



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# **Regulation 8: Organic Compounds Rule 34: Solid Waste Disposal Sites Concept Paper**

Prepared by Laura Cackette  
Bay Area Air Quality Management District  
May 2019

## Contents

1.	Background.....	1
2.	Purpose.....	1
3.	Regulatory Context.....	2
4.	Rule Concepts.....	3
5.	Emissions and Emission Reductions .....	4
6.	Stakeholders/Affected Industries .....	4
7.	Regulation 8, Rule 34 Schedule .....	5

# Regulation 8: Organic Compounds, Rule 34: Solid Waste Disposal Sites Concept Paper

## 1. Background

Solid waste disposal sites, also referred to as municipal solid waste landfills, are significant sources of methane and volatile organic compound emissions. As organic solid waste decomposes, it produces landfill gas via naturally-occurring bacterial processes. Landfill waste goes through several phases of decomposition. The first phase is aerobic decomposition (occurring in the presence of oxygen). Next, after all of the oxygen present in the waste has been consumed, the process shifts into phases that are anaerobic (occurring in the absence of oxygen). Decomposition continues to occur long after the solid waste is deposited in a landfill; landfills usually sustain landfill gas production for 20 years (with some known to produce gas for 50 years or longer).

Landfill gas contains mainly methane and carbon dioxide in roughly equal parts, plus small amounts of nitrogen, non-methane organic compounds, and hydrogen sulfide. Most of the non-methane organic compounds are ozone precursors; many are also toxic air contaminants and/or odorous compounds.

Air quality issues related to landfills stem from concerns regarding emissions of criteria pollutants (including odorous compounds), as well as climate pollutants (greenhouse gases, e.g., methane). If left uncontrolled, landfill gas may seep through the landfill surface and cause significant emissions of greenhouse gases (specifically, carbon dioxide and methane), precursor organic compounds, and toxic compounds to the atmosphere. Uncontrolled landfill gas also poses fire, health, and safety hazards. Landfill gas collection and control systems have been required by regulations for these reasons. However, landfill gas collection and control systems can also be sources of emissions, with those emissions coming from landfill gas processing or occurring as a result of fugitive leaks.

There are 38 solid waste disposal sites located within the Bay Area jurisdiction. Thirteen of those are actively accepting waste. Four are not actively accepting waste (inactive) and 21 are permanently not accepting waste (closed). All 38 landfills have landfill gas collection systems installed (as required by Air District Regulation 8, Rule 34<sup>1</sup>); the collected gas is either controlled and flared to the atmosphere or processed through energy recovery devices (such as turbines or internal combustion engines).

## 2. Purpose

Recent emissions research has shown that landfills are a much larger source of methane than previously thought. Current estimates of methane from landfills calculate mass emissions to be 1.3-2.3 times greater than emissions inventory numbers reflect. These findings have highlighted

---

<sup>1</sup> Rule 8-34, the first regulation to require installation of landfill gas collection systems, was passed by the Bay Area Air Quality Management District in 1984. It required installation of landfill gas collection systems by January 1, 1987. In the 1990s, under the Clean Air Act, the EPA passed regulations requiring installation of such systems nationally (40 CFR Subpart W and Subpart Cc).

that landfills are the single largest source of methane in the Bay Area. As a result, the Air District is prioritizing regulatory efforts to control those emissions.

The Air District aims to reduce emissions of methane and non-methane volatile organic compounds from solid waste disposal facilities and to improve the level of compliance for all facilities accepting and disposing of solid waste.

Many of the solid waste disposal sites in the Bay Area must comply with multiple rules and regulations. Harmonization among disparate requirements across the regulations, where possible, could ease burden on industry and make compliance simpler to achieve in practice. This harmonization could translate into greater enforcement and permitting consistency as well. Furthermore, state legislation mandating diversion of organic material from landfills (discussed in further detail in Section 3) is resulting in changes to the characteristics of the waste stream that arrives at landfills. It also has implications with respect to the use of organic materials as alternative daily cover at landfills.

A well-run operation minimizes emissions of methane and odors through facility planning and maintenance, monitoring and compliance testing, and utilization of best management practices (BMPs). Incorporating these concepts into Rule 8-34, through a public and well-vetted process, would help institutionalize practices that would result in lower emissions and greater operational efficiency.

### 3. Regulatory Context

#### *Short-lived Climate Pollutants / Methane*

The State of California has identified short-lived climate pollutants as an important group of air pollutants to address as part of its overall effort to fight climate change. Methane is the second-largest category of the greenhouse gas inventory worldwide and is a short-lived climate pollutant that is over 80 times more potent than carbon dioxide (on a 20-year basis).

In September 2016, Governor Brown signed Senate Bill 32, which mandated a greenhouse gas emissions reduction target of 40 percent below 1990 emission levels by 2030. Senate Bill 605 (Chapter 523, Statutes of 2014) requires the California Air Resources Board to develop a plan to reduce emissions of short-lived climate pollutants such as methane, and Senate Bill 1383 (Chapter 249, Statutes of 2016) requires the Air Resources Board to approve and implement a plan by January 2018 to achieve these reductions. SB 1383 also sets a target for reduction of methane emissions to 40 percent below 2013 levels by 2030. Pursuant to SB 605 and SB 1383, the Air Resources Board subsequently developed the Short-lived Climate Pollutant Reduction Strategy, adopted in March 2017. As part of this strategy, the California Department of Resources Recycling and Recovery (CalRecycle), in consultation with the Air Resources Board, is developing enforceable requirements to reduce the level of disposal of organic waste - statewide - by 50 percent (from 2014 levels) by 2020 and 75 percent (from 2014 levels) by 2025. CalRecycle is in the process of considering these regulations, which would take effect on or after January 1, 2022.

Additional legislation focusing on waste management and reducing short-lived climate pollutants includes AB 1594. The bill would require that beginning in 2020, the use of green waste at landfills as alternative daily cover is no longer credited as diversion and instead is considered disposal. Thus, the green waste used in that type of practice would not be counted towards the 50 and 75 percent diversion mandates in CalRecycle's Short-lived Climate Pollutant plan.

## Landfills

Currently, there are three levels of regulatory authority governing air emissions from landfills: federal, state, and local. Each tier of regulation has different language and different levels of stringency that are imposed in order to control emissions. Monitoring is required by other agencies as well.

The Air District first adopted Regulation 8: Organic Compounds, Rule 34: Solid Waste Disposal Sites in May of 1984. It has been updated several times, but not substantively since 1999. Rule 8-34 regulates emissions of both methane and non-methane organic compounds from landfill surfaces and landfill gas collection and control systems. It also sets a minimum destruction efficiency for landfill gas control systems and/or energy recovery devices. The regulation was amended in 1999 to align the Air District requirements with updates that were made to the federal requirements in 1996. In August 2016, the EPA updated their New Source Performance Standards and Emissions Guidelines again; the Air Resources Board subsequently submitted a Plan to EPA in 2017 proposing that their Landfill Methane Regulation, which was final as of 2010, be accepted as an “equivalent” to the new federal regulations. Following the change in federal administration, the EPA never formally responded to the proposed Plan submittal. However, the State Landfill Methane Rule has not been affected. Through a Memorandum of Understanding with the State, the Air District has been delegated authority to enforce both Rule 8-34 and the Landfill Methane Rule.

## 4. Rule Concepts

Air District staff is working to amend Rule 8-34 to better address methane emissions from landfills. This process is envisioned to occur in two phases. Phase 1 amendments to Rule 8-34 are envisioned to include 1) coordination and alignment with current State and federal regulations and 2) best management practices that will reliably reduce methane emissions. The first phase of updates is on schedule to go to the Board in the second quarter of 2020 for consideration. A second phase of amendments would occur subsequently, as ongoing and future research produces new findings to consider. Phase 2 would allow for a more flexible timeline within which research to inform best practices and emissions controls could occur.

This paper focuses on concepts for Phase 1. Draft amendments to Rule 8-34 would impact all solid waste disposal sites above a threshold amount of waste in place. Rule 8-34 currently applies to landfills with one million tons of decomposable solid waste in place. Potential updates would primarily focus on active landfills, since permanently closed landfills generate a declining volume of landfill gas over time.

The draft amendments could include best management practices that would address areas such as

- monitoring;
- inspection and maintenance programs;
- breakdown events;
- energy recovery device best practices;
- daily, intermediate and final covers; and
- working face management.

The Air District will also examine the existing state and federal regulations to identify areas where requirements can feasibly be made more effective, more practical, and/or more stringent.

With the goal of identifying best management practices that could be applied throughout the Bay Area, staff is working with stakeholders to understand the effectiveness of existing monitoring plans and inspection and maintenance programs at different landfill sites in the Air District's jurisdiction. Based on preliminary feedback, inspection and maintenance provisions, per Rule 8-34 and the state regulation, will be re-evaluated; Requirements in Section 113 of Rule 8-34 would be clarified.

The Air District is also conducting research in-house. As an area of initial investigation, staff is examining how characteristics - such as the material composition and the thickness of alternative daily cover materials - affect surface emissions of methane. Partnerships with other research efforts that have looked at methane emissions from landfills in California and the Bay Area are being leveraged to strengthen these ongoing analyses.

## 5. Emissions and Emission Reductions

Solid waste disposal can result in emissions of criteria pollutants and their precursors, greenhouse gases, and toxic air contaminants. Throughout the waste decomposition process, volatile organic compounds (including methane and non-methane organic compounds) are of most concern. The amount and types of emissions are dependent on several parameters, including waste and waste cover characteristics, stage in the decomposition process, temperature, moisture, and other climatic conditions.

Landfills are a major source of methane in the Air District's jurisdiction. The Air District adopted the Basin-wide Methane Strategy in its 2017 Clean Air Plan and engaged in efforts to better understand methane emissions in the nine-county Bay Area region. As a result of studies conducted as part of the Strategy, several points have become apparent: current emissions estimates (when conducted via top-down methods as compared to bottom-up methods) are significantly inconsistent; landfills are the largest category of stationary sources in the Bay Area contributing to the methane inventory, and more research is needed to better understand characteristics of landfills and their methane emissions. Enhanced emissions testing efforts in situ, to complement and validate top-down research results, are being conducted to further help identify problem areas to address.

## 6. Stakeholders/Affected Industries

This rule will potentially affect all 38 landfills in the Bay Area jurisdiction. Landfill owners and operators, environmental consultants, and members of the public and community advocacy groups are all likely stakeholders in the rule amendment process. These stakeholders and affected industry will be included in communications to ensure they are represented in our rule development process.

This year, staff initiated outreach regarding amending Rule 8-34. In the first quarter of this year, staff visited the Altamont Landfill. In April, two additional site visits were conducted; the first visit was to Sonoma Landfill and a second visit was to the Potrero Hills Landfill. The latter site visit was for data gathering purposes and was conducted in tandem with researchers from Cal Poly San Luis Obispo. Air District staff collected data using the agency's research van, which is equipped with advanced air emissions detection instrumentation. Readings for carbon dioxide, methane, and isotopic carbon ratios were collected and are currently being analyzed. Additional site visits will be scheduled to collect additional data – for more robust analyses and to

investigate the potential role of additional variables such as waste composition, seasonality, or wind direction.

## 7. Regulation 8, Rule 34 Schedule

Staff anticipates bringing proposed amendments to the Air District Board of Directors for consideration at a public hearing in the second quarter of 2020. Outreach efforts will continue in June 2019 with a series of public workshops during which the initial concepts for Rule 8-34, provided in this concept paper, will be discussed. At the workshops, draft Rule 13-2, which would address composting and organic materials handling, will be discussed most extensively; a workshop report and draft rule language will be available. A workshop report and draft regulatory language will also be available for Regulation 13, which is a foundational regulation for the Air District's planned source-specific rules that address climate pollutants. Concepts for Rule 13-4, which will address methane emissions from anaerobic digesters and wastewater treatment plants, will be discussed as well.

Staff will consider input and comments received before, during, and after the public workshops. They will take this feedback into account as they further develop the Rule 8-34 concepts into draft language that will then be presented at a second round of workshops to be scheduled.