DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Division of Air Quality

STATE PLAN FOR THE REGULATION OF AIR EMISSIONS FROM MUNICIPAL SOLID WASTE LANDFILLS

March 12, 2017

DELAWARE STATE PLAN TO REGULATE AIR EMISSIONS FROM MUNICIPAL SOLID WASTE LANDFILLS

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Delaware State Plan to Regulate Air Emissions from Municipal Solid Waste Landfills

I. Introduction

On March 12, 1996, the Environmental Protection Agency (EPA) promulgated emission guidelines (EG) for the control of landfill gas (LFG) emissions from existing municipal solid waste (MSW) landfills. The EG are found in Subpart Cc of 40 CFR Part 60. Effective August 29, 2016 the EPA finalized a new subpart that updates the EG and Compliance Times for existing Municipal Solid Waste Landfills to reflect changes to the population of landfills and the results of an EPA analysis of the timing and methods for reducing emissions. The revised EG is found in Subpart Cf of 40 CFR Part 60.

Landfill gas contains methane, carbon dioxide, and more than 100 different nonmethane organic compounds (NMOCs) including volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and odorous compounds. Landfills are a significant source of methane, which is a potent greenhouse gas pollutant. The EPA has determined that affects from these compounds include ground-level ozone formation, cancer and noncancer health effects, odor nuisance, methane migration and fire hazard potential, and global warming.

The State of Delaware has developed this State Plan for imposing collection and control requirements on existing landfills, as required by the emission guidelines, Section 111(d) of the Clean Air Act, and 40 CFR Part 60 Subpart B, Adoption and Submittal of State Plans for Designated Facilities.

II. Legal Authorities and Enforceable Mechanism

Effective August 29, 2016, the EPA promulgated a new source performance standard (NSPS) for the control of emissions from new (i.e. newly constructed, reconstructed or modified) MSW landfills. The NSPS is found at 40 CFR Part 60 Subpart XXX (Subpart XXX). The EPA also promulgated emission guidelines for the development of State Plans to control the emissions from existing MSW landfills. The emission guideline is found at 40 CFR Part 60 Subpart Cf (Subpart Cf). 7 **Del.C**. Ch. 60 (Environmental Control) gives the Secretary of the Department of Natural Resources and Environmental Control (DNREC) the legal authority to adopt, implement, and enforce regulations that control the emissions of air contaminants into the atmosphere. Delaware's plan is to adopt into 7 **DE Admin. Code** 1120, "New Source Performance Standards", a new regulation, as Section 30, that incorporates Subpart XXX by reference. When adopting Subpart XXX, the MSW landfills being subject to Section 30 of 7 **DE Admin. Code** 1120 (Section 30) will be expanded to additionally include all MSW landfills that have accepted municipal solid waste after November 8, 1987 or MSW landfills that have additional capacity available to accept municipal solid waste. Thus, Delaware's 3 existing MSW landfills are also subject to Section 30; thereby enabling Delaware to meet the applicability requirements of Subpart Cf. Once promulgated, the regulation and this State Plan will be submitted to the EPA for approval pursuant to 40 CFR 60.27. Delaware has the requisite legal authorities to develop, implement and enforce this State Plan, specifically:

1. Section 6010 "Rules and regulations; plans" of 7 **Del.C**. Ch. 60 gives the Secretary the authority to adopt regulations that control the emissions of air contaminants, which includes the designated pollutants in Subpart Cf, into the atmosphere.

2. Section 6005 "Enforcement; civil and administrative penalties; expenses" of 7 **Del.C**. Ch. 60 gives the Secretary the authority to enforce any rule, regulation, or permit condition.

3. Section 6010 of 7 **Del.C**. Ch. 60, 7 **DE Admin. Code** 1102 "Permits," 7 **DE Admin. Code** 1117 "Source Monitoring, Recordkeeping and Reporting," 7 **DE Admin. Code** 1130 "Title V State Operating Permit Program," and Section 30, gives the Secretary the authority to obtain information necessary to determine compliance.

4. Section 6010 and section 6024 "Right of Entry" of 7 **Del.C**. Ch. 60, 7 **DE Admin. Code** 1102, 7 **DE Admin. Code** 1117, 7 **DE Admin. Code** 1130, and Section 30, gives the Secretary the

authority to require record keeping, make inspections, and conduct tests.

5. Section 6010 of 7 **Del.C**. Ch. 60, 7 **DE Admin. Code** 1102, 7 **DE Admin. Code** 1117, 7 **DE Admin. Code** 1130, and Section 30, gives the Secretary the authority to require the use of monitors and require emission reports of municipal solid waste landfill owners or operators.

6. Section 6014 "Regulatory and compliance information, facility performance and public information" of 7 **Del.C**. Ch. 60, 7 **DE Admin. Code** 1102, and 7 **DE Admin. Code** 1130 gives the Secretary the authority to make emission data available to the public.

The requisite legal authorities, which are available at the time of the submission of the State Plan, are provided in APPENDIX A of this State Plan.

The complete text of Subpart XXX, as adopted in Section 30, is provided in APPENDIX B of this State Plan. Other referenced documents are available from the Department upon request.

III. Adoption of 40 CFR Part 60 Subpart XXX by Reference

The State of Delaware is adopting Subpart XXX by reference with several changes that also make existing municipal solid waste landfills subject to Section 30. The adoption of this regulation will be incorporated into the State of Delaware "**Regulations Governing the Control of Air Pollution**" in Section 30. This regulation will read as follows:

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Division of Air Quality

1120 New Source Performance Standards

30.0 Standards of Performance for Municipal Solid Waste Landfills After July 11, 2017

The provisions of Subpart XXX of Part 60, Title 40 of the Code of Federal Regulations - "Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014", as set forth in Vol. 81, No. 167, pp. 59368-59384, of the Federal Register, dated August 29, 2016, attached hereto, are hereby incorporated herein and adopted by reference, subject to the following changes:

30.1 Wherever the word "Administrator" appears it shall be replaced by the word "Department", with the exception of paragraphs 60.760(b) and 60.764(a)(5).

30.2 The ASTM Standard Test Method D6522-11 is incorporated herein and adopted by reference. The following definitions, subsections and test methods that are referenced in the text of the preceding adoption are also incorporated herein and adopted by reference as they appear in Title 40 of the Code of Federal Regulations, dated July 1, 2016:

30.2.1 The definition of "land application unit", "surface impoundment", "injection well", "waste pile" and "other types of RCRA Subtitle D wastes" as each of those terms is defined in 40 CFR 257.2.

30.2.2 The definition of "sludge" and "solid waste" as each of those terms is defined in 40 CFR 258.2.

30.2.3 The definition of "performance test" in 60.764(a)(3)(i), as the term is defined in 40 CFR 60.8.

30.2.4 The requirements of 40 CFR 51.166 and 52.21, as referenced in 60.764(c).

30.2.5 The requirements of 40 CFR 60.4, as referenced in 60.767(i)(2).

30.2.6 The requirements of 40 CFR 60.7(a)(1), as referenced in 60.767(a)(1).

30.2.7 The requirements of 40 CFR 60.7(a)(4), as referenced in 60.761 and 60.767(e).

30.2.8 The requirements of 40 CFR 60.8, as referenced in 60.764(b)(3)(i), 60.764(e)(1), 60.767(g), 60.767(h), and 60.767(i)(1).

30.2.9 The requirements of 40 CFR 60.17, as referenced in 60.766(a)(2)(ii) and 60.766(a)(2)(iii)(B).

30.2.10 The requirements of 40 CFR 60.18, as referenced in 60.762(b)(2)(iii)(A) and 60.768(b)(4).

30.2.11 The requirements of 40 CFR 60.18(f)(3) and 60.18(f)(4), as referenced in 60.764(e).

30.2.12 The requirements of 40 CFR 258, as referenced in 60.767(k).

30.2.13 The requirements of 40 CFR 258.40, as referenced in 60.762(b)(2)(ii)(D)(2).

30.2.14 The requirements of 40 CFR 258.60, as referenced in 60.767(e).

30.2.15 Methods 2, 2E, 3, 3A, 3C, 18, 21, 25, 25A and 25C in appendix A of 40 CFR Part 60.

30.3 The title of Subpart XXX shall be replaced with the following language: "30.0 Standards of Performance for Municipal Solid Waste Landfills After July 11, 2017."

30.4 Section 60.760(a) shall be replaced with the following language: "The provisions of this subpart apply to each municipal solid waste landfill, open or closed, that commenced construction, reconstruction, or modification after July 17, 2014 or that has accepted waste after November 8, 1987 or that has additional capacity available to accept waste."

30.5 Section 60.762(a) shall be replaced with the following language: "Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume must submit an initial design capacity report to the Department as provided in §60.767(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions must be documented and submitted with the report. For purposes of 7 **DE Admin. Code** 1130, Title V State Operating Permit Program, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under 7 **DE Admin. Code** 1130, provided it is not a major source as defined in 7 **DE Admin. Code** 1130. Submittal of the initial design capacity report fulfills the requirements of this subpart except as provided for in paragraphs (a)(1) and (2) of this section."

30.6 Delete ", local, or tribal" in Sections 60.761, 60.767(a)(2)(i) and 60.767(a)(2)(ii).

30.7 Paragraph 60.762(b) shall be replaced with the following language: "Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, must either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in §60.764. The NMOC emission rate must be recalculated annually, except as provided in §60.767(b)(1)(ii). The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is subject to 7 **DE Admin. Code** 1130. When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in §60.762(b)(2)(v), a 7 **DE Admin. Code** 1130 operating permit is no longer required."

30.8 Section 60.762(b)(2)(ii) shall be replaced with the following language: "*Collection system.* Install and start up a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(C) or (D) and (b)(2)(iii) of this section in accordance with paragraph (b)(2)(ii)(A) or (B) of this section, whichever is applicable."

30.9 Section 60.762(b)(2)(ii)(A) shall be replaced with the following language: "*For MSW landfills that commenced construction, reconstruction, or modification on or after July 17, 2014.* The collection and control system must be started up in accordance with paragraph (b)(2)(ii)(A)(*1*) or (*2*) of this section, whichever is applicable."

30.10 Add new section 60.762(b)(2)(ii)(A)*(1)* with the following language: "Within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 34 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 34 megagrams per year, as specified in §60.767(c)(4) or".

30.11 Add new section 60.762(b)(2)(ii)(A)*(2)* with the following language: "Within 30 months of the most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2, if the Tier 4 surface emissions monitoring shows a surface methane emission concentration of 500 parts per million methane or greater as specified in §60.767(c)(4)(iii)."

30.12 Section 60.762(b)(2)(ii)(B) shall be replaced with the following language: "*For all other subject MSW landfills.* As expeditiously as practicable but not later than January 8, 2018."

30.13 Section 60.762(c) shall be replaced with the following language: "For purposes of obtaining an operating permit under title V of the Clean Air Act, the owner or operator of an MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under 7 **DE Admin. Code** 1130,

unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, and not otherwise subject to 7 **DE Admin. Code** 1130, becomes subject to the requirements of paragraph 5.1.1 of 7 **DE Admin. Code** 1130, regardless of when the design capacity report is actually submitted, no later than:".

30.14 Sections 60.762(c)(1), 60.767(a)(1)(i) and 60.767(b)(1)(i)(A) shall be replaced with the following language: "Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 or".

30.15 Section 60.762(c)(2) and Section 60.767(b)(1)(i)(B) shall be replaced with the following language: "January 8, 2018 for all other subject MSW landfills."

30.16 Section 60.763(g) shall be replaced with the following language: "If monitoring demonstrates that the operational requirement in paragraphs (b), (c), or (d) of this section are not met, corrective action must be taken as specified in §60.765(a)(3) and (5) or §60.765(c). If corrective actions are taken, as specified in §60.765, the monitored exceedance is not a violation of the operational requirements in this section."

30.17 Section 60.767(a)(1)(ii) shall be replaced with the following language: "The date specified in a State construction or operating permit, if applicable, or January 8, 2018, whichever is earlier, for all other subject MSW landfills."

30.18 The final sentence in section 60.767(a)(2)(ii) shall be replaced with the following language: "The Department may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill."

30.19 Section 60.767(i)(1)(ii) shall be replaced with the following language: "For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT Web site at the time of the test, you must submit the results of the performance test to the Department."

30.20 Section 60.767(k)(7) shall be replaced with the following language: "The initial report must contain items in paragraph (k)(1) through (6) 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 (13) months after the date of commenced construction, modification, or reconstruction for landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 containing data for the first 12 months after August 29, 2016."

30.21 Delete and reserve sections 60.767(k)(7)(i) and 60.767(k)(7)(ii).

30.22 Section 60.768(c)(3) shall be replaced with the following language: "Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with §60.762(b)(2)(iii) must keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other state or federal regulatory requirements.)"

The complete text of Subpart XXX, as adopted in Section 30, is provided in APPENDIX B of this State Plan. All municipal solid waste landfills in Delaware are subject to Section 30.

IV. Source and Emission Inventories

Delaware has three municipal solid waste landfills that are subject to the requirements of this State Plan. All of these MSW landfills are currently accepting waste, have a design capacity greater than 2.5 million megagrams, and an uncontrolled NMOC emission rate of greater than 34 megagrams per year using Tier 1 procedures. These facilities along with the emission inventories are provided in the table below.

Municipal Solid Waste Landfills Subject To Emission Guidelines in Subpart Cf					
Facility Name	**County**	**Design Capacity (Million Mg)**	**2015 Estimated NMOC Emissions (Uncontrolled)**	**Tier**	**Year Opened**
Cherry Island (NSWMC-2)	New Castle	9.452	47.15 Mg/year	1	10/85
Central Solid Waste Management Center (CSWMC)	Kent	4.606	28.85 Mg/year	1	10/80
Southern Solid Waste Management Center (SSWMC)	Sussex	5.109	12.83 Mg/year	1	10/84

Note that pursuant to Section 28 of 7 **DE Admin. Code** 1120 each of these three existing municipal solid waste landfills is currently subject to the requirements of 40 CFR Part 60 Subpart WWW.

V. Emission Standards

The emission standards for municipal solid waste landfills are those stated in Section 60.762 of Section 30. These standards include design capacity cutoff for applicability, NMOC emission limits, collection system requirements, types of control device requirements, and length of time of required control for municipal solid waste landfills. The test methods and procedures for determining compliance with the emission standards are those stated in Section 60.764 of Section 30.

The emission standards apply to any municipal solid waste landfill, open or closed, that commenced construction, reconstruction, or modification after July 17, 2014 or that has accepted waste after November 8, 1987 or that has additional capacity available to accept waste.

VI. Process for Review of Design Plans

For a landfill subject to the emission standards, the owner or operator must submit to the Department a Collection and Control Design Plan. This design plan must meet the requirements stated in Section 30.

As provided for in Section 30, the Department will review each submitted design plan and will, in writing, either approve it, disapprove it, or request that additional information be submitted.

VII. Compliance Schedules

The table below specifies the compliance schedule for existing municipal solid waste landfills in the State of Delaware.

Compliance Schedule for Existing Municipal Solid Waste Landfills	
State Plan Submittal to EPA	May 30, 2017
EPA approval of State Plan	Within 4 months of submittal to EPA
Final emission guideline compliance date	For NSWMC-2, CSWMC, and SSWMC, to be completed as expeditiously as possible but no later than 180 days from the effective date of Section 30

VIII. Public Participation

A public hearing was held on April 24, 2017 at 6:00 pm in the Department of Natural Resources and Environmental Control's office located at 100 W. Water Street, Suite 6A, Dover, DE. Affidavits from the Delaware State News and the Sunday News Journal, and copies of the notices as they appeared in those publications on March 12, 2017 advertising the public hearing are provided in APPENDIX C of this State Plan. A list of the public hearing attendees and other public noticing is also provided in APPENDIX C.

IX. Source Surveillance, Compliance Assurance, and Enforcement

The affected facilities will be subject to the operational standards, test methods and procedures, compliance provisions, monitoring of operations, reporting requirements, and recordkeeping requirements specified in Section 30.

The Department will submit annual reports to the EPA which detail the progress in the enforcement of the State Plan. The first progress report will be submitted to the EPA one year following the approval of the State Plan. The annual report will contain the following information:

1. Enforcement actions initiated against a designated facility during the reporting period,

2. Identification of the achievement of any increments of progress required by the State Plan during the reporting period,

3. Identification of designated facilities that have ceased operation during the reporting period,

4. Submission of additional emission data to update previous progress reports, and

5. Emission inventory data for any municipal solid waste landfill that has accepted waste after November 8, 1987, or that has additional design capacity available to accept waste and that was not in operation at the time of State Plan development but began operation during the reporting period.

Technical reports on all performance testing conducted on the designated facilities, complete with concurrently recorded control device operating data will be retained by the Department and a copy will be sent to the Environmental Protection Agency, Region III.

APPENDIX A

Legal Authorities

Legal Authority	Links on the Delaware General Assembly website
7 DE Code Chapter 60 - Subchapter I. General Provisions	http://delcode.delaware.gov/title7/c060/sc01/index.shtml
7 DE Code Chapter 60 - Subchapter II. Powers and Duties of Secretary and Department	http://delcode.delaware.gov/title7/c060/sc02/index.shtml
7 DE Admin Code 1102 - Permits	http://regulations.delaware.gov/AdminCode/title7/1000/1100/1102.shtml#TopOfPage
7 DE Admin Code 1117 - Source Monitoring, Record Keeping And Reporting	http://regulations.delaware.gov/AdminCode/title7/1000/1100/1117.shtml#TopOfPage
7 DE Admin Code 1130 - Title V State Operating Permit Program	http://regulations.delaware.gov/AdminCode/title7/1000/1100/1130.shtml#TopOfPage

APPENDIX B

40 CFR Part 60 Subpart XXX, as adopted in Section 30

Appendix B illustrates the changes being proposed in Section 30 of 7 DE Admin. Code 1120 to 40 CFR Part 60 Subpart XXX. The underline indicates additions being proposed to Subpart XXX and the strikeouts indicate deletions being proposed to Subpart XXX.

~~Subpart XXX —~~ 30.0 Standards of Performance for Municipal Solid Waste Landfills ~~That Commenced Construction, Reconstruction, or Modification After July 17, 2014~~ After July 11, 2017

§60.760 Applicability, designation of affected source, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill, open or closed, that commenced construction, reconstruction, or modification after July 17, 2014 or that has accepted waste after November 8, 1987 or that has additional capacity available to accept waste. ~~Physical or operational changes made to an MSW landfill solely to comply with subparts Cc, Cf, or WWW of this part are not considered construction, reconstruction, or modification for the purposes of this section.~~

(b) The following authorities are retained by the Administrator and are not transferred to the state: §60.764(a)(5).

(c) Activities required by or conducted pursuant to a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), or state remedial action are not considered construction, reconstruction, or modification for purposes of this subpart.

§60.761 Definitions.

As used in this subpart, all terms not defined herein have the meaning given them in the Act or in subpart A of this part.

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

Closed area means a separately lined area of an MSW landfill in which solid waste is no longer being placed. If additional solid waste is placed in that area of the landfill, that landfill area is no longer closed. The area must be separately lined to ensure that the landfill gas does not migrate between open and closed areas.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under §60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with §60.762(b)(2)(i).

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.

Design capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the state~~, local, or tribal~~ agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site-specific density, which must be recalculated annually.

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emission rate cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

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

enclosed combustor.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (*i.e.,* fan, blower, compressor) used to transport landfill gas through the header system.

Gust means the highest instantaneous wind speed that occurs over a 3-second running average.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). Household waste does not include fully segregated yard waste. Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities. Household waste does not include construction, renovation, or demolition wastes, even if originating from a household.

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this chapter. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: Electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

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 §257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

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.

Modification means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of §60.764.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

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.

Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities.

Sludge means the term sludge as defined in 40 CFR 258.2.

Solid waste means the term solid waste as defined in 40 CFR 258.2.

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

Sufficient extraction rate means a rate sufficient 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, for the life of the blower.

Treated landfill gas means landfill gas processed in a treatment system as defined in this subpart.

Treatment system means a system that filters, de-waters, and compresses landfill gas for sale or beneficial use.

Untreated landfill gas means any landfill gas that is not treated landfill gas.

§60.762 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume must submit an initial design capacity report to the ~~Administrator~~ Department as provided in §60.767(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions must be documented and submitted with the report. For purposes of 7 **DE Admin. Code** 1130, Title V State Operating Permit Program, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under 7 **DE Admin. Code** 1130, provided it is not a major source as defined in 7 **DE Admin. Code** 1130. Submittal of the initial design capacity report fulfills the requirements of this subpart except as provided for in paragraphs (a)(1) and (2) of this section.

(1) The owner or operator must submit to the ~~Administrator~~ Department an amended design capacity report, as provided for in §60.767(a)(3).

(2) When an increase in the maximum design capacity of a landfill exempted from the provisions of §60.762(b) through §60.769 on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the owner or operator must comply with the provisions of paragraph (b) of this section.

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, must either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in §60.764. The NMOC emission rate must be recalculated annually, except as provided in §60.767(b)(1)(ii). The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is subject to ~~part 70 or 71 permitting requirements~~ 7 **DE Admin. Code** 1130. When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in §60.762(b)(2)(v), a 7 **DE Admin. Code** 1130 operating permit is no longer required.

(1) If the calculated NMOC emission rate is less than 34 megagrams per year, the owner or operator must:

(i) Submit an annual NMOC emission rate emission report to the ~~Administrator~~ Department, except as provided for in §60.767(b)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in §60.764(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 34 megagrams per year,

or the landfill is closed.

(A) If the calculated NMOC emission rate, upon initial calculation or annual recalculation required in paragraph (b) of this section, is equal to or greater than 34 megagrams per year, the owner or operator must either: Comply with paragraph (b)(2) of this section; calculate NMOC emissions using the next higher tier in §60.764; or conduct a surface emission monitoring demonstration using the procedures specified in §60.764(a)(6).

(B) If the landfill is permanently closed, a closure report must be submitted to the ~~Administrator~~ Department as provided for in §60.767(e).

(2) If the calculated NMOC emission rate is equal to or greater than 34 megagrams per year using Tier 1, 2, or 3 procedures, the owner or operator must either:

(i) Calculated *NMOC Emission Rate.* Submit a collection and control system design plan prepared by a professional engineer to the ~~Administrator~~ Department within 1 year as specified in §60.767(c); calculate NMOC emissions using the next higher tier in §60.764; or conduct a surface emission monitoring demonstration using the procedures specified in §60.764(a)(6). The collection and control system must meet the requirements in paragraphs (b)(2)(ii) and (iii) of this section.

(ii) *Collection system.* Install and start up a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(C) or (D) and (b)(2)(iii) of this section in accordance with paragraph (b)(2)(ii)(A) or (B) of this section, whichever is applicable. ~~within 30 months after:~~

(A) *For MSW landfills that commenced construction, reconstruction, or modification on or after July 17, 2014.* The collection and control system must be started up in accordance with paragraph (b)(2)(ii)(A)(*1*) or (*2*) of this section, whichever is applicable. ~~The first annual report in which the NMOC emission rate equals or exceeds 34 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 34 megagrams per year, as specified in §60.767(c)(4); or~~

(1) Within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 34 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 34 megagrams per year, as specified in §60.767(c)(4) or

(2) Within 30 months of the most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2, if the Tier 4 surface emissions monitoring shows a surface methane emission concentration of 500 parts per million methane or greater as specified in §60.767(c)(4)(iii).

(B) *For all other subject MSW landfills.* As expeditiously as practicable but not later than January 8, 2018. ~~The most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2, if the Tier 4 surface emissions monitoring shows a surface methane emission concentration of 500 parts per million methane or greater as specified in §60.767(c)(4)(iii).~~

(C) An active collection system must:

(*1*) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment;

(*2*) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade.

(*3*) Collect gas at a sufficient extraction rate;

(*4*) Be designed to minimize off-site migration of subsurface gas.

(D) A passive collection system must:

(*1*) Comply with the provisions specified in paragraphs (b)(2)(ii)(C)(*1*), (*2*), and (*3*) of this section.

(*2*) Be installed 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.

(iii) *Control system.* Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B), or (C) of this section.

(A) A non-enclosed flare designed and operated in accordance with the parameters established in §60.18 except as noted in §60.764(e); or

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 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 §60.764(d). 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.

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

(*2*) The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in §60.766;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to either paragraph (b)(2)(iii)(A) or (B) of this section.

(D) All emissions from any atmospheric vent from the gas treatment system are subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section. For purposes of this subpart, atmospheric vents located on the condensate storage tank are not part of the treatment system and are exempt from the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

(iv) *Operation.* Operate the collection and control device installed to comply with this subpart in accordance with the provisions of §§60.763, 60.765 and 60.766.

(v) *Removal criteria.* The collection and control system may be capped, removed, or decommissioned if the following criteria are met:

(A) The landfill is a closed landfill (as defined in §60.761). A closure report must be submitted to the ~~Administrator~~ Department as provided in §60.767(e).

(B) The collection and control system has been in operation a minimum of 15 years or the landfill owner or operator demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flow.

(C) Following the procedures specified in §60.764(b), the calculated NMOC emission rate at the landfill is less than 34 megagrams per year on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.

(c) For purposes of obtaining an operating permit under title V of the Clean Air Act, the owner or operator of an MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under ~~part 70 or 71 of this chapter~~ 7 **DE Admin. Code** 1130, unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, and not otherwise subject to ~~either part 70 or 71~~ 7 **DE Admin. Code** 1130, becomes subject to the requirements of ~~§70.5(a)(1)(i) or §71.5(a)(1)(i) of this chapter~~ paragraph 5.1.1 of 7 **DE Admin. Code** 1130, regardless of when the design capacity report is actually submitted, no later than:

(1) ~~November 28, 2016 for MSW landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016;~~ Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 or

(2) ~~Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commence construction, modification, or reconstruction after August 29, 2016~~ January 8, 2018 for all other subject MSW landfills.

(d) When an MSW landfill subject to this subpart is closed as defined in this subpart, the owner or

operator is no longer subject to the requirement to maintain an operating permit under part 70 or 71 of this chapter for the landfill if the landfill is not otherwise subject to the requirements of either part 70 or 71 and if either of the following conditions are met:

(1) The landfill was never subject to the requirement for a control system under paragraph (b)(2) of this section; or

(2) The owner or operator meets the conditions for control system removal specified in paragraph (b)(2)(v) of this section.

§60.763 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of §60.762(b)(2) must:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) 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 annual reports as provided in §60.767(g)(1);

(2) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the ~~Administrator~~ Department as specified in §60.767(c);

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit). The owner or operator may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the ~~Administrator~~ Department 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.,* neither causing fires nor killing methanogens is acceptable).

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface testing using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in §60.765(d). The owner or operator must conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations. Thus, the owner or operator must monitor any openings that are within an area of the landfill where waste has been placed and a gas collection system is required. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan must be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with §60.762(b)(2)(iii). In the event the collection or control system is not operating, the gas mover system must be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere must be closed within 1 hour of the collection or control system not operating; and

(f) Operate the control system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of this section are not met, corrective action must be taken as specified in §60.765(a)(3) and (5) or §60.765(c). If

corrective actions are taken, as specified in §60.765, the monitored exceedance is not a violation of the operational requirements in this section.

§60.764 Test methods and procedures.

(a)(1) *NMOC Emission Rate*. The landfill owner or operator must calculate the NMOC emission rate using either Equation 1 provided in paragraph (a)(1)(i) of this section or Equation 2 provided in paragraph (a)(1)(ii) of this section. Both Equation 1 and Equation 2 may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (a)(1)(i) of this section, for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in paragraph (a)(1)(ii) of this section, for part of the life of the landfill. The values to be used in both Equation 1 and Equation 2 are 0.05 per year for k, 170 cubic meters per megagram for L_o, and 4,000 parts per million by volume as hexane for the C_{NMOC}. For landfills located in geographical areas with a 30-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

(i)(A) Equation 1 must be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^{n} 2\,k\,L_o M_i \left(e^{-kt_i}\right)\left(C_{NMOC}\right)\left(3.6\times10^{-9}\right) \qquad \text{(Eq. 1)}$$

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Where:

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year.

k = Methane generation rate constant, year^{-1}.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the ith section, megagrams.

t_i = Age of the ith section, years.

C_{NMOC} = Concentration of NMOC, parts per million by volume as hexane.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

(ii)(A) Equation 2 must be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC} = 2L_oR\,(e^{-kc}-e^{-kt})\,C_{NMOC}(3.6 \times 10^{-9}) \qquad \text{(Eq.2)}$$

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Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.

L_o = Methane generation potential, cubic meters per megagram solid waste.

R = Average annual acceptance rate, megagrams per year.

k = Methane generation rate constant, year^{-1}.

t = Age of landfill, years.

C_{NMOC} = Concentration of NMOC, parts per million by volume as hexane.

c = Time since closure, years; for active landfill c = 0 and e^{-kc} = 1.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value of R, if documentation of the nature and amount of such wastes is maintained.

(2) *Tier 1.* The owner or operator must compare the calculated NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 34 megagrams per year, then the landfill owner or operator must submit an NMOC emission rate report according to §60.767(b), and must recalculate the NMOC mass emission rate annually as required under

§60.762(b).

(ii) If the calculated NMOC emission rate as calculated in paragraph (a)(1) of this section is equal to or greater than 34 megagrams per year, then the landfill owner must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in §60.767(c) and install and operate a gas collection and control system within 30 months according to §60.762(b)(2)(ii) and (iii);

(B) Determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the Tier 2 procedures provided in paragraph (a)(3) of this section; or

(C) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the Tier 3 procedures provided in paragraph (a)(4) of this section.

(3) *Tier 2.* The landfill owner or operator must determine the site-specific NMOC concentration using the following sampling procedure. The landfill owner or operator must install at least two sample probes per hectare, evenly distributed over the landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The probes should be evenly distributed across the sample area. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25 or 25C of appendix A of this part. Taking composite samples from different probes into a single cylinder is allowed; however, equal sample volumes must be taken from each probe. For each composite, the sampling rate, collection times, beginning and ending cylinder vacuums, or alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the cylinder approaches ambient pressure where measurement accuracy diminishes. If more than the required number of samples are taken, all samples must be used in the analysis. The landfill owner or operator must divide the NMOC concentration from Method 25 or 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe. The sample location on the common header pipe must be before any gas moving, condensate removal, or treatment system equipment. For active collection systems, a minimum of three samples must be collected from the header pipe.

(i) Within 60 days after the date of completing each performance test (as defined in §60.8), the owner or operator must submit the results according to §60.767(i)(1).

(ii) The landfill owner or operator must recalculate the NMOC mass emission rate using Equation 1 or Equation 2 provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average site-specific NMOC concentration from the collected samples instead of the default value provided in paragraph (a)(1) of this section.

(iii) If the resulting NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must submit a periodic estimate of NMOC emissions in an NMOC emission rate report according to §60.767(b)(1), and must recalculate the NMOC mass emission rate annually as required under §60.762(b). The site-specific NMOC concentration must be retested every 5 years using the methods specified in this section.

(iv) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 34 megagrams per year, the landfill owner or operator must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in §60.767(c) and install and operate a gas collection and control system within 30 months according to §60.762(b)(2)(ii) and (iii);

(B) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures specified in paragraph (a)(4) of this section; or

(C) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in

paragraph (a)(6) of this section.

(4) *Tier 3.* The site-specific methane generation rate constant must be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator must estimate the NMOC mass emission rate using Equation 1 or Equation 2 in paragraph (a)(1)(i) or (ii) of this section and using a site-specific methane generation rate constant, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator must compare the resulting NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration and Tier 3 site-specific methane generation rate is equal to or greater than 34 megagrams per year, the owner or operator must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in §60.767(c) and install and operate a gas collection and control system within 30 months according to §60.762(b)(2)(ii) and (iii); or

(B) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(ii) If the NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must recalculate the NMOC mass emission rate annually using Equation 1 or Equation 2 in paragraph (a)(1) of this section and using the site-specific Tier 2 NMOC concentration and Tier 3 methane generation rate constant and submit a periodic NMOC emission rate report as provided in §60.767(b)(1). The calculation of the methane generation rate constant is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations.

(5) *Other methods.* The owner or operator may use other methods to determine the NMOC concentration or a site-specific methane generation rate constant as an alternative to the methods required in paragraphs (a)(3) and (4) of this section if the method has been approved by the Administrator.

(6) *Tier 4.* The landfill owner or operator must demonstrate that surface methane emissions are below 500 parts per million. Surface emission monitoring must be conducted on a quarterly basis using the following procedures. Tier 4 is allowed only if the landfill owner or operator can demonstrate that NMOC emissions are greater than or equal to 34 Mg/yr but less than 50 Mg/yr using Tier 1 or Tier 2. If both Tier 1 and Tier 2 indicate NMOC emissions are 50 Mg/yr or greater, then Tier 4 cannot be used. In addition, the landfill must meet the criteria in paragraph (a)(6)(viii) of this section.

(i) The owner or operator must measure surface concentrations of methane along the entire perimeter of the landfill and along a pattern that traverses the landfill at no more than 30-meter intervals using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in §60.765(d).

(ii) The background concentration must be determined by moving the probe inlet upwind and downwind at least 30 meters from the waste mass boundary of the landfill.

(iii) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed no more than 5 centimeters above the landfill surface; the constant measurement of distance above the surface should be based on a mechanical device such as with a wheel on a pole, except as described in paragraph (a)(6)(iii)(A) of this section.

(A) 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. Average on-site wind speed must also be determined in an open area at 5-minute intervals using an on-site anemometer with a continuous recorder and data logger for the entire duration of the monitoring event. 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.

(B) Landfill surface areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover, and all cover penetrations must also be monitored using a device meeting the specifications provided in §60.765(d).

(iv) Each owner or operator seeking to comply with the Tier 4 provisions in paragraph (a)(6) of this section must maintain records of surface emission monitoring as provided in §60.768(g) and submit a Tier 4 surface emissions report as provided in §60.767(c)(4)(iii).

(v) If there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must submit a gas collection and control system design plan within 1 year of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill according to §60.767(c) and install and operate a gas collection and control system according to §60.762(b)(2)(ii) and (iii) within 30 months of the most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2.

(vi) If after four consecutive quarterly monitoring periods at a landfill, other than a closed landfill, there is no measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must continue quarterly surface emission monitoring using the methods specified in this section.

(vii) If after four consecutive quarterly monitoring periods at a closed landfill there is no measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must conduct annual surface emission monitoring using the methods specified in this section.

(viii) If a landfill has installed and operates a collection and control system that is not required by this subpart, then the collection and control system must meet the following criteria:

(A) The gas collection and control system must have operated for 6,570 out of 8,760 hours preceding the Tier 4 surface emissions monitoring demonstration.

(B) During the Tier 4 surface emissions monitoring demonstration, the gas collection and control system must operate as it normally would to collect and control as much landfill gas as possible.

(b) After the installation and startup of a collection and control system in compliance with this subpart, the owner or operator must calculate the NMOC emission rate for purposes of determining when the system can be capped, removed or decommissioned as provided in §60.762(b)(2)(v), using Equation 3:

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC} \qquad \text{(Eq. 3)}$$

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Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.

Q_{LFG} = Flow rate of landfill gas, cubic meters per minute.

C_{NMOC} = NMOC concentration, parts per million by volume as hexane.

(1) The flow rate of landfill gas, Q_{LFG}, must be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control system using a gas flow measuring device calibrated according to the provisions of section 10 of Method 2E of appendix A of this part.

(2) The average NMOC concentration, C_{NMOC}, must be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25 or Method 25C. The sample location on the common header pipe must be before any condensate removal or other gas refining units. The landfill owner or operator must divide the NMOC concentration from Method 25 or Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the ~~Administrator~~ Department.

(i) Within 60 days after the date of completing each performance test (as defined in §60.8), the owner or operator must submit the results of the performance test, including any associated fuel analyses, according to §60.767(i)(1).

(ii) [Reserved]

(c) When calculating emissions for Prevention of Significant Deterioration purposes, the owner or operator of each MSW landfill subject to the provisions of this subpart must estimate the NMOC emission rate for comparison to the Prevention of Significant Deterioration major source and significance levels in §§51.166 or 52.21 of this chapter using Compilation of Air Pollutant Emission Factors, Volume I:

Stationary Point and Area Sources (AP-42) or other approved measurement procedures.

(d) For the performance test required in §60.762(b)(2)(iii)(B), Method 25 or 25C (Method 25C may be used at the inlet only) of appendix A of this part must be used to determine compliance with the 98 weight-percent efficiency or the 20 parts per million by volume outlet concentration level, unless another method to demonstrate compliance has been approved by the ~~Administrator~~ Department as provided by §60.767(c)(2). Method 3, 3A, or 3C must be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. Method 18 may be used in conjunction with Method 25A on a limited basis (compound specific, *e.g.,* methane) or Method 3C may be used to determine methane. The methane as carbon should be subtracted from the Method 25A total hydrocarbon value as carbon to give NMOC concentration as carbon. The landowner or operator must divide the NMOC concentration as carbon by 6 to convert from the CNMOC as carbon to CNMOC as hexane. Equation 4 must be used to calculate efficiency:

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out})/(NMOC_{in}) \qquad \text{(Eq. 4)}$$

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Where:

$NMOC_{in}$ = Mass of NMOC entering control device.

$NMOC_{out}$ = Mass of NMOC exiting control device.

(e) For the performance test required in §60.762(b)(2)(iii)(A), the net heating value of the combusted landfill gas as determined in §60.18(f)(3) is calculated from the concentration of methane in the landfill gas as measured by Method 3C. A minimum of three 30-minute Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under §60.18(f)(4).

(1) Within 60 days after the date of completing each performance test (as defined in §60.8), the owner or operator must submit the results of the performance tests, including any associated fuel analyses, required by §60.764(b) or (d) according to §60.767(i)(1).

(2) [Reserved]

§60.765 Compliance provisions.

(a) Except as provided in §60.767(c)(2), the specified methods in paragraphs (a)(1) through (6) of this section must be used to determine whether the gas collection system is in compliance with §60.762(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with §60.762(b)(2)(ii)(C)(*1*), either Equation 5 or Equation 6 must be used. The methane generation rate constant (k) and methane generation potential (L_o) kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the ~~Administrator~~ Department. If k has been determined as specified in §60.764(a)(4), the value of k determined from the test must be used. A value of no more than 15 years must be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_oR\,(e^{-kc} - e^{-kt}) \qquad \text{(Eq. 5)}$$

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Where:

Q_m = Maximum expected gas generation flow rate, cubic meters per year.

L_o = Methane generation potential, cubic meters per megagram solid waste.

R = Average annual acceptance rate, megagrams per year.

k = Methane generation rate constant, $year^{-1}$.

t = Age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed

after closure, t is the age of the landfill at installation, years.

c = Time since closure, years (for an active landfill c = 0 and e^{-kc} = 1).

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^{n} 2kL_oM_i(e^{-kt_i}) \qquad \text{(Eq. 6)}$$

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Where:

Q_M = Maximum expected gas generation flow rate, cubic meters per year.

k = Methane generation rate constant, $year^{-1}$.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the ith section, megagrams.

t_i = Age of the ith section, years.

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, Equation 5 or Equation 6 in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using Equation 5 or Equation 6 in paragraphs (a)(1)(i) or (ii) of this section or other methods must be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with §60.762(b)(2)(ii)(C)(*2*), the owner or operator must design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the ~~Administrator~~ Department, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with §60.762(b)(2)(ii)(C)(*3*), the owner or operator must measure gauge pressure in the gas collection header applied to each individual well, monthly. If a positive pressure exists, action must be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under §60.763(b). Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(i) If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement of positive pressure, 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 positive pressure was first measured. The owner or operator must keep records according to §60.768(e)(3).

(ii) 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. The owner or operator must submit the items listed in §60.767(g)(7) as part of the next annual report. The owner or operator must keep records according to §60.768(e)(4).

(iii) 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 the ~~Administrator~~ Department, according to §60.767(g)(7) and §60.767(j). The owner or operator must keep records according to §60.768(e)(5).

(4) [Reserved]

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator must monitor each well monthly for temperature as provided in §60.763(c). If a well exceeds the operating parameter for temperature, action must be initiated to correct the exceedance within 5 calendar days. Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(i) If a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit) cannot be achieved within 15 calendar days of the first measurement of landfill gas temperature greater than 55 degrees Celsius (131 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 55 degrees Celsius (131 degrees Fahrenheit) was first measured. The owner or operator must keep records according to §60.768(e)(3).

(ii) 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 measurement of landfill gas temperature greater than 55 degrees Celsius (131 degrees Fahrenheit). The owner or operator must submit the items listed in §60.767(g)(7) as part of the next annual report. The owner or operator must keep records according to §60.768(e)(4).

(iii) 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 the ~~Administrator~~ Department, according to §60.767(g)(7) and §60.767(j). The owner or operator must keep records according to §60.768(e)(5).

(6) An owner or operator seeking to demonstrate compliance with §60.762(b)(2)(ii)(C)(*4*) through the use of a collection system not conforming to the specifications provided in §60.769 must provide information satisfactory to the ~~Administrator~~ Department as specified in §60.767(c)(3) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with §60.763(a), each owner or operator of a controlled landfill must place each well or design component as specified in the approved design plan as provided in §60.767(c). Each well must be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

(1) Five (5) years or more if active; or

(2) Two (2) years or more if closed or at final grade.

(c) The following procedures must be used for compliance with the surface methane operational standard as provided in §60.763(d).

(1) After installation and startup of the gas collection system, the owner or operator must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration must be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed within 5 to 10 centimeters of the ground. Monitoring must be performed during typical meteorological conditions.

(4) Any reading of 500 parts per million or more above background at any location must be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section must be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of §60.763(d).

(i) The location of each monitored exceedance must be marked and the location and concentration recorded.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section must be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) of this section has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this

section must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) of this section must be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device must be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the ~~Administrator~~ Department for approval.

(5) The owner or operator must implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section or §60.764(a)(6) must comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer must meet the instrument specifications provided in section 6 of Method 21 of appendix A of this part, except that "methane" replaces all references to "VOC".

(2) The calibration gas must be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) 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.

(4) 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.

(e) The provisions of this subpart apply at all times, including periods of startup, shutdown or malfunction. During periods of startup, shutdown, and malfunction, you must comply with the work practice specified in §60.763(e) in lieu of the compliance provisions in §60.765.

§60.766 Monitoring of operations.

Except as provided in §60.767(c)(2):

(a) Each owner or operator seeking to comply with §60.762(b)(2)(ii)(C) for an active gas collection system must install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in §60.765(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as follows:

(i) The nitrogen level must be determined using Method 3C, unless an alternative test method is established as allowed by §60.767(c)(2).

(ii) Unless an alternative test method is established as allowed by §60.767(c)(2), the oxygen level must be determined by an oxygen meter using Method 3A, 3C, or ASTM D6522-11 (incorporated by reference, see §60.17). Determine the oxygen level by an oxygen meter using Method 3A, 3C, or ASTM D6522-11 (if sample location is prior to combustion) except that:

(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;

(E) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

(iii) A portable gas composition analyzer may be used to monitor the oxygen levels provided:

(A) The analyzer is calibrated; and

(B) The analyzer meets all quality assurance and quality control requirements for Method 3A or ASTM D6522-11 (incorporated by reference, see §60.17).

(3) Monitor temperature of the landfill gas on a monthly basis as provided in §60.765(a)(5). The

temperature measuring device must be calibrated annually using the procedure in 40 CFR part 60, appendix A-1, Method 2, Section 10.3.

(b) Each owner or operator seeking to comply with §60.762(b)(2)(iii) using an enclosed combustor must calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:

(1) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.

(2) 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.

(c) Each owner or operator seeking to comply with §60.762(b)(2)(iii) using a non-enclosed flare must install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

(1) 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.

(2) 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.

(d) Each owner or operator seeking to demonstrate compliance with §60.762(b)(2)(iii) using a device other than a non-enclosed flare or an enclosed combustor or a treatment system must provide information satisfactory to the ~~Administrator~~ Department as provided in §60.767(c)(2) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The ~~Administrator~~ Department must review the information and either approve it, or request that additional information be submitted. The ~~Administrator~~ Department may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in §60.769 or seeking to monitor alternative parameters to those required by §§60.763 through 60.766 must provide information satisfactory to the ~~Administrator~~ Department as provided in §60.767(c)(2) and (3) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The ~~Administrator~~ Department may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with the 500 parts per million surface methane operational standard in §60.763(d) must monitor surface concentrations of methane according to the procedures in §60.765(c) and the instrument specifications in §60.765(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(g) Each owner or operator seeking to demonstrate compliance with §60.762(b)(2)(iii) using a landfill gas treatment system must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required in §60.768(b)(5)(ii)

and 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). The owner or operator must:

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

(2) 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.

(h) The monitoring requirements of paragraphs (b), (c) (d) and (g) 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. You are required to complete monitoring system repairs in response to monitoring system malfunctions and to return the monitoring system to operation as expeditiously as practicable.

§60.767 Reporting requirements.

(a) *Design capacity report.* Each owner or operator subject to the requirements of this subpart must submit an initial design capacity report to the ~~Administrator~~ Department.

(1) *Submission.* The initial design capacity report fulfills the requirements of the notification of the date construction is commenced as required by §60.7(a)(1) and must be submitted no later than:

(i) ~~November 28, 2016, for landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016;~~ Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 or

(ii) ~~Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016~~ The date specified in a State construction or operating permit, if applicable, or January 8, 2018, whichever is earlier, for all other subject MSW landfills.

(2) *Initial design capacity report.* The initial design capacity report must contain the following information:

(i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the permit issued by the state~~, local, or tribal~~ agency responsible for regulating the landfill.

(ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the state~~, local, or tribal~~ agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity must be calculated using good engineering practices. The calculations must be provided, along with the relevant parameters as part of the report. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site-specific density, which must be recalculated annually. Any density conversions must be documented and submitted with the design capacity report. The ~~state, tribal, local agency or Administrator~~ Department may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) *Amended design capacity report.* An amended design capacity report must be submitted to the ~~Administrator~~ Department providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to meet or exceed 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in §60.768(f).

(b) *NMOC emission rate report.* Each owner or operator subject to the requirements of this subpart must submit an NMOC emission rate report following the procedure specified in paragraph (i)(2) of this section to the ~~Administrator~~ Department initially and annually thereafter, except as provided for in paragraph (b)(1)(ii) of this section. The ~~Administrator~~ Department may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in §60.764(a) or (b), as applicable.

(i) The initial NMOC emission rate report may be combined with the initial design capacity report required in paragraph (a) of this section and must be submitted no later than indicated in paragraphs (b)(1)(i)(A) and (B) of this section. Subsequent NMOC emission rate reports must be submitted annually thereafter, except as provided for in paragraph (b)(1)(ii) of this section.

(A) ~~November 28, 2016, for landfills that commenced construction, modification, or reconstruction after July 17, 2014, but before August 29, 2016,~~ Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 or

(B) ~~Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016~~ January 8, 2018 for all other subject MSW landfills.

(ii) If the estimated NMOC emission rate as reported in the annual report to the ~~Administrator~~ Department is less than 34 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit, following the procedure specified in paragraph (i)(2) of this section, an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided to the ~~Administrator~~ Department. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted to the ~~Administrator~~ Department. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements to submit an NMOC emission rate report, after installing a collection and control system that complies with §60.762(b)(2), during such time as the collection and control system is in operation and in compliance with §§60.763 and 60.765.

(c) *Collection and control system design plan.* Each owner or operator subject to the provisions of §60.762(b)(2) must submit a collection and control system design plan to the ~~Administrator~~ Department for approval according to the schedule in paragraph (c)(4) of this section. The collection and control system design plan must be prepared and approved by a professional engineer and must meet the following requirements:

(1) The collection and control system as described in the design plan must meet the design requirements in §60.762(b)(2).

(2) 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 of §§60.763 through 60.768 proposed by the owner or operator.

(3) The collection and control system design plan must either conform with specifications for active collection systems in §60.769 or include a demonstration to the ~~Administrator~~ Department's satisfaction of the sufficiency of the alternative provisions to §60.769.

(4) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters must submit a collection and control system design plan to the ~~Administrator~~ Department for approval within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year, except as follows:

(i) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in §60.764(a)(3) and the resulting rate is less than 34 megagrams per year, annual periodic reporting must be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 34 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, must be submitted, following the procedures in paragraph (i)(2) of this section, within 180 days of the first calculated exceedance of 34 megagrams per year.

(ii) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant k, as provided in Tier 3 in §60.764(a)(4), and the resulting NMOC emission rate is less than 34 Mg/yr, annual periodic reporting must be resumed. The resulting site-specific methane generation rate constant k must be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of §60.764(a)(4) and the resulting site-specific methane generation rate constant k must be submitted, following the procedure specified in paragraph (i)(2) of this section, to the ~~Administrator~~ Department within 1 year of the first calculated emission rate equaling or exceeding 34 megagrams per year.

(iii) If the owner or operator elects to demonstrate that site-specific surface methane emissions are below 500 parts per million methane, based on the provisions of §60.764(a)(6), then the owner or operator must submit annually a Tier 4 surface emissions report as specified in this paragraph following the procedure specified in paragraph (i)(2) of this section until a surface emissions readings of 500 parts per million methane or greater is found. If the Tier 4 surface emissions report shows no surface emissions readings of 500 parts per million methane or greater for four consecutive quarters at a closed landfill, then the landfill owner or operator may reduce Tier 4 monitoring from a quarterly to an annual frequency. The ~~Administrator~~ Department may request such additional information as may be necessary to verify the reported instantaneous surface emission readings. The Tier 4 surface emissions report must clearly identify the location, date and time (to nearest second), average wind speeds including wind gusts, and reading (in parts per million) of any value 500 parts per million methane or greater, other than non-repeatable, momentary readings. For location, you 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 Tier 4 surface emission report must also include the results of the most recent Tier 1 and Tier 2 results in order to verify that the landfill does not exceed 50 Mg/yr of NMOC.

(A) The initial Tier 4 surface emissions report must be submitted annually, starting within 30 days of completing the fourth quarter of Tier 4 surface emissions monitoring that demonstrates that site-specific surface methane emissions are below 500 parts per million methane, and following the procedure specified in paragraph (i)(2) of this section.

(B) The Tier 4 surface emissions report must be submitted within 1 year of the first measured surface exceedance of 500 parts per million methane, following the procedure specified in paragraph (i)(2) of this section.

(5) The landfill owner or operator must notify the ~~Administrator~~ Department that the design plan is completed and submit a copy of the plan's signature page. The ~~Administrator~~ Department has 90 days to decide whether the design plan should be submitted for review. If the ~~Administrator~~ Department chooses to review the plan, the approval process continues as described in paragraph (c)(6) of this section. However, if the ~~Administrator~~ Department indicates that submission is not required or does not respond within 90 days, the landfill owner or operator can continue to implement the 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.

(6) Upon receipt of an initial or revised design plan, the ~~Administrator~~ Department must review the information submitted under paragraphs (c)(1) through (3) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems. If the ~~Administrator~~ Department 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, recognizing they would be proceeding at their own risk.

(7) If the owner or operator chooses to demonstrate compliance with the emission control requirements of this subpart using a treatment system as defined in this subpart, then the owner or operator must prepare a site-specific treatment system monitoring plan as specified in §60.768(b)(5).

(d) *Revised design plan.* The owner or operator who has already been required to submit a design plan under paragraph (c) of this section must submit a revised design plan to the ~~Administrator~~ Department for approval as follows:

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

(2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the ~~Administrator~~ Department according to paragraph (c) of this section.

(e) *Closure report.* Each owner or operator of a controlled landfill must submit a closure report to the ~~Administrator~~ Department within 30 days of waste acceptance cessation. The ~~Administrator~~ Department may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the ~~Administrator~~ Department, no additional wastes may be placed into the landfill without filing a notification of modification as described under §60.7(a)(4).

(f) *Equipment removal report.* Each owner or operator of a controlled landfill must submit an equipment removal report to the ~~Administrator~~ Department 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report must contain all of the following items:

(i) A copy of the closure report submitted in accordance with paragraph (e) of this section;

(ii) A copy of the initial performance test report demonstrating that the 15-year minimum control period has expired, unless the report of the results of the performance test has been submitted to the EPA via the EPA's CDX, or information that demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flows. In the equipment removal report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX; and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 34 megagrams or greater of NMOC per year, unless the NMOC emission rate reports have been submitted to the EPA via the EPA's CDX. If the NMOC emission rate reports have been previously submitted to the EPA's CDX, a statement that the NMOC emission rate reports have been submitted electronically and the dates that the reports were submitted to the EPA's CDX may be submitted in the equipment removal report in lieu of the NMOC emission rate reports.

(2) The ~~Administrator~~ Department may request such additional information as may be necessary to verify that all of the conditions for removal in §60.762(b)(2)(v) have been met.

(g) *Annual report.* The owner or operator of a landfill seeking to comply with §60.762(b)(2) using an active collection system designed in accordance with §60.762(b)(2)(ii) must submit to the ~~Administrator~~ Department, following the procedure specified in paragraph (i)(2) of this section, annual reports of the recorded information in paragraphs (g)(1) through (7) of this section. 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 required under §60.8, as applicable, unless the report of the results of the performance test has been submitted to the EPA via the EPA's CDX. In the initial annual report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX. For enclosed combustion devices and flares, reportable exceedances are defined under §60.768(c).

(1) Value and length of time for exceedance of applicable parameters monitored under §60.766(a), (b), (c), (d), and (g).

(2) 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 under §60.766.

(3) 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.

(4) All periods when the collection system was not operating.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in §60.763(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. For location, you 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.

(6) The date of installation and the location of each well or collection system expansion added pursuant to §60.765(a)(3), (a)(5), (b), and (c)(4).

(7) For any corrective action analysis for which corrective actions are required in §60.765(a)(3) or (5) 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 reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

(h) *Initial performance test report.* Each owner or operator seeking to comply with §60.762(b)(2)(iii) must include the following information with the initial performance test report required under §60.8:

(1) 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;

(2) 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;

(3) 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;

(4) 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; and

(5) 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

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

(i) *Electronic reporting.* The owner or operator must submit reports electronically according to paragraphs (i)(1) and (2) of this section.

(1) Within 60 days after the date of completing each performance test (as defined in §60.8), the owner or operator must submit the results of each performance test according to the following procedures:

(i) For data collected using test methods supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT Web site (*https://www3.epa.gov/ttn/chief/ert/ert_info.html*) at the time of the test, you must submit the results of the performance test to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). CEDRI can be accessed through the EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/*). Performance test data must be submitted in a file format generated through the use of the EPA's ERT or an alternative file format consistent with the extensible markup language (XML) schema listed on the EPA's ERT Web site, once the XML schema is available. If you claim that some of the performance test information being submitted is confidential business information (CBI), you must submit a complete file generated through the use of the EPA's ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT Web site, including information claimed to be CBI, on a compact disc, flash drive or other commonly used electronic storage media to the EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAQPS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same ERT or alternate file with the CBI omitted must be submitted to the EPA via the EPA's

CDX as described earlier in this paragraph.

(ii) For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT Web site at the time of the test, you must submit the results of the performance test to the ~~Administrator~~ Department ~~at the appropriate address listed in §60.4~~.

(2) Each owner or operator required to submit reports following the procedure specified in this paragraph must submit reports to the EPA via the CEDRI. (CEDRI can be accessed through the EPA's CDX.) The owner or operator must use the appropriate electronic report in CEDRI for this subpart or an alternate electronic file format consistent with the XML schema listed on the CEDRI Web site (*https://www3.epa.gov/ttn/chief/cedri/index.html*). If the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the owner or operator must submit the report to the ~~Administrator~~ Department at the appropriate address listed in §60.4. Once the form has been available in CEDRI for 90 calendar days, the owner or operator must begin submitting all subsequent reports via CEDRI. The reports must be submitted by the deadlines specified in this subpart, regardless of the method in which the reports are submitted.

(j) *Corrective action and the corresponding timeline.* The owner or operator must submit according to paragraphs (j)(1) and (j)(2) of this section.

(1) For corrective action that is required according to §60.765(a)(3)(iii) or (a)(5)(iii) and is expected to take longer than 120 days after the initial exceedance to complete, you must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the ~~Administrator~~ Department 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 ~~Administrator~~ Department must approve the plan for corrective action and the corresponding timeline.

(2) For corrective action that is required according to §60.765(a)(3)(iii) or (a)(5)(iii) and is not completed within 60 days after the initial exceedance, you must submit a notification to the ~~Administrator~~ Department as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance.

(k) *Liquids addition.* The owner or operator of an affected landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters 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 the ~~Administrator~~ Department, annually, following the procedure specified in paragraph (i)(2) of this section, the following information:

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

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

(3) Surface area (acres) over which the leachate is recirculated (or otherwise applied).

(4) Surface area (acres) over which any other liquids are applied.

(5) 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.

(6) 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.

(7) The initial report must contain items in paragraph (k)(1) through (6) 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 (13) months after the date of commenced construction, modification, or reconstruction for landfills that commenced construction, modification, or reconstruction on or after July 17, 2014 containing data for the first 12 months after August 29, 2016.

(i) ~~September 27, 2017, for landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016 containing data for the first 12 months after August 29,~~

~~2016; or~~ [Reserved].

(ii) ~~Thirteen (13) months after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016 containing data for the first 12 months after August 29, 2016~~ [Reserved].

(8) Subsequent annual reports must contain items in paragraph (k)(1) through (6) 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.

(9) Landfills may cease annual reporting of items in paragraphs (k)(1) through (7) of this section once they have submitted the closure report in paragraph (e) of this section.

(l) *Tier 4 notification.* (1) The owner or operator of an affected landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters must provide a notification of the date(s) upon which it intends to demonstrate site-specific surface methane emissions are below 500 parts per million methane, based on the Tier 4 provisions of §60.764(a)(6). The landfill must also include a description of the wind barrier to be used during the SEM in the notification. Notification must be postmarked not less than 30 days prior to such date.

(2) If there is a delay to the scheduled Tier 4 SEM date due to weather conditions, including not meeting the wind requirements in §60.764(a)(6)(iii)(A), the owner or operator of a landfill shall notify the ~~Administrator~~ Department by email or telephone no later than 48 hours before any delay or cancellation in the original test date, and arrange an updated date with the ~~Administrator~~ Department by mutual agreement.

§60.768 Recordkeeping requirements.

(a) Except as provided in §60.767(c)(2), each owner or operator of an MSW landfill subject to the provisions of §60.762(b)(2)(ii) and (iii) must keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report that triggered §60.762(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Except as provided in §60.767(c)(2), each owner or operator of a controlled landfill must keep up-to-date, readily accessible records for the life of the control system equipment of the data listed in paragraphs (b)(1) through (5) of this section 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.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.762(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in §60.765(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the ~~Administrator~~ Department.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in §60.769(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.762(b)(2)(iii) 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.

(ii) The percent reduction of NMOC determined as specified in §60.762(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.762(b)(2)(iii)(B)(*1*) through use of a boiler or process heater of any size: A 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 testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.762(b)(2)(iii)(A) through use of a non-enclosed flare, the flare type (*i.e.,* steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate

or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in §60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.

(5) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with §60.762(b)(2)(iii) 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.

(ii) *Site-specific treatment monitoring plan,* to include:

(A) 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 that ensure the treatment system is operating properly for each intended end use of the treated landfill gas.

(B) 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.

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

(D) Identify who is responsible (by job title) for data collection.

(E) Processes and methods used to collect the necessary data.

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

(c) Except as provided in §60.767(c)(2), each owner or operator of a controlled landfill subject to the provisions of this subpart must keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in §60.766 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that must be recorded and reported under §60.767(g):

(i) 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 at which compliance with §60.762(b)(2)(iii) was determined.

(ii) 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 paragraph (b)(3) of this section.

(2) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible continuous records of 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, specified under §60.766.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with §60.762(b)(2)(iii) must keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other state~~, local, tribal,~~ or federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of a non-enclosed flare must keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under §60.766(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(5) Each owner or operator of a landfill seeking to comply with §60.762(b)(2) using an active collection system designed in accordance with §60.762(b)(2)(ii) must keep records of periods when the collection system or control device is not operating.

(d) Except as provided in §60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for the life of the collection system an up-to-date, readily accessible plot map showing

each existing and planned collector in the system and providing a unique identification location label for each collector.

(1) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under §60.765(b).

(2) Each owner or operator subject to the provisions of this subpart must keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in §60.769(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in §60.769(a)(3)(ii).

(e) Except as provided in §60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of the following:

(1) All collection and control system exceedances of the operational standards in §60.763, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

(2) Each owner or operator subject to the provisions of this subpart must also keep records of each wellhead temperature monitoring value of 55 degrees Celsius (131 degrees Fahrenheit) or above, each wellhead nitrogen level at or above 20 percent, and each wellhead oxygen level at or above 5 percent.

(3) For any root cause analysis for which corrective actions are required in §60.765(a)(3)(i) or (a)(5)(i), keep a record of the root cause analysis conducted, including a description of the recommended corrective action(s) taken, and the date(s) the corrective action(s) were completed.

(4) For any root cause analysis for which corrective actions are required in §60.765(a)(3)(ii) or (a)(5)(ii), keep a record 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, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

(5) For any root cause analysis for which corrective actions are required in §60.765(a)(3)(iii) or (a)(5)(iii), keep a record 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 the regulatory agency.

(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, as provided in the definition of "design capacity", must keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(g) Landfill owners or operators seeking to demonstrate that site-specific surface methane emissions are below 500 parts per million by conducting surface emission monitoring under the Tier 4 procedures specified in §60.764(a)(6) 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 this part, including all of the following items:

(1) Calibration records:

(i) Date of calibration and initials of operator performing the calibration.

(ii) Calibration gas cylinder identification, certification date, and certified concentration.

(iii) Instrument scale(s) used.

(iv) A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value.

(v) If an owner or operator makes their own calibration gas, a description of the procedure used.

(2) 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.

(3) Timestamp of each surface scan reading:

(i) Timestamp should be detailed to the nearest second, based on when the sample collection begins.

(ii) A log for the length of time each sample was taken using a stopwatch (*e.g.,* the time the probe was held over the area).

(4) 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.

(5) Monitored methane concentration (parts per million) of each reading.

(6) Background methane concentration (parts per million) after each instrument calibration test.

(7) Adjusted methane concentration using most recent calibration (parts per million).

(8) For readings taken at each surface penetration, the unique identification location label matching the label specified in paragraph (d) of this section.

(9) Records of the operating hours of the gas collection system for each destruction device.

(h) Except as provided in §60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of all collection and control system monitoring data for parameters measured in §60.766(a)(1), (2), and (3).

(i) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CDX may be maintained in electronic format.

(j) For each owner or operator reporting leachate or other liquids addition under §60.767(k), 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.

§60.769 Specifications for active collection systems.

(a) Each owner or operator seeking to comply with §60.762(b)(2)(i) must site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the ~~Administrator~~ Department as provided in §60.767(c)(2) and (3):

(1) The collection devices within the interior must be certified to achieve comprehensive control of surface gas emissions 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.

(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section must address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

(3) The placement of gas collection devices determined in paragraph (a)(1) of this section must control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under §60.768(d). The documentation must provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and must be provided to the ~~Administrator~~ Department upon request.

(ii) 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 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material must be documented and provided to the ~~Administrator~~ Department upon request. A separate NMOC emissions estimate must be made for each

section proposed for exclusion, and the sum of all such sections must be compared to the NMOC emissions estimate for the entire landfill.

(A) The NMOC emissions from each section proposed for exclusion must be computed using Equation 7:

$$Q_i = 2\ k\ L_o M_i (e^{-kt_i})\ (C_{NMOC})\ (3.6 \times 10^{-9}) \qquad \text{(Eq. 7)}$$

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Where:

Q_i = NMOC emission rate from the ith section, megagrams per year.

k = Methane generation rate constant, $year^{-1}$.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of the degradable solid waste in the ith section, megagram.

t_i = Age of the solid waste in the ith section, years.

C_{NMOC} = Concentration of nonmethane organic compounds, parts per million by volume.

3.6×10^{-9} = Conversion factor.

(B) If the owner/operator is proposing to exclude, or cease gas collection and control from, nonproductive physically separated (*e.g.,* separately lined) closed areas that already have gas collection systems, NMOC emissions from each physically separated closed area must be computed using either Equation 3 in §60.764(b) or Equation 7 in paragraph (a)(3)(ii)(A) of this section.

(iii) The values for k and C_{NMOC} determined in field testing must be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (this distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k, L_o and C_{NMOC} provided in §60.764(a)(1) or the alternative values from §60.764(a)(5) must be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with §60.762(b)(2)(ii)(A) construct the gas collection devices using the following equipment or procedures:

(1) 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.

(2) 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.

(3) 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.

(c) Each owner or operator seeking to comply with §60.762(b)(2)(iii) must convey the landfill gas to a control system in compliance with §60.762(b)(2)(iii) 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:

(1) 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 (c)(2) of this section must be used.

(2) For new collection systems, the maximum flow rate must be in accordance with §60.765(a)(1).

APPENDIX C

Certification of Public Noticing

Placeholder for

- Legal Notice in News Journal on March 12
- Legal Notice in Delaware State News on March 12
- Public Notice on DNREC website
- Public Notice on Delaware's Statewide Meeting Calendar
- Public Notice in biweekly E-News Update from DNREC's Office of Environmental Protection
- Notification to EPA Region 3
- Certification that the hearing was held in accordance with the requirements of 40 CFR 60.23(d)
- List of witness and their affiliation, if any, appearing at the hearing with a brief summary of the presentation or submittal