State of California
AIR RESOURCES BOARD

PUBLIC HEARING TO CONSIDER THE PROPOSED AMENDMENTS TO THE REGULATION FOR LIMITING OZONE EMISSIONS FROM INDOOR AIR CLEANING DEVICES

STAFF REPORT: INITIAL STATEMENT OF REASONS

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EXECUTIVE SUMMARY

Background

The California Air Resources Board (CARB or Board) proposes to amend the Regulation for Limiting Ozone Emissions from Indoor Air Cleaning Devices. A subset of indoor air cleaning devices intentionally produce ozone, resulting in indoor air concentrations well above the health-based state and federal ozone ambient air quality standards. As shown by extensive scientific research, exposure to ozone at these levels can impact human health because of an increased potential for respiratory symptoms, asthma onset and exacerbation, increased school absences, hospitalizations due to respiratory diseases, and premature death.

In 2006, Assembly Bill (AB) 2276 (Pavley, Stats. 2006, ch. 770)[i] directed the California Air Resources Board (CARB) to adopt regulations to protect public health from ozone emitted by indoor air cleaning devices. In September of 2007, the Board approved the air cleaner regulation[ii], which became effective in 2008. The regulation requires all indoor air cleaners sold in California after October 18, 2010 to be tested, certified, and labeled as complying with electrical safety standards and the ozone emission concentration limit of 0.050 parts per million (ppm). Several minor amendments to the regulation were approved in 2009 and fully implemented in October 2012. To date, CARB has certified nearly 2,500 air cleaning device models manufactured by more than 330 companies.

The regulation has successfully reduced the potential for Californians to be exposed to ozone from portable indoor air cleaning devices. However, CARB recognizes the need for amendments to improve public health protection by addressing additional devices and industrial use exemptions. In addition, these proposed amendments update legal references, definitions, and approved test procedures. These changes also intend to streamline the implementation of the regulation and reduce the regulatory burden on manufacturers.

These amendments are intended to ensure that Californians are not exposed to unhealthy levels of ozone in their homes from using air cleaning devices.

Staff Recommendation

Staff recommends that the Board adopt the proposed amendments to the indoor air cleaner regulation. These proposed amendments are intended to strengthen, streamline, and update the regulation as well as make it easier for regulated entities to achieve and maintain compliance with its provisions.

Staff considered alternatives to the current proposal, including eliminating the current certification requirement for portable mechanical air cleaning devices. However, the current proposal is recommended because it is technologically feasible, cost-effective, and further enhances consumer benefits. Most importantly, the amendments meet the public health goal in the authorizing legislation of preventing harmful exposure to ozone.

I. INTRODUCTION AND BACKGROUND

The California Air Resources Board (CARB or Board) is proposing amendments to the Regulation for Limiting Ozone Emissions from Indoor Air Cleaning Devices. This Staff Report provides a brief justification and technical analysis supporting the amendments to this regulation. The proposed, revised regulation order is provided in Appendix A of this document.

Included in this report is the following information:

- History of the air cleaner regulation;
- CARB air cleaner certification requirements;
- A summary of the proposed action;
- A description of the primary problem addressed by the amendments;
- A summary and rationale for proposed amendments;
- A description of potential benefits from the amendments;
- An analysis of the expected environmental impacts;
- An assessment of environmental justice-related impacts of the proposed amendments;
- The economic impacts associated with the proposed amendments;
- Alternatives to the proposed amendments that were considered; and
- The public process staff used to develop the proposal.

The purpose of the proposed amendments to the Regulation for Limiting Ozone Emissions from Indoor Air Cleaning Devices is to further reduce the potential for Californians to be exposed to unhealthy levels of ozone emitted from air cleaners. The proposed amendments to the regulation would be codified in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.7, Article 1, sections 94800 – 94809.

History of the Air Cleaner Regulation

Starting in the early 2000s, CARB staff and external researchers identified a significant public health risk from indoor air cleaners.[iii] The results of these studies showed that some devices sold as “air cleaners” emitted large quantities of ozone that result in indoor ozone concentrations above the health-based state and federal ambient air quality standards for ozone.[iv] Extensive scientific research showed that exposure to ozone above these standard levels can cause respiratory symptoms (such as cough, wheeze, and difficulty breathing), reduced lung function, increased airway hyper-reactivity, and increased airway inflammation.[v] Additionally, exposure to ozone above the California standards has been associated with asthma onset and exacerbation, increased school absences, hospitalizations due to respiratory diseases, and premature death.[vi]

The recognition that indoor air cleaners can be a source of ozone exposure, coupled with a growing body of public health research on the adverse health effects from ozone inhalation, spurred the State Legislature to pass AB 2276 in 2007. AB 2276 directed CARB to develop and adopt regulations, consistent with federal law, to protect public health from harmful levels of ozone emitted by indoor air cleaning devices in occupied spaces. On September 27, 2007, the Board approved the indoor air cleaner regulation, requiring all indoor air cleaners sold in California to be tested, certified, and labeled as compliant with the 0.050 ppm ozone emission limit by October 18, 2010.

Early in 2009, manufacturers expressed concern regarding their ability to meet compliance dates in the regulation. In response to their concern, CARB adopted amendments to the indoor air cleaner regulation that extended the certification labeling deadline one year to October 18, 2011, and allowed the use of adhesive labels until October 1, 2012.[vii] The amendments also added electrical safety testing facilities and incorporated three clarifications to the ozone test protocol in ANSI/UL Standard 867. Finally, the amendments allowed dual-function devices to use the most appropriate electrical safety standard for such devices and revised the definition of "mechanical filtration only" air cleaners.

CARB Certification Requirements

There are two general categories of indoor air cleaning devices: mechanical air cleaners and electronic air cleaners. The primary difference between these categories is that mechanical air cleaners use only filtration (i.e. a physical barrier) to remove airborne pollutants. Electronic air cleaners can utilize a range of technologies, including an ozone generator, plasma, ionizer, electrostatic precipitation, ultraviolet (UV) light, photocatalytic oxidation, hydroxyl radicals, or other technology. Additionally, electronic air cleaners often use filtration in combination with the electronic air cleaning technology. Both mechanical and electronic air cleaners are subject to the air cleaner regulation and must be certified by CARB prior to sale in California.

Electronic air cleaners must be tested for both electrical safety and ozone emissions according to the American National Standards Institute (ANSI)/Underwriters Laboratories, Inc. (UL) Standard 867. Testing for ANSI/UL Standard 867 must be conducted by a laboratory that is both (1) a Nationally Recognized Testing Laboratory (NRTL) according to the U.S. Occupational Health and Safety Administration (OSHA) and (2) approved by CARB for the ozone emissions test specified in Section 37 (now Section 40) of ANSI/UL Standard 867. Mechanical air cleaners do not need to undergo ozone emissions testing since they emit little to no ozone but must be tested under ANSI/UL Standard 507 for their electrical safety.

The regulation also requires manufacturers to: (1) notify all of their known distributors, retailers, and sellers about the regulation, (2) provide them with a copy of the regulation, and (3) send documentation of this notification and contact information for their distributors, retailers, and sellers to CARB. Finally, manufacturers, distributors, retailers, sellers, and testing laboratories must maintain production, quality control,

sales, and testing records for at least three years, and make them available to CARB upon request.

The regulation addresses air cleaning devices designed for rooms, whole houses, buildings, vehicles, or personal use (i.e. are carried or worn). Currently exempted devices include in-duct air cleaners that are an electrically connected component of a heating, air conditioning, and ventilation (HVAC) system and a subset of ozone-producing devices that are used for specific, industrial purposes. Industrial-use devices, as defined in the regulation, are exempt as long as specified labeling and point-of-purchase requirements are met.

Since the regulation was adopted in 2007, nearly 2,500 air cleaning devices from more than 330 manufacturers have been certified by CARB. CARB also maintains an online list of certified devices, which is widely used by consumers around the United States, leading to additional public health benefits outside of the state. Although the air cleaner regulation has been successfully implemented for over a decade, the California market has diversified and expanded, with changes in air cleaner technology and increasing sales driven by California-specific market drivers such as widespread smoke impacts from wildfires, public concern about health effects from air pollution, and the use of air cleaners to address cannabis-related odors. Amendments are needed to address the market changes as well as corrections, updates, and other small changes.

Summary of the Proposed Action

This section presents a broad overview of the amendments staff propose for the air cleaner regulation. Chapter II provides a more in-depth description of the problem that the proposal is intended to address. Chapter III provides a summary, purpose, and rationale for each amended section of the proposed regulation order.

The proposed amendments would strengthen the regulation by requiring the certification of electronic in-duct air cleaning devices and modifying industrial use exemptions. The proposal also streamlines the certification process by reducing the testing required to certify certain devices, and eliminating the need for manufacturers of certified devices to complete the notification requirement. The amendments also clarify requirements manufacturers need to meet prior to certification and to maintain certification of their device(s). CARB also proposes to update the regulation text to the latest versions of the approved test standards and incorporate additional test standards for dual-function devices and electronic in-duct devices.

Staff has worked with air cleaner manufacturers, trade associations, and testing laboratories to provide sufficient time and flexibility to allow compliance with limited disruptions to the market.

Table 1: Summary of Proposed Regulatory Amendments to the Air Cleaner Regulation

Topic	Proposed Regulatory Updates
General	• Minor updates for clarification and addition of definitions, revising the agency acronym from ARB to CARB, and updating approved test standards to most current versions
Certification	• Eliminate exemption for electronic in-duct air cleaning devices • Incorporate the Canadian Standards Association (CSA) test method for in-duct electronic air cleaning devices • End ozone test requirement for portable devices using UV lamp(s) that meet specific conditions • Add new test standards for additional dual-function devices • Specify the documents required for a complete application
Compliance	• Modify language on required label and in manuals and marketing materials • Require manufacturer to apply to FDA's Medical Device Program if making medical claims for their device • Specify conditions when previously certified devices must be recertified • Clarify requirements for laboratories to obtain CARB approval to conduct ozone testing • Clarify the industrial use exemptions • Clarify that California consumers must be advised they cannot purchase a non-compliant air cleaner prior to proceeding to the check-out page for a purchase made on the internet • Eliminate notification requirements for manufacturers of certified devices • Clarify that production, quality control, sales, or testing records must be maintained for as long as the air cleaning device(s) are sold or in commerce • Specify when CARB may withhold the issuance or renewal of certification

II. THE PROBLEM THAT THE PROPOSAL IS INTENDED TO ADDRESS

Californians Are Still Exposed to Ozone from Indoor Air Cleaning Devices

The air cleaner regulation was adopted by the Board in 2007 with the goal of protecting California consumers from exposure to ozone from indoor air cleaners. At that time, CARB-sponsored research on the use of air cleaners by the California public[viii] found that ten percent (10%) of households owned an air cleaner that produces ozone, either intentionally or as a by-product, which equated to more than 280,000 households. In 2017, The Freedonia Group, a market research company, published a report entitled *Consumer Air Treatment Systems in the U.S.*, which forecast an annual increase of 4.9% in demand for air cleaners by consumers living in the western states, including California, from 2017 to 2023.[ix] The report also highlighted specific market drivers leading to increased consumer demand, including widespread air pollution, wildfire smoke, the prevalence of respiratory ailments, and the use of air cleaners to address cannabis-related odors. To better understand the California air cleaner market, CARB commissioned a report in 2019 from the marketing research firm TechSci Research. The study found over 320,000 portable electronic air cleaners and 103,000 in-duct electronic air cleaning devices were sold in California in 2017 (Figures 1& 2), with a projected increase of 30% by 2023.[x] This represents a significant increase in the percentage of California homes with an electronic air cleaner, and illustrates the importance of the air cleaner regulation. Because of the exemption of in-duct air cleaners from the regulation, this report also identifies that nearly one fourth of Californians who purchased electronic air cleaning devices for their home were not afforded full protection from exposure to unhealthy levels of ozone.

Figure 1. California Portable Air Cleaner Units Market Size (TechSci Research, 2019)

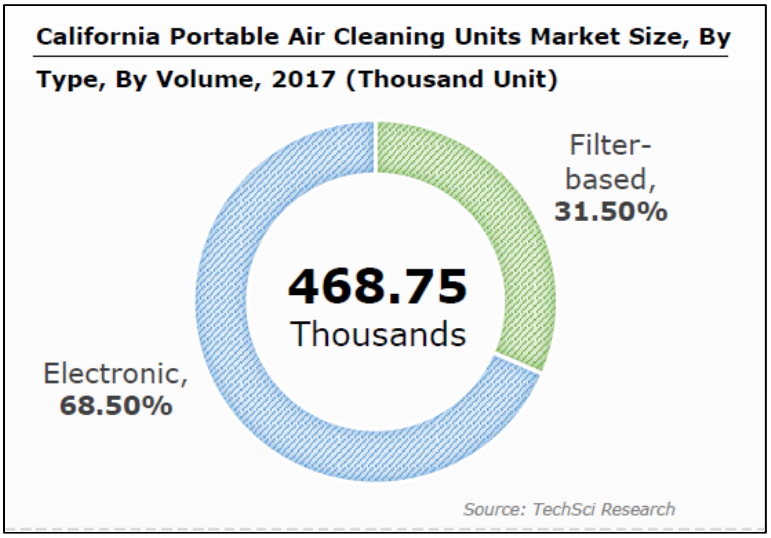
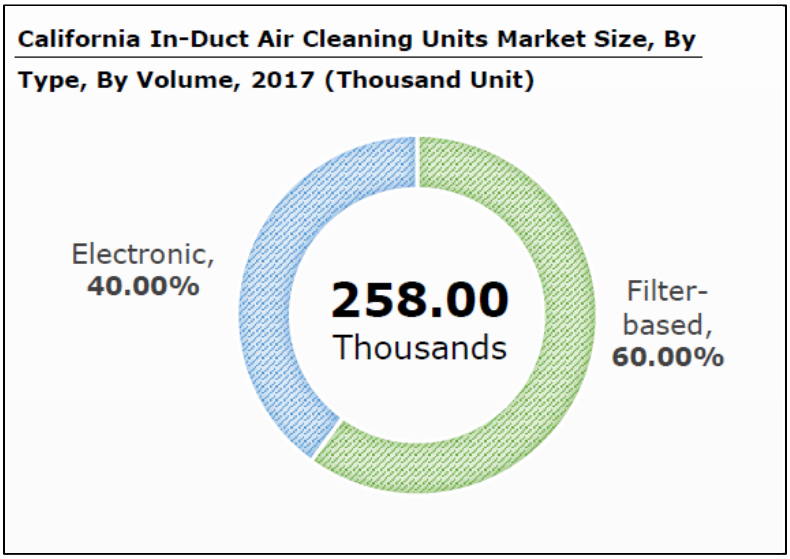


Figure 2. California In-Duct Air Cleaner Units Market Size (TechSci Research, 2019)



Over the last decade of implementation, CARB staff has also recognized other areas of the regulation that need to be strengthened to better support CARB's public health goal of preventing exposure to ozone from air cleaning devices. These include refining and modifying the list of industrial use exemptions. The marketing materials should also require language that explains the importance of preventing exposure to ozone. The label affixed to ozone-generating devices needs to explicitly state that people should avoid exposure to ozone during use. By expanding the definition of the type of devices subject to the regulation, CARB is also ensuring that a broader range of air cleaners sold in California do not emit harmful levels of ozone.

The following subsections describe in more detail the significant problems with the current regulation.

1) Currently Exempted In-duct Air Cleaners Can Emit Unhealthy Levels of Ozone

In-duct electronic air cleaners are not subject to ozone emissions standards and are allowed to emit ozone at an uncontrolled rate. The amount of ozone produced by an in-duct device depends on the type of air cleaning technology employed, but can be much higher than the 0.050 ppm emissions concentration permitted under the regulation. CARB commissioned a research report on the ozone emission rates from in-duct air cleaning devices[xi] and found that rates ranged from undetectable to greater than 350 mg h^{-1}. In this study, field tests of in-duct air cleaning devices found indoor air ozone concentrations as high as 194 ppb (0.194 ppm) when the air cleaner was used according to manufacturer recommendations and under normal field conditions in test homes. The report concluded that indoor air concentrations of ozone from the use of ozone-emitting in-duct air cleaning devices could expose residents in California to

unhealthy levels of ozone in typical buildings. Higher concentrations were predicted when devices are used in smaller homes with lower air exchange rates, which are common features of homes built to meet California's energy efficiency standards and low-income housing needs. Based on the test results, the researchers modelled the expected increase in ozone air concentrations for a home with a volume of 350 m^3 as a function of the in-duct air cleaning device's emissions rate, shown in Figure 3 below.

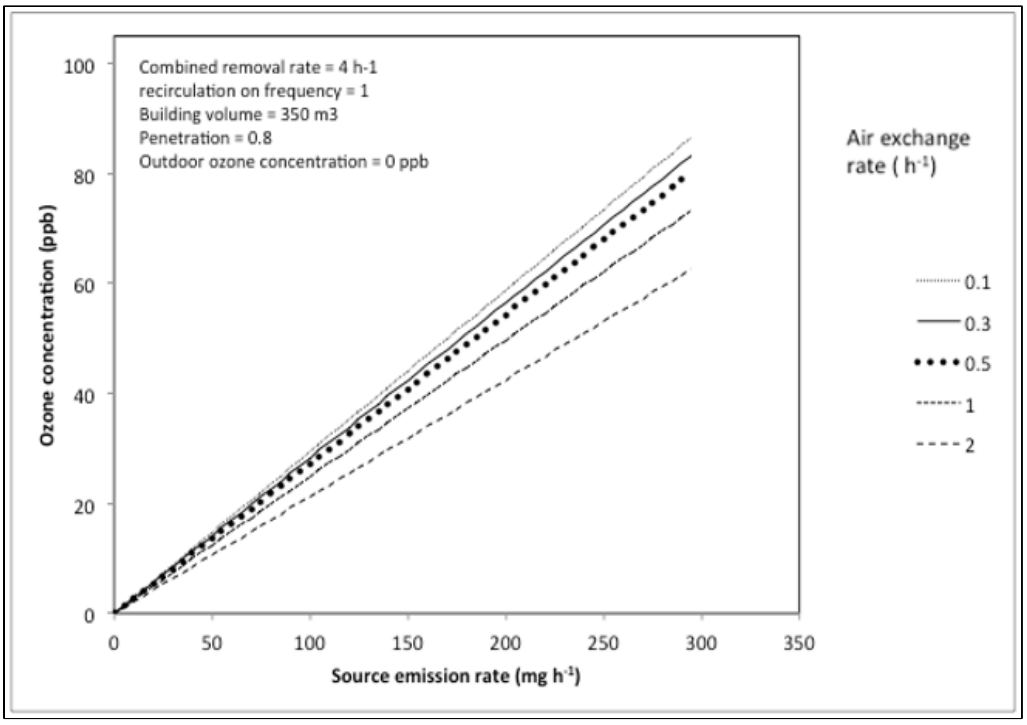


Figure 3. Ozone concentration as a function of source emission rate and air exchange rate for the Standard House (Morrison, 2014).

These modelled results project an indoor air ozone concentration of over 80 ppb (0.080 ppm) from the use of an in-duct ozone generating device producing 300 mg/h of ozone in a home with a low air exchange rate of 0.3/h. Even in homes with higher air exchange rates, it is possible for ozone levels to increase to levels above 50 ppb from the use of these ozone-generating air cleaning devices, as shown in Figure 3.

A review of manufacturer websites found in-duct ozone-generating devices advertised for residential use emitting up to 2,200 mg/h ozone.[xii] Figure 4 shows estimates of the ozone concentrations expected at the air delivery vent for a residential HVAC system emitting 2,200 mg/h ozone over a range of airflows. A typical home will have a two- or three-ton cooling system and the standard airflow for residential cooling systems is typically 400 cfm per ton of cooling capacity. The shaded box in Figure 4 provides ozone concentration estimates for both the two- and three-ton systems, which are 822 ppb (0.822 ppm) and 548 ppb (0.548 ppm), respectively. In order not to exceed the

0.050 ppm emissions limit specified in the regulation, an in-duct air cleaner would need to emit no more than 200 mg/h or 131 mg/h of ozone for a two- or three-ton system, respectively.

These estimates do not correct for ozone decay or deposition onto interior surfaces such as ducting and walls. Also, this calculation, which is found in Appendix B, assumes that all the ozone created by the device remains within the total volume of air emitted by the central air system during one hour of operation. Thus, the 822 ppb (0.882 ppm) and 548 ppb (0.548 ppm) estimates are the maximum values that might be seen in a home using an in-duct air cleaner that emits 2,200 mg/h ozone.

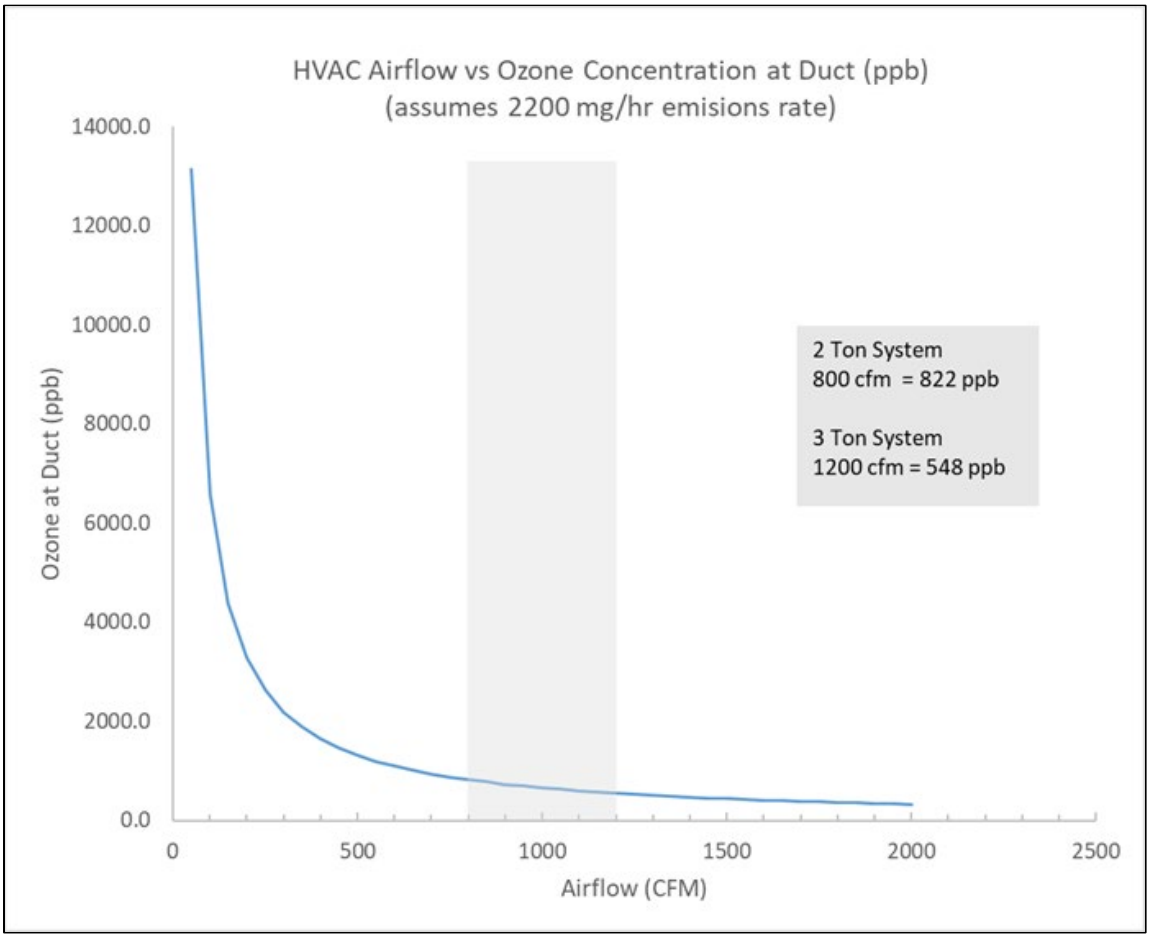


Figure 4. Estimated ozone concentration at the air delivery vent as a function of different airflows for typical residential central air systems.

At the time the regulation was drafted in 2007, there was not a test method available to measure ozone emission concentrations from air cleaning devices that are attached to or inserted into HVAC ductwork. California market data on in-duct air cleaners was also lacking. For these reasons, in-duct air cleaners were exempt from the initial regulation, which created an avenue for expanding sales of in-duct ozone-producing devices in the

California marketplace. Ozone-producing in-duct devices are widely marketed for uses other than those provided in the industrial exemptions, including for cannabis growing operations and in veterinary clinics, dental offices, and casinos. The potential exists for thousands of Californians to unknowingly be exposed to ozone from currently exempt in-duct devices used in a wide-range of residential, retail and commercial settings.

2) Exempt Uses Do Not Uniformly Include Language Limiting Use Around People

The regulation includes specific exemptions for ozone-producing devices used in some commercial and industrial applications. Some of these exempted uses include language stating that the ozone producing device can only be used if no people are present, but this provision is not included for all exempted uses. The use of ozone in agricultural processing plants, in the hotel industry, in remediation or damage restoration, or for motor vehicle reconditioning do not currently include the provision. To ensure better protection of public health, CARB proposes adding the language to each exempted industrial use.

3) Required Labelling Does Not Provide Adequate Information to Prevent Exposures to Ozone

The current regulation specifies that air cleaning devices used for an exempted industrial purpose must be labeled, but the required text on the label does not inform users that they should avoid exposure to ozone during use. The text describes ozone exposure as a *potential* health hazard, not a definitive health hazard, potentially leading people to conclude that the actual health risk from exposure to ozone is negligible or undefined and so the need to take precautionary measures to prevent exposure is minimal.

Manufacturers may voluntarily state in an owner's manual or on a website that an uncertified ozone-producing device should only be used in an unoccupied space, but there is routinely a lack of information about adverse health effects associated with exposure to ozone. Without health-related information, users of such devices may not understand why they need to vacate an enclosed space prior to use of the ozone-producing device or why a treated space should be ventilated prior to re-entry. Lack of awareness of specific health effects could lead users to underestimate the potential effects from exposure and take unnecessary exposure risks as a result.

4) New Types of Ozone-Producing Devices Are Being Marketed

When drafted in 2007, the definition of an indoor air cleaning device was made intentionally broad. Over the last decade, though, the market has dramatically diversified, with new electronic air cleaning technologies being employed in an expanding array of devices, many of these serving multiple functions. The definition of the devices subject to the regulation needs to be further expanded to include even more types of devices capable of producing ozone. This includes updating electrical safety

tests that are currently included in the regulation and adding new ones so these devices can be properly tested and certified as safe.

There are also situations where air cleaners that have already been CARB certified need to be re-certified, which may require re-testing for ozone emissions. CARB certification does not expire and manufacturers can advertise their certified devices as such unless the certification is revoked. There may be occasions, though, where changes are made to the design or manufacturing location of a previously certified device that results in a change to its ozone producing capability and, in these cases, a manufacturer must have the device(s) re-tested for ozone emissions. Those situations need to be described in the regulation so manufacturers are aware of the requirements for re-certification.

III. THE SPECIFIC PURPOSE AND RATIONALE OF EACH AMENDMENT

In this section, CARB provides a summary of the amendments included in the proposed regulation and the rationale for CARB's determination that each provision of the regulation is (1) reasonably necessary to carry out the purpose of the statutes or other provisions of law that the action is implementing, interpreting, or making specific; and (2) reasonably necessary to address the problem for which the regulation is proposed.

Section 94800. Applicability.

Purpose of Amendment to Section 94800
The proposed amendment to this section strikes from the regulation the specification that the indoor air cleaning devices subject to the requirement for certification must be "used or intended for use in occupied spaces."

Rationale of Amendment to Section 94800
This provision was originally added to the regulation to make clear that the air cleaners subject to the regulation are those that are used indoors, where people could be exposed to ozone emitted from such devices. Some manufacturers have interpreted the wording to mean that uncertified air cleaning devices can be sold for any purpose as long as the manufacturer states that the device is not for use in occupied spaces. The amendment is necessary to address this misinterpretation; therefore specifying that all indoor air cleaning devices sold or introduced into commerce in California are subject to the regulation, regardless of whether they are used or intended for use only in occupied spaces.

Section 94801. Definitions.

Purpose of Amendments to Sections 94801(a)(3a) to 94801(a)(3f)
The proposed amendments to these sections update ANSI/UL Standard test methods in the current regulation to the most recent revision dates.

Rationale of Amendments to Sections 94801(a)(3a) to 94801(a)(3f)
It is legally necessary to update test standards to the most current version to align the regulation with the test methods used by CARB approved testing laboratories.

Purpose of Amendments to Sections 94801(a)(3g) to 94801(a)(3l)
These amendments add approved ANSI/UL Standards for testing electrical safety for dual-function air cleaning devices, including for motor-operated appliances, portable electric luminaires, humidifiers, heating and cooling equipment, and electric heating appliances.

Rationale of Amendments to Sections 94801(a)(3g) to 94801(a)(3l)
Over the last 10 years, an increasing variety of consumer products, such as lights, humidifiers, and heating/cooling devices, have been marketed that include an air cleaning component as a secondary function. These devices meet the definition of an indoor air cleaning device and are required to be certified prior to sale in California. Including these additional test methods in the regulation ensures that manufacturers and testing laboratories can select the most appropriate electrical safety test for each device in order to meet the electrical safety testing requirement for certification.

Purpose of Amendment to Section 94801(a)(4)
This amendment updates the acronym for California Air Resources Board, as used throughout the regulation, from ARB to CARB.

Rationale of Amendment to Section 94801(a)(4)
This amendment is necessary to better reflect the current identification of the State Board within the California Environmental Protection Agency that is responsible for implementing the regulation.

Purpose of Amendments to Section 94801(a)(5)
These amendments capitalize the term used to designate testing organizations that verify compliance with applicable approved test standards and add the acronym “CSA” to the definition.

Rationale of Amendments to Section 94801(a)(5)
The capitalization of the term “Nationally Recognized Testing Laboratories” brings the definition in line with its accepted use by the Occupational Safety and Health Administration (OSHA), which coordinates the Nationally Recognized Testing Laboratory (NRTL) Program. It is necessary to add CSA to the definition because a CSA (Canadian Standards Association) test method is being proposed for incorporation in the amended regulation and will be utilized by the testing laboratories, and devices certified under a CSA standard will show a CSA certification mark.

Purpose of Amendments to Sections 94801(a)(8) and 94801(a)(9)
These amendments add the definition of CSA and the CSA test method[xiii] that is proposed for incorporation into the regulation.

Rationale of Amendments to Sections 94801(a)(8) and 94801(a)(9)
These amendments are necessary because CARB is proposing to eliminate the current exemption of in-duct air cleaning devices from the regulation; therefore, all electronic in-duct air cleaning devices will become subject to the regulation and be required to undergo testing for ozone emissions prior to certification. The Canadian Standards Association (CSA) test method will be used for measuring ozone emissions from electronic in-duct air cleaning devices.

Purpose of Amendment to Section 94801(a)(13)
This amendment sets forth the definition of a dual-function air cleaning device to the regulation.

Rationale of Amendment to Section 94801(a)(13)
Consumer products that include an air cleaning function in addition to a primary function are considered indoor air cleaning devices. It is necessary to add the definition because they are referred to in the current regulation in Section 94805(b) in regards to testing requirements and in proposed amendments to Section 94806(b) regarding labeling of such devices.

Purpose of Amendments to Section 94801(a)(17)~~(14)~~
The proposed amendments to this section explain and expand the definition of indoor air cleaning devices subject to the regulation. The definition will include devices intended to clean air that is entering or already present within an enclosed space. It includes examples of air spaces and physical settings in which such devices are commonly used. The amendments also specify in-duct and window air cleaners, which were not previously stated in the definition.

Rationale of Amendments to Section 94801(a)(17)~~(14)~~
It is necessary to explicitly describe the types of devices that must be certified by CARB prior to sale in California. This section will specify that window-mounted appliances that bring in outdoor air and have an electronic air cleaning function are included in the definition of an air cleaner, and therefore are subject to the regulation.

Common air spaces in which air cleaners are used are also listed, including rooms, offices, vehicles and the air surrounding a person. In the amended definition, the concept of a personal air space, defined as the air surrounding a person, is added to the examples of spaces in which air cleaners are used. Also, the term “personal air cleaning devices” is specifically added to the examples of types of devices included for clarity.

Purpose of Amendment to Section 94801(a)(18)
This amendment sets forth that the definition of in-duct air cleaner is referring to those devices that are electrically connected within a heating, air-conditioning, and/or ventilation system for an enclosed space.

Rationale of Amendment to Section 94801(a)(18)
It is necessary to set forth the definition of in-duct air cleaner because the amended regulation requires the certification of such devices; therefore, it is necessary to specify the type of devices that are included. In-duct air cleaners are fully physically integrated and electrically connected within a ventilation or heating and air conditioning system for an enclosed space. In-duct air cleaning devices may use pleated filters, electrostatic fields, ultraviolet light, photo-catalysts, hydroxyl generation, other electronic technologies, or a combination of these, to clean air in an enclosed space, including in vehicle and boat cabins. CARB must include a clear definition of an in-duct air cleaning device so that manufacturers understand what types of devices are subject to the regulation, in order to achieve compliance. The definition makes clear that the types of in-duct devices subject to the regulation are only those that are electrically connected, which excludes traditional pleated (HVAC) filters and mechanical in-duct devices that use only physical filtration to remove pollutants.

Purpose of Amendments to Section 94801(a)(19)~~(15)~~
The proposed amendments to this section set forth that ozone-producing devices are permitted to be used for exempted industrial purposes listed in the section, only if people are not physically present; and, for some exempted uses, only by people trained in the use of such devices. Three current industrial use exemptions are removed from the regulation.

Rationale of Amendments to Section 94801(a)(19)~~(15)~~
The current definition of industrial use specifies that ozone can be used for the exempted purposes. The revised definition removes vagueness by specifying ozone-producing devices; thus, the regulation is focused on the type of uncertified device used, not the gas that is emitted from the device.

When the regulation was initially drafted, CARB received a request to include agricultural processing as an industrial exemption because ozone was used to sanitize fruit. Similarly, other industrial uses of ozone-producing air cleaners, such as chemical oxidation disinfection, were exempted where workers who may be present would be covered under Cal-OSHA regulations on ozone exposure limits. However, we have become aware of broader uses of ozone-generating devices in these agricultural and industrial processes where workers may be exposed to ozone for long periods of time. Some commercial uses were also exempted, but were afforded language stating that ozone could only be used when people are not physically present. Modifying the industrial use exemptions so they all include language limiting use to when people are not present provides consistency in the application of the regulation and will help ensure

that people, including workers and bystanders, are not exposed to unhealthy levels of ozone. Additionally, some currently exempted uses were for ozone applied for water disinfection purposes, bleaching, and certain types of industrial odor control, which do not apply to the regulation, and so are being eliminated.

Some of the industrial use exemptions are for ozone applied on an "as needed" basis to address short-term problems with odor or mold. In these cases, an employee of the business will typically use a portable ozone generator that is placed in the enclosed space and run for a pre-determined length of time. CARB is concerned about the potential for employees who are not trained in the proper use of the device to use the ozone-generator in a manner that exposes people to unhealthy levels of ozone. For these reasons, it is necessary to amend Section 94801(a)(19) to stipulate that ozone-producing devices used for odor and smoke control in the hotel industry; for remediation of property impacted by fire, smoke, mold, or odor; for odor control in the motor vehicle reconditioning and detailing industry; and in mausoleums be applied by trained personnel. CARB recognizes the temporary and intermittent use of uncertified ozone-producing air cleaners in the hotel industry, as long as people are not present during use and the treated room is ventilated prior to being re-occupied.

Purpose of Amendments to Section 94801(a)(21)~~(17)~~
The purpose of amendments to this section are to define "listing mark" and describe the organizations that use the "listing mark" to indicate that a representative sample of the product bearing the mark meets certain quality or safety criteria.

Rationale of Amendments to Section 94801(a)(21)~~(17)~~
CARB approves specific Nationally Recognized Testing Laboratories to conduct required tests for certification of air cleaning devices. These laboratories use a symbol to designate that a sample of the tested product has met specified test standards for quality or safety. The term "certification mark" may be used inter-changeably with "listing mark" depending on the preferences of the certifying laboratory, so the definitions need to be aligned.

Purpose of Amendment to Section 94801(a)(25)~~(21)~~
This amendment sets forth the slightly amended definition of a model group to include units that differ only in decorative treatments not *potentially* related to ozone output.

Rationale of Amendment to Section 94801(a)(25)~~(21)~~
The air cleaner regulation provides an avenue for manufacturers to receive certification for numerous devices that are very similar to each other. Designating different models as part of a model group, for purposes of certification, benefits the manufacturer because the regulation requires that only one model in the group needs to be tested for electrical safety and ozone emissions. This reduced testing requirement can significantly reduce manufacturer costs and decrease time to achieve certification.

The current definition states that units in a model group can differ in ways that do not relate to ozone output, such as decorative treatments. Manufacturers may claim that a difference between units in a model group do not relate to ozone output. Without actual ozone emissions test results comparing ozone output between models, CARB staff cannot ensure that small changes in units don't affect ozone output. By including the word "potentially", CARB staff may exclude units from a model group if there is reason to believe differences between models could affect ozone output, even without ozone test results. This change helps protect public health by assuring that models that could potentially emit ozone are not certified without proper testing to confirm that they do not emit harmful levels of ozone.

Purpose of Amendment to Section 94801(a)(~~25~~)
The amendment eliminates the definition of "occupied space", which was removed from section 94800.

Rationale of Amendment to Section 94801(a)(~~25~~)
In Section 94800 (Applicability), the article states that the regulation applies to any person who manufacturers, sells, supplies, offers for sale, or introduces into commerce in the state of California indoor air cleaning devices, including both medical and non-medical devices used or intended for use in occupied spaces. CARB proposes to amend that section by removing the clause "used or intended for use in occupied spaces"; therefore, the definition of an occupied space is no longer needed in the regulation.

Purpose of Amendment to Section 94801(a)(30)~~(27)~~
This amendment specifies that required labeling can be placed on a container used to ship a device only if that container is the only packaging used for the product.

Rationale of Amendment to Section 94801(a)(30)~~(27)~~
Section 94806(b) of the regulation requires the placement of a CARB certification label on the device packaging. This amendment to the definition of "packaging" is necessary to explicitly state that it is permissible to place the required label on the container used for shipping purposes if that is the only packaging used for the product.

Purpose of Amendment to Section 94801(a)(31)
The proposed amendment sets forth the definition of a permanent filter for the purposes of the ANSI/UL 867 ozone test procedure, which requires the removal of all filters, unless they are permanent filters and truly cannot be removed.

Rationale of Amendment to Section 94801(a)(31)
It is necessary to set forth the definition of a permanent filter because the required ANSI/UL 867 test Standard includes taking out all removable filters in a device for a portion of the test. Some manufacturers have claimed their device's filters are permanent (non-removable) when they actually are not. The purpose of removing all

filters is to measure ozone emissions concentrations under a “worst case” emissions scenario that could arise if a consumer operated the device without a filter, either purposefully or inadvertently. Some manufacturers have sought to avoid having a device tested with the filters removed by stating that filters were permanent and unable to be removed by consumers. In some cases, testing laboratories evaluating such devices were able to easily remove those filters for testing purposes. The amendment is necessary to remove vagueness by specifying that if a filter can be easily removed by a testing laboratory, then it is not permanent and must be removed for the purposes of the required ozone test. If a manufacturer claims that a filter is permanent, then the filter also must be capable of functioning effectively for the lifetime of the device and not need replacement.

Purpose of Amendment to Section 94801(a)(32)
The proposed amendment to this section sets forth the definition of a personal air cleaning device as a one that is intended to clean the air surrounding a person, and which can be worn or carried by the person in any way.

Rationale of Amendment to Section 94801(a)(32)
The amendment is necessary to clarify the types of devices referenced by the term “personal air cleaning devices”, as used in the current regulation. The regulation refers to such devices as those intended to clean the air nearest a person, which could be interpreted as including every type of indoor air cleaning device. These very small devices, typically ionizers and ozone generators, are worn around the neck or carried on a person and are marketed for use to clean the air within a person’s breathing zone, and may be worn or carried inside or outside an enclosed space.

Purpose of Amendment to Section 94801(a)(38)
The proposed amendment to this section defines the type of light that is emitted from germicidal ultraviolet (UVGI) lamps in order to differentiate these from other types of UV lamps that are capable of generating ozone.

Rationale of Amendment to Section 94801(a)(38)
The proposed amendment is necessary because the regulation requires that all electronic air cleaning devices undergo testing for ozone emissions prior to certification. CARB is now proposing to eliminate this requirement for coated UVGI lamps emitting light with wavelengths ≥ 240 nm and a spectral peak of 254 nm. Portable air cleaners that include UVGI lamps as their only electronic air cleaning technology have been subject to the ozone testing requirement, even though they emit no or negligible amounts of ozone. CARB is proposing to eliminate the ozone testing requirement for such portable devices; therefore, it is critical to clearly describe the type of UV lamp CARB will accept as meeting the test requirement.

Section 94802. Standards for Indoor Air Cleaning Devices.

Purpose of Amendment to Section 94802

The proposed amendments to this section stipulate that manufacturers of in-duct air cleaners will have 24 months to meet the certification requirements, while manufacturers of other types of indoor air cleaners permitted for sale in California will have 12 months from the effective date to comply with specific sections of the regulation. The proposed amendments also clarify that California Air Resources Board refers to itself both internally and externally as CARB, not ARB.

Rationale of Amendment to Section 94802

This section originally applied to all manufacturers of indoor air cleaning devices subject to the regulation, which were permitted 24 months to meet certification requirements. The amendments to this section are necessary to make clear that only manufacturers of in-duct air cleaners have 24 months in which to comply with the amended regulation, and manufacturers of portable air cleaners are required to comply with the new labeling and safety mark requirements within 12 months of the effective date. Manufacturers of in-duct air cleaners are provided a longer period of time to come into compliance with the regulation because they are subject to the new testing requirements. Manufacturers of uncertified air cleaners sold or used for exempted industrial purposes must meet the requirements in Section 94803(a) and in Section 94807 within 12 months of the effective date of the regulation. These amendments ensure that manufacturers of different types of devices are aware of the time frame in which they are required to become fully compliant with the regulation.

The amendments are also necessary to reflect the current identification of the Board within the California Environmental Protection Agency that is responsible for implementing the regulation. The prior acronym, ARB, has been replaced with CARB for consistency in national and international identification.

Section 94803. Exclusions and Exemptions.

Summary of Amendments to Section 94803(a)

The regulation includes exclusions and exemptions for ozone-producing indoor air cleaning devices manufactured, advertised, marketed, labeled, and used solely for the industrial uses defined in Section 94801(a)(~~15~~)(19), provided the devices meet additional requirements. The amendments to this section modify those requirements by revising the language used in the advisory required to be placed on the device, in owner's manuals, and in marketing materials. The amendments now require the addition of a graphic illustrating that the device should not be used around people. Information about potential health effects from exposure to ozone and an advisory that enclosed spaces in which an ozone-producing air cleaner is used should be well-ventilated for at least an hour prior to re-entry are also required in owner's or operations manuals.

The proposed amendments also state that those entities subject to the regulation must be able to demonstrate that exempted air cleaning devices are manufactured, marketed, advertised and labeled solely for an exempted purpose.

A provision in the regulation that requires devices sold for exempted purposes to be sold through industrial supply businesses is deleted from the amended regulation.

Rationale of Amendments to Section 94803(a)

Amendments to Section 94803(a) are necessary to better meet the intent of Article 8, Sections 41985 and 41986 of the California Health and Safety Code[xiv] , which states that ozone emitted from indoor air cleaning devices poses a serious health hazard and seeks to prevent unhealthful exposures to ozone. The air cleaner regulation limits allowable ozone emissions generated from indoor air cleaning devices sold in California to less than or equal to 0.050 ppm. During the development of the regulation in 2007, industry representatives met with CARB staff and requested exemptions for the use of uncertified air cleaning devices for specific industrial use applications. CARB staff agreed that, even though ozone is a harmful air pollutant and lung irritant, it can be used at high concentrations for specific industrial purposes where people would not normally be present or where air ozone exposures would be limited by workplace regulations. Therefore, CARB provided exclusions and exemptions from the regulation for ozone-producing devices used for specific purposes, and sought to reduce possible exposures to ozone in the general public by requiring that such devices be marketed solely through industrial supply outlets, thereby reducing their availability to the general public, and requiring that ozone generators be labeled in a specific way that associates ozone with a health hazard.

The required language, however, does not inform users to avoid exposure to ozone accordingly. Since occupants of an enclosed space in which ozone is used may not know how much ozone constitutes a health hazard, they may remain in the space while the device is in operation because the label does not indicate they should leave. Therefore, it is necessary to modify the required label to read: “For industrial use only. Use only in unoccupied spaces. Health hazard: emits ozone” and to include a graphic illustrating that the device should not be used around people – both of which should be placed on the device in a clearly visible location near the power switch. For people unable to read an advisory in English, it is important to convey the advisory in graphic form. This same advisory must also be printed in all manuals for the device and in marketing materials, which must also include information about health effects associated with exposure to ozone.

It is also necessary to include an advisory to sufficiently ventilate enclosed spaces after ozone application. Without monitoring equipment to accurately determine the concentration of ozone in indoor air after treatment, taking precautionary steps to restore indoor air to pre-treatment ozone levels through ventilation is prudent. The half-life of ozone is dependent on different physical properties of air and the air exchange rate or ventilation rate of the treated space, which can vary significantly. Ozone reacts with air pollutants, particles, and surface materials throughout the treated space. In most cases, the half-life of ozone in indoor air is less than 10 minutes, but will depend

on the steady-state concentration, background concentration, the size of the room, air exchange rate, humidity, temperature, and the type of materials present in the room with which ozone may react.[xv] Because of these wide-ranging factors, it is reasonably foreseeable that elevated ozone levels could persist in indoor air after an ozone generating device is stopped, presenting an increased risk of exposure to ozone by employees, residents, and other occupants. Therefore, CARB proposes to amend the section so that owner's and operations manuals include an advisory that enclosed spaces be ventilated for at least one hour prior to being re-occupied. These amendments are intended to assist people in protecting their health when using ozone-producing air cleaners.

At the time the regulation was drafted, the majority of ozone generators were sold to commercial businesses through industrial supply outlets. Over the last decade, though, these devices have been increasingly marketed over the internet, and industrial supply outlets have largely been replaced by home improvement stores and online distributors. This change in the distribution network of ozone-producing devices used for exempted purposes makes the provision stating that the exclusion only applies to devices sold through industrial supply outlets or businesses no longer relevant. Accordingly, CARB proposes to remove that provision from the regulation.

Instead, the amended regulation specifies that manufacturers, distributors, sellers, and retailers of uncertified ozone generating air cleaning devices must be able to demonstrate to CARB that the ozone generators they manufacture and market to Californians are intended for an exempted purpose. This responsibility on the part of the regulated entities was implied in the current regulation, and this amendment adds further clarity.

Purpose of Amendment to Section 94803(b)

The proposed amendment to this section removes the exemption of in-duct air cleaning systems from the regulation. The result of this amendment is that in-duct air cleaning devices will be subject to the regulation and will need to be certified by CARB prior to sale in California.

Rationale of Amendment to Section 94803(b)

CARB adopted the air cleaner regulation in accordance with California AB 2276, in order to limit the amount of ozone produced from indoor air cleaning devices, with the goal of protecting public health. The definition of indoor air cleaning devices subject to the regulation includes energy-using devices intended to clean the air inside an enclosed space, including a room, house or entire building. In-duct air cleaners are an indoor air cleaning device that is installed within heating, cooling or ventilation systems for an enclosed space, including buildings and vehicles.

At the time the regulation was drafted in 2007, in-duct systems were exempted for a few key reasons. The size and distribution of the California in-duct air cleaner market was unknown, there was minimal information on ozone emissions from those systems, and

there was no test method for measuring ozone concentrations from air cleaning devices that are attached to or inserted into central air system ductwork.

The exemption allowed in-duct ozone-producing devices to flourish in the California marketplace. As discussed previously in Section II, the in-duct market has increased in recent years, and the California in-duct market is expected to increase by 32% from 2017 to 2023. Ozone-producing in-duct devices are widely marketed for uses other than those provided in the industrial exemptions, including for cannabis growing operations and in veterinary clinics, dental offices, and casinos. The potential exists for thousands of Californians to unknowingly be exposed to elevated levels of ozone from currently exempted in-duct devices used in a wide-range of retail and commercial outlets.

Additionally, as shown by the results from the CARB-funded research study discussed previously in Section II, the amount of ozone produced by an in-duct device can be much higher than the 0.050 ppm emissions concentration permitted under the regulation. That study[xvi] found that the ozone emission rates from in-duct air cleaning devices ranged from *de minimus* rates to greater than 350 mg/h. Field tests of the in-duct devices found ozone concentrations as high as 194 ppb (0.194 ppm) which exceeds the 0.050 ppm (50 ppb) limit emissions limit when the air cleaner was used according to manufacturer recommendations and under normal field conditions in test homes. The investigators determined that indoor air concentrations of ozone from the use of ozone-emitting in-duct air cleaning devices could increase to unhealthy levels in typical California residential buildings, and even higher concentrations were predicted when devices are used in smaller homes with lower air exchange rates, which are common in California. Also as discussed in Section II, CARB's calculations using the highest ozone emission rate (2200 mg/h) found on manufacturers' websites and typical in-duct airflow rates for California homes showed that ozone concentrations as high as 800 ppb (0.800 ppm) – more than 10 times higher than the regulation limit − can potentially be produced.

For these reasons, CARB is increasingly concerned that Californians are exposed to unhealthy ozone levels from electronic in-duct air cleaning devices. Finally, an accepted test method for measuring ozone emissions from in-duct air cleaners is now available. The Canadian Standards Association (CSA), a recognized testing organization, has established a test standard for measuring ozone emissions from electronic in-duct devices, CSA standard C22.2 no. 187-09 sections 7.5 and 7.6. This test method uses a duct and airflow set-up typical of residential ducting and similar to that used by ASHRAE 52.2 (an HVAC industry test standard) for other in-duct test purposes.

Because of increasing consumer demand for in-duct air cleaners and their known potential for producing elevated levels of ozone in the home, it is necessary to amend the regulation to eliminate the exemption for in-duct air cleaning devices. Requiring CARB certification of in-duct air cleaners meets the legislative mandate of AB 2276 to regulate the amount of ozone produced from indoor air cleaners to protect public health.

Purpose of Amendments to Section 94804(a)
The proposed amendments to this section relate to the certification application process. They include identification of a specific email address that manufacturers can use to submit an application to CARB and a provision that manufacturers who make a medical claim about a device must apply for FDA approval before submitting an application for CARB certification.

Rationale of Amendments to Section 94804(a)
The proposed amendments to section 94804(a) are necessary because the current regulation only provides information on how to submit a hard copy of an application to a mailing address. The provision of a dedicated email account for the purposes of communicating with manufacturers makes implementation of the regulation much more efficient and timely.

Amendments to this section are also necessary because some manufacturers of indoor air cleaning devices make claims about the efficacy of their devices in treating specific health-related conditions, which legally requires approval from FDA as a medical device. Currently, CARB certifies devices which include health claims by the manufacturer and then directs the manufacturer to FDA's Medical Device Program. Because CARB does not routinely follow up on FDA approvals, this practice may result in some companies continuing to make medical claims in their advertising on CARB certified devices, even though they do not seek and receive FDA approval.

Ensuring that certified air cleaners are compliant with FDA regulations is necessary to protect California consumers from health fraud. A survey conducted by the University of California at Berkeley for CARB found that the most common reason Californians purchased air cleaners was to help address allergies, asthma or other health issues.[xvii] Californians who purchase air cleaners to help reduce allergies and asthma could be adversely impacted if the air cleaners are marketed with unproven medical claims.

Purpose of Amendments to Section 94804(b)
The amendments to section 94804(b) relate to the types of indoor air cleaning devices not required to undergo testing for ozone emissions, although these types are still required to be certified for electrical safety. In the current regulation, mechanical air cleaning devices which only use filters to remove air pollutants are exempted from the ozone testing requirement. This section is amended to also include portable air cleaners that use only ultraviolet lamps that meet the definition of being germicidal UV, or UVGI, with or without mechanical filtration. The amendments include the requirement that instructions are included in owner's or operations manuals that inform consumers about safe and proper replacement of UVGI lamps.

Rationale of Amendments to Section 94804(b)
The air cleaner regulation was developed in response to AB 2276, which directed CARB to protect public health by limiting the amount of ozone produced by indoor air cleaning devices. Several electronic air cleaning technologies exist that have the potential to

generate ozone, including ionizers, corona discharge, electrostatic precipitators, plasma, photocatalytic oxidation, and UV light. Because UV light has the potential to create ozone, CARB included air cleaners that have UV lamps in the category of devices requiring testing for ozone emissions prior to certification in the regulation.

The process by which UV light generates ozone is well understood and is the same process for the formation and breakdown of ozone in the stratosphere. Short wavelength UV light (<240 nm) is highly energetic and dissociates oxygen molecules in ambient air into oxygen free-radicals, which then react with other oxygen molecules to form ozone.[xviii] Longer wavelengths of UV light do not have sufficient energy to break the bond between oxygen atoms and do not create significant amounts of ozone. There is sufficient evidence that germicidal UV lamp(s) emitting light above 240 nm wavelength, with a spectral peak of 254 nm, generate very low or no ozone.

UV lamps are made with two different types of glass. Lamps that are manufactured to produce ozone are made with clear fused quartz and are transparent to most wavelengths of UV radiation. In contrast, germicidal UV (UVGI) lamps that do not generate ozone are made with quartz that is coated with a material that blocks emittance of 185 nm UV light, which is the wavelength that produces significant amounts of ozone. When such a coated quartz UV lamp is used in an air cleaning device, there is extremely low or no ozone produced and ozone present in air from other sources is broken down by the longer wavelengths of UV light emitted by the lamp. For these reasons, there is very little risk of exposure to ozone from air cleaning devices with properly installed non-ozone producing UVGI lamps.

Since the adoption of the regulation, thousands of portable mechanical barrier type air cleaning devices have been tested for ozone emissions. CARB is confident that such air cleaning devices properly outfitted with coated UV lamps that emit only germicidal UV light with wavelengths ≥240 nm, with a spectral peak at 254 nm, will not produce measurable levels of ozone, in contrast to the more energetic wavelengths below 240 nm.

UV lamps have a finite usable life and must be replaced periodically. Because it is possible for consumers to replace coated germicidal UV lamps with those that can produce ozone, CARB will require manufacturers to include information in owner's and operations manuals that specifies the particular lamp type or model that be used. In addition, information regarding the hazards associated with installing the wrong lamp type will added. The purpose of this additional information is so that consumers are informed about the importance of using only germicidal UV lamps in the air cleaner. CARB will also require testing laboratories to list the type and wavelength of the UV lamp used in a device in the electrical safety report and provide an exploded parts diagram of the device; hence, CARB will be able to verify the type of lamp used in the air cleaner.

Purpose of Amendment to Section 94804(c)
The acronym used to designate California Air Resources Board is changed from ARB to CARB.

Rationale of Amendment to Section 94804(c)
This amendment is necessary to reflect the current identification of the Board within the California Environmental Protection Agency that is responsible for implementing the regulation. The prior acronym, ARB, has been replaced with CARB for consistency in national and international identification.

Purpose of Amendments to Section 94804(c)(3)
The amendments to Section 94804(c) specify the information and documents that manufacturers must submit to CARB when they apply for certification of an air cleaning device.

Rationale of Amendments to Section 94804(c)(3)
These amendments are necessary to clarify which documents manufacturers need to submit to CARB with their application for air cleaner certification. These include a complete electrical safety test report, the ozone test report (when such testing is required), the owner's or operations manual for the device(s), a copy of the testing laboratory's online directory that lists the device(s) as certified as meeting one of the required standards, and an exploded parts diagram labelled in English. The current regulation provides a partial list of required documents, but manufacturers frequently submit unnecessary documents, which can delay the certification process.

The electrical safety report and ozone test report are completed by the NRTL and provide CARB with necessary information on the operations and performance of the device(s) for which certification is sought. The reports identify parts of the device and their function, and provide the results of all of the testing conducted on the device. CARB refers to the reports to confirm whether the device is a "mechanical only" or an electronic air cleaner under our definitions and to ensure the device was tested to the appropriate safety standard. The reports also confirm that the brand name and model number of the device(s) tested match the brand name and model number submitted for certification and identified in other submitted materials. The regulation states that ozone emissions test results must be submitted, when applicable, but does not clearly state that the full electrical safety test reports and full ozone test reports must be submitted. This amendment clarifies these requirements.

A copy of the owner's, operations or installation manual is required because these describe the functioning of the air cleaner in detail and provide information on maintenance and care of the device. CARB also screens manuals for medical claims and refers manufacturers to FDA's Medical Device program if such claims are made. An amendment requiring the submission of a copy of the online listing directory of the testing laboratory is necessary, as this listing affirms to the public and CARB that the device(s) in the application were successfully tested and are currently certified by the testing organization.

The current regulation also requires manufacturers to submit “device schematics depicting operation”, which has led to manufacturers submitting numerous types of diagrams and schematics, many of which are irrelevant or improperly labelled. An amendment that clearly stipulates that an exploded parts diagram labelled in English must be submitted is necessary because this type of diagram shows all the separate parts of an air cleaner, which are difficult to differentiate unless clearly labelled.

Purpose of Amendments to Sections 94804(c)(4)(E), 94804(c)(4)(F), 94804(e)
The amendments to these sections update the test standards used by the NRTLs conducting ozone emissions tests in sections describing the information needed from the NRTLs. These amendments set forth that revised Section 37 of ANSI/UL Standard 867 is now Section 40 and adds the CSA ozone test for in-duct air cleaning devices, CSA C22.2 no. 187-15 Sections 7.5 and 7.6., as an approved test method for determining and reporting ozone emissions from in-duct air cleaning devices. The amendments also add the entire CSA C22.2 no. 187-15 test standard for electrical safety to section 94804(4)(F) and clarify that an NRTL must notify CARB if a previously certified device tested under any of the standards listed in section 94801(a)(3) subsequently fails testing.

Rationale of Amendments to Sections 94804(c)(4)(E), 94804(c)(4)(F), 94804(e)
These amendments are necessary to update references to the ANSI/UL Standard 867 to the most recent revised edition. They are also necessary to add the CSA test standard to the list of those approved for ozone testing purposes by CARB, as that standard is being incorporated into the regulation as the test method required for electronic in-duct devices. It is also necessary to clarify that an NRTL must notify CARB if a previously certified device fails subsequent testing because that failure may signify that the device has been altered in a way that renders it unsafe for consumers, particularly if functional changes result in increased ozone emissions.

Purpose of Amendments to Section 94804(d)
The amendment to this section specifies that CARB has 30 days to review a completed application.

Rationale of Amendments to Section 94804(d)
The current regulation states that CARB has 30 days to review an application after it is accepted. Some manufacturers have expressed confusion as to the length of the review period because they mistakenly believe that CARB has 30 days to review the application once we acknowledge receipt of the application. The section references the common situation where an application is deemed “incomplete” and this amendment makes clear that a 30-day review period commences once the application is considered “complete” and not when CARB receives the initial application.

Purpose of Amendments to Section 94804(f)
The proposed amendments to this section set forth conditions under which previously certified devices must undergo re-certification.

Rationale of Amendments to Section 94804(f)
Amendments to section 94804(f) are necessary to inform manufacturers and testing laboratories about conditions under which previously certified devices must undergo re-certification by CARB.

CARB certifies indoor air cleaning devices based on the results of approved electrical safety and ozone testing by NRTLs and issues an Executive Order (EO) to the manufacturer of a device that lists the brand name and model number of the certified device(s). If a manufacturer re-brands a previously certified device or sells the device to another company for re-branding, then the device must be re-certified under the new brand name and model number and a new EO number is issued to the company. This new brand name, model number and EO number is then added to the online list of Certified California Air Cleaners for consumers and CARB Enforcement staff to reference.

Testing laboratories already require notification if a manufacturer makes functional changes to an air cleaner that was previously tested, with changes documented in updates to the electrical safety report issued by the NRTL. These amendments require manufacturers to also notify CARB if the certified device is subsequently changed in any way, other than minor cosmetic changes.

If a manufacturer moves a production facility to another location or is contracting with a new production company for manufacture of their brand, the supply chain for components used in previously certified devices may change, which could affect the device's ozone-producing capability. These amendments clarify that manufacturers also need to notify CARB regarding such changes, which may require re-testing and re-certification of the device(s).

Purpose of Amendment to Section 94804(g)
The acronym used to designate California Air Resources Board is changed from ARB to CARB.

Rationale of Amendment to Section 94804(g)
This amendment is necessary to reflect the current identification of the Board within the California Environmental Protection Agency that is responsible for implementing the regulation. The prior acronym, ARB, has been replaced with CARB for consistency in national and international identification.

Purpose of Amendments to Section 94805(b)
Amendments to Section 94804(b) identify electrical safety test methods approved by CARB for the purposes of this regulation, including test method CSA C22.2 no. 187-15

for in-duct air cleaning devices. ANSI/UL electrical safety standards for dual-function devices that include an air cleaning function in addition to its primary function are also added.

Rationale of Amendments to Section 94805(b)

The regulation currently lists approved standards for testing the electrical safety of air cleaning devices, which is required prior to certification. These amendments are necessary to update the list of approved test standards accepted by CARB, with the specific intent of identifying test method CSA C22.2 no. 187-15 for electronic in-duct air cleaning devices and adding test standards for dual-function devices, as defined in section 94801(a)(13).

Expanding public interest in indoor air quality has led to an increase in the types of dual-function devices available to consumers. Because these devices are subject to the regulation, it is necessary to identify appropriate ANSI/UL test methods for determining their electrical safety prior to certification.

The addition of these test methods is necessary to inform the regulated community and NRTLs of the specific tests approved by CARB for the purposes of the regulation.

Purpose of Amendments to Section 94805(c)

The amendments to section 94805(c) identify the ozone emissions test methods approved by CARB for the purpose of certifying air cleaning devices as emitting less than or equal to 0.050 ppm ozone. The amendments also describe specific conditions under which the ozone emissions concentrations must be tested.

Rationale of Amendments to Section 94805(c)

The regulation currently lists ANSI/UL Standard 867, Section 37, as the approved standard for testing ozone emissions concentrations from portable electronic air cleaning devices. Section 37 has been revised and is now Section 40 in the most current version of the test standard, so the regulation must be updated accordingly. This test standard is not appropriate for use in testing ozone emissions from most in-duct electronic devices. Because the proposed amendments require certification of in-duct devices, it is necessary to identify test method CSA C22.2 no. 187-15 Sections 7.5 and 7.6, as the approved method for testing ozone emissions from electronic in-duct air cleaning devices. ANSI/UL Standard 867 is suitable for testing some devices and has been used for a limited number of certified air cleaning devices used for in-duct applications in the past, particularly those devices with a power cord that is plugged into an electrical socket and do not necessarily depend on duct air flow to function. The ANSI/UL 867 Section 40 test is acceptable for certain types of air cleaners used inside ducts if pre-approved by the testing laboratory and by CARB.

ANSI/UL Standard 867, Section 40, requires the removal of filters from a device during testing in order to measure ozone emissions under different conditions. In some cases, ozone emissions from a device will increase after a filter is removed. It is important to test devices under this condition because it is feasible that consumers may remove a

filter. Some manufacturers have claimed that filters in a device are permanent and are not intended to be removed by testing laboratory staff or consumers; however, the laboratory has been able to easily remove some filters that manufacturers said were permanent. The amendments clarify that CARB requires filters to be removed as necessitated by the test procedure unless the device is a permanent filter, as defined in section 94801(a)(31).

Purpose of Amendments to Section 94805(d)

The proposed amendments indicate when Nationally Recognized Testing Laboratories (NRTLs) and laboratories operating under NRTL oversight are permitted to conduct electrical safety testing of indoor air cleaning devices for the purposes of this regulation. Descriptive language about OSHA Supplemental Programs is deleted from the regulation.

Rationale of Amendments to Section 94805(d)

The amendments to section 94805(d) are necessary because OSHA is in process of revising its Supplemental Programs for NRTLs, so modifying language is needed to properly include the NRTL-associated laboratories currently covered by the OSHA Supplemental Programs. The regulation currently identifies a series of OSHA Supplemental Programs that an NRTL may use to test for the CARB approved ANSI/UL Standards. Supplemental Programs refer to various levels of administrative or contractual relationships between NRTLs and other laboratories that operate under NRTLs at varying levels of NRTL oversight and control. OSHA has been revising the Supplemental Programs and those revisions have not been finalized. The proposed amendments delete reference to OSHA's Supplemental Programs, yet add language that is broad enough to encompass OSHA's proposed changes and include laboratories previously covered under the Supplemental Programs specified in the current regulation.

Purpose of Amendments to Section 94805(e)

The proposed amendments to this section update the test methods approved by CARB for measuring ozone emissions from air cleaning devices and further stipulate which laboratories are approved to conduct the required tests. The amendments set forth the criteria that an approved laboratory must meet in order to maintain CARB approval.

Rationale of Amendments to Section 94805(e)

The proposal requires testing of ozone emissions from electronic in-duct air cleaning devices. The amendments to section 94805(e) are necessary to update the ANSI/UL 867 ozone test method to the latest revision, while adding CSA C22.2 no. 187-15 Sections 7.5 and 7.6 for testing of ozone emitted from in-duct devices.

Amendments are also proposed to clarify that, even though NRTLs are approved to perform the required tests, independent testing laboratories that are supervised by an NRTL are also able to perform the tests, as long as the laboratory has passed a CARB audit. Deletion of Supplemental 2 laboratories and addition of the new language is in

response to OSHA's changes to their Supplemental Programs, as described above. The amendments also include more detail about what a CARB audit includes. The regulation currently describes only the technical aspects of the audit, with a focus on test and equipment specifications. This enhanced description of the audit process is necessary to remove vagueness by providing a timeline for approval and clearly indicating that laboratories may need to undergo subsequent audits following an initial approval period of at least one year.

Purpose of Amendments to Section 94806(a)
Amendments to this section remove language indicating time periods during which manufacturers had to meet the labeling requirement in the current regulation.

Rationale of Amendments to Section 94806(a)
Amendments to this section are necessary to remove language that is no longer necessary. At the time the regulation went into effect, manufacturers requested additional time to meet the labeling requirement. For this reason, CARB extended the deadline for meeting the labeling requirement from October 2010 to October 2012.

Purpose of Amendments to Section 94806(b)
The proposed amendments to this section modify the language on the label required to be placed on every certified air cleaner. The label is required to be at least 1 inch by 2 inches in size, easily readable, and state "This air cleaner complies with the federal ozone emissions limit. ARB certified." The proposed label will read "Meets California ozone emissions limit. CARB certified". Amendments are also proposed which will allow smaller labels on certain devices, which still meet other requirements. The amendments also stipulate that labels cannot be placed on the bottom of packaging.

Rationale of Amendments to Section 94806(b)
Amendments to section 94806(b) are necessary to improve the accuracy of the information on the certification label. The purpose of the label is to inform the consumer that the device meets the requirements of the air cleaner regulation, including CARB's ozone emissions limit. The currently required language states that the device is meeting a federal ozone emissions limit. However, there are no federal ozone emission limits for most (non-medical) air cleaners and CARB certified air cleaners are not typically medical devices. The proposed amendment will clarify that the ozone emissions limit is a California regulatory limit, not a federal limit.

It is important that the certification label be placed in a location on device packaging where consumers can easily view the label. Packaging for some air cleaning devices is large and heavy, which can make it difficult to pick up and inspect. For this reason, it is necessary to amend Section 94806(b) to include the provision that the certification label cannot be placed on the bottom of device packaging, where it may be difficult for consumers to view. Some very small air cleaning devices, including dual-function devices, cannot accommodate a label of the specified size and the amendments permit the use of a smaller label in specific cases.

Purpose of Amendment to Section 94806(c)
The acronym used to designate California Air Resources Board is changed from ARB to CARB.

Rationale of Amendment to Section 94806(c)
This amendment is necessary to reflect the current identification of the Board within the California Environmental Protection Agency that is responsible for implementing the regulation. The prior acronym, ARB, has been replaced with CARB for consistency in national and international identification.

Purpose of Amendments to Section 94806(d)
Amendments to section 94806(d) set forth additional conditions under which required certification or listing marks must be displayed on certified air cleaning devices. Proposed amendments include adding the approved CSA test standard for in-duct devices to the requirement that all certified indoor air cleaning devices display the certification or listing mark consistent with the appropriate NRTL prior to sale in California, unless the device meets the criteria for exemption from the regulation. The proposed amendments also set forth that portable air cleaning devices using only UVGI lamp(s), with or without mechanical filtration, are required to display the ANSI/UL Standard 507 certification or listing mark and dual-function devices must display the mark for the appropriate electrical safety test for its primary function.

Rationale for Amendments to Section 94806(d)
Amendments to section 94806(d) are necessary to include in-duct air cleaners in the requirement that certified devices display the appropriate safety certification or listing mark. These marks convey to the consumer that devices have been adequately tested according to the requirements of the NRTL safety certification organization.

Previously, CARB required that portable air cleaning devices using only UVGI lamp(s) undergo testing for ozone emissions. Because this proposal eliminates that requirement as long as the UVGI lamp(s) meet the definition set forth in section 94801(a)(38), the amendments to this section stipulate that such devices will henceforth only be required to undergo electrical safety testing to the UL 507 Standard, which will then be displayed on the certification or listing mark placed on the device.

The proposed amendments also address the proliferation of dual-function devices that include an air cleaning component. Numerous additional electrical safety tests are being proposed for addition to section 94801 of the amended regulation which designate specific ANSI/UL tests for a range of devices. The amendments in this section are necessary to set forth that dual-function devices shall display the mark for the appropriate electrical safety test, as indicated by its primary function.

Purpose of Amendment to Section 94806(e)
This amendment requires that sellers of uncertified air cleaning devices that are not exempted from certification prominently display a notification that the product cannot be shipped to California on advertisements and webpages. This notification must be displayed prior to consumers entering their purchase information.

Rationale for Amendment to Section 94806(e)
The regulation includes a provision that advertisements which market uncertified air cleaners "for non industrial use", including websites and catalogs, must display an advisory in a prominent place that informs consumers that the device cannot be shipped to California. This amendment is necessary because it clarifies that such air cleaners are those that are not exempt from certification. If an uncertified indoor air cleaning device is exempted under Section 94803, sellers are not required to display the advisory.

Some online retailers do not comply with this requirement and include this advisory after a consumer has entered their contact and credit card information, or not at all. This amendment is necessary to ensure that consumers are provided more timely notice that the device cannot be shipped to California. It is not appropriate for consumers to have to input financial information before finding that the air cleaner is not actually available for sale to them.

Purpose of Amendments to Section 94807
The proposed amendments to this section relate to the requirements for manufacturers of *uncertified* air cleaning devices to notify their distributors, retailers and sellers who sell in California about the air cleaning regulation and submit documentation of that notification to CARB. The amendments eliminate the requirement that manufacturers of *certified* air cleaning devices comply with notification requirement. The amendments also provide additional information about how to submit documentation to CARB.

Rationale for Amendments to Section 94807
CARB previously included the notification requirement in the regulation because it was an important vehicle for informing stakeholders about the requirements of the regulation that directly impacts distributors, retailers and sellers of air cleaning devices. At this point, hundreds of air cleaner manufacturers have had devices certified by CARB and most retailers and sellers are aware of the regulation and sell only compliant devices in California.

In meetings with stakeholders during development of amendments to the regulation, requests were made that CARB eliminate the notification requirement for manufacturers of CARB certified air cleaning devices because of the administrative burden on manufacturers. Because the notification requirement has largely served its purpose for informing distributors and retailers of certified devices, CARB agreed to eliminate the notification requirement for manufacturers of CARB certified devices.

Manufacturers of *uncertified* devices sold in California are still subject to the notification requirement and are required to comply with it within 12 months of the effective date of the amendment. The sale of uncertified ozone-producing devices in the California marketplace is only permitted for exempted purposes. It is critical that such manufacturers notify their distributors, retailers and sellers about the regulation and maintain contact information for these entities because of the risk of human exposure to ozone from the use of uncertified devices. Distributors and sellers of such devices need to be aware of the limitations associated with the use of uncertified devices. Manufacturers of uncertified air cleaners sold in California are responsible for providing notification documentation to CARB on an annual basis and must update those records for as long as the device is marketed. Manufacturers must maintain notification records for at least five years in case an enforcement action in undertaken at a future date.

Purpose of Amendments to Section 94808

Amendments to this section change the length of time that manufacturers, distributors, retailers, sellers and test laboratories are required to maintain certain records related to production, sales and testing. The regulation currently stipulates that these must be maintained for at least three years. The amendments change that requirement so that records must be maintained for as long as the device(s) are sold or in commerce. The acronym for California Air Resources Board is changed from ARB to CARB.

Rationale of Amendments to Section 94808

The regulation currently requires manufacturers, distributors, retailers, sellers and test laboratories to maintain records pertaining to production, quality control, sales, or testing for only three years. The proposed amendments to this section are necessary because enforcement actions are often conducted retroactively and it is important that CARB have access to records from the entire time period that a device was manufactured or sold within California. Currently, if a problem arises with a device after the three year time period, manufacturers may not have accurate records on that device, which could limit CARB's ability to enforce the regulation.

Amendments to this section are also necessary to reflect the current identification of the Board within California Environmental Protection Agency that is responsible for implementing the regulation. The prior acronym, ARB, has been replaced with CARB for consistency in national and international identification.

Purpose of Amendments to Section 94809

Amendments to this section clarify that CARB may withhold certification or certification renewal of an air cleaning device under certain circumstances.

Rationale of Amendments to Section 94809

This amendment is necessary to clearly communicate to regulated entities that CARB may deny air cleaner certification or re-certification where these actions are necessary

to protect the public health from ozone emissions from indoor air cleaning devices, in accordance with the mandates of AB 2776.

IV. BENEFITS ANTICIPATED FROM THE REGULATORY ACTION

AB 2276 directed CARB to adopt regulations to limit the amount of ozone emitted from indoor air cleaning devices to protect public health. The requirement that portable electronic air cleaning devices undergo testing for ozone emissions has reduced the potential for exposure to ozone by the California public because higher emitting air cleaners are excluded from the California marketplace. Since 2008, nearly 2,500 air cleaning devices have been certified by CARB as having very low or no ozone emissions. The TechSci Research report on the California air cleaner market shows 468,000 portable air cleaners bought by California consumers in 2017. The average household in California includes 2.96 persons[xix], illustrating that the air cleaner regulation benefited nearly 1.4 million Californians in 2017 alone by guaranteeing that the air cleaners in their home did not expose them to harmful levels of ozone.

A necessary exemption in the regulation currently permits the sale of electronic in-duct air cleaning devices capable of generating ozone. The TechSci Research market report states that over 100,000 electronic in-duct devices were bought by Californians in 2017, with a projected increase of 30% by 2023. Ending the exemption for in-duct devices and requiring their ozone testing and certification will eliminate in-duct devices capable of emitting unhealthy levels of ozone from the California marketplace. This change in the regulation meets the legislative requirement to protect public health by restricting ozone emissions from indoor air cleaning devices.

Potential Health Benefits Due to Updates to Industrial Use Exemptions

Industrial use exemptions were granted for ozone-producing air cleaning devices used in specific commercial and industrial applications. The types of ozone-producing devices commonly used for an exempted purpose are capable of emitting up to 20,000 mg/h ozone, potentially resulting in unhealthy air concentrations. At the time the regulation was drafted, some of the exempted uses were provided language that limited the use of ozone to times when people were not present in the space to be treated. Amendments to the regulation extend the language restricting use around people to all exempted uses, with the goal of reducing the potential for health effects from exposure to ozone.

The California Legislature found, in Section 1. Article 8. of the enabling legislation, that exposure to ozone results in significant numbers of hospitalizations due to respiratory and cardiac illnesses and significant numbers of premature deaths. Restricting the use of ozone to times when no people are present is intended to benefit workers in those industries where ozone is intentionally applied, as well as bystanders and members of the public. This could lead to improved public health overall, and a reduction in medical-related expenses associated with exposure to ozone.

In addition, several of the commercial sectors where uncertified ozone-producing devices are permitted for use typically employ people of color and are low-wage jobs, such as in agricultural processing, hotel maintenance, property remediation, and motor vehicle detailing. For example, ozone-producing air cleaners are used in fruit and vegetable sorting and packing facilities. The California workers typically employed as an agricultural grader and sorter in these facilities, as of May 2018, were paid an annual mean wage of $24,680 - $26,470, as reported by the U.S. Bureau of Labor Statistics.[xx] These commercial operations are often located in agricultural regions, such as Merced, which has a large Hispanic or Latino community, comprising over 59% of the local population. Defining the industrial use exemption as applicable only if the ozone-generating air cleaners are used when people are not present in the fruit and vegetable sorting and packing rooms could lead to health benefits for workers in this sector, who are often disproportionately impacted by environmental chemical exposures and other socioeconomic stressors.

Potential Health Benefits from Removal of In-duct Air Cleaner Exemption

Based on the TechSci report, the number of households with electronic in-duct air cleaners is estimated to be 103,200 and 146,620 in 2017 and 2023, respectively. However, it is not known what proportion of these devices potentially exceed the regulatory standard of 0.050 ppm (50 ppb) due to the current lack of testing for these devices. As discussed previously, these devices have the potential to produce 822 ppb (0.882 ppm) and 548 ppb (0.548 ppm) for either a 2 ton or 3 ton system, respectively. Therefore, an estimate of the number of Californians potentially exposed to ozone levels above the standard was calculated based on an estimate of the average California household size of 2.9 individuals per household and summarized in Table 2:

Table 2. Potential Ozone Exposure Reduction Resulting from Regulation

Year	# of California households with Electronic In-duct Air Cleaners*	Ozone emitted from residential in-duct air cleaners (mg/h)**	Max indoor air ozone concentrations (ppb)***	Number of Californians Potentially Exposed***
2017	103,200	0 – 2,200	882	299,280
2023	146,626	0 – 2,200	882	425,215

* TechSci Report
**Morrison report found some emitted none, while online retailer advertises residential unit emitting 2,200 mg/h
*** See Figure 4 – page 15
****Number of Californian households x average household size (2.9; 2010 census)

Given that most Californians spend approximately 90% of their time indoors, this regulation is important to protect close to half a million residents from adverse health impacts from elevated ozone concentrations in indoor air. As noted earlier, the concentrations could be up to 10 times the state and federal standards for outdoor air.

V. AIR QUALITY

The air quality benefit associated with the proposed amendments is the reduction of indoor ozone concentrations in spaces where currently exempted in-duct air cleaning devices are used. In-duct ozone generators currently available to California consumers typically emit ozone from 10-1100 mg/h; however, ozone generators used for commercial purposes commonly produce ozone in the range of 2 – 10 g/h and some industrial devices generate up to 5 kg/h. The TechSci Research report on the California air cleaner market estimated that 103,200 electronic in-duct air cleaners were sold in California in 2017. The concentration of ozone present in indoor air resulting from the use of ozone-producing in-duct air cleaners would vary depending on how long they are run, the size of the spaces treated, the rate of ozone production, the air flow, and other factors. In a study funded by CARB, the investigators found that intentional ozone-generating in-duct air cleaners could produce room levels of ozone well above 0.050 ppm under various conditions, resulting in a decrease in indoor air quality.

VI. ENVIRONMENTAL ANALYSIS

Introduction

This chapter provides the basis for CARB's determination that the proposed action is exempt from the requirements of the California Environmental Quality Act (CEQA). A brief explanation of this determination is provided in section B below. CARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of CEQA (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. CARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Staff Report prepared for a proposed action to comply with CEQA (17 CCR 60000-60008). If the action is finalized, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources Agency and the State Clearinghouse for public inspection

Analysis

CARB has determined that the proposed action is exempt from CEQA under the general rule or "common sense" exemption (14 CCR 15061(b)(3)). CEQA Guidelines state "the activity is covered by the general rule that CEQA applies only to projects which have the

potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA." The proposal is also categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment. AB 2276 directed CARB to adopt regulations to protect public health from ozone emitted by indoor air cleaning devices. The proposed actions to amend the air cleaner regulation aim to strengthen and streamline the regulation with the overall goal of further reducing the potential for Californians to be exposed to unhealthy levels of ozone emitted from in-duct air cleaning devices or when ozone is applied for an exempted industrial use. Based on CARB's review, it can be seen with certainty that there is no possibility that the proposed action may result in a significant adverse impact on the environment. Further, the proposed action is designed to protect the environment, and CARB found no substantial evidence indicating the proposal could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption apply (14 CCR 15300.2). Therefore, this activity is exempt from CEQA.

VII. ENVIRONMENTAL JUSTICE

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Government Code, section 65040.12, subdivision (c)). CARB is committed to making environmental justice an integral part of its activities. The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into CARB's programs consistent with the directives of State law (CARB 2001). These policies apply to all communities in California, but recognize that environmental justice issues have been raised more in the context of low-income and minority communities.

Environmental justice-related impacts from the current air cleaner regulation may occur due to the lack of protections for people engaged in activities for which the use of ozone-producing devices are exempted. These include jobs in agricultural processing plants, in the hotel industry, in remediation or damage restoration companies, or in motor vehicle reconditioning. These are generally lower-income occupations that may disproportionately employ people of color, who may also experience other socioeconomic pressures and environmental conditions that increase their overall risk of exposure to pollution. The cumulative impact of these factors could increase the possibility that exposure to ozone from air cleaning devices may lead to adverse health effects, including asthma and other respiratory illnesses. By clarifying that exemptions for industrial uses only apply if the exempt device is used when people are not present, CARB is clearly indicating that ozone-generating devices exempted for industrial uses should not be used around people under any circumstances.

As well, the label required to be placed on an ozone generator must state that it can only be used in unoccupied spaces and include a graphic that illustrates this provision,

which is intended to communicate to people who do not read English the need to avoid exposure to ozone from the device.

VIII. ECONOMICS ASSESSMENT ANALYSIS

Estimated cost of the amendments over the lifetime of the regulation

A review of the Freedonia and TechSci Research consumer air cleaner market reports was completed, in addition to comprehensive internet research by CARB staff. From these activities, staff identified 42 manufacturers which market approximately 160 different in-duct electronic air cleaning devices in California that would be affected by the ozone testing requirement in the proposed amendments. A comparison of the cost of these air cleaning devices resulted in an estimated cost average of $600. The TechSci Research report projects unit sales of 122,050 for these 160 models in California in 2020 when the proposed amendments are expected to be implemented, implying an average unit sales of 763 (i.e. 122,050/160) air cleaners sold per model type. The report also forecasts a 6 percent increase in the number of electronic in-duct air cleaners sold in California between 2017 and 2027. This will result in an increase in the number of in-duct air cleaner models to 170 (i.e., 166 x 1.06) for which an application will be submitted within the first 2 years of implementation of the proposed amendments. The estimated breakdown of number of new models certified is projected to be 80 for the first year (2020) and 90 for the second year (2021). From 2022, all new applications for certification are expected to be for models that result from innovations in air cleaning technology and new companies entering the California marketplace. As shown in Table 3, the total statewide costs from the proposed amendments are $1,890,000 over the 10-year life of the regulation. This cost reflects the lifetime increase in consumer prices of electronic in-duct air cleaning devices related to the requirements of the proposed amendments.

Table 3. Estimated Economic Impact of Amendments to Air Cleaner Regulation on California Consumers

Year	# of applications for new models*	Total # of models	Testing cost per device ($)	Total cost manufacturer ($)	Cost to consumer ($)**	# units sold in California	Per unit cost inc***	Avg. price ($)	% inc in per unit cost
2020	80	80	5,000	400,000	560,000	122,050	4.59	605	<1
2021	90	170	5,000	450,000	630,000	129,200	4.88	616	<1
2022	10	180	5,000	50,000	70,000	136,800	0.51	623	<1
2023	11	191	5,000	55,000	77,000	146,620	0.53	630	<1
2024	11	202	5,000	55,000	77,000	154,830	0.50	637	<1
2035	12	214	5,000	60,000	84,000	163,500	0.51	644	<1
2026	13	227	5,000	65,000	91,000	172,656	0.53	651	<1
2027	14	241	5,000	70,000	98,000	182,324	0.54	658	<1
2028	14	255	5,000	70,000	98,000	192,534	0.51	665	<1
2029	15	270	5,000	75,000	105,000	203,315	0.52	672	<1
Total	**270**			**1,350,000**	**1,890,000**				

*The number of manufacturers was derived through analyses conducted by industry market research firms Freedonia Group and TechSci Research. CARB staff also conducted a comprehensive internet search using trade association information on U.S. air cleaner manufacturers, identifying approximately 160 different models of electronic in-duct air cleaning devices that would be subject to the one-time ozone test requirement. It is assumed that manufacturers will submit applications for certification of these different models during the first 2 years that in-duct devices are required to undergo ozone testing, as occurred with portable devices during the initial implementation of the air cleaner regulation in 2008.

**The total cost to consumers was estimated by multiplying the total cost to manufacturers by 1.4, reflecting 140% of costs associated with ozone testing being passed on to consumers. A 40% mark-up in cost is considered the high end of normal when evaluating a three-tier distribution model.[1]

***The cost per unit increase is estimated by dividing the total costs to consumers by the number of devices sold in California. This is an over-estimate because it assumes California consumers will bear

[1] Thomas H. Gray (2012) Reasonable Markup to Distributors. Accessed on July 23, 2019 at: http://www.tom-gray.com/2012/04/26/reasonable-markup-to-distributors/

the full brunt of increased costs, when it will actually be distributed across the total U.S. electronic in-duct air cleaning device market. The cost increase will significantly decrease after year 2 of implementation because the number of new models tested for certification purposes significantly decreases.

Estimated cost savings for manufacturers over the lifetime of the regulation

Elimination of the notification requirement will benefit all manufacturers of certified portable and in-duct air cleaning devices because they will no longer need to dedicate staff time to meeting its provisions. CARB has certified portable devices from over 330 manufacturers which have been subject to the notification requirement. Eliminating the notification requirement could benefit manufacturers of currently certified devices about $57,000 annually in wages and benefits for staff (i.e., 330 manufacturers x $172 reporting cost savings). [xxi]

Manufacturers of portable air cleaners that use a UV lamp emitting light ≥ 240 nm in wavelength, with or without mechanical filtration, will experience cost savings because they are no longer required to test their devices for ozone emissions. A review of certification applications received from 2014 – 2018 identified an estimated 35 applications for air cleaners that meet this definition, for an average of 7 applications per year. The ozone emissions test costs an estimated $5,000 per test, resulting in an annual cost savings by manufacturers of an estimated $35,000 (i.e. 7 applications x $5,000 test cost per manufacturer applicant).

Overall, the elimination of the notification requirement for manufacturers of certified devices and the exemption from ozone testing for manufacturers of portable air cleaners using only specific UV lamps, with or without mechanical filtration, will result in an annual cost savings of $92,000 (i.e., $57,000 reporting cost savings + $35,000 testing cost savings), and the lifetime cost savings of $920,000 (i.e., $92,000 annual cost savings x 10 years).

The creation or elimination of jobs within the State of California

The proposed amendments to eliminate the exemption for in-duct air cleaners will result in an increase in the number of indoor air cleaning devices required to undergo testing by an NRTL prior to certification. There is no CARB-approved NRTL in California, so no California jobs will be impacted by this testing requirement.

It is possible that some in-duct air cleaning devices currently available for sale in California will not meet CARB certification requirements and will, therefore, be unavailable for sale in California. A total of 777 HVAC contractors and air cleaner suppliers were identified via a search of the industrial online marketplace Thomasnet.[xxii] Even though the ozone test requirement may result in some in-duct air cleaners not receiving CARB certification, CARB does not expect HVAC suppliers or contractors to be adversely impacted by the proposed amendments because the total in-duct air cleaner market includes many alternative products that are not subject to the proposed amendments, such as filtration-based in-duct air cleaners, as well as electronic in-duct

air cleaners that are known to emit very low or no ozone and will continue to be available to HVAC installers and consumers.

In conclusion, it is not anticipated that the elimination of high ozone-emitting in-duct air cleaners from the California marketplace will impact jobs within the State of California.

The creation of new business or the elimination of existing businesses within the State of California.

A review of the Freedonia and TechSci Research consumer air cleaner market reports was completed, in addition to comprehensive internet research by CARB staff. Staff identified 42 manufacturers marketing approximately 160 different in-duct electronic air cleaning devices in California that would be affected by the proposed amendments. Forty of the affected manufacturers are located outside California and are considered large businesses. Of the two California-based manufacturers, one was identified as a small business because it is independently owned and operated and has 100 or fewer employees

The businesses most likely to be impacted are HVAC supply companies that sell ozone-producing in-duct air cleaning devices that do not meet CARB certification requirements, and will not be available for sale to California consumers in the future. Due to the availability of devices that are anticipated to meet CARB testing and certification requirements, CARB does not expect the creation or elimination of any existing businesses within the State of California as a result of these amendments.

The expansion of businesses currently doing business within the State of California

CARB does not anticipate the expansion of any businesses currently doing business within the State of California as a result of these amendments.

Significant Statewide Adverse Economic Impact Directly Affecting Business, Including Ability to Compete

These amendments are not anticipated to have a significant adverse economic impact on California businesses as a wide range of indoor air cleaning devices will continue to be available for sale and use. The primary economic impact of the amendments is the expanded testing requirement for in-duct air cleaners, which will be the responsibility of the manufacturer of the device. The end-user of indoor air cleaners, such as any of the commercial or industrial operations identified in the exempted use category, will not incur additional costs associated with the amendments.

IX. EVALUATION OF REGULATORY ALTERNATIVES

Government Code section 11346.2, subdivision (b)(4) requires CARB to consider and evaluate reasonable alternatives to the proposed regulatory action and provide reasons for rejecting those alternatives. This section discusses alternatives evaluated and provides reasons why these alternatives were not included in the proposal. As explained below, no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner than ensures full compliance with the authorizing law. The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business.

Alternative 1: No action

This alternative would not increase costs relative to the current regulation, and would not result in the 10-year cost increase of $1.89 million under the proposed amendments. However, this alternative would increase the potential for exposure to unhealthy levels of ozone emitted from electronic in-duct air cleaners, with increased risk of adverse public health impacts. In addition, this alternative does not streamline the current regulation to provide the lifetime cost savings of $920,000 to manufacturers of certified air cleaning devices by eliminating the notification requirement. For these reasons, staff rejected this alternative.

Alternative 2: Exempt portable mechanical air cleaners from the regulation

Alternative 2 would expand the exemptions of the proposed amendments to include all portable mechanical air cleaners. This alternative was proposed by an air cleaner industry trade association in order to reduce the regulatory burden on portable mechanical air cleaner manufacturers. CARB staff evaluated this alternative from the perspective of manufacturers, consumers, and regulators. Focusing on sales volume only, as outlined in the TechSci Research report, mechanical air cleaners were 31 percent of the California portable air cleaner market in 2017, yet currently account for 72 percent of the applications submitted for CARB certification in 2019, to date. This indicates that the portable mechanical air cleaner market is expanding, with new models entering the market and requiring certification. Over the last decade, an average of 34 applications per year were submitted for portable mechanical air cleaners. Ozone testing is not required for these types of air cleaners. Therefore, exempting portable mechanical air cleaners from the regulation could only result in an estimated annual cost savings of $5,800 (i.e., 34 applications x 3 hours x $57.27 hourly wage and benefit rate) for these manufacturers by not having to complete the application process, with a lifetime cost savings of $58,000. This cost savings is in addition to the benefit associated with the proposed amendments, leading to total cost savings associated with this alternative of $978,000 (i.e., $920,000 + $58,000).

The cost savings would benefit portable mechanical air cleaner manufacturers and may increase the market share for their devices if they pass on part of their cost savings to the consumer. However, lack of “ARB Certified” labelling is likely to confuse consumers, retailers, and enforcers, who would not be able to reference CARB’s

Certified Air Cleaner List to confirm that a portable air cleaner was certified. This alternative could also result in a potential increase in purchases of unlabeled, uncertified air cleaner devices that emit harmful ozone. Efforts by CARB staff to monitor compliance by manufacturers would also be more difficult if there were no longer uniformity in the labeling across the market sector. This would, in turn, reduce enforcement effectiveness and would likely to increase CARB's enforcement costs. Enforcement of the regulation would also be more difficult for online retailers who require an Executive Order from CARB prior to allowing online sales; therefore screening air cleaners to ensure compliance with the regulation. For these reasons, this alternative was rejected.

Small Business Alternative

The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business.

Performance Standards in Place of Prescriptive Standards

Government Code section 11346.2(b)(4)(A) requires that when CARB proposes a regulation that would mandate the use of specific technologies or equipment, or prescribe specific actions or procedures, it must consider performance standards as an alternative. The air cleaner regulation sets forth a permissible ozone emissions limit of ≤ 0.050 ppm ozone, which is a performance standard that manufacturers can meet using any applicable technology.

Health and Safety Code section 57005, Major Regulation Alternatives

The proposed regulation will not result in a total economic impact on state businesses of more than $10 million in one or more years of implementation. Therefore, this proposal is not a major regulation as defined by Health and Safety Code section 57005.

X. JUSTIFICATION FOR ADOPTION OF REGULATIONS DIFFERENT FROM FEDERAL REGULATIONS CONTAINED IN THE CODE OF FEDERAL REGULATIONS

There are no comparable Federal regulations limiting the amount of ozone emitted from indoor air cleaning devices. There is a Federal Food and Drug Administration (FDA) regulation set in 1972 that limits the allowable amount of ozone emitted from medical devices to 0.05 ppm.[xxiii] Most indoor air cleaners do not meet the criteria for designation as a medical device and are not classified as medical devices, but a few have been certified by FDA as medical devices. The proposed amendments are necessary as required by AB 2276 to protect public health from ozone emitted by indoor air cleaning devices.

XI. PUBLIC PROCESS FOR DEVELOPMENT OF THE PROPOSED ACTION (PRE-REGULATORY INFORMATION)

Consistent with Government Code sections 11346, subdivision (b), and 11346.45, subdivision (a), and with the Board's long-standing practice, CARB staff held public workshops and meetings with interested persons during the development of the proposed regulation. These informal pre-rulemaking discussions provided staff with useful information that was considered during development of the amendments that are now being proposed for formal public comment.

Staff held two public meetings, on March 8, 2019 and June 3, 2019, during which CARB conducted a presentation and responded to questions from attendees. During the initial workshop, CARB staff presented information about the implementation of the air cleaner regulation to date and specific areas of the regulation that were being considered for amendments. The second workshop presented proposed amendments and a brief explanation of the necessity for each. Both public meetings were webcast and comments/questions were accepted in person, via email during the workshop, and by phone and email afterwards. During the past 5 months, numerous teleconference and in-person meetings with air cleaner manufacturers and retailers have been held. Staff also held meetings with representatives from trade organizations representing air cleaner manufacturers and from NRTLs. Dedicated websites are available with the public materials from these workshops and information has been distributed to list serves hosting over 9,000 registrants. The workshop announcements and agendas can be found at this website: https://ww2.arb.ca.gov/our-work/programs/air-cleaners-ozone-products/air-cleaner-regulation-meetings-workshops

XII. REFERENCES

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