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April 9, 2008

File No. 31R-10.11

Mary D. Nichols, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Nichols:

Comparison of the Use of Green Waste as Alternative Daily Cover (ADC) vs. Composting: Greenhouse Gas Emission (GHG) Impacts

This letter is in response to correspondence submitted to you jointly from the Sierra Club, Californians Against Waste, and NRDC on March 28, 2008 (joint letter) regarding the above-referenced study. We previously provided the study to you in a submittal dated March 8, 2008. The results of the Sanitation Districts' study indicate that using green waste as an ADC can reduce carbon emissions, and thus greenhouse gases, three times more than composting. The study was conducted using realistic values and based upon sound science consistent with USEPA's emissions assessment methodology. The primary message of the study is that blanket statements cannot be made that composting of green waste in all cases provides greater GHG emission reductions than use as ADC; rather, a site-specific life cycle analyses must be conducted to determine the potential environmental impacts.

The joint letter described our analysis as "*biased*" and "*not worthy of serious consideration by the Board (CARB)*". Although technical support for these claims was not provided in the joint letter, after careful review of the joint letter's comments, we offer the following responses:

Comment: The presentation does not incorporate all the greenhouse gas benefits of composting such as the benefits of reduced irrigation and avoided application and production of synthetic fertilizers.

Response: The life cycle analysis performed by the Sanitation Districts was based upon USEPA methodologies (USEPA 2006). The joint letter acknowledges that the study includes indirect sequestration for the composting scenario specifically from enhanced crop growth. We are not aware of any standards or criteria developed by EPA to quantify the benefits of decreased irrigation or decreased use of fertilizer, nor does the joint letter offer any source of reliable technical information about these activities. The quantification of these factors would be extremely complex and site-specific, which highlights the message of our analysis - the necessity of case-specific life cycle analyses to determine the most environmentally beneficial organics management approach.

Comment: There are several false assumptions in the study such as the only alternative to greenwaste as ADC is imported soil and that "freshly placed" greenwaste used as a cover does not generate methane.

Response: The study acknowledges that ADC's, other than soil, exist. In fact, the Sanitation Districts use other ADCs such as degradable plastic sheets and foam in landfill cover operations. The study does state that the use of these other options may be limited depending on site-specific conditions (e.g., per Title 27, foam cannot be used when there is a greater than 40% chance of rain and tarps are difficult, even unsafe, to place or remove during high winds.). The Sanitation Districts' attempt to estimate the emissions of importing soil by truck for cover versus the use of green waste ADC was one specific scenario. However, we recognize that this assumption may not apply to other landfills, so we conducted another modeling run without emissions from soil importation (see Figure 1). As shown in Figure 1, even with the removal of soil importation, the conclusions of the life cycle analysis remain the same.

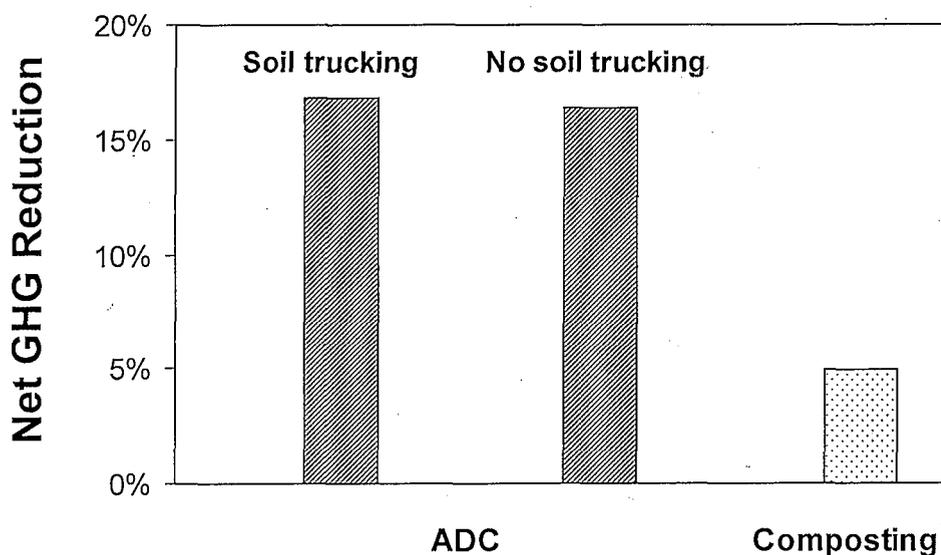


Figure 1. Net GHG reductions of ADC (with and without soil trucking option) and composting scenarios.

There is a general misconception that freshly placed organic material in a landfill will quickly start producing methane emissions. In the South Coast Air Quality Management District, and other air districts around the state, landfills are required to comply with stringent methane surface levels over the entire landfill footprint, including areas just covered. Theoretical modeling, confirmed by long term field monitoring (e.g., Al-Yousfi 1992, Barlaz et al., 1992), indicates that it takes time for all oxygen to be consumed during decomposition and for anaerobic conditions conducive to methane production in a landfill to develop. This was also recognized in the federal Municipal Solid Waste Landfill New Source Performance Standards (NSPS) that allows several years before a gas system needs to be installed in a cell. The Sanitation Districts ensure continuous collection of landfill gas, even in newer areas, by the use of horizontal collection systems that maintain a continuous vacuum throughout fill with methane generation potential.

Comment: The inclusion of "landfill sequestration" distorts the issue. The California Air Resources Board (CARB) does not recognize any CO2 sequestration in landfills.

Response: It is well known now that landfilling provides higher carbon sequestration than composting (e.g., USEPA, 1998, 2002, Bogner *et al.*, 2008). In fact, contrary to the joint letter statement, carbon sequestration *is* recognized by CARB in its greenhouse gas inventory. CARB does not call this out as a line item in the inventory, but includes it generically in its "Sinks" line item. In fact, to demonstrate the significance of the sequestration that occurs in landfills, by CARB's own data for one recent year,

approximately 77% of the incoming carbon to landfills in the state is sequestered. The USEPA (2006) recognizes and incorporates carbon storage/sequestration in landfills in its GHG inventory/life-cycle analysis. Our analyses were consistent with EPA's methodology. Carbon sequestration is important to the life cycle analysis, however, *as stated in the study*, even with carbon sequestration excluded in the life-cycle analysis, ADC still provides greater GHG reduction than composting.

Comment: The emissions from transporting greenwaste to landfills for use as ADC are omitted but emissions from transporting greenwaste to compost facilities are counted.

Response: In the study, the starting point for both scenarios was at a site where chipping and grinding of green waste took place. Emissions from the transport of green waste from the curb to the chipping and grinding facility (which, in this case, is co-located with a landfill), as well as emissions from the actual chipping and grinding of green waste, were assumed to be the same for both scenarios and, thus, were not included in the analysis. The transport component for the composting scenario included only the transport following chipping and grinding; that is the transport to a compost facility and then to an end use market. This transport component was not included for the ADC scenario because, of course, the green waste is used onsite.

The transport assumptions used for the composting analysis were based on our real world experience using composting markets for a portion of the green waste we receive. Specifically, we assumed transport to a composting facility in northern Ventura County and then transport to an end market Kern County for agricultural and farming applications. The study assumed this total distance to be 180 miles round trip, which is a reasonable, yet conservative, number since the actual round trip distance from Los Angeles County to Kern County, is farther than 180 miles.

Summary

The Sanitation Districts support composting and, in fact, have one of the largest composting programs in the state. While composting of greenwaste results in a net reduction of greenhouse gases, the life-cycle analysis conducted by the Sanitation Districts indicates that using greenwaste as an ADC was three times more effective in reducing carbon emissions and thus greenhouse gases. The study was based upon conservative assumptions and sound science and highlights the very important need to conduct site-specific analyses when comparing the potential GHG emissions from green waste ADC with composting. The Sanitation Districts support an active debate on the life cycle analysis prepared by our staff. My staff is preparing a report further documenting all of the assumptions and calculation methodologies used in the study; however, in the meantime, we would very much welcome the opportunity to meet with you and your staff, as well as the signatory parties of the joint letter, to discuss their data as well as the technical details of our analysis. If you would like to discuss this matter further, please contact me at (562) 908-4288, extension 2402.

Very truly yours,
Stephen R. Maguin



Grace R. Chan
Department Head
Solid Waste Management Department

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cc: Members, California Air Resources Board
Members, California Integrated Waste Management Board
James Goldstene, Executive Officer, California Air Resources Board
Darby Hoover, Natural Resources Defense Council
Mark Leary, Executive Director, California Integrated Waste Management Board
Bill Magavern, Sierra Club California
Scott Smithline, Californians Against Waste

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