Riverside County
Waste Management Department

Hans W. Kernkamp, General Manager-Chief Engineer

June 7, 2010

Syd Partridge, Policy Manager
Climate Action Reserve
523 W. Sixth Street, Suite 428
Los Angeles, CA 90014

RE: Draft Organic Waste Composting Project Protocol

Dear Mr. Partridge:

The Riverside County Waste Management Department (RCWMD) is a local agency that is charged with the primary responsibilities of planning, facilitating, and implementing integrated waste management programs for the County of Riverside, California. The integrated waste management programs consist of landfill, recycling, and composting operations and public awareness training. The RCWMD shares the view that the landfills will continue to serve a critical role in managing solid waste in California, particularly since it will take many years to develop and permit the necessary infrastructure to divert organic waste and other beneficially reusable waste materials. More importantly, the RCWMD believes that the solutions should be found in a holistic and diverse approach to solid waste management that takes into account the various dynamic, environmental and economical factors associated with solid waste, locally, regionally, and, in the case of climate change, globally.

The State of California is committed to an integrated waste management approach to solid waste and associated environmental issues with the enactment and enforcement of the landmark legislation, *The Integrated Waste Management Act* of 1989 (AB 939), as well as the fight against global warming by reducing State-wide greenhouse gas (GHG) emissions to the 1990 level by 2020 with the enactment and swift enforcement of the first-in-the-nation legislation, *The Global Warming Solutions Act of 2006* (AB 32). Under these mandates, solid waste management entities operating within the State strive to manage solid waste in the manner that treats waste as a resource and aims to achieve materials conservation and environmental preservation to the extent feasible. In this light, the RCWMD offers the following comments for your consideration:

Overall Comments:

1. The Protocol is intended to provide guidance to account for, report, and verify GHG reductions associated with diversion of eligible organic wastes from anaerobic landfill systems (i.e., comingled waste burial) to aerobic composting facilities. In other words, the Protocol is based on the assumption that diversion of organic waste from landfills to aerobic composting facilities equals greenhouse gas (GHG) emissions reductions. This underlying assumption reflects the mainstream belief among many regulators and the myth promulgated by industry that composting is

14310 Frederick Street • Moreno Valley, CA 92553 • (951) 486-3200 • Fax (951) 486-3205 • Fax (951) 486-3230
www.rivcowm.org

better than landfills in reducing GHG emissions from the handling of organic wastes. This Protocol is designed to perpetuate this belief by not using a life-cycle analysis for assessment of the GHG emission capacity of both the landfill and aerobic composting systems. As a result, the Protocol relies on the U.S. Environmental Protection Agency (EPA) determination that *landfills are the second largest source of anthropogenic methane emissions, accounting for 25% of the total methane emissions* in justifying that composting equals GHG emission reduction. While landfill gas production has been systematically studied, composting emissions of GHG have not. Without a life-cycle analysis, the true GHG emission potential of aerobic composting systems is unknown, and therefore, the GHG emission reduction conclusion in favor of composting has no sound scientific basis. To allow generation of carbon offset credits, or Climate Reserve Tonnes (CRT), by composting industry on the basis of an unproven hypothesis is not fair to the landfill industry, not a good practice for policy development, nor will it do justice to the course of reversing climate change/global warming, which is a primary objective of the Protocol.

2. The Protocol is based on a standardized approach to account for GHG emissions from both landfill and aerobic composting systems. This approach, however, is flawed.The Protocol focuses on and includes only the active composting processes, both anaerobic in the landfill system and aerobic in the composting system, in the GHG Assessment Boundary, leaving out other processes, for example, *compost curing* and *transportation of finished compost* in the composting system and *equipment operation* in the landfill system, that can also emit anthropogenic GHG. In addition, for the landfill system, the Protocol assumes fugitive emission of 100% of CH_4 generated in the first 2 years of landfill residency of the organic waste and prescribes the use of the First Order Decay (FOD) Model, which is subject to contention in the science community, and generic landfill gas collection efficiencies, which are a topic of dispute between landfill operators and regulators and even among scientists, for estimating GHG emissions into the atmosphere. The obvious drawbacks of this standardized approach are an incomplete accounting of GHG emissions from the full composting process and, likely, an over-estimate of GHG emissions from landfills. More specific comments on this approach are found in subsequent technical comments.

3. While the Protocol is intended to promote composting of organic waste for the presumed benefit of GHG emissions reduction, it could have the unintended negative effect of discouraging the emerging new technologies for handling organic waste that combine landfill and composting operations into one common setting for purpose of landfill gas (LFG) harvest as an alternative energy source. Examples of these new technologies include Bioreactor and Landfill-based Anaerobic Digester/Composting. Since these new technologies aim at harvesting methane gas for conversion into alternative energies, they are designed to minimize or even eliminate all fugitive emissions of GHG into the atmosphere. The Climate Action Reserve (CAR) should not shy away from broadening the scope of the Protocol and

considering the merits of these new integrated waste management technologies in generating their own CRT, precisely because they are also a deviation from the "business-as-usual" landfill treatment of organic waste that the CAR believes to be a significant industrial source of fugitive emissions of anthropogenic GHG. This is consistent with the Protocol's intent to encourage alternative treatment of organic waste to disposal at landfills for the benefit of GHG emissions reduction.

Technical Comments:

1. Table 4.1, Description of all Sources, Sinks, and Reservoirs — SSR 4, Waste Disposal at Landfills, identifies the anaerobic decomposition of eligible organic wastes as the only emission source of anthropogenic GHG and ignore the GHG emissions from landfill equipment that performs the waste disposal operation, as well as the general landfill construction and maintenance functions. A fair share of the equipment GHG emissions from handling the eligible organic waste should be included in the baseline emissions, because landfill equipment, like composting equipment, is a direct source of GHG emissions from the organic waste management practice. In addition, the Justification/Explanation for this SSR to be included in the baseline emissions states that *these emissions* (i.e., from anaerobic decomposition of eligible organic waste) *are avoided by an organic waste composting (OWC) project*. This justification statement is not a proven fact since an OWC project can also generate anaerobic emissions of GHG, as indicated in SSR 5, Temporary On-site Storage, where anaerobic composting could occur, and even in SSR 7, Aerobic Composting, since pockets of anaerobic decomposition are known to occur within aerobic composting piles. It is recommended that this justification statement be corrected to read: *"These emissions are expected to be reduced by an OWC project."*

2. SSR 8, Storage of Finished Compost, excludes all GHG emissions from continued decay of the finished compost based on the assumptions that methane, or CH_4, emissions peak in the first four weeks of the active composting phrase and nitrous oxide, or N_2O, emissions are small beyond the active phrase. These assumptions work to favor instead of objectively substantiate composting as a means of GHG emissions reduction as compared to landfill, because they are not supported by solid field test data from systematic studies of composting GHG emission characteristics. In fact, there is literature that shows that CH_4 emissions occur uniformly throughout the entire composting process and that N_2O emissions are predominant during the later, mesophillic phases of composting (including curing and finished compost storage stages). In addition, N_2O has a global warming potential of 310 times that of CO_2, which means that even in small quantities compared to CH4, it could have a significant global warming effect. The Protocol should include SSR 8 emissions as Project Emissions to ensure that the true potential of GHG emissions from aerobic composting is not underestimated.

3. Related to the above comment, the Protocol entirely neglects potential GHG emissions from the curing stage of composting without an explanation. As discussed earlier, the compost curing stage is basically mesophillic in nature, and literatures show that GHG emissions, particularly N_2O emission, continue to occur during this stage to such an extent that its negligence represents a serious flaw of the Protocol.

4. SSR 9, Transportation of Finished Compost, is excluded from the GHG Assessment Boundary and excludes fossil fuel emissions from transportation of the finished compost to the market by arguing that *transportation source can be large without significantly affecting a project's total net GHG reductions*. This SSR represents a three-fold flaw. First, according to the current EMFac and Urbemis computer models for transportation emissions, emissions of CO_2 from heavy duty trucks that are commonly used to haul finished compost can be large, and which could affect a project's total net GHG reductions, if the amount and transport distance are both substantial. Second, the Protocol has overlooked the facts that compost markets are largely urban-oriented, since agriculture still predominantly uses chemical fertilizers, and that composting facilities, in contrast, are commonly located away from urban areas. Combined, these two facts imply potential substantial vehicle-miles-traveled (VMT) from transportation of finished compost to the markets, thus potential significant CO_2 emission. Third, this GHG source is unique to the composting system for handling organic waste as opposed to disposal at landfill, because landfill is the final destination of the waste. Excluding this potentially significant emission source from the GHG Assessment Boundary is fundamentally wrong, even for the standardized approach that the Protocol takes, let alone viewed from a life-cycle analysis perspective.

5. The SSR's identified in Table 4.1 are all GHG Sources, and none of them are GHG Sinks or Reservoirs. Therefore, it would be appropriate to eliminate the labels of Sinks and Reservoirs from the GHG categories in the Protocol.

6. Equation 5.1, page 13. The legend "PE" contains an editorial error in the reference to Section 0. The correct reference should be to Section 5.2.

7. Equation 5.2, page 14. The bracketed reference at the end of its title should be to Section 4 instead of Section 5.

8. Equation 5.3, page 15. The parameter of LCE, $_x$, or the fraction of methane that would be captured and destroyed by LFG systems in year x, assumes that no LFG collection within the first 2 years of disposal of the organic waste at the landfill, thus 100% fugitive emission of GHG during this time period. This assumption is a gross over-generalization and does not correspond to the common observations at the landfills in arid climate regions of the country. For example, in Riverside County, an arid climate region of California, LFG generation from new landfill cells is always found to be de minimis by means of monitoring the gas pressure

within the horizontal gas wells that are placed within the new landfill cells as they are being filled with refuse. This dormant stage of LFG generation can be attributed to the region's arid climate, lack of moisture within the refuse, and proportion of organic waste within the disposal wastestream. Periodic surface emissions monitoring with portable instrument at the new cell areas shows results that are consistent with the horizontal gas well pressure monitoring results, that is, undetectable LFG generation and emission. Therefore, it is recommended that the Protocol allow flexibility for the Project Developer to use values other than the recommended zero for this parameter, subject to verification with field evidence.

9. Table 6.1, Organic Waste Composting Project Monitoring Parameters. The VMT and total fuel consumption for transportation of finished compost to final destinations should be added to the Monitoring Requirements and monitored for assessment of total and net Project Emissions.

10. Table 6.1, page 32, Equations 5.3 and 5.4. The k (i.e., decay rate) values for the eligible wastes to be chosen from Appendix A, Figure A-2 should be applicable to the County where the wastes are disposed of, and not originated. It is because the decay rate is determined by the climate of the disposal site and not the waste generation area.

11. Table 6.1, Equation 5.7, Parameter EL_{PR}, Description "*Total Electricity Consumed by the Project Landfill Gas Collection and Destruction System.*" This description is erred in that the parameter is for measurement of electricity consumption at the composting project facility and not at the landfill.

The RCWMD appreciates the opportunity to review and comment on the draft Protocol and your consideration of our comments in preparation of the final draft Protocol. We are looking forward to receiving your written responses to our comments prior to completion of the final draft Protocol. Should you have any questions regarding the comments, please contact my planning staff, Mr. Sung Key Ma, at (951) 486-3283 or sma@co.riverside.ca.us. Thank you.

Sincerely,

Hans W. Kernkamp
General Manager-Chief Engineer

PD #90122