3745-76-01 Definitions.

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see paragraph (B)(31) of this rule titled, "Referenced materials."]

(A) Terms used but not defined in this chapter have the meaning given them in the Clean Air Act and in rule 3745-15-01 of the Administrative Code.

(B) The following definitions shall apply exclusively to this chapter.

(1) "Active collection system" means a gas collection system that uses gas mover equipment.

(2) "Active landfill" means a licensed and permitted landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

(3) "Btu" means British thermal unit

(4) "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 in accordance with 40 CFR 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. .

(5) "Closure" means that point in time when a landfill becomes a closed landfill.

(6) "Commercial solid waste" means all types of solid waste generated by stores, offices, restaurants, ware-houses, and other non-manufacturing activities, excluding residential and industrial wastes.

(7) "Controlled landfill" means any landfill at which collection and control systems are required under this chapter 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 paragraph (B)(2)(a) of rule 3745-76-07 of the Administrative Code.

(8) "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 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.

(9) "Disposal facility" means any contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

(10) "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.

(11) "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.

(12) "Flare" means an open combustor without enclosure or shroud.

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

(14) "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).

(15) "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, 40 CFR Part 264 and 40 CFR Part 265. 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; non-ferrous 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 definition does not include mining waste or oil and gas waste.

(16) "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.

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

(18) "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.

(19) "Modification" means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion.

(20) "Municipal solid waste" is a type of solid waste generated from community, commercial and agricultural operations, including but not limited to the following:

(a) Solid waste generated by community operations (including single and

multiple-household residences, hotels, motels, bunkhouses, ranger stations, crew quarters, campgrouds, and day-use recreation areas;

(b) Solid waste generated by commercial operations (including stores, offices, restaurants, warehouses, and other non-manufacturing activities);

(c) Solid waste generated from agricultural operations (including single-family and commercial farms, greenhouses, and nurseries);

(d) Sludge from municipal, commercial, or industrial waste water treatment plants, water treatment plants, and air pollution control facilities that is co-disposed with other municipal solid waste in a sanitary landfill facility; and

(e) Fly ash and bottom ash generated from the incineration of municipal solid waste, provided the fly ash and bottom ash is not regulated as a hazardous waste.

(21) "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 (40 CFR 257.2) 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.

(22) "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.

(23) "NMOC" means nonmethane organic compounds, as measured according to the provisions of rule 3745-76-09 of the Administrative Code.

(24) "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.

(25) "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.

(26) "PSD" means prevention of significant deterioration, as defined in 40 CFR 52.21, prevention of significant deterioration of air quality.

(27) "Sludge" means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial waste-water treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

(28) "Solid waste" means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, included solid, liquid, semisolid, or contained gaseous material resulting from

industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under the national pollutant discharge elimination system or the United States nuclear regulatory commission.

(29) "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 chapter.

(30) "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.

(31) Referenced materials. This chapter includes references to certain matter or materials. The text of the referenced materials is not included in the rules contained in this chapter. Information on the availability of the referenced materials as well as the date of, or the particular edition or version of the material is included in this rule. For materials subject to change, only the specific version specified in this rule are referenced. Material is referenced as it exists on the effective date of this rule. Except for subsequent annual publication of existing (unmodified) Code of Federal Regulation compilations, any amendment or revision to a referenced document is not applicable unless and until this rule has been amended to specify the new dates.

(a) Availability. The referenced materials are available as follows:

(i) Clean Air Act. Information and copies may be obtained by writing to: "Superintendent of Documents, Attn: New Orders, P.O. Box 371954, Pittsburgh, PA 15250-7954." The full text of the Act as amended in 1990 is also available in electronic format at www.epa.gov/oar/caa/. A copy of the Act is also available for inspection and copying at most public libraries and "The State Library of Ohio."

(ii) Code of Federal Regulations (CFR). Information and copies may be obtained by writing to: "Superintendent of Documents, Attn: New Orders, PO Box 371954, Pittsburgh, PA 15250-7954." The full text of the CFR is also available in electronic format at http://www.ecfr.gov. The CFR compilations are also available for inspection and copying at most public libraries and "The State Library of Ohio."

(iii) Compilation of Air Pollutant Emission Factors, AP-42. Information and copies may be obtained by writing to: "Superintendent of Documents, Attn: New Orders, PO Box 371954, Pittsburgh, PA 15250-7954." The full text of the compilation of air pollutant emission factors, AP-42, is also available in electronic format at http://www.epa.gov/ttn/chief/ap42/. The compilation of air pollutant emission factors, AP-42, are also available for inspection and

copying at most public libraries and "The State Library of Ohio."

(b) Referenced materials:

(i) ASTM D1946-90; "Standard Practice for Analysis of Reformed Gas by Gas Chromatography;" 2000.

(ii) ASTM D4809-00; "Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method);" 2005.

(iii) Method 2; "Determination of stack gas velocity and volumetric flow rate (type 'S' pitot tube);" 40 CFR Part 60, Appendix A-1, as published in the July 1, 2005 Code of Federal Regulations.

(iv) Method 2A; "Direct measurement of gas volume through pipes and small ducts;" 40 CFR. Part 60, Appendix A-1, as published in the July 1, 2005 Code of Federal Regulations.

(v) Method 2C; "Determination of gas velocity and volumetric flow rate in small stacks or ducts (standard pitot tube);" 40 ... Part 60, Appendix A-1, as published in the July 1, 2005 Code of Federal Regulations.

(vi) Method 2D; "Measurement of gas volume flow rates in small pipes and ducts;" 40 CFR. Part 60, Appendix A-1, as published in the July 1, 2005 Code of Federal Regulations.

(vii) Method 2E; "Determination of landfill gas production flow rate;" 40 CF. Part 60, Appendix A-1, as published in the July 1, 2005 Code of Federal Regulations.

(viii) Method 3A; "Determination of oxygen and carbon dioxide concentrations in emissions from stationary sources (instrumental analyzer procedure);" 40CFR. Part 60, Appendix A-2, as published in the July 1, 2005 Code of Federal Regulations.

(ix) Method 3C; "Determination of carbon dioxide, methane, nitrogen, and oxygen from stationary sources;" 40CFR. Part 60, Appendix A-2, as published in the July 1, 2005 Code of Federal Regulations.

(x) Method 18; "Measurement of gaseous organic compound emissions by gas chromatography;" 40CFR. Part 60, Appendix A-6, as published in the July 1, 2005 Code of Federal Regulations.

(xi) Method 21; "Determination of volatile organic compound leaks;" 40CFR. Part 60, Appendix A-7, as published in the July 1, 2005 Code of Federal Regulations.

(xii) Method 25; "Determination of total gaseous nonmethane organic emissions as carbon;" 40CFR. Part 60, Appendix A-7, as published in the July 1, 2005 Code of Federal Regulations.

(xiii) Method 25A; "Determination of total gaseous organic concentration using a flame ionization analyzer;" 40CFR. Part 60, Appendix A-7, as published in the July 1, 2005 Code of Federal Regulations.

(xiv) Method 25C; "Determination of nonmethane organic compounds (NMOC) in MSW landfill gases;" 40 ..R. Part 60, Appendix A-7, as published in the July 1, 2005 Code of Federal Regulations.

(xv) 40 CFR Part 60, Subpart Cc, "Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills;" 61 FR 9919, March 12, 1996, as amended at 63 FR 32750, June 16, 1998.

(xvi) 40 CFR 52.21, "Prevention of significant deterioration of air quality;" as published in the July 1, 2015 Code of Federal Regulations.

(xvii) 40 CFR Part 60, Subpart WWW, "Standards of Performance for Municipal Solid Waste Landfills;" 61 FR 9919, March 12, 1996, as amended at 63 FR 32753, June 16, 1998; 64 FR 9262, February 24, 1999; 65 FR 18909, April 10, 2000.

(xviii) 40 CFR Part 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;" as published in the July 1, 2005 Code of Federal Regulations.

(xix) 40 CFR Part 265,_"Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;" as published in the July 1, 2005 Code of Federal Regulations.

(xx) 40 CFR Part 258, "Criteria for Municipal Solid Waste Landfills;" 56 FR 51016, October 9, 1991, as amended at 58 FR 51546, October 1, 1993; 60 FR 52342, October 6, 1995; 61 FR 50413, September 25, 1996.

(xxi) 40 CFR Part 60.7, "Notification and Recordkeeping;" 36 FR 24877, Dec. 28, 1971, as amended at 40 FR 46254, Oct. 6, 1975; 40 FR 58418, Dec. 16, 1975; 45 FR 5617, Jan. 23, 1980; 48 FR 48335, Oct. 18, 1983; 50 FR 53113, Dec. 27, 1985; 52 FR 9781, Mar. 26, 1987; 55 FR 51382, Dec. 13, 1990; 59 FR 12428, Mar. 16, 1994; 59 FR 47265, Sep. 15, 1994; 64 FR 7463, Feb. 12, 1999.

(xxii) 40 CFR 257.2, "Definitions;" 44 FR 53460, Sept. 13, 1979; 44 FR 58910, Oct. 12, 1979; 56 FR 51016, Oct. 9, 1991; 58 FR 9385, Feb. 19, 1993; 68 FR 36495, June 18, 2003.

(xxiii) 40 FR 258.40_"Design Criteria for Municipal Solid Waste Landfills;", as published in the July 1, 2005 Code of Federal Regulations.

Effective: 08/25/2016

Five Year Review (FYR) Dates: 05/27/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY
Certification

08/15/2016
Date

Promulgated Under: 119.03
Statutory Authority: 3704.03(E)
Rule Amplifies: 3704.03(A), 3704.03(E)
Prior Effective Dates: 11/16/99, 1/31/98, 10/10/

3745-76-02 **Designated facilities.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

(A) The designated facility to which this rule applies is each existing MSW landfill for which construction, reconstruction or a modification resulting in increased disposal capacity was commenced before May 30, 1991.

[Comment: Any MSW landfill which, through construction, reconstruction, or modification, increases the disposal capacity of the landfill after May 30, 1991 is not subject to these rules, which regulate landfills subject to United States environmental protection agency's emission guidelines for landfills installed or expanded before this date under 40 CFR Part 60, Subpart Cc, but instead would be subject to the standards of performance for MSW landfills found in 40 CFR Part 60, Subpart WWW.]

(B) Physical or operational changes made to an existing MSW landfill solely to comply with this rule are not considered a modification under Chapter 3745-31 of the Administrative Code.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 10/10/06

3745-76-03 **Control requirements for municipal solid waste landfills.**

(A) MSW landfill emissions shall be controlled at each MSW landfill meeting the following three conditions:

(1) The landfill has accepted waste at any time since November 8, 1987, or has additional design capacity available for future waste deposition;

(2) The landfill has a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report; and

(3) The landfill has a nonmethane organic compound emission rate of fifty megagrams per year or more.

(B) Each MSW landfill meeting the conditions in paragraph (A) of this rule shall install a collection and control system meeting the conditions provided in paragraph (B)(2)(b) of rule 3745-76-07 of the Administrative Code.

(C) Collected MSW landfill emissions shall be controlled through the use of control devices meeting the requirements of paragraph (C)(1), (C)(2), or (C)(3) of this rule.

(1) An open flare designed and operated in accordance with the parameters established in rule 3745-76-15 of the Administrative Code; or

(2) A control system designed and operated to reduce NMOC by ninety-eight weight per cent; or

(3) An enclosed combustor designed and operated to reduce the outlet NMOC concentration to twenty parts per million as hexane by volume, dry basis at three per cent oxygen, or less.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 10/10/06

3745-76-04 **Test methods and procedures.**

Each landfill having a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters shall calculate the NMOC emission rate as required in rule 3745-76-09 of the Administrative Code. If the NMOC emission rate is calculated to be fifty megagrams or more per year, the owner or operator shall comply with all of the applicable rules in the Administrative Code, including but not limited to the collection and control system requirements in rule 3745-76-07 of the Administrative Code; the operational standards for the control and collection system in rule 3745-76-08 of the Administrative Code; the compliance provisions in rule 3745-76-10 of the Administrative Code; the monitoring provisions in rule 3745-76-11 of the Administrative Code; the reporting requirements in rule 3745-76-12 of the Administrative Code; and the record keeping requirements of rule 3745-76-13 of the Administrative Code. An active collection system shall also meet the requirements of rule 3745-76-14 of the Administrative Code and a flare shall meet the requirements of rule 3745-76-15 of the Administrative Code.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 10/10/06

3745-76-06 **Compliance times.**

(A) Except as provided for under paragraph (B) of this rule, planning, awarding of contracts, and installation of MSW landfill air emission collection and control equipment capable of meeting the emission guidelines established under rule 3745-76-03 of the Administrative Code shall be accomplished within thirty months after the date the initial NMOC emission rate report shows NMOC emissions to equal or exceed fifty megagrams per year.

(B) For each existing MSW landfill meeting the conditions in paragraph (A)(1) of rule 3745-76-03 of the Administrative Code and paragraph (A)(2) of rule 3745-76-03 of the Administrative Code whose NMOC emission rate is less than fifty megagrams per year on the initial effective date of this chapter, installation of collection and control systems capable of meeting rule 3745-76-03 of the Administrative Code shall be accomplished within thirty months of the date when the condition in paragraph (A)(3) of rule 3745-76-03 of the Administrative Code is met (i.e., the date of the first annual nonmethane organic compounds emission rate report which equals or exceeds fifty megagrams per year).

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-07 **Standards for air emissions from municipal waste landfills.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

(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 shall submit an initial design capacity report to the director as provided in paragraph (A) of rule 3745-76-12 of the Administrative Code. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report. Submittal of the initial design capacity report shall fulfill the requirements of this chapter except as provided for in paragraphs (A)(1) and (A)(2) of this rule.

(1) The owner or operator shall submit to the director an amended design capacity report, as provided for in paragraph (A)(3) of rule 3745-76-12 of the Administrative Code.

(2) When an increase in the maximum design capacity of a landfill exempted from the provisions of paragraph (B) of rule 3745-76-07 of the Administrative Code to rule 3745-76-14 of the Administrative Code on the basis of the design capacity exemption in paragraph (A) of this rule 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 shall comply with the provision of paragraph (B) of this rule.

(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, shall either comply with paragraph (B)(2) of this rule or calculate an NMOC emission rate for the landfill using the procedures specified in rule 3745-76-09 of the Administrative Code. The NMOC emission rate shall be recalculated annually, except as provided in paragraph (B)(1)(b) of rule 3745-76-12 of the Administrative Code. The owner or operator of an MSW landfill subject to this chapter with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is required to obtain a Title V permit.

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

(a) Submit an annual emission report to the director, except as provided for in paragraph (B)(1)(b) of rule 3745-76-12 of the Administrative Code; and

(b) Recalculate the NMOC emission rate annually using the procedures specified in paragraph (A)(1) of rule 3745-76-09 of the Administrative Code until such time as the calculated NMOC emission rate is equal to or greater than fifty megagrams per year, or the landfill is closed.

(i) If the NMOC emission rate, upon recalculation required in paragraph (B)(1)(b) of this rule, is equal to or greater than fifty megagrams per year, the owner or operator shall install a collection and control system in compliance with paragraph (B)(2) of this rule.

(ii) If the landfill is permanently closed, a closure notification shall be submitted to the director as provided for in paragraph (D) of rule 3745-76-12 of the Administrative Code.

(2) If the calculated NMOC emission rate is equal to or greater than fifty megagrams per year, the owner or operator shall:

(a) Submit a collection and control system design plan prepared by a professional engineer to the director within one year:

(i) The collection and control system as described in the plan shall meet the design requirements of paragraph (B)(2)(b) of this rule.

(ii) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of rule 3745-76-08 of the Administrative Code to 3745-76-13 of the Administrative Code proposed by the owner or operator.

(iii) The collection and control system design plan shall either conform with specifications for active collection systems in rule 3745-76-14 of the Administrative Code or include a demonstration to the director's satisfaction of the sufficiency of the alternative provisions to rule 3745-76-14 of the Administrative Code.

(iv) The director shall review the information submitted under paragraphs (B)(2)(a)(i), (B)(2)(a)(ii) and (B)(2)(a)(iii) of this rule 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.

(b) Install a collection and control system that captures the gas generated within the landfill as required under paragraph (B)(2)(b)(i) or (B)(2)(b)(ii) and paragraph (B)(2)(c) of this rule within thirty months after the first annual report in which the emission rate equals or exceeds fifty megagrams per year, unless tier two or tier three sampling demonstrates that the emission rate is less than fifty megagrams per year as specified in paragraph (C)(1) or (C)(2) of rule 3745-76-12 of the Administrative Code.

(i) An active collection system shall:

(a) 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 or treatment system equipment;

(b) Collect gas from each area in the landfill where:

(i) Municipal solid waste has been placed for five years or more; or

(ii) Acceptance of municipal solid waste has ceased for at least two years;

(c) Collect gas at a sufficient extraction rate;

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

(ii) A passive collection system shall:

(a) Comply with the provisions specified in paragraphs (B)(2)(b)(i)(a), (B)(2)(b)(i)(b), and (b)(2)(b)(i)(d) of this rule.

(b) Be installed with composite liners on the bottom and all sides in all areas in which gas is to be collected. The composite liners shall be designed and installed in accordance with 40 CFR 258.40 and the requirements contained in rules 3745-27-06 and 3745-27-07 of the Administrative Code.

(c) Route all the collected gas to a control system that complies with the requirements in either paragraph (B)(2)(c)(i), (B)(2)(c)(ii) or (B)(2)(c)(iii) of this rule.

(i) An open flare designed and operated in accordance with rule 3745-76-15 of the Administrative Code;

(ii) A control system designed and operated to reduce NMOC by ninety eight weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by ninety eight weight percent or reduce the outlet NMOC concentration to less than twenty parts per million by volume, dry basis as hexane at three percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than one hundred eighty days after the initial startup of the approved control system, using the test methods specified in paragraph (D) of rule 3745-76-09 of the Administrative Code.

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

(b) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in rule 3745-76-11 of the Administrative Code;

(iii) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (B)(2)(c)(i) or (B)(2)(c)(ii) of this rule.

(d) Operate the collection and control device installed to comply with this chapter in accordance with the provisions of rules 3745-76-08, 3745-76-10, and 3745-76-11 of the Administrative Code.

(e) The collection and control system may be capped or removed provided that all the conditions of paragraphs (B)(2)(e)(i), (B)(2)(e)(ii), and (B)(2)(e)(iii) of this rule are met:

(i) The landfill shall be a closed landfill as defined in rule 3745-76-01 of the Administrative Code. A closure report shall be submitted to the director as provided in paragraph (D) of rule 3745-76-12 of the Administrative Code;

(ii) The collection and control system shall have been in operation a minimum of fifteen years from when the first well was installed and put into operation; and

(iii) Following the procedures specified in paragraph (B) of rule 3745-76-09 of the Administrative Code, the calculated NMOC gas produced by the landfill shall be less than fifty megagrams per year on three successive test dates. The test dates shall be no less than ninety days apart, and no more than one hundred eighty days apart.

(C) For purposes of obtaining an operating permit under Title V of the Clean Air Act, the owner or operator of a MSW landfill subject to this chapter 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 Title V, unless the landfill is otherwise subject to Title V. For purposes of submitting a timely application of an operating permit under Title V, the owner or operator of a MSW landfill subject to this chapter with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, and not otherwise subject to Title V, becomes subject to the requirements of Title V regardless of when the design capacity report is actually submitted, no later than:

(1) June 10, 1996 for MSW landfills that commenced construction, modification, or reconstruction on or after May 30, 1991 but before March 12, 1996;

(2) Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

(D) When a MSW landfill subject to this chapter is closed, the owner or operator is no longer subject to the requirement to maintain an operating permit under Title V for the landfill if the landfill is not otherwise subject to the requirements of Title V 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 rule; or

(2) The owner or operator meets the conditions for control system removal specified in paragraph (B)(2)(e) of this rule.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-08 **Operational standards for collection and control systems.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of paragraph (B)(2)(b) of rule 3745-76-07 of the Administrative Code shall:

(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) Five years or more if active; or

(2) Two 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 shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in paragraph (F)(1) of rule 3745-76-12 of the Administrative Code;

(2) Use of a geomembrane or synthetic cover. The owner or operator shall 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 shall be approved by the director;

(C) Operate each interior wellhead in the collection system with a landfill gas temperature less than fifty five degrees Celsius and with either a nitrogen level less than twenty percent or an oxygen level less than five per cent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

(1) The nitrogen level shall be determined using Method 3C of Appendix A of 40 CFR Part 60, unless an alternative test method is established as allowed by paragraph (B)(2)(a) of rule 3745-76-07 of the Administrative Code.

(2) Unless an alternative test method is established as allowed by paragraph (B)(2)(a) of rule 3745-76-07 of the Administrative Code, the oxygen shall be determined by an oxygen meter using Method 3A of Appendix A of 40 CFR Part 60 except that:

(a) The span shall be set so that the regulatory limit is between twenty and fifty per cent of the span;

(b) A data recorder is not required;

(c) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;

(d) A calibration error check is not required;

(e) The allowable sample bias, zero drift, and calibration drift are plus or minus ten per cent.

(D) Operate the collection system so that the methane concentration is less than five hundred parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at thirty meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the thirty 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 paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code. In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour; and

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

(G) If monitoring demonstrates that the operational requirements in paragraph (B), (C), or (D) of this rule are not met, corrective action shall be taken as specified in paragraphs (A)(3) to (A)(5) of rule 3745-76-10 of the Administrative Code or paragraph (C) of rule 3745-76-10 of the Administrative Code. If corrective actions are taken as

specified in rule 3745-76-10 of the Administrative Code, the monitored exceedance is not a violation of the operational requirements in this rule.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-09 **Test methods and procedures.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

(A)

(1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (A)(1)(a) of this rule or the equation provided in paragraph (A)(1)(b) of this rule. Both equations may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (A)(1)(a) of this rule, 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)(b) of this rule, for part of the life of the landfill. The values to be used in both equations are 0.05 per year for k, one hundred seventy cubic meters per megagram for L_o, and four thousand parts per million by volume as hexane for the C_{NMOC} . For landfills located in geographical areas with a thirty year annual average precipitation of less than twenty five inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

(a) The following equation shall be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^{n} 2kL_0M_i(e^{-kt_i})(C_{NMOC})(3.6 \times 10^{-9})$$

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 i^{th} section, megagrams

t_i = age of the i^{th} section, years

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

3.6×10^{-9} = conversion factor

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.

(b) The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown.

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

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

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R, if documentation of the nature and amount of such wastes is maintained.

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

(a) If the NMOC emission rate calculated in paragraph (A)(1) of this rule is less than fifty megagrams per year, then the landfill owner shall submit an emission rate report as provided in paragraph (B)(1) of rule 3745-76-12 of

the Administrative Code, and shall recalculate the NMOC mass emission rate annually as required under paragraph (B)(1) of rule 3745-76-07 of the Administrative Code.

(b) If the calculated NMOC emission rate is equal to or greater than fifty megagrams per year, then the landfill owner shall either comply with paragraph (B)(2) of rule 3745-76-07 of the Administrative Code, or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in paragraph (A)(3) of this rule.

(3) Tier 2. The landfill owner or operator shall determine the NMOC concentration using the following sampling procedure. The landfill owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least two years. If the landfill is larger than twenty five hectares in area, only fifty samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25 or Method 25C of Appendix A of 40 CFR Part 60. Method 18 of Appendix A of 40 CFR Part 60 may be used to analyze the samples collected by the Method 25 or 25C sampling procedure. . If more than the required number of samples are taken, all samples shall be used in the analysis. The landfill owner or operator shall divide the NMOC concentration from Method 25 or Method 25C of Appendix A of 40 CFR part 60 by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(a) 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. The compositing shall be terminated before the cylinder approaches ambient pressure where measurement accuracy diminishes.

(b) If using Method 18, the owner or operator must identify all compounds in the sample, and, at a minimum, test for those compounds published in the most recent "Compilation of Air Pollutant Emission Factors (AP-42)", minus carbon monoxide, hydrogen sulfide, and mercury. At a minimum, the instrument must be calibrated for each of the compounds on the list. The concentration of each Method 18 compound shall be converted to

C_{NMOC} as hexane by multiplying it by the ratio of its carbon atoms divided by six.

(c) If the landfill has an active or passive gas removal system in place, Method 25 or Method 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 before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe.

(d) The landfill owner or operator shall recalculate the NMOC mass emission rate using the equations provided in paragraph (A)(1)(a) or (A)(1)(b) of this rule and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in paragraph (A)(1) of this rule.

(e) If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than fifty megagrams per year, then the landfill owner or operator shall either comply with paragraph (B)(2) of rule 3745-76-07 of the Administrative Code, or determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in paragraph (A)(4) of this rule.

(f) If the resulting NMOC mass emission rate is less than fifty megagrams per year, the owner or operator shall submit a periodic estimate of the emission rate report as provided in paragraph (B)(1) of rule 3745-76-12 of the Administrative Code and retest the site-specific NMOC concentration every five years using the methods specified in this rule.

(4) Tier 3. The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of Appendix A of 40 CFR Part 60. The landfill owner or operator shall estimate the NMOC mass emission rate using equations in paragraph (A)(1)(a) or (A)(1)(b) of this rule and using a site-specific methane generation rate constant k, and the site-specific NMOC concentration as determined in paragraph (A)(3) of this rule instead of the default values provided in paragraph (A)(1) of this rule. The landfill owner or operator shall compare the resulting NMOC mass emission rate to the standard of fifty megagrams per year.

(a) If the NMOC mass emission rate as calculated using the site-specific methane generation rate and concentration of NMOC is equal to or greater than fifty megagrams per year, the owner or operator shall comply with paragraph (B)(2) of rule 3745-76-07 of the Administrative Code.

(b) If the NMOC mass emission rate is less than fifty megagrams per year, then the owner or operator shall submit a periodic emission rate report as provided in paragraph (B)(1) of rule 3745-76-12 of the Administrative Code and shall recalculate the NMOC mass emission rate annually, as provided in paragraph (B)(1) of rule 3745-76-12 of the Administrative Code using the equations in paragraph (A)(1) of this rule and using the site-specific methane generation rate constant and NMOC concentration obtained in paragraph (A)(3) of this rule. The calculation of the methane generation rate constant is performed only once, and the value obtained from this test shall be used in all subsequent annual NMOC emission rate calculations.

(5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific k as an alternative to the methods required in paragraphs (A)(3) and (A)(4) of this rule if the method has been approved by the director.

(B) After the installation of a collection and control system in compliance with rule 3745-76-10 of the Administrative Code, the owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed as provided in paragraph (B)(2)(e) of rule 3745-76-07 of the Administrative Code, using the following equation:

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$$

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} shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of Appendix A of 40 CFR Part 60.

(2) The average NMOC concentration, C_{NMOC}, shall 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 25C or Method 18 of Appendix A of 40 CFR Part 60. If using Method 18 of Appendix A of 40 CFR Part 60, the minimum list of compounds to be tested shall be those published in the most recent "Compilation of Air Pollutant Emission Factors (AP-42)". The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the NMOC concentration from Method 25C of Appendix A of 40 CFR Part 60 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 director.

(C) When calculating emissions for PSD purposes, the owner or operator of each MSW landfill subject to the provisions of this chapter shall estimate the NMOC emission rate for comparison to the major stationary source and significant levels in rule 3745-31-01 of the Administrative Code using AP-42 or other approved measurement procedures. If a collection system, which complies with the provisions in paragraph (B)(2) of rule 3745-76-07 of the Administrative Code is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in paragraph (B) of this rule.

(D) For the performance test required in paragraph (B)(2)(c)(ii) of rule 3745-76-07 of the Administrative Code, Method 25C or Method 18 of appendix A of 40 CFR Part 60 shall be used to determine compliance with ninety eight weight-per cent efficiency or the twenty parts per million volume outlet concentration level, unless another method to demonstrate compliance has been approved by the director as provided by paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code. If using Method 18 of Appendix A of 40 CFR Part 60, the minimum list of compounds to be tested shall be those published in the most recent "Compilation of Air Pollutant Emission Factors (AP-42)". The following equation shall be used to calculate efficiency:

Control efficiency = $(NMOC_{IN} - NMOC_{OUT}) / (NMOC_{IN})$

Where,

$NMOC_{IN}$ = mass of NMOC entering control device

$NMOC_{OUT}$ = mass of NMOC exiting control device

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-10 Compliance provisions.

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see paragraph (B)(31) of rule 3745-76-01 of the Administrative Code titled "Referenced materials."]

(A) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, the specified methods in paragraphs (A)(1) to (A)(6) of this rule shall be used to determine whether the gas collection system is in compliance with paragraph (B)(2)(b) of rule 3745-76-07 of the Administrative Code.

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with paragraph (B)(2)(b)(i)(a) of rule 3745-76-07 of the Administrative Code, one of the following equations shall be used. The k and 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 director. If k has been determined as specified in paragraph (A)(4) of rule 3745-76-09 of the Administrative Code, the value of k determined from the test shall be used. A value of no more than fifteen years shall 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.

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

$$Q_M = 2L_oR\ (e^{-kc} - e^{-kt})$$

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 = O and $e^{-kc} = 1$)

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

$$Q_M = \sum_{i=1}^{n} 2kL_0M_i(e^{-kt_i})$$

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 i^{th} section, megagrams

t_i = age of the i^{th} section, years

(c) 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, the equations in paragraph (A)(1)(a) and paragraph (A)(1)(b) of this rule. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraph (A)(1)(a) or (A)(1)(b) of this rule or other methods shall 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 paragraph (B)(2)(b)(i)(b) of rule 3745-76-07 of the Administrative Code, the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the director, 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 paragraph (B)(2)(b)(i)(c) of rule 3745-76-07 of the Administrative Code, the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within five calendar days, except for the three conditions allowed under paragraph (B) of rule 3745-76-08 of the Administrative Code. If negative pressure cannot be achieved without excess air infiltration within fifteen calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within one hundred twenty days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Director

for approval.

(4) Owners or operators are not required to expand the system as required in paragraph (A)(3) of this rule during the first one hundred eighty days after gas collection system start-up.

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in paragraph (C) of rule 3745-76-08 of the Administrative Code. If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within five calendar days. If correction of the exceedance cannot be achieved within fifteen calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within one hundred twenty days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Director for approval.

(6) An owner or operator seeking to demonstrate compliance with paragraph (B)(2)(b)(i)(d) of rule 3745-76-07 of the Administrative Code through the use of a collection system not conforming to the specifications provided in rule 3745-76-14 of the Administrative Code shall provide information satisfactory to the director as specified in paragraph (B)(2)(a)(iii) of rule 3745-76-07 of the Administrative Code demonstrating that off-site migration is being controlled.

(B) For purposes of compliance with paragraph (A) of rule 3745-76-08 of the Administrative Code, each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in paragraph (B)(2)(a) of rule 3745-76-07 of the Administrative Code. Each well shall be installed no later than sixty days after the date on which the initial solid waste has been in place for a period of:

(1) Five years or more if active; or

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

Each well shall be installed as a measure to abate or minimize the migration of explosive gas when the director orders the owner or operator to perform such measures pursuant to paragraph (D) of rule 3745-76-08 of the Administrative Code.

(C) The following procedures shall be used for compliance with the surface methane operational standard as provided in paragraph (D) of rule 3745-76-08 of the Administrative Code.

(1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at thirty 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 rule.

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

(3) Surface emission monitoring shall be performed in accordance with section 8.3.1 of Method 21 of Appendix A of 40 CFR Part 60, except that the probe inlet shall be placed within five to ten centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.

(4) Any reading of five hundred parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs (C)(4)(a) to (C)(4)(e) of this rule shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of paragraph (D) of rule 3745-76-08 of the Administrative Code.

(a) The location of each monitored exceedance shall be marked and the location recorded.

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

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

(d) Any location that initially showed an exceedance but has a methane concentration less than five hundred parts per million methane above background at the ten-day re-monitoring specified in paragraph (C)(4)(b) or (C)(4)(c) of this rule shall be re-monitored one month from the initial exceedance. If the one-month re-monitoring shows a concentration less than five hundred parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the one-month re-monitoring shows an exceedance, the actions specified in paragraph (C)(4)(c) or (C)(4)(e) of this rule shall be taken.

(e) For any location where monitored methane concentration equals or exceeds five hundred parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within one hundred twenty 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 director for approval.

(5) The owner or operator shall implement a program to monitor for cover integrity and

implement cover repairs as necessary on a monthly basis, and as specified in paragraph (E)(12) of rule 3745-27-19 of the Administrative Code and paragraph (A) of rule 3745-27-14 of the Administrative Code.

(D) Each owner or operator seeking to comply with the provisions in paragraph (C) of this rule shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer shall meet the instrument specifications provided in section 6 of Method 21 of Appendix A of 40 CFR Part 60, except that "methane" shall replace all references to VOC.

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

(3) To meet the performance evaluation requirements in section 6 of Method 21 of Appendix A of 40 CFR Part 60, the instrument evaluation procedures of section 8.1 of Method 21 of Appendix A of 40 CFR Part 60 shall be used.

(4) The calibration procedures provided in section 8.1.1.1 of Method 21 of Appendix A of 40 CFR Part 60 shall be followed immediately before commencing a surface monitoring survey.

(E) The provisions of this rule apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed five days for collection systems and shall not exceed one hour for treatment or control devices.

Effective: 08/25/2016

Five Year Review (FYR) Dates: 05/27/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY
Certification

08/15/2016
Date

Promulgated Under: 119.03
Statutory Authority: 3704.03(E)
Rule Amplifies: 3704.03(A), 3704.03(E)
Prior Effective Dates: 1/31/98, 11/16/99, 10/10/06

3745-76-11 **Monitoring of operations.**

Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code,

(A) Each owner or operator seeking to comply with paragraph (B)(2)(b)(i) of rule 3745-76-07 of the Administrative Code for an active gas collection system shall 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 paragraph (A)(3) of rule 3745-76-10 of the Administrative Code; and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in paragraph (A)(5) of rule 3745-76-10 of the Administrative Code; and

(3) Monitor temperature of the landfill gas on a monthly basis as provided in paragraph (A)(5) of rule 3745-76-10 of the Administrative Code.

(B) Each owner or operator seeking to comply with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code using an enclosed combustor shall 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 plus or minus one percent of the temperature being measured expressed in degrees Celsius or plus or minus 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 forty four megawatts.

(2) A device that records flow to or bypass of the control device. The owner or operator shall either:

(a) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every fifteen minutes; or

(b) 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 shall 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 paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code using an open flare shall 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 or bypass of the flare. The owner or operator shall either:

(a) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every fifteen minutes; or

(b) 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 shall 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 paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the director as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The director shall review the information and either approve it, or request that additional information be submitted. The director may specify additional appropriate monitoring procedures.

(E) Each owner or operator seeking to install a collection system that does not meet the specifications in rule 3745-76-14 of the Administrative Code or seeking to monitor alternative parameters to those required by rule 3745-76-08 to rule 3745-76-11 of the Administrative Code shall provide information satisfactory to the director as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code and paragraph (B)(2)(a)(iii) of rule 3745-76-07 of the Administrative Code describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The director may specify additional appropriate monitoring procedures.

(F) Each owner or operator seeking to demonstrate compliance with paragraph (C) of rule 3745-76-10 of the Administrative Code, shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in paragraph (D) of rule 3745-76-10 of the Administrative Code. 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 five hundred parts per million or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.04(E)
Rule Amplifies:	3704.03(A), 3704.;03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-12 **Reporting requirements.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code,

(A) Each owner or operator subject to the requirements of this chapter shall submit or shall have submitted an initial design capacity report to the director.

(1) The initial design capacity report shall contain the date construction commenced and the date of initial waste placement, if applicable.

(2) The initial design capacity report shall contain the following information:

(a) 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 director.

(b) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the director, 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 shall be calculated using good engineering practices. The calculations shall be provided, along with the relevant parameters as part of the report. The director may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) An amended design capacity report shall be submitted to the director providing notification of any increase in the design capacity of the landfill, within ninety days of an increase in the maximum design capacity of the landfill to or above 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in permitted volume of the landfill or an increase in the density as documented in the annual recalculation required under paragraph (F) of rule 3745-76-13 of the Administrative Code. Any expansion of the landfill shall be deemed a modification, which shall cause the landfill to become subject to the new source performance standards in 40 CFR Part 60, Subpart WWW.

(B) Each owner or operator subject to the requirements of this chapter shall submit an NMOC emission rate report to the director initially and annually thereafter, except as provided for in paragraph (B)(1)(b) or (B)(3) of this rule. The director may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report shall contain an annual or five-year estimate of the NMOC emission rate calculated using the formula and procedures provided in paragraph (A) or (B) of rule 3745-76-09 of the Administrative Code, as applicable.

(a) The initial NMOC emission rate report may be combined with the initial design capacity report required in paragraph (A) of this rule. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (B)(1)(b) and (B)(3) of this rule.

(b) If the estimated NMOC emission rate as reported in the annual report to the director is less than fifty megagrams per year in each of the next five consecutive years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next five-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the five years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based shall be provided to the director. This estimate shall be revised at least once every five years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the five-year estimate, a revised five-year estimate shall be submitted to the director. The revised estimate shall cover the five-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 shall include all the data, calculations, sample reports and measurements used to estimate the annual or five-year emissions.

(3) Each owner or operator subject to the requirements of this chapter is exempted from the requirements of paragraphs (B)(1) and (B)(2) of this rule, after the installation of a collection and control system in compliance with paragraph (B)(2) of rule 3745-76-07 of the Administrative Code, during such time as the collection and control system is in operation and in compliance with rule 3745-76-08 and rule 3745-76-10 of the Administrative Code.

(C) Each owner or operator subject to the provisions of paragraph B)(2)(a) of rule 3745-76-07 of the Administrative Code shall submit a collection and control system

design plan to the director within one year of the first report, required under paragraph (B) of this rule, in which the emission rate exceeds fifty megagrams per year, except as follows:

(1) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in paragraph (A)(3) of rule 3745-76-09 of the Administrative Code and the resulting rate is less than fifty megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than fifty 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, shall be submitted within one hundred eighty days of the first calculated exceedance of fifty megagrams per year.

(2) 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 paragraph (A)(4) of rule 3745-76-09 of the Administrative Code, and the resulting NMOC emission rate is less than fifty megagrams per year, annual periodic reporting shall be resumed. The resulting site-specific methane generation rate constant (k) shall 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 paragraph (A)(4) of rule 3745-76-09 of the Administrative Code and the resulting site-specific methane generation rate constant (k) shall be submitted to the director within one year of the first calculated emission rate exceeding fifty megagrams per year.

(D) Each owner or operator of a controlled landfill shall submit a closure report to the director within thirty days of waste acceptance cessation. The director may request additional information as may be necessary to verify that permanent closure has taken place in accordance with 40 CFR 258.60. If a closure report has been submitted to the director, no additional wastes may be placed into the landfill without filing a notification of modification. The landfill owner or operator shall also meet the notification requirements for landfill closure contained in paragraph (E) of rule 3745-27-11 of the Administrative Code.

(E) Each owner or operator of a controlled landfill shall submit an equipment removal report to the director thirty days prior to removal or cessation of operation of the control equipment.

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

(a) A copy of the closure report submitted in accordance with paragraph (D) of this rule;

(b) A copy of the initial performance test report demonstrating that the fifteen year minimum control period has expired; and

(c) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty megagrams or greater of NMOC per year.

(2) The director may request such additional information as may be necessary to verify that all of the conditions for removal in paragraph (B)(2)(e) of rule 3745-76-07 of the Administrative Code have been met.

(F) Each owner or operator of a landfill seeking to comply with paragraph (B)(2) of rule 3745-76-07 of the Administrative Code using an active collection system designed in accordance with paragraph (B)(2)(b) of rule 3745-76-07 of the Administrative Code shall submit to the director annual reports of the recorded information in paragraphs (F)(1) to (F)(6) of this rule. The initial annual report shall be submitted within one hundred eighty days of installation and start-up of the collection and control system, and shall include the initial performance test report for enclosed combustion devices and flares. Reportable exceedances are defined under paragraph (C) of rule 3745-76-13 of the Administrative Code.

(1) Value and length of time for exceedance of applicable parameters monitored under paragraphs (A), (B), (C), and (D) of rule 3745-76-11 of the Administrative Code.

(2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified under rule 3745-76-11 of the Administrative Code.

(3) Description and duration of all periods when the control device was not operating for a period exceeding one hour and length of time the control device was not operating.

(4) All periods when the collection system was not operating in excess of five days.

(5) The location of each exceedance of the five hundred parts per million methane concentration as provided in paragraph (D) of rule 3745-76-08 of the Administrative Code and the concentration recorded at each location for which an exceedance was recorded in the previous month.

(6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (A)(3), (B), and (C)(4) of rule 3745-76-10 of the Administrative Code.

(G) Each owner or operator seeking to comply with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code shall include the following information with the initial performance test report as specified in paragraph (B)(2)(c)(ii) of rule 3745-76-07 of the Administrative Code:

(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;

(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.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-13 **Recordkeeping requirements.**

(A) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, each owner or operator of an MSW landfill subject to the provisions of paragraph (B) of rule 3745-76-07 of the Administrative Code shall keep for at least five years up-to-date, readily accessible, on-site records of the design capacity report which triggered paragraph (B) of rule 3745-76-07 of the Administrative Code, 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 four hours. Either paper copy or electronic formats are acceptable.

(B) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs (B)(1) to (B)(4) of this rule as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of five years. Records of the control device vendor specifications shall be maintained until removal.

(1) Where an owner or operator subject to the provisions of this chapter seeks to demonstrate compliance with paragraph (B)(2)(b) of rule 3745-76-07 of the Administrative Code:

(a) The maximum expected gas generation flow rate as calculated in paragraph (A)(1) of rule 3745-76-10 of the Administrative Code. The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the director.

(b) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in paragraph (A)(1) of rule 3745-76-14 of the Administrative Code.

(2) Where an owner or operator subject to the provisions of this chapter seeks to demonstrate compliance with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than forty four megawatts:

(a) The average combustion temperature measured at least every fifteen minutes and averaged over the same time period of the performance test.

(b) The percent reduction of NMOC determined as specified in paragraph (B)(2)(c)(ii) of rule 3745-76-07 of the Administrative Code achieved by the control device.

(3) Where an owner or operator subject to the provisions of this chapter seeks to demonstrate compliance with paragraph (B)(2)(c)(ii)(a) of rule 3745-76-07 of the Administrative Code 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 chapter seeks to demonstrate compliance with paragraph (B)(2)(c)(i) of rule 3745-76-07 of the Administrative Code through use of an open 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 rule 3745-76-15 of the Administrative Code; 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.

(C) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, each owner or operator of a controlled landfill subject to the provisions of this chapter shall keep for five years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in rule 3745-76-11 of the Administrative Code 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 shall be recorded and reported under paragraph (F) of rule 3745-76-12 of the Administrative Code:

(a) For enclosed combustors except for boilers and process heaters with design heat input capacity of forty four megawatts (one hundred fifty million British Thermal Units per hour) or greater, all three-hour periods of operation during which the average combustion temperature was more than twenty eight degrees centigrade below the average combustion temperature during the most recent performance test at which compliance with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code was determined.

(b) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (B)(3) of this rule.

(2) Each owner or operator subject to the provisions of this chapter shall keep up-to-date, readily accessible continuous records of the indication of flow to

the control device or 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 rule 3745-76-11 of the Administrative Code.

(3) Each owner or operator subject to the provisions of this chapter who uses a boiler or process heater with a design heat input capacity of forty four megawatts or greater to comply with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code shall 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 a permit or other state, local, or federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this chapter by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under paragraph (C) of rule 3745-76-11 of the Administrative Code, and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(D) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, each owner or operator subject to the provisions of this chapter shall 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 chapter shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under paragraph (B) of rule 3745-76-10 of the Administrative Code.

(2) Each owner or operator subject to the provisions of this chapter shall 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 paragraph (A)(3)(a) of rule 3745-76-14 of the Administrative Code as well as any nonproductive areas excluded from collection as provided in paragraph (A)(3)(b) of rule 3745-76-14 of the Administrative Code.

(E) Except as provided in paragraph (B)(2)(a)(ii) of rule 3745-76-07 of the Administrative Code, each owner or operator subject to the provisions of this chapter shall keep for at least five years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in rule 3745-76-08 of the

Administrative Code, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

(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", shall 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 four hours. Either paper copy or electronic formats are acceptable.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-14 **Specifications for active collection systems.**

(A) Each owner or operator seeking to comply with paragraph (B)(2)(a) of rule 3745-76-07 of the Administrative Code shall 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 director as provided in paragraph (B)(2)(a)(iii) of rule 3745-76-07 of the Administrative Code and paragraph (B)(2)(a)(iv)) of rule 3745-76-07 of the Administrative Code:

(1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandibility, 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 maintenance of the integrity of the final cover around each well.

(2) The sufficient density of gas collection devices determined in paragraph (A)(1) of this rule shall 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 rule shall control all gas producing areas, except as provided by paragraphs (A)(3)(a) and (A)(3)(b) of this rule.

(a) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under paragraph (D) of rule 3745-76-13 of the Administrative Code. The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the director upon request.

(b) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than one percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the director upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC

emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2kL_0M_i(e^{-kt_i})(C_{NMOC})(3.6 \times 10^{-9})$$

Where,

Q_i = NMOC emission rate from the i^{th} 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 i^{th} section, megagram

t_i = age of the solid waste in the i^{th} section, years

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

3.6×10^{-9} = conversion factor

(c) The values for k, and C_{NMOC} determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence (the 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 paragraph (A)(1) of rule 3745-76-09 of the Administrative Code or the alternative values from paragraph (A)(5) of rule 3745-76-09 of the Administrative Code shall 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)(a) of this rule.

(B) Each owner or operator seeking to comply with paragraph (B)(2)(a)(i) of rule 3745-76-07 of the Administrative Code shall construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components shall 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 shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall 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 shall 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 shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(C) Each owner or operator seeking to comply with paragraph (B)(2)(a)(i) of rule 3745-76-07 of the Administrative Code shall convey the landfill gas to a control system in compliance with paragraph (B)(2)(c) of rule 3745-76-07 of the Administrative Code through the collection header pipe(s). The gas mover equipment shall 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 shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (C)(2) of this rule shall be used.

(2) For new collection systems, the maximum flow rate shall be in accordance with paragraph (A)(1) of rule 3745-76-10 of the Administrative Code.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 11/16/99, 10/10/06

3745-76-15 **Flare requirements.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see the last paragraph of rule 3745-76-01 of the Administrative Code titled "Incorporation by reference."]

(A) General requirements

(1) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (D)(1) of this rule, except for periods not to exceed a total of five minutes during any two consecutive hours.

(2) Flares shall be operated with a flame present at all times, as determined by the methods specified in paragraph (D)(2) of this rule.

(3) Flares used to comply with provisions of this chapter shall be operated at all times when emissions may be vented to them.

(4) Flares used to comply with this rule shall be steam-assisted, air-assisted, or nonassisted.

(B) The owner or operator shall either comply with the requirements for the heat content specifications and the maximum tip velocity in paragraphs (B)(1) of this rule or the requirements for nonassisted flares having a hydrogen content of 8.0 per cent or greater in paragraph (B)(2) of this rule:

(1) Heat content and maximum tip velocity specifications

(a) Flares shall be used only with the net heating value of the gas being combusted being 11.2 megajoules per standard cubic meter (three hundred Btu per standard cubic foot) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 megajoules per standard cubic meter (two hundred Btu per standard cubic foot) or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in paragraph (D)(3) of this rule.

(b) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity less than 18.3 meters per second (sixty feet per second), as determined by the methods specified in paragraph (D)(4) of this rule, except as provided in paragraphs (B)(1)(c) and (B)(1)(d) of this rule.

(c) If the net heating value of the gas being combusted is greater than 37.3 megajoules per standard cubic foot (one thousand Btu per standard cubic foot), steam-assisted and nonassisted flares can be designed for and operated with an exit velocity equal to or greater than 18.3 meters per second (sixty feet per second) but less than one hundred and twenty-two meters per second (four hundred feet per second), as determined by the methods specified in paragraph (D)(4) of this rule.

(d) Steam-assisted and nonassisted flares may be designed for and operated with an exit velocity less than that calculated for the velocity (V_{max}) below and less than one hundred and twenty two meters per second (four hundred feet per second). . This maximum permitted velocity shall be calculated as follows:

$$\text{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

where:

V_{max} = maximum permitted velocity, meters per second;

28.8 = constant;

31.7 = constant; and

H_T = the net heating value as determined in paragraph (D)(3) of this rule.

The actual exit velocity of the flare shall be determined by the methods specified in paragraph (D)(4) of this rule.

(e) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, V_{max}, calculated as follows:

$$V_{max} = 8.706 + 0.7084\ (H_T)$$

where:

V_{max} = maximum permitted velocity, meters per second;

8.706 = constant;

0.7084 = constant; and

H_T = the net heating value as determined in paragraph (D)(3) of this rule.

The actual exit velocity of the flare shall be determined by the methods specified in paragraph (D)(4) of this rule.

(2) Nonassisted flares with a hydrogen content of at least eight per cent (by volume)

(a) Nonassisted flares shall be used that have a diameter of three inches or greater, and a hydrogen content of 8.0 per cent (by volume), or greater, and shall be designed for and operated with an exit velocity of less than 37.2 meters per second (one hundred and twenty two feet per second) and less than the velocity, V_{max}, as determined by the following equation:

$V_{max} = (X_{H2}-K_1) K_2$

Where:

V_{max} = maximum permitted velocity, meters per second;

K_1 = constant, 6.0 volume-per cent hydrogen;

K_2 = constant, 3.9 meters per second per volume-per cent hydrogen; and

X_{H2} = the volume-per cent of hydrogen, on a wet basis, as calculated by using the ASTM D1946-90.

The actual exit velocity of the flare shall be determined by the methods specified in paragraph (D)(4) of this rule.

(C) Owners or operators of flares used to comply with the provisions of this chapter shall monitor these control devices to ensure that they are operated and maintained in conformance with their design. Monitoring and record keeping shall be maintained as required in paragraph (C)(4) of rule 3745-76-13 and paragraph (C) of rule 3745-76-11 of the Administrative Code.

(D) Compliance determination

(1) Reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this rule. An observation period of two hours shall be used in accordance with the requirements of Method 22.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = k \sum_{i=1}^{n} C_i H_i$$

Where:

k = constant, 1.740×10^{-7} (megajoule-gram mole per parts per million-standard cubic meter-kilocalorie), where the standard temperature for (gram mole per standard cubic meter) is twenty degrees Celsius;

H_T = net heating value of the sample, megajoules per standard cubic meter; where the net enthalpy per mole of offgas is based on combustion at twenty five degrees Celsius and seven hundred sixty millimeters of mercury, but the standard temperature for determining the volume corresponding to one mole is twenty degrees Celsius;

C_i = concentration of sample component i in ppm on a wet basis, as measured for organics by Method 18 of Appendix A of 40 CFR Part 60and measured for hydrogen and carbon monoxide by ASTM D1946- 90;

H_i = net heat of combustion of sample component i, kilocalorie per gram mole at twenty five degrees Celsius and seven hundred sixty millimeters of mercury. The heats of combustion may be determined using ASTM D4809-95 if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

Five Year Review (FYR) Dates: 3/24/2016 and 03/24/2021

CERTIFIED ELECTRONICALLY

Certification

03/24/2016

Date

Promulgated Under:	119.03
Statutory Authority:	3704.03(E)
Rule Amplifies:	3704.03(A), 3704.03(E)
Prior Effective Dates:	1/31/98, 10/10/06