

Proposed Amended Rule 1133 Series –

Rule 1133 – Composting and Related Operations - General Administrative Requirements Rule 1133.1 – Chipping and Grinding Activities Rule 1133.2 – Emission Reductions from Co-Composting Operations Rule 1133.3 – Emission Reductions from Greenwaste Composting Operations

> WORKING GROUP MEETING #2 WEDNESDAY MAY 7, 2025 – 2 PM

Zoom Meeting: <u>https://scaqmd.zoom.us/j/96768220758</u> Meeting ID: 967 6822 0758

Agenda

Rulemaking Recap and Update

PM2.5 (Fine Particulates)

Best Control Measure-10

Best Control Measure-11

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Recap of Working Group Meeting #1

- Introduction to Composting
 - Estimate of emissions, including ammonia, from direct land application of uncomposted greenwaste versus composting
- Rule 1133 Series Regulatory Background
- 2012 Annual PM2.5 Attainment Plan, including ammonia reductions
 - BCM-10: direct land application (DLA) prohibition
 - Wood waste to be excluded from prohibition
 - BCM-11: digestion of foodwaste before composting
- Facilities Regulated Under Rule 1133 Series
 - Identified 82 facilities subject to parts of rule series





Update on Rule 1133 Series Team Activities



- Site visits to chipping and grinding, greenwaste composting, and cocomposting facilities
- Meeting with industry experts in composting field
- Roundtable discussion with state and local regulators
- Additional topics may be explored in future Working Group Meetings
 - Alternative to the control efficiency limit, such as a mass emission rate limit
 - Composted or uncomposted greenwaste as alternative daily cover at landfills
 - Harmonization of definitions across rule series to ensure clarity and consistency

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National Ambient Air Quality Standards

- South Coast AQMD is responsible for ensuring attainment with National Ambient Air Quality Standards (NAAQS) for the three air basins within its jurisdiction:
 - South Coast Air Basin (Basin) all of Orange County and the populated non-desert portions of Los Angeles, Riverside, San Bernardino Counties
 - Portion of Salton Sea Air Basin within Riverside County (Coachella Valley)
 - Portion of Mojave Desert Air Basin within Riverside County
- Plans are blueprints to bring air basins into attainment with NAAQS and include:
 - 2022 Air Quality Management Plan (AQMP) for the 2015 8-hour ozone standard for the Basin and Coachella Valley
 - South Coast Air Basin Attainment Plan for the 2012 Annual PM2.5 Standard (PM2.5 Plan)*, adopted in 2024



SOUTH COAST AIR BASIN ATTAINMENT PLAN

for the 2012 Annual PM2.5 Standard

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

2012 Annual PM2.5 Standard and PM2.5 Plan



- Basin classified as Nonattainment/Serious for 2012 Annual PM2.5 standard
 - "Serious" is the highest level of nonattainment for the PM2.5 standard
- Serious nonattainment classification requires implementation of most stringent measures (MSMs)
 - Defined as permanent and enforceable control measures to reduce PM2.5 and PM2.5 precursors, like ammonia, included in a State Improvement Plan (SIP) and can feasibly be implemented
- Best Control Measure-10 (BCM-10), originally an element in the 2016 AQMP and included in the California SIP, identified as an MSM and included in the PM2.5 Plan
 - BCM-11 from PM2.5 Plan not identified as MSM and to be discussed in later section

Best Control Measure-10 (BCM-10)

- Titled "Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste"
 - More thorough discussion of BCM-10 to follow
- Seeks reductions in ammonia emissions from direct land application of chipped and ground uncomposted greenwaste
- Identified Rule 1133 series, in particular Rule 1133.3 regarding composting, in text of control measure
- South Coast AQMD under "sanction clock" to feasibly implement BCM-10, an MSM, or face sanctions



Active PM2.5 Sanction Clocks

		Status of Active Sanc As o	tion Clocks under the C of January 27, 2025	lean Air Act		
Status of Active Sanction Clocks under the Clean Air Act As of January 27, 2025						r Act
State	Area	Required Element(s)	Effective Date and Type of Finding	Date of New Source Review 2:1 Offset Sanction	Date of Highway Sanction	Sanction Clock Stayed or Deferred?
CA	Los Angelés- South Coast Air Basin	2012 PM2.5 NAAQS: RFP, attainment demonstration, contingency measures, other SIP elements	2/29/2024 Failure to Submit	8/29/2025	3/1/2026	No
CA	South Coast AQMD	2012 annual PM2.5: BACM and EI	6/26/2023 Failure to Submit	12/26/2024	6/26/2025	No

Source: https://www.epa.gov/system/files/documents/2025-02/caa-sanctions-table_january-27-2025_external-document.pdf Section 179(b) of the Clean Air Act identifies two types of sanction "clocks" that are triggered if finding South Coast AQMD failed to make reasonable further progress:

- Nonattainment New Source Review (NSR) Sanctions, known as "offset sanctions"
 - Ratio of at least 2-to-1 will be required for emissions reductions to be achieved within the nonattainment area to offset emissions from new or modified major facilities
 - Occur 18 months after finding if not cured
- Federal Highway Funding Sanctions
 - Requires the Federal Highway Administration to impose a funding moratorium on most projects
 - Occur 24 months after finding if not cured
 - Impact would be loss of billions of dollars of federal highway funding to region

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BCM-10 and Direct Land Application

- BCM-10 seeks to reduce ammonia emissions from direct land application via Rule 1133 series
 - May include amending existing rules or adopting additional rule
- Direct land application is applying chipped and ground uncomposted greenwaste to agricultural land, land cover for erosion control, or other uses
 - Considering restrictions on suppliers of chipped and ground uncomposted greenwaste, not on landowners or other end users of these products at present
- Lead agency in California regulating direct land application is CalRecycle



CalRecycle



- In California, waste and recycling are regulated by the Department of Resources Recycling and Recovery, known as CalRecycle
- CalRecycle oversees a number of programs, including:
 - Construction and Demolition Diversion: wood waste
 - Organic Materials Management: compost, mulch, biosolids, and food waste
- CalRecycle develops statewide regulations regarding the handling of wastes and waste processes, sometimes by emergency pathways
 - Recently issued emergency regulations to address improper disposal that claimed to be land application*

* https://calrecycle.ca.gov/laws/rulemaking/illegaldisposal/

Local Enforcement Agencies (LEAs)

- Primary enforcement of CalRecycle regulations at the local level is delegated to Enforcement Agencies, or LEAs
- LEAs have primary responsibility to ensure correct operation at solid waste facilities like landfills, transfer stations, chipping and grinding sites, and compost facilities
- LEAs can be parts of city or county government within public health or building and safety departments, or special districts
- Within South Coast AQMD's jurisdiction, there are many LEAs including:
 - Cities: Los Angeles, Vernon, West Covina
 - Counties: Orange, Los Angeles, Riverside, San Bernardino
 - Special District: Sunshine Canyon Landfill



Background on Rule 1133.1



Purpose is to prevent inadvertent decomposition occurring during chipping and grinding activities, including stockpile operations, by closely mirroring CalRecycle regulations and LEA restrictions:

- Foodwaste not accepted unless allowed by LEA
- Wastes must be chipped and ground to be used onsite or removed within 48 hours of receipt, unless approved by LEA up to 7 days
- Moisture content required for exemptions and is determined by collecting at least 10 samples from various locations at a depth of at least 12 inches below pile surface

Nitrogen Cycle and Ammonia Emissions

- Nitrogen is vital for plant life on Earth and is recycled indefinitely through the nitrogen cycle
- Ammonia (NH3) is converted to plantusable nitrogen by ammonia-oxidizing bacteria (AOB) and ammonia-oxidizing archaea (AOA) under favorable biological conditions, such as composting
- In unfavorable biological conditions, such as direct land application, AOB and AOA are not as active as during composting and more nitrogen is lost to atmosphere in the form of ammonia by volatilization



Mitigation Strategies



- For decades, composting and other methods of decomposition of organic waste have been studied
 - Some studies focused on improving nitrogen retention
 - Others sought to reduce ammonia and VOC emissions
 - More recent analysis emphasized greenhouse gas
- Staff is spotlighting four studies or strategies that could be used, independently or in combination, to reduce ammonia emissions from direct land application
 - Considering restricting facilities from supplying uncomposted greenwaste for direct land application unless certain mitigation strategies are used
 - Enforcement mechanism would be recordkeeping, consistent with CalRecycle and LEA approach

2008 Card & Schmidt Report for San Joaquin Valley APCD

- Performed to provide useful air emission data from windrow composting sites
- Daily emission data showed ammonia emissions peaked at day 7 of composting
- Daily ammonia emissions largely plateaued at day 15 of composting
- Highest days of ammonia emissions associated with the active phase of windrow composting
- Emission reduction strategy #1
 - Restrict supply of uncomposted chipped and ground greenwaste unless material has completed active phase of composting



2010 UC Davis Study on Ground-Level Ozone for CalRecycle



- Performed to study ground-level ozone formation from the windrow composting process
 - Ammonia (NH3) was not evaluated
- Found that "a pseudo biofilter cap made out of oversized materials screened from finished compost" effective as an ozone mitigation measure
 - Reduced average measured ozone formation by 27% for active-phase piles and by 36% for curing-phase piles
- Study is the scientific basis for 6-inch compost cap requirement currently in Rule 1133.3
 - See PAR 1133 Series Working Group Meeting #1 for additional information on Rule 1133.3 requirements

• Emission reduction strategy #2

 Restrict supply of uncomposted chipped and ground greenwaste unless material covered with a finished compost cap

2015 UC Davis Study on Greenhouse Gas Emissions for CalRecycle

- Performed to study greenhouse gas emissions from direct land application of uncomposted greenwaste
 - CH4, N2O, and VOC were studied
 - Ammonia (NH3) was not evaluated
- Found VOC emissions were greatly reduced by soil incorporation
 - Uncomposted greenwaste was tilled with three passes of a disk to a depth of 6-8 inches
 - VOC emission rates for tilled material similar to control
- Water testing demonstrated relatively little contaminant migration from the tilled greenwaste
- Emission reduction strategy #3
 - Restrict supply of uncomposted chipped and ground greenwaste unless material is incorporated into soil by tilling



Quantification of Nitrogen and Ammonia

SEPA United States Environmental Protection Agency

Method 351.2, Revision 2.0: Determination of Total Kjeldahl Nitrogen by Semi-Automated Colorimetry

Simple Kjeldahl Apparatus Set-up



- Uncomposted materials for direct land application may also be tested for total Kjeldahl nitrogen (TKN, total organic nitrogen and ammonia) to determine potential to emit ammonia
- Kjeldahl digestion (U.S. EPA Method 351.2) considered gold standard, but requires laboratory testing
 - Other laboratory methods, such as Dumas combustion technique, also can accurately measure nitrogen content
- Handheld analyzers have not demonstrated accurate measurement of nitrogen in soil or other media
- Emission reduction strategy #4
 - Restrict supply of uncomposted chipped and ground greenwaste unless material below certain nitrogen content level

Potential Restrictions on Supply of Chipped and Ground Greenwaste

Strategy	<u>Strategy #1</u> Active composting required before supplying	<u>Strategy #2</u> May only be supplied for DLA if covered with finished compost cap	<u>Strategy #3</u> May only be supplied for DLA if tilled into soil	<u>Strategy #4</u> Prohibit materials above TKN threshold
Advantages	2008 study indicated lower VOC and ammonia emissions	2010 study identified this best management practice to reduce VOC and ammonia	2015 study indicated emission profile similar to control soil	Quantifiable approach based on potential to emit ammonia
Disadvantages	Additional composting capacity needed or additional cost and emissions for transportation	Cost and emissions associated with transport of finished compost or compost overs	Cost and emissions associated with operating tilling equipment	Need to establish acceptable threshold and cost associated with analysis

Proposed Framework

Strategy	<u>Strategy #1</u> Active composting required before supplying	<u>Strategy #2</u> May only be supplied for DLA if covered with finished compost cap	<u>Strategy #3</u> May only be supplied for DLA if tilled into soil	<u>Strategy #4</u> Prohibit materials above TKN threshold
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Proposed Enforcement Mechanism

- Prior to uncomposted greenwaste leaving facility, operator records the destination, the quantity, and the approved use identified by the customer, such as:
 - Composting, co-composting, or digestion
 - Direct land application, provided uncomposted greenwaste is tilled or covered with finished compost
 - Use outside of South Coast AQMD
- Records maintained onsite by operator and not required to be submitted to South Coast AQMD
- Annually, operator compiles report for South Coast AQMD including uncomposted greenwaste by usage
 - Annual updates of feedstocks and products already required by South Coast AQMD under Rule 1133
 - Rule 1133 forms to be updated
 - Reporting will assist South Coast AQMD by determining if additional rulemaking is necessary for end users of uncomposted greenwaste for direct land application



Proposed Enforcement Mechanism Flow Chart

Operator records information from customers of uncomposted greenwaste

Operator submits annual report to South Coast AQMD



If necessary, additional rulemaking may be warranted*

South Coast

*As noted earlier, CalRecycle is lead agency regulating direct land application

Summary of BCM-10 Implementation Framework

Applies To	Includes	Excludes	Restriction	Mechanism
Fule 1133.1Fule 1133.2Fule 1133.2Fule 1133.2Fule 1133.3	Uncomposted Greenwaste	 Greenwaste that has completed active phase of composting Finished greenwaste compost Woodwaste and other organic materials 	Customers of uncomposted greenwaste for direct land application in South Coast AQMD must state to supplier that material will either be: •Incorporated into soil to depth of 6" •Covered with a finished compost cap to depth of 6"	 Recordkeeping: Suppliers must create a log of uncomposted greenwaste customers and maintain onsite Submit annual report of uncomposted greenwaste, as already required

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BCM-11 – Emission Reductions from Organic Waste Composting



- Foodwaste tends to have higher nitrogen content than other forms of organic waste like woodwaste or greenwaste
- BCM-11 would require co-digestion of foodwaste via anaerobic digestion prior to composting
- Initial study identified potential reductions of ammonia emissions from foodwaste but more studies required
- Will not include BCM-11 measures in this rulemaking effort at this time

Background on Foodwaste



Source: calrecycle.ca.gov

- California throws away between 5-6 million tons of foodwaste each year
- To reduce this and other sources of greenhouse gas emissions, California adopted Senate Bill (SB) 1383
 - Requires diversion of organic waste, including foodwaste, away from landfills
 - All jurisdictions must provide organic waste collection services to residents and businesses, usually as a green waste bin
- Generally speaking, foodwaste, compared to some forms of organic waste like greenwaste or woodwaste, is high in nitrogen content and may lead to higher ammonia emissions

Summary of BCM-11

- Control measure seeks reduction of ammonia via the processing of organic waste materials including foodwaste, greenwaste, and agricultural waste, by:
 - Foodwaste co-digestion
 - Integration of anaerobic digestion (AD) with composting
- Proposes to expand applicability of Rule 1133 series to regulate the codigestion of foodwaste with biosolids and the integration of foodwaste digestate with greenwaste composting for further emission reductions
 - Integrated AD-composting system believed to result in less overall waste and a more useful product



Digestion of Foodwaste

- Alternative to composting of foodwaste is digestion
 - Rule 1133.3 requires an emission control device for foodwaste throughput above 5,000 tons per year
- Foodwaste, typically in anaerobic conditions, is broken down biologically in a digester and biogas (methane and other gases) is produced
- With anaerobic digestion, biogas can be collected for beneficial use such as heat, steam, or power generation
- The byproduct of digestion is digestate, which can be composted and estimated to result in 50% less ammonia emissions compared to undigested foodwaste*
- Foodwaste digestion in use at publicly-owned treatment works and supermarket distribution sites in South Coast AQMD
- Many more research in-vessel digestion projects in South Coast AQMD and statewide



^{*} https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iv-a-control-measures.pdf

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Milestone	Projected Date	
Working Group Meeting #3	Early June 2025	
Release of Preliminary Draft Rule Language & Staff Report	Late June 2025	
Public Workshop	June/July 2025	
Set Hearing	August 2025	
Public Hearing	September 2025	

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