Proposed Regulation to Limit Ozone Emissions from Indoor Air Cleaning Devices

California Air Resources Board

September 27, 2007

Outline

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Harmful Health Effects of Ozone

- A primary component of photochemical smog
- Highly reactive molecule, damages airway tissues
  - Inflammation and irritation
  - Chronic exposure can cause permanent lung damage
- Can exacerbate asthma
- Chronic exposure may increase risk of death in susceptible populations
- CAAQS*: 0.070 ppm 8-hour average
  0.09 ppm 1-hour average

* ARB, 2005. Review of California Ambient Air Quality Standard for Ozone.

Indoor Ozone

- Ineffective at removing indoor pollutants
- Reduces microbial activity only at very high levels (> 5 ppm)
- Chemical reactions increase formaldehyde and ultrafine PM (even below 0.050 ppm)
- Reduces some odors, but also impairs sense of smell

Primary Types of Air Cleaners

- Mechanical filtration devices: use a filtering media (little or no ozone)
- Ionizers and electrostatic precipitators: electronic devices that may emit ozone as a by-product of operation (typically low levels)
- Devices listed above can be effective at cleaning indoor air when sized and used correctly
- Ozone generators: electronic devices that intentionally emit ozone (very high levels)

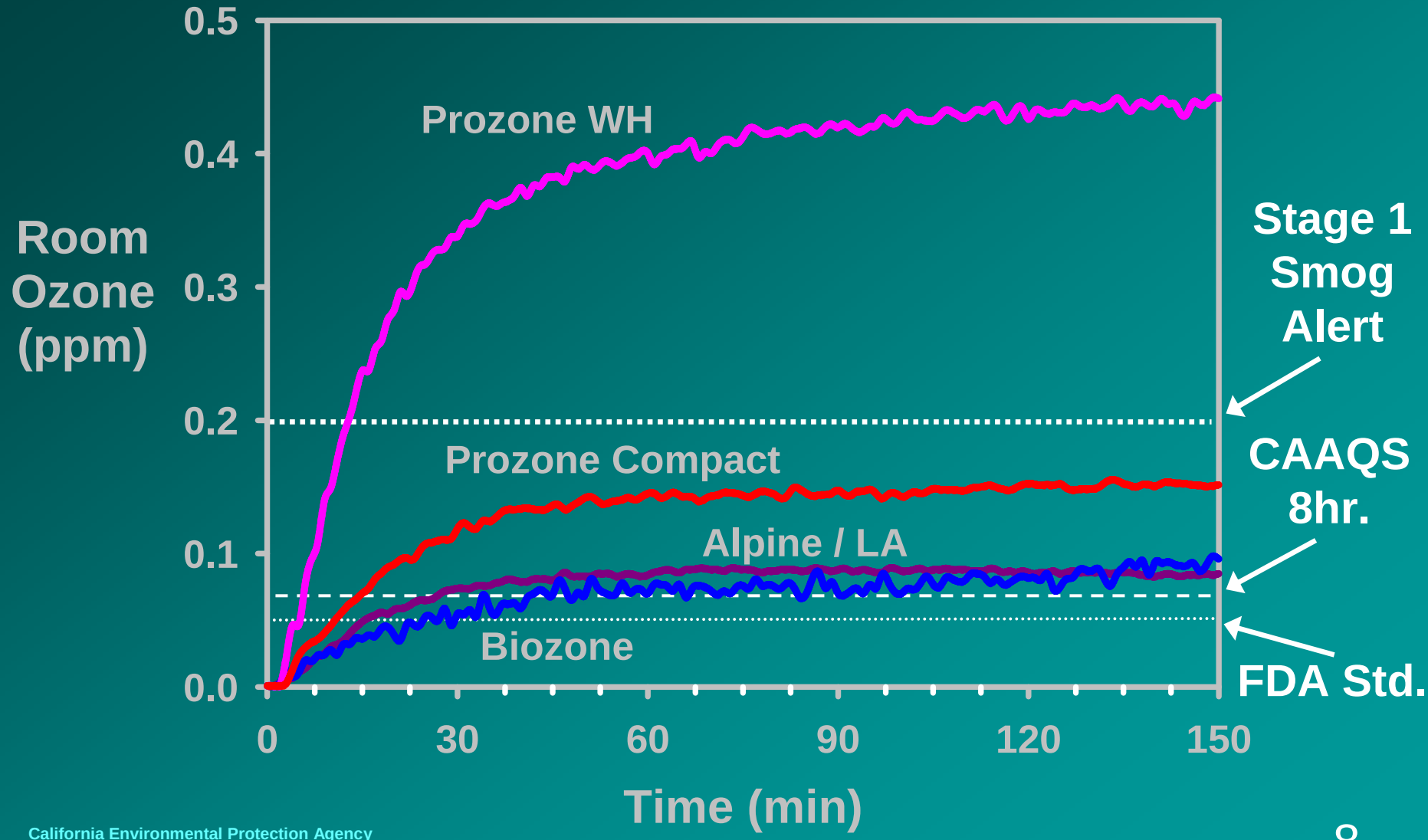
Air Cleaner Usage in California

- Found in 14% of California households
- 50% purchase to improve allergies and asthma
- Other reasons for purchase:
  - Improve indoor air quality
  - Reduce dust and pet dander
- 70% of purchased models are still in use
  - Most operated 24 hours a day, year round
- 70% believed indoor air quality improved

Ozone Generators in California

- Comprise about 15% of air cleaners sold in California
- Found in 2% of households
  - Exposure of 500,000+ people to elevated indoor ozone levels
  - 45% of these households include children
- Indoor ozone exposures well above CAAQS

Room Ozone Levels from Ozone Generators – ARB Results



AB 2276 Provisions

Regulation must include:

- **Ozone emission concentration standard; equivalent to FDA limit (0.05 ppm)**
- **Medical and non-medical devices in occupied spaces**
- **Test procedures: must consider existing test methods (ANSI and UL)**
- **Certification procedures**
- **Package labeling requirements**
- **Adoption by December 31, 2008**

AB 2276 Provisions, Cont.

Regulation may include:

- **Ban on sale of devices that exceed ozone standard**
- **Exemption for air cleaners that emit *de minimis* levels of ozone**
- **Any other element deemed necessary to protect public health**

Regulation Development

- Three public workshops and comment periods
- Survey of manufacturers
- Numerous conference calls and meetings
  - Testing laboratories
  - Industry representatives
  - Scientific research experts
  - Environmental health organizations
- General public outreach program
  - Ozone generator fact sheet
  - Ozone generator list on webpage

Proposed Regulation Overview

- Ozone standard of 0.050 ppm
- Electrical safety testing
- ARB certification
- Labeling requirements for devices, packaging and sales materials

Ozone Emission Concentration Standard

- Devices must meet 0.050 ppm ozone standard
- Consistent with federal standard
- Test method: ANSI / UL Standard 867, 2007 Section 37 revision

Affected Devices

- Medical and non-medical air cleaners
- Air cleaners designed for:
  - Single room
  - Whole floor
  - Whole house
  - Vehicles
  - Personal use
- Devices advertised, offered for sale or sold in California

Exemptions: Industrial Use and In-duct Devices

- Industrial use: devices used solely for industrial applications
  - Must be manufactured, advertised, and marketed for industrial use only
  - Must be obtained only via industrial suppliers
  - Must be labeled: "Solely for industrial use. Potential health hazard: emits ozone."
- In-duct Systems: must be an integrated component of a central air system

Industrial Uses Exempted

- "Industrial Use" means the use of ozone for:
  - Water purification
  - Microbe control on produce
  - Oxidation / disinfection in electronics, chemical, pharmaceutical, and biotechnology industries
  - Bleaching etc. in pulp and paper industry
  - Odor control of industrial stack gases or wastewater
  - Odor and smoke control in hotels in unoccupied areas
  - Mold remediation in unoccupied areas
  - Fire and smoke damage remediation in unoccupied areas

Devices Must Be Certified

- Must be ARB certified for sale in California
- Applications may be submitted by the manufacturer or a representative, and include:
  - Manufacturer and model information
  - Test results and signatures
- Applications reviewed for:
  - Completeness (max. 30 days)
  - Approval (max. 60 days)
- Certification issued to manufacturer

Ozone Test Method

- Staff selected 2007 Revision of Section 37 of the ANSI / UL Standard 867
  - 24-hour chamber test
  - Standard currently used by industry
  - Reduces time and resource requirements to develop new method
  - Final ANSI revision expected in November 2007
- N.R.T.L. and OSHA Program 2 laboratory testing
- Testing of one model within a model group
- Mechanical filtration only devices exempted – *de minimis* ozone emissions

Electrical Safety Test Required

- Electrical safety testing ensures safety if device is modified to comply
- Most devices: ANSI / UL Standard 867
- Mechanical filtration-only devices: ANSI / UL Standard 507
- Must display the certification mark

Examples:

Labeling Requirements

- All devices sold in California must be labeled
- Medical device packaging must comply with federal law and include “ARB certified”
- Non-medical devices must display “This air cleaner complies with the federal ozone emissions limit. ARB certified”
- Any non-industrial device sold via Internet or catalog that is not ARB certified must display specified warning label on the relevant pages

Additional Requirements

- Manufacturers must notify California distributors, retailers and sellers within 12 months of the regulation effective date
- Contact information for all California distributors, retailers, and sellers must be provided to ARB
- Must retain records for 3 years; provide to ARB upon request

Penalties

- Certification applications may be denied, or a certification revoked or suspended
- ARB may order product recall and replacement with compliant products
- Other penalties authorized by law, such as fines, apply as well

Economic Impacts

- 61 manufacturers and their distributors may be affected (6 manufacturers located in California)
- About 200 models may require certification
- Primary costs from testing and labeling
- Estimated annual cost per manufacturer
  - Compliance costs: $13,600 - $86,800
  - Decrease in profitability: typically less than 1%, but up to 10% for small ozone generator manufacturers
- Or cost to consumer may increase up to $11-$16 per unit (most currently cost $100 - $700)
- Conclusion: No significant impact

Exposure and Health Impacts

- Prevent exposures of over 500,000 Californians to indoor ozone levels above the 8-hour CAAQS of 0.070 ppm
  - Prevent Stage 1 Smog Alert levels indoors
- Achieve significant health benefits from reductions in indoor ozone exposure
- Reduce health risks from ozone reaction by-products such as formaldehyde and ultrafine particles

Comments / ARB Response

- **Manufacturer effective date of 12 months is inadequate**

  Response:

  Staff agree, and propose to extend from 12 months to 24 months.

  Staff propose to present a status report to the Board in September 2008.

Comments / ARB Response, contd.

- **Alternate ozone test method**

  Response:

  Method is already used by industry and most manufacturers endorse its selection

- **Additional warning labels on high emitters; allow dual-use devices**

  Response:

  Labels do not eliminate exposures to high levels;

  AB 2276 requires 0.050 ppm limit

Proposed 15-day Revisions

- Revise Section 94802 language
  - Incorporate corrected language
  - Extend the original 12 month manufacturer effective date to 24 months
- Include ANSI revision changes:
  - 8-hour test instead of 24-hour, if steady-state
  - Reduce run-in period from 72 to 48 hours
  - Reduce number of exhaust face pre-tests

Staff Recommendation

- The proposed regulation:
  - Is necessary and beneficial for protection of public health
  - Is technologically and commercially feasible
  - Utilizes industry test method
  - Does not produce significant economic impacts
  - Meets requirements of AB 2276
- Staff recommend approval of the proposed regulation and modifications