

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Amended Rule 1133 Series – Composting, Chipping and Grinding, and Related Operations

Proposed Amended Rule 1133 – Emission Reductions from Direct Land Application

Proposed Amended Rule 1133.1 – Chipping and Grinding Operations

Proposed Amended Rule 1133.2 – Emission Reductions from Co-composting Operations

Proposed Amended Rule 1133.3 – Emission Reductions from Composting Operations

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EXECUTIVE SUMMARY

Rule 1133 Series – Composting, Chipping and Grinding, and Related Operations (Rule 1133 Series) comprises four rules: Rule 1133 – Composting and Related Operations – General Administrative Requirements (Rule 1133), Rule 1133.1 – Chipping and Grinding Activities (Rule 1133.1), Rule 1133.2 – Emission Reductions from Co-composting Operations (Rule 1133.2), and Rule 1133.3 – Emission Reductions From Greenwaste Composting Operations (Rule 1133.3). Rule 1133 Series reduces volatile organic compound (VOC) and ammonia (NH₃) emissions from composting, reduces inadvertent decomposition from chipping and grinding activity, and gathers information regarding the compostable waste industry. Rule 1133 Series applies to chipping and grinding operations, operations that compost biosolids and manure, referred to as co-composting, and operations that compost greenwaste, foodwaste, and other compostable waste. Proposed Amended Rule (PAR) 1133 Series affects approximately 98 facilities within the South Coast AQMD and reduces emissions from the direct land application of uncomposted greenwaste and from legacy co-composting, calculated to be the source of 2.06 tons of VOC emissions per day and 0.31 ton of ammonia emissions per day.

Proposed amendments to each of the four rules are needed to implement Best Control Measure-10 (BCM-10) from the South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard (PM_{2.5} Plan) to further reduce VOC and ammonia emissions, precursors for the air contaminant fine particulate matter (PM_{2.5}) via atmospheric reactions with oxides of nitrogen (NO_x) to form ammonium nitrate. Proposed Amended Rule 1133 – Emission Reductions from Direct Land Application (PAR 1133) establishes restrictions and prohibitions on suppliers of uncomposted greenwaste for direct land application unless uncomposted greenwaste is applied in a manner to minimize VOC and ammonia emissions. Proposed Amended Rule 1133.2 – Emission Reductions from Co-composting Operations (PAR 1133.2) further reduces VOC and ammonia emissions by requiring legacy co-composters, one smaller co-composting facility in operation at the time of original rule adoption in 2003, to use best management practices when composting. Proposed Amended Rule 1133.1 – Chipping and Grinding Operations (PAR 1133.1), PAR 1133.2, and Proposed Amended Rule 1133.3 – Emission Reductions from Composting Operations (PAR 1133.3) contain the information gathering elements formerly located within Rule 1133 to enable PAR 1133 to implement BCM-10. PAR 1133 Series applies to a combined 98 facilities subject to PAR 1133.1, PAR 1133.2, or PAR 1133.3. Of these 98 facilities, PAR 1133 would apply to 86 facilities that transport uncomposted greenwaste offsite. The control strategies are expected to reduce VOC emissions by 1.3 tons per day and reduce ammonia emissions by 0.12 ton per day. The total cost of the control strategies is expected to be \$195,100 per year to implement. The overall cost-effectiveness of PAR 1133 Series is estimated to be \$400 per ton of VOC reduced and \$4,700 per ton of ammonia reduced.

Development of PAR 1133 Series was conducted through a public process. Three Working Group meetings were held on January 30, 2025, May 7, 2025, and June 5, 2025, respectively. The Working Group is composed of representatives from businesses, environmental groups, public agencies, and consultants. A Public Workshop will be held on July 9, 2025, where the proposed amended rule language will be presented to the general public and stakeholders to solicit comments. Staff also conducted multiple site visits as part of this rulemaking process.

CHAPTER 1: BACKGROUND

INTRODUCTION

PROCESS DESCRIPTIONS

REGULATORY BACKGROUND

AFFECTED FACILITIES

PUBLIC PROCESS

INTRODUCTION

Rule 1133 Series – Composting, Chipping and Grinding, and Related Operations (Rule 1133 Series) is a collection of four rules: Rule 1133 – Composting and Related Operations – General Administrative Requirements (Rule 1133), Rule 1133.1 – Chipping and Grinding Activities (Rule 1133.1), Rule 1133.2 – Emission Reductions from Co-composting Operations (Rule 1133.2), and Rule 1133.3 – Emission Reductions From Greenwaste Composting Operations (Rule 1133.3), to reduce volatile organic compound (VOC) and ammonia (NH₃) emissions from composting, to reduce inadvertent decomposition from chipping and grinding activity, and to gather information regarding the compostable waste industry. Rule 1133 Series applies to chipping and grinding operations, operations that compost biosolids and manure, referred to as co-composting, and operations that compost greenwaste, foodwaste, and other compostable waste. Proposed amendments to each of the four rules are needed to implement Best Control Measure-10 (BCM-10) from the South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard (PM_{2.5} Plan) to further reduce VOC and ammonia emissions, precursors for the air contaminant fine particulate (PM_{2.5}) via atmospheric reactions with oxides of nitrogen (NO_x) to form ammonium nitrate.

Proposed Amended Rule 1133 – Emission Reductions from Direct Land Application (PAR 1133) repurposes existing Rule 1133, the information-gathering rule for the compostable waste industry. PAR 1133 establishes restrictions and prohibitions on suppliers of uncomposted greenwaste for direct land application unless uncomposted greenwaste is applied in a manner to minimize VOC and ammonia emissions.

Proposed Amended Rule 1133.1 – Chipping and Grinding Operations (PAR 1133.1) applies to chipping and grinding operations and is meant to reduce inadvertent decomposition of materials not destined for use onsite. PAR 1133.1 more closely aligns rule language with statewide greenwaste handling rules, improving clarity and consistency.

Proposed Amended Rule 1133.2 – Emission Reductions from Co-composting Operations (PAR 1133.2) applies to operations that compost any amount of biosolids, the solid waste residue produced after digestion of sewage sludge at wastewater plants, or more than 20 percent manure by volume. PAR 1133.2 further reduces VOC and ammonia emissions by requiring legacy co-composters to use best management practices when composting. PAR 1133.2 also reduces exemption thresholds to reduce potential VOC and ammonia emissions.

Proposed Amended Rule 1133.3 – Emission Reductions from Composting Operations (PAR 1133.3) applies to all other composting operations that are not regulated by PAR 1133.2. PAR 1133.3 updates rule language for clarity and consistency with the other rules in the series. Lastly, the information gathering component of existing Rule 1133 is now located in PAR 1133.1, PAR 1133.2, and PAR 1133.3, respectively.

PROCESS DESCRIPTIONS

The compostable waste industry is a complex web of multiple media and differing pathways. Specific definitions for terms will be more closely described in Chapter 3 – Summary of Proposals. The wastes or byproducts of processing of wastes created by living beings such as plants, animals, and humans are utilized by the compostable waste to manufacture a variety of products for residential gardening, public landscaping, agricultural production, or other beneficial uses using mechanical equipment to produce directly or to assist biological processes via naturally-occurring

bacteria, archaea, and other organisms. The feedstocks for compost include greenwaste, woodwaste, foodwaste, biosolids, digestate, and manure.



Figure 1-1 – Greenwaste



Figure 1-2 – Woodwaste



Figure 1-3 – Foodwaste



Figure 1-4 – Biosolids



Figure 1-5 – Digestate



Figure 1-6 – Manure

The compostable waste industry is linked with fine particulate matter, or PM_{2.5}, emissions. PM_{2.5} may be emitted directly or PM_{2.5} precursors may be emitted from a variety of processes, interacting in the atmosphere to produce PM_{2.5}. NO_x and ammonia are significant precursors for PM_{2.5}, through the formation of ammonium nitrate. Ammonium nitrate is believed to contribute 20 to 35 percent of total PM_{2.5} in the region, varying by season and location.

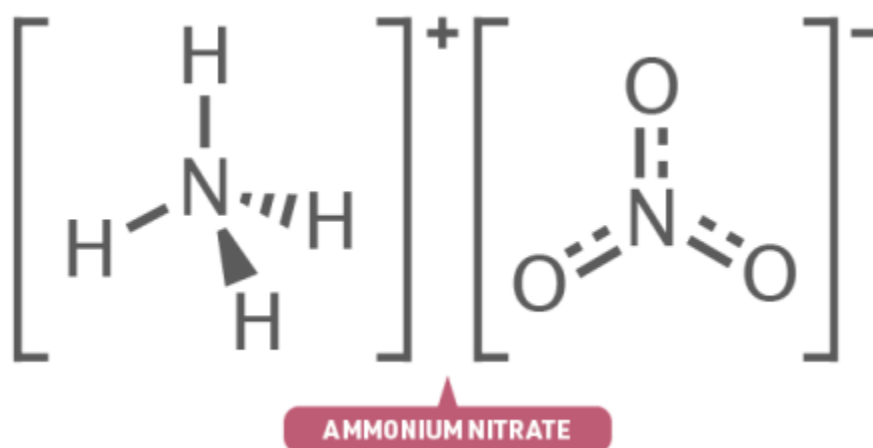


Figure 1-7 – Ammonium Nitrate

CHIPPING AND GRINDING

Chipping and grinding mechanically reduces the size of material using equipment like wood chippers, tub grinders, or horizontal grinders to increase surface area, to improve uniformity, and to increase usability. Chipping and grinding is often followed by and separate from screening and conveying to produce material to size specification and to remove stones. Screening and conveying may include magnets, suction, and water to remove metal and other contaminants. Greenwaste, woodwaste, and foodwaste are often chipped and ground, sometimes multiple times, to produce end products like wood chip for land covering, uncomposted greenwaste as a soil amendment for direct land application, or feedstock for composting. Prior to and after chipping and grinding, materials are stockpiled onsite. PM emissions are directed associated with chipping and grinding operations, and VOC and ammonia emissions are associated with stockpiling, both before and after the material is processed.

COMPOSTING

Composting is the aerobic decomposition of organic, carbon-based wastes and other feedstocks to produce a biologically-stable nutrient-rich soil amendment and usable byproducts. Common feedstocks for composting include: chipped and ground greenwaste; chipped and ground woodwaste and associated byproduct sawdust; and chipped and ground foodwaste. Composting feedstocks typically not requiring chipping and grinding include: biosolids, the solid byproduct of digestion of sewage; digestate, the solid byproduct of digestion of waste other than sewage; and manure, the waste and soiled bedding from animal keeping.

Under favorable biological conditions with consideration for temperature, moisture, oxygen levels, and pile shape, naturally-occurring bacteria, archaea, and other organisms consume the wastes and its byproducts for energy and reproduction. The elevated temperatures of composting also reduce pathogens like *E. coli* and other coliform bacteria and destroy weed seeds. Some specialized organisms consume VOC and ammonia as energy sources, such as the nitrifying bacteria *Nitrosomonas*. Composting may be divided into the active phase, when readily available energy sources are rapidly consumed under higher temperatures usually lasting a few days or weeks depending on oxygen supply and other factors, and the curing phase, a slower process typically lasting weeks or months. After composting, the product is screened to remove compost overs, a woody material byproduct, from finished compost, a humus-like material used as a soil amendment.

Composters may also produce a variety of land cover products that have completed some or all of the composting process. A medium-sized woody material may be produced from the product of active and curing phases of composting, sized larger than fine finished compost and smaller than coarse compost overs. Composters may also perform only the active phase of composting on uncomposted greenwaste to reduce pathogens and weeds in the product. Both of these products are often referred to as mulch. Mulch in common usage may also refer to uncomposted lawn clippings reapplied to lawns. Because the term “mulch” in common usage can refer to uncomposted, partially composted, or fully composted material, the term is not used in PAR 1133 Series rule language to avoid confusion. While screening and conveying are associated with the composting process, the feedstocks of composting must be moist to produce favorable biological conditions and are considered de minimus sources of PM emissions. Composting and stockpiling prior to composting are associated with VOC and ammonia emissions.

DIRECT LAND APPLICATION

Direct land application is the application of waste, byproducts, or finished products to raw land to protect soil or to add nutrients. Direct land application, as opposed to composting, is not under favorable biological conditions. For example, the only source of moisture is expected to be rain as opposed to composting's careful moisture management. As a result, biological processes that reduce emissions, such as nitrifying bacteria *Nitrosomonas*, are not expected to be active. Thus, decomposition of direct land applied materials, such as uncomposted greenwaste, is expected to result in more VOC and ammonia emissions than composting.

OTHER USES OF ORGANIC WASTE MATERIALS

Chipping and grinding, composting, and direct land application are not the only processes associated with the compostable waste industry. Chipped and ground greenwaste or foodwaste may be sent for anaerobic digestion with the resulting collected biogas used for energy or heat production. Woodwaste may be used as a fuel at biomass-fired power plants. Greenwaste, woodwaste, foodwaste, along with other solid wastes, are often burned at waste incinerators which also produce electricity.

REGULATORY BACKGROUND

The following is a summary of the air quality programs that affect the compostable waste industry.

FEDERAL CLEAN AIR ACT REQUIREMENTS

The federal Clean Air Act (CAA) obligates the United State Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for air pollutants. Six air pollutants commonly found in ambient air are known as “criteria air pollutants”, specifically: 1) ozone; 2) particulate matter (PM); 3) carbon monoxide; 4) lead; 5) sulfur dioxide; and 6) nitrogen dioxide. PM is further subdivided by the size of the particulate matter: PM10 for particulate matter smaller than 10 um (micrometer) in diameter and PM2.5, known as fine particulates, for particulate matter smaller than 2.5 um in diameter. There are three NAAQS for PM based on size and averaging time: 1) 24-hour PM10 standard; 2) 24-hour PM2.5 standard; and 3) annual PM2.5 standard.

In 2012, U.S. EPA lowered the primary annual NAAQS for PM2.5 to 12.0 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).¹ Under the CAA, there are two tiers of nonattainment for areas that fail to meet PM2.5 standards; “moderate” and “serious.” Nonattainment areas are classified by the U.S. EPA into one of these two tiers based on the levels of PM2.5 in the region. Effective April 15, 2015, the U.S. EPA designated the South Coast Air Basin (Basin) as a “moderate” nonattainment area for the 2012 annual PM2.5 NAAQS.² In the 2016 Air Quality Management Plan (AQMP), South Coast AQMD requested reclassification of the Basin to “serious” nonattainment for the 2012 annual PM2.5 standard as provided in the CAA. The 2016 AQMP was adopted by the South Coast AQMD Governing Board on March 3, 2017, and submitted to U.S. EPA for approval on April 27, 2017, via the California Air Resources Board (CARB). On December 9, 2020, U.S. EPA reclassified the Basin from “moderate” to “serious” nonattainment for the 2012 annual PM2.5

¹ National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3086 (January 15, 2013)

² Air Quality Designations for the 2012 Primary Annual Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS), 80 Fed. Reg. 2206 (Jan. 15, 2015)

NAAQS per South Coast AQMD's previous request, establishing an attainment deadline of December 31, 2025.³

SOUTH COAST AIR BASIN ATTAINMENT PLAN FOR THE 2012 ANNUAL PM2.5 STANDARD (PM2.5 PLAN)

To achieve attainment with the 2012 annual PM2.5 NAAQS, South Coast AQMD prepared the PM2.5 Plan,⁴ adopted by the South Coast AQMD Governing Board on June 7, 2024. Included in the PM2.5 Plan is a request for a 5-year extension to demonstrate attainment of the standard by December 31, 2030. Under CAA Section 188(e), areas classified as serious nonattainment seeking an extension of the attainment date are required to demonstrate that the attainment plan includes Most Stringent Measures (MSMs). Title 40 of the Code of Federal Regulations, Section 51.1000 (Subpart Z) states in pertinent part:

Most stringent measure (MSM) is any permanent and enforceable control measure that achieves the most stringent emissions reductions in direct PM2.5 emissions and/or emissions of PM2.5 plan precursors from among those control measures which are either included in the SIP for any other NAAQS, or have been achieved in practice in any state, and that can feasibly be implemented in the relevant PM2.5 NAAQS nonattainment area.

BCM-10 – Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste is identified as MSM and states:

This control measure seeks reductions in NH3 emissions from direct land application (DLA) of chipped and ground uncomposted greenwaste to agricultural land, public land for erosion control or roadway management, and consumers' properties for gardening or landscaping purposes. This control measure proposes to require composting of chipped and ground greenwaste, in accordance with the Best Management Practices (BMP) requirements of Rule 1133.3, prior to DLA.

A second control measure listed in the PM2.5 Plan for the compostable waste source category is BCM-11 – Emission Reductions from Organic Waste Composting. However, BCM-11 is not identified as MSM. The PM2.5 Plan states regarding BCM-11:

This control measure seeks emission reductions of NH3 from the processing of organic waste materials including foodwaste, greenwaste, and agricultural waste. Control approaches include foodwaste co-digestion and integration of anaerobic digestion (AD) with composting. If foodwaste is the only feedstock input to AD, the resulting digestate could be included into greenwaste composting where emission control is governed by Rule 1133.3. This control measure proposes to expand the applicability of Rules 1133.2 and 1133.3 to regulate the co-digestion of foodwaste with biosolids and the integration of foodwaste digestate with greenwaste composting for further emission reductions. An integrated AD-composting system will result in less overall waste and a more useful product.

³ Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2012 PM2.5 NAAQS, 85 Fed. Reg. 71264 (November 9, 2020)

⁴ [https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-\(sip\)-revisions/2012-annual-pm2-5-plan](https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-(sip)-revisions/2012-annual-pm2-5-plan)

PAR 1133 Series incorporates BCM-10 as MSM via amendments to Rule 1133. As BCM-11 is not an MSM and requires more study to assess impacts, it is not included in this rulemaking.

RULE HISTORY

Elements of Rule 1133 Series were originally adopted in 2003 and subsequent rulemaking occurred in 2011:

2003 ADOPTION OF RULE 1133, RULE 1133.1, AND RULE 1133.2

In 2003, adoption of Rule 1133, Rule 1133.1, and Rule 1133.2 occurred,⁵ partially implemented Control Measure WST-02 – Emission Reductions from Composting, which were included in the 1994 and 1997 AQMPs as well as in the 1999 amendment to the 1997 Ozone State Implementation Plan for the South Coast Air Basin. The control measure called for the development of an emissions inventory as well as identification of technically and economically feasible control options for composting operations.

Rule 1133 required composting and chipping and grinding facilities to register with South Coast AQMD, to pay a fee, and to provide their facility and throughput information along with annual updates of their throughput.

Rule 1133.1 established holding or processing time requirements for chipping and grinding activities in order to prevent inadvertent decomposition associated with stockpiling waste for extended periods of time.

Rule 1133.2 required new co-composting operations to enclose their active composting operations and to use forced-air aeration systems for their curing part of the operation to control 80 percent of their VOC and ammonia emissions. Rule 1133.2 also required existing co-composting operations to control 70 percent of their VOC and ammonia emissions.

2011 ADOPTION OF RULE 1133.3 AND AMENDMENT OF RULE 1133.1

In 2011, the South Coast AQMD Governing Board adopted Rule 1133.3 to implement Control Measure MCS-04 in the 2007 AQMP and amended Rule 1133.1 for consistency with statewide requirements for chipped and ground greenwaste.⁶

Rule 1133.3 established Best Management Practices (BMPs) for greenwaste composting operations for previously uncontrolled composting by requiring active phase compost piles be covered with at least six (6) inches of finished compost or compost covers within 24 hours of initial pile formation and requiring active phase compost piles be sufficiently wet prior to turning.

Rule 1133.1 amended the rule with a maximum holding time requirement of 48 hours or up to seven (7) days with Local Enforcement Agency (LEA) approval to conform to statewide requirements in the California Code of Regulations, Title 14, Division 7, Chapter 3.1.

FEDERAL PROGRAMS

Sewage Sludge Disposal Standards

U.S. EPA promulgated standards for the use or disposal of sewage sludge in Title 40, Chapter I, Subchapter O, Part 503 of the Code of Federal Regulations (40 CFR Part 503).⁷ 40 CFR Part 503

⁵ <http://www3.aqmd.gov/hb/2003/January/030131a.html>

⁶ <https://www.aqmd.gov/docs/default-source/agendas/governing-board/2011/2011-jul8-037.pdf>

⁷ <https://www.epa.gov/biosolids/sewage-sludge-laws-and-regulations>

contains requirements for the control of pathogens, vectors, and heavy metal for sludge composting operations. To qualify as Class A compost, Appendix B to Part 503 – Pathogen Treatment Process, generally requires processes to further reduce pathogens (PFRP). PFRP requires that open windrow composting maintain the temperature of the compost at 131 degrees Fahrenheit or higher for 15 days or longer, and during this time there must be a minimum of five (5) turnings of the windrows. For in-vessel or aerated static pile (ASP) composting, the RFRP requires the active pile temperature be at least 131 degrees Fahrenheit or higher for three (3) days. This process ensures that virtually all human pests and pathogens are destroyed. Since food residuals contain human pathogens, fungi, and bacteria, this PFRP should be met when foodwaste is being mixed with greenwaste for composting.

STATE PROGRAMS

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle oversees the state's waste management, recycling, and waste reduction programs, including organic materials management such as chipping and grinding operations and composting operations. CalRecycle develops statewide rules, including by emergency pathways, for these programs and, in the case of organic materials, assists in enforcement at the local level with training and support.

California Senate Bill (SB) 1383

In 2016, the state of California approved Senate Bill (SB) 1383 directing CalRecycle to implement a short-lived climate pollutant reduction strategy for methane emissions including compostable waste.⁸ SB 1383 set targets to reduce compostable waste such as greenwaste and foodwaste sent to landfills by 75% by 2025. SB 1383 and CalRecycle rule changes, such as the loss of diversion credit for greenwaste as alternative daily cover at disposal sites, have resulted in a significant increase of greenwaste, woodwaste, and foodwaste diverted away from disposal at landfills and towards chipping and grinding operations and composting operations.

Illegal Disposal Emergency Regulations

In 2025, in response to widespread illegal dumping and disposal of compostable waste and comingled waste in the Antelope Valley area of Los Angeles County, CalRecycle adopted emergency regulations that defined land application activities and place these activities within CalRecycle's regulations including operator filing requirements, state minimum standards, recordkeeping, and LEA inspection requirements.⁹ The emergency regulations were to ensure that land application of compostable material or digestate are appropriately regulated to ensure protection of public health and safety and the environment. The emergency regulations require testing of material prior to land application, limit land application of compostable material to six (6) inches in depth, capping farms at three (3) applications per year while all others just once per year, and restrict more material from being added until existing material is tilled or incorporated into soil.

⁸ <https://calrecycle.ca.gov/organics/slep/>

⁹ <https://calrecycle.ca.gov/laws/rulemaking/illegaldisposal/>

LOCAL PROGRAMS

In addition to South Coast AQMD regarding air quality issues, several other local programs exert significant control over chipping and grinding operations and composting operations with foci including solid waste issues, stormwater runoff, and land use.

Local Enforcement Agency (LEA)

Within the South Coast AQMD's jurisdiction, at least eight different Local Enforcement Agencies (LEAs) operate to ensure compliance with CalRecycle's statewide waste management program.¹⁰ LEAs have the primary responsibility for ensuring the correct operation and closure of solid waste facilities, including chipping and grinding operations and composting operations, in California. LEAs are typically programs within departments of city or county government, such as public health or building and safety. LEAs may also be special districts.

LEAs investigate complaints, receive and process Notifications, Registrations, and Permits for solid waste operations, including chipping and grinding and composting, and conduct periodic inspections of facilities. These activities of the various LEAs are reported to CalRecycle and maintained in a statewide database known the Solid Waste Information System or SWIS.¹¹ The types of solid waste activities found in this database include locations of Rule 1133 Series activity such as landfills, transfer stations, composting sites, and in-vessel digestion sites. For each site, the database contains information about the location, land owner, operator, activity type, regulatory and operational status, authorized waste types, LEA, inspections, and enforcement action records.

AFFECTED FACILITIES

PAR 1133 Series affects approximately 98 facilities within the South Coast AQMD based on a review of South Coast AQMD Permits to Operate, inspection reports, and Annual Emissions Reporting (AER) data, as well as the CalRecycle SWIS database. Using these tools, 43 facilities were detected that exclusively perform chipping and grinding subject to PAR 1133.1. A total of four facilities are considered co-composting operations and PAR 1133.2 applies. Lastly, 51 facilities perform composting subject to PAR 1133.3.

PUBLIC PROCESS

Development of PAR 1133 Series was conducted through a public process. Three Working Group meetings were held on January 30, 2025, May 7, 2025, and June 5, 2025, respectively. The Working Group is composed of representatives from businesses, environmental groups, public agencies, and consultants. The purpose of the Working Group meetings is to discuss proposed concepts and work through the details of South Coast AQMD's proposal. Additionally, a Public Workshop will be held on July 9, 2025. The purpose of the Public Workshop is to present the proposed amended rule language to the general public and stakeholders, and to solicit comments. Staff also conducted multiple site visits as part of this rulemaking process.

¹⁰ <https://www2.calrecycle.ca.gov/SolidWaste/LEA/Directory/>

¹¹ <https://www2.calrecycle.ca.gov/SolidWaste/Site/Search>

CHAPTER 2: BARCT ASSESSMENT

INTRODUCTION

BARCT ANALYSIS APPROACH

**ASSESSMENT OF SOUTH COAST AQMD REGULATORY
REQUIREMENTS**

ASSESSMENT OF EMISSION LIMITS FOR EXISTING UNITS

OTHER REGULATORY REQUIREMENTS

ASSESSMENT OF POLLUTION CONTROL TECHNOLOGIES

INITIAL BARCT EMISSION LIMIT AND OTHER CONSIDERATIONS

**COST-EFFECTIVENESS AND INCREMENTAL COST-
EFFECTIVENESS ANALYSES**

BARCT EMISSION LIMIT RECOMMENDATION SUMMARY

INTRODUCTION

PAR 1133 Series rule development was initiated in response to implement BCM-10 in the PM2.5 Plan. Additionally, South Coast AQMD periodically assesses rules to ensure that Best Available Retrofit Control Technology (BARCT) is reflected in rule requirements. To implement BCM-10 and ensure that Rule 1133 Series reflects BARCT, a BARCT assessment was conducted to identify the potential to further reduce emissions.

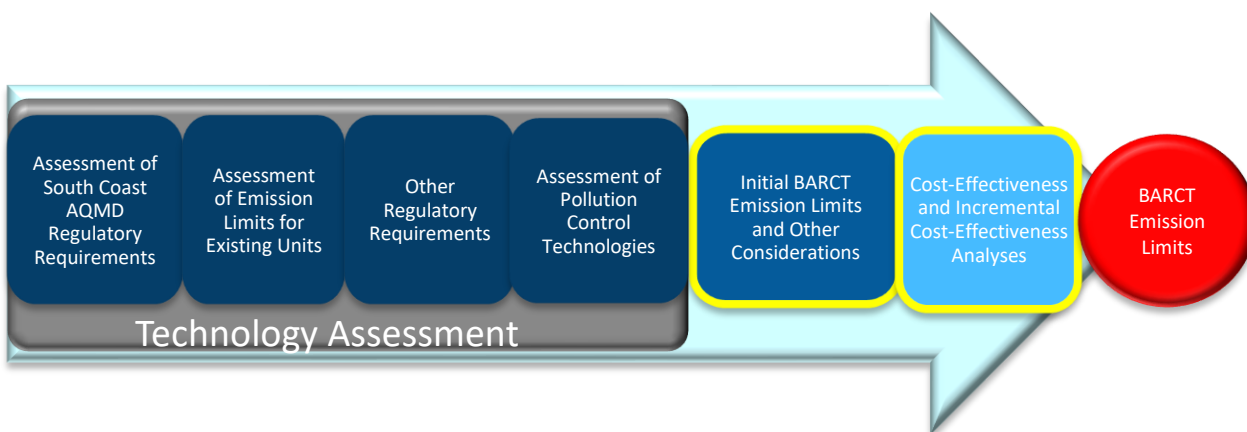
BARCT is defined in the Health & Safety Code Section 40406 as “an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.” Consistent with state law, BARCT emission limits take into consideration environmental impacts, energy impacts, and economic impacts. The BARCT analysis approach follows a series of steps conducted for each equipment category.

BARCT ANALYSIS APPROACH

The BARCT analysis approach follows a series of steps conducted for each operation type within PAR 1133 Series, specifically chipping and grinding operations subject to PAR 1133.1, co-composting operations subject to PAR 1133.2, and composting operations subject to PAR 1133.3. PAR 1133 regarding supply of uncomposted greenwaste, applies to all three types of operations.

The steps for BARCT analysis include:

- Assessment of South Coast AQMD Regulatory Requirements
- Assessment of Emissions Limits for Existing Units
- Other Regulatory Requirements
- Assessment of Pollution Control Technologies
- Initial BARCT Emission Limits and Other Considerations
- Cost-Effectiveness and Incremental Cost-Effectiveness Analyses
- BARCT Emission Limit



The BARCT assessment included a review of technologies and emission reduction strategies. As part of the technology assessment, a cost-effectiveness analysis was conducted for technologies with potential to reduce emissions. A cost-effectiveness analysis determines the cost per ton of pollutant reduced. In the 2022 AQMP, a cost-effectiveness threshold of \$36,000 per ton of VOC reduced was established. After adjusting for inflation, the cost-effectiveness threshold is \$41,400

per ton of VOC reduced (2024 U.S. Dollars). An incremental cost-effectiveness analysis was also conducted for proposed controls and monitoring methods to establish BARCT, if applicable, and is discussed in Chapter 4. At the present time, the South Coast AQMD Governing Board has not established a cost-effectiveness threshold for PM_{2.5} or PM_{2.5} precursor ammonia.

ASSESSMENT OF SOUTH COAST AQMD REGULATORY REQUIREMENTS

As part of the BARCT assessment, staff reviewed existing South Coast AQMD regulatory requirements that affect VOC and ammonia emissions for chipping and grinding operations, co-composting operations, and composting operations subject to the Rule 1133 Series. Chipping and grinding operations, subject to Rule 1133.1, must chip and grind greenwaste and utilize on-site or remove from the site within 48 hours of receipt, excluding official federal and state holidays, or up to 7 days maximum, with approval from the LEA. Co-composting operations, subject to Rule 1133.2, must conduct the active phase of composting of their various feedstocks including biosolids and manure within an enclosure and must conduct the curing phase of composting using an aeration system, vented to controls with equal to or greater than 80% control efficiency for VOC and ammonia, respectively. Composting operations, subject to Rule 1133.3, must use best management practices for their composting. If composting large amounts of foodwaste, an aeration system is required, venting to controls with equal to or greater than 80% control efficiency for VOC and ammonia, respectively.

ASSESSMENT OF EMISSION LIMITS FOR EXISTING UNITS

Staff examined the current requirements of air quality permits for facilities subject to the Rule 1133 Series, including permits to operate for chipping and grinding equipment, permits to operate for enclosures, aeration systems, and associated biofilters for co-composting operations, and aeration systems and associated biofilters for composting operations. Staff assessed the emission limits and practices of those existing units and determined that the emission limits of 80% control of VOC and ammonia emissions as well as best management practices were consistent with the emission limits and practices expressed in the existing Rule 1133 Series. Staff did not detect any required practices or emission limits more stringent than those required by the Rule 1133 Series.

OTHER REGULATORY REQUIREMENTS

As part of the BARCT assessment, staff examined chipping and grinding, co-composting, and composting rules promulgated by other jurisdictions. In 2007, the San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted SJVAPCD Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations (SJVAPCD Rule 4565). SJVAPCD Rule 4565 requires that operators of co-composting facilities with throughputs between 20,000 wet tons per year and 100,000 wet tons per year to implement a combination of four mitigation measures, designed to reduce VOC emissions by 40% when used in combination, consistent with Rule South Coast AQMD 1133.3 best management practices. South Coast AQMD Rule 1133.2 exempts co-composting operations, if in operation at the time of rule adoption in 2003, with a design capacity of less than 35,000 tons of throughput per year containing no more than 20 percent biosolids, by volume, from any control requirements.

In 2011, SJVAPCD adopted Rule 4566 – Organic Material Composting Operations (SJVAPCD Rule 4566). SJVAPCD Rule 4566 contains similar provisions to South Coast AQMD Rule 1133.2 regarding composting.

DISCUSSION REGARDING BEST CONTROL MEASURE-11 (BCM-11) – EMISSION REDUCTIONS FROM ORGANIC WASTE COMPOSTING

With the PM_{2.5} Plan, in addition to BCM-10, is a second control measure pertaining to the compostable waste industry, referred to as BCM-11. BCM-11 states:

This control measure seeks emission reductions of NH₃ from the processing of organic waste materials including foodwaste, greenwaste, and agricultural waste. Control approaches include foodwaste co-digestion and integration of anaerobic digestion (AD) with composting. If foodwaste is the only feedstock input to AD, the resulting digestate could be included into greenwaste composting where emission control is governed by Rule 1133.3. This control measure proposes to expand the applicability of Rules 1133.2 and 1133.3 to regulate the co-digestion of foodwaste with biosolids and the integration of foodwaste digestate with greenwaste composting for further emission reductions. An integrated AD-composting system will result in less overall waste and a more useful product.

While anaerobic digestion of foodwaste is technologically feasible, it is still in a research phase with several research foodwaste operations in place across South Coast AQMD. The California Air Pollution Control Officers Association (CAPCOA) is also studying foodwaste digestion and composting with their associated emission factors and is preparing to publish updated emission factors for those processes in the near future. Second, the compostable waste industry is currently in a period of transition, shifting from a disposal model to a reuse model under SB 1383. This transition has not been seamless with documented misconduct in neighboring jurisdictions. In addition, numerous waste facilities have recently ceased operating or had problematic operations, including Southeast Resource Recovery Facility (SERRF) in Long Beach, Commerce Refuse-to-Energy in the City of Commerce, Desert View Power (formerly Colmac Energy) in Mecca, El Sobrante Landfill in Corona, Chiquita Canyon Landfill in Castaic, and Sunshine Canyon Landfill in Sylmar. Implementing BCM-11 into rule language would be expected to take considerable time to account for emerging research and unintended consequences to the waste industry thus staff did not implement BCM-11 in this rulemaking. Staff will continue to monitor progress in the research to evaluate when such activities are deemed technologically feasible.

ASSESSMENT OF POLLUTION CONTROL TECHNOLOGIES

Staff assessed two approaches to reduce VOC and ammonia emissions from existing co-composting with design capacity of less than 35,000 tons per calendar year, described below.

BEST MANAGEMENT PRACTICES (BMPs)

Adopted as part of PR 1133.3 in 2011, a best management practice (BMP) for composting required applying finished compost or compost overs to the top of composting piles so that the peak is six (6) inches thick. Source tests demonstrated that the bulk of emissions escape from the top one-third of compost piles. Finished compost is required to be applied to active phase piles within 24 hours of initial pile construction. The finished compost or compost overs cover acts as a “pseudo-biofilter”, adsorbing VOC and ammonia emissions. A second BMP required that piles be

adequately wet prior to turning. According to a 2010 greenwaste mitigation measure study¹, the application of six inches finished compost to the surface of a greenwaste windrow resulted in a 53 percent reduction in VOC emissions for the 22-day active phase period compared to the regular greenwaste windrow without finished compost on it. In 2007 emissions study in Modesto², a 75 percent reduction in VOC emissions was achieved with a six inches layer of finished compost cover for the first two weeks of the active composting phase. Another 2010 emissions research paper³ using a compost cap of oversized materials screened from finished compost, known as compost overs, showed a reduction of average ozone formation by 27 percent in five-day-old piles and by 36 percent in 21-day-old piles. In their 2011 rulemaking, staff concluded that Rule 1133.3 BMPs reduce VOC emissions by 40% and ammonia emissions by 20%.

ENCLOSURE VENTED TO EMISSION CONTROL SYSTEM

Adopted as part of PR 1133.2 in 2003, non-exempt co-composting operations were required to conduct the active phase of composting within enclosures and to conduct the curing phase under negative pressure, both vented to controls. The minimum control efficiency of these measures must be 80% control of VOC emissions and 80% control of ammonia emissions.

INITIAL BARCT EMISSION LIMIT AND OTHER CONSIDERATIONS

Currently, there is no emission limit for existing co-composting operations with a design capacity of less than 35,000 tons throughput per year. Uncontrolled co-composting emission factors are 1.78 lbs VOC per ton of throughput and 2.93 lbs ammonia per ton of throughput, as published in South Coast AQMD document *Guidelines for Calculating Emissions from Greenwaste Composting and Co-Composting Operations*.⁴ Each of these facilities, if operating at their throughput limit, would be capable of emitting 31.1 tons of VOC and 51.2 tons of ammonia per year.

COST-EFFECTIVENESS AND INCREMENTAL COST-EFFECTIVENESS ANALYSES

BEST MANAGEMENT PRACTICES (BMPs)

The cost for BMPs as described in Rule 1133.3 adoption, at the time of that rulemaking, was determined to be \$1.15 per ton throughput. Adjusting for inflation based on the California Consumer Price Index from Year 2010 dollars to Year 2024 dollars results in an adjusted cost of \$1.73 per ton throughput. The annual cost to implement BMPs at a co-composting operation with a design capacity of 35,000 ton per year is calculated to be \$60,700 per year. The expected emission reductions associated with BMPs at a co-composting operation with a design capacity of 35,000 tons per year are calculated to be 12.4 tons of VOC per year and 10.3 tons of ammonia per year. At the low end, for a facility with a design capacity of 100 tons per year, the annual cost is

¹ SJVAPCD, 2010a. Comparison of Mitigation Measures for Reduction of Emissions Resulting from Greenwaste Composting, Project 09-01 CCOS Draft Final Report.

² CIWMB, 2007. Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley, Contractor's Report to the California Integrated Waste Management Board, October 31, 2007.

³ CalRecycle, 2010. An Investigation of the Potential for Ground-Level Ozone Formation Resulting from Compost Facility Emissions, Contractor's Report to the California Department of Resources Recycling and Recovery, December 2010.

⁴ <https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/greenwaste-and-composting.pdf>

expected to be \$173 per year with the expected emission reductions calculated to be 0.04 tons VOC and 0.03 tons ammonia per year.

ENCLOSURE VENTED TO EMISSION CONTROL SYSTEM

Cost data to implement enclosure vented to an emission control system was collected from facilities implementing enclosures to comply with other South Coast AQMD rules and from public data sources. Capital cost for construction on a negative pressure enclosure for a co-composting operation with design capacity of 35,000 tons per year is expected to be approximately \$9,570,000, with additional cost of \$75,000 for a biofilter emission control system. Recurring costs for operation of the enclosure vented to an emission control system, including maintenance and electricity to operate blowers to maintain a negative pressure environment, are expected to be \$1,000,000 per year.

In accordance with South Coast AQMD practice to use the Discounted Cash Flow method to account for capital costs, with an interest rate of 4% and life of equipment of 10 years yields $PVF_{(4,10)} = 8.11$. Thus, the Present Value to construct and to operate each enclosure vented to an emission control system over 10 years is calculated at \$17,760,000, or \$1,776,000. The expected emission reductions associated with control strategy are calculated to be 24.9 tons of VOC per year and 41.0 tons of ammonia per year.

Combining the costs with the associated emission reductions, Table 2-1 and Table 2-2 presents cost-effectiveness and incremental cost-effectiveness for each control strategy for both VOC and ammonia:

Table 2-1 BARCT VOC Assessment Summary		
Proposed Requirement	Best Management Practices	Enclosure Vented to Control
Annualized Cost (\$)	\$60,700	\$1,776,000
Emission Reductions (tons VOC/year)	12.4	24.9
Cost-Effectiveness (per ton VOC)	\$4,900	\$71,500
Incremental Cost- Effectiveness (per ton VOC)		\$138,000

Table 2-2 BARCT Ammonia Assessment Summary		
Proposed Requirement	Best Management Practices	Enclosure Vented to Control
Annualized Cost (\$)	\$60,700	\$1,776,000
Emission Reductions (tons ammonia/year)	10.3	41.0
Cost-Effectiveness (per ton ammonia)	\$5,900	\$43,400
Incremental Cost-Effectiveness (per ton ammonia)		\$56,000

Thus, for co-composting operations that began operating in 2003 or earlier with a design capacity of 35,000 ton or less, BMPs were found to be cost-effective with respect to VOC while enclosure with an emission control system was found not to be cost-effective or incremental cost-effective with respect to VOC.

Regarding Table 2-2, the South Coast AQMD Governing Board has not established an approved cost-effectiveness threshold for ammonia, as opposed to VOC or NO_x. The cost-effectiveness thresholds, established in the 2022 AQMP, for VOC and NO_x are \$36,000 per ton and \$325,000 per ton, respectively, and are adjusted annually for inflation. The reason for the disparity by almost an order of magnitude between the two cost-effectiveness thresholds is because the cost-effectiveness threshold for NO_x is a health benefit-based threshold, taking into account societal benefits, while the VOC cost-effectiveness threshold is not. Staff proposes to reexamine this control measure after the South Coast AQMD Governing Board establishes a cost-effectiveness threshold for ammonia.

BARCT EMISSION LIMIT RECOMMENDATION SUMMARY

Based on the BARCT assessment, staff proposes to require co-composting operations with a design capacity of less than 35,000 tons throughput per year to employ BMPs. Table 2-3 below shows the cost-effectiveness for the proposed requirement:

Table 2-3 BARCT Assessment Summary		
Proposed Requirement	Cost-Effectiveness (\$/ton VOC)	Cost-Effectiveness (\$/ton ammonia)
Best Management Practices	\$4,900	\$5,900

CHAPTER 3: SUMMARY OF PROPOSALS

INTRODUCTION

PROPOSED AMENDED RULE 1133 SERIES DEFINITIONS

PROPOSED AMENDED RULE 1133

PROPOSED AMENDED RULE 1133.1

PROPOSED AMENDED RULE 1133.2

PROPOSED AMENDED RULE 1133.3

INTRODUCTION

PAR 1133 Series is being amended to implement control measure BCM-10 from the PM2.5 Plan. PAR 1133 restricts the supply of uncomposted greenwaste for direct land application to certain operations or with certain techniques to reduce VOC and ammonia emissions. In addition, PAR 1133.2 requires certain legacy co-composting operations to begin to use best management practices at their operations. The proposed amendments also lower thresholds for exemption to further reduce potential emissions of VOC and ammonia.

The following describes the definitions for PAR 1133 Series and, for each operation-specific rule, the structure of the rule and explanations of the provisions incorporated. New provisions and any modifications to provisions that have been incorporated are also explained. PAR 1133 Series also includes grammatical and editorial changes for clarity.

PROPOSED AMENDED RULE 1133 SERIES DEFINITIONS

Several definitions are proposed to be added, deleted, or substantially modified for clarity and consistency across the entire PAR 1133 Series. Key definition changes are discussed below:

- *Active Phase* – consolidation of *Active Co-composting* and *Active Compost definitions*; modified to relocate time and testing requirements from Definition subdivisions to Requirement subdivisions.
- *Agricultural Operation* – new definition to replace *Agricultural Chipping and Grinding* and *Agricultural Composting definitions*; defined to refer to Rule 102 for consistency
- *Biomass Power Generation Facility* – new definition to implement acceptable uses for uncomposted greenwaste and better explain existing exemption for chipping and grinding operations. Biomass includes Greenwaste, Woodwaste, orchard removal trees and could also include material like biochar which is derived from Woodwaste.
- *Baseline Emission Factors* – deleted and replaced with mass emission limits for processes expressed in lbs of air contaminant per ton throughput; previous approach in rule text was to express alternate limits as percentage of control efficiency against *Baseline Emissions Factors*.
- *Biosolids* – new definition added to clarify newly-defined *Organic Waste Material*.
- *Chipping and Grinding Operation* – new definition to replace *Chipping and Grinding* and to standardize rule language across PAR 1133 Series to “operation”.
- *Co-composting Operation* – new definition to replace *Co-composting* and to standardize rule language across PAR 1133 Series to “operation”.
- *Compost Overs* – modified to remove qualifier “oversized”; the definition *Compost Overs* now includes both the oversized, coarse woody fraction following *Active Phase* and *Curing Phase* of composting as well as the midsized, medium screened woody fraction, sometimes referred to as compost mulch.
- *Composting Operation* – new definition to replace *Composting*, *Composting Operations*, and *Greenwaste Composting* and to standardize rule language across PAR 1133 Series to “operation”.
- *Control Efficiency* – new definition added for consistency and clarity and consolidate differing verbiage in rule text referring to emission reduction, control efficiency, or destruction efficiency.

- *Curing Phase* – consolidation with deleted *Curing* definition; modified to relocate time and testing requirements from Definition subdivisions to Requirement-type subdivisions.
- *Digestate* – new definition added to clarify newly-defined *Organic Waste Material*.
- *Digestion Operation* – new definition to implement acceptable uses for uncomposted greenwaste.
- *Direct Land Application* – new definition to implement restrictions for *Uncomposted Greenwaste*.
- *Existing Small-Capacity Co-composting Operation* – modification of existing definition *Existing Co-composting Operation* for clarity of implementation of BMPs for previously-exempt legacy co-composting operations.
- *Existing Greenwaste Composting Operations* – definition deleted as all phase-in time periods for requirements for legacy facilities have elapsed and distinction between new and existing facility types is no longer necessary.
- *Finished Compost* – consolidation of deleted *Compost* definition in various Rule 1133 series rules.
- *Foodwaste* – modification to reflect changes as a result of SB 1383. Previous definition labeled *Greenwaste* with any amount of *Foodwaste*, including table food scraps, as *Foodwaste*. SB 1383 encourages residences to dispose of food scraps with curbside *Greenwaste*. Definition clarifies that food scraps co-collected with residential curbside *Greenwaste* is considered *Greenwaste*, not *Foodwaste*.
- *Greenwaste* – consolidation of deleted definitions *Curbside Greenwaste*, *Mixed Greenwaste*, and *Non-Curbside Greenwaste*; definition modified to reflect changes as a result of SB 1383 and add clarity regarding sorting. As explained above in *Foodwaste*, *Greenwaste* includes food scraps co-collected with residential curbside *Greenwaste*. Larger woody waste, free of leaves and other green material, may be considered *Woodwaste* instead of *Greenwaste*.
- *Inadvertent Decomposition* – definition deleted as it is not used within rule requirements.
- *Intermediate Material* – new definition added to implement direct land application requirements; refers to land coverings that have undergone the *Pathogen Reduction Process* such as pathogen-reduced mulch.
- *Landclearing* – definition modified to add clarity and align with statewide regulations.
- *Manure* – new definition added to clarify newly-defined *Organic Waste Material*.
- *New Co-composting Operations* – definition deleted as all phase-in time periods for requirements for legacy facilities have elapsed and distinction between facility types is no longer necessary.
- *New Greenwaste Composting Operations* – definition deleted as all phase-in time periods for requirements for legacy facilities have elapsed and distinction between facility types is no longer necessary.
- *Operator* – definition deleted and newer verbiage “owner or operator” used throughout rule text.
- *Organic Material* – new definition added to implement direct land application requirements; refers to feedstocks, intermediate products, and final products of composting.
- *Organic Material Supplier* – new definition added to implement direct land application requirements; refers to facilities subject to PAR 1133 Series that supply *Organic Material*.

- *Organic Waste Material* – modification of previous definition *Organic Waste*; refers to feedstocks to produce intermediate or final products of composting, such as *Greenwaste*, *Woodwaste*, *Foodwaste*, *Biosolids*, *Digestate*, or *Manure*.
- *Palm Chipping and Grinding* – definition deleted as exemption that referred to this definition was deleted for inconsistency with statewide regulations.
- *Pathogen Reduction Process* – new definition added for consistency and clarity, referring to California Code of Regulations regarding statewide pathogen reduction requirements.
- *Portable Chipping and Grinding* – definition deleted as meaning was inconsistent with current interpretation of portable. For more information regarding the meaning of portable, refer to *California Air Pollution Control Officers Association (CAPCOA) Explanation & Examples of Uses of PERP* dated March 12, 2014.¹
- *Publicly-owned Small-capacity Co-composting Operation* – new definition added for clarity to implement requirements previously located in Exemption subdivision of Rule 1133.2; defined as owned or operated by a public entity and composting 5,000 tons per year or less of *Biosolids* and *Manure*, combined.
- *Rainy Day* - definition deleted as exemption that referred to this definition was deleted due to inconsistency with statewide regulations.
- *Recreational Facilities Composting* – definition deleted and consolidated with *Recreational Facility Composting*.
- *School Composting* – new definition added to implement new exemption to apply to composting performed at schools for educational purposes.
- *Solvita Maturity Index* – definition deleted and test method added to *Test Methods and Protocol* subdivision where needed.
- *Start Up* – definition deleted as all phase-in time periods for requirements for legacy facilities have elapsed and distinction between facility types is no longer necessary.
- *TMECC* – definition deleted and test method added to *Test Methods and Protocol* subdivision where needed.
- *Uncomposted Greenwaste* – new definition added to implement direct land application requirements; refers to *Greenwaste* that has not undergone the *Pathogen Reduction Process*. As *Intermediate Material*, *Finished Compost*, and *Compost Overs* have all completed pathogen reduction, they are not considered *Uncomposted Greenwaste*.
- *Wet Weather Conditions* – definition deleted as exemption that referred to this definition was deleted for inconsistency with statewide regulations.
- *Windrow Composting Process* – new definition added for clarity to distinguish between composting using elongated piles mechanically turned, as opposed to the aerated static pile (ASP) composting process using an *Aeration System* (previously defined).
- *Woodwaste* – definition modified to reflect changes as a result of SB 1383 and to add clarity regarding sorting. Larger woody waste, free of leaves and other green material, may be considered *Woodwaste* instead of *Greenwaste*.
- *Woodwaste Composting* – definition deleted as exemption that referred to this definition was deleted for inconsistency with statewide regulations.

¹ https://ww2.arb.ca.gov/sites/default/files/2018-11/capcoa_document_3-12-14.pdf

PROPOSED AMENDED RULE 1133 (PAR 1133)**PAR 1133 TITLE**

The title of PAR 1133 will be modified to “Emission Reductions from Direct Land Application” to more accurately reflect the intent of the rule, repurposed from its original intent as an information-gathering rule.

Subdivision (a) Purpose

The purpose of this rule is modified to identify the rule is repurposed to establish requirements and prohibitions on organic material for direct land application, instead of information gathering.

Subdivision (b) Applicability

The types of facilities applicable to this rule are the same facilities that are subject to any of the following: PAR 1133.1, PAR 1133.2, or PAR 1133.3. This is consistent with the approach in existing Rule 1133, although expressed slightly differently.

Subdivision (c) Definitions

Definitions for the entire PAR 1133 Series are discussed above with Proposed Amended Rule 1133 Series Definitions.

Subdivision (d) Requirements

PAR 1133 moves the existing information-gathering requirements of subdivision (d) to the various operation-specific rules of PAR 1133 Series.

New requirements are added on the supply of uncomposted greenwaste. PAR 1133 restricts organic material suppliers to supply uncomposted greenwaste only to six categories of facilities: 1) Co-composting operations; 2) Composting operations; 3) Digestion operations; 4) Biomass power generation facilities; 5) agricultural operations; and 6) outside South Coast AQMD. Currently, organic material suppliers are not restricted by South Coast AQMD rules on to whom they supply and may provide uncomposted greenwaste to anyone, including those that may not have the ability to minimize greenwaste decomposition emissions. PAR 1133 limits the supply of uncomposted greenwaste to only operations that can complete the aerobic composting or anaerobic digestion process (categories 1, 2, or 3), combust the greenwaste (category 4), properly apply the uncomposted greenwaste in a manner to minimize emissions (category 5), or remove from South Coast AQMD (category 6).

In addition, PAR 1133 further restricts the supply to agricultural operations only if the recipient informs supplier of their intent to use an acceptable direct land application technique: either 1) land incorporation by tilling, injecting, or plowing to depth of six (6) inches; or 2) cover uncomposted greenwaste with six (6) inches of finished compost or compost overs.

PAR 1133 acknowledges the LEA, enforcing the statewide regulations promulgated by CalRecycle, as the lead agency in the handling of solid waste and determining if land application at agricultural operations is conducted properly. PAR 1133 does not act as an administrative variance from LEA and CalRecycle requirements and organic material suppliers may not supply organic material unless otherwise allowed by the LEA.

Subdivision (e) Recordkeeping

PAR 1133 repurposes existing subdivision (e) *Registration Process* into *Recordkeeping* in order to demonstrate compliance with subdivision (d) *Requirements*. Records must be made to track

supply of uncomposted greenwaste, including recipient information, dates of supply, and quantity of material. Records must be maintained onsite for two (2) years and made available upon request.

Subdivision (f) Prohibitions

PAR 1133 repurposes existing subdivision (f) *Fees* into *Prohibitions* in order to restrict the supply of other organic waste materials with high potential to emit ammonia: 1) foodwaste; 2) biosolids; 3) digestate; and 4) manure. The existing requirement for chipping and grinding operations, co-composting operations, and composting operations to register with South Coast AQMD and submit a fee is eliminated.

Subdivision (g) Exemptions

PAR 1133 establishes a de minimus exemption amount of 100 tons of uncomposted greenwaste supplied, in place of the exemptions by facility type present in existing Rule 1133. Supply of 100 tons of uncomposted greenwaste for direct land application per year, as opposed to composting the uncomposted greenwaste, is expected to emit about one pound of VOC emissions per day and less than one pound of ammonia emissions per day, in keeping with South Coast AQMD guidance for de minimus sources.

PROPOSED AMENDED RULE 1133.1 (PAR 1133.1)

PAR 1133.1 TITLE

The title of PAR 1133.1 will be modified to “Chipping and Grinding Operations” for consistency with other rules in PAR 1133 Series to refer to an “operation” instead of an “activity”.

Subdivision (a) Purpose

The purpose of this rule is modified to use defined term chipping and grinding operation, similar to PAR 1133.1 title.

Subdivision (b) Applicability

The applicability of PAR 1133.1 is clarified to be chipping and grinding operations not subject to another operation-specific rule within the Rule 1133 Series. However, chipping and grinding operations, if generating chipped and ground greenwaste, woodwaste, or foodwaste for uses other than composting or co-composting onsite would be subject to Rule 1133.1, even if located at facilities that contain co-composting operations subject to Rule 1133.2 or at facilities that contain composting operations subject to Rule 1133.3. An example is a facility that contains a composting operation and also a chipping and grinding operation that generates chipped and ground greenwaste for use at a different offsite composting operation. In that example, the facility would comply with Rule 1133.1 to take measures to prevent inadvertent decomposition from that chipping and grinding operation.

Subdivision (c) Definitions

Definitions for the entire PAR 1133 Series are discussed above with Proposed Amended Rule 1133 Series Definitions.

Subdivision (d) Requirements

PAR 1133.1 leaves existing requirements unchanged with minor changes to rule text for capitalization and style.

Subdivision (e) Recordkeeping

PAR 1133.1 places recordkeeping and document retention requirements in subdivision (e) that were formerly located in subdivision (d) *Requirements*. Former subdivision (e) *Moisture Content Measurement* contained procedures for moisture testing for an exemption and are deleted. The moisture content exemption pathway was inconsistent with statewide rules and is eliminated.

Subdivision (f) Reporting

PAR 1133.1 relocates the information-gathering requirements of Rule 1133 and places them in each of the operation-specific rules of PAR 1133 Series. For chipping and grinding operations, the reporting requirements, formerly referred to as annual updates, are now located in subdivision (f) of PAR 1133.1. Forms for reporting will be updated and available at the South Coast AQMD website.

Subdivision (g) Exemptions

Formerly identified as subdivision (f), PAR 1133.1 modifies subdivision (g) *Exemptions* by lowering the de minimus exemption from 1,000 cubic yards of greenwaste (231 tons by calculation with default U.S. EPA conversion factors) to 100 tons of greenwaste per year. Chipping and grinding of 100 tons of greenwaste is expected to emit less than one pound of VOC emissions per day and less than one pound of ammonia emissions per day, in keeping with South Coast AQMD guidance for de minimus sources.

PAR 1133.1 also eliminates exemptions for palm chipping and grinding and chipped and ground curbside greenwaste held under 30 percent moisture content. These exemptions were inconsistent with statewide waste handling rules. PAR 1133.1 also eliminates exemptions for landfills and biomass power generation facilities that do not perform chipping and grinding of greenwaste onsite. As those facilities do not perform chipping and grinding onsite, they are not subject to PAR 1133.1 and do not require exemption.

PROPOSED AMENDED RULE 1133.2 (PAR 1133.2)**Subdivision (a) Purpose**

The purpose of the rule is unchanged with minor modifications for capitalization and style.

Subdivision (b) Applicability

The applicability of the rule is unchanged with minor modification for capitalization and style.

Subdivision (c) Definitions

Definitions for the entire PAR 1133 Series are discussed above with Proposed Amended Rule 1133 Series Definitions.

Subdivision (d) Requirements

PAR 1133.2 leaves existing requirements largely intact. Certain requirements for the active phase and curing phase of composting regarding time and testing, formerly located in subdivision (c) *Definitions*, are now in subdivision (d) *Requirements*. Active phase is complete 22 days after mixing co-composting feedstock or when product achieves a Solvita Compost Maturity Index of 4.5 or greater. Curing phase is complete 40 days after active phase is complete or when product achieves a Solvita Compost Maturity Index of 6.0 or greater or a respiration rate under 10 mg O₂ per gram volatile solids as measured by direct respirometry.

In addition, Rule 1133.2 formerly contained an alternative pathway to comply with the 80% control efficiency requirement for emission control systems for VOC and ammonia, respectively. This alternative path involved the use of a compliance plan per subdivision (e) and to demonstrate 80% control efficiency against baseline emission factors for co-composting (1.78 pounds of VOC emissions per ton throughput and 2.93 pounds ammonia emissions per ton throughput). PAR 1133.2 updates the alternative compliance pathway by eliminating the need for a compliance plan and instead requires demonstration of a mass emission rate of 0.35 lbs VOC emissions per ton throughput and 0.58 lbs ammonia emissions per ton throughput, which is 80% control efficiency against baseline emission factors for co-composting. Facilities may also comply by demonstrating 80% control efficiency for both VOC and ammonia against baseline emission factors or operation-specific emission factors, if approved by the Executive Officer.

Source testing requirements to demonstrate control efficiency or the mass emission rate are also updated by PAR 1133.2. PAR 1133.2 now requires source testing be performed within one (1) year of startup of the emission control system. After this initial performance source test, periodic source testing is still required every two (2) years, as in existing Rule 1133.2.

PAR 1133.2 also formalizes two additional compliance pathways, formerly located in subdivision (j) *Exemptions*. PAR 1133.2 now requires co-composting operations existing at the time of original rule adoption in 2003 with a design capacity of less than 35,000 tons throughput, formerly exempt from all controls, to comply with subdivision (d) or comply with windrow composting best management practices described in subdivision (e). PAR 1133.2 also now requires publicly-owned co-composting operations to comply with subdivision (d) or comply with an alternative pathway in subdivision (f), formerly located in Rule 1133.2 subdivision (j) *Exemptions*.

Subdivision (e) Existing Small-capacity Co-composting Operation Alternative

PAR 1133.2 eliminates the existing *Compliance Plan* requirements formerly located in subdivision (e) and repurposes the subdivision for windrow composting process best management practices, adopted in Rule 1133.3. See PAR 1133.3 subdivision (d) *Requirements* for a thorough explanation of the windrow composting process best management practices. Subdivision (e) is a compliance alternative for existing small-capacity co-composting operations instead of complying with subdivision (d) and enclosure and emission control system requirements.

Subdivision (f) Publicly-owned Small-capacity Co-composting Operation Alternative

PAR 1133.2 relocates a compliance alternative for smaller municipal co-composting operations, formerly located in subdivision (j) *Exemptions*, into dedicated subdivision (f). Subdivision (f), formerly titled *Compliance Schedule*, contained compliance deadlines that are now all in the past and have been deleted. Subdivision (f) is a compliance alternative for publicly-owned small-capacity co-composting operations instead of complying with subdivision (d) and enclosure and emission control system requirements.

This compliance alternative has also been updated to allow either 1) demonstration of 80% control of VOC emissions and 80% control of ammonia emissions or 2) demonstration of 80% control of the baseline emission factors, by demonstration of a mass emission rate of no more than 0.35 lbs VOC emissions per ton throughput and no more than 0.58 lbs ammonia emissions per ton throughput. Facilities may also comply by demonstrating 80% control efficiency for both VOC and ammonia against baseline emission factors or operation-specific emission factors, if approved by the Executive Officer.

Subdivision (g) Test Methods and Protocol

Formerly titled *Testing and Protocol*, PAR 1133.2 modifies subdivision (g) by adding updated source testing expectations consistent with other recently adopted or amended rules. PAR 1133.2 requires a source test protocol be submitted prior to source testing, to submit a new protocol if equipment is changed or if requested by the Executive Officer, to conduct source testing in accordance with the valid approved source test protocol, and to submit the source testing report within 60 days of sampling. PAR 1133.2 also updates the subdivision for style and clarity, and add references to test methods for Solvita Compost Maturity Index and direct oxygen respirometry, consistent with Rule 1133.3.

Subdivision (h) Recordkeeping

PAR 1133.2 updates the subdivision by listing records required to be maintained by co-composting operations and by expressing the record retention requirements in language consistent with the other rules within PAR 1133 Series.

Subdivision (i) Reporting

PAR 1133.2 relocates the information-gathering requirements of Rule 1133 and places them in each of the operation-specific rules of PAR 1133 Series. For co-composting operations, the reporting requirements, formerly referred to as annual updates, are now located in subdivision (i) of PAR 1133.2. The requirements of existing Rule 1133.2 subdivision (i) *Plan Fees* are no longer appropriate as PAR 1133.2 deleted reference to compliance plans. Forms for reporting will be updated and available at the South Coast AQMD website.

Subdivision (j) Exemptions

PAR 1133.2 updates the exemptions of Rule 1133.2 by eliminating the exemption for existing small-capacity co-composting operations and relocating the requirements for publicly-owned co-composting operations to subdivision (f). PAR 1133.2 also lowers the existing de minimus throughput exemption from 1,000 tons of throughput per year to 100 tons of throughput per year. Using baseline emission factors for co-composting, exempt co-composting operations could emit as much as five pounds of VOC emissions per day and eight pounds of ammonia emission per day. By lowering the de minimus exemption limit by a factor of ten and calculated using baseline emission factors, exempt co-composting operations will emit less than one pound of VOC emissions per day and less than one pound of ammonia emissions per day, consistent with South Coast AQMD practice.

Attachment A - Guidelines for the Development of Source Test Protocols for VOC and Ammonia Emissions from Co-Composting Operations

PAR 1133.2 updates Attachment A by refining minimum flux sample locations and piles tested and also standardizing rule language for capitalization, consistency, and clarity with the other rules in PAR 1133 Series.

PROPOSED AMENDED RULE 1133.3 (PAR 1133.3)**PAR 1133.3 TITLE**

The title of PAR 1133.3 will be modified to “Emission Reductions from Composting Operations” for clarity. Previously, the rule title referenced “greenwaste composting” and, as foodwaste

composting is expected to increase as a result of increased compliance with SB 1383, the title change improves communication that the rule applies to composting of foodwaste as well.

Subdivision (a) Purpose

The purpose of the rule will have minor modifications for capitalization and style.

Subdivision (b) Applicability

PAR 1133.3 makes minor changes to the applicability of the rule, by specifying rule applies to all composting operation except those operations subject to Rule 1133.2. This is a change to improve clarity but is not expected to increase or decrease the number of operations subject to rule.

Subdivision (c) Definitions

Definitions for the entire PAR 1133 Series are discussed above with Proposed Amended Rule 1133 Series Definitions.

Subdivision (d) Requirements

PAR 1133.3 leaves existing requirements largely intact. Certain requirements for the active phase and curing phase of composting regarding time and testing, formerly located in subdivision (c) *Definitions*, are now in subdivision (d) *Requirements*. Active phase is complete 22 days after mixing composting feedstock or when product achieves a Solvita Compost Maturity Index of 4.5 or greater. Curing phase is complete 40 days after active phase is complete or when product achieves a Solvita Compost Maturity Index of 6.0 or greater or a respiration rate under 10 mg O₂ per gram volatile solids as measured by direct respirometry.

PAR 1133.3 clarifies existing Rule 1133.3 language that aeration system venting to an emission control system, known as aerated static pile (ASP) composting, is only required for composting operations that process more than 5,000 tons of foodwaste per year and only for piles with more than 10% foodwaste, by weight. At facilities that process less than 5,000 tons of foodwaste per year, ASP composting process or windrow composting process may be used. At facilities that process more than 5,000 tons of foodwaste per year, any pile with less than 10% foodwaste, by weight, may be composted with the windrow composting process, without an aeration system.

PAR 1133.3 clarifies windrow composting best management practices (BMPs) language. For the windrow composting process, BMPs include:

- 1) Cover each active phase pile within 24 hours with finished compost or compost overs so that the top of the pile cover is at least six (6) inches thick.
- 2) Ensure that prior to turning an active phase pile, the pile is sufficiently wet at a depth of three (3) inches by the Squeeze Ball Test.

Windrow composting BMPs language was modified to improve clarity and consistency. PAR 1133.3 also retains rule language that allows for alternatives to the squeeze ball test, such as moisture sensors, and alternatives to BMPs if able to demonstrate at least 40% control of VOC emissions and 20% control of ammonia emissions, consistent with expected performance of BMPs.

PAR 1133.3 updates aeration system requirements, by integrating the alternative compliance pathway as a mass emission limit for emission control systems. Rule 1133.3 formerly contained an alternative pathway to comply with the 80% control efficiency requirement for emission control systems for VOC and ammonia, respectively. This alternative path involved demonstrating 80%

control efficiency against baseline emission factors for the active phase of composting (4.25 pounds of VOC emissions per ton throughput and 0.46 pounds ammonia emissions per ton throughput). PAR 1133.3 updates the alternative compliance pathway by requiring demonstration of a mass emission rate of 0.85 pounds VOC emissions per ton throughput and 0.092 pounds ammonia emissions per ton throughput, which is 80% control efficiency against baseline emission factors for the active phase of composting. Facilities may also comply by demonstrating 80% control efficiency for both VOC and ammonia against baseline emission factors or operation-specific emission factors, if approved by the Executive Officer.

Source testing requirements to demonstrate control efficiency or the mass emission rate are also updated by PAR 1133.3. PAR 1133.3 now requires source testing be performed within one (1) year of startup of the emission control system. After this initial performance source test, periodic source testing is still required every three (3) years, as in existing Rule 1133.3.

Subdivision (e) Test Methods and Protocol

PAR 1133.3 modifies subdivision (e) by adding updated source testing expectations consistent with other recently adopted or amended rules. PAR 1133.3 requires a source test protocol be submitted prior to source testing, to submit a new protocol if equipment is changed or if requested by the Executive Officer, to conduct source testing in accordance with the valid approved source test protocol, and to submit the source testing report within 60 days of sampling. PAR 1133.3 also updates the subdivision for style and clarity.

Subdivision (f) Recordkeeping

PAR 1133.3 updates the subdivision by listing records required to be maintained by composting operations and by expressing the record retention requirements in language consistent with the other rules within PAR 1133 Series.

Subdivision (g) Reporting

PAR 1133.3 relocates the information-gathering requirements of Rule 1133 and places them in each of the operation-specific rules of PAR 1133 Series. For composting operations, the reporting requirements, formerly referred to as annual updates, are now located in subdivision (g) of PAR 1133.3. Forms for reporting will be updated and available at the South Coast AQMD website.

Subdivision (h) Exemptions

Formerly organized as subdivision (g), PAR 1133.3 updates the exemptions of Rule 1133.3 by eliminating two non-essential exemptions: 1) Operations subject to Rule 1133.2 are now not subject to PAR 1133.3 by exclusion in subdivision (b) *Applicability*; and 2) Operations using aeration system or ASP composting are not subject to windrow composting BMPs per subdivision (d) *Requirements*.

PAR 1133.3 establishes a de minimus throughput exemption of 100 tons of throughput per year, consistent with the other rules of PAR 1133 Series. Using baseline emission factors for composting, exempt composting operations could emit as much as one pound of VOC emissions per day and less than one pound of ammonia emission per day, consistent with South Coast AQMD practice. PAR 1133.3 also establishes a school composting exemption, for composting at a public or private school for the purpose of education.

Attachment A - Guidelines for the Development of Source Test Protocols for VOC and Ammonia Emissions from Composting Operations

PAR 1133.3 updates Attachment A by refining minimum flux sample locations and piles tested and also standardizing rule language for capitalization, consistency, and clarity with the other rules in PAR 1133 Series.

CHAPTER 4: IMPACT ASSESSMENTS

INTRODUCTION

EMISSION REDUCTIONS

COSTS AND COST-EFFECTIVENESS

INCREMENTAL COST-EFFECTIVENESS

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COMPARATIVE ANALYSIS

INTRODUCTION

Impact assessments were conducted as part of PAR 1133 Series rule development to assess the environmental and socioeconomic implications. These impact assessments include emission reduction calculations, cost-effectiveness and incremental cost-effectiveness analyses, a socioeconomic impact assessment, and a California Environmental Quality Act (CEQA) analysis. Staff will prepare draft findings and a comparative analysis pursuant to Health and Safety Code Sections 40727 and 40727.2, respectively.

EMISSION REDUCTIONS

PAR 1133 achieves VOC and ammonia emission reductions largely through two strategies: 1) restricting the supply of uncomposted greenwaste only to certain facilities and, in some cases, only if using certain mitigation measures; and 2) requiring smaller legacy co-composting operations to use best management practices.

Quantification of both VOC and ammonia emissions from direct land application of uncomposted greenwaste has not been studied directly. As mentioned earlier, CAPCOA is studying VOC and ammonia emission factors for the compostable waste industry and is preparing to publish updated emission factors for those processes in the near future. Recent source testing of direct land application has emphasized greenhouse gas emissions. Additionally, nitrogenous compounds other than ammonia have been studied. Several older source tests have been performed over the past quarter century at composting facilities where stockpile operations have also been studied. The emission data from stockpile operations are expected to more accurately model the emission profile of direct land application than composting operations as stockpiling will not have careful pile construction or moisture monitoring that composting operations exhibit. For reference, the default South Coast AQMD uncontrolled composting emission factors are 4.67 lbs VOC and 0.66 lbs ammonia per ton of throughput.

After a review of source test reports, five results were discovered that present both VOC and ammonia emission factors for greenwaste stockpile operations. The longest timeframe published in these source test reports was 90 days. One result is excluded as an outlier: according to source test report, the stockpile also contained winery waste and the resulting VOC and ammonia data differs by one-half to two orders of magnitude, respectively. Also presented are default stockpile emission factors. SJVAPCD has published¹ in their Compost Emission Factor Report, revised March 21, 2023, VOC and ammonia emission factors for organic material stockpile. The results of those source tests and default emission factors, normalized across a 90 day time period, are presented below in Table 4-1 and Table 4-2, respectively:

¹ <https://ww2.valleyair.org/media/hdsoobtp/criteria-compost-emission-factors-report-final-voc-nh3-3-21-23.pdf>

Table 4-1 VOC Emission Factors from Source Testing and Default Factor			
Source	VOC Emissions (lbs/ton)	Timeframe (days)	Emission Factor (lbs/ton/90 days)
Zamora Facility	11.34	90	11.34
Vacaville Facility	2.95	7	37.93
Colton Facility (winter)	0.909	9	9.09
Colton Facility (fall)	2.793	21	11.97
Average of source test results			17.58
SJVAPCD stockpile emission factor	0.2	1	18.0

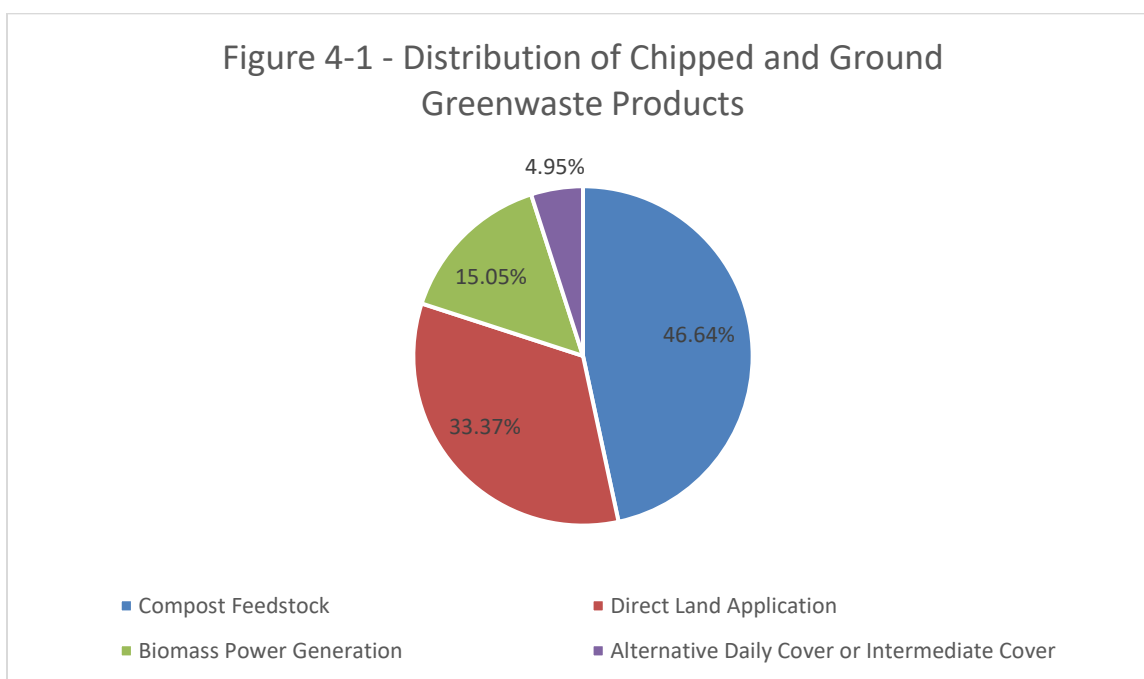
Table 4-2 Ammonia Emission Factors from Source Testing and Default Factor			
Source	Ammonia Emissions (lbs/ton)	Timeframe (days)	Emission Factor (lbs/ton/90 days)
Zamora Facility	1.64	90	1.64
Vacaville Facility	0.07	7	0.90
Colton Facility (winter)	0.063	9	0.63
Colton Facility (fall)	0.693	21	2.97
Average of source test results			1.54
SJVAPCD stockpile emission factor	0.02	1	1.8

For the purpose of quantifying emissions associated with direct land application over one year, the emission factors of 17.58 lbs VOC and 1.54 lbs ammonia per ton of throughput, respectively, will be used. Although not studied over an entire year, these stockpile emission factors normalized

across a 90 day time period represent the most accurate representation of VOC and ammonia emissions associated with direct land application. These emission factors are consistent with the default SJVAPCD stockpile emission factors, extrapolated across 90 days. These emission factors are also consistent with the South Coast AQMD default uncontrolled composting emission factors, considering direct land application is not in favorable biological conditions, unlike composting, and certain organisms that consume VOC and ammonia are not expected to be active in a direct land application setting.

Next, staff reviewed Rule 1133 Annual Updates submitted to South Coast AQMD. Of the 98 facilities detected subject to Rule 1133 Annual Updates, 44 facilities submitted at least one Rule 1133 Annual Update over the past 12 years. Almost all of the 98 facilities are also included in the CalRecycle SWIS database and have facility profiles with acreage and periodic inspection reports including facility activity. Using submitted data and reported acreage, staff developed a conversion factor to calculate projected chipping and grinding activity from acreage and projected composting activity from acreage. Using these methods, staff developed an estimate of the total amount of chipping and grinding of greenwaste at 2,460,000 tons per year.

Staff also reviewed each facility's most recently submitted Rule 1133 Annual Updates to determine the distribution of the products of greenwaste chipping and grinding. Based on those reports, the products of greenwaste chipping and grinding are distributed as shown in Figure 4-1:



Based on these data, staff concluded that 33.37% of chipped and ground greenwaste is used for direct land application, or approximately 820,800 tons. After discussions with operators, staff believes that approximately 90% of chipping and ground greenwaste for land application has either undergone the pathogen reduction process or is applied by land incorporation tilling. The remaining 10%, or 82,080 tons, is the focus of the direct land application restrictions.

PAR 1133 proposed two acceptable direct land application techniques: 1) land incorporation by tilling, injecting, or plowing; or 2) cover uncomposted greenwaste with finished compost or compost overs. Land incorporation of uncomposted greenwaste was the focus of a 2015 CalRecycle research study, conducted by the University of California, Davis, titled *Research to Evaluate Environmental Impacts of Direct Land Application of Uncomposted Green and Woody Wastes on Air and Water Quality*.²

The 2015 study found that tilling uncomposted greenwaste to a depth of six (6) inches reduces VOC and nitrogenous compound emissions to near background levels, according to Figure 4-2.

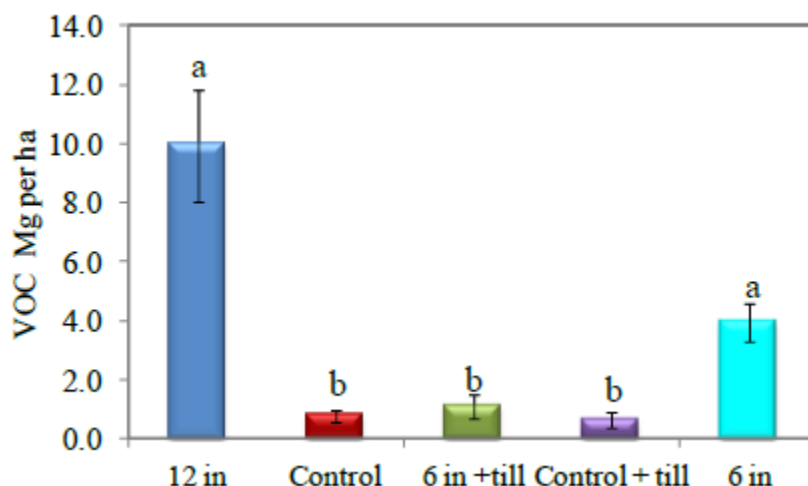


Figure 4-2 – Mean cumulative VOC fluxes from the one-year experiment

For VOC, applying six (6) inches of uncomposted greenwaste resulted in approximately 4.0 Mg VOC per hectare, or about 1.8 tons VOC per acre. If the uncomposted greenwaste is tilled, VOC emissions are 0.8 Mg VOC per hectare, or 0.36 tons VOC per acre. Background VOC emissions from tilled soil is approximately 0.4 Mg VOC per hectare, or 0.18 tons VOC per acre. Thus, tilling uncomposted greenwaste into soil is expected to reduce the uncomposted greenwaste contribution to VOC emissions from 3.2 Mg per hectare to 0.4 Mg per hectare, a reduction of approximately 90%.

While the 2015 study did not include ammonia, it did include a different volatile nitrogenous compound, N_2O , and the control of N_2O will be applied to ammonia, as shows in Figure 4-3.

² <https://www2.calrecycle.ca.gov/Publications/Details/1531>

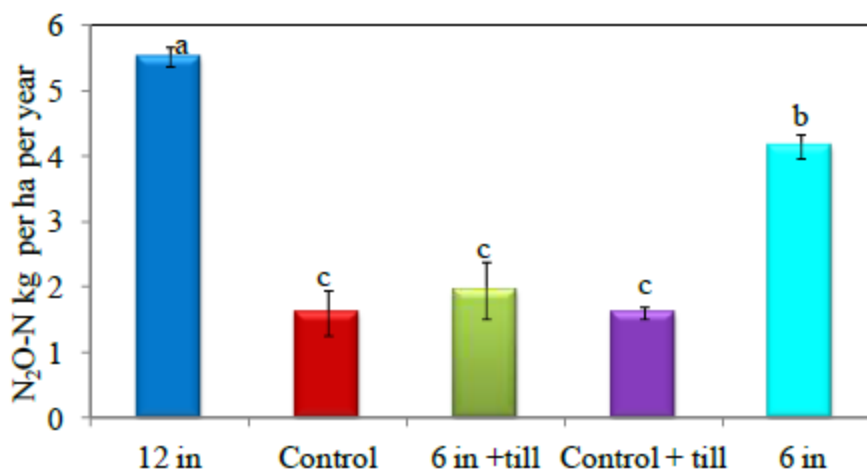


Figure 4-3 – Mean cumulative N₂O fluxes for the one-year field experiment

For N₂O, tilling reduced emissions from 4.0 Mg per hectare to 2.0 Mg per hectare. Background N₂O emissions were 1.6 Mg per hectare. The contribution of the uncomposted greenwaste was reduced from 2.4 Mg per hectare to 0.4 Mg per hectare, or approximately 80% control. Assuming tilling to a depth of six (6) inches reduces VOC emissions by 90% and ammonia emissions by 80%, the emission factors for uncomposted greenwaste after land incorporation are 1.76 lbs VOC and 0.31 lbs ammonia per ton of uncomposted greenwaste, respectively.

During the 2011 PR1133.3 rulemaking process, staff found that applying a six (6) cover of finished compost or compost overs creates a “pseudo-biofilter” on windrow composting piles and reduces VOC and ammonia emissions by 40% and 20%, respectively. Assuming these same emission reductions yields emission factors for uncomposted greenwaste, covered with six (6) inches of finished compost or compost overs after direct land application, of 10.55 lbs VOC and 1.23 lbs ammonia per ton of uncomposted greenwaste, respectively.

Table 4-3 and Table 4-4 shows the estimated emission reductions for VOC and ammonia, respectively, associated with restrictions on supply of uncomposted greenwaste for agricultural operation direct land application, assuming 50% of uncomposted greenwaste is incorporated into land and 50% is covered with finished compost or compost overs.

Table 4-3 VOC Emission Reductions from Direct Land Application Restrictions			
Land Application Technique	Throughput (tons)	VOC emission factor (lbs/ton)	VOC emissions (tons per year)
<i>Uncontrolled</i>	82,080	17.58	721.5
Land Incorporation	41,040	1.76	36.1
Compost Cover	41,040	10.55	216.4
Emission Reduction (land incorporation and compost cover emissions versus uncontrolled land application emissions)			469.0

Table 4-4 Ammonia Emission Reductions from Direct Land Application Restrictions			
Land application Technique	Throughput (tons)	Ammonia emission factor (lbs/ton)	Ammonia emissions (tons per year)
<i>Uncontrolled</i>	82,080	1.54	63.2
Land Incorporation	41,040	0.31	6.3
Compost Cover	41,040	1.23	25.3
Emission Reduction (land incorporation and compost cover emissions versus uncontrolled land application emissions)			31.6

Combined, restrictions on the supply of uncomposted greenwaste used for direct land application and requiring legacy co-composting operations to use best management practices is expected to reduce VOC and ammonia emissions in the South Coast AQMD. For a detailed analysis of the projected VOC and ammonia emission reductions associated with best management practices for smaller legacy co-composting operations, please refer to Chapter 2. Table 4-5 and Table 4-6 show the combined VOC and ammonia emissions associated with the PAR 1133 Series.

Table 4-5 VOC Emission Reductions from PAR 1133 Series		
Proposed Requirement	VOC Emission Reductions (tons per year)	VOC Emission Reductions (tons per day)
Restricting supply of uncomposted greenwaste (PAR 1133)	469.0	1.28
Best management practices for smaller legacy co-composters (PAR 1133.2)	12.4	0.034
Overall	481.4	1.32

Table 4-6 Ammonia Emission Reductions from PAR 1133 Series		
Proposed Requirement	Ammonia Emission Reductions (tons per year)	Ammonia Emission Reductions (tons per day)
Restricting supply of uncomposted greenwaste (PAR 1133)	31.6	0.087
Best management practices for smaller legacy co-composters (PAR 1133.2)	10.3	0.028
Overall	41.9	0.12

PAR 1133 Series total VOC emission reductions are 1.32 tons per day and total ammonia emission reductions are 0.12 tons per day.

COSTS AND COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires a cost-effectiveness analysis when establishing BARCT requirements. The cost-effectiveness of a control is measured in terms of the control cost in dollars per ton of air pollutant reduced. The costs for the control technology include purchasing, installation, operation, maintenance, and permitting. Emission reductions were calculated for each requirement and based on estimated baseline emissions. The 2022 AQMP established a cost-effectiveness threshold of \$36,000 per ton of VOC reduced. After adjusting for inflation, the cost-effectiveness threshold is \$41,400 per ton of VOC reduced (2024 U.S. Dollars). A cost-effectiveness that is greater than the threshold of \$41,400 per ton of VOC reduced requires additional analysis and a hearing before the Governing Board on costs.

The cost-effectiveness is estimated based on the present value of the retrofit cost, which was calculated according to the capital cost (initial one-time equipment and installation costs) plus the annual operating cost (recurring expenses over the useful life of the control equipment multiplied by a present worth factor). Capital costs are one-time costs that cover the components required to assemble a project. Annual costs are any recurring costs required to operate equipment. Costs for this proposal were obtained from available literature, vendors, and facilities.

Costs associated with PAR 1133 restrictions on supply of uncomposted greenwaste are largely administrative, for recordkeeping to document compliance. Statewide CalRecycle regulations regarding land application already require that no additional uncomposted greenwaste may be delivered until the previous application has been tilled into the soil. Sites that do not till uncomposted greenwaste into soil within 30 days are considered landfill disposal sites and require permitting as such. This requirement applies to sites receiving more than 4,040 cubic yards of uncomposted greenwaste. Staff estimates that 86 of the 98 facilities subject to PAR 1133 Series provide uncomposted greenwaste for use offsite. The estimated quantity of chipped and ground greenwaste is 2,460,000 tons per year. Staff estimates that approximately 50% of this chipped and ground greenwaste is used onsite of the facility where it was processed while the other 50% is transferred offsite. Waste transfer trucks vary in size, but assuming a transfer truck capacity of 25 tons per load, currently in South Coast AQMD, 49,200 transfers by truck of uncomposted greenwaste occur each year from the estimated 86 facilities providing uncomposted greenwaste offsite.

With 49,200 truck transfers occurring over 250 operating days per calendar year, approximately 200 truck transfers occur each operating day. For the 86 facilities providing uncomposted greenwaste offsite, that is an average of three truck transfers per day. To document these transfers, staff assumes approximately 0.25 hours of labor per operating day per facility. At a labor rate of \$25 per hour, the estimated cost of compliance with PAR 1133 recordkeeping requirements across South Coast AQMD is \$134,400 per year.

Details regarding costs and cost-effectiveness determinations associated with best management practices for smaller legacy co-composting operations are included in Chapter 2. The overall cost-effectiveness of the proposed amended rule is \$400 per ton of VOC reduced. The cost-effectiveness for each proposed requirement and the overall cost-effectiveness is summarized in Table 4-7 and Table 4-8.

Table 4-7 Summary of VOC Cost-Effectiveness			
Proposed Requirement	Annualized Cost	Annual VOC Reductions (tons per year)	Cost-Effectiveness (\$/ton VOC)
Restricting supply of uncomposted greenwaste (PAR 1133)	\$134,400	469.0	\$300
Best management practices for smaller legacy co-composters (PAR 1133.2)	\$60,700	12.4	\$4,900
Overall	\$195,100	481.4	\$400

Table 4-8 Summary of Ammonia Cost-Effectiveness			
Proposed Requirement	Annualized Cost	Annual Ammonia Reductions (tons per year)	Cost-Effectiveness (\$/ton ammonia)
Restricting supply of uncomposted greenwaste (PAR 1133)	\$134,400	31.6	\$4,300
Best management practices for smaller legacy co-composters (PAR 1133.2)	\$60,700	10.3	\$5,900
Overall	\$195,100	41.9	\$4,700

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for BARCT rules or emission reduction strategies when there is more than one control option which would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SOx, NOx, and their precursors. Since volatile organic compounds are precursors to ozone, an incremental cost-effectiveness analysis is required for controls proposed to limit VOC emissions. Incremental cost-effectiveness is the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control options as compared to the next less expensive control option.

Incremental cost-effectiveness is calculated as following:

$$\text{Incremental Cost} \cdot \text{Effectiveness} = \frac{\text{Cost of Option 2} - \text{Cost of Option 1}}{\text{Benefit of Option 2} - \text{Benefit of Option 1}}$$

Details regarding costs and incremental cost-effectiveness determinations are included in Chapter 2. The incremental cost-effectiveness for each next more stringent proposed requirement is summarized in Table 4-9 and Table 4-10 below.

Table 4-9 Summary of VOC Incremental Cost-Effectiveness			
Next More Stringent Proposed Requirement	Incremental Annualized Cost	Incremental Annual VOC Reductions (tons per year)	Incremental Cost-Effectiveness (\$/ton VOC)
Enclosure Vented to Emission Control System	\$1,715,0000	12.5	\$138,000

Table 4-10 Summary of Ammonia Incremental Cost-Effectiveness			
Next More Stringent Proposed Requirement	Incremental Annualized Cost	Incremental Annual Ammonia Reductions (tons per year)	Incremental Cost-Effectiveness (\$/ton ammonia)
Enclosure Vented to Emission Control System	\$1,715,000	41.0	\$56,000

SOCIOECONOMIC IMPACT ASSESSMENT

A Socioeconomic Impact Assessment, to be included in the Draft Staff Report, will be prepared and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing for the PAR 1133 Series, which is scheduled for September 5, 2025 (subject to change).

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l), and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project (PAR 1133 Series) to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

DRAFT FINDINGS UNDER HEALTH & SAFETY CODE SECTION 40727

Requirements to Make Findings

Health and Safety Code Section 40727 requires that the Governing Board make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with Health and Safety Code Section 40727, Health and Safety Code Section 40727.2 requires a written analysis comparing the proposed amended rule with existing regulations, if the rule meets certain requirements.

Necessity

A need exists to amend PAR 1133 Series to implement Best Control Measure-10 (BCM-10) from the South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard (PM_{2.5} Plan) to further reduce VOC and ammonia emissions.

Authority

The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations pursuant to Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, 40920.6, and 41508.

Clarity

PAR 1133 Series is written or displayed so that its meaning can be easily understood by the persons directly affected by them.

Consistency

PAR 1133 Series is in harmony with and not in conflict with or contradictory to existing statutes, court decisions, or state or federal regulations.

Non-Duplication

PAR 1133 Series will not impose the same requirements as any existing state or federal regulations. The proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference

In amending this rule, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code Sections 39002, 40001, 40406, 40702, 40440(a), and 40725 through 40728.5.

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the South Coast AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed South Coast AQMD rules and air pollution control requirements and guidelines which are applicable to storage tanks. The comparative analysis will be provided in a future report.