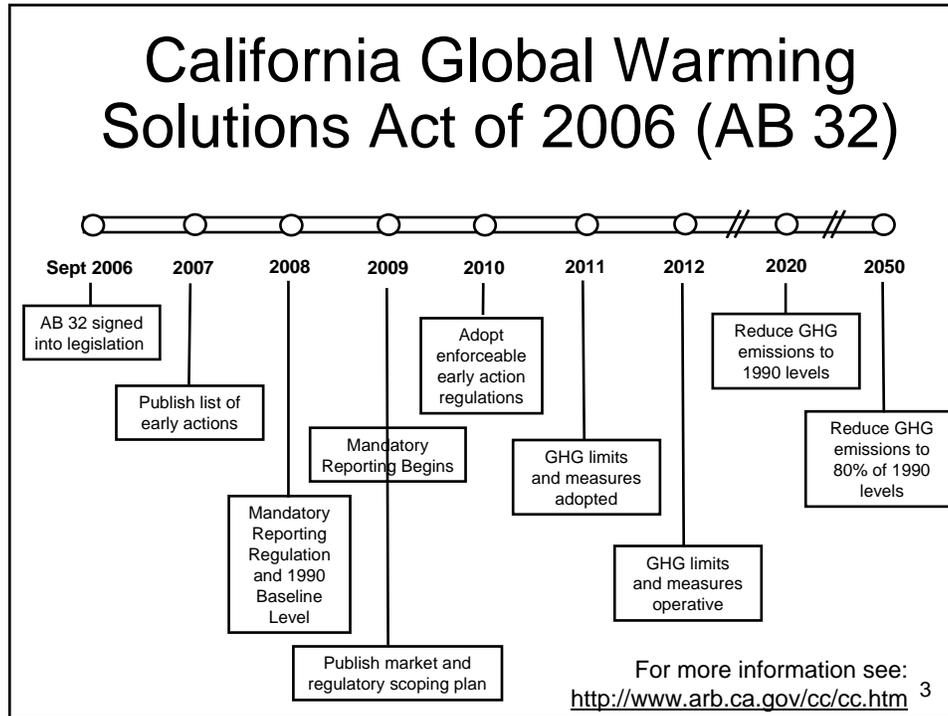




Agenda

- 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

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

5

Landfill Methane Primer

6

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

7

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

8

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

9

Landfill Methane Primer

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

10



Landfill Methane Primer

Collection and Control Systems

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

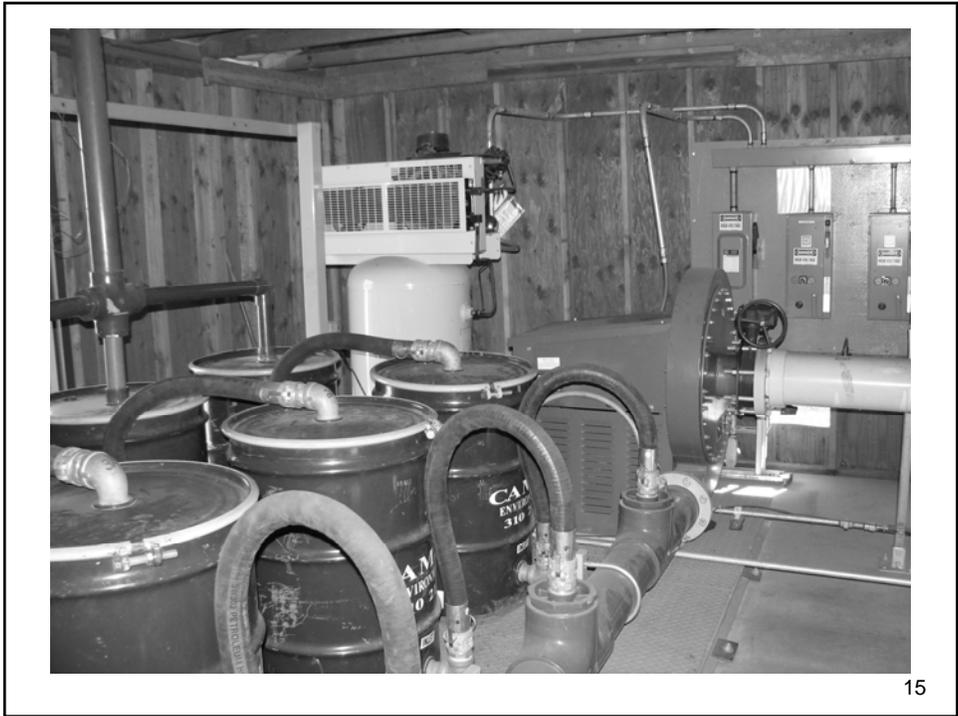
13

Landfill Methane Primer

Collection and Control Systems

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

14



15



16

Sources and Emissions

17

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

18

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

19

Draft Regulatory Concepts

20

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.

21

Draft Regulatory Concepts

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

22

Draft Regulatory Concepts

Methane Collection and Control Requirements

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

23

Draft Regulatory Concepts

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

24

Draft Regulatory Concepts

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

25

Draft Regulatory Concepts

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)

26

Draft Regulatory Concepts

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

27

Draft Regulatory Concepts

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

28

Draft Regulatory Concepts

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

29

Draft Regulatory Concepts

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

30

Draft Regulatory Concepts

Potential Issues

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

31

Implementation and Enforcement

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

32

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)

33

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

34

ARB Contacts

Renaldo Crooks (Staff Lead)
rcrooks@arb.ca.gov
(916) 327-5618

Kari Fish – Project Team Member
kfish@arb.ca.gov
(916) 322-1049

Richard Boyd – Manager
rboyd@arb.ca.gov
(916) 322-8285

Landfill Methane Control Measure
Website:
*[http://www.arb.ca.gov/cc/ccea/landfills/
landfills.htm](http://www.arb.ca.gov/cc/ccea/landfills/landfills.htm)*



Thank you.

Questions about Draft Regulatory Concepts?



37