

Washington Compost Emissions State-Wide Testing

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History



The Need

- Air Quality permits rely on emission factors
 - To date, the best emission factors are based on four California tests
 - The limited test data may not reflect all composting practices
- The existing emission factors limit the throughput of compost facilities, if they seek to avoid more expensive Title V air permits
- The Legislature encourages more composting in Washington
 - Organic Material Management Law HP-1799
 - New compost facilities may be needed
 - Expansion of existing facilities may be needed

California Emission Study

- Report Published 2010 by San Joaquin Valley APCD
- Results based on turned windrows without covers
- Primary pollutants of concern for composting operations are:
 - Volatile organic compounds
 - Ammonia
 - Methanol
- Authored by Charles Schmidt and Thomas Card

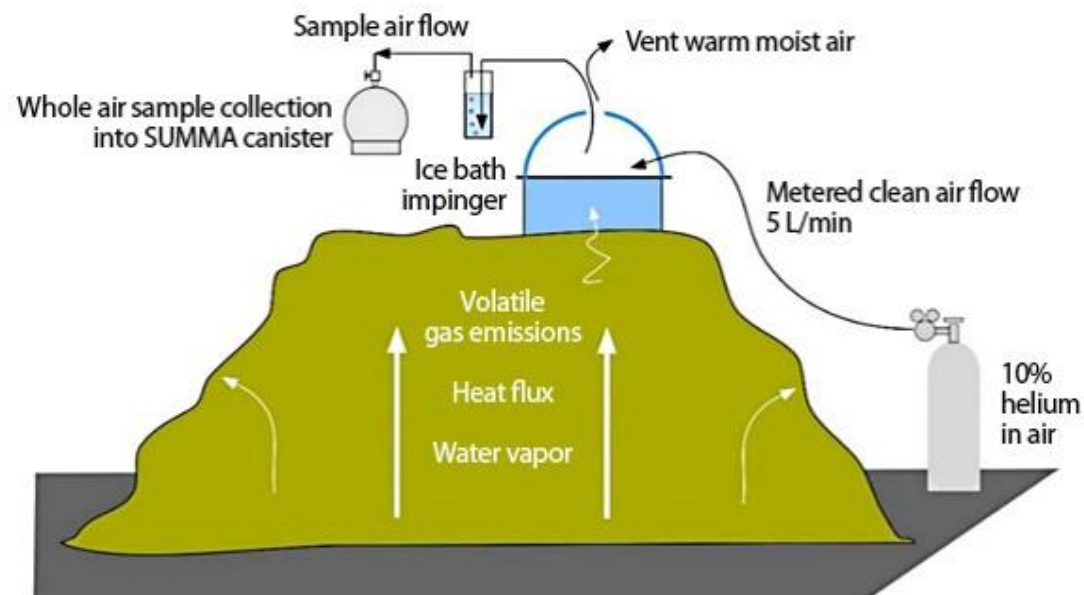


Major Factors Affecting Emission Magnitude

- Operation of the system
 - Initial carbon to nitrogen ratio of pile
 - Moisture and pH of the piles
 - Nutrients availability
 - Temperature increases resulting from microbial respiration
 - Sufficient oxygen to maintain aerobic piles
 - Feedstock variability, especially with respect to food waste
 - Seasonal temperature changes
- Applied control technologies
 - Pseudo biofilter covers with positive aeration
 - Geosynthetic covers with positive aeration
 - Traditional biofilters with negative aeration

Typical Compost Emissions Sampling

Figure 2. Surface flux isolation chamber sampling methodology on top of a static pile



- Based on flux emissions escaping from the surface (passive system)
- Emissions were sampled using the flux chamber and SCAQMD Method 25.3 for total VOC.
- Based on minimum 60 day curing (active phase 22 days)

Aerated Piles with Biofilters



Figure 1. Example of ECS multi aeration mode Pilot CASP System

- Offers many process control advantages
- Washington has a few different systems
- One pulls air through the pile and into pipe system and discharges to a biofilters system
- One pushes air through the pile
- Some alternate between the two options.

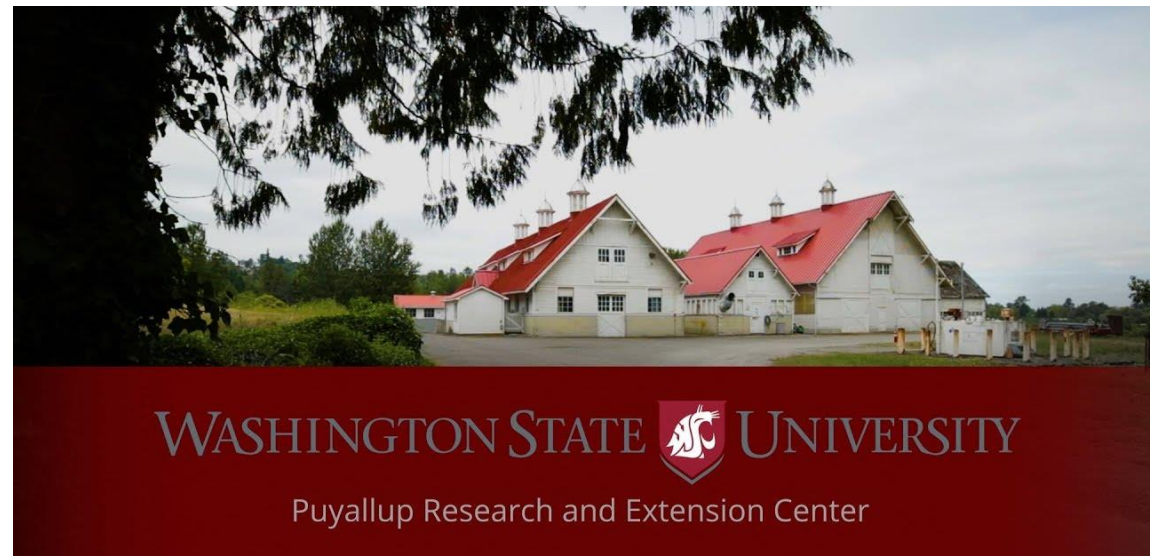


WSU Research Project



State-Wide Testing

- Governor's budget is 2.5 million dollars for the study
- Testing will be done at the Pullman Campus and the Puyallup Campus
- Washington compost emission research:
 - Would increase the amount of emissions data available for consideration
 - May better represent composting practices within the state.



The Goals for the statewide testing

- Will use compost from facilities across the state.
- Will incorporate environment conditions from the west and east sides of Washington State.
- Develop a QAPP that is approved by Ecology.
- Will develop a graph to show when emissions decrease from the aerated pile.
- Testing will be conducted by WSU.
- Testing will need to be done during the summer.
- Scientifically-defensible emission factors

The Goals for the State-Wide Testing

- Establish correlation between the flux, the NCASI, and the van
- Define the primary pollutants of concern
- Establish emissions from different ratios of feedstock
 - Green waste
 - Food waste
 - Biosolids
- The note the environmental conditions



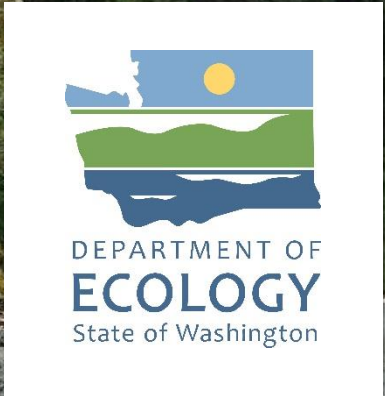
Information from the Study

- Air Quality and Solid Waste Management working together on the outcomes
- To gather Washington compost emission data
 - Composting styles
 - The operation of aerated piles
 - Carbon and nitrogen ratio affects air emissions
 - Testing of the feedstock qualities
 - Weather differences
- Composters Surveyed in 2020 identified negative aeration most commonly used among larger facilities



Outreach by Ecology

- EPA suggested the following for scientifically-defensible emission factors
 - testing done using Method 25.3 and NCASI
 - sampling across state
- Meet with local air agency representatives for input
- Meet with a stakeholder group of composters for input



Thank you