Testing Protocol

A testing protocol was developed to describe the sampling strategy, sampling procedures, and analytical test methods. Prior to commencing field tests, the protocol was reviewed with SJVUAPCD in meetings with CIWMB, San Diego State University researcher Dr. Fatih Buyuksonmez, and field chemist Dr. Chuck Schmidt.

Sampling strategy

The four test windrows were formed on Day 0 (October 18, 2006). The sampling started on Day 1 and continued throughout the life-span of the windrows with more frequent sampling at the beginning. Fourteen samples were taken per sampling event as follows:

- Three flux samples collected from each composting windrow
- One extra ridgetop flux sample from one of the windrows (either greenwaste or food waste windrow)
- One media blank sample (a test for contaminants in the media used to trap the emissions. This media includes the reagent water and ultra high purity air.)

The greenwaste and food waste windrows were sampled for the full test period while the two BMP windrows were sampled for only the first two weeks. Each sample was analyzed in triplicate (sometimes in duplicate due to time constraints) for statistical analysis. Sample location zones included ridgetop, middle-side, and bottom-zone to evaluate the variable fluxes from the "chimney effect" of the temperature profile within the composting windrows. An initial screening of the ridgetops was conducted with a portable gas analyzer (TVA-1000) to determine venting and non-venting locations. This data was then used to determine the exact sampling location within the ridgetop sample zone. See Tables 3 and 4 for the sampling scheme and project test schedule.

Figure 1 is a cross-sectional representation of a typical windrow divided into three sections: bottom, middle and ridgetop. Each bottom and middle section is approximately one eighth of the total width (W/8) and the ridgetop comprises the remainder.

For a given windrow, up to four emission samples were collected. These included:

1. High level of emissions on the ridgetop, i.e., venting (R1)
2. Low level of emissions on the ridgetop, i.e., non- venting (R2)
3. Middle section emissions
4. Bottom section emissions

In the event that all four samples were collected, the total ridgetop emissions were estimated based on the ratio of the venting versus non-venting surface of the ridgetop, and the emissions from the middle and bottom sections were assumed to be constant. Since most of the emissions resulted from the ridgetop, the middle and bottom section emissions would not significantly

affect the total. In the event only one ridgetop sample was collected, an average of the previous and the following R2 (non-venting) emission values was used. (R1 (venting) samples were collected each sampling event for all windrows. R2 (non-venting) samples were collected on a rotating schedule between the greenwaste and the food waste windrows. There were a total of 109 emission samples collected, of which 9 were media blanks for quality control. Emission samples were collected in evacuated stainless steel Summa canisters and analyzed according to the AQMD Method 25.3 for VOC emissions.

The on-site field laboratory provided an opportunity to collect additional samples with a syringe using the isolation flux chambers. These were then injected directly into the on-site gas chromatograph and analyzed using SCAQMD Method 25.3. These samples were used to determine the variation in VOC emissions versus time of day for the same sample location and also to elucidate the emission differences along the cross-sectional profile of a windrow. The sampling procedure difference between the samples analyzed on-site and the source emission samples that were shipped to Almega Laboratories is that the samples analyzed on-site were withdrawn into a 30-ml sampling syringe instead of passing through a condensate trap and collected in canisters. For the on-site sampling protocol, condensation was not deemed to be a concern since the samples were injected into the gas chromatography immediately following their collection and the ambient temperature was sufficient to prevent condensation.

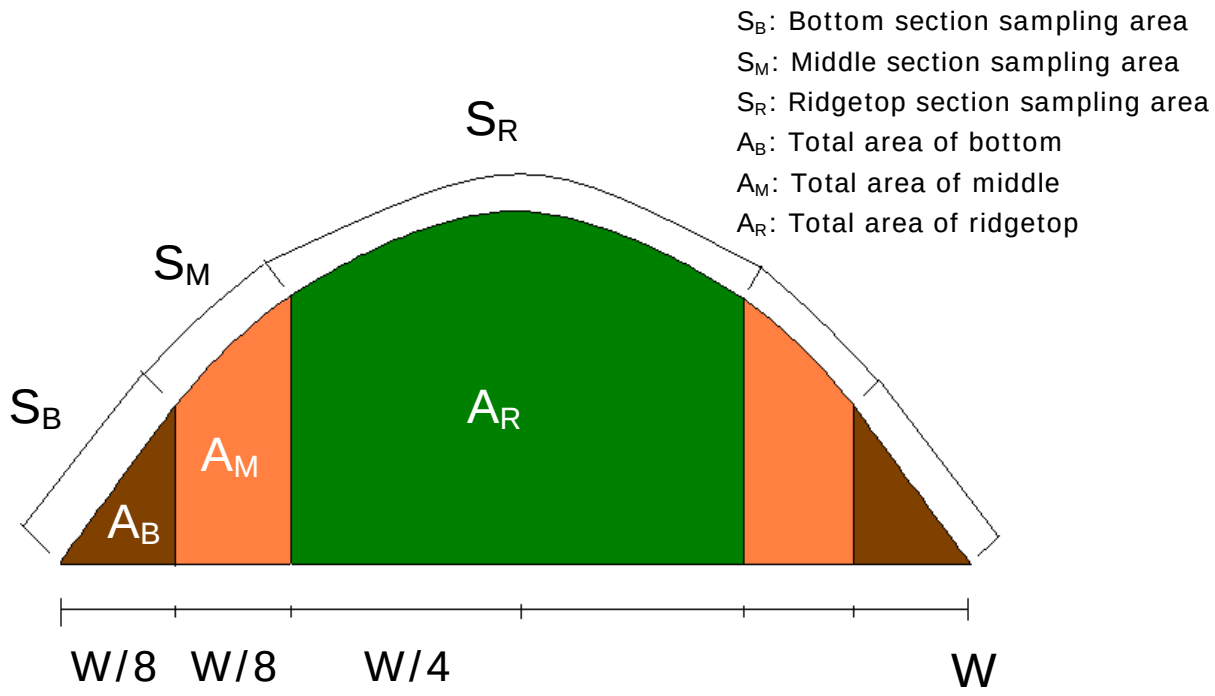

Figure 1. Sampling Segments of Windrows