Workshop on Draft Regulatory Concepts for Landfill Methane Capture

California Air Resources Board
October 10, 2007 – Cal/EPA Headquarters

Agenda

- Brief Overview of AB 32
- Landfill Methane Primer
- Sources and Emissions
- Draft Regulatory Concepts
- Enforcement and Implementation
- Next Steps
- Discussion
California Global Warming Solutions Act of 2006 (AB 32)

On June 21, 2007, the Board approved the first two components of the Landfill Methane Capture Strategy as a discrete early action measure:

- Require the installation of gas collection and control systems (GCCS) at smaller landfills that are not currently required to install controls
- Increase landfill methane capture efficiencies
- Increase energy recovery from landfill methane

ARB is collaborating with CIWMB on the development of the control measure.

For more information see: [http://www.arb.ca.gov/cc/cc.htm](http://www.arb.ca.gov/cc/cc.htm)
California Global Warming Solutions Act of 2006 (AB 32)
Requirements for Discrete Early Action Measures

- Adopted and made enforceable before January 1, 2010
- Achieve the maximum technologically feasible and cost-effective reductions in greenhouse gases (GHG) from pertinent sources to achieve 2020 GHG emission limit levels
- No relaxation in conventional air pollutant controls

Landfill Methane Primer
Landfill Methane Primer

- Landfill gas results from the natural decomposition of organic waste in landfills
- Landfill gas composition:
  - ~ 45 – 50% methane
  - ~ 40 – 60% carbon dioxide
  - < 1% trace gases

Landfill Methane Primer

- Methane generation rate depends on waste type, age, moisture, temperature, pH, alkalinity and nutrients
- Methane is released to the atmosphere if not captured and controlled
Landfill Methane Primer

Significance of Landfill Gas
- Methane is a potent GHG gas, 21 times the GWP of carbon dioxide
- Health hazards associated with trace gases
- Explosive danger (5% - 15%)
- Odor nuisance
- Potential energy recovery of methane

Collection and Control Systems

Active Collection Systems
- Methane extraction wells and/or horizontal trenches
- Methane moving equipment (e.g., piping and blowers)
- Methane combustion, energy recovery, treatment, or conversion equipment

Passive Collection Systems
- Cutoff trenches or vents
- Allow methane to flow into the atmosphere
Landfill Methane Primer
Collection and Control Systems

- Control Devices
  - Flares (open and enclosed)
  - Reciprocating engines
  - Turbines
  - Microturbines
  - Boilers

Landfill Methane Primer
Collection and Control Systems

- Other Technologies
  - LFG to CNG
  - LFG to pipeline quality natural gas
  - Fuel cell
  - Carbon adsorption
Sources and Emissions

- Total landfill emissions inventory – 372
  - 1990: 6.58 MMTCO2E
  - 2005: 5.83 MMTCO2E
- >500,000 tons WIP w/o controls – 26
  - 1990: 0.23 MMTCO2E
  - 2005: 0.56 MMTCO2E
Sources and Emissions

- Passive venting – 24
  - 1990: 0.16 MMTCO2E
  - 2005: 0.16 MMTCO2E

- Carbon adsorption – 2
  - 1990: 0.01 MMTCO2E
  - 2005: 0.01 MMTCO2E

Draft Regulatory Concepts
Draft Regulatory Concepts

Applicability
- All new and existing MSW landfills >500,000 tons of degradable WIP
- MSW landfill ARB staff is examining the feasibility of a threshold <500,000 tons of WIP.
- Alternatively, base applicability on surface emissions rather than size.

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Methane Collection and Control Requirements
- Active gas collection and control system (GCCS) and submit design plan
- Flexibility for other emissions control methods based on site-specific conditions
- Some existing passive and carbon adsorption systems may no longer be allowed to openly vent methane
- Some exemptions may apply
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Methane Collection and Control Requirements

- Statewide surface emission standards to maximize collection efficiencies
  - 50 ppm integrated surface sampling
  - 500 ppm (or lower) instantaneous sampling

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Methane Collection and Control Requirements

- Collection of gases from uncontrolled areas of the landfill where waste has been placed for 2 years or more, or at final grade
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Methane Collection and Control Requirements

- At closed landfills, require GCCS to remain in operation for a longer period of time
- Landfill methane gas combusted with or without energy recovery, or routed to a conversion system

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Methane Collection and Control Requirements

- If flare is used as control device, it must be enclosed ground type
- Control device designed and operated to reduce methane by a specified destruction efficiency (to be determined)
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Monitoring, Recordkeeping, and Reporting Requirements
- Quarterly (or more frequent monitoring) to ensure proper operation of GCCS
- Submit subsurface perimeter monitoring results (if available)
- Spacing requirement of 25 feet between walking grid pattern for surface monitoring
- Maintain records of monitoring results and report exceedances of operating parameters

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Compliance Schedule
- Accelerated installation of GCCS (compared to federal requirements)
- Schedule would consider time for design, permitting, and installation of GCCS
- More time provided for landfill owners electing to recover the landfill methane gas for energy utilization
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Potential Exemptions

- Landfills must meet all the following:
  1. Demonstrate a low potential for generating gas;
  2. Meet surface emission standards; and
  3. Not pose a threat to human health or the environment.

- Landfills which contain only non-decomposable, inert solid waste, or hazardous waste would also be exempt.

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Potential Issues

- Some landfill owners may not have the necessary funds to install GCCS earlier than what would have been required under the federal requirements.

- Smaller and older landfills (closed >30 years) may not generate enough methane to support some types of control devices, such as a flare.
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Potential Issues

- Reporting requirements
- Some existing passive and carbon adsorption systems may no longer be allowed to openly vent methane

Implementation and Enforcement

- Airborne Toxic Control Measure not appropriate
- MOU or Interagency Agreement with local air districts, California Integrated Waste Management Board, other agencies
Next Steps

- ARB is seeking comments and will continue to work with stakeholders
- Landfill Technical Review Workgroup meetings
- February 2008 – Second public workshop to discuss the draft regulatory language (tentative)

Next Steps

- Late Sept. 2008 – Staff report (Initial Statement of Reasons), will be available for a 45 day formal public review and comment
- November 2008 – Board hearing to officially adopt the landfill methane control measure
- Fall 2009 – Anticipated effective date of the control measure
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Landfill Methane Control Measure
Website:
http://www.arb.ca.gov/cc/ccea/landfills/landfills.htm

Thank you.
Questions about Draft Regulatory Concepts?