BAY AREA AIR QUALITY MANAGEMENT DISTRICT

ADVISORY COUNCIL
PUBLIC HEALTH COMMITTEE

COMMITTEE MEMBERS

VICTOR TORREANO, CHAIRPERSON
CASSANDRA ADAMS
ELINOR BLAKE
JEFFREY BRAMLETT
LINDA WEINER

MONDAY
JUNE 13, 2005
1:30 P.M.

CONFERENCE ROOM 716

AGENDA

1. **Call to Order – Roll Call**

2. **Public Comment Period**

   Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3. *The public has the opportunity to speak on any agenda item. All agendas for Advisory Council Committee meetings are posted at the District, 939 Ellis Street, San Francisco, at least 72 hours before a meeting. At the beginning of the meeting, an opportunity is also provided for the public to speak on any subject within the Committee's purview. Speakers are limited to five minutes each.*

3. **Approval of Minutes of April 18, 2005**

4. **Discussion of Recommendations Regarding the District's Role in Indoor Air Quality Management**

   The Committee will review information on indoor air quality received in presentations from the staff of the California Department of Health Services, Environmental Protection Agency Region IX, and the California Air Resources Board, and discuss and possibly propose recommendations on the District's role in indoor air quality management.

5. Committee Member Comments/Other Business

Committee or staff members on their own initiative, or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on their own activities, provide a reference to staff about factual information, request staff to report back at a subsequent meeting concerning an matter or take action to direct staff to place a matter of business on a future agenda.

6. Time and Place of Next Meeting

1:30 p.m., Monday, August 15, 2005, 939 Ellis Street, San Francisco, California 94109.

7. Adjournment

VT:jc

CONTACT CLERK OF THE BOARDS - 939 ELLIS STREET SF, CA 94109

(415) 749-4965
FAX: (415) 928-8560
BAAQMD homepage:
www.baaqmd.gov

- To submit written comments on an agenda item in advance of the meeting.
- To request, in advance of the meeting, to be placed on the list to testify on an agenda item.
- To request special accommodations for those persons with disabilities notification to the Clerk's Office should be given in a timely manner so that arrangements can be made accordingly.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET, SAN FRANCISCO, CALIFORNIA 94109
(415) 771-6000

CLERK OF THE BOARDS OFFICE:
MONTHLY CALENDAR OF DISTRICT MEETINGS

MAY 2005

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Advisory Council Executive Committee	**Wednesday**	**11**	**9:00 a.m.**	**Room 716**
Advisory Council Regular Meeting	**Wednesday**	**11**	**10:00 a.m.**	**Board Room**
Board of Directors Mobile Source Committee *(Meets 2nd Thursday each Month)* **- CANCELLED**	**Thursday**	**12**	**9:30 a.m.**	**4th Floor Conf. Room**
Board of Directors Public Outreach Committee *(Meets 4th Monday every other month)*	**Monday**	**16**	**9:30 a.m.**	**4th Floor Conf. Room**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**18**	**9:45 a.m.**	**Board Room**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**18**	**Immediately Following Board Meeting**	**Board Room**
Board of Directors Executive Committee *(Meets 5th Wednesday of Months that have 5 Wednesdays))*	**Friday**	**20**	**9:30 a.m.**	**4th Floor Conf. Room**
Board of Directors Stationary Source Committee *(Meets 4th Monday every other Month)*	**Monday**	**23**	**9:30 a.m.**	**Board Room**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**25**	**9:45 a.m.**	**4th Floor Conf. Room**
Joint Policy Committee	**Friday**	**27**	**10:00 a.m. – Noon**	**BAAQMD - Board Room 939 Ellis Street San Francisco, CA 94109**

JUNE 2005

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**1**	**9:45a.m.**	**Board Room**
Board of Directors Legislative Committee *(At the Call of the Chair)*	**Monday**	**6**	**9:30 a.m.**	**4th Floor Conf. Room**
Advisory Council Joint Air Quality Planning & Technical Committee	**Wednesday**	**8**	**9:30 a.m.**	**Board Room**
Board of Directors Mobile Source Committee *(Meets 2nd Thursday of each Month)*	**Thursday**	**9**	**9:30 a.m.**	**4th Floor Conf. Room**

June 2005 Calendar continued on next page

JUNE 2005

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Advisory Council Public Health Committee	**Monday**	**13**	**1:30 p.m.**	**Room 716**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**15**	**9:45 a.m.**	**Board Room**
Joint Policy Committee	**Friday**	**17**	**10:00 a.m. – Noon**	**MetroCenter Auditorium 101 8th Street Oakland, CA 94607**
Advisory Council Public Health Committee - RESCHEDULED TO 6/13/05	**Monday**	**20**	**1:30 p.m.**	**Room 716**
Air District's 50th Anniversary Symposium	**Monday**	**20**	**11:00 a.m. – 4:00 pm.**	**Yerba Buena Center For the Arts San Francisco, CA**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**22**	**9:45 a.m.**	**4th Floor Conf. Room**
Board of Directors Executive Committee *(Meets 5th Wednesday of Months that have 5 Wednesdays))*	**Wednesday**	**29**	**9:30**	**4th Floor Conf. Room**

JULY 2005

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**6**	**9:45 a.m.**	**Board Room**
Board of Directors Public Outreach Committee *(Meets 4th Monday every other month)*	**Monday**	**11**	**9:30 a.m.**	**4th Floor Conf. Room**
Advisory Council Executive Committee	**Wednesday**	**13**	**9:00 a.m.**	**Room 716**
Advisory Council Regular Meeting	**Wednesday**	**13**	**10:00 a.m.**	**Board Room**
Board of Directors Mobile Source Committee *(Meets 2nd Thursday each Month)*	**Thursday**	**14**	**9:30 a.m.**	**4th Floor Conf. Room**
Joint Policy Committee	**Friday**	**15**	**10:00 a.m. – Noon**	**MetroCenter Auditorium 101 8th Street Oakland, CA 94607**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**20**	**9:45 a.m.**	**Board Room**
Board of Directors Stationary Source Committee *(Meets 4th Monday every other Month)*	**Monday**	**25**	**9:30 a.m.**	**Board Room**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**27**	**9:45 a.m.**	**4th Floor Conf. Room**

MR:hl
5/11/05 (3:15) p.m.
P/Library/Calendar/Moncal

AGENDA NO. 3

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

DRAFT MINUTES

Advisory Council Public Health Committee Meeting
1:30 p.m., Tuesday, April 18, 2005

1. **Call to Order – Roll Call.** Chairperson Torreano called the meeting to order at 1:33 p.m. Present: Victor Torreano, Chair, Cassandra Adams, Elinor Blake, Jeffrey Bramlett, Linda Weiner.

2. **Public Comment Period.** There were no public comments.

3. **Approval of Minutes of February 15, 2005.** Ms. Adams moved approval of the minutes; seconded by Mr. Bramlett; carried unanimously.

4. **Indoor Air Quality: A California Air Resources Board (CARB) Perspective.** Peggy Jenkins, Manager, CARB Indoor Exposure Assessment Section Research Division, stated that CARB staff recently made a presentation on indoor air quality (IAQ) to the Board of Directors of CARB. The report noted that there are numerous sources of indoor air pollutants, including air cleaners such as ozone generators, biological contaminants such as mold, building materials and furnishings which contain formaldehyde, combustion appliances such as gas stoves, environmental tobacco smoke, soil that contains radon and water with chlorinated solvents, architectural coatings with volatile organic compounds (VOCs), consumer products, household and office equipment, and pesticides.

   California adults and teenagers spend 87% of their time indoors, while young children spend a bit more time outdoors than adults. Faculty at the University of California at Berkeley have calculated that emissions from indoor sources emitted in a home or a school building have a thousand times greater likelihood of being inhaled than emissions in ambient air from industrial sources.

   The health effects associated with indoor air pollution include asthma, allergies, cancer, premature death, increased heart and respiratory disease, and irritants and other effects. A report in the year 2000 on asthma and exposures confirmed known indoor triggers of asthma, and found new triggers such as high levels of nitrous oxide and also identified possible triggers in formaldehyde and fragrances. More recent studies have also focused on VOCs as possible asthma triggers.

   The CARB Indoor Exposure Assessment Section Research Division has produced a preliminary estimate on the potential cancer burden from air toxics in California annually by source: 375 deaths annually from environmental tobacco smoke, 250 from indoor toxic air contaminant, and 375 from outdoor toxic air contaminant sources such as diesel exhaust particles and other sources.

   While outdoor particulate matter (PM) is associated with severe respiratory and cardiovascular health effects, a corresponding amount of research has not been conducted on the causal relationship of indoor emissions to health effects. Nevertheless, the general perspective is that indoor sources do contribute to respiratory and cardiovascular health effects. Indoor sources of air pollution contain carbon monoxide which is capable of producing death- and flu-like symptoms.

Indoor sources of air pollution also emit nitrous oxide and ozone which can cause lung damage and respiratory disease. Communicable diseases are also transmitted indoors, and other health effects include irritant effects and sick building syndrome.

Excluding PM, the costs of indoor air pollution in California are estimated at $45 billion annually, with $36 billion in premature deaths; $8.5 billion in lost worker productivity; and $0.6 billion in other medical costs.

Principle categories of IAQ improvement include source control, ventilation, proper building operation and maintenance, professional training, public education and air cleaning devices. The status quo on IAQ regulations and guidelines features regulations and guidelines spread out among a number of agencies. Workplace standards are regulated by the California Occupational Safety and Health Administration which has adopted some regulations on ventilation. The California Energy Commission has also adopted some ventilation requirements, particularly with regard to the amount of outdoor air applied to a building. In 1995, AB 13 was adopted which established the state's smoke-free workplace requirement. The federal Consumer Products Safety Commission regulates consumer products, although its greatest concern is safety and safe product operation. When it concerns air quality, a labeling requirement comes into play. CARB also regulates consumer products to some extent, as do air districts, when it comes to products that have an impact on outdoor air quality. There are also some indoor air quality benefits associated with this type of regulation. However, no single agency is designated to oversee indoor air quality. There are voluntary guidelines from government agencies, industry and professional groups, with some success. The American Society of Heating, Refrigerating and Air-Conditioning Engineers has developed standards for ventilation; the Carpet and Rug Institute has also developed some product guidelines with the encouragement of the Environmental Protection Agency.

In its report to the Legislature, CARB set forth a prioritization of indoor air pollution by source categories rather than by specific pollutants. Air cleaners—particularly the ones that generate ozone, biological contaminants, building materials and furnishings, combustion appliances, such as gas stoves that are not vented, environmental tobacco smoke, and radon (which has a high cancer risk and inextricably interwoven with sources of tobacco smoke) constitute the major sources. Less than 1% of homes in California exceed any applicable standards for radon concentrations.

The medium priority indoor air pollutant source categories requiring mitigation are architectural coatings, consumer products and personal care products, household and office equipment and appliances, and pesticides. Many of these are already under some level of regulation and their emissions are comparatively lower than those in the high source priority ranking.

With regard to indoor air pollution mitigation, CARB has suggested that such measures include the creation of an indoor air quality management system, establishment of emission limits, requiring emissions testing of products as requisites for equipment procurement, making children's health a top priority, development of clearer indoor air quality guidelines, amendment of building codes, funding public outreach and education programs, conducting more research especially on indoor effects of particulate matter and turpines that add fragrance to consumer products, and funding of innovative technologies for indoor air quality management. CARB's clean air technology program for ambient air has been successful in helping companies with new products and ideas by bringing them into commercialization and can be geared to indoor applications as well.

Mitigation measures for indoor air pollution in schools include urging the implementation of all 16 recommendations from the California Portable Classrooms Study. The District might consider partnering with schools on IAQ with a focus on integrating indoor with outdoor air issues as well as augmenting the Tools for Schools program and improving staff training for it. The promotion of "best practices" for design, construction and maintenance for schools could benefit from District input as well. CARB may approach the District for training programs on indoor air quality in its development of training on indoor air.

In assessing the proven benefits of improving IAQ, CARB has reviewed some case studies, including a healthy home program in Seattle with an asthma intervention program that provided informational materials to low income groups. The program significantly reduced asthma medical costs over a four-year period, lowered inhaler use in elementary schools by 50% and improved attendance by 5%.

CARB's recent IAQ report was approved by the Board of Directors of CARB last month, and should be forwarded to the Governor through the California Environmental Protection Agency. The State Legislature will hold a hearing on IAQ in May of this year.

With regard to "air purifiers" which are really portable ozone generators, studies show that these emit harmful levels of indoor ozone greater than the ambient standard with normal use. These have been marketed aggressively in California, often with inaccurate advertising, suggesting that these devices eliminate indoor pollutants and airborne microbes. The indoor odor mitigation attributed to these is due to the fact that ozone deadens the sense of smell. Purifiers equipped with sensors that limit ozone concentrations to 50 parts per billion cannot guarantee the longevity of such sensers. These devices counter reductions in ambient ozone levels. The Department of Health Services issued a press release in 1997 on these devices, but it had little effect. CARB has published the names of ozone generator brands to alert the public on ozone emissions.

CARB believes that ozone generators pose an unnecessary public health risk and has submitted an ozone generator mitigation plan to the Attorney General's Office, which is considering options for legal action. Additional measures in the plan include development of public and professional guidance materials, and an outreach program, as well as working with air cleaner manufacturers to develop test protocols for air cleaners and establish emission limits.

The Air District might consider becoming involved with the ozone generator issue as well as with encouraging implementation of mitigation measures for schools. Involvement with public outreach efforts on IAQ is also recommended for the District, given its existing public outreach network and familiarity with residents and institutions in the Bay Area region. The Advisory Council's own suggestion that an IAQ summit for the Bay Area region be held is excellent. CARB sponsored a Symposium on IAQ in the year 2000. The District might also consider becoming more involved with training on building filtration systems, and loaning measurement devices to schools and homes for the care of the elderly.

In reply to questions and suggestions from Committee members, Ms. Jenkins noted:

- A large bibliography of studies on IAQ is posted on the CARB website, and additional materials will be e-mailed to the Advisory Council through the Deputy Clerk.

- The District could be encouraged to issue correspondence to magazines discouraging advertisement of ozone generating air purifiers, and the Advisory Council might consider adopting such a recommendation for forwarding to the Governing Board.
- Legislation proposed three years ago would have given CARB authority to regulate IAQ but was unsuccessful. The Portable Classroom Study has recently generated two proposed bills.
- CARB staff can make a presentation on its recent IAQ report to such groups as the American Institute of Architects, Pacific Gas & Electric and other building related networks. The presentation can be tailored to focus on certain fields depending upon the audience. For example, for architectural groups there should be some focus on outdoor coatings.
- Most product labeling requirements concern emissions to outdoor air—such as ones governing volatile organic compounds—and are not specific to IAQ. CARB would like to require manufacturers to test their products and publish the data on labels: this would allow for product comparison and subject improvement in procurement selection. At present, such labeling would be purely voluntary as there is no authority to require it. Moreover, manufacturers do not want to pay for the cost of the test and if the product does not meet a given standard they would have to engage in product reformulation, which would pose an additional cost.
- Indoor ozone generators have created an entire market based on vague, and often inaccurate, science. The strength of regulatory agencies in IAQ management is that they can fund research and conduct public education. There are alternatives to ozone generators for indoor air purification: these include HEPA filters, and electrostatic precipitators and ionizers.
- CARB's Stationary Source Division is handling the issue of the two different resins for indoor and outdoor plywood particle board. The resin used in the indoor plywood emits more formaldehyde than what is used for the outdoor plywood. CARB believes that the resin used in outdoor applications would be acceptable for use in indoor applications as well.

5. **Committee Member Comments/Other Business.** There was none.

6. **Time and Place of Next Meeting.** 1:30 p.m., Monday, June 13, 939 Ellis Street, San Francisco, CA 94109.

7. **Adjournment.** 3:04 p.m.

James N. Corazza
Deputy Clerk of the Boards

AGENDA NO. 4

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

June 13, 2005

To: Public Health Committee

From: Victor Torreano, Chairperson

Re: Advisory Council Discussions on Indoor Air Quality

Set forth below in chronological order are excerpts from the minutes of the Public Health Committee and the Advisory Council on the subject of Indoor Air Quality, beginning with the Advisory Council Regular meeting of May 12, 2004 to the Public Health Committee meeting of February 15, 2005:

ADVISORY COUNCIL REGULAR MEETING: MAY 12, 2004

Indoor Air Technical & Policy Issues: An Update for the BAAQMD Advisory Council.

Jed Waldman, Ph.D., Chief, Indoor Air Quality Section, California Department of Health Services, stated that Americans spent approximately 90% of their time indoors. Most indoor environments have less effective air exchange than the urban atmosphere and certain pollutants occur at higher levels indoors than outdoors. In an indoor environment, cigarette smoke and pollen have a thousand-fold greater chance of reaching a human being than outside due to less dispersion.

Ambient air quality management emphasizes source control methods to reduce exposure to pollution. Indoor air quality management is somewhat more flexible and is achieved by modifying ventilation rates, either through code modification or building management staff. Green building design combines energy conservation and resource efficiency to build healthier buildings with lower indoor pollution sources and more effective ventilation. This enables "building commissioning" in which a building is constructed and operated according to its design.

Indoor air pollution contains gases and vapors similar to ambient air, including volatile organic compounds such as formaldehyde; particulate matter and dust from tobacco, wood combustion and cooking; allergens from dust mites, pollens and pet dander; fibers from asbestos and microbial fungi and viruses; and toxics such as lead, pesticides and polychlorinated biphenyls (PCBs). Other indoor sources include construction and cleaning products such as adhesives; solvents, insulation and ceiling tile, paints; furnishings such as carpets, upholstery, pressed wood; ventilation system components; office equipment, personal care products, and dry cleaned clothes. Tobacco was once the most important indoor pollution source, but that has been reduced by 90% through the law.

Health risks from indoor air pollution include eye and respiratory irritation, allergies, asthma, chronic sinusitis, increased rates of infectious diseases such as influenza and colds, neurological impairment such as headaches, memory and motor function, and increased cancer risks. The terminology

governing such effects includes “building related illness,” “sick building syndrome” and “multiple chemical sensitivity.” These are broad terms for health effects caused by a multitude of factors, and many toxins also have the same health effects. An individual may feel better at home than at work, or vice versa. Symptoms from these circumstances range from perception of bothersome odors, temporary mild discomfort, to severe illness and permanent injury.

Regulatory authority for ambient air quality resides in the District and the California Air Resources Board (CARB). The California Occupational Safety & Health Administration (Cal/OSHA) promulgates workplace exposure standards and air toxics reference exposure level standards. California’s regulations on smoking are enforced locally. There is new legislation that will restrict smoking in vehicles in which small children are traveling.

Proposition 65 requires posted warnings indoors, and applies water quality exposure limits to indoor air quality. It is enforced through litigation — examples of which are the product reformulations of nail care products and typewriter correction fluid. Draft indoor air quality guidelines, based on ambient air quality standards and reference exposure levels, are under discussion. Federal clean air legislation will address radon content in drinking water, which is the greatest source of cancer risk in indoor air and is comparable to second hand smoke. A multi-media regulatory approach has been developed for water quality agencies that would allow radon content in homes above a lower end threshold in return for the institution of an indoor air quality program.

Indoor air quality emission limits are primarily addressed by focusing on individual appliances. The Gas Appliance Manufacturing Association (GAMA) sets the flame emission limits for stoves. The Housing & Urban Development commission regulates formaldehyde emissions from pressed wood products. Consumer products are regulated by the Food and Drug Administration (FDA). Section 01350 is a state specification developed by a group of representatives from the Department of General Services (DGS), Department of Health Services (DHS), and State Consumer Protection Society (SCPC), on the purchase of carpentry, office module furniture, etc. It requires a high-recycled content and a high recycling potential. Indoor lighting must be energy efficient. This group provides an excellent model for stakeholders to meet and produce an effective standard.

With regard to building design and construction standards and guidelines for materials, the standards for ventilation are created by a non-government group called the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE). The U.S. Green Building Council has established Leadership in Energy & Environmental Design (LEED). There are also self-inspection guidelines and a Collaborative for High Performance Schools (CHPS) in place.

Key indoor air quality agencies include the federal Environmental Protection Agency (EPA), the Center for Disease Control (CDC) (to assess moisture and mold), and the National Institute of Occupational Safety and Health (NIOSH) to provide funding for research. The State Department of Health Services (DHS) has an indoor air quality program. CARB has a research division that includes indoor air quality. Cal/OSHA is the regulatory agency. The Office of Environmental Health Hazard Assessment (OEHHA) provides risk assessment. The DGS oversees the construction of new buildings and materials procurement. The California Energy Commission (CEC) and the State & Consumer Services Agency (SCSA) provide additional oversight on the sustainable building effort.

Home inspection authority is found at the local level, through rental property requirements and individual homeowner compliance with building codes. Local environmental health, as well as housing, inspectors received training years ago but their success was variable. The American Lung

Association is very knowledgeable and promotes indoor air quality improvement. The Green Building Council (GBC) promotes standards in building design and ASHRAE maintains the ventilation standards. The tobacco and hospitality industries are still fighting in other states. The Carpet & Rug Institute (CRI) is an exceptional group for minimizing indoor air pollution. Other research organizations on indoor air quality include the Lawrence Berkeley National Laboratory.

- Several years ago, the Toxic Mold Protection Act was passed, but it was written in a way that did not provide the DHS enforcement authority, and so it has mainly raised public awareness.
- EPA has advocated improving indoor air quality in schools, and the CHPS leads the nation in the sustainable green building effort for schools.
- In the 1980's, the DGS put together a building task force, which included the DHS and coordinated the energy efficiency and recycled products fields to promote indoor air quality.
- The Department of Education building in the east wing of the State capitol is a landmark of green building principles.
- The District can collaborate with DHS to address public health concern on air pollution exposures that include indoor air.
- The Spare the Air program provides an opportunity to explicate the meaning of "shelter in place."
- There are noteworthy public outreach opportunities regarding exposure to particulate matter generated on roadways and the idling of diesel buses in schoolyards.
- The DHS is collaborating with CARB to develop a rule for pressed wood products that release formaldehyde, as indoor emissions affect outdoor air and should be included in the baseline emissions inventory.
- Plywood and pressed wood product manufacturers will need to respond to such emission standards.

In reply to Council member questions, Dr. Waldman stated:

a) There is a 50/50 split between exposure to particulate matter in indoor and outdoor air: 90% of the exposure to benzene occurs indoors even though more than 90% of benzene emissions derive from industrial sources. For formaldehyde, which has the largest carcinogenic risk, indoor exposure levels are three to four times greater than in outdoor air.

b) There are no enforcement mechanisms for cigarette smoke in homes or apartments. Title V ventilation requirements that apply to the workplace cannot be applied to residential environments. However, property co-ops may provide some means of accountability.

c) Radon in drinking water emanates only from ground water, and homes that obtain water directly from wells are the most at risk. A survey of California homes has never reached the high levels of radon found in homes in Pennsylvania or New Jersey. However, none of the counties in California will need to address radon in drinking water or in the air.

d) Substandard housing is a socio-economic surrogate for indoor air pollution health risks.

e) Nationwide statistical data on the cancer mortality risk comparing radon and tobacco smoke indicate that about 15,000 excess lung cancers are due to radon exposure. The risk is primarily associated with smokers as there are synergistic effects between indoor radon and tobacco.

These data have not been adjusted for California, which has a lower than national average for smoking and a lower radon level as well. Data for diesel PM mortality on a national level predict that 60,000 cardiovascular related deaths occur annually.

f) As to whether the causality of asthma is due more to indoor air in which 90% of Americans spend their time and are exposed to PM about 50% of the time, it depends upon the trigger. Bio-allergens such dust mites and pet dander are quite prevalent indoors.

g) The DHS focuses its building commissioning efforts on schools and compliance is volun-tary. Mr. Bhandari noted that there are no building commissioning regulations for tract homes. In Texas and California, agencies work cooperatively with but do not regulate home builders. Suppliers and builders can be encouraged to use preferred products prior to the adoption of policies, but such materials must be available for a policy to work. Indoor materials do pollute outside air when they are used on or near exterior surfaces.

h) Recent indoor air chemistry analysis reveals that many home products release chemicals that react with ozone, and can produce a little smog factory within the home, despite lower concentrations of ozone indoors.

i) The District and the DHS could collaborate in public outreach and education to deliver a message about how the choices people make in their home and work environments influence their both their health and ambient air quality.

Jack Broadbent, Executive Officer/APCO, requested that the Advisory Council review the role of the District in indoor air quality management and consider potential future agency programs in this field.

PUBLIC HEALTH COMMITTEE MEETING OF AUGUST 8, 2004

Indoor Air Quality. Chairperson Weiner reviewed the two documents in the agenda packet entitled, *Report to the California Legislature: Indoor Air Pollution in California, California Air Resources Board (CARB), June 2004*, and *Indoor Air Technical & Policy Issues: An Update for the BAAQMD Advisory Council, by Jed Waldman, Ph.D., Chief, Indoor Air Quality Section, California Department of Health Services, May 12, 2004.* She stated that at this time there is no comprehensive and coor-dinated strategy on indoor air quality. Regulatory jurisdiction is spread throughout a variety of agencies.

Ms. Blake distributed her August 9, 2004 memorandum to the Committee entitled *Rough draft idea for a recommendation to the Council concerning the District's role in indoor air quality*. She observed that the CARB report was issued at the request of the Legislature and attests to the widespread health effects associated with indoor air pollution. Noting that the Air District has a rare opportunity to explore its potential role in this field, she offered two suggestions:

1) that the District convene a workshop or series of workshops in which researchers, organizations and regulatory agencies associated with indoor air quality could discuss the District's role. The workshops could be convened within the Bay Area with either a broad statewide invitation or as Bay Area-only but with representation from appropriate State agencies.. Key features of the discourse would include identifying current agency roles in indoor air quality and recommendations for future research, education and regulation.

2) That the District annually sponsor a graduate student scholarship for research in indoor air quality. This would provide both visibility and a connection with local academic institutions.

Mr. Torreano observed that building materials are a major source of the indoor air pollutants, particularly formaldehyde in pressboard and insulation. In commissioning buildings, contractors heat the interior to treat caulking and epoxies. However, any deficiencies in the commissioning process require review. If the proper installation and maintenance of building materials could be incorporated into building codes, this would reduce indoor air pollution.

Ms. Bailey suggested that the Committee review the study of the toxicity of formaldehyde in the recent rulemaking by the Environmental Protection Agenda (EPA) on wood products. Peter Hess, Deputy APCO, added that formaldehyde is used in plywood resin as a material binder, and is also found in the resin in caulking materials. The latter are regulated as consumer products by CARB, which is currently evaluating an air toxic control measure in this field.

Mr. Hess referred to an advertisement in today's San Francisco Chronicle for an indoor ozone generator, which asserts that ozone has a good effect on health. Chairperson Weiner suggested that the District consider issuing a letter to the editor correcting that misconception. Mr. Torreano observed that the CARB report on indoor air quality addresses this type of equipment.

Mr. Hess noted that the District regulates volatile organic compounds (VOCs) in paints and has adopted stringent rules in this field. The District's perchlorethylene (perc) rule, which is based on toxic air contaminant regulation, far exceeds the stringency of the CARB rule for perc dry cleaners. The District's authority to regulate perc derives from the California Health & Safety Code and is based on ambient air quality management. There may be indoor air quality benefits that derive from the rule but these cannot form the basis for its adoption.

Ms. Bailey opined that any District action on indoor air quality should not supplant its concern with or work on ambient air quality. However, other fields of indoor exposure, such as inside vehicles, and in occupational settings like an excavator or a highway tollbooth, should also be considered. Jack Broadbent, Executive Officer/APCO stated that the South Coast AQMD conducted an in-vehicle study in the 1980's that showed elevated levels of most of the com-pounds for which the agency monitored. The National Resources Defense Council has also conducted a study on air in buses. Chairperson Weiner noted that the American Lung Associa-tion is presently studying indoor air quality in the context of school buses.

Ms. Hess suggested that the Council consider working with staff in contacting and working with planning departments in Bay Area cities and counties. Council member Hayes has previously participated with District executive management in speaking to local governments about urban heat island mitigation. Such Council/staff outreach could be extended to the effort to influence building codes. The Council, in concert with staff, would develop the presentation, which would concern guidelines, recommendations and identify key issues. Ms. Blake suggested that local government staff be included on the invitation list to the above-mentioned workshops. Noting that the District was successful years ago in getting local entities to adopt air quality elements in their general plans, she suggested that a comparable general plan amendment for building codes could be studied. This may be a topic for next year's Advisory Council Retreat.

Mr. Torreano noted that the apprentice sheet metal workers in his union are trained in various ventilation processes. It would be ideal for a union training department to incorporate indoor air quality certification processes into an apprenticeship program. However, at the present time there are neither guidelines nor certification processes associated with the installation or maintenance of industrial air duct cleaners for hospitals and municipalities.

Mr. Broadbent observed that there are building heating and ventilation guidelines on airflow, but these do not address indoor air quality concentrations. That is why the field of indoor air quality is ripe for review with regard to potential courses of regulatory action.

Jack Colburn, Senior Policy Advisor, stated that EPA has produced a packet on the "Tools for Schools" program, one of which will be provided to each Committee member. It provides a number of key sources of information. Guidance can be gleaned from the packet materials and reviewed for possible application to other indoor situations. A considerable amount of information on indoor air quality is generally available but there is no clearinghouse for it. Molds in buildings and homes are the major indoor air issue in the state. Ms. Blake noted that the State Health Department has active programs on mold in indoor building environments.

Mr. Broadbent suggested that at an off-site location next year the Board and Council hold a Retreat on indoor air quality. Prior to the Retreat, the Council could adopt recommendations for the Board to consider. In addition to the state of the science on indoor air quality, the discussion could include establishing standards for smaller sources comparable to the regulation of back-up diesel generators that are found in many buildings. It could involve a component in which owners of back-up generators, as well as building maintenance staff, could also be educated about ventilation systems and integrate ambient and indoor air quality management awareness.

Mr. Broadbent added that in the Bayview Hunters Point area, where there are higher incidences of asthma, there is no program to deal with indoor air quality. Mr. Hess suggested that perhaps indoor air could be included in the forthcoming public meetings on the Ozone Control Strategy. Mr. Broadbent added that the Community Air Risk Evaluation (CARE) program would be addressed in these community meetings. Ms. Roggenkamp indicated that the meetings would begin in late September and continue through mid-October.

Chairperson Weiner opined that the review of indoor air quality in Bayview Hunters Point, as it relates to the incidence of asthma, should not supplant the District's careful review of permitting an electrical generating power plant since the emissions may also influence the incidence of asthma in that area. Ms. Bailey added that care must be taken in framing the categories of discourse on indoor air quality and asthma.

Ms. Blake inquired if there could be an immediate augmentation of programs in which the District encourages the development of educational and advisory materials for distribution in residential neighborhoods. Mr. Colburn replied that checklists for home inspections are available and there are scientifically proven building materials that meet both environmental and energy conservation ratings.

Mr. Broadbent added that such material may not be widely distributed, and this issue could be discussed in the workshop. Chairperson Weiner stated that from the perspective of social marketing, tailoring the principles of the meeting and the materials to be presented to a given audience is always to be recommended.

Ms. Blake suggested the following additions to the proposed recommendation, based on today's discussion:

- In No. 3, prior to "we recommend that" add "to augment—but in no case to supplant—the District's activities to improve ambient air quality" and before "in which" in the first line add "within the next year".
- In the first bullet under No. 3, add a second sentence to read: "Included among the issues to be addressed should be their building materials and their appropriate installation and maintenance."
- After "or workshops" in No. 3 in the first line add "or summit."
- Delete "state policy" from the last line in No. 3 and insert "and programs" in its place.

Mr. Torreano moved adoption of the text as amended for forwarding on September 8 to the Council; seconded by Ms. Bailey; carried unanimously. The Committee directed that the members absent from today's meeting receive the revised document via e-mail and be invited to separately submit comments to the Clerk for inclusion in the Council meeting agenda packet.

In reply to Chairperson Weiner, Emily Hopkins, Public Information Officer, stated that to date 30 cities and 6 counties have adopted the District's wood smoke ordinance. There are approximately 100 incorporated cities and nine counties in the District's jurisdiction, two counties of which are partial counties with some jurisdiction from another air district.

ADVISORY COUNCIL REGULAR MEETING OF SEPTEMBER 8, 2004

Report of the Public Health Committee Meeting of August 9, 2004. Ms. Weiner reported that the Committee reviewed the issue of the District's role in indoor air quality (IAQ) and adopted recommendations urging that multi-agency public meetings on IAQ be held in the Bay Area and that the District sponsor a scholarship for graduate student study of the issues. The Committee reviewed a recent California Air Resources Board (CARB) draft IAQ report as well as minutes of Dr. Jed Waldman's presentation on IAQ to the Advisory Council on May 12, 2004. Jack Broadbent, Executive Officer/APCO, noted that while the District lacks authority to establish ambient IAQ standards, there is an exchange between indoor and outdoor air that requires further exploration from a regulatory viewpoint. There was brief discussion on the extent to which people may receive their highest exposure to ozone in indoor environments, or whether, due to surface area, indoor concentrations of ozone might ultimately prove to be comparatively low.

Chairperson Blake called for public comment and the following individuals came forward:

Jim Hussey
Marina Mechanical
San Leandro, California

noted that "unintended pressurization" in buildings due to leaking duct work, failed cabling seals and cavities in walls can impact IAQ through pressure differential between interior and exterior of the building. He presented the November 2002 magazine of the *American Society of Heating, Refrigerating and Air-Conditioning Engineers* featuring several topical articles on IAQ, and offered to share the research and experience of his industry on IAQ with the Advisory Council.

Patrick Pico
Sheetmetal Workers Local 104
San Jose, California

stated that his union sponsored courses for 6,000 journeypersons that install, service and maintain HVAC systems. He presented the "Final Report of the National Center for Energy Management and Building Technologies Task 2: Under Floor Air Distribution (UFAD) – Results of Seminars," dated January 2004 – July 2004, and offered to work further with the Council regarding IAQ.

Mr. Dawid inquired about regulatory authority over indoor air quality in apartment complexes. Dr. Bornstein noted that in some buildings at San Jose State University that house science departments, the effluent from chemistry laboratory hoods returned into the building through the intake vents.

Staff complaints were filed with the Occupational Safety & Health Administration. Mr. Shanahan observed that emergency standby generators are often installed next to air intake systems. The Council members noted that these remarks illustrate the importance of reviewing the IAQ issue and the various types of exchange between indoor and outdoor air. Mr. Kurucz observed that it is unclear how the District should intercede in this field if it is primarily an architectural issue. Chairperson Blake replied that this is why it would be helpful and informative to hold workshops with other agencies and explore the various jurisdictional issues, as the Committee recommends.

Chairperson Blake called for a vote on the recommendation. It carried unanimously by acclamation.

ADVISORY COUNCIL REPORT TO BOARD EXEC. COMMITTEE – SEPTEMBER 29, 2004

To: Chairperson Haggerty and Members of the Board of Directors Executive Committee

From: Chairperson Blake and Members of the Advisory Council

Subject: Air District Role in Indoor Air Quality

Topic

The District's role in Indoor Air Quality (IAQ) management.

Background

Indoor air pollutants present a well-documented harm to the public's health. Studies of the health effects and their considerable scope are summarized in the recent California Air Resources Board (CARB) draft report, *Indoor Air Pollution in California*, June 2004 (http://www.arb.ca.gov/research/indoor/ab1173/ab1173.htm). Pollution indoors is generated both from within buildings, and from the air outside. Many California agencies and universities are engaged in various aspects of research and education on the subject, but, in the words of the CARB draft report, "there is no systematic program [in California] to improve indoor air quality, there are relatively few regulations or standards to address individual indoor air quality problems, and few resources focused on effectively addressing problems and promoting improvements. Current efforts to address indoor pollution are not commensurate with the scope of the risk to health it poses to Californians."

Recommendations

In this vacuum, the District is presented with an unusual opportunity to explore creatively its potential role in improving indoor air quality, which affects the health of everyone in the Bay Area. To augment—but in no case to supplant—the District's activities to improve ambient air quality, we recommend that:

(1) The District convene or initiate a workshop or series of workshops, or summit, within the next year in which government agencies, researchers, and organizations concerned with IAQ can discuss the current and potential roles of the District and others in improving IAQ. Included among the issues to be addressed should be building materials and their appropriate installation and maintenance. These workshops might be convened as statewide, involving other Air Districts, or as Bay Area workshops with state agency representation. Such workshop(s) would provide a forum for the generation and exchange of ideas and information to develop District proposals and programs for a cohesive approach to IAQ.

(2) The District consider establishing a graduate student investigator initiative to research impacts of regional air pollution on indoor environments. The Bay Area has an impressive number of universities that conduct research on IAQ: this initiative would allow the District to tap into those resources at relatively little cost, with the added benefit of providing recognition to the District. CARB, CDHS and other agency experts could also be mentors. The District could administer the program or arrange with another entity to do so (e.g., a non-profit such as the Public Health Institute; a university President's Office; a Bay Area foundation). Students would apply annually for the funds, and a review committee would select among the proposals. The California Interagency Working Group on Indoor Air Quality, in which the District participates, could assist by suggesting potential IAQ-related research topics.

ADVISORY COUNCIL RETREAT/REGULAR MEETING – JANUARY 12, 2005

Round Table Discussion with District's Management on Key Issues Facing the District and Assignments Proposed by District Staff

Mr. Broadbent presented his January 11, 2005 memorandum entitled "Potential Candidate Assignments from the Executive Officer/APCO" which set forth five areas of study for the Advisory Council as recommended by District staff, as follows:

Indoor Air Pollution - While the Air District does not have direct authority, 50% of indoor air pollution originates outdoors, and from an exposure perspective, people are indoors 80-90% of the time. The Executive Officer/APCO is requesting the Advisory Council to explore the possible roles for the District regarding indoor air pollution. – Suggested Committee lead: Public Health.
Noting that District programs and future challenges have been reviewed by staff and were discussed at a Board retreat last year and at an All-Hands meeting with staff this year, Mr. Broadbent stated:

Last year the Council began its investigation into the field indoor air quality management, and this should be continued this year as part of a continuing policy dialogue at the District. The Council last year recommended the District hire an indoor air quality intern. What is the District's role in this field, and how can District programs be integrated with indoor air quality? What would a District indoor air quality program look like? Mr. Broadbent opined that counties are in a better position than the District to promulgate standards for indoor air quality. Nevertheless, the public does not perceive a distinction

between air quality management outside or inside the home. There are growing concerns over Bay Area asthma rates and particularly in the Bayview Hunters Point area. This represents a challenge for the District.

Reconvene to Full Council Format for Follow-up on Committee Discussion Sessions. The full Advisory Council reconvened at 1:04 p.m. The Standing Committees reported out as follows.

Public Health Committee. Mr. Torreano stated the Committee will meet at 1:30 p.m. every third Monday of the even numbered months, except for February, as follows: February 15, April 18, June 20, August 15, October 17 and December 19. The Committee will address indoor air quality and assess the scope of the issue and different agency jurisdictions at the municipal, county, state and federal level. It may also sponsor a stakeholders' forum for the discussion of indoor air quality issues. The Committee will review the dynamics of community outreach associated with indoor air quality, and will also address the CARE program and review any policies coming out of that program.

PUBLIC HEALTH COMMITTEE MEETING OF FEBRUARY 15, 2005

Indoor Air Quality: An EPA Perspective. Barbara Spark, Indoor Air Program Coordinator, U.S. EPA Region IX, stated she would address EPA's programmatic on indoor air quality (IAQ) its perspective on regulatory jurisdiction, collaboration with agencies on the state and local level, and its development of incentive programs. Also, EPA suggestions as to what role the District might play in IAQ management will be addressed. While EPA neither regulates IAQ nor comments on the IAQ regulatory work of other agencies, it does collaborate with other agencies and non-governmental organizations in emphasizing voluntary changes to behavior related to IAQ.

The State Department of Health Services has estimated that people spend 90% of their time indoors, where the air exchange is less effective than outdoors. The Total Exposure Method Assessment Study which occurred in the mid-1990's estimated that indoor concentrations can be two to five times higher than outdoor concentrations. Faculty at U.C. Berkeley estimate that a molecule released indoors is 1,000 times more likely to enter the lungs than one released outdoors.

Sources of air pollution include outside air (smog, traffic, pollen), construction and cleaning (adhesives, solvents, paints, insulation, ceiling tile), furnishings (carpets, upholstery, pressed-wood), office equipment (copiers, computer screens), combustions (stoves, tobacco, fireplaces), ventilation systems (dirty filters, moldy coils), and occupants (personal care products, pet dander, dry cleaned clothes). Indoor air toxics can also be found in concentrations two to five times higher than outdoor concentrations, and at times at even higher concentrations.

The US EPA Indoor Environments Division (IED) works to improve indoor air quality and its authority comes from Title IV of the Superfund Amendments and Reauthorization Act (SARA) of 1986, the indoor radon abatement Act of 1988, the Safe Drinking Water Act Amendments and various Assistance Agreements issued under Section 103 of the Clean Air Act. Under SARA, the EPA is not allowed to regulate and may only conduct research, development and related reporting, disseminate information and coordinate activities specified in the statute. EPA's program strategy is to take existing knowledge and turn it into practical guidance. This program has grown in the past decade and emphasizes guidance, training and public information and working with public and private sector partners to educate, train and promote exposure/risk reduction practices.

There are many variables in the study of IAQ, including study of the sources of pollutants, pollutant types, solutions, health effects, exposures, populations and other complicating factors. The health risks from IAQ include eye and respiratory irritation, allergies, asthma, chronic sinusitis, increased rates of infectious diseases such as influenza and colds, neurological impairment such as headaches, memory, motor function, and increased cancer risks. Symptoms from indoor air pollution range from perception of bothersome odors, temporary mild discomfort, severe illness and permanent injury. Typical phrases describing indoor air pollution include "Building-Related Illness," "Sick Building Syndrome" and "Multiple Chemical Sensitivity."

EPA priority programs concern indoor radon, childhood exposure to environmental tobacco smoke, indoor asthma triggers, and indoor air quality in schools. In its IAQ programs, EPA collaborates with other agencies, such as the State Department of Health Services (DHS) and the California Air Resources Board (CARB). EPA has developed "Healthy Buildings, Healthy People: A Vision for the 21st Century" with an extensive network of stakeholders for cross-agency input. The EPA also participates on the Interagency Committee on Indoor Air Quality (CIAQ) with several co-chairs from the Consumer Product Safety Commission, Department of Energy, National Institute for Occupational Safety and Health, and the Occupational Safety and Health Administration. Members include representatives from the Departments of Agriculture, Defense, Commerce, Justice, State, Transportation, Interior and Housing & Urban Development.

EPA Region IX implements its core IAQ programs at the regional level through working with leading governmental, health and educational organizations, as well as with individual schools and people. EPA's "Orientation to IAQ" program started in 1992 provides IAQ training for public officials. In 1995, EPA began providing training on mold in indoor environments at conferences that were attended by many public health and government officials. EPA's "Tools for Schools" is another core program with many partners and involves considerable hands-on experience and the continuing development of new IAQ management tools. EPA also participates and consults on programs and policy on occupational health, with which the California Asthma Strategy is also involved. It also works with the California Endowment on Asthma/Environments Panel, the California Interagency Working Group, and provides grants to asthma study groups.

California regulation and authority provides for air exposure standards in several areas. Ambient air quality standards derive from CARB, while workplace standards and regulations are issued by the California Occupational Safety & Health Administration (Cal-OSHA). EPA Region IX partners for IAQ programs in schools with a variety of state agencies, the American Lung Association, and school district and administrator associations.

EPA research on IAQ is conducted through "Program needs for Indoor Environments Research" (PNIER) which covers such topics as pollutants, sources and health effects, human performance, IAQ measure and indices, building design and operation, homeland security and product techno-logy and verification. EPA's Building Assessment, Survey and Evaluation Study (BASE) has evaluated about 100 buildings in its in order to characterize indoor environments.

The Building Air Quality Alliance provided incentives in the form of recognizing buildings with good IAQ practices. However, support for this program for a variety of reasons was withdrawn. The Indoor Air Quality Education and Assessment Guidance (I-BEAM) provides education for commercial facilities on IAQ, and is intended for building managers. It provides them with tools to assess the air quality within the building and ways to make necessary corrections.

The EPA also assists building managers on mold remediation in schools and commercial buildings and has published guidance on this matter. The guidance document was published on the Internet before issued in hard copy: within two weeks there were 50,000 hits, and in two months 153,000.

The Asthma Strategic Overview includes a national awareness campaign and continues to promote World Asthma Day. The Overview also includes an in-home education program that manages existing grants and a health-care/managed-care program that works with key organizations to integrate environmental controls into clinical practice and standards of care. A School/Daycare program emphasizes education and supports established programs, and its results are tracked.
The EPA collaborated with the Institute of Medicine (IOM) in its report "Clearing the Air: Asthma and Indoor Exposures." EPA's "Tools for Schools Kit" identifies ways to improve IAQ at little or no cost through flexibly applied, voluntary means that are based on common sense and require little training. The program urges that everyone in the school community understand that indoor air is important to health, and have a basic understanding of the causes of indoor air pollution.

EPA's Tools for Schools IAQ team members include teachers, administrative staff, health officers, facilities operators, school boards and students and parents. Program implementation begins with establishing an IAQ team and assigning an IAQ coordinator, conduct a walk through of the school, develop an IAQ checklist, and create an IAQ management identifying major priorities and repairs. The Tools for Schools program is needed now more than ever, despite the budget constraints at the state. Schools are poorly staffed for maintenance, custodial, repairs and teachers and staffs.

Additional resources include an IAQ Information Clearinghouse hotline at 1-800-438-4318 as well as the EPA's own website at www.epa.gov/iaq.

With regard to the role of District in IAQ, collaborative and complementary opportunities exist in:

- collaborating with /helping fund activities of regional asthma organizations working on asthma and IAQ—such as the Regional Asthma Management and Prevention Initiative.
- providing grants to organizations providing effective in-home asthma trigger education.
- supporting school districts implementing IAQ management plans or IAQ Tools for Schools, and partnering with US EPA on these and other local projects.
- further collaborative and complementary opportunities are to be found in the fields of research, education and outreach on the indoor impacts from candles, incense, scented cleaning products, wood smoke; indoor interactions between ozone and volatile organic compounds from scented cleaning products, education and outreach on indoor ozone generators and air cleaners.

The Council's recent recommendation to the Board of Directors Executive Committee that an IAQ workshop be held in the Bay Area is a step in the right direction. This would provide follow-up to CARB's May 2001 Symposium "Indoor Air Quality: Risk Reduction in the 21st Century." The Council's other recent recommendation that the District hire a graduate student to investigate the ambient/indoor air quality nexus would greatly benefit from receiving student selection input from Dr. Waldman of the State Department of Health Services, Peggy Jenkins of CARB, and U.C. Berkeley faculty members William Nazaroff , Ira Tager and Katherine Hammond.

In reply to Council member questions, Ms. Spark replied as follows:

- District contribution to indoor air pollution research in selected areas, such as scented indoor and personal care products and their potential interrelationship with asthma, would be useful. The question concerns exposures at low levels and what impacts these may have on health. A key component in this work includes education. However, manufacturers are not required to publish what is on their products, and it is unclear to what extent such information would be meaningful to people who read the labels. There are also some trade-secret elements involved with scented products that prevent their ingredients from being revealed on a product label.
- EPA is currently working on a source ranking database for indoor sources.
- The agenda of an IAQ workshop should be crafted in such a way as to steer the discussion into identifying the status quo and what role the District can play. It should not be allowed to become a forum merely for special interest groups. Suggestions as to the District's IAQ role would likely emerge from a well-directed discussion.

Mr. Colbourn noted that the District has asked the Council to preliminarily investigate IAQ, even though this field is not within the District's regulatory purview. Asthma experts are members of an advisory committee to a program that will assess neighborhoods with the greatest exposure to toxic air contaminants. The District does not presently intend to make IAQ a regulatory program.

Chairperson Torreano called for public comment, and Dr. Jed Waldman, State Department of Health Services, stated a workshop can help focus on the large yet simple ideas and insights as to what is unambiguously the case in terms of IAQ at this time. Many resources are applied to ambient air and yet people spend 90% of their time indoors. Citizens should be educated to improve and maintain residential good air quality. Purported indoor "air purifiers" release ozone into the home. Some residents are not careful on the storage of various chemicals. There is a link for the District here, in terms of exposure to harmful indoor air contaminants. It should be noted that the District is the most influential Bay Area agency when it comes to air quality issues.

Ms. Blake expressed interest in hearing from CARB on the matter of the indoor air purifiers that emit ozone, especially since CARB strongly advocates reduction in ambient ozone concentrations. She inquired if there are similar substances that have the similar indoor/outdoor dynamic that might be dealt with. She suggested that the Council consider whether the District could play a greater educational role in dynamics such as this in referencing substances in the home or office, building materials and ventilations. Mr. Colbourn replied that at the District's public meetings, offering a brochure on IAQ might be useful. Ms. Blake stated IAQ must not be overemphasized to the point that personal responsibility exceeds the need for the District to fulfill its regulatory charges.

PUBLIC HEALTH COMMITTEE MEETING OF FEBRUARY 15, 2005

Indoor Air Quality: A California Air Resources Board (CARB) Perspective. Peggy Jenkins, Manager, CARB Indoor Exposure Assessment Section Research Division, stated that CARB staff recently made a presentation on indoor air quality (IAQ) to the Board of Directors of CARB. The report noted that there are numerous sources of indoor air pollutants, including air cleaners such as ozone generators, biological contaminants such as mold, building materials and furnishings which contain formaldehyde, combustion appliances such as gas stoves, environmental tobacco smoke, soil that contains radon and water with chlorinated solvents, architectural coatings with volatile organic compounds (VOCs), consumer products, household and office equipment, and pesticides.

California adults and teenagers spend 87% of their time indoors, while young children spend a bit more time outdoors than adults. Faculty at the University of California at Berkeley have calculated that emissions from indoor sources emitted in a home or a school building have a thousand times greater likelihood of being inhaled than emissions in ambient air from industrial sources.

The health effects associated with indoor air pollution include asthma, allergies, cancer, premature death, increased heart and respiratory disease, and irritants and other effects. A report in the year 2000 on asthma and exposures confirmed known indoor triggers of asthma, and found new triggers such as high levels of nitrous oxide and also identified possible triggers in formaldehyde and fragrances. More recent studies have also focused on VOCs as possible asthma triggers.

The CARB Indoor Exposure Assessment Section Research Division has produced a preliminary estimate on the potential cancer burden from air toxics in California annually by source: 375 deaths annually from environmental tobacco smoke, 250 from indoor toxic air contaminant, and 375 from outdoor toxic air contaminant sources such as diesel exhaust particles and other sources.

While outdoor particulate matter (PM) is associated with severe respiratory and cardiovascular health effects, a corresponding amount of research has not been conducted on the causal relationship of indoor emissions to health effects. Nevertheless, the general perspective is that indoor sources do contribute to respiratory and cardiovascular health effects. Indoor sources of air pollution contain carbon monoxide which is capable of producing death- and flu-like symptoms.
Indoor sources of air pollution also emit nitrous oxide and ozone which can cause lung damage and respiratory disease. Communicable diseases are also transmitted indoors, and other health effects include irritant effects and sick building syndrome.

Excluding PM, the costs of indoor air pollution in California are estimated at $45 billion annually, with $36 billion in premature deaths; $8.5 billion in lost worker productivity; and $0.6 billion in other medical costs.

Principle categories of IAQ improvement include source control, ventilation, proper building operation and maintenance, professional training, public education and air cleaning devices. The status quo on IAQ regulations and guidelines features regulations and guidelines spread out among a number of agencies. Workplace standards are regulated by the California Occupational Safety and Health Administration which has adopted some regulations on ventilation. The California Energy Commission has also adopted some ventilation requirements, particularly with regard to the amount of outdoor air applied to a building. In 1995, AB 13 was adopted which established the state's smoke-free workplace requirement. The federal Consumer Products Safety Commission regulates consumer products, although its greatest concern is safety and safe product operation. When it concerns air quality, a labeling requirement comes into play. CARB also regulates consumer products to some extent, as do air districts, when it comes to products that have an impact on outdoor air quality. There are also some indoor air quality benefits associated with this type of regulation. However, no single agency is designated to oversee indoor air quality. There are voluntary guidelines from government agencies, industry and professional groups, with some success. The American Society of Heating, Refrigerating and Air-Conditioning Engineers has developed standards for ventilation; the Carpet and Rug Institute has also developed some product guidelines with the encouragement of the Environmental Protection Agency.

In its report to the Legislature, CARB set forth a prioritization of indoor air pollution by source categories rather than by specific pollutants. Air cleaners—particularly the ones that generate ozone, biological contaminants, building materials and furnishings, combustion appliances, such as gas stoves that are not vented, environmental tobacco smoke, and radon (which has a high cancer risk and inextricably interwoven with sources of tobacco smoke) constitute the major sources. Less than 1% of homes in California exceed any applicable standards for radon concentrations.

The medium priority indoor air pollutant source categories requiring mitigation are architectural coatings, consumer products and personal care products, household and office equipment and appliances, and pesticides. Many of these are already under some level of regulation and their emissions are comparatively lower than those in the high source priority ranking.

With regard to indoor air pollution mitigation, CARB has suggested that such measures include the creation of an indoor air quality management system, establishment of emission limits, requiring emissions testing of products as requisites for equipment procurement, making children's health a top priority, development of clearer indoor air quality guidelines, amendment of building codes, funding public outreach and education programs, conducting more research especially on indoor effects of particulate matter and turpines that add fragrance to consumer products, and funding of innovative technologies for indoor air quality management. CARB's clean air technology program for ambient air has been successful in helping companies with new products and ideas by bringing them into commercialization and can be geared to indoor applications as well.

Mitigation measures for indoor air pollution in schools include urging the implementation of all 16 recommendations from the California Portable Classrooms Study. The District might consider partnering with schools on IAQ with a focus on integrating indoor with outdoor air issues as well as augmenting the Tools for Schools program and improving staff training for it. The promotion of "best practices" for design, construction and maintenance for schools could benefit from District input as well. CARB may approach the District for training programs on indoor air quality in its development of training on indoor air.

In assessing the proven benefits of improving IAQ, CARB has reviewed some case studies, including a healthy home program in Seattle with an asthma intervention program that provided informational materials to low income groups. The program significantly reduced asthma medical costs over a four-year period, lowered inhaler use in elementary schools by 50% and improved attendance by 5%.

CARB's recent IAQ report was approved by the Board of Directors of CARB last month, and should be forwarded to the Governor through the California Environmental Protection Agency. The State Legislature will hold a hearing on IAQ in May of this year.

With regard to "air purifiers" which are really portable ozone generators, studies show that these emit harmful levels of indoor ozone greater than the ambient standard with normal use. These have been marketed aggressively in California, often with inaccurate advertising, suggesting that these devices eliminate indoor pollutants and airborne microbes. The indoor odor mitigation attributed to these is due to the fact that ozone deadens the sense of smell. Purifiers equipped with sensors that limit ozone concentrations to 50 parts per billion cannot guarantee the longevity of such sensers. These devices counter reductions in ambient ozone levels. The Department of Health Services issued a press release in 1997 on these devices, but it had little effect. CARB has published the names of ozone generator brands to alert the public on ozone emissions.

CARB believes that ozone generators pose an unnecessary public health risk and has submitted an ozone generator mitigation plan to the Attorney General's Office, which is considering options for legal action. Additional measures in the plan include development of public and professional guidance materials, and an outreach program, as well as working with air cleaner manufacturers to develop test protocols for air cleaners and establish emission limits.

The Air District might consider becoming involved with the ozone generator issue as well as with encouraging implementation of mitigation measures for schools. Involvement with public outreach efforts on IAQ is also recommended for the District, given its existing public outreach network and familiarity with residents and institutions in the Bay Area region. The Advisory Council's own suggestion that an IAQ summit for the Bay Area region be held is excellent. CARB sponsored a Symposium on IAQ in the year 2000. The District might also consider becoming more involved with training on building filtration systems, and loaning measurement devices to schools and homes for the care of the elderly.

In reply to questions and suggestions from Committee members, Ms. Jenkins noted:

- A large bibliography of studies on IAQ is posted on the CARB website, and additional materials will be e-mailed to the Advisory Council through the Deputy Clerk.
- The District could be encouraged to issue correspondence to magazines discouraging advertisement of ozone generating air purifiers, and the Advisory Council might consider adopting such a recommendation for forwarding to the Governing Board.
- Legislation proposed three years ago would have given CARB authority to regulate IAQ but was unsuccessful. The Portable Classroom Study has recently generated two proposed bills.
- CARB staff can make a presentation on its recent IAQ report to such groups as the American Institute of Architects, Pacific Gas & Electric and other building related networks. The presentation can be tailored to focus on certain fields depending upon the audience. For example, for architectural groups there should be some focus on outdoor coatings.
- Most product labeling requirements concern emissions to outdoor air—such as ones governing volatile organic compounds—and are not specific to IAQ. CARB would like to require manufacturers to test their products and publish the data on labels: this would allow for product comparison and subject improvement in procurement selection. At present, such labeling would be purely voluntary as there is no authority to require it. Moreover, manufacturers do not want to pay for the cost of the test and if the product does not meet a given standard they would have to engage in product reformulation, which would pose an additional cost.
- Indoor ozone generators have created an entire market based on vague, and often inaccurate, science. The strength of regulatory agencies in IAQ management is that they can fund research and conduct public education. There are alternatives to ozone generators for indoor air purification: these include HEPA filters, and electrostatic precipitators and ionizers.
- CARB's Stationary Source Division is handling the issue of the two different resins for indoor and outdoor plywood particle board. The resin used in the indoor plywood emits more formaldehyde than what is used for the outdoor plywood. CARB believes that the resin used in outdoor applications would be acceptable for use in indoor applications as well.