

# Guidelines for Calculating Emissions from Greenwaste Composting and Co-Composting Operations

February 2015

## DESCRIPTION:

Composting refers to the active phase biodegradation and subsequent curing phase of organic waste materials. Greenwaste composting is microbiological decomposition of greenwaste by itself, or in combination with foodwaste, or up to 20 percent manure, per pile volume basis. Co-Composting is composting of biosolids and/or manure with a bulking agent. Composting of greenwaste combined with manure greater than 20 percent, per pile volume basis, is considered as co-composting. Specific to greenwaste composting and co-composting, Rule 301 requires that the total weight of emissions of organic gases (VOC) and ammonia (NH<sub>3</sub>) be annually reported, even those which continue to passively emit air contaminants after they are processed by permitted or unpermitted equipment or operations.

## 1. EMISSION CALCULATION PROCEDURES

- a) Facilities can estimate their VOC and NH<sub>3</sub> emissions using equation (1) when the emissions are not being controlled or equation (2) when the emissions are being controlled prior to be released to the atmosphere.

$$\text{EMISSION} = \text{Throughput} * \text{Uncontrolled Emission Factor} \quad (1)$$

$$\text{EMISSION} = \text{Throughput} * \text{Controlled Emission Factor} \quad (2)$$

Where,

EMISSION: VOC or NH<sub>3</sub> emissions expressed in pounds per year (lb/yr)

Throughput: Mass of foodwaste, manure, biosolids, and greenwaste in tons per year as received by a facility and processed through composting excluding recycled materials.

Uncontrolled Emission Factor (EF<sub>u</sub>): SCAQMD default factors that are taken from the Rule 1133.2 and Rule 1133.3 staff reports and are available to estimate the emissions from co-composting and greenwaste composting operations.

Controlled Emission Factors (EF<sub>c</sub>): These are the factors determined based on the types of emissions control exist at the facility such as best management practices or additional SCAQMD approved control system as described below.

*If controlled emission factors are used to estimate emissions, you must provide the District with documentation that demonstrates compliance.*

- i. **Best Management Practices:** The best management practices are defined as when greenwaste composting piles are covered with at least six inches of finished

compost within 24 hours of initial pile formation, and not turned for the first seven days of active phase composting, and

For the first fifteen days of initial pile formation, and within six hours before turning, the top half of the pile is kept wet to a depth of at least three inches.

- ii. **Add-on Control:** SCAQMD approved emission control system is used for greenwaste composting and co-composting piles (i.e., Thermal Oxidizer (T/O), Bio-filtration, etc.)

**b) Uncontrolled and Controlled Emission Factors for Greenwaste Composting & Co-Composting Operations**

The uncontrolled emission factors for VOC & NH<sub>3</sub> are provided in Table 1 and the controlled emission factors are listed under Table 2a for housekeeping practices and Table 2b for add-on control.

**Table 1: Uncontrolled Emission Factors**

<b>Operation</b>	<b>VOC (lbs/ton of throughput)</b>	<b>NH<sub>3</sub> (lbs/ton of throughput)</b>
Greenwaste Composting	4.67	0.66
Co-Composting	1.78	2.93

**Table 2a: Controlled Emission Factors (Best Management Practices)**

<b>Operation</b>	<b>VOC (lbs/ton of throughput)</b>	<b>NH<sub>3</sub> (lbs/ton of throughput)</b>
Greenwaste Composting	2.97*	0.57**

\*This value assumes 40% control applied to the active phase only

\*\*This value assumes 20% control applied to the active phase only

**Table 2b: Controlled Emission Factors (Add-On Control)**

<b>Operation</b>	<b>VOC (lbs/ton of throughput)</b>	<b>NH<sub>3</sub> (lbs/ton of throughput)</b>
Greenwaste Composting*	$4.25 \times (1-CE_{A,VOC}) + 0.42 \times (1-CE_{C,VOC})$	$0.46 \times (1-CE_{A,NH3}) + 0.20 \times (1-CE_{C,NH3})$
Co-Composting	$1.78 \times (1-CE_{VOC})$	$2.93 \times (1-CE_{NH3})$

Where,  $CE_{VOC}$  or  $CE_{NH3}$  is a control efficiency of the Add-on control and expressed as a decimal fraction. \*The subscript A for greenwaste composting refers to the control efficiency during the active phase, and the subscript C refers to the control efficiency (if any) during the curing phase.

**c) VOC and NH<sub>3</sub> Emissions Calculations**

To estimate the total VOC and NH<sub>3</sub> emissions from greenwaste composting or co-composting operations,

1. Take the total weight of foodwaste, manure, biosolids, and greenwaste in tons per year as received by a facility and processed through composting excluding recycled materials.
2. Take the uncontrolled emission factor from Table 1 when there is no control at the facility or controlled emission factors from Tables 2a or 2b when best management practices or SCAQMD approved control system are used, based on the type of emissions (i.e., VOC, NH<sub>3</sub>).
3. Enter the values obtained in steps 1 and 2 in equations (1) or (2), whichever applicable, to estimate the VOC & NH<sub>3</sub> emissions for greenwaste composting and/or co-composting operations.

## 2. EXAMPLES:

The following examples show how data are entered into the AER Web Tool and emissions are reported. A facility reports emissions from three distinct greenwaste composting and co-composting operations as follows:

**Operation 1:** Co-composted 8,000 tons of materials with no add-on control. The VOC and NH<sub>3</sub> emissions are estimated as shown in screenshots 1 - 7 below with emission factors from row 2 of Table 1.

**Operation 2:** Composted 10,000 tons of combined greenwaste composting materials with good housekeeping practices. The VOC and NH<sub>3</sub> emissions are estimated as shown in screenshots 8 - 13 below with emission factors from Table 2a.

**Operation 3:** Co-composted 18,000 tons of materials with add-on control system: thermal oxidizer (T/O) controlling VOC at 99.2% efficient and bio-filter controlling NH<sub>3</sub> at 75% efficient. The VOC and NH<sub>3</sub> emissions are estimated as shown in screenshots 14 - 20 below with emission factors from row 2 of Table 2b.

Screenshot #21 shows emissions from composting and co-composting processes are added.

## Operation 1: Screenshot #1: Add Emission Source for Uncontrolled Co-Composting Operation

Facility ID: 999111      Facility ID: 999111 · ABC · Reporting period: 2013

**Edit Emission Source**

Providing correct information and proper selection categories would help to classify emission source.

Permitted

A/N

Permit No

Permit Device ID

AER Device ID will be assigned upon saving

ES Name

Operating ES Status: Normal Operation

Comment: Co-Composting Operations

Emission Source Group: Determine Emission Source Group Type

Design Capacity

Save and return to List of Emission Sources or Save and proceed to Process Reporting or Cancel

Optional: Save and Mark as Completed

## Operation 1: Screenshot #2: Select Process ID P1

South Coast Air Quality Management District

test 2014  
Logout | Edit Profile

**Process References**

A/N	Permit NO	Permit Device ID	Permit Device Description	AER Device ID	ES Name	Source Group	Emissions?	Equipment	ES Status
				ES37		Other Processes	Y	Other process equipment	Work in progress

Process ID: P1      Source Group: Other Process Emissions      Process Name: Work in progress      Process Status: Work in progress      Operation Type: routine

Add Process

OK

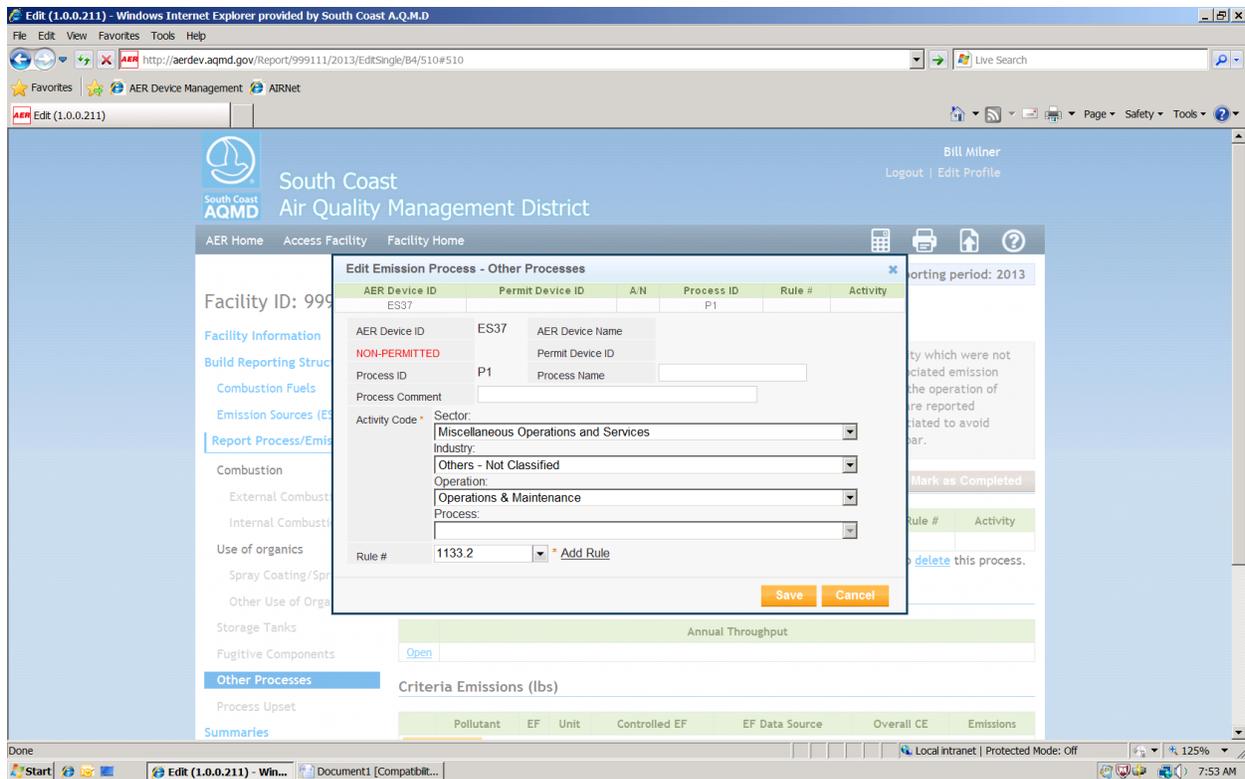
Displaying 37 emission sources. You can use filter to narrow down selection.

A/N:      Permit NO:      AER Device ID:      Permit Device ID:

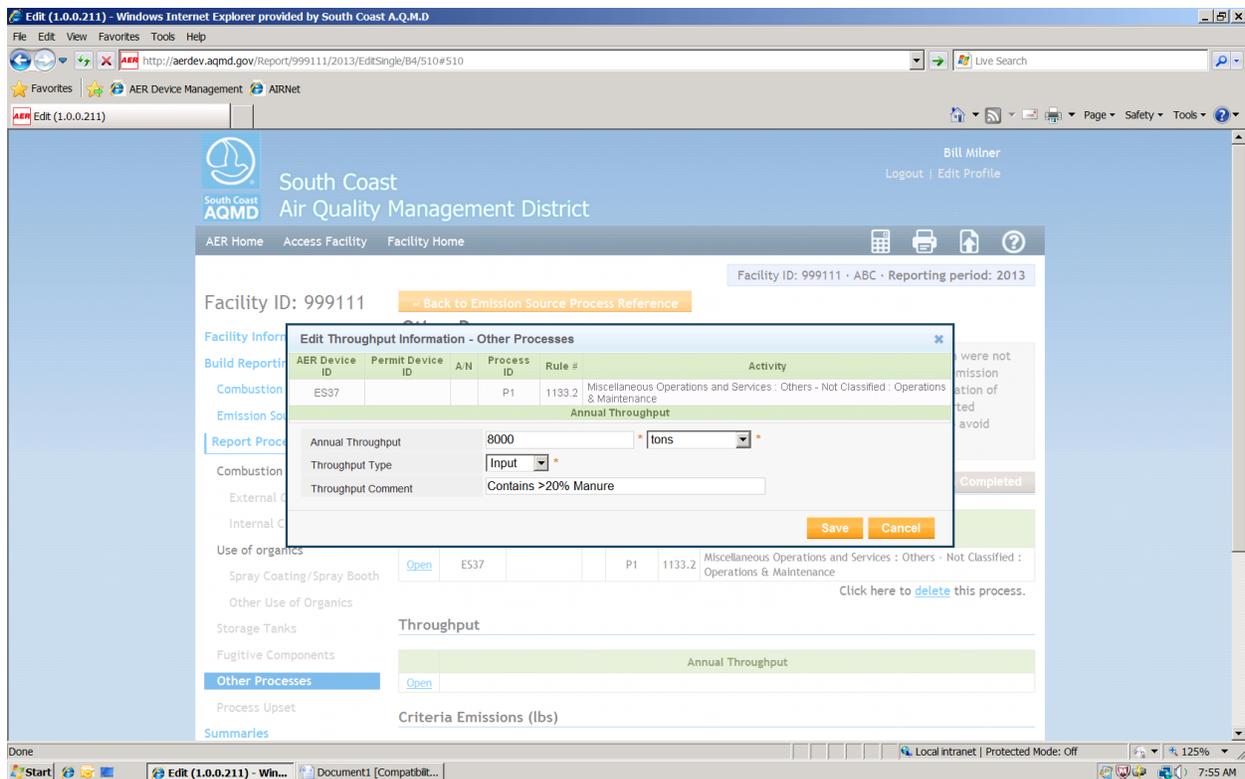
Search Emission Sources

Add New Emission Source

### Operation 1: Screenshot #3: Assign Activity Code and Rule Number



### Operation 1: Screenshot #4: Input Throughput



## Operation 1: Screenshot #5: Enter VOC Information

The screenshot shows the 'Open Criteria Emission Information - Other Processes' form. The facility ID is 999111 and the reporting period is 2013. The form is for process P1, 'Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance', with an annual throughput of 8,000.0 tons. The pollutant is VOC, with an emission factor (EF) of 1.7800 lbs/tons. The overall control efficiency is 0.00000. The emission factor comment is 'Uncontrolled Co-Composting VOC Emissions'. The emission factor data source is 'AQMD default', resulting in emissions of 14,240.00 lbs.

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	1133.2	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Annual Throughput: 8,000.0 tons

Criteria Emissions (lbs)

Pollutant	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions
VOC	1.7800	lbs/tons		AQMD default	0.00000	14,240.00

Toxic (TAC/ODC) Emissions (lbs)

## Operation1: Screenshot #6: Enter Ammonia Information

The screenshot shows the 'Open Toxic (TAC/ODC) Emission Information - Other Processes' form. The facility ID is 999111 and the reporting period is 2013. The form is for process P1, 'Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance', with an annual throughput of 8,000.0 tons. The pollutant is 32 - Ammonia, with a TAC Group of 32 - Ammonia and CAS # 7664417 - Ammonia. The emission factor (EF) is 2.93000e+0 lbs/tons. The overall control efficiency is 0.00000. The emission factor comment is 'Co-Composting Uncontrolled Ammonia Emissions'. The emission factor data source is 'AQMD default', resulting in emissions of 2.344e+4 lbs.

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	1133.2	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Annual Throughput: 8,000.0 tons

TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

Pollutant: 32 - Ammonia

TAC Group: 32 - Ammonia

CAS # (Pollutant): 7664417 - Ammonia

Emission Factor (EF): 2.93000e+0 lbs/tons

Overall Control Efficiency: 0.00000

Emission Factor Comment: Co-Composting Uncontrolled Ammonia Emissions

Emission Factor Data Source: AQMD default

Emissions: 2.344e+4 lbs

## Operation1: Screenshot #7: Data Entry Complete

Facility ID: 999111

**Facility Information**

**Build Reporting Structure**

- Combustion Fuels
- Emission Sources (ES)
- Report Process/Emissions**
- Summaries
- Data Validation
- Report Submission

This reporting screen is for reporting activity data for other processes used in your facility which were not covered in previous reporting screens. Please provide specific information for every associated emission source. You must select Activity and throughput units before reporting emissions. If the operation of such sources involves burning fuels, make sure emissions generated from burning fuels are reported separately. Combined emissions can also be reported here; however, it must be substantiated to avoid double reporting. Detailed instructions are available by clicking on Help icon in the tool bar.

**Process** [Return to Work in Progress](#)

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
<a href="#">View</a>	ES37		P1	1133.2	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

**Throughput**

Annual Throughput
<a href="#">View</a> 8,000.0 tons

**Criteria Emissions (lbs)**

Pollutant	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions
<a href="#">View</a>	VOC	1.7800 lbs / tons	No	AQMD default	0.00000	14,240.00

**Toxic (TAC/ODC) Emissions (lbs)**

TAC/ODC Group	CAS #	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions
<a href="#">View</a>	Ammonia	7664417	2.93000e+0 lbs / tons	No	AQMD default	0.00000	2.344e+4

[Back to Emission Source Process Reference](#)

AQMD web site Home | AER Web Site | Submit question/comment | Ecotek Web Site | Report a Bug

## Operation 2: Screenshot #8: Add Emission Source for Composting with Best Management Practices

Facility ID: 999111 · ABC · Reporting period: 2013

**Edit Emission Source**

Providing correct information and proper selection categories would help to classify emission source.

Permitted

A/N

Permit No

Permit Device ID

AER Device ID will be assigned upon saving

ES Name

Operating ES Status: **Normal Operation**

Comment: Greenwaste Composting

**Other Processes**

Emission Source Group: **Determine Emission Source Group Type**

Design Capacity

[Save and return to List of Emission Sources](#) or [Save and proceed to Process Reporting](#) or [Cancel](#)

Optional: [Save and Mark as Completed](#)

AQMD web site Home | AER Web Site | Submit question/comment | Ecotek Web Site | Report a Bug

## Operation 2: Screenshot #9: Assign Activity Code and Rule Number

South Coast AQMD Air Quality Management District

Facility ID: 999111

Bill Milner  
Logout | Edit Profile

AER Home Access Facility Facility Home

**Edit Emission Process - Other Processes**

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES38			P1		

AER Device ID: ES38 AER Device Name:

Permit Device ID:

Process ID: P1 Process Name:

Process Comment:

Activity Code:

Rule #:  \* Add Rule

Save Cancel

Annual Throughput

Criteria Emissions (lbs)

Pollutant EF Unit Controlled EF EF Data Source Overall CE Emissions

## Operation 2: Screenshot #10: Input Throughput

South Coast AQMD Air Quality Management District

Facility ID: 999111 ABC Reporting period: 2013

AER Home Access Facility Facility Home

**Edit Throughput Information - Other Processes**

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES38			P1	1133.3	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Annual Throughput:  tons

Throughput Type:

Throughput Comment:

Save Cancel

Annual Throughput

Criteria Emissions (lbs)

## Operation 2: Screenshot #11: Input VOC Information

Facility ID: 999111

Other Processes

This reporting screen is for reporting activity data for other processes used in your facility which were not covered in previous reporting screens. Please provide specific information for every associated emission source. You must select Activity and throughput units before reporting emissions. If the operation of this process is not applicable, you may mark it as completed.

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	1133.3	Miscellaneous Operations and Services : Greenwaste Reclamation : Operations & Maintenance : Composting

Annual Throughput: 10,000.00 tons

Pollutant: VOC \*

Emission Factor (EF): 2.9700 \* lbs/tons

Controlled EF value  
(mark checkbox if EF listed represents EF determined after control)

Overall Control Efficiency: [ ]

Emission Factor Comment: Greenwaste Composting VOC Emissions Using Best Management Practices

Emission Factor Data Source: AQMD default \*

Emissions: 29,700.00 lbs

Buttons: Save, Cancel

Step 4: Toxic (TAC/ODC) Emissions (lbs)

TAC/ODC Group	CAS #	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions

Buttons: Add New

## Operation 2: Screenshot #12: Input Ammonia Information

Facility ID: 999111

Step 1: Process

double reporting. Detailed instructions are available by clicking on Help icon in the tool bar.

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	1133.3	Miscellaneous Operations and Services : Greenwaste Reclamation : Operations & Maintenance : Composting

Annual Throughput: 10,000.00 tons

TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

Pollutant: 32 - Ammonia \*

TAC Group: 32 - Ammonia

CAS # (Pollutant): 7664417 - Ammonia

Emission Factor (EF): 5.70000e-1 \* lbs/tons

Controlled EF value  
(mark checkbox if EF listed represents EF determined after control)

Overall Control Efficiency: [ ]

Emission Factor Comment: Greenwaste Ammonia Emissions Using Best Management Practices

Emission Factor Data Source: AQMD default \*

Emissions: 5.700e+3 lbs

Buttons: Save, Cancel

AQMD web site Home | AER Web Site | Submit question/comment | Ecotek Web Site | Report a Bug

## Operation 2: Screenshot #13: Data Entry Complete

The screenshot shows the 'Annual Emission Reporting' interface for Facility ID: 999111. The left sidebar contains navigation links for Facility Information, Build Reporting Structure, Emission Sources (ES), Report Process/Emissions, Combustion, Use of organics, Fugitive Components, Other Processes, Process Upset, Summaries, Data Validation, Print Facility Report, Excel Reports, and Report Submission. The main content area is divided into four steps:

- Step 1: Process**: A table with columns for AER Device ID, Permit Device ID, A/N, Process ID, Rule #, and Activity. One entry is shown: AER Device ID ES37, Process ID P1, Rule # 1133.3, Activity: Miscellaneous Operations and Services : Greenwaste Reclamation : Operations & Maintenance : Composting. A button 'Optional: Mark as Completed' is present.
- Step 2: Throughput**: A table with columns for Annual Throughput. One entry is shown: 10,000.00 tons.
- Step 3: Criteria Emissions (lbs)**: A table with columns for Pollutant, EF, Unit, Controlled EF, EF Data Source, Overall CE, and Emissions. One entry is shown: VOC, 2.9700 lbs / tons, Yes, AQMD default, 29,700.00.
- Step 4: Toxic (TAC/ODC) Emissions (lbs)**: A table with columns for TAC/ODC Group, CAS #, EF, Unit, Controlled EF, EF Data Source, Overall CE, and Emissions. One entry is shown: Ammonia, 7664417, 5.70000e-1 lbs / tons, Yes, AQMD default, 5.700e+3.

At the bottom, there are navigation links: AQMD web site Home | AER Web Site | Submit question/comment | Ecotek Web Site | Report a Bug. The taskbar shows the application 'Edit (2.0.0.300) - Win...' and the time is 9:30 AM.

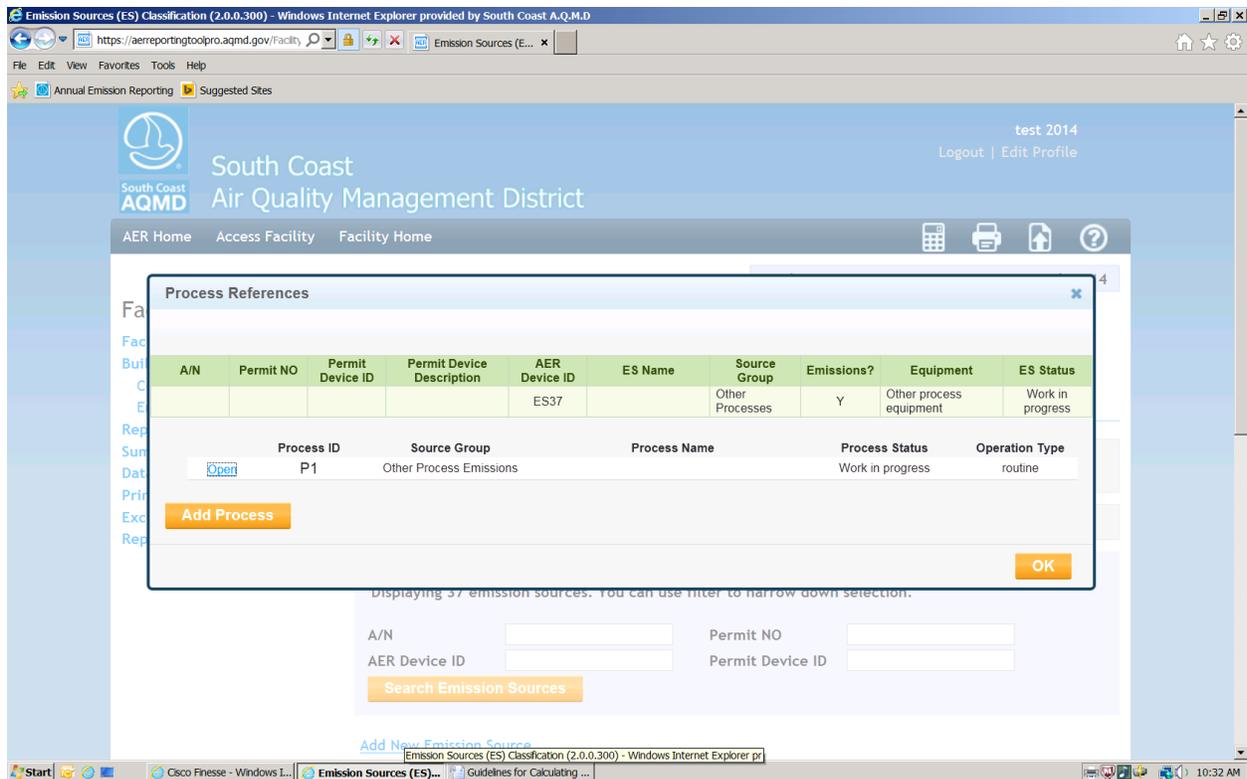
## Operation 3: Screenshot#14: Add Emission Source for Co-Composting With Add-on Control

The screenshot shows the 'Edit Emission Source' interface for Facility ID: 999111. The left sidebar contains navigation links for Facility Information, Build Reporting Structure, Emission Sources (ES), Report Process/Emissions, Summaries, Data Validation, and Report Submission. The main content area is titled 'Edit Emission Source' and includes a note: 'Providing correct information and proper selection categories would help to classify emission source.' The form contains the following fields:

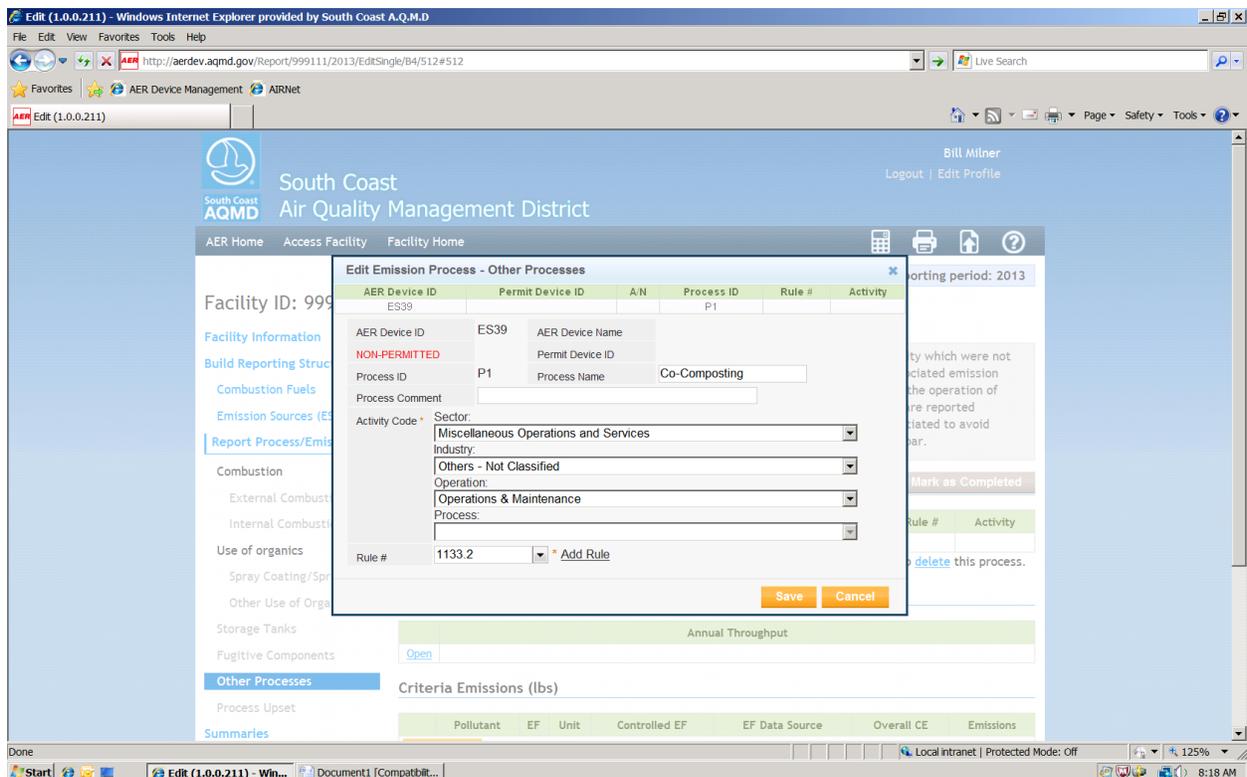
- Permitted:
- A/N:
- Permit No:
- Permit Device ID:
- AER Device ID: will be assigned upon saving
- ES Name:
- Operating ES Status: Normal Operation (dropdown menu)
- Comment:
- Emission Source Group: Determine Emission Source Group Type (dropdown menu)
- Design Capacity:

At the bottom, there are three buttons: 'Save and return to List of Emission Sources', 'Save and proceed to Process Reporting', and 'Cancel'. A button 'Optional: Save and Mark as Completed' is also present. The taskbar shows the application 'Edit Emission Source (...)' and the time is 8:15 AM.

### Operation 3: Screenshot #15: Select Process ID P1



### Operation 3: Screenshot #16: Assign Activity Code and Rule Number



### Operation 3: Screenshot #17: Input Throughput

Facility ID: 999111

such sources involves burning fuels, make sure emissions generated from burning fuels are reported separately. Combined emissions can also be reported here; however, it must be substantiated to avoid double reporting. Detailed instructions are available by clicking on Help icon in the tool bar.

Optional: Mark as Completed

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES39		P1	1133.2		Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Annual Throughput: 18,000.0 tons

Throughput Type: Input

Throughput Comment: Controlled by TO with 99.2% Efficiency

Buttons: Save, Cancel

### Operation 3: Screenshot #18: Input VOC Information

Facility ID: 999111

such sources involves burning fuels, make sure emissions generated from burning fuels are reported separately. Combined emissions can also be reported here; however, it must be substantiated to avoid double reporting. Detailed instructions are available by clicking on Help icon in the tool bar.

Optional: Mark as Completed

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES39		P1	1133.2		Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Pollutant: VOC - Volatile Organic Compounds

Emission Factor (EF): 0.7800 lbs/tons

Overall Control Efficiency: 0.99200

Emission Factor Comment: Co-Composting Controlled with Thermal Oxidizer

Emission Factor Data Source: Source Test

Emissions: 256.32 lbs

Buttons: Save, Cancel

### Operation 3: Screenshot #19: Input Ammonia Information

Facility ID: 999111

Facility Information

Build Reporting Structure

Combustion Fuels

Emission Sources (ES)

Report Process/Emissions

Combustion

External Combustion

Internal Combustion

Use of organics

Spray Coating/Spray Booth

Other Use of Organics

Storage Tanks

Fugitive Components

Other Processes

Process Upset

Summaries

Data Validation

Report Submission

Open Toxic (TAC/ODC) Emission Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES39			P1	1133.2	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Annual Throughput  
18,000.0 tons

TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

Pollutant: 32 - Ammonia

TAC Group: 32 - Ammonia

CAS # (Pollutant): 7664417 - Ammonia

Emission Factor (EF): 2.93000e+0 \* lbs/tons

Overall Control Efficiency: 0.75000

Emission Factor Comment: Co-Composting Ammonia Emissions After Add-on Control

Emission Factor Data Source: Source Test

Emissions: 1.319e+4 lbs

Save Cancel

« Back to Emission Source Process Reference

### Operation 3: Screenshot #20: Data Entry Complete

Facility ID: 999111

Facility Information

Build Reporting Structure

Combustion Fuels

Emission Sources (ES)

Report Process/Emissions

Combustion

External Combustion

Internal Combustion

Use of organics

Spray Coating/Spray Booth

Other Use of Organics

Storage Tanks

Fugitive Components

Other Processes

Process Upset

Summaries

Data Validation

Report Submission

Process

Optional: Mark as Completed

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
Open	ES39		P1	1133.2	Miscellaneous Operations and Services : Others - Not Classified : Operations & Maintenance

Click here to [delete](#) this process.

Throughput

Annual Throughput  
18,000.0 tons

Criteria Emissions (lbs)

Pollutant	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions
Open	VOC	1.7800 lbs / tons	No	Source Test	0.99200	256.32

Add New

Toxic (TAC/ODC) Emissions (lbs)

TAC/ODC Group	CAS #	EF	Unit	Controlled EF	EF Data Source	Overall CE	Emissions
Open	Ammonia	2.93000e+0	lbs / tons	No	Source Test	0.75000	1.319e+4

Add New

« Back to Emission Source Process Reference

## Operations 1, 2 and 3: Screenshot #21: All Sources Are Added

Emission Sources (ES) Classification (1.0.0.211) - Windows Internet Explorer provided by South Coast A.Q.M.D.

File Edit View Favorites Tools Help

http://aerdev.aqmd.gov/Facility/999111/2013/EmissionSources

Live Search

Favorites AER Device Management AIRNet

Emission Sources (ES) Classification (1.0.0.211)

Page Safety Tools

Facility ID: 999111 · ABC · Reporting period: 2013

**Facility ID: 999111** **Build Reporting Structure**

Facility Information  
 Build Reporting Structure  
 Combustion Fuels  
 Emission Sources (ES)  
 Report Process/Emissions  
 Summaries  
 Data Validation  
 Report Submission

**Emission Sources (ES) Classification**

This section contains facility permit profile. Please make sure that every device has a specified Emission Source (ES). New emission sources can also be added.

EPA TANKS Software DATA IMPORT - [Click here](#) for more instructions.

Displaying 39 emission sources. You can use filter to narrow down selection.

A/N:  Permit NO:   
 AER Device ID:  Permit Device ID:

[Add New Emission Source](#)

Search:

Action	A/N	Permit NO	Permit Device ID	Permit Equipment Description	AER Device ID	ES Name	Source Group	Has Emissions	Equipment	ES Status	Process Reference
<a href="#">Open</a>					ES39	Other Processes		Y	Other process equipment	Work in progress	<a href="#">Reference</a>
<a href="#">Open</a>					ES38	Other Processes		Y	Other process equipment	Work in progress	<a href="#">Reference</a>
<a href="#">Open</a>					ES37	Other Processes		Y	Other process equipment	Work in progress	<a href="#">Reference</a>

Done

Local intranet | Protected Mode: Off | 125% | 8:38 AM

Emission Sources (ES)... Document1 [Compatibl...