

Solid Waste Industry for Climate Solutions

***Allied Waste Services, Inc.
County Sanitation Districts of Los Angeles County
Norcal Waste Systems, Inc.
Republic Services, Inc.
Waste Connections, Inc.
Waste Management***

May 4, 2007

Chuck Shulock, Program Manager
Greenhouse Gas Reduction Program
California Air Resources Board
1001 I Street,
Sacramento, CA 95812

Subject: Proposed Early Actions for Reducing Emissions of Greenhouse Gases

Dear Mr. Shulock:

Thank you for the opportunity to provide written comments to you on the report, "Proposed Early Actions to Mitigate Climate Change in California" dated April 20, 2007. We will also be providing copies of these comments, as well as separate comments, to the California Climate Action Team regarding their separate report, "Climate Action Team Proposed Early Actions to Mitigate Climate Change in California (undated, but approximately April 20, 2007).

The letterhead organizations and undersigned parties to this letter are part of an informal coalition of solid waste industry stakeholders known as "Solid Waste Industry for Climate Solutions" (SWICS). We have organized ourselves in this fashion to better represent the interests of the solid waste industry in discussions over climate change issues.

Solid Waste Industry Track Record

The solid waste industry has a long track record of working with regulatory agencies and persons we serve to reduce the impact of municipal solid waste (MSW) management on the environment. Efforts to reduce greenhouse gas emissions are no exception. As documented in the attached paper, "The Impact of Municipal Solid Waste Management on Greenhouse Gas Emissions in the United States" (Weitz, et al, 2002), total waste generated approximately doubled from 1974 to 1997 while greenhouse gas emissions from landfills and from the waste industry as a whole dramatically declined.

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Using a life-cycle assessment of all MSW management practices, the paper's authors estimate that GHG emissions from MSW management were reduced from 36 MMTCE in 1974 to 8 MMTCE in 1997 – a more than 75% reduction. Further, the paper estimates that if MSW were being managed today as it was in 1974, total GHG emissions from MSW would be over 60 MMTCE – approximately 8 times higher than today.

No other major industry in North America or in California can point to such a stellar track record of GHG reductions over the last 30 years. Of course, these changes did not come solely from the industry itself. Working with regulatory agencies and our customers we have implemented a wide range of measures that have resulted in reduced GHG emissions over the past 30 years including:

- Increased landfill methane capture and destruction,
- Conversion of landfill gas to energy,
- Increased recycling and waste minimization,
- Increased conversion of waste to energy, and
- Increased solid waste collection and processing efficiencies.

As your agency, Cal/EPA and the rest of the State of California move to implement AB 32, the solid waste industry requests that you recognize these past accomplishments and continue to work cooperatively with the solid waste industry to achieve even further reductions.

Confusion Over the Types of AB 32 "Early Actions"

There seems to be some confusion over the two types of Early Actions that are specified in AB 32:

1. Voluntary Early Action by which implementers may be able to secure future greenhouse gas reduction "credits", and
2. Discrete Early Actions that are to be developed into regulatory proposals adopted by the ARB and made enforceable by January 1, 2010.

While the solid waste industry would like to secure credits for actions we have taken and will be taking in the future to reduce greenhouse gas emissions from our operations, we suspect that such credit would not be forthcoming for early actions that may be mandated through regulations implementing Discrete Early Actions under the second bullet above. Further clarification of the relationship between these two "early action" programs would be very much appreciated.

Landfill Methane Emissions

While there is considerable uncertainty regarding the amount of methane emissions from landfills, most landfill gas practitioners believe total emissions to be much lower than the estimates currently being relied upon by the State of California. Existing regulations require that surface concentrations of methane at a landfill be maintained at very low

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levels. While there is considerable information on landfill gas that is being captured and destroyed through landfill gas collection systems and the extremely low concentrations levels of methane that must be maintained at the surface of landfills, there is very little definitive information on the amount of overall fugitive emissions from landfills.

Most estimates of fugitive landfill gas emissions rely on models and assumptions that are several years, if not decades, old. Although some work has been done recently to get a better handle on estimates of fugitive landfill emissions, accurate measurements of fugitive emissions are extremely difficult, expensive, and time consuming. The solid waste industry is very interested in working cooperatively with the Cal/EPA and the ARB to get a better understanding on actual landfill gas emissions.

The original CCAT report estimated that at least 16 MMTCO₂E were from California landfill methane emissions. Now, one year later, the California Energy Commission's revised inventory through 2004 estimate landfill methane emission to be 8.4 MMTCO₂E – approximately ½ that of the CCAT report. Yet, even the accuracy of the 8.4 MMTCO₂E is not known. Although this more recent number appears to be based on procedures developed by the individual California Air Districts for estimating emissions – only two of these districts have provided any background as to how these numbers were actually calculated.

One basis for these emission numbers appears to be protocols developed by US EPA many years ago. One assumption that EPA developed as a "rule of thumb" over 15 years ago was that landfill gas collection systems only capture 75% of landfill gas that is generated by landfills. This "75% factor" was based on an informal survey of landfill gas control practitioners around the United States. Some practitioners estimated landfill gas capture to be over 95% while some estimated less than 50% capture. As a result, the US EPA decided upon a rough average estimate of landfill gas capture of 75%. Ironically, some of the most well-documented information on landfill gas capture at the time of this survey came from California with estimates on the higher end of the curve (i.e., between 80% and 100% landfill gas capture).

AB32 specifies that all GHG reduction measures adopted and implemented by CARB be technologically feasible and cost-effective. The ARB is proceeding with the proposed early action items on what appears to be a "presumption" that all of the measures it is proposing to pursue will meet all the legal requirements of AB32. Yet, AB 32 also outlines a series of screening measures that staff should apply when choosing early action measures, including cost effectiveness and technological feasibility, as well as other important criteria. In an effort to get early action measures up and running, we are concerned that the ARB may be short-cutting a careful evaluation of early screening measures as required by AB32 and outlined in the staff document. We recommend that ARB develop a more comprehensive staff report, not based upon "presumption", but a careful development of the science and reasoning to support a measure's listing.

Uncontrolled landfills are one of the early action measures proposed by the ARB, simply based upon the fact that landfill gas at these sites is currently "uncontrolled". It is likely

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that these sites are older, smaller landfills. Here, we are concerned that ARB may be "presuming" that since a site is uncontrolled, simply installing a gas system will result in significant methane capture. This presumption also assumes that such an action is technologically feasible and cost effective. We believe that the science behind this selection and presumptions has not been carefully developed. In fact, we believe that pursuing ill-considered methane control programs at landfills could be counterproductive to the intent. The State of California is one of the most heavily regulated states in the nation, and the landfill industry one of the most heavily regulated sectors, as evidenced by the impressive industry track record of 94% of waste in place already having landfill gas controls. Regulations that have been adopted for landfills at a local, state and federal level, all have been based upon a careful understanding of how a landfill operates. A landfill is a controlled system that anaerobically decomposes and stabilizes solid waste. In addition, disposal of waste in a landfill is a solid waste management practice that should be considered a form of pollution control strategy. The basis for this rests on the premise that if solid waste is left unmanaged in a responsible manner, the results could be detrimental to human health and to the environment.

Since there is only a very small segment of landfills in the State that are left uncontrolled -- in a State that has the most advanced landfill regulations in the world -- it is a clear indication that they have already been considered by regulations, but passed over. More importantly, though, the market has also decided not to pursue capture of methane at these sites. The landfill industry is very much market driven. If landfill gas could be economically developed at a site, the market will generally pursue a project that could lead to energy recovery. The fact that these sites have been left untouched is a clear indication that the capture of landfill gas is not technologically or economically feasible.

If the ARB were to proceed with enhanced landfill gas capture systems at landfills without careful evaluation, the effort could be counterproductive. First, the methane content of uncontrolled sites is likely very low which limits the gas management options. If the methane is too low (e.g., less than 10% methane), flaring may require supplemental fuel, such as natural gas, creating additional air emissions and requiring air permitting, which is often a struggle. Another option for low methane gas streams is to pass the gas through a carbon adsorber to remove toxic constituents. However, in this process, the methane passes through the carbon unaffected, counter to the measure's purpose.

Also, installing a gas system on an old or small landfill often can disrupt the anaerobic conditions of a landfill by introducing too much air in to the system. In this case, the reactor can become aerobic and allow the waste to compost, creating the potential for landfill fires, or not allowing the waste to properly decompose. Both situations are not only counter to the intent of the early action measure, but are counter to AB32 that requires that the action not create a negative impact.

Considering all these facts, it is clear that ARB should carefully work to fulfill the intent of its on screening criteria and work through these issues before considering uncontrolled landfills in the early action list. If after careful consideration, ARB staff believes its

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actions justified, staff should work with the industry on controls that can achieve the goals of the AB32 program

Landfill Carbon Storage (Sequestration)

The fact that landfills "store" (or Sequester) carbon that would otherwise be emitted as CO₂ has been widely documented. The US EPA clearly articulates this fact in their report, "Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks" (October, 2006):

<http://www.epa.gov/climatechange/wywd/waste/SWMGHGreport.html>
See, in particular, Chapter 6 on "Landfilling".

In addition, a number of technical papers, such as the attached study (Barlaz, 1998 -- attached), document the phenomenon of carbon storage in landfills.

The last two Greenhouse Inventories prepared by the California Energy Commission also clearly document landfill carbon sequestration due to the landfill management of lumber and yard trimmings. The latest 2006 inventory estimates 5.5 MMTCO₂E of landfill carbon storage sinks in 2004 at California landfills. Although the solid waste industry believes this number underestimates the amount of carbon storage or sequestration occurring annually in California landfills, we believe that this carbon sink should be mentioned in concert with parallel statements about methane emissions. For example, we believe the last sentence at the end of the second paragraph on page 15 of the report under "Landfill Methane Capture" should be modified as follows:

"Currently, the California Energy Commission estimates GHG emissions from California's MSW landfills to be approximately 8.4 MMTCO₂E in 2004. In addition, the CEC estimates that carbon storage in landfills is approximately 6.9 MMTCO₂E over the same time period. Thus, based on these numbers, California landfills appear to result in net emissions of 1.5 MMTCO₂E during 2004."

Landfill Early Actions

As documented on page 15 of your report, the ARB and the California Climate Action Team have identified 3 categories of possible early action strategies:

- 1. Installation of Emission Control Systems at Uncontrolled Landfills.** As pointed out in the report, only about 41 landfills in California are currently operating without landfill gas collection systems and emission controls. These landfills represent less than 6 percent of the total waste in place that is generating gas. According to the report, this category is being considered for inclusion as a discrete early action. We do not oppose inclusion of this activity as a discrete early action. However, we ask that you give appropriate consideration to the concerns we have expressed above before proceeding with a rule-making in this area. Further, we ask that you recognize that 6 percent of 8.4 MMTCO₂E is only 0.5 MMTCO₂E even assuming 100% capture efficiency -- which is unlikely. Further, no method of funding these emissions controls has yet been identified.

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Our industry group would like to work cooperatively with the ARB to further evaluate these landfills and determine appropriate approaches for the control of emissions from this relatively small number of uncontrolled landfills.

2. **Increased Methane Capture Efficiencies.** There is considerable uncertainty regarding the currently level of methane capture efficiency in landfills. Some parties such as the Los Angeles County Sanitation Districts (LACSD) maintain that their landfill gas capture efficiencies are as high as 95% or more (see attached paper by Huitric, 2006). Most other operators of landfill gas systems believe their capture efficiencies are well over 75%. The solid waste industry believes that current landfill gas capture rates are much higher than currently estimates reflect. Currently the report does not specifically include this activity as a "discrete early action" – and the solid waste industry supports this stance. The levels of reduction that Cal/EPA and the ARB are seeking from this activity may well have already occurred due to voluntary controls by the solid waste industry and compliance with NSPS standards to control VOC emissions. We suggest delaying inclusion of this activity in any specific regulatory initiative until the following efforts are completed:
 - a. **Complete the CIWMB project, "Technologies and Management Practices Reducing Greenhouse Gas Emissions from Landfills".** As described in the CIWMB RFP: The objective of this study is to provide a guidance document that landfill operators and regulators can use to evaluate potential changes to landfills that will result in additional GHG emissions (Note: we assume it means "emission reductions"). The study will be based on an evaluation of existing state-of-the-art practices, as reflected in published literature, reports to regulatory agencies, and contractor familiarity with specific landfill practices and projects. It will evaluate the technologies and practices and recommend practical and cost-effective site-specific measures that can be used on a voluntary basis to reduce GHG emissions from landfills in California (emphasis added).
 - b. **CEC and CIWMB complete the evaluation of Landfill Fugitive Emissions through the contract with Landfills + Inc.** This study will provide valuable information regarding more reliable estimates of GHG emissions from landfills.
 - c. **Upon Completion of the above two programs, evaluate the need for additional regulatory action.** We believe that the track record of the solid waste industry demonstrates our willingness to implement measures to reduce GHG emissions. We request that existing control strategies be fully evaluated before resorting to new regulatory command and control measures to achieve landfill gas collection efficiencies that may already been attained. To the extent that increased collection efficiencies can be achieved through voluntary measures, the solid waste industry should be eligible for potential GHG reduction credits. We believe that this is

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sufficient incentive to encourage responsible action on the part of the solid waste industry.

3. **Increasing Energy Recovery from Landfill Methane.** The solid waste industry strongly recommends that this activity not be considered for further regulatory action at this time. There are many regulatory and economic barriers currently preventing optimization of landfill methane energy recovery, including:
- a. Conflicts with criteria pollutant standards, particularly NO_x emission standards and offset requirements.
 - b. High capital and operational costs of landfill gas to energy projects.
 - c. High variability of landfill gas and landfill configurations, including tie-in to the energy grid.
 - d. Potential conflict with the objective of activity #2 above: Increased methane capture efficiencies, if not conducted properly, could lead to degraded gas conditions that would decrease potential energy recovery.

The solid waste industry requests that Cal/EPA and the ARB work cooperatively to identify ways in which barriers to future energy development can be eliminated and the economics of energy recovery projects can be enhanced. For example, a viable GHG offset trading program could provide additional revenues to make these projects economically viable.

Summary of Recommendations

1. **Waste Industry Track Record.** Recognize the accomplishments of the solid waste industry, in concert with government programs and generator efforts to reduce waste that greenhouse gas emissions from the solid waste industry, unlike most other industries, have declined dramatically over the past 30 years.
2. **Types of Early Actions.** Clearly define the differences between voluntary early actions that may be eligible for emission credits and early actions that require regulatory action and for which emission credits would not be earned.
3. **Landfill GHG Emission Sources and Sinks.** Clearly recognize the GHG emission sinks along with the GHG emission sources. If we are to be scrutinized for our potential sources of GHG emissions we should be similarly credited for emission sinks and carbon storage.
4. **Uncontrolled Landfill Gas Capture as a Discrete Early Action.** Carefully evaluate the efficacy of controlling landfill gas at landfills that are currently "uncontrolled" before proceeding with the development of regulations to require more landfills to install gas collection systems as a discrete early action under AB 32.
5. **Increase Landfill Gas Collection Efficiency.** Further evaluate fugitive landfill gas emissions through the existing CEC/CIWMB study. Proceed with the

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development of voluntary guidance by the CIWMB on landfill gas capture efficiencies. Defer further regulatory action until the real extent of fugitive landfill emissions is better understood.

6. **Increased Energy Production from landfill gas and waste.** Work cooperatively with the solid waste industry to remove regulatory and economic barriers to increased energy production from landfill gas and other waste materials. Focus on voluntary measures and incentives to increase energy production from landfill gas and other waste materials.

Thank you for your consideration of the above issues. If you require any further information or have any questions, please contact any one of the undersigned individuals.

Sincerely,

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Attachments: "The Impact of Municipal Solid Waste Management on Greenhouse Gas Emissions in the United States". Weitz et al, Air and Waste Management Association, 2002.

"Carbon Storage during Degradation of Municipal Solid Waste Components in Laboratory-Scale Landfills". Barlaz, Global Biogeochemical Cycles, 1998.

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"Measuring Landfill Gas Collection Efficiency Using Surface Methane
Concentrations". Huitric et al, SWANA, 2006.

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