

# ***Solid Waste Industry for Climate Solutions***

***Allied Waste Services  
County Sanitation Districts of Los Angeles County  
Kern County Waste Management  
OC Waste & Recycling  
Riverside County Waste Management  
Norcal Waste Systems  
Republic Services  
Rural Counties' Environmental Services Joint Powers Authority  
Waste Connections  
Waste Management***

May 5, 2008

Richard Boyd  
California Air Resources Board  
Stationary Source Division  
1001 I Street, P.O. Box 2815  
Sacramento, CA 95812  
Via Email: [rboyd@arb.ca.gov](mailto:rboyd@arb.ca.gov)

**Subject: SWICS COMMENTS AND PROPOSED REVISION OF CARB DRAFT  
PROPOSED REGULATION ORDER FOR THE CONTROL OF METHANE  
EMISSIONS FROM MSW LANDFILLS (3/20/2008 – VERSION 1.0)**

Dear Mr. Boyd:

Thank you for the opportunity to provide written comments on the draft proposed regulation order for the control of methane emissions from MSW landfills dated March 20, 2008. 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 regarding climate change issues.

## ***Landfill GHG Emissions Are Small***

In considering regulations for the control of methane from landfills in California, we ask that the CARB keep in mind that total anthropogenic GHG emissions from landfills are very low and are well within the range of what would normally be considered de minimis:

- Methane emissions from landfills are currently estimated by CARB to only be about 1.16% of total California GHG emissions – and there is substantial evidence that this may be an overestimate.
- There is no other sector of the US Economy that has done as much to reduce GHG emissions from its operations as has the solid waste and recycling sector. We have previously provided you with technical studies documenting that, overall, GHG emissions from the solid waste and recycling sector are as much as 75% lower today than 30 years ago. Although recycling and waste-to-energy have contributed significantly to these emission reductions, a significant portion of these emission reduction have come from improved landfill technology – including the widespread use of landfill gas collection systems. *If all sectors of the world economy had made the same level of effort to control past emissions, we would not likely have a greenhouse gas problem today.*
- The CARB's own inventory data show that landfill GHG emissions have declined steadily over the past 15 years since 1990. *No other sector of the California economy can demonstrate similar emission reductions.*
- In developing the California GHG emission inventory, CARB still relies on nationwide average default assumptions for the collection and management of landfill gas (75%) and methane oxidation in cover/cap materials (10% of fugitives or 2.5% overall). *SWICS believes that this assumption grossly overestimates the level of fugitive landfill gas emissions in California -- due to the following:*
  - California has regulated the capture and controlled management of landfill gas longer and more extensively than any other state.
  - The South Coast AQMD and Bay Area AQMD, where most of the landfill waste-in-place is located, have much more stringent regulations for the control of landfill gas than any other part of the United States.
  - California's generally dryer climate results in lower methane production levels than other portions of the country.
- SWICS has previously provided you with documentation that methane emissions in California are much lower than the national average estimated by US EPA. *SWICS believes that the current level of landfill GHG emissions is at least 50% lower than that currently estimated by CARB.*
- State of the art measuring systems, such as modeled surface surveys, flux boxes and tunable diode lasers (TDLs) are documenting that methane emissions from well-managed California landfills are extremely low.

***Purpose of Regulations is to Minimize Methane Emissions***

The stated purpose of CARB's proposed Regulation Order Methane Emissions from Municipal Solid Waste Landfills is to minimize methane emissions from landfills, pursuant to AB32. This

is a purpose that SWICS strongly supports, but we urge CARB to recognize past emission reductions and focus primarily on the largest potential sources of remaining methane emissions that may be coming from California landfills. No other sector is being asked to essentially eliminate all GHG emissions – nor should that be asked of the landfill sector particularly given our demonstrated track record. The regulations should focus on potential remaining significant sources of landfill GHG emissions and not focus on de minimis sources within the landfill sector.

SWICS believes that CARB's currently proposed regulation contains too many components that are not necessary or important to the primary goal of reducing methane emissions. The biggest problem with the proposal is that the language draws from a template of existing landfill regulations whose focus were on reduction of landfill gas to reduce reactive organic gases (ROG) emission and potential for public health/nuisance, and only marginally, if at all, concerned with methane reduction as a greenhouse gas. The nature of ROG's contribution to ozone and health, due to trace toxics, is that small levels of emissions are important. With this purpose in mind, a leak check program, for example, such as the Bay Area AQMD Rule 34, is very effective because it reduces small amounts of ROG, which is important to the overall effort to reduce ozone, a regional pollutant as well as toxic pollutants. Methane emissions, as a greenhouse gas that can impact climate, are important on a much larger global scale. Thus, in the same example, the de minimis methane reduction from the same leak check program is not likely to result in a significant reduction in overall greenhouse gas emissions – nor on climate change.

Three important regulations that impact MSW landfills and that have focused primarily on either reducing ROG emissions or public health/nuisance issues are:

- the Federal New Source Performance Standards (NSPS) – *Standards of Performance for Municipal Solid Waste Landfills*;
- South Coast Air Quality Management District (SCAQMD) Rule 1150.1 – *Control of Gaseous Emissions from Municipal Solid Waste Landfills*; and,
- Bay Area Air Quality Management District (Bay Area AQMD) *Regulation 8 - Organic Compounds, Rule 34 – Solid Waste Disposal Sites*.

Each of the three regulations individually, or in combination, has already been very effective in controlling landfill gas emissions (significantly reducing ROG emissions and nuisance concerns), and also indirectly methane emissions. In fact, the reductions have been dramatic, achieving methane collection and destruction efficiencies in excess of 90%, and as has been demonstrated at some California landfills, up to 99%. SWICS has provided the following examples and referenced information to you previously and can be provided again upon request:

- Current MSW Industry Position and State-of-the-Practice on LFG Collection Efficiency, Methane Oxidation, and Carbon Sequestration in Landfills, SWICS.
- Measure Landfill Gas Collection Efficiency Using Surface Methane Concentrations, Huitric et al.

### ***Basic Principles***

Overall methane reduction is due to the installation of landfill gas collection systems. In order for the proposed CARB regulations to be successful in reducing additional methane emissions from landfills beyond what has already been achieved indirectly and very successfully through existing regulations, two principles should be followed in the rule development process:

First, for many landfills, the existing regulations and resulting control measures have been so effective, that very little additional methane can be extracted. SWICS is concerned that the current proposed language is so broadly written that its focus is any methane reduction no matter how small. As discussed above, because methane emissions as a greenhouse gas is important on a global scale, language that focuses on small leaks in components, for example, should be avoided, as these emissions are clearly de minimis.

This concept of de minimis greenhouse gases is supported in other programs, such as the California Climate Action Registry (CCAR), where a recorder can specify up to five percent of emissions sources as de minimis. Although de minimis emissions must still be estimated, the focus of control strategies is on the larger sources of emissions. Once again, the scale or magnitude of emissions of concern are different than a ROG reduction program, where an entity can be emitting thousands of tons of CO<sub>2</sub>e emissions. Thus, an effective regulation should recognize that performance of the gas collection system at some landfills cannot be significantly improved -- *and any effort to force additional vacuum at the wells, would be counterproductive and hurt other important efforts such as energy recovery or could lead to a higher risk of air intrusion and subsurface fires.*

A second principal that should be followed in the proposed regulation is that language should include performance standards that are a real measure of collection efficiency. As discussed, the successful reduction of landfill gas has been achieved through the installation of landfill gas collection systems. All three of the regulations cited above require surface scan measurements of organic gases that can identify instantaneous levels above the pre-determined standard of 500 ppm. If detections above the standard are discovered during the monitoring program, and they are randomly dispersed, this is generally an indication of minor leaks due to cracks in the cover, and not an indication of the overall collection efficiency of the control system. Thus, this monitoring program is very effective in monitoring the condition of a landfill cover. If there is a problem with the gas collection system, for example flooded collection wells that have been rendered ineffective, then the monitoring program would likely find a cluster of 500 ppm exceedances in the immediate area.

SCAQMD Rule 1150.1, in addition to an instantaneous monitoring program, requires an integrated monitoring program. Integrated monitoring accumulates and averages all the instantaneous surface readings and provides a more direct means of revealing clusters of emissions indicative of gas system problems or failures. It is these gas system events that impact landfill gas collection efficiency and ultimately methane emissions and thus, should be considered for inclusion in CARB's proposal. Although integrated monitoring is more expensive and requires the landfill technician to cover more ground, SWICS believes the integrated approach will give a clearer picture of how the landfill gas system is performing.

### ***Proposed Restructuring of the Draft Proposed Regulation***

With these two principals to guide CARB's efforts, SWICS recommends that the proposed regulation (PR) be revised to consider the components suggested below. By offering these suggestions for a reformatted regulatory proposal, SWICS is only suggesting that these requirements are appropriate for California landfills – not landfills elsewhere in the United States or elsewhere. This is due to two primary reasons:

- Landfills in California already have experience complying with similar requirements in the SCAQMD and to a certain extent in the BAAQMD.
- California has unique hydrographic conditions which generally result in far drier and lower landfill gas producing conditions than exists in most of the rest of North America. The average annual precipitation for California is about 22 inches. However, most waste-in-place in California is located in regions with much less than 20 inches of precipitation per year. East of the Rockies and in northwestern North America annual precipitation is generally over 30 inches per year and frequently over 40-50 inches per year.

SWICS would not support the application of the following California recommended regulatory framework to other portions of North America until there is greater experience with these procedures in a variety of alternative hydrographic conditions:

1. ***Smaller and Drier Landfill Exclusion.*** The PR is currently proposed to extend down to landfills equal to or greater than 400,000 tons in place. Alternatively, the PR should, at a minimum, exclude landfills with less than 1,000,000 tons of municipal solid waste in place, a level that has successfully been used by the Bay Area AQMD. Current regulations have not focused on these smaller sites, which in many cases are old landfills, because the small levels of methane they produce are not practical to collect. In addition, other exclusions should focus on landfills that are unlikely to produce much methane, such as those in arid areas that have reduced moisture content and, hence, less landfill gas generation.
2. ***Collection Wells Monitoring.*** The PR should not contain any monitoring efforts that focus on collection wells or other gas collection systems. The experience of landfill operators is that a collection system's performance is independent of Federal NSPS type well parameters, such as oxygen content. Well monitoring program becomes a burden for operators, yielding little if any emissions reductions.
3. ***Instantaneous and Integrated Surface Monitoring.*** The PR should include an integrated surface-monitoring program in addition to the instantaneous program. Lowering the existing 500 ppm emissions threshold for instantaneous monitoring as suggested by CARB, brings with it a significant possibility of over drawing on well fields that can cause subsurface fires and reduce the energy value of the landfill gas by impacting energy production from this valuable source of renewable energy. With the adoption of an integrated monitoring program, lowering the instantaneous threshold is not necessary because an integrated surface-monitoring program will provide a real and accurate indication of the functioning of the gas

collection system, while the instantaneous program continues to check the integrity of the landfill cover.

Instituting an integrated monitoring program statewide will provide a tool for landfills to quickly identify problems with existing gas collection systems and will result in real reductions in methane emissions. SWICS suggests that the emissions standard developed and used by the SCAQMD (50 ppm) for its integrated monitoring program be utilized in CARB's PR statewide. The use of this approach in the SCAQMD has resulted in the landfills considered to be some of the best controlled landfills in the world. As with the instantaneous monitoring threshold of 500 ppm, lowering the threshold below 50 ppm in the integrated monitoring program can cause overdraw on well fields with the consequences discussed above.

4. **Monitoring Frequency.** Monitoring frequency for the instantaneous and SWICS proposed integrated surface monitoring programs, should be on a quarterly basis, not monthly. The SCAQMD's Rule 1150.1, which predates all current landfill regulations, began with a monthly monitoring program. When the rule was revised in 1998 to incorporate federal NSPS/EG language, industry effectively argued that through a decade of data, quarterly monitoring would be just as effective as the monthly program. The SCAQMD reviewed the industry data and concluded that a quarterly program would be just as effective.
5. **Monitoring pathway spacing.** Walking of routes for surface gas monitoring should follow the spacing utilized in the Federal NSPS, 30 meters. This spacing will be effective in an integrated monitoring program, and coupled with visual inspection, very effective in an instantaneous program. SWICS would be willing to further discuss ways that monitoring pathways can be randomized to prevent any systematic failure of the monitoring to detect unknown releases.
6. **Leak Detection and Monitoring.** In keeping with the principal that methane emissions as a greenhouse gas has a very high de minimis threshold, a leak check program will not result in any significant methane emission reductions. Leak check regulatory programs at facilities have generally focused on ROG emission reductions, not methane, so the lower emission thresholds were justified. SWICS recommends that the leak check program language be removed as the minor methane reductions achieved are not justified given the added burden to landfill operators.
7. **Coordination with Districts.** Many regions of the State, such as the SCAQMD and Bay Area AQMD, have existing landfill emissions regulations that have been effective in reducing landfill gas emissions. In addition, larger landfills must also comply with federal landfill regulations. AB 32 mandates that CARB be as consistent as possible with other regulatory programs. Therefore, SWICS recommends that CARB work with the local air districts to explore ways to implement CARB's PR through the existing local regulatory programs.

We look forward to discussing our concerns with the draft regulations and our concepts for a revised draft proposed regulations at the next scheduled meeting on Friday May 9, 2008 in your Sacramento offices. In the interim, please contact any one of the undersigned if you have comments, questions or concerns about this letter or its attachment.

Sincerely,

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Richard Boyd  
SWICS Comments on Draft Proposed LFG Regulation  
May 5, 2008

Page 8 of 8

Attachment: Specific SWICS Concerns with Draft Proposed CARB LFG Regulation

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***SWICS COMMENTS ON CARB DRAFT PROPOSED REGULATION  
ORDER FOR THE CONTROL OF METHANE EMISSIONS FROM  
MSW LANDFILLS (3/20/2008 – VERSION 1.0)***

**(c) Limited Exemptions**

The standards for a limited exemption are significantly more stringent than the standards for permanent removal of the GCCS. Since the environmental impact is the same, landfills should be exempt if they meet the performance standards required for permanent GCCS removal (i.e., surface emissions and subsurface migration) presented in (e)(9). The requirements for the GCCS to be operated for 15 years and for the landfill to be closed do not impact methane emissions and therefore should not be considered.

**(c)(1) 400,000 tons in place**

Bay Area AQMD Rule 8-34 uses 1,000,000 tons in place as a triggering threshold for when landfill gas (LFG) control is necessary. Other rules in California have used other thresholds; however, none have proposed a threshold as low as 400,000 tons in place. No justification or cost effectiveness analysis was presented in the draft CARB rule for setting the threshold at 400,000 tons. The draft CARB rule has included a variety of requirements from Bay Area AQMD Rule 8-34, and the 1,000,000 threshold would be a stringent threshold that will ensure all landfills with sufficient gas production will be controlled while avoiding requiring LFG controls at landfills with only minimal gas production. We believe that there are numerous landfills with greater than 400,000 tons in place, which produce only minimal LFG and therefore, would not create any worthwhile methane reductions if they were controlled.

**(c)(1)(A) 200 ppmv limit at surface requirement**

The draft CARB rule does not provide any justification or cost effectiveness analysis for lowering the surface emissions monitoring (SEM) threshold from 500 to 200 parts per million by volume (ppmv) methane. See below for SWICS discussion on the SEM topic.

**(c)(1)(B) 2.5 mm Btu/hr (83 scfm at 50% methane) threshold of exemption**

This exemption threshold is too low and will cause many small landfills, including very old sites, to install LFG systems at a high cost for minimal methane recovery. As above, the draft CARB rule does not provide any justification or cost effectiveness analysis for the use of this threshold. We

understand that this threshold is based on the smallest LFG flare that vendors could manufacturer to meet methane destruction efficiency requirements. This is not an appropriate threshold to use because it is not reflective of a threshold at which cost-effective methane reductions can be achieved. Rather, it only considers the minimum amount of LFG necessary to sustain proper combustion in the smallest flare. The actual landfills in question may not produce the amount of gas predicted by the gas models; therefore, this threshold may not be met, resulting too little LFG to sustain combustion. Instead, CARB should look at the amount of gas recovery that could create cost effective methane reductions, based on a reasonable criteria for cost-benefit, as well as a flare sizing criteria that is safely within the range where combustion can be maintained using well-proven flare sizes.

Also, gas production modeling procedure [(h)(2)], which is referenced for use in determining heat content to compare against this limit, commonly overestimates LFG generation for dry California landfills, which will result in more landfills being unreasonably prevented from using this exemption. For sites with active LFG collection and control systems (GCCS), they should be allowed to use actual LFG recovery data coupled with methane oxidation and attenuation from the landfill cover system control from their GCCS to compare to this threshold rather than any modeled value. Further, the Intergovernmental Panel on Climate Change (IPCC) guidelines referenced in the rule are very complicated and require data that many landfills will not have, particularly for historical waste disposal.

SWICS proposes instead that for any landfill that does not currently collect LFG, the exemption would be based on conformance with the SEM criteria under (c)(1)(A). For closed, this monitoring would be limited to the 6-month period defined in the draft rule. For active sites, monitoring beyond the initial 6-month period could be required on a reduced frequency to ensure this performance standard could be met on a long-term basis to keep the exemption and included in the annual report.

If gas generation modeling is required to determine the heat content, a better strategy may be to allow use of the IPCC guidelines or the U.S. EPA LFG emissions model (LANDGEM) with default values for "k" and "Lo" from the IPCC guidance, which have been used by CARB in its statewide GHG inventory for landfills, or site-specific model inputs. The exemption determination proposed in the CARB rule should also account for methane oxidation and attenuation, which occurs in the landfill cover system and thereby prevents methane from being fugitively emitted. Landfills should have the flexibility of using default factors for methane oxidation or site-specific values.

For any sites that actively or passively collect LFG, and either vent it directly or through activated carbon, an MMBtu/hr threshold could be used based on comparison to actual recovery data. However, in both cases, this threshold should

be based on the lowest level that is deemed cost effective based on a reasonable cost-benefit analysis, not on the smallest enclosed flare that could be manufactured.

**(c)(3) Exemption request**

The requirement to submit the exemption request within nine months of rule promulgation should be deleted from the rule. A facility should be allowed to submit an exemption request at any time once a site believes it meets the exemption criteria, which may not occur until a later date, as long as compliance is achieved up to the point an exemption is granted. We also believe that for exemption requests, bi-annual (every 24 months) submittals should be should be sufficient rather than every 12 months, as long as the exemption criteria are not exceeded during the 24-month period.

**(d)(2) Component leak; 1/2 inch or less monitoring height**

The definition of component leak should be revised to clarify that measurement must be taken outside of any enclosed space where the component may be contained. Monitoring within an enclosed area, such as inside of a vault or blower assembly, can skew measured results by detecting levels of collected gas in the space, which may not be leaking to the atmosphere, rather than an actual leaking component.

**(d)(3) Vaults**

Same comment as noted above. Leak measurements for vaults should be taken above the surface of the vault exposed to the atmosphere, not from within the enclosed space of the vault.

**(d)(5) Closed landfills**

The definition for closed landfills is very broad, and many landfills that closed a long time ago will not have the documentation referenced. Landfills should provide the level of closure documentation, which was required at the time they closed. Landfills, which closed prior to any specific closure requirements, should simply be required to document that they are no longer accepting waste. CARB should also consider including age of waste as an exemption criteria since it is well documented that gas production substantially decreases after landfill closure. CARB should consider any landfills, which closed prior to RCRA Subtitle D implementation (October 9, 1991), as being exempt under this rule. By the time the rule is fully effective, these landfills will be a minimum of 20 years into their post-closure period. Alternately, these older landfills could be subject to a less stringent waste in place threshold, reflective of the fact that they are 20 years or more past their peak LFG generation.

**(d)(9) Enforcement agency**

The definition of enforcement agency is very broad and would appear to leave it open for multiple agencies for implementation, inspection, enforcement, and fees. CARB should clarify that a single agency will ultimately be delegated implementation/enforcement authority of this rule in each area of the state and that only that agency has authority to implement the rule. SWICS wants to avoid multiple and possibly conflicting regulatory interpretations and overlapping fines and fees.

**(d)(14) Landfill surface**

The definition of landfill surface should also exclude any other areas that have been designated as unsafe from a health and safety perspective for as long as they remain unsafe. Active landfilling areas are not the only unsafe areas on a landfill. Steep slopes, wet/icy conditions and various construction activities may cause or contribute to unsafe working conditions for landfill employees and contractors.

**(d)(17) Owner or operator**

The definition of owner or operator should be further revised to clarify responsibility for compliance with this section when there are multiple parties involved with the ownership and/or operation of the landfill and associated LFG system. The responsible party for compliance with each element of this rule should be the party under local air district permit for the landfill as well as each affected piece of equipment (e.g., flares, engines, etc.) which could result in multiple responsible parties. In the absence of any permit holders, the landfill owner should be the responsible party as a default.

**(d)(19) Surface leak; 0 to 3 inches**

SWICS has serious concerns regarding measurement of surface leaks at a distance as low as zero inches above the landfill surface. In practice, it is impossible to conduct surface emissions monitoring and keep the sampling probe at this level due to the uneven nature of the landfill surface and because of the landfill's vegetative cover or any other materials placed on the surface of the landfill (e.g., erosion control materials, drainage berms, etc.), which are required by solid waste regulations. Further, testing at zero inches risks failure of the testing device, which needs some air to support combustion, or creates an enclosed space situation between the tip of the sampling probe and the landfill surface, which skews concentration measurements. The lowest feasible level for surface emissions testing is two inches from the landfill surface, which is consistent with BAAQMD Rule 8-34 and the most stringent level in the New Source Performance Standards (NSPS; 40 CFR Part 60, Subpart WWW). Finally, having a range of

heights above the landfill surface creates a degree of subjective confusion between self-monitoring, which could be done at one level, and regulatory agency monitoring, which could be done at another. A single compliance height of 2 inches would solve this problem.

**(d)(21) Working face**

Instead of defining "working face," SWICS recommends providing a definition of unsafe areas for the purposes of monitoring exemptions in the rule. Working faces would be examples of unsafe areas at a landfill, but there are others such as steep slopes, wet or icy surfaces, areas undergoing closure or other construction activities, etc. In addition, it should be clarified that the unsafe areas exemption should apply to all required monitoring in the rule for as long as an area remains unsafe; not just for surface emissions monitoring.

**(e)(1)(A) GCCS Design Plan**

CARB should clarify in the rule that GCCS Design Plans are only required when new LFG systems or upgrades to existing systems are necessary to comply with the rule. For sites with existing systems that already meet the requirements of the rule, an engineer's certification is all that should be required. Further, many landfills have already prepared GCCS Design Plans under the NSPS. This rule should allow use of these existing plans, with any necessary updates or addenda, to meet the specified requirements. In addition, SWICS request that the rule be amended to add a requirement for the enforcement agency to review or approve the plans within 60 days from submittal or the plans should be approved as written. Finally, the discretion as to whether a GCCS design is sufficient to meet the rule requirements should be based on the engineer's certification since that is where the expertise lies for LFG design. We do not want regulatory agencies mandating particular GCCS designs unless those agencies want to take responsibility for compliance. As such, the enforcement agency approval should be a mere formality, recognizing that the plan was submitted and generally contains the required elements.

**(e)(1)(A)(3) Maximum expected gas generation rate**

CARB should clarify in this subsection that the LFG collection system need only be designed to handle the expected gas generation rate for the existing waste in place, not for the maximum design capacity of landfill, which could be many years or decades in the future. Instead, the GCCS Design Plan should include plans for phased LFG system expansion as the gas generation rate increases.

**(e)(1)(A)(6) GHG best management practices**

SWICS does not believe that a voluntary guidance document, such as the CIWMB's best management practices (BMP) document, should be referenced in an actual regulation. While the BMP guidance may provide some useful information for landfill owner/operations, its use should be at their discretion and not the subject of a mandated requirement. By referencing the BMP guidance document in the rule, CARB has incorporated the document into regulation. Use of the document may then be enforceable. A site electing to NOT use the document or deviating from BMPs in the document could then be subject to enforcement action. This was not what was intended for this voluntary guidance and would be inconsistent with the way the guidance is recommended for use. As such, the GCCS Design Plan requirement should be limited to proposed criteria necessary to comply with this rule, and any reference to the CIWMB voluntary BMP guidance, or any other voluntary guidance, should be deleted.

**(E)(2)(A)(A) Written request to operate less than continuously**

The approval for less than continuous operation should not require regulatory approval on a separate basis. If the design engineer believes that compliance can be achieved without operating the GCCS full-time, then a site should be able to implement this strategy as long as it can comply with other elements of the rule. Again, the design engineer, not the enforcement agency staff, should be making determinations as to what is sufficient LFG control to achieve compliance with the rule.

**(e)(2)(A)(2) Component leaks**

As stated in the cover letter, SWICS does not support leak component leak testing. In keeping with the principal that methane emissions as a greenhouse gas has a very high de minimis threshold, a leak check program will not result in any significant methane emission reductions. Leak check regulatory programs at facilities have generally focused on ROG emission reductions, not methane, so the lower emission thresholds were justified. The majority of gas collection system components are under vacuum whereby component leaks are all but impossible. Therefore, requiring monitoring for all components is a very costly requirement with very little value in reducing emissions. SWICS recommends that the leak check program language be removed as the minor methane reductions achieved are not justified given the added burden to landfill operators.

Additional comments on the monitoring aspects of this provision are noted below.

**(e)(2)(A)(3) Maximum expected gas generation rate**

SWICS has the same comment here as for (e)(1)(A)(3).

**(e)(2)(B)(1) Enclosed flares**

SWICS requests an exemption provision be added to this subsection to allow existing candlestick flares; where the owner/operator has already expended a substantial amount of money for the device, to be grandfathered into compliance with this rule. Furthermore, a case-by-case exemption allowance should be added for circumstances when the owner/operator can demonstrate that a candlestick flare would be better suited for control at a particular site. For example, candlestick flares have larger turndown ratios and can operate at a wider range of LFG flows, specifically low flow conditions and low methane quality. At some sites where flares serve as backup and have to operate at differing flow levels, the use of a candlestick flare would allow a greater degree of control because it would have less downtime than an enclosed flare under similar circumstances. SWICS does not believe there is a great difference between enclosed and candlestick flares in terms of methane destruction efficiency (the NSPS rule considers them equals for NMOCs), so in certain cases, the benefits of a candlestick, as noted above, could outweigh any perceived deficiencies.

**(e)(2)(B)(2) Continuous recording temperature sensors**

This subsection requires temperature-recording devices; however, there are no specific requirements or limits against which to measure these data. In the absence of such requirements, the temperature-recording device should not be required. As an alternative, flares could be equipped with less expensive UV scanners or simple thermocouples, which measure flame presence to demonstrate the flare is operable.

**(e)(2)(C)(1) Alternative outlet ppmv limit for methane**

SWICS is obviously very interested in the proposed ppmv limit for this rule, and reserve the right to further comment on this subsection in the future. When establishing this limit, SWICS requests that CARB consider a more flexible limit for IC engines. These engines are the workhorses for the majority of LFG to energy projects, and have had to operate under lean burn conditions to achieve compliance with stringent NOx limits. A more flexible, alternative limit for engines would preserve these very important renewable energy projects, which are providing GHG reductions in their own right.

**(e)(2)(D) Source test requirements**

SWICS request that the annual source-testing requirement be modified to allow source testing on the same schedule that the flare or other control device is tested for other parameters under its existing operating permits. This will avoid additional costly source tests just for methane destruction efficiency. Some flares or other control devices are not normally tested annually because of limited use or

other circumstances, and SWICS believes that it is appropriate and reasonable to align the methane testing with the testing schedule for NO<sub>x</sub>, CO, NMOCs, etc.

**(e)(3) 200 ppmv landfill surface methane limit**

CARB has not provided any documentation or justification why the surface methane limit should be reduced from the current most stringent instantaneous limit of 500 ppmv. SWICS believes that the 500 ppmv limit has a long history of successful use in limiting landfill surface emissions. When landfill surface leaks are detected, they are generally higher than 500 ppmv and would therefore be subject to corrective action under the 500 ppmv limit. There is not a significant number of surface leaks between 200 to 500 ppmv that would require remediation under this rule to justify the change in the standard. SWICS is also concerned that the use of this limit will result in overpull of LFG system with increased air intrusion, risk of subsurface fire, increased instability of combustion, and reduction in energy content of the LFG, threatening the recovery of LFG for renewable energy.

SWICS takes the same position on the component leak standard under (e)(2)(A)(2), and globally throughout these proposed regulations herein where the 200 ppmv limit is proposed, despite the fact that the most stringent standard for component leaks is 1000 ppmv for BAAQMD Rule 8-34.

**(e)(4) Wellhead requirements**

As noted in our public testimony, SWICS has serious concerns regarding the inclusion of the NSPS wellhead requirements in this rule. Over the last ten years, these provisions have proven to be the most arbitrary and complicated element of the NSPS rule, while providing no value in terms of emissions control. In fact, in many cases, operation of a LFG system to meet the wellhead standards actually results in less efficient LFG collection and could increase methane emissions. These standards are extremely prescriptive and create endless loops of corrective action, remonitoring, recordkeeping, and massive reams of paper reporting. As such, SWICS strongly requests that these wellhead requirements be removed from the rule. The requirement in (e)(2)(A)(4) to operate the LFG system to prevent fires is sufficient for the stated purpose of the wellhead standards.

**(e)(5) Well raising**

The limits under the subsection are too restrictive and prescriptive. The restriction under (e)(5)(A) only references the adding of new fill and directly conflicts with the definition under (d)(20). This provision should apply to well-raising that occurs for any legitimate reason. The limitations on the number of wells in (e)(5)(B) is arbitrary and has no specific basis. The 10% requirement is more reasonable and allows more wells to be off-line at larger sites. Therefore,



CARB should revise this provision to allow five wells or 10% of the total number of wells to be off-line, whichever is greater. The downtime limitation in (e)(5)(C) should allow downtime beyond five days as long as records are kept to demonstrate that LFG emissions were minimized to the extent practical during the downtime. No agency approval should be required for this activity as it would only result in needless delays in field work that is needed on a timely basis.

**(e)(6) Inspection and maintenance**

Under (e)(6), CARB limits GCCS downtime to 240 hours per year. There is no basis or proof that downtime beyond 240 hours would cause any excess emissions. In as little as five hours per week of downtime, the rule considers this duration an act of non-compliance and excess emissions, which is simply not the case. As long as the site is meeting its SEM requirements, then the downtime should not be limited. At worst, the rule could use the NSPS 5-day downtime limit for a single GCCS downtime event.

If this limit is retained in the rule, then it should be clarified to include all planned and unplanned downtime as long as the downtime is preceded and/or followed by some form of inspection and/or maintenance.

**(e)(7) Temporary shutdown**

As with (e)(5) above, SWICS believes that the number of wells that can be offline should be the greater of five wells, or 10% of the total wells, and downtime should be allowed for any reasons necessary to maintain successful GCCS operation, not just for the limited number of reasons stated. Further, the downtime limitation in (e)(5)(C) should allow downtime beyond 5 days as long as records are kept to demonstrate that LFG emissions were minimized to the extent practical during the downtime. No agency approval should be required for this activity and would only result in needless delays in field work that is needed on a timely basis.

**(e)(8) Construction activities**

Subsection (e)(8) should apply to landfill closure activities or any other types of landfill construction that affects the landfill cover. Also, no agency approval should be required for this activity and would only result in needless delays in field work that is needed on a timely basis.

**(e)(9)(A) 15 years**

CARB should revise this subsection to exclude the 15-year requirement. It is arbitrary and prescriptive. If a landfill can meet all of the other requirements

under (e)(9), then it should not have to arbitrarily operate the LFG system for 15 years.

**(f)(1) Instantaneous Landfill Methane Surface Monitoring**

SWICS recommends that the surface of any landfill be divided into grids for the purposes of SEM, similar to SCAQMD Rule 1150.1. This will allow better identification and tracking of exceedances that are detected. More importantly, we request that when the surface monitoring frequency has been reduced through long-term compliance, subsequent exceedances should only require an increase in frequency on a grid-by-grid basis. This will prevent an increase in frequency for hundreds of acres, at a large cost, for only a single exceedance.

SWICS also requests that CARB reconsider the 45-day requirement for expanding the gas system to correct an exceedance. This is simply not enough time in many cases to design, contract, procure materials and contract drilling to install, and startup any new LFG systems components, particularly for municipalities which have strict contracting requirements. In addition, federal NESHAP asbestos regulations (40 CFR 61 Subpart M) require a 45-day written notification to the agency authority prior to disrupting any area which may contain asbestos materials.

Instead, we recommend using the 120-day requirement from the landfill NSPS rule. Furthermore, the 120-day threshold should not be triggered with simply a third exceedance. Rather, the requirement should only be triggered when an initial exceedance cannot be remediated within the two sequential 10-day re-monitoring periods. This will allow the landfill to conduct multiple re-monitoring events in the 20-day period without triggering the 120-day requirement. The third exceedance should not be a violation of the rule; instead it should only trigger the requirement to expand the GCCS or perform other corrective actions as necessary achieve compliance. Expanding the GCCS is not always the most effective way to resolve an exceedance. If compliance after 120 days cannot be achieved, then SWICS would agree that a violation has occurred if an alternative timeline has not been requested and approved.

Note that we have additional comment on the SEM requirements under (h)(3).

**(f)(1)(C) Closed or inactive landfills**

SWICS requests that both closed and inactive areas on a landfill qualify for reduced monitoring frequency, not just entire landfills. This is consistent with the intent of rule and would reduce costs for monitoring closed or inactive areas, which can remain inactive for many years while other portions of the landfill remain active.

**(f)(2) Gas control system equipment monitoring**

As previously noted, in the absence of any temperature requirement, SWICS requests that the temperature monitoring and recording requirement be removed from the rule.

**(f)(2)(B) Gas control devices other than an enclosed combustor**

Again, in the absence of any temperature monitoring limit for enclosed combustors, non-enclosed combustors should not be subject to any similar monitoring when there is no regulatory limit for comparison.

**(f)(2)(C) Component leak testing**

This rule requirement should be deleted. In keeping with the principal that methane emissions as a GHG have a very high de minimis threshold, a leak check program will not result in any significant methane emission reductions. Leak check regulatory programs at facilities have generally focused on VOC or ROG emission reductions, not methane, where the lower emission thresholds were justified because the pollutant creates air quality impact at much lower levels. The majority of gas collection system components are under vacuum whereby component leaks are all but impossible. Therefore, requiring monitoring for all components is a very costly requirement with very little value in reducing methane emissions. SWICS recommends that the leak check program language be removed as the minor methane reductions achieved are not justified given the added burden to landfill operators.

**(f)(3) Wellhead monitoring**

As previously indicated, SWICS strongly requests the removal of the wellhead requirement from this rule for the reasons stated previously. These requirements are at best a nuisance and paperwork exercise and at worst impede achieving a high level of emissions control.

**(g) Recordkeeping and Reporting Requirements**

Any changes to the standards and remonitoring requirements from the comments provided above should be reflected in related changes to the recordkeeping and reporting requirements in the rule. For example, as a result of SWICS comments, recordkeeping and reporting requirements for temperature monitoring and recording, wellhead monitoring, etc., would need to be deleted or revised.

**(g)(2)(B) Equipment removal report after 15 years**

SWICS previously requested that this requirement be revised to exclude 15 years of LFG operation. The use of a minimum 15-year operating life is an arbitrary standard that pre-supposes that a LFG system must be operated for 15 years before it can meet the criteria for equipment removal. This is simply not the case. A landfill, which can meet all of the necessary criteria for discontinuing LFG collection and removing equipment, should not have to continue operating for 15 years when there is no basis for it. This would be an unwarranted operating cost, which would not result in any appreciable methane reductions.

**(g)(2)(C) Annual report**

Many of the annual report elements required by this rule are redundant with semi-annual reports prepared under NSPS requirements or annual reports under BAAQMD 8-34. To avoid duplicative and redundant reporting, SWICS requests that the annual report requirement be clarified to allow combined reports with the NSPS or 8-34 reports and adjustments to the reporting period to synchronize with the other reports, which already have defined reporting periods. Also, SWICS would like the annual reporting to include the amount of carbon sequestered in the landfill each year.

**(h)(2) Determination of rated heat capacity**

The rule currently requires the use of LFG generation modeling procedures from the 2006 IPCC guidelines. SWICS has found these procedures overestimate gas generation at dry climate landfill, which represent a large percentage of California, and be very difficult to use. These guidelines were originally designed to do inventories for entire countries. Please see comments above under (c)(1)(B) for a proposed strategy for gas generation modeling. Additionally, the rule should allow use of the first order decay model with allowances for properly documented site-specific parameters for "k", "Lo", gas recovery rate, and any other inputs to the model. This will result in much more accurate gas generation estimates than using the IPCC methods. The rule should also allow for sites to account for methane oxidation and attenuation that occurs in the cover system, thereby producing a more realistic estimate of uncollected gas.

**(h)(3) Instantaneous landfill methane surface monitoring procedures**

SWICS has already provided comments relative to the 0 to 3-inch testing height in previous sections of this letter. In addition to that issue, SWICS takes serious issue with the requirement to reduce the surface monitoring path from 100 to 25 feet for spacing intervals. This reduction, coupled with the requirement for monthly testing, increases the effort and cost for surface emissions monitoring by 12 times (3 times for quarterly to monthly and 4 times for 100 to 25 feet) without any demonstrated additional benefits. Because of landfill configurations and logistics, the 25-foot threshold will likely result in a more than 4-fold increase in

the time and cost for SEM. SWICS believes that the 25-foot intervals are too stringent and difficult to achieve in the field. A better alternative would be to retain the 100-foot standard from the NSPS and various District rules and require that the monitoring pattern be varied every round of monitoring.

Furthermore, the rule should not require monitoring around surface penetrations during every monitoring event. Most penetrations do not leak, particularly when they are properly sealed. Some sites have over 1000 penetrations, and the cost to monitor each of them during every event would be excessive. Instead, cover penetrations should be treated like other surface issues, such as cracks and distressed vegetation, and be monitored only when visual or olfactory inspection shows potential evidence of a leak (e.g., LFG odor, surface crack between component and cover, etc.).

Also, it is impractical to ask for and receive approval from the Enforcement Agency to exclude an unsafe area from monitoring. These can change every event, and some areas that are unsafe during one event could be safe for monitoring during another. Technicians must have the final say on what is safe for monitoring as they know their limitations and site conditions the best. A more practical way to address this situation is to require the landfill owner/operator to keep records and include in the annual report evidence of unsafe area exclusion. We assume that the Enforcement Agency does not want to reject a request for exemption only to have an injury occur during a monitoring event.

SWICS also requests that the rule either allow a monitoring exemption or permit monitoring under any conditions when meteorological conditions do not satisfy the rule requirements by the end of the monitoring period. A facility would not want to be found out of compliance for being late on a monitoring event, simply by following the rule.

**(h)(5) Determination of concentration**

As noted above, we strongly request that the wellhead requirements be deleted from this rule; however, if oxygen or methane measurements are required as part of the rule, monitoring should be allowed using field methods (such as the Landtec GEM-500 or 2000 meter) as well as the laboratory methods (EPA Method 3C) prescribed in the rule. In addition, the rule should allow the use of other approved test methods for methane concentration testing.

