Waste Management Comments on Draft Organic Waste Composting Project Protocol Version 1.0 (May 2010) – June 7, 2010

The Protocol does not accurately reflect Landfill GHG emissions and thus, does not meet the CAR's policies of emission reductions being real, permanent, additional and verifiable.

The draft Climate Action Reserve (CAR) Organic Waste Composting Protocol (Protocol) generates compost project GHG emission reduction credits based on the diversion of waste from a landfill that would have otherwise generated and released methane to the atmosphere – similar to what was assumed as part of the Organic Waste Digestion Protocol already adopted by CAR last year. Waste Management (WM) still has concerns about using default assumptions apparently based on EPA models regarding landfill emissions. WM has previously submitted recent papers that indicate individual landfills are capable of achieving far greater than 75% methane capture during their operating life and more than 10% oxidation of methane in cover and cap materials. Further, the California Air Resources Board (CARB) has recently adopted new regulations to further control emissions from landfills – in California. US EPA is contemplating similar regulations nationwide. It is WM understands that CARB/CalRecycle now uses an 83% control efficiency rather than the EPA 75% for California landfills subject to, and compliant with, the new CARB landfill rule. As we have stated repeatedly, we request that the CAR Compost Protocol accurately reflect the conditions a the specific landfill or landfills from which the waste is being diverted to composting. Otherwise, we believe the protocol fails to meet the requirements: ***real, permanent, additional, verifiable.***

The best information on landfill methane control should be used. In places, such as California, that have specifically adopted more stringent regulations to control landfill GHG emissions, the protocol should recognize this fact and require that factors more appropriate for that jurisdiction should be used. California assumes that the landfill methane control measure will reduce GHG emission by 2 million tons/year. California landfills are currently estimated to emit about 6 million tons per year using a 75% collection efficiency. This is a 1/3 reduction. One-third of the 25% not captured is approximately 8%. Thus, the new California regulations would appear to assume an increase in collection efficiency from 75% to 83%. Assuming 10% oxidation in cover/cap materials (+ 2%) raised the overall California control efficiency to about 85%. Any added reduction from enhanced LF cover materials (e.g., more widespread use of compost for cover) would be in addition to that. There is considerable evidence in the literature (that WM has previously provided to you) that oxidation of landfill methane in cover and cap materials is much greater than the 10% US EPA default assumption. WM has published information documenting that 30% methane oxidation in cover/cap materials is not unusual and could push overall landfill methane control in California to approaching 90%. Unfortunately, the compost protocol does not recognize the level of methane control that can be achieved many landfills – such as those subject to stringent California regulations. As a result, the Protocol will assume greater GHG reductions associated with compost diversion operations than are actually achieved.

The Protocol does not reflect the very high level of GHG emissions that result from poorly controlled composting operations.

The protocol does not reflect the emission levels from poorly controlled compost facilities. WM has previously submitted a recent Danish paper on compost GHG emissions. According to this study, a 17,000 ton/year windrow operation emits 1,136 – 1,725 tons/year of CO2e. Our business partner, Harvest Power, also did a comparison of a Riverside Co ASP methane emission vs. the Danish windrow

methane emission and it appears the *ASP emitted 11% of the methane the windrow was emitting*. This is a significant reduction due to the application of improved composting technology.

Limiting the protocol default to only food waste composting is appropriate. However, provision should be made for other organic waste types if the developer can demonstrate they were not composted previously.

Currently, the draft only allows credit for "food waste" composting. WM believes this is appropriate due to the understanding that there is very little food waste composting currently being conducted. However, we would support allowing other organic) material types (yard trimming, green waste) to be factored into the protocol if the project developer can clearly and unambiguously demonstrate that these materials were previously disposed in a *specific* landfill – and are now being diverted to a compost facility. We believe that such an approach would meet the requirement of *real, permanent, additional and verifiable* – provided an accurate assessment is made of emissions from the source of diversion as discussed above (i.e., landfills).

Other waste can be composted with these, but credit will not be given. This includes yard waste, wood waste, unrecycled paper, biosolids, fats, oils and greases. Animal waste (livestock remains, etc.) were excluded because they typically get recycled in rendering plants. However, grocery store waste gets a "split", if the stream has been landfilled for at least three years prior, it counts as additional when composted. WM requests that any organic waste should be included provided the prior destination of that organic waste can be documented.

The protocol should focus only on CH4 and N2) emissions from the compost facility, not the compost product.

The protocol will estimate the amount of GHG emissions (CH4 and N2O) that are estimated to be emitted from a compost project facility (but not the compost product) – based on the nature of the compost operation and the degree of control measures used to mitigate GHG emissions. WM supports this approach and believes that these two GHGs should be included in evaluated compost facility emissions.

The protocol should not include GHG benefits that are derived from the use of the compost product itself. CAR wisely has chosen to not include these in the protocol as such benefits would likely be outside of the control of the compost project or facility developer who sells the compost product for use by another party. In addition, and soil carbon storage benefits associated with compost use would also require that the protocol include landfill carbon storage reductions that would occur as a result of diverting the food waste (or green waste) from landfill disposal. This would significantly complicate the protocol and are best avoided for the time being.

Proper Emission Controls for Aerated Static Piles

One of the problems with the draft Protocol is an apparent over simplification of aerated static piles. In the most basic sense it involves intermittent on-off forced positive pressure aeration into the pile and an insulating cover that offers some treatment in addition to insulation (which was the original reason for the cover). Here are the variables that should be addressed to really describe aerated static pile. A well designed and operated ASP system can provide excellent GHG emission control.

- Direction of airflow (negative/vacuum or positive pressure) through the pile
- Cycle and frequency of forced aeration (on minutes + off minutes)
- Collection and destruction of exhaust emissions (odor, VOC, ammonia, etc)
- Aeration rate
- Surface area to volume ratio
- Type of cover material
- Pile turning frequency
- Pile turning method
- Temperature and moisture operating metrics (they more or less covered this one)

Industrial Food Waste should be included in the Protocol

Thus far, the protocol apparently recognizes residential and some commercial food waste composting as being additional and able to generate credits. Industrial sources of food waste should be included if the prior management of the industrial food waste can be documented. Other types of organic waste should be eligible for credit (e.g., yard waste & green waste) if prior management can be documented by the project developer. *WM supports the inclusion of industrial food waste as well as other types of organic waste if the project can document it was previously landfilled.*

GHG emission reduction credit for existing compost operations.

Existing composting facilities should have only limited ability to generate GHG reduction credits. Existing compost operations should get credit if they can show that some other "new" composter has taken their food waste away and they have to go look for new sources that were previously managed in a way that would generate greater emissions than the compost operation. We would support this provision for existing composters if the project developer can demonstrate that the new food waste they are receiving previously came from specific landfills or other facilities with documented emissions.

Appendix A should clearly discuss how an existing compost facility must determine the historical maximum amount of food waste they previously composted so as to know how much new food waste is "additional". We support the requirement for existing composting facilities to report on amount of food waste previously composted and only seek credits for new food waste composting, or be able to clearly document that a "replacement" food waste stream was previously disposed at a specific landfill.

No food waste compost project should be eligible for credits if there is any local or state mandate to compost food waste.

Compost Project Boundary and Storage of incoming feedstock.

Only the compost facility itself should be eligible for generating GHG reduction credits. Activities leading up to compost facility are not included, nor is storage and application of the compost product. One question arose regarding how long should storage of incoming feedstocks be allowed to take place before they are considered a source of GHG emissions? 24 hrs? 48 hrs? WM supports a short 24 hour time period – so that the protocol does not encourage additional GHG emissions from the stored feedstock.

Sources, Sinks and Reservoirs and N2O Emissions from Landfills and Compost Operations

The Protocol discusses the various GHG Sources, Sinks and Reservoirs surrounding food waste composting. Landfills should be assumed to have minimal N2O emissions. *WM supports this as the approach taken by IPCC, CDM and other protocols – based on available data.* However, the CDM protocol *does* recognize N2O emission from composting as a source. Should N2O be treated the same for both LFs and compost projects? *Since CDM clearly recognizes composting as a possible source of N2O and should be included in this CAR protocol. WM has no objection to including N2O emissions landfills at a later date once further information is developed for this possible source –* ***and individual landfills are assessed as to their ability to control such emissions.*** *Unless CAR has specific info to warrant deviation from CDM protocols, N2O should be included in the evaluation of composting operations.*

Compost Use at Landfills.

Only a very small portion of compost is currently used at landfills for cover or other beneficial use. However, this could potentially change significantly in the future as increasing data shows that compost is excellent material for landfill cover and contributes significantly to reducing fugitive LF emissions. See articles that WM has previously sent to you. Of course, projecting how future compost use in landfills may be used to further reduce LF GHG emissions would be extremely difficult to project at this point in time.

Quantifying GHG Emissions Reductions and Emissions and use of the FOD model.

This is Section 5 of the report and supplemented by the separate Methodology and Discussion paper also attached. The First Order Decay Model (FOD) should not be used to estimate GHG emissions from the landfills from which the food waste is being diverted – nor as a method to estimate methane emissions from the compost operations. There is ample discussion in the technical literature that the FOD model may be off by an order of magnitude (in either direction) for emissions from specific landfills. We suspect the same would be true for composting operations as well.

Landfills as the 2nd Largest Source of Methane

Protocol Page 2. WM objects to the use of the quotation from the Inventory of U.S. Greenhouse Gas Emissions and Sinks about landfills being the second biggest U.S. source of methane – without also framing it in terms of total GHG emissions. While landfills may be the 2nd largest source of anthropogenic methane, overall GHG emissions overall from landfills is less than two percent of total US GHG emissions.

Non-Aerated or Passive Pile Compost Systems.

Protocol Page 3. WM supports the recognition in the Protocol that a non-aerated static or passive pile compost facility is not eligible to generate GHG reduction credits.

Composted Waste Ownership.

Also, the Protocol requires the project developer to "own" the waste to get the carbon credits, and they have to prove up ownership with legal documentation. WM supports such a requirement.

Project Start Date.

Protocol Page 5: "Project start date" is not the beginning of operations, it is the beginning of operations under a formal "Monitoring Plan" designed to meet the requirements of the protocol. This will be important to document that all the controls are in place as required by the Protocol.

Project Crediting Period.

Protocol Page 6: The "project crediting period" is ten years, renewable for another ten years, and the only intervening factor is change in legal requirements making your reductions no longer additional. CAR should consider also allowing protocol changes for new technology to be an intervening factor. This would force more "primitive" operations to upgrade their management technology to keep the stream of credits going. Ten years is a long time when technology is emerging quickly.

Compost Emissions.

Protocol Pages 26-30: For calculating emissions from the composting activity for subtraction from baseline, protocols are provided for turned systems and forced aeration systems, with "additional credit" for optional process controls such as applying finished compost to windrows or using a biofilter, aerated static pile, covered aerated static pile, Gore covered aerated windrow and in vessel composting using a biofilter was a means of odor filtration should set the standard.

Odors.

Another barrier cited is problems in permitting (where required) and public problems due to odor. Odors should be controlled and any compost process that is not sufficient to control odors should not qualify for carbon credits. Odors need to be controlled – a combination of GHG measures and measured odor levels should set the bar.

Specific Comments.

Pg. 2 first full paragraph. The Protocol states that a majority of methane is lost before a landfill gas system can be installed. The Protocol provides no evidence of this whatsoever, except conjecture.

Pg. 2 paragraph under Section 2.2. The Protocol claims composting facilities are generally designed and operated to minimize anaerobic activity. Again, no evidence or data to support statement. We do not believe this is true windrow composting without forced aeration.

Pg. 3 the Protocol presents criteria based solely on temperature and turning that they claim will prevent formation of methane and N2O. Yet again, no test data to support. We have reviewed many compost emission testing studies can find and none that documented any comparison between what happens at different temps and most did not test for methane and N2O.

Pg. 3 Food waste handling BMPs. They say 48 hours is good enough from when it reaches facility. What about time before that? WM believes 24 hours of stockpiling at a facility should be the upper limit.

Pg. 3 Second paragraph under Section 2.3. How can project developer attest that no other entities are reporting or claiming GHG reductions caused by the project when he is not the landfill owner/operator?

As stated above, many jurisdictions, such as California, are requiring landfills to achieve much greater methane emission reductions than the default assumptions used in this Protocol.

Pg. 8 under Section 3.5. We believe the unreported or misreported VOC emissions should be a regulatory issue. That is, the composting facilities should be required to properly report and permit their real VOC emissions to meet the regulatory test.

Pg. 10 Table 4.1. Under Item #3 for waste transportation. The Protocol excludes transportation emissions because they claim it will be comparable to baseline. This is completely unfounded. This should be determined on project-specific basis whenever distance will be greater than for landfill, including any mileage from extra route trucks because a separate collection round is needed for the organics.

Pg. 11 Table 4.1. Under Item #7 for aerobic composting. If an operator meets BMPs, then they can avoid reporting. This must be measured on a site-specific basis to prove whether these emissions are occurring. The Protocol's assumptions are completely unfounded.

Pg. 12 Table 4.1. Under Item #8 for finished compost. The Protocol claims methane gone after 4 weeks, but again no evidence is provided. The SCAQMD studies found significant VOCs during curing and storage of final compost and no aeration or turning occurs on these finished product piles, so it is much easier for them to go anaerobic.

Pg. 12 Table 4.1. Under Item #8 for compost transportation. The Protocol excludes emissions because they claim it will be insignificant. This is completely unfounded. This should be determined on project-specific basis. We know some compost can go from metropolitan area into rural Ag areas, which could be significant. In some of my studies, other things balances out and the transportation emissions were deciding factor whether composting was net benefit or detriment in terms of GHG emissions.

Pg. 15 definition of LCE. There whole basis for collection efficiency is unfounded and must be project specific. The Protocol must evaluate the actual landfill the waste is being diverted from and determine a site specific collection efficiency. There should be incentive to divert waste from landfills without collection and a reduction in benefit for diversion from sites with good GCCS and energy recovery.

Pg. 18. Same issue as pg. 15 for LFG assumptions

Pg. 23 Section 5.2.2 No credits should be given and a facility does not pass performance test criteria if they are not using forced aeration. Forced aeration is essential to proper facility operation.

Pg. 24 on biofilter systems. These vary wildly in performance. These must be tested for emissions before any credit given for reductions. If you review some the facility specific emission data, you can see that different types of covers vary quite a bit in performance.

Pg. 26 Table 5.2 More investigation is needed on the emission factors for methane and N2O. We do not believe these are from food waste composting. Because food waste will degrade faster, it will go anaerobic faster and create more emissions in the anaerobic phase. Just like we have seen higher VOCs and odorous emissions from the food waste compost, you will see higher methane and N2O. Project proponents must test this on site specific basis. And when you look at the SCAQMD studies (which were

not food waste), there was a huge range of values. For example, there factors range from 0.03 to 0.09 MTCO2e/MT of compost. SCAQMD factors (on either green waste or co-compost with biosolids):

- 2.23 lb/ton methane (0.025)
- 33.4 lb/ton methane (0.35)
- 0.83 lb/ton methane (0.008)

This is a huge range, much bigger than assumed in the Protocol and we would expect food waste numbers to be higher across the board.

Also, testing on biofilters should be on outlet of biofilter---that is, source testing should be required to confirm control efficiency.

Pg. 29 Section 6.3.1. Again, there is no evidence from actual testing data that the temp and turning frequency cited will reduce methane and N2O. This must be proven first. If they do these things, they can report zero emissions of these pollutants, so testing is critical prove of performance.

Pg. 30 Section 6.4.2. No requirements to test outlet of biofilter to confirm methane reductions. This is totally unsupported by any evidence -- in light of all the lack of testing data and the high variation in the types of biofilters.