



Facts about Air Quality Permits for Municipal Solid Waste Landfills

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Some Municipal Solid Waste (MSW) landfills are required to have air emission permits from the Minnesota Pollution Control Agency (MPCA). Effective July 1, 2011, more landfills may require air quality permits because of their potential emissions of greenhouse gases. An MSW landfill meeting any of the following criteria requires a permit:

If the Potential to Emit (PTE) of the landfill, including any other emission units located at the landfill (such as generators, flares, or boilers combusting Landfill Gas (LFG) or other fuels), exceeds any of the thresholds in Table 1, a Part 70 or state operating permit is required.

Even if the PTE is below all the thresholds in Table 1, if Federal Standards of Performance for Municipal Solid Waste Landfills (NSPS Subpart WWW) apply to the landfill, the landfill must obtain a Part 70 operating permit.

If the PTE is below the Part 70 Permit Thresholds in Table 1, and if NSPS Subpart WWW does not apply, if any other federal standard applies (other New Source Performance Standards (NSPS) under 40 CFR Part 60, or National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR Part 61 or Part 63), the landfill may be required to obtain a permit, regardless of whether any of the Thresholds from Table 1 are exceeded.

Table 1: Potential Emissions and Air Permit Requirements

Pollutant	Total landfill PTE thresholds (tons per year, [tpy])	
	Part 70 permit threshold	State permit threshold
Total Particulate Matter (PM)	100	100
PM less than 10 microns (PM ₁₀)	100	25
PM less than 2.5 microns (PM _{2.5})	100	100
Nitrogen Oxides (NO _x)	100	100
Sulfur Dioxide (SO ₂)	100	50
Carbon Monoxide (CO)	100	100
Volatile Organic Compounds (VOC)	100	100
Lead	NA	0.5
Any single Hazardous Air Pollutant (HAP)	10	10
Any combination of 2 or more HAP	25	25
Carbon Dioxide Equivalents (CO _{2e})	100,000	NA

How do I determine potential to emit?

Potential to Emit (PTE) is defined as the maximum amount of emissions that can be generated by the landfill and all its associated equipment (flares, generators, etc.) at maximum physical capacity. PTE is very different from actual emissions.

Step 1: Potential landfill gas emissions

Uncontrolled landfill emissions will be primarily Methane (CH₄) and Carbon Dioxide (CO₂), both of which are greenhouse gases and must be included in the calculation of Carbon Dioxide Equivalents (CO₂e), and some Non-Methane Organic Compounds (NMOC). You can do the calculations manually using information from Environmental Protection Agency's (EPA) AP-42 document at www.epa.gov/ttn/chief/ap42/ch02/index.html, chapter 2.4, using default or site-specific data. Those calculations can be onerous, and an alternative is to use EPA's LandGEM model (available at the same Web address), which is a Microsoft Excel spreadsheet-based model that calculates annual emissions of total LFG, CH₄, CO₂, and NMOC using relatively simple user inputs. The model uses information from AP-42 for gas concentrations, but also allows additional user input if site specific data is available. Whichever method is used (manual calculations or LandGEM), calculate CO₂e as follows:

$$\text{CO}_2\text{e (tpy)} = \text{CO}_2 \text{ (tpy)} + [21 \times \text{CH}_4 \text{ (tpy)}]$$

If the calculated NMOC is more than 100 tpy, then determine how much of the NMOC is VOC; default concentrations of NMOC components, some of which are VOC, are listed in AP-42 and are used by LandGEM.

If the calculated NMOC is more than 10 tpy, then determine if any of the NMOC components which are HAP are greater than 10 tpy by themselves, and if any combination of two or more HAP is greater than 25 tpy; default concentrations of NMOC components, some of which are HAP, are listed in AP-42 and are used by LandGEM.

Step 2: Additional combustion emissions

Many landfills employ flares, boilers, generators, or turbines to combust landfill gas. If the use of one or more of these is required by rule or federally enforceable permit condition, you may take credit for the reduction in CH₄ and NMOC emissions that is required by the rule or permit condition when you are determining what type of permit is needed, but not if a permit is needed. (To determine if a permit is needed, you must assume no pollution reductions).

Regardless of whether the use of such equipment is required, you must also account for the additional emissions that result from the combustion of LFG. Emission factors for some of these pollutants are listed in Chapter 2.4 of AP-42, depending on the type of combustion equipment. Depending again on the type of combustion equipment, additional emission factors for criteria pollutants and HAP may be found in other chapters of AP-42, or from other sources. One commonly used source for HAP factors is the California Air Toxics Emission Factor (CATEF) Database, available at www.arb.ca.gov/ei/catef/catef.htm. Be sure to document the source of all emission factors used for all calculations.

If you have combustion units that burn fuel other than LFG, include those in your calculations as well.

Step 3: Compare to thresholds

Once you have completed the emission calculations for the landfill, the LFG combustion units, and other combustion units, compare the totals of each pollutant to the thresholds in Table 1. If one or more threshold is exceeded, you will be required to obtain an air emission permit for the facility.

What is New Source Performance Standards Subpart WWW?

New Source Performance Standards (NSPS) Subpart WWW is the Standards of Performance for Municipal Solid Waste Landfills. It can be found online at EPA's Electronic Code of Federal Regulations (e-CFR) Web site (see address at the end of this fact sheet), within Part 60. If your landfill was constructed, reconstructed, or modified after May 30, 1991, then Subpart WWW applies and you are required to obtain a Part 70 operating permit for the landfill. The specific requirements differ depending on the design capacity of the landfill and the calculated NMOC emission rate. If NSPS Subpart WWW requires installation and operation of a gas collection system, then NESHAP Subpart AAAA, National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, may also apply. NESHAP can be found on-line at EPA's e-CFR Web site (see address at the end of this fact sheet); NESHAP are codified under Part 63.

What other federal standards might apply?

If you operate a boiler with a capacity of 10 MMBtu/hour or more, and it was constructed, reconstructed, or modified after June 9, 1989, the boiler is probably subject to NSPS Subpart Dc, Standards of Performance for Small Industrial-Commercial-

Institutional Steam Generating Units If the PTE of the facility is below all the thresholds in Table 1, and no other NSPS or NESHAP applies, applicability of NSPS Subpart Dc by itself does not require a permit.

A boiler may also be subject to NESHAP Subpart DDDDD (if potential HAP emissions of the entire facility exceed the thresholds in Table 1) or NESHAP Subpart JJJJJ (if potential HAP emissions of the entire facility do not exceed the thresholds in Table 1). If you have a boiler subject to either of these standards, you will be required to obtain an air emission permit for the entire facility. These NESHAP can also be found under Part 63 at the e-CFR website (see address at end of fact sheet).

If you operate a stationary gas turbine at the landfill, the turbine may be subject to NSPS Subpart GG, Standards of Performance for Stationary Gas Turbines; NSPS Subpart KKKK, Standards of Performance for Stationary Combustion Turbines; and/or NESHAP Subpart YYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (if the HAP PTE is 10 tpy or more for a single HAP, or 25 tpy for any combination of two or more HAP). All of the combustion turbine standards require that the facility obtain an air emission permit.

If you operate a stationary engine or generator, depending on the age, type, and size, it may be subject to NSPS Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; NSPS Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines; and/or NESHAP Subpart ZZZZ, NESHAP for Reciprocating Internal Combustion Engines. All of these standards require that the facility obtain an air emission permit (there are some exceptions for NSPS Subpart IIII, if that is the only federal standard that applies and the only reason a permit is needed – see Minn. R. 7007.0300, subp. 1.B.[5]).

Your landfill may also be subject to the Mandatory Greenhouse Gas Reporting rule, which can be found in Part 98, at the e-CFR web address listed at the end of this fact sheet.

What do I do if my landfill needs a permit?

If it turns out your landfill needs a permit, there may be several options available, depending on the facility PTE, actual emissions, and which standards apply.

Information on the different types of permits can be found on the MPCA's Web page at www.pca.state.mn.us/index.php/air/air-permits-and-rules/air-permits-and-forms/air-permits/all-about-air-permits.html?menuid=&missing=0&redirect=1.

Application forms for all types of air quality permits can be found at www.pca.state.mn.us/index.php/air/air-permits-and-rules/air-permits-and-forms/air-forms/air-quality-forms-permit-application-notifications-compliance-and-miscellaneous.html?menuid=&missing=0&redirect=1.

What if I still need more help?

The MPCA strongly encourages you to review the standards that may be applicable to your landfill or other equipment. New Source Performance Standards are codified at 40 CFR Part 60. National Emission Standards for Hazardous Air Pollutants are codified at 40 CFR Part 61 and Part 63. You can access these regulations on the internet at the e-CFR address listed at the end of this fact sheet. Additional references that may be useful to you are listed below.

If you would like additional assistance or have questions, contact the MPCA 651-296-6300 or 800-657-3864.

Additional resources

Air Pollution Engineering Manual (2nd edition). Air and Waste Management Association. 2000.

Compilation of Air Pollutant Emission Factors. Vol. I: Stationary Point and Area Sources (AP-42, 5th edition). www.epa.gov/ttn/chief/ap42/ch02/index.html

EPA Office of Air Quality Planning and Standards. Research Triangle Park, NC. www.epa.gov/ttn/chief/ap42/index.html.

Landfill Gas Emissions Model (LandGEM), version 3.02, and User's Guide, www.epa.gov/ttn/catc/products.html#software.

MPCA's Web site: www.pca.state.mn.us.

Electronic Code of Federal Regulations (e-CFR) Web site: ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl, select "Title 40" from the list.

Minn. R. ch. 7007, Permits and Offsets: www.revisor.mn.gov/rules/?id=7007.