Proposed Regulation to Limit Ozone Emissions from Indoor Air Cleaning Devices

California Air Resources Board

September 27, 2007
Outline

- Background
- AB 2276 Requirements
- Regulation Development
- Proposed Regulation Overview
- Economic, Exposure and Health Impacts
- Proposed Revisions
- Staff Recommendation
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

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

Time (min) vs. Room Ozone Levels (ppm)

- **Prozone WH**
- **Prozone Compact**
- **Alpine / LA**
- **Biozone**

- **Stage 1 Smog Alert**
- **CAAQS 8hr.**
- **FDA Std.**
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

- **In-duct Systems**: must be an integrated component of a central air system
“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:

[UL Listed] [ETL Listed]
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