



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

**Regulation 13: Climate Pollutants  
Rule 2: Organic Material Handling  
Rule 3: Composting Operations  
Concept Paper**

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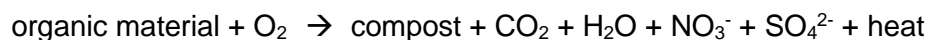
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# Regulation 13: Climate Pollutants, Rule 2: Organic Material Handling, and Rule 3: Composting Operations Concept Paper

## 1. Background

Composting is a controlled biological process of converting organic matter under aerobic conditions (in the presence of oxygen) into simple stable compounds in a solid substrate. This end-product (compost) is characterized by relatively short molecule chains, an absence of pathogens, and a high degree of humic compounds (major organic fraction of soil), making it a useful soil amendment to increase nutrients, soil structure, and reduce phytotoxicity. Microorganisms use oxygen to convert organic matter into compost while also producing carbon dioxide, water, nitrate, sulfate and heat. Chemically this relationship can be represented by the following:



Unfortunately, composting does not generally occur under ideal laboratory conditions. In real world conditions, volatile organic compounds (VOCs) and other odor causing compounds may be released during an intermediary step of the process and organic material may be converted to methane due to anaerobic or anoxic conditions (in the absence of oxygen). A well-run composting operation minimizes emissions of odors and methane through facility planning, adoption of best management practices (BMPs), odor impact monitoring, and implementation of biofiltration systems.

All composting facilities have the potential to generate odor complaints from the surrounding community, but poorly run operations are much more likely to have excess odors due to anoxic conditions. Since 2010, the Air District has received nearly ten thousand odor complaints related to facilities processing solid waste, and most of these complaints are specific to a relatively small number of facilities processing organic waste. As per California Health and Safety Code (H&SC) section 41705, odors emanating from composting operations are exempt from the Air District's nuisance provisions. As is the case with all complaints, Air District Compliance and Enforcement staff investigate the cause of these odor complaints but is not able to pursue enforcement action other than to provide the results of these investigations to the County Health Department or other local enforcement agency (LEAs).

In September 2016, Governor Brown signed Senate Bill 32, which mandated a greenhouse gas (GHG) 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 (ARB) to develop a plan to reduce emissions of short-lived climate pollutants (SLCPs), and Senate Bill 1383 (Chapter 249, Statutes of 2016) requires ARB to approve and implement a plan by January 2018 to achieve these reductions. SB 1383 also sets a target for reduction of methane emissions of 40 percent below 2013 levels by 2030. Pursuant to SB 605 and SB 1383, ARB subsequently developed the SLCP Reduction Strategy, adopted in March 2017. As part of this strategy, the California Department of Resources Recycling and Recovery (CalRecycle) in

consultation with ARB is developing regulations to reduce the level of statewide disposal of organic waste by 50 percent of 2014 levels by 2020 and 75 percent of 2014 levels by 2025. CalRecycle will consider adoption of these regulations by the end of 2018 to take effect on or after January 1, 2022.

The mandated diversion of organic material from landfills will result in an increase in compost production throughout California, particularly in the more populated areas of the state. In consultation with ARB and the California air pollution control officers association (CAPCOA), CalRecycle estimates that 12 to 15 new composting facilities will be needed in the Air District in order to process an additional 700 to 900 thousand tons per year of organic feedstock. There are currently 15 permitted compost facilities in the Air District processing between 750 thousand to 1 million tons per year of organic material. Some of these facilities may be expanded to accommodate a portion of the diverted material, but with roughly a doubling of the material processed in the Air District, a significant number of new and modified permit applications will need to be evaluated and subsequently issued.

## 2. Purpose

These two rules are being developed to minimize excess emissions of methane and odor causing compounds from all facilities, control VOC emissions from large facilities, and for consistency in compliance and permitting of all facilities handling and processing organic material. BMPs for storage piles at material processing and composting operations are intended to minimize excess emissions of methane and odors. Odor issues are largely dependent on the efficiency of material handling operations, and complaints may signal a lack of compliance with BMPs. Suggested BMPs will be enforceable by Air District staff. Composting facilities of significant size will be required to apply biofiltration for the control of VOCs in addition to compliance with BMPs for their operations. The codification into Rules 13-2 and 13-3 of control requirements currently found in existing permit conditions will ensure consistency for the anticipated new and modified sources needed to achieve the organics diversion goals detailed in the previous section.

## 3. Regulatory Context

Currently, the Air District does not have a rule that specifically addresses emissions from either composting operations or facilities handling organic material. However, both types of facilities would be subject to particulate standards of Rule 6-1 and VOC standards of Rule 8-2. The Air District's permitting Rule, 2-1, includes exemptions for solid waste transfer stations processing less than 50 tons per day (2-1-121.18) and composting and other similar facilities handling less than 500 tons per year (2-1-113.1.2). Any facility processing more than these amounts requires an Air District Permit and may be subject to new source review requirements of Rule 2-2 for criteria pollutants and Rule 2-5 for toxic compounds. Depending on emission levels, this could trigger implementation of best available control technology (BACT or TBACT for toxics) as well as VOC emission offsets.

As previously mentioned in the Background section of this paper, odors emanating from composting operations are exempt from the public nuisance provisions of Regulation 1. The Air

District's authority to enforce this prohibition is provided in section 41700 of the H&SC; however, section 41705 exempts composting operations from section 41700.

South Coast Air Quality Management District (South Coast) and San Joaquin Valley Air Pollution Control District (San Joaquin) are the only two air districts in the state to have specific rules for composting operations, but San Diego and Ventura Counties are currently developing rules for composting operations. South Coast and San Joaquin are both in severe or extreme non-attainment for state and federal ambient ozone standards. San Diego is adjacent South Coast and Ventura is adjacent to both South Coast and San Joaquin.

South Coast has a suite of rules governing composting operations as well as a rule to address odors from transfer stations and material recovery facilities. In 2003, South Coast adopted a general administrative rule for composting and related operations (Rule 1133), a rule to prevent inadvertent decomposition from chipping, grinding, and stockpiling (Rule 1133.1), and a rule to reduce VOC and ammonia emissions from composting operations of biosolids and manure (Rule 1133.2). In 2006, South Coast adopted a rule to address odors from transfer stations and material recovery facilities (Rule 410). In 2011, South Coast amended Rule 1133.1, and adopted a rule to reduce fugitive VOC and ammonia emissions from green waste composting operations (Rule 1133.3).

In 2007, San Joaquin adopted a rule to address VOC emissions from operations involving co-composting and management of biosolids, animal manure, and poultry litter (Rule 4565). In 2011, San Joaquin adopted a rule to limit VOC emissions from organic material composting (Rule 4566).

## 4. Rule Concepts

Draft Rule 13-2 would impact all facilities/stationary sources that sort, store, or otherwise handle organic material. A partial list of facilities that would be impacted by Rule 13-2 includes transfer stations, material recovery facilities, and any facility that actively composts or stores organic material. This rule is envisioned to cover any facility that handles organic material as it moves through the waste stream and may include facilities that store finished compost.

Draft Rule 13-3 would be limited to facilities that actively compost organic material. Active composting operations are those that place organic material into either traditional windrows or aerated static piles (ASP), with the intent to generate finished compost. Rule 13-3 would provide definitions for terms used to describe active composting operations. In addition, Rule 13-3 will likely require the implementation of abatement technology such as the use of finished compost cover on active piles or biofiltration for ASP, as well as metrics for determining the end of the active compost phase.

Both rules would include BMPs that address stockpile management to minimize VOC, methane, and other odor-causing emissions. The BMPs would address storage times for various phases, pile dimensions, feedstock content, and other parameters typically used by industry to monitor piles of organic material. Both rules would also include reporting requirements for types and quantity of feedstocks, residence times of piles, and the quantity of material exported from a site. Finally, specific testing methods may also be required.

## 5. Emissions and Emission Reductions

The composting process and associated handling of organic materials can result in emissions of criteria pollutants and their precursors, GHGs, and toxic air contaminants (TACs). Throughout the organic recovery process, particulate matter, ammonia, VOC, and odorous compounds are of most concern. Compost piles emit small amounts of carbon dioxide, methane and very small amounts of nitrous oxide. TACs include ammonia, acetaldehyde, isopropyl alcohol, methanol and naphthalene. Ammonia is not a cancer-causing compound and the carcinogenic TACs are all VOCs. The amount and types of emissions depend greatly on feedstock composition, stage in the process, temperature, humidity and other climatic conditions. Ammonia, odors and methane are indicative of poorly managed conditions and are best minimized through good facility design and the adoption of BMPs. BMPs can also address particulate emissions and to some degree VOC emissions. In the case of larger facilities, biofiltration or other control methods may be necessary to bring emissions of VOCs and their TAC component down to acceptable levels.

Emission estimation from this source category is difficult for several reasons. Established emission factors for VOC and ammonia (as compiled by ARB based on data provided by South Coast and San Joaquin) for composting operations are highly inconsistent. These established values are based on open windrow composting and emissions vary considerably through the entire composting process. Variability may be due to composition of the feedstock, geographic location, meteorological and seasonal conditions, and differences in operational process. Quantification of control factors for compost biofiltration caps are currently being investigated as is variability of emission factors for the compost process due to composition of feedstock. Research efforts are underway, but these studies are by no means complete. The research efforts at quantifying GHG emission factors are far less established.

The source inventory is not fully characterized and is subject to change due to the advance of organic diversion goals. Large scale composting operations require Air District permits so throughput is reasonably well known; however, the number and scale of smaller operations is less so. Currently 10 to 15 facilities in the Bay Area process 750 thousand to 1 million tons of compost a year. Feedstock consists mainly of green waste with small amounts of food waste, and smaller still amounts of biosolids or manure. Diversion goals will increase the number of facilities processing material by as much as a factor of two, but these goals will likely change the nature of feedstock with a decrease in the fraction of green waste as food waste and biosolids are added to the mix. This may lead to changes in the emission factors, operational methods, and methods of control for emissions. The number of facilities processing organic material in general is far less known, as the permitting threshold for solid waste transfer stations is larger than that for composting operations by a factor of 25. Again, due to diversion goals, the amount and composition of material processed by these facilities is dynamic.

## 6. Stakeholders/Affected Industries

These two rules will affect operations involving the supply, processing or consumption of organic materials and compost. A list of potentially affected facilities or operations includes landfills, transfer stations, waste haulers, municipal recycling facilities, landscaping companies, stand-alone composting operations, anaerobic digesters, and the municipal environmental health agencies charged with oversight of these facilities. In addition, community advocacy groups both

on the side of encouraging organic recovery efforts and those formed to address odor impacts from these facilities should be involved in our rule development efforts.

## 7. Regulation 13, Rules 2 and 3 Schedule

Rule development staff anticipates bringing these rules before the Air District Board of Directors for consideration at a public hearing in the third quarter of 2019. Public outreach efforts will begin with a series of workshops in November of 2018 to present the initial rule concepts for these rules and those for Regulation 13 along with draft rule language for Rule 13-1. Staff intends to present draft rule language and a draft staff report in support of rules 13-2 and 13-3 at a series of public workshops in the first quarter of 2019. Staff will consider comments received, conduct socioeconomic and CEQA analyses, and prepare final drafts of rules and supporting documentation in advance of the Board Hearing.