(Adopted January 10, 2003)

RULE 1133.2 EMISSION REDUCTIONS FROM CO-COMPOSTING OPERATIONS

(a) Purpose

The purpose of this rule is to reduce volatile organic compounds (VOC) and ammonia (NH_3) emissions from co-composting operations.

(b) Applicability

This rule applies to all new and existing co-composting operations.

(c) Definitions

For the purposes of this rule, the following definitions shall apply:

(1) AERATION SYSTEM is a system where air is forced through organic materials being composted, through the use of fans or blowers.

(2) AGRICULTURAL COMPOSTING is composting conducted in agricultural settings where the feedstock consists of wastes generated on-site by the production and processing of farm or agricultural products.

(3) ACTIVE CO-COMPOSTING is the phase of the composting process that begins when organic materials are mixed together for composting and lasts a minimum of 22 days.

(4) BASELINE EMISSIONS FACTORS are the non-controlled emission factors for co-composting operations for VOC and ammonia.

(5) BIOFILTRATION is a pollution control technology that removes and oxidizes VOC and ammonia through the action of bacteria and other microorganisms.

(6) CO-COMPOSTING is composting where biosolids and/or manure are mixed with bulking agents to produce compost. Co-composting includes both the active and curing phases of the composting process.

(7) COMPOST is a product resulting from the controlled biological decomposition of organic materials.

(8) COMPOSTING is a process in which solid organic waste materials are decomposed in the presence of oxygen under controlled conditions through the action of bacteria and other microorganisms.

(9) CURING is the phase of the co-composting process that begins immediately after the end of the active phase of composting and lasts 40 days or until the compost has a Solvita Maturity Index of 7 or the product respiration rate is below 10 milligrams of oxygen consumed per gram of volatile solids per day as measured by direct respirometry.

(10) ENCLOSURE is a completely walled, floored, and roofed structure or vessel.

(11) EXISTING CO-COMPOSTING OPERATIONS are all co-composting operations that have begun operations on or before the date of adoption of this rule.

(12) GREENWASTE is any organic waste material generated from gardening, agriculture, or landscaping activities including, but not limited to, grass clippings, leaves, tree and shrub trimmings, and plant remains.

(13) GREENWASTE COMPOSTING is composting of greenwaste by itself or greenwaste in combination with up to 20 percent manure, by volume.

(14) NEW CO-COMPOSTING OPERATIONS are co-composting operations that have not started operations as of the date of adoption of this rule.

(15) OPERATOR is the operator of a co-composting operation.

(16) SOLVITA MATURITY INDEX is an index that defines the stage where compost exhibits resistance to further decomposition, as tested by the Solvita Maturity Test®.

(17) START-UP is the first day of active co-composting operations at the facility.

(18) THROUGHPUT is the mass of biosolids, manure, and greenwaste in tons per year as received by the facility and processed through composting excluding recycled materials.

(19) WOODWASTE is lumber, and the woody material portion of mixed demolition wastes and mixed construction wastes.

(20) WOODWASTE COMPOSTING is composting of woodwaste by itself.

(d) Requirements

(1) Operators of new co-composting operations shall:

(A) Conduct all active co-composting within the confines of an enclosure which meets the following conditions:

(i) 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.

(ii) 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.

(iii) 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.

(iv) No measurable increase over background levels of ammonia or hydrocarbons 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 shall be used for these measurements. The portable ammonia analyzer shall be operated per manufacturer's instructions and calibrated with certified zero and 10 parts per million ammonia standards. The portable hydrocarbon analyzer shall be a flame ionization detector operated per manufacturer's instructions and calibrated with certified zero and 10 parts per million methane standards.

(B) Conduct all curing using an aeration system that operates under negative pressure for no less than 90 percent of its blower(s) operating cycle; and,

(C) Vent the exhaust from the enclosure and the aeration system to an emissions control system designed and operated with a control efficiency equal to or greater than 80 percent, by weight, for VOC emissions and 80 percent, by weight, for ammonia emissions.

(2) In lieu of complying with the requirements of paragraph (d)(1), operators of new co-composting operations may submit a compliance plan, for the approval of the Executive Officer, that demonstrates an overall emission reduction of 80 percent, by weight, for VOC emissions and 80 percent, by weight, for ammonia emissions from the baseline emission factors.

(3) Operators of existing co-composting operations shall submit a compliance plan, for the approval of the Executive Officer, that demonstrates an overall emission reduction of 70 percent, by weight, for VOC emissions and 70 percent, by weight, for ammonia emissions from the baseline emission factors.

(4) The baseline emission factors to be used under paragraphs (d)(2) and (d)(3) shall be 1.78 pounds of VOC per ton of throughput and 2.93 pounds of ammonia per ton of throughput. The Executive Officer may approve the use of operation-specific baseline emission factors in lieu of the baseline emission factors, if the operator requests the use of such baseline emission factors as part of the compliance plan submittal and demonstrates that the operation specific baseline emissions factors are representative of noncontrolled operations.

(5) The operator of a co-composting operation shall submit the compliance plan required pursuant to paragraphs (d)(2) or (d)(3) at least one year prior to the start of operations for new co-composting operations and at least one year prior to the effective date of compliance for existing co-composting operations.

(6) The control efficiency required under subparagraphs (d)(1)(C) and (j)(2)(A) for new co-composting operations shall be demonstrated by a source test conducted as part of the permit application process and every two years thereafter.

(7) The control efficiency required under subparagraph (j)(2)(A) for existing co-composting operations shall be demonstrated by a source test conducted on or before January 1, 2007, and every two years thereafter.

(8) Within 180 days after the effective date of compliance and every two years thereafter, the operator of a co-composting operation shall perform all necessary tests and provide a certification of compliance report that includes all source test data and all other applicable information to demonstrate compliance with the emission reduction requirement of paragraphs (d)(2) or (d)(3).

(e) Compliance Plan

(1) Compliance plans required under paragraphs (d)(2) and (d)(3) shall contain all the following elements:

(A) The name(s), address(es), and telephone number(s) of the person(s) responsible for the preparation, submittal and implementation of the compliance plan;

(B) The name, address, and telephone number(s) of the facility for which the compliance plan is being prepared;

(C) A description and process diagram of the co-composting operation;

(D) A complete description of the control method(s) that will be used at the co-composting operation to meet the requirements under paragraphs (d)(2) or (d)(3). The description shall be in sufficient detail to demonstrate compliance with paragraphs (d)(2) or (d)(3). The acceptable control methods include, but are not limited to:

(i) enclosure design or technology;

(ii) aeration system design and operation;

(iii) biofiltration;

(iv) scrubber;

(v) feedstock component optimization;

(vi) biosolids thermal pre-treatment;

(vii) enclosed material mixing and thermal stripping;

(viii) staged active pile construction and aeration;

(ix) feedstock ratio optimization;

(x) process controls;

(xi) best management practices; or,

(xii) any combination of the methods listed above; or,

(xiii) any other method approved by the Executive Officer, California Air Resources Board, and the United States Environmental Protection Agency.

(E) All data, calculations methodology, calculations, records, manufacturer specifications and all other information necessary to determine that the composting methods and control methods proposed in subparagraph (e)(1)(D) will achieve the required emission reductions.

(F) A methodology and calculations establishing the daily and annual VOC and ammonia emissions or projected emissions;

(G) If applicable, a source test protocol developed in accordance with the requirements of subdivision (g), to establish operation-specific baseline emission factors.

(H) A source testing protocol developed in accordance with the requirements of subdivision (g) to demonstrate compliance with the overall emission reductions specified in paragraph (d)(2) or (d)(3).

(I) An identification of all equipment needing permits to construct and operate.

(2) In evaluating the plan, the Executive Officer may require tests and sampling as necessary to determine the adequacy of the plan and the likelihood of compliance with the emission reduction requirements of paragraphs (d)(2) or (d)(3).

(3) The Executive Officer may approve operation-specific baseline emissions factors provided the baseline emissions factors are substantiated with source test data obtained in accordance with subdivision (g) of this rule and the composting method(s) and mixture is representative of normal operations.

(4) The Executive Officer shall provide interim approval of the compliance plan provided the operator submits all of the information required under paragraph (e)(1) and the Executive Officer verifies that, by design, the plan will meet the requirements of paragraph (d)(2) or (d)(3), as applicable.

(5) Following the interim approval of the plan, the Executive Officer shall approve the compliance plan provided the operator submits, no later than 180 days after the effective date of compliance, a certification of compliance report that includes all source test data, and the Executive Officer verifies that the emissions from the co-composting operations comply with the requirements of paragraphs (d)(2) or (d)(3), as applicable.

(6) The Executive Officer may impose conditions necessary to ensure that the co-composting operation complies with the compliance plan and all applicable AQMD rules.

(7) The Executive Officer may require the operator to maintain records consistent with the compliance plan necessary to demonstrate compliance with the plan.

(8) Compliance with the provisions of the approved plan does not exempt an operator from complying with the requirements of the California Health and Safety Code, or any other AQMD rule.

(f) Compliance Schedule

(1) The effective dates of compliance for paragraphs (d)(1), (d)(2), and (d)(3) of this rule shall be as follows:

(A) Upon start-up for new co-composting operations.

(B) January 1, 2007 for existing co-composting operations with a facility design capacity of 100,000 tons of throughput per year or more.

(C) January 1, 2008 for existing co-composting operations with a facility design capacity greater than or equal to 10,000 but less than 100,000 tons of throughput per year.

(D) January 1, 2009 for existing co-composting operations with a facility design capacity less than 10,000 tons of throughput per year.

(2) The Executive Officer shall extend for up to three years the compliance date for an existing co-composting operation which, at the time of rule adoption and at least one year prior to the effective compliance date, has less than 3 years remaining under a non-renewable conditional use permit beyond its effective compliance date. By June 1, 2003, the operator of such an operation must submit to the Executive Officer 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.

(g) Testing Protocol

(1) The operator of a co-composting operation shall conduct all required source and laboratory tests in accordance with an Executive Officer approved test protocol developed in accordance to the guidelines provided in Attachment A of this rule.

(2) The operator of the co-composting operation shall use a District approved laboratory in accordance with the Attachment A of this rule.

(3) The following methods shall be used to determine compliance with this rule:

(A) SCAQMD Method 207.1 – Determination of Ammonia Emissions from Stationary Sources.

(B) SCAQMD Method 25.3 – Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions from Clean Fueled Combustion Sources.

(C) SCAQMD Method 1.1 Sample and Velocity Traverses for Stationary Sources.

(D) SCAQMD Method 1.2 Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts.

(E) SCAQMD Method 2.1 Determination of Stack Gas Velocity and Volumetric Flow Rate (S-Type Pitot Tube).

(F) SCAQMD Method 2.2 Direct Measurement of Gas Volume through Pipes and Small Ducts.

(G) SCAQMD Method 2.3 Determination of Gas Velocity and Volumetric Flow Rate From Small Stacks or Ducts.

(H) SCAQMD Method 4.1 Determination of Moisture Content in Stack Gases.

(h) Recordkeeping

The operator shall, at a minimum, maintain operation's records for a period of at least two years, or five years for facilities subject to Title V Permit Requirements, and make them available to the Executive Officer upon request.

(i) Plan Fees

Operators subject to a compliance plan submittal pursuant to paragraphs (d)(2) and (d)(3) shall be assessed, as applicable, filing and evaluation fees pursuant to Rule 306.

(j) Exemptions

(1) The provisions of subdivisions (d) through (i) of this rule shall not apply to agricultural composting operations, greenwaste composting operations, woodwaste composting operations, co-composting operations with a design capacity of less than 1,000 tons of throughput per year, and existing co-composting operations with a design capacity of less than 35,000 tons of throughput per year containing no more than 20 percent biosolids, by volume.

(2) Except for paragraphs (d)(6) and (d)(7), the provisions of subdivisions (d) through (i) shall not apply to new and existing co-composting operations that:

(A) Conduct co-composting operations using an aeration system that is vented to an emission control device with a control efficiency of

80 percent, by weight, for VOC emissions and 80 percent, by weight, for ammonia emissions; and,

(B) Are owned and operated by a municipality which composts waste generated within the jurisdiction of the municipality; and,

(C) Process less than 5,000 tons of biosolids or manure per year, combined.

ATTACHMENT A

GUIDELINES FOR THE DEVELOPMENT OF SOURCE TEST PROTOCOLS FOR VOC AND AMMONIA EMISSIONS FROM CO-COMPOSTING OPERATIONS

Source test protocols are to consist of testing plans to measure VOC and ammonia emissions due to the composting process. When used for determining the control device efficiency requirement specified for new facilities, the measurements shall consist of lb/hr measurements at the inlet and exhaust of the control device as well as a verification of the enclosure and are subject to the applicable requirements that follow. When used for determining the overall emission reduction requirements as compared to the baseline emissions factors, emissions are to be reported as % reductions for the active co-composting and curing phases in terms of pounds of emissions per ton of throughput (total raw material as received) and are subject to the applicable requirements that follow. The following are general requirements for all testing as well as specific requirements for the rule sections for each facility-specific protocol which must be prepared by the source test contractor and approved by the SCAQMD prior to testing.

1. *Alternative Test Methods*

   The reference test methods for ammonia, VOC, and flow rate cited in this guideline shall be used to determine compliance with this rule. Alternative test methods may be used if they are determined to be equivalent and approved in writing by the Executive Officer, the California Air Resources Board, and the U.S. Environmental Protection Agency. For the source test protocols, as defined as the manner in which the reference test methods are employed to obtain a measurement of the emissions, alternatives to the procedures cited in this guidelines may be used if they are determined to be equivalent and approved in writing by the Executive Officer.

2. *LAP Requirements*

   The sampling, analysis, and reporting shall be conducted by a laboratory/source test firm that has been approved under the SCAQMD Laboratory Approval Program (LAP) for the cited SCAQMD reference test methods, where LAP approval is available. For SCAQMD reference test methods for which no LAP program is available, the LAP approval requirement shall become effective one year after the date that the LAP program becomes available for that SCAQMD reference test method.

3. Operating Conditions

The testing must be conducted under representative operating conditions with respect to seasonal conditions, compost composition, process throughput, processing of the materials, and pile geometries. The following operating parameters shall be recorded during testing and reported with the test results:

a) A thorough description of the composting process and process diagram of each processing area and including residence times in each of the composting process areas.
b) Process throughput as determined by facility's billing scales or other calibrated measuring device that represents the tons of the material as received that is present at the facility during the time of the testing. When using the District Baseline Emission Factors, the process throughput is to include all of the raw organic materials that are composted excluding material that is recycled from previous similar processing. Several throughputs may be necessary if applicable to the different processing areas or pile ages.
c) Compost composition (percent and type of materials i.e. biosolids, manure, greenwaste, etc…).
d) Age of all piles that were tested and all piles present at the facility during testing.
e) Detailed Dimensions of all piles so that a surface area for each pile type can be calculated.

4. Ammonia Sampling

SCAQMD Method 207.1 shall be used to obtain the ammonia samples from each source of emissions to be tested. When sampling from a flux chamber, a sample line of minimal length should be connected to a midget sampling train consisting of; two midget impingers each filled with 15 ml of 0.1N Sulfuric Acid, an empty bubbler, and a bubbler filled with tared silica gel. The samples shall be analyzed for ammonium content as ammonia by ion chromatography or ion selective electrode.

5. VOC Sampling

Duplicate integrated gas samples shall be taken from each source of emissions to be tested using SCAQMD Method 25.3. The Method 25.3 apparatus should be connected to sample directly inside the flux chamber or duct as applicable. Compost emissions are considered as water soluble sources where the 50 ppm applicability limit of Method 25.3 does not apply.

6. Specific Requirements for Testing Co-Composting Operations Control Equipment Performance

For surface types of emissions, such as with open faced biofilter exhausts, the exhaust emission rate shall be determined as in the following Section (8).

For a control device inlet or exhaust that is vented through a testable duct, the gas velocity within the duct shall be measured according to SCAQMD Methods 1.1, 2.1, and 3.1. The flow rate shall also be corrected to dry standard conditions using the moisture content as determined by SCAQMD Method 4.1. This flow rate may then be used to determine mass emission rates.

The overall destruction efficiency is calculated as follows:

$$ODE = 100 \times (1 - (E / I)) \qquad \text{(Equation 1)}$$

Where:

ODE =	Overall Destruction Efficiency (%)
E =	Total Exhaust Emission Rate (lb/hr)
I =	Total Inlet Emission Rate to Control Device (lb/hr)

7. Specific Requirements for Existing Co-Composting Operations and New Co-Composting Operations (Overall Emissions Reduction)

A proposed measurement from the active and curing co-composting process, including but not limited to surface emissions of all piles where the materials are composted, and outlets (vents or surfaces) of control devices must be included in the protocol. If the emissions are vented to atmosphere from a vent stack such as from an otherwise uncontrolled aerated static pile or other vent to atmosphere, then the stack concentration, determined using methods specified in Sections (4) and (5) and flow rate measurements as specified in the previous Section (6) are required. From all surface types of emissions such as from compost piles and biofilter surfaces, the procedure for measuring surface emissions as in Section (8) is required. A measurement for fugitive emissions from aerated static pile surfaces must also be included.

Each type of pile must be tested. If the facility includes several identical piles, then only the largest pile need be tested. If the facility has more than three different age piles that are otherwise identical in processing and composition, then at a minimum three ages can be tested including newer, older, and middle aged piles. In any case, the surface area of all piles at the facility must be included in the determination of pile dimensions as recorded in Section (3).

If the facility elects to use an alternative to the District's baseline emissions factors, then a separate test must be conducted to establish this baseline on the uncontrolled composting operation (e.g., windrow method) with the same compost mix. Following the source test to determine an alternative baseline, facilities would have the option to use the District's baseline emissions factors or the alternative baseline emissions factors.

Reduction of emissions shall be calculated as follows:

$$\% \text{ Reduction} = 100 \times (1 - TE/B) \qquad \text{(Equation 2)}$$

Where:

TE = Total Active and Curing Phase Emissions (lb/ton throughput)
B = District Baseline Emissions or Alternative Baseline Emissions if Tested (lb/ton throughput)

8. Procedure for Measuring Surface Emissions

The procedure for measuring surface emissions such as the compost pile and biofilter surfaces that cannot be tested by conventional methods through a stack or duct, is a modified form of the procedures found in the US Environmental Protection Agency's (EPA) *Measurement of Gaseous Emission Rates from Land Surfaces Using an Emission Isolation Flux Chamber User's Guide* (EPA Guide). The modification to the procedures in the EPA Guide are specified in the following requirements.

The flux chamber encompasses a fixed surface area of 1.4 ft^2 and contains a sweep air system to obtain a homogeneous air sample by employing a mixing fan and sweep gas (10% He in air at 5 liters/min recommended). The sweep gas must contain a non reactive and non-present tracer such as the aforementioned 10% helium so that a correction for the contribution of the surface flow rate can be calculated.

A minimum of ten (10) sample locations or a sufficient number at each pile/surface tested must be obtained in order to achieve a representative sample of the surface emissions. These locations can be composited for each pile/surface to reduce testing costs. For example, for one hour sampling, ten (10) random positions on the pile should be tested for 6 minutes each. Alternatively, a lesser number of sample locations may be sampled provided that an evaluation of spatial variation demonstrates that the number of sample locations are sufficient.

The emissions must be reported in units of lb/hr-ft^2, lb/hr and lb/ton of throughput. The following calculations shall apply to the test results:

$$\text{Surface Flow Correction Factor} = C_t / C_s \qquad \text{(Equation 3)}$$

Where:

C_t = Concentration of Tracer in Sweep Gas
C_s = Concentration of Sweep Gas in Flux Chamber Sample

Corrected Flux Chamber Results (lb/hr-ft^2) = UFC x SFCF (Equation 4)

Where:

UFC = Uncorrected Flux Chamber Results (lb/hr-ft^2)
SFCF = Surface Flow Correction Factor

lb/hr = lb/hr-ft^2 x Total Compost Surface Area in Category (Equation 5)

lb/ton throughput = lb/hr x (24 hr/day) /PT (Equation 6)

Where:

PT = Process Throughput (total ton/day as received)

Total Emissions (lb/ton throughput) = $\sum$ P (Equation 7)

Where:

P = Active and curing sources of the Facility Compost Emissions (lb/ton throughput)

For a facility where not every age of pile was tested, the surface areas from each pile in the facility must be included and sorted into appropriate age and emissions categories from those that were measured.