

# Colorado Department of Public Health and Environment

## Air Pollution Control Division

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of Public Health  
and Environment

### **An Overview of Colorado Air Regulations for Municipal Solid Waste Landfills Includes Federal New Source Performance Standards 40 CFR Part 60 Subpart Cc and Subpart WWW**

Solid waste landfills release air pollutants that are regulated by the Air Pollution Control Division (APCD) at the Colorado Department of Public Health and Environment (CDPHE). As the waste in a landfill decomposes, it breaks down to form landfill gases (LFGs), such as *Methane (CH<sub>4</sub>)*, *Carbon Dioxide (CO<sub>2</sub>)*, and *non-methane organic compounds (NMOC)*. Landfills also can produce smog-causing volatile organic compounds (VOCs), and air toxics, pollutants known or suspected of causing cancer and other serious health effects. Particulate Matter (PM) emissions can also be generated in the form of fugitive dust created by mobile sources (i.e., garbage trucks) traveling along paved and unpaved surfaces.

This guidance document provides an overview of air emission reporting and permitting requirements for Municipal Solid Waste Landfills (MSW). The requirements, known as the federal New Source Performance Standards (NSPS) for MSW landfills are located in 40 CFR Part 60 Subpart Cc and WWW and are available for download at <http://ecfr.gpoaccess.gov/>

In addition to solid waste and hazardous waste regulations, landfills must comply with state and federal air quality regulations. Air quality regulations generally include reporting, permitting, control, monitoring, recordkeeping and reporting requirements. This guidance document identifies those air quality regulations that apply to landfills in Colorado, by providing key definitions, identifying general reporting and permitting requirements, as well as the more specific federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (a.k.a. maximum achievable control technology or MACT) requirements.

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## **GENERAL AIR REPORTING AND PERMITTING REQUIREMENTS**

Landfills are subject to the Air Quality Control Commission's (AQCC's) Regulation 1, 2, 3, 7 and 9. See AQCC's Regulation 1 for regulations specific to smoke, opacity, open burning, fuel burning, incineration and fugitive dust. AQCC's Regulation 2 is specific to odor. AQCC's Regulation 3, Part A includes regulations specific to reporting of emissions for inventory purposes, and Parts B, C, and D are specific to permitting. AQCC's Regulation 7 establishes reasonably available control technology (RACT) requirements for VOC and NO<sub>x</sub> as precursor pollutants to ozone. Finally, the Colorado Oil and Gas Conservation Commission's (COGCC's) under the 900 Series Exploration and Production Waste Management rules also includes requirements for handling Exploration and Production (E&P) waste.

### **➤ Submitting an Air Pollutant Emission Notice (APEN)**

To report air emissions per AQCC Regulation 3, Part A the APEN form titled "Air Pollutant Emission Notice and Construction Permit Application- Landfills" is available through the Division and

downloadable at <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251596800209> under Municipal Solid Waste Landfills. The APEN form is used to record general information including the landfill waste acceptance rate, location, size, and duration of the landfill or expected closure date. APENs are valid for five years, and each APEN must be renewed at least 30 days before it expires. Additionally, revised APENs must be submitted to the Division when certain changes occur at your facility. Examples of such changes include, but are not limited to: a name change, a change in ownership, a change in process equipment, an increase in waste acceptance limit, a significant change in emissions, or a modification to the design capacity.

In addition, the APEN form includes detailed information on the *Fugitive Dust Control Plan (FDCP)* and the *Initial Design Capacity* of the landfill. The FDCP stems from AQCC Regulation 1 and addresses how particulate matter will be kept to a minimum at the site. Fugitive dust control techniques commonly included in the plan are as follows:

- Speed Limits - Posted and observed by drivers
- Haul Roads- Application of water, Magnesium Chloride (MgCl), gravel, or recycled asphalt as needed to control dust
- Stockpiles- Watered or revegetated as needed to control dust

If other activities take place at the landfill, use General APEN forms to report them. Examples of other activities which must be reported include, but are not limited to, solidification basins, trash grinders or shredders, generators, and aggregate processing equipment.

## ➤ The Permit Process

The division will use the information provided in the APEN to determine the specific terms and conditions for your permit and to determine if a Construction Permit or a Title V is required. Air permits are issued in two phases: Initial Approval and Final Approval.

- An **Initial Approval (IA)** permit allows a business to construct the facility and begin operation. Note that the Air Pollution Control Division requires businesses to have a valid permit **before** beginning construction, as defined in Reg. 3 I.B.10.
- A **Final Approval (FA)** permit is issued after a business certifies that the facility is in compliance with the conditions of the Initial Approval permit. The information required to certify compliance may include, but is not limited to, opacity observations (initial 3-hour, 6-minute averages), fuel supplier certification forms, recordkeeping and other case-specific requirements. Information on how to self-certify compliance with an IA permit may be found online at: <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251596800307>
- A **Title V** permit must be applied for **WITHIN 90 DAYS** of starting construction if the landfill's design capacity is equal to or exceeds 2.5 million Mg **and** 2.5 million cmv. The initial NMOC emission rate shall also be reported **WITHIN 90 DAYS** of starting construction. For other requirements go to <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251596446069>

## ➤ Reporting and Permitting Fees

**Filing Fee:** A filing fee is required for each APEN submitted. This includes APENs submitted for administrative changes (e.g., change in ownership, change in location). Fees are subject to change by the legislature on an annual basis.

**Annual Fee:** All sources required to file an APEN must pay annual fees based on the estimated annual emissions of air pollutants. The Division bills each source subject to an annual fee per ton of criteria pollutants emitted and per ton of non-criteria (hazardous air pollutants) emitted. The Division mails invoices for these fees in May or June of each year. Fees are subject to change by the legislature on an annual basis.

**Permit Processing Fee:** In addition to the APEN filing fee, the Division assesses a fee for the review of the permit application and processing by an engineer.

Fee rates are posted on line at: <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251596441467>

**Each owner or operator of a landfill shall submit a cancellation of permit form to the division when the landfill closes as well as notify the Solid Waste Division. If the landfill is a controlled landfill, a closure report must be submitted to the division within 30 days of waste acceptance cessation, per subpart 60.757 (d).**

### Other issues for landfills:

- ❖ Odors- Landfills are subject to the odor requirements of Colorado Air Quality Control Regulation No. 2. Detectable odors can be a problem and cause a potential nuisance to neighbors. Best practical treatment and controls shall be utilized.
- ❖ Open Burning- Colorado AQCC Regulation No. 1 and 9 applies to all open burning activities throughout the state. Any business or resident intending to conduct an open burn must comply with State open burning regulations, in addition to any local ordinances or regulations.

What types of open burning are permissible with a permit?

- Burning of tree limbs
- Burning of stumps
- Permits for other types of open burning are considered on a case-by-case basis.

What types of open burning are prohibited?

- Burning of material that contains food wastes, plastic, coated or treated wood products, rubber, insulation, tires, car bodies, insulated wire, motor oil, aerosol cans, hazardous or toxic materials, or other materials that will produce substantial amounts of smoke and particulates.
- Burning of wood residue, which includes bark, sawdust, slabs, chips, shavings, mill trim, and other wood products derived from wood processing.
- Burning of construction debris (includes both clean and treated wood).

- Burning of buildings or structures for demolition purposes.
- Burning of material for which a practical alternative method of disposal exists.

Permits for some of these materials may be issued on a case-by-case basis. Open burning permit application can be obtained at: <http://www.colorado.gov/cdphe/smoke>

- ❖ Disposal by Evaporation- Certain landfills accept soils contaminated with oil, gasoline, and other chemicals and dispose of it by land applying the soil. This process can contribute a significant amount of VOC emissions from a landfill. Per AQCC Regulation 7, section V. Disposal of Volatile Organic Compounds states that, “No person shall dispose of volatile organic compounds by evaporation or spillage unless RACT is utilized.” The Division has developed calculation procedure to provide landfills with an approved method to estimate emissions from PCS at landfills. The Divisions approved method to calculating PCS emissions at landfills is documented in Permit Section (PS) Memo 12-01, which can be found online at: <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251597387439> under 2012 memos.
- ❖ Composting Operations- Landfills that compost must submit a separate APEN for these operations. Composting can be a source of green house gases, VOCs, particulate matter, and ammonia (NH<sub>3</sub>). VOC emissions from composting operations can be calculated by using the Divisions approved emission factor as described in PS Memo 12-02, which can be found at: <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251597387439> under 2012 memos.

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## SUMMARY OF NEW SOURCE PERFORMANCE STANDARDS (NSPS) REQUIREMENTS FOR MUNICIPAL SOLID WASTE LANDFILLS

Landfills are also subject to the requirements of the more specific federal NSPS and MACT regulations, as follows:

NSPS, Subpart Cc for Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills found in 40 C.F.R. Part 60, Subpart Cc: <http://www.epa.gov/ttn/atw/landfill/fr16jn98.pdf>

NSPS, subpart WWW for Standards of Performance for Municipal Solid Waste Landfills found in 40 C.F.R. Part 60, Subpart WWW: <http://www.epa.gov/ttn/atw/landfill/fr16jn98.pdf>

MACT, Subpart AAAA for National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills found in 40 C.F.R. Part 63, Subpart AAAA: <http://www.epa.gov/ttn/atw/landfill/fr16ja03.pdf>

MSW landfills that commenced operation *prior* to May 30, 1991 are subject to the federal New Source Performance Standards (NSPS) Subpart Cc, and landfills that commenced operation or reconstruction (modifications) *after* May 30, 1991 are subject to the NSPS Subpart WWW. In addition, the Colorado Air Quality Control Commission adopted another federal rule, Maximum Achievable Control Technology (MACT) Subpart AAAA that applies to landfills with uncontrolled NMOC emissions above 50 megagrams (Mg) per year providing additional requirements for bioreactors. As a result, all landfills in Colorado are subject to general air emissions reporting and permitting requirements.

## **What must a MSW landfill do to demonstrate compliance with these rules?**

Each owner or operator of a MSW landfill must submit an Air Pollutant Emissions Notice (APEN) along with an *Initial Design Capacity Report* to the division to report their emissions. Owners or operators must also file an amended Design Capacity Report when changes to the design capacity of the landfill are anticipated. The APEN will be reviewed by a division engineer and a permit will be developed and issued:

- If the design capacity is *less* than 2.5 million Mg by mass **or** 2.5 million cubic meters by volume (cmv) then the design capacity report is the only documentation that is submitted with the APEN to fulfill the requirements of the NSPS.
- If the design capacity is *equal to or exceeds* 2.5 million Mg **or** 2.5 million cmv (but not both), the landfill must calculate the site specific density and recalculate the design capacity each year.
- If the design capacity *equals or exceeds* 2.5 million Mg **and** 2.5 million cmv, the landfill must calculate emissions of non-methane organic compounds (NMOC) each year and report the emissions to the division. Sources at this level will also be subject to Title V permitting requirements per NSPS WWW. If emissions of NMOC are **less than 50 Mg** per year, then the owner/operator of the landfill must submit an annual report to division recalculating the NMOC emissions rate until the emissions equal or exceed 50 megagrams per year or until the landfill is closed. If NMOC emissions **equal or exceed 50 Mg** per year, the landfill must install a landfill gas collection and control system (LGCC), or determine a site specific NMOC concentration and recalculate the NMOC emissions rate yearly using sampling procedures in subpart 60.754 (a)(3) to demonstrate emissions are under 50 million Mg of NMOC. See Table #1.

### ➤ **Submitting the Design Capacity Report**

The owner or operator of a landfill is required to submit the initial design capacity of the landfill to the division. Landfill capacity calculations should be in Mg and cmv units of measure, so convert cubic yards (yd<sup>3</sup>) or tons accordingly. ***Use your site-specific density if it is available, and document the source of the density conversion. Note: 1 cubic yard of MSW (trash) approx. = 0.5523 Mg and 1 Mg = 1.1 ton. This is for compacted or 'in place yard' not for gate volume.*** The Design Capacity Report shall include a map or plot plan, size, site specific information and location of the landfill. If the design capacity is increased then an amended Design Capacity Report shall be submitted to the division within 90 days of the increase in maximum capacity. The design capacity will determine if there will be additional requirements under the NSPS for the landfill. See table 1. The Design Capacity Report form can be found at: <http://www.colorado.gov/cs/Satellite/CDPHE-AP/CBON/1251596800209>

Table 1

Constructed or Modified Date	NSPS requirements	
<p><b>Before 1991</b> <b>Subject to Cc,</b></p> <p><b>After 1991</b> <b>Subject to</b> <b>WWW</b></p>	<p>Design capacity is <math>\leq 2.5</math> million Mg (2.75 Mtons) <b>or</b> 2.5 million m<sup>3</sup> (3.27 million yd<sup>3</sup>)</p>	<p>Submit a design capacity report to division.</p> <p>If design capacity is increased, submit an amended design capacity report to the division within 90 days of an increase.</p>
	<p>Design capacity is <math>\geq 2.5</math> million Mg <b>or</b> <math>\geq 2.5</math> million cubic meters, but not both</p>	<p>Submit a design capacity report to division.</p> <p>If design capacity is increased, submit an amended design capacity report to the division within 90 days of an increase</p> <p>Calculate the site-specific density and recalculate the design capacity annually. If the capacity is over both thresholds, file an amended design capacity report with the division within 90 days of an increase.</p>
<p>Design capacity is <math>\geq 2.5</math> million Mg (2.75 Mtons) <b>and</b> 2.5 million m<sup>3</sup> (3.27 million yd<sup>3</sup>).</p> <p>Must have following:</p> <ul style="list-style-type: none"> <li>• NMOC emission rate</li> <li>• Operating permit</li> </ul>	<p>NMOC emission rate is <math>\leq 50</math> megagrams(55.1 tons) per year</p>	<p>Recalculate NMOC emissions annually as specified in 60.754 (a)(1) submit annual and can submit a 5 year projection of NMOC emission report to division after 5 years of annual testing from first test.</p>
	<p>Calculated NMOC emission rate is <math>\geq 50</math> megagrams(55.1 tons) per year based on default parameters</p>	<p>Conduct Tier 2 sampling at the landfill and recalculate NMOC emissions per 60.754 (a) (3); <i>And</i></p> <p>Repeat Tier 2 sampling every 5 years while emissions are less than 50 Mg; <i>Or</i></p> <p>Comply with 60.752 (b) (2) and install control equipment within 30 months after first annual report.</p>

➤ **Calculating NMOC Emissions for the NSPS and Air Permitting**

EPA provides a program called LandGEM at no cost to calculate the landfills NMOC emission rates. **LandGEM** is an automated estimation tool, created by the EPA and based on AP-42 section 2.4, with a Microsoft Excel interface that can be used to estimate emission rates for total landfill gas, methane,

carbon dioxide, nonmethane organic compounds, and individual air pollutants from municipal solid waste landfills. The first step in using LandGEM is to determine if you are running it for NSPS requirements or for air emission reporting requirements. If the landfill must report NMOC emissions under the NSPS requirements then LandGEM shall be run using the following parameter values:

- Methane Generation Rate ( $k$ ) = .02, Potential Methane Generation Capacity ( $L_0$ ) = 170, NMOC Concentration ( $C_{NMOC}$ ) = 4,000 OR your site-specific value as determined by Tier 2 sampling (click on down drop bar and choose “user-specified”), and Methane Constant = 50%.

If the landfill is calculating air emissions to report to the division (for inventory and permitting purposes) then LandGEM shall be run using the following parameter values:

- Methane Generation Rate ( $k$ ) = .02, Potential Methane Generation Capacity ( $L_0$ ) = 100, NMOC Concentration ( $C_{NMOC}$ ) = 956.4 OR your site-specific value as determined by Tier 2 sampling (click on down drop bar and choose “user-specified”), and Methane Constant = 50%.

You will also need to enter the year the landfill opened, the annual waste acceptance rates for each year the landfill was open, and either the closure year or the design capacity. LandGEM can be accessed at: <http://www.epa.gov/ttn/catc/products.html#software>. LandGEM shall be used to calculate landfill emissions, and LandGEM reports shall be submitted to the division with the APEN.

*Note: In order to enter specified values in LandGEM Macros must be enabled first. Users should be prompted to enable Macros when LandGEM is first opened.*

**EXAMPLE:**

**USER INPUTS** Landfill Name or Identifier:

**1: PROVIDE LANDFILL CHARACTERISTICS**

Landfill Open Year	<input type="text"/>	
Landfill Closure Year	<input type="text"/>	
Have Model Calculate Closure Year?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Waste Design Capacity	<input type="text"/>	megagrams <input type="button" value="v"/>

**2: DETERMINE MODEL PARAMETERS**

Methane Generation Rate, $k$ ( $year^{-1}$ )	CAA Arid Area - 0.02 <input type="button" value="v"/>	<input type="text"/>
Potential Methane Generation Capacity, $L_0$ ( $m^3/Mg$ )	CAA Conventional - 170 <input type="button" value="v"/>	
NMOC Concentration ( $ppmv$ as hexane)	CAA - 4,000 <input type="button" value="v"/>	
Methane Content (% by volume)	CAA - 50% by volume <input type="button" value="v"/>	

➤ **Record Keeping Requirements**

Each owner or operator of a MSW landfill shall maintain the following records on site for at least 5 years:

- Design Capacity records
- Current amount of solid waste in-place (in Mg or tons)
- Annual waste acceptance rate (in Mg or tons)

Controlled landfills shall maintain the above records, as well as those required under subpart 60.758 depending on the type of control device used (this list is not all inclusive) :

- Maximum gas generation flow rate
- Density of wells, horizontal collectors, surface collectors
- Average combustion temperature measured every 15 minutes
- Percent reduction of NMOC achieved by control device
- If using a boiler as control device; provide description of location where gas vent stream is introduced
- If using a flare as a control device; visible emissions readings, heat content determination, if flare is operating, etc
- Records of flow to the control device or the indication of bypass flow
- If using a boiler as a control device; if heat input capacity of 44 megawatts or greater keep records of operation
- Records of all collection and control exceedances of the operational standards
- If convert design capacity from volume to mass or mass to volume maintain records of annual recalculation of site-specific density

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**DEFINITIONS-** Per § 60.751 unless otherwise stated.

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

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate.

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

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).

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this title. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp

and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

MACT means Maximum Achievable Control Technology. The national emission standards for hazardous air pollutants (NESHAPs) established by the U.S. Environmental Protection Agency (EPA) are commonly called maximum achievable control technology (MACT) standards. MACT standards are designed to reduce HAP emissions to a maximum achievable degree, taking into consideration the cost of reductions and other factors. CCA Section 112 (g).

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.

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

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

NMOC means nonmethane organic compounds, as measured according to the provisions of §60.754

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

NSPS means New Source Performance Standards. NSPS under the Clean Air Act (CAA) dictate the level of pollution that a new stationary source may produce. These standards are authorized by Section 111 of the CAA.

Solid waste means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including 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 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

Title V Permitting – An air permit called a Title V Operating Permit that streamlines both compliance and enforcement with all applicable state and federal air pollution regulations. Only installations which are considered major sources (emissions over 100 tons per year) for at least one regulated air pollutant are

required to apply for a Title V permit. For more information, refer to [www.cdphe.state.co.us/ap/Titlev.html](http://www.cdphe.state.co.us/ap/Titlev.html)

➤ **RESOURCES**

- ❖ **The Small Business Assistance Program offers free and confidential assistance to small businesses with environmental questions.**

**Small Business Assistance Program: (303) 692-3175 or (303) 692-3148**  
**Small Business Ombudsman: (303) 692-2135**

**APCD Website: <http://www.colorado.gov/cdphe/apcd>**  
**COGCC Regulations Website: <http://cogcc.state.co.us/>**

- ❖ **Air Pollution Control Division (DIVISION): (303) 692-3100**

