

Subpart WWW--Standards of Performance for Municipal Solid Waste Landfills

Applicability and Designation of Affected Facility - § 60.750

General	<ol style="list-style-type: none"> 1) Municipal solid waste landfill 2) Facility commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991 3) Physical or operational changes made to an existing MSW landfill solely to comply with Subpart Cc are not considered construction, reconstruction, or modification
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Standard for Air Emissions - §60.752

Source	Requirements
Landfill design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume	<p>Each owner or operator shall submit to the Administrator:</p> <ol style="list-style-type: none"> 1) An initial design capacity report 2) An amended design capacity report, as provided for in § 60.757(a)(3), when there is any increase in the design capacity of a landfill subject to the provisions of this subpart, whether the increase results from an increase in the area or depth of the landfill, a change in the operating procedures of the landfill, or any other means

<p>Landfill design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume, and the calculated NMOC emission rate is less than 50 megagrams per year</p>	<p>1) The owner or operator shall:</p> <ul style="list-style-type: none"> a) Submit an annual emission report to the Administrator, using the procedures specified in § 60.754(a)(1) to calculate the NMOC emission rate, until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed b) If the landfill is permanently closed, a closure notification shall be submitted to the Administrator as provided for in § 60.757(d)
<p>Landfill design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume, and the calculated NMOC emission rate is greater than 50 megagrams per year</p>	<p>1) The owner or operator shall:</p> <ul style="list-style-type: none"> a) Submit a collection and control system design plan to the Administrator within 1 year b) The collection and control system as described in the plan shall meet the design requirements of § 60.752 (b)(2)(ii) and (iii) c) Install the collection and control system within 18 months of the submittal of the design plan <p>2) The owner or operator may cap or remove the collection and control system provided that all the conditions of § 60.757 (b)(2)(v)(A), (B), and (C) are met</p>

Part 70 Operating Permit Requirements

<p>Part 70 Permit Required</p>	<p>1) An MSW landfill with a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters</p> <p>2) When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in § 60.752(b)(2)(v) of this subpart, a part 70 operating permit is no longer required</p>
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Collection System Requirements

Type of Collection System	Requirements
Active collection system	<ol style="list-style-type: none"> 1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment 2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of: <ol style="list-style-type: none"> a) 5 years or more if active; or b) 2 years or more if closed or at final grade 3) Collect gas at a sufficient extraction rate 4) Be designed to minimize off-site migration of subsurface gas
Passive collection system	<ol style="list-style-type: none"> 1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment 2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of: <ol style="list-style-type: none"> a) 5 years or more if active; or b) 2 years or more if closed or at final grade 3) Be designed to minimize off-site migration of subsurface gas 4) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under § 258.40 of this title

Control System Requirements

Control device	Requirements
Open flare	Flare designed and operated in accordance with § 60.18
A control system or enclosed combustion device	Designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen
Treatment system	All emissions from any atmospheric vent from the gas treatment system shall be subject to the above control requirements

Removal of Control System

Control system may be capped or removed if all of the following is satisfied	<ol style="list-style-type: none"> 1) The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of § 258.60 of this title. A closure report shall be submitted to the Administrator as provided in § 60.757(d); 2) The collection and control system shall have been in operation a minimum of 15 years; and 3) The calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates which are no less than 90 days apart, and no more than 180 days apart
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Operational Standards for Collection and Control Systems - § 60.753

Affected Source	Requirements
<p>MSW landfill gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii)</p>	<ol style="list-style-type: none"> 1) 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: <ol style="list-style-type: none"> a) 5 years or more if active; or b) 2 years or more if closed or at final grade; 2) Operate the collection system with negative pressure at each wellhead except under the following conditions: <ol style="list-style-type: none"> a) A fire or increased well temperature b) Use of a geomembrane or synthetic cover c) A decommissioned well 3) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55°C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent 4) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill 5) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.752(b)(2)(iii) 6) Operate the control or treatment system at all times when the collected gas is routed to the system 7) If monitoring demonstrates that the operational requirement in 2-4 are not met, corrective action shall be taken as specified in § 60.752(a)(3) through (5) or § 60.755(c) of this subpart

Test Methods and Procedures - §60.754

Threshold/Action	Requirement
All landfills operators	<p>Use the following equations to calculate NMOC emission rate:</p> <p>a) If solid waste acceptance rate is known:</p> $M_{\text{NMOC}} = \sum_{i=1}^n 2 k L_o M_i (e^{-kt_i}) (C_{\text{NMOC}}) (3.6 \times 10^{-9})$ <p>b) If solid waste acceptance rate is not known:</p> $M_{\text{NMOC}} = 2L_o R (e^{-kc} - e^{-kt}) (C_{\text{NMOC}})(3.6 \times 10^{-9})$
If the calculated NMOC emission rate is less than 50 megagrams per year	The landfill owner shall submit an emission rate report as provided in § 60.757(b)(1), and shall recalculate the NMOC mass emission rate annually as required under § 60.752(b)(1)
If the calculated NMOC emission rate is more than 50 megagrams per year	The landfill owner shall either comply with § 60.752 (b)(2), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in § 60.754 (a)(3) , (a)(4), or a method approved by the Administrator
Basis for removal of a landfill collection and control system	<p>The owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed using the following equation:</p> $M_{\text{NMOC}} = 1.89 \times 10^{-3} Q_{\text{LFG}} C_{\text{NMOC}}$ <p>or another method approved by the Administrator</p>
Performance test required in § 60.752(b)(2)(iii)(B)	Method 25 or Method 18 of appendix A

Compliance Provisions §60.755

Requirement to Satisfy	Compliance Provisions
General	The provisions of this subpart 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 5 days for collection systems and shall not exceed 1 hour for treatment or control devices
§ 60.753(a)	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 § 60.752(b)(2)(i). Each well shall be installed within 60 days of the date in which the initial solid waste has been in place for a period of: 1) 5 years or more if active; or 2) 2 years or more if closed or at final grade

<p>Determine whether the gas collection system is in compliance with § 60.752(b)(2)(ii).</p>	<p>1) The following equations shall be used to determine the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.752(b)(2)(ii)(A)(1)</p> <p>a) For sites with unknown year-to-year solid waste acceptance rate:</p> $Q_m = 2L_o R (e^{-kc} - e^{-kt})$ <p>b) For sites with known year-to-year solid waste acceptance rate:</p> $Q_M = \sum_{i=1}^n 2 k L_o M_i (e^{-kt_i})$ <p>2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.752(b)(2)(ii)(A)(2), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards</p> <p>3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.752(b)(2)(ii)(A)(3), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly</p> <p>4) Owners or operators are not required to install additional wells as required in paragraph (3) during the first 180 days after gas collection system start-up</p> <p>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 § 60.753(c)</p> <p>6) An owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in § 60.759 shall provide information satisfactory to the Administrator as specified in § 60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled</p>
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<p>Surface methane operational standard (§ 60.753(d))</p>	<ol style="list-style-type: none"> 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 serpentine pattern spaced 30 meters apart (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 60.755(d) 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 30 meters from the perimeter wells 3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of this part, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions 4) Any reading of 500 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)(i) through (v) of this section shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.753(d). 5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis. 6) Each owner or operator shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices: <ol style="list-style-type: none"> a) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that "methane" shall replace all references to VOC. b) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air c) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used d) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey
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Monitoring of Operations - §60.756

Applicable Section of NSPS Triggering Monitoring Requirement	Requirements
Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A) for an active gas collection system	<ol style="list-style-type: none"> 1) Install a sampling port and a thermometer or other temperature measuring device at each wellhead 2) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.755(a)(3) 3) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in § 60.755(a)(5) 4) Monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5)
Each owner or operator seeking to comply with § 60.752(b)(2)(iii) control requirements using an enclosed combustor	<p>Shall calibrate, maintain, and operate:</p> <ol style="list-style-type: none"> 1) A temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or ± 0.5 °C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity greater than 44 megawatts 2) A gas flow rate measuring device that provides a measurement of gas flow to or bypass of the control device
Each owner or operator seeking to comply with § 60.752(b)(2)(iii) control requirements using an open flare	<p>Shall calibrate, maintain, and operate:</p> <ol style="list-style-type: none"> 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
Each owner or operator using a device other than an open flare or an enclosed combustor to comply with § 60.752(b)(2)(iii) control requirements	<ol style="list-style-type: none"> 1) Provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures

<p>Each owner or operator seeking to install a collection system that does not meet the specifications for active collection systems (§ 60.759) or seeking to monitor alternative parameters to those required by § 60.753 through § 60.756</p>	<p>1) Provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures</p>
<p>Each owner or operator seeking to demonstrate compliance with § 60.755(c)</p>	<p>1) Shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in § 60.755(d).</p> <p>2) Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring.</p> <p>3) Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring</p>

Reporting Requirements - §60.757

Applicable Section of NSPS Triggering Reporting Requirement	Requirement
All landfills	<ol style="list-style-type: none"> 1) Each owner or operator shall submit an initial design capacity report <ol style="list-style-type: none"> a) Shall be submitted no later than the earliest day from the following: <ol style="list-style-type: none"> (1) 90 days of the issuance of the State, Local, Tribal, or RCRA construction or operating permit; or (2) 30 days of the date of construction or reconstruction as defined under § 60.15; or (3) 30 days of the initial acceptance of solid waste b) The initial design capacity report shall contain the following information: <ol style="list-style-type: none"> (1) 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 provisions of the State, local, Tribal, or RCRA construction or operating permit; and (2) The maximum design capacity of the landfill. 2) Each owner or operator shall submit an NMOC emission rate report initially and annually thereafter to the Administrator, except as provided for in §60.757 (b)(1)(ii) or (b)(3) 3) Each owner or operator shall submit an amended design capacity report to the Administrator <ol style="list-style-type: none"> a) The notification will be provided for any increase in the design capacity of the landfill b) The notification will indicate whether the increase results from an increase in the permitted area or depth of the landfill, a change in the operating procedures, or any other means which results in an increase in the maximum design capacity of the landfill above 2.5 million megagrams or 2.5 million cubic meters c) The amended design capacity report shall be submitted within 90 days of the issuance of an amended construction or operating permit, or the placement of waste in additional land, or the change in operating procedures which will result in an increase in maximum design capacity, whichever occurs first

<p>Landfill is subject to the provisions of § 60.752 (b)(2) (i)</p>	<p>1) Each affected owner or operator shall submit a collection and control system design plan to the Administrator within 1 year of the first report in which the emission rate exceeds 50 megagrams per year, except as provided for in §60.757 (c)(1) and (2)</p>
<p>Landfill is subject to the provisions of § 60.752 (b)(2)</p>	<p>1) Each owner or operator shall submit to the Administrator annual reports with the following information:</p> <ul style="list-style-type: none"> a) 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; b) 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; c) 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; d) 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 e) 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 f) The provisions for the control of off-site migration.
<p>Controlled landfill</p>	<p>1) Each affected owner or operator shall submit a closure report within 30 days of waste acceptance cessation</p> <p>2) Each affected owner or operator shall submit an equipment removal report 30 days prior to removal or cessation of operation of the control equipment</p>

<p>Landfill complying with § 60.752(b)(2) using an active collection system</p>	<ol style="list-style-type: none"> 1) Each owner or operator shall submit annual reports containing: <ol style="list-style-type: none"> a) Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d) b) 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 § 60.756 c) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating d) All periods when the collection system was not operating in excess of 5 days e) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month f) 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 § 60.755 2) The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under § 60.8
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Recordkeeping Requirements - §60.758

Applicable Section of NSPS Triggering Recordkeeping Requirement	Requirement
<p>Landfill subject to the provisions of § 60.752(b)</p>	<ol style="list-style-type: none"> 1) Each owner or operator shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate

<p>Landfill subject to the provisions of § 60.752(b)(2)(ii)</p>	<p>1) Each owner or operator shall keep the following records:¹</p> <ul style="list-style-type: none"> a) The maximum expected gas generation flow rate as calculated in § 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator. b) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.759(a)(1)
<p>Where an owner or operator demonstrates compliance with § 60.752(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than 44 megawatts</p>	<p>1) Each owner or operator shall keep the following records:¹</p> <ul style="list-style-type: none"> a) The average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test b) The percent reduction of NMOC determined as specified in § 60.752(b)(2)(iii)(B) achieved by the control device c) Up-to-date, readily accessible record of all periods of operation of the boiler or process heater
<p>Where an owner or operator seeks to demonstrate compliance with § 60.752(b)(2)(iii)(B)(1) through use of a boiler or process heater of any size</p>	<p>1) Each owner or operator shall keep the following records:¹</p> <ul style="list-style-type: none"> 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

¹ Readily accessible records shall be kept for the life of the control equipment

<p>Where an owner or operator seeks to demonstrate compliance with § 60.752(b)(2)(iii)(A) through use of an open flare</p>	<p>1) Each owner or operator shall keep the following records:¹</p> <ul style="list-style-type: none">a) The flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absentb) Keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60.756(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent
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¹ Readily accessible records shall be kept for the life of the control equipment

<p>Controlled landfill subject to landfill NSPS</p>	<p>1) Each owner or operator shall:</p> <ul style="list-style-type: none"> a) Keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756 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 b) 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 § 60.756 c) Keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance <p>2) The following constitute exceedances that shall be recorded and reported under § 60.757(f):</p> <ul style="list-style-type: none"> a) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 °C below the average combustion temperature during the most recent performance test at which compliance with § 60.752(b)(2)(iii) 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)(i) of this section
<p>Collection system subject to the landfill NSPS</p>	<p>Each owner or operator shall:</p> <ul style="list-style-type: none"> 1) 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 2) Keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.755(b) 3) Documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.759(a)(3)(ii)

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