, or request additional information be submitted. The Gas Collection and Control System Design Plan shall meet the following requirements:
    - 1. The Gas Collection and Control System Design Plan shall be prepared by a professional engineer.
    - 2. The Gas Collection and Control System 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. 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 a sufficient 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 and Control System Design Plan shall conform to specifications for active collection systems in 40 CFR 60.759 *[insert effective date]*, or include a demonstration to the Enforcement Agency's satisfaction of the sufficiency of the alternative provisions describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures.
5. The owner or operator shall include any alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements in the Gas Collection and Control System Design Plan.
  - a. The Enforcement Agency shall review the alternatives and either approve, disapprove, or request that additional information be submitted.
  - b. The Enforcement Agency shall deny the approval of any alternatives not providing equivalent levels of methane emission control and enforceability.
6. The owner or operator shall address any appropriate greenhouse gas best management practices in the Gas Collection and Control System Design Plan to further minimize emissions and maximize landfill gas collection efficiencies. Examples include, but are not limited to:
  - a. The use of horizontal collectors, tighter spacing of landfill gas wells, mixed horizontal and vertical well systems, gas control equipment capacity maximization, and enhanced seals on landfill gas wells and bore holes, and deeper landfills.
7. As operating experience is gained and as site conditions change, the Gas Collection and Control System Design Plan

may be revised, subject to the approval of the Enforcement Agency.

- (B) 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 Gas Collection and Control System 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 system and operate the gas collection and control system continuously, unless the following conditions for non-continuous operation are met:
  - a. Any owner or operator seeking to operate the gas collection and control system less than continuously shall submit a written request to the Enforcement Agency that contains the following:
    - i. The landfill gas flow rate and methane concentrations as measured for the entire system or as measured for individual gas collection wells or components for which less than continuous operation is being sought.
    - ii. A map showing the locations of individual components.
    - iii. An operating, maintenance, and inspection schedule.
    - iv. If the Enforcement Agency approves non-continuous operation of the gas collection and control system, such approval shall contain the landfill gas flow rate, methane concentration, and operating conditions.
  - b. A request for less than continuous operation must be renewed every three years or whenever the information submitted pursuant to subsection (e)(2)(A)1.a.i changes.

2. Operate the gas collection and control system so that there is no component leaks that exceed 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)(E) 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. 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 comply with subsection (e)(8) to prevent the release of methane 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.
2. Enclosed flares shall be equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.
3. 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.



(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 or emits less than [to be inserted] ppmv of methane at the outlet, 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.

(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) *Wellhead Requirements:* Unless the owner or operator receives written approval from the Enforcement Agency for conditions containing alternative operating levels pursuant to subsection (e)(1)(A)4, each wellhead in the gas collection system shall meet the following requirements:

- (A) Each wellhead shall be operated under a vacuum (negative pressure).
- (B) The oxygen concentration in each wellhead shall be less than 5 percent by volume.
- (C) The landfill gas temperature in each wellhead shall be less than 55 degrees Celsius (131 degrees Fahrenheit).
- (D) The owner or operator shall comply with the wellhead monitoring requirements of subsection (f)(3).
- (5) *Well Raising:* The requirements of sections (e)(2)(A)1, (e)(2)(A)2, and (e)(4), 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) No more than five gas collection wells or ten percent of the gas collection wells, whichever is less, are shut down at any time for well raising purposes. A well shall be deemed shut down if it has been disconnected from a vacuum source and is not meeting the requirements of subsection (e)(4).
  - (C) A gas collection well is not disconnected from a vacuum source for longer than 5 consecutive days.
  - (D) Once installed, a gas collection well extension is sealed or capped until the raised well is reconnected to a vacuum source.
  - (E) Well disconnection times are recorded pursuant to subsection (g)(1)(A).
- (6) *Gas Collection and Control System Inspection and Maintenance:* The requirements of subsections (e)(2)(A) through (e)(2)(C), (e)(3), and (e)(4) shall not apply to MSW landfills during inspection and maintenance of the gas collection and control system provided the following conditions are met:
  - (A) Methane emissions are minimized during shutdown.
  - (B) The gas collection and control system is not shut down for more than 240 hours in any calendar year. The duration of a gas collection and control system shutdown shall not exceed 5 consecutive days.

- (C) The applicable requirements of subsection (g)(1) are satisfied.
- (7) *Temporary Shutdown of Gas Collection System Components:* The requirements of subsections (e)(2)(A)1, (e)(2)(A)2, and (e)(4), 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 Gas Collection and Control System Design Plan as specified in subsection (e)(1).
  - (C) No more than five gas collection wells, or ten percent of the gas collection wells, whichever ever number is less, are shut down at any time, except in cases where wells are being shut down to prevent or extinguish fires. A well shall be deemed shut down if it has been disconnected from a vacuum source and is not meeting the requirements of subsection (e)(4).
  - (D) No gas collection well may be disconnected from a vacuum source for longer than 24 consecutive hours, unless the owner or operator receives prior written approval from the Enforcement Agency for a longer well shut down time up to a maximum of 5 consecutive days.
  - (E) Gas collection system components shall be recorded pursuant to subsection (g)(1)(A).
- (8) *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 submit a Construction Plan in writing to the Enforcement Agency at least 7 calendar days prior to beginning any construction activities, unless the construction activity is urgently required. Appropriate reasons for urgent construction activities include, but are not limited to, preventing fires, minimizing

emissions of methane gas to the atmosphere, installing replacement wells, or expanding the gas collection system to meet the requirements of subsections (f)(1)(A)(3)(b) and (f)(3)(C). For urgent construction activities, the owner or operator shall notify the Enforcement Agency of the need for urgent construction activity within 24 hours of discovery of the problem and shall submit an Urgent Construction Activity Report to the Enforcement Agency within 14 calendar days of discovery of the problem. The Construction Plan or Urgent Construction Activity Report 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. A map of the landfill showing any affected collection system components.
3. The reason the action is required including a copy of the statute, regulation, standard, provision, and/or permit clause that obligates the landfill to take the action(s), or written approval for the action(s) from the appropriate enforcement agencies.
4. A construction schedule including projected construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.
5. A description of the mitigation measures planned or taken to minimize potential air quality impacts.

- (B) For construction activities related to the installation, expansion, replacement, or repair of the gas collection system components, the action must be required to maintain compliance with this section, and any new collection system components must be included in the most recent Gas Collection and Control System Design Plan.
- (C) For construction activities related to leachate or gas condensate collection and removal systems, the action must be required by or approved in writing by the appropriate Enforcement Agency.
- (D) Any excavated refuse is covered immediately and then properly disposed of within 24 hours of excavation.

- (E) No drilled wells or excavated trenches shall be left uncovered for more than 8 hours.
  - (F) The installation time for any component shall be no longer than 5 days.
  - (G) Landfill gas collection wells are sealed or capped until the well is connected to a vacuum source.
  - (H) The construction dates for each well are recorded pursuant to subsection (g)(1)(A)(6).
- (9) *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.
  - (B) The landfill has no design capacity available for future waste deposition.
  - (C) 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).
  - (D) 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.
  - (E) The owner or operator submits an Equipment Removal Report to the Enforcement Agency pursuant to subsection (g)(2)(B).
- (10) *Permanent Landfill Closure.*
- (A) Any owner or operator initiating the permanent closure of a landfill must submit a Closure Report pursuant to subsection (g)(2)(A).
  - (B) If a Closure Report has been submitted to the Enforcement Agency, the owner or operator shall not place any additional wastes into the landfill without prior written approval from the Enforcement Agency.

**(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 monthly basis using the procedure specified in subsection (h)(3).

(A) Any reading 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 or identified by using a global positioning system and recorded on a topographic map of the landfill, drawn to scale with the location of the gas collection system clearly marked and identified.
2. The owner or operator shall initiate corrective action, such as cover maintenance 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, it shall be a violation unless the owner or owner or operator determines that a new or replacement gas collection well is needed. The owner or owner or operator must install and operate the new or replacement well no later than 45 days after detecting the third exceedance.

(B) Any active MSW landfill that has no monitored exceedances of the limit specified in subsection (e)(3) after 12 consecutive monthly monitoring periods may monitor quarterly. Any reading of 200 ppmv or more of methane detected during quarterly monitoring or compliance inspections shall result in a return to monthly monitoring of the landfill surface.

- (C) Any closed or inactive MSW landfill that has no monitored exceedances of the limit specified in subsection (e)(3) after 12 consecutive monthly monitoring periods may monitor quarterly. Any reading of 200 ppmv or more of methane detected during quarterly monitoring or compliance inspections shall result in a return to monthly monitoring of the landfill surface.
  - 1. If there has been no monitored exceedances of the limit specified in subsection (e)(3) after 4 consecutive quarterly monitoring periods, the owner or operator may monitor annually.
  - 2. Any reading of 200 ppmv or more of methane detected during annual monitoring or compliance inspections shall result in a return to monthly 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 rule shall be submitted as specified in subsection (e)(1)(A)(5). The Enforcement Agency may specify additional appropriate monitoring procedures.
  - (C) The gas control system shall be monitored monthly for component leaks. Any exceedances of the limit specified in subsection (e)(2)(A)2 shall be recorded pursuant to subsection (g)(1)(E).

- (3) *Well Head Monitoring:* The owner or operator shall monitor each individual wellhead on a monthly basis for gauge pressure, landfill gas temperature, and oxygen. If any exceedance of a limit specified in subsections (f)(3)(A), (f)(3)(B), or (f)(3)(C) is detected, the following actions shall be taken:
- (A) The owner or operator shall record the date, exceedance value, well identification number, and corrective actions taken.
  - (B) The owner or operator shall initiate action to correct the exceedance within 5 calendar days of discovering the problem.
  - (C) If the exceedance cannot be corrected within 15 days of the date that the problem was first discovered, the owner or operator shall initiate further action, including, but not limited to, any necessary expansion of the gas collection system, to correct the exceedance.
  - (D) Any expansion of the gas collection system shall be completed and all new wells shall be operating within 120 days of the date that the problem was first discovered.

**(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, including individual well shutdown times, and the reason for the downtime.
    - 2. All emission control system downtime and the reason for the downtime.
    - 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. Monthly landfill gas flow rates and well concentration readings for landfills which have been approved by the Enforcement Agency to operate the gas collection and control system less than continuously.



6. Records of all component leak testing and landfill surface monitoring dates, 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 of discovery, the action taken to repair the leak, date of repair, well construction date, date of any required re-monitoring, and the re-monitored concentration in ppmv.
7. Records of all wellhead monitoring dates, any exceedances of the limits stated in subsection (e)(4), including: well identification number, the measured exceedance, the action taken to repair the exceedance, and the date of repair.
8. Annual waste acceptance rate and the current amount of waste-in-place.
9. 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 Gas Collection and Control System Design Plan.
10. 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 an enclosed combustor (except boiler and process heater 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.
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 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. The landfill's estimated waste-in-place, in tons.
10. Percentage of area with final cover and a geomembrane.
11. Percentage of area with final cover but without a geomembrane.
12. The information required by subsections (g)(1)(A)1, (g)(1)(A)2, (g)(1)(A)6, (g)(1)(A)7, (g)(1)(A)8, and (g)(1)(B)4.

(D) *Reporting Requirements for Landfills Exempted Pursuant to Subsections (c)(1) and (c)(2):* Any owner or operator seeking 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.
- (2) **Determination of Rated Heat Capacity:** 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 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 3 *[insert effective date]* and using a potential 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.

- (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 within 0 to 3 inches above the ground along a walking pattern that traverses the landfill in 25-foot intervals.
    - 1. If owner or operator has detected no exceedances of the limit specified in subsection (e)(3) after 12 consecutive monthly monitoring periods, the spacing may be increased to 100-foot intervals. The owner or operator shall return to a 25-foot spacing interval upon any exceedance of the limit specified in subsection (e)(3).
  - (B) Any landfill surface areas with cover penetrations, distressed vegetation, cracks or seeps shall also be inspected.
  - (C) Steep slopes and other dangerous areas may be excluded from landfill surface inspection. To exclude an area from monitoring, the landfill owner or operator shall file a written request with the Enforcement Agency. Such a request shall include an explanation of the requested exclusion and photographs of the area.
  - (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 40 CFR 60.755 (a)(1) *[insert effective date]*.
  - (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 System Efficiency Determination.* Either EPA Reference Methods *[to be inserted]* shall be used to determine the efficiency of the control system 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]*