



International Ozone Association- Pan American Group

**International Ozone Association
Comments to California Air Resources Board Meeting
13 December 2006**

Introduction

Thank you for this opportunity to participate in this public workshop on the development of regulation to limit ozone emissions from indoor air cleaners.

My name is Paul Overbeck, Executive Director of the International Ozone Association (IOA) - Pan American Group, a “not for profit” educational association with members from academic, student, consultant, manufacturing and end user communities and from those interested in learning about ozone and its multiple application benefits.

Stated purposes of the Association in our bylaws are:

To collect and disseminate information on, and to promote research in, any and all aspects of ozone and related oxygen species technologies through conferences, workshops, symposia, newsletters, bulletins, journals, books, pamphlets, or other public information media, or other means and to provide liaison among industry, educational and research institutions, governmental agencies, conservation groups, and the general public in information collection and dissemination, problem solving, or research in ozone technology and applications.

To this end, the IOA held a seat at the table during the U.S. EPA negotiated regulation process to update the Safe Drinking Water Act resulting in the Disinfectant and Disinfection Byproduct Rule (D/DBPR) and the Long Term 2 Surface Water Treatment Rule (LT2SWTR). We are also in our 28th year of publishing “Ozone Science & Engineering” a peer reviewed technical journal for our members, libraries and educational institutions.

We look forward to providing technical support in this Board’s regulatory development. We have six (6) California based manufacturing members with hundreds of employees that produce small to large scale ozone systems who have committed to work with you on this regulation.

Because all businesses offering ozone equipment for air treatment or other applications are not members of the IOA they may not have access to our educational materials and technical support and may be misapplying ozone. Therefore, I wish to specifically state:

“The IOA does NOT support the unsubstantiated use of ozone or the indiscriminate application of ozone in any manner that endangers the health of workers, users, the general public or the environment”.



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Background

The word “Ozone”, unfortunately, carries a negative public perception although the ozone offers many positive benefits.

The primary benefit is protection of life on earth. Ozone occurs naturally in the stratosphere above the earth's surface and forms a layer that protects our planet from the sun's harmful rays however, you typically only hear about its depletion and the negatives caused by its loss.

Ozone is produced unintentionally at ground level by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. These NO_x and VOCs are present from motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as from natural sources. The combination of these chemicals and the ozone produced is commonly referred to as “Smog”. Without these pollutants there would be a naturally low ozone background level.

Since gas phase analysis of ozone by modern instrumentation is so accurate and so simple, compared to the analysis of other photochemical smog constituents, and since the concentration of ozone is proportional to the other constituents of photochemical smog, the U.S. EPA has specified that the total photochemical smog be reported as ozone by monitoring stations all over the USA.

In this case, public perception of the word ozone is associated solely to negatives “Smog” (total pollutants) delivers to the public in outdoor air.

Ozone is also produced intentionally by specific electrically driven and controlled process technologies for more than 100 years as a beneficial oxidant and antimicrobial agent for numerous water, wastewater, soil and gas/air treatment applications.

Beneficial Ozone

Drinking Water Treatment

Today more than fifty (50) California municipal drinking water treatment plants employ ozone to produce more than **5 billion gallons per day** of safe drinking water for the public consumption.

Ozone is also the last treatment step in virtually all bottled water operations.

Industry

The electronics, pharmaceutical, biotech and chemical process industries use ozone for chemical oxidation and disinfection processes to deliver increased product quality, safety and production yields.



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Aquatics

Athletes in swimming and diving events at the past 3 summer Olympic Games competed in ozonated pool water.

Millions visit aquariums like Sea World, the Monterey Bay and Bodega Bay Aquariums and Marine Land where ozone is a critical part of the exhibits "Life Support System".

Food Safety

Some food processors started employing ozone after its U.S. FDA approval for use as an antimicrobial agent in June 2001 and many more are considering ozone as part of a multiple intervention approach to assuring food safety based on recent highly publicized E. coli and other food borne pathogen outbreaks this year.

Additionally, potatoes, citrus, grains and other perishable food storage facilities are using ozone in cold storage to extend shelf life, product freshness and seasonal consumer availability.

Municipal and Industrial Process

Odor control from wastewater treatment plants and hazardous industrial stack gas emissions is a growing application for ozone. Our current issue (#6 of 2006) of Ozone News magazine provides detail of this application.

This Legislation/Regulation

In these and many more applications, ozone is used successfully and safely 24 hours per day, 7 days per week and 365 days per year. The key to the safe use is intrinsically safe equipment design, operator education and proper application and control for the purpose intended.

Ozone can be effective in building air and surface treatment for reduction of odors from fire damage, cooking, animals and smoking, mold and other organisms directly in rooms if applied and controlled at sufficiently high concentrations.

These concentrations are typically above levels deemed safe for prolonged exposure by people, animals and most plants. Therefore, we support regulation of indoor air cleaners that generate ozone for use in occupied space.

We recommend that the regulation being developed include:

1. Establishment of a maximum occupied space exposure level consistent with available health effects data for occupied space. The 0.05 ppm level in the legislation is consistent with U.S. FDA regulation for exposure to people confined indoors, and who would be exposed 24 hours per day, 7 days per week and 365 days per year. While the current US Department of Health Occupational Safety and Health Administration (OSHA) 8 hour time weighted average exposure level is 0.10 ppm it does not appear the legislation gives the ARB latitude to compromise.



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Therefore, it appears this Board must use the legislated value, however, we do not feel there is compelling data available to justify lowering the regulated level to less than 0.05 ppm. Additionally, we feel work is necessary on the details for the analytical measurement process and point of measurement and to support ARB technically in this area.

2. The regulation should contain an exemption statement, “This regulation does not apply to ozone generators designed for use in commercial-industrial applications such as, fire damage restoration, food processing, HVAC ducting systems and water and wastewater treatment and others where occupants are not normally present”. This statement is similar to one included in Health Canada regulation.
3. Establish device testing procedure.
4. Establish a product certification program.
5. Establish specific labeling requirement for Ozone systems sold for air treatment of occupied space.
6. Establish a standardized warning for placement in operation manuals to identify the potential health risk if equipment is improperly used.
7. Establish standards for advertising media to limit unsubstantiated performance claims.

In summary, ozone is a valuable treatment tool in many applications that protect public health and the environment. Ozonation processes have a proven track record for safe and effective use when properly applied, operated and maintained.

This legislation must be very specific to air treatment operation in occupied spaces or it runs the risk of reducing the multiple benefits delivered by the controlled use of ozone in other industries and applications.

Sincerely,

Paul Overbeck
Executive Director
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Subject: Additional IOA Comments - AB 2276 AIR CLEANER REGULATION
From: Paul Overbeck <PaulOverbeck@io3a.org>
Date: Tue, 09 Jan 2007 16:48:11 -0700
To: mjenkins@arb.ca.gov

Hello Peggy,

I have attached additional comments on the UL 867 Section 37 test procedure for your review.

Please contact me with any questions.

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IOA Comments - CA ARB - UL 867 S37 Test.doc

CURRENT OZONE TEST

(NOTE: The following is the ozone test currently in effect in UL 867.)

37 Ozone Test

37.1 A portable product for household use shall not produce a concentration of ozone exceeding 0.05 parts per million by volume when tested as described in 37.2 – 37.7. The information provided on your web site for UL 867 only includes Section 37 Ozone Test and does not identify the type of instrumentation to be used. This may be in another section of UL 867 that I do not have access to. Please send a copy of the full procedure. Therefore, for accurate measurement of ambient ozone at low concentrations we recommend the use of UV absorption based instrumentation, designed using the Beer Lambert Law and calibrated annually by NIST.

37.2 The test is to be conducted in a room having a volume of 950 – 1100 cubic feet (26.9 – 31.1 m³) with a minimum side dimension of 8 feet (2.4 m) and a maximum height dimension of 10 feet (3.0 m) without openings. The test room walls and ceiling are to be covered with a sheet of polyethylene or aluminum. The floor is to be of a nonporous material such as vinyl tile or aluminum.

1. We agree on the test chamber volume as it is a typical bedroom size.
2. Planned test chamber materials change to stainless steel with no vinyl will give worst case values (conservative) as there is no reaction with materials but is not “real world”.
3. A closed chamber has no exchange air and is not real world conditions (see comments in 3.5 below).

37.3 During the test, the test room is to be maintained at a temperature of 25 ±2°C (77 ±4°F) and a relative humidity of 50 ±5 percent. Prior to the start of and immediately after this test, the ozone background level is to be measured with the product off. The background level average shall be calculated and subtracted from the maximum measurement during the test.

1. This seems reasonable

37.4 The product is to be located in the center of the test room floor and about 30 inches (762 mm) above the floor for a table-mounted product.

1. Typically these products are placed in a corner of a room with out flow directed toward the room center.
2. The height above the floor is OK at 30 inches but many are mounted at higher elevation in actual application. Ozone is heavier than air and will fall with highest concentration near the floor without room/chamber air circulation.

37.5 The ozone monitor sampling tube is to be located 2 inches (50 mm) from the air outlet of the product and is to point directly into the air stream.

1. Sampling tube to what type of monitor (see note in 37.1)? Also, the tubing size and length to the monitor will affect accurate measurement.
2. The concentration of ozone will be highest at the immediate outlet of the unit (2 inches). This does not meet the “intention” of the legislation which is assuring that the “room” ozone level does not exceed 50 ppb. We suggest sample point placement in the center of the room/chamber at 24 inches above the floor (height of a typical bed).
3. Ozone produced by a device is reduced by reaction, dilution and normal decay (half-life) which all affect the average concentration in the room/test chamber.

- a. Reaction with chamber materials is reduced with changes to materials of construction in 37.2.
 - b. If this test is in a closed chamber without air exchange reaction with exchange air impurities is eliminated.
 - c. The rate of dilution is affected by the chamber volume, the air flow rate through the device and air exchange in the room/chamber. This test is in a closed chamber without air exchange eliminates "real world" dilution affect.
 - d. Ozone decay rate is a function of oxidizable materials contacted, temperature humidity and pressure. Again, material from surfaces and exchange air appear to be eliminated, therefore, decay will be affected by the controlled temperature, pressure and humidity conditions that are shown in 37.3.
4. We recommend adding a specification on room/chamber air exchange. Specifically, we recommend using ASHRAE Standard 62, which teaches that residential ventilation exchange rates should be a minimum of 15 cfm/person. As the room/chamber size is that of a typical bedroom occupancy for design purposes should be 2 people. The exchange air should be ozone free.

37.6 The emission of ozone is to be monitored for 24 hours to determine the concentration.

1. Or until equilibrium concentration is achieve for a minimum of 30 minutes.

37.7 If the filter cell can be energized with any of its fans not functioning or with particle filters removed, the test described in 37.1 – 37.6 is to be repeated with the various components not operating or with particle filters removed.

1. It is equally important to define test procedures for units with variable fan speed and electrical power consumption. Will this be full output testing only or will the test procedure follow manufacturers recommended operating settings to match to room size?

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