

Subject: AB2276, Pavley, 2006
From: RMDodd@aol.com
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CC: mjenkins@arb.ca.gov, rbode@arb.ca.gov

To Whom It May Concern:

I apologize for the post-deadline (albeit by six hours, as I begin typing) submission. Hopefully even if the testimony itself isn't eligible to become part of the official record, CEPA, CARB, and the Legislature will find my remarks and suggestions helpful.

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For the last 11 years, I've been president of Clean Air Systems, Inc., a Bellevue, Washington-based Honeywell Commercial Indoor Air Purification Full-Service Distributor for five western states. Although our client base is both residential and commercial, my personal area of expertise is evaluating and remediating indoor air quality issues for commercial businesses of all sizes and types, from strip malls, medical and dental offices and clinics to multi-story commercial office buildings.

I also benefit from the 35 years of institutional memory and experience my company has accumulated in the commercial indoor air quality industry. HVAC and mechanical contracting businesses typically get 1-2 calls on indoor air quality issues per year. Clean Air Systems has a wide reputation for its unique ability to identify and remediate all commercial indoor air quality issues, so not only do we get the calls directly from building owners and occupants, mechanical contractors and engineers call on us frequently as well.

I've perfected the use of HVAC-injected ozone for odor control in occupied commercial spaces, an approach my company and a Chicago-based company which we bought out several years ago have implemented successfully in more than 300 businesses over the last 15 years.

The majority of our ozone-injection systems are in businesses where tobacco smoking is allowed, but we've also done many systems in non-smoking facilities with either locally-generated odor issues, or odor problems with the ambient atmosphere being used for building ventilation.

In short, I'm an advocate of ozone for odor control in occupied commercial spaces not only because I've done more research on how to use it effectively and safely than anyone else I've encountered, but because the anecdotal record we've accumulated in using the technology effectively and safely 300 times with hundreds of operating-years of experience convinces me that ozone works better than anything else for a specific range of odor-related IAQ issues.

However, because of the exhaustively-documented negative health consequences associated with exposure to excessive levels of ozone, I applaud the Legislature, CEPA and CARB for their effort to restrict the use of ozone-generating devices in the residential market.

I've never implemented or recommended ozone for continuous use in an occupied private residence, and I never will. In the interest of public health, the best regulation would be one which completely banned devices which intentionally generate and emit ozone from the residential market.

First, unlike mechanically-ventilated commercial buildings, the majority of residences are ventilated by infiltration only (air entering the structure only through doorways, windows, walls, etc.). Both because of stricter building and energy codes and advances in construction methods, modern houses are virtually air-tight.

This creates an environment where, even without ozone being added to the mix, indoor air pollutants from a variety of sources can and do accumulate to levels with significant negative health consequences. Adding ozone to an indoor environment where there's little or no displacement of the volatile organic compounds (VOCs) by ventilation with

outdoor air does more harm than good, for two reasons:

A) The ozone itself is an irritant at higher levels, and every portable ozone generator I've ever seen will continue producing ozone until it's turned off or the power fails, regardless of the ozone level it's creating in the interior atmosphere (including the models which claim to have "on-board ozone sensors"); and,

B) because the chemical compounds created by ozone's reaction with a range of common household VOCs (emissions from furniture, carpet, paint and adhesives specifically) are even more harmful than the "basic" VOCs themselves. In an under- or un-ventilated environment, ozone can actually increase total VOC concentrations.

Second, as noted in the support literature for AB2276 (and correlated by my own personal experience), the population most likely to have ozone generators present in the house unfortunately tends to be the population most likely to suffer negative health consequences as the result of ozone being added to the space in which they dwell; i.e., the elderly, asthmatics and others with diminished respiratory function, families with small children, etc. To the degree that it is within the state's capability to implement a change of this magnitude, this just has to stop.

Third, at the residential level there are portable, self-contained media air purifying units which do a good job of reducing VOCs via adsorption with sorbent media with none of ozone's negative potential, and carry the additional benefit over ozone generators of removing particulate matter with HEPA-grade dust filters. The company we represent, Honeywell, produces a line of residential (and commercial) portable air purifiers, but there's no shortage of quality competition in this market segment.

In the total mix of technologies and products we use to remediate indoor air quality challenges on the large scale, ozone is an important tool for a specific set of circumstances. None of these circumstances exists in private homes.

Examples of non-smoking commercial situations where we've used ozone include:

- 1) The corporate HQ of a large financial services company based in a nine-story office building in downtown Tacoma, Wash. Under certain conditions (low tide and southerly wind with or without atmospheric inversion) the "Tacoma Aroma" emanating from the tide flats and being drawn in through the building's HVAC system is strong enough to buckle the knees of the building occupants.
- 2) A wood products company's HQ which sits directly adjacent to the same tideflats;
- 3) An office building in the center of a municipal primary sewage treatment plant.

The odors in the above situations are all the result of hydrogen sulfide (H₂S), a common pollutant associated with fecal material and other decaying organic substances. Fortunately, the use of ozone to remediate H₂S is well-known and widely implemented (by law, every sewage lift station in Europe has to be equipped with an ozone generator to eliminate odor emissions).

We've had building-wide HVAC-injected ozone systems operating in the above buildings for a decade. All the odors are gone, and not one occupant of any of the buildings has ever complained of symptoms related to exposure to ozone. The ozone level required to treat this particular pollutant is less than 10 parts per billion, far below the exposure standards mandated by the relevant state and federal agencies.

Based on my conversation with a representative of CARB, Peggy Jenkins, it's my understanding that the state doesn't intend to regulate the use of ozone in occupied commercial spaces at this time. However, if the Legislature changes its mind on this point and/or takes it up in the future, I'd make the following recommendations:

- 1) A ban on portable ozone generators which introduce ozone directly into occupied spaces. In situations where there are "local" IAQ issues (for example, a copier room, individual office or work area as opposed to total-building problems), there are always non-ozone solutions.
- 2) A requirement banning the implementation of ozone in any building in which the ventilation capacity of the HVAC system is below 15 cubic feet per minute per occupant.
- 3) A requirement that the HVAC system of any building where ozone is being introduced be adjusted to provide ventilation no lower than 15/cfm/occupant at all times. (Building owners frequently operate their HVAC systems below maximum ventilation capacity to save money on cooling/heating expense, regardless of the health consequences of dwelling in under-ventilated spaces on the occupants of the building.)

4) A requirement for "live, real-time" monitoring of the ozone levels throughout the building to ensure that the FDA 50 ppb standard is never exceeded.

5) A requirement that the ozone monitoring system be interconnected with the ozone generating system so that ozone output is automatically terminated if the 50 ppb level is reached, and remains inoperable until the level drops back below 50 ppb.

6) A requirement that the ozone system also is interconnected with the HVAC system so that ozone output is terminated if the supply air fan stops or, in the case of variable frequency drive motors, at any time the fan speed drops below 20 percent of capacity.

Thank you for this opportunity to participate in the process. Please feel free to call me with any questions or if I may be of assistance in any way.

Respectfully,

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