

## ATTACHMENT F

### SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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#### Final Staff Report

**Proposed Rule 1133 – Composting and Related Operations – General Administrative Requirements**

**Proposed Rule 1133.1 – Chipping and Grinding Activities**

**Proposed Rule 1133.2 – Emission Reductions from Co-Composting Operations**

**January 10, 2003**

#### **Deputy Executive Officer**

Planning, Rule Development and Area Sources  
Elaine Chang, DrPH

#### **Assistant Deputy Executive Officer**

Planning, Rule Development and Area Sources  
Laki T. Tisopoulos, Ph.D., P.E.

#### **Planning and Rules Manager**

Planning, Rule Development and Area Sources  
Zorik Pirveysian

---

**Authors:** Tuyet-Le Pham – Transportation Specialist  
Ricardo A. Rivera – Air Quality Specialist

**Reviewed By:** Barbara Baird - District Counsel  
Frances Keeler - Senior Deputy District Counsel

**Contributions:** Jay Chen - Sr. Air Quality Engineer Manager  
Shah Dabirian – Air Quality Specialist  
Mike Garibay – Sr. Air Quality Engineer  
David Jones - Air Quality Analysis & Compliance Supervisor  
Julia Lester, Ph.D. - Program Supervisor  
Charles Tupac - Sr. Air Quality Engineer

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
GOVERNING BOARD**

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Cities Representative, Orange County

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Supervisor, Fourth District  
San Bernardino County Representative

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Mayor Pro Tem, City of Montclair  
Cities Representative, San Bernardino County

JAMES W. SILVA  
Supervisor, Second District  
Orange County Representative

CYNTHIA VERDUGO-PERALTA  
Governor's Appointee

**EXECUTIVE OFFICER:**  
BARRY R. WALLERSTEIN, D.Env.

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## **EXECUTIVE SUMMARY**

The proposed rules for composting and related operations are presented here as three separate rules: Proposed Rule 1133 – Composting and Related Operations - General Administrative Requirements; Proposed Rule 1133.1 – Chipping and Grinding Activities; and Proposed Rule 1133.2 – Emission Reductions from Co-Composting Operations. The proposed rules are designed to regulate and reduce emissions from composting and related operations, which for the most part are currently not subject to specific District regulations. The purpose of these proposed rules is three fold: 1) establish a registration and annual reporting program for composting-related facilities to better characterize the emissions and operations of this industry and keep track of activity levels (PR 1133); 2) develop holding and processing time requirements for chipping and grinding activities in order to prevent inadvertent decomposition of greenwaste and foodwaste (PR 1133.1); and 3) reduce VOC and ammonia emissions from co-composting operations (PR 1133.2).

The proposed rules would in part implement Control Measure WST-02 – Emission Reductions from Composting, which was 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. Accordingly, a technology assessment was conducted by staff, which provided the industry profile and background information on composting operations, developed an estimated emissions inventory, identified and evaluated various control methods, conducted cost-effectiveness analysis, and provided recommendations for rule development. The technical assessment was presented to and approved by the AQMD's Governing Board in April 2002. The information presented in this staff report is based on the technical assessment report as well as additional or new information obtained and developed since April 2002 (Attachment A to the Final Staff Report).

The three primary categories of the composting and related operations industry include co-composting, greenwaste composting, and chipping and grinding which contribute to significant amounts of VOC and ammonia emissions in the South Coast Air Basin (Basin). VOCs and ammonia are precursors to ozone and PM10 emissions for which ambient air quality standards are currently exceeded in the Basin. Although emissions from greenwaste composting operations are significant (i.e., 4.4 approximately 5 tons of VOC and 1 ton of ammonia per day) and control options for these operations could result in significant reductions, the affordability analysis presented in the technology assessment demonstrated that the cost impact for this industry would be substantial at this time. Therefore, specific control requirements are not proposed for greenwaste composting operations at this time. Staff would continue to work with all stakeholders including the California Integrated Waste Management Board (CIWMB), sanitation districts and local municipalities to seek funding sources and identify feasible control methods for greenwaste composting operations. For co-composting operations, however, based on the technology assessment report prepared by staff, control methods (e.g., enclosures, forced aeration, in-vessel systems, and biofilters) are

available which can significantly reduce emissions from these operations in a cost-effective manner.

PR 1133 would require composting and chipping and grinding facilities to register with AQMD and provide their facility and throughput information (e.g., type and amount of feedstock and products, process description, etc.). These facilities will also be required to provide annual updates to AQMD on their registration information. Specific exemptions are provided for small scale operations such as nurseries; community, agricultural, recreational and backyard composting; and wood waste and portable chipping and grinding activities.

PR1133.1 would establish holding and/or processing time requirements for greenwaste and foodwaste chipping and grinding activities in order to prevent inadvertent decomposition occurring during stockpiling greenwaste and/or foodwaste for extended periods of time. Stockpiling greenwaste (or foodwaste) for extended periods will cause the organic materials to decompose anaerobically and generate VOC and NH<sub>3</sub> emissions (as well as odors) based on source tests conducted by District and CIWMB. High temperature and VOC monitoring data recorded during District staff site visits also demonstrate that these piles are in the process of decomposing. Inadvertent decomposition refers to decomposition of greenwaste (or foodwaste) which is not associated with normal chipping and grinding operations. Therefore, the proposed rule requires the removal or processing (i.e., on-site applications) of foodwaste and greenwaste received by facilities for chipping and grinding purposes within specified timeframe upon receipt. Specifically, foodwaste is required to be removed or used on-site for composting within 2 days of receipt. Curbside greenwaste such as household grass clippings and leaves is required to be chipped and ground or removed from the facility within 3 days of receipt. Non-curbside greenwaste, which is mainly composed of tree trimming and landscaping greenwaste, is required to be chipped and ground or removed from the facility within 14 days of receipt. Mixed greenwaste, that contains both curbside and non-curbside greenwaste, is required to be chipped and ground or removed from the facility within 7 days of receipt. All of the holding/processing time requirements stated above exclude state and federal holidays as well as rainy days and wet weather conditions following a rainy day (up to 10 days) which impede normal chipping and grinding operations. Chipped and ground curbside greenwaste are also required to be removed from the facility or used for on-site applications within a period of 3 days (unless the moisture content is less than 30%). The requirements for curbside greenwaste are different from non-curbside greenwaste since non-curbside greenwaste tend to decompose at slower rate compared with curbside greenwaste due to the lower moisture content of non-curbside greenwaste.

PR1133.2 would require new co-composting operations to enclose their active co-composting operations and use forced-air aeration system for their curing part of the operations. Both the air exhaust from the enclosure and the aeration system are to be vented to an emission control system with a control efficiency of at least 80 percent for VOC and ammonia emissions. As an alternative to enclosing the active phase and aeration system for curing phase, new co-composting operations may employ any combination of composting and control methods to achieve an overall control efficiency of 80 percent by weight for VOC and ammonia emissions from both the active and curing phases of the composting process. This optional method of compliance would also require the submittal of a compliance plan at least one year prior to start of operations.

It should be noted that the recommendations in the Technology Assessment report for co-composting operations only included requirements for new co-composting operations (with 100,000 tons or more of throughput) because of potential cost impact on existing and smaller new facilities. However, at the April 2002 Board meeting as well as subsequent Stationary Source Committee meetings, the Board members directed staff to re-evaluate the cost of controlling emissions from existing as well as new facilities, in addition to large new facilities, because costs need not necessarily be borne by the facility, but may be passed on as a fee to waste disposal customers. Based on staff's analysis, the compliance cost for all existing co-composting operations will represent only a nominal increase of \$0.25 per month per household assuming that the cost would be passed onto the Basin households. For a new co-composting facility, the compliance cost will be \$0.004 per month per household for every 10,000 tons of throughputs using the same assumption. Therefore, emission reductions from existing and new smaller facilities are also feasible (in addition to larger new facilities) assuming the cost would be passed through to households in the Basin. These facilities are included in PR1133.2 for the Board's consideration.

Under PR 1133.2, existing co-composting operations will be required to demonstrate an overall control efficiency of 70 percent for VOC and ammonia emissions based on implementation of any combination of composting and control methods. Existing co-composting operations would also be required to submit a compliance plan at least one year prior to their effective date of compliance. The compliance date for new co-composting operations is as of the date of adoption of this rule (i.e., prior to start-up). Existing co-composting operations compliance dates range from the year 2007 to 2009 depending on the size of their operations.

Compliance with PR 1133.2 can be demonstrated based on a comparison of the co-composting baseline emission factors, developed by the District, with the controlled emissions. The baseline emission factors, included in the proposed rule, were based on source tests conducted on existing co-composting operations (i.e., 1.78 pounds of VOC and 2.93 pounds of ammonia per ton of throughput). The proposed rule also allows co-composting operators to develop their facility-specific baseline emission factors to demonstrate that the reduction requirements are met.

The emissions inventory for co-composting operations is estimated to be 1.67 and 2.74 tons per day of VOC and ammonia, respectively. The proposed rule is expected to reduce VOC and ammonia emissions by 70 percent (1.17 tons of VOC per day and 1.92 tons of ammonia per day) from existing co-composting operations. Depending on the control method selected, the cost-effectiveness would vary for co-composting facilities. For new co-composting facilities, the cost effectiveness is estimated to be about \$24,000 to \$27,000 per ton of VOC reduced or \$11,000 to \$12,000 per ton of VOC and ammonia reduced based on fabric or concrete type of enclosure for the active phase of composting and forced aeration system for the active and curing phases of operations vented to a biofilter. For existing co-composting facilities, the cost effectiveness would vary based on the composting/control methods selected. Three scenarios are presented in the cost-effectiveness section for existing co-composting facilities. Depending on the type of enclosure for active phase and forced aeration system for curing phase both vented to a biofilter, the cost-effectiveness would

range from approximately \$8,700 to \$10,000 per ton of VOC and ammonia reduced or \$23,000 to \$26,500 per ton of VOC reduced. Assuming that forced aeration system in combination with other methods (e.g., process controls, biofilters) for both active and curing phases (without building enclosure) could achieve the required reductions (i.e., 70% VOC and 70% ammonia), the cost-effectiveness could be as low as \$6,500 per ton of VOC and ammonia reduced or about \$17,000 per ton of VOC reduced. Forced aeration systems in combination with methods such as optimized process controls and optimized feedstock ratios could result in significant emission reductions.

Facilities affected by PR1133 will be subject to a one-time registration fee equivalent to the plan submittal fee in Rule 306 - Plan Fees which is currently \$89.59. PR1133.1 would also result in minimal cost to affected facilities for recordkeeping. There are no additional cost associated with compliance with PR1133.1 since emission reductions are not claimed under PR1133.1 for the chipping and grinding activities and the rule establishes holding/processing time requirements for greenwaste (and foodwaste) to prevent inadvertent decomposition associated with stockpiling greenwaste (and foodwaste) for extended periods of time. Based on information provided by the industry and through CTAC, chipping and grinding activities subject to the rule are already processing their greenwaste within the time frame proposed in PR1133.1, and therefore, emission reductions, and additional costs, if any, are not expected to be significant. The objective of establishing these standard holding/processing time requirements is to prevent emissions from increasing for chipping and grinding activities.

## BACKGROUND

The 1994 and 1997 AQMPs as well as the 1999 amendments to the 1997 AQMP Ozone State Implementation Plan (SIP) for the South Coast Air Basin included the proposed Control Measure WST-02 – Emission Reductions from Composting. The control measure was proposed to be implemented in two phases. Under Phase I, an emissions inventory of composting operations would be developed based on additional source tests and improved test protocols. Depending on the significance of these emissions, Phase II would identify specific control options to reduce emissions (VOC and ammonia) from composting activities. In order to implement the proposed control measure, AQMD staff conducted a technical assessment for composting and related operations. The technology assessment provided the composting industry's profile, estimated emissions inventory, evaluated various composting methods and control technologies, and conducted cost-effectiveness analysis.

At its April 5, 2002 Board meeting, the Governing Board of the South Coast Air Quality Management District (AQMD) conducted a Pre-Hearing on controlling VOC and ammonia emissions from composting and related operations and received staff's Technology Assessment Report. Based on the Technology Assessment Report (April 2002), significant VOC and ammonia emissions are attributed to the composting and related operations. The baseline emissions inventory for this industry (i.e., co-composting and greenwaste composting only) is estimated at 6.8 and 4.7 tons per day for VOC and ammonia, respectively. The technology assessment also identified and evaluated a number of feasible control technologies for co-composting operations. (For more details on the composting industry, emissions inventory estimation, control technology assessment, and cost-

effectiveness analysis, refer to the Technology Assessment Report (Attachment A to the ~~Draft~~ Final Staff Report). Accordingly, the Governing Board directed AQMD staff to proceed with rulemaking and to develop a series of proposed rules to address each sector of the composting and related operations industry independently. Also, according to the AQMD Governing Board's direction, a Composting Technical Advisory Committee (CTAC) was established to oversee the on-going technical studies of cost-effective composting control technologies and assist AQMD staff during rule development. In addition, a Co-Composting subcommittee to CTAC was subsequently formed to further evaluate specific issues related to controlling emissions from co-composting operations. Board members also directed staff to evaluate the feasibility of controlling emissions from existing and smaller new facilities.

### ***Industry Profile***

The AQMD developed an inventory of facilities involved in composting operations and/or chipping and grinding activities based on information obtained from the California Integrated Waste Management Board (CIWMB) permit database, AQMD permit system, AQMD-conducted surveys, facility inspections and comments from the public. Through this process, 277 facilities were identified that represent the composting and related operations industry. For the purpose of rule development, these facilities are classified into four categories: 1) co-composting facilities; 2) greenwaste composting facilities; 3) chipping and grinding facilities; and, 4) exempt facilities.

Co-composting facilities include composting facilities that use putrescible materials, such as, biosolids and/or manure in combination with greenwaste or foodwaste to produce compost products. Greenwaste composting facilities are composting facilities that use green-waste as raw feedstock materials or greenwaste with small amount of amendments such as manure. Chipping and grinding facilities are facilities dedicated to the size reduction of greenwaste or wood waste to be used in composting, as alternative daily cover (ADC) for landfills, as feedstock for waste-to-energy facilities, or for producing mulch. Finally, exempt facilities are those facilities that are proposed to be categorically exempt from the proposed rules because of the type of operation (e.g., nurseries, community composting, and portable chipping/grinding activities, agricultural composting). Table 1 provides a breakdown of the composting-related facilities as well as their estimated annual throughput.

**Table 1 - Composting and Related Operations Industry**

Category	Number of Facilities	Throughput (tons/year)
Co-Composting	9	683370 <sup>1</sup>
Greenwaste-composting	18	867,618 <sup>a</sup>
Chipping/Grinding	47	3,033,092 <sup>b</sup>
Exempt Facilities	203	237,356
<b>Total</b>	<b>277</b>	<b>4,821,436</b>

<sup>a</sup> Four facilities have unknown throughputs.

<sup>b</sup> Twenty-one facilities have unknown throughputs. Note that a portion of the chipped/ground greenwaste could be used for greenwaste and co-composting operations.

The geographical distribution of the facilities for the composting and related operations industry, by county, is approximately 42, 20, 22 and 16 percent for Los Angeles, Orange, Riverside, and San Bernardino counties, respectively. Table 2, Composting Facilities by County, provides information of the number of facilities in each of the counties by industry sector.

**Table 2  
Composting Facilities by County**

Category	Number of Facilities by County			
	Los Angeles	Orange	Riverside	San Bernardino
Co-Composting	3	04	12	53
Greenwaste-composting	6	5	4	3
Chipping/Grinding	20	9	13	5
Exempt Facilities	87	39	26	51
<b>Total</b>	<b>116</b>	<b>54</b>	<b>45</b>	<b>62</b>

<sup>1</sup> Throughput includes both putrescible materials and bulking agents (i.e., greenwaste).

***Chipping and Grinding Activities***

For the purpose of proposed rules 1133 and 1133.1, chipping and grinding is defined as an activity that mechanically reduces the size of greenwaste, woodwaste or food waste, using chippers and/or tub grinders. Chipping and grinding can be a stand-alone operation, or part of a landfill or a composting operation.

Chipping and grinding facilities process greenwaste, which is mostly, collected from landscapers or from cities' curbside collection programs. Curbside greenwaste is collected from receptacles designated for residential household greenwaste, and is mainly composed of succulent materials such as grass clippings and weeds. Curbside greenwaste tends to decompose quickly under high temperature and moisture conditions, and may also contain other putrescible wastes (i.e., foodwaste). Non-curbside greenwaste is greenwaste that is not collected from curbside programs and mainly contains tree trimmings and other landscaping greenwaste. Non-curbside greenwaste is expected to decompose at a much slower rate due to its low moisture content.

At chipping and grinding facilities, curbside greenwaste is usually separated from other waste contaminants such as food, glasses, cans, or paper waste, prior to being chipped or ground. In some facilities, in order to maintain a low moisture level needed for certain end products, curbside greenwaste is kept separately from non-curbside greenwaste, or is sorted to separate grassy greenwaste material from woody material. Also, in order to obtain fine or coarse products, chipping and grinding facilities may also screen greenwaste either before or after the chipping and grinding activity. Generally, curbside greenwaste is chipped/ground and transferred to customers or used for on-site applications within 2 to 3 days of receipt of greenwaste (except for holidays or extreme circumstances). There is a broad market for chipped and ground curbside greenwaste where they can be utilized as alternative daily cover (ADC) at landfills, mulch, feedstock for greenwaste composting, and bulking agents for manure and/or sewer sludge composting.

Stockpiling greenwaste, especially those from curbside collection, for an extended period of time (under favorable moisture and temperature conditions), will cause anaerobic decomposition of greenwaste and will result in VOC and ammonia emissions. High temperature readings and VOC emissions data obtained from greenwaste piles at chipping and grinding facilities are strong indicators of the greenwaste decomposition. District's recent source tests for curbside and non-curbside greenwaste have also confirmed that VOC and ammonia emissions occur from greenwaste piles. Chipping and grinding activities are required to comply with PR 1133.1, which establishes holding or processing time requirements for foodwaste, curbside and non-curbside greenwaste in order to prevent inadvertent decomposition of greenwaste and foodwaste.

Chipping and grinding activities could also generate significant amounts of particulate matter (PM) emissions when wood waste or greenwaste is mechanically ground and shredded, screened, and when chipped and ground greenwaste is stored outdoor or loaded into trucks. These activities are currently required to comply with AQMD Rule 403 – Fugitive Dust.

### ***Co-Composting Operations***

Composting is a biological process where organic materials (e.g., grass clippings, tree trimming, leaves, biosolids, manure, food waste) are decomposed by microorganisms under a controlled environment to create a soil-like material called compost. While decomposition occurs naturally anywhere plants grow, the process has also been industrialized to produce compost products under controlled conditions. In co-composting operations, putrescible materials such as biosolids and/or manure are combined with bulking agents to produce compost.

Composting is an important component of the solid waste industry. It provides resource conservation through source reduction, recycling, and reuse. However, as with other industrial processes, composting produces air emissions that are currently uncontrolled. In terms of air quality, composting is an exothermic process that releases carbon dioxide, water vapor, and other organic and inorganic gases such as ammonia, methane, VOCs, amines, and sulfides.

From an industrial perspective, composting is a three-stage process that begins as soon as appropriate materials are combined and piled together. The initial stage of the process is referred to as active composting followed by curing or finishing, and storage and/or processing of composted products. During the composting process microorganisms such as bacteria, fungi, and actinomycetes, consume oxygen while feeding on organic material such as green/wood waste, food-waste, livestock manure, biosolids (the semisolid residue of domestic sewage treatment processes) and other putrescible materials. The microbial activity results in the decay of the initial mixture and at the completion of the composting cycle wastes are transformed into a stable, pathogen-free composted material.

The microorganisms that contribute to the composting process contain both thermophilic and mesophilic species. Thermophilic and mesophilic microorganisms are microorganisms that can sustain life under high (110-150 °F) and low (50–105 °F) temperatures, respectively. The type of microbial activity present may characterize the active and curing stages of the composting process. However, for the purpose of Proposed Rule 1133.2, active co-composting has been defined as the phase of the composting process that begins when organic materials are mixed together for composting purposes and lasts at least 22 days. Based on source tests conducted by District staff, 80% of VOC and 50% of NH<sub>3</sub> emissions occurred during the first 22 days of the composting operations, which is considered the active phase of the composting for the purpose of the rule. The active phase of composting is where the thermophilic microorganisms' population is usually the highest. This stage is characterized by high temperatures, high level of oxygen demand and high evaporation rates due to temperature.

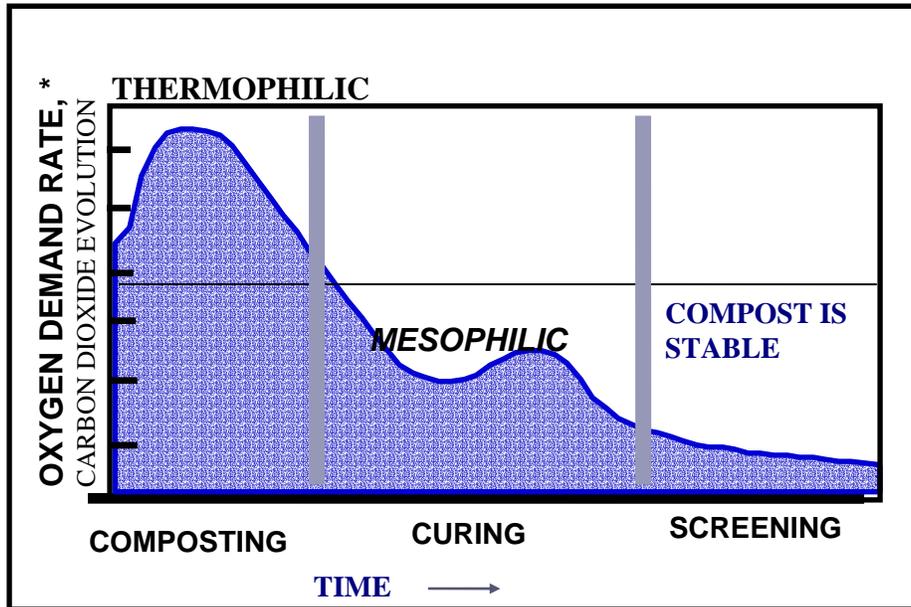
Conversely, the curing stage of the process is where the mesophilic microorganism population is the highest and the need for oxygen and the evaporation rates decreases. For the purpose of Proposed Rule 1133.2, the curing phase has been defined as a period that begins immediately after the active phase and lasts 40 days or until the compost exhibits a Solvita Maturity Index® of 7, or the product respiration rate is below 10 milligrams of oxygen per gram of volatile solids per day as measured by direct respirometry. The Solvita Maturity Test® is a widely recognized test that gives a maturity index for compost (maturity

means resistance to further decomposition). The test measures the carbon-dioxide respiration and ammonia volatility simultaneously. There is also a linkage between the microbial activity and the VOC emissions profile from composting operations. Specifically, emissions can be correlated to the activity of these microorganisms in that the emissions are generally higher during thermophilic temperatures and lower during mesophilic temperatures. Figure 1 illustrates the oxygen demand and microbial profile of the various composting stages. This figure can be used to illustrate the corresponding VOC emissions primarily occurring during active and curing phases of composting.

Proposed Rule 1133.2 includes control requirements for co-composting operations in order to achieve VOC and ammonia emission reductions. Co-composting are composting operations where biosolids and/or manure are mixed with bulking agents to produce compost.

Of the nine co-composting facilities in the Basin, seven facilities use the windrow method of composting, one uses a forced aeration system in combination with a biofilter and one uses the in-vessel composting technology where the composting operations are confined within a building and emissions are vented to a biofilter. Of the seven co-composting facilities that are not equipped with any control methods, three have annual throughputs greater than 100,000 tons, two have throughputs between 10,000 and 100,000 tons and two have less than 10,000 tons of throughput per year. These composting methods are described in detail in the Technical Assessment report on composting and related operations.

**Figure 1**  
**Composting Phases**



This graphic was provided by Eliot Epstein, Ph.D. Chief Environmental Scientist, Tetra Tech, Inc.

\*VOC emissions are expected to follow the similar profile as oxygen demand.

As stated before, it is the ability to control the physical and chemical characteristics of the process that makes composting a viable industrial process. The main physical and chemical characteristics that are optimized in an industrial composting process include: carbon-to-nitrogen ratio (C:N), moisture content, oxygen, temperature, PH, particle size, pile structure, and type of feedstock. These characteristics are described in detail in the Technical Assessment for Composting and Related Operations, dated April 2002, Attachment A to the Final Staff Report.

### ***Regulatory Background***

Following is a summary of the regulatory programs that are applicable or pertinent to the composting and related operations industry.

#### *Federal Programs*

The federal Clean Air Act requires the AQMD to adopt an AQMP that identifies a control strategy to demonstrate compliance with the federal ambient air quality standards. To address this federal mandate, the 1994 and 1997 AQMPs and 1999 Amendments to the 1997 Ozone State Implementation Plan for the SCAB included Control Measure WST-02 – Emission Reductions from Composting. The U.S. EPA approved these plans making this control measure federally enforceable. In addition to air quality issues, there are other federal requirements that apply to composting operations. Specifically, the federal requirements focus mainly on water and solid waste (i.e., sewage sludge) issues. The following is a brief summary of these requirements.

#### Resource Conservation and Recovery Act

In 1976, Congress enacted the Resource Conservation and Recovery Act (RCRA), an amendment to the 1965 Solid Waste Disposal Act. RCRA calls for conservation of energy and natural resources, waste reduction, and environmentally sound waste management practices. In addition, RCRA encourages states to develop plans for non-hazardous industrial solid waste and municipal solid waste (MSW) management, sets criteria for MSW landfills, as well as for other solid waste disposal facilities, and prohibits the opening dumping of solid waste. Congress delegated authority to U.S. EPA to develop specific regulations to implement the requirements of RCRA. Solid waste regulations have been promulgated in the Code of Federal Regulations under Title 40, Chapter I, Subchapter I, Parts 240-282 (40 CFR Parts 240-282). As a result of RCRA's prohibition on open dumping of solid waste other disposal alternatives for sewage sludge has been pursued including land spreading (treated sludge is spread over crop land as fertilizer), aerobic digestion, and composting.

#### National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) is an EPA-implemented program that requires permits for discharging pollutants from facility operations into water<sup>2</sup>. Even though the NPDES program focuses on water pollution from all types of industries, NPDES also applies to owners or operators of facilities that treat and handle sewage sludge, including composting with sewage sludge. The criteria and standards for NPDES are quite

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<sup>2</sup> 40 CFR Part 122, §122.1 (b).

extensive and have been promulgated in several parts of the Code of Federal Regulations under Title 40, Chapter I, Subchapter D, Parts 122, 123, 124 and 125 (40 CFR Parts 122–125).

Sewage Sludge Disposal Standards

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). 40 CFR Part 503 contains requirements for the control of pathogens, vectors, and heavy metal for sludge composting operations. In particular, to qualify as Class A compost Appendix B to Part 503-Pathogen Treatment Processes, generally requires Processes to further reduce pathogens (PFRP). PFRP requires that open windrow composting maintain the temperature of the compost to be 55<sup>0</sup> C or higher for 15 days or longer, and during this time there must be a minimum of 5 turnings of the windrows. For in-vessel or aerated static pile (ASP) composting, the PFRP requires the active pile temperature be at least 55<sup>0</sup> C or higher for 3 days.

*State Programs*

State law also requires the AQMD to adopt an AQMP that identifies a control strategy to demonstrate progress towards achieving the state ambient air quality standards. The 1994 and 1997 AQMPs and 1999 Amendments to the 1997 Ozone State Implementation Plan for the SCAB that included Control Measure WST-02 – Emission Reductions from Composting, was also submitted to the CARB to comply with state law. These air plans identified composting as a source of ammonia, PM10, and VOC emissions. As such, Control Measure WST-02 required the development of control to reduce the emissions from this industry by 2003. In addition to air quality requirements, there are several other state requirements that may apply to chipping and grinding and composting operations. Specifically, these state requirements focus on air, water and solid waste (i.e., sewage sludge) issues. The following is a summary of these requirements.

California Air Resources Board

In addition to reviewing and approving the AQMP, CARB's permitting requirements can affect composting and chipping and grinding operations that use portable equipment. Under the CARB's "Statewide Portable Equipment Registration Program", registered portable engines and equipment can be operated throughout California without the need to get individual permits from local air pollution control districts, such as the AQMD. Therefore, it is common for composting and chipping and grinding facilities to have equipment (i.e., portable engines associated with wood chippers, tub grinders, trommel screens) registered under the State Program.

California State Legislature: California Integrated Waste Management Act

Recognizing landfill limitations (i.e., capacity and siting) and the need for integrated waste management practices, in 1989, the California state legislature passed Assembly Bill (AB) 939 – California Integrated Waste Management Act into law, which was incorporated into the California Public Resources Code, Division 30. Accordingly, cities and counties are mandated to achieve a total waste diversion of 25 percent by 1995 and a total waste diversion of 50 percent by 2000 based on the 1990 baseline. As a result, recycling, reuse, and source reduction have been widely promoted to achieve these goals. Based on the California Integrated Waste Management Board's (CIWMB) report, statewide diversion rate in the year of 2000 reached a 42 percent benchmark.

California Integrated Waste Management Board

In June 1995, the CIWMB promulgated a set of regulations governing composting operations and facilities. The CIWMB currently regulates approximately 87 composting facilities operating in California in accordance with the California Code of Regulations, Title 14, Division 7, Chapter 3.1 – Composting Operations Regulatory Requirements (Chapter 3.1). Depending on the type of composting materials and the throughputs, affected facilities are required to obtain a Registration Permit, a Standardized Composting Permit, or a Full Solid Waste Facilities Permit (Full Permit). Full Permits require the preparation of an Environmental Impact Report (EIR) and are issued by CIWMB while Registration and Standardized Permits are issued through local enforcement agencies (LEAs), such as the environmental health departments. According to the CIWMB database, sixteen of the twenty-seven facilities in the AQMD's jurisdiction are identified as having a CIWMB permit.

The CIWMB is currently developing amendments to the California Code of Regulations, Title 14, Division 7, Chapter 3.1 – Composting Operations Regulatory Requirements (Chapter 3.1) to include chipping and grinding and other operations that handle compostable organic materials. These facilities would be subject to both permitting and operational requirements. In addition, to address increasing number of odor complaints, the CIWMB is also proposing a requirement of an Odor Impact Minimization Plan (OIMP) which must be developed by each facility. However, the proposed regulation at this time does not establish odor control requirements for these operations. Instead, the adequacy of an OIMP would be determined through public complaints.

Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) enforces EPA-issued National Pollutant Discharge Elimination System (NPDES) permits. In addition, the RWQCB focuses on wastewater generation, water demand, the capacity of existing or planned stormwater drainage systems and potential new sources of polluted run-off, and potential depletion of groundwater supplies or interference with groundwater recharge. In the case of composting and chipping/grinding facilities, the RWQCB has required various composting and chipping and grinding sites to be graded, paved, and surrounded by berms and other drainage-related protections to prevent run-off and the leaching of chipped and ground materials into the groundwater.

*Local Programs*

There are several local requirements that may apply to chipping/grinding and composting operations. Specifically, these requirements focus on air, land use and solid waste (i.e., sewage sludge) issues. The following is a summary of these requirements.

AQMD Rule Requirements

Currently, operators of chipping/grinding facilities located in the district are required to comply with AQMD Rule 402 – Nuisance, Rule 403 – Fugitive Dust, and Rule 203 – Permit to Operate for equipment that require permits (composting facilities are subjected to Rules 403 and 203). However, none of these rules establish specific control requirements to reduce VOC and ammonia emissions from greenwaste at composting and chipping and grinding facilities.

Local Enforcement Agency Requirements

There are several different local (i.e., city or county) enforcement agencies or LEAs that act as either the permitting or enforcement division of the CIWMB, depending on the throughput and type of compostable materials. For example, the local department of health services, on behalf of the CIWMB, issues Registration and Standardized permits and enforces the requirements in these permits for facilities with lower throughputs. However, for facilities that have throughputs that require a Full Permit issued by the CIWMB, the LEA is only responsible for enforcing the requirements in the Full Permit. For either type of permit scenario, the LEAs are responsible for handling and investigating complaints from composting and chipping/grinding operations. Pursuant to Section 41705, composting operations are exempt from AQMD odor regulations; AQMD must refer odor complaints to the LEA.

In addition, city or county offices in the jurisdiction where a facility is located, has the authority over land use issues and issuing conditional use permits to site composting facilities, transfer stations, et cetera.

Sewage Sludge Ordinances

In addition to EPA's federal requirements regarding the use or disposal of sewage sludge, there are local ordinances or restrictions throughout California and other states that ban the import and land use of certain grades of sewage sludge. For example, 14 counties within California, with Riverside county being the only one located within the AQMD's jurisdiction, have passed ordinances or permitting requirements that either ban or restrict the application of certain grades of sewer sludge onto farmland<sup>3</sup>. In addition, recent litigation and regulations in both Kern and Kings counties have resulted in ordinances that ban the import of certain classes of sewage sludge starting early 2003. Other states such as Pennsylvania, Vermont, and New Hampshire, have also passed similar ordinances to ban or limit the application of sewer sludge onto land. These restrictions will likely force the water treatment plants within the AQMD's jurisdiction, throughout California and the nation to further process the sewage sludge so that it can be recycled and used on farmland.

Local Governments

Local government zoning ordinances determine where composting and chipping and grinding activities can occur. In addition, local governments grant conditional use permits if the jurisdiction has determined that special conditions and approvals are necessary. Local governments also contract with chipping and grinding facilities for chipping and grinding greenwaste collected from their curbside recycling programs.

***Other Issues Facing the Composting Operations***

**Public Nuisance Issues**

Uncontrolled emissions, odors, and dust generated by windrow composting and chipping and grinding operations are often sources of public complaints. Emissions and odors can dramatically increase if the windrows are not maintained properly or chipped and ground material is allowed to decompose. Feedstocks like food waste, dairy products, manure,

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<sup>3</sup> County of Riverside Ordinance No. 744 – Regulating the Processing of Greenwaste.

sewer sludge, are odorous. Dust may also result from open feedstock preparation areas, chipping and grinding operations, and compost turning, curing, screening, storage, and loading. The problem can be worse during high winds.

Over the last two years, thousands of odor and dust complaints have been filed with the AQMD and with local enforcement agencies (LEAs). In particular, between January 1, 2000 and December 31, 2001, the AQMD received 470 public complaints regarding composting and chipping and grinding operations. The LEAs have received over 2,600 complaints regarding composting and chipping and grinding operations.<sup>4</sup> The AQMD staff has issued notices to comply (NC) and notices of violation (NOVs). The AQMD does not have records of enforcement actions taken by the LEAs. The table presented below summarizes this information.

**2000-2001 Public Complaints/AQMD Enforcement Actions  
On Composting and Chipping and Grinding Operations**

<b>Agency</b>	<b># of Complaints</b>	<b># of NCs/NOVs</b>
AQMD	470	55 (30 NCs and 27 NOVs)
LEAs	2,600+	N/A

The AQMD's role in addressing public complaints from these facilities has been affected by AB 59 that became law in 1995. Under this law, all air districts in California are to refer public complaints pertaining to odors from a composting facility that is subject to the CIWMB's regulatory requirements, to the LEAs. Odors from non-composting activities, such as chipping and grinding activities, mulching, and ADC application, as well as non-odor related public complaints including dust or emissions-related nuisances are under the air districts' jurisdictions.

**Waste Diversion (AB 939)**

The use of chipped and ground greenwaste as ADC is one of many integral methods of compliance with AB 939, which requires 50% waste diversion by the year 2000. However, actual quantity of waste diverted is not available at this time. Instead, the CIWMB determines compliance with AB 939 waste diversion goals by measuring the reduction in the amount of waste that a given jurisdiction disposes to the landfill. For each jurisdiction, a maximum allowable disposal amount is calculated, which represents a 50 percent reduction of disposed waste from 1990. To meet the diversion rate requirement, a jurisdiction may not dispose more than the maximum allowed amount. Each jurisdiction must also submit an annual report that includes information on all programs being implemented to divert waste disposal from a landfill.

As mentioned earlier, the year 2000 statewide diversion rate is estimated at 42 percent; however, it is unknown how much each individual waste diversion program contributes to the overall waste diversion rate.

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<sup>4</sup> This number underestimates the total number of complaints to LEAs because not all the LEAs maintain the data in a tabulated format and not all the composting and chipping and grinding facilities were included in the AQMD's data request.

Recent studies by the CIWMB show that many of the organic materials (i.e., foodwaste, grass, etc.) which are prevalent in the waste stream (35.1%) are associated with odors and emissions.

### **Environmental Justice**

In California, environmental justice is generally considered to be a call for the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies. In October 1997, the AQMD Governing Board adopted an environmental justice policy. The four guiding principles are:

- All basin residents have the right to live and work in an environment of clean air, free of airborne health threats;
- Government is obligated to protect public health;
- The public and private sectors have the right to be informed of scientific findings concerning hazardous and toxic emission levels, and to participate in the development and implementation of adequate environmental regulations in their communities; and
- The (AQMD) governing board is to uphold the civic expectation that the public and private sectors of the basin will engage in practices that contribute to a health economy and truly livable environment."

Environmental justice can be an issue in the siting of composting operations because of odors and dust impacts on neighborhoods from uncontrolled operations. The number of public nuisance complaints that the AQMD and LEAs have received regarding composting and related activities shows that these operations are having an impact on the surrounding community. As such, regardless of air quality regulations, environmental justice issues will affect the ability for future expansion of composting operations unless these issues can be adequately addressed. Controls to reduce emissions are expected to go a long way in addressing these impacts and would be consistent with the AQMD's environmental justice policy.

### **Regulatory Limits on Land-Application of Wastewater Sludge**

There are two classes of processed sludge. Class A sludge must undergo pathogen reduction to be below detectable levels; therefore, it can be used on edible vegetables and plants. Class B sludge must undergo pathogen reduction to ensure the pathogens are reduced to levels that are protective of public health and the environment. Class B sludge is only used on non-edible crops, forests, and reclamation sites.

Currently, most Class B sewer sludge is trucked from this region to Kings and Kern Counties where it is spread on croplands. Public concerns over Class B sludge used on croplands in Kings and Kern Counties has resulted in these jurisdictions placing limitations on Class B sludge. As a result, additional options to deal with Class B sludge will need to be developed. This could include additional composting of sewer sludge in the region. Therefore, there is an increased need to resolve the environmental impacts issues associated with co-composting operations so that additional co-composting facilities can be sited in the AQMD's jurisdiction.

## EMISSIONS INVENTORY AND REDUCTIONS

The emissions inventory for co-composting operations was developed based on the 2001 activity data (i.e., annual throughput) and baseline emission factors developed for these operations. The VOC and ammonia baseline emission factors were developed based on the AQMD source tests conducted in 1995 and 1996 for three windrow co-composting facilities. The baseline emission factors for VOC and ammonia are 1.78 and 2.93 lbs./ton of throughput (i.e., composting feedstock received at the facility), respectively. Emissions from co-composting operations are estimated by multiplying the facilities annual throughput by these facility-wide average emission factors. For chipping and grinding activities, emission reductions are not claimed under PR1133.1 since this rule establishes holding/processing time requirements for greenwaste to prevent inadvertent decomposition associated with stockpiling greenwaste (or foodwaste) for extended periods of time. Based on information provided by the industry and through CTAC, chipping and grinding activities subject to the rule are already processing their greenwaste within the time frame proposed in PR1133.1, and therefore, emission reductions, if any, are not expected to be significant. The objective of establishing these standard holding/processing time requirements is to prevent emissions from increasing for chipping and grinding activities.

Table 3 provides the emissions inventory for co-composting operations as well as the level of reductions anticipated from the implementation of PR1133.2. As shown in Table 3, co-composting operations generate significant amounts of VOC and ammonia emissions in the Basin. Emissions from co-composting operations place the composting and related operations industry as the largest unregulated stationary source category and the second largest stationary source category following the refinery category in the Basin. Using the baseline VOC emission factor, co-composting facilities with annual throughput of at least 11,300 tons would also generate VOC emissions in excess of 10 tons per year, which is the threshold for major sources as defined in AQMD Rule 3001. The three largest co-composting facilities in the Basin emit about 100 to 300 tons per of VOC and 150 to 500 tons per year of ammonia.

**Table 3 - Emissions Inventory and Reductions for Existing Co-Composting Operations**

	VOC	NH3
Emissions Inventory (tons/day)	1.67	2.74
% Reduction	70%	70%
Emissions Reduction (tons/day)	1.17	1.92

## CONTROL METHODS

The technology assessment provided an analysis of several control methods available to industry including: windrow, enclosures, forced aeration systems, and in-vessel composting. Emissions from enclosures, forced aeration systems and in-vessel systems can also be vented to emission control equipment such as biofilters. Forced aeration and in-vessel systems can also be enclosed, with all emissions vented to control equipment. Also available are other composting methods that employ variations of in-vessel and forced-air aeration systems that may be considered as closed-loop systems capable of achieving very high capture and control efficiencies. In this region, with the exception of three facilities, the predominant method of co-composting is windrow composting. In windrow composting, materials are moved with front-end loaders into long piles called windrows. Aeration for this method of composting is achieved mechanically by the turning of the piles with front-end loaders or scarabs machines. The temperature and moisture are monitored to optimize and hasten decomposition. After two to four months in the windrows, the material becomes compost. Based on the analysis conducted in the technology assessment, technologies exist today that can significantly reduce emissions from co-composting operations.

Currently, there are 118 operational composting facilities in the U.S. utilizing the forced aeration systems (e.g., ASP); one of them is located in the District. Nationwide, these facilities handle a daily throughput ranging from 0.1 to 300 dry tons. In addition, several groups in the District also consider forced aeration systems for their future co-composting facilities. There are also approximately 50 operational composting facilities in the U.S. utilizing the in-vessel technology; one of them is located in the District. The daily throughputs for these facilities range from 1 to 100 dry tons. A number of these forced aeration or in-vessel systems are enclosed with exhaust vented to the control equipment.

Biofiltration is a well-established emission and control technology in Europe where over two hundred biofilters were in use as of 1984 and even more are expected today. In the United States, biofilters have been mainly utilized for the treatment of odors as well as VOCs in wastewater treatment plants. Biofilters have recently gained better acceptance by composting and other operations such as auto body shops, pharmaceuticals, and beer breweries. Based on the information collected so far on existing biofilter composting applications, control efficiencies of about 80% to 90% for VOC and 70% to over 90% for ammonia have been achieved (one of this composting applications reported an initial control efficiency of 65 percent for VOC but was later improved to achieve an 80 percent control efficiency). This specific field example along with other available data presented in the Technology Assessment Report clearly demonstrates that a well-designed, well-operated, and well-maintained biofilter is capable of achieving 80 percent control efficiency for VOC and ammonia. Biofilter manufacturers also emphasize that regular inspection and maintenance of the biofilter are key elements to achieve such control level. Furthermore, information from a well-known biofilter manufacturer indicate that VOC removal efficiencies of greater than 90% are achievable.

In order to comply with the requirements of PR1132, new co-composting facilities would be required to enclose their active phase of co-composting operations and use negative forced-air aeration system for the curing phase of operations. The exhaust from the enclosure and

the aeration system would also be required to be vented to a control equipment such as a biofilter with a control efficiency of at least 80 percent for VOCs and ammonia emissions. Based on source test data from two existing co-composting operations (Griffith Park and Philadelphia Biosolids Recycling Center ), properly-designed and maintained biofilters have demonstrated destruction efficiencies of over 90% for both VOC and NH<sub>3</sub> emissions. However, because of concerns over the continuous effectiveness of biofilters in reducing emissions beyond 80%, a minimum of 80% control efficiency is required under the rule. Proposed Rule 1133.2 would require demonstration of compliance with these destruction efficiencies within 180 days of the start of operations and every two years thereafter. In addition, it is expected that biofilter control systems, as with any other control device, are maintained and operated in accordance with permit conditions.

Alternatively, new co-composting operations would also have the option to utilize any combination of the composting and control methods to demonstrate an overall control efficiency of 80 percent for VOC and ammonia emissions from active and curing phases.

Under PR1133.2, existing co-composting operations would be required to demonstrate an overall emission reduction of 70 percent for VOC and ammonia emissions (from active and curing phases) using any combination of composting and control methods. These facilities can comply with these requirements by enclosing their active co-composting and using forced aeration system for curing phase of operations (in combination with emission control equipment). Under this scenario, the enclosure will have a 100% capture efficiency for the active phase, the aeration system will have an ~~an control~~ collection efficiency of at least 45% for VOC and 55% for NH<sub>3</sub> emissions (based on test results from the recent Southern California Association of POTWs (SCAP) study), and a biofilter control system with a control efficiency of at least 80% for VOC and NH<sub>3</sub>. For ammonia emissions, the above combination in conjunction with optimized feedstock mix ratios (with at least 40% reduction efficiency) will also achieve the required reduction target. In addition, there are best management practices that can reduce emissions, which can be used as part of the compliance strategy provided such reductions are quantified following the guidelines specified in Attachment A of PR1133.2.

Any combination of composting and control methods (e.g., enclosure, aeration system, in-vessel composting, biofiltration, process controls, optimized mix ratios, and best management practices) capable of achieving the required emission reductions may also be utilized by existing facilities or new facilities (under the alternative option) to comply with PR1133.2 (following the testing guidelines included in the rule).

## **COST-EFFECTIVENESS**

Table 4 presents staff's cost-effectiveness analysis for new and existing co-composting operations based on implementation of several possible scenarios. For new co-composting operations, the cost-effectiveness is estimated to be about \$24,000 to \$27,000 per ton of VOC reduced depending on the type of enclosure (fabric or concrete). However, if the VOC and ammonia emission reductions are considered, the cost-effectiveness would range from about \$11,000 to \$12,000 per ton of both VOC and ammonia reduced. This scenario

assumes enclosure and aeration system for active co-composting operations and aeration system for curing phase both vented to a biofilter. It should be noted that the use of aeration system inside the enclosure would significantly reduce the enclosure cost because of the reduced space requirements for the aeration system (compared to windrow composting).

For existing co-composting operations, three scenarios were analyzed as presented in Table 4. Under scenario 2, assuming enclosure without an aeration system for active phase of composting and a forced aeration system for curing phase (both vented to a biofilter) and depending on the type of enclosure, the cost-effectiveness would range from \$11,400 to \$15,400 per ton of VOC and ammonia reduced, or \$30,000 to \$40,000 per ton of VOC reduced. However, as mentioned before, the use of a forced aeration system for active phase within an enclosure will significantly reduce the overall cost because of reduced space requirements, as indicated in scenario 3. Under scenario 3, using enclosure and aeration system for active phase, and aeration system for curing phase, both vented to biofilter (with efficiencies mentioned in previous section), the cost effectiveness would range from \$8,700 to \$10,000 per ton of VOC and ammonia reduced or \$23,000 to \$26,500 per ton of VOC reduced (depending on the type of enclosure). Under scenario 4, assuming that forced aeration system (in combination with process controls, optimized feedstock mix ratios, and best management practices) for both active and curing phases (combined with a biofiltration system) could achieve the required reductions (i.e., 70% for VOC and ammonia), the cost-effectiveness could be as low as \$6,500 per ton of VOC and ammonia reduced or \$17,000 per ton of VOC reduced. However, additional test data will be necessary to validate the efficiency of such control methods. The cost assumptions used in this analysis (capital and operating cost) are included in the Technology Assessment Report for PR1133 (Attachment A to the ~~Draft~~ Final Staff Report).

**Table 4 - Co-Composting Annualized Cost and Cost-effectiveness (\$/ton)**

Facility Type	Scenario	Annualized Cost (Millions \$)		C-E for VOC Only		C-E for VOC & Ammonia	
		Concrete	Fabric	Concrete	Fabric	Concrete	Fabric
New	1	\$4.45	\$3.88	\$27,287	\$23,798	\$12,345	\$10,767
Existing	2	\$22.7	\$16.9	\$40,677	\$30,236	\$15,373	\$11,427
Existing	3	\$14.8	\$12.9	\$26,508	\$23,118	\$10,018	\$8,737
Existing	4	\$9.6		\$17,166		\$6,487	

Scenario 1. Enclosure+ Forced Aeration System (Open ASP) + Biofilter (80% ammonia, 80% VOC) for Active. Forced Aeration System +Biofilter (~~19%~~ 20% ammonia, and 20% VOC) for Curing. Assuming 200,000 tons per year throughput.

Scenario 2. Enclosure+ Windrow+ Biofilter for Active. Forced Aeration System +Biofilter for Curing. 70% Overall Reduction for VOC and ammonia. The building cost for the enclosed windrow

is assumed to be three times higher than the building cost for an enclosed aeration system due to higher footage requirements.

Scenario 3. Enclosure + Forced Aeration System + Biofilter for Active. Forced Aeration System + Biofilter for Curing, achieving 70% overall reductions for VOC and ammonia.

Scenario 4. Forced Aeration System for Active and Curing, assuming that forced aeration system for both active and curing operations is capable of achieving 70% overall reductions for VOC and ammonia.

For new and existing co-composting operations, compliance cost would represent an increase of about \$22/ton of throughput (waste processed). For new co-composting facilities with a combined throughput of 200,000 tons per year, this cost would represent an additional \$0.08 per month per household in the Basin (or \$0.004 per month per household for every 10,000 tons of throughput) assuming that the cost would be passed onto the Basin households. The compliance cost for all existing co-composting facilities would represent an additional \$0.25 per month per household (under scenario 3 above) using the same assumption.

Facilities affected by PR1133 will also be subject to a one-time registration fee equivalent to the plan submittal fee in Rule 306 - Plan Fees which is currently \$89.59. Also, PR1133.1 would result in minimal cost to affected facilities for recordkeeping. There are no additional cost associated with compliance with PR1133.1 because the holding/processing time requirements in the rule are based on the normal chipping and grinding activities which do not result in inadvertent decomposition (based on information provided through the Composting Technical Advisory Committee).

## **SUMMARY OF PROPOSED RULES**

PR 1133, PR 1133.1, and 1133.2 would implement, in part, AQMD Control Measure WST-02. These proposed rules were developed with the assistance and input from the Composting Technical Advisory Committee (CTAC) and the Co-Composting Subcommittee to CTAC. PR 1133 is an administrative rule, which is intended to obtain information from the Composting and Related Operations industry via a registration and annual update process. PR 1133.1 establishes holding time/processing requirements for chipping and grinding operators with the objective of preventing inadvertent decomposition from occurring at chipping and grinding facilities. PR 1133.2 requires emission reductions from co-composting based on implementation of specific control methods. Following is a summary of the requirements of the proposed rules.

### ***Summary of Proposed Rule 1133 - Composting and Related Operations - General Administrative Requirements***

#### Applicability

PR 1133 applies to owners or operators of chipping and grinding, and composting facilities. The proposed rule applies to both existing and new facilities.

Requirements

Effective July 1, 2003, PR 1133 would require existing chipping and grinding and composting facilities to register with the District by submitting a registration form. The registration data would include general business information, process and operations information, and number of air quality- and odor-related enforcement actions issued for the facility. The odor-related information is requested as part of the registration process because of the correlation between odor and emissions (e.g., ammonia).

New chipping and grinding and composting facilities would also be ~~are~~ required to submit the registration form prior to the start of their operations (i.e., prior to facility's start-up). New facilities are also required to provide projected information when actual information is not yet available.

Also, effective July 1, 2004, every year thereafter, chipping and grinding, and composting facilities would be required to provide an update to the information provided as part of the initial registration.

Fees

Facilities subject to PR1133 will be subject to a one-time fee equivalent to the plan submittal fee in accordance with Rule 306 – Plan Fees at the time of registration. Based on the existing version of Rule 306, facilities subject to PR 1133 will be subject to a one-time fee of \$89.59.

Exemptions

The composting and related operations industry includes various processes and types of operations. PR 1133 specifically exempts from regulations the following seven types of operations: portable chipping and grinding operations; community composting; agricultural composting; nursery composting; recreational facilities composting; backyard composting; and wood waste chipping and grinding facilities. These operations or activities are defined within PR 1133. These operations are generally conducted in small scales or do not cause inadvertent decomposition.

***Summary of Proposed Rule 1133.1 - Chipping and Grinding Activities***

Applicability

PR 1133.1 applies to operators of chipping and grinding activities, unless otherwise exempted. In order to clarify the applicability of Rule 403 – Fugitive Dust to all chipping and grinding activities, language is provided in PR 1133.1 to reinforce this requirement.

Requirements

~~In order to clarify the applicability of Rule 403 – Fugitive Dust to all chipping and grinding activities, language is provided in PR 1133.1 to reinforce this requirement.~~

Effective July 1, 2003 , operators of chipping and grinding activities would be required to: 1) remove foodwaste or use for on-site composting within a period of two days; 2) chip and grind, use on-site, or remove curbside greenwaste from the facility within three calendar days of receipt ; 3) chip and grind or remove non-curbside greenwaste from the facility within 14 days of receipt; 4) chip and grind, use on-site, or remove mixed greenwaste within seven days of receipt; and 5) remove from the facility chipped and ground curbside greenwaste or use them on-site within three days of being chipped and ground (unless the moisture content

is maintained below 30%, in which case the holding/processing time limit for chipped and ground curbside greenwaste will not apply. All of the holding/processing times exclude state and federal holidays and may be extended to include rainy days and wet weather conditions (which could last up to 10 days after a rainy day) provided that records documenting wet weather conditions which impede normal operations are kept on-site.

Non-curbside greenwaste as used in this proposed rule refers to greenwaste that is not collected from receptacles designated for residential household greenwaste. It also includes screened or sorted greenwaste containing only large woody materials, such as tree trimmings and branches that are larger than 3 inches in any dimension. Although these woody materials may also come from city's curbside collection programs; they are generally separated from the grassy materials and processed separately. Greenwaste containing woody materials is expected to decompose at a slower rate (compared with grassy materials) due to their lower moisture content. On the other hand, curbside greenwaste refers to greenwaste that is collected from receptacles designated for residential household greenwaste. It also includes screened or sorted curbside greenwaste that contains only grass, leaves, and/or small twigs. This type of greenwaste is expected to decompose at a faster rate, and therefore, is proposed to be subject to a shorter holding or processing time requirement. Chipped and ground greenwaste products (form non-curbside type greenwaste) used for applications such as biomass fuel (i.e., meets specific biomass fuel specifications) are not subject to PR 1133.1 holding time requirements because of the low moisture content requirements for these products thereby decreasing or eliminating the potential for inadvertent decomposition.

The holding or processing time requirements for chipping and grinding activities are intended to prevent inadvertent decomposition of greenwaste, which is not associated with normal chipping and grinding operations. Therefore, these requirements are not intended to interfere with AB 939 diversion goals. For greenwaste categories subject to PR 1133.1, the proposed rule is not expected to result in any significant emissions reductions since the requirement for holding or processing time is in line with the normal practice of most chipping and grinding operations. However, the proposed rule would establish a uniform requirement for the removal, on-site use, or processing of greenwaste in a reasonable time frame to ensure that inadvertent decomposition associated with stockpiling greenwaste for an extended period of time would not occur. Compared to a performance-based approach (i.e., emission thresholds), which is not practical for chipping and grinding activities, or other requirements based on best management practices, which are not clearly defined, the holding/processing time requirements would streamline compliance for chipping and grinding facilities as well as enforcement for the District.

In addition, the operator of a chipping and grinding activity would also be required to maintain the following records on-site for two years:

- A copy of the facility's AQMD registration and annual updates; and,
- Records of date, type, and amount of greenwaste and/or foodwaste received; and,
- Records of date, type, amount of greenwaste and/or foodwaste removed from the site, and location where they are transferred.
- Records of dates of rainy days and wet weather conditions (i.e., conditions following rainy days that impede normal operations).
- Records of moisture content measurements for chipped and ground curbside greenwaste (if applicable).
- Records of dates and amount of curbside greenwaste chipped and ground.

Exemptions

PR 1133.1 provides exemption from the holding or processing time and record keeping requirements for the following:

- Portable chipping and grinding operations, palm chipping and grinding, and woodwaste chipping and grinding activities. Woodwaste (i.e., lumber, woody portion of mixed demolition and construction wastes) mostly contain very low moisture levels generally not subject to decomposition. Palm is fibrous and bulky, and costly and difficult to grind quickly, and is not expected to decompose quickly. Also, portable chipping and grinding, defined as chipping and grinding utilizing equipment (with a manufacturer's rating of 170 brake horsepower or less) where usually small amounts of greenwaste are processed and the piles are usually removed shortly after being chipped and ground is not subject to this rule.
- Chipping and grinding activities of greenwaste and/or foodwaste derived from the site and used on-site, such as chipping and grinding activities at agricultural settings, nurseries, botanical gardens, etc.

***Summary of Proposed Rule 1133.2 Requirements***

Applicability

PR 1133.2 applies to the operators of new and existing co-composting operations.

Requirements

PR 1132 establishes emission control requirements for new and existing co-composting operations. New facilities would have two options to comply with the rule requirements. Under the first option, new co-composting facilities would be required to enclose their active phase of the co-composting operations and use aeration system (that operates under negative pressure for no less than 90 percent of its blower(s) operating cycle) during the curing phase of their co-composting operations. Air exhaust from both the enclosure and aeration system are required to be vented to an emission control system with a control efficiency of at least 80 percent for VOC and 80 percent for ammonia emissions. The required destruction (control) efficiency for VOC and ammonia emissions are based on the demonstrated effectiveness of existing emission control equipment or systems such as biofilters for co-composting operations.

Because of the potentially large area of enclosure required for the active phase, and the need to have openings for brief periods (i.e., access or maintenance), the enclosure for active phase of composting must also meet the following criteria:

- 1) The inward face velocity of air through each opening in which air can enter the enclosure shall be a minimum of 100 feet per minute, unless the opening is equipped with a closure device that seals the opening in the event that the airflow direction changes.
- 2) The area of all openings in the enclosure through which air can enter the enclosure shall not exceed 2% of the surface area of the enclosure's four walls, floor, and ceiling.

- 3) The enclosure may be opened for brief time periods, not to exceed a total of 30 minutes per day for purposes of access or maintenance. These time periods do not need to be included in the face velocity determination or as an opening for the two percent criteria.
- 4) No measurable increase over background levels outside the enclosure shall occur at any enclosure opening including any opening that occurs briefly for access or maintenance. A portable ammonia or hydrocarbon analyzer that is calibrated in accordance with manufacturer's specifications shall be used for these measurements.

As indicated in the rule, the active phase of composting that needs to be enclosed under this option is defined as the phase of the composting process that begins when organic materials are mixed together for composting and lasts a minimum of 22 days. Enclosure of this phase (lasting at least 22 days) would ensure that majority of emissions associated with composting operations will be captured and vented to the control device.

Under the second option, new co-composting facilities would be required to achieve an overall reduction target of 80 percent by weight for VOC and 80 percent by weight for ammonia emissions from the active and curing phases of composting. This option would require facilities to submit a compliance plan at least one year prior to start of operations. Compliance with the 80% overall reduction target is expected to be achieved based on a combination of composting methods (such as optimized mix ratios, pile design, best management practices and aeration systems) in conjunction with control methods (e.g., biofilters). Staff has also received information that this level of reduction is achievable through the use of in-vessel composting with advanced aeration systems without the use of control equipment such as biofilters. For operators which select to use the enclosed in-vessel composting method, this option provides the flexibility to enclose a shorter period of the composting (since aeration accelerates composting time) and use aeration or other methods for curing in conjunction with control equipment as long as they can meet the overall reduction target.

Existing co-composting operations will be required to employ any combination of composting and control methods to demonstrate an overall control efficiency of 70 percent for VOC and 70 percent for ammonia emissions (for both active and curing operations). Existing co-composting operations would also be required to submit a compliance plan at least one year prior to their effective date of compliance. The less stringent reduction target for existing facilities (i.e., 70% vs. 80%) is to accommodate the lesser flexibility for these facilities in designing and operating composting and control methods compared with new facilities. Compliance with the 70% overall target can be achieved by enclosing the active phase, using negative aeration system for the curing phase, and venting exhaust from the enclosure and aeration system to a biofilter capable of achieving at least 80% destruction efficiency for VOC and NH<sub>3</sub>. Based on recent tests conducted by SCAP on the Griffith Park co-composting facility, the aeration system has demonstrated an approximately 45% collection for VOC emissions and about 55% collection for ammonia emissions (prior to being vented to the biofilter). Therefore, the combination of an enclosure (with 100% capture efficiency) for active phase, aeration system for curing phase, and a biofilter will achieve the required VOC reductions. For ammonia emissions, the above combination in conjunction with optimized feedstock mix ratios (capable of achieving at least 40% reduction in NH<sub>3</sub> emissions) will also achieve the required reduction for ammonia emissions.

Compliance with the overall emission reduction targets for existing and new facilities will be demonstrated based on a comparison of the co-composting baseline emission factors, developed by the District, with the controlled emissions rates for VOC and NH<sub>3</sub>. The baseline emission factors, included in the proposed rule, were based on source tests conducted on existing uncontrolled co-composting operations (i.e., 1.78 pounds of VOC and 2.93 pounds of ammonia per ton of throughput). The proposed rule also allows co-composting operators to develop their facility-specific baseline emission factors to demonstrate that the reduction requirements are met (as part of the compliance plan process).

Compliance plans required to be submitted by new facilities (under second option) and existing facilities must at least include the following data and information to be approved by District: a description and process diagram of the co-composting operation; a complete and detailed description of the control method(s) that will be used at the co-composting operation to meet the reduction requirements such as enclosure; aeration; biofiltration; feedstock component optimization or process controls; best management practices; or any combination of the methods listed in the rule; or, any other method approved by the Executive Officer, California Air Resources Board, and the United States Environmental Protection Agency.

In addition, the compliance plan must contain all data, calculations methodology, calculations, records manufacturer specifications and all other information necessary to determine that the composting methods and control methods will achieve the required emission reductions. Also, a methodology and calculations establishing the daily and annual VOC and ammonia emissions or projected emissions must be provided. Furthermore, for facilities that select to establish their own operation-specific baseline emission factors, a source test protocol must be submitted in accordance with the guidelines included in Attachment A of the rule (which includes guidelines for the development of source test protocols for VOC and ammonia emissions from co-composting operations). Finally, a source testing protocol must be developed to demonstrate compliance with the overall emission reductions following the guidelines in Attachment A of the rule. Facilities would also be required to identify all equipment that require District permit in this process.

Following the interim approval of the compliance plan by the District, within 180 days of the effective compliance dates for existing and new co-composting operations, facilities are required to demonstrate compliance with the required reductions by submitting a compliance report which would include all the necessary source test and applicable data and obtain District's final approval of the compliance plan.

#### Compliance Schedule

New co-composting operations would be subject to the requirements of this rule on the date of adoption of this rule prior to the start of operations. Existing facilities, defined in the proposed rule as facilities that have begun operation as of the date of adoption of this proposed rule will be required to comply with the requirements of this rule based on the size of facility (i.e., design capacity). Facilities that have a design capacity of greater than 100,000 tons per year or more will be required to comply with the requirements of this proposed rule by January 1, 2007. Facilities that have a design capacity greater than 10,000 but less than 100,000 tons per year will be required to comply by January 1, 2008. Facilities that have a design capacity of less than 10,000 tons per year will be required to comply by January 1, 2009.

#### Fees

Operators subject to compliance plans will be subject to plan submittals and evaluation fees in accordance with Rule 306.

Exemptions

Proposed Rule 1133.2 provides an exemption from this rule for greenwaste composting operations, agricultural composting operations, woodwaste composting operations as well as co-composting operations that have a design capacity of less than 1,000 tons of throughput per year. In addition, the proposed rule also provides an exemption from the requirements of the proposed rule for new and existing co-composting operations that: 1) are equipped with an aeration system and the emissions are vented to a control device with a control efficiency of 80 percent, by weight, for VOC and 80 percent, by weight, for ammonia emissions; 2) are owned and operated by municipalities which compost wastes generated within the jurisdiction of the municipality; and, 3) process less than 5,000 tons of biosolids or manure, combined, per year. These facilities are however required to demonstrate the effectiveness of the control device (i.e., biofilters) in reducing VOC and NH<sub>3</sub> emissions on January 1, 2007 and every two years thereafter.

In addition, because of cost considerations, the compliance date for an existing co-composting operation with less than 3 years remaining under its non-renewable conditional use permit (beyond its effective compliance date) will be extended for up to three years provided that the operator submits a copy of the conditional use permit and a letter from the responsible agency verifying that the permit is non-renewable and the date when the permit is expired.

## **ENVIRONMENTAL ASSESSMENT**

Pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15252 and the AQMD's Certified Regulatory Program (Rule 110), staff has prepared an Environmental Assessment (EA) for the proposed Rules 1133, 1133.1, and 1133.2. The Draft EA, which was made available for a 30-day review period, concluded that the proposed rules would not have any significant adverse effects on environment. Responses to comments received on the EA have been prepared and are part of the Final EA, which is included as part of the attached package for the public hearing on the proposed rules.

## **SOCIOECONOMIC ASSESSMENT**

The socioeconomic assessment and the incremental cost-effectiveness analysis for the proposed rules have been prepared and are presented as an addendum to the staff report.

PR 1133 affects a total of 74 facilities, including 18 greenwaste, 47 chipping and grinding, and 9 co-composting facilities. PR 1133.1 would impact 18 greenwaste and 47 chipping and grinding facilities. PR 1133.2 would impact seven co-composting facilities. The total compliance cost for the 74 facilities affected by PR 1133 would be \$6,630 for a one-time registration fee. PR 1133.1 would result in minimal cost to affected facilities. The average annual cost of the PR 1133.2 is estimated at \$14.80 million. It is estimated that an average of 155 jobs could be forgone annually in the local economy as a result. However, considering

the two existing facilities' plan to move to an enclosed facility (vented to biofilter) despite the proposed rule and one facility's potential extension of compliance date (i.e., due to its non-renewable conditional use permit), the compliance cost and regional economic impact associated with PR1133.2 will be about 10% of these estimates.

## **COMPARATIVE ANALYSIS**

As required by Health and Safety Code Section 40727.2, the purpose of this analysis is to identify and compare any other AQMD or federal regulations that apply to the same operations or source type. Currently, there are no existing federal regulations or AQMD requirements that apply to composting and related operations with regards to VOC emissions and ammonia emissions, however, other federal state and local requirements have been summarized on pages 9-13.

## **DRAFT FINDINGS**

Before adopting, amending or repealing a rule, the AQMD shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference, as defined in Health and Safety Code Section 40727. The draft findings are as follows:

**Necessity** - The AQMD Governing Board finds and determines that Proposed Rule 1133 – Composting Operations – General Administrative Requirements, Proposed Rule 1133.1 – Requirements for Chipping and Grinding Activities, and Proposed Rule 1133.2 – Emissions Reductions from Co-Composting Operations, are necessary in order to implement a control measure of the 1999 Amendment to the 1997 Ozone SIP, and to reduce PM10 and its precursors.

**Authority** - The AQMD Governing Board obtains its authority to adopt, amend or repeal rules and regulations from Health and Safety Code §§39002, 40000, 40001, 40440, and 40702.

**Clarity** - The AQMD Governing Board finds and determines that Proposed Rule 1133 – Composting Operations – General Administrative Requirements, Proposed Rule 1133.1 – Requirements for Chipping and Grinding Activities, and Proposed Rule 1133.2 – Emissions Reductions from Co-Composting Operations, are written and displayed so that the meaning can be easily understood by persons directly affected by it.

**Consistency** – The AQMD Governing Board finds and determines that Proposed Rule 1133 – Composting Operations – General Administrative Requirements, Proposed Rule 1133.1 – Requirements for Chipping and Grinding Activities, and Proposed Rule 1133.2 – Emissions Reductions from Co-Composting Operations are in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or federal or state regulations.

**Non-Duplication** – The AQMD Governing Board has determined that Proposed Rule 1133 – Composting Operations – General Administrative Requirements, Proposed Rule 1133.1 – Requirements for Chipping and Grinding Activities, and Proposed Rule 1133.2 – Emissions

Reductions from Co-Composting Operations do not impose the same requirements as any existing state or federal regulation, and the extent they overlap with NESHAP requirements are necessary to carry out the duty to adopt rules implementing the AQMP.

**Reference** - In adopting these proposed rules, the AQMD Governing Board references the following statutes which AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 and 40440.

## **CONCLUSIONS**

The proposed rule reflects reasonable available control technology for the reduction of VOC and ammonia emissions from the co-composting operations. The implementation of the rule as proposed is estimated to reduce 1.2 tons and 1.9 tons of VOC and ammonia emissions, respectively at an overall cost-effectiveness of approximately \$8,700 to \$10,000 per ton of VOC and ammonia reduced (or \$23,000 to \$26,500 per ton of VOC reduced), to be passed to waste disposal customers at a cost of at least \$0.25 per month per household, assuming that the cost would be passed onto the Basin households.

## **COMMENTS AND RESPONSES**

### **PR1133**

Comment 1-1: Definitions in PR1133, 1133.1 and 1133.2 should be consistent for the same terms.

Response 1-1: The definitions used throughout the proposed rules were made consistent.

Comment 1-2: The date of compliance for registration is too stringent.

Response 1-2: The compliance date for Proposed Rule 1133 has now been extended from February 1, 2003 to July 1, 2003.

Comment 1-3: The registration process should be streamlined by providing a checklist on the registration form.

Response 1-3: The registration form will include a checklist that facilitates compliance with the requirements of the proposed rule (i.e., submittal of registration information).

Comment 1-4: The proposed rule exempts nurseries, residential neighborhoods, agricultural composting operations and other types of operations from the registration requirements of this rule; however, the definitions describing these operations are too restrictive in that they do not allow

the sale of products derived from this type of operations. This limitation on sale of products should be eliminated from these definitions.

Response 1-4: The definitions have been changed and no longer limit the sale of products derived from the exempted sources.

Comment 1-5 Does the definition of community composting include any limits of compost sold?

Response 1-5. The definition of community composting does not include any limits of compost sold; however, it clearly states that this activity is conducted by a residential neighborhood association using feedstock generated by the neighborhood to produce compost for the neighborhood's use.

**PR 1133.1**

Comment 1-1 Definitions of curbside and non-curbside greenwaste should be combined since curbside loads often include non-curbside greenwaste.

Response 1-1 A new definition for mixed greenwaste is added to the rule to define greenwaste that contains both curbside and non-curbside materials. However, there are different holding/processing time requirements for curbside and non-curbside greenwaste so both definitions are necessary. Specific holding/processing time for mixed greenwaste is also established.

Comment 1-2 Definition of alternative daily cover refers exclusively to greenwaste-derived materials. It could also include woodwaste.

Response 1-2 Under the revised rule language, the holding/processing time requirements are proposed for chipped and ground curbside greenwaste instead of ADC or composting feedstock (i.e., 3-days). Exemption is also provided for chipped and ground curbside greenwaste provided that the moisture content is less than 30%. Because of this revision, the definition for ADC is removed.

Comment 1-3 Definition of mulch should also refer to the use of mulch below the surface of soil as well as on top of soil.

Response 1-3 Under the revised rule language, the holding/processing time requirements are proposed for chipped and ground curbside greenwaste instead of ADC (including mulch) or composting feedstock (i.e., 3-days). Exemption is also provided for chipped and ground curbside greenwaste provided that the moisture content is less than 30%. Because of this revision, the definition for mulch is removed.

## Final Staff Report for Proposed Rules 1133, 1133.1, and 1133.2

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- Comment 1-4 Agricultural chipping and grinding should be exempt from the holding time requirements of the rule.
- Response 1-4 Rule language is revised to exempt agricultural chipping and grinding from the holding/processing time and recordkeeping requirements.
- Comment 1-5 PR 1133.1 should have a provision to address equipment breakdown.
- Response 1-5 Equipment breakdown is covered under Rule 430 – Breakdown Provisions, which includes reporting procedures and specific timeframe for equipment repair, as well as the allowance for emergency variance for equipment that would need additional repair time.
- Comment 1-6 PR 1133.1 should allow additional holding time during and after rainy days.
- Response 1-6 PR 1133.1 is revised so that holding/processing time may be extended to allow time for rainy days (defined as any day with a minimum of 0.05 inches of rain reported by the National Weather Service or a cooperative weather reporting station for the site closest to the chipping and grinding operations) and wet weather conditions defined as weather conditions following a rainy day that would impede normal operations (not to exceed 10 days) provided that records documenting these conditions are kept on-site.
- Comment 1-7 Palm chipping and grinding activity should be exempt from PR 1133.1
- Response 1-7 PR 1133.1 is revised to exempt palm chipping and grinding activity from the holding/processing time and recordkeeping requirements because of its bulkiness and difficulty in grinding quickly as well as due to its slow decomposition rate.
- Comment 1-8 Holding/processing times are too strict, especially for non-curbside greenwaste.
- Response 1-8 PR 1133.1 is revised to include various holding times for unprocessed greenwaste received as well as for processed (curbside chipped and ground) greenwaste. In particular, the holding/processing time for unprocessed non-curbside greenwaste is revised to be 14 calendar days (from receiving date), excluding official federal and state holidays as well as rainy days and wet weather conditions, and the holding time for chipped and ground curbside greenwaste is 3 calendar days. There is no holding time requirement for chipped and ground non-curbside greenwaste such as those used for biomass fuel.

The holding/processing time requirements are revised to be in-line with normal chipping and grinding operations while preventing inadvertent decomposition.

Comment 1-9 PR 1133.1 should prohibit chipping and grinding of foodwaste.

Response 1-9 Instead of prohibiting foodwaste chipping and grinding, PR 1133.1 requires foodwaste to be removed from the site or used for on-site composting within 2 calendar days of receipt.

Comment 1-10 The holding/processing time requirements of PR 1133.1 may negatively impact AB 939 (i.e., waste diversion from landfills).

Response 1-10 The holding/processing time requirements are intended to prevent inadvertent decomposition associated with stockpiling of greenwaste for extended periods of time, which is not supposed to be a normal practice at chipping and grinding facilities. Therefore, these requirements do not adversely impact AB 939 goals.

Comment 1-11. Landclearing activity should be exempt from PR 1133.1.

Response 1-11. PR 1133.1 is revised to exempt landclearing activity from the holding/processing time and recordkeeping requirement since the activity is conducted offsite and is associated with non-curbside greenwaste chipping and grinding.

Comment 1-12. ASTM Test Method E 871 – Standard Method for Moisture Analysis of Particulate Wood Fuels should be an additional method to measure moisture content.

Response 1-12. PR 1133.1 is revised to add the above ASTM method.

### **PR1133.2**

Comment 1-1: An aeration system within an enclosure is discretionary; therefore it should not be constrained by the 90 percent negative pressure operating requirement.

Response 1-1: Proposed Rule 1133.2 does not require the use of aeration systems within enclosures. The proposed rule language has been modified to clarify that the requirement for an aeration system (a forced-air aeration system that operates under negative pressure for at least 90 percent of the blower operating time) is only for curing phase of composting under the method of compliance specified in paragraph (d)(1), for new facilities.

- Comment 1-2: The definition of the term “active co-composting” contradicts the definition of the California Integrated Waste Management Board (CIWMB) (i.e., 122°F). The use of a range of temperatures does not work for this definition. Alternative ways to define this term should be considered.
- Response 1-2: This definition has been modified and is now based on time (number of days) instead of temperature. As revised, the definition clearly defines the active phase and does not contradict the CIWMB definition for active composting. For air quality purposes, defining active co-composting based on the number of days is more representative, since up to 80 percent of VOC and 50 percent of ammonia emissions occur in this phase.
- Comment 1-3: The use of the word “throughput” in the definition of the term “baseline emission factors” is inconsistent with how emissions factors were developed.
- Response 1-3 The proposed rule now contains a definition for the term “throughput.” Adding this definition clarifies the rule and eliminates the inconsistencies.
- Comment 1-4 The definition of the term “co-composting operations does not mention any greenwaste or bulking agents. Co-composting cannot be conducted without bulking agents.
- Response 1-4: The co-composting definition has now been modified to state that co-composting operations are "composting operations where biosolids and/or manure are mixed with bulking agents to produce compost. Co-composting operations include both the active and curing phases of the composting process."
- Comment 1-5: The use of the word “collection” in the definition of composting is incorrect since the collection aspect does not have anything to do with composting.
- Response 1-5: The definition of the term “composting” has been modified and does not include collection.
- Comment 1-6: The definition of the term “curing” in terms of temperature is burdensome. It is recommended that the definition be changed to a microbial-activity based definition.
- Response 1-6: The definition of the term “curing” has been changed and it now contains a time element (i.e., 40 days) and a microbial-activity based definition based on the Solvita test or oxygen consumption (respirometry).

- Comment 1-7: There are greenwaste composting operations that process or use manure and/or foodwaste in their composting process. These types of operations should not be considered to be co-composting since they are truly greenwaste composting operations. It is recommended that definition of the term “co-composting” be changed to exclude greenwaste composting operations that handle small amounts of manure.
- Response 1-7: Proposed Rule 1133.2 has been modified and it now includes a definition of greenwaste composting, defined as greenwaste composting operations where bulking agents can include up to 20 percent manure. The proposed rule specifically exempts greenwaste composting from the requirements of Proposed Rule 1133.2. Furthermore, the definition of co-composting has been modified and foodwaste as a feedstock is not included in that definition, and therefore, foodwaste composting is not regulated under the Proposed Rule 1133.2 at this time.
- Comment 1-8: The most likely add-on control technology that would be used to comply with rule is biofiltration. Given the limited source tests data on VOC reduction efficiency with this type of control technology, it is requested that the proposed rule provide some flexibility in demonstrating compliance with the destruction efficiency of biofilters since the demonstration on a continuous basis may be difficult.
- Response 1-8: The proposed rule has been revised to address this issue by providing flexibility in demonstration of the destruction efficiency of biofilters such that compliance demonstration must be done initially as part of the permit application process and every two years thereafter. Guidelines for source test protocols to determine compliance are provided in Attachment A of PR1133.2.
- Comment 1-9 Previous version of the rule contained exemptions for small composting operations. Please consider adding an exemption for small composting operations:
- Response 1-9: The proposed rule includes an exemption for small co-composting operations that handle less than 1,000 tons of throughput per year.
- Comment 1-10: A 100 percent capture efficiency is too restrictive and may be difficult to be met.
- Response 1-10: The rule is revised to include specific criteria for an enclosure to provide for access as well as brief periods of openings (refer to section (d)(1)(A)(i) through (d)(1)(A)(iv)).
- Comment 1-11 The baseline emission factors that AQMD has developed represent only the active phase of composting.

- Response 1-11: Staff disagrees. The baseline emission factors were based on source tests conducted on both the active and curing phases of co-composting process (including and up to the 62 days of composting).
- Comment 1-12: There is insufficient data on biofilter performance with respect to controlling VOCs.
- Response 1-12: Based on the available data on existing biofilter applications, VOC destruction efficiencies of between 80% and 90% have been demonstrated. Based on available information, the 80 percent reduction efficiency required for emissions control equipment for new facilities (under d(1)) is achievable by optimally maintained and operated biofilters or other control equipment capable of achieving equivalent reductions, while providing some compliance margin to address potential performance variations.
- Comment 1-13: Small municipally-owned co-composting operations that have already invested in control technologies should be exempt from Proposed Rule 1133.2. Furthermore, this type of exemption should also be provided to other municipalities whose operations are not for profit and would have difficulty in meeting the financial demands to comply with the main requirements of the proposed rule.
- Response 1-13: The proposed rule has been revised and now includes an exemption for co-composting operations that meet all of these conditions: 1) the co-composting operation is equipped with a forced-air aeration system and the emissions from the forced-air aeration system are vented to a control device that has a destruction efficiency equal or greater than 80 percent for VOC and ammonia, by weight; and, 2) the co-composting operation is used to compost wastes generated within the jurisdiction of the municipality, and 3) the co-composting operation does not handle more than 5,000 tons per year or biosolids or manure, combined.
- Comment 1-14: The proposed rule should exempt existing co-composting operations that have a non-renewable and limited conditional use permit. Facilities that would only operate for three years beyond the compliance schedule of this rule should be exempt, since it would be impossible to amortize the required investment to comply with the proposed rule.
- Response 1-14: The District is proposing this rule to protect public health by reducing air pollutants. The District rule establishes a percentage control for existing facilities, but leaves the method of control to the individual facility. This would enable a facility to choose the most cost effective controls for its operation. Furthermore, Proposed Rule 1133.2 includes a provision to extend the effective date of compliance for up to three years for an existing facility that has less than 3 years remaining under a

non-renewable conditional use permit (beyond its effective compliance date) provided such facility submits a copy of their conditional use permit and a letter from the responsible agency confirming that the permit has an expiration date and it is non-renewable.

Comment 1-15: The proposed rule is technology limiting and discriminates against other viable technologies.

Response 1-15: The proposed rule, in fact, provides flexibility for new and existing co-composting operations to demonstrate compliance using any combination of composting and control methods.

Comment 1-16: Alternatives to flux chamber method of testing for VOC emissions should be allowed because of the high cost of testing.

Response 1-16: Attachment A of PR 1133.2 is revised to allow for alternative test protocols to be submitted to the District for approval.

Comment 1-17: Method 207.1 for measuring ammonia is a draft method and specifies outdated analytical techniques.

Response 1-17: Attachment A of PR 1133.2 is revised to specify the use of ion chromatography or ion specific electrode analytical methods under Method 207.1.

Comment 1-18: The requirement for the use of Laboratories approved under District's Laboratory Approval Program (LAP) is too restrictive and costly. Annual renewal of certificates is also required.

Response 1-18: The use of approved laboratories is common to all District regulations and is intended to provide data quality assurance and equity. This is a responsible alternative to using District resources solely. The annual renewal fee is minimal (\$100).

Comment 1-19. Manure should be excluded from the definition of co-composting.

Response 1-19. From an emissions standpoint, manure is included in the definition of co-composting since manure is a putrescible organic matter that generates ammonia and VOC emissions. The concern that by including manure in the co-composting definition, greenwaste composting would be included in PR 1133.2 is addressed by adding a definition for greenwaste composting that includes up to 20 percent manure. Greenwaste composting is exempt from the requirements of Proposed Rule 1133.2.

- Comment 1-20. PR 1133.2 should provide flexibility to achieve the required emissions reduction by the use of process control and/or best management practices, (i.e., pile geometry, mixture composition optimization).
- Response 1-20. Proposed Rule 1133.2 provides a compliance option whereby a facility may comply with the requirements of the proposed rule by employing any combination of composting and control methods, including, but not limited to, process controls and/or best management practices.
- Comment 1-21: The requirements for enclosures openings should be based on either face velocity or emission measurements, not both.
- Response 1-21. To ensure that enclosures are well designed in terms of their ability to capture emissions, both tests are required and are independent of each other.
- Comment 1-22 Does a compliance plan supersede a permit?
- Response 1-22. Compliance plan submittals are required as part of the rule for existing co-composting facilities and for new facilities that elect to comply with the overall emission reduction target through a compliance plan process. These plans are independent of any permits that may be required to site a new facility or modify an existing facility. A compliance plan does not supersede a permit or vice versa. Also for facilities that may be able to comply with the requirements of the rule solely by process controls or best management practices, the plan then becomes the enforcement tool since there may not be a permit associated with that type of composting method (i.e., without control equipment or basic equipment).
- Comment 1-23. Demonstration of control efficiency should not be limited to source testing.
- Response 1-23. Source testing is the only acceptable procedure to demonstrate control efficiency of control equipment. The rule also allows overall control efficiency demonstration through source testing. However, alternative test methods are also allowed provided that they are determined to be equivalent and approved by the AQMD, ARB and U.S. EPA.
- Comment 1-24. Source testing requirement should not be included in the compliance plan since it is part of the permit applications.
- Response 1-24. Source testing requirements are included in compliance plans in order to demonstrate compliance with required emission reductions, especially in the event that permits are not required. When both permits and a plan are required, District staff will ensure that conditions of any plan and any required permit requirements are consistent with each other.

Comment 1-25. Clarify baseline emissions.

Response 1-25. Baseline emissions are emissions generated from the existing uncontrolled setting and/or practices of the composting operations, where emissions control equipment or methods are not in-place.

Comment 1-26. Why is interim plan approval necessary?

Response 1-26. Interim plan approval is a necessary procedure to ensure that the proposed compliance method would achieve the overall emission reduction targets prior to a facility beginning construction and incurring costs. Following the construction of the new or modified facility, the operator is then required to demonstrate by source testing that the proposed method of control demonstrates compliance.

Comment 1-27. The definition of curing should include product respiration rate in terms of oxygen uptake.

Response 1-27. The proposed rule language is revised to also include the suggested oxygen uptake as option in defining the end of the curing phase of the composting process.

Comment 1-28. The control efficiency requirements for control equipment is bothersome since there may be insufficient data regarding biofilter's control efficiency.

Response 1-28. It is important that the rules achieve intended emission reductions. Without specifying a control efficiency, reductions may not be achieved. Manufacturers can design biofilters to meet the control efficiency. Based on the literature review and the available source test information, control efficiencies of 80% to 90% for VOC and 70% to over 90% for ammonia have been achieved in practice. Biofilter manufacturers/designers also emphasize that biofilters have to be well-designed, well-operated, and well-maintained to achieve such control levels.

Comment 1-29. The unit of the emission factors are not consistent between source test reports and rule language (lb emissions/ton compost mix vs. lb emission/ton throughput). Does throughput include recycled materials?

Response 1-29. The proposed rule language has been made consistent throughout. A definition of the term "throughput" has also been included for clarification which does not include recycled materials. Throughput only includes the amount of compost feedstock plus bulking agents and/or amendment.

Comment 1-30. Clarify the number of existing co-composting facilities in the inventory.

Response 1-30. Based on the previous definition of co-composting, District staff had identified 12 co-composting facilities, which included small facilities as well as facilities that compost small percentage of manure along with greenwaste. However, under the current definition of co-composting, there are 9 co-composting operations identified under PR 1133.2. Please note that staff also considered two operations conducted by two independent operators at the same location as two individual facilities.