Summer 2005

AIR CURRENTS

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

A Message from the Executive Officer

Last year was an extraordinary year for air quality in the Bay Area. With no measured exceedances of the federal one-hour or eight-hour ozone standards, and only seven state exceedances, it was the cleanest summer on record.

Although cool weather was partly responsible for this accomplishment, along with the California Air Resources Board's regulation of fuels and motor vehicles, the Air District's programs—as well as actions by individuals throughout the Bay Area—played a significant role.

As we move through 2005, we can be proud of this success. It's a foundation the Air District can build upon in the years to come, as we expand our scope to address the complicated array of air quality issues that face our region. The year 2005 will be significant for the agency, as we celebrate the 50th anniversary of our efforts to improve air quality in the region, and prepare to meet the numerous challenges ahead.

Based on the Bay Area's record over the past three years, the EPA has found that we are in attainment of the federal one-hour ozone standard. We have also been designated a marginal non-attainment area for the eight-hour standard, based on the years 2001-2003, but our record for 2002-2004 would put us in attainment of that standard as well.

So, though we find ourselves in a very good position overall, if past experience is any indication, we can't afford to be complacent. Our success at lowering ozone levels over the years opens up opportunities for the Air District to embrace new challenges as we expand our mission to better serve Bay Area residents. We will continue our core work in regulating and permitting stationary sources of air pollution, but this year we plan to get ahead of the curve and pursue several progressive, innovative programs, addressing such issues as global warming, indoor air pollution, and the governor's proposed

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Air District Rolls Out Innovative CARE Program

Black smokestacks and brown smoggy skies form the most popular conceptions of air pollution. But, while it's true that the worst pollution episodes can be quite obvious to the eye, evidence of the actual day-to-day exposure to pollution that can be most damaging to health is not always so starkly visible. For this and other reasons, it can be difficult at first glance to tell if certain communities in the Bay Area carry a greater pollution burden than their surrounding neighbors.

To address this issue, the Air District has embarked on a groundbreaking project to assess public exposure to toxic air pollution on a local level, throughout the Bay Area. The Community Air Risk Evaluation (CARE) program was launched last year to gather emissions data and to identify the Bay Area neighborhoods where people face the highest health risks from air pollution.

According to Janet Stromberg, the CARE Program Interim Manager, "This is a program that our Executive Officer, Jack

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

TOLL-FREE NUMBERS

DAILY AIR QUALITY	1-800-HELP-AIR
COMPLAINT LINE	1-800-334-ODOR
SMOKING VEHICLES	1-800-EXHAUST

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Message

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"hydrogen highway." The challenges ahead will require more flexibility and integration of the Air District's divisions, as we retain our core programs while moving forward to adopt a broader vision.

This year the agency will turn its attention even more toward the substantial public health problems posed in our local communities by particulates and toxic pollutants. The Air District's Community Air Risk Evaluation (CARE) program, for example, will involve an unprecedented effort and coordination between staff in various departments with expertise in air monitoring, modeling, and analysis. Initiated in 2004, the program is projected to last several years and has for a goal the creation of a two-square-kilometer gridded toxic emissions inventory of the entire Bay Area.

In general, the CARE program demonstrates an increased focus on the part of the Air District on particulate pollution. Recent studies have linked fine particulates to a range of health effects from cardiopulmonary disease to premature death, and PM from diesel exhaust has been estimated to account for up to 70 percent of the cancer risk from toxic air pollution throughout the Bay Area. The CARE Program will involve an extensive effort to measure and model particulates from diesel exhaust. And Senate Bill 656 requires local air districts to present a list of PM mitigation measures to the state later this summer.

This year we will explore various options—including legislation—for controlling pollution from diesel exhaust, and look to expand incentives to encourage local government agencies and their contractors to use our grant money to clean their fleets.

As a world-renowned agency, we took part this summer in two significant public events. The United Nations-sponsored World Environment Day took place in San Francisco, and we participated by hosting a luncheon on June 1 that included a staff presentation on "The Top 10 Elements of a Successful Clean Air Program." We also sponsored a symposium in late June to celebrate the Air District's 50th Anniversary, where an esteemed panel provided a look ahead at this century's air quality challenges. Former EPA Administrator Christine Todd Whitman delivered the keynote address.

The Air District has also managed the impacts of the state fiscal crisis and remains financially sound. This year we will be cautious and will continue to monitor state efforts and adjust the Air District budget accordingly.

Internally, we will work to improve efficiencies and accountability, and to enhance integration of our divisions, as we move forward with new initiatives. We will continue to improve our relationships with our traditional partners in state, regional, and local government, with industrial stakeholders, and with environmental and community groups. Our community outreach program continues to expand, and we will hold a further series of informational meetings to address problems faced in local neighborhoods.

Our engineering division currently takes only 35 working days to process permits—the shortest permit review period in the state—and maintains a no backlog status in all categories. Last year a total of 45 permit revisions were made to Title V facilities, with four original and four renewal Title V permits issued. This year we will continue to process Title V renewals and modifications, and issue the occasional original permit. In addition, at the EPA's behest, several Title V permits for refineries will be reopened.

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Air District Will Accept Applications for Carl Moyer Program Grants

The Air District is preparing to solicit applications for a new round of Carl Moyer Program grants. This program provides funding for the implementation of projects that reduce emissions from heavy-duty diesel engines. The Carl Moyer Program offers a very cost-effective means of reducing emissions of nitrogen oxides and particulate matter. The Air District administers the Carl Moyer Program in partnership with the California Air Resources Board (CARB).

Eligible project types include on-road heavy-duty engines, off-road heavy-duty equipment, marine engines, locomotives, forklifts, airport ground-support equipment, stationary agricultural irrigation pumps, and auxiliary power units that reduce engine idling. Both private fleets and public agency fleets are eligible to apply directly for Carl Moyer Program funds.

The Air District expects to award at least $2.5 million in Carl Moyer Program grants in the upcoming funding cycle.

The Air District will issue Carl Moyer Program guidelines and a call for applications in **fall 2005.** The guidelines and application forms will be available on the Air District's website at www.baaqmd.gov. Look under "Grants & Incentives" for the "Carl Moyer" link. Basic information on the Carl Moyer Program is also available on the CARB website at http://www.arb.ca.gov/msprog/moyer/moyer.htm. If you wish to be added to the Carl Moyer Program mailing list, please send an e-mail to grants@baaqmd.gov. Please state that you want to be added to the Carl Moyer Program mailing list, and provide your U.S. Postal Service mailing address.

—David Burch

Air District Updates Vehicle Buy Back Program

Last year, the Air District's Vehicle Buy Back Program was updated to increase the amount paid per vehicle traded in to $650, and to move the eligible model-year forward to 1985 and older vehicles. This is an expansion from the previous program specifications of $500 offered for 1981 and older vehicles.

Other vehicle requirements will remain the same: the vehicle must be in running order, and must have taken and passed a Smog Check if it is within 60 days of that requirement.

The Vehicle Buy Back program purchases and scraps older automobiles that lack modern emission control systems and therefore produce more air pollution than newer cars. Since its inception in 1996, the program has purchased and scrapped almost 24,000 vehicles. The emission reductions for these vehicles are more than 1,900 tons of reactive organic pollutants, about 950 tons of oxides of nitrogen, and more than 300 tons of particulate matter.

For more information about the Vehicle Buy Back Program, see the "Grants & Incentives" section of the Air District's website at www.baaqmd.gov, or call 1-888-690-2274. You may also e-mail queries to grants@baaqmd.gov.

Message

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Our compliance program is the most comprehensive in the state, and a model for the entire nation. We currently have about 75 inspectors, and will explore ways for them to expand their roles as the "face" of the Air District for industry and many Bay Area business owners. This year, we will continue to benefit from last year's enhancement to our telephone complaint line, giving Bay Area residents access to new multi-lingual translation capabilities.

This year, Air District staff are engaged in rule development for refinery flares, refinery waste water systems, marine vessel loading, pressure relief devices, and blowdown systems.

Our Technical Services Division will devote substantial resources in coming years to the CARE Program, which should also grow to be a significant part of our toxics section. We already have the most extensive air monitoring network in the nation, and in 2005 will open up new particulate monitoring sites for the CARE Program. This summer, we will also begin measuring ozone concentrations against the new state eight-hour standard.

Our grant programs will continue to provide major ongoing funding for cleanup of diesel engines, clean school buses, and accelerated vehicle retirement. The Carl Moyer program is once again funded. Our planners are also busy preparing the *2005 Ozone Strategy* for approval by our Board of Directors.

Last summer we ran the most effective *Spare the Air* campaign ever, with surveys showing a 50 percent increase in the number of Bay Area residents who reduced their polluting activities on *Spare the Air* days. And last year, for the very first time, free morning commutes were offered on BART trains on two weekdays when air quality was forecast to be over the *Spare the Air* threshold. This program has been expanded to include free morning commutes on most of the Bay Area's local transit agencies this summer.

Finally, I foresee a role for our talented staff as we expand the Air District's vision to encompass a handful of far-reaching new initiatives. We are a first-class organization, and we're in a clear position to step out on issues like climate change and indoor air pollution. It makes sense for us to play a leadership role in addressing global warming, as rising temperatures in California could erode our gains in air quality. We will explore several strategies for dealing with climate change, including model ordinances, local resolutions, conservation studies, and energy efficiency projects.

A recent report released by the California Air Resources Board indicates that the toxic risk to California residents from indoor air pollution is equivalent to that posed by diesel exhaust. We will look at several approaches to this problem, such as working with county health offices to seek "home assessment" and "tools for schools" type projects to promote less-toxic building materials, furnishings, and equipment.

I have been with the Air District for almost two years, and I just want to say it has been an honor to serve as this agency's Executive Officer. I believe it's a once in a lifetime opportunity to work with such an exemplary organization. But the task of improving air quality in the Bay Area will involve more than just the Air District's institutional activities. We can't do this alone: contributions from businesses and individuals will also be required as we work together to create a healthier future.

Last year was exceptionally clean for the Bay Area, and this year looks to be equally momentous for the Air District, as we commemorate our distinguished past and even more importantly look ahead to future opportunities. As the Air District celebrates its 50th anniversary, it's important to remember that we're still at the dawn of a new century in air pollution control, and as our knowledge and vision continue to grow, so do the challenges we will face as we strive to improve air quality and protect public health in the Bay Area.

—Jack Broadbent

CARE Program

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Broadbent, initiated to gather and analyze new scientific information about the sources of toxic air contaminants and put additional resources in place to reduce health risks in areas where people are most impacted."

The CARE program includes both air monitoring and emission calculation components. The Air District has an extensive air monitoring network, comprising over 30 air monitoring stations that record pollution concentrations in the ambient air. These monitoring stations provide air quality information about various pollutants at specific locations.

In the CARE Program, we will also rely on calculated emissions from permitted facilities, estimates of emissions from known pollution-causing activities, and estimates of on-road motor vehicle emissions. Emission-generating activities to be studied in the CARE project accordingly fall into three main categories:

Point sources consist of emission-generating equipment at fixed locations, including industrial facilities that range from dry cleaners to power plants and refineries. These sources are generally included in the Air District's permit programs. The Air District has annual criteria and toxic pollutant emission figures for over 20,000 point sources at specific addresses throughout the Bay Area.

Toxic emissions from new and modified point sources are evaluated for health risk to gauge the potential impact of permitted activities on a hypothetical individual in a highest-exposure location. But these health risk evaluations do not measure the cumulative impacts from those sources and others on the broader local population. Assessing the cumulative impacts is one of the major objectives of the CARE Program.

Measuring Diesel Particulates — A Key CARE Program Challenge

One of the major challenges of the CARE Program is to determine the contribution of diesel particulate matter (PM) to ambient PM. Diesel particulates were added several years ago to the state of California's registry of Toxic Air Contaminants, and are estimated to contribute as much as 70 percent of the overall cancer risk from toxic air pollution in the Bay Area. As such, their analysis will be a cornerstone of the CARE Program's efforts to gauge the local effects of toxic pollution in the region.

However, unlike single-compound pollutants, fine particulates are microscopic pieces of solid or liquid matter that can be made up of several different substances, which are emitted in different quantities depending on their source of origin. Exhaust from diesel engines produces a myriad of particle types, many of which undergo further chemical reactions as they interact with gases in the lower atmosphere.

For these reasons, there is as yet no scientifically accepted method of directly measuring diesel PM in ambient air. "There isn't a fingerprint as of yet that will give us the characteristics of diesel particulates," says Eric Stevenson, the Air District's Air Monitoring Manager. "Elemental carbon appears to be an indicator of diesel particulate concentration, but this is a qualitative rather than quantitative determination. A lot of work is being done to identify this fingerprint."

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Area sources are emission-generating activities that generally fall outside the Air District's permitting jurisdiction. These sources include activities such as lawn mowing, agricultural spraying, wood-burning, and the use of consumer products containing VOCs.

The California Air Resources Board (CARB) has created 70 "surrogate" categories to represent area source emission activities, based on census and land-use data. Until now, the Air District has only identified the amount of *criteria* air pollutants emitted by area sources. The amount of toxic air contaminants emitted by these activities will be identified as part of the CARE Program.

On-road motor vehicle source emissions will be identified using the Direct Travel Impact Model developed by Caltrans. This model produces gridded hourly on-road motor vehicle emission-estimates, using emission factors from CARB and detailed transportation data—including vehicle miles traveled and traffic speeds—supplied by local planning agencies such as the Metropolitan Transportation Commission (MTC). Other information required to run this model includes gridded hourly temperature and humidity figures and Bay Area fleet compositions (i.e., the number of passenger cars, light and heavy-duty trucks, buses, motorcycles, etc.) Again, the existing work on motor vehicle emissions has been for criteria pollutants. As with area source emissions, the amount of toxics emitted from on-road mobile sources will be determined and incorporated into the overall emission estimates.

Based solely on emissions of three pollutants—benzene, 1,3 butadiene, and diesel exhaust particulates—motor

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Jean Roggenkamp Named DAPCO

In November 2004, Executive Officer Jack P. Broadbent appointed then-Director of Planning & Research Jean Roggenkamp to a new position of Deputy Air Pollution Control Officer (DAPCO) for the Air District.

Roggenkamp will oversee the Public Information and Outreach, Planning, Technical Services, and legislative functions of the Air District. DAPCO Peter Hess will continue to oversee the enforcement and engineering activities.

Roggenkamp holds Masters Degrees from the University of California at Berkeley in City and Regional Planning and in Environmental Planning. Before attending graduate school, she had been an environmental consultant in land use planning.

"I had done work as a consultant on various projects, including developing a national forest multi-use plan and designing a permitting system for oil drilling in Alaska. Through my graduate studies, I realized I wanted to solve environmental problems on a regional level," says Roggenkamp. Her professors influenced her decision to pursue a career in public service, and she joined the Air District staff in 1985.

Roggenkamp sees clear connections between the challenging issues that face the Air District, and her goals as DAPCO.

"We have made a lot of progress in 50 years," says Roggenkamp, referring to the Air District's establishment in 1955. "We have attained most national and state air quality standards, but we need to continue to make progress toward clean air. One key public health issue is exposure levels—the number of people who are exposed to air pollutants, at what levels, and how it affects their health.

"For example, our new CARE (Community Air Risk Evaluation) program will help to determine health risk associated with toxic air pollutants in the Bay Area. This is a key program for the Air District to use its collective expertise. It is exactly what we need to be doing," she says.

Grant programs to clean up diesel emissions are another part of the approach to this issue. Because diesel engines have such a long service life, incentives can help to clean up the current fleet.

"We also can start thinking about things more globally," says Roggenkamp. "The California Air Resources Board now has a greenhouse gas regulation for light duty vehicles. It's time for the Air District to focus on greenhouse gases as well," she adds.

"When I came to this agency, I wasn't sure what to expect. What I found is a team of talented and dedicated staff. Over the past 20 years, they have reaffirmed my choice of public service every day. I'm really proud to be here, and I am honored to have been given a leadership role and the opportunity to help shape the agency for the future," she says.

—Emily Hopkins

CARE Program

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vehicles have been estimated to account for 90 percent of the cancer risk from toxic air pollution throughout the Bay Area, with diesel exhaust possibly making up almost three-quarters of that total risk. Unlike benzene and 1,3 butadiene, however, which exist as individual compounds, diesel particulates contain a variety of substances and cannot be directly measured in the air. For that reason, refining the analysis of monitoring results so that Air District staff can isolate diesel particulates is one of the objectives of the CARE program (see the related article on page 4). This will involve some expansion of our monitoring network, as well as re-analysis of older particulate samples.

An initial CARE Program goal is to present a comprehensive picture of the distribution of toxic air pollution throughout the region. To do this, toxic air contaminant emissions from point sources, area sources and on-road motor vehicle sources will be displayed on maps created with geographic information system (GIS) technology. The maps will show the average annual toxic emissions, weighted for potency, on a two square-kilometer grid laid over the entire Bay Area.

Once the emission density maps are compiled for the entire Bay Area, the Air District will use these to identify more highly impacted neighborhoods and analyze measures for reducing toxic risk. These measures may involve revision of Air District regulations, the distribution of grants and incentives, and possibly an effort to expand the Air District's legislative authority to regulate heavy-duty diesel fleets.

Public input is a key component of the CARE program. Seven community meetings were held in September and

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CARE Program

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October of 2004 to offer information about the program, and updates will continue to be provided in the form of public meetings and postings on the Air District's website at www.baaqmd.gov.

In addition, a CARE Program Task Force has been assembled, composed of scientists, doctors, public health professionals, and community and industry representatives to provide input into the program as it progresses. The Task Force currently comprises 14 members, and it has already met several times this year.

The CARE Program will involve extensive and unprecedented collaboration among Air District staff with various fields of expertise: in toxics evaluation, air monitoring, laboratory analysis, emissions inventory, air modeling, statistics, and public information.

This program represents a new approach on the part of the Air District, which has traditionally focused on region-wide pollution problems. It's an attempt to measure the impacts of pollution on a more local level, and provide more locally specific solutions.

Overall, the effect of the CARE program over its two-to-three year duration should be to illuminate the extent of air pollution's public health impact on our local neighborhoods, bringing increasing clarity and assistance to those Bay Area communities most adversely affected by toxic air pollution.

—Aaron Richardson

Diesel

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In the CARE Program, the Air District's approach to the problem of measuring particulates that come from diesel exhaust rather than other sources, is to study the proportions of elemental carbon, or EC, and organic carbon, or OC, in each PM sample.

Elemental carbon refers to compounds that consist solely of carbon atoms bonding with each other, in different configurations. Organic carbon refers to compounds that consist of carbon bonded with other atoms, in particular hydrogen. Both are produced by diesel engines, and can be isolated by a carbon analyzer, which essentially burns off the OC compounds first at various lower temperatures, and then the EC compounds, which are more stable.

"Researchers are looking for a unique marker that will identify diesel PM," says Stevenson, "but they haven't found that marker or a unique chemical signature yet."

One problem is that the kinds of long-chain hydrocarbons in the OC produced by diesel engines can be chemically reactive and undergo further chemical reactions as they travel in time away from the source. This means that the diesel-produced OC sampled near a roadway might have an entirely different physical make-up than that sampled farther away from the same traffic source.

At this point, largely due to its greater stability, EC appears to be a better indicator of diesel particulate concentrations. Various estimates as to the total fraction of diesel in a typical EC sample already exist. And Carbon-14 analysis of particulate air samples offers a promising avenue for further refinement of these estimates.

Carbon-14 (C-14) is a radioactive isotope of carbon that is continously produced in the atmosphere by cosmic radiation, and also decays at a fixed rate. Living things have a fixed fraction of C-14 atoms among their carbon atoms, because of a continuous exchange of CO2 with the atmosphere. Fossil fuels, however, are derived from organic matter that ceased to be alive so long ago that almost all of the C-14 originally present has decayed.

The results of the C-14 analysis indicate the fraction of "modern" carbon, and by difference, the fraction of "fossil-fuel" carbon. Modern carbon comes primarily from cooking, wood burning, and open burning, among other things, while fossil-fuel carbon in air samples is largely generated by combustion sources burning fossil fuels, such as gasoline diesel, and natural gas.

C-14 analysis is extremely expensive, and must be performed selectively. Under the CARE Program, the Air District plans to re-analyze old PM_{10} filters, and possibly expand PM monitoring in a couple of locations.

However, in performing a C-14 analysis of PM samples and estimating particulate contributions from various sources, staff must weigh a perplexing number of additional variables, such as the fact that heavy-duty diesel vehicle activity is higher on weekdays than weekends, and the fact that wood burning activity is higher in the winter, and highest on weekends and holidays. The problems to be solved in isolating the diesel exhaust particulates remain quite challenging.

"In the CARE Program," says Stevenson. "The problems to be solved are hugely complex and will take some time. The most important thing is, we want to build a really solid foundation so that our decision-making in the future is sound."

—Aaron Richardson

Air District Participates in UN World Environment Day

On Wednesday, June 1, in conjunction with the weeklong, United Nations-sponsored World Environment Day celebration, the Air District hosted a luncheon event at St. Mary's Cathedral Conference Center in San Francisco. San Francisco is the first U.S. city to host the event since its inception in 1972.

Those who attended included international mayors and delegates to World Environment Day, mayors from the Bay Area, and the Air District's Board of Directors. This year the focus was on the urban environment.

On display at the Air District's World Environment Day event were two Daimler-Chrysler hydrogen fuel cell cars the District is using as part of the U.S. Department of Energy's Hydrogen Learning Demonstration Project. A total of thirty such cars are involved in this project, designed to gather data on their performance.

The central event was a series of presentations by Air District staff on the *Top 10 Elements of a Successful Clean Air Program*, covering the following topics:

· Legal Aspects of Regulation
· Regulating Open Burning
· Monitoring Air Quality
· Permit, Enforcement & Vapor Recovery Programs
· Developing Rules & Regulations
· Funding for Air Pollution Programs: Grants
· Educating the Public: Voluntary Programs
· Controlling Automobile Emissions and Clean Fuels
· Planning for Smart Growth
· Involving Communities

Opening remarks were offered by the Air District's Executive Officer / Air Pollution Control Officer Jack Broadbent. Marland Townsend, Chairperson of the Air District's Board of Directors, was the keynote speaker.

Displays outside the conference center included the Air District's new Daimler-Chrysler hydrogen fuel cell vehicles, an electric vehicle, and a Toyota Prius hybrid. The mobile source test van and a mobile air monitoring station were also on display, with Air District staff available to take questions from the public and media.

A Santa Clara Valley Transportation Authority (VTA) zero emission bus provided courtesy shuttle service to the Air District event from Civic Center Plaza. During lunch, the new Air District informational video was screened, "Sparing the Air for a Healthier Future."

World Environment Day is sponsored by the United Nations Environment Programme and is celebrated each year in early June in a different city. It is one of the principal vehicles through which the United Nations stimulates worldwide awareness of the environment and enhances political attention and action. The theme for the 2005 event was *Green Cities*, and mayors from around the world met to create a plan for a sustainable urban future outlined in the San Francisco Urban Environmental Accords.

UN World Environment Day 2005

Prior to these events, on May 18, the Air District's Board of Directors passed a "Resolution Supporting World Environment Day, June 1–5th, 2005, and the San Francisco Urban Environmental Accords." This resolution urges the mayors of Bay Area cities to sign the San Francisco Urban Accords, which would commit them to implementing a series of environmentally responsible actions by the year 2012.

These actions are divided into groups of three, under the following seven categories—energy, waste reduction, urban design, urban nature, transportation, environmental health, and water—for a total of 21. The goal is for cities to adopt three a year. For a full list, see the World Environment Day website at www.wed2005.org.

The Air District's Board resolution further urges cities to select actions that benefit air quality, and to develop and implement all feasible measures as expeditiously as practicable in order to clean the air and protect public health.

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SPARE the AIR

FREE TRANSIT on SPARE THE AIR DAYS

this SUMMER

To encourage Bay Area residents to "Spare the Air," rides on 21 Bay Area transit partners will be free during the morning commute (4 am to 9 am) on the **first five non-holiday weekdays** the Air District declares a "Spare the Air" day from June 1 through October 14, 2005. Riders must enter the system betweem 4:00 and 9:00 am. Learn more about the "Free Morning Commute" promotion at www.511.org.

New Air District PUBLICATIONS

The Air District has recently published two in-depth, full-color reports. Our *2004 Annual Report* provides information about the Air District's efforts on behalf of clean air, with an overview of last year's challenges and achievements and a look to the future. *The Clean Air Journey* celebrates the Air District's 50th anniversary year by outlining the Air District's vision for the future of air quality in the Bay Area.

To order free copies of these publications, call the Public Information Office at (415) 749-4900. The *2004 Annual Report* is also available for downloading in Adobe Acrobat pdf format at www.baaqmd.gov/pio/publications.htm.