



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

**Regulation 13: Climate Pollutants  
Rule 4: Sewage Treatment and  
Anaerobic Digestion  
Concept Paper**

Prepared by Misha Nishiki  
Bay Area Air Quality Management District  
May 2019

## Contents

1.	Background .....	1
2.	Purpose .....	1
3.	Regulatory Context .....	2
4.	Rule Concepts .....	2
5.	Emission Reductions .....	3
6.	Stakeholders/Affected Industries .....	3
7.	Regulation 13, Rule 4 Schedule .....	3

# Regulation 13: Climate Pollutants

## Rule 4: Sewage Treatment and Anaerobic Digestion

### Concept Paper

## 1. Background

Anaerobic digestion is a natural process in which microorganisms break down organic materials in an oxygen deprived environment. The main product of anaerobic digestion is biogas, which is mostly composed of methane, a potent climate pollutant, and carbon dioxide, with trace amounts of water vapor and other gases. The biogas produced through the anaerobic digestion process is a renewable energy source that is used to generate electrical power via internal combustion engines and turbines, distributed through the natural gas pipeline network to be used in homes and businesses, or further processed into compressed or liquified natural gas to fuel cars and trucks.

Commercial or industrial anaerobic digestion is usually conducted in vessels called, “anaerobic digesters” of which there are two types – wet and dry. Wet anaerobic digesters generally process feedstocks with a solids content less than 15 percent, and conversely, dry anaerobic digesters process feedstocks with a solids content greater than 15 percent.<sup>1</sup> Most wet anaerobic digesters within the Bay Area Air Quality Management District (Air District) are located at publicly owned treatment works, otherwise known as sewage treatment plants. There are also a handful of facilities that operate dry anaerobic digesters completely independent of sewage treatment plants. Draft Rule 13-4: Sewage Treatment and Anaerobic Digestion (draft Rule 13-4) is anticipated to regulate emissions of air pollutants from anaerobic digesters (both wet and dry) and sewage treatment plants.

The Air District expects an increase in the amount of organic material processed in the Bay Area due to recently passed legislation. In 2016, the California Legislature passed SB 1383, which requires the diversion of organic materials from landfills. SB 1383 established statewide organic waste diversion goals of 50 percent from 2014 levels by 2020 and 75 percent by 2025. Additionally, SB 1383 set methane reduction targets of 40 percent below 2013 levels by 2030. The mandatory diversion is anticipated to increase the amount of organic material being sent to anaerobic digesters, compost facilities, and other facilities that process organic material.

## 2. Purpose

Draft Rule 13-4 is being developed to minimize emissions of methane, greenhouse gases, and volatile organic compound emissions from anaerobic digesters and sewage treatment plants. Draft Rule 13-4 would implement portions of the Air District’s 2017 Clean Air Plan,<sup>2</sup> and is meant to create a consistent regulatory framework for the sewage treatment and anaerobic digestion industries.

The motivation behind this rule largely stems from the organic diversion targets set by the state. In a joint report, the California Air Pollution Control Officers Association, the California Air Resources Board, and CalRecycle estimated that over 12.5 million additional tons per year of

---

<sup>1</sup> <https://www.epa.gov/anaerobic-digestion/types-anaerobic-digesters>

<sup>2</sup> Control Measures: WA 2 – Composting Operations & Anaerobic Digesters and WR 1 – POTWs

organic material will need to be diverted from landfills by 2025.<sup>3</sup> The diversion of organic material will result in a significant increase of material being sent to traditional organic waste material processing facilities such as composting operations, anaerobic digesters, and by default, sewage treatment plants.

### 3. Regulatory Context

Currently, the Air District does not have a rule that specifically addresses methane, greenhouse gases, or volatile organic compound emissions from sewage treatment plants or anaerobic digestors. The Air District's wastewater collection and separation systems rule, Rule 8-8, specifically exempts publicly owned municipal wastewater treatment facilities from its standards.<sup>4</sup> However, both types of operations are subject to the permitting requirements of Rule 2-1: General Requirements<sup>5</sup>, the particulate standards of Rule 6-1: General Requirements, the odor concentrations of Reg 7: Odorous Substances, the volatile organic compound standards of Rule 8-2: Miscellaneous Operations, and the toxic standards of Rule 11-18: Reduction of Risk from Air Toxic Emissions at Existing Facilities.

No air district in the state has a rule that specifically regulates both sewage treatment plants and anaerobic digestors. In fact, no air district has a rule that specifically regulates anaerobic digestors outside of confined animal feed operations or dairy operations. South Coast Air Quality Management District and Antelope Valley Air Quality Management District are the only two air districts in the state that have rules specific to sewage treatment plants. However, neither rule specifically addresses or has requirements for anaerobic digestors located at sewage treatment plants. Other air districts have rules that only regulate anaerobic digestors located at confined animal feed operations and dairy operations.

Finally, there has been a suite of recently passed state legislation that addresses the reduction and diversion of organic material going to landfills. In 2014, SB 605 was signed into law and directed the California Air Resources Board to develop a comprehensive Short-Lived Climate Pollutant Reduction Strategy. In 2016, SB 1383 codified the Short-Lived Climate Pollutant Reduction Strategy, which established statewide organic waste diversion goals of 50 percent reduction of 2014 levels by 2020 and a 75 percent reduction of 2014 levels by 2025. Additionally, SB 1383 set methane reduction targets of 40 percent below 2013 levels by 2030. CalRecycle, the state agency tasked with implementing SB 1383, plans to adopt regulations in 2019 to meet the mandated organics diversion targets. The CalRecycle regulations will be enforced on, or after, January 1, 2022.

### 4. Rule Concepts

Draft Rule 13-4 would impact facilities operating any type of anaerobic digester and any facility treating sewage. A non-exhaustive list of facilities that will be potentially impacted by draft Rule 13-4 includes: sewage treatment plants, stand-alone anaerobic digester operations, and any other facility operating an anaerobic digester (wet or dry).

Draft Rule 13-4 would provide definitions for terms used to describe the anaerobic digestion and sewage treatment processes. It would also include standards to ensure that biogas is produced

---

<sup>3</sup> CAPCOA, ARB, CalRecycle. August 2018. Composting in California – Addressing Air Quality Permitting and Regulatory Issues for Expanding Infrastructure. <https://www2.calrecycle.ca.gov/PublicNotices/Documents/9215>.

<sup>4</sup> See Rule 8-8, Section 8-8-115

<sup>5</sup> Rule, 2-1, includes an exemption for wastewater pumping stations where no treatment is performed. See Rule 2-1, Section 2-1-128.20.

and collected in such a way as to minimize leaks or releases of methane into the atmosphere, and that emissions of other greenhouse gases and volatile organic compounds are minimized. These standards might include feedstock and digestate handling, leak detection and fugitive emissions minimization, flaring requirements, and recordkeeping. Additionally, draft Rule 13-4 would likely include best management practices that would address the handling of feedstock and end products, maintenance procedures, and likely require the recording and reporting of greenhouse gas emissions - especially methane.

## 5. Emissions and Emission Reductions

The treatment of public sewage and the operation of anaerobic digesters can result in the emissions of criteria pollutants and their precursors, climate pollutants (greenhouse gases), toxic air contaminants, and particulate matter. Anaerobic digestion results in the production of biogas, which is mainly composed of methane, carbon dioxide, and trace amounts of water vapor and other gases. A typical use of biogas generated by anaerobic digesters located at a sewage treatment plant is to power internal combustion engines or turbines to generate energy. The combustion of biogas results in emissions of criteria pollutants, including Nitrogen oxides, particulate matter, and reactive organic compounds.

Quantifying emissions, especially greenhouse gases emissions, from both industries is difficult because feedstock compositions are variable and typically outside the control of the processing facility. The variability in feedstock compositions affects the amount and type of emissions released. The upcoming state organic diversion requirements, which will divert food waste to processing facilities, will likely increase the inconsistency of feedstocks. The introduction and increase of food waste in feedstock going to anaerobic digesters may change the types and amount of emissions emitted. Pilot projects and studies have shown that introducing food waste to an anaerobic digester's feedstock often produces unpredictable results such as large spikes in biogas production as well as the rapid reproduction then subsequent die-off of mesophilic or thermophilic bacteria<sup>6</sup> in digester tanks.

## 6. Stakeholders/Affected Industries

This rule would affect facilities that treat public sewage and facilities that operate anaerobic digesters. Potentially affected facilities include sewage treatment plants and any facility operating an anaerobic digester – wet or dry. There are approximately 70 sewage treatment facilities currently operating in the Air District and approximately 45 facilities operating anaerobic digesters.

## 7. Regulation 13, Rule 4 Schedule

Air District staff anticipates bringing this rule before the Air District Board of Directors for consideration at a public hearing in the second quarter of 2020. Public outreach efforts will begin with a series of workshops in June 2019 to present initial rule concepts. Staff intend to present draft rule language and a draft Staff Report in support of draft Rule 13-4 at a series of public workshops in the fourth quarter of 2019. Staff will consider received comments, conduct socioeconomic and California Environmental Quality Act environmental analyses, and prepare a final draft of the rule and supporting documentation in advance of the Board Hearing.

---

<sup>6</sup> Thermophilic bacteria are the bacteria that can grow at high temperatures such as 45-122 °C while mesophilic bacteria grow at moderate temperatures such as 20-45 °C.